

Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina

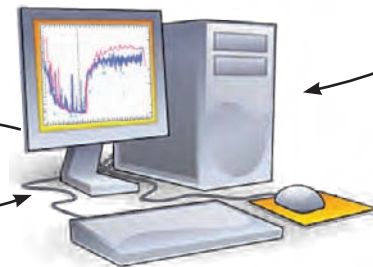
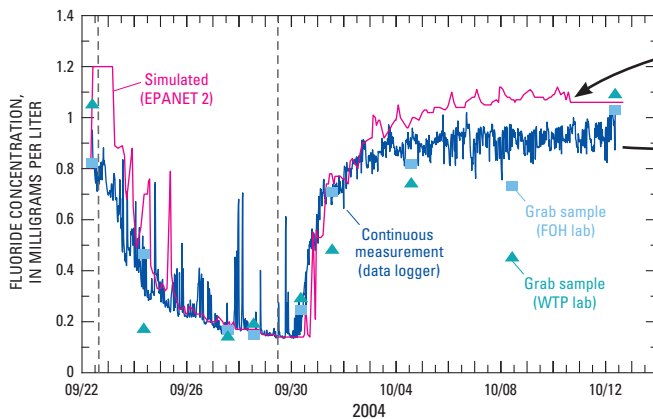
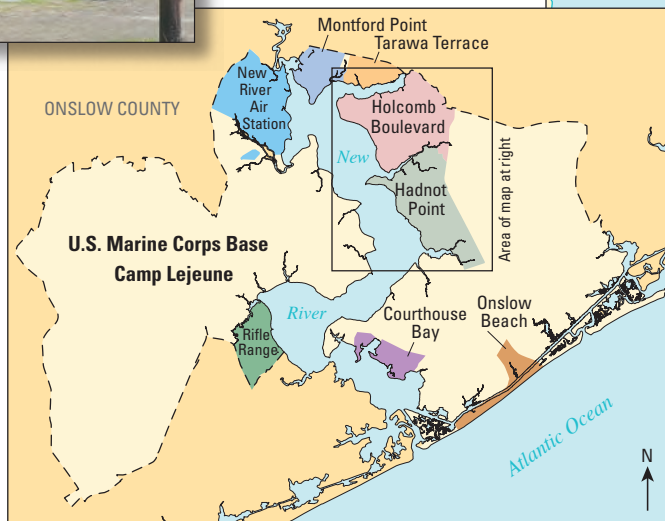
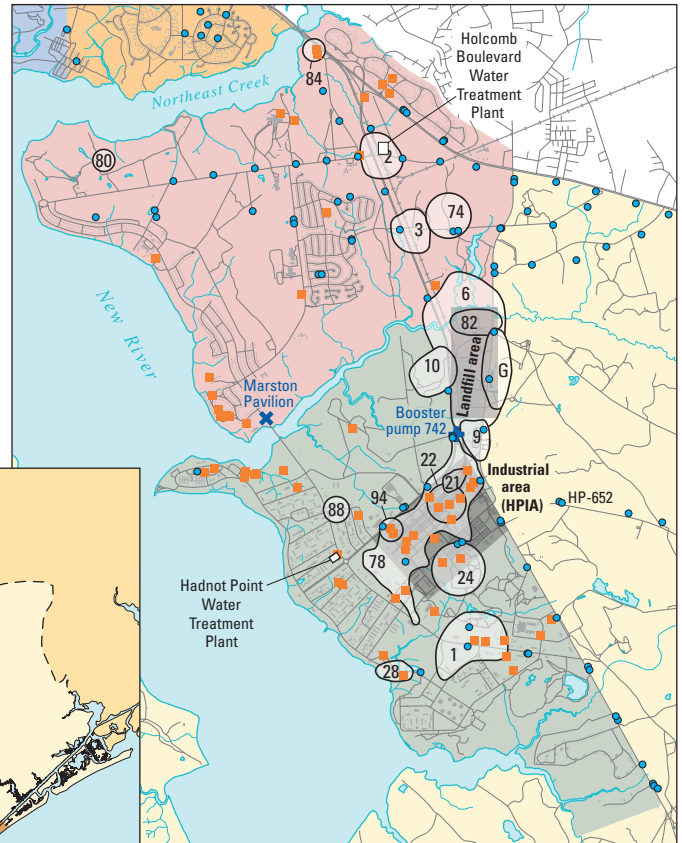
Chapter C: Occurrence of Selected Contaminants in Groundwater at Installation Restoration Program Sites



Hadnot Point water treatment plant (Building 20)



HP-652 well house



Atlanta, Georgia – October 2010

Front cover: Historical reconstruction process using data, information sources, and water-modeling techniques to estimate historical contaminant concentrations.

Maps: U.S. Marine Corps Base Camp Lejeune, North Carolina; Holcomb Boulevard and Hadnot Point areas showing extent of sampling at installation restoration program sites (white numbered areas), above-ground and underground storage tank sites (orange squares), and water-supply wells (blue circles).

Photograph (upper): Hadnot Point water treatment plant (Building 20).

Photograph (lower): Well house building for water-supply well HP-652.

Graph: Measured fluoride data and simulation results for Paradise Point elevated storage tank (S-2323) for tracer test of the Holcomb Boulevard water-distribution system, September 22–October 12, 2004; simulation results obtained using EPANET 2 water-distribution system model assuming last-in first-out plug flow (LIFO) storage tank mixing model. [WTP lab, water treatment plant water-quality laboratory; FOH lab, Federal Occupational Health Laboratory]

**Analyses and Historical Reconstruction of Groundwater Flow,
Contaminant Fate and Transport, and Distribution of Drinking Water
Within the Service Areas of the Hadnot Point and
Holcomb Boulevard Water Treatment Plants and Vicinities,
U.S. Marine Corps Base Camp Lejeune, North Carolina**

**Chapter C: Occurrence of Selected Contaminants in
Groundwater at Installation Restoration Program Sites**

By Robert E. Faye, Barbara A. Anderson, René J. Suárez-Soto, and Jason B. Sautner

Agency for Toxic Substances and Disease Registry
U.S. Department of Health and Human Services
Atlanta, Georgia

October 2010



Authors

Robert E. Faye, MSCE, PE

Civil Engineer/Hydrologist

Robert E. Faye and Associates, Inc.
Consultant to Eastern Research Group, Inc.
Lexington, Massachusetts

Barbara A. Anderson, MSEnvE, PE

Environmental Health Scientist

Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry
Atlanta, Georgia

René J. Suárez-Soto, MSEnvE, EIT

Environmental Health Scientist

Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry
Atlanta, Georgia

Jason B. Sautner, MSCE, EIT

Environmental Health Scientist

Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry
Atlanta, Georgia

For additional information write to:

Project Officer
Exposure-Dose Reconstruction Project
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry
4770 Buford Highway, Mail Stop F-59
Atlanta, Georgia 30341-3717

Suggested citation:

Faye RE, Anderson BA, Suárez-Soto RJ, and Sautner JB. Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina—Chapter C: Occurrence of Selected Contaminants in Groundwater at Installation Restoration Program Sites. Atlanta, GA: Agency for Toxic Substances and Disease Registry; 2010.

Foreword

The Agency for Toxic Substances and Disease Registry (ATSDR), an agency of the U.S. Department of Health and Human Services, is conducting an epidemiological study to evaluate whether in utero and infant (up to 1 year of age) exposures to volatile organic compounds (such as trichloroethylene, tetrachloroethylene, and benzene) in drinking water at U.S. Marine Corps Base Camp Lejeune, North Carolina, were associated with specific birth defects and childhood cancers. The study includes births occurring during the period 1968–1985 to women who were pregnant while they resided in family housing at the base. During 2004, the study protocol received approval from the Centers for Disease Control and Prevention Institutional Review Board and the U.S. Office of Management and Budget.

Historical exposure data needed for the epidemiological case-control study are limited. To obtain estimates of historical exposure, ATSDR is using water-modeling techniques and the process of historical reconstruction. These methods are used to quantify concentrations of particular contaminants in finished water and to compute the level and duration of human exposure to contaminated drinking water.

Eight water-distribution systems have supplied or currently (2010) are supplying drinking water to family housing and other facilities at U.S. Marine Corps Base Camp Lejeune, North Carolina. The three distribution systems of interest to this study—Tarawa Terrace, Hadnot Point, and Holcomb Boulevard—have historically supplied drinking water to the majority of family housing units at the Base. During 2007–2009, ATSDR published historical reconstruction results for Tarawa Terrace and vicinity. Results for Hadnot Point, Holcomb Boulevard, and vicinity—based on information gathering, data interpretations, and water-modeling analyses—are now presented as another series of ATSDR reports supporting the current health study. These reports provide comprehensive descriptions of information, data analyses and interpretations, and modeling results used to reconstruct historical contaminant levels in drinking water within the service areas of the Hadnot Point and Holcomb Boulevard water treatment plants and vicinities. Each topical subject within the historical reconstruction process is assigned a chapter letter. Specific topics for each chapter report are listed below:

- **Chapter A:** Summary of Findings
- **Chapter B:** Geohydrologic Framework of the Brewster Boulevard and Castle Hayne Aquifer Systems and the Tarawa Terrace Aquifer and Confining Unit
- **Chapter C:** Occurrence of Selected Contaminants in Groundwater at Installation Restoration Program Sites
- **Chapter D:** Occurrence of Selected Contaminants in Groundwater at Above-Ground and Underground Storage Tank (AST/UST) Sites
- **Chapter E:** Physical, Chemical, and Fate Properties of Selected Contaminants in Soil and Groundwater and Computations of Contaminant Mass in Soil and Groundwater
- **Chapter F:** Descriptions and Characterizations of Water-Supply Well Capacities, Histories, and Drinking Water
- **Chapter G:** Descriptions and Characterizations of Water-Level Data and Groundwater Flow for the Brewster Boulevard and Castle Hayne Aquifer Systems and the Tarawa Terrace Aquifer and Confining Unit
- **Chapter H:** Development and Application of a Methodology to Characterize Present-Day and Historical Water-Supply Well Operations within the Hadnot Point and Holcomb Boulevard Service Areas

- **Chapter I:** Theory, Development, and Application of Linear Control Model Methodology to Reconstruct Historical Contaminant Concentrations at Selected Water-Supply Wells Within the Hadnot Point and Holcomb Boulevard Service Areas
- **Chapter J:** Simulation of Three-Dimensional Groundwater Flow
- **Chapter K:** Simulation of Three-Dimensional Groundwater Flow and Contaminant Fate and Transport in the Vicinity of the Hadnot Point Industrial Area
- **Chapter L:** Simulation of the Migration of Light Nonaqueous Phase Liquids (LNAPL) in the Vicinity of the Hadnot Point Industrial Area
- **Chapter M:** Simulation of Three-Dimensional Groundwater Flow and Contaminant Fate and Transport in the Vicinity of the Hadnot Point Landfill Area
- **Chapter N:** Simulation of Three-Dimensional Groundwater Flow and Contaminant Fate and Transport in the Vicinity of Holcomb Boulevard Water-Supply Well HP-645
- **Chapter O:** Simulation of Three-Dimensional Multispecies and Multiphase Contaminant Fate and Transport in the Vicinity of Hadnot Point Industrial Area, Hadnot Point Landfill, and Holcomb Boulevard Water-Supply Well HP-645
- **Chapter P:** Field Tests, Data Analyses, and Simulation of the Distribution of Drinking Water with Emphasis on Intermittent Transfers of Drinking Water Between the Hadnot Point and Holcomb Boulevard Water-Distribution Systems
- **Chapter Q:** Supplemental Information

An electronic version of this report, *Chapter C: Occurrence of Selected Contaminants in Groundwater at Installation Restoration Program Sites*, will be made available on the ATSDR Camp Lejeune Web site at <http://www.atsdr.cdc.gov/sites/lejeune/index.html>. Readers interested solely in a summary of this report or any of the other reports can refer to *Chapter A: Summary of Findings*, which also will be available on the ATSDR Web site.

Contents

Authors	ii
Foreword	iii
Glossary and Abbreviations	xiv
Abstract	C1
Background and Environmental History	C2
Housing Areas	C2
Water Treatment Plants	C3
Chronology of Supply-Well Construction and Activity	C3
Contaminants of Concern	C4
Contaminant Source Areas	C4
Contaminants in Supply Wells	C5
Contaminants in Water Treatment Plants	C7
Placement on National Priorities List	C8
Methods and Scope of Study	C8
Geohydrologic Framework	C9
Installation Restoration Program Site Investigations and Histories	C10
Installation Restoration Site 1—French Creek Liquids Disposal Area	C10
Installation Restoration Site 2—Former Nursery Day-Care Center (Building 712).....	C12
Installation Restoration Site 3—Old Creosote Site (Also Known as the Sawmill Site).....	C15
Installation Restoration Site 6—Storage/Disposal Lots 201 and 203	C18
Installation Restoration Site 9—Fire Fighting Training Pit	C22
Installation Restoration Site 10—Original Base Landfill	C23
Installation Restoration Site 21—Transformer Storage Lot 140.....	C25
Installation Restoration Site 22—Industrial Area Tank Farm	C26
Installation Restoration Site 24—Industrial Area Fly Ash Dump	C28
Installation Restoration Site 28—Industrial Area Burn Dump	C30
Installation Restoration Site 30—Sneads Ferry Road Fuel Tank Sludge Disposal Area.....	C32
Installation Restoration Site 74—Mess Hall Grease Pit Area.....	C34
Installation Restoration Site 78—Hadnot Point Industrial Area	C36
Installation Restoration Site 80—Paradise Point Golf Maintenance Area	C44
Installation Restoration Site 82—VOC Disposal Area at Piney Green Road	C46
Installation Restoration Site 84/Building 45 Area—(Tank S781; Leaking Underground Storage Tank—USTs S941-1 and S941-2)	C52
Installation Restoration Site 88—Building 25	C56
Installation Restoration Site 94/Building 1613 Area Leaking Underground Storage Tank—USTs 1613-1–1613-4.....	C61
Site G—Proposed Camp Lejeune Landfill	C62
Discussion	C63
Summary and Findings.....	C64
Acknowledgments	C68
References	C68
Compact disc—read-only memory (CD-ROM).....	Inside back cover
Contains files for this report and Plate 1	

Figures

Plate 1	Map showing location of wells and boreholes, Installation Restoration Program site areas, above-ground and underground storage tank sites, and water-distribution systems (2004), Hadnot Point, Holcomb Boulevard, and Tarawa Terrace and vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	Inside back cover
C1–C17.	Maps showing—	
C1.	Installation Restoration Program site locations within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C6
C2.	Monitor well locations at Installation Restoration Site 1—French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C11
C3.	Monitor well locations at Installation Restoration Site 2—former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C13
C4.	Monitor well locations at Installation Restoration Site 3—old creosote site, U.S. Marine Corps Base Camp Lejeune, North Carolina	C16
C5.	Monitor well locations at Installation Restoration Sites 6 and 82—storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C19
C6.	Monitor well locations at Installation Restoration Site 9—fire fighting training pit, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C22
C7.	Monitor well locations at Installation Restoration Site 10—original base landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina	C24
C8.	Monitor well locations at Installation Restoration Site 21—transformer storage lot 140, U.S. Marine Corps Base Camp Lejeune, North Carolina	C25
C9.	Monitor well locations at Installation Restoration Site 22—Industrial Area tank farm, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C27
C10.	Monitor well locations at Installation Restoration Site 24—Industrial Area fly ash dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C29
C11.	Monitor well locations at Installation Restoration Site 28—Industrial Area burn dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C31
C12.	Monitor well locations at Installation Restoration Site 30—Sneads Ferry Road fuel tank sludge disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina	C33
C13.	Monitor well locations at Installation Restoration Site 74—mess hall grease pit disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C34
C14.	Site boundaries and monitor well locations at Installation Restoration Site 78—Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C37
C15.	Extraction and monitor well locations at Installation Restoration Site 78—Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C40
C16.	Chlorinated solvent concentrations during 1996 at Installation Restoration Site 78—Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina	C41
C17.	Locations of section lines <i>A–A'</i> , <i>B–B'</i> , and <i>C–C'</i> at the north contaminated area, Installation Restoration Site 78—Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C42
C18.	Sections <i>A–A'</i> , <i>B–B'</i> , and <i>C–C'</i> showing trichloroethylene (TCE) concentrations at depth at the north contaminated area, September 2002, Installation Restoration Site 78—Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C43
C19–C20.	Maps showing—	
C19.	Monitor well locations at Installation Restoration Site 80—Paradise Point golf maintenance area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C45
C20.	Location of section line <i>A–A'</i> at the VOC disposal area at Piney Green Road, Installation Restoration Sites 6 and 82, U.S. Marine Corps Base Camp Lejeune, North Carolina	C48
C21.	Section line <i>A–A'</i> showing total VOC concentrations at depth, July 2002, VOC disposal area at Piney Green Road, Installation Restoration Sites 6 and 82, U.S. Marine Corps Base Camp Lejeune, North Carolina	C49

C22.	Section line <i>A–A'</i> showing total VOC concentrations at depth, July 2004, VOC disposal area at Piney Green Road, Installation Restoration Sites 6 and 82, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C49
C23–C27.	Maps showing—	
C23.	Trichloroethylene (TCE) distribution within the Brewster Boulevard lower aquifer and the Tarawa Terrace aquifer, Installation Restoration Sites 6 and 82, January 2000, U.S. Marine Corps Base Camp Lejeune, North Carolina	C50
C24.	Trichloroethylene (TCE) distribution within the Upper Castle Hayne aquifer—River Bend unit, Installation Restoration Sites 6 and 82, January 2000, U.S. Marine Corps Base Camp Lejeune, North Carolina	C51
C25.	Monitor well and hydropunch locations at Installation Restoration Site 84—Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina	C52
C26.	Monitor well locations at Installation Restoration Site 88—Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina	C56
C27.	Locations of section lines <i>A–A'</i> and <i>B–B'</i> at Building 25, Installation Restoration Site 88, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C58
C28.	Section line <i>A–A'</i> showing PCE concentrations at depth, Building 25, Installation Restoration Site 88, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C59
C29.	Section line <i>B–B'</i> showing PCE concentrations at depth, Building 25, Installation Restoration Site 88, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C59
C30–C34.	Maps showing—	
C30.	Monitor well and hydropunch locations at Installation Restoration Site 94—Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C61
C31.	Monitor well and borehole locations at Site G—proposed Camp Lejeune landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C62
C32.	Groundwater sample locations for tetrachloroethylene (PCE) and ranges of PCE concentration in monitor and supply wells within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina	C65
C33.	Groundwater sample locations for trichloroethylene (TCE) and ranges of TCE concentration in monitor and supply wells within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina	C66
C34.	Groundwater sample locations for benzene and ranges of benzene concentration in monitor and supply wells within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C67

Tables (all tables are in back of report)

C1.	Chronology of Hadnot Point and Holcomb Boulevard family and bachelor housing construction and contemporary populations, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C83
C2.	Average annual rate of treated finished water delivered by the Hadnot Point Water Treatment Plant, U.S. Marine Corps Base Camp Lejeune, North Carolina	C84
C3.	Average annual rate of treated finished water delivered by the Holcomb Boulevard Water Treatment Plant, U.S. Marine Corps Base Camp Lejeune, North Carolina	C84
C4.	Construction, location, and contributing aquifer data for Hadnot Point Water Treatment Plant and Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina	C85
C5.	Installation Restoration sites within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C93

C6.	Above-ground and underground storage tank sites within the Hadnot Point–Holcomb Boulevard study area subject to remedial investigation and co-located with Installation Restoration Program sites, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C93
C7.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in Hadnot Point Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C94
C8.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in Hadnot Point water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C98
C9.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C102
C10.	Summary of analyses for benzene, toluene, ethylbenzene, and xylene in water samples collected in Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina	C104
C11.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected at the Hadnot Point Water Treatment Plant, U.S. Marine Corps Base Camp Lejeune, North Carolina	C106
C12.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected at the Hadnot Point Water Treatment Plant, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C108
C13.	Summary of analyses for trichloroethylene (TCE) and <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE) at locations within the Holcomb Boulevard Water Treatment Plant distribution network, January 29–February 7, 1985, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C110
C14.	Geohydrologic units and unit thickness within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C111
C15.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 1, French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C112
C16.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 1, French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C113
C17.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 1, French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C116
C18.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina	C119
C19.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C120
C20.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina	C125

C21.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 3, old creosote site, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C130
C22.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 3, old creosote site, U.S. Marine Corps Base Camp Lejeune, North Carolina	C131
C23.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 3, old creosite site, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C134
C24.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina	C137
C25.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C139
C26.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C150
C27.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 9, fire fighting training pit, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C160
C28.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 9, fire fighting training pit, U.S. Marine Corps Base Camp Lejeune, North Carolina	C161
C29.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 9, fire fighting training pit, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C162
C30.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 10, original base landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina	C163
C31.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 10, original base landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C164
C32.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 10, original base landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C165
C33.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 21, transformer storage lot 140, U.S. Marine Corps Base Camp Lejeune, North Carolina	C166
C34.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 21, transformer storage lot 140, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C166
C35.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 21, transformer storage lot 140, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C167
C36.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 22, Industrial Area tank farm, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C168

C37.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 22, Industrial Area tank farm, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C169
C38.	Summary of BTEX free-phase measurements in monitor wells at Installation Restoration Site 22, Industrial Area tank farm, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C170
C39.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 22, Industrial Area tank farm, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C171
C40.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 24, Industrial Area fly ash dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C172
C41.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 24, Industrial Area fly ash dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C173
C42.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 24, Industrial Area fly ash dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C174
C43.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 28, Industrial Area burn dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C175
C44.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 28, Industrial Area burn dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C176
C45.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 28, Industrial Area burn dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C177
C46.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 30, Sneads Ferry Road fuel tank sludge disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C178
C47.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 30, Sneads Ferry Road fuel tank sludge disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C178
C48.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 30, Sneads Ferry Road fuel tank sludge disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C179
C49.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 74, mess hall grease pit disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C180
C50.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 74, mess hall grease pit disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C181
C51.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 74, mess hall grease pit disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C181
C52.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C182

C53.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C188
C54.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C212
C55.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 80, Paradise Point golf maintenance area, U.S. Marine Corps Base Camp Lejeune, North Carolina	C236
C56.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 80, Paradise Point golf maintenance area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C236
C57.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 80, Paradise Point golf maintenance area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C237
C58.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina	C238
C59.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C239
C60.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina	C244
C61.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C249
C62.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C252
C63.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina	C254
C64.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected at hydropunch locations at Installation Restoration Site 84, Tank S781/Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C256
C65.	Summary of BTEX free-phase measurements in monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C256
C66.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C257
C67.	Location coordinates and land-surface altitude at soil boring locations at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C260
C68.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in soil samples collected in monitor well boreholes at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C261

C69.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 88, Building 25 area, U.S. Marine Corps Base Camp Lejeune, North Carolina	C266
C70.	Summary of tetrachloroethylene (PCE) free-phase measurements in monitor wells at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina	C269
C71.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina	C270
C72.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected at hydropunch locations at Installation Restoration Site 94, Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C272
C73.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected at hydropunch locations at Installation Restoration Site 94, Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C273
C74.	Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 94, Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C274
C75.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 94, Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C275
C76.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 94, Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina	C276
C77.	Construction, location, and contributing aquifer data for monitor wells at Site G, proposed Camp Lejeune landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina	C277
C78.	Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), <i>trans</i> -1,2-dichloroethylene (<i>trans</i> -1,2-DCE), <i>cis</i> -1,2-dichloroethylene (<i>cis</i> -1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Site G, proposed Camp Lejeune landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina.....	C278
C79.	Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Site G, proposed Camp Lejeune landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina	C279
C80.	Summary of analyses for groundwater contaminants of concern and related contaminant source characterizations and affected water-supply wells within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina	C280

Conversion Factors

Multiply	By	To obtain
Length		
inch (in.)	2.54	centimeter (cm)
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
mile, nautical (nmi)	1.852	kilometer (km)
yard (yd)	0.9144	meter (m)
Area		
acre	4,047	square meter (m ²)
acre	0.4047	hectare (ha)
acre	0.004047	square kilometer (km ²)
square foot (ft ²)	929.0	square centimeter (cm ²)
square foot (ft ²)	0.09290	square meter (m ²)
square yard (yd ²)	0.8361	square meter (m ²)
Volume		
gallon (gal)	3.785	liter (L)
gallon (gal)	0.003785	cubic meter (m ³)
million gallons (Mgal)	3,785	cubic meter (m ³)
cubic yard (yd ³)	0.7646	cubic meter (m ³)
Flow rate		
gallon per minute (gpm)	0.06309	liter per second (L/s)
gallon per day (gal/d)	0.003785	cubic meter per day (m ³ /d)
gallon per year (gal/yr)	0.003785	cubic meter per year (m ³ /yr)
million gallons per day (MGD)	0.04381	cubic meter per second (m ³ /s)
Mass		
pound per year (lb/yr)	0.45359	kilogram per year
ton, short (2,000 lb)	0.9072	megagram (Mg)
ton, long (2,240 lb)	1.016	megagram (Mg)

Concentration Conversion Factors

Unit	To convert to	Multiply by
microgram per liter (µg/L)	milligram per liter (mg/L)	0.001
microgram per liter (µg/L)	milligram per cubic meter (mg/m ³)	1
microgram per liter (µg/L)	microgram per cubic meter (µg/m ³)	1,000

Vertical coordinate information is referenced to the National Geodetic Vertical Datum of 1929 (NGVD 29).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 1983).

Altitude, as used in this report refers to distance above the vertical datum.

Glossary and Abbreviations

Definitions of terms and abbreviations used throughout this report are listed below.

— A —

AST Above-ground storage tank

ATSDR Agency for Toxic Substances and Disease Registry

— B —

B Constituent detected in blank sample.

bgs Below ground surface

biodegradation Transformation of substances into new compounds through biochemical reactions or the actions of microorganisms, such as bacteria. Typically expressed in terms of a rate constant or half-life (USEPA 2004). The new compounds are referred to as degradation by-products [for example, TCE, *trans*-1,2-DCE, and vinyl chloride (VC) are degradation by-products of tetrachloroethylene (PCE)]

BTEX Benzene, toluene, ethylbenzene, and xylene; a group of VOCs found in petroleum hydrocarbons, such as gasoline, and other common environmental contaminants

BBUAQ Brewster Boulevard upper aquifer

BBUCU Brewster Boulevard upper confining unit

BBLAQ Brewster Boulevard lower aquifer

BBLCU Brewster Boulevard lower confining unit

— C —

CERCLA The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also known as Superfund

CLW Camp Lejeune water document

CPT Cone penetration test

— D —

D Sample dilution required

DCE DCE dichloroethylene
 1,1-DCE 1,1-dichloroethylene or 1,1-dichloroethene
 1,2-DCE 1,2-dichloroethylene or 1,2-dichloroethene
cis-1,2-DCE *cis*-1,2-dichloroethylene or *cis*-1,2-dichloroethene
trans-1,2-DCE *trans*-1,2-dichloroethylene or *trans*-1,2-dichloroethene

DDT Dichlorodiphenyltrichloroethane, a synthetic pesticide; its use in the United States was banned in 1972

degradation See biodegradation

density The mass per unit volume of material, expressed in terms of kilograms per cubic meter or grams per cubic centimeter

DNAPL Dense nonaqueous phase liquids; a class of environmental contaminants that have a specific gravity greater than water (Huling and Weaver 1991). Immiscible (nonmixing) DNAPLs exist in the subsurface as a separate fluid phase in the presence of air and water. DNAPLs can vaporize into air and slowly dissolve into flowing groundwater. Examples of DNAPLs include chlorinated solvents, creosote, coal tar, and PCBs (Kueper et al. 2003)

DVD Digital video disc

— E —

E Constituent concentration exceeds calibration range of GC/MS instrument

epidemiological study A study to determine whether a relation exists between the occurrence and frequency of a disease and a specific factor such as exposure to a toxic compound found in the environment

exposure Pollutants or contaminants that come in contact with the body and present a potential health threat

— F —

fate and transport Also known as mass transport; a process that refers to how contaminants move through, and are transformed in, the environment

FFCA Federal Facilities Compliance Act of 1992

finished water Groundwater that has undergone treatment at a water treatment plant and is delivered to a person's home

FS Feasibility Study

ft Foot or feet

— G —

gal Gallon or gallons

GIS Geographic information system

gpm Gallons per minute

GPS Global positioning system

GC/MS Gas chromatograph/Mass spectrometer

— H —

historical reconstruction A diagnostic analysis used to examine historical characteristics of groundwater flow, contaminant fate and transport, water-distribution systems, and exposure

HPIA Hadnot Point Industrial Area

HPFF Hadnot Point Fuel Farm

HSWA Hazardous and Solid Waste Amendments of 1984

— I —

IAS Initial Assessment Study

IR Installation Restoration

IRP Installation Restoration Program

— J —

J Estimated concentration

— K —

kg Kilogram

— L —

LCHAQ Lower Castle Hayne aquifer

LCHCU Lower Castle Hayne confining unit

LNAPL Light nonaqueous phase liquids

— M —

MGD Million gallons per day
mg/L Milligram per liter; 1 part per million (ppm), a unit of concentration
MCHAQ Middle Castle Hayne aquifer
MCHCU Middle Castle Hayne confining unit

— N —

NA Constituent concentration not determined, or analytical result is unknown
NACIP Navy Assessment and Control of Installation Pollutants
NAD 83 North American Datum of 1983
ND Constituent not detected
NGVD 29 National Geodetic Vertical Datum of 1929
NPL National Priorities List; the USEPA's official list of uncontrolled hazardous waste sites which are to be cleaned up under the Superfund legislation

— P —

PCB Polychlorinated biphenyl
PCE Tetrachloroethene, tetrachloroethylene, 1,1,2,2-tetrachloroethylene, or perchloroethylene; also known as PERC® or PERK®
PHA Public health assessment; an evaluation conducted by ATSDR of data and information on the release of hazardous substances into the environment in order to assess any past, present, or future impact on public health
potentiometric level A level to which water will rise in a tightly cased well

— R —

R Analytical result is unreliable
RCRA Resource Conservation and Recovery Act of 1976
RI Remedial Investigation
RI/FS Remedial Investigation/Feasibility Study
ROD Record of decision

— S —

SARA Superfund Amendments and Reauthorization Act of 1981
SEAR Surfactant-enhanced aquifer remediation
SI Site Investigation
SR Highway or state route

— T —

TCE 1,1,2-trichloroethene, or 1,1,2-trichloroethylene, or trichloroethylene
TPH Total petroleum hydrocarbons
TTAQ Tarawa Terrace aquifer
TTCU Tarawa Terrace confining unit

— U —

UCHLU Upper Castle Hayne aquifer lower unit
UCHRBU Upper Castle Hayne aquifer–River Bend unit
UCHRBU&LU Upper Castle Hayne aquifer–River Bend and Lower units
USEPA U.S. Environmental Protection Agency
USGS U.S. Geological Survey
USMCB U.S. Marine Corps Base
UST Underground storage tank

— V —

variability Observed differences attributable to heterogeneity or diversity in a model parameter, an exposure parameter, or a population
VC Vinyl chloride or chloroethene
VOC Volatile organic compound; an organic chemical compound (chlorinated solvent) that has a high enough vapor pressure under normal circumstances to significantly vaporize and enter the atmosphere. VOCs are considered environmental pollutants, and some may be carcinogenic

— W —

water-distribution system A water-conveyance network consisting of hydraulic facilities, such as wells, reservoirs, storage tanks, high-service and booster pumps, and a network of pipelines for delivering drinking water
water table Also known as the phreatic surface; the surface where the water pressure is equal to atmospheric pressure
WTP Water treatment plant

—Symbols—

< Constituent concentration is less than detection limit. Number following the "<" is the detection limit.
µg/kg Microgram per kilogram; 1 part per billion (ppb); a unit of concentration used in soil sampling
µg/L Microgram per liter; 1 part per billion (ppb), a unit of concentration used in groundwater sampling

Note: The maximum contaminant level (MCL) is a legal threshold limit set by the USEPA on the amount of a hazardous substance that is allowed in drinking water under the Safe Drinking Water Act; usually expressed as a concentration in milligrams or micrograms per liter. Effective dates for MCLs are as follows: trichloroethylene (TCE) and vinyl chloride (VC), January 9, 1989; tetrachloroethylene (PCE) and *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), July 6, 1992 (40 CFR, Section 141.60, Effective Dates, July 1, 2002, ed.)

Use of trade names and commercial sources is for identification only and does not imply endorsement by the Agency for Toxic Substances and Disease Registry or the U.S. Department of Health and Human Services.

Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina

Chapter C: Occurrence of Selected Contaminants in Groundwater at Installation Restoration Program Sites

By Robert E. Faye,¹ Barbara A. Anderson,² René J. Suárez-Soto,² and Jason B. Sautner²

Abstract

Eight water-distribution systems have supplied or currently (2010) are supplying drinking water to family housing and other facilities at U.S. Marine Corps Base (USMCB) Camp Lejeune, North Carolina. The three distribution systems of interest to this study—Tarawa Terrace, Hadnot Point, and Holcomb Boulevard—have historically supplied drinking water to the majority of family housing units at the Base. Two of the three water-distribution systems were contaminated with volatile organic compounds (VOCs). Groundwater within the Tarawa Terrace water treatment plant (WTP) service area was contaminated mostly with tetrachloroethylene (PCE). Groundwater within the Hadnot Point WTP service area was contaminated mostly with trichloroethylene (TCE), as well as PCE and refined petroleum products (BTEX). Most of the groundwater within the Holcomb Boulevard WTP service area remained uncontaminated. Discovery of contaminated water supplies at USMCB Camp Lejeune initiated a series of assessments of groundwater contamination within the Hadnot Point WTP and Holcomb Boulevard WTP service areas. Assessments began in 1984, and monitoring continues to date (2010) at several locations. Ultimately, assessments of groundwater contamination were conducted at a total of 18 Installation Restoration (IR) Program sites within the Hadnot Point and Holcomb Boulevard service areas. As reported in numerous site assessment and monitoring reports, subsurface contamination by various VOCs of interest, including PCE, TCE, benzene, and vinyl chloride, was delineated through the construction and sampling of hundreds of monitor wells and the sampling and analyses of surface and subsurface soil samples and surface-water and stream sediment samples. Substantial groundwater contamination by VOCs was determined at 9 of the 18 IR sites. Concentrations of TCE were detected in groundwater at 13 of 18 IR sites, ranging from 1.2 micrograms per liter ($\mu\text{g/L}$) to 180,000 $\mu\text{g/L}$. Similarly, PCE was detected in groundwater at 8 of 18 IR sites at

concentrations ranging from less than 1.0 $\mu\text{g/L}$ to 170,000 $\mu\text{g/L}$. Concentrations of benzene in groundwater were detected at 10 of 18 IR sites at concentrations ranging from less than 1.0 $\mu\text{g/L}$ to 29,000 $\mu\text{g/L}$. Of a total of 30 water-supply wells contaminated or potentially contaminated by VOCs because of construction and proximity to contaminated IR sites, VOCs were determined in 11 wells by sampling and analyses. An additional 13 of the 30 supply wells were abandoned and destroyed prior to 1984 and could not be sampled. In the contaminated water-supply wells, detected TCE concentrations ranged from less than 1.0 $\mu\text{g/L}$ to 18,900 $\mu\text{g/L}$, and PCE concentrations ranged from 3.2 $\mu\text{g/L}$ to 400 $\mu\text{g/L}$. Corresponding concentrations of benzene ranged from 1.6 $\mu\text{g/L}$ to 720 $\mu\text{g/L}$. At several IR sites located near active supply wells, VOC contamination was determined in the subsurface at depths greater than 140 feet. Concentrations of TCE detected in finished water at the Hadnot Point WTP ranged from 1.2 $\mu\text{g/L}$ to 1,400 $\mu\text{g/L}$. Concentrations of PCE detected in finished water at the Hadnot Point WTP ranged from 15 $\mu\text{g/L}$ to 100 $\mu\text{g/L}$. Benzene contamination also was detected in Hadnot Point WTP water, although the treatment status was unknown. Benzene concentrations in water at the Hadnot Point WTP ranged from 1.0 $\mu\text{g/L}$ to 2,500 $\mu\text{g/L}$.

This report, Chapter C, is one of approximately 16 reports planned to describe and summarize groundwater data and water-modeling results necessary to estimate spatial and temporal distributions of contaminant-specific concentrations in drinking-water supplies within the Hadnot Point and Holcomb Boulevard WTP service areas. These contaminant-specific concentrations are necessary to complete ATSDR's current health study of birth defects and specific childhood cancers and to determine possible associations between adverse health effects and contaminated drinking water at USMCB Camp Lejeune. Most of the data tabulated and described in this report were obtained from USMCB Camp Lejeune IR Administrative Records and files of the U.S. Geological Survey and were extracted and summarized from thousands of documents, hundreds of individual site reports, approximately 120 site- and well-location maps, and more than 400 well-bore and geophysical logs.

¹Consultant to Eastern Research Group, Inc., Lexington, Massachusetts.

²Agency for Toxic Substances and Disease Registry, Atlanta, Georgia.

Background and Environmental History

U.S. Marine Corps Base (USMCB) Camp Lejeune is located in the Coastal Plain of North Carolina, in Onslow County, south of the City of Jacksonville and about 70 miles northeast of the City of Wilmington, North Carolina. The focus of this investigation is the areas served by the water distribution networks supplied by the Hadnot Point and Holcomb Boulevard water treatment plants (WTPs), herein called the study area. In general, the study area is bordered on the north by Northeast Creek and North Carolina Highway 24 (SR 24), to the west by New River, to the south by Frenchs Creek, and generally to the east by the drainage divides of upstream tributaries of Wallace and Frenchs Creeks (Plate 1).

The current health study of birth defects and specific childhood cancers by the Agency for Toxic Substances and Disease Registry (ATSDR) requires estimates or direct knowledge of contaminant concentrations in finished water³ delivered to family housing within the study area. When direct knowledge of contaminant concentrations in finished water is unavailable, historical reconstruction is used to provide estimates of contaminant concentrations. Characteristically, historical reconstruction includes the application of simulation tools, such as models, to re-create or represent past conditions (Rodenbeck and Maslia 1998; McLaren/Hart-ChemRisk 2000; Costas et al. 2001; Maslia et al. 2001; Reif et al. 2003; Kopecky et al. 2004). At USMCB Camp Lejeune, historical reconstruction methods include linking materials mass balance (mixing) and water-distribution system models to groundwater-flow and fate and transport models (Maslia et al. 2009). Groundwater fate and transport models are based to a large degree on groundwater-flow velocities or specific discharges simulated by a groundwater-flow model. Data necessary for the construction of a groundwater-flow model are the vertical and spatial (vertical and horizontal) distribution of aquifers and confining units and their respective hydraulic characteristics, such as hydraulic conductivity and specific storage. Construction of fate and transport models also requires knowledge of temporal, spatial, and vertical occurrences of specific contaminant constituents within water-bearing units open to water-supply and other observation wells, and physical, chemical, and fate properties of specific contaminants of concern.

This report provides a detailed accounting of the known occurrences of contaminants of concern and their related degradation products in groundwater at selected sites within the service areas of the Hadnot Point and Holcomb Boulevard WTPs, USMCB Camp Lejeune, North Carolina. Concentrations of these constituents in water-supply wells and in

³ For this study, finished drinking water is defined as groundwater that has undergone treatment at a WTP and was subsequently delivered to a family housing unit or other facility.

finished water of the Hadnot Point WTP also are described. Collectively, these data provide most of the base of information necessary to construct the fate and transport models used to simulate (reconstruct) historical concentrations of contaminants within the water-distribution systems serviced by the Hadnot Point and Holcomb Boulevard WTPs. Additionally, this report provides a detailed summary of historical information useful to ongoing and future exposure and health studies at USMCB Camp Lejeune, including a chronology of residential housing areas served by the Hadnot Point and Holcomb Boulevard WTPs, annual operational capacities of the WTPs, locations and construction details of water-supply wells and water-quality monitor wells, and a summary and discussion of relevant environmental investigations at 18 individual sites within the study area where contaminated groundwater occurred or was thought to have occurred.

Housing Areas

Family housing areas currently (2010) served by the Hadnot Point and Holcomb Boulevard WTPs are Berkeley Manor, Hospital Point, Midway Park, Paradise Point, and Watkins Village (Plate 1). In 1999, a total of 2,158 individual housing units were located in these areas (ECG, Inc. 1999). Bachelor housing in the study area is located in the vicinity of Hadnot Point between River Road/Julian C. Smith Road and McHugh Boulevard (Plate 1). The current (2010) number of bachelor housing units is not available.

Construction of family housing at USMCB Camp Lejeune began in 1942, in conjunction with other major infrastructure components at the base, such as roads, WTPs, and the water-distribution network. Midway Park and Paradise Point were the first housing units constructed, followed in 1947 by Hospital Point Housing, Berkeley Manor in 1961, and Watkins Village in 1978. Housing at Paradise Point was improved and expanded during 1947, 1948, and 1962 (Scott R. Williams, USMCB Camp Lejeune, electronic communication, September 3, 2008). A chronology of family housing unit construction and corresponding population is listed in Table C1. Family housing occupancy rate was 95 percent or greater in 1998 (ECG, Inc. 1999), and similar rates probably have prevailed at USMCB Camp Lejeune since the base was established. Thus since 1963, the population of family housing in the study area has been continuously maintained at about 4,000 to 8,000 residents, depending on the number of available housing units (Table C1). In 1999, the number of occupants of bachelor housing in the study area totaled 13,427 personnel. Of these, 13,129 personnel were served by the Hadnot Point WTP (ECG, Inc. 1999). The resident bachelor population includes permanently assigned personnel as well as a substantial number of short-term transient personnel and, as such, probably varies significantly from month to month and year to year.

Water Treatment Plants

The Hadnot Point WTP (Building 20) was constructed probably during 1941 and 1942, along with much of the original infrastructure of the Base. Original capacity of the Hadnot Point WTP was 7.3 million gallons per day (MGD) (Harned et al. 1989). By May 1986 the reported plant capacity was 5.0 MGD, followed by 5.9 MGD in 1987 (Naval Facilities Engineering Command, 1986; Harned et al. 1989). Present-day (2010) capacity is probably about 5.0 MGD. Annual rates of finished water delivered by the Hadnot Point WTP are listed in Table C2. Rates listed for years 1942, 1944, 1948, and 1953 are reported as “max. delivered to plant” or “max. amount delivered to plant” and ranged from 4.8 to 6.0 MGD [unknown author, USMCB Camp Lejeune, Raw Water Supply Data, written communication, 1969(?)]. Between 1959 and 1988, the average annual rate of finished water supplied by the Hadnot Point WTP generally ranged between 3.0 and 5.2 MGD [unknown author, U.S. Geological Survey, Raw Water Treated, Hadnot Point WTP, 1959–1988, written communication, 1989(?)]. Between 1974 and 1986, following initial construction of the Holcomb Boulevard WTP, the average annual rate of finished water supplied by the Hadnot Point WTP declined significantly and ranged between 3.0 and 3.8 MGD (Harned et al. 1989). Between 1994 and 1998, the annual finished water production from the Hadnot Point WTP averaged about 2.9 MGD (ECG, Inc. 1999). The service area of the Hadnot Point WTP currently (2009) includes the Hospital Point family housing area, billeting facilities for a large number of bachelor officers and enlisted personnel, the Hadnot Point Industrial Area (HPIA), and the Frenchs Creek area (Plate 1). The population served by the Hadnot Point WTP during March 1987 totaled 37,134 personnel (Harned et al. 1989). This number probably included permanent and transient military personnel and civilian personnel assigned to various offices and facilities throughout the Hadnot Point WTP service area.

Until the summer of 1972, all finished water distributed to bachelor and family housing units and all other facilities within the study area was supplied by the Hadnot Point WTP (Building 20). Subsequent to 1972, finished water distributed to Berkeley Manor, Midway Park, Paradise Point, and Watkins Village family housing areas was supplied by the Holcomb Boulevard WTP (Building 670) (Plate 1). Also included in the Holcomb Boulevard WTP service area are the current U.S. Naval Hospital, the Camp Lejeune high school, and the Brewster Boulevard junior high school (Plate 1).

The Holcomb Boulevard WTP began operations during the summer of 1972 with a capacity of about 2 MGD (Table C3) (Scott A. Brewer, USMCB Camp Lejeune, written communication, September 29, 2005).⁴ The treatment capacity of the plant was increased to 5 MGD probably during 1986 and 1987 (Naval Facilities Engineering Command, Atlantic

Division, 1986, Camp Lejeune Water Document CLW #4938). Average annual rates of finished water delivered by the Holcomb Boulevard WTP between 1975 and 1998 ranged between 0.7 and 2.5 MGD. Annual delivery rates for this period are listed in Table C3. Finished water supplies from the Tarawa Terrace WTP to Tarawa Terrace family housing were significantly reduced in February 1985 following the discovery of contamination by volatile organic compounds (VOCs) in several Tarawa Terrace supply wells and the subsequent removal of these wells from active service (Faye and Green 2007). To supplement Tarawa Terrace water supplies, deliveries of finished water from the Holcomb Boulevard WTP to Tarawa Terrace began during the summer of 1985 with the completion of a connecting pipe line. All Tarawa Terrace supply wells were removed from service by February or March 1987. At that time, the Holcomb Boulevard WTP service area was increased to include all of Tarawa Terrace family housing and, by connection, the Camp Knox trailer park. The Holcomb Boulevard WTP service area was further increased later in 1987 to include the area formerly served by the Montford Point WTP and related supply wells (Maslia et al. 2007) (Plate 1). By March 1987, the resident and transient population served by the Holcomb Boulevard WTP totaled 17,297 persons (Harned et al. 1989). The Holcomb Boulevard water-distribution system is linked to the Hadnot Point water-distribution system near McHugh Boulevard and Wallace Creek (Marston Pavilion valve) and near Holcomb Boulevard and Wallace Creek at booster pump 742 (Plate 1; Naval Facilities Engineering Command, Atlantic Division 1986; ECG, Inc. 1999). For operational reasons, the two water-distribution systems are rarely connected—exceptions being some interconnections that occurred during the late spring and early summer months of 1978–1986, as noted in WTP log books (Camp Lejeune water documents CLW #6774–#8761).

Chronology of Supply-Well Construction and Activity

The first wells that supplied the Hadnot Point WTP were completed by the fall of 1942 and were numbered sequentially from 1 to 21 (HP-601 to HP-621, Plate 1, Table C4). Wells HP-624, HP-625, HP-626, HP-627, HP-628, and HP-629 were completed probably during 1951 to 1953 to expand total water-supply capacity. During 1947, supply wells M-1 and M-2, which had formerly served only Midway Park family housing and immediate vicinity, were connected to the Hadnot Point WTP distribution system, and the Hadnot Point WTP began serving the Midway Park area (unknown author, “Technical Report and Recommendations for Additions and Improvements to the Hadnot Point Fresh Water System at the Marine Barracks, Camp Lejeune,” written communication, October 13, 1950). Between 1953 and 1960, supply wells HP-630, HP-631, HP-632, HP-633, HP-634, HP-635, HP-636, LCH-4006, and LCH-4007 were added to the Hadnot Point WTP raw water distribution network to increase total system

⁴ Based on information contained in the written communication from USMCB Camp Lejeune, the start of continuous operations at the Holcomb Boulevard WTP is estimated to be about June 1972.

Background and Environmental History

capacity and to replace abandoned wells. Supply well HP-607 was abandoned, probably about 1955 (unknown author, USMCB Camp Lejeune, Water Treatment Plant Well Pump Data, written communication, February 19, 1957), and was ultimately replaced by well HP-630. Supply wells LCH-4006 and LCH-4007 probably replaced wells M-1 and M-2 by 1956 or 1957. Supply well HP-604 was abandoned during 1957 and was replaced during 1969 by well HP-637 [unknown author, USMCB Camp Lejeune, Raw Water Supply Data, written communication, 1969(?)]. Between 1962 and 1969 use of supply wells HP-624, HP-628, HP-629, HP-630, and HP-631 was terminated because the wells were “becoming filled with sand and gravel” [unknown author, USMCB Camp Lejeune, Raw Water Supply Data, written communication, 1969(?)]. Supply wells HP-638, HP-639, HP-640, HP-641, HP-642, HP-651, and HP-652 were added to the Hadnot Point WTP raw water supply probably between 1969 and 1972. Between 1978 and 1986, supply wells HP-607 (new), HP-622, HP-623, HP-629 (new), HP-639 (new), HP-653, HP-654, HP-655, HP-660, HP-661, HP-662, HP-663, HP-709, HP-710, HP-711, HP-5186, and LCH-4009 were added to the Hadnot Point WTP raw water distribution network to replace abandoned wells and to maintain raw water-supply capacity. (Water-supply well HP-660 is consistently and incorrectly referred to in many data sources as supply well HP-601.) The term “new” included parenthetically with the names of supply wells HP-607, HP-629, and HP-639 along with other wells listed herein, in Table C4, and in other tables indicates that the particular well is the second well so named to supply the Hadnot Point WTP. Similarly, when “old” is included parenthetically with a well name listed in tables or in this text, the well is the first well so named to supply the Hadnot Point WTP. The most recent period of Hadnot Point WTP supply-well completions occurred between 1994 and 2000 when wells HP-585, HP-595, HP-596, HP-611 (new), HP-612 (new), HP-614 (new), and HP-621 (new) were added to the raw water-supply network. Location coordinates for all historical and currently active (2010) water-supply wells within the study area are listed in Table C4.

The Holcomb Boulevard WTP began operations during the summer of 1972 with a capacity of 2 MGD and was immediately supplied by wells HP-643, HP-644, HP-645, HP-646, HP-647, HP-648, HP-649, and HP-650 (Table C4, Plate 1). The treatment capacity of the plant was increased to 5 MGD probably during 1986 and 1987 (Naval Facilities Engineering Command, Atlantic Division, 1986; Camp Lejeune Water Document CLW #4938). Between 1985 and 1986, potential raw water deliveries to the Holcomb Boulevard WTP were significantly increased with the completion of wells HP-698, HP-699, HP-700, HP-701, HP-703, HP-704, HP-705, HP-706, HP-707, and HP-708. By 1991, well HP-645 was no longer in service (Geophex, Ltd. 1991). Supply wells HP-617 (new), HP-618 (new), and HP-619 (new) were constructed during 1994. Well HP-706 was probably abandoned about 1998. Supply wells HP-557, HP-558, and HP-584 were completed during 1998 to 2000, probably to supplement raw water deliveries to the Holcomb Boulevard WTP and to replace abandoned wells.

Contaminants of Concern

Contaminant VOCs of interest to this study are generally classified as chlorinated alkenes and gasoline components. The chlorinated alkenes of interest are tetrachloroethylene (PCE), also known as PERC® or tetrachloroethene; trichloroethylene (TCE), also called trichloroethene; and their degradation products. The gasoline components of interest are benzene, toluene, ethylbenzene, and xylene, collectively known as BTEX. PCE, TCE, and their degradation products are commonly grouped with compounds called dense non-aqueous phase liquids (DNAPLs). As such, the densities of DNAPLs are greater than the density of water, and DNAPLs are characterized by an enhanced potential for downward vertical migration when occurring in the subsurface. The BTEX components are grouped with compounds commonly called light nonaqueous phase liquids (LNAPLs). These compounds are characterized by densities less than the density of water, and their downward vertical migration in the subsurface is generally limited to the vicinity of the water table.

PCE and TCE in solution in groundwater commonly degrade under anaerobic conditions by a process called reductive dechlorination (Lawrence 2007). TCE can occur in groundwater as a degradation product of PCE or as contamination from an original source or sources. TCE degrades to three compounds—most commonly to *cis*-1,2-dichloroethylene (*cis*-1,2-DCE) and less commonly to *trans*-1,2-dichloroethylene (*trans*-1,2-DCE) and 1,1-dichloroethylene (1,1-DCE). These compounds, in turn, all degrade to vinyl chloride. Degradation occurs along pathways of dechlorination activity, more to less. Degradation of BTEX components is not considered in this report. Contaminants of primary concern to this study are PCE, TCE, vinyl chloride, and benzene.

Contaminant Source Areas

The introduction of contaminant compounds to the soil and groundwater within the study area at USMCB Camp Lejeune occurred intentionally and unintentionally. The introduction of BTEX components to the subsurface was largely unintentional and resulted from accidental spills and leaks from above-ground and underground storage tanks (ASTs and USTs, respectively) and related connecting pipes and valves. Such tanks commonly contained refined petroleum products such as heating oil, gasoline, and diesel fuel. The introduction of PCE to the subsurface probably was the unintentional result of leaks from USTs and wastewater discharge lines as well as the intentional disposal of “still bottoms” and dry filters and possibly liquid PCE in drums and other containers to landfills, temporary pits, and disposal trenches. “Still bottoms” and dry filters are common by-products of dry-cleaning processes and typically contain high concentrations of PCE. Of the contaminants of interest to this study, TCE, PCE, and BTEX components occur most frequently within the study area. Pathways of TCE introduction to the subsurface are probably highly similar to those described previously for PCE with respect to unintentional leaks from storage tanks and wastewater discharge lines

and the intentional disposal of liquid wastes in landfills and in temporary pits and trenches.

Major source areas for contaminants within the study area are disposal sites such as landfills and trenches, vehicle maintenance facilities, dry-cleaning establishments, and large storage tanks and tank farms that contain refined petroleum products. Possible source areas were first identified in 1982–1983 during an initial study conducted to assess sites at USMCB Camp Lejeune that could pose a potential threat to human health and the environment caused by past hazardous materials operations (Water and Air Research, Inc. 1983). A total of 76 disposal or potentially contaminated sites were identified where hazardous materials had possibly been mis-handled or subjected to inappropriate disposal. Each site was formally designated a “disposal site” and assigned a name and number. These names and numbers were maintained as site identifiers through subsequent investigations; however, the term “disposal site” was later changed to Installation Restoration (IR) site. Ultimately, a total of 94 IR sites were identified by the mid-1990s (Baker Environmental, Inc. 1996c). The numbers and respective names assigned to IR sites within the Hadnot Point and Holcomb Boulevard study area are listed in Table C5. Locations of IR sites, by number, are shown on Plate 1 and in Figure C1. In addition, two sites within the study area that contained AST and UST facilities were co-located with IR sites and also were subjects of site assessments related to subsurface and groundwater contamination by BTEX components. Accordingly, investigations of BTEX contamination resulting from leaking ASTs and USTs at sites 84 and 94 are also summarized in this report, and corresponding site names and tank designations are listed in Table C6. Note that assessments of subsurface and groundwater contamination at IR sites are conducted under the auspices of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and various amendments to this act, particularly the Superfund Amendments and Reauthorization Act of 1986 (SARA), which resulted in the creation of the Installation Restoration Program (IRP) at Department of Defense facilities (DLA Environmental Protection Manual, 1991). Similarly, investigations of subsurface and groundwater contamination by refined petroleum products, such as BTEX components, caused by leaking above-ground or underground storage tanks are authorized by the Resource Conservation and Recovery Act (RCRA) of 1976, as amended by the Hazardous and Solid Wastes Amendments Act (HSWA) of 1984 and the Federal Facilities Compliance Act (FFCA) of 1992 (U.S. Environmental Protection Agency, 2009).

Major landfills and IR sites were located throughout the study area; however, most were located between Wallace and Frenchs Creeks (Figure C1). Site 1 represents several dispersed disposal areas located north of Frenchs Creek and north and south of McHugh Boulevard between Daly Road and Gonzalez Boulevard (Plate 1). Sites 6 and 82, a major landfill, are located immediately south of Wallace Creek between Piney Green Road and Holcomb Boulevard within storage/disposal lot 203 and were the likely sources of TCE and PCE to at least one water-supply well (HP-651, Table C4). Site 10,

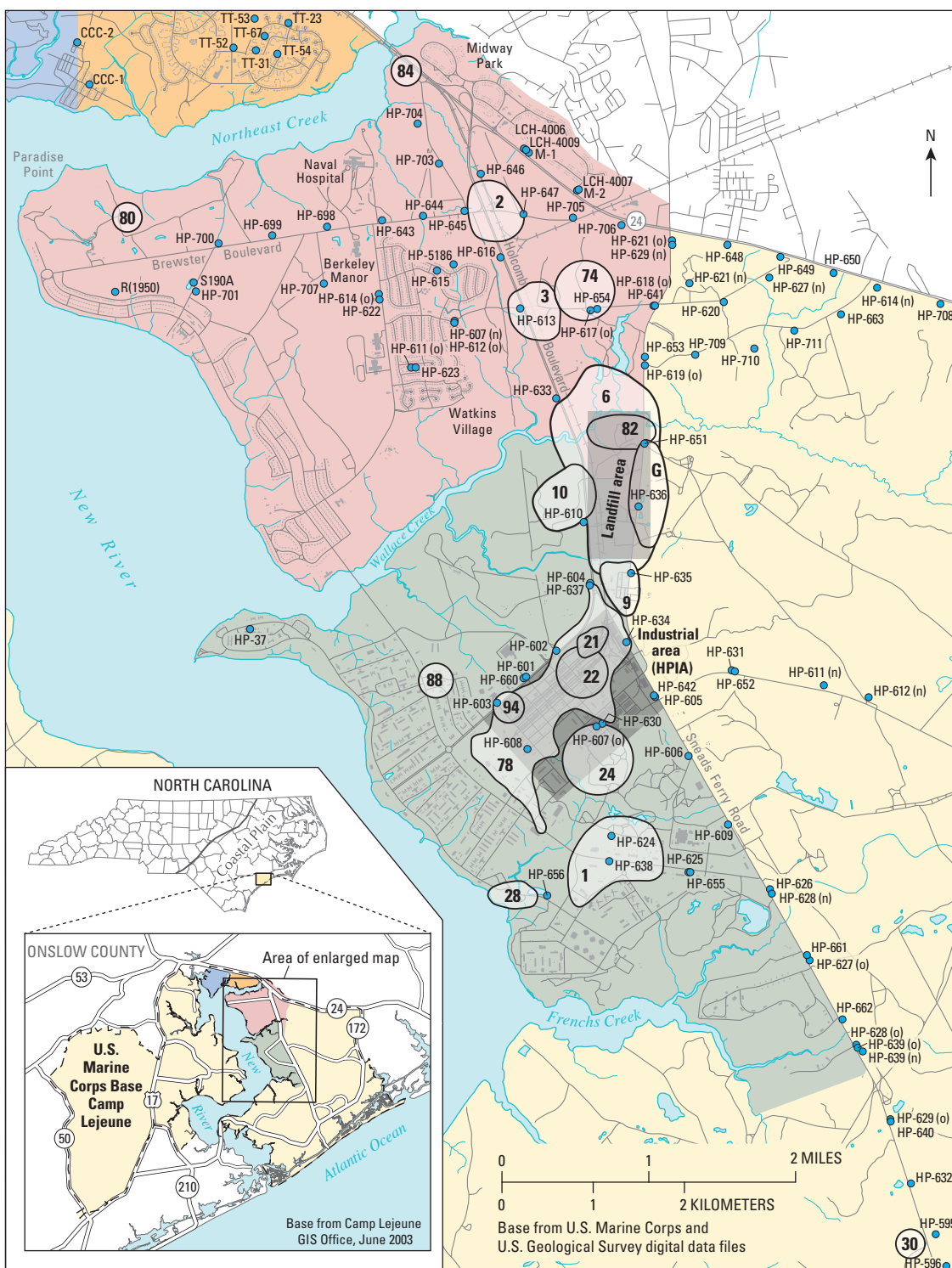
the original base landfill, is located south of Wallace Creek between Holcomb Boulevard and Bearhead Creek (Plate 1). Less extensive disposal sites, areally, are located at an old creosote injection plant immediately east of Holcomb Boulevard and supply well HP-613 (site 3; Plate 1). Site 74 is located east of Holcomb Boulevard between the creosote injection area and Piney Green Road. Disposal at the latter two sites, as well as at parts of the HPIA (sites 21 and 24; Plate 1), probably was to temporary pits and trenches. Major vehicle maintenance facilities were located mostly within the HPIA, the northeast to southwest trending rectangular area bordered to the east by Sneads Ferry Road, to the north by Holcomb Boulevard, to the west by Gum Street, and to the south by Louis Road (sites 21, 22, 24, 78, and 94) (Figure C1, Plate 1). Vehicle maintenance facilities were likely sources of TCE to several water-supply wells located around the perimeter of the HPIA. A large tank farm used to store gasoline and diesel fuel was located in the north-central part of the HPIA (Site 22). Leaks and spills from this tank farm and from the area of Site 94 were major sources of BTEX contamination to groundwater at the HPIA and vicinity. The single major dry-cleaning facility within the study area was in Building 25, located east of McHugh Boulevard between Post Lane and Virginia Dare Drive (Site 88). Dry-cleaning operations at Building 25 were a major source of PCE contamination to groundwater at USMCB Camp Lejeune. These areas and their immediate vicinities were the subject of investigations of soil and groundwater contamination by VOCs beginning in 1982 (Water and Air Research, Inc. 1983). Groundwater contamination by BTEX components and/or PCE and TCE was discovered at several locations at this time, resulting in the establishment of monitor well networks and the periodic monitoring of groundwater contamination and water levels. Monitoring began in 1984 and continues currently (2010) at several sites (Environmental Science and Engineering, Inc. 1990; Baker Environmental, Inc. 2004; CH2M Hill, Inc. 2009). Attempts to remediate groundwater contamination at several IR sites began about 1995 (Baker Environmental, Inc. 1996c). Site histories and respective results of investigations of groundwater contamination pertinent to this study are summarized in the “Installation Restoration Program Site Investigations and Histories” section of this report.

Note that IR site locations, shown as shaded areas on Plate 1 and accompanied by a respective number, are approximate and generally based on the areal extent of monitor wells installed at each site. As such, a particular IR site boundary, as shown on Plate 1, may not exactly conform to the site boundary formally defined by the IR Program

Contaminants in Supply Wells

Supply wells near several areas where contaminated groundwater was initially discovered were sampled for contaminants, beginning in July 1984 (Environmental Science and Engineering, Inc. 1985). Sample collection from water-supply wells and subsequent analyses continued frequently during December 1984 and January and February 1985 (Camp Lejeune Water Documents CLW #4552–#4556;

Background and Environmental History



EXPLANATION

- | | | |
|--|---|---|
| Historical water-supply areas of Camp Lejeune Military Reservation | | Other areas of Camp Lejeune Military Reservation |
| Montford Point | Holcomb Boulevard | 28 Approximate extent of sampling during contaminant delineation and Installation Restoration Program site number |
| Tarawa Terrace | Hadnot Point | HP-608 • Water-supply well and identifier |

Figure C1. Installation Restoration Program site locations within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

R.D. Crowson, Testing of Potable Water Wells and Water Treatment Plant, written communication, January 8, 1985; CERCLA Administrative Record file #149). Monitoring of groundwater quality at supply wells continued with varying frequency until the early 1990s (E.A. Betz, Drinking Water Well Monitoring, written communication, August 7, 1990; CERCLA Administrative Record file #354, Environmental Science and Engineering, Inc. 1992a,b). Groundwater-quality monitoring continued at selected wells until 2001 (Bionomics Laboratory, Inc. 1995; Geological Resources, Inc. 2002; Camp Lejeune Water Documents CLW #2703, #2798, #2930, #2955). Water-quality monitoring at supply wells occurred subsequent to 2001, but results are not reported herein. Analytical results obtained after 2001 can be obtained by formal request to the Environmental Management Division, USMCB Camp Lejeune.

Concentrations of PCE, TCE, and several of their degradation products are listed in Table C7 for wells that supply or have supplied the Hadnot Point WTP. Corresponding concentrations of BTEX components are listed in Table C8. Of the chlorinated alkenes of interest, TCE was most frequently noted above detection limits in water samples at concentrations ranging from about 1.0 microgram per liter ($\mu\text{g/L}$) to more than 18,000 $\mu\text{g/L}$ (Table C7). TCE occurred consistently in wells located at or immediately adjacent to the HPIA (Site 78), including in wells HP-602, HP-603, HP-608, HP-634, HP-637, and HP-660 (Plate 1, Table C7). TCE also was noted on a single occasion in well HP-652, located about 1 mile (mi) east of the HPIA (Plate 1). The highest concentration of TCE (18,900 $\mu\text{g/L}$) in water-supply wells occurred in well HP-651, located adjacent to Piney Green Road and immediately east of storage/disposal lot 203 (Sites 6 and 82, Figure C1, Plate 1). TCE was also detected in supply well HP-653 (5.5 $\mu\text{g/L}$), located adjacent to Piney Green Road and north of Wallace Creek and about 1 mi north of supply well HP-651 (Plate 1). PCE was detected in supply wells in the same areas as TCE, but was detected less frequently than TCE. PCE was detected at the HPIA in wells HP-660 and HP-602 and near storage/disposal lot 203 in well HP-651. Concentrations of PCE ranged from about 1.0 to 400 $\mu\text{g/L}$ (Table C7). Note that concentrations of vinyl chloride occurred in supply wells HP-602 and HP-651, indicating that PCE and/or TCE degradation pathways were substantially complete within the volume of aquifers influenced by pumping at these wells. (Statements herein indicating that degradation pathways were complete do not imply that the source or sources of original contaminant had been completely degraded, only that sufficient time had elapsed such that biodegradation processes within the aquifer had proceeded along several possible pathways to the production of an unknown mass of vinyl chloride.⁵)

Occurrences of BTEX components in supply wells sampled were substantially less frequent than those noted for TCE and PCE but also occurred in the HPIA in wells HP-602 and HP-608 and near storage/disposal lot 203 in well HP-651

⁵ Description of degradation pathways of VOCs and BTEX compounds are presented in Lawrence (2007).

(Table C8, Plate 1). Of the BTEX components observed in supply wells, benzene occurred most frequently and was detected at concentrations ranging from about 2.0 to 700 $\mu\text{g/L}$. Toluene concentrations ranged from about 1.0 to 12 $\mu\text{g/L}$. Ethylbenzene was detected once at supply well HP-602 at a concentration of 8.0 $\mu\text{g/L}$. Water-supply wells HP-643, HP-644, HP-646, HP-647, HP-648, and HP-650, which serve the Holcomb Boulevard WTP, were also sampled during January 1985; no contaminants were detected at concentrations greater than 10 $\mu\text{g/L}$ (Camp Lejeune Water Documents CLW #5621–#5626) (Tables C9, C10). Because of VOC contamination, service was permanently terminated at several water-supply wells—HP-602 (11/30/1984), HP-608 (12/6/1984), HP-634 (12/14/1984), HP-637 (12/14/1984), HP-651 (2/4/1985), HP-652 (2/8/1985), HP-653 (2/8/1985), and HP-660 (12/6/1984) (Camp Lejeune Water Documents CLW #4913, #4971).

Contaminants in Water Treatment Plants

The occurrence of contaminants in wells supplying the Hadnot Point WTP indicates that finished water from the WTP was also contaminated with chlorinated alkenes and BTEX components. The fact that the Hadnot Point WTP was substantially contaminated with PCE and TCE was well known to USMCB Camp Lejeune by May 1982 (Camp Lejeune Water Document CLW #5182); however, the Base did not initiate sampling of raw and finished water at the Hadnot Point WTP until early December 1984 (E. Betz, USMCB Camp Lejeune, written communication, February 26, 1985; Camp Lejeune Water Documents CLW #4546–#4557) (Tables C11, C12). Contaminants greater than detection limits occurred infrequently at this time at the WTP, although sampling and analyses were relatively frequent through December 1984 and during February through December 1985.

Beginning in May 1982, PCE concentrations in samples from finished and untreated water collected at the Hadnot Point WTP ranged from less than 1.0 to 100 $\mu\text{g/L}$ (Table C11). Corresponding concentrations of TCE ranged from about 1 to 1,400 $\mu\text{g/L}$; however, the high concentration value of 1,400 $\mu\text{g/L}$ was reported as unreliable because the cap sealing the sample bottle was found to be loose prior to analysis of the sample (Camp Lejeune Water Document CLW #3300). During January 1985, occurrences of *trans*-1,2-DCE were detected in several samples ranging in concentration from about 1.0 to 150 $\mu\text{g/L}$. Vinyl chloride was detected in a single sample, occurring at a concentration of about 3.0 $\mu\text{g/L}$. This sample also contained relatively high concentrations of PCE, TCE, and *trans*-1,2-DCE (Table C11). Benzene and toluene were detected in samples collected only during November and December 1985 (Table C12). Benzene was in three samples, and concentrations ranged from 1.0 to 2,500 $\mu\text{g/L}$. Toluene was in two samples, and concentrations ranged from 10 to 100 $\mu\text{g/L}$ (Camp Lejeune Water Document CLW #1356).

Somewhat by coincidence, an occurrence of local BTEX contamination in a reservoir at the Holcomb Boulevard WTP resulted in the sampling and analyses of finished water for TCE

Methods and Scope of Study

and *trans*-1,2-DCE at several locations within the Holcomb Boulevard WTP distribution network (Fred Hill, USMCB Camp Lejeune, Report of Investigation or Inspection-water system, written communication, January 29, 1985). Because of the time required to purge the Holcomb Boulevard WTP of the BTEX components, finished water from the Hadnot Point WTP was delivered to the Holcomb Boulevard WTP distribution network during most of the period from January 27, 1985, to February 7, 1985. At the times of sampling on January 29 and January 31, 1985, finished water supplied to the Holcomb Boulevard WTP distribution network had originated entirely from the Hadnot Point WTP (Camp Lejeune Water Document CLW #4546) (Table C13). During January 31, 1985, concentrations of TCE within the Holcomb Boulevard WTP distribution network ranged from 24 to 1,148 µg/L, depending on location. Corresponding concentrations for *trans*-1,2-DCE ranged from 7.4 to 407 µg/L. These concentrations, for the most part, are in sharp contrast to concentrations described previously in samples of Hadnot Point WTP raw and finished water obtained during December 1984 (Table C11). Such differences were possibly caused by the raw water supply to the WTP originating from uncontaminated and contaminated wells, respectively, prior to the time of sampling.

Daily records of operating wells supplying water to the Hadnot Point WTP during January 28–February 4, 1985, indicate that, of the contaminated supply wells listed in Tables C7 and C8, only well HP-651 was operating during this period (Camp Lejeune Water Documents CLW #1121–#1122). In fact, supply well HP-651 is recorded as operating every day during this period, with the exception of February 4, 1985. Reference to analyses of water samples obtained from supply well HP-651 on January 16 and February 4, 1985 (Table C7) indicate that high concentrations of TCE and *trans*-1,2-DCE occurred consistently in water samples from this well. Thus, after accounting for dilution from uncontaminated supply wells, well HP-651 is isolated as the single (or at least the most prominent) source of contaminants observed in the Holcomb Boulevard WTP distribution network during January 29–31, 1985.

Prior to 1985, comprehensive incidents of contaminated water supplies, similar to those represented by data listed in Table C13, were not observed. Regardless of the lack of data, incidents of contamination similar to those represented in Table C13 probably occurred fairly frequently within the Hadnot Point WTP distribution network and, prior to 1972, within much of the current (2010) distribution network served by the Holcomb Boulevard WTP. If contaminated supply wells were operated routinely, then incidents of contamination within the water-distribution networks probably occurred routinely, as well. The major objective of historical reconstruction at USMCB Camp Lejeune is to simulate such incidents of distribution network contamination as accurately and reasonably as possible.

Placement on National Priorities List

USMCB Camp Lejeune was placed on the U.S. Environmental Protection Agency's (USEPA) National Priorities List

(NPL) on November 4, 1989. A Federal Facilities Agreement with the Department of Navy, USEPA Region IV, and the North Carolina Department of Environment, Health, and Natural Resources was completed on February 4, 1991, and placed all contaminant investigation and remediation activities at USMCB Camp Lejeune under the oversight of the CERCLA and RCRA (Environmental and Safety Designs, Inc. 1996; Baker Environmental, Inc. 1999a). In accordance with Congressional mandate, once a site is placed on the NPL, ATSDR is responsible for conducting and publishing a public health assessment (PHA). A PHA is an evaluation conducted by ATSDR of data and information on the release of hazardous substances into the environment in order to assess any past, present, or future effects on public health. During 1997, ATSDR completed and published a PHA for USMCB Camp Lejeune⁶ (ATSDR 1997).

Methods and Scope of Study

Completion of this study required the review, extraction, and compilation of pertinent data from hundreds of source documents. Document sources used for this report were obtained largely from USMCB Camp Lejeune CERCLA IR Administrative Records and files of the U.S. Geological Survey. In addition, relevant data were extracted from hundreds of Camp Lejeune Water documents (CLWs), the identification numbers of which are listed under data sources, mainly in Tables C7–C13. [See Maslia et al. (2007) for a digital video disc (DVD) containing copies of most source documents used for this study.]

IRP site assessment, site characterization, and site investigation reports, along with CLW documents, were the major sources of historical supply well and groundwater contaminant data used for this study. Data presented in IRP reports generally are the earliest comprehensive evaluations of groundwater contamination and contaminant source characterization at individual IR sites and, as such, represent site conditions prior to the onset of site remediation. The spatial and subsurface distribution of contaminant mass and contaminant concentration data in source areas prior to remediation are critical end points for the historical reconstruction process, in particular, the calibration of groundwater fate and transport models, and, as such, are the major emphasis of IR site narratives and tabulations included herein. Post-remediation monitoring data are also described and tabulated where such information further enhances knowledge of contaminant mass distribution and concentrations in the subsurface in source areas. Accordingly,

⁶ On May 7, 2009, ATSDR publicly announced on its Web site the removal of the 1997 Camp Lejeune PHA from its Web site. In the 13 years since the 1997 PHA was published, additional information has emerged related to exposures to VOCs in drinking water at Camp Lejeune. Due in part to the ongoing historical reconstruction analyses, ATSDR has learned that communities serviced by the Holcomb Boulevard water-distribution system were exposed to contaminated water for a longer period than was used in the 1997 evaluation contained in the PHA. Also, at the Camp Lejeune site, benzene was present in some water-supply wells that were shut down sometime prior to 1985, and this information was not included in the 1997 PHA. Refer to the ATSDR Web site for additional details (<http://www.atsdr.cdc.gov/sites/lejeune/index.html>).

monitor well data at individual IR sites, related well-location maps, and similar information, such as the results of hydro-punch and geoprobe investigations included herein, are inclusive in time either to the termination of data collection at the site or to about year 2004. Groundwater and well data at IR sites for years up to and including 2004 are inclusive of the vast majority of site data available at any site and are considered sufficient to undertake water modeling investigations necessary for historical reconstruction.

Determining location coordinates at numerous monitor wells and other data-collection locations throughout the study area was a major part of the data compilation process. Maps showing data-collection locations were identified for each IR site of interest and rectified using standard geographic information system (GIS) methods. As few as four and as many as ten control points were used to rectify each map, depending on the areal coverage and cultural detail portrayed on the particular map. Control points included road intersections, bridge-stream intersections, and corners of prominent buildings. Location coordinates of control points were determined from topographic maps, rectified maps, and aerial photographs contributed by USMCB Camp Lejeune. Rectification of many maps accomplished for this project was made possible by maps and aerial photographs contributed by the U.S. Marine Corps. A total of 118 maps were rectified for this study, resulting in the extraction of location coordinates for more than 600 monitor wells, numerous soil borings, and other data-collection locations.

Additional data necessary for the construction of a groundwater-flow model of the study area were also reviewed and compiled as a part of this study and included monitor and supply-well construction data, groundwater levels, aquifer- and slug-test results, and stage data at various stream locations.

Although VOCs are the contaminants of primary interest to this study, other contaminants such as pesticides were frequently observed in surface and subsurface soils in conjunction with VOCs in groundwater. The methods and locations of pesticide disposal probably mimicked VOC disposal at several IR sites. Pesticides such as dichlorodiphenyltrichloroethane (DDT), DDT metabolites, and chlordane do not readily degrade in the subsurface. Accordingly, occurrences of these pesticides in surface and subsurface soils at IR sites possibly also correspond to historical VOC disposal areas and, as such, are briefly described herein, along with concentrations of VOCs of interest. In addition, several IR sites are drained by ditches and streams which are likely lines of discharge for contaminated groundwater. Thus, results of surface-water and related sediment analyses for selected VOCs and pesticides are also briefly described herein in order to definitively identify the respective drainage ditch or stream as a line of groundwater discharge.

The concentrations and occurrence of other constituents, such as semi-volatile compounds and metals, in groundwater and soils were also determined at most IR sites within the study area. These constituents are not discussed herein.

Note that this report is not intended to be a complete or even a substantial summary or representation of all IRP activities at any IR site described herein. Rather, the report is intended to provide sufficient bases of information in support of ATSDR's historical reconstruction-epidemiological study. Accordingly, remediation and/or monitoring efforts at IR sites after 2004 are neither considered nor discussed herein. At most IR sites within the study area, post-2004 remediation efforts, such as collection of soil and groundwater data, groundwater monitoring, etc., continue to the present day (2010). Results of these continuing investigations can be obtained by formal request to the Environmental Management Division, USMCB Camp Lejeune, and by referring to any of several USMCB Camp Lejeune Final Site Management Plans (for example, CH2M Hill, Inc. 2009).

Geohydrologic Framework

Ancillary to this study was the expansion of the geohydrologic framework described for the Tarawa Terrace study area by Faye (2007a) to the entire Hadnot Point-Holcomb Boulevard study area. More than 400 borehole and test boring logs were extracted from IR site assessments and similar reports and used in conjunction with geophysical logs at supply wells to identify various components of the geohydrologic framework (Table C14). Preliminary maps showing the thickness and altitude at the top of each geohydrologic unit were subsequently developed from these point data and used to identify the water-bearing units contributing to the open intervals of monitor and supply wells. These maps and related data will be published subsequent to this report as Chapter B of the ATSDR Hadnot Point-Holcomb Boulevard report series, published in support of the current health study at USMCB Camp Lejeune. Titles of the various chapter reports are listed in the Foreword section of this report.

Fourteen aquifers and confining units were identified for this study within the Hadnot Point-Holcomb Boulevard study area and were named after local cultural features where the units were first identified or as subdivisions of the Castle Hayne Formation (Harned et al. 1989; Geophex, Ltd. 1994, Appendixes E, F). Named geohydrologic units and unit thicknesses are listed in Table C14. Sediments correlated with the Brewster Boulevard aquifer and confining unit by Faye (2007) between Northeast and Wallace Creeks thicken considerably south of Wallace Creek and were subdivided, for purposes of this study, into two aquifers and two confining units, all assigned to the Brewster Boulevard aquifer system. With the exception of the Brewster Boulevard aquifer system, geohydrologic units listed in Table C14 correspond, with minor changes, one-to-one to units previously identified and described by Faye (2007) between Northeast and Wallace Creeks.

The base of the Lower Castle Hayne aquifer is at the top of the Beaufort confining unit and corresponds, within most of the study area, to the base of freshwater flow. Freshwater is

Installation Restoration Program Site Investigations and Histories

defined herein as water containing a concentration of total dissolved solids less than 10,000 milligrams per liter (mg/L). The top of freshwater flow occurs everywhere at the water table, the depth to which fluctuates seasonally over a range of about 10 feet (ft) or less. Depending on location, whether highland or lowland, the water table generally occurs in the lower or upper part of the Brewster Boulevard aquifer system, respectively, or within the Tarawa Terrace aquifer.

Aquifers of the Castle Hayne aquifer system comprise the major water-bearing units of the study area and are composed largely of fine silty and clayey sand and sandy limestone. Confining units are clay, sandy clay, or silty clay. For detailed descriptions of framework geometry and well, borehole, and geophysical data used to define the geohydrologic framework between Northeast and Wallace Creeks, refer to Chapter B of the Tarawa Terrace report series (Faye 2007).

Installation Restoration Program Site Investigations and Histories

An Initial Assessment Study (IAS) of possible contaminant occurrence in soils and groundwater at USMCB Camp Lejeune was initiated by the Navy Assessment and Control of Installation Pollutants (NACIP) Program during 1982–1983 (Camp Lejeune Water Document CLW #3455; Water and Air Research, Inc. 1983). The IAS identified 76 potentially contaminated (disposal) sites where hazardous materials had possibly been mishandled or subjected to inappropriate disposal. Of these locations, 22 sites were recommended for additional investigation and were included in a later Confirmation Study (Environmental Science and Engineering, Inc. 1985). This first phase of the Confirmation Study, termed the Verification Step, began in 1984 and included Sites 1, 2, 6, 9, 21, 22, 24, 28, 30, and 74 within the study area (Figure C1, Plate 1, Table C5). Monitor well networks were established at several of these sites, and water-quality monitoring was initiated. Several Hadnot Point WTP supply wells were also sampled at this time (July 1984) (Tables C7, C8). In 1986, the NACIP program was converted to the IRP, with requirements that IRP plans and procedures conform to USEPA standards and regulations (Camp Lejeune Water Document CLW #1821). Under the IRP, the IAS became the Preliminary Assessment/Site Investigation (PA/SI). Similarly, the Confirmation Study begun in 1984 was transformed to a Remedial Investigation/Feasibility Study (RI/FS). As part of the RI/FS, additional rounds of sampling began in November 1986 and continued into March 1987 at all IR sites in the study area that were part of the original Confirmation Study (Environmental Science and Engineering, Inc. 1990). This second phase of the Confirmation Study also included a Confirmation Step and was generally followed by a Verification Step. Several water-supply wells located near the HPIA were also sampled at this time, and additional monitor wells were constructed at several sites (Environmental Science and Engineering, Inc. 1987). A separate part of the

Confirmation Study termed a Characterization Step focused entirely on the HPIA and included additional sampling at monitor wells, construction of additional monitor wells, a soil gas survey, and a comprehensive aquifer test of water-bearing units open to nearby water-supply wells (Environmental Science and Engineering, Inc. 1988a). During or about 1988, comprehensive remedial investigations and site assessments of soil and groundwater contamination began at individual IR sites within the HPIA and elsewhere within the study area. Remedial investigations were sometimes followed by various “supplemental” investigations or “focused” remedial investigations, all of which ultimately devolved, at most locations, into routine water-quality sampling and water-level monitoring. Monitoring generally occurred on a quarterly or semi-annual schedule.

The following subsections of this report include short narratives about contaminant disposal or spill histories at individual IR sites within the study area and corresponding summaries of groundwater investigation results pertinent to this study. Tabulated monitor well construction and contaminant concentration data, as well as one or more associated site maps, complement each of the site narratives. Table C5 contains an index of the IR sites and corresponding data tables and figures; Figure C1 and Plate 1 show the locations of the IR sites. References to “surface soil samples” in the following subsections refer to soil samples collected at depths generally ranging from ground surface to 1 or 2 ft below ground surface (bgs). Corresponding references to “subsurface soil samples” refer to soil samples generally collected below the surface soil samples (1 to 2 ft bgs) and above the water table.

Installation Restoration Site 1— French Creek Liquids Disposal Area

Installation Restoration Site 1 is composed of two general areas. The north disposal area is located north of the intersection of McHugh Boulevard and Daly Road, east of water-supply well HP-624 (Plate 1), north of Buildings FC115 and FC120, and immediately south of unnamed secondary roads and tank tracks (Figures C1, C2). The south disposal area is located south of McHugh Boulevard and between Daly Road and Gonzalez Boulevard (Baker Environmental, Inc. 1995ckm) (Figure C2, Plate 1). Various facilities within these areas were used for vehicle maintenance, equipment and material storage, and storage of refined petroleum products. Equipment wash facilities were also located in the vicinity of the north and south disposal areas, and all were equipped with oil/water separators. The north area separators discharged to drainage ditches and ultimately to a retention pond. The south area separators discharged to a drainage ditch and ultimately to Cogdels Creek and New River (Figure C2, Plate 1). Vehicle maintenance and equipment and material storage have been ongoing at Site 1, probably since the 1940s. Liquid wastes generated by maintenance operations, including battery acids, oil, and lubricants, were routinely discharged to surface soils in wooded or grassy

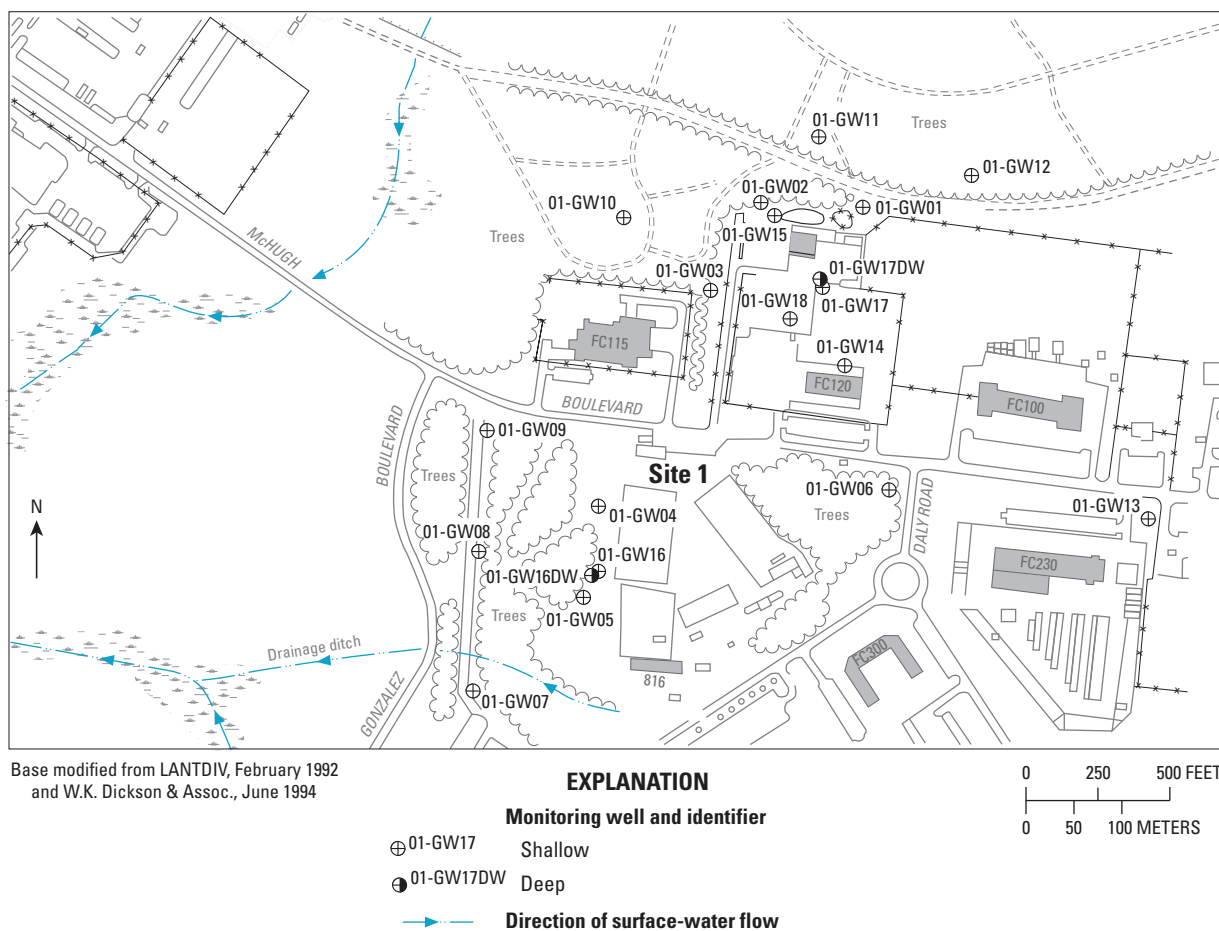


Figure C2. Monitor well locations at Installation Restoration Site 1—French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1997i).

areas near the maintenance facilities. Disposal methods may have routinely included the digging of shallow holes, which were backfilled following disposal. Acid waste disposal areas and petroleum product disposal areas were probably not congruent and are not well defined. The total areas of the north and south disposal locations generally are delimited by the locations of monitor wells (Figure C2). However, suspected disposal locations possibly encompass an area of 7 or 8 acres. The total volume of petroleum wastes discharged to Site 1 is estimated between 5,000 and 20,000 gallons (gal). Corresponding volumes of battery acid waste range between 1,000 and 10,000 gal (Water and Air Research, Inc. 1983).

Investigations of groundwater contamination by VOCs at Site 1 began during the NACIP-sponsored IAS described previously and continued during the Verification and Confirmation Steps of the follow-up Confirmation Study (Water & Air Research, Inc. 1983; Environmental Science and Engineering, Inc. 1985, 1987, 1992a). Six shallow monitor wells open to the Brewster Boulevard aquifer system were constructed during the Confirmation Study (01-GW01–01-GW06) and were sampled for selected VOCs during July 1984 and November 1986 (Tables C15–C17). In July 1991, soil samples were collected at 18 locations in the vicinity of the south disposal

area prior to grading and subsequent building construction. With the exception of a trace quantity of toluene at a concentration of 1.0 microgram per kilogram ($\mu\text{g}/\text{kg}$), which was detected in a surface soil sample near the intersection of Daly Road and McHugh Boulevard (Figure C2), no VOCs of interest to this study were determined at this time in any soil samples. Additional groundwater samples were collected during April 1993. Groundwater analyses were limited to a selected number of analytical parameters, mostly metals, and are not described herein.

A final RI was conducted in 1994 resulting in the construction of 13 additional shallow monitor wells open to the Brewster Boulevard aquifer system (01-GW07–01-GW17) and completion of two deep wells open to the Upper Castle Hayne aquifer (01-GW16DW, 01-GW17DW) (Table C15). Groundwater samples were collected during April 1994 at all newly installed monitor wells and analyzed for numerous VOCs, including BTEX components, PCE, TCE, DCE, and vinyl chloride (Tables C16, C17) (Baker Environmental, Inc. 1995km).

Of the VOCs of interest in groundwater at Site 1, TCE occurred most frequently, ranging in concentration from about 1 to 27 $\mu\text{g}/\text{L}$ (Table C16). Concentrations of PCE occurred consistently below detection limits in all monitor wells, with

Installation Restoration Program Site Investigations and Histories

the exception of a concentration of about 7 µg/L in monitor well 01-GW05, sampled during July 1984. Degradation of probably TCE at Site 1 is apparent from concentrations of total 1,2-DCE and vinyl chloride, particularly in well 1GW10. Concentrations of total *trans*-1,2-DCE ranged from 10 to 23 µg/L in well 01-GW10 and occurred consistently in all samples collected between 1994 and 2000. Corresponding concentrations of vinyl chloride ranged from an estimated 1.0 to 4.0 µg/L. Disposal of PCE and particularly TCE at Site 1 was not discussed in published site histories (Water and Air Research, Inc. 1983) but apparently did occur at least one time (Table C16).

With the exception of the occurrence of xylenes in monitor well 01-GW12, concentrations of BTEX components at Site 1 occurred only in trace quantities or ranged below detection limits in all monitor wells (Table C17). In monitor well 01-GW12, total xylenes concentrations ranged from 3.0 to 280 µg/L and occurred consistently between 1994 and 1998. An estimated concentration of total xylenes of 0.78 µg/L was also detected in monitor well 01-GW01 during January 1998. Concentrations of benzene were never above detection limits. Toluene and ethylbenzene were detected during August 1995 in monitor well 01-GW12, each at an estimated concentration of 4.0 µg/L.

Also during the RI, a total of 124 soil samples were collected at 54 locations within Site 1. Volatile organic compounds of interest to this study (TCE and toluene) were detected in subsurface soils during April 1994 in trace amounts at two locations, both of which are in the vicinity of the northern disposal area. TCE was detected at an estimated concentration of 3.0 µg/kg between 13 and 15 ft bgs in a borehole near the northwest corner of Building FC120 (Figure C2). Toluene was detected at an estimated concentration of 1.0 µg/kg between 9 and 11 ft bgs in a core obtained during the drilling of monitor well 01-GW17DW.

Pesticides occurred infrequently in surface- and subsurface soil samples at Site 1. Concentrations of DDT and DDT metabolites ranging from about 2 to 12 µg/kg occurred in surface samples between land surface and 1 ft bgs at locations later occupied by monitor wells 01-GW08, 01-GW12, and 01-GW17. In subsurface samples, DDT and DDT metabolites occurred in concentrations ranging from about 2 to 120 µg/kg in several boreholes at depths ranging from 1 to 7 ft bgs. A DDT concentration of about 8.0 µg/kg was detected between 9 and 11 ft bgs in a core obtained during the drilling of monitor well 01-GW17. With two exceptions, all locations of DDT occurrence in surface and subsurface soil samples were located in the northern disposal area (Baker Environmental, Inc. 1995k).

Following completion of the final RI, an FS was initiated to address remediation of groundwater contamination at Site 1. In 1995, a remediation approach was selected and included in a final Record of Decision (ROD) between the Department of the Navy and the U.S. Marine Corps, the North Carolina Department of Environment, Health, and Natural Resources, and USEPA Region IV (Baker Environmental, Inc. 1995ac). Implementation of the ROD included a reliance on semiannual monitoring of groundwater conditions to observe attenuation of contaminant constituents (Tables C16, C17). Summaries

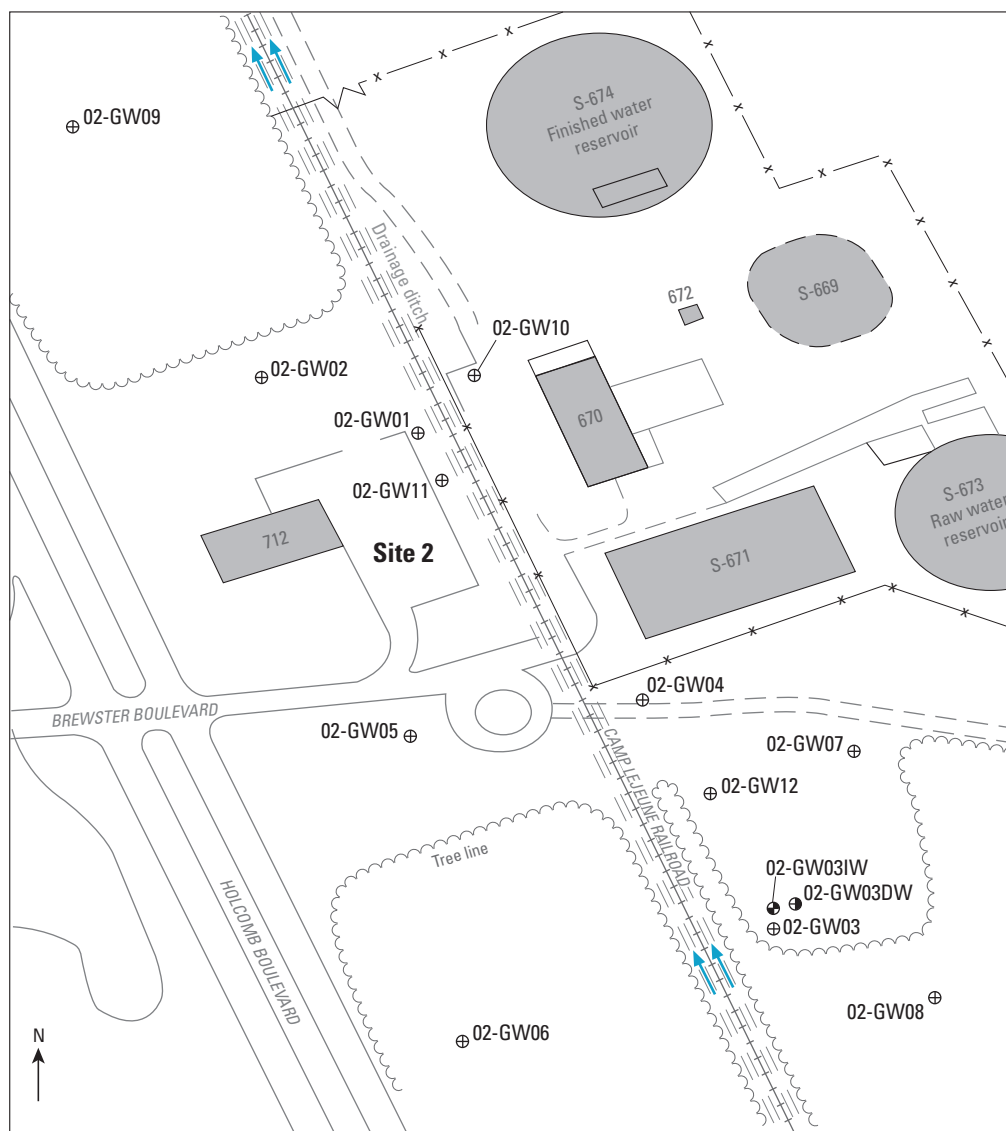
of monitoring results were published in a series of reports beginning in 1995 (Environmental Science and Engineering, Inc. 1985, 1987; Baker Environmental, Inc. 1995ko, 1996m, 1997hi, 1998n; Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 1998, 2000bgh; CH2M Hill, Inc. and Baker Environmental, Inc. 2001e). Monitor well 01-GW05 was abandoned by 1995 and was replaced by monitor well 01-GW18 (Baker Environmental, Inc. 1996l). Many monitor wells were sampled periodically following implementation of the ROD up to year 2000. Wells 01-GW05 and 01-GW06 were abandoned for sampling purposes after 1986. Wells 01-GW04, 01-GW07, 01-GW08, 01-GW13, 01-GW14, and 01-GW16DW were apparently abandoned for sampling purposes shortly after construction in 1994. Monitor wells 01-GW01, 01-GW02, 01-GW03, 01-GW10, 01-GW11, 01-GW12, 01-GW17, and 01-GW17DW were monitored consistently from the time of construction to 1998 and 2000.

Installation Restoration Site 2—Former Nursery Day-Care Center (Building 712)

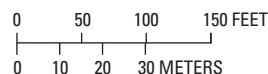
Installation Restoration Site 2 is located just east and slightly north of the intersection of Brewster and Holcomb Boulevards (Figure C3, Plate 1). The site was used from 1945 to 1958 for the storing, handling, and dispensing of pesticides and was used later as a children's day-care center (Environmental Science and Engineering, Inc. 1990). Pesticide volumes distributed from Site 2 are reported to have included Baygon, Chlordane [100 gallons per year (gal/yr) of 40-percent powder], DDT (750 to 1,000 gal per day of 5- to 15-percent solution), Diazinon (25 gal per month), Dieldrin (less than 100 pounds per year), Dursban (stored but not used), Lindane (less than 10 gal/yr of 1-percent solution), Malathion (100 gal/yr), Mirex (stored but not used), Silvex (stored but not used), 2,4-D (1,000 gal/yr of 1- to 100-percent solution), and 2,4,5-T (50 gal/yr; 1 year only). Estimated total contaminated area is 6,625 square feet (ft²), including the playground located in the vicinity of Building 712 (6,300 ft²), and 325 ft² of pesticide mixing and equipment washing areas (Water and Air Research, Inc. 1982).

During 1957 or 1958, pesticide storage and mixing were moved to Building 1105 at the HPIA (Water and Air Research, Inc. 1982), and Building 712 at Site 2 was later converted to a children's day-care center. DDT, chlordane, and other organochlorine insecticides were detected in surface soil samples collected during the IAS in 1982, and the day-care center was closed.

Groundwater sampling at Site 2 began during the IAS in August 1984 with the construction of five shallow monitor wells open to the Brewster Boulevard aquifer system (02-GW01–02-GW05, Table C18, Figure C3). Additional sampling occurred during the Verification Steps of the Confirmation Study in December 1986 and March 1987, respectively (Environmental Science and Engineering, Inc. 1990). Although pesticides at Site 2 were the analytes of greatest interest during the Confirmation Study and later RI



Base modified from LANTDIV
February 1992



EXPLANATION

Monitoring well and identifier

- ⊕ 02-GW03 Shallow
- ⊕ 02-GW03IW Intermediate
- ⊕ 02-GW03DW Deep

→ **Direction of surface-water flow**

Figure C3. Monitor well locations at Installation Restoration Site 2—former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1997g).

(Baker Environmental, Inc. 1994h), concentrations of contaminants of interest to this study, such as PCE, TCE, and the BTEX components, were also determined during the Confirmation Study in December 1986 and March 1987 (Tables C19, C20) and continued to be determined as part of subsequent groundwater monitoring. Following completion of the final RI, an FS was initiated to address remediation of groundwater contamination at Site 2. In 1994, a remediation approach was

selected and included in a final ROD between the Department of the Navy and the U.S. Marine Corps, the North Carolina Department of Environment, Health, and Natural Resources, and USEPA Region IV (Baker Environmental, Inc. 1994ef). Requirements of the ROD at Site 2 were the removal of contaminated soil (Baker Environmental, Inc. 1994f; OHM Remediation Services Corp. 1995). Subsequently, monitoring of groundwater conditions at Site 2 occurred routinely

on a quarterly or semiannual basis. Monitoring results were published in a series of reports beginning in 1996 (Baker Environmental, Inc. 1996k, 1997fg, 1998lm, 1999fi; Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000af, 2001a, 2002a; Baker Environmental, Inc. and CH2M Hill, Inc. 2002hi, 2003; CH2MHill, Inc. and Baker Environmental, Inc. 2001cd; Engineering and Environment, Inc. and Michael Baker Jr., Inc. 2004c; Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2003a, 2004) (Tables C19, C20). After October 1996, monitor wells 02-GW01, 02-GW02, 02-GW04, and 02-GW06 were abandoned with respect to the collection of samples for water-quality analyses, largely as a result of questions regarding the integrity of well construction. During the summer of 1995, well 02-GW03DW was added to the sampling network to monitor the occurrence of contaminants in the Upper Castle Hayne aquifer–River Bend unit (Figure C3, Tables C18–C20) (Baker Environmental, Inc. 1996k). Because of poor construction integrity, well 02-GW03DW was abandoned by early 1997 (Baker Environmental, Inc. 1997g). At about the same time, the area of surveillance was expanded with the addition of monitor wells 02-GW10 and 02-GW11, which were constructed open to the Brewster Boulevard aquifer system (Baker Environmental, Inc. 1997f). Additional expansion of the surveillance network was accomplished by early 1997 to include monitor wells 02-GW03IW, open to the Tarawa Terrace aquifer, and 02-GW12, open to the Brewster Boulevard aquifer system. Monitor well 02-GW09 was removed from the water-quality sampling network by April 1997 (Baker Environmental, Inc. 1997g). Monitor well 02-GW11 apparently was abandoned after October 1998.

PCE and TCE in groundwater at Site 2 were detected infrequently in several monitor wells and at low concentrations (Table C19). Concentrations of PCE greater than detection limits occurred during 1997 and 1998 in monitor wells 02-GW03, 02-GW03IW, 02-GW08, 02-GW10, and 02-GW12 and ranged only from an estimated 1 to 10 µg/L. Concentrations of TCE occurred only in monitor wells 02-GW03, 02-GW05, and 02-GW07 during 1997 and 2002 and ranged from an estimated 3.0 to 7.0 µg/L.

BTEX components at Site 2 were detected in most monitor wells, including 02-GW01, 02-GW02, 02-GW03, 02-GW03IW, 02-GW03DW, 02-GW07, 02-GW08, and 02-GW12 (Table C20). Concentrations of ethylbenzene and total xylenes occurred most frequently and were greatest in wells 02-GW03 and 02-GW12. Concentrations of ethylbenzene were detected in monitor well 2GW03 during most sampling events between December 1986 and January 2004 and ranged from less than 1.0 to about 730 µg/L. Corresponding concentrations of total xylenes ranged from 140 to about 7,000 µg/L. Substantial concentrations of ethylbenzene and total xylenes were also frequently noted in well 02-GW12, ranging from an estimated 1.0 to 14 µg/L and from an estimated 3.0 to 260 µg/L, respectively. Total xylenes were also determined in several samples in monitor well 02-GW03IW at concentrations less than 5.0 µg/L and once in well 02-GW03DW at a concentration of 0.1 µg/L. Well 02-GW03IW was open to the

Tarawa Terrace aquifer at interval 50–60 ft bgs. Similarly, well 02-GW03DW was open to the Upper Castle Hayne aquifer–River Bend unit between 90 and 100 ft bgs (Figure C3). The occurrence of BTEX (LNAPL) components at such depths indicates substantial downward vertical migration from the water table had occurred at the site prior to the onset of monitoring in 1997. Such migration was probably largely by advection along downward vertical head gradients caused by pumping from nearby supply wells HP-616, HP-645, HP-646, and HP-647 (Plate 1). The relatively large concentrations of BTEX components observed at water-supply well HP-645 during November 1986 and February 1987 (Table C10) are possibly related to the same BTEX source or sources noted at Site 2. Benzene and toluene were determined in monitor wells at Site 2 only infrequently and at substantially lower concentrations compared to concentrations of ethylbenzene and total xylenes (Table C20). Although published histories make no mention of storage or disposal of contaminants other than pesticides at Site 2, the occurrence of PCE, TCE, and BTEX components in the shallow and deep subsurface indicates that these contaminants were present at the site, but infrequently and in smaller quantities with respect to PCE and TCE and in substantial quantities with respect to BTEX components.

Concentrations of DDT and metabolites of DDT in groundwater samples from monitor wells were small and generally but not entirely isolated to the vicinity of Building 670. Concentrations in monitor well 02-GW09, north of Site 2, ranged from 0.73 to 1.5 µg/L. Concentrations in monitor well 02-GW08, south of Site 2, ranged from about 4 to 9.4 µg/L. In monitor wells 02-GW10 and 02-GW11, in the immediate vicinity of Building S670, concentrations ranged from about 0.1 to 2.0 µg/L.

In addition to groundwater sampling, sediment samples were collected for analyses during the IAS and the Confirmation Study from a drainage ditch that parallels the Camp Lejeune Railroad along the eastern boundary of Site 2 (Figure C3). The ditch drains to the north-northwest toward Overs Creek and ultimately to Northeast Creek (Plate 1). Sediment samples were collected in August 1984 and December 1986 at locations upstream and downstream of the defined Site 2 area. Metabolites of DDT and DDT were detected at both locations and ranged in concentration from about 100 to 4,000 µg/kg. Concentrations were generally greatest in the upstream samples. Two surface-water samples were collected in December 1986 in the drainage ditch at locations congruent with the collection of sediment samples. Concentrations of DDT and DDT metabolites were detected in both samples at less than 1.0 µg/L. The upstream location was located approximately 100 ft west of monitor well 2GW04 and immediately west of the tracks of the Camp Lejeune Railroad. The downstream sample was located about 200 ft north of Building 670. Additional sediment samples were collected as part of the RI during April 1993 at three locations along Overs Creek and at 21, mostly paired, locations along the drainage ditch that parallels the tracks of the Camp Lejeune Railroad. Samples were collected at depths of 6 to 12 inches bgs. At Overs Creek,

concentrations of DDT and metabolites of DDT in sediments ranged from 11 to 460 µg/kg. Concentrations generally decreased in the downstream direction. Concentrations of DDT and DDT metabolites in sediment samples collected along the drainage ditch ranged from about 11 to 700,000 µg/kg. Concentrations were greatest opposite Building 670 (Figure C3) and decreased substantially to the north toward Overs Creek and to the south to the vicinity of monitor well 02-GW03. No pesticides were detected in water samples collected from Overs Creek. Metabolites of DDT and DDT were determined in only one water sample from the drainage ditch at concentrations of 0.76 and 2.3 µg/L, respectively. The sample location was about 300 ft north of Building 670.

A total of 64 locations in the immediate vicinity of Site 2, as well as north and south of the site, were selected for the collection of surface and subsurface soil samples during the final RI. The pesticides DDT and metabolites of DDT and, to a lesser degree, chlordane occurred ubiquitously in soil samples throughout and near the site. Concentrations of DDT and DDT metabolites in surface soil samples collected between 0 and 6 inches bgs were greatest between Building 712 and the Camp Lejeune Railroad in a former mixing pad area and were as high as 3,000,000 µg/kg. Subsurface soil samples were collected between 2 and 6 ft bgs. Concentrations of DDT and DDT metabolites were as high as 130,000 µg/kg in subsurface soil and also were greatest in the vicinity of the former mixing pad area (Baker Environmental, Inc. 1994h). Such conditions indicate that pesticide occurrences in the subsurface probably occurred as a result of small accidental spills, drainage from equipment washing, and disposal of excess or dated materials (Environmental Science and Engineering, Inc. 1990).

Installation Restoration Site 3—Old Creosote Site (Also Known as the Sawmill Site)

The old creosote plant was located directly east of supply well HP-613 and the Camp Lejeune Railroad (Figure C4, Plate 1). The site was active during 1951 and 1952 to supply treated ties for the construction of the Camp Lejeune Railroad. Logs were cut into ties at the onsite sawmill and were pressure treated with hot creosote. The creosote was stored nearby in a railroad tank car. The creosote plant and sawmill were dismantled and sold following completion of the railroad. Total site area is about 5 acres. Published site histories indicate that creosote was not disposed of onsite (Baker Environmental, Inc. 1996f; Haliburton NUS 1992a).

Following the dismantling and sale of the sawmill and creosote plant, Site 3 was apparently used as a disposal site for mess hall grease, transformer oil, and drums of an unknown material, possibly pesticides. Several trenches approximately 130 ft long and 30 ft wide were constructed at the site and used for disposal (Wallace Eakes, trip report, written communication, February 3, 1983; CERCLA Administrative Record file #93).

Groundwater sampling at Site 3 began during the summer of 1991 in conjunction with a Site Investigation (SI)

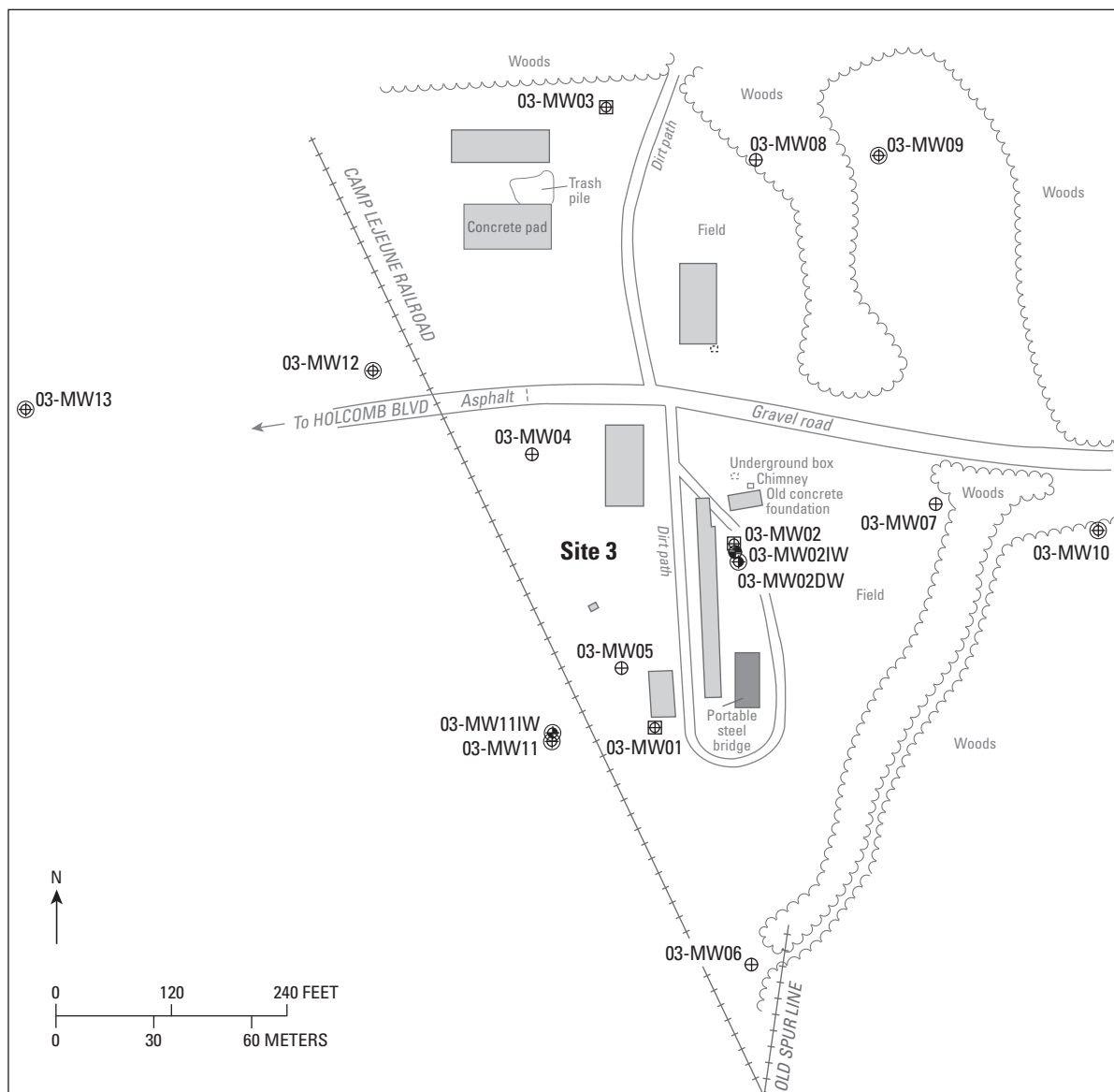
(Haliburton NUS 1992a). Monitor wells 03-MW01–03-MW03 were constructed during June 1991 and were open to the Brewster Boulevard aquifer system (Figure C4, Table C21). Water samples collected in these wells at this time were not analyzed for contaminants of interest to this study; however, the groundwater sample collected in monitor well 03-MW02 did contain several polycyclic aromatic hydrocarbons (PAHs; also known as polycyclic aromatic hydrocarbons and polynuclear aromatic hydrocarbons) in concentrations greater than 1,000 µg/L. Samples collected in monitor wells 03-MW01 and 03-MW03 did not contain concentrations of PAH compounds above detection limits.

Sixteen surface soil and subsurface soil samples also were collected at this time for PAH analysis, two each from five soil boring locations and two each during the construction of each monitor well. Collection depth of the surface samples was 0 to 2 ft bgs. Collection depth of the subsurface samples varied between 3 and 17 ft bgs. The soil sample collected during the construction of monitor well 03-MW02 at a depth of 15 to 17 ft bgs contained total PAH concentrations greater than 35,000 µg/kg. Surface-soil samples collected in the vicinity of well 03-MW02 at depths ranging from 0 to 2 ft bgs also contained several PAH compounds at concentrations greater than 1,000 µg/kg (Haliburton NUS 1992a).

Collection of groundwater and soil samples and subsequent analyses for contaminants of interest to this study began during the RI in September 1994 and continued to the completion of the RI during July 1995. Monitor wells 03-MW04–03-MW13 were constructed during this period (Figure C4, Table C21). Most newly constructed wells were open to the Brewster Boulevard aquifer system; however, wells 03-MW02IW and 03-MW11IW were constructed open to the Tarawa Terrace aquifer between 71.5 and 87 ft bgs. Well 03-MW02DW was constructed open to the Upper Castle Hayne aquifer–River Bend unit between 125 and 140 ft bgs. Surface-soil and/or subsurface soil samples were collected during the construction of each monitor well.

Groundwater samples were collected in monitor wells on three occasions between December 1994 and July 1995. PCE, TCE, and related constituents occurred infrequently throughout Site 3 in low concentrations or in concentrations below detection limits (Table C22). Concentrations of PCE in all monitor wells ranged from below detection limits to 22 µg/L in well 03-MW11IW. This sample was obtained from the Tarawa Terrace aquifer as was the sample in monitor well 03-MW02IW, which contained PCE at a concentration of 9.3 µg/L. Detection of PCE also occurred in well 03-MW02DW from the Upper Castle Hayne aquifer–River Bend unit (6.1 µg/L). An estimated concentration of TCE was detected in a sample from well 03-MW02IW at 1.0 µg/L. Concentrations of *cis*-1,2-DCE greater than detection limits were also determined in well 03-MW02IW at 0.4 and 0.7 µg/L. The maximum TCE concentration at Site 3 of 11 µg/L was detected in well 03-MW11IW from the Tarawa Terrace aquifer.

Components of BTEX occurred in several monitor wells at Site 3. Benzene concentrations above detection limits



EXPLANATION

Monitoring well and identifier

03-MW03	Shallow (installed prior to the remedial investigation conducted in October 1994)	03-MW11	Shallow (installed during the third phase of the soil investigation, June 12 through June 29, 1995)
03-MW06	Shallow (installed during the second phase of the soil investigation, November 15 through November 22, 1994)	03-MW11IW	Intermediate (installed during the third phase of the soil investigation, June 12 through June 29, 1995)
03-MW02IW	Intermediate (installed during the second phase of the soil investigation, November 15 through November 22, 1994)	03-MW02DW	Deep (installed during the third phase of the soil investigation, June 12 through June 29, 1995)

Figure C4. Monitor well locations at Installation Restoration Site 3—old creosote site, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1997a).

ranged from an estimated 1.7 µg/L in monitor well 03-MW02 to an estimated 40 µg/L in well 03-MW08 (Table C23). BTEX components occurred most frequently in the Brewster Boulevard upper aquifer in monitor well 03-MW02, where total BTEX concentrations ranged from an estimated 1.0 to about 60 µg/L. Total BTEX included concentrations of benzene, toluene, ethylbenzene, and total xylenes. Concentrations of total BTEX decreased from high to low between 1999 and 2004. BTEX components also occurred at Site 3 in the Tarawa Terrace aquifer (03-MW02IW) and the Upper Castle Hayne aquifer–River Bend unit (03-MW02DW) (Baker Environmental, Inc. 1996f). The occurrence of DNAPL and BTEX (LNAPL) components at depths ranging from 72 to 140 ft (Table C21) indicates substantial downward vertical migration from the water table had occurred at Site 3 prior to the onset of monitoring in 1994 (Tables C22, C23). Such migration probably occurred largely by advection along downward vertical head gradients caused by pumping from nearby supply wells, probably HP-613, HP-617, and HP-654. BTEX components in the subsurface at Site 3 possibly occurred originally as spills or leaks from ASTs used to store fuel to heat creosote for the pressure treatment of railroad ties.

Contamination of groundwater by PCE, TCE, and related constituents possibly occurred from disposal in trenches constructed at Site 3. Detection of PAH compounds also occurred in monitor wells open to the Brewster Boulevard aquifer system, the Tarawa Terrace aquifer, and the Upper Castle Hayne aquifer–River Bend unit. Within the Brewster Boulevard aquifer system, total PAH concentrations ranged from an estimated 5.0 µg/L in well 03-MW07 to 1,923 µg/L in well 03-MW02. In well 03-MW02IW, open to the Tarawa Terrace aquifer, total PAH concentrations ranged from an estimated 48 to 244 µg/L. Within the Upper Castle Hayne aquifer–River Bend unit, the maximum total PAH concentration detected was 3,895 µg/L in well 03-MW02DW (Baker Environmental, Inc. 1996f).

A total of 51 surface soil samples were collected during the RI at Site 3 at depths of 0 to 1 ft bgs and analyzed for PAH constituents and several BTEX components. With the exception of several locations used for background analyses, all sampling locations were located between the woods boundary shown in Figure C4 and the tracks of the Camp Lejeune Railroad. Estimated low concentrations of toluene (2.0 µg/kg) were detected in the immediate vicinity of monitor wells 03-MW02IW and 03-MW13. Ethylbenzene was detected in the vicinity of well 03-GW02 at estimated concentrations of 2.0 and 6.0 µg/kg. Similar analyses for PAH constituents and BTEX components were conducted for 28 subsurface soil samples collected at varying depths, depending on the location of the water table. Toluene was detected in samples at or in the vicinity of well 03-MW02IW at concentrations of 18 µg/kg (5 to 7 ft bgs) and 423 µg/kg (7 to 9 ft bgs). The maximum total PAH concentration in the subsurface was 402,300 µg/kg

(7 to 9 ft bgs) and occurred in the immediate vicinity of monitor wells 03-MW02DW and 03-MW02IW.

Following completion of the final RI, an FS was initiated to address remediation of groundwater contamination at Site 3 (Baker Environmental, Inc. 1996b). In 1998, a remediation approach was selected and included in a final ROD between the Department of the Navy and the U.S. Marine Corps, the North Carolina Department of Environment, Health, and Natural Resources, and USEPA Region IV (Baker Environmental, Inc. 1997a). Implementation of the ROD included a reliance on semiannual monitoring of groundwater conditions at Site 3 to observe attenuation of contaminant concentrations (Tables C22, C23). Monitoring results were published in a series of reports beginning in 1998 (Baker Environmental, Inc. 1998f, 1999gh; Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000ci, 2003; Baker Environmental, Inc. and CH2M Hill, Inc. 2001c, 2002cjk; CH2M Hill, Inc. and Baker Environmental, Inc. 2001a; CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2001b; Engineering and Environment, Inc. and Michael Baker Jr., Inc. 2004d; Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2003b). Most monitor wells were sampled periodically following completion of the RI and the adoption of the ROD (Tables C22, C23). Wells 03-MW01, 03-MW03, 03-MW04, 03-MW05, 03-MW08, 03-MW09, 03-MW10, and 03-MW12 were abandoned for sampling purposes after 1995 for a variety of reasons, including questions regarding the integrity of well construction and insufficient development of the well following construction.

Concentrations of PCE, TCE, and related degradation products were detected infrequently in Site 3 monitor wells during routine monitoring between years 1995 and 2004 (Table C22). Detections of PCE occurred in several monitor wells during years 1998 and 1999 at concentrations ranging from an estimated 3.0 to 22 µg/L. Concentrations of TCE were detected less frequently between 1995 and 2004 and were generally lower than corresponding PCE concentrations, ranging from an estimated 1.0 to 11 µg/L. In 2004, degradation products 1,1-DCE and *cis*-1,2-DCE were detected in monitor well 03-MW02IW at estimated concentrations of 0.4 µg/L.

Concentrations of BTEX components were frequently observed above detection limits in several monitor wells between 1995 and 2004. All BTEX components were consistently detected in monitor well 03-MW02 during 1994 and 1995 at concentrations ranging from an estimated 1.7 to 34 µg/L. Benzene was detected in low concentrations ranging from an estimated 0.1 to 0.3 µg/L in well 03-MW02IW during 2002–2004. Benzene, toluene, and total xylenes were detected in monitor wells 03-MW07 and 03-MW08 during December 1994 at concentrations ranging from an estimated 5 to 40 µg/L.

Installation Restoration Site 6— Storage/Disposal Lots 201 and 203

Storage/disposal lots 201 and 203, termed lot 201 or lot 203 in the following text, are located south of Wallace Creek and within the triangular area north of the intersection of Holcomb Boulevard and Piney Green Road (Figure C5, Plate 1). Lot 203 is located north of lot 201 and is separated from lot 201 by wooded areas and a west-east trending secondary road. The boundaries of both lots are explicitly defined by encircling fences (Figure C5). Lot 201 encompasses an estimated area of 25 acres; lot 203 encompasses an estimated area of 46 acres (Water and Air Research, Inc. 1983). Wooded areas generally surround both lots and may have been occasionally used for waste disposal. The wooded area between the northern boundary of lot 203 and Wallace Creek generally corresponds to IR Site 82 (Figures C1 and C5, Plate 1). IR Site 9 is located immediately south of lot 201. The environmental histories of Sites 9 and 82 are described herein in forthcoming sections.

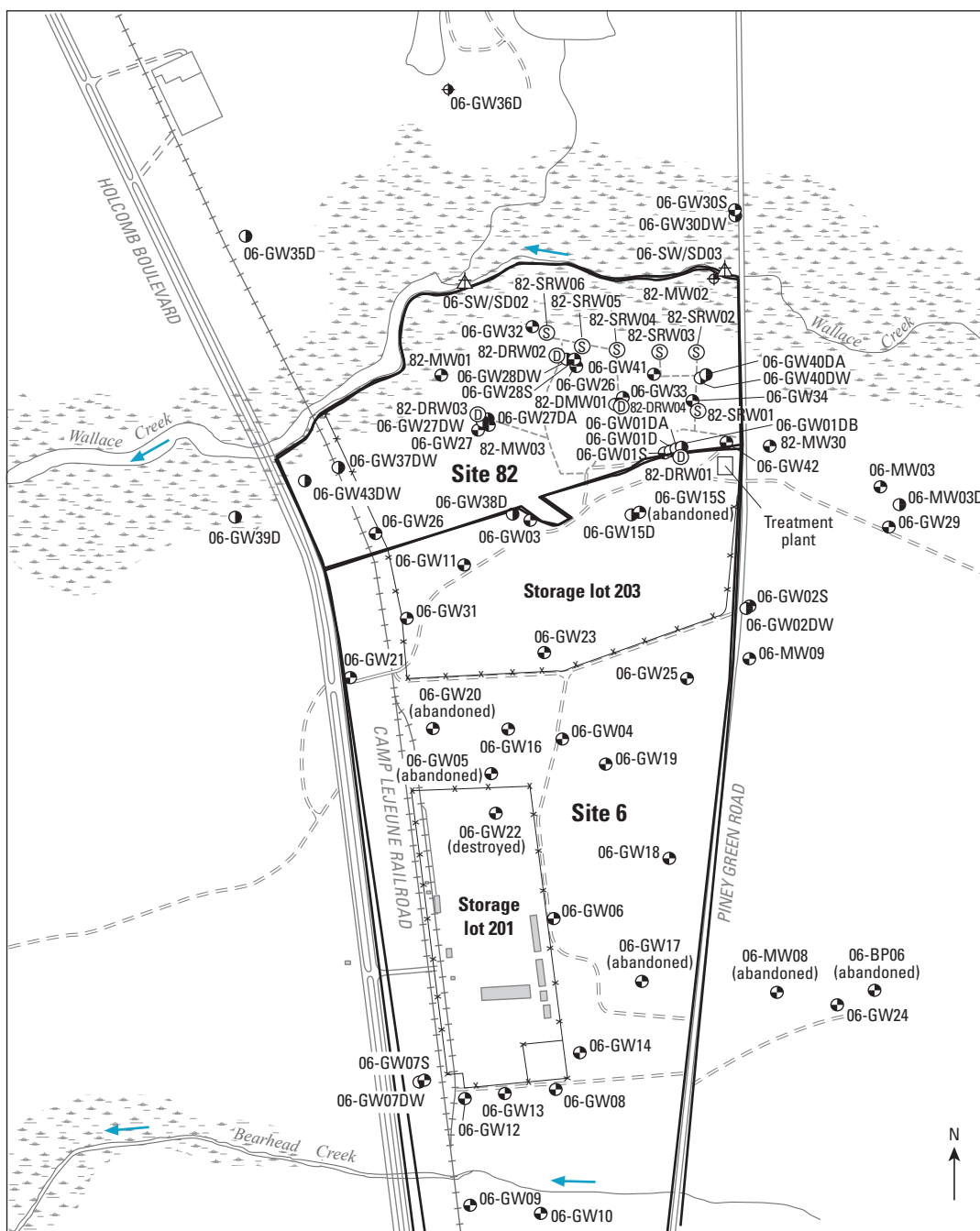
Lot 203 was actively used for waste disposal, probably as early as the 1940s. Active waste disposal at lot 203 was probably ongoing as late as 1981 (F.W. Mount, Defense Property Disposal Office Inspection General Discrepancy, written communication, May 28, 1991; Camp Lejeune Water Documents CLW #6002, #6003) and was terminated by 1991 (Baker Environmental, Inc. 1992b). Storage of military supplies and equipment was ongoing at lot 201 in 1992 and possibly continues to date (2010). No disposal activities were documented at lot 201; however, the lot reportedly was previously used for the storage of pesticides and transformers (Baker Environmental, Inc. 1992b). The pesticide DDT reportedly was disposed of in the southeastern part of lot 203 (Baker Environmental, Inc. 1992b). Otherwise, waste disposal at lot 203 was not documented, and no information is available regarding what materials were disposed of, the volumes of disposed materials, or the disposal locations within the lot area. A site reconnaissance by Baker Environmental, Inc. (1992b) resulted in the detection of various empty and full 55-gal drums littering the surface of lot 203 along with ordnance, crates of metal cleaner, shredded tires, empty ASTs, batteries, unlabeled drums, and many types of other materials. Drums were observed in several groups of 20 or less throughout the site. According to various labels, drums contained or had contained lubricants, petroleum products, and corrosives. Anecdotal reports of waste handling at lot 203 include disposal of polychlorinated biphenyls (PCBs), cleaning solvents, electrolytes from used batteries, and waste oils (Baker Environmental, Inc. 1993k).

Investigations of groundwater contamination at Site 6 began in October 1986, during the Characterization Step of the NACIP Confirmation Study, with the construction of eight monitor wells open to the Brewster Boulevard aquifer system (06-GW01S, 06-GW02S, 06-GW03, lot 203; 06-GW04–06-GW07S, 06-GW08, lot 201; Figure C5, Table C24). Groundwater sampling for VOCs of interest to this study began in November 1986 (Tables C25, C26).

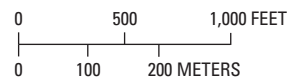
Additional sampling for VOCs in groundwater occurred during January 1987 and during the final Site Assessment–Characterization Study in January 1991 (Environmental Science and Engineering, Inc. 1987, 1992b). The final RI at Site 6 began during 1992 and resulted in the construction of and sample collection in 19 additional shallow monitor wells (06-GW09–06-GW23, 06-GW25, 06-GW26, and 06-GW26S) and 5 deep monitor wells (06-GW01D, 06-GW02DW, 06-GW07DW, 06-GW27DW, and 06-GW28DW) (Figure C5, Table C24). Two sampling rounds were accomplished during the RI—one during the fall of 1992 and one during the spring of 1993 (Tables C25, C26).

Following completion of the final RI and a final FS, several approaches were selected to remediate contaminated groundwater at Site 6, including groundwater extraction and treatment, implementation of long-term groundwater monitoring, implementation of vapor extraction methods to enhance volatilization of VOCs within contaminated soils, and excavation of soil contaminated with PCBs and pesticides. These and other remediation methods were included in an ROD between the Department of Navy and the U.S. Marine Corps, the State of North Carolina, and USEPA Region IV, which was signed in 1993 (Baker Environmental, Inc. 1993ef). Subsequently, groundwater monitoring occurred routinely on a quarterly, semiannual, or annual basis in most monitor wells. Results of groundwater monitoring were published in a series of reports beginning in 1992 (Environmental Science and Engineering, Inc. 1992b; Baker Environmental, Inc. 1993k, 1997e, 1998ghi, 1999de; Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000e; CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2000b; Baker Environmental, Inc. and CH2M Hill, Inc. 2001a, 2002b; Michael Baker Jr., Inc. and CH2M Hill, Inc. 2003; Engineering and Environment, Inc. and Michael Baker Jr., Inc. 2004b; Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2004). A report summarizing the final basis of design for site remediation was completed in 1994 (Baker Environmental, Inc. 1994a).

Numerous tables listing concentrations of BTEX components and PCE, TCE, and related degradation products are included in the foregoing list of reports and indicate that concentrations of PCE and TCE in groundwater occurred above detection limits in much of the eastern part of Site 6 as well as throughout much of adjacent Site 82. The number 1 monitor well array is located within lot 203 near the boundary of Sites 6 and 82 in the northeastern part of Site 6 (Figure C5). Monitor wells in the number 1 array include 06-GW01S (open to the Brewster Boulevard aquifer system), 06-GW01D (open to the Upper Castle Hayne aquifer–River Bend unit), and wells 06-GW01DA and 06-GW01DB (open to the Middle Castle Hayne aquifer). TCE and PCE were detected in each well of the array. Concentrations of TCE were greatest in well 06-GW01D, open to the Upper Castle Hayne aquifer–River Bend unit between 103 and 112 ft bgs, and ranged, at various times, between 6,400 and 180,000 µg/L. Corresponding concentrations of total 1,2-DCE and vinyl chloride ranged between 730 and 36,000 µg/L and between 10 and 800 µg/L,



Base modified from LANTDIV, October 1991



EXPLANATION

- | | |
|---|--|
| <ul style="list-style-type: none"> ▲ 06-SW/SD03 Surface-water/sediment sample and identifier — Approximate site boundary → Direction of surface-water flow | <p>Well type and identifier</p> <ul style="list-style-type: none"> ⊙ 82-SRW01 Shallow recovery ⊕ 82-DRW01 Deep recovery ⊗ 06-GW14 Shallow monitoring ⊖ 06-GW39D Deep monitoring |
|---|--|

Figure C5. Monitor well locations at Installation Restoration Sites 6 and 82—storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from CH2MHill Federal Group, Ltd. and Baker Environmental, Inc. 2000b).

Installation Restoration Program Site Investigations and Histories

respectively, indicating that degradation pathways were essentially complete at Site 6 as early as 1993 (Table C25). Concentrations of PCE detected in monitor well 06-GW01D ranged between an estimated 210 and 2,000 µg/L. Concentrations of TCE detected in monitor wells 06-GW01DA and 06-GW01DB, open to the Middle Castle Hayne aquifer, ranged from less than 1.0 to 160 µg/L. Corresponding PCE concentrations were 1.0 µg/L and an estimated 2.9 µg/L, respectively. Other monitor wells within or adjacent to lot 203 that contained concentrations of PCE and/or TCE greater than detection limits were 06-GW02DW, 06-GW03, 06-GW15D, 06-GW21, 06-GW23, and 06-GW38D (Figure C5, Table C25). Concentrations of TCE in these wells ranged from less than 1.0 to 34 µg/L. Concentrations of TCE as great as 160 µg/L in those wells open to the Middle Castle Hayne aquifer at Site 6 indicate substantial contamination of groundwater within lot 203 at depths in excess of 200 ft bgs (Tables C24, C25). The number 1 monitor well array is located only about 500 ft from supply well HP-651 (Tables C3, C24). The contaminants noted at Site 6 in wells 06-GW01D and 06-GW01DA, within the Upper Castle Hayne aquifer–River Bend unit and Middle Castle Hayne aquifer, respectively, probably are a major source of the TCE and PCE detected in well HP-651 (Table C7) and, consequently, are also the likely source of TCE and *trans*-1,2-DCE detected throughout the Holcomb Boulevard water-supply network during January and February 1985 (Table C13). Similarly, the same source or nearby sources are probably the origin of the TCE detected in supply well HP-653 during January 1985 and November 1986 (Table C7). Supply well HP-653 is located approximately 3,100 ft directly north of monitor well 06-GW01D (Plate 1).

The distribution of BTEX components in groundwater at lot 203 somewhat mirrored that of the chlorinated alkenes. Concentrations of all BTEX components were above detection limits at various times in monitor well 06-GW01D. Benzene was most commonly observed at concentrations ranging from less than 1.0 to 8.0 µg/L. Benzene, ethylbenzene, and total xylenes also were detected in monitor well 06-GW01S between years 1986 and 2004. The maximum concentration of benzene in this well was 3.1 µg/L. Components of BTEX also were detected at least once in monitor wells 06-GW03 and 06-GW11. Concentrations in these wells were 1.0 µg/L or less.

The fact that BTEX components, an LNAPL, and concentrations of PCE, TCE, and related degradation products were detected in well 06-GW01D, a deep well open to the Upper Castle Hayne aquifer–River Bend unit at more than 100 ft bgs, indicates that downward vertical migration was largely by advection along downward vertical head gradients. Such gradients were probably caused by pumping at nearby supply well HP-651 and, to a lesser degree, pumping at wells HP-610, HP-619, HP-633, HP-636, and HP-653, when they were active. Pumping, particularly at supply well HP-651, probably also enhanced the downward vertical migration

of DNAPLs PCE, TCE, and related degradation products detected in the Middle Castle Hayne aquifer in monitor wells 06-GW01DA and 06-GW01DB (Figure C5, Table C25).

In addition to the groundwater samples collected at lot 203 during the Characterization Step of the NACIP Study, two surface-water samples were collected from Wallace Creek during November 1986—one sample each upstream and downstream of Piney Green Road (Figure C5, Plate 1). Vinyl chloride and *trans*-1,2-DCE were detected in samples from both locations at concentrations of 1.9 and 3.6 µg/L and 6.4 and 35 µg/L, respectively, upstream and downstream. A concentration of 26 µg/L of TCE was detected at the downstream location (Environmental Science and Engineering, Inc. 1992b). Two surface-water samples also were collected during January 1991 from Wallace Creek—one upstream at Piney Green Road and one downstream at Holcomb Boulevard. A concentration of 5.0 µg/L of TCE was detected in the downstream sample (Baker Environmental, Inc. 1993k).

A total of 11 surface-water sampling locations were established at Wallace Creek during the final RI at Site 6, and 6 of these bordered Site 82 at intervals from just upstream of Piney Green Road to just downstream of Holcomb Boulevard. With respect to these six locations, toluene, 1,2-DCE, TCE, and PCE were determined in one or more samples during August 1992. TCE and 1,2-DCE occurred most frequently ranging in concentration from 3.0 to 98 µg/L and 2.0 to 85 µg/L, respectively. Concentrations were greatest about 750 ft upstream of Holcomb Boulevard. Concentrations of pesticides above detection limits were not observed in surface-water samples from Wallace Creek during the final RI. Surface-water samples also were collected during the final RI at seven locations from Bearhead Creek, located south of lot 201 (Plate 1), during August and October 1992. Concentrations of pesticides and VOCs of interest to this study were not observed greater than detection limits in water samples from the Bearhead Creek locations (Baker Environmental, Inc. 1993eik).

Two staff gages were established at Wallace Creek during the final RI—one upstream at Piney Green Road and the other downstream at the Camp Lejeune Railroad (Figure C5, Plate 1). Water levels at the gages observed once during April 1993 were 1.2 and 1.0 ft above NGVD 29, respectively.

Sediment samples were collected during the final RI from the streambeds of Wallace and Bearhead Creeks, congruent with most of the surface-water sampling locations mentioned previously. Sediments were collected at several depths at each location; however, the depths were not recorded (Baker Environmental, Inc. 1993k). At Wallace Creek, concentrations of DDT and DDT metabolites were detected in 15 of 33 sediment samples, inclusive of 9 of 11 sampling locations. Concentrations ranged from 4.8 to 1,200 µg/kg. Of the VOCs of interest, total 1,2-DCE was detected at one location at a concentration of 31 µg/kg, and TCE was detected at one location at

concentrations of 7.0 and 23 $\mu\text{g}/\text{kg}$. Of the BTEX components, concentrations of total xylenes occurred above detection limits at two locations at 26 $\mu\text{g}/\text{kg}$ and an estimated 120 $\mu\text{g}/\text{kg}$. Toluene occurred at two locations at estimated concentrations of 4.0 and 5.0 $\mu\text{g}/\text{kg}$ (Baker Environmental, Inc. 1993ei).

Streambed sediments were also collected at 7 of 15 locations at Bearhead Creek. Concentrations of DDT and metabolites of DDT were detected in 11 of 20 samples inclusive of 4 locations ranging from 5.7 $\mu\text{g}/\text{kg}$ to an estimated 220 $\mu\text{g}/\text{kg}$. Chlordane was detected at a single location at an estimated concentration of 14 $\mu\text{g}/\text{kg}$. Of the chlorinated alkenes of interest, TCE concentrations above detection limits occurred in streambed sediment samples from two Bearhead Creek locations at an estimated 5.0 $\mu\text{g}/\text{kg}$ and 120 $\mu\text{g}/\text{kg}$. PCE was detected once at an estimated concentration of 3.0 $\mu\text{g}/\text{kg}$. BTEX components that occurred above detection limits in sediment samples from Bearhead Creek included an estimated concentration of 57 $\mu\text{g}/\text{kg}$ of ethylbenzene at a single location. Benzene also was detected at a single location at an estimated concentration of 5.0 $\mu\text{g}/\text{kg}$. Total xylenes were detected at two locations at estimated concentrations of 5.0 and 380 $\mu\text{g}/\text{kg}$ (Baker Environmental, Inc. 1993ei).

At lot 201, contaminants of interest to this study occur in monitor wells only infrequently and in substantially lower concentrations compared to groundwater conditions at lot 203. Concentrations of PCE, TCE, and most related degradation products occurred above detection limits in monitor well 06-GW16 at various times between 1992 and 2004. Maximum observed concentrations of TCE and total 1,2-DCE were 17 and 33 $\mu\text{g}/\text{L}$, respectively (Table C25). An estimated concentration of 2.0 $\mu\text{g}/\text{L}$ of vinyl chloride was detected during January 1993, indicating that degradation pathways were essentially complete within the source area contributing to that volume of the Brewster Boulevard aquifer system sampled by the well. TCE was detected twice in well 06-GW07DW during November 1992 and March 1993 at concentrations of 1.2 and 2.1 $\mu\text{g}/\text{L}$, respectively. Well 06-GW07DW is open to the Upper Castle Hayne aquifer–River Bend unit between 90.5 and 99.5 ft bgs (Table C24). PCE concentrations greater than detection limits were determined twice in monitor well 06-GW22 during October 1992 and March 1993 at 1.2 and 1.4 $\mu\text{g}/\text{L}$, respectively.

Groundwater contamination by BTEX components was observed at only one location at lot 201 in monitor well 06-GW16. Concentrations of all BTEX components, with the exception of ethylbenzene, were above detection limits in this well at least once between 1992 and 2004, ranging from an estimated 0.2 to 9.0 $\mu\text{g}/\text{L}$ (Table C26). The concentrations of PCE, TCE, and related degradation products, as well as BTEX components, in monitor well 06-GW16 indicate that the well is located near a possible inactive VOC disposal area.

Surface-soil samples and subsurface soil samples were collected periodically at Site 6, beginning with the Verification

Step of the Confirmation Study during August 1984. Ten samples were collected each at lots 201 and 203 from 0 to 3 ft bgs and were analyzed only for DDT and metabolites of DDT. Sample locations are unknown. Detections of pesticides ranged in concentration from less than 1.0 to 770 $\mu\text{g}/\text{kg}$ (Environmental Science and Engineering, Inc. 1985). Numerous surface and subsurface samples were obtained during the final RI at lots 201 and 203 and were analyzed for pesticides as well as VOCs of interest to this study and PCBs. A total of 120 surface soil samples were collected at lot 201, and sample locations were concentrated in the southern and northeastern parts of the lot. Analyses of soil samples included determinations of DDT, metabolites of DDT, and chlordane, as well as VOCs; however, not all samples were analyzed using the same constituent schedule. The pesticide DDT and DDT metabolites were detected throughout the sampled parts of lot 201. Concentrations in surface samples ranged from about 3.0 to 1,200,000 $\mu\text{g}/\text{kg}$ and occurred above detection limits in 62 of 96 samples. In subsurface samples, concentrations of DDT and metabolites of DDT at lot 201 ranged from less than 1.0 to 460,000 $\mu\text{g}/\text{kg}$ and occurred above detection limits in 55 of 106 samples. Chlordane occurred in 1 of 96 surface samples at an estimated concentration of 8.9 $\mu\text{g}/\text{kg}$. No VOC concentrations occurred above detection limits in surface samples. In subsurface samples, PCE was detected in one sample in the southeastern part of lot 201 at an estimated concentration of 4.0 $\mu\text{g}/\text{kg}$. BTEX components were detected in one sample in the same area at concentrations ranging from 2,800 to 54,000 $\mu\text{g}/\text{kg}$.

At lot 203, surface soil and subsurface soil samples were collected throughout the site during the final RI at 74 locations, including a ravine area in the north-central part of the lot; most of the locations were in the eastern part of the lot. Concentrations of DDT and DDT metabolites occurred above detection limits in surface samples throughout most of the sampled area in 37 of 66 samples. Concentrations ranged from about 3.4 to 2,100 $\mu\text{g}/\text{kg}$. Chlordane was detected in 4 of 66 surface samples at concentrations ranging from 2.3 to 160 $\mu\text{g}/\text{kg}$. Of the VOCs of interest to this study, a single toluene concentration of 7.0 $\mu\text{g}/\text{kg}$ was determined above detection limits in 1 of 28 surface samples. With respect to subsurface samples, concentrations of DDT and metabolites of DDT at lot 203 occurred above detection limits in 10 of 73 samples. Concentrations ranged from an estimated 3.6 to 470 $\mu\text{g}/\text{kg}$. Chlordane was detected in 1 of 73 samples at an estimated concentration of 140 $\mu\text{g}/\text{kg}$. No VOCs of interest to this study were determined above detection limits in subsurface samples at lot 203 during the final RI (Baker Environmental, Inc. 1993eik).

Installation Restoration Site 9— Fire Fighting Training Pit

The fire fighting training pit, Site 9, is located immediately south of lot 201 and Bearhead Creek between Piney Green Road and Holcomb Boulevard (Figure C1, Plate 1). The immediate site area is approximately 2 acres. Fire training at Site 9 began in the 1960s and continued in operation until at least 1983 (Water and Air Research, Inc. 1983). Initially, fire training activities were conducted in an unlined pit. In 1981, an asphalt liner was installed in the training pit (approximately 8 acres) along with an oil-water separator. Approximately 30,000 gal of used oils, contaminated fuels, and solvents were burned annually during training exercises (Water and Air Research, Inc. 1983; Environmental Science and Engineering, Inc. 1990; Baker Environmental, Inc. 1993m).

Investigations of groundwater contamination at Site 9 began during the Confirmation Study between 1984 and 1986 with the construction of monitor wells 09-GW01, 09-GW02, and 09-GW03 open to the Brewster Boulevard aquifer system (Table C27, Figure C6). Several rounds of groundwater sample collection in these wells occurred between 1984 and 1987, resulting in the detection of no VOCs of interest to this study (Tables C28, C29). The final RI at Site 9 began during 1992 and resulted in the construction of monitor wells 09-GW04–09-GW08 during September 1992. Monitor well 09-GW04 is not shown in Figure C6 and is located approximately 820 ft southeast of well 09-GW01. Well 09-GW07D was constructed open to the Upper Castle Hayne aquifer–River Bend Unit between 100 and 109 ft bgs. Other wells constructed during the final RI were open to the Brewster Boulevard aquifer system (Table C27). Groundwater sampling in these monitor

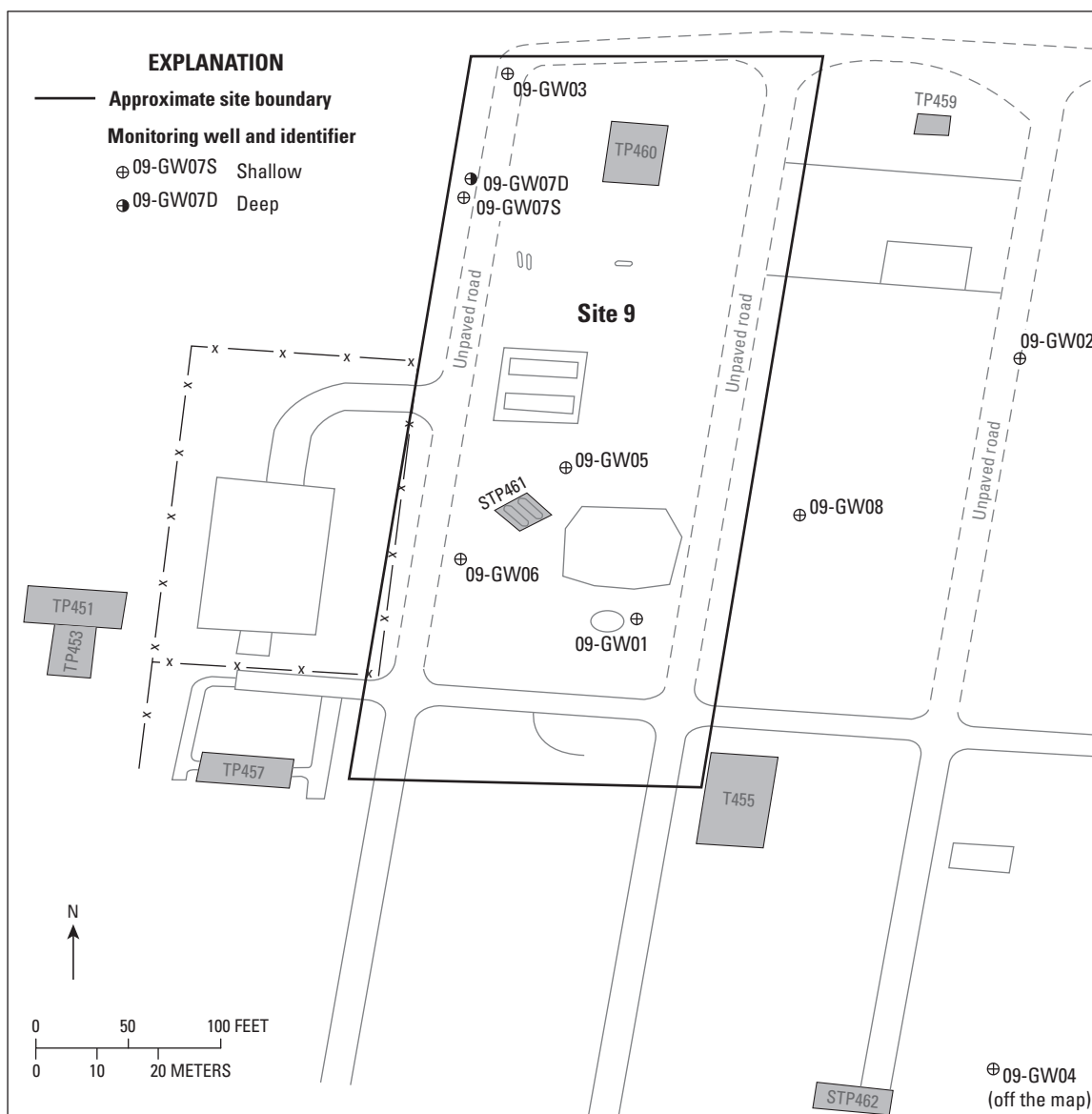


Figure C6. Monitor well locations at Installation Restoration Site 9—fire fighting training pit, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1993b).

wells occurred during October and November 1992 and March 1993. Of the VOCs of interest to this study, a single TCE concentration of 1.2 µg/L occurred above detection limits in well 09-GW07D. Concentrations of BTEX components above detection limits occurred in wells 09-GW06 and 09-GW08 during October 1992 and March 1993. Concentrations ranged from less than 1.0 to 14 µg/L (Tables C28, C29). Concentrations of DDT and DDT metabolites were determined above detection limits in monitor well 09-GW01 during March 1993, ranging from an estimated 0.13 to 1.0 µg/L. Following completion of the final RI and an FS for Site 9, an ROD between the Department of Navy and the U.S. Marine Corps, the State of North Carolina, and USEPA Region IV was signed in 1993 (Baker Environmental, Inc. 1993ef). No additional groundwater monitoring occurred at Site 9 following implementation of the ROD.

Surface soil and subsurface soil samples were collected at Site 9 during the final RI in 1993. Samples were collected at 58 locations throughout Site 9. Depth intervals were not reported; however, surface samples probably were collected between 0 and 6 inches bgs. With respect to surface samples, PCE was detected in one of seven samples at a concentration of 21 µg/kg. The sample location was approximately midway between monitor wells 09-GW05 and 09-GW07S (Figure C6). Toluene was detected also in one of seven samples at an estimated concentration of 2.0 µg/kg. Sample location was in the southwestern corner of Site 9. Concentrations of DDT and DDT metabolites were detected in a total of 5 of 7 samples at concentrations ranging from an estimated 3.3 to 570 µg/kg. The location of maximum concentration was near the location where PCE also was detected. With respect to subsurface soil samples, sampling depths were not recorded; however, sample depth was probably within 5 ft above the water table, based on sampling methods at other IR sites. PCE concentrations occurred above detection limits in 2 of 25 samples at an estimated 2.0 and 3.0 µg/kg. Concentrations of BTEX components in 25 subsurface samples were not above detection limits. Concentrations of DDT and DDT metabolites above detection limits were determined in 7 of 25 samples ranging from 4.0 to 62 µg/kg. Chlordane was detected in one sample at an estimated concentration of 2.9 µg/kg.

Installation Restoration Site 10— Original Base Landfill

The original base landfill (Site 10) is located just west of Holcomb Boulevard and lots 201 and 203 (Sites 6 and 82) and about midway between Wallace and Bearhead Creeks (Figure C1, Plate 1). The area of the original landfill is reported to be approximately 5–10 acres (Baker Environmental, Inc. 2001bc). The IAS reported that the landfill area was a disposal location for construction debris and burn area and probably operated prior to the 1950s. When disposal at the site was terminated is unknown. Records indicating the types and volumes of various debris deposited at the site are also unavailable. Following the IAS, Site 10 was identified as an area not

in need of additional investigation (Water and Air Research, Inc. 1983; Baker Environmental, Inc. 2001bc). In 1994, two marines conducting night maneuvers fell into an open trench and came in contact with an “oily substance.” Because both marines developed a skin rash as a result of this exposure and because Site 10 was considered a possible location for the open trench, additional investigations were conducted at the Site 10 area, beginning with an expedited characterization study in 1995.

Location of the expedited characterization study was limited to a small area near the southwestern boundary of Site 10 (Figure C7). Groundwater samples were collected at this time in three temporary wells open to the Brewster Boulevard upper aquifer [Table C30, 10-TW01 (old)–10-TW03 (old)]. Groundwater samples were obtained from intervals just below the water table probably using direct push or Geoprobe methods. No VOC concentrations of interest to this study were determined above detection limits in these samples. Surface-soil samples also were collected during the expedited characterization study at five locations between land surface and 0.5 ft bgs. Subsurface soil samples were collected at the same locations at depth intervals of 1–3, 3–5, and 7–9 ft bgs. No VOC concentrations of interest to this study were determined above detection limits in any surface or subsurface soil samples. However, concentrations of DDT and metabolites of DDT were determined above detection limits in several surface soil samples ranging from an estimated 3.4 to 9.5 µg/kg. A DDT concentration of 8.2 µg/kg was detected in one subsurface soil sample at a depth range of 3–5 ft bgs.

A final site characterization study at Site 10 was conducted in two phases—Phase I was during March 1998, and Phase II was during February and March 2001 (Baker Environmental, Inc. 2001bc). During Phase I, nine temporary monitor wells [10-TW01 (new)–10-TW09, Table C30] were constructed open to the Brewster Boulevard upper aquifer, and surface soil samples were collected between land surface and 1 ft bgs at 25 locations (Figure C7). Subsurface soil samples were collected at 23 locations in conjunction with surface soil samples at depths ranging from 3–5 ft bgs to 5–7 ft bgs. Surface-water and sediment samples also were collected at two small ponds located within Site 10.

Of the VOCs of interest to this study, none were determined above detection limits in monitor wells during Phase I (Tables C31, C32). During the Phase II investigations, an additional six monitor wells were constructed at Site 10 (10-MW02–10-MW04, 10-MW06, 10-MW08, 10-MW09, Table C30) open to the Brewster Boulevard upper aquifer. Wells constructed during Phase II were permanent monitor wells, were located at six of the locations formerly occupied by temporary wells, and were named accordingly. Samples collected in these wells were not analyzed for VOC contaminants of interest to this study; therefore, only Phase I results are reported herein.

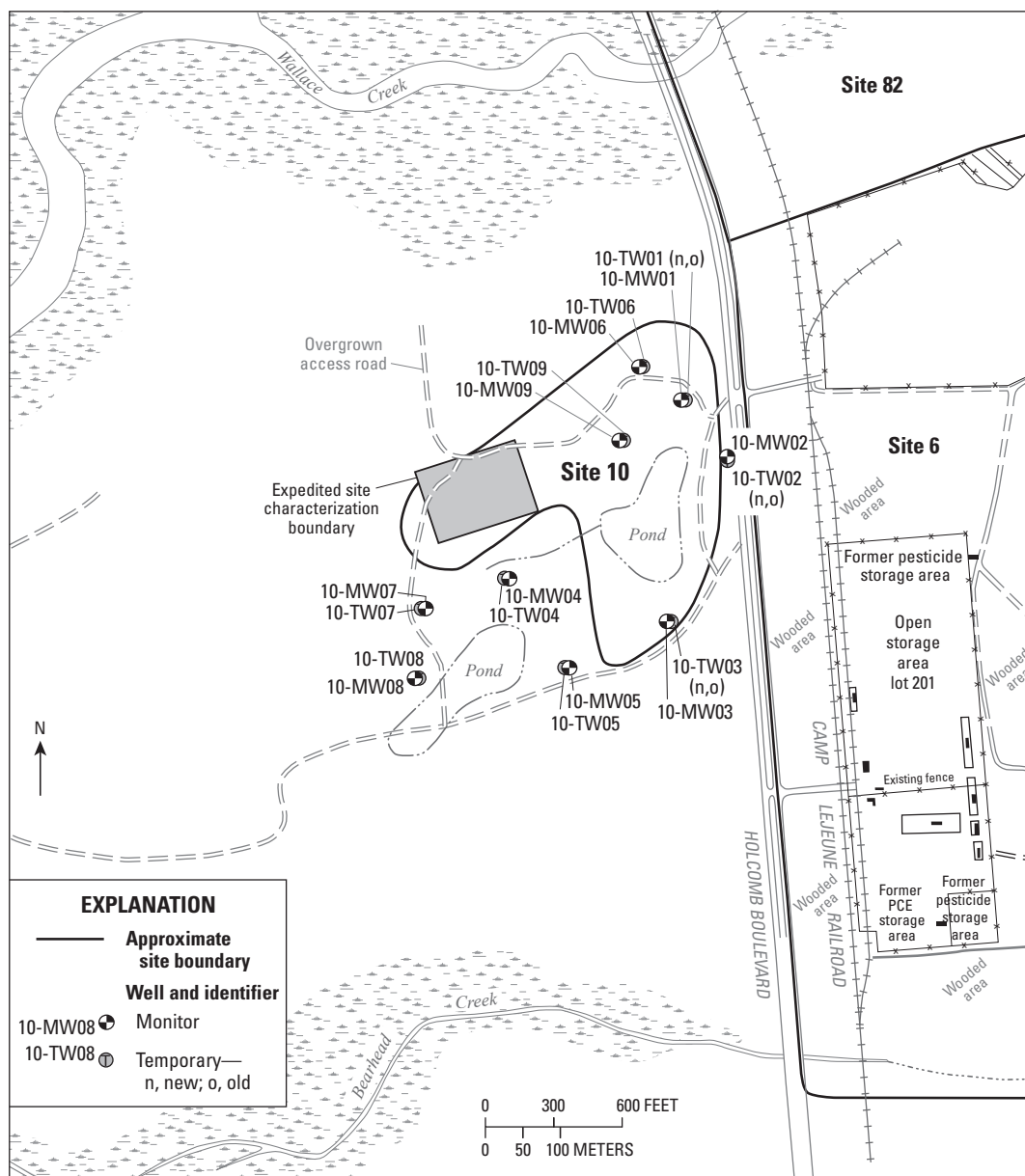
Concentrations of TCE and 1,1-DCE were above detection limits at two locations and one location, respectively, in surface soil samples proximate to test wells 10-TW01 and 10-TW02. Concentrations of TCE were estimated at 2.3 and

Installation Restoration Program Site Investigations and Histories

2.4 $\mu\text{g}/\text{kg}$. The single detection of 1,1-DCE occurred at a concentration of 2.6 $\mu\text{g}/\text{kg}$. Of the BTEX components detected in surface soil samples, benzene occurred once at an estimated concentration of 4.9 $\mu\text{g}/\text{kg}$ at the same location near test well 10-TW02 where TCE and 1,1-DCE also were detected. Toluene was detected in surface soils at 11 of 25 locations throughout Site 10 at concentrations ranging from an estimated 1.3 to 8.3 $\mu\text{g}/\text{kg}$. Concentrations of DDT and DDT metabolites occurred above detection limits at two locations at 3.1 and 6.2 $\mu\text{g}/\text{kg}$. Of the VOCs of interest detected in subsurface soils, only toluene was observed at two locations near test well 10-TW06. Estimated concentrations were 2.0 and 2.6 $\mu\text{g}/\text{kg}$. Concentrations of DDT and DDT metabolites

were not observed above detection limits in subsurface soils. Toluene was the only VOC of interest that occurred in surface-water samples. Toluene occurred above detection limits in a single sample from each pond at an estimated concentration of 1.3 $\mu\text{g}/\text{L}$. Concentrations of toluene also occurred above detection limits in all six sediment samples collected at the two ponds, ranging from an estimated 7.4 to 97 $\mu\text{g}/\text{kg}$. Concentrations of DDT above detection limits occurred in two sediment samples from the southernmost pond. The DDT concentration at both locations was an estimated 4.0 $\mu\text{g}/\text{kg}$.

Following completion of the Phase II investigations, no additional groundwater monitoring occurred at Site 10.



Base modified from U.S. Marine Corps Base Camp Lejeune, North Carolina

Figure C7. Monitor well locations at Installation Restoration Site 10—original base landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 2001c).

Installation Restoration Site 21— Transformer Storage Lot 140

IR Site 21, transformer storage lot 140, is located at the northeast corner of the HPIA and is bounded by Ash Street to the west, Center Road to the south, and an unnamed dirt road to the north (Figure C8, Plate 1). The perimeter of storage lot 140 is bordered by a generally rectangular fence of approximate dimensions 220 by 890 ft, encompassing approximately

4.5 acres. Total site area is about 7 acres. A drainage ditch near the fence surrounds the site and receives runoff from the site during substantial rainfall. Between 1958 and 1977, the site was used for pesticide mixing and equipment washing. Estimated wash discharge was about 350 gal per week. The mixing and wash area was probably located in the southwest corner of the lot. During 1950–1951, an onsite pit located in the northeast corner of the lot was used for disposal of transformer oils. Dimensions of the pit were 25 or 30 ft long

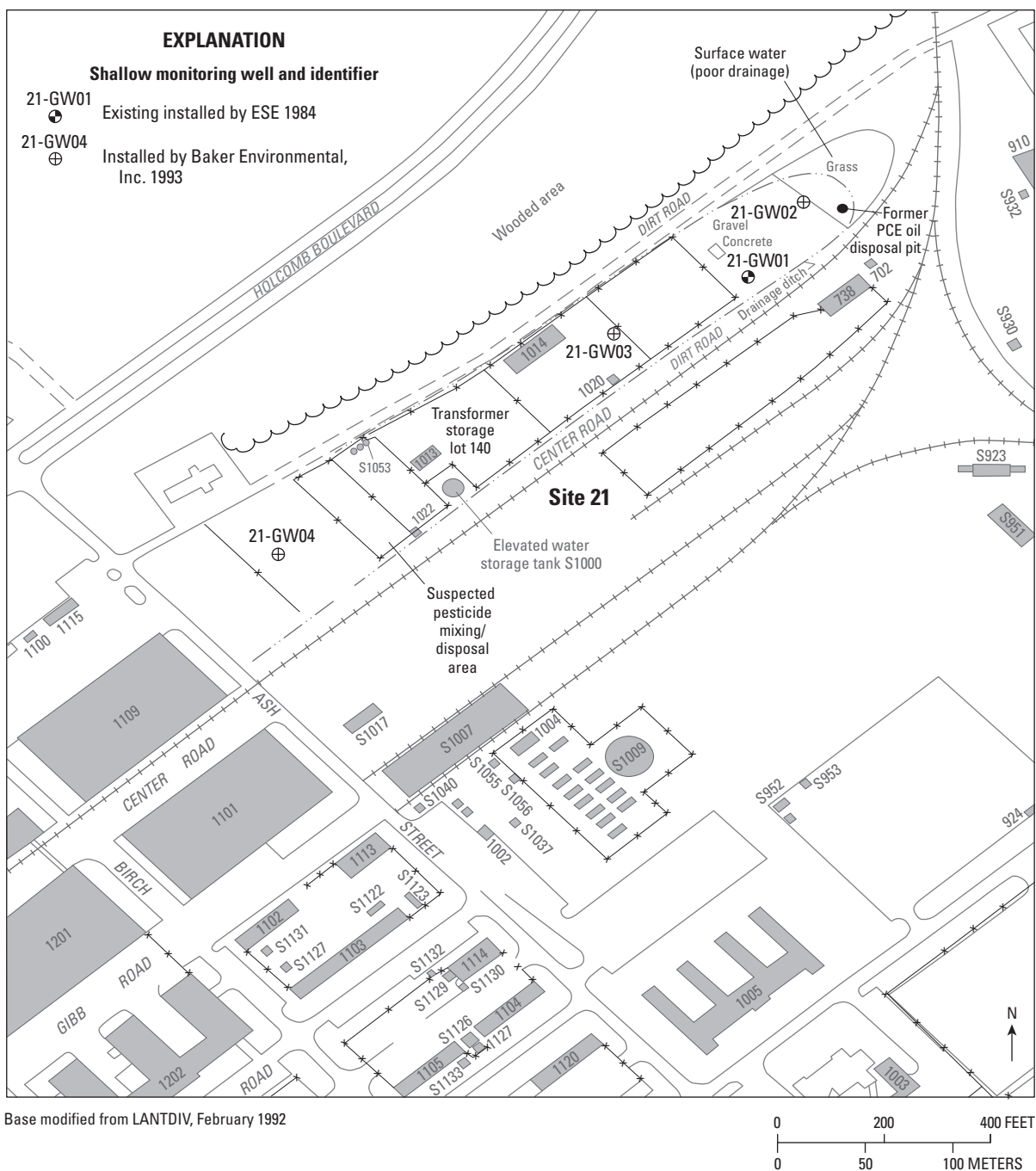


Figure C8. Monitor well locations at Installation Restoration Site 21—transformer storage lot 140, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1994g).

Installation Restoration Program Site Investigations and Histories

by 6 ft wide by 8 ft deep. Sand was used to cover free standing oil at the bottom of the pit (Baker Environmental, Inc. 1994f; Environmental and Safety Designs, Inc. 1995).

The Confirmation Study at Site 21 consisted of a Verification Step and a Confirmation Step. During the Verification Step, in August 1984, 16 soil borings were obtained between land surface and 2 ft bgs at generally regular intervals along the fence that defines the perimeter of lot 140. Samples were collected inside and outside the perimeter fence. Concentrations of VOCs of interest to this study were not determined in soil samples during the Confirmation Study at Site 21. Concentrations of DDT and DDT metabolites above detection limits were determined in all soil samples, ranging from 0.6 to 2,100 $\mu\text{g}/\text{kg}$. No PCBs were determined above detection limits in any soil samples. During the Confirmation Step, in November 1986, soil samples at eight additional locations were collected near the bordering fence. The exact locations of these sampling sites are unknown; however, collection probably occurred along the long dimensions of the perimeter fence, four locations per side. At each location, samples were collected at depths ranging from land surface to 1 ft, 1 to 3 ft, 3 to 5 ft, and at 5 ft bgs. Concentrations of DDT and DDT metabolites were observed above detection limits at five of the eight locations, ranging from 28 to 5,080 $\mu\text{g}/\text{kg}$ and occurred at all depth intervals. Chlordane concentrations were observed above detection limits at two locations at 118 and 203 $\mu\text{g}/\text{kg}$ (Environmental Science and Engineering, Inc. 1987).

During the Verification Step, a single monitor well, 21-GW01, was constructed open to the Brewster Boulevard aquifer system (Table C33). Concentrations of contaminants of interest to this study were first determined in this well during the Confirmation Step in November 1986, and none were observed above detection limits (Tables C34, C35). Concentrations of DDT, DDT metabolites, and chlordane also occurred below detection limits in this well during the Confirmation Step. Monitor well 21-GW01 was sampled again during the final RI for the HPIA in January 1991 with similar results (Environmental Science and Engineering, Inc. 1991, 1992a).

A final RI at Site 21 was accomplished between May and December 1993. Soil borings were advanced at 34 locations throughout Site 21, 3 of which were converted to monitor wells (21-GW02–21-GW04, Figure C8, Table C33). All monitor wells were constructed open to the Brewster Boulevard aquifer system.

Concentrations of BTEX components were detected in groundwater at monitor well 21-GW02 during May 1993, ranging from an estimated 77 to 1,300 $\mu\text{g}/\text{L}$ (Table C34). In addition, an estimated TCE concentration of 41 $\mu\text{g}/\text{L}$ was detected in a sample from monitor well 21-GW02 (Table C35). With these exceptions, no other VOCs of interest to this study were detected in groundwater at Site 21. Concentrations of DDT, DDT metabolites, or chlordane also were not observed above detection limits in groundwater at Site 21 at this time (Baker Environmental, Inc. 1994g).

During the final RI, surface soil samples were collected between land surface and 6 inches bgs. Subsurface soil

samples were collected at varying depths ranging from 2 to 12 ft bgs. Of the VOCs of interest to this study, only concentrations of BTEX components were observed above detection limits in subsurface soils at one location in the southwestern part of Site 21. Concentrations of BTEX components ranged from an estimated 37 to 3,400 $\mu\text{g}/\text{kg}$.

Concentrations of DDT and DDT metabolites occurred above detection limits in surface soils at 18 of 34 locations ranging from 3.6 $\mu\text{g}/\text{kg}$ to an estimated 34,000 $\mu\text{g}/\text{kg}$. Pesticide concentrations occurred throughout the Site 21 area and were greatest in the southwestern part of the site. Chlordane concentrations were detected in surface soils at six locations, also in the southwestern part of Site 21, and ranged from an estimated 4.6 to 4,000 $\mu\text{g}/\text{kg}$. Concentrations of DDT and DDT metabolites detected in subsurface soils ranged from an estimated 4.6 to 2,800 $\mu\text{g}/\text{kg}$ and occurred at six locations in the central and southwestern parts of the site. A chlordane concentration of 15 $\mu\text{g}/\text{kg}$ occurred in a single subsurface soil sample, also in the southwestern part of Site 21.

Sediment samples were collected at 15 locations distributed at generally equal distances along the drainage ditch near the fence that surrounds the lot 140 area. Two sediment samples were collected at each location between land surface and 1 ft bgs. Concentrations of DDT and DDT metabolites were observed above detection limits at 12 of the 15 sample locations, ranging from an estimated 4.2 to 3,500 $\mu\text{g}/\text{kg}$. Chlordane concentrations were detected in drainage ditch sediments at four locations, ranging from an estimated 3.8 to 960 $\mu\text{g}/\text{kg}$ (Baker Environmental, Inc. 1994g).

Following completion of the RI and an FS for Site 21, an ROD between the Department of Navy, the U.S. Marine Corps, the State of North Carolina, and USEPA Region IV was signed in 1994 (Baker Environmental, Inc. 1994bd). No further groundwater monitoring that included VOCs of interest to this study occurred at Site 21 following implementation of the ROD.

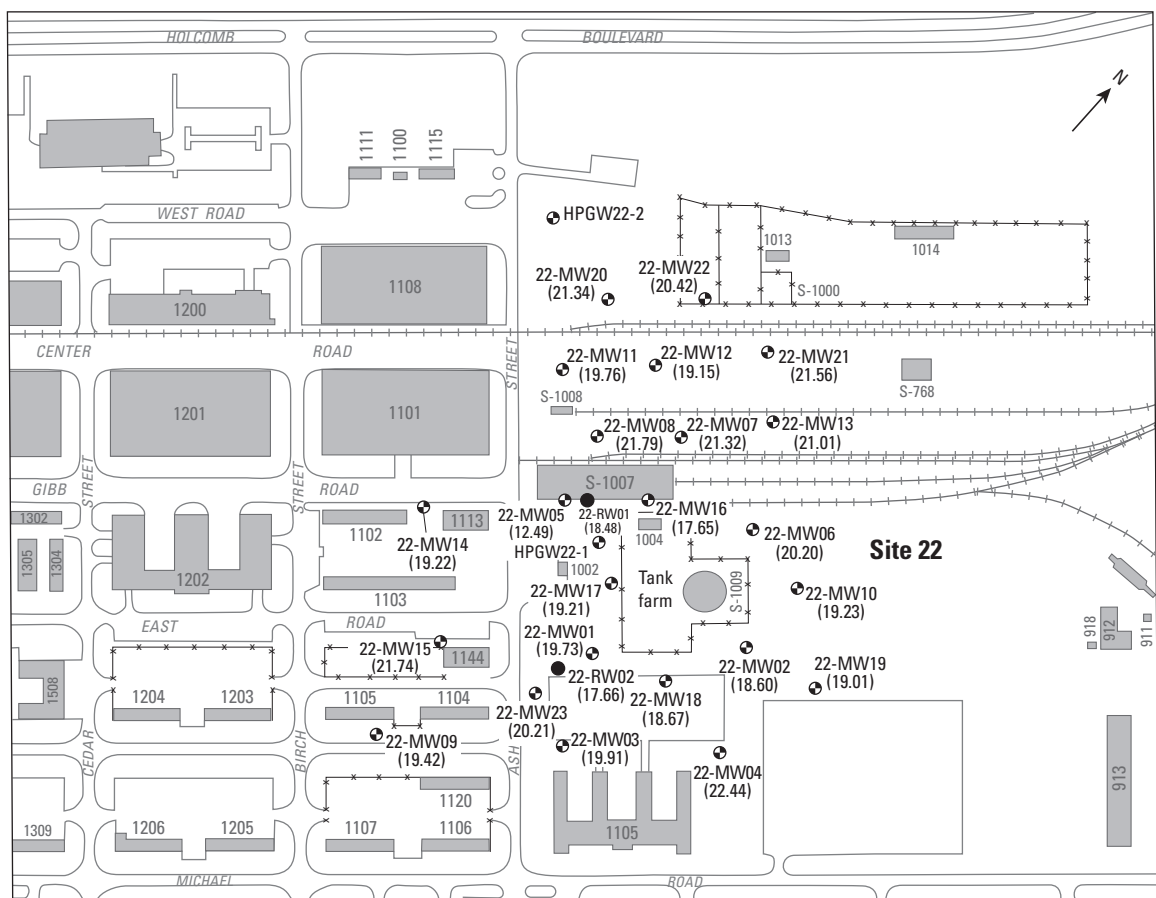
Installation Restoration Site 22— Industrial Area Tank Farm

IR Site 22 is formally named the Hadnot Point Industrial Area fuel farm (HPFF) or Hadnot Point tank farm and is located within the east-central part of the HPIA northeast of Ash Street and southeast of Site 21 (Figures C1, C9). The HPFF was constructed about 1941 and consisted of 15 fuel storage tanks: 1 AST with a capacity 600,000 gal, 6 USTs with capacities of 12,000 gal each, and 8 USTs with capacities of 15,000 gal each. The large AST contained diesel fuel; the other tanks contained gasoline, unleaded gasoline, and kerosene. Fuel inventory records indicate that approximately 20,000 to 30,000 gal of losses occurred from the tank farm during eight recorded loss events between 1979 and 1987. The largest loss of 20,000 to 30,000 gal occurred during 1979 when unknown quantities of diesel and unleaded fuel were accidentally discharged, probably largely to the subsurface.

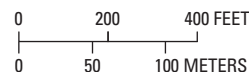
Other losses ranged in volume from about 50 to 1,600 gal and consisted largely of unleaded gasoline. Records of fuel losses prior to 1979 are not available. Fuel losses were probably the result of leaks from transfer lines and related valves rather than directly from tanks (O'Brien and Gere Engineers, Inc. 1988). Groundwater model simulations of floating petroleum volume (using the SpillCad model) by Baker Environmental, Inc., during 1995 and 1996 further refined estimates of fuel losses at the HPFF. Model results indicated that the fuel volume present in the HPFF subsurface was estimated to be more than 830,000 gal, with 500,000 gal being recoverable because of soil and fluid properties (Catlin Engineers and Scientists 2010, UST Management Web Portal File #01185, p. 526–562; Baker Environmental, Inc., written communication, January 21, 1997; CERCLA Administrative Record File #1866). During 2001, CH2M Hill, Inc., conducted an

order-of-magnitude mass analysis to quantify remediation progress. The total fuel mass in the subsurface at the HPFF was estimated by this approach to range from 400,000 gal to 1,100,000 gal (CH2M Hill, Inc. 2001).

Characterization of groundwater contamination in the vicinity of the HPFF began during the IAS when Site 22 was identified as a potential threat to the environment and human health (Water and Air Research, Inc. 1983). During the Verification Step of the Confirmation Study, in 1984, monitor wells HPGW22-1 and HPGW22-2 were constructed open to the Brewster Boulevard aquifer system at the HPFF and directly west of Site 21 (Figure C9, Table C36) (Environmental Science and Engineering, Inc. 1985). Analyses of groundwater samples collected from these wells during July 1984 indicated that individual BTEX components occurred in the shallow groundwater at the HPFF at concentrations ranging from



Base modified from U.S. Navy Hadnot Point fuel farm Camp Lejeune, North Carolina



EXPLANATION

Well and identifier—Number in parentheses is groundwater elevation, in feet above mean sea level. Corrected December 15, 1989

- 22-MW05 ☉ Monitor well (12.49)
- 22-RW-2 6-inch well installed December 1989 (17.66)

Figure C9. Monitor well locations at Installation Restoration Site 22—Industrial Area tank farm (HPFF), U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from O'Brien and Gere Engineers, Inc. 1990).

Installation Restoration Program Site Investigations and Histories

3,800 to 27,000 µg/L (HPGW22-1, Table C37). A groundwater investigation aimed directly at characterizing the extent of BTEX contamination at the HPFF began in February 1988 with the construction and sampling of additional monitor wells 22-MW01–22-MW20, all open to the Brewster Boulevard aquifer system (Table C36). During April 1988, concentrations of all BTEX components greater than detection limits were determined in most of these wells (Table C37). Toluene concentrations ranged from 1.0 to 110,000 µg/L and occurred in 16 of 20 wells, most notably northwest and southeast of the large AST S-1009 (Figure C9). Benzene concentrations also were detected in 16 of 20 wells and ranged from 1.0 to 29,000 µg/L with a similar distribution. The thickness of free-phase BTEX was measured periodically between March 1988 and December 1989 (Table C38). Positive BTEX thicknesses ranged from more than 15 ft at monitor well 22-MW16 to less than 1.0 ft at wells 22-MW07 and 22-MW15. Lobes of substantial free-phase thickness occurred northwest and southeast of AST S-1009 (O'Brien and Gere Engineers, Inc. 1988). Of the chlorinated alkenes of interest to this study, only PCE and TCE were observed in Site 22 monitor wells at concentrations greater than detection limits. Concentrations of TCE were detected in wells 22-MW20 and HPGW22-2, at 1.0 and 5.0 µg/L, respectively. The single occurrence of PCE occurred in well 22-MW03 at a concentration of 4.0 µg/L (Table C39). The BTEX components observed in monitor wells at Site 22 are likely the source or sources of BTEX concentrations determined in supply well HP-602 during sample collections in November and December 1984 and later in 1986 and 1991 (Table C8).

Following completion of the groundwater characterization at Site 22 by O'Brien and Gere Engineers, Inc. (1988), additional groundwater samples were collected and analyzed in conjunction with the preliminary design of a product recovery system for the HPFF (O'Brien and Gere Engineers, Inc. 1990). Results of these analyses are not available. By 1993, IRP investigations of groundwater contamination at Site 22 were integrated with similar and proximate investigations at Sites 21 and 78, and subsequent groundwater sample collection at Site 22 as part of IRP investigations occurred only at monitor well HPGW22-1 (Table C37). Because BTEX components were the major sources of subsurface and groundwater contamination at Site 22, subsequent investigations of contamination at the site were conducted under the auspices of RCRA, as amended in 1984 and 1992.

Installation Restoration Site 24— Industrial Area Fly Ash Dump

IR Site 24 is located adjacent to the southern boundary of the HPIA and extends southeast to include contributing areas to several tributaries of Cogdels Creek (Figures C1 and C10, Plate 1). Much of the northern boundary of Site 24 is formed by streets within the HPIA, namely Louis, Dogwood, and

Duncan Streets. Site area is approximately 100 acres (Baker Environmental, Inc. 1994b).

From the late 1940s to 1980, Site 24 was used as a disposal area for fly ash, cinders, solvents, used furniture-stripping compounds, sewage sludge, and spiractor sludge from WTPs. During the 1960s, construction debris was reportedly disposed of at the site. Ash and cinders were dumped on the ground surface during 1972 to 1979. Solvents used to clean boilers were poured onto the ash piles (Baker Environmental, Inc. 1994b).

Investigations of groundwater contamination at Site 24 began during the Verification Step of the Confirmation Study in July 1984 when monitor wells 24-GW01–24-GW05 were constructed open to the Brewster Boulevard aquifer system and subsequently sampled (Table C40). Sediment and surface-water samples were collected at about the same time at two locations on Cogdels Creek, upstream and downstream of Site 24 (Environmental Science and Engineering, Inc. 1985). Two additional monitor wells, 24-GW06 and 24-GW07 (old), were constructed during the Confirmation Step of the Confirmation Study during 1986, also open to the Brewster Boulevard aquifer system, and were sampled during December 1986 and March 1987. Sediment and surface-water samples also were collected during the Confirmation Step at Cogdels Creek at the two locations sampled during the Verification Step as well as at two additional locations (Environmental Science and Engineering, Inc. 1987) (Tables C40–C42). A final RI was conducted at Site 24 during 1993 resulting in the construction and sampling of four additional monitor wells open to the Brewster Boulevard aquifer system [24-GW07 (new)–24-GW10]. Surface and subsurface soil samples also were collected at 37 locations throughout Site 24 during the final RI. Surface samples were collected between land surface and 6 inches bgs. Subsurface samples were collected at several intervals per location between 1.5 and 14 ft bgs (Environmental Science and Engineering, Inc. 1985, 1987; Baker Environmental, Inc. 1994g).

During the Verification and Confirmation Steps of the Confirmation Study, analyses of samples collected at monitor wells 24-GW01–24-GW05, with the exception of one analysis for benzene, indicated that concentrations of all VOCs of interest to this study were below detection limits. Similar results were obtained during the final RI during 1993 and during subsequent periodic groundwater monitoring (Tables C41, C42). A concentration of benzene of 3.0 µg/L was detected in monitor well 24-GW05 during July 1984 (Figure C10). Analyses of surface-water samples collected at the upstream location near monitor well 24-GW02 during August 1984 indicated that only concentrations of *trans*-1,2-DCE and TCE were observed above detection limits at 2.7 µg/L and 7.1 µg/L, respectively. No concentrations of VOCs of interest to this study were detected above detection limits at the downstream station located downstream of monitor well 24-GW07 (old) (Figure C10). Sediment samples were analyzed only for metals, and results are not reported herein. Monitor wells 24-GW01–24-GW07 (new) were apparently



Base modified from LANTDIV
February 1992

EXPLANATION

- Approximate site boundary**
- **Direction of surface-water flow**
- ⊕ **Shallow monitoring well and identifier**

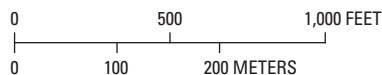


Figure C10. Monitor well locations at Installation Restoration Site 24—Industrial Area fly ash dump, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1997d; Environmental and Safety Designs, Inc. 1995).

abandoned for sampling purposes after 1993 (Environment and Safety Designs, Inc. 1995).

Analyses of surface and subsurface soil samples collected during the final RI during 1993 indicated that pesticides occurred in soils throughout Site 24. Concentrations of DDT and DDT metabolites were observed above detection limits in surface soils at 12 of 37 locations ranging from 2.2 to 350 µg/kg. Maximum concentrations occurred in the northeastern part of Site 24 in the immediate vicinity of

monitor well 24-GW08. Chlordane concentrations in surface soils occurred above detection limits at 8 of 37 locations and ranged from 2.5 µg/kg to an estimated 26 µg/kg. Occurrences were most frequent in the northeastern part of the site. In subsurface soils, concentrations of DDT and DDT metabolites also occurred throughout Site 24 at 8 of 37 locations and ranged from an estimated 4.0 to 220 µg/kg. The maximum concentration also occurred in the immediate vicinity of monitor well 24-GW08. Chlordane concentrations above detection

limits were not observed in subsurface soil samples. Although not described in site histories, several areas of Site 24, in particular the northeastern parts of the site, were possibly areas of pesticide disposal.

Following completion of the final RI, an FS was initiated to address remediation of groundwater contamination at Site 24 (Baker Environmental, Inc. 1994b). In 1994, a remediation approach was selected and included in a final ROD between the Department of the Navy and the U.S. Marine Corps, the North Carolina Department of Environment, Health, and Natural Resources, and USEPA Region IV (Baker Environmental, Inc. 1994d). Implementation of the Record of Decision included a reliance on quarterly and semiannual monitoring of groundwater conditions at Site 24 (Tables C41, C42). Monitoring results were published in a series of reports beginning in 1996 (Baker Environmental, Inc. 1996ij, 1997cd, 1998k).

Installation Restoration Site 28— Industrial Area Burn Dump

IR Site 28 is located east of the New River near the Hadnot Point wastewater treatment facility (Figures C1 and C11, Plate 1). The site area occurs generally west of Gonzales Boulevard and extends to the east and west banks of Cogdels Creek (Figure C11). Site 28 was operated as a burn area for solid wastes including trash, oil-based paints, and construction debris. Burn operations were active between 1946 and 1971. In 1971, burn operations ceased, and the area was graded and seeded with grass. The area occupied by burned debris and disposed waste is approximately 23 acres. Depths of waste range from 5 to 10 ft bgs and represent a volume of approximately 185,000 to 375,000 cubic yards (Baker Environmental, Inc. 1995l).

Investigations of groundwater contamination at Site 28 began in July 1984, during the Verification Step of the Confirmation Study, when monitor wells 28-GW01–28-GW03 were constructed open to the Brewster Boulevard aquifer system and sampled (Tables C43–C45). Surface-water and sediment samples were collected during August 1984 at two locations from Cogdels Creek—upstream where Cogdels Creek is near Site 28 and downstream near the confluence of Cogdels Creek and New River. During the Confirmation Step of the Confirmation Study, in 1986, an additional monitor well, 28-GW04, was constructed, also open to the Brewster Boulevard aquifer system. Wells 28-GW01–28-GW04 were sampled during December 1986. Surface-water and sediment samples also were collected at three locations along Cogdels Creek—upstream, downstream, and proximate to Site 28—during the Confirmation Step. Well 28-GW04 was sampled again during March 1987, also during the Confirmation Step (Environmental Science and Engineering, Inc. 1985, 1987).

During the Confirmation Study, concentrations of several VOCs of interest to this study were determined above detection limits in groundwater, including TCE, *trans*-1,2-DCE, and vinyl chloride, all in monitor well 28-GW01 (old) (Table C44).

Concentrations of vinyl chloride were 13 and 22 $\mu\text{g/L}$, which are relatively large when compared to TCE concentrations, indicating that degradation pathways were substantially complete at the time of sampling. Concentrations of TCE greater than detection limits also were observed in surface-water samples collected from the upstream and downstream locations on Cogdels Creek at 1.3 and 1.1 $\mu\text{g/L}$, respectively. Concentrations of BTEX components above detection limits were not observed in any groundwater or surface-water samples (Table C45). During the Verification Step, in 1984, extremely low concentrations of DDT and DDT metabolites were detected in each monitor well and ranged from 0.007 to 0.22 $\mu\text{g/L}$.

Metabolites of DDT and DDT also were detected during the Verification Step in sediment samples collected from both the upstream and downstream locations on Cogdels Creek at concentrations ranging from 0.5 to 84 $\mu\text{g/kg}$. Concentrations were consistently greatest at the upstream location. Chlordane concentrations were not detected in groundwater, surface-water, or sediment samples during the Verification Step.

During the Confirmation Step in 1986, DDT, DDT metabolites, and chlordane were not detected in groundwater or surface-water samples. A DDT metabolite concentration was observed above detection limits in two sediment samples from Cogdels Creek at 61.9 and 243 $\mu\text{g/kg}$. The highest concentration occurred at the station located near and slightly upstream of Site 28. At the same time, chlordane concentrations were observed above detection limits in all sediment samples from Cogdels Creek and ranged from 298 to 595 $\mu\text{g/kg}$. Concentrations were greatest in the sample collected near and slightly downstream of Site 28 (Environmental Science and Engineering, Inc. 1985, 1987).

To prepare for a final RI, a third round of groundwater sampling in monitor wells 28-GW01 (old)–28-GW04 was conducted during April 1993 (Tables C44, C45). With the exception of the sample collected in well 28-GW01 (old), concentrations of VOCs of interest to this study were all below detection limits. Well 28-GW01 (old) contained estimated concentrations of total 1,2-DCE and vinyl chloride at 2.0 and 6.0 $\mu\text{g/L}$, respectively (Table C44). A DDT metabolite was also detected in well 28-GW01 (old) at a concentration of 0.24 $\mu\text{g/L}$.

Surface-water and sediment sample collection occurred during May 1993 at 15 stations located along the entire length of Cogdels Creek and its major tributaries upgradient of Site 28 and at 3 locations bordering the New River adjacent to Site 28. The most upstream station was located near the western end of Duncan Street at the south central part of the HPIA. The downstream-most station was located near the confluence of Cogdels Creek and the New River. Two sediment samples were collected at each of the 18 collection locations between land surface and 1 ft bgs. Five of 18 surface-water samples collected from Cogdels Creek and the New River during May 1993 contained concentrations of several VOCs of interest greater than detection limits. TCE was detected in four samples at a maximum concentration of 47 $\mu\text{g/L}$, and total 1,2-DCE was detected in one sample at an estimated concentration of 6 $\mu\text{g/L}$. Ethylbenzene occurred in one

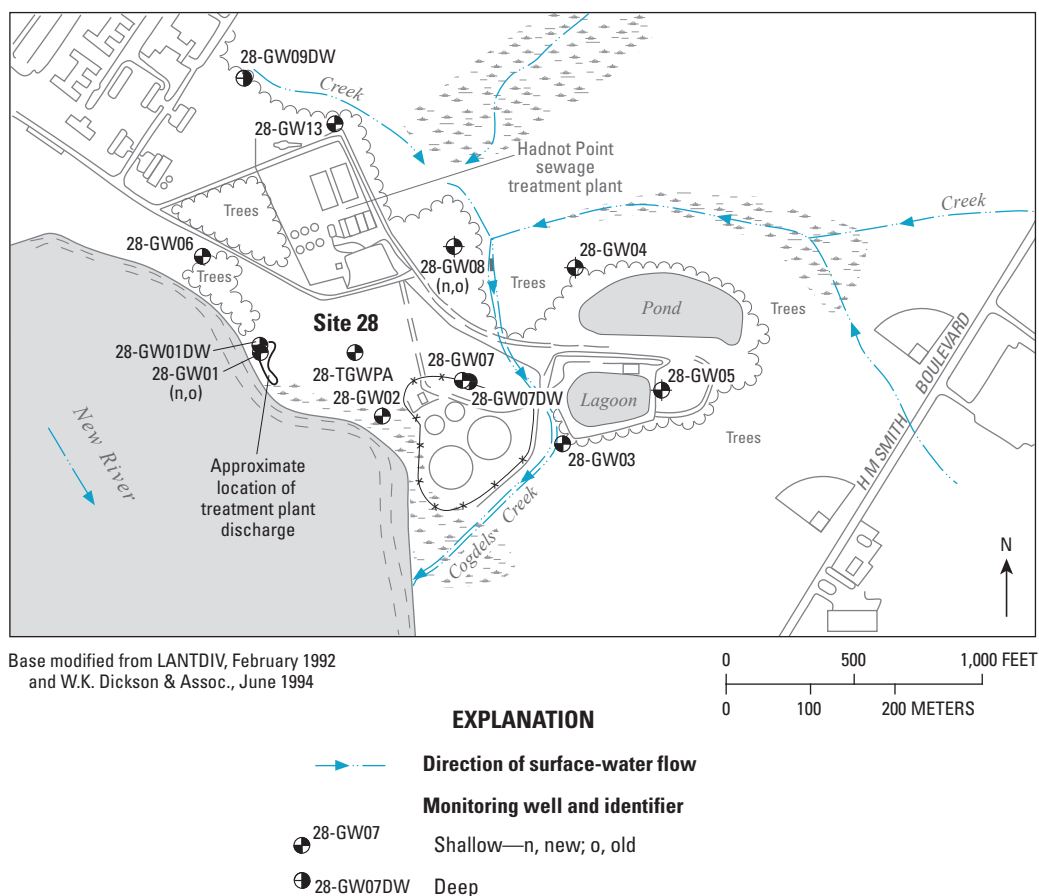


Figure C11. Monitor well locations at Installation Restoration Site 28—Industrial Area burn dump, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1998n).

sediment sample at an estimated concentration of 16 $\mu\text{g}/\text{kg}$. Concentrations of DDT and DDT metabolites occurred above detection limits in 17 of 36 sediment samples and ranged from 4.4 to an estimated 350 $\mu\text{g}/\text{kg}$. Chlordane was detected in 4 of 36 sediment samples at concentrations ranging from an estimated 2.5 to 6.3 $\mu\text{g}/\text{kg}$ (Baker Environmental, Inc. 1995l).

Analytical results for surface-water and sediment sample collection at Cogdels Creek and New River during May 1993 and reported for Site 28 were accomplished in conjunction with the final RI at Site 78. Tables of positive detections of contaminants determined in surface-water and sediment samples from Cogdels Creek and New River during May 1993 were published in Baker Environmental, Inc. (1994g).

The final RI was conducted at Site 28 during 1993–1994 (Baker Environmental, Inc. 1995l). Additional monitor wells were constructed during April 1994, including wells 28-GW01DW, 28-GW07DW, and 28-GW09DW open to the Upper Castle Hayne aquifer–River Bend unit (Table C43) between 111 and 132 ft. Other wells constructed included a replacement for original well 28-GW01 (old) and wells 28-GW05–28-GW08, 28-GW13, and test well 28-TGWPA, all probably open to the Brewster Boulevard aquifer system.

A fourth round of sampling in all existing and newly installed monitor wells occurred during the final RI during April and May 1994. Surface-water and sediment samples were collected at seven stations along Cogdels Creek and its tributaries during March 1994. Two sediment samples were collected at each location between land surface and 1 ft bgs. To assess suspected disposal practices, 47 soil borings were advanced during the final RI distributed throughout the Site 28 area. Surface soil samples were collected at each location to a depth of 1 ft bgs. Five subsurface soil samples were collected at each location between 1 and 11 ft bgs. Soil sampling was accomplished during March 1994 (Baker Environmental, Inc. 1995l). In addition to groundwater, surface-water, sediment, and soil sampling, three staff gages were established on Cogdels Creek to determine water-surface altitudes. Measurements made during May 1994 indicated upstream and downstream altitudes of 0.88 and 0.85 ft above NGVD 29, respectively.

Of the monitor wells sampled during April and May 1994, only samples collected in wells 28-GW07 and 28-TGWPA contained VOCs of interest (BTEX) at concentrations greater than detection limits. Concentrations of BTEX components ranged from 2.0 to 19 $\mu\text{g}/\text{L}$ (Table C45).

Installation Restoration Program Site Investigations and Histories

All BTEX components were detected with the exception of benzene. Concentrations of DDT and DDT metabolites in groundwater were detected in 6 of 12 wells and ranged from an estimated 0.05 to 9.0 µg/L. An estimated chlordane concentration of 0.049 µg/L was detected in well 28-GW08.

With respect to VOCs detected in surface-water and sediment samples collected at and along Cogdels Creek and its tributaries during March 1994, no VOC concentrations of interest to this study were determined above detection limits. Concentrations of DDT metabolites were observed above detection limits in surface water at one Cogdels Creek station adjacent to Site 28 at 0.04 and 0.05 µg/L. Concentrations of DDT and DDT metabolites also were detected in Cogdels Creek sediments at seven of seven stations ranging from an estimated 4.3 to 450 µg/kg. Chlordane concentrations greater than detection limits were observed in Cogdels Creek sediments at four of seven stations, ranging from an estimated 2.6 to 8.4 µg/kg.

Of the VOCs of interest that occurred in surface and subsurface soil samples at Site 28, only PCE was detected at a single location at an estimated concentration of 5.0 µg/kg at a depth of 5 to 7 ft bgs. On the other hand, occurrences of pesticides were ubiquitous throughout the site. Concentrations of DDT and DDT metabolites greater than detection limits occurred in surface soils at 28 of 47 locations ranging from an estimated 2.7 to 1,400 µg/kg. Corresponding concentrations of chlordane occurred at 15 of 47 locations and ranged from an estimated 1.2 to 130 µg/kg. Occurrences of pesticides in subsurface soils were substantially less frequent compared to occurrences in surface soils. Concentrations of DDT and DDT metabolites were detected in subsurface soils at 19 of 47 locations ranging from an estimated 3.0 to 1,600 µg/kg. Chlordane concentrations were detected in subsurface soils at 5 of 47 locations ranging from an estimated 2.7 to 45 µg/kg (Baker Environmental, Inc. 1995l).

Following completion of the final RI, an ROD for Site 28 was implemented between the Department of the Navy and the U.S. Marine Corps, the North Carolina Department of Environment, Health, and Natural Resources, and USEPA Region IV (Baker Environmental, Inc. 1995e). Implementation of the ROD included a reliance on quarterly and semiannual monitoring of groundwater conditions at Site 28 during 1996–2001. Groundwater samples collected from Site 28 monitor wells during this period were analyzed mostly for metals concentrations and did not consider VOCs of interest to this study. Monitoring results were published in a series of reports beginning in 1996 (Baker Environmental, Inc. 1996m, 1997hi;

Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 1998, 2000bgh; Baker Environmental, Inc. and CH2M Hill, Inc. 2001b; CH2M Hill, Inc. and Baker Environmental, Inc. 2001e). Monitor well 28-GW08 (old) was abandoned following the RI and was replaced for sampling purposes by well 28-GW08 (new) during August 1995 (Table C43).

Installation Restoration Site 30—Sneads Ferry Road Fuel Tank Sludge Disposal Area

Installation Restoration Site 30 is located in the southern part of the study area within the headwaters of Frenchs Creek and about 1 mile southwest of supply wells HP-629 (old) and HP-640 (Figures C1 and C12, Plate 1). Prior to 1983, Site 30 reportedly was used by a private contractor to wash and clean empty fuel storage tanks from off-site locations. The tanks contained refined petroleum products such as gasoline, waste sludge, and possibly cleaning solvents. The estimated area of disposal is approximately 7,500 square yards (approximately 1.5 acres) (Baker Environmental, Inc. 1995j).

Investigations of groundwater contamination at Site 30 began during the first Verification Step of the Confirmation Study in July 1984 with the construction and sampling of monitor well 30-GW01 (Environmental Science and Engineering, Inc. 1985) and continued until the completion of the second Verification Step of the Confirmation Study during 1987 (Tables C46–C48) (Environmental Science and Engineering Inc. 1987). Monitor well 30-GW02 was constructed during the Confirmation Step of the Confirmation Study in December 1986 (Table C46). Along with groundwater samples collected from monitor wells, sediment and surface-water samples also were collected during the Confirmation Step at a single station on Frenchs Creek, located on the creek generally opposite and slightly north of monitor well 30-GW02. Groundwater sampling preliminary to and in support of planning for an RI was conducted during April 1993 (Tables C47, C48) (Baker Environmental, Inc. 1993p). An RI was conducted at Site 30 during March through early May 1994 resulting in the construction of monitor well 30-GW03 and piezometer 30-PZ01. In addition to groundwater samples collected from the monitor wells and piezometer, surface and subsurface soil samples were collected at 20 locations during the RI, along with surface-water and sediment samples at two locations on Frenchs Creek (Baker Environmental, Inc. 1995jo).

No concentrations of PCE, TCE, related degradation products, or BTEX components were observed greater than detection limits in any groundwater sample collected at Site 30 (Tables C47, C48). Similar results were obtained with respect to all surface-water and sediment samples collected at Frenchs Creek as well as soil samples collected within the Site 30 area during the RI.

Following completion of the RI, a final ROD for Site 30 was implemented between the Department of the Navy and the U.S. Marine Corps, the North Carolina Department of Environment, Health, and Natural Resources, and USEPA Region IV (Baker Environmental, Inc. 1995e). Implementation of the ROD resulted in no further remedial actions or environmental monitoring at Site 30.

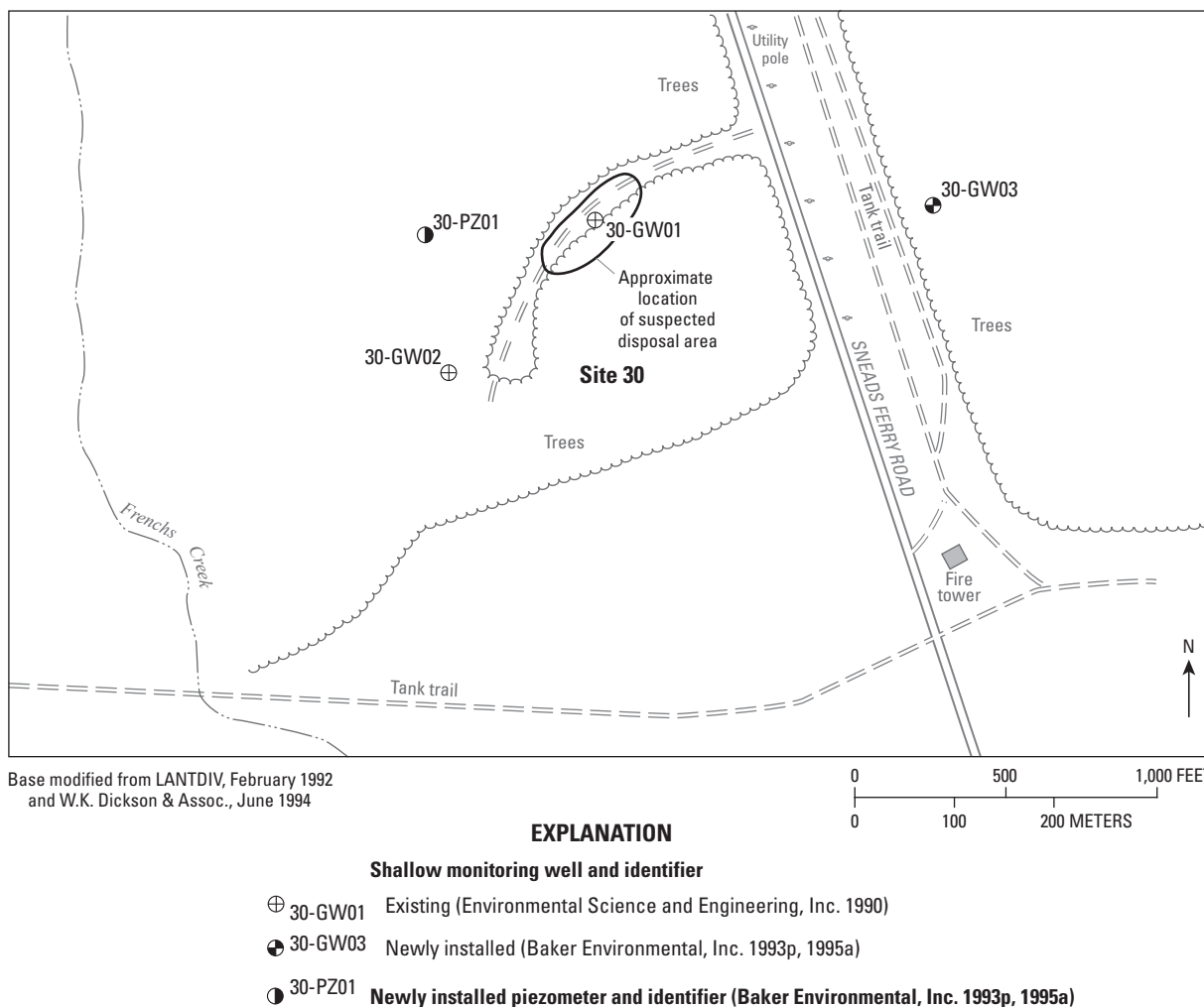


Figure C12. Monitor well locations at Installation Restoration Site 30—Sneads Ferry Road fuel tank sludge disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1995j).

Installation Restoration Site 74— Mess Hall Grease Pit Area

The mess hall grease pit disposal area covers the northern part of Site 74 and is located approximately one-half mile east of Holcomb Boulevard and north and slightly west of supply well HP-654 (Figures C1 and C13, Plate 1). A possible disposal area and pest control area are in the southern part of Site 74 and are located immediately east of supply well HP-654, between supply wells HP-654 and HP-641 (Figure C13, Plate 1). Mess hall grease and food waste were deposited in several rectangular pits within the northern part of Site 74 from the early 1950s until 1960. Approximate

dimensions of the disposal pit area were 135 ft long by 30 ft wide by 12 ft deep. Total area of the northern part of Site 74 is approximately 5 acres. Total area of the southern part of Site 74 is approximately 4 acres. Records indicate that at least on one occasion an attempt was made to burn materials deposited in the pits within the northern part of the site, probably using a volatile refined petroleum product, but the attempt failed. Whether the effort to burn the waste occurred prior to or after the waste was washed out of the pits during Hurricane Hazel in 1954 is unknown. The quantity of grease deposited at the site also is unknown. Pesticide-soaked bags and drums, possibly containing pesticides and/or PCBs, were deposited at or near the grease disposal pits, probably prior to 1960. An estimated 500 gal of pesticides were released into the

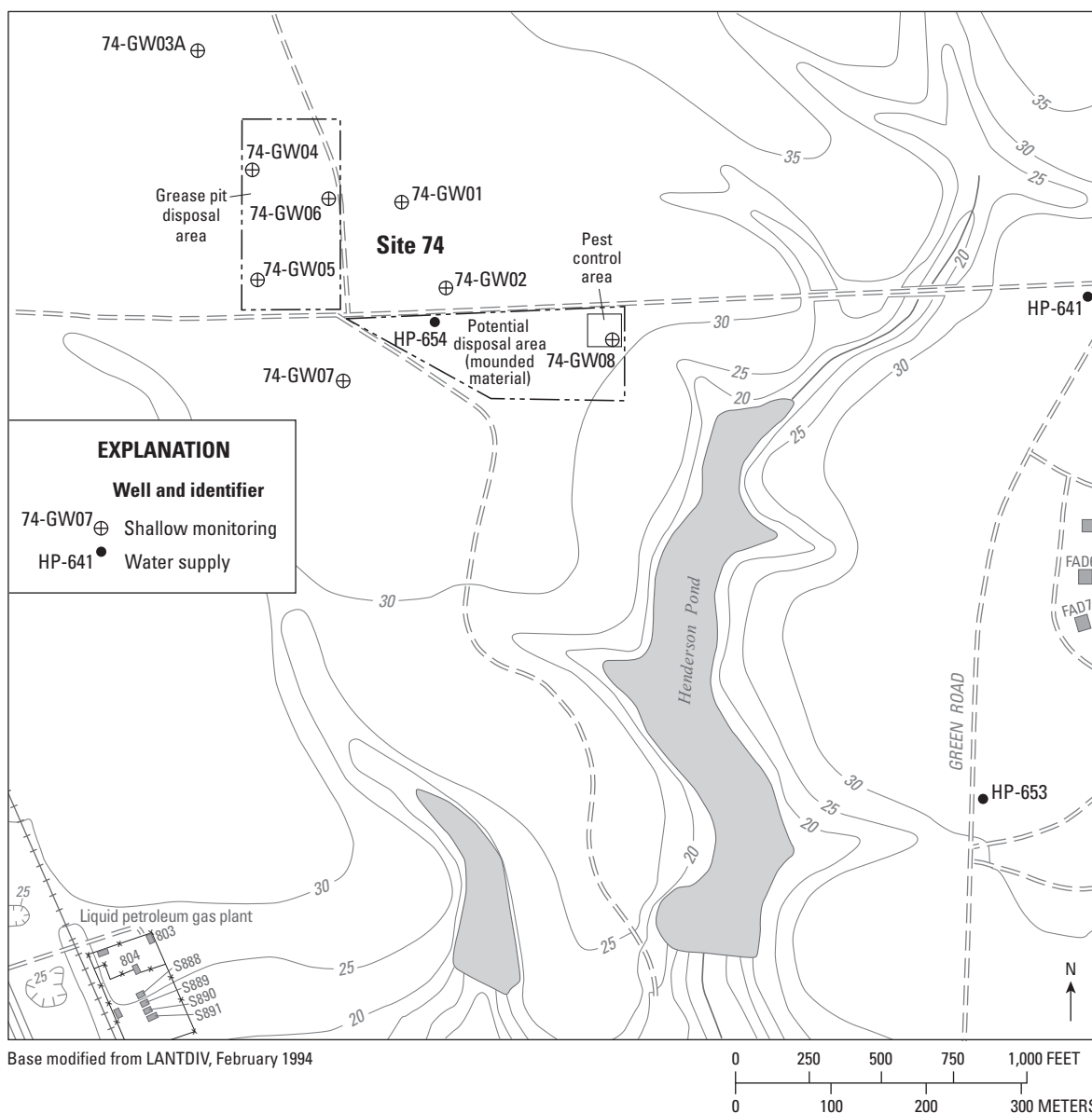


Figure C13. Monitor well locations at Installation Restoration Site 74—mess hall grease pit disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1995b).

subsurface from the deposition of the bags along with approximately 2,200 gal of pesticides and 1,100 gal of PCBs from the drums (Wallace Eakes, trip report, written communication, February 3, 1983; Baker Environmental, Inc. 1995i; Environmental and Safety Designs, Inc. 1995; CERCLA Administrative Record file #93).

Investigations of contaminated groundwater at Site 74 began during the Verification Step of the Confirmation Study in 1984 with the installation of monitor wells 74-GW01 and 74-GW02 (Table C49). Well 74-GW03 was installed during the Confirmation Step of the Confirmation Study in 1986. Monitor well 74-GW03 is not shown in Figure C13 but is located approximately 260 ft north and 150 ft west of well 74-GW03A. Each well was constructed open to the Brewster Boulevard aquifer system. Groundwater samples collected during July 1984 in wells 74-GW01 and 74-GW02 were analyzed only for pesticides. A trace quantity of a DDT metabolite was detected in well 74-GW02. Two soil borings were augured by hand during August 1984 in the pest control area. Three samples were collected at each location between land surface and 3 ft bgs. Concentrations of DDT and/or DDT metabolites were observed above detection limits in all six samples ranging from 0.4 to 260 µg/kg. Concentrations of chlordane were not detected (Environmental Science and Engineering, Inc. 1985). Groundwater samples also were collected in the three monitor wells during the Confirmation Step in December 1986 and were analyzed for pesticides as well as for VOCs of interest to this study. Neither pesticides nor VOCs of interest were observed in groundwater at this time at concentrations greater than detection limits. Similar results were obtained from analysis of a sample collected from monitor well 74-GW02 during March 1987 (Tables C50, C51) (Environmental Science and Engineering, Inc. 1987).

A final RI was conducted at Site 74 from January through March 1994. Additional monitor wells 74-GW03A and 74-GW04–74-GW08 were constructed at this time open to the Brewster Boulevard aquifer system and were sampled during February 1994. No pesticides or VOCs of interest to this study were determined at concentrations greater than detection limits in any well at this time (Tables C49–C51, Baker Environmental, Inc. 1995h). Geophysical surveys using electromagnetic terrain conductivity and magnetometer surveys were completed at Site 74 prior to the RI. Survey results located a drum disposal trench immediately north of the previously identified grease disposal pit. Monitor well 74-GW06, open to the Brewster Boulevard upper aquifer, was placed within or immediately adjacent to the drum disposal trench defined by the geophysical surveys.

For purposes of collecting and analyzing soils data, Site 74 was subdivided into three areas—Area 1, the grease pit disposal and drum trench disposal area (FDA), composing the northern part of the site; Area 2, the potential disposal area (PDA); and Area 3, the pest control area (FPA), in the southern part of the site. A total of 38 boreholes were advanced in the northern part of Site 74 for the collection of surface and subsurface soil samples. Surface soil samples were collected

between land surface and 1 ft bgs. Subsurface soil samples were collected at 2-foot intervals between 1 ft bgs and the water table. Corresponding borehole locations in the southern part of Site 74 numbered 9 at the pest control area and 17 at the potential disposal area. These numbers also include several boreholes located away from potentially contaminated areas to collect background data. Soil samples also were collected during the construction of monitor wells. Surface-water and sediment samples were collected at two upstream stations and one downstream station at Henderson pond (Figure C13) (Baker Environmental, Inc. 1995i). Sediment samples were collected between land surface and 1 ft bgs.

Of the VOCs of interest observed in surface soils, TCE was detected at 5 of 60 locations at estimated concentrations ranging from 2.0 to 8 µg/kg. Four occurrences of TCE were within or adjacent to the drum trench disposal area. A single occurrence was south of the pest control area (Figure C13). Concentrations of BTEX components greater than detection limits were observed in surface soils at 3 of 60 locations ranging from an estimated 1.0 to 6 µg/kg. All components were observed, with the exception of benzene. Concentrations of DDT and DDT metabolites were detected in surface soils at 31 of 60 locations ranging from an estimated 0.31 to 3,840 µg/kg. Chlordane concentrations greater than detection limits occurred at 8 of 60 borehole locations and ranged from an estimated 0.39 to 1,680 µg/kg. The majority of pesticide occurrences (22) were at boreholes located in the northern part of Site 74. Regarding subsurface soils, no concentrations of VOCs of interest were observed greater than detection limits. Concentrations of DDT and DDT metabolites in subsurface soils occurred at 9 of 47 locations and ranged from an estimated 0.34 to 21.4 µg/kg. Chlordane concentrations greater than detection limits were not observed in subsurface soils. Surface-water samples collected at Henderson Pond contained no concentrations of VOCs or pesticides of interest greater than detection limits. Of the sediment samples collected at Henderson Pond, an estimated concentration of TCE at 8.0 µg/kg was detected in one upstream sample. Concentrations of DDT and DDT metabolites were detected in both upstream sediment samples at Henderson Pond at an estimated 0.82 and 1.85 µg/kg, respectively (Baker Environmental, Inc. 1995ghi).

Following completion of the final RI, an FS was initiated to address remediation of groundwater contamination at Site 74 (Baker Environmental, Inc. 1995b). An ROD between the Department of the Navy and the U.S. Marine Corps, the North Carolina Department of Environment, Health, and Natural Resources, and USEPA Region IV was signed in 1995 and required periodic monitoring of groundwater conditions at Site 74 (U.S. Environmental Protection Agency, written communication, EPA review comments, October 1, 2009). Reports documenting the results of groundwater monitoring at Site 74 following the implementation of the ROD can be obtained by formal request to the Environmental Management Division, USMCB Camp Lejeune, North Carolina.

Installation Restoration Site 78— Hadnot Point Industrial Area

The HPIA was constructed prior to 1940 and is the center of industrial activity within the Hadnot Point–Holcomb Boulevard study area. Industrial activities that occur at a variety of HPIA facilities include vehicle service and maintenance, warehousing, auto body painting and maintenance, and heavy equipment maintenance. A variety of multipurpose storage facilities include active USTs and solvent storage areas (Baker Environmental, Inc. 1994b). The HPIA/Site 78 is bounded to the northwest by Holcomb Boulevard, to the southwest by the McHugh Boulevard/Main Service Road, and to the northeast by Sneads Ferry Road (Figure C14, Plate 1). The southeastern boundary is somewhat diffuse but is generally defined by Duncan Street (Figure C15). Contained within or immediately adjacent to Site 78 are Sites 21, 22, and 24 (Figure C14). Site 94 is located in the extreme southwest corner of Site 78 immediately east of Gum Street and bounded generally by the locations of monitor wells 78-GW05–78-GW07 (Figure C15). Total area of Site 78 is approximately 590 acres. Most of the HPIA area is paved; however, relatively small areas of lawn occur between buildings and around the periphery of roads and buildings.

Investigations of groundwater contamination at and adjacent to the HPIA began during the Verification Step of the Confirmation Study during 1984 at Sites 21, 22, and 24 and were described previously herein. Investigations specific to Site 78 began during a Characterization Step of the Confirmation Study in 1986. Construction of monitor wells 78-GW01–78-GW29 began in October 1986 and was completed by July 1987 (Table C52). All shallow wells were completed open to the Brewster Boulevard aquifer system. Wells of intermediate and deep construction were advanced at locations 9, 17, and 24 and were open to the Tarawa Terrace aquifer and then to the Upper Castle Hayne aquifer–River Bend unit (Figure C14, Table C52). The siting of monitor wells was facilitated by sampling soil gas at several storage and maintenance facilities.

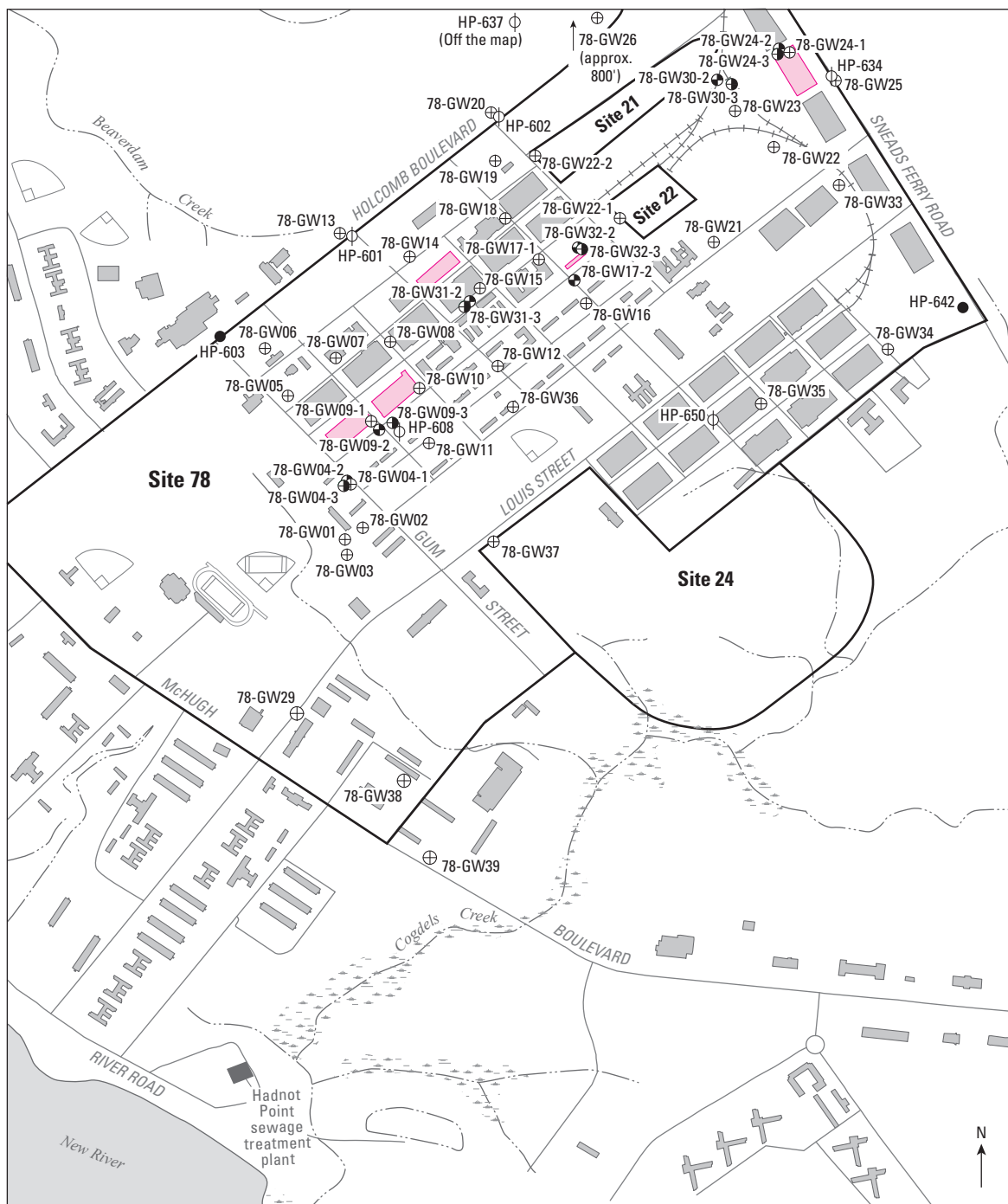
Groundwater samples were collected in all existing monitor wells between January and August 1987 and were analyzed for all VOCs of interest to this study (Tables C53 and C54). Results of the Confirmation Study further refined the known area of groundwater contamination caused by BTEX components in the vicinity of the Hadnot Point fuel farm (Site 22) and identified other areas of groundwater contamination at the HPIA, particularly (1) in the vicinity of Building 902 in the northeastern part of Site 78 adjacent to monitor well 78-GW24-1 and Sneads Ferry Road, (2) near Building 1601 at the location of monitor well 78-GW09 (old), and (3) in the vicinity of Building 1202, generally defined by the locations of monitor wells 78-GW15, 78-GW17-1, and 78-GW18. Based on soil gas sample analyses, groundwater contamination near Buildings 902 and 1202 originated largely from subsurface disposal of waste solvents. Subsurface disposal of waste solvents as well as BTEX components apparently caused groundwater contamination near Building 1601. To a large

degree, soil gas results were substantiated by groundwater data from monitor wells determined during 1987.

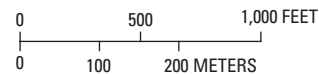
During the Confirmation Study, concentrations of TCE greater than detection limits at well 78-GW09-1 (old) were 5,000 and 6,100 µg/L during January and March 1987 (Table C53). Several BTEX components also were observed in well 78-GW09-1 (old) at this time at concentrations of 1,100 and 2,500 µg/L (Table C54). Similar results were obtained in well 78-GW24-1, where concentrations of *trans*-1,2-DCE were detected at 4,300 µg/L and 6,400 µg/L and benzene was observed at a concentration of 2.0 µg/L (Tables C53, C54). Concentrations of vinyl chloride detected during the Confirmation Study at well 78-GW24-1 were 190 µg/L and 250 µg/L, indicating that degradation pathways were essentially complete within the volume of water sampled by the well. An additional result of the Confirmation Study was the closure of supply wells HP-602, HP-608, HP-634, and HP-660, all located within or adjacent to the perimeter of the HPIA (Tables C7 and C8, Plate 1).

Additional investigations of soil and groundwater contamination at Site 78, termed a Supplemental Characterization Step, were initiated during 1990 and 1991 to determine the extent of contamination within soils and the “shallow aquifer,” termed herein the Brewster Boulevard aquifer system, and underlying “intermediate” and “deep” water-bearing units, termed herein the Tarawa Terrace aquifer and units of the Upper Castle Hayne aquifer system, respectively (Tables C14 and C52). Whether or not the Supplemental Characterization Step was part of the Confirmation Study is unknown. Additional wells of relatively intermediate and deep construction were advanced during the Supplemental Characterization Step, including wells 78-GW04-2, 78-GW30-2, 78-GW31-2, and 78-GW32-2, open to the Tarawa Terrace aquifer between 64 ft and 78 ft bgs, and wells 78-GW04-3, 78-GW30-3, 78-GW31-3, and 78-GW32-3, open to the Upper Castle Hayne aquifer and/or zones equivalent to the local confining unit between 140 and 153 ft bgs. The new intermediate, deep, and other existing shallow wells were sampled during January 1991. Samples were analyzed for all VOCs of interest as well as for pesticides. Similar analytical schedules were applied at this time to samples collected in supply wells HP-602, HP-603, HP-634, HP-637, HP-642, HP-651, HP-652, HP-653, and HP-660 (Tables C7, C8). Concentrations of BTEX components greater than detection limits were observed in most intermediate wells during the 1991 sampling event. A maximum concentration of benzene of 27 µg/L occurred in well 78-GW32-2. Of the chlorinated alkenes of interest in intermediate wells, only total 1,2-DCE and vinyl chloride were observed at concentrations greater than detection limits in well 78-GW30-2. The reported concentration of both constituents was 12 µg/L (Table C53).

Also at this time, 30 soil borings were advanced in the vicinity of Buildings 902, 1202, and 1601 where soil gas analyses had previously indicated substantial groundwater contamination. Three soil samples were collected at each borehole at depths ranging from land surface to 12 ft bgs and analyzed



Base modified from LANTDIV, February 1992



EXPLANATION

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> — Approximate site boundary ■ Building identified in magenta—
Soil investigation conducted by Baker Environmental, Inc. during Remedial Investigation | <p>Monitoring well and identifier</p> <ul style="list-style-type: none"> ⊕ 78-GW34 Shallow ⊙ 78-GW17-2 Intermediate ⊚ 78-GW09-3 Deep | <p>Water-supply well and identifier</p> <ul style="list-style-type: none"> ● HP-642 Active ⊕ HP-650 Inactive |
|--|--|---|

Figure C14. Site boundaries and monitor well locations at Installation Restoration Site 78—Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1994b).

Installation Restoration Program Site Investigations and Histories

for selected VOCs of interest to this study as well as for pesticides. Of the VOCs of interest, concentrations of TCE greater than detection limits occurred most frequently in 7 of 90 samples and ranged from an estimated 2.0 to 120 µg/kg. Concentrations of BTEX components greater than detection limits occurred in 4 of 90 samples, ranging from an estimated 1.0 to 580 µg/kg. Concentrations of DDT and DDT metabolites greater than detection limits were observed in 3 of 90 samples, ranging from 22 to 140 µg/kg. No chlordane concentrations greater than detection limits were determined in any soil sample (Environmental Science and Engineering, Inc. 1991).

Following the Supplemental Characterization Step investigations, an interim RI was begun during 1992 to further evaluate the nature and extent of groundwater contamination within the Brewster Boulevard aquifer system at the HPIA. No additional field data were collected during this investigation (Baker Environmental, Inc. 1992a). Also during 1992, a Pre-investigation Study was conducted in preparation for an RI/FS at Site 78. Groundwater samples were obtained for analyses in several deep monitor wells as well as at several abandoned supply wells in the vicinity of Site 78 (Baker Environmental, Inc. 1994b). Results of these analyses were not published in available reports. Geophysical investigations conducted during the Pre-investigation Study indicated the probable existence of USTs within Site 78 at Buildings 903, 1502, and 1601. No USTs were indicated at Buildings 1202 or 1709 (Baker Environmental, Inc. 1994b).

Field investigations related to a final RI at Site 78 began during April 1993 and continued into December 1993. Monitor wells 78-GW33–78-GW39 were constructed during the final RI, all open to the Brewster Boulevard aquifer system. Well 78-GW09-1 (new) was constructed to replace 78-GW09-1 (old). Samples were collected in several wells at Site 78 during May and December 1993 and were analyzed for all VOCs of interest to this study as well as selected pesticides. With the exception of wells 78-GW09-1 (new), 78-GW23, and 78-GW24-1, VOCs of interest detected in the newly constructed and existing wells were small or below detection limits. Concentrations of TCE detected in wells 78-GW09-1 (new) and 78-GW23 were 2,100 and 57 µg/L, respectively. Concentrations of *cis*-1,2-DCE detected in wells 78-GW23 and 78-GW24-1 were an estimated 14,000 and 3,400 µg/L, respectively (Figures C14 and C15, Table C53). Contours of total chlorinated solvents within the Brewster Boulevard aquifer system at the HPIA determined during the final RI are shown in Figure C16. The solvents delineated within the Brewster Boulevard aquifer system in the northern part of the HPIA are possibly the source of TCE and related degradation products observed in supply wells HP-602, HP-634, and possibly HP-652 during 1984–1991. Similarly, the solvents delineated in this aquifer in the southern part of the HPIA are the possible source or sources of TCE and related degradation products observed in supply well HP-608 during 1984–1986 (Figures C14–C16, Table C7). All BTEX components were observed in several monitor wells during the final RI sample collection during 1991 and 1993. Benzene

was detected most frequently at concentrations ranging from 2.0 µg/L in well 78-GW21 to 51 µg/L in well 78-GW24-1 (Table C54). Benzene was detected in deep well 78-GW31-3 at an estimated concentration of 15 µg/L and in intermediate well 78-GW32-2 at a concentration of 27 µg/L. All BTEX components were detected in well 78-GW32-2 at concentrations ranging from an estimated 2.0 µg/L of ethylbenzene to 31 µg/L of toluene. Monitor well 78-GW31-3 was constructed open to the Upper Castle Hayne aquifer system at an interval of 140–153 ft bgs. Well 78-GW32-2 was open to the Tarawa Terrace aquifer between 65 and 78 ft bgs. The occurrence of BTEX (LNAPL) components at such depths indicates substantial downward vertical migration from the water table had occurred at the site prior to the onset of monitoring in 1993. Such migration was probably largely by advection along downward vertical head gradients caused by pumping from nearby supply wells HP-601, HP-602, HP-634, HP-642, and, depending on the timing of BTEX occurrence in the shallow subsurface, pumping at supply wells HP-607 and HP-630. Concentrations of DDT and DDT metabolites observed in Site 78 monitor wells were less than detection limits during May 1993. A single detection of chlordane occurred in monitor well 78-GW09-3 at an estimated concentration of 0.11 µg/L.

Surface-water and sediment samples were collected at 7 stations located on Beaverdam Creek and 15 stations along Cogdels Creek and its tributaries during May 1993 (Figure C14). Two surface-water and sediment collection stations also were located east of Cogdels Creek along a short unnamed tributary and adjacent to the New River opposite Site 28. Results of the collection and subsequent analyses of surface-water and sediment samples at Cogdels Creek and New River were summarized with respect to previous investigations at Site 28. A toluene concentration of an estimated 3.0 µg/L was detected in a surface-water sample in the unnamed tributary east of Cogdels Creek. At the seven stations located on Beaverdam Creek, no VOCs of interest were detected either in surface-water or sediment samples. Concentrations of DDT and DDT metabolites were detected in sediments at five of seven Beaverdam Creek locations at concentrations ranging from an estimated 4.8 to 93 µg/kg. Concentrations of chlordane in Beaverdam Creek sediments occurred greater than detection limits at three of seven locations and ranged from 2.4 µg/kg to an estimated 5.6 µg/kg.

Surface and subsurface soil samples also were collected at several locations within the HPIA during the final RI. Sample locations were generally near or adjacent to building locations, including Buildings 903, 1103, 1300, 1502, 1601, and 1608. With the exception of Building 1608, these buildings are outlined in magenta on Figure C14. Building 1608 is located across East Road opposite Building 1601 (Figure C14). Thirty soil borings were advanced. Surface soil samples were collected between land surface and 6 inches bgs. Subsurface soil samples were collected at 1- or 2-ft intervals between about 1 ft bgs to near the water table. Concentrations of VOCs of interest were determined greater than detection limits in surface soils at Buildings 1103 and 1502. Toluene and xylenes

were detected at Building 1103 at estimated concentrations of 9 and 10 $\mu\text{g}/\text{kg}$, respectively. An estimated concentration of 2.0 $\mu\text{g}/\text{kg}$ of total 1,2-DCE was observed in a surface soil sample at Building 1502. Concentrations of DDT and DDT metabolites were detected at each building location, frequently in more than one borehole, and ranged from an estimated 3.7 to 16,000 $\mu\text{g}/\text{kg}$. Chlordane concentrations were determined greater than detection limits at Building 1103 at an estimated 12 $\mu\text{g}/\text{kg}$ and at 1,900 $\mu\text{g}/\text{kg}$. Regarding the subsurface samples, concentrations of ethylbenzene and total xylenes were detected between 6 and 7 ft bgs at Building 1601 at an estimated 35 $\mu\text{g}/\text{kg}$ and at 450 $\mu\text{g}/\text{kg}$, respectively. Concentrations of total 1,2-DCE were detected at an estimated 6.0 and 16 $\mu\text{g}/\text{kg}$ at Building 903. Concentrations of DDT and DDT metabolites greater than detection limits occurred in subsurface soils in at least one borehole at each building, with the exception of Building 903. Concentrations ranged from an estimated 1.3 to 9.7 $\mu\text{g}/\text{kg}$. Maximum depth of occurrence was 9 ft bgs. Concentrations of chlordane were not detected in subsurface soils. Subsurface soil samples also were collected during the construction of monitor wells. Of the VOCs of interest, only toluene was detected at an estimated concentration of 3.0 $\mu\text{g}/\text{kg}$ at a depth of 14 ft bgs in the borehole of well 78-GW39. A DDT metabolite was detected in the borehole of well 78-GW37 at concentrations of 42 and 48 $\mu\text{g}/\text{kg}$. Maximum depth of occurrence was 8 ft bgs (Baker Environmental, Inc. 1994b).

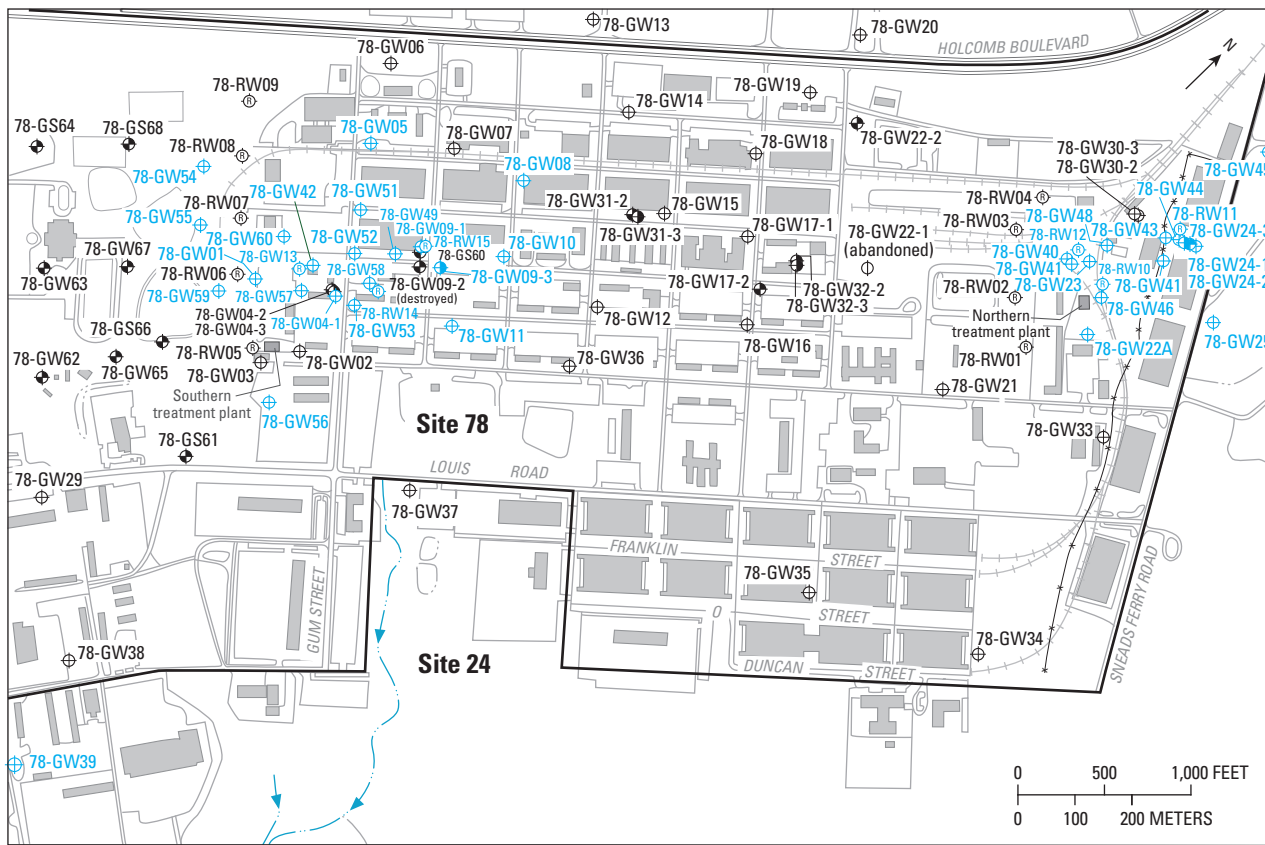
Following completion of the RI and a final FS, several approaches were selected to remediate contaminated groundwater at Site 78, including groundwater extraction and treatment and implementation of long-term groundwater monitoring. These and other remediation methods were included in an ROD between the Department of Navy and the U.S. Marine Corps, the State of North Carolina, and USEPA Region IV signed in 1994 (Baker Environmental, Inc. 1994bd). Subsequently, groundwater monitoring occurred routinely on a quarterly, semiannual, or annual basis at most monitor wells, including newly constructed monitor wells. Results of groundwater monitoring and results of VOC extraction from the shallow aquifer were published in a series of reports beginning in 1996 (Baker Environmental, Inc. 1996ij, 1997cd, 1998jk, 1999bc, 2002a; CH2M Hill Federal Group Ltd. and Baker Environmental, Inc. 2000a, 2001a; Baker Environmental, Inc. and CH2M Hill, Inc. 2002a; Baker Environmental, Inc., CH2M Hill, Inc., and CDM Federal Programs Corp. 2003; Michael Baker Jr., Inc. and CH2M Hill Federal Group, Ltd. 2003; Engineering and Environment, Inc. and Michael Baker Jr., Inc. 2004a).

By December 1994, north and south VOC extraction networks were in place and operating at Site 78 (Figure C15). Wells related to the north extraction network were 78-RW01N–78-RW04N. Corresponding wells constructed for the south extraction network were 78-RW05S–78-RW09S. All wells were constructed open to the Brewster Boulevard aquifer system. By July–November 1996, only wells 78-RW10N and 78-RW11N were active at the north extraction network. Wells 78-RW01N–78-RW04N were inactive at that time because

of limited VOC collection and possibly were abandoned as extraction wells. At the south extraction network, wells 78-RW05S–78-RW08S were active, and well 78-RW09S was inactive. During October 1996, wells 78-RW10N and 78-RW11N pumped at a combined rate of 5.8 gallons per minute (gpm). The corresponding combined pumping rate at the south extraction network for wells 78-RW05S–78-RW08S was 14 gpm (Baker Environmental, Inc. 1996j). Between July and December 1997, combined pumping rates at the north extraction network ranged from 1.9 to 3.6 gpm. Corresponding rates at the south extraction network were 2.3 to 16.4 gpm (Baker Environmental, Inc. 1998k). The combined pumping rate at the north extraction network remained little changed from June 1999 through August 2002. The cumulative weight of VOCs removed from the Brewster Boulevard aquifer system by the north extraction network as of August 2002 was 64.5 pounds. The combined pumping rate at the south extraction network between June 1999 and August 2002 varied from about 1 to 16 gpm. The cumulative weight of VOCs removed by the south extraction network by January 2000 was about 9 pounds. Apparently, the south extraction network was inoperative between about January 2000 and May 2002. The cumulative weight of VOCs removed by the south extraction network by August 2002 was 23.3 pounds (Baker Environmental, Inc. and CH2M Hill, Inc. 2000a, 2002a; CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2000a).

Following completion of the north and south extraction networks in 1994, additional monitor wells (78-GW40–78-GW78), small-diameter piezometers (78-PZ01–78-PZ12), and test wells (78-S-TW01–78-S-TW13) were constructed between 1995 and 2003 to further refine knowledge of the extent of VOC contamination at the HPIA and evaluate the performance of the extraction networks (Figure C14, Table C52). Additional extraction wells were constructed and added to the north and south extraction networks—wells 78-RW10N–78-RW12N and 78-RW13S–78-RW15S, respectively. A detailed study of the vertical and areal extent of VOC contamination in the immediate vicinities of the north and south extraction networks was accomplished during June 2002 when Geoprobe samples were collected at numerous locations. In general, three to five water samples were collected at each location at depths ranging from about 20 to 50 ft. These data were combined with monitor well data to construct sections portraying subsurface conditions across the north and south contaminated areas. For example, locations of section lines *A–A'*, *B–B'*, and *C–C'* assembled for the north area are shown in Figure C17. The vertical distribution of TCE along these section lines is shown in Figure C18. Concentrations of TCE ranging from below detection limits to more than 200 $\mu\text{g}/\text{L}$ are shown to occur at depth with a high degree of spatial continuity throughout the northern contaminated area. Zones of relatively high concentration are separated by zones of relatively low concentration along each section. Such variations are possibly caused by aquifer and confining unit heterogeneity, particularly the variability of horizontal and vertical hydraulic conductivity within the Brewster Boulevard aquifer system.

Installation Restoration Program Site Investigations and Histories

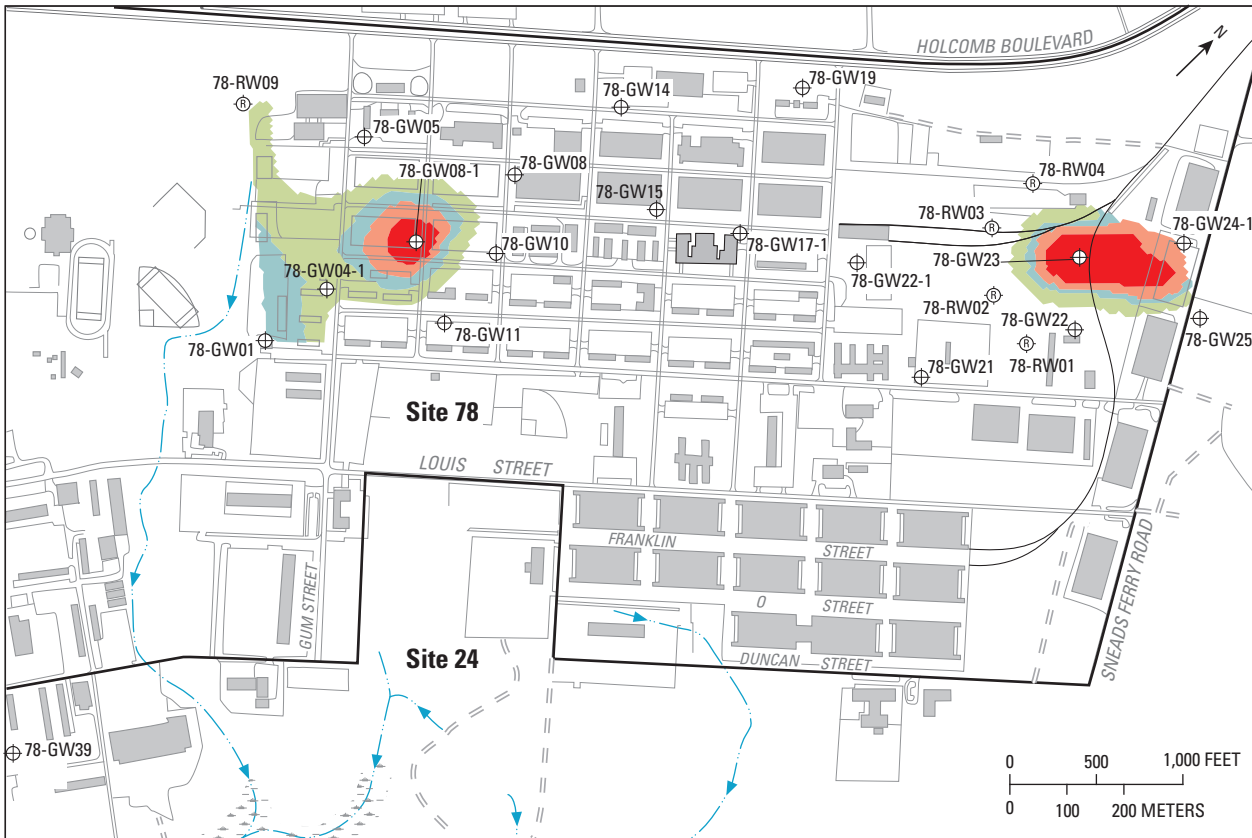


Base modified from U.S. Marine Corps Base Camp Lejeune, March 2000

EXPLANATION

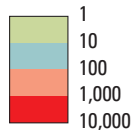
- Approximate site boundary**
- Direction of surface-water flow**
- Recovery well**—Well shown in black font is off-line
- Monitoring well and identifier**—Well shown in black font is not included in monitoring program
 - 78-GW24-1 (Shallow)
 - 78-GW24-2 (Intermediate)
 - 78-GW24-3 (Deep)

Figure C15. Extraction and monitor well locations at Installation Restoration Site 78—Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Michael Baker, Jr. Inc. and CH2M Hill Federal Group, Ltd. 2003).



EXPLANATION

Chlorinated solvent concentration, in micrograms per liter



- Approximate site boundary
- Direction of surface-water flow
- Well and identifier**
- ⊕ 78-RW04 Recovery
- ⊕ 78-GW11 Shallow monitoring

Figure C16. Chlorinated solvent concentrations during 1996 at Installation Restoration Site 78—Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1996j).

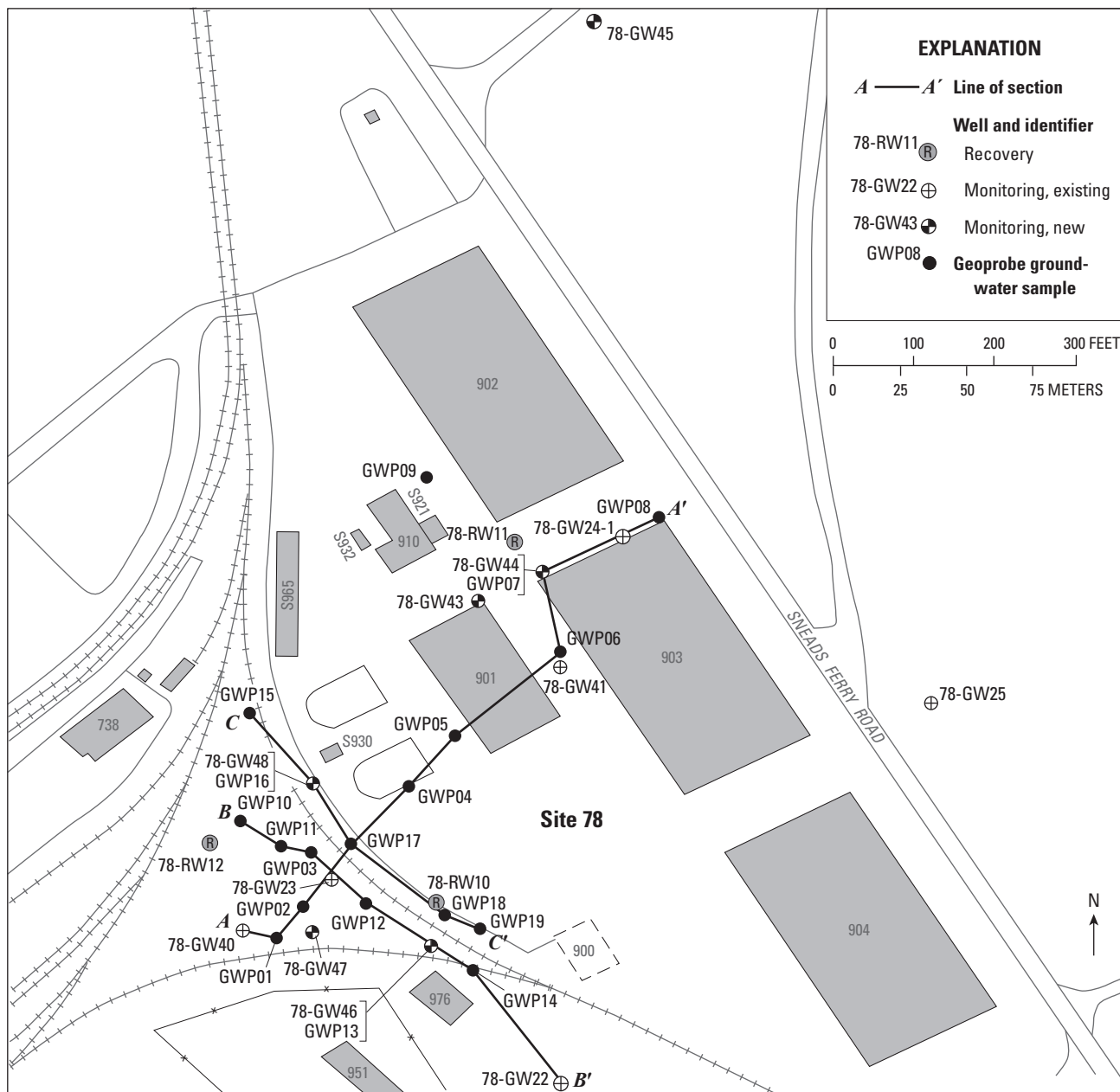


Figure C17. Locations of section lines *A–A'*, *B–B'*, and *C–C'* at the north contaminated area, Installation Restoration Site 78—Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental Inc., CH2M Hill Federal Group Ltd., and CDM Federal Programs Corp. 2003).

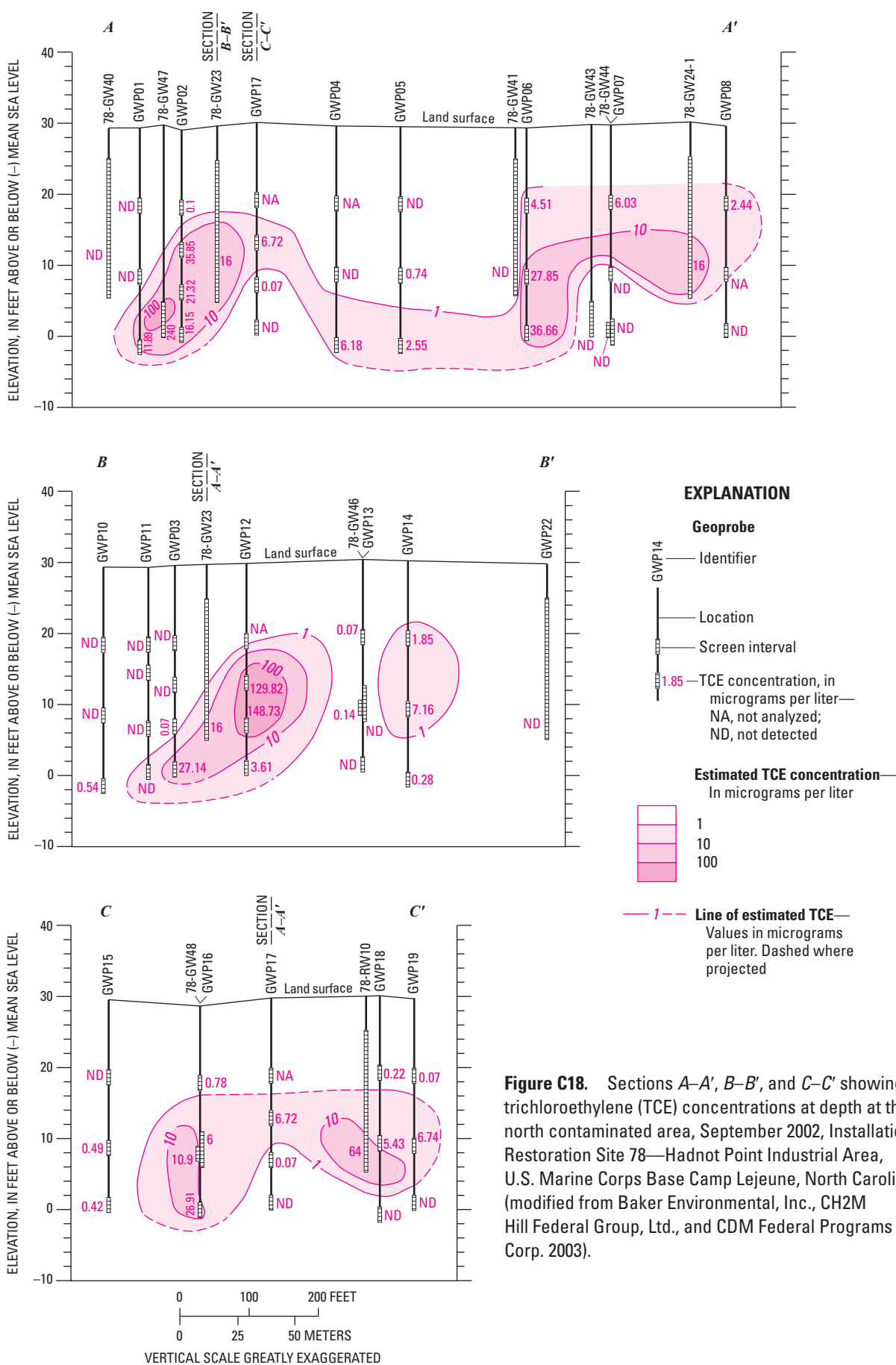


Figure C18. Sections A–A', B–B', and C–C' showing trichloroethylene (TCE) concentrations at depth at the north contaminated area, September 2002, Installation Restoration Site 78—Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc., CH2M Hill Federal Group, Ltd., and CDM Federal Programs Corp. 2003).

Installation Restoration Site 80— Paradise Point Golf Maintenance Area

The Paradise Point golf maintenance area is located about midway between Brewster Boulevard and Northeast Creek and approximately three-quarters of a mile east of New River (Figure C1, Plate 1). As of 1991, Site 80 was used and had been used as (1) a maintenance area for equipment used to maintain the base golf courses, (2) a pesticide mixing and wash area, (3) an equipment wash area, (4) a storage area for golf course debris, such as brush and lawn clippings, and (5) a disposal area for abandoned mechanical equipment. Total site area is about 1 acre. Site 80 occupies a highland area on the divide between Northeast Creek and the New River and is drained by a shallow drainage ditch along its eastern periphery (Haliburton NUS 1992b; Baker Environmental, Inc. 1996e).

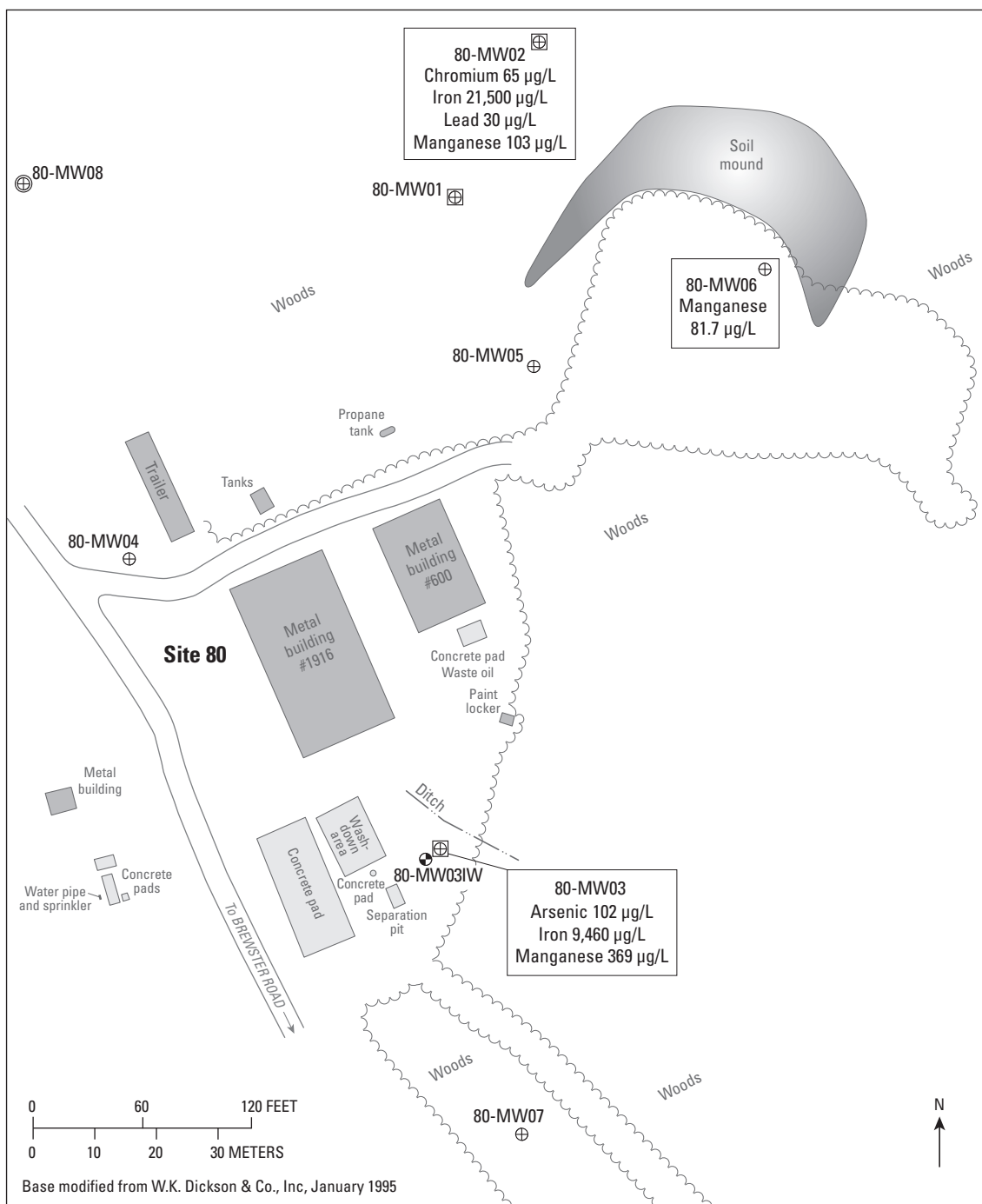
Investigations of groundwater contamination at Site 80 began during a site inspection in 1991. Seven soil borings were advanced to near the water table, including three borings converted to monitor wells 80-MW01–80-MW03, constructed open to the Tarawa Terrace aquifer between 10 and 22 ft bgs (Figure C19, Table C55). Fourteen subsurface soil samples were obtained from the soil borings—two from each borehole (one between land surface and 2 ft bgs and one at or slightly above the water table). Three surface soil samples also were collected between land surface and 6 inches bgs at a soil mound near the eastern periphery of the site. Seven additional soil samples were collected between land surface and 2 ft bgs at various locations to determine background conditions. In addition, sediment and surface-water samples were collected in the drainage ditch at five and three locations, respectively. Groundwater and soil samples were collected and analyzed during June 1991. Concentrations of components of BTEX were greater than detection limits in monitor well 80-MW03; concentrations ranged from 5.0 to 180 µg/L. Toluene concentrations were greater than detection limits in two surface-water samples at 30 and 110 µg/L. No pesticides were detected in groundwater, surface water, or subsurface soil samples at Site 80. Concentrations of DDT and DDT metabolites were detected in 5 of 10 surface soil samples ranging from 13 to 700 µg/kg. Chlordane was detected in 1 of 10 surface soil samples at a concentration of 60 µg/kg (Haliburton NUS 1992b; Baker Environmental, Inc. 1996d).

A final RI began at Site 80 during October 1994 and continued until July 1995. Shallow monitor wells 80-MW04–80-MW07 were constructed open to the Tarawa Terrace aquifer between 11 and 27.5 ft bgs during November 1994. Intermediate well 80-MW03IW also was constructed during

November 1994 open to the Upper Castle Hayne aquifer–River Bend unit between 57 and 72 ft bgs. Monitor wells 80-MW01–80-MW07 were sampled during November 1994. An additional shallow well, 80-MW08, was constructed during June 1995 open to the Tarawa Terrace aquifer between 10 and 25 ft bgs and was sampled during July 1995 (Tables C55–C57). Of the groundwater samples analyzed for VOCs, no VOCs of interest to this study were observed greater than detection limits (Tables C56, C57). The pesticides DDT and DDT metabolites were detected in a sample from well 80-MW04 during November 1994 at estimated concentrations of 0.58 and 2.2 µg/L, respectively.

A total of 114 surface soil samples and 51 subsurface soil samples were collected at Site 80 during two sampling rounds in November 1994 and June 1995. Fifty-five of the surface soil samples were collected in a small area in the northwestern part of the site called the “lawn area” because of suspected contamination from a septic absorption system leach field. Surface soil samples were collected between land surface and 1 ft bgs. Subsurface soil samples were collected between 1 ft bgs to just above the water table. Of the 34 surface soil samples analyzed for VOCs, no VOCs of interest to this study were observed greater than detection limits. Of the 55 surface soil samples submitted for pesticide analyses, DDT and DDT metabolites were detected in 45 samples at concentrations ranging from an estimated 0.6 to 260,000 µg/kg (Baker Environmental, Inc. 1996de). With respect to concentrations of VOCs of interest to this study in subsurface soil samples collected during the final RI, none were determined greater than detection limits in any of 45 samples submitted for analyses. Metabolites of DDT and DDT were detected in 18 of 45 subsurface soil samples at concentrations ranging from an estimated 1.1 µg/kg to an estimated 510 µg/kg. Chlordane concentrations were not observed greater than detection limits in any sample.

Remediation of contamination at Site 80 was proposed following completion of the final RI and was based on the excavation and removal of soils contaminated with pesticides at several areas of concern (Baker Environmental, Inc. 1995q). Successful removal of contaminated soils probably negated the need for additional monitoring at Site 80, and routine monitoring for groundwater conditions was terminated after 1995. An ROD between the Department of the Navy and the U.S. Marine Corps, the North Carolina Department of Environment, Health, and Natural Resources, and USEPA Region IV was signed in 1997. The ROD stipulated that no further remedial action was required at IR Site 80 (Robert A. Lowder, U.S. Marine Corps Camp Lejeune, written communication, review comments, this report, September 23, 2009).



EXPLANATION

- Shallow monitoring well and identifier**
- 80-MW01 ⊕ Installed prior to remedial investigation conducted in October 1994
 - 80-MW05 ⊕ Installed during the first part of groundwater investigation, November 1 through November 7, 1994
 - 80-MW08 ⊕ Installed during the second part of groundwater investigation, June 12 through June 14, 1995
- Intermediate monitoring well and identifier**—Installed during the first part of groundwater investigation, November 1 through November 7, 1994
- 80-MW03IW ⊕

Figure C19. Monitor well locations at Installation Restoration Site 80—Paradise Point golf maintenance area, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 1996e). [Note: sample concentrations shown in micrograms per liter (µg/L)]

Installation Restoration Site 82— VOC Disposal Area at Piney Green Road

The history of waste disposal at Site 82 closely parallels the history of Site 6 discussed previously herein. Site 82 is bounded to the south by the northern boundary of Site 6, to the north by Wallace Creek, and to the west and east by Holcomb Boulevard and Piney Green Road, respectively (Figure C5). Site area is approximately 30 acres (Haliburton NUS 1992c). The area that would later be designated Site 82 was observed during the final RI at Site 6 to be littered with surface debris, such as empty and rusted drums near monitor wells 06-GW01 and 06-GW01D (Figure C5) (Baker Environmental, Inc. 1992b, 1993e).

The locations of monitor wells 82-MW01–82-MW03 and 82-MW30 are shown in Figure C5 in conjunction with Site 6 monitor wells. Monitor wells shown in Figure C5 in the Site 82 area with names printed in blue and whose names are prefaced by DR and SR are wells 82-DRW01–82-DRW04 and 82-SRW01–82-SRW06 listed in Tables C58–C60. Monitor well 82-MW31 is not shown in Figure C5 but was reportedly constructed near supply well HP-653. Construction information for this well is not available, but the well is possibly abandoned supply well HP-619 (old) (Haliburton NUS 1992c) (Tables C4 and C58, Plate 1). Other monitor wells constructed at Site 82 but not shown in Figure 5 are 82-DP01 and 82-DP02 (near 06-GW01D), 82-SP01 and 82-SP02 (near 06-GW34), and 82-TW01–82-TW03 (near 06-GW32). These wells were installed as observation wells for a large-scale aquifer test and were not sampled for groundwater contaminants (Figure C5) (Baker Environmental, Inc. 1998a).

Investigations of groundwater contamination specifically dedicated to Site 82 began during 1991 with a Site Inspection by Haliburton NUS (1992c). Monitor wells 82-MW01–82-MW03 and 82-MW30 were constructed open to the Brewster Boulevard aquifer system and sampled during June 1991. No VOCs of interest to this study were observed greater than detection limits in these monitor wells at this time (Tables C59, C60). Concentrations of DDT, DDT metabolites, and chlordane also were not detected. Six surface-water and collocated sediment sampling stations were established at Wallace Creek—three stations immediately north of Site 82 including one immediately downstream of Piney Green Road, two stations upstream of Piney Green Road, and one station between Holcomb Boulevard and the Camp Lejeune Railroad. Surface-water and sediment samples were collected during June 1991. Of the VOCs of interest that occurred in surface water, TCE, total 1,2-DCE, and vinyl chloride were detected at one or more stations at concentrations ranging from 6.0 to 74 µg/L. No pesticides of interest were detected. Total 1,2-DCE was detected at every station. No BTEX components

were detected. Regarding the sediment samples, concentrations of total 1,2-DCE were greater than detection limits at each of the three stations directly north of Site 82 and ranged from 14 to 57 µg/kg. A metabolite of DDT was detected at two of these stations at concentrations of 30 and 69 µg/kg. A total of 26 subsurface soil borings were obtained from 6 boreholes and 3 monitor well borings generally distributed throughout the eastern part of Site 82. Two to five samples were obtained from each borehole between 4 and 17 ft bgs. Eighteen soil samples were selected for analyses. Concentrations of two VOCs of interest were observed above detection limits in 2 of 18 samples. Total 1,2-DCE and toluene occurred at 13 and 9.0 µg/kg, respectively. Concentrations of DDT and DDT metabolites were observed greater than detection limits in 1 of 18 samples, ranging from an estimated 77 to 110 µg/kg.

Following completion of the Site Investigation and a final FS, several approaches were selected to remediate contaminated groundwater at Site 82, including groundwater extraction and treatment, implementation of long-term groundwater monitoring, implementation of vapor extraction methods to enhance volatilization of VOCs within contaminated soils, and excavation of soil contaminated with PCBs and pesticides. These and other remediation methods were included in an ROD between the Department of Navy and the U.S. Marine Corps, the State of North Carolina, and USEPA Region IV signed in 1993 (Baker Environmental, Inc. 1993ef). Subsequently, groundwater monitoring occurred routinely on a quarterly, semiannual, or annual basis at most monitor wells. Results of groundwater monitoring were published in a series of reports beginning in 1997 (Environmental Science and Engineering, Inc. 1992b; Baker Environmental, Inc. 1997e, 1998ghi, 1999de; Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000e; CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2000b; Baker Environmental, Inc. and CH2M Hill, Inc. 2001a, 2002b; Michael Baker Jr., Inc. and CH2M Hill, Inc. 2003; Engineering and Environment, Inc. and Michael Baker Jr., Inc. 2004b; Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2004). A report summarizing the final basis of design for site remediation was completed in 1994 (Baker Environmental, Inc. 1994a).

Implementation of the extraction and treatment provisions of the ROD at Site 82 required the construction of six shallow and four deep extraction wells. Deep wells 82-DRW01–82-DRW04 were constructed during 1995 and 1996 open to the Upper Castle Hayne aquifer–River Bend unit between 80 and 110 ft bgs. Shallow wells 82-SRW01–82-SRW06 were constructed during the same period open to either the Brewster Boulevard aquifer system or the Tarawa Terrace aquifer (Table C58) (James A. Dunn, Jr., OHM Remediation Services Corp., Relocation of Additional Extraction Wells, written communication, April 1, 1996; Baker Environmental, Inc. 1998a). A treatment plant for the

extracted groundwater was constructed between Piney Green Road and the number 1 monitor well array at Site 6 (Baker Environmental, Inc. 1994a). Groundwater extraction from shallow and deep wells commenced during October 1996 and continued with occasional interruptions for maintenance until at least October 2004. The cumulative weight of total VOCs removed by extraction wells by October 2004 was approximately 166,000 pounds (Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2004). Estimates of total VOCs extracted by weight after July 2001 were based on the sum of concentrations of all organic volatile constituents detected in the samples collected in extraction wells during a designated month. Prior to July 2001, total VOCs extracted were estimated based on the concentrations of selected constituents (Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2004). Concentrations of BTEX components in the shallow and deep extraction wells at Site 82 were consistently small or below detection limits in all wells. A benzene concentration of 11 µg/L was detected in several samples from deep well 82-DRW02 and is the maximum concentration of a BTEX component determined in any extraction well between 1998 and 2004. Pumping rates from extraction wells during 1997 ranged between 24 and 48 gpm at the shallow wells and between 75 and 81 gpm at the deep wells (Baker Environmental, Inc. 1997e). Between January 1996 and July 2004, pumping rates at extraction wells 82-DRW01–82-DRW03 ranged between 25 and 50 gpm. At well 82-DRW04, the pumping rate was comparatively constant at about 150 gpm. Pumping rates at the shallow wells during the same period ranged between 0.1 and 4.5 gpm (Michael Baker Jr., Inc. and Engineering and Environment Inc. 2004).

Sampling in extraction wells for contaminant analyses began in April 1998 and continued periodically until at least July 2004. Analytical schedules included only VOCs and metals. Concentrations of PCE, TCE, and related degradation products greater than detection limits occurred consistently and frequently in all extraction wells during this period (Table C59). High concentrations of TCE and total 1,2-DCE occurred in each of the deep extraction wells open to the Upper Castle Hayne aquifer. Concentrations of TCE ranged from 1,800 µg/L in well 82-DRW03 to 71,000 µg/L in well 82-DRW01. Corresponding concentrations of total 1,2-DCE ranged from 1,200 µg/L in well 82-DRW03 to 20,000 µg/L in well 82-DRW02. Similar contaminant concentrations occurred in shallow wells 82-SRW01–82-SRW06.

Concentrations of total VOCs in Site 6 and Site 82 monitor and extraction wells published during July 2002 and July 2004 were used, along with lithologic data, to create sections representing subsurface conditions between Wallace Creek and the number 2 well array at Site 6 (Figures C20–C22). During both years, the highest VOC (DNAPL) concentrations are shown to occur between

extraction well 82-DRW02 and monitor well 06-GW01DA at depths ranging from 80 to 120 ft bgs. These depths are equivalent to the Tarawa Terrace aquifer and Upper Castle Hayne aquifer–River Bend unit at Site 82. Note also the general absence of confining unit lithologies such as clays and silts recorded in the background of the section diagrams. The dominant subsurface lithologies appear to be fine to medium sand, shells, and limestone. The absence of an extensive and competent confining unit at Sites 6 and 82 probably facilitated the downward migration of the originally shallow VOC mass to depths corresponding to the open intervals of nearby supply wells such as HP-651. Substantial downward migration of the center of the VOC mass appears to have occurred between 2002 and 2004 despite remediation efforts, as the base of the closed 10,000-µg/L contour during July 2004 is approximately 40 ft lower than during July 2002 (Figures C21, C22). Concentration contour maps of TCE distributions within the combined Brewster Boulevard lower aquifer and the Tarawa Terrace aquifer and within the Upper Castle Hayne aquifer–River Bend unit during January 2000 at IR Sites 6 and 82 are shown in Figures C23 and C24, respectively, and approximate the vertical representation of TCE plumes shown in sections in Figures C21 and C22.

Surface-water and sediment sample collection and analysis for VOCs from several stations at Wallace Creek directly north of Site 82 were initiated during January 2000 and continued periodically until July 2004. A total of 21 samples were collected during this period. Concentrations of all BTEX components in surface-water samples were less than detection limits with the exceptions of an estimated 0.10 µg/L of benzene during January 2004 and an estimated 5.0 µg/L of toluene during January 2002 (Baker Environmental, Inc. and CH2M Hill, Inc. 2002g; Engineering and Environment, Inc. and Michael Baker Jr., Inc. 2004b). Concentrations of PCE, TCE, and related degradation products were detected in several surface-water samples, generally at low concentrations. Concentrations of total 1,2-DCE occurred most frequently ranging from an estimated 0.4 to 22 µg/L in five samples. Concentrations of TCE ranged from an estimated 4.0 to 22 µg/L in three samples. The occurrence of VOCs in sediment samples from Wallace Creek was similar to occurrences in surface water. Concentrations of total 1,2-DCE occurred in four samples ranging from an estimated 1.0 to 8.0 µg/kg. Concentrations of TCE also occurred in four samples ranging from an estimated 2.0 to 7.0 µg/kg. Toluene was detected in two samples at estimated concentrations of 6.0 and 8.0 µg/kg (CH2M Hill Federal Group, Ltd and Baker Environmental, Inc. 2000b; Baker Environmental, Inc. and CH2M Hill, Inc. 2001a, 2002bg; Michael Baker Jr., Inc. and Ch2M Hill, Inc. 2003; Engineering and Environment, Inc. and Michael Baker Jr., Inc. 2004b; Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2004).

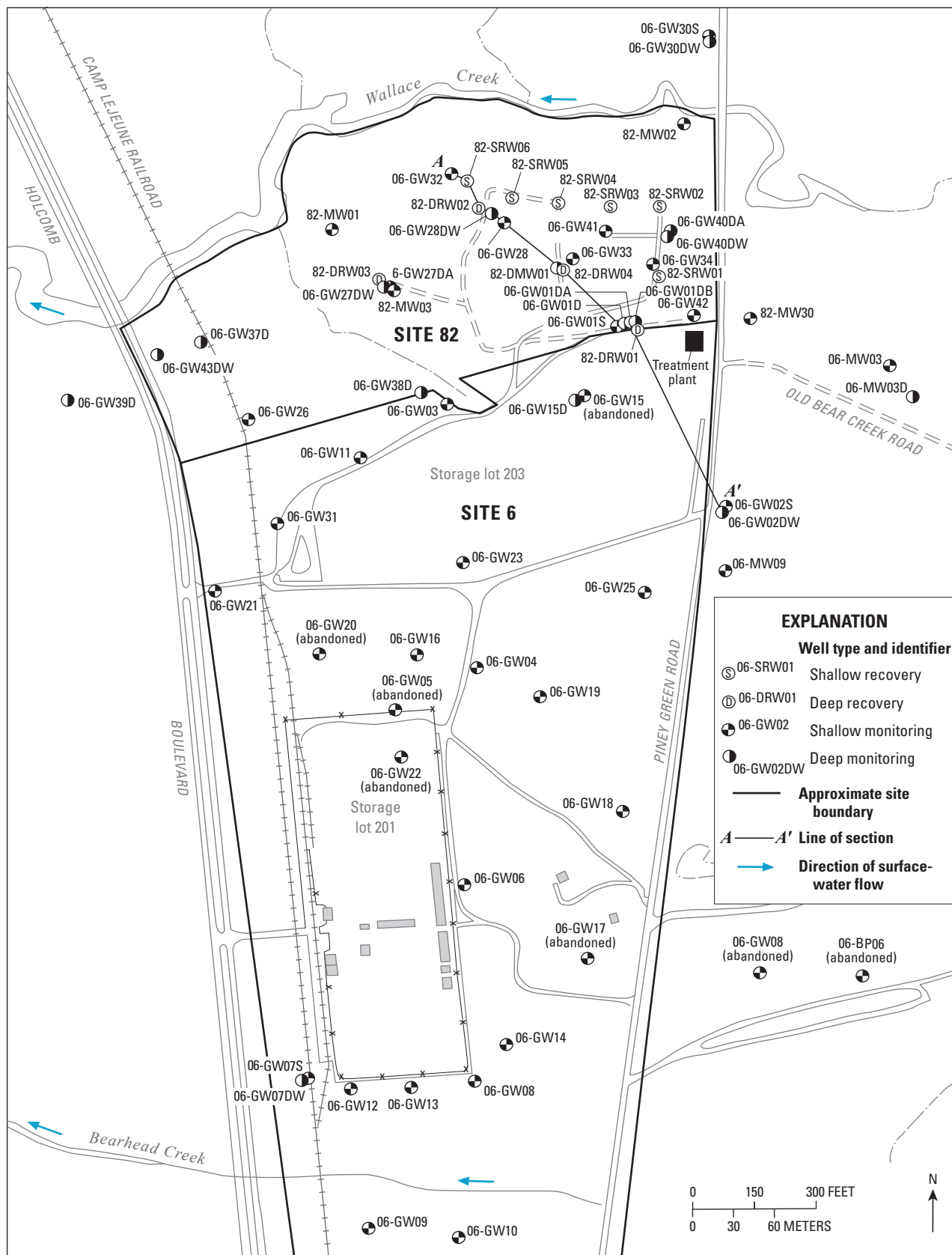


Figure C20. Location of section line A-A' at the VOC disposal area at Piney Green Road, Installation Restoration Sites 6 and 82, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Michael Baker, Jr., Inc. and Engineering and Environment, Inc. 2004). [VOC, volatile organic compound]

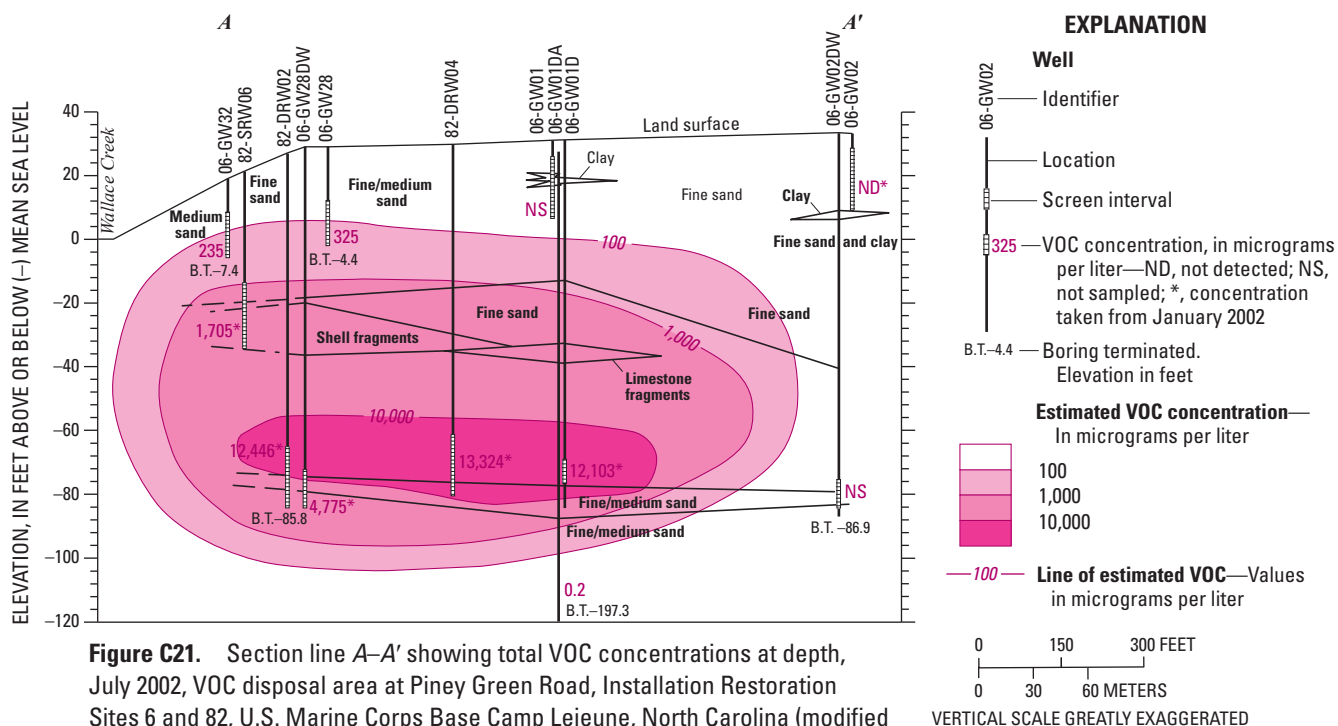


Figure C21. Section line A-A' showing total VOC concentrations at depth, July 2002, VOC disposal area at Piney Green Road, Installation Restoration Sites 6 and 82, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Michael Baker, Jr., Inc. and Engineering and Environment, Inc. 2004).

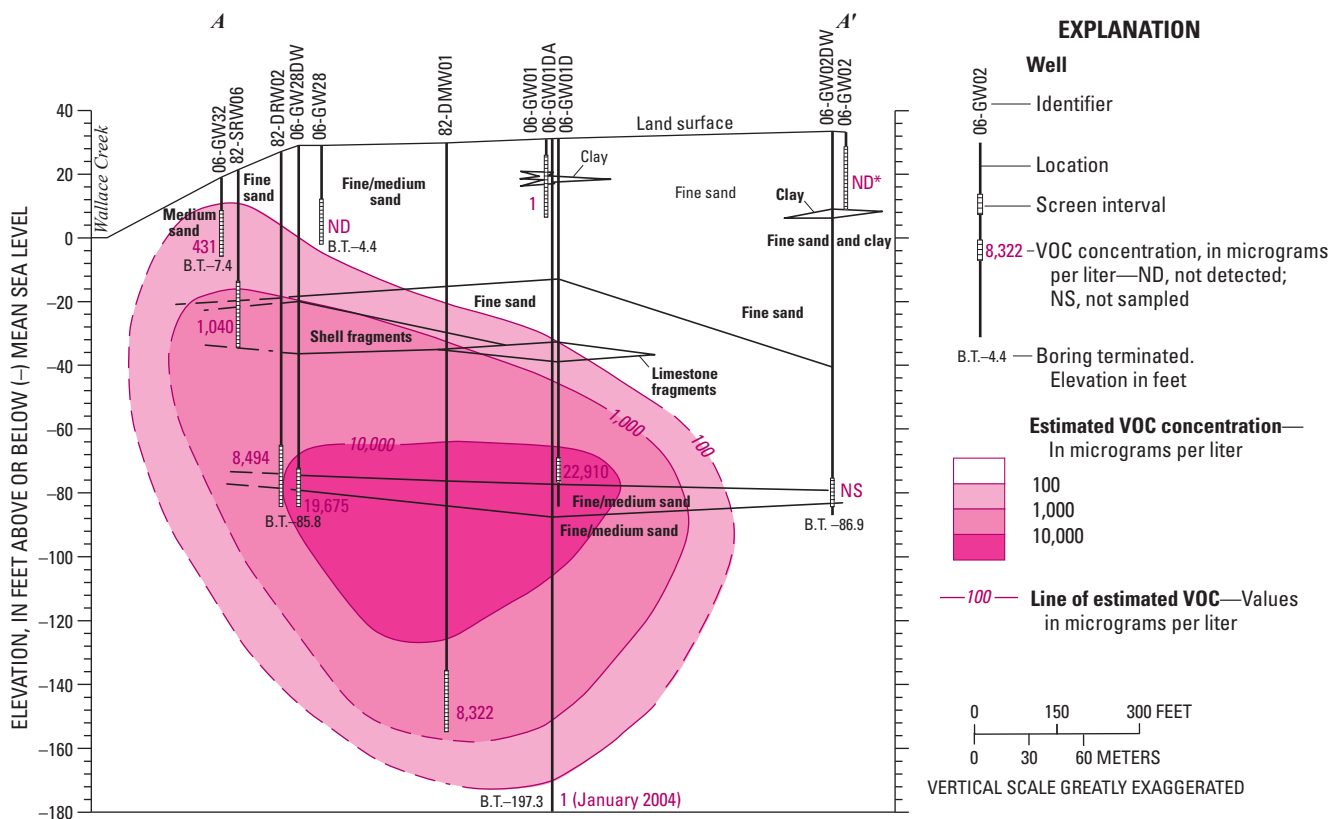
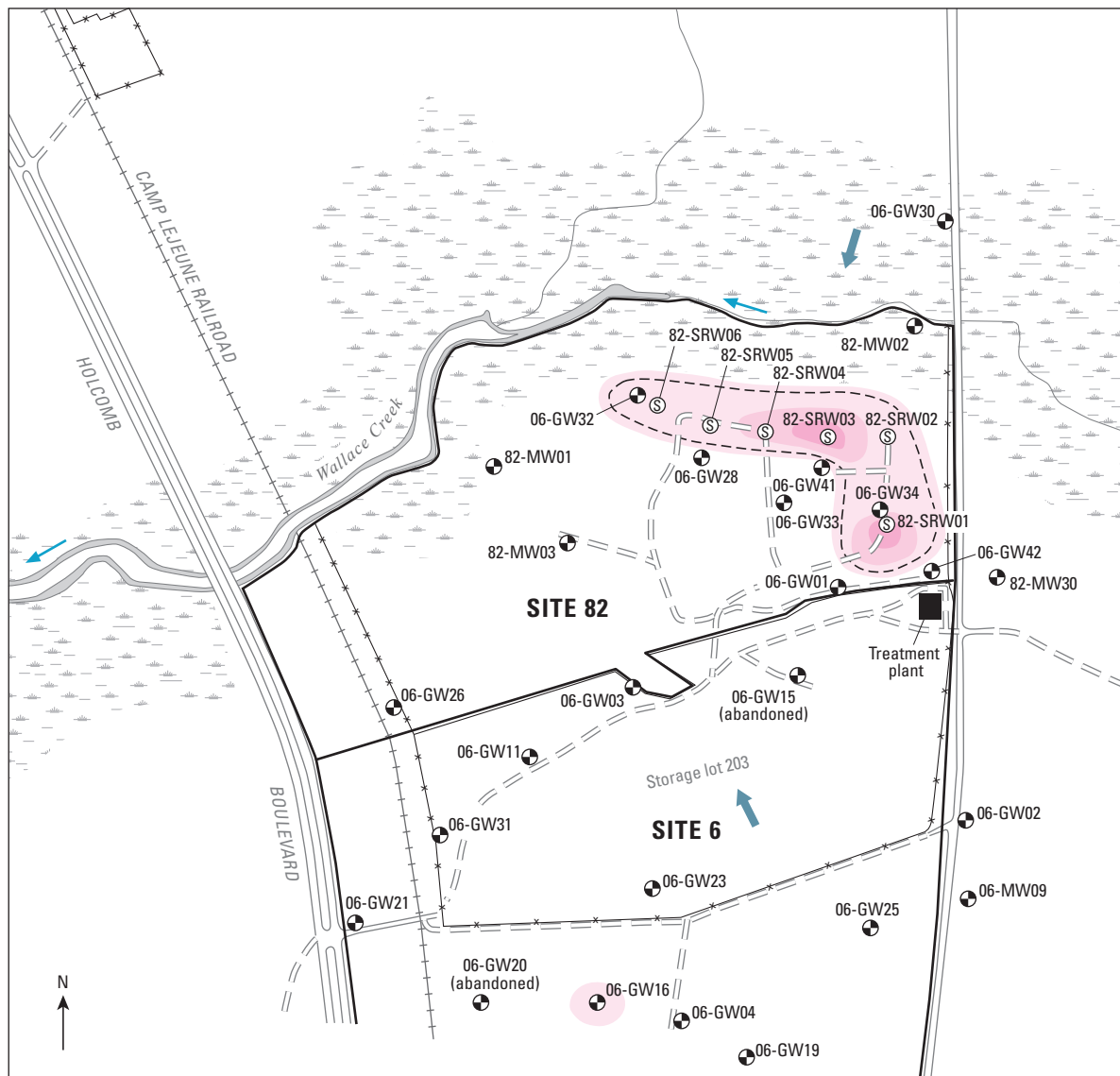


Figure C22. Section line A-A' showing total VOC concentrations at depth, July 2004, VOC disposal area at Piney Green Road, Installation Restoration Sites 6 and 82, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Michael Baker, Jr., Inc. and Engineering and Environment, Inc. 2004).

Installation Restoration Program Site Investigations and Histories



Base modified from U.S. Marine Corps
Base Camp Lejeune



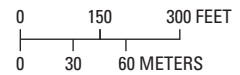
EXPLANATION

- | | |
|--|---|
| <p>TCE concentration—In micrograms per liter</p> <p>1
500
1,000</p> <p>--- Remediation level approximate boundary—
2.8 micrograms per liter</p> | <p>— Approximate site boundary</p> <p>General flow direction</p> <p>➔ Groundwater</p> <p>➔ Surface water</p> <p>Shallow well type and identifier</p> <p>⊕ 82-MW30 Monitoring</p> <p>⊙ 82-SRW01 Recovery</p> |
|--|---|

Figure C23. Trichloroethylene (TCE) distribution within the Brewster Boulevard lower aquifer and the Tarawa Terrace aquifer, Installation Restoration Sites 6 and 82, January 2000, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from CH2M Hill Federal Group, Ltd and Baker Environmental, Inc. 2000b).



Base modified from U.S. Marine Corps
Base Camp Lejeune



EXPLANATION	
<p>TCE concentration—In micrograms per liter</p> <p>1,000 5,000 10,000 50,000</p> <p>--- Remediation level approximate boundary— 2.8 micrograms per liter</p>	<p>— Approximate site boundary</p> <p>General flow direction</p> <p>➡ Groundwater</p> <p>➡ Surface water</p> <p>Deep well type and identifier</p> <p>06-GW39D ● Monitoring</p> <p>82-DRW03 ⊕ Recovery</p>

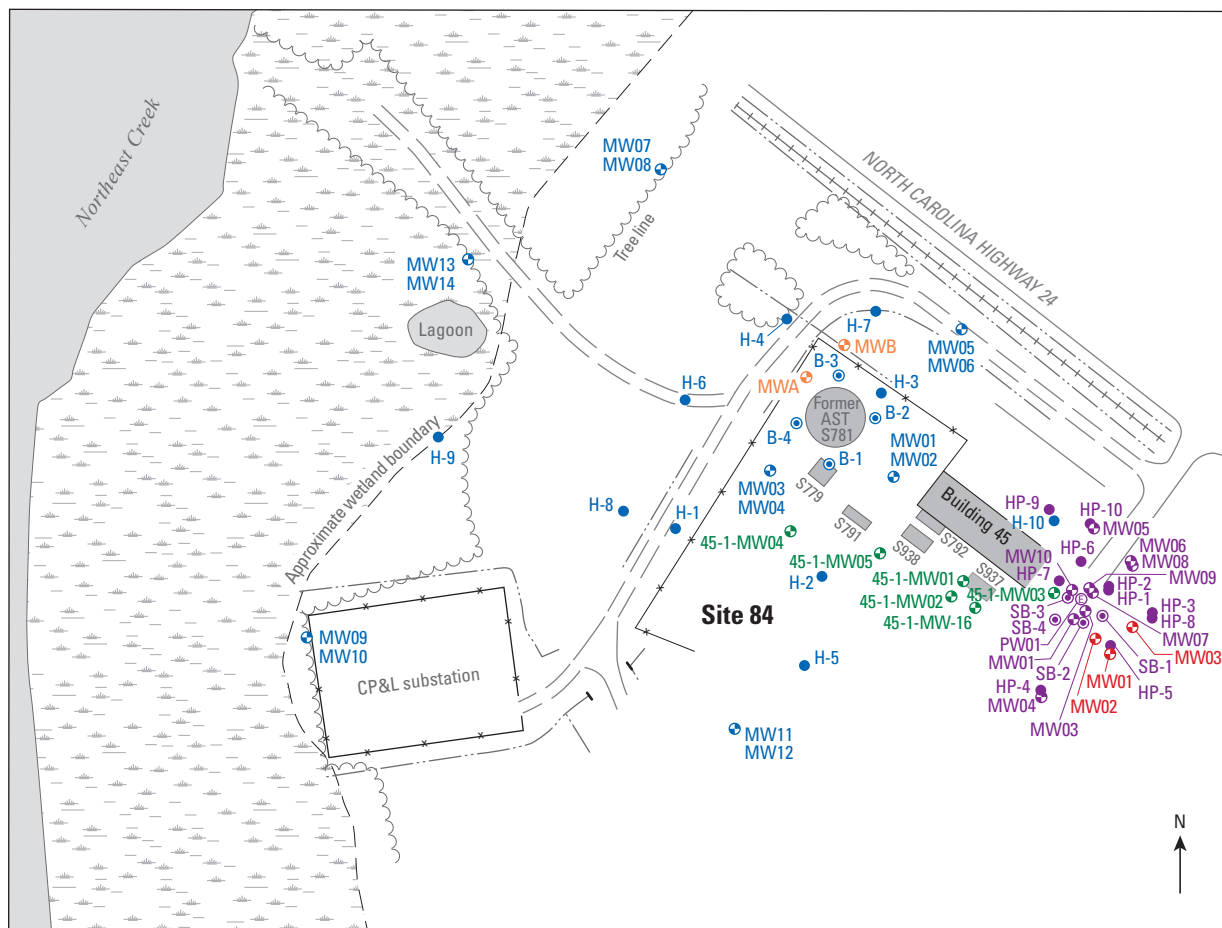
Figure C24. Trichloroethylene (TCE) distribution within the Upper Castle Hayne aquifer—River Bend unit, Installation Restoration Sites 6 and 82, January 2000, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from CH2M Hill Federal Group, Ltd and Baker Environmental, Inc. 2000b).

Installation Restoration Site 84/Building 45 Area—(Tank S781; Leaking Underground Storage Tank—USTs S941-1 and S941-2)

IR Site 84 is located immediately southwest of SR 24 in the northernmost part of the study area. Northeast Creek borders the entire western boundary of Site 84 (Figures C1, C25). Soil and groundwater contamination at Site 84 was caused primarily by accidental leakage of refined petroleum products from storage tank S781, located near the center of the site, and two smaller USTs, S941-1 and S941-2, located southeast of Building 45, which is a heavy equipment maintenance and

storage building. Some limited contamination from PCBs was suspected after finding and removing approximately 20 transformers from a lagoon located on the site. The transformer disposal was probably related to the operation of a nearby Carolina Power and Lighting electric substation.

Tank S781 was in place when the Marine Corps acquired the property in the early 1940s and was previously used to store fuel oil for power generation. The USMCB Camp Lejeune used tank S781 to store waste oils primarily related to diesel engine maintenance and repair. Tank S781 was emptied in 1988, and leakage of waste oils possibly occurred during the emptying process. Tank capacity was 176,000 gal.



Base modified from U.S. Marine Corps Base Camp Lejeune

EXPLANATION

Site type and identifier	Installed by
PW01 ⊕ Extraction well	ATEC
H-2 ● Hydropunch	Dewberry and Davis (D&D)
MW01 ⊕ Monitoring well	Law Engineering (Law)
B-4 ⊕ Soil boring	O'Brien and Gere (O&G)
	R.E. Wright (Wright)

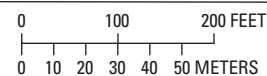


Figure C25. Monitor well and hydropunch locations at Installation Restoration Site 84—Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Baker Environmental, Inc. 2001a).

Tank S941-1 contained diesel fuel, and tank S941-2 contained gasoline. Tank capacities were 6,000 and 550 gal, respectively. Both tanks were installed in 1941. A leak test during June 1990 indicated a line leak related to UST tank S941-2 at a rate of about 0.10 gal per hour. Apparently, tank S941-1 was removed in October 1992 (Law Engineering and Environmental Services 1994). Tank S941-2 was removed in July 1999 (J.A. Jones Environmental Services Company 1999).

Investigations of groundwater contamination at Site 84 by Dewberry and Davis (1991) began during November 1990 with the construction of two monitor wells in the immediate vicinity of tank S781. The location of these wells was reported as northwest and north-northwest of the tank and near the perimeter fence and probably are wells MW-A and MW-B shown on Figure C25 and reported in O'Brien and Gere Engineers, Inc. (1992, 1993) (Table C61). Monitor wells MW-A and MW-B were constructed open to the Brewster Boulevard aquifer system (Table C61). Groundwater samples were collected in these wells, probably shortly after construction in November 1990, and reportedly contained concentrations of VOCs of interest to this study no greater than detection limits. Soil samples were collected at several depths between land surface and 4 or 5 ft bgs during construction of wells MW-A and MW-B and at seven locations near tank S781, probably also during November 1990. Concentrations of total petroleum hydrocarbons (TPH) occurred in four samples from four locations and ranged from 20,000 to 2,400,000 $\mu\text{g}/\text{kg}$. The maximum soil TPH concentration occurred between 0 and 2 ft bgs in the borehole for monitor well MW-A (Dewberry and Davis 1991).

Additional investigations of groundwater and soil contamination at Site 84 were accomplished during 1991 by O'Brien and Gere Engineers, Inc. (1992). Field activities completed by December 1991 included (1) the construction of monitor wells AST-S781-MW01–AST-S781-MW14, (2) completion of soil data collection during monitor well construction at the seven deep well locations and four other locations (B-1 to B-4), and (3) groundwater sample collection using hydro-punch (direct push) methods at ten locations (Figure C25, Table C61). Even-numbered monitor wells were constructed open to the Tarawa Terrace aquifer between 17 and 30 ft bgs and were paired with an odd-numbered shallow well open to the Brewster Boulevard aquifer system. Two soil samples were collected from each of the four soil boring locations and each of the seven deep monitor well locations. Results of the hydro-punch investigations indicated that concentrations of VOCs of interest to this study occurred below detection limits at all locations; therefore, results are not reported herein in detail. Concentrations of PCE, TCE, and related degradation products and BTEX components in groundwater samples collected in monitor wells during December 1991 were less than detection limits in all but three locations. A concentration of 2.0 $\mu\text{g}/\text{L}$ of total 1,2-DCE occurred in monitor well AST-S781-MW04 (Table C63). Ethylbenzene and toluene occurred in monitor wells AST-S781-MW03 and AST-S781-MW12, respectively, at concentrations of 16 $\mu\text{g}/\text{L}$ and 2.0 $\mu\text{g}/\text{L}$, respectively (Table C62). Concentrations of TPH determined

in soil samples ranged from 11,000 to 12,000,000 $\mu\text{g}/\text{kg}$. Maximum or near maximum TPH concentrations occurred in borehole B-4 between 4 and 11 ft bgs. During sample collection at borehole B-4, free-phase BTEX was noted in the samples collected at 4, 6, and 9 ft bgs. Concentrations of TPH were also high (255,000 $\mu\text{g}/\text{kg}$) in the sample collected in the borehole of monitor well AST-S781-MW04 between 14 and 16 ft bgs (O'Brien and Gere Engineers, Inc. 1992).

An additional 12 soil borings were completed during October 1992 by O'Brien and Gere Engineers, Inc. (1993) at locations near tank S781 as well as in a field north and northwest of the tank area. Two soil samples were collected in each borehole to a depth of 15 ft bgs. Concentrations of TPH determined in the soil samples from the tank area were similar to those determined during the previous investigation. Concentrations of TPH in soil samples from the field area ranged from less than detection limits to 59,000 $\mu\text{g}/\text{kg}$. Concentrations of TPH in 6 of 14 soil samples from 7 locations in the field area were less than detection limits and were less than 10,000 $\mu\text{g}/\text{kg}$ in 3 samples.

Generally coincident with the work of O'Brien and Gere Engineers, Inc. (1992) at Site 84 was the investigation by American Testing and Engineering Corporation (1992) regarding leaking USTs S941-1 and S941-2 located northeast of Building 780 (not shown on Figure C25) and southeast of Building 45. Three shallow monitor wells were constructed in the immediate vicinity of the USTs during August 1991 open to the Brewster Boulevard aquifer system. These wells are identified in Tables C61–C63 as UST-Bldg45-MW01—UST-Bldg45-MW03 followed by “ATEC” in parentheses. For laboratory analysis, a single soil sample was collected just above the water table during monitor well construction. Each sample was contaminated with BTEX components ranging in concentration from 49 $\mu\text{g}/\text{kg}$ of ethylbenzene in borehole UST-Bldg45-MW03 to 17,000 $\mu\text{g}/\text{kg}$ of total xylenes in borehole UST-Bldg45-MW01. Groundwater samples collected in each monitor well also contained BTEX components ranging in concentration from less than detection limits for ethylbenzene in well UST-Bldg45-MW02 to 16,000 $\mu\text{g}/\text{L}$ of toluene in well UST-Bldg45-MW01 (American Testing and Engineering Corporation 1992). The groundwater contamination by BTEX components in the vicinity of tank S941-2 resulted in the removal of the two USTs in October 1992 and the excavation of approximately 105 cubic yards of soil in the immediate vicinity of the tanks. During the excavation and closure process, free-phase BTEX was noted in the excavation cavity of UST S941-1 (Law Engineering and Environmental Services, Inc. 1996).

In April 1992, Law Engineering, Inc. (1993) completed a Leaking Underground Storage Tank Site Assessment at UST S941-2. Thirteen borings were completed at this time that included the collection of at least 16 surface and subsurface soil samples, including samples collected during the construction of monitor wells. Subsurface soil samples were collected at various depths between 1.5 and 10 ft bgs, depending on location. In addition, 10 hydro-punch samples of shallow groundwater were collected, and

Installation Restoration Program Site Investigations and Histories

19 monitor wells (UST-Bldg45-MW04–UST-Bldg45-MW22) and one extraction well (UST-Bldg45-PW01) were constructed. Wells UST-Bldg45-MW06, UST-Bldg45-MW09, UST-Bldg45-MW21, and UST-Bldg45-MW22 were constructed as deep wells open to the Tarawa Terrace aquifer between 45 and 50.7 ft bgs. Other shallow wells were open to the Brewster Boulevard aquifer system and possibly the uppermost part of the Tarawa Terrace aquifer. Locations of monitor wells, hydropunch samples, and soil borings were mostly southeast of Building 45 and between Building 45 and the access road that intersects SR 24 to the northeast (Figure C25, Tables C61, C64). BTEX components were measured infrequently at concentrations greater than detection limits in soil and groundwater samples. TPHs were detected twice in soil borings at the location of monitor well UST-Bldg45-MW19 between 2 and 4 ft bgs and at boring SB-3 between 3 and 4.5 ft bgs (Figure C25). Concentrations of TPH were 1.6 and 700 µg/kg, respectively. Concentrations of BTEX components detected at hydropunch locations are listed in Table C64. Concentrations of each BTEX component were greatest at location HP-4, near monitor well UST-Bldg45-MW04, and ranged from 3.2 µg/L of ethylbenzene to 83 µg/L of toluene. Concentration trends with depth were not apparent (Table C64). Concentrations of BTEX components greater than detection limits in monitor wells ranged from 0.7 µg/L of toluene in well UST-Bldg45-MW16 to 3,800 µg/L of benzene in well UST-Bldg45-MW15. All BTEX components were detected in wells UST-Bldg45-MW15, UST-Bldg45-MW18, and UST-Bldg45-PW01; several were at concentrations greater than 500 µg/L (Table C62). Free-phase BTEX thickness was measured periodically in monitor well UST-Bldg45-MW02 between January 1994 and June 1995 and in monitor well UST-Bldg45-MW03 between January and September 1994 (Table C65). Free-phase thickness measured in well UST-Bldg45-MW02 in January 1994 was about 2.3 ft and declined to 0.02 ft by June 1995. The maximum free-phase BTEX thickness measured in well UST-Bldg45-MW03 was about 0.5 ft in January 1994. Between March 1994 and June 1995, about 8.4 gal of free-phase BTEX were recovered at Site 84 (Law Engineering and Environmental Services, Inc. 1996).

A pre-RI at Site 84 was undertaken during 1995 and 1998 to collect additional groundwater data and evaluate the extent and degree of contaminant concentrations in soils, water, and sediments of the onsite lagoon and adjacent Northeast Creek. Soil, sediment, and groundwater samples were collected during October 1995 and were analyzed only for PCBs. Twenty surface soil samples were collected from 10 boreholes located adjacent to and around the periphery of the onsite lagoon. Samples were collected between land surface and 1 ft bgs. The PCB compound Aroclor-1260 was detected at every borehole location at concentrations ranging from 110 to 12,000 µg/kg. PCBs were not detected in four sediment and surface-water samples collected at the same time from the lagoon. Concentrations of PCBs in four sediment and surface-water samples collected adjacent to and in Northeast Creek also were determined below detection limits

at this time. Groundwater samples collected in a temporary monitor well immediately adjacent to the lagoon and in wells AST-S781-MW07 and AST-S781-MW13 also contained no concentrations of PCBs greater than detection limits.

During April 1998, an additional 62 surface soil samples were collected from 31 locations adjacent to and somewhat removed from the periphery of the lagoon. Samples were collected between land surface and 1 ft bgs. Twenty-eight samples were selected for laboratory analyses. Of these, a total of 17 samples contained concentrations of PCBs greater than detection limits, ranging from an estimated 62 to 200,000 µg/kg. Surface-water and sediment samples also were collected at this time from three lagoon locations. No PCBs were detected in the surface-water samples. Toluene and total xylenes were detected in one surface-water sample, however, at concentrations of 2.7 and 3.5 µg/L, respectively. An estimated concentration of 910 µg/kg of total xylenes was determined in one sediment sample collected at the same location. Sediments collected at two lagoon locations contained the PCB compound Aroclor-1260 at concentrations of 4,300 and 5,900 µg/kg.

One sediment and four surface-water samples also were collected at locations adjacent to and in Northeast Creek during April 1998 and were analyzed only for PCB compounds. No PCBs were determined greater than detection limits in the surface-water samples. The PCB compound Aroclor-1260 was detected in the single sediment sample at a concentration of 40,000 µg/kg. Groundwater samples were collected at six monitor wells during April 1998 and analyzed for all VOCs of interest to this study. Benzene and ethylbenzene were both detected in wells AST-S781-MW03 and AST-S781-MW04 at concentrations of an estimated 3.4 µg/L and 3.4 µg/L and 1.5 µg/L and 6.7 µg/L, respectively (Figure C25; Tables C61–C63) (Baker Environmental, Inc. 1998de). Concentrations of PCE, TCE, and their degradation products were not detected.

Project plans for a final RI at Site 84 were published in June 2001 (Baker Environmental, Inc. 2001a). Field data collection as part of the final RI/FS began during July and August 2001. Direct push technology was used to obtain 149 surface and subsurface soil samples at 85 locations. Surface soil samples were collected between land surface and 1 ft bgs. Subsurface samples were collected from 1.0 ft bgs to within 0.5 ft of the water table. Direct push locations were concentrated in the vicinity of Building 45 and tank S781, the onsite lagoon, and between Site 84 and SR 24 northwest to Northeast Creek. An additional eight subsurface soil samples were collected during the drilling and construction of eight monitor wells (MW16–MW23) (Table C61). Subsurface soil samples were collected from the boreholes directly above the water table. The additional eight monitor wells were constructed open to the Brewster Boulevard aquifer system and the Tarawa Terrace aquifer. Not all soil samples were selected for analysis, and not all samples were analyzed using the same analytical schedule. No surface-water or sediment samples were collected during the final RI.

Occurrences of VOCs of interest detected in groundwater samples during the final RI were limited to one sample containing TCE, two samples containing BTEX components, and two monitor wells, MW17 and MW22 (Figure C25; Tables C62, C63). Ethylbenzene was detected in both wells at concentrations of an estimated 0.60 and 3.6 µg/L, respectively. The sample collected in monitor well MW17 also contained an estimated concentration of 0.19 µg/L of TCE and 1.8 µg/L of total xylenes. No PCBs occurred in groundwater samples at any locations at this time at concentrations greater than detection limits. Concentrations of DDT and metabolites of DDT greater than detection limits occurred in monitor wells MW16, MW18, and MW20 and ranged from an estimated 0.023 to 0.044 µg/L.

Surface soil samples were analyzed only for ethylbenzene and total xylenes, of the VOCs of interest to this study. Ethylbenzene was detected in 1 of 26 surface soil samples at an estimated concentration of 330 µg/kg. Xylenes were detected in 2 of 26 surface soil samples at estimated concentrations of 8.7 and 120 µg/kg. Detections occurred in samples collected in the vicinity of tank S781 and in the vicinity of Northeast Creek. Concentrations of the PCB component Aroclor-1260 were determined greater than detection limits in 68 of 95 surface soil samples ranging from an estimated 18 to 200,000 µg/kg. Occurrences were ubiquitous throughout the sampled area. The pesticides DDT and DDT metabolites were detected in 7 of 24 surface soil samples at concentrations ranging from 1.9 µg/kg to an estimated 3,000 µg/kg. Concentrations of chlordane greater than detection limits occurred in 10 of 24 surface soil samples ranging from an estimated 2.0 to 58,000 µg/kg. Most occurrences of pesticides were in samples collected around the perimeter of Building 45.

The BTEX components and total 1,2-DCE were the only VOCs of interest detected in subsurface soil samples. Total

1,2-DCE was detected in 1 of 24 subsurface soil samples at an estimated concentration of 91 µg/kg. The sample was collected about 50 ft southwest of tank S781. Of the BTEX components, ethylbenzene was determined most frequently in 5 of 24 subsurface soil samples. Concentrations of ethylbenzene greater than detection limits ranged from an estimated 0.89 to 1,300 µg/kg. The maximum concentration of a BTEX component was 3,100 µg/kg of total xylenes. Most occurrences of BTEX components in subsurface soils occurred in samples collected in the vicinity of Building 45. The PCB compound Aroclor-1260 was determined in 11 of 39 subsurface soil samples. Concentrations greater than detection limits ranged from an estimated 13 to 45,000 µg/kg and occurred most frequently in samples collected in the vicinity of Building 45 and northwest of tank S781. Chlordane concentrations greater than detection limits occurred in 8 of 33 subsurface soil samples ranging from an estimated 3.3 to 18,000 µg/kg. Detections of chlordane occurred in samples collected in the vicinity of Building 45 and near the periphery of the onsite lagoon. Concentrations of DDT and metabolites of DDT greater than detection limits occurred in 7 of 33 subsurface soil samples and ranged from an estimated 1.7 to 120 µg/kg. Locations of occurrences were similar to those recorded for chlordane (Baker Environmental, Inc. and CH2M Hill, Inc. 2002d,e,f).

Following completion of the final RI, a final FS was initiated to determine the appropriate methodology to remediate groundwater and soil contamination at Site 84 and adjacent areas (Baker Environmental, Inc. and CH2M Hill, Inc. 2002d). Reports that describe results of groundwater monitoring at Site 84 following completion of the final RI in 2001 and final FS can be obtained by a formal request to the Environmental Management Division, USMCB Camp Lejeune, North Carolina.

Installation Restoration Site 88—Building 25

Building 25 served as the only base dry-cleaning facility from 1943 until at least 1998 (Environmental and Safety Designs, Inc. 1995; Thomas H. Burton, Environmental Management Division, USMCB Camp Lejeune, written communication, April 26, 2001). The solvent used for dry cleaning was changed in 1970 from the LNAPL Varsol to PCE. Building 25 is located directly east of McHugh Boulevard and northwest of Holcomb Boulevard (Figures C1, C26, Plate 1). Building dimensions are 180 ft long and 50 ft wide. In 1983, PCE use for dry cleaning at Building 25 was approximately 34 tons, or about 5,000 gal. Solvent losses during dry cleaning were reported to occur only as a result of volatilization during the

dry cycle. Solvent was reclaimed by filtration and distillation. Spent filters from the distillation process were dried at high temperatures, bagged, and removed to a landfill (Environmental and Safety Designs, Inc. 1995). Spent PCE also was reportedly disposed of in floor drains connected to the sewer system. Five 750-gal USTs used to store dry-cleaning solvents were reportedly installed behind Building 25 during the 1940s. The tanks were removed during November 1995. Soil contamination by Varsol and PCE was identified at this time, and groundwater contamination was suspected. From the 1970s to the mid-1980s, additional storage of PCE occurred in several 150-gal ASTs located outside Building 25 (Baker Environmental, Inc. 1995d, 1996hl, 1998co; Environmental and Safety Designs, Inc. 1995).

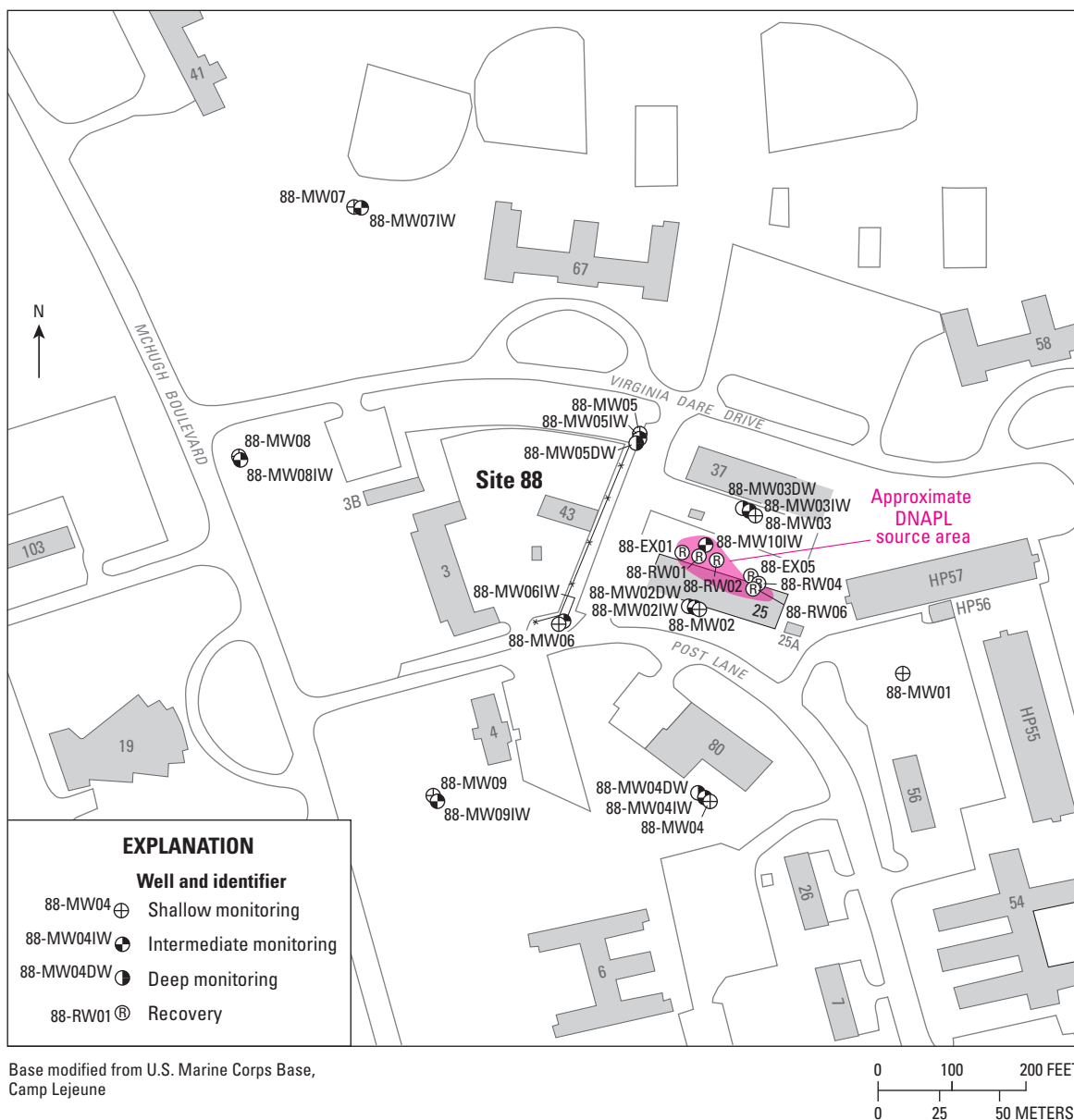


Figure C26. Monitor well locations at Installation Restoration Site 88—Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from CH2M Hill, Inc. and Baker Environmental, Inc. 2001b). [DNAPL, dense nonaqueous phase liquids; See Figure C27 for enlargement of Building 25 area]

Investigations of groundwater contamination at Site 88 began during the removal of the aforementioned five USTs located along the northern perimeter of Building 25. To follow up on observations of soil contamination made during removal of the USTs, test monitor wells 88-TW01–88-TW04 were constructed near the perimeter of Building 25—three in the vicinity of the removal area (88-TW01–88-TW03) and one on the opposite side of the building (88-TW04). A single soil sample was collected for analysis at each borehole during drilling between 3 and 8 ft bgs. Each monitor well was constructed open to the Brewster Boulevard upper aquifer (Table C66). Concentrations of PCE were detected in all monitor wells during November 1995 and ranged from 416 to 29,200 µg/L. Total 1,2-DCE also was detected in groundwater samples at this time from monitor wells 88-TW02 and 88-TW03 at concentrations of 154 µg/L and 10,000 µg/L, respectively. A single concentration of TCE greater than detection limits was determined in monitor well 88-TW03 at 2,750 µg/L (Tables C67, C69). Concentrations of PCE in the soil samples ranged from less than 5.0 to 55 µg/kg. No pesticides were detected in the monitor wells.

An RI sample strategy plan was developed during early 1993 to determine the extent of groundwater contamination at Building 25. The plan recommended a two-phase investigation such that soil borings and temporary monitor wells would be established during Phase I along with groundwater sampling using direct push technologies. Phase II would include the construction of permanent monitor wells and groundwater sampling (Baker Environmental, Inc. 1996).

The Phase I investigation was conducted during July and August 1996. A total of 19 soil samples were collected in borings that were later converted to temporary monitor wells. Most monitor wells were constructed in the immediate vicinity of Building 25. All temporary shallow monitor wells were constructed open to the Brewster Boulevard upper aquifer. Temporary intermediate wells (IW) were constructed open to the Brewster Boulevard lower aquifer (88-TW04IW–88-TW19IW) (Tables C66, C67). Concentrations of PCE in groundwater greater than detection limits occurred in 15 of 19 monitor wells and ranged from 0.10 µg/L to more than 53,700 µg/L. Concentrations in five samples exceeded 1,000 µg/L. Concentrations of TCE were detected in 10 of 19 monitor wells ranging from 0.2 µg/L to more than 3,000 µg/L. The concentration of *cis*-1,2-DCE detected at monitor well 88-TW15 was 3,725 µg/L. Concentrations of PCE were detected in three of the four intermediate monitor wells, indicating vertically downward migration of the DNAPL compounds in the vicinity of Building 25. Concentrations of PCE were not detected in intermediate well 88-TW19IW, which was located approximately 600 ft northwest of Building 25 near McHugh Boulevard (Table 69). Concentrations of PCE greater than detection limits also were determined in 13 of 18 soil samples and ranged from 0.10 µg/kg to about 238 µg/kg. Concentrations of TCE were detected in 6 of 18 soil samples ranging from 0.10 to 8.5 µg/kg (Table 67). Concentrations of BTEX components in

the soil or groundwater greater than detection limits were not reported during the Phase I investigations (Table C70) (Baker Environmental, Inc. 1996h).

Following an analysis of the Phase I results, tasks necessary to complete Phase II were developed and published (Baker Environmental, Inc. 1997b). All field data collection for the Phase II investigation was completed during April and May 1997. An additional 18 temporary monitor wells were constructed during April 1997 (88-TW20–88-TW28IW) (Table C66). The shallow wells were constructed open to the Brewster Boulevard upper aquifer through to the upper part of the Brewster Boulevard lower aquifer. The intermediate (IW) wells were constructed open to the base of the Brewster Boulevard lower aquifer. Permanent monitor wells also were installed during the Phase II investigations (88-MW01–88-MW10IW) (Figure C26, Table C66). Screen intervals constructed for the permanent shallow and intermediate (IW) monitor wells were open to the Brewster Boulevard upper and lower aquifers, respectively, similar to those described previously for the correspondingly named temporary wells. Several deep wells (DW) also were constructed open to the Tarawa Terrace aquifer.

Shallow, intermediate, and deep wells were constructed in close proximity at several locations to create well clusters. Water-level measurements at these clusters obtained during several periodic measurements between May and July 1997 consistently indicated a vertically downward potentiometric gradient throughout Site 88 between the Brewster Boulevard aquifer system and the Tarawa Terrace aquifer. Within the Brewster Boulevard aquifer system, substantial vertically downward potentiometric gradients also occurred between the Brewster Boulevard upper and lower aquifers. The temporary wells were abandoned for monitoring purposes by July 1997.

Additional sampling for groundwater contaminants in newly constructed permanent and temporary monitor wells during Phase II further defined the areal and vertical extent of PCE migration in the vicinity of Site 88. Concentrations of PCE and related degradation products were not observed greater than detection limits in any of the deep monitor wells open to the Tarawa Terrace aquifer between 80 and 97 ft bgs. Estimated concentrations of 5.0 and 7.0 µg/L of 1,1-DCE were detected in intermediate monitor wells 88-MW05IW and 88-MW07IW, respectively (Table C69). Accordingly, results of the Phase I and Phase II investigations indicated substantial soil and groundwater contamination by PCE and PCE degradation products largely within the shallow Brewster Boulevard upper aquifer, with the greatest concentrations occurring immediately north and northwest of Building 25 (Baker Environmental, Inc. 1998c). In addition, a layer of clay and silty clay was observed consistently at a depth of about 20 ft bgs during soil borings for well construction during Phases I and II. The lack of PCE contamination in the intermediate and deep wells open to the Brewster Boulevard lower aquifer and Tarawa Terrace aquifer and the substantial accumulation of PCE and PCE related degradation products at high concentrations in the Brewster Boulevard upper aquifer at Site 88

Installation Restoration Program Site Investigations and Histories

indicate that this clay layer is a competent aquitard, preventing further downward migration of DNAPLs. For this study, this clay layer is considered equivalent to the Brewster Boulevard upper confining unit. Additional soil borings (88-SB01–88-SB06) and cone penetration tests (CPTs) were conducted during May and November 1997 to further define the extent and thickness of the clay aquitard (Table C67). Location coordinates of the 88-SB borings and CPT investigation locations are listed in Table C67 (Baker Environmental, Inc. 1998c).

Immediately following completion of Phase II of the RI, investigations were undertaken during the latter half of 1997 to characterize the extent of soil and groundwater contamination specifically in the vicinity of the DNAPL source area determined during the RI. Soil borings 88-IS01–88-IS31 were completed within the Brewster Boulevard upper aquifer using direct push technology during July and August 1997

(88-IS01–88-IS13) and November 1997 (88-IS14–88-IS31) (Figure C27, Table C67). Borings were located within about 50 ft of the northwestern third of Building 25 as well as within Building 25. Borings 88-IS05, 88-IS09, and 88-IS29–88-IS31, obtained inside of Building 25, all contained PCE at depths ranging from about 2 to 19 ft bgs. Concentrations of PCE in interior soil samples ranged from 24 to 4,361 $\mu\text{g}/\text{kg}$ (Table C68). Soil samples obtained exterior to Building 25 also contained PCE concentrations at depths ranging from near land surface to about 20 ft bgs. A concentration trend with depth was not obvious, but the highest concentrations, ranging to more than 25,000 $\mu\text{g}/\text{kg}$, occurred below 15 ft bgs (Table C68). The influence of the clay and silty clay aquitard noted previously probably accounts, at least partially, for the accumulation of relatively excessive concentrations of PCE with greater depth (Figures C28–C29). Boring logs created during the

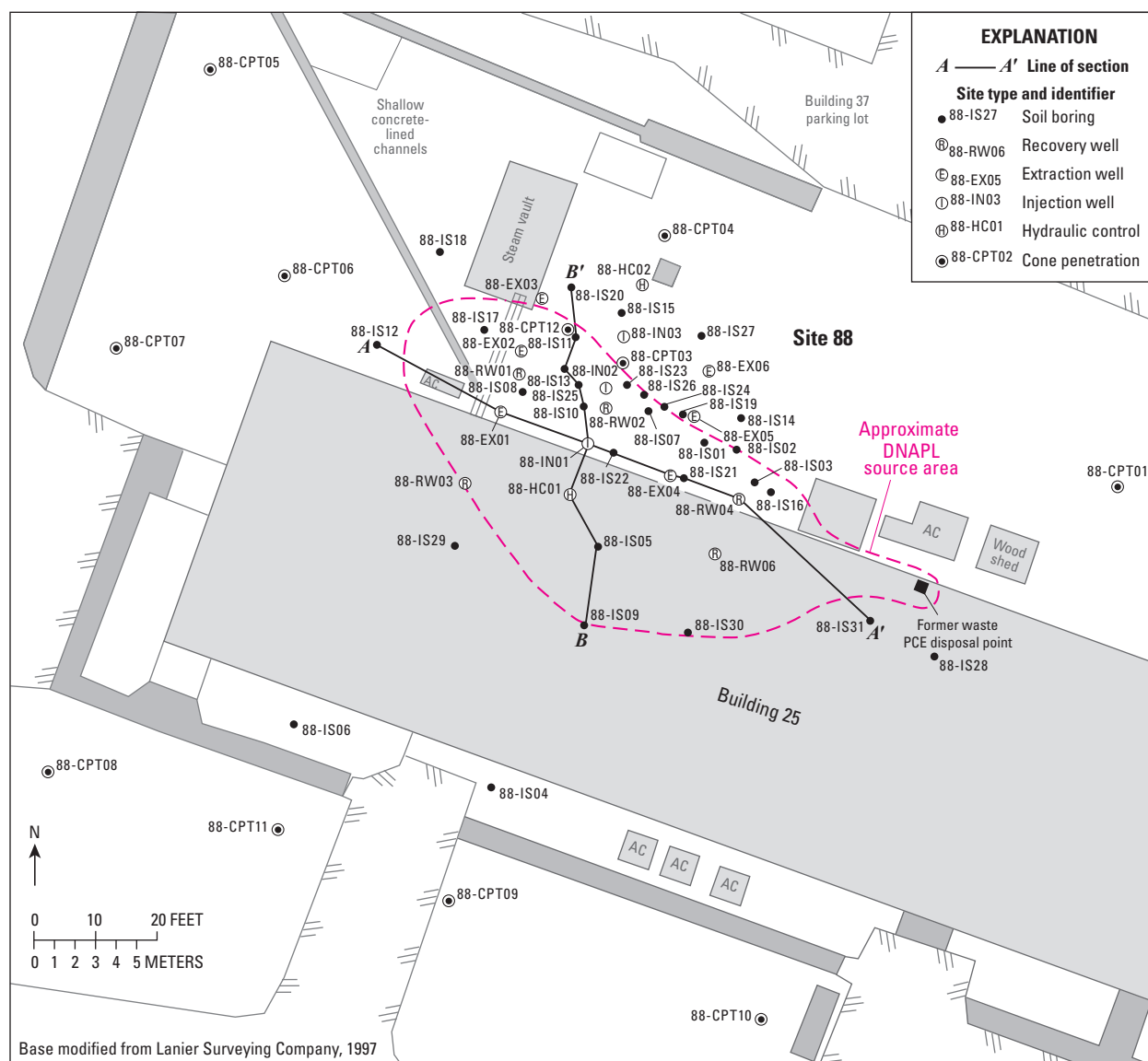


Figure C27. Locations of section lines A–A' and B–B' at Building 25, Installation Restoration Site 88, U.S. Marine Corps Base Camp Lejeune, North Carolina (Modified from Duke Engineering Services, Inc. and Baker Environmental, Inc. 1999a).

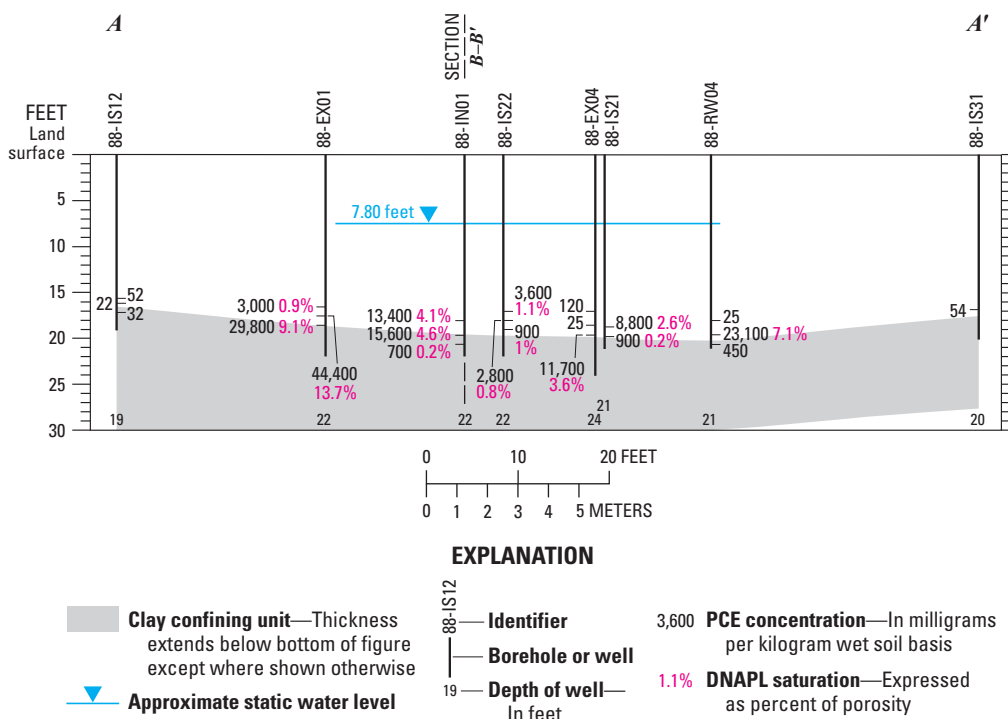


Figure C28. Section line A–A' showing PCE concentrations at depth, Building 25, Installation Restoration Site 88, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Duke Engineering Services, Inc. and Baker Environmental, Inc. 1999a).

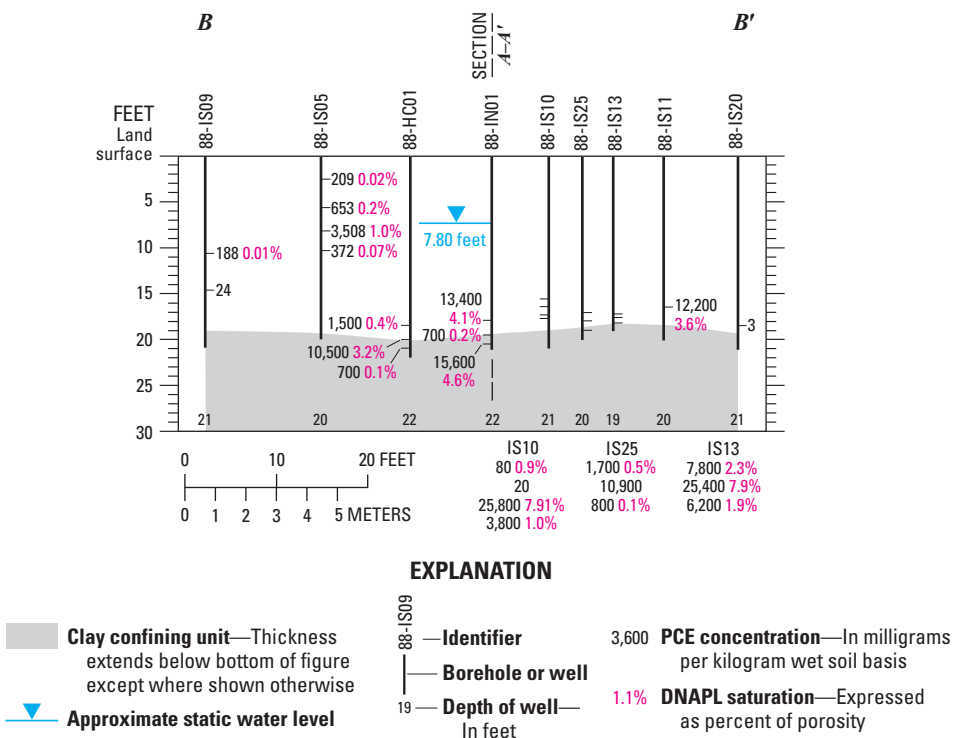


Figure C29. Section line B–B' showing PCE concentrations at depth, Building 25, Installation Restoration Site 88, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Duke Engineering Services, Inc. and Baker Environmental, Inc. 1999a).

Installation Restoration Program Site Investigations and Histories

collection of soil samples have notes about “strong chemical odors” and “strong hydrocarbon smells,” and similar observations were made at or in the immediate vicinity of the water table. These observations were later related to the occurrence of Varsol, which apparently had leaked from the USTs formerly located nearby and had accumulated at the water table.

Additional wells 88-IW01, 88-RW01, and 88-RW02 were constructed open to the Brewster Boulevard upper aquifer during August 1997 as discharge and observation wells for an aquifer test (Table C66). Following construction, concentrations of PCE determined at wells 88-RW01 and 88-RW02 were 170,000 and 150,000 $\mu\text{g}/\text{L}$, respectively (Table C69) (Duke Engineering and Services, Inc. and Baker Environmental, Inc. 1999a).

The discovery of Varsol at Site 88 prompted a separate investigation to characterize the occurrence and extent of Varsol contamination of soil and groundwater. The source area and extent of Varsol contamination in groundwater were highly coincident in space with the PCE source area noted previously (Figures C27, C28), indicating that leaking USTs were also a possible source of subsurface PCE contamination near Building 25. Varsol concentrations were detected in 6 of 16 soil samples collected at IS boreholes (Table C67) and ranged from 27 to 4,900 $\mu\text{g}/\text{kg}$. Varsol concentrations detected in groundwater ranged from 360 to 4,900 $\mu\text{g}/\text{L}$ (Baker Environmental, Inc. 1998o).

A network of monitor, injection, and extraction wells was designed to test remediation alternatives at Site 88, including an interwell tracer test designed to test the feasibility of using surfactants to dissolve and extract free-phase DNAPLS. Additional wells necessary to implement extraction and the tracer test were constructed largely during December 1997. Extraction wells (88-EX01–88-EX06) were constructed within and around the northern perimeter of the DNAPL source area. Tracer injection wells (88-IN01–88-IN02), hydraulic control wells (88-HC01–88-HC02), and recovery wells (88-RW01–88-RW06) were located within the DNAPL source area as well as interior to Building 25 to facilitate interpretation of test results. Later, wells 88-EX04R and 88-MW10IW were constructed, respectively, as a replacement for well 88-EX04 and to monitor test results below the clay aquitard (Brewster Boulevard upper confining unit). Wells 88-WP01AQT and 88-WP02AQT were constructed within the clay aquitard also to monitor test conditions (Table C66). Free-phase DNAPL

was encountered and measured following construction of several of these wells (Table C70). Tests of the DNAPL extraction network using six extraction wells (88-EX01–88-EX06, Table C66) were conducted during January and February 1998, resulting in the removal of an undetermined volume of DNAPL that was possibly as much as 60 gal.

The interwell tracer test was initiated during May 1998 and continued for 40 days. Final results of the tracer test confirmed the RI and later characterizations of DNAPL occurrence at Site 88 and provided the bases for the design of a surfactant-enhanced aquifer remediation (SEAR) demonstration project. The estimated pore volume affected by the interwell tracer test was 4,800 gal. Of this volume, an estimated 74 to 88 gal was DNAPL (Baker Environmental, Inc. 1998c; Duke Engineering and Services, Inc. and Baker Environmental, Inc. 1999a). A sampling and analysis plan for the SEAR demonstration project was completed by March 1999. The SEAR demonstration began in April 1999 and continued through August 1999 (Duke Engineering and Services, Inc. and Baker Environmental, Inc. 1999ab). A total of 268,000 gal of water was extracted during the demonstration at the six extraction wells at an average rate of 1.0 gpm. Of the volume removed, approximately 32 gal was PCE solubilized in groundwater and 44 gal was free-phase PCE. Routine monitoring at permanent monitor wells began in July 1999 during the SEAR demonstration and continued into 2001 (Tables C68, C70; Baker Environmental, Inc. and CH2M Hill, Inc. 2000b; Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000j, 2001b; CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2001c; CH2M Hill, Inc. and Baker Environmental, Inc. 2001b). A final RI work plan for Site 88 was published by CH2M Hill, Inc. (2003). Documents and reports that describe the results of groundwater monitoring and other remediation activities at Site 88 following publication of the final RI work plan can be obtained by a formal request to the Environmental Management Division, USMCB Camp Lejeune, North Carolina.

Analyses for pesticides in groundwater were not determined at Site 88. Numerous analyses for concentrations of BTEX components in groundwater were accomplished; however, only toluene was observed greater than detection limits at temporary well 88-TW22IW at a concentration of 7.0 $\mu\text{g}/\text{L}$ (Table C71).

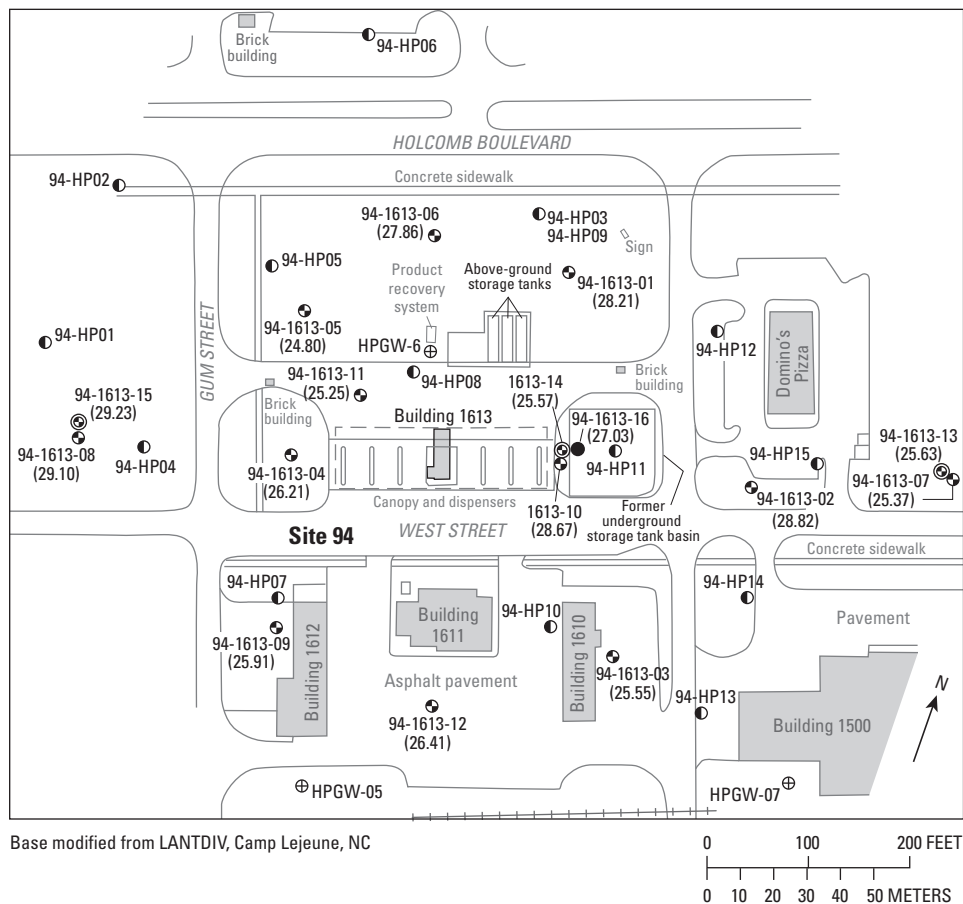
Installation Restoration Site 94/Building 1613 Area Leaking Underground Storage Tank— USTs 1613-1–1613-4

Building 1613 is located in the far southwest corner of the HPIA and serves as the Base Exchange Service Station (Figures C1 and C30, Plate 1). Refined petroleum products were stored at Building 1613 in one 10,000-gal UST, two 30,000-gal USTs, and one 9,000-gal UST. The USTs were reportedly installed during the 1950s and were removed during January 1995. Soil contamination by refined petroleum products was observed during the UST removal process and caused the implementation of a Site Assessment (Richard Catlin and Associates, Inc. 1996a).

Groundwater samples at 15 hydropunch (direct push) locations were collected and analyzed at the beginning of the site assessment (April 1995) as a guide to locate permanent monitor wells (Figure C30). Substantial concentrations of BTEX components greater than detection limits were observed at hydropunch locations 94-HP08 and 94-HP11, located in the immediate vicinity of the pump island at the service station, and ranged from 1,100 to 20,700 µg/L (Figure C30, Table C72). These concentrations indicated that the source of groundwater BTEX contamination at Site 94 was probably leakage from one or more of the four USTs previously installed at the pump island or possibly from pressure lines

connecting the USTs and service pumps. A concentration of 1.1 µg/L of 1,1-DCE was detected at the 94-HP10 location, and 29.2 µg/L of TCE was detected in the sample collected at location 94-HP01D (Table C73). The source of the TCE and 1,1-DCE is unknown but possibly originates in Building 1500, southeast of Building 1613, which houses a base laundry facility and is a storage area for dry-cleaning solvents.

The installation of monitor wells at Site 94 occurred during April 1994 and included 14 wells constructed open to the Brewster Boulevard aquifer system (94-Bldg1613-01—94-Bldg1613-12, 94-Bldg1613-15, and 94-Bldg1613-16) and two wells probably open to the Tarawa Terrace aquifer (94-Bldg1613-13 and 94-Bldg1613-14) between 45 and 50 ft (Table C74). Concentrations of BTEX components greater than detection limits were observed in only three wells—94-Bldg1613-10, 94-Bldg1613-11, and 94-Bldg1613-16 (Table C75). Concentrations of all BTEX components were observed in wells 94-Bldg1613-10 and 94-Bldg1613-11. Maximum concentrations of all components occurred in well 94-Bldg1613-10, located immediately adjacent to the pump island, and ranged from 804 to 9,290 µg/L. A BTEX free-phase recovery system was operating at Site 94 during the site assessment and was centered on monitor well 78-GW06 (HPGW-6 in Figure C30). Recovery began during November 1994, at which time the thickness of free-phase BTEX product in well 78-GW06 was approximately 6.0 ft (Richard Catlin and Associates, Inc. 1996ab). By February 1996,



EXPLANATION

Site type and identifier

- HPGW-06 ⊕ Existing type II well
- 94-1613-14 ⊕ Type II well
- 94-1613-11 ⊕ Type III well
- 94-HP07 ⊕ Hydropunch
- 94-1613-16 ⊕ Pumping well

(29.10) ⊕ **Top of casing elevation, in feet**—Referenced to mean sea level, based on MCB monument E-1 2d top (elevation 28,436 feet)

Figure C30. Monitor well and hydropunch locations at Installation Restoration Site 94—Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Richard Catlin and Associates, Inc. 1996a).

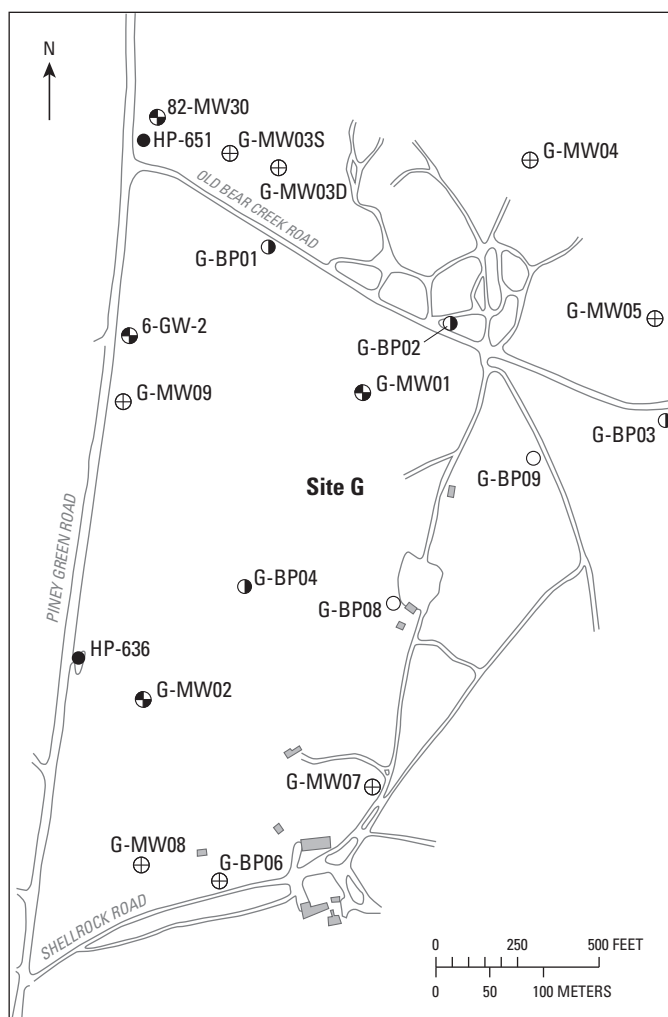
Installation Restoration Program Site Investigations and Histories

approximately 340 gal of BTEX free-phase liquids had been recovered. Analyses for PCE, TCE, and related degradation products were below detection limits or concentrations were not determined at most Site 94 monitor wells. However, TCE was determined in monitor wells 94Bldg1613-09 and 94Bldg1613-13—94Bldg1613-16 at concentrations ranging from 1.3 to 79 µg/L. TCE concentrations in wells 94Bldg1613-13—94Bldg1613-15 occurred in samples collected during May 1995 and September 2003 and increased in wells 94Bldg1613-13 and 94Bldg1613-15 during that period. Degradation products 1,1-DCE, *trans*-1,2-DCE and *cis*-1,2-DCE also were observed in these monitor wells at the same time ranging in concentration from 0.70 to 38 µg/L (Table C76). Pesticide concentrations in groundwater were not determined at Site 94.

Site G—Proposed Camp Lejeune Landfill

Site G is located east of IR Sites 6 and 82 within a triangular-shaped area bounded on the west by Piney Green Road, to the north by Wallace Creek, and to the east and south by Shell Rock Road (Figures C1 and C31, Plate 1). Investigations of possible groundwater contamination at Site G began in 1991 during a preliminary site study. Monitor wells G-MW01 and G-MW02 were constructed at that time. Construction features of these wells are unknown, but they were probably installed open to the Brewster Boulevard aquifer system. Small concentrations of pesticides were detected in monitor well G-MW01 at the time. Seven soil borings were advanced during the 1991 investigation, but the borehole locations and analytical results of samples, if any, are unknown.

A Site Characterization Study began during 1992 and included the advancement of 11 soil borings, construction of 7 monitor wells (G-MW03D–G-MW09), and construction of 2 piezometers (G-BP08–G-BP09) (Table C77). Monitor wells and probably the piezometers were constructed open to the Brewster Boulevard aquifer system. Samples collected in existing monitor wells during May 1992 were analyzed for pesticides and VOCs. No VOC contaminant or pesticide concentrations greater than detection limits were observed in any sample (Tables C78, C79). After 1992, several Site G monitor wells were periodically monitored in conjunction with routine monitoring at Sites 6 and 82 (Baker Environmental, Inc. 1993k; Michael Baker Jr., Inc. and CH2M Hill, Inc. 2003; Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2004). A sample collected in well G-MW03S during July 2004 contained an estimated concentration of 0.30 µg/L of toluene. A sample collected from the same well in January 2003 contained an estimated 0.60 µg/L of TCE (Tables C78, C79).



EXPLANATION

Site type and identifier

- G-BP08 ○ Boring and piezometer
- ⊕ G-MW04 Boring and monitor well
- G-BP04 Existing piezometer
- ⊕ G-MW01 Existing monitor well
- HP-636 Production well

Figure C31. Monitor well and borehole locations at Site G—proposed Camp Lejeune landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina (modified from Dewberry and Davis 1992).

Discussion

The accuracy of coordinates assigned to data-collection locations listed in several tables in this report are subject to uncertainty largely caused by the scale and rendition of published maps. Additional uncertainty was caused by inconsistent nomenclature used to identify data-collection locations. For example, at several IR sites, different identifiers were assigned to identical monitor wells. Conversely, duplicate identifiers also were assigned to different monitor wells at other sites. Maps showing the locations of monitor wells published in a particular IR site report frequently were rendered with a different base and different scale compared to similar maps published in other reports related to the same IR site and showing locations of identical wells. In general, maps included in reports published later in time were more accurate than maps included in reports published earlier in time. Such differences often resulted in as many as six coordinate pairs determined for a single data-collection location. Efforts to “ground truth” data-collection locations were not part of this study’s methods and scope. Regardless, many monitor wells listed herein have been destroyed, and hydropunch, CPT, and soil boring locations could only have been recovered for a short time following data collection. Such activities occurred several years to perhaps a decade or longer prior to the beginning of this study. Accordingly, determining the most accurate location to assign to a data-collection location was based generally on a qualitative evaluation of map accuracy, such as date of publication, and the cultural and topographic detail apparent in the map base. Given these limitations of map quality and accuracy, monitor well, hydropunch, and soil boring location coordinates listed in several tables in this report are probably accurate to within 100 ft at most locations and possibly accurate to within 25 ft or 50 ft at many locations.

Location coordinates for many modern Hadnot Point WTP and Holcomb Boulevard WTP supply wells were based on previous global positioning system (GPS) surveys accomplished and published by USMCB Camp Lejeune (AH Environmental Consultants 2002). Location coordinates of these wells are probably accurate to within 25 ft or less. Location coordinates of older abandoned and destroyed wells were partly determined using rectified maps of historical water-supply well locations and partly using detailed site-specific drawings of well locations, all supplied by USMCB Camp Lejeune. Location coordinates of historical and abandoned supply-well locations are probably accurate within a range of 50 to 100 ft (Table C4).

Construction of monitor wells and the methods and techniques of collecting water samples possibly affected the analytical results and thus the characterization of in situ groundwater quality described herein. Most monitor wells constructed for this study were open to the shallow Brewster Boulevard aquifer system and were designed to include the water table within the open interval of the well. Screen openings at monitor wells ranged from 5 to 25 ft in length

and typically were 10 to 20 ft in length. Screen lengths of this dimension probably are appropriate when groundwater contaminants are completely mixed within the aquifer volume sampled by the well. However, LNAPL liquids, such as BTEX components, typically accumulate at or near the water table at unspecified thicknesses. Monitor wells at IR sites were typically purged of 3 to 6 casing volumes prior to sampling. In wells where screen openings are 10 ft or more and include the water table, such methods may result in dilution of LNAPL liquids within the sampled interval and a poor characterization of LNAPL concentrations within the subsurface. Similar arguments also apply to DNAPL liquids, such as PCE, which accumulate at depth, possibly below the open interval of the monitor well.

Of major concern to this study are the reported contaminant concentrations at water-supply wells (Tables C7–C10). Many of the water-supply wells that contained contaminants were located along the perimeter of the HPIA (Sites 21, 22, and 78) and in the vicinity of storage/disposal lot 203 (Sites 6 and 82, Figure C1 and Plate 1). As such, these wells likely were located near the edges or fringes of major contaminant plumes (Figures C16, C20–C24). Water-supply wells within the Hadnot Point–Holcomb Boulevard study area typically were continuously operated for 12 to 24 hours at a time. Where a substantial contaminant mass occurred within the radius of influence of the operating well, such as at Site 82, the mass would migrate toward the pumping well, probably in progressively increasing quantities determined by the period of continuous operation. Thus, contaminant concentrations at the wellhead would dynamically increase with increasing time of well operation. Although sampling methods at supply wells are poorly documented, particularly for samples collected during the NACIP program and during late 1984 and early 1985, methods probably included purging supply wells of 3 to 6 casing volumes prior to sampling, similar to later methods used at monitor wells. For example, consider an inactive well of 10-inch internal diameter that pumps at 150 gpm and contains a water column of 200 ft. A single casing volume of this well contains about 820 gal. At a pumping rate of 150 gpm, 1 casing volume would be removed from this well in less than 6 minutes; 6 casing volumes would be removed in about 30 minutes. Thus, the sampling method poorly replicates, at best, actual operational conditions. Also, where the supply well is located near a contaminant plume, the contaminant concentration determined in the water sample collected in the “standard” manner may not represent at all the average concentrations at the wellhead during 12 to 24 hours of operation. A field example that possibly demonstrates contaminant migration toward an actively pumping well and consequent dynamic changes in contaminant concentration at the wellhead occurred at supply well HP-651 between January 16, 1985, and February 4, 1985 (Table C7). The TCE concentration determined in a sample collected in well HP-651 on January 16, 1985 was 3,200 µg/L. At this time, the well was inactive and had been inactive during the previous 8 days. Beginning on January 21, 1985, supply well

Summary and Findings

HP-651 was continuously operated until February 4, 1985, at which time water samples collected from the well contained TCE concentrations of 17,600 µg/L and 18,900 µg/L. This increase in contaminant concentration at the wellhead likely was caused by different operational conditions prior to sampling (Camp Lejeune Water Documents CLW #6590–#6593; Table C7). Note that during routine sampling of Camp Lejeune water-supply wells during September 1995, sampling protocols required that approximately half of the wells be pumped continuously for at least 24 hours prior to sampling (Bionomics Laboratory, Inc. 1995).

Summary and Findings

Findings of this study are summarized in Table C80 and on Figures C32–C34. For the contaminants of concern, maximum concentrations are listed by Installation Restoration (IR) site in Table C80 along with (1) the date the water sample was collected; (2) a brief characterization of the contaminant source or sources contributing to the sampled well, described as dispersed, plume, or off-site; (3) the water-bearing units at the IR site containing contaminants; and (4) the water-supply wells possibly affected by groundwater contamination at the IR site. Maximum concentrations were extracted from the various IR site data tables listed in this report and refer to sample collections and analyses that occurred between 1984 and 2004.

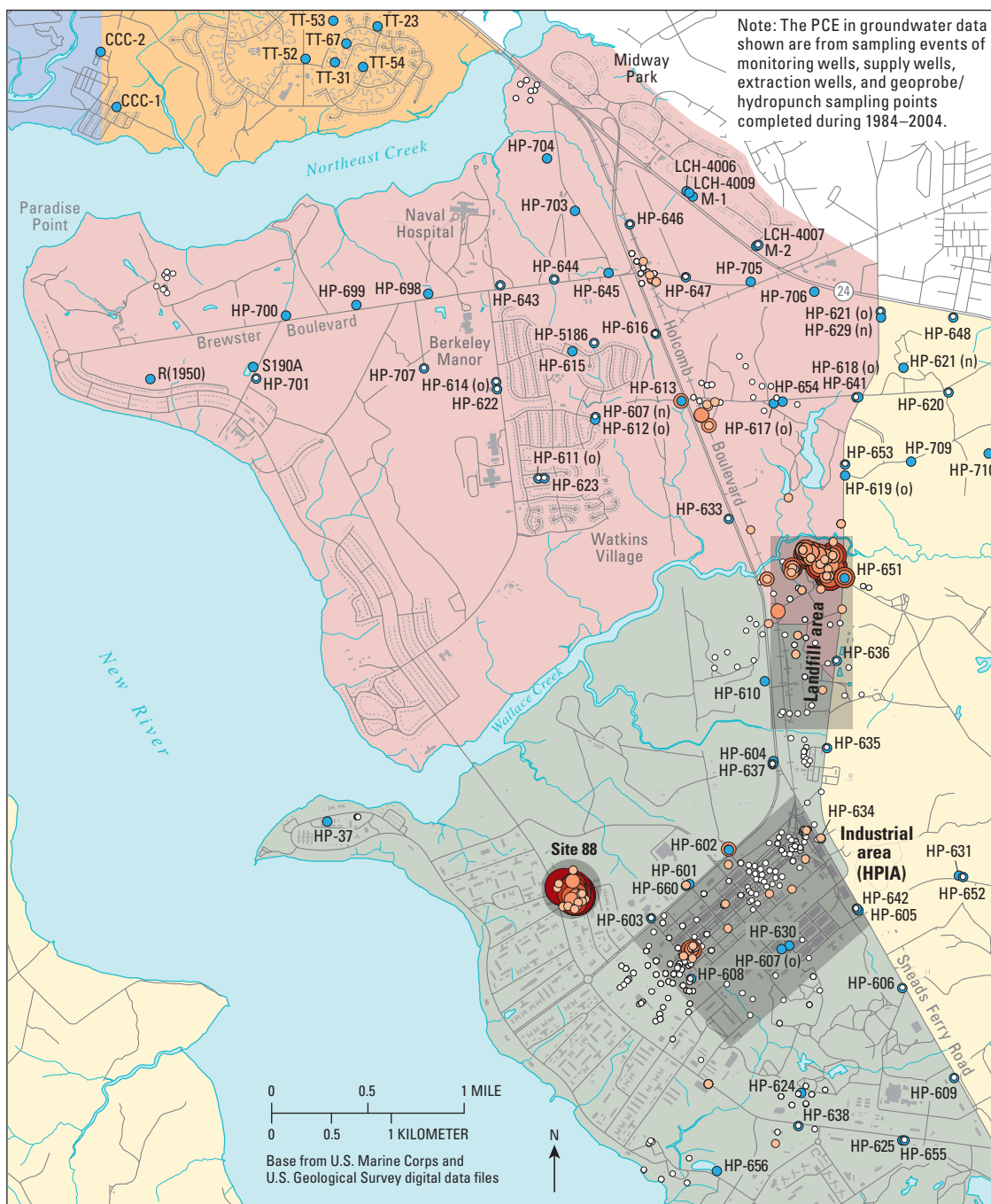
Concentrations of all contaminants of concern occur only at Sites 6, 78, and 82. Each of these sites probably contains a plume or plumes containing most or all of the contaminants of concern. Groundwater contamination occurs at greatest depth also in the vicinity of Site 6, extending to the Middle Castle Hayne aquifer at depths of approximately 200 or more feet below ground surface (ft bgs) (Table C24). Groundwater contamination also occurs at considerable depth at Sites 78 and 82, extending to the Upper Castle Hayne aquifer–Lower unit and Upper Castle Hayne aquifer–River Bend unit at depths of about 150 and 80 ft bgs, respectively.

Contaminants of concern also occur at depth (Upper Castle Hayne aquifer–River Bend unit) in relatively small concentrations at Sites 2 and 3. The occurrence of contaminants at such depths, particularly LNAPLs such as benzene, indicates induced vertically downward migration probably caused by pumping at nearby supply wells. With these exceptions, groundwater contamination appears to be largely confined to the Brewster Boulevard aquifer system and the Tarawa Terrace aquifer at most IR sites. The contaminant trichloroethylene (TCE) occurs most frequently at 13 of 18 IR sites, followed by benzene which occurs at 10 sites, and tetrachloroethylene (PCE) which occurs at 8 sites. Vinyl chloride occurs least at only six sites. The maximum concentration of TCE occurs at

Site 6 at 180,000 micrograms per liter (µg/L), which is more than double the second greatest concentration of 71,000 µg/L of TCE, which occurs at nearby Site 82. The maximum PCE concentration occurs at IR Site 88 at 170,000 µg/L and is far greater than the second greatest concentration of 6,300 µg/L, which occurs at Site 6. Because vinyl chloride is a degradation product of PCE and TCE, patterns of vinyl chloride occurrence and maximum concentrations conform closely to those mentioned previously for PCE and TCE. The maximum vinyl chloride concentration of 6,700 µg/L occurs at Site 78, followed by concentrations of 910 µg/L and 800 µg/L at Sites 88 and 6, respectively. Positive maximum concentrations of benzene range from 0.40 to 29,000 µg/L, and are greatest in the vicinities of Sites 22, 78, 84, and 94, all of which probably contain plumes of BTEX components.

Water-supply wells most adversely affected by groundwater contamination at IR sites were probably those located in the vicinities of the Hadnot Point Industrial Area (HPIA) and Sites 6 and 82. A total of 15 supply wells were constructed in the immediate vicinity and east of the HPIA. Of these, sample analyses indicate that contamination occurred in six wells during or following July 1984. The likely source of this contamination is the various plumes of contaminants mentioned previously that occur within or immediately adjacent to the HPIA. Similarly, five water-supply wells were constructed adjacent to or in the vicinity of Sites 6 and 82. Of these, sample analyses indicated contamination in three wells during or following January 1985. Well HP-651, located adjacent to storage/disposal lot 203 (Sites 6 and 82), was by far the most adversely affected of the five wells. Of the 30 individual water-supply wells possibly affected by groundwater contamination (Table C80), analyses of samples collected in 11 wells indicated contamination at the wellhead. A total of 13 wells were removed from service prior to 1984 and could not be sampled. Note that analyses of samples collected in well HP-706 during 1995 and 2001 indicated contamination of the well by BTEX components, specifically benzene. The source of BTEX that ultimately contaminated supply well HP-706 is not a known IR site and is not discussed herein.

Groundwater sample locations and related contaminant concentrations for PCE, TCE, and benzene within the study area are mapped in Figures C32–C34. Information shown in the figures closely parallels the previous discussions related to Table C80. High contaminant concentrations are shown for PCE and TCE at the HPIA (Sites 6 and 82) and at Site 88. Similarly, high concentrations of benzene are shown in the vicinity of the HPIA and at Sites 84 and 94. In particular, note the locations of many supply wells along Brewster Boulevard, Sneads Ferry Road, and SR 24. Most of these wells are modern wells (post 1995) and were deliberately constructed to avoid known locations of groundwater contamination.



EXPLANATION

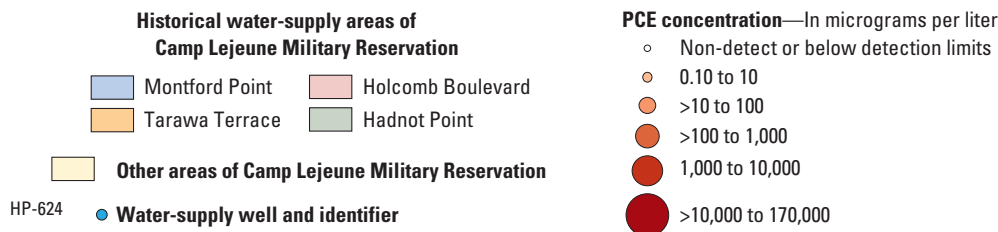
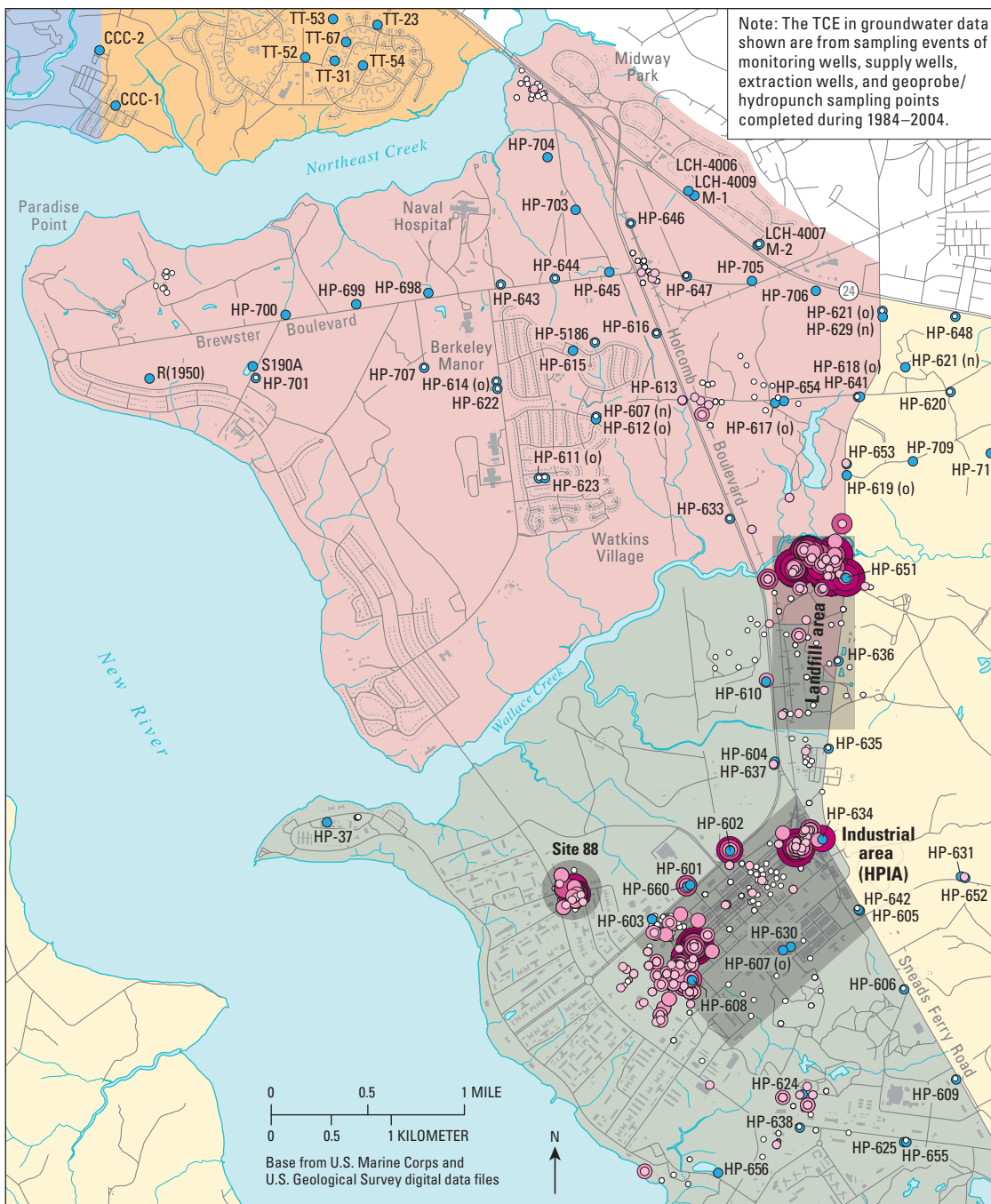


Figure C32. Groundwater sample locations for tetrachloroethylene (PCE) and ranges of PCE concentration in monitor and supply wells within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

Summary and Findings



EXPLANATION

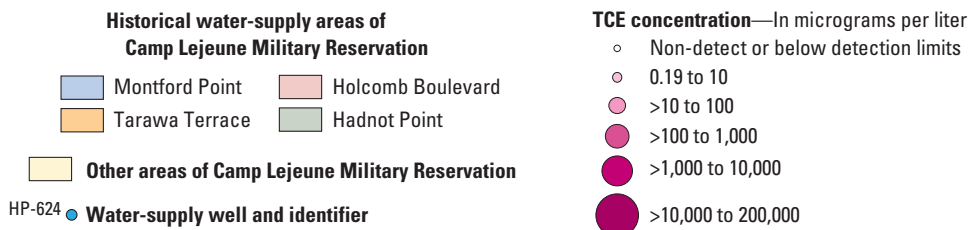
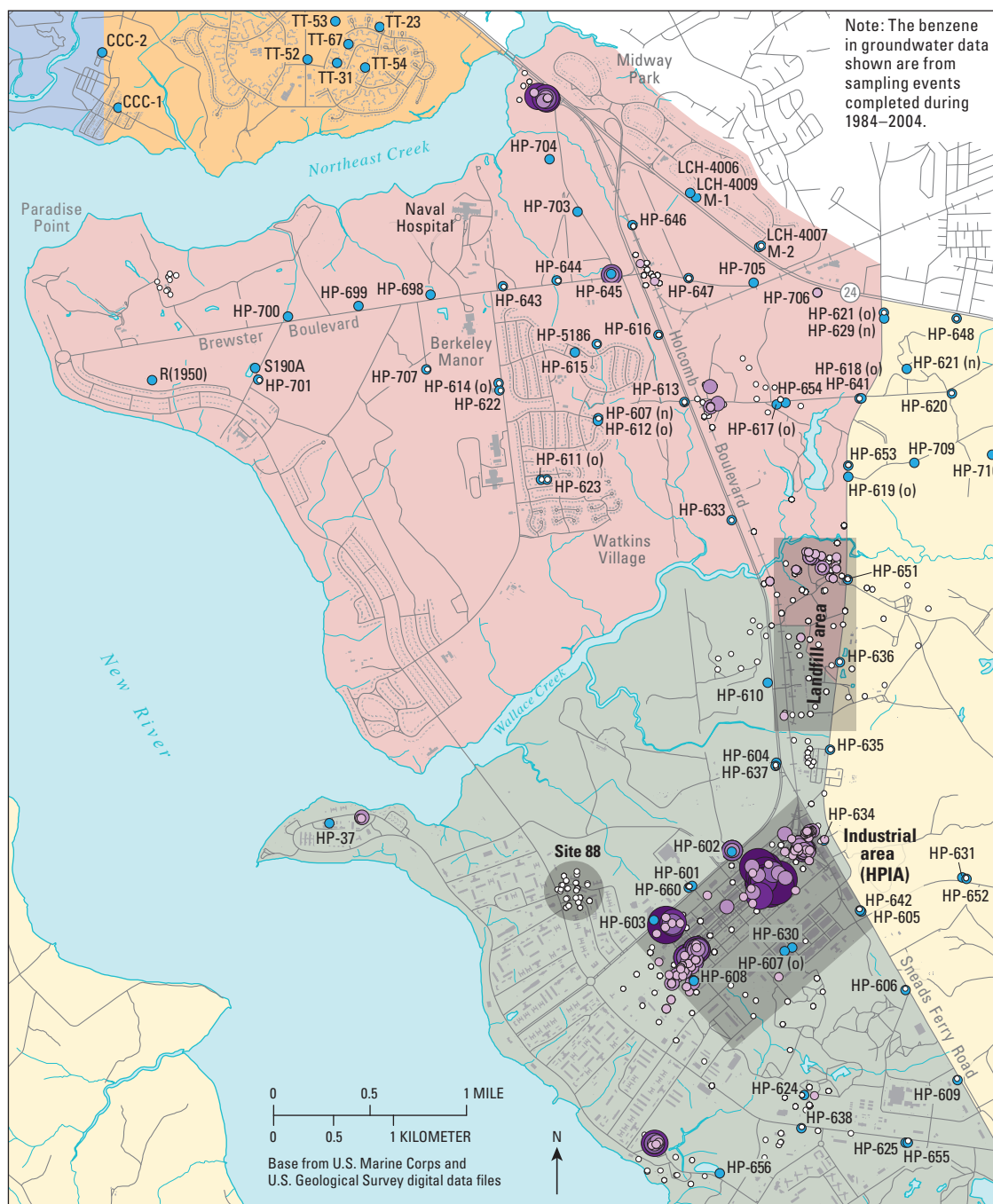


Figure C33. Groundwater sample locations for trichloroethylene (TCE) and ranges of TCE concentration in monitor and supply wells within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.



EXPLANATION

- | | | |
|---|--|---|
| <p>Historical water-supply areas of Camp Lejeune Military Reservation</p> <ul style="list-style-type: none"> Montford Point Tarawa Terrace Other areas of Camp Lejeune Military Reservation | | <p>Benzene concentration—In micrograms per liter</p> <ul style="list-style-type: none"> ○ Non-detect or below detection limits ○ 0.7 to 10 ○ >10 to 100 ○ >100 to 1,000 ○ >1,000 to 10,000 ○ >10,000 to 40,000 |
| <ul style="list-style-type: none"> Holcomb Boulevard Hadnot Point | | |
- HP-624 ● Water-supply well and identifier

Figure C34. Groundwater sample locations for benzene and ranges of benzene concentration in monitor and supply wells within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

Acknowledgments

The authors of this report acknowledge the managers and staff of the U.S. Geological Survey Water Science Center in Raleigh, North Carolina. In particular, the contributions of Melinda J. Chapman, Douglas A. Harned, and Stephen S. Howe are acknowledged for providing the majority of water-supply well construction and well log data used in this study. The authors also acknowledge the staff of the Environmental Management Division, U.S. Marine Corps Base Camp Lejeune, North Carolina. In particular, Scott R. Williams is acknowledged for his assistance and cooperation, especially for providing a large number of technical reports, maps, and historical documents that summarize the results of groundwater remedial investigations and related monitoring throughout the Hadnot Point–Holcomb Boulevard study area. The authors are especially appreciative of the historical information and perspectives provided by Joel Hartsoe and Danny E. Hill of the Camp Lejeune Public Works Department Utility Section. The authors gratefully acknowledge Caryl J. Wipperfurth and Kimberly A. Waltenbaugh of the U.S. Geological Survey Enterprise Publishing Network for their expert and highly professional assistance in the preparation of text, illustrations, and electronic media.

References

- Agency for Toxic Substances and Disease Registry. Public Health Assessment for U.S. Marine Corps Base at Camp Lejeune, Military Reservation, Camp Lejeune, Onslow County, North Carolina. Atlanta, GA: U.S. Department of Health and Human Services; 1997. Report No.: NC6170022580.
- AH Environmental Consultants. Wellhead Protection Plan—2002 Update, Marine Corps Base, Camp Lejeune, North Carolina; 2002. Contract No.: N62470-00-D-3300.
- American Testing and Engineering Corporation. Underground Storage Tank (UST) Site Check Investigation Report, Equipment and Maintenance Shop, Building 45, UST S-941-2, Camp Lejeune Marine Corps Base, Jacksonville, North Carolina; 1992. Leaking Underground Storage Tank report #730.
- Baker Environmental, Inc. Final Site Assessment Report, Site 1—French Creek Liquids Disposal Area, Camp Lejeune, North Carolina; 1991. Contract Task Order 0044, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1510).
- Baker Environmental, Inc. Final Interim Remedial Action Remedial Investigation for the Shallow Aquifer at the Hadnot Point Industrial Area Operable Unit, Camp Lejeune, North Carolina; 1992a. Contract Task Order 0017, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2588).
- Baker Environmental, Inc. Final Remedial Investigation/Feasibility Study Work Plan for Sites 6, 9, 48 and 69, Marine Corps Base Camp Lejeune, North Carolina; 1992b. Contract Task Order 0024, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2802).
- Baker Environmental, Inc. Draft Final Effluent Study, Installation Restoration and Underground Storage Tank Sites, Marine Corps Base, Camp Lejeune, North Carolina; 1993a. Contract Task Order 0140, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #144).
- Baker Environmental, Inc. Draft Remedial Investigation Report for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base, Camp Lejeune, North Carolina, Volume 1 of 2; 1993b. Contract Task Order 0133, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2623).
- Baker Environmental, Inc. Final Basis of Design Report for the Hadnot Point Industrial Area Shallow Aquifer Groundwater Treatment System, Marine Corps Base, Camp Lejeune, North Carolina; 1993c. Contract Task Order 0134, Contract No.: N62470-92-B2255 (CERCLA Administrative Record file #1518).
- Baker Environmental, Inc. Final Feasibility Study for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base, Camp Lejeune, North Carolina; 1993d (CERCLA Administrative Record file #1250).
- Baker Environmental, Inc. Final Feasibility Study for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base, Camp Lejeune, North Carolina; 1993e (CERCLA Administrative Record file #1483).
- Baker Environmental, Inc. Final Record of Decision for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base, Camp Lejeune, North Carolina; 1993f. Contract Task Order 0133, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1248).
- Baker Environmental, Inc. Final Remedial Investigation Report for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base Camp Lejeune, North Carolina, Appendixes A–D, Volume 1 of 4; 1993g (CERCLA Administrative Record file #1615).
- Baker Environmental, Inc. Final Remedial Investigation Report for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base Camp Lejeune, North Carolina, Appendixes E–K, Volume 2 of 4; 1993h (CERCLA Administrative Record file #2297).

- Baker Environmental, Inc. Final Remedial Investigation Report for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base Camp Lejeune, North Carolina, Appendixes L–M, Volume 3 of 4; 1993i (CERCLA Administrative Record file #2298).
- Baker Environmental, Inc. Final Remedial Investigation Report for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base Camp Lejeune, North Carolina, Appendixes A–D, Volume 4 of 4; 1993j (CERCLA Administrative Record file #1615).
- Baker Environmental, Inc. Final Remedial Investigation Report for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base Camp Lejeune, North Carolina; 1993k. Contract Task Order 0133, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1272).
- Baker Environmental, Inc. Final Remedial Investigation Report for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base Camp Lejeune, North Carolina, Volume 2 of 2 (Figures); 1993l. Contract Task Order 0133, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #720).
- Baker Environmental, Inc. Final Remedial Investigation Report for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base Camp Lejeune, North Carolina, Volume 1 of 2 (Text); 1993m. Contract Task Order 0133, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #125).
- Baker Environmental, Inc. Final Remedial Investigation Report for Operable Unit No. 2 (Sites 6, 9, and 82), Marine Corps Base Camp Lejeune, North Carolina, Volume 2 of 2 (Text); 1993n. Contract Task Order 0133, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1559).
- Baker Environmental, Inc. Final Remedial Investigation/Feasibility Study Work Plan for Operable Unit No. 1 (Sites 78, 21, and 24), Marine Corps Base Camp Lejeune, North Carolina; 1993o. Contract Task Order 0106, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1491).
- Baker Environmental, Inc. Final Remedial Investigation/Feasibility Study Work Plan for Operable Unit No. 7 (Sites 1, 28, and 30), Marine Corps Base Camp Lejeune, North Carolina; 1993p. Contract Task Order 0160, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1130).
- Baker Environmental, Inc. Final Treatability Study for the Hadnot Point Industrial Area Shallow Aquifer, Marine Corps Base Camp Lejeune, Jacksonville, North Carolina; 1993q. Contract Task Order 0017, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1503).
- Baker Environmental, Inc. Final Design Package, Basis of Design Report, Soil and Ground-Water Remediation, Operable Unit No. 2, Marine Corps Base Camp Lejeune, North Carolina; 1994a. Contract Task Order 0222, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #236).
- Baker Environmental, Inc. Final Feasibility Study for Operable Unit No. 1 (Sites 21, 24, and 78), Marine Corps Base, Camp Lejeune, North Carolina; 1994b. Contract Task Order 0177, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1256).
- Baker Environmental, Inc. Final Feasibility Study, Operable Unit No. 5, Site 2, Marine Corps Base Camp Lejeune, North Carolina; 1994c. Contract Task Order 0174, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1251).
- Baker Environmental, Inc. Final Record of Decision for Operable Unit No. 1 (Sites 21, 24, and 78), Marine Corps Base, Camp Lejeune, North Carolina; 1994d. Contract Task Order 0177, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #366).
- Baker Environmental, Inc. Final Record of Decision, Operable Unit No. 5 (Site 2), Marine Corps Base Camp Lejeune, North Carolina; 1994e. Contract Task Order 0174, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #230).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 1 (Sites 21, 24, and 78), Marine Corps Base Camp Lejeune, North Carolina, Volume 1 of 2 (Text and Figures); 1994f (CERCLA Administrative Record file #1271).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 1 (Sites 21, 24, and 78), Marine Corps Base Camp Lejeune, North Carolina, Volume 2 of 2 (Text and Figures); 1994g (CERCLA Administrative Record file #522).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 5, Site 2, Marine Corps Base, Camp Lejeune, North Carolina; 1994h. Contract Task Order 0174, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1273).
- Baker Environmental, Inc. Final Sample Strategy Plan, Remedial Investigation/Feasibility Study Project Plans, Operable Unit No. 8 (Site 16), Operable Unit No. 11 (Sites 7 and 80), Operable Unit No. 12 (Site 3), Marine Corps Base, Camp Lejeune, North Carolina; 1994i. Contract Task Order 0233, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #221).

References

- Baker Environmental, Inc. Draft Record of Decision, Operable Unit No. 7, Site 1—French Creek Liquids Disposal Area, Marine Corps Base, Camp Lejeune, North Carolina; 1995a. Contract Task Order 0231, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #240).
- Baker Environmental, Inc. Final Feasibility Study, Operable Unit No. 4 (Sites 41 and 74), Marine Corps Base Camp Lejeune, North Carolina; 1995b. Contract Task Order 0212, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1568).
- Baker Environmental, Inc. Final Feasibility Study Report, Operable Unit No. 7, Site 1, Marine Corps Base Camp Lejeune, North Carolina, Volume I of II; 1995c. Contract Task Order 0231, Contract No.: N62476-89-D-4814 (CERCLA Administrative Record file #1497).
- Baker Environmental, Inc. Final Fiscal Year 1996 Site Management Plan for Marine Corps Base Camp Lejeune, North Carolina; 1995d. Contract Task Order 0099, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1515).
- Baker Environmental, Inc. Final Record of Decision, Operable Unit No. 7, Sites 1, 28, and 30, Marine Corps Base, Camp Lejeune, North Carolina; 1995e. Contract Task Order 0231, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1784).
- Baker Environmental, Inc. Final Relative Risk Ranking System, Data Collection Investigation, Marine Corps Base Camp Lejeune, North Carolina; 1995f. Contract Task Order 0314, Contract No.: N62470-89-D-4814 (CERCLA Administrative file #1729).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 4 (Sites 41 and 74), Marine Corps Base Camp Lejeune, North Carolina, Appendixes A–K, Volume 1 of 3; 1995g. Contract Task Order 0212, Contract No.: N62470-89-D-4814 (CERCLA Administrative file #1524).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 4 (Sites 41 and 74), Marine Corps Base Camp Lejeune, North Carolina, Appendixes L–O, Volume 2 of 3; 1995h. Contract Task Order 0212, Contract No.: N62470-89-D-4814 (CERCLA Administrative file #1525).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 4 (Sites 41 and 74), Marine Corps Base Camp Lejeune, North Carolina, Volume 1 of 2 (Text and Figures); 1995i. Contract Task Order 0212, Contract No.: N62470-89-D-4814 (CERCLA Administrative file #1543).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 7 (Sites 1, 28, 30), Marine Corps Base Camp Lejeune, North Carolina; 1995j. Contract Task Order 0231, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1498).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 7 (Sites 1, 28, and 30), Marine Corps Base Camp Lejeune, North Carolina; 1995k. Contract Task Order 0231, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1499).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 7 (Sites 1, 28, and 30), Marine Corps Base Camp Lejeune, North Carolina; 1995l. Contract Task Order 0231, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1500).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 7 (Sites 1, 28, and 30), Marine Corps Base Camp Lejeune, North Carolina; 1995m. Contract Task Order 0231, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1505).
- Baker Environmental, Inc. Final Site Characterization and Evaluation Report, Sites 10 and 85, MCB Camp Lejeune and Sites 11 and 17, Naval Station Roosevelt Roads; 1995n. Contract Task Order 0348, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1732).
- Baker Environmental, Inc. Remedial Investigation Report, Operable Unit No. 7, (Sites 1, 28, and 30), Marine Corps Base Camp Lejeune, North Carolina; 1995o. Contract Task Order 0231, Contract No.: N62470-89-D-4811 (CERCLA Administrative Record file #1501).
- Baker Environmental, Inc. No title. Tables, figures, and attachments related to well construction, water-quality sampling, and sample analyses at monitor wells and monitor well construction at Operable Unit No. 7—Site 1; 1995p (CERCLA Administrative Record file #2592).
- Baker Environmental, Inc. Remediation of Pesticide-Contaminated Soil, Operable Unit No. 11 (Site 80), Paradise Point Golf Course Maintenance Area, Marine Corps Base, Camp Lejeune, North Carolina; 1995p. Contract Task Order 0274, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1722).
- Baker Environmental, Inc. Draft Project Plans, Pilot-Scale Bioremediation Treatability Study, Operable Unit No. 12 (Site 3), Marine Corps Base, Camp Lejeune, North Carolina; 1996a. Contract Task Order 0274, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #206).

- Baker Environmental, Inc. Final Feasibility Study for Operable Unit No. 12 (Site 3), Marine Corps Base Camp Lejeune, North Carolina; 1996b. Contract Task Order 0274, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1721).
- Baker Environmental, Inc. Final Fiscal year 1997 Site Management Plan for Marine Corps Base, Camp Lejeune, North Carolina; 1996c. Contract Task Order 0099, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1705).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 11 (Site 80) Marine Corps Base Camp Lejeune, North Carolina (Appendixes); 1996d. Contract Task Order 0274, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1698).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 11 (Site 80), Marine Corps Base Camp Lejeune, North Carolina (Text and Figures); 1996e. Contract Task Order 0274, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1697).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 12 (Site 3), Marine Corps Base, Camp Lejeune, North Carolina; 1996f. Contract Task Order 0274, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record files #1699).
- Baker Environmental, Inc. Final Remedial Investigation Report, Operable Unit No. 12 (Site 3), Marine Corps Base, Camp Lejeune, North Carolina; 1996g. Contract Task Order 0274, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record files #1700).
- Baker Environmental, Inc. Phase I Investigation, Operable Unit No. 15 (Site 88), MCB Camp Lejeune, North Carolina; 1996h. Contract Task Order 0356, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1747).
- Baker Environmental, Inc. Quarterly Monitoring Report, Operable Unit No. 1—Sites 24 and 78, Fourth Quarter 1996 (OCT–DEC 96), Marine Corps Base Camp Lejeune, North Carolina; 1996i. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1778).
- Baker Environmental, Inc. Quarterly Monitoring Report, Operable Unit No. 1—Sites 24 and 78, Third Quarter 1996 (JUL–SEP 96), Marine Corps Base Camp Lejeune, North Carolina; 1996j. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1777).
- Baker Environmental, Inc. Quarterly Monitoring Reports, Operable Unit No. 5—Site 2, Marine Corps Base, Camp Lejeune, North Carolina; 1996k. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1706).
- Baker Environmental, Inc. Sample Strategy Plan, Operable Unit No. 15, Site 88, Marine Corps Base Camp Lejeune, North Carolina; 1996l. Contract Task Order 0356, Contract No. N62470-89-D-4814 (CERCLA Administrative Record file #2302).
- Baker Environmental, Inc. Semiannual Monitoring Reports, Operable Unit No. 7—Sites 1 and 28, Marine Corps Base Camp Lejeune, North Carolina; 1996m. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1749).
- Baker Environmental, Inc. Final Record of Decision, Operable Unit No. 12 (Site 3), Marine Corps Base Camp Lejeune, North Carolina; 1997a. Contract Task Order 0274, Contract No.: N62470-89-D-4814 (CERCLA Administrative file #1753).
- Baker Environmental, Inc. Final Site Evaluation Project Plans, Operable Unit No. 15 (Site 88) MCB Camp Lejeune, North Carolina; 1997b. Contract Task Order 0356, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1760).
- Baker Environmental, Inc. Quarterly Monitoring Report, Operable Unit No. 1—Sites 24 and 78, First Quarter 1997 (JAN–MAR 97), Marine Corps Base Camp Lejeune, North Carolina; 1997c. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1780).
- Baker Environmental, Inc. Quarterly Monitoring Report, Operable Unit No. 1—Sites 24 and 78, Second Quarter 1997 (APR–JUN 97), Marine Corps Base Camp Lejeune, North Carolina; 1997d. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1779).
- Baker Environmental, Inc. Quarterly Monitoring Report, Operable Unit No. 2—Sites 6 and 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1997–September 1997; 1997e. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1781).
- Baker Environmental, Inc. Quarterly Monitoring Report, Operable Unit No. 5—Site 2, First Half 1997 (JAN–JUN 97), Marine Corps Base Camp Lejeune, North Carolina; 1997f. Contract Task Order 0367, Contract No. : N62470-89-D-4814 (CERCLA Administrative Record file #1774).

References

- Baker Environmental, Inc. Quarterly Monitoring Report, Operable Unit No. 5—Site 2, Fourth Quarter 1996 (OCT–DEC 96), Marine Corps Base Camp Lejeune, North Carolina; 1997g. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1773).
- Baker Environmental, Inc. Semiannual Monitoring Reports, Operable Unit No. 7—Sites 1 and 28, First Half (JAN–JUN97); 1997h. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1771).
- Baker Environmental, Inc. Semiannual Monitoring Reports, Operable Unit No. 7—Sites 1 and 28, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1997–December 1997; 1997i. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1772).
- Baker Environmental, Inc. Final Basewide remediation Assessment, Groundwater Study (BRAGS), Marine Corps Base Camp Lejeune, North Carolina; 1998a. Contract Task Order 0140, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2013).
- Baker Environmental, Inc. Final Focused Remedial Investigation Report, Operable Unit No. 15 (Site 88), Marine Corps Base, Camp Lejeune, North Carolina (Appendixes); 1998b. Contract Task Order 0356, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2032).
- Baker Environmental, Inc. Final Focused Remedial Investigation Report, Operable Unit No. 15 (Site 88), Marine Corps Base, Camp Lejeune, North Carolina (Text); 1998c. Contract Task Order 0356, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2020).
- Baker Environmental, Inc. Final Pre-Remedial Investigation Screening Study, Sites 12, 68, 75, 76, 84, 85, and 87, Marine Corps Base Camp Lejeune, North Carolina, Volume II of II (Appendixes); 1998d. Contract Task Order 0314, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2635A).
- Baker Environmental, Inc. Final Pre-Remedial Investigation Screening Study, Sites 12, 68, 75, 76, 84, 85, and 87, Marine Corps Base Camp Lejeune, North Carolina, Volume II of II (Appendixes); 1998e. Contract Task Order 0314, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2636A).
- Baker Environmental, Inc. Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1998–December 1998; 1998f. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2320).
- Baker Environmental, Inc. Quarterly Monitoring Report, Operable Unit No. 2—Sites 6 and 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period April 1998–June 1998; 1998g. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Report file #2300).
- Baker Environmental, Inc. Quarterly Monitoring Report, Operable Unit No. 2—Sites 6 and 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 1998–March 1998; 1998h. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Report file #2037).
- Baker Environmental, Inc. Quarterly Monitoring Report, Operable Unit No. 2—Sites 6 and 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period October 1997–December 1997; 1998i. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1978).
- Baker Environmental, Inc. Semiannual Monitoring Report, Operable Unit No. 1—Site 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 1998–June 1998; 1998j. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2304).
- Baker Environmental, Inc. Semiannual Monitoring Reports, Operable Unit No. 1—Sites 24 and 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1997–December 1997; 1998k. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1977).
- Baker Environmental, Inc. Semiannual Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period October 1997–March 1998; 1998l. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1793).
- Baker Environmental, Inc. Semiannual Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period April 1998–September 1998; 1998m. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2296).
- Baker Environmental, Inc. Semiannual Monitoring Report, Operable Unit No. 7—Sites 1 and 28, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 1998–June 1998; 1998n. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2017).

- Baker Environmental, Inc. VARSOL Investigation Summary Report, Operable Unit No. 15 (Site 88), Marine Corps Base Camp Lejeune, North Carolina; 1998o. Contract Task Order 0356, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #1979).
- Baker Environmental, Inc. Final Five-Year Review, Marine Corps Base Camp Lejeune, North Carolina; 1999a. Contract Task Order 0099, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2332).
- Baker Environmental, Inc. Monitoring Report, Operable Unit No. 1—Site 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 1999–June 1999; 1999b. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2338).
- Baker Environmental, Inc. Monitoring Report, Operable Unit No. 1—Site 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1998–December 1998; 1999c. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2321).
- Baker Environmental, Inc. Monitoring Report, Operable Unit No. 2—Sites 6 and 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 1999–June 1999; 1999d. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2337).
- Baker Environmental, Inc. Monitoring Report, Operable Unit No. 2—Sites 6 and 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1998–December 1998; 1999e. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2322).
- Baker Environmental, Inc. Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period April 1999–September 1999; 1999f. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2328).
- Baker Environmental, Inc. Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 1999–June 1999; 1999g. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2334).
- Baker Environmental, Inc. Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1999–December 1999; 1999h. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #2613).
- Baker Environmental, Inc. Semiannual Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period October 1998–March 1999; 1999i. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #2310).
- Baker Environmental, Inc. Final Remedial Investigation/ Feasibility Study Project Plans, Operable Unit 19, Site 84/ Building 45 Area, Marine Corps Base, Camp Lejeune, North Carolina; 2001a. Contract Task Order 0139 (Clean II), Contract No. N62470-95-D-6007 (CERCLA Administrative Record file #3018).
- Baker Environmental, Inc. Final Site Investigation Report, Site 10—Original Base Landfill, Marine Corps Base Camp Lejeune, North Carolina; 2001b. Contract Task Order 0369, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #3266).
- Baker Environmental, Inc. Phase II Groundwater Sampling Results, Site 10—Original Base Landfill, MCB Camp Lejeune, North Carolina; 2001c. Contract Task Order 0369, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #3061).
- Baker Environmental, Inc. Investigative Data Summary Report, Operable Unit No. 1 (Site 78), Marine Corps Base, Camp Lejeune, North Carolina; 2002. Contract No.: N62470-95-D-6007 (CERCLA Administrative Record File #3200).
- Baker Environmental Inc. Final Fiscal Year 2004 Site Management Plan, Marine Corps Base Camp Lejeune, North Carolina; 2004. Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3490).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Monitoring Report, Operable Unit No. 7—Sites 1 and 28, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period October 1998–December 1998; 1998. Contract Task Order 0367, Contract No.: N62470-89-D-4814 (CERCLA Administrative Record file #3414).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Annual Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1999–June 2000; 2000a. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #2610A).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Annual Monitoring Report, Operable Unit No. 7—Sites 1 and 28, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1999–June 2000; 2000b. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #2611A).

References

- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Annual Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1999–June 2000; 2000c. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3325).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Monitoring Report, Operable Unit No. 1—Site 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2000–September 2000; 2000d. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #2598A).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Monitoring Report, Operable Unit No. 2—Sites 6 and 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2000–December 2000; 2000e. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record #2599A).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period October 1999–March 2000; 2000f. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3288).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Monitoring Report, Operable Unit 7—Sites 1 and 28, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2000–March 2000; 2000g. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #2601A).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Monitoring Report, Operable Unit No. 7—Sites 1 and 28, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2000–September 2000; 2000h. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #2602A).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2000–December 2000; 2000i. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #2605A).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Monitoring Report, Operable Unit No. 15—Site 88, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2000–December 2000; 2000j. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #2606A).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Annual Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2000–June 2001; 2001a. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3290).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Monitoring Report, Operable Unit No. 15—Site 88, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2001–December 2001; 2001b. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3343).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Annual Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2001–June 2002; 2002a. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3293).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Monitoring Report, Operable Unit 1—Site 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2002–June 2002; 2002b. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3408).
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. Annual Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2002–June 2003; 2003. Contract Task Order 0252, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3332).
- Baker Environmental, Inc., CH2M Hill Federal Group, Ltd., and CDM Federal Programs Corp. Final Pilot Study Project Plans, Site 78, Operable Unit 1, Marine Corps Base Camp Lejeune, North Carolina; 2003. Contract Task Order 0253, Contract No.: N62470-95-D6007 (CERCLA Administrative Record file #3242).
- Baker Environmental, Inc. and CH2M Hill, Inc. Annual Monitoring Report, Operable Unit No. 1—Site 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2000–September 2001; 2000a. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3272).
- Baker Environmental, Inc. and CH2M Hill, Inc. Annual Monitoring Report, Operable Unit No. 15—Site 88, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1999–June 2000; 2000b. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #2614A).

- Baker Environmental, Inc. and CH2M Hill, Inc. Annual Monitoring Report, Operable Unit No. 2—Sites 6 and 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2000–September 2001; 2001a. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3276).
- Baker Environmental, Inc. and CH2M Hill, Inc. Annual Monitoring Report, Operable Unit No. 7—Site 28, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2000–June 2001; 2001b. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3313).
- Baker Environmental, Inc. and CH2M Hill, Inc. Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2001–December 2001; 2001c. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3328).
- Baker Environmental, Inc. and CH2M Hill, Inc. Annual Monitoring Report, Operable Unit No. 1—Site 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period August 2002–December 2002; 2002a. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3273).
- Baker Environmental, Inc. and CH2M Hill, Inc. Annual Monitoring Report, Operable Unit No. 2—Sites 6 & 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period October 2001–December 2002; 2002b. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3278).
- Baker Environmental, Inc. and CH2M Hill, Inc. Annual Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2001–June 2002; 2002c. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3330).
- Baker Environmental, Inc. and CH2M Hill, Inc. Final Feasibility Study, Operable Unit No. 19, Site 84/Building 45 Area, Marine Corps Base Camp Lejeune, North Carolina; 2002d. Contract Task Order 0219, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3024).
- Baker Environmental, Inc. and CH2M Hill, Inc. Final Remedial Investigation, Operable unit No. 19, Site 84/Building 45 Area, Marine Corps Base Camp Lejeune, North Carolina, Volume I; 2002e. Contract Task Order 0219, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3268).
- Baker Environmental, Inc. and CH2M Hill, Inc. Final Remedial Investigation, Operable unit No. 19, Site 84/Building 45 Area, Marine Corps Base Camp Lejeune, North Carolina, Volume II; 2002f. Contract Task Order 0219, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3269).
- Baker Environmental, Inc. and CH2M Hill, Inc. Monitoring Report, Operable Unit No. 2—Sites 6 & 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2002–June 2002, 2002g. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3277).
- Baker Environmental, Inc. and CH2M Hill, Inc. Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period April 2002–June 2002; 2002h. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3241).
- Baker Environmental, Inc. and CH2M Hill, Inc. Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2002–December 2002; 2002i. Contract Task Order 0252, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3294).
- Baker Environmental, Inc. and CH2M Hill, Inc. Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2002–June 2002; 2002j. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3329).
- Baker Environmental, Inc. and CH2M Hill, Inc. Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2002–December 2002; 2002k. Contract Task Order 0252, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3331).
- Baker Environmental, Inc. and CH2M Hill, Inc. Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2003–June 2003; 2003. Contract Task Order 0252, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3466).
- Bionomics Laboratory, Inc. Sampling and Analysis of Groundwater Wells at the Marine Corps Base, Camp Lejeune, NC and Marine Corps Air Station New River, Jacksonville, NC; 1995. Contract No. N62470-95-B-1501 (CERCLA Administrative Record File #1731).
- Catlin Engineers and Scientists. Marine Corps Base Camp Lejeune, UST Web Portal File #01185, p. 526–562; 2010. [cited 2010 January 14]; Available from <http://lejeune.webmainframe.com>

References

- CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. Annual Monitoring Report, Operable Unit 1—Site 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1999–June 2000; 2000a. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #2608A).
- CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. Annual Monitoring Report, Operable Unit No. 2—Sites 6 and 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 1999–June 2000; 2000b. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #2609A).
- CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. Monitoring Report, Operable Unit No. 1—Site 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2001–June 2001; 2001a. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3271).
- CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2001–June 2001; 2001b. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3326).
- CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. Monitoring Report, Operable Unit No. 15—Site 88, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2001–June 2001; 2001c. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3341).
- CH2M Hill, Inc. Hadnot Point Fuel Farm/Building 1101, Remediation Assessment Report, Marine Corps Base, Camp Lejeune, North Carolina; 2001. Contract No.: N62470-95-D-6007, Navy CLEAN II Program, March 2, 2001 (UST file #0670).
- CH2M Hill, Inc. Final Site 88 Remedial Investigation Work Plan, Operable Unit No. 15 (Site 88), Marine Corps Base Camp Lejeune, North Carolina; 2003 (CERCLA Administrative Record File #3187).
- CH2M Hill, Inc. Final Site 94 Phase I Sample Strategy Plan, Operable Unit No. 18 (Site 94), Marine Corps Base Camp Lejeune, North Carolina; 2004. Contract Task Order 0036, Contract No.: N62470-02-D-3052 (CERCLA Administrative Record file #3491).
- CH2M Hill, Inc. Final Site Management Plan, Fiscal Year 2010, Marine Corps Base Camp Lejeune, Jacksonville, North Carolina; 2009. Contract No.: N62470-08-D-1000.
- CH2M Hill, Inc. and Baker Environmental, Inc. Annual Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2000–June 2001; 2001a. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3327).
- CH2M Hill, Inc. and Baker Environmental, Inc. Annual Monitoring Report, Operable Unit No. 15—Site 88, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2000–June 2001; 2001b. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3342).
- CH2M Hill, Inc. and Baker Environmental, Inc. Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period April 2001–September 2001; 2001c. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3291).
- CH2M Hill, Inc. and Baker Environmental, Inc. Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period October 2000–March 2001; 2001d. Contract Task Order 0120, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3289).
- CH2M Hill, Inc. and Baker Environmental, Inc. Monitoring Report, Operable Unit No. 7—Sites 1 and 28, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period October 2000–March 2001; 2001e. Contract Task Order 0120, Contract No.: N62370-95-D-6007 (CERCLA Administrative Record file #3310).
- CLW, Camp Lejeune Water Documents, 0001–8761 (not consecutively available), provided on DVD format. In: Maslia ML, Sautner JB, Faye RE, Suárez-Soto RJ, Aral MM, Grayman WM, Jang W, Wang J, Bove FJ, Ruckart PZ, Valenzuela C, Green JW Jr, and Krueger AL. Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions—Chapter A: Summary of Findings. Atlanta, GA: Agency for Toxic Substances and Disease Registry; 2007.
- Costas K, Knorr RS, and Condon SK. A Case-Control Study of Childhood Leukemia in Woburn, Massachusetts: The Relationship Between Leukemia Incidence and Exposure to Public Drinking Water. *The Science of the Total Environment*. 2002; 300:23–35.
- Dewberry and Davis. Technical Memorandum No. 2, Results of Field Investigation, Camp Lejeune Waste Oil Tank Sites; 1991. Contract No.: N62470-C090-6796 (CERCLA Administrative Record file #269, included as part of O'Brien and Gere Engineers, Inc. 1992).

- Dewberry and Davis. Groundwater Characterization Study for Camp Lejeune Sanitary Landfill, Onslow County, North Carolina, MCON Project P-948, Landfill, Department of the Navy, Marine Corps Base, Camp Lejeune, North Carolina; 1992 (Site G) CERCLA Administrative Record file #345).
- DLAM 6050.1. DLA Environmental Protection Manual, Forward and Chapter 9. 1991. [cited 2010 January 26]; Available from <http://www.p2pays.org/ref/10/09690/chapter9.htm>
- Duke Engineering and Services, Inc. Work Plan for a Partitioning Interwell Tracer Test, Site 88, Marine Corps Base Camp Lejeune; 1997 (CERCLA Administrative Record file #217).
- Duke Engineering and Services, Inc. and Baker Environmental, Inc. DNAPL Site Characterization Using a Partitioning Interwell Tracer Test at Site 88, Marine Corps Base, Camp Lejeune, North Carolina; 1998 (CERCLA Administrative Record file #3188).
- Duke Engineering and Services, Inc. and Baker Environmental, Inc. Final DNAPL Site Characterization Using a Partitioning Interwell Tracer Test at Site 88, Marine Corps Base, Camp Lejeune, North Carolina; 1999a (CERCLA Administrative Record file #2324).
- Duke Engineering and Services, Inc. and Baker Environmental, Inc. Sampling and Analysis Plan for a Surfactant-Enhanced Aquifer Remediation Demonstration, Site 88, Marine Corps Base Camp Lejeune, North Carolina; 1999b (CERCLA Administrative Record file #3159).
- Duke Engineering and Services, Inc. and Baker Environmental, Inc. Surfactant-Enhanced Aquifer Remediation Demonstration at Site 88, Marine Corps Base, Camp Lejeune, North Carolina; 2000 (CERCLA Administrative Record file #2598).
- ECG, Inc. Marine Corps Base Camp Lejeune and Marine Corps Air Station, New River, Water Conservation Analysis. Vienna, VA: ECG, Inc.; 1999.
- Engineering and Environment, Inc. and Michael Baker Jr., Inc. Monitoring Report, Operable Unit No. 1—Site 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2004–June 2004; 2004a. Contract Task Order 0004, Contract No.: N62470-03-D-4000 (CERCLA Administrative Record file #3453).
- Engineering and Environment, Inc. and Michael Baker Jr., Inc. Monitoring Report, Operable Unit No. 2—Sites 6 & 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2004–June 2004; 2004b. Contract Task Order 0004, Contract No.: N62470-03-D-4000 (CERCLA Administrative Record file #3454).
- Engineering and Environment, Inc. and Michael Baker Jr., Inc. Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2004–June 2004; 2004c. Contract Task Order 0004, Contract No.: N62470-03-D-4000 (CERCLA Administrative Record file #3462).
- Engineering and Environment, Inc. and Michael Baker Jr., Inc. Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2004–June 2004; 2004d. Contract Task Order 0004, Contract No.: N62470-03-D-4000 (CERCLA Administrative Record file #3522).
- Environmental and Safety Designs, Inc. Facility Assessment, Preliminary Review Document for Marine Corps Base Camp Lejeune, North Carolina; 1995 (CERCLA Administrative Record file #124).
- Environmental and Safety Designs, Inc. RCRA Facility Assessment Report for Marine Corps Base Camp Lejeune, North Carolina; 1996 (CERCLA Administrative Record file #2358).
- Environmental Science and Engineering, Inc. Monthly Progress Report, Period 5/16/84 Through 6/15/84, Marine Corps Base, Camp Lejeune, North Carolina; 1984. Contract No.: N62470-83-C-6106.
- Environmental Science and Engineering, Inc. Evaluation of Data from First Round of Verification Sample Collection and Analysis, Confirmation Study to Determine Existence of Specific Chemicals In Situ, Marine Corps Base Camp Lejeune, North Carolina; 1985. Contract No.: N62470-83-B-6101 (CERCLA Administrative Record file #388).
- Environmental Science and Engineering, Inc. Evaluation of Data from Second Round of Verification Step Sample Collection and Analysis, Confirmation Study to Determine Existence of Specific Chemicals In Situ, Marine Corps Base Camp Lejeune, North Carolina; 1987. Contract No.: N62470-83-B-6101 (CERCLA Administrative Record file #387).
- Environmental Science and Engineering, Inc. Characterization Step Report for Hadnot Point Industrial Area, Confirmation Study to Determine Existence and Possible Migration of Specific Chemicals In Situ, Marine Corps Base Camp Lejeune, North Carolina; 1988a. Contract No.: N62470-83-C-6106 (CERCLA Administrative Record file #258).
- Environmental Science and Engineering, Inc. Feasibility Study for Hadnot Point Industrial Area Camp Lejeune, North Carolina, Final, Marine Corps Base Camp Lejeune, North Carolina; 1988b (CERCLA Administrative Record file #428).

References

- Environmental Science and Engineering, Inc. Site Summary Report—Final, Marine Corps Base Camp Lejeune, North Carolina; 1990. Contract No.: N62470-83-B-6101 (CERCLA Administrative Record file #214).
- Environmental Science and Engineering, Inc. Final Remedial Investigation Report for Hadnot Point Industrial Area, Characterization Study to Determine Existence and Possible Migration of Specific Chemicals In Situ, Marine Corps Base Camp Lejeune, North Carolina, Volume 2; 1991. Contract No.: N62470-83-C-6106 (CERCLA Administrative Record Report File #1517).
- Environmental Science and Engineering, Inc. Final Remedial Investigation Report for Hadnot Point Industrial Area Operable Unit, Shallow Soils and Castle Hayne Aquifer Characterization Study to Determine Existence and Possible Migration of Specific Chemicals In Situ, Marine Corps Base Camp Lejeune, North Carolina, Volume 1; 1992a. Contract No.: N62470-83-C-6106 (CERCLA Administrative Record file #1516).
- Environmental Science and Engineering, Inc. Final Site Assessment Report for Sites 6, 48, and 69, Characterization Study to Determine Existence and Possible Migration of Specific Chemicals In Situ, Marine Corps Base Camp Lejeune, North Carolina; 1992b. Contract No.: N62470-83-C-6106 (CERCLA Administrative Record file #273).
- Faye, RE. Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions—Chapter B: Geohydrologic Framework of the Castle Hayne Aquifer System. Atlanta, GA: Agency for Toxic Substances and Disease Registry; 2007.
- Faye, RE. Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions—Chapter B: Geohydrologic Framework of the Brewster Boulevard and Castle Hayne Aquifer Systems and the Intervening Tarawa Terrace Aquifer and Confining Unit. Atlanta, GA: Agency for Toxic Substances and Disease Registry; 2010a (in progress).
- Faye, RE. Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions—Chapter C: Occurrence of Contaminants in Soil and Groundwater; 2010b (in progress).
- Faye, RE and Green JW Jr. Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions—Chapter E: Occurrence of Contaminants in Groundwater. Atlanta, GA: Agency for Toxic Substances and Disease Registry; 2007.
- Geological Resources, Inc. Groundwater Well Sampling Report, Marine Corps Base, Camp Lejeune, North Carolina and Marine Corps Air Station, New River, Jacksonville, North Carolina; 2002. Contract No.: N62470-01-B-2202 (Appendix A, Leaking Underground Storage Tank Report #528).
- Geophex, Ltd. Wellhead Management Program, Engineering Study 91-36, Submitted to Officer In Charge of Construction, Marine Corps Base Camp Lejeune, North Carolina; 1991. Contract No.: N62470-90-D-6756 (Camp Lejeune Water Document #1917).
- Geophex, Ltd. Final Report on Groundwater Resource Evaluation at Marine Corps Air Station, New River, Engineering Study 93-09; 1994.
- Greenhorne and O'Mara, Inc. Final Report, Wellhead Monitoring Study, Volumes I and II, Camp Lejeune, North Carolina; 1994. Contract No.: N62470-92-D-8290.
- Haliburton NUS. Draft Site Inspection Report, Site 03: Old Creosote Plant, Marine Corps Base Camp Lejeune, Jacksonville, North Carolina; 1992a. Haliburton NUS Project Number 2F36 (CERCLA Administrative Record file #331).
- Haliburton NUS. Draft Site Inspection Report, Site 80: Paradise Point Golf Course, Marine Corps Base Camp Lejeune, Jacksonville, North Carolina; 1992b. Haliburton NUS Project Number 2F36 (CERCLA Administrative Record file #329).
- Haliburton NUS. Draft Site Inspection Report, Site 82: Piney Green Road, Marine Corps Base Camp Lejeune, Jacksonville, North Carolina; 1992c. Haliburton NUS Project Number 2F36 (CERCLA Administrative Record file #3165).
- Harned DA, Lloyd OB Jr, and Treece MW Jr. Assessment of Hydrologic and Hydrogeologic Data at Camp Lejeune Marine Corps Base, North Carolina. Raleigh, NC: U.S. Geological Survey Water-Resources Investigations Report 89-4006; 1989.
- Huling SG, and Weaver JW. Dense Nonaqueous Phase Liquids. Washington, D.C.: U.S. Environmental Protection Agency, Office of Research and Development and Office of Solid Waste and Emergency Response; 1991 March. Report No.: EPA/540/4-91-002.

- J.A. Jones Environmental Services Company. GW-UST 12 Report, UST Removal at Building 45, Marine Corps Base Camp Lejeune, North Carolina; 1999 (Leaking Underground Storage Tank Report #45).
- JTC Environmental Consultants, Inc. Laboratory Analyses on Naval Samples, Case #401, JTC Data Report #88-357; 1988. Contract No.: N62470-86-C-8754 (CERCLA Administrative Record file #298).
- Kopecky KJ, Davis S, Hamilton TE, Saporito MS, and Onstad LE. Estimation of Thyroid Radiation Doses for the Hanford Thyroid Disease Study: Results and Implications for Statistical Power of the Epidemiological Analyses. *Health Physics*. 2004; 87(1):15–32.
- Kueper BH, Wealthall GP, Smith JWN, Leharne SA, and Lerner DN. *An Illustrated Handbook of DNAPL Transport and Fate in the Subsurface*. Bristol, United Kingdom: Environment Agency R&D Publication 133; 2003 June.
- Law Engineering and Environmental Services, Inc. Corrective Action Plan for the Restoration of Petroleum Contaminated Soil and Groundwater, Building 45, USTS S-941-1 and 2, Equipment and Maintenance Shop, Marine Corps Base Camp Lejeune, North Carolina; 1996 (Leaking Underground Storage Tank Site Report #742).
- Law Engineering, Inc. Leaking Underground Storage Tank Site Assessment Report, Volume 1, Building 45, Equipment and Maintenance Shop UST S-941-2, Marine Corps Base Camp Lejeune, North Carolina; 1994 (Leaking Underground Storage Tank Site Report #1994_Law_Site_Assessment).
- Lawrence SJ. Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions—Chapter D: Properties and Degradation Pathways of Common Organic Compounds in Groundwater. Atlanta, GA: Agency for Toxic Substances and Disease Registry; 2007.
- Maslia ML, Aral MM, Faye RE, Suárez-Soto RJ, Sautner JB, Wang J, Jang W, Bove FJ, and Ruckart, PZ. Reconstructing Historical Exposures to Volatile Organic Compound–Contaminated Drinking Water at a U.S. Military Base. *Water Quality, Exposure and Health*. 2009;1(1):49–68.
- Maslia ML, Sautner JB, Aral MM, Gillig RE, Reyes JJ, and Williams RC. Historical Reconstruction of the Water-Distribution System Serving the Dover Township Area, New Jersey: January 1962–December 1996. Atlanta, GA: Agency for Toxic Substances and Disease Registry; 2001 October.
- Maslia ML, Sautner JB, Faye RE, Suárez-Soto RJ, Aral MM, Grayman WM, Jang W, Wang J, Bove FJ, Ruckart PZ, Valenzuela C, Green JW Jr, and Krueger, AL. Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions—Chapter A: Summary of Findings. Atlanta, GA: Agency for Toxic Substances and Disease Registry; 2007.
- McLaren/Hart-ChemRisk. Oak Ridge Dose Reconstruction Project Summary Report. Alameda, CA: McLaren/Hart-ChemRisk; 2000.
- Michael Baker Jr., Inc. and CH2M Hill Federal Group, Ltd. Monitoring Report, Operable Unit No. 1—Site 78, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2003–June 2003; 2003. Contract Task Order 0252, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3409).
- Michael Baker Jr., Inc. and CH2M Hill, Inc. Monitoring Report, Operable Unit No. 2—Sites 6 & 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2003–June 2003; 2003. Contract Task Order 0252, Contract No.: N62470-95-D-6007 (CERCLA Administrative Record file #3410).
- Michael Baker Jr., Inc. and Engineering and Environment, Inc. Monitoring Report, Operable Unit No. 5—Site 2, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2003–December 2003; 2003a. Contract Task Order 0004, Contract No.: N62470-03-D-4000 (CERCLA Administrative Record file #3419).
- Michael Baker Jr., Inc. and Engineering and Environment, Inc. Monitoring Report, Operable Unit No. 12—Site 3, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period July 2003–December 2003; 2003b. Contract Task Order 0004, Contract No.: N62470-03-D-4000 (CERCLA Administrative Record file #3471).
- Michael Baker Jr., Inc. and Engineering and Environment, Inc. Annual Monitoring Report, Operable Unit No. 2—Sites 6 & 82, Marine Corps Base Camp Lejeune, North Carolina, Reporting Period January 2004–December 2004; 2004. Contract Task Order 0004, Contract No.: N62470-03-D-4000 (CERCLA Administrative Record file #3637).
- Naval Facilities Engineering Command. Atlantic Division, Master Plan, Camp Lejeune Complex, North Carolina; 1984.
- Naval Facilities Engineering Command. Atlantic Division, Survey of Potable Water Treatment Plants and Swimming Pools Water Treatment at Marine Corps Base, Camp Lejeune; 1986 (Camp Lejeune Water Document CLW #4938).

References

- O'Brien and Gere Engineers, Inc. Final Report, Contaminated Ground Water Study, Marine Corps Base Camp Lejeune, North Carolina, Hadnot Point Area; 1988. Contract No.: N62470-86-C-8740 (CERCLA Administrative Record file #417).
- O'Brien and Gere Engineers, Inc. Preliminary Engineering Report, Product Recovery System Design, Hadnot Point Fuel Farm, Marine Corps Base Camp Lejeune, North Carolina; 1990. Contract No.: N62470-88-D-5825 (CERCLA Administrative Record file #382).
- O'Brien and Gere Engineers, Inc. Site Assessment, Tank S781, Midway Park, Marine Corps Base Camp Lejeune, North Carolina; 1992. Contract No.: N62470-90-R-7626 (CERCLA Administrative Record file #269).
- O'Brien and Gere Engineers, Inc. Site Assessment Addendum, Tank S781, Marine Corps Base Camp Lejeune, North Carolina; 1993. Contract No.: N62470-90-R-7626 (CERCLA Administrative Record file #270).
- OHM Remediation Services Corp. Contractor's Closeout Report, Time Critical Removal Action for Pesticide Contaminated Soil, Operable Unit 5, Site 2, MCB Camp Lejeune, Jacksonville, North Carolina; 1995. Contract No.: N62470-93-D-3032 (CERCLA Administrative Record file #1560).
- OHM Remediation Services Corp. Contractor's Closeout Report, Underground Storage Tank Removals at Building 25, MCB Camp Lejeune, Jacksonville, North Carolina, Volume I of IV; 1996a. Delivery Order 0078, Contract No.: N62470-93-D-3032 (CERCLA Administrative Record file #1738).
- OHM Remediation Services Corp. Draft Final Report for Soil Remediation of Site 82 AOC-1 Area A, MCB Camp Lejeune, North Carolina, Volume I of II; 1996b. Delivery Order 0015, Contract No.: N62470-93-D-3032 (CERCLA Administrative Record file #191).
- Reif JS, Burch JB, Nuckols JR, Metzger L, Ellington D, and Anger KW. Neurobehavioral Effects of Exposure to Trichloroethylene Through a Municipal Water Supply. *Environmental Research*. 2003;93:248–258.
- R.E. Wright Associates, Inc. Five Well Site Check and Resample One Existing Well, Marine Corps Base, Camp Lejeune, North Carolina; 1994 (Leaking Underground Storage Tank Site Report 1994_REW_FiveWellSiteCheck).
- Richard Catlin and Associates, Inc. Final Leaking Underground Storage Tank Comprehensive Site Assessment, Building 1613, USTs 1613 1–4, Marine Corps Base Camp Lejeune, North Carolina, Volume I; 1996a. Richard Catlin and Associates, Inc. Job No. 94127-F, Contract No. N62470-93-D-4020 (CERCLA Administrative Record file #76).
- Richard Catlin and Associates, Inc. Final Leaking Underground Storage Tank Comprehensive Site Assessment, Building 1613, USTs 1613 1–4, Marine Corps Base Camp Lejeune, North Carolina, Volume II; 1996b. Richard Catlin and Associates, Inc. Job No. 94127-F, Contract No. N62470-93-D-4020 (CERCLA Administrative Record file #90).
- Ricker JA. A Practical Method to Evaluate Ground Water Contaminant Plume Stability. *Ground Water Monitoring & Remediation*. 2008;28(4):85–94.
- Rodenbeck SE, and Maslia ML. Groundwater Modeling and GIS to Determine Exposure to TCE at Tucson. *Practice Periodical of Hazardous, Toxic, and Radioactive Waste Management*. 1998;2(2):53–61.
- Unknown Author. Sampling Data for Site Inspection at Sites 3, 7, 43, 44, 54, 63, 65, 80, and 82; 1991 (CERCLA Administrative Record files, #193, #702).
- U.S. Environmental Protection Agency. How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites—A Guide for Corrective Action Plan Reviewers. Washington, D.C.: U.S. Environmental Protection Agency, Report No.: EPA 510-B-95-007. 2004. [cited 2010 January 26]; Available from <http://www.epa.gov/swerust1/pubs/tums.htm>
- U.S. Environmental Protection Agency. RCRA Statute, Regulations & Enforcement; 2009. [cited 2010 January 26]; Available from <http://www.epa.gov/compliance/civil/rcra/rcraenfstatreq.html>
- U.S. Marine Corps. Hadnot Point Fuel Farm, Camp Lejeune, North Carolina, Site Background and Current Status; 2001 (CERCLA Administrative Record file #3103).
- U.S. Marine Corps. Marine Corps Base, Camp Lejeune, Proposed Remedial Action Plan, Operable Unit No. 19 (Site 84/Building 45 Area); 2002 (CERCLA Administrative Record file #2979).
- Water and Air Research, Inc. Initial Assessment Study, Navy Assessment and Control of Installation Pollutants (NACIP) Program, MCB Camp Lejeune, North Carolina; 1982 (CERCLA Administrative Record file #332).
- Water and Air Research, Inc. Initial Assessment Study of Marine Corps Base Camp Lejeune, North Carolina, UIC-M67001; 1983 (CERCLA Administrative Record file #124).

Tables C1–C80

Table C1. Chronology of Hadnot Point and Holcomb Boulevard family and bachelor housing construction and contemporary populations, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NA, not available]

Housing area	Year built	Number of units	Type of units	Resident population ¹
Bachelor Housing	NA	NA	NA	NA/13,427
Berkeley Manor	1962/1963	677	Single	2,721/2,486
Hospital Point	1947	24	Single (?)	NA/86
Midway Park	1942/1943	699	Single and duplex	1,726/1,809
Paradise Point	1942	5	Single	
	1947	100	Single	
	1948	67	Single	
	1962	123	Single	
	1999	(total) 510	Single	1,854/1,665
Watkins Village	1978/1979	250	Townhouses	1,342/1,347

¹ The first number is the resident population indicated by hand-written notes on the maps listed below under Data sources. The second number is the resident population in 1999 reported by ECG, Inc. (1999, Appendix 2)

Data sources:

ECG, Inc. 1999

U.S. Marine Corps Base Camp Lejeune

Map of Berkeley Manor area, June 30, 1979

Map of Midway Park housing area and Naval Hospital, July 31, 1984

Map of Officer Quarters, Paradise Point area, July 31, 1984

Map of Watkins Village, June 30, 1979

Scott R. Williams, U.S. Marine Corps Base Camp Lejeune, written communication, September 9, 2008

Tables C2 and C3

Table C2. Average annual rate of treated finished water delivered by the Hadnot Point Water Treatment Plant, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[WTP, water treatment plant; MGD, million gallons per day; N/A, not available]

Year	Average annual rate of treated finished water delivered by the Hadnot Point WTP, in MGD	Year	Average annual rate of treated finished water delivered by the Hadnot Point WTP, in MGD
1942	¹ 5.0	1971	² 4.13
1943	N/A	1972	N/A
1944	¹ 4.8	1973	N/A
1945	N/A	1974	² 3.50
1946	N/A	1975	² 3.39
1947	N/A	1976	² 3.75
1948	¹ 5.5	1977	² 3.69
1949	N/A	1978	² 3.71
1950	N/A	1979	² 3.42
1951	N/A	1980	² 3.46
1952	N/A	1981	² 3.37
1953	¹ 6.0	1982	² 3.43
1954	N/A	1983	² 3.21
1955	N/A	1984	² 3.54
1956	N/A	1985	² 3.23
1957	N/A	1986	² 3.00
1958	N/A	1987	² 3.85
1959	² 4.90	1988	² 3.34
1960	² 4.92	1989	³ 2.94
1961	² 4.97	1990	³ 2.81
1962	² 5.07	1991	³ 2.70
1963	² 5.17	1992	³ 2.72
1964	² 4.60	1993	³ 2.58
1965	² 4.69	1994	⁴ 3.04
1966	² 4.72	1995	⁴ 3.02
1967	² 4.80	1996	⁴ 2.85
1968	² 4.34	1997	⁴ 2.79
1969	N/A	1998	⁴ 2.96
1970	N/A		

¹Unknown author, U.S. Marine Corps Base Camp Lejeune, Raw Water Supply Data, “max. amount delivered to plant,” written communication, 1969(?)

²Unknown author, U.S. Geological Survey, Raw Water Treated, Hadnot Point WTP, written communication, 1989(?)

³Camp Lejeune Water Document CLW #5004, Monthly Potable Self-Supplied Water, written communication, 1994(?)

⁴ECG, Inc. 1999

Table C3. Average annual rate of treated finished water delivered by the Holcomb Boulevard Water Treatment Plant, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[WTP, water treatment plant; MGD, million gallons per day; N/A, not available]

Year	Average annual rate of treated finished water delivered by the Holcomb Boulevard WTP, in MGD
1972	N/A
1973	N/A
1974	N/A
1975	¹ 0.71
1976	¹ 0.78
1977	¹ 0.93
1978	¹ 1.12
1979	¹ 1.05
1980	¹ 1.04
1981	¹ 1.17
1982	¹ 1.23
1983	¹ 1.26
1984	¹ 1.22
1985	¹ 1.26
1986	¹ 1.23
1987	¹ 1.89
1988	¹ 2.20
1989	² 2.14
1990	² 2.25
1991	² 2.04
1992	² 2.24
1993	² 2.26
1994	² 2.47
1995	² 2.37
1996	² 2.27
1997	² 2.10
1998	³ 1.98

¹Unknown author, U.S. Geological Survey, Raw Water Treated, Holcomb Boulevard WTP, written communication, 1989(?)

²Camp Lejeune Water Document CLW #5004, Monthly Potable Self-Supplied Water, written communication, 1994(?)

³ECG, Inc. 1999

Table C4. Construction, location, and contributing aquifer data for Hadnot Point Water Treatment Plant and Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, LCHAQ—Lower Castle Hayne aquifer, LCHCU—Lower Castle Hayne confining unit, local CU—local confining unit, MCHAQ—Middle Castle Hayne aquifer, MCHCU—Middle Castle Hayne confining unit, TTAQ—Tarawa Terrace aquifer, TTCU—Tarawa Terrace confining unit, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit, UCHRBU&LU—Upper Castle Hayne aquifer River Bend and Lower units; AKA, also known as; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screened interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
HP-37 ⁶ AKA E-1	341418	2489651	9.2	8/2/1942	102	52–82 92–102	TTAQ UCHRBU
HP-557 ⁴ AKA HB-557 AKA #1	352980	2519748	³ 39	12/9/1998	240	130–155 200–230	UCHLU MCHAQ
HP-558 ⁴ AKA #2	353451	2521375	³ 41	1/20/1999	272	152–177 202–217 252–262	UCHLU MCHCU MCHAQ
HP-584 ⁴ AKA HB-584 AKA #706A	354041	2525065	³ 37	10/17/2000	271	205–235 257–267	MCHAQ
HP-585 AKA 609A	316410	2515140	³ 44	8/10/2000	125	85–125	BBUCU BBLAQ
HP-595 AKA Sneads Ferry #1	319705	2514271	42.0	8/11/1997	255	165–180 200–240 245–255	TTAQ
HP-596 AKA Sneads Ferry #2	318559	2514652	³ 45	5/27/1997	210	100–110 120–150 160–200	BBLAQ BBLCU TTAQ
HP-601 AKA DTA #1	339693	2499568	23.0	9/1/1941	200	45–60 95–100 115–130 175–195	BBLCU TTCU UCHRBU&LU
HP-602 AKA DTA #2	340638	2500652	25.0	11/29/1941	160	70–80 100–105 120–125 145–150 155–160	TTAQ, TTCU UCHRBU&LU Local CU
HP-603 AKA DTA #3	338762	2498518	24.8	12/1/1941	195	70–80 100–110 130–140 160–170 190–195	TTAQ, TTCU UCHRBU&LU MCHAQ
HP-604 AKA DTA #4 and USGS obser- vation well #1	343071	2501865	31.2	1941(?)	195	90–105 125–135 155–165 185–195	UCHRBU&LU MCHAQ
HP-605 AKA DTA #5 and Well #3 HPIA aquifer test	338997	2504185	30.3	11/1/1941	201	67–77 117–127 147–167 181–191	BBLCU, TTAQ UCHRBU&LU MCHCU MCHAQ
				11/12/1986	92	N/A	TTAQ
HP-606 AKA DTA #6	336849	2505409	31.8	12/1/1941	220	80–90 110–120 140–150 170–180 200–210	TTAQ UCHRBU&LU MCHAQ

Table C4

Table C4. Construction, location, and contributing aquifer data for Hadnot Point Water Treatment Plant and Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, LCHAQ—Lower Castle Hayne aquifer, LCHCU—Lower Castle Hayne confining unit, local CU—local confining unit, MCHAQ—Middle Castle Hayne aquifer, MCHCU—Middle Castle Hayne confining unit, TTAQ—Tarawa Terrace aquifer, TTCU—Tarawa Terrace confining unit, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit, UCHRBU&LU—Upper Castle Hayne aquifer River Bend and Lower units; AKA, also known as; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screened interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
HP-607 (old) AKA DTA #7	337925	2502102	29.0	1942(?)	190	60–70 90–100 120–130 150–160 180–190	BBLCU, TTCU UCHRBU&LU MCHCU
HP-607(new)	352494	2496994	31	8/21/1984	200	115–135 163–175 190–200	UCHRBU&LU MCHAQ
HP-608 AKA DTA #8	337098	2499607	29.9	3/24/1942	161.5	62–82 92–102 122–132 152–162	TTAQ, TTCU UCHRBU&LU
HP-609 AKA DTA #9	334393	2506828	29.3	4/14/1942	150	65–80 100–110 130–150	BBLAQ, TTAQ
HP-610 AKA DTA #10	345268	2501654	27.9	4/20/1942	190	60–70 90–110 130–140 180–190	TTAQ UCHRBU&LU MCHAQ
HP-611 (old) AKA DTA #11	350816	2495437	31.0	6/27/1942 2/27/1985	161	61–71 91–101 121–136 156–161 61–73 88–109 129–141	TTAQ UCHRBU&LU MCHAQ
HP-611 (new) AKA Lyman Road #1	339383	2510267	40.0	4/1/1997	218	107–198	UCHRBU&LU Local CU MCHCU
HP-612 (old) AKA DTA #12	352428	2496995	31.8	6/22/1942	190	60–70 90–95 115–120 140–145 155–160 170–175 185–190	TTAQ UCHRBU&LU MCHAQ
HP-612 (new) AKA Lyman Road #2	338959	2511877	42.0	4/29/1997	210	120–200	UCHRBU&LU Local CU MCHCU
HP-613 AKA DTA #13	352946	2499350	21.2	5/15/1942	150	60–70 90–95 115–120 130–135 145–150	TTAQ UCHRBU&LU

Table C4. Construction, location, and contributing aquifer data for Hadnot Point Water Treatment Plant and Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, LCHAQ—Lower Castle Hayne aquifer, LCHCU—Lower Castle Hayne confining unit, local CU—local confining unit, MCHAQ—Middle Castle Hayne aquifer, MCHCU—Middle Castle Hayne confining unit, TTAQ—Tarawa Terrace aquifer, TTCU—Tarawa Terrace confining unit, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit, UCHRBU&LU—Upper Castle Hayne aquifer River Bend and Lower units; AKA, also known as; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screened interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
HP-614 (old) AKA DTA #14	353455	2494270	31.4	8/1/1942	166.6	58–68 89–99 118–128 147–167	UCHRBU&LU MCHAQ
HP-614 (new) AKA #4	353675	2512183	³ 39	12/20/1994	183	118–138 140–150 158–178	UGHRBU&LU Local CU
HP-615 AKA DTA #15	354285	2496367	30.7	7/2/1942	158	60–70 90–100 110–130 148–158	TTCU UCHRBU&LU Local CU
HP-616 AKA DTA #16	354772	2498638	33.3	8/3/1942	170	95–115 130–140 160–170	UCHRBU&LU MCHAQ
HP-617 (old)	352879	2501888	³ 32	1942 (?)	N/A	N/A	UCHRBU&LU (?)
HP-617 (new) ⁴ AKA #1	353622	2523411	³ 41	9/14/1994	265	205–260	MCHAQ
HP-618 (old) AKA USGS well HP-614A	353039	2504201	35.7	1942(?) 11/15/1986	N/A 38.6	N/A N/A	TTAQ (?) UCHRBU&LU (?) BBLAQ(?)
HP-618 (new) ⁴ AKA #2	352211	2517893	³ 30	9/26/1994	230	180–230	MCHAQ
HP-619 (old)	350899	2503845	29.9	1942(?)	N/A	N/A	TTAQ (?) UCHRBU&LU (?)
HP-619 (new) ⁴ AKA #3	352646	2515872	³ 39	11/1/1994	211	125–155 181–201	UCHRBU&LU Local CU MCHAQ
HP-620	353181	2506668	35.0	1942(?)	54	46–54	TTAQ (Karst)
HP-621 (old)	355383	2504816	40.8	10/21/1942	77	57–77	TTAQ
HP-621 (new) AKA #5	353846	2505434	³ 38	5/17/1995	180	120–140 150–170	UCHRBU&LU
HP-622	353257	2494310	31.1	5/19/1983	227	105–120 150–170 217–227	UCHRBU MCHAQ
HP-623	350823	2495593	29.8	5/25/1983	205	65–75 115–135 182–197	TTAQ UCHRBU&LU Local CU MCHAQ
HP-624 AKA Test Well E	333975	2502633	17.5	1951	150	50–60 80–100 120–130 135–145	BBLAQ, BBLCU TTAQ TTCU

Table C4

Table C4. Construction, location, and contributing aquifer data for Hadnot Point Water Treatment Plant and Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, LCHAQ—Lower Castle Hayne aquifer, LCHCU—Lower Castle Hayne confining unit, local CU—local confining unit, MCHAQ—Middle Castle Hayne aquifer, MCHCU—Middle Castle Hayne confining unit, TTAQ—Tarawa Terrace aquifer, TTCU—Tarawa Terrace confining unit, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit, UCHRBU&LU—Upper Castle Hayne aquifer River Bend and Lower units; AKA, also known as; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screened interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
HP-625 AKA Test Well B	332687	2505415	24.7	Before April 1953	205	78–93 104–114 132–147 190–200	BBLCU, TTAQ TTCU UCHRBU
HP-626 AKA Test Well C	332058	2508327	26.0	Before 1953	205	58–63 82–92 108–123 129–139 144–154	BBLAQ, BBLCU TTAQ TTCU (?)
HP-627 (old) AKA Test Well D	329529	2509747	30.7	Before 1953	163	65–75 92–102 117–122 133–158	BBLAQ, BBLCU TTAQ
HP-627 (new) AKA #6	354035	2508321	35	5/7/1995	175	105–135 145–165	UCHRBU&LU MCHCU
HP-628 (old) AKA Test Well A	326487	2511431	15.5	1951	160	54–59 64–74 94–104 114–134 150–155	BBLAQ, BBLCU TTAQ
HP-628 (new)	331932	2508385	20	10/2/1984	150	60–70 85–89 110–120 135–145	BBLAQ, TTAQ
HP-629 AKA Test Well F	323807	2512647	29.8	1951	169	60–80 95–100 116–126 149–164	BBLAQ, BBLCU TTAQ
HP-629 (new)	355226	2504808	41.2	3/8/1983	230	60–70 125–140 160–165	TTAQ UCHRBU&LU
HP-630	338021	2502304	29.3	1954 (?)	176	53–68 88–93 108–118 128–143 153–163	BBLCU, TTCU UCHRBU&LU Local CU
HP-631	339933	2506952	31	3/9/1954	225	61–76 86–91 142–147	BBLCU, TTAQ Local CU
HP-632	321532	2513376	36	2/14/1957	200	N/A	BBLAQ (?) TTAQ (?)

Table C4. Construction, location, and contributing aquifer data for Hadnot Point Water Treatment Plant and Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, LCHAQ—Lower Castle Hayne aquifer, LCHCU—Lower Castle Hayne confining unit, local CU—local confining unit, MCHAQ—Middle Castle Hayne aquifer, MCHCU—Middle Castle Hayne confining unit, TTAQ—Tarawa Terrace aquifer, TTCU—Tarawa Terrace confining unit, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit, UCHRBU&LU—Upper Castle Hayne aquifer River Bend and Lower units; AKA, also known as; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screened interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
HP-633	349702	2500647	25.6	1959	205	55–65 75–80 95–105 123–133 138–143 158–168 178–183 195–205	TTAQ UCHRBU&LU MCHAQ
HP-634	340948	2503179	30.8	10/13/1959	215	65–75 78–83 88–93 98–103 112–122 129–134 140–145 158–168	TTAQ, TTCU UCHRBU&LU Local CU
HP-635	343426	2503346	20.2	1959	210	65–75 93–108 122–127 136–146 152–157 172–177 187–192	TTAQ UCHRBU&LU MCHCU MCHAQ
HP-636	345819	2503608	28.8	10/22/1959	225	90–100 115–120 130–135 140–150 158–163 170–175 185–190 200–210	TTCU UCHRBU&LU MCHCU MCHAQ
HP-637	342990	2501856	33.1	1969	175	90–98 100–114 120–128 140–148 156–172	UCHRBU&LU MCHAQ
HP-638	333067	2502563	25.9	6/30/1969	196	106–114 126–134 150–158 162–170 176–184 188–196	TTAQ UCHRBU
HP-639 (old)	326404	2511456	17.0	1969 (?)	182	62–70 85–93 120–132 136–148 155–163 168–176	BBLAQ, TTAQ TTCU

Table C4

Table C4. Construction, location, and contributing aquifer data for Hadnot Point Water Treatment Plant and Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, LCHAQ—Lower Castle Hayne aquifer, LCHCU—Lower Castle Hayne confining unit, local CU—local confining unit, MCHAQ—Middle Castle Hayne aquifer, MCHCU—Middle Castle Hayne confining unit, TTAQ—Tarawa Terrace aquifer, TTCU—Tarawa Terrace confining unit, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit, UCHRBU&LU—Upper Castle Hayne aquifer River Bend and Lower units; AKA, also known as; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screened interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
HP-639 (new)	326190	2511579	18.7	1981	N/A	N/A	TTAQ (?) UCHRBU&LU (?)
HP-640	323749	2512653	29.5	1969	180	64–72 76–80 92–100 112–120 130–134 140–148 157–165 172–176	BBLAQ, BBLCU TTAQ
HP-641	353038	2504147	36.2	9/5/1971	178	108–118 128–150 158–168	TTCU UCHRBU&LU
HP-642	339034	2504141	32.5	9/13/1971	210	112–124 136–144 157–163 174–178 188–196	UCHRBU&LU Local CU MCHCU MCHAQ
HP-643 ⁴	356093	2494391	29.0	3/16/1971	270	88–98 135–150 260–265	UCHRBU&LU LCHAQ
HP-644 ⁴ AKA HB-644	356265	2495875	30.7	7/30/1971	255	85–100 235–250	UCHRBU LCHAQ
HP-645 ⁴ AKA HB-645	356438	2497358	27.4	8/11/1971	245	90–100 138–148 230–240	UCHRBU&LU MCHAQ
HP-646 ⁴ AKA HB-646	357770	2497948	29.5	6/23/1971	270	90–100 240–250 255–265	UCHRBU MCHAQ LCHCU (?)
HP-647 ⁴ AKA HB-647	356335	2499469	30.3	12/15/1970	200	105–115 138–143 175–190	UCHRBU MCHAQ
HP-648 ⁴ AKA HB-648	355229	2506806	33.3	8/19/1971	265	107–122 245–260	UCHRBU MCHAQ
HP-649 ⁴ AKA HB-649	354769	2508706	37.9	10/13/1971	284	126–136 159–164 205–210 232–237 274–279	UCHRBU&LU MCHAQ
HP-650 ⁴	354220	2510613	37.4	11/10/1971	179	128–133 140–150 155–165 169–174	UCHRBU&LU

Table C4. Construction, location, and contributing aquifer data for Hadnot Point Water Treatment Plant and Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, LCHAQ—Lower Castle Hayne aquifer, LCHCU—Lower Castle Hayne confining unit, local CU—local confining unit, MCHAQ—Middle Castle Hayne aquifer, MCHCU—Middle Castle Hayne confining unit, TTAQ—Tarawa Terrace aquifer, TTCU—Tarawa Terrace confining unit, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit, UCHRBU&LU—Upper Castle Hayne aquifer River Bend and Lower units; AKA, also known as; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screened interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
HP-651	348083	2503829	32.0	11/10/1971	199	125–135 140–155 189–194	UCHRBU&LU MCHAQ
HP-652	339894	2507078	32.9	1/18/1972	193	128–138 148–158 163–168 173–178	UCHRBU&LU
HP-653	351211	2503838	31.3	7/15/1978	250	105–140 155–185	UCHRBU&LU MCHAQ
HP-654	352912	2502123	34.2	5/16/1978		75–95 120–130 150–185	TTAQ UCHRBU MCHAQ
HP-655	332690	2505472	25.8	5/8/1981	147	N/A	TTAQ (?) UCHRBU (?)
HP-656 ⁶	331839	2500311	213	N/A	N/A	N/A	N/A
HP-660	339652	2499482	23.8	11/21/1983	187	94–97 108–140 175–187	TTCU UCHRBU&LU
HP-661	329695	2509656	29.0	3/29/1983	140	50–65 87–102 125–135	BBLAQ, TTAQ
HP-662	327419	2510912	³ 16	8/18/1983	230	121–131 134–146 185–195 215–220 225–230	TTAQ UCHRBU&LU
HP-663 AKA #14	352709	2510880	³ 36	5/5/1986	180	130–180	UCHRBU&LU Local CU
HP-698 ⁴ AKA #1	355871	2492416	³ 23	12/16/1985	124	84–124	UCHRBU&LU Local CU
HP-699 ⁴ AKA #2	355567	2490438	³ 23	2/3/1986	124	84–124	UCHRBU&LU Local CU
HP-700 ⁴ AKA #3	355278	2488526	³ 20	2/20/1986	130	100–130	UCHRBU&LU
HP-701 ⁴ AKA #4	353547	2487696	³ 21	3/3/1986	100	70–100	UCHRBU&LU
HP-703 ⁴ AKA #5	358143	2496446	³ 28	3/6/1985	146	85–100 121–136	UCHRBU&LU
HP-704 ⁴ AKA #6	359582	2495665	³ 26	3/8/1986	124	84–114	UCHRBU&LU Local CU
HP-705 ⁴ AKA #7	356209	2501256	³ 36	4/15/1986	160	120–160	UCHRBU&LU Local CU
HP-706 ⁴ AKA #8	355944	2502989	³ 40	4/21/1986	176	126–176	UCHRBU&LU Local CU

Table C4

Table C4. Construction, location, and contributing aquifer data for Hadnot Point Water Treatment Plant and Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, LCHAQ—Lower Castle Hayne aquifer, LCHCU—Lower Castle Hayne confining unit, local CU—local confining unit, MCHAQ—Middle Castle Hayne aquifer, MCHCU—Middle Castle Hayne confining unit, TTAQ—Tarawa Terrace aquifer, TTCU—Tarawa Terrace confining unit, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit, UCHRBU&LU—Upper Castle Hayne aquifer River Bend and Lower units; AKA, also known as; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screened interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
HP-707 ⁴ AKA #9	353837	2492298	³ 26	3/13/1986		80–140	UCHRBU&LU Local CU
HP-708 ⁴ AKA #10	353096	2514446	39.8	8/28/1985	226	126–176	UCHRBU&LU Local CU
HP-709 AKA #11	351280	2505651	³ 26	3/20/1986	170	110–140	UCHRBU&LU Local CU
HP-710 AKA #12	351493	2507772	³ 32	4/8/1986	170	110–140	UCHRBU&LU
HP-711 AKA #13	352140	2509201	³ 36	3/11/1986	150	110–150	TTCU UCHRBU
HP-5186	354532	2496971	³ 30	12/17/1985	175	95–112 125–137 155–169	UCHRBU&LU
LCH-4006	358664	2499516	³ 33	1956	N/A	N/A	UCHRBU (?)
LCH-4007	357219	2501452	40.6	12/15/1956	150	55–65 70–75 80–90 95–100 110–120 125–135 140–150	TTAQ TTCU UCHRBU&LU Local CU MCHCU
LCH-4009	358539	2499677	32.8	5/16/1983	140	90–114 116–134	UCHRBU Local CU
M-1 AKA LCH-1	358656	2499538	32.7	9/16/1941	125	25–40 60–70 75–95 115–125	BBLCU, TTAQ TTCU UCHRBU
M-2 AKA LCH-2	357175	2501411	41.2	3/30/1942	145.25	49–59 69–99 120–130 140–145	TTAQ, TTCU UCHRBU&LU Local CU
R(1950) ⁵	353534	2484804	³ 21	3/25/1942	100	50.42–60.42 80–100	UCHRBU
S190A ⁵	353872	2487628	³ 20	6/6/1988	135	82–122	UCHRBU Local CU

¹ See Plate 1 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

⁴ Well supplies Holcomb Boulevard Water Treatment Plant

⁵ Irrigation well

⁶ Well probably was never connected to water treatment plant

Table C5. Installation Restoration sites within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[VOC, volatile organic compound]

Site number ¹	Site name	Page number of site narrative	Associated contaminant data tables	Associated figure(s)
1	French Creek liquids disposal area	C10	C15–C17	C2
2	Former nursery day-care center (Building 712)	C12	C18–C20	C3
3	Old creosote site	C15	C21–C23	C4
6	Storage/disposal lots 201 and 203	C18	C24–C26	C5, C20–C24
9	Fire fighting training pit	C22	C27–C29	C6
10	Original base landfill	C23	C30–C32	C7
21	Transformer storage lot 140	C25	C33–C35	C8
22 ²	Industrial Area tank farm	C26	C36–C39	C9
24	Industrial Area fly ash dump	C28	C40–C42	C10
28	Industrial Area burn dump	C30	C43–C45	C11
30	Sneads Ferry Road fuel tank sludge disposal area	C32	C46–C48	C12
74	Mess hall grease pit disposal area	C34	C49–C51	C13
78	Hadnot Point Industrial Area	C36	C52–C54	C14–C18
80	Paradise Point golf maintenance area	C44	C55–C57	C19
82	VOC disposal area at Piney Green Road	C46	C58–C60	C5, C20–C24
84	Tank S781/Building 45 area	C52	C61–C65	C25
88	Building 25	C56	C66–C71	C26–C29
94	Building 1613	C61	C72–C76	C30
G ³	Proposed Camp Lejeune landfill	C62	C77–C79	C31

¹ See Figure C1 and Plate 1 for location

² Monitor wells merged with Site 78

³ Not an Installation Restoration site. Several monitor wells merged with Site 6

Table C6. Above-ground and underground storage tank sites within the Hadnot Point–Holcomb Boulevard study area subject to remedial investigation and co-located with Installation Restoration Program sites, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[AST, above ground storage tank; UST, underground storage tank]

Site name	Tank designation
Building 45 area	AST S-781
	UST S-941-1
	UST S-941-2
Building 1613 area	UST 1613-1
	UST 1613-2
	UST 1613-3
	UST 1613-4

Table C7

Table C7. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in Hadnot Point Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>Trans</i> -1,2-DCE	<i>Cis</i> -1,2-DCE	Total 1,2-DCE	VC
HP-585	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-595	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-596	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-602	7/6/1984	<1.9	<1.4	<1.3	7.8	NA	NA	<0.9
	11/30/1984	24	1,600	2.4J	630	NA	NA	18
	12/10/1984	<500	540	<500	380	NA	NA	<500
	12/13/1984	3.2	300	NA	110	NA	NA	NA
	12/14/1984	<50	340	<50	230	NA	NA	<50
	2/4/1985	1.5J	38	<10	74	NA	NA	<10
	11/12/1986	<4.1	2.2	<2.8	14	NA	NA	<4.9
	1/22/1991	<5.0	0.7J	<5.0	NA	NA	12	<10
HP-603	12/4/1984	<10	4.6J	<10	<10	NA	NA	<10
	12/12/1984	<10	<10	<10	<10	NA	NA	<10
	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	8/11/1988	<10	<10	<10	<10	NA	NA	<10
	6/26/1990	<5.0	<5.0	<5.0	NA	NA	NA	<10
	1/22/1991	<5.0	1.0J	<5.0	NA	NA	<5.0	<10
	9/20/1995	<0.50	3.0	<0.50	<0.50	2.4	NA	<0.50
HP-606	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-607 (new)	6/26/1990	<5.0	<5.0	<5.0	NA	NA	NA	<10
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-608	12/4/1984	<10	110	<10	5.4J	NA	NA	<10
	12/10/1984	<10	13	<10	2.4J	NA	NA	<10
	2/4/1985	<10	9.0	<10	<10	NA	NA	<10
	11/12/1986	<4.1	66	<2.8	8.5	NA	NA	<4.9
HP-609	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-610	2/4/1985	<10	<10	<10	<10	NA	NA	<10
	10/1/1992	<1.0	37	NA	NA	NA	NA	<2.0
HP-611 (old)	1/16/1985	<10	<10	<10	<10	NA	NA	<10
HP-611 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-612 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-613	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-614 (old)	1/16/1985	<10	<10	<10	<10	NA	NA	<10

Table C7. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in Hadnot Point Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>Trans</i> -1,2-DCE	<i>Cis</i> -1,2-DCE	Total 1,2-DCE	VC
HP-614 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-616	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/1/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/2/1996	<0.30	<0.10	NA	NA	NA	NA	<0.10
	7/24/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-620	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-621 (old)	1/16/1985	<10	<10	<10	<10	NA	NA	<10
HP-621 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-622	6/26/1990	<5.0	<5.0	<5.0	NA	NA	NA	<10
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-623	6/26/1990	<5.0	<5.0	<5.0	NA	NA	NA	<10
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-627 (old)	1/16/1985	<10	<10	<10	<10	NA	NA	<10
HP-627 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-628	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-629 (new)	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-632	1/16/1985	<10	<10	<10	<10	NA	NA	<10
HP-633	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-634	12/4/1984	<10	<10	<10	<10	NA	NA	<10
	12/10/1984	<10	<10	<10	2.3J	NA	NA	<10
	1/16/1985	10	1,300	<10	700	NA	NA	6.8
	11/12/1986	<4.1	<1.9	<2.8	2.9	NA	NA	<4.9
	1/22/1991	<5.0	<5.0	<5.0	NA	NA	1.0J	<10
HP-635	7/5/1984	<1.5	<1.2	<1.1	<1.0	NA	NA	<0.8
	1/16/1985	<10	<10	<10	<10	NA	NA	<10
HP-636	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	4/11/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0

Table C7

Table C7. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in Hadnot Point Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>Trans</i> -1,2-DCE	<i>Cis</i> -1,2-DCE	Total 1,2-DCE	VC
HP-637	12/4/1984	<10	<10	<10	<10	NA	NA	<10
	12/10/1984	<10	<10	<10	<10	NA	NA	<10
	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	1/22/1991	<5.0	0.90J	<5.0	NA	NA	<5.0	<10
	8/26/1992	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
HP-638	7/5/1984	<1.5	<1.2	<1.1	<1.2	NA	NA	<0.8
	1/16/1985	<10	<10	<10	<10	NA	NA	<10
HP-639 (old)	1/16/1985	<10	<10	<10	<10	NA	NA	<10
HP-640	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-641	1/16/1985	<10	<10	<10	<10	NA	NA	<10
HP-642	12/4/1984	<10	<10	<10	<10	NA	NA	<10
	12/10/1984	<10	<10	<10	<10	NA	NA	<10
	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	8/11/1988	<10	<10	<10	<10	NA	NA	<10
	1/22/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-651	1/16/1985	386	3,200	187	3,400	NA	NA	655
	2/4/1985	307	17,600	<200	8,070	NA	NA	179
	2/4/1985	400	18,900	<200	7,580	NA	NA	168
	11/12/1986	45	32	7.0	140	NA	NA	140
	1/22/1991	53	13	2.0J	NA	NA	75	70
HP-652	1/16/1985	<10	9.0	<10	<10	NA	NA	<10
	11/12/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/22/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-653	1/16/1985	<10	5.5	<10	<10	NA	NA	<10
	11/12/1986	<4.1	2.6	<2.8	<1.6	NA	NA	<4.9
	1/22/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
HP-654	2/4/1985	<10	<10	<10	<10	NA	NA	<10
	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-655	1/16/1985	<10	<10	<10	<10	NA	NA	<10
HP-660	12/4/1984	5.0J	210	<10	88	NA	NA	<10
	12/10/1984	4.4J	230	<10	99	NA	NA	<10
	1/16/1985	<10	26	<10	8.8	NA	NA	<10
	11/12/1986	<4.1	<1.9	<2.8	<1.6	NA	NA	<4.9
	1/22/1991	<5.0	1.0J	<5.0	NA	NA	2.0J	<10

Table C7. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in Hadnot Point Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>Trans</i> -1,2-DCE	<i>Cis</i> -1,2-DCE	Total 1,2-DCE	VC
HP-661	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-662	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-663	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-709	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-710	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-711	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-5186	6/26/1990	<5.0	<5.0	<5.0	NA	NA	NA	<10
	9/20/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
LCH-4007	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
LCH-4009	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50

¹ See Plate 1 for location

Data sources:

Camp Lejeune Water Documents #1093, #1094, #1652, #1654, #1796–#1800, #1818–#1823, #4546–#4557, #5512–#5515, #5518–#5520, #5595–#5631, #5637, #5638, #5639, #5640, #5646, #5647, #5648, #5649, #5650, #5651, #5652, #5656, #5670, #5671

CERCLA Administrative Record file #273, #318, #354, #388, #1501, #1516, #1731

Baker Environmental, Inc. 1995o

Bionomics Laboratory, Inc. 1995

Elizabeth A. Betz, U.S. Marine Corps Base Camp Lejeune, Drinking Water Well Monitoring, written communication, August 7, 1990 (CERCLA Administrative Record file #354)

Environmental Science and Engineering, Inc. 1985, 1992a,b

Geological Resources, Inc. 2002

Greenhorne and O'Mara 1994

J.R. Bailey, U.S. Marine Corps Base Camp Lejeune, Remedial Investigation/Feasibility Study (RI/FS) at the U.S. Marine Corps Base Camp Lejeune, North Carolina, written communication, June 5, 1987 (CERCLA Administrative Record file #318)

Table C8**Table C8.** Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in Hadnot Point water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
HP-585	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-595	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-596	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-602	7/6/1984	380	10	8.0	NA
	11/30/1984	120	5.4J	<10	NA
	12/10/1984	720	<500	<500	NA
	12/13/1984	<1.0	<1.0	<2.0	NA
	12/14/1984	230	12J	<50	NA
	2/4/1985	<10	<10	<10	NA
	11/12/1986	50	<6.0	<7.2	<12
	1/22/1991	17	<5.0	<5.0	<5.0
HP-603	12/4/1984	<10	<10	<10	NA
	12/10/1984	<10	<10	<10	NA
	1/16/1985	<10	<10	<10	NA
	8/11/1988	<10	<10	<10	<10
	6/26/1990	<5.0	<5.0	<5.0	<5.0
	1/22/1991	<5.0	<5.0	<5.0	<5.0
	9/20/1995	<0.50	<0.50	<0.50	<0.50
HP-606	1/16/1985	<10	<10	<10	NA
	9/20/1995	<0.50	<0.50	<0.50	<0.50
HP-607 (new)	6/26/1990	<5.0	<5.0	<5.0	<5.0
	9/20/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-608	12/4/1984	3.7J	<10	<10	NA
	12/10/1984	4.0J	<10	<10	NA
	2/4/1985	1.6	<10	<10	NA
	11/12/1986	<4.4	<6.0	<7.2	<12
HP-609	1/16/1985	<10	<10	<10	NA
	9/20/1995	<0.50	<0.50	<0.50	<0.50
HP-610	2/4/1985	<10	<10	<10	NA
	10/1/1992	NA	<1.0	NA	<1.0
HP-611 (old)	1/16/1985	<10	<10	<10	NA
HP-611 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-612 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-613	1/16/1985	<10	<10	<10	NA
	9/20/1995	<0.50	<0.50	<0.50	<0.50
HP-614 (old)	1/16/1985	<10	<10	<10	NA
HP-614 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50

Table C8. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in Hadnot Point water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
HP-616	1/16/1985	<10	<10	<10	NA
	8/1/1995	<0.10	<0.10	<0.10	NA
	11/1/1995	<0.10	<0.10	<0.10	NA
	2/1/1996	<0.10	<0.10	<0.10	NA
	5/2/1996	<0.10	<0.10	<0.10	NA
	7/24/1996	<0.50	<0.50	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	<0.50
	9/20/1995	<0.50	<0.50	<0.50	<0.50
HP-620	1/16/1985	<10	<10	<10	NA
	9/19/1995	<0.50	<0.50	<0.50	<0.50
HP-621 (old)	1/16/1985	<10	<10	<10	NA
HP-621 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-622	6/26/1990	<5.0	<5.0	<5.0	<5.0
	9/20/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-623	6/26/1990	<5.0	<5.0	<5.0	<5.0
	9/20/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-627 (old)	1/16/1985	<10	<10	<10	NA
HP-627 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-628	9/20/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-629 (new)	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-632	1/16/1985	<10	<10	<10	NA
HP-633	1/16/1985	<10	<10	<10	NA
	9/20/1995	<0.50	<0.50	<0.50	<0.50
HP-634	12/10/1984	<10	<10	<10	NA
	1/16/1985	<10	<10	<10	NA
	11/12/1986	<4.4	<6.0	<7.2	<12
	1/22/1991	<5.0	<5.0	<5.0	<5.0
HP-635	7/5/1984	<0.3	<0.5	<0.9	NA
	1/16/1985	<10	<10	<10	NA
HP-636	1/16/1985	<10	<10	<10	NA
	4/11/1994	<2.0	<2.0	<2.0	<2.0
HP-637	12/10/1984	<10	<10	<10	NA
	1/16/1985	<10	<10	<10	NA
	1/22/1991	<5.0	<5.0	<5.0	<5.0

Table C8

Table C8. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in Hadnot Point water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
HP-638	7/5/1984	<0.3	<0.5	<0.9	NA
	1/16/1985	<10	<10	<10	NA
HP-639 (old)	1/16/1985	<10	<10	<10	NA
HP-639 (new)	1/16/1985	<10	<10	<10	NA
HP-640	1/16/1985	<10	<10	<10	NA
	9/20/1995	<0.50	<0.50	<0.50	<0.50
HP-641	1/16/1985	<10	<10	<10	NA
HP-642	12/10/1984	<10	<10	<10	NA
	1/16/1985	<10	<10	<10	NA
	8/11/1988	<10	<10	<10	<10
	1/22/1991	<5.0	<5.0	<5.0	<5.0
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-651	1/16/1985	<10	<10	<10	NA
	2/7/1985	<10	<10	<10	NA
	2/7/1985	<10	<10	<10	NA
	11/12/1986	<4.4	<6.0	<7.2	<12
	1/22/1991	<5.0	0.9J	<0.5	<0.5
HP-652	1/16/1985	<10	<10	<10	NA
	11/12/1986	<1.0	<6.0	<7.2	<12
	1/22/1991	<5.0	<5.0	<5.0	<5.0
	9/20/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-653	1/16/1985	<10	<10	<10	NA
	11/12/1986	<4.4	<6.0	<7.2	<12
	1/22/1991	<5.0	<5.0	<5.0	<5.0
HP-654	2/4/1985	<10	<10	<10	NA
	9/19/1995	<0.50	<0.50	<0.50	<0.50
HP-655	1/16/1985	<10	<10	<10	NA
HP-660	12/4/1984	<10	<10	<10	NA
	12/10/1984	<10	<10	<10	NA
	1/16/1985	<10	<10	<10	NA
	11/12/1986	<4.4	<6.0	<7.2	<12
	1/22/1991	<5.0	<5.0	<5.0	<5.0
HP-661	9/20/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-662	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-663	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50

Table C8. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in Hadnot Point water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
HP-709	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-710	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-711	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-5186	6/26/1990	<5.0	<5.0	<5.0	<5.0
	9/20/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
LCH4007	1/16/1985	<10	<10	<10	NA
	9/19/1995	<0.50	<0.50	<0.50	<0.50
LCH4009	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50

¹ See Plate 1 for location

Data sources:

Camp Lejeune Water Documents #1093, #1094, #1652, #1654, #1796, #1800, #1818–#1823, #4546–#4557, #5512–#5515, #5518–#5520, #5595–#5631, #5637, #5638, #5639, #5640, #5646, #5647, #5648, #5649, #5650, #5651, #5652, #5656, #5670, #5671

Baker Environmental, Inc. 1996k, 1997f

Bionomics Laboratory, Inc. 1995

CERCLA Administrative Record files #354, #1706, #1731, #1773

Elizabeth A. Betz, U.S. Marine Corps Base Camp Lejeune, Drinking Water Well Monitoring, written communication, August 7, 1990 (CERCLA Administrative Record file #354)

Environmental Science and Engineering, Inc. 1985, 1992a,b

Geological Resources, Inc. 2002

Greenhorne and O'Mara 1994

J.R. Bailey, U.S. Marine Corps Base Camp Lejeune, Remedial Investigation/Feasibility Study (RI/FS) at the U.S. Marine Corps Base Camp Lejeune, North Carolina, written communication, June 5, 1987 (CERCLA Administrative Record file #318)

Table C9

Table C9. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>Trans</i> -1,2-DCE	<i>Cis</i> -1,2-DCE	Total 1,2-DCE	VC
HP-557	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-558	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-584	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-617 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-618 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-619 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-643	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-644	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-645	2/4/1985	<10	<10	<10	<10	NA	NA	<10
HP-646	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	2/1/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/2/1996	<0.10	<0.10	NA	NA	NA	NA	<0.10
	7/24/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-647	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/1/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/2/1996	<0.10	<0.10	NA	NA	NA	NA	<0.10
	7/24/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-648	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-649	2/4/1985	<10	<10	<10	<10	NA	NA	<10
HP-650	1/16/1985	<10	<10	<10	<10	NA	NA	<10
	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-698	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-699	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-700	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50

Table C9. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter						VC
		PCE	TCE	1,1-DCE	<i>Trans</i> -1,2-DCE	<i>Cis</i> -1,2-DCE	Total 1,2-DCE	
HP-701	6/26/1990	<5.0	<5.0	<5.0	NA	NA	NA	<10
	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-703	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-704	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-705	9/21/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-706	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
HP-707	6/26/1990	<5.0	<5.0	<5.0	NA	NA	NA	<10
HP-708	9/19/1995	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50	<0.50	NA	<0.50

¹ See Plate 1 for location

Data sources:

Camp Lejeune Water Documents CLW #1653, #2955, #2956, #4546–#4557, #5516, #5517, #5621–#5626

CERCLA Administrative Records files #354, #1706, #1731, #1773

Elizabeth.A. Betz, U.S. Marine Corps Base Camp Lejeune, Drinking Water Well Monitoring, written communication, August 7, 1990 (CERCLA Administrative Records file #354)

Baker Environmental, Inc. 1996l, 1997f

Bionomics Laboratory, Inc. 1995

Geological Resources, Inc. 2002

Table C10. Summary of analyses for benzene, toluene, ethylbenzene, and xylene in water samples collected in Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
HP-557	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-558	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-584	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-617 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-618 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-619 (new)	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-643	1/16/1985	<10	<10	<10	NA
	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-644	1/16/1985	<10	<10	<10	NA
	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-645	2/4/1985	<10	<10	<10	NA
	11/6/1986	20	7.5	ND	ND
	2/17/1987	290	15	38	36
HP-646	1/16/1985	<10	<10	<10	NA
	2/1/1996	<0.10	<0.20	<0.10	NA
	5/2/1996	<0.10	<0.10	<0.10	NA
	7/24/1996	<0.50	<0.50	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-647	1/16/1985	<10	<10	<10	NA
	8/1/1995	<0.10	<0.10	<0.10	NA
	11/1/1995	<0.10	<0.10	<0.10	NA
	2/1/1996	<0.10	<0.10	<0.10	NA
	5/2/1996	<0.10	<0.10	<0.10	NA
	7/24/1996	<0.50	<0.50	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-648	1/16/1985	<10	<10	<10	NA
	9/19/1995	<0.50	<0.50	<0.50	<0.50
HP-649	2/4/1985	<10	<10	<10	NA
HP-650	1/16/1985	<10	<10	<10	NA
	9/19/1995	<0.50	<0.50	<0.50	<0.50
HP-698	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-699	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50

Table C10. Summary of analyses for benzene, toluene, ethylbenzene, and xylene in water samples collected in Holcomb Boulevard Water Treatment Plant water-supply wells, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
HP-700	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-701	6/26/1990	<5.0	<5.0	<5.0	<5.0
	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-703	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-704	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-705	9/21/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50
HP-706	9/19/1995	0.60	<0.50	<0.50	<0.50
	1/13/1998	6.1	NA	NA	NA
HP-707	6/26/1990	<5.0	<5.0	<5.0	<5.0
HP-708	9/19/1995	<0.50	<0.50	<0.50	<0.50
	12/11/2001	<0.50	<0.50	<0.50	<0.50

¹ See Plate 1 for location

Data sources:

Camp Lejeune Water Documents CLW #1653, #2955, #2956, #4546–#4557, #5516, #5517, #5621–#5626

CERCLA Administrative Records files #354, #1706, #1731, #1773

Elizabeth A. Betz, U.S. Marine Corps Base Camp Lejeune, Drinking Water Well Monitoring, written communication, August 7, 1990

Baker Environmental, Inc. 1996l, 1997f

Bionomics Laboratory, Inc. 1995

Geological Resources, Inc. 2002

Table C11

Table C11. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected at the Hadnot Point Water Treatment Plant, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration]

Sample date	Concentration, in micrograms per liter						
	PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
5/27/1982 ¹	15	1,400	NA	NA	NA	NA	NA
7/27/1982 ²	100	NA	NA	NA	NA	NA	NA
7/27/1982 ³	<1.0	19	NA	NA	NA	NA	NA
7/27/1982 ⁴	<1.0	21	NA	NA	NA	NA	NA
12/4/1984 ⁴	3.9J	200	<10	83	NA	NA	NA
12/4/1984 ³	<10	46	<10	15	NA	NA	NA
12/12/1984 ⁴	<10	2.3J	<10	2.3J	NA	NA	<10
12/13/1984 ⁵	<10	<10	<10	<10	NA	NA	<10
12/14/1984 ³	<10	<10	<10	<10	NA	NA	<10
12/14/1984 ³	<10	<10	<10	<10	NA	NA	<10
12/15/1984 ³	<10	<10	<10	<10	NA	NA	<10
12/16/1984 ³	<10	<10	<10	<10	NA	NA	<10
12/17/1984 ³	<10	<10	<10	<10	NA	NA	<10
12/18/1984 ³	<10	<10	<10	<10	<10	<10	<10
12/19/1984 ⁵	<10	<10	<10	<10	<10	<10	<10
12/19/1984 ⁶	NA	1.2	NA	NA	NA	NA	NA
2/5/1985 ⁵	7.5J	429	<10	150	NA	NA	2.9J
6/18/1985 ⁵	<10	<10	<10	<10	NA	NA	<10
6/24/1985 ⁵	<10	<10	<10	<10	NA	NA	<10
7/1/1985 ⁵	<10	<10	<10	<10	NA	NA	<10
7/8/1985 ⁵	<10	<10	<10	<10	NA	NA	<10
7/31/1985 ⁵	<10	<10	<10	<10	NA	NA	<10
8/19/1985 ⁵	<10	<10	<10	<10	NA	NA	<10
9/11/1985 ⁵	<10	<10	<10	<10	NA	NA	<10
9/17/1985 ⁵	<10	<10	<10	<10	NA	NA	<10
9/24/1985 ⁵	<10	<10	<10	<10	NA	NA	<10
10/30/1985 ⁵	<10	<10	<10	<10	NA	NA	<10
3/3/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
3/11/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
4/16/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
4/21/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
5/5/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
5/12/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
5/19/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
5/27/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
6/2/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
6/9/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
6/16/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
6/25/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
7/1/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
7/9/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
7/14/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
7/21/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
7/28/1986 ⁴	<10	<10	<10	<10	NA	NA	<10

Table C11. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected at the Hadnot Point Water Treatment Plant, U.S. Marine Corps Base Camp Lejeune, North Carolina.
—Continued

[NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration]

Sample date	Concentration, in micrograms per liter						
	PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
8/4/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
12/16/1986 ⁴	<10	<10	<10	<10	NA	NA	<10
12/23/1987 ⁵	<0.5	0.20	<0.5	<0.5	NA	NA	<0.5
1/11/1988 ⁵	<10	<10	<10	<10	NA	NA	<10
3/2/1988 ⁵	NA	<0.5	<0.5	NA	NA	NA	<0.5
5/11/1988 ⁵	NA	<0.5	<0.5	NA	NA	NA	<0.5
8/11/1988 ⁵	<10	<10	<10	<10	NA	NA	<10
9/15/1988 ⁵	NA	<0.5	<0.5	NA	NA	NA	<0.5
5/9/1989 ⁵	NA	<0.5	<0.5	NA	NA	NA	<0.5
8/8/1989 ⁵	NA	<0.5	<0.5	NA	NA	NA	<0.5
11/6/1989	NA	0.9	<0.5	NA	NA	NA	<0.5
6/26/1990 ⁴	<5.0	<5.0	<5.0	NA	NA	NA	<10
6/26/1990 ³	<5.0	<5.0	<5.0	NA	NA	NA	<10
2/13/1991 ⁵	<0.5	<0.5	<0.5	<0.5	<0.5	NA	<0.5
5/20/1991 ⁵	NA	<0.5	<0.5	NA	NA	NA	<0.5
8/5/1991 ⁵	NA	<0.5	<0.5	NA	NA	NA	<0.5
11/4/1991 ⁵	NA	<0.5	<0.5	NA	NA	NA	<0.5

¹ Water sample collected at Building NH-1; data reported as unreliable

² Water sample collected at Building FC-530

³ Untreated water

⁴ Treated water

⁵ Treatment status unknown

⁶ Sample collected at Building FC-540

Data sources:

Camp Lejeune Water Documents #1796–#1800, #1819, #3300, #4550, #5111, #5138, #5140, #5155, #5182, #5466, #5482, #5525, #5635, #5636, #4550, #5653, #5657, #5660, #5661, #5662, #5663, #5666, #5668, #5842, #5853, #5859, #5885

Elizabeth A. Betz, U.S. Marine Corps Base Camp Lejeune, written communication, August 7, 1990 (CERCLA Administrative Record file #354)

JTC Environmental Consultants, Inc., 1986-1987

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #87w8817-1, written communication, February 8, 1988

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis, written communication, March 5, 1988 (date is analysis completion date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #88w1451-1, written communication, May 19, 1988

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #88w2901-1, written communication, September 28, 1988 (date is analysis completion date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis, written communication, May 9, 1989 (date is sample collection date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #89w7311-2, written communication, August 10, 1989 (date is analysis completion date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #89w8793, written communication, November 18, 1989

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #91w7876-1, written communication, February 22, 1991 (date is analysis report date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #91w9770-1, written communication, June 4, 1991 (date is analysis report date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #91w2148-1, written communication, September 19, 1991 (date is analysis report date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #91w3938-1, written communication, November 25, 1991 (date is analysis report date)

Table C12

Table C12. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected at the Hadnot Point Water Treatment Plant, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Sample date	Concentration, in micrograms per liter			
	Benzene	Toluene	Ethylbenzene	Total xylene
12/4/1984 ¹	<10	<10	<10	NA
12/4/1984 ²	<10	<10	<10	NA
12/12/1984 ¹	<10	<10	<10	NA
12/14/1984 ²	<10	<10	<10	NA
12/18/1984 ²	<10	<10	<10	NA
12/19/1984 ³	<10	<10	<10	NA
2/7/1985 ³	<10	<10	<10	NA
6/18/1985 ³	<10	<10	<10	NA
6/24/1985 ³	<10	<10	<10	NA
7/1/1985 ³	<10	<10	<10	NA
7/8/1985 ³	<10	<10	<10	NA
7/31/1985 ³	<10	<10	<10	NA
8/19/1985 ³	<10	<10	<10	NA
9/11/1985 ¹	<10	<10	<10	NA
9/17/1985 ³	<10	<10	<10	NA
9/24/1985 ³	<10	<10	<10	NA
10/30/1985 ³	<10	<10	<10	NA
11/19/1985 ³	2,500	100	NA	NA
12/10/1985 ³	38	10	NA	NA
12/18/1985 ³	1.0	NA	NA	NA
3/3/1986 ¹	<10	<10	<10	<10
3/11/1986 ¹	<10	<10	<10	<10
4/16/1986 ¹	<10	<10	<10	<10
4/21/1986 ¹	<10	<10	<10	<10
5/5/1986 ¹	<10	<10	<10	<10
5/12/1986 ¹	<10	<10	<10	<10
5/19/1986 ¹	<10	<10	<10	<10
5/27/1986 ¹	<10	<10	<10	<10
6/2/1986 ¹	<10	<10	<10	<10
6/9/1986 ¹	<10	<10	<10	<10
6/16/1986 ¹	<10	<10	<10	<10
6/25/1986 ¹	<10	<10	<10	<10
7/1/1986 ¹	<10	<10	<10	<10
7/9/1986 ¹	<10	<10	<10	<10
7/14/1986 ¹	<10	<10	<10	<10
7/21/1986 ¹	<10	<10	<10	<10
7/28/1986 ¹	<10	<10	<10	<10
8/4/1986 ¹	<10	<10	<10	<10
12/16/1986 ¹	<10	<10	<10	<10
12/23/1987 ³	<0.5	<0.5	<0.5	<0.5

Table C12. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected at the Hadnot Point Water Treatment Plant, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Sample date	Concentration, in micrograms per liter			
	Benzene	Toluene	Ethylbenzene	Total xylene
3/2/1988 ³	<0.5	NA	NA	NA
5/11/1988 ³	<0.5	NA	NA	NA
8/11/1988 ³	<10	<10	<10	<10
9/15/1988 ³	<0.5	NA	NA	NA
5/9/1989 ³	<0.5	NA	NA	NA
8/8/1989 ³	<0.5	NA	NA	NA
11/6/1989	<0.5	NA	NA	NA
6/26/1990 ¹	<5.0	<5.0	<5.0	<5.0
6/26/1990 ²	<5.0	<5.0	<5.0	<5.0
2/13/1991 ³	<0.5	<0.5	<0.5	<0.5
5/20/1991 ³	<0.5	NA	NA	NA
8/5/1991 ³	<0.5	NA	NA	0.73
11/4/1991 ³	<0.5	NA	NA	NA

¹Treated water

²Untreated water

³Treatment status unknown

Data sources:

Camp Lejeune Water Documents #1356, #1796–#1800, #1819, #5111, #5138, #5140, #5155, #5466, #5482, #5525, #5635, #5636, #5653, #5657, #5666, #5668, #5842, #5853, #5859, #5885

Elizabeth A. Betz, U.S. Marine Corps Base Camp Lejeune, written communication, August 7, 1990 (CERCLA Administrative Report file #357)

JTC Environmental Consultants, Inc., 1986–1987

Oxford Laboratories, Inc., Hadnot Point WTP water system analysis #87w8817-1, written communication, February 8, 1988

Oxford Laboratories, Inc., Hadnot Point WTP water system analysis, written communication, March 5, 1988 (date is analysis completion date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #88w1451-1, written communication, May 19, 1988

Oxford Laboratories, Inc., Hadnot Point WTP water system analysis #88w2901-1, written communication, September 28, 1988 (date is analysis completion date)

Oxford Laboratories, Inc., Hadnot Point WTP water system analysis, written communication, May 9, 1989 (date is sample completion date)

Oxford Laboratories, Inc., Hadnot Point WTP water system analysis #88w2901-1, written communication, August 10, 1989 (date is analysis completion date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #89w8783, written communication, November 18, 1989

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #91w7876, written communication, February 22, 1991 (date is analysis report date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #91w9770, written communication, June 4, 1991 (date is analysis report date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #91w2148-1, written communication, September 19, 1991 (date is analysis report date)

Oxford Laboratories, Inc., Hadnot Point WTP water sample analysis #91w3938-1, written communication, November 25, 1991 (date is analysis report date)

Table C13**Table C13.** Summary of analyses for trichloroethylene (TCE) and *trans*-1,2-dichloroethylene (*trans*-1,2-DCE) at locations within the Holcomb Boulevard Water Treatment Plant distribution network, January 29–February 7, 1985, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; WTP, water treatment plant]

Sample location	Date	Time	Concentration, in micrograms per liter	
			TCE	<i>trans</i> -1,2-DCE
2212 Paradise Point	1/29/1985	1315	1,041	NA
Building #670, reservoir		1405	8.2	NA
Building #670, upstream of reservoir		1420	340	NA
2212 Paradise Point, cold water	1/31/1985	1235	725	249
2212 Paradise Point, hot water		1235	613	201
Tank S-2323		1253	407	159
Hydrant near 2204 Paradise Point		1300	840	308
2600 Paradise Point		1306	891	332
Hydrant near Tank S830		1315	849	340
5677 Berkeley Manor		1330	981	369
5531 Berkeley Manor		1335	906	335
Tank SLCH 4004		1349	318	108
Building #670, top of reservoir		1400	27	7.6
Building #670, bottom of reservoir		1410	24	7.4
Building #670, middle of reservoir		1417	26	7.8
Building #20		1433	900	321
Building #5400, Berkeley Manor School		NA	1,148	407
Building #20	2/5/1985 ¹	NA	429	150
Building #20 finished water	2/7/1985 ²	NA	17	5.3
Building #20 filter effluent #1		NA	< 2.0	< 2.0
Building #20 filter effluent #2		NA	< 2.0	< 2.0
Building #20 influent		NA	< 2.0	< 2.0
Building #670 finished water reservoir		NA	< 2.0	< 2.0
Building #670 filter effluent #1		NA	< 2.0	< 2.0
Building #670 filter effluent #2		NA	< 2.0	< 2.0
Building #670 influent		NA	< 2.0	< 2.0
Hydrant near 2204 Paradise Point		NA	32	9.0
Building #5400, Berkeley Manor School		NA	135	45

¹ See Table C11 for complete analysis

² Holcomb Boulevard WTP was reactivated on February 4, 1985. Flushing of entire Holcomb Boulevard WTP and Hadnot Point WTP distribution systems was initiated (Camp Lejeune Water Document CLW #4547)

Data sources:

Camp Lejeune Water Documents #1119–#1123, #1434–#1439, #4514–#4516, #4546–#4548, #5369–#5371, #5525, #6590–6592

Table C14. Geohydrologic units and unit thickness within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[Units are listed shallowest to deepest and youngest to oldest; N/A, not available]

Geohydrologic unit	Thickness range, in feet
Brewster Boulevard aquifer system	
Brewster Boulevard upper aquifer	3 to 38
Brewster Boulevard upper confining unit	1 to 22
Brewster Boulevard lower aquifer	11 to 48
Brewster Boulevard lower confining unit	3 to 30
Tarawa Terrace aquifer	8 to 86
Tarawa Terrace confining unit	11 to 40
Castle Hayne aquifer system	
Upper Castle Hayne aquifer–River Bend unit	20 to 70
Local confining unit	8 to 22
Upper Castle Hayne aquifer–Lower unit	11 to 34
Middle Castle Hayne confining unit	12 to 30
Middle Castle Hayne aquifer	62 to 123
Lower Castle Hayne confining unit	18 to 38
Lower Castle Hayne aquifer	73 to 96
Beaufort confining unit	N/A

Table C15**Table C15.** Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 1, French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, UCHRBU—Upper Castle Hayne aquifer–River Bend unit; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
01-GW01	333927	2502925	13.3	1984	24.0	NA	BBUAQ(?), BBLAQ(?)
01-GW02	333936	2502570	15.7	1984	23.0	9.0–23.0	BBUAQ, BBUCU, BBLAQ
01-GW03	333627	2502391	19.7	1984	23.0	9.0–23.0	BBUAQ, BBUCU, BBLAQ
01-GW04	332890	2501996	22.9	1984	31.5	17.5–31.5	BBUCU(?), BBLAQ
01-GW05	332567	2501935	22.4	1984	31.0	17.0–31.0	BBUCU(?), BBLAQ
01-GW06	332970	2503007	25.1	1984	29.6	N/A	BBUCU(?), BBLAQ(?)
01-GW07	332234	2501551	20.2	4/12/1994	24.7	10.1–24.7	BBUAQ, BBUCU
01-GW08	332716	2501579	19.4	4/12/1994	24.4	10.1–24.4	BBUAQ, BBUCU, BBLAQ(?)
01-GW09	333130	2501612	14.9	4/10/1994	20.1	6.2–20.4	BBUAQ, BBUCU, BBLAQ
01-GW10	333867	2502095	15.3	4/11/1994	23.4	9.1–23.4	BBUAQ, BBUCU, BBLAQ
01-GW11	334163	2502775	10.4	4/10/1994	16.7	2.1–16.4	BBUAQ, BBUCU, BBLAQ
01-GW12	334048	2503302	13.8	4/10/1994	17.4	3.1–17.4	BBUAQ, BBUCU, BBLAQ
01-GW13	332899	2503901	29.5	4/9/1994	30.4	16.0–30.4	BBUAQ, BBUCU, BBLAQ
01-GW14	333385	2502858	³ 21	N/A	N/A	N/A	BBUAQ(?), BBLAQ(?)
01-GW15	333895	2502616	³ 15	N/A	N/A	N/A	BBUAQ(?), BBLAQ(?)
01-GW16	332660	2501994	20.7	4/13/1994	26.4	12.1–26.4	BBUAQ, BBUCU, BBLAQ
01-GW16DW	332642	2501970	20.8	5/4/1994	122.0	107.0–122.0	UCHRBU
01-GW17	333651	2502776	20.1	4/19/1994	24.4	10.0–24.4	BBUAQ, BBUCU, BBLAQ
01-GW17DW	333674	2502775	19.1	5/7/1994	105.0	105.0–120.0	UCHRBU
01-GW18	333538	2502665	³ 21	8/15/1995	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ

¹ See Figure C2 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

Data sources:

CERCLA Administrative Record files #1499, #1505, #1771, #2592

Baker Environmental, Inc. 1995k,m,p, 1997h

Table C16. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 1, French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
01-GW01	7/5/1984	<1.5	2.0	<1.0	1.0	NA	NA	<0.8
	11/18/1986	<4.1	4.6	<2.8	3.4	NA	NA	<4.9
	4/15/1993	<10	<10	<10	NA	NA	<10	<10
	4/22/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
	8/15/1995	NA	<10	NA	NA	NA	<10	NA
	7/28/1996	<10	<10	<10	NA	NA	<10	<10
	2/23/1997	<10	<10	<10	NA	NA	<10	<10
	8/8/1997	<10	<10	<10	NA	NA	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
01-GW02	7/5/1984	<1.5	1.3	<1.0	<1.0	NA	NA	<0.8
	11/18/1986	<4.1	3.2	<2.8	<1.6	NA	NA	<4.9
	4/15/1993	<10	<10	<10	NA	NA	<10	<10
	4/22/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
	8/15/1995	NA	<10	NA	NA	NA	<10	NA
	7/30/1996	<10	<10	<10	NA	NA	<10	<10
	2/23/1997	<10	<10	<10	NA	NA	<10	<10
	8/8/1997	<10	<10	<10	NA	NA	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
01-GW03	7/5/1984	<1.5	<1.2	<1.1	<1.0	NA	NA	<0.8
	11/19/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	4/15/1993	<10	<10	<10	NA	NA	<10	<10
	4/22/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
	8/15/1995	NA	<10	NA	NA	NA	<10	NA
	7/30/1996	<10	<10	<10	NA	NA	<10	<10
	2/23/1997	<10	<10	<10	NA	NA	<10	<10
	8/8/1997	<10	<10	<10	NA	NA	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
01-GW04	7/5/1984	<1.5	<1.1	<1.0	<1.0	NA	NA	<0.8
	11/18/1986	<4.1	<1.9	<2.8	<1.6	NA	NA	<4.9
	4/15/1993	<10	<10	<10	NA	NA	<10	<10
	4/24/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
	4/24/1994	NA	ND	NA	NA	NA	ND	ND
01-GW05	7/7/1984	6.8	5.2	1.1	2.4	NA	NA	<0.8
	11/18/1986	<4.1	2.2	2.8	2.4	NA	NA	<4.9

Table C16

Table C16. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 1, French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
01-GW06	7/5/1984	<1.7	<1.3	<1.2	<1.2	NA	NA	<0.9
	11/18/1986	<4.1	<1.9	<2.8	<1.6	NA	NA	<4.9
	4/15/1993	<10	<10	<10	NA	NA	<10	<10
	4/23/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
01-GW07	4/24/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
01-GW08	4/24/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
01-GW09	4/24/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
01-GW10	4/24/1994	<2.0	4.0	<2.0	NA	NA	10	2.0
	11/11/1994	NA	8.0J	2.0J	NA	NA	21	4.0J
	8/15/1995	NA	4.0J	NA	NA	NA	23	NA
	7/28/1996	<10	<10	<10	NA	NA	19	<10
	2/23/1997	<10	3.0J	<10	NA	NA	16	<10
	8/8/1997	<10	<10	<10	NA	NA	16	<10
	1/21/1998	<5.0	1.6J	<5.0	NA	NA	14	<10
	10/25/1998	<5.0	2.0J	<5.0	NA	NA	16	2.0J
	7/30/1999	<5.0	<5.0	<5.0	<5.0	12	12	1.0J
	10/23/1999	<5.0	12.0	<5.0	<5.0	18	18	<2.0
	1/12/2000	<5.0	<5.0	<5.0	<5.0	16	16	<2.0
	4/13/2000	<5.0	<5.0	<5.0	<5.0	12	12	<2.0
	7/15/2000	<5.0	<5.0	<5.0	<5.0	14	14	1.0J
	10/21/2000	<5.0	<5.0	<5.0	<5.0	11	11	<2.0
01-GW11	4/24/1994	<2.0	1.0J	<2.0	NA	NA	<2.0	<2.0
	11/12/1994	NA	ND	ND	NA	NA	ND	ND
	8/15/1995	NA	<10	NA	NA	NA	<10	NA
	7/28/1996	<10	<10	<10	NA	NA	<10	<10
	2/23/1997	<10	<10	<10	NA	NA	<10	<10
	8/8/1997	<10	<10	<10	NA	NA	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
01-GW12	4/24/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
	11/12/1994	NA	ND	ND	NA	NA	ND	ND
	8/15/1995	NA	<10	NA	NA	NA	<10	NA
	7/28/1996	<10	<10	<10	NA	NA	<10	<10
	2/23/1997	<10	<10	<10	NA	NA	<10	<10
	8/8/1997	<10	<10	<10	NA	NA	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10

Table C16. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 1, French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
01-GW13	4/23/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
01-GW14	4/24/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
01-GW15	4/23/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
01-GW16	4/24/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
01-GW16DW	5/9/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
01-GW17	4/24/1994	<2.0	27	<2.0	NA	NA	1.0J	<2.0
	11/16/1994	NA	18	ND	NA	NA	ND	ND
	8/15/1995	NA	<10	NA	NA	NA	<10	NA
	7/31/1996	<10	<10	<10	NA	NA	<10	<10
	2/24/1997	<10	3.0J	<10	NA	NA	<10	<10
	8/8/1997	<10	<10	<10	NA	NA	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	10/28/1998	<1.0	2.0	<1.0	NA	NA	<1.0	<1.0
	7/30/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/19/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/12/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/13/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/14/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
10/20/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
01-GW17DW	5/25/1994	<10	<10	<10	NA	NA	<10	<10
	8/15/1995	NA	<10	NA	NA	NA	<10	NA
	7/31/1996	<10	<10	<10	NA	NA	<10	<10
	2/24/1997	<10	<10	<10	NA	NA	<10	<10
	8/8/1997	<10	<10	<10	NA	NA	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
01-GW18	8/15/1995	NA	<10	NA	NA	NA	<10	NA

¹ See Figure C2 for location

Data sources:

CERCLA Administrative Record files #387, #388, #1499, #1501, #1749, #1771, #1772, #2017, #2592, #2602A, #2611A, #3310, #3414

Baker Environmental, Inc. 1995k,o,p, 1996m, 1997h,i, 1998n

Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 1998, 2000b,h

CH2M Hill, Inc. and Baker Environmental, Inc. 2001e

Environmental Science and Engineering, Inc. 1985, 1987

Table C17

Table C17. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 1, French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
01-GW01	7/5/1984	0.50	<0.50	NA	NA
	11/18/1986	<0.02	<6.0	<7.2	<12
	4/15/1993	<10	<10	<10	<10
	4/22/1994	<2.0	<2.0	<2.0	<2.0
	8/15/1995	NA	<10	<10	<10
	7/28/1996	<10	<10	<10	<10
	2/23/1997	<10	<10	<10	<10
	8/8/1997	<10	<10	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	0.76J
01-GW02	7/5/1984	<0.30	<0.50	NA	NA
	11/18/1986	<0.02	<6.0	<7.2	<12
	4/15/1993	<10	<10	<10	<10
	4/22/1994	<2.0	<2.0	<2.0	<2.0
	8/15/1995	NA	<10	<10	<10
	7/30/1996	<10	<10	<10	<10
	2/23/1997	<10	<10	<10	<10
	8/8/1997	<10	<10	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	<5.0
01-GW03	7/5/1984	<0.30	<0.60	NA	NA
	11/19/1986	<0.02	<6.0	<7.2	<12
	4/15/1993	<10	<10	<10	<10
	4/22/1994	<2.0	<2.0	<2.0	<2.0
	8/15/1995	NA	<10	<10	<10
	7/30/1996	<10	<10	<10	<10
	2/23/1997	<10	<10	<10	<10
	8/8/1997	<10	<10	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	<5.0
01-GW04	7/5/1984	<0.30	<0.50	NA	NA
	11/18/1986	<0.02	<6.0	<7.2	<12
	4/15/1993	<10	<10	<10	<10
	4/24/1994	<2.0	<2.0	<2.0	<2.0
01-GW05	7/7/1984	<0.30	<0.60	NA	NA
	11/18/1986	<0.02	<6.0	<7.2	<12

Table C17. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 1, French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
01-GW06	7/5/1984	<0.30	NA	NA	NA
	11/18/1986	<0.02	<6.0	<7.2	<12
	4/15/1993	<10	<10	<10	<10
	4/23/1994	<2.0	<2.0	<2.0	<2.0
01-GW07	4/24/1994	<2.0	<2.0	<2.0	<2.0
01-GW08	4/24/1994	<2.0	<2.0	<2.0	<2.0
01-GW10	4/24/1994	<2.0	<2.0	<2.0	<2.0
	11/11/1994	NA	NA	NA	ND
	8/15/1995	NA	<10	<10	<10
	7/28/1996	<10	<10	<10	<10
	2/23/1997	<10	<10	<10	<10
	8/8/1997	<10	<10	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	<5.0
	10/25/1998	<5.0	<5.0	<5.0	<5.0
	7/30/1999	<5.0	<5.0	<5.0	<5.0
	10/23/1999	<5.0	<5.0	<5.0	<5.0
	1/12/2000	<5.0	<5.0	<5.0	NA
	4/13/2000	<5.0	<5.0	<5.0	<5.0
	7/15/2000	<5.0	<5.0	<5.0	<5.0
	10/21/2000	<5.0	<5.0	<5.0	<5.0
01-GW11	4/24/1994	<2.0	<2.0	<2.0	<2.0
	11/12/1994	NA	NA	NA	ND
	8/15/1995	NA	<10	<10	<10
	7/28/1996	<10	<10	<10	<10
	2/23/1997	<10	<10	<10	<10
	8/8/1997	<10	<10	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	<5.0
01-GW12	4/24/1994	<2.0	<2.0	<2.0	3.0
	11/12/1994	NA	NA	NA	19
	8/15/1995	NA	4.0J	4.0J	150
	7/28/1996	<10	<10	<10	6.0J
	2/23/1997	<10	<10	<10	<10
	8/8/1997	<10	<10	<10	280
	1/21/1998	<5.0	<5.0	<5.0	<5.0

Table C17

Table C17. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 1, French Creek liquids disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
01-GW13	4/23/1994	<2.0	<2.0	<2.0	<2.0
01-GW14	4/24/1994	<2.0	<2.0	<2.0	<2.0
01-GW16	4/24/1994	<2.0	<2.0	<2.0	<2.0
01-GW16DW	5/9/1994	<2.0	<2.0	<2.0	<2.0
01-GW17	4/24/1994	<2.0	<2.0	<2.0	<2.0
	11/16/1994	NA	NA	NA	ND
	8/15/1995	NA	<10	<10	<10
	7/31/1996	<10	<10	<10	<10
	2/24/1997	<10	<10	<10	<10
	8/8/1997	<10	<10	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	<5.0
	10/28/1998	<1.0	<1.0	<1.0	<1.0
	7/30/1999	<5.0	<5.0	<5.0	<5.0
	10/19/1999	<5.0	<5.0	<5.0	<5.0
	1/12/2000	<5.0	<5.0	<5.0	NA
	4/13/2000	<5.0	<5.0	<5.0	<5.0
	7/14/2000	<5.0	<5.0	<5.0	<5.0
	10/20/2000	<5.0	<5.0	<5.0	<5.0
01-GW17DW	5/25/1994	<10	<10	<10	<10
	8/15/1995	NA	<10	<10	<10
	7/31/1996	<10	<10	<10	<10
	2/24/1997	<10	<10	<10	<10
	8/8/1997	<10	<10	<10	<10
	1/21/1998	<5.0	<5.0	<5.0	<5.0
01-GW18	8/15/1995	NA	<10	<10	<10

¹ See Figure C2 for location

Data sources:

CERCLA Administrative Record files #387, #388, #1499, #1501, #1749, #1771, #1772, #2017, #2592, #2602A, #2611A, #3310, #3414

Baker Environmental, Inc. 1995k,o,p, 1996m, 1997h,i, 1998n

Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 1998, 2000b,h

CH2M Hill, Inc. and Baker Environmental, Inc. 2001e

Environmental Science and Engineering, Inc. 1985, 1987

Table C18. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, TTAQ—Tarawa Terrace aquifer, UCHRBU—Upper Castle Hayne aquifer–River Bend unit; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
02-GW01	356697	2498264	32.3	6/ /1984	25.0	10.0–25.0	BBLAQ, BBLCU
02-GW02	356743	2498140	31.9	1986	25.0	10.0–25.0	BBLAQ, BBLCU
02-GW03	356251	2498534	33.0	1986	25.0	10.0–25.0	BBLAQ, BBLCU
02-GW03IW	356271	2498535	³ 33	2/21/1997	N/A	50.0–60.0	TTAQ
02-GW03DW	356275	2498552	33.1	4/23/1993	100.0	90.0–100.0	UCHRBU
02-GW04	356457	2498435	30.7	1986	25.0	10.0–25.0	BBLAQ, BBLCU
02-GW05	356421	2498248	31.8	1986	25.0	10.0–25.0	BBLAQ, BBLCU
02-GW06	356143	2498281	31.8	4/24/1993	12.5	2.6–12.6	BBLAQ
02-GW07	356413	2498604	31.6	4/22/1993	13.0	3.0–13.0	BBLAQ
02-GW08	356191	2498658	31.9	4/23/1993	12.5	2.5–12.5	BBLAQ
02-GW09	356966	2498000	32.6	4/24/1993	13.0	3.0–13.0	BBLAQ
02-GW10	356749	2498310	32.5	2/ /1994	13.5	3.5–13.5	BBLAQ
02-GW11	356570	2498318	33.9	2/ /1994	14.0	1.0–14.0	BBLAQ
02-GW12	356375	2498488	31.5	2/21/1997	23.0	3.0–23.0	BBLAQ, BBLCU

¹ See Figure C3 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

Data sources:

CERCLA Administrative Record files #387, #1273, #1706, #1774

Baker Environmental, Inc. 1994i, 1996l, 1997g

Environmental Science and Engineering, Inc. 1987

Table C19

Table C19. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
02-GW01	12/2/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	8/1/1995	<0.10	<0.10	<.30	<0.10	NA	NA	<0.10
	11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/1/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/3/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	7/23/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
02-GW02	12/2/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/3/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/1/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/3/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	7/23/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
10/1/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	
02-GW03	12/2/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/3/1987	<30	<30	<28	<16	NA	NA	<10
	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/1/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/3/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	7/23/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/25/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/23/1997	6.6J	<25	<25	NA	NA	<25	<50
	4/20/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	10/27/1998	<100	<100	<100	NA	NA	<100	<100
	4/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	10/23/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/21/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/4/2001	<100	<100	<100	<100	<100	<100	<40
4/20/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
7/30/2002	<5.0	3.0J	<5.0	<5.0	<5.0	<5.0	<2.0	
1/28/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
7/26/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/24/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	

Table C19. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
02-GW03D	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/2/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/2/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	7/25/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
02-GW03IW	4/25/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/23/1997	10	<5.0	<5.0	NA	NA	<5.0	<10
	4/20/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	10/25/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	10/23/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/21/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/4/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/20/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/28/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/26/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/24/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
02-GW04	12/2/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/3/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/1/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/3/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	7/23/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
02-GW05	12/2/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/3/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/1/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/3/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	7/23/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
4/25/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	

Table C19

Table C19. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
02-GW05— Continued	10/22/1997	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/20/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	10/25/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	10/23/1999	<5.0	4.0J	<5.0	<5.0	<5.0	<5.0	<2.0
	4/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/21/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/4/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/20/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/29/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/26/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/24/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
02-GW06	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/1/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/3/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	7/23/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
02-GW07	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/1/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/3/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	7/23/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/25/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/23/1997	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/20/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	10/25/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	10/23/1999	<5.0	7.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/21/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/4/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/20/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
1/29/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
7/26/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/24/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	

Table C19. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
02-GW08	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/1/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/3/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	7/24/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/25/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/23/1997	7.7	<5.0	<5.0	NA	NA	<5.0	<10
	4/20/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	10/27/1998	1.0J	<5.0	<5.0	NA	NA	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	10/23/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/21/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/4/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/20/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
1/28/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
7/26/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/24/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
02-GW09	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/2/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/3/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	7/25/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/3/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	02-GW10	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA
11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10	
2/2/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10	
5/3/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10	
7/25/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	
10/1/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	
4/25/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	
10/23/1997	3.5J	<5.0	<5.0	NA	NA	<5.0	<10	
4/20/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10	
10/25/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0	
4/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0	
10/23/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
4/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	

Table C19

Table C19. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
02-GW11	8/1/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	11/2/1995	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	2/2/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	5/2/1996	<0.10	<0.10	<0.30	<0.10	NA	NA	<0.10
	7/23/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/25/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/23/1997	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/20/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
10/25/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0	
02-GW12	4/25/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/23/1997	8.6	<5.0	<5.0	NA	NA	<5.0	<10
	4/20/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	10/25/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	10/23/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/21/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/4/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	4/20/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/28/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/26/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/24/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0

¹ See Figure C3 for location

Data sources:

CERCLA Administrative Record files #387, #1273, #1706, #1773, #1774, #1793, #2296, #2310, #2328, #2610A, #3288, #3289, #3290, #3293, #3294, #3419, #3462, #3466

Baker Environmental, Inc. 1994h, 1996l, 1997f,g, 1998l,m, 1999f,i

Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000a,f, 2001a, 2002a

Baker Environmental, Inc. and CH2M Hill, Inc. 2002i, 2003

CH2M Hill, Inc. and Baker Environmental, Inc. 2001c,d

Engineering and Environment, Inc. and Micahel Baker, Jr., Inc. 2004c

Environmental Science and Engineering, Inc. 1987

Michael Baker, Jr., Inc. and Engineering and Environment, Inc. 2003a

Table C20. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; E, concentration exceeds calibration range of gas chromatograph/mass spectrometer; D, sample dilution required; J, estimated concentration; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
02-GW01	12/2/1986	<1.0	<6.0	<7.2	NA
	8/1/1995	<0.10	<0.10	0.9	<0.60
	11/2/1995	<0.10	<0.10	1.1	<0.80
	2/1/1996	<0.10	<0.10	0.4	<0.10
	5/3/1996	<0.10	<0.10	0.7	<0.60
	7/23/1996	<0.50	<0.50	1.0	<0.50
	10/1/1996	<0.50	<0.50	<0.50	<0.50
02-GW02	12/2/1986	<1.0	<6.0	<7.2	NA
	3/3/1987	<1.0	<6.0	<7.2	NA
	8/1/1995	<0.10	<0.10	<0.10	<0.10
	11/2/1995	0.40	<0.10	<0.10	<0.10
	2/1/1996	<0.10	<0.10	<0.10	<0.10
	5/3/1996	<0.20	<0.10	<0.10	<0.10
	7/23/1996	<0.50	<0.50	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	<0.50
02-GW03	12/2/1986	<1.0	12	330	NA
	3/3/1987	<10	<60	510	NA
	5/20/1993	NA	7.0	93E	510E
	8/1/1995	0.30	3.4	<0.10	1,100
	11/2/1995	<0.10	2.1	60.2	672
	2/1/1996	<0.10	1.4	64.2	593
	5/3/1996	<0.10	1.3	60.7	564
	7/23/1996	<0.50	3.0	130	1,200
	10/1/1996	<0.50	6.0	220	2,100
	4/25/1997	<0.50	7.0	170	1,600
	10/23/1997	<25	7.9J	230	2,000
	4/20/1998	<5.0	5.5	140	1,500D
	10/27/1998	<100	<100	460	1,300
	4/17/1999	<5.0	7.0	130	840D
	10/23/1999	<5.0	5.0	140	1,100
	4/15/2000	<5.0	12	350D	3,000D
	10/21/2000	<5.0	7.0	730D	7,000D
	4/4/2001	<100	<100	360	3,200
	4/20/2002	<5.0	<5.0	69	380
	7/30/2002	<5.0	<5.0	13	140
1/28/2003	<5.0	0.80J	37	310	
7/26/2003	<5.0	1.0J	93B	880JD	
1/24/2004	<5.0	0.80J	67	560	

Table C20

Table C20. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; E, concentration exceeds calibration range of gas chromatograph/mass spectrometer; D, sample dilution required; J, estimated concentration; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
02-GW03DW	8/1/1995	<0.10	0.30	<0.10	<0.30
	11/2/1995	<0.10	<0.20	<0.10	0.10
	2/2/1996	<0.10	<0.20	<0.10	<0.10
	5/2/1996	<0.10	<0.40	<0.20	<0.60
	7/25/1996	<0.50	<0.50	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	<0.50
02-GW03IW	4/25/1997	<0.50	<0.50	<0.50	4.0
	10/23/1997	<5.0	<5.0	<5.0	1.6J
	4/20/1998	<5.0	<5.0	<5.0	3.0J
	10/25/1998	<5.0	<5.0	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<15
	10/23/1999	<5.0	<5.0	<5.0	<5.0
	4/15/2000	<5.0	<5.0	<5.0	<5.0
	10/21/2000	<5.0	<5.0	<5.0	<5.0
	4/4/2001	<5.0	<5.0	<5.0	<5.0
	4/20/2002	<5.0	<5.0	<5.0	<5.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0
	1/28/2003	<5.0	<5.0	<1.0	2.0J
	7/26/2003	<5.0	<5.0	<5.0	0.90J
1/24/2004	<5.0	<5.0	0.20J	0.60J	
02-GW04	12/2/1986	<1.0	<6.0	<7.2	NA
	3/3/1987	<1.0	<6.0	<7.2	NA
	8/1/1995	<0.10	<0.10	<0.10	<0.30
	11/2/1995	<0.10	<0.20	<0.10	<0.10
	2/1/1996	<0.10	<0.10	<0.10	<0.10
	5/3/1996	<0.10	<0.10	<0.10	<0.10
	7/23/1996	<0.50	<0.50	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	<0.50
02-GW05	12/2/1986	<1.0	<6.0	<7.2	NA
	3/3/1987	<1.0	<6.0	<7.2	NA
	8/1/1995	<0.10	<0.10	<0.10	<0.10
	11/2/1995	<0.10	<0.10	0.10	<0.10
	2/1/1996	<0.10	<0.20	<0.10	<0.10
	5/3/1996	<0.10	<0.10	<0.10	<0.10
	7/23/1996	<0.50	<0.50	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	<0.50
	4/25/1997	<0.50	<0.50	<0.50	<0.50
	10/22/1997	<5.0	<5.0	<5.0	<5.0

Table C20. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; E, concentration exceeds calibration range of gas chromatograph/mass spectrometer; D, sample dilution required; J, estimated concentration; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
02-GW05—	4/20/1998	<5.0	<5.0	<5.0	<5.0
Continued	10/25/1998	<5.0	<5.0	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<15
	10/23/1999	<5.0	<5.0	<5.0	<5.0
	4/15/2000	<5.0	<5.0	<5.0	<5.0
	10/21/2000	<5.0	<5.0	<5.0	<5.0
	4/4/2001	<5.0	<5.0	<5.0	<5.0
	4/20/2002	<5.0	<5.0	<5.0	<5.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0
	1/29/2003	<5.0	<5.0	<5.0	<5.0
	7/26/2003	<5.0	<5.0	<5.0	<5.0
	1/24/2004	<5.0	<5.0	<5.0	<15
02-GW06	8/1/1995	<0.10	<0.10	<0.10	<0.10
	11/2/1995	<0.10	<0.10	<0.10	<0.10
	2/1/1996	<0.10	<0.20	<0.10	<0.10
	5/3/1996	<0.10	<0.10	<0.10	<0.10
	7/23/1996	<0.50	<0.50	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	<0.50
02-GW07	8/1/1995	<0.10	<0.10	<0.10	0.50
	11/2/1995	<0.10	<0.20	<0.10	<0.10
	2/1/1996	<0.10	<0.20	<0.10	<0.10
	5/3/1996	<0.10	<0.10	<0.10	<0.10
	7/23/1996	<0.50	<0.50	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	<0.50
	4/25/1997	<0.50	<0.50	<0.50	2.0
	10/23/1997	<5.0	<5.0	<5.0	<5.0
	4/20/1998	<5.0	<5.0	<5.0	6.5
	10/25/1998	<5.0	<5.0	<5.0	24
	4/17/1999	<5.0	<5.0	<5.0	18
	10/23/1999	<5.0	<5.0	<5.0	10
	4/15/2000	<5.0	<5.0	<5.0	4.0J
	10/21/2000	<5.0	<5.0	<5.0	<5.0
	4/4/2001	<5.0	<5.0	<5.0	<5.0
	4/20/2002	<5.0	<5.0	<5.0	<5.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0
	1/29/2003	<5.0	<5.0	<1.0	<5.0
	7/26/2003	<5.0	<5.0	<5.0	<5.0
	1/24/2004	<5.0	<5.0	<5.0	<15

Table C20. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; E, concentration exceeds calibration range of gas chromatograph/mass spectrometer; D, sample dilution required; J, estimated concentration; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
02-GW08	8/1/1995	<0.10	<0.10	<0.10	<0.10
	11/2/1995	<0.10	<0.20	<0.10	0.30
	2/1/1996	<0.10	<0.10	<0.10	<0.10
	5/3/1996	<0.10	<0.10	0.40	<0.10
	7/24/1996	<0.50	<0.50	<0.50	<0.50
	10/2/1996	<0.50	<0.50	<0.50	<0.50
	4/25/1997	<0.50	0.60	<0.50	<0.50
	10/23/1997	<5.0	<5.0	<5.0	<5.0
	4/20/1998	<5.0	<5.0	<5.0	<5.0
	10/27/1998	<5.0	<5.0	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<15
	10/23/1999	<5.0	<5.0	<5.0	<5.0
	4/15/2000	<5.0	<5.0	<5.0	<5.0
	10/21/2000	<5.0	<5.0	<5.0	<5.0
	4/4/2001	<5.0	<5.0	<5.0	<5.0
	4/20/2002	<5.0	<5.0	<5.0	<5.0
	7/30/2002	<5.0	<5.0	7.0	15
1/28/2003	<5.0	<5.0	<5.0	9.0	
7/26/2003	<5.0	0.30J	<5.0	5.0	
1/24/2004	<5.0	0.20J	<5.0	<15	
02-GW09	8/1/1995	<0.10	<0.10	<0.10	<0.10
	11/2/1995	<0.10	<0.20	<0.10	<0.10
	2/2/1996	<0.10	<0.10	<0.10	<0.10
	5/3/1996	<0.10	<0.10	<0.10	<0.10
	7/25/1996	<0.50	<0.50	<0.50	<0.50
	10/3/1996	<0.50	<0.50	<0.50	<0.50
02-GW10	8/1/1995	<0.10	<0.10	<0.10	<0.10
	11/2/1995	<0.10	<0.30	<0.10	<0.10
	2/2/1996	<0.10	<0.10	<0.10	<0.10
	5/3/1996	<0.10	<0.10	<0.10	<0.10
	7/25/1996	<0.50	<0.50	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	<0.50
	4/25/1997	<0.50	0.50	<0.50	<0.50
	10/23/1997	<5.0	<5.0	<5.0	<5.0
	4/20/1998	<5.0	<5.0	<5.0	<5.0
	10/25/1998	<5.0	<5.0	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<15
	10/23/1999	<5.0	<5.0	<5.0	<5.0
4/15/2000	<5.0	<5.0	<5.0	<5.0	

Table C20. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 2, former nursery day-care center (Building 712), U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; E, concentration exceeds calibration range of gas chromatograph/mass spectrometer; D, sample dilution required; J, estimated concentration; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
02-GW11	8/1/1995	<0.10	<0.10	<0.10	<0.10
	11/2/1995	<0.10	<0.10	<0.10	<0.10
	2/2/1996	<0.10	<0.10	<0.10	<0.10
	5/2/1996	<0.10	<0.10	<0.10	<0.10
	7/23/1996	<0.50	<0.50	<0.50	<0.50
	10/1/1996	<0.50	<0.50	<0.50	<0.50
	4/25/1997	<0.50	0.50	<0.50	<0.50
	10/23/1997	<5.0	<5.0	<5.0	<5.0
	4/20/1998	<5.0	<5.0	<5.0	<5.0
	10/25/1998	<5.0	<5.0	<5.0	<5.0
02-GW12	4/25/1997	<0.50	<0.50	<0.50	15
	10/23/1997	<5.0	<5.0	3.2J	49
	4/20/1998	<5.0	<5.0	5.2	71
	10/25/1998	<5.0	<5.0	14	53
	4/17/1999	<5.0	<5.0	8.0	97
	10/23/1999	<5.0	<5.0	<5.0	3.0J
	4/15/2000	<5.0	<5.0	7.0	77
	10/21/2000	<5.0	<5.0	5.0	72
	4/4/2001	<5.0	<5.0	<5.0	<5.0
	4/20/2002	<5.0	<5.0	17	260
	7/30/2002	<5.0	<5.0	<5.0	14
	1/28/2003	<5.0	0.40J	12	180
	7/26/2003	<5.0	0.40J	3.0JB	69
1/24/2004	<5.0	<5.0	1.0J	21	

¹ See Figure C3 for location

Data sources:

CERCLA Administrative Record files #387, #1273, #1706, #1773, #1774, #1793, #2296, #2310, #2328, #2610, #3288, #3289, #3290, #3293, #3294, #3419, #3462, #3466

Baker Environmental, Inc. 1994h, 1996l, 1997f,g, 1998l,m, 1999i,f

Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000a,f, 2001a, 2002a

Baker Environmental, Inc. and CH2M Hill, Inc. 2002i, 2003

CH2M Hill, Inc. and Baker Environmental, Inc. 2001d

Engineering and Environment, Inc. and Michael Baker, Jr., Inc. 2004c

Environmental Science and Engineering, Inc. 1987

Michael Baker, Jr., Inc. and Engineering and Environment, Inc. 2003

Table C21

Table C21. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 3, old creosote site, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, TTAQ—Tarawa Terrace aquifer, UCHRBU&LU—Upper Castle Hayne aquifer—River Bend and Lower units]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
03-MW01	352563	2500000	31.4	6/12/1991	24.5	14.5–24.5	BBUCU, BBLAQ
03-MW02	352823	2500068	32.4	6/12/1991	16.8	6.8–16.8	BBUAQ, BBUCU
03-MW02DW	352801	2500072	32.2	6/28/1995	140.0	125–140	UCHRBU&LU
03-MW02IW	352813	2500068	32.5	1/16/1994	87.0	71.5–86.5	TTAQ
03-MW03	353411	2499911	29.4	6/11/1991	17.8	7.8–17.8	BBUAQ, BBUCU
03-MW04	352927	2499859	30.9	11/17/1994	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ
03-MW05	352639	2499963	31.8	11/19/1994	33.0	18.0–33.0	BBUCU, BBLAQ
03-MW06	352246	2500114	27.9	11/19/1994	22.0	7.0–22.0	BBUAQ, BBUCU, BBLAQ
03-MW07	352902	2500267	31.0	11/19/1994	14.0	4.0–14.0	BBUAQ
03-MW08	353356	2500064	30.1	11/20/1994	18.0	3.0–18.0	BBUAQ, BBUCU
03-MW09	353376	2500187	31.5	6/13/1995	19.0	4.0–19.0	BBUAQ, BBUCU
03-MW10	352883	2500432	32.4	6/14/1995	18.5	3.5–18.5	BBUAQ, BBUCU
03-MW11	352531	2499898	30.7	6/15/1995	31.5	16.5–31.5	BBUCU, BBLAQ
03-MW11IW	352544	2499897	30.3	6/29/1995	87.0	72.0–87.0	TTAQ
03-MW12	353025	2499695	27.7	6/13/1995	20.0	5.0–20.0	BBUAQ, BBUCU, BBLAQ
03-MW13	352933	2499347	20.8	6/14/1995	21.5	6.5–21.5	BBUAQ, BBUCU, BBLAQ

¹ See Figure C4 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

Data sources:

CERCLA Administrative Record files #206, #1699, #1700

Baker Environmental, Inc. 1996a,f,g

Table C22. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 3, old creosote site, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; R, analytical result is unreliable; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
03-MW01	7/13/1995	<10	<10	<10	NA	NA	<10	<10
	9/28/1995	<10	<10	<10	NA	NA	<10	<10
03-MW02	7/13/1995	<10	<10	<10	NA	NA	<10	<10
	9/28/1995	<10	<10	<10	NA	NA	<10	<10
	7/22/1998	8.5	<5.0	<5.0	NA	NA	<5.0	<10
	1/18/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/26/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/28/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/26/2003	<5.0R	<5.0R	<5.0R	<5.0R	<5.0R	<5.0R	<2.0R
1/24/2004	<5.0	<5.0	<10	<5.0	<5.0	NA	<2.0	
03-MW02DW	12/3/1994	<10	<10	<10	NA	NA	<10	<10
	7/13/1995	<10	<10	<10	NA	NA	<10	<10
	9/28/1995	<10	<10	<5.0	NA	NA	<5.0	<10
	7/20/1998	6.1	<5.0	<5.0	<5.0	NA	NA	<10
	1/18/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2000	<5.0	<5.0	<10	NA	<5.0	<10	<2.0
03-MW02IW	6/12/1995	<10	1.0J	1.0J	NA	NA	<10	<10
	9/29/1995	<10	<10	<10	NA	NA	<10	<10
	7/20/1998	9.3	<5.0	<5.0	NA	NA	<5.0	<10
	1/18/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/26/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0	<5.0	2.0J	<2.0
	1/28/2003	<5.0	<5.0	<5.0	<5.0	0.70J	<5.0	<2.0
	7/26/2003	<5.0R	<5.0R	<5.0R	<5.0R	<5.0R	<5.0R	<2.0R
1/24/2004	<5.0	<5.0	0.40J	<5.0	0.40J	NA	<2.0	

Table C22

Table C22. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 3, old creosote site, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; R, analytical result is unreliable; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
03-MW03	7/13/1995	<10	<10	<10	NA	NA	<10	<10
	9/29/1995	<10	<10	<10	NA	NA	<10	<10
03-MW04	7/11/1995	<10	1.0J	<10	NA	NA	<10	<10
	9/28/1995	<10	<10	<10	NA	NA	<10	<10
03-MW05	7/11/1995	<10	<10	<10	NA	NA	<10	<10
	9/28/1995	<10	<10	<10	NA	NA	<10	<10
03-MW06	7/12/1995	<10	<10	<10	NA	NA	<10	<10
	9/28/1995	<10	<10	<10	NA	NA	<10	<10
	7/19/1998	11	<10	<10	NA	NA	<10	<10
	1/18/1999	3.0J	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/26/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/28/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/26/2003	<5.0R	<5.0R	<5.0R	<5.0R	<5.0R	<5.0R	<2.0R
1/24/2004	<5.0	<5.0	<10	<5.0	<5.0	NA	<2.0	
03-MW07	12/1/1994	<10	<10	<10	NA	NA	<10	<10
	7/12/1995	<10	<10	<10	NA	NA	<10	<10
	9/28/1995	<10	<10	<10	NA	NA	<10	<10
	7/19/1998	10	<10	<10	NA	NA	<10	<10
03-MW08	12/1/1994	<10	<10	<10	NA	NA	<10	<10
	7/11/1995	<10	<10	<10	NA	NA	<10	<10
	9/29/1995	<10	<10	<10	NA	NA	<10	<10
03-MW09	7/13/1995	<10	<10	<10	NA	NA	<10	<10
	9/29/1995	<10	<10	<10	NA	NA	<10	<10
03-MW10	7/12/1995	<10	<10	<10	NA	NA	<10	<10
	9/29/1995	<10	<10	<10	NA	NA	<10	<10
03-MW11	7/12/1995	<10	<10	<10	NA	NA	<10	<10
	9/29/1995	<10	<10	<10	NA	NA	<10	<10
	7/22/1998	12	<10	<10	NA	NA	<10	<10
	1/18/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0

Table C22. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 3, old creosote site, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; R, analytical result is unreliable; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
03-MW11— Continued	7/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/26/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2002	<5.0	2.0J	<5.0	<5.0	<5.0	<5.0	<2.0
	1/28/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/26/2003	<5.0R	<5.0R	<5.0R	<5.0R	<5.0R	<5.0R	<2.0R
	1/24/2004	<5.0	<5.0	<10	<5.0	<5.0	NA	<2.0
03-MW11IW	7/12/1995	<10	<10	<10	NA	NA	<10	<10
	9/28/1995	<10	<10	<10	NA	NA	<10	<10
	7/22/1998	22	<10	<10	NA	NA	<10	<10
	1/18/1999	<5.0	11	<5.0	<5.0	<5.0	NA	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/28/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
03-MW12	7/12/1995	<10	1.0J	<10	NA	NA	<10	<10
	9/29/1995	<10	<10	<10	NA	NA	<10	<10
03-MW13	7/13/1995	<10	1.0J	<10	NA	NA	<10	<10
	9/29/1995	<10	<10	<10	NA	NA	<10	<10
	7/19/1998	11	<10	<10	NA	NA	<10	<10
	1/18/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0

¹ See Figure C4 for location

Data sources:

CERCLA Administrative Record files #1699, #1700, #2320, #2334, #2605A, #2613, #3325, #3326, #3328, #3329, #3331, #3332, #3471, #3522
 Baker Environmental, Inc. 1996f,g, 1998f, 1999g,h
 Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000c,i, 2003
 Baker Environmental, Inc. and CH2M Hill, Inc. 2001c, 2002j,k
 CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2001b
 Engineering and Environment, Inc. and Michael Baker Jr., Inc., 2004d
 Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2003b

Table C23

Table C23. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 3, old creosote site, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; R, analytical result is unreliable]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
03-MW01	7/13/1995	<10	<10	<10	<10
	9/28/1995	<10	<10	<10	<10
03-MW02	7/13/1995	<10	<10	<10	<10
	9/28/1995	3.0J	11	10	20
	7/22/1998	1.7J	8.7	13	31
	1/18/1999	<5.0	11	15.0	34
	8/1/1999	<5.0	12	16	32
	1/15/2000	<5.0	9.0	14	34
	7/30/2000	<5.0	<5.0	<5.0	4.0J
	1/13/2001	<5.0	<5.0	<5.0	<5.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0
	1/26/2002	<5.0	<5.0	<5.0	<5.0
	7/30/2002	<5.0	0.30J	<5.0	<5.0
	1/28/2003	0.20J	0.50J	<1.0	3.0J
	7/26/2003	<5.0R	0.5R	0.3R	<1.0R
1/24/2004	<5.0	0.20J	0.40J	0.50J	
03-MW02DW	12/3/1994	11J	4.0J	<10	7.0J
	7/13/1995	3.0J	15J	14J	32J
	9/28/1995	<10	<10	<10	<10
	7/20/1998	<5.0	<5.0	<5.0	<5.0
	1/18/1999	<5.0	<5.0	<5.0	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0
	7/30/2000	<5.0	<5.0	<5.0	<5.0
03-MW02IW	6/12/1995	<10	2.0J	<10	<10
	9/29/1995	<10	<10	<10	<10
	7/20/1998	<5.0	<5.0	<5.0	<5.0
	1/18/1999	<5.0	<5.0	<5.0	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0
	7/30/2000	<5.0	<5.0	<5.0	<5.0
	1/13/2001	<5.0	<5.0	<5.0	<5.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0
	1/26/2002	<5.0	<5.0	<5.0	<5.0
	7/30/2002	0.30J	<5.0	<5.0	<5.0
	1/28/2003	0.20J	<5.0	<5.0	<5.0
	7/26/2003	<5.0R	0.20R	<5.0R	<5.0R
1/24/2004	0.10J	<5.0	<5.0	<15	

Table C23. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 3, old creosote site, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; R, analytical result is unreliable]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
03-MW03	7/13/1995	<10	<10	<10	<10
	9/29/1995	<10	<10	<10	<10
03-MW04	7/11/1995	<10	<10	<10	<10
	9/28/1995	<10	<10	<10	<10
03-MW05	7/11/1995	<10	<10	<10	<10
	9/28/1995	<10	<10	<10	<10
03-MW06	7/12/1995	<10	<10	<10	<10
	9/28/1995	<10	8.0J	1.0J	<10
	7/19/1998	<5.0	<5.0	<5.0	<5.0
	1/18/1999	<5.0	<5.0	<5.0	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0
	7/15/2000	<5.0	<5.0	<5.0	<5.0
	1/13/2001	<5.0	<5.0	<5.0	<5.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0
	1/26/2002	<5.0	<5.0	<5.0	<5.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0
	1/28/2003	<5.0	<5.0	<1.0	2.0J
	7/26/2003	<5.0R	<5.0R	<5.0R	<5.0R
	1/24/2004	<5.0	<5.0	<5.0	<15R
03-MW07	12/1/1994	13J	5.0J	<10	6.0J
	7/12/1995	<10	<10	<10	<10
	9/28/1995	<10	<10	<10	<10
	7/19/1998	<5.0	<5.0	<5.0	<5.0
03-MW08	12/1/1994	40J	10J	<10	9.0J
	7/11/1995	<10	<10	<10	<10
	9/29/1995	<10	<10	<10	<10
03-MW09	7/13/1995	<10	<10	<10	<10
	9/29/1995	<10	<10	<10	<10
03-MW10	7/12/1995	<10	<10	<10	<10
	9/29/1995	<10	<10	<10	<10
03-MW11	7/12/1995	<10	<10	<10	<10
	9/29/1995	<10	<10	<10	<10
	7/22/1998	<5.0	<5.0	<5.0	<5.0
	1/18/1999	<5.0	<5.0	<5.0	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0
	7/15/2000	<5.0	<5.0	<5.0	<5.0

Table C23. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 3, old creosote site, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; R, analytical result is unreliable]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
03-MW11— Continued	1/13/2001	<5.0	<5.0	<5.0	<5.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0
	1/26/2002	<5.0	<5.0	<5.0	<5.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0
	1/28/2003	<5.0	<5.0	<5.0	<5.0
	7/26/2003	<5.0R	<5.0R	<5.0R	<5.0R
	1/24/2004	<5.0	<5.0	<5.0	<15R
03-MW111W	7/12/1995	<10	<10	<10	<10
	9/28/1995	<10	<10	<10	<10
	7/22/1998	<5.0	<5.0	<5.0	<5.0
	1/18/1999	<5.0	<5.0	<5.0	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0
	7/15/2000	<5.0	<5.0	<5.0	<5.0
03-MW12	7/12/1995	<10	<10	<10	<10
	9/29/1995	<10	<10	<10	<10
03-MW13	7/13/1995	<10	<10	<10	<10
	9/29/1995	<10	<10	<10	<10
	7/19/1998	<5.0	<5.0	<5.0	<5.0
	1/18/1999	<5.0	<5.0	<5.0	<5.0
	8/1/1999	<5.0	<5.0	<5.0	<5.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0
	7/15/2000	<5.0	<5.0	<5.0	<5.0

¹ See Figure C4 for location

Data sources:

CERCLA Administrative Record files #1700, #2320, #2334, #2605A, #2613, #3325, #3326
#3328, #3329, #3331, #3332, #3471, #3522

Baker Environmental, Inc. 1996g, 1998f, 1999g,h

Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000c,i, 2003

Baker Environmental, Inc. and CH2M Hill, Inc. 2001c, 2002j,k

CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2001b

Engineering and Environment, Inc. and Michael Baker Jr., Inc. 2004d

Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2003b

Table C24. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, MCHAQ—Middle Castle Hayne aquifer, TTAQ—Tarawa Terrace aquifer, TTCU—Tarawa Terrace confining unit, UCHRBU—Upper Castle Hayne aquifer–River Bend unit, UCHLU—Upper Castle Hayne aquifer–Lower unit; Topo, altitude estimated from topographic map; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
06-GW01D	348137	2503363	32.8 Topo ± 28 ft	10/8/1992	112.5	102.7–112.5	UCHRBU
06-GW01DA	348320	2503384	32.7 Topo ± 25 ft	4/13/1993	230	220.0–229.6	MCHAQ
06-GW01DB	348124	2503419	32.6	9/10/1993	262	242–262	MCHAQ
06-GW01S	348127	2503343	32.8	10/21/1986	25	5–25	BBUAQ, BBUCU, BBLAQ
06-GW02DW	347220	2503760	35.1	10/14/1992	119	108.1–118.1	TTCU(?), UCHRBU
06-GW02S	347214	2503751	36.2	10/21/1986	25	5–25	BBUAQ, BBUCU, BBLAQ
06-GW03	347739	2502666	29.1	10/24/1986	25	5–25	BBUAQ, BBUCU, BBLAQ
06-GW04	346437	2502778	25.5	10/22/1986	25	5–25	BBUAQ, BBUCU, BBLAQ
06-GW05	346233	2502452	23.3	10/22/1986	25	5–25	BBUAQ, BBUCU, BBLAQ
06-GW06	345360	2502750	24.4	10/23/1986	25	5–25	BBUAQ, BBUCU, BBLAQ
06-GW07DW	344336	2502082	17.4	10/6/1992	100.5	90.5–99.5	TTCU(?), UCHRBU
06-GW07S	344414	2502106	15.6	10/24/1986	25	5–25	BBUAQ, BBUCU, BBLAQ
06-GW08	344392	2502799	20.5	10/23/1986	25	5–25	BBUAQ, BBUCU, BBLAQ
06-GW09	343675	2502352	18.6 Topo ± 9 ft	9/25/1992	19.1	5.3–18.7	BBLAQ
06-GW10	343645	2502726	17.2 Topo ± 12 ft	9/23/1992	18	3.8–17.5	BBLAQ
06-GW11	347504	2502329	32.4	10/12/1992	18.7	4–18.4	BBUAQ
06-GW12	344362	2502314	17.0	9/24/1992	18	3.8–17.6	BBUAQ, BBUCU (?)
06-GW13	344366	2502549	18.1	9/24/1992	18	3.8–17.6	BBUAQ, BBUCU (?)
06-GW14	344589	2502928	25.5	10/6/1992	22	7.5–21.7	BBUAQ, BBUCU, BBLAQ
06-GW15D	347767	2503174	25.2	4/6/1993	155	145.0–154.5	UCHLU
06-GW15S	347784	2503211	26.1	10/10/1992	20	5.4–19.7	BBUAQ, BBUCU, BBLAQ
06-GW16	346496	2502546	24.9	10/11/1992	20	5.4–19.8	BBUAQ, BBUCU, BBLAQ
06-GW17	345001	2503233	25.7	9/25/1992	17.8	2.3–17.1	BBUAQ, BBUCU (?)
06-GW18	345731	2503377	26.5	9/25/1992	18.5	4.3–18.1	BBUAQ, BBUCU, BBLAQ
06-GW19	346289	2503020	25.2	10/6/1992	20	5.2–19.2	BBUAQ, BBUCU, BBLAQ
06-GW20	346519	2502192	22.5 Topo ± 27 ft	10/8/1992	19.7	4.8–19.4	BBUAQ, BBUCU, BBLAQ
06-GW21	346816	2501743	27.9	9/24/1992	22.5	7.5–22.0	BBUAQ, BBUCU, BBLAQ
06-GW22	345993	2502502	24.5	9/24/1992	19.5	4.7–19.0	BBUAQ, BBUCU, BBLAQ
06-GW23	346933	2502738	24.5	10/12/1992	23	8.4–22.7	BBUAQ, BBUCU, BBLAQ
06-GW24	344834	2504094	³ 37	N/A	N/A	N/A	N/A
06-GW25	346792	2503435	32.1	10/7/1992	23.5	8.9–23.2	BBUAQ, BBUCU, BBLAQ
06-GW26	347656	2501883	20.9 Topo ± 25 ft	10/9/1992	20	5.0–19.7	BBUAQ, BBUCU
06-GW27	348269	2502478	³ 26	N/A	N/A	N/A	N/A
06-GW27DA	348303	2502436	22.9	8/5/1993	236	226–236	MCHAQ

Table C24

Table C24. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, MCHAQ—Middle Castle Hayne aquifer, TTAQ—Tarawa Terrace aquifer, TTCU—Tarawa Terrace confining unit, UCHRBU—Upper Castle Hayne aquifer–River Bend unit, UCHLU—Upper Castle Hayne aquifer–Lower unit; Topo, altitude estimated from topographic map; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
06-GW27DW	348316	2502449	22.5	10/12/1992	110	100.1–109.1	UCHRBU
06-GW28DW	348677	2502849	28.7 Topo ± 25 ft	10/20/1992	114.5	104.7–113.6	UCHRBU
06-GW28S	348623	2502900	27.6	10/9/1992	32	17.5–37.5	BBUCU(?), BBLAQ
06-GW29	347697	2504429	³ 37	N/A	N/A	N/A	N/A
06-GW30DW	349532	2503730	9.9	3/4/1993	100	90.0–99.6	UCHRBU
06-GW30S	349553	2503728	9.9	10/10/1992	20	5.3–19.7	BBUAQ, BBUCU, BBLAQ
06-GW31	347162	2502005	27.8	4/1/1993	27	11.4–26.6	BBUAQ, BBUCU, BBLAQ
06-GW32	348840	2502690	19.6	4/1/1993	27	11.3–26.6	BBUAQ(?), BBUCU, BBLAQ
06-GW33	348457	2503167	20.0 Topo ± 15 ft	4/1/1993	22	6.2–21.6	BBUAQ(?), BBUCU, BBLAQ
06-GW34	348434	2503483	29.0	3/5/1993	35	19.3–34.6	BBUCU(?), BBLAQ
06-GW35D	349394	2501254	12.0	3/7/1993	105	95.0–104.6	UCHRBU
06-GW36D	350271	2502282	15.6 Topo ± 20 ft	4/1/1993	95	75.3–94.6	TTAQ, TTCU, UCHRBU
06-GW37DW	348037	2501703	14.0	4/1/1993	95	76.1–94.6	TTCU(?), UCHRBU
06-GW38D	347788	2502571	29.3	8/27/1993	275	255–275	MCHAQ
06-GW39D	347729	2501175	12.3	7/30/1993	203	190–200	MCHAQ
06-GW40DA	348584	2503544	25.8	12/4/1994	246	230–245	MCHAQ
06-GW40DW	348563	2503536	16.6	12/6/1994	116	100–115	UCHRBU
06-GW41	348576	2503291	24.1	11/16/1998	23	8–23	BBUCU(?), BBLAQ
06-GW42	348171	2503658	31.2	11/16/1998	32	17–32	BBUCU(?), BBLAQ
06-MW03D AKA G-MW03D	347811	2504501	34.0	4/1/1993	118	97.5–117.6	TTCU, UCHRBU
06-MW43DW AKA 06-GW43DW	347960	2501527	³ 10	5/15/2001	90	75–90	TTCU(?), UCHRBU

¹ See Figure C5 or C20 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

Data sources:

CERCLA Administrative Record files #125, #273, #345, #387, #1272, #1615, #2297, #2337, #2802, #3276

Baker Environmental, Inc. 1992b, 1993g,h,k,m, 1999d

Baker Environmental, Inc. and CH2M Hill, Inc. 2001a

Dewberry and Davis, 1992

Environmental Science and Engineering, Inc. 1987, 1992b

Table C25. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; D, sample dilution required; B, detected in blank; E, concentration exceeds calibration range of GC/MS instrument; R, analytical result is unreliable; AKA, also known as]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
06-GW01D	11/4/1992	630	58,000J	ND	NA	NA	5,600J	ND
	3/23/1993	920	50,000	51	NA	NA	26,000	800J
	10/27/1997	1,600	140,000D	<1,000	NA	NA	36,000D	520J
	1/15/1998	2,000J	170,000	<5,000	NA	NA	36,000	<10,000
	4/16/1998	1,300J	110,000	<2,500	NA	NA	30,000	<5,000
	7/23/1998	1,200JD	110,000BD	47	NA	NA	24,000D	320E
	1/16/1999	390	180,000	72	7,600	18,000	NA	520
	7/29/1999	980JD	59,000D	35	3,800D	10,000D	14,000D	330E
	1/18/2000	990EJ	49,000D	32	3,300D	8,800D	12,000D	310E
	7/30/2000	880D	43,000	<5.0	6,200	16,000D	23,000D	360D
	1/15/2001	790D	49,000D	20	4,300D	11,000D	16,000D	91
	7/18/2001	6,500	48,000	21	3200	8,000	11,000	110
	1/15/2002	210J	8,200	7.0	450	1,400	1,800	36
	7/31/2002	270R	6,800R	4.0J	280R	930R	1,200R	14
	1/24/2003	<280	6,400	4.0J	230J	630	870	13
	1/20/2004	370JD	12,000D	5.0J	210JD	520D	730JD	10J
7/26/2004	610DJ	20,000D	9.0	560DJ	1,700DJ	NA	31	
06-GW01DA	5/3/1993	2.9	160	<1.0	NA	NA	100	<1.0
	10/24/1997	<10	2.1J	<10	NA	NA	<10	<10
	1/15/1998	<5.0	0.93J	<5.0	NA	NA	<5.0	<10
	4/16/1998	<5.0	13	<5.0	NA	NA	2.3J	<10
	1/15/1999	<5.0	13	<5.0	<5.0	<5.0	NA	<5.0
	1/13/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/31/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/24/2003	<5.0	2.0J	<5.0	<5.0	<5.0	<5.0	<2.0
1/20/2004	<5.0	0.60J	<5.0	<5.0	<5.0	<10	<2.0	
06-GW01DB	10/24/1997	<10	<10	<10	NA	NA	<10	<10
	1/15/1998	1.0J	<5.0	<5.0	NA	NA	<5.0	<10
	4/16/1998	<5.0	7.5	<5.0	NA	NA	<5.0	<10
	1/15/1999	<5.0	7.0	<5.0	<5.0	<5.0	NA	<5.0
	1/19/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/31/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/24/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/20/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0

Table C25

Table C25. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; D, sample dilution required; B, detected in blank; E, concentration exceeds calibration range of GC/MS instrument; R, analytical result is unreliable; AKA, also known as]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
06-GW01S	11/19/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/21/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10.0
	10/24/1992	2.9	1.0	ND	NA	NA	ND	ND
	3/23/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
	10/24/1997	12	<10	<10	NA	NA	<10	<10
	1/15/1998	2.8J	<5.0	<5.0	NA	NA	<5.0	<10
	4/16/1998	<5.0	1.4J	<5.0	NA	NA	<5.0	<10
	7/24/1998	9.3	<5.0	<5.0	NA	NA	<5.0	<10
	1/15/1999	6.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/28/1999	2.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
1/21/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/20/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
7/26/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0	
06-GW02DW	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10.0
	11/3/1992	1.4	ND	ND	NA	NA	ND	ND
	3/21/1993	<1.0	<4.0	<1.0	NA	NA	<1.0	<1.0
	10/27/1997	<10	<10	<10	NA	NA	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/18/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
06-GW02S	11/20/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/21/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/19/1991	<5.0	<5.0	<5.0	NA	NA	NA	<10.0
	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10.0
	3/21/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW03	11/20/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/22/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/19/1991	<5.0	<5.0	<5.0	NA	NA	NA	<10.0
	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10.0
	10/22/1992	0.9J	ND	ND	NA	NA	ND	ND
	3/22/1993	<1.0	<14	<1.0	NA	NA	<1.0	<1.0
	10/25/1997	<10	<10	<10	NA	NA	1.5J	<10
	1/15/1998	1.3J	<5.0	<5.0	NA	NA	4.6J	<10
	4/17/1998	<5.0	0.76J	<5.0	NA	NA	<5.0	<10
	7/24/1998	7.3	1.1J	<5.0	NA	NA	<5.0	<10

Table C25. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; D, sample dilution required; B, detected in blank; E, concentration exceeds calibration range of GC/MS instrument; R, analytical result is unreliable; AKA, also known as]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
06-GW03— Continued	1/16/1999	<5.0	< 5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/29/1999	<5.0	<5.0	<5.0	<5.0	3.0J	3.0J	<2.0
	1/13/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/12/2000	<10	<10	<10	<10	<10	<10	<4.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/21/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
	7/28/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0
06-GW04	11/19/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/21/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/19/1991	<5.0	<5.0	<5.0	NA	NA	NA	<10.0
	10/21/1992	ND	ND	ND	NA	NA	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW05	11/19/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/21/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/19/1991	<5.0	<5.0	<5.0	NA	NA	NA	<10.0
	3/21/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW06	11/19/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/22/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/19/1991	<5.0	<5.0	<5.0	NA	NA	NA	<10.0
	3/20/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW07DW	11/4/1992	ND	1.2	0.6J	NA	NA	ND	ND
	3/19/1993	<1.0	2.1	<1.0	NA	NA	<1.0	<1.0
06-GW07S	11/20/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/22/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/19/1991	<5.0	<5.0	<5.0	NA	NA	NA	<10.0
	3/19/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW08	11/20/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/22/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/19/1991	<5.0	<5.0	<5.0	NA	NA	NA	<10.0
	3/20/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW09	3/19/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW10	3/20/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW11	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	3/21/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
	1/21/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
	7/28/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0

Table C25

Table C25. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; D, sample dilution required; B, detected in blank; E, concentration exceeds calibration range of GC/MS instrument; R, analytical result is unreliable; AKA, also known as]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
06-GW12	3/20/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW13	10/20/1992	ND	ND	ND	NA	NA	ND	ND
	3/20/1993	<1.0	1.2	<1.0	NA	NA	<1.0	<1.0
06-GW14	10/22/1992	ND	ND	ND	NA	NA	ND	ND
	3/20/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW15D	5/3/1993	1.0	34	<1.0	NA	NA	9.1	<1.0
	7/26/1997	<10	<10	<10	NA	NA	<10	<10
	10/29/1997	<10	<10	<10	NA	NA	<10	<10
	1/19/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/18/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/17/1999	<5.0	6.0	<5.0	<5.0	<5.0	NA	<5.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	8/1/2002	<5.0	0.8J	<5.0	<5.0	<5.0	<5.0	<2.0
	1/24/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
1/20/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
06-GW15S	10/23/1992	ND	1.9	ND	NA	NA	6.4	ND
	3/21/1993	<1.0	8.0	<1.0	NA	NA	6.4	<1.0
06-GW16	10/21/1992	ND	ND	ND	NA	NA	ND	ND
	3/21/1993	1.2	<1.2	<1.0	NA	NA	<1.0	<1.0
	7/27/1997	<10	<10	<10	NA	NA	<10	<10
	10/23/1997	<500	<500	<500	NA	NA	<500	<500
	1/19/1998	<100	<100	<100	NA	NA	<100	<200
	1/15/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/29/1999	<5.0	15B	<5.0	<5.0	<5.0	<5.0	<2.0
	1/17/2000	<5.0	4.0J	<5.0	3.0J	3.0J	6.0	<2.0
	7/12/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0	<5.0	3.0J	<2.0
	7/29/2002	<5.0	<5.0	<5.0	3.0J	<5.0	3.0J	<2.0
	1/21/2003	<5.0	0.80J	<5.0	17	16	33.0	2.0J
1/20/2004	4.0J	17.0	<5.0	1.0J	1.0J	2.0J	<2.0	
7/28/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0	
06-GW17	10/22/1992	ND	ND	ND	NA	NA	ND	ND
	3/20/1993	2.6	<1.0	<1.0	NA	NA	<1.0	<1.0
	7/27/1997	<10	<10	<10	NA	NA	<10	<10
	10/26/1997	<10	<10	<10	NA	NA	<10	<10

Table C25. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; D, sample dilution required; B, detected in blank; E, concentration exceeds calibration range of GC/MS instrument; R, analytical result is unreliable; AKA, also known as]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
06-GW17— Continued	1/17/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/17/1998	<5.0	2.3J	<5.0	NA	NA	<5.0	<10
06-GW18	3/20/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW19	3/20/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW20	3/21/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW21	10/22/1992	1.1	0.5J	ND	NA	NA	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
	7/27/1997	<10	<10	<10	NA	NA	<10	<10
	10/26/1997	<10	<10	<10	NA	NA	<10	<10
	1/18/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/18/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
06-GW22	10/22/1992	1.2	ND	ND	NA	NA	ND	ND
	3/22/1993	1.4	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW23	10/22/1992	ND	0.6J	ND	NA	NA	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/29/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
	7/28/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0
06-GW25	10/23/1992	ND	ND	ND	NA	NA	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW26	10/23/1992	ND	ND	ND	NA	NA	ND	ND
	3/22/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
06-GW27DA	7/23/1997	<10	<10	<10	NA	NA	<10	<10
	10/29/1997	<10	<10	<10	NA	NA	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/15/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/16/1999	<5.0	14	NA	<5.0	<5.0	NA	<5.0
	1/13/2000	<5.0	6.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/31/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/23/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
1/22/2004	<5.0	0.4J	<5.0	<5.0	<5.0	<10	<2.0	
06-GW27DW	11/3/1992	ND	18,000	ND	NA	NA	5,800	ND
	3/23/1993	18	22,000	55	NA	NA	30,000	250J
	7/22/1997	<10	3,400	11	NA	NA	4,800	110
	10/29/1997	<500	2,900	<500	NA	NA	4,300	84J

Table C25

Table C25. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; D, sample dilution required; B, detected in blank; E, concentration exceeds calibration range of GC/MS instrument; R, analytical result is unreliable; AKA, also known as]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
06-GW27DW— Continued	1/18/1998	<100	3,500	<100	NA	NA	4,400	<200
	4/16/1998	<5.0	3,400D	8.4	NA	NA	4,400D	97
	7/24/1998	17J	3,000	<120	NA	NA	3,100	74J
	1/16/1999	<5.0	2,100	4.0J	600	1,800	NA	43
	7/29/1999	<5.0	1,100D	<5.0	200D	710D	920D	22
	1/13/2000	<5.0	1,900D	4.0J	600D	1,400D	1,900D	32
	7/30/2000	<5.0	790D	<5.0	200	480D	660D	<2.0
	1/14/2001	<25	530	<25	35	110	140	<10
	7/18/2001	<5.0	390	<5.0	26	79	100	3.0
	1/13/2002	<5.0	110	<5.0	3.0J	16	19	1.0J
	7/30/2002	<5.0	100	<5.0	2.0J	14J	16	<2.0
	1/23/2003	<5.0	96	<5.0	<5.0	16	16	0.60J
	1/22/2004	0.60J	86	28	12	52	63	2.0J
	7/26/2004	0.40J	54	21	9.0	41	NA	1.0J
06-GW28DW	11/3/1992	ND	3,600	ND	NA	NA	500	ND
	3/23/1993	42	9,100	12	NA	NA	5,800	100J
	7/25/1997	<250	1,100	<250	NA	NA	550	<250
	10/28/1997	140J	9,600D	<500	NA	NA	3,500D	75J
	1/16/1998	49J	4,100	<120	NA	NA	1,400	<250
	4/18/1998	15J	1,200	<50	NA	NA	440	<100
	7/24/1998	50J	3,300	<120	NA	NA	1,200	<250
	1/17/1999	51	4,200	12	450J	1,300	NA	58
	7/29/1999	200JD	5,200D	20	1,200D	3,600D	4,900D	170D
	1/19/2000	180	26,000D	45	3,200D	8,800D	12,000D	370E
	7/30/2000	12	1,400D	3.0J	170	430D	580D	<2.0
	1/14/2001	370D	22,000D	16	1,900D	4,800D	6,800D	86
	7/18/2001	690	19,000	11	NA	6,000	NA	66
	1/13/2002	480	8,600	11	1,200	2,700	3,900	93
	8/1/2002	240	2,300	7.0J	260	830	1,100	28J
1/24/2003	650B	13,000	<250	1,300	3,400	4,700	81J	
1/22/2004	1,100D	17,000D	37	2,400D	6,100D	8,400D	220JD	
7/26/2004	1,200D	12,000D	4.0J	1,700D	4,600D	NA	150	
06-GW28S	10/23/1992	26	120	ND	NA	NA	16	ND
	3/18/1993	1.0	4.0	<1.0	NA	NA	1.8J	<1.0
	7/25/1997	7.0J	22.0	<10	NA	NA	<10	<10
	10/26/1997	37	49	<10	NA	NA	15	<10
	1/16/1998	24	39	<5.0	NA	NA	12	<10
	4/18/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/24/1998	7.2	3.8J	<5.0	NA	NA	<5.0	<10
	1/15/1999	68	230	<5.0	18	55	NA	<5.0

Table C25. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; D, sample dilution required; B, detected in blank; E, concentration exceeds calibration range of GC/MS instrument; R, analytical result is unreliable; AKA, also known as]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
06-GW28S— Continued	7/29/1999	4.0J	8.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/19/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/10/2001	25	45	<5.0	<5.0	12	12	<2.0
	7/10/2001	51J	110J	<5.0	8.0	28	36	<2.0
	1/13/2002	5.0J	14	<5.0	<5.0	3.0J	3.0J	<2.0
	7/29/2002	87	110	<5.0	15.0	49	64	<2.0
	1/24/2003	88	100	<5.0	16.0	44	61	<2.0
	1/22/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
	7/26/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0
06-GW30DW	3/23/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
	7/24/1997	<10	<10	<10	NA	NA	<10	<10
	10/25/1997	<10	<10	<10	NA	NA	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/18/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
06-GW30S	10/23/1992	ND	ND	ND	NA	NA	ND	ND
	3/22/1993	1.1	<1.0	<1.0	NA	NA	<1.0	<1.0
	7/24/1997	<10	<10	<10	NA	NA	<10	<10
	10/25/1997	3.4J	<10	<10	NA	NA	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/18/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/25/1998	3.3J	0.98J	<5.0	NA	NA	<5.0	<10
	1/16/1999	<5.0	150	<5.0	8.0	10	NA	<5.0
	7/28/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
1/21/2003	6.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/22/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
7/28/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0	
06-GW31	3/6/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/21/2003	15.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/21/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
7/28/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0	

Table C25

Table C25. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; D, sample dilution required; B, detected in blank; E, concentration exceeds calibration range of GC/MS instrument; R, analytical result is unreliable; AKA, also known as]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
06-GW32	3/18/1993	74	1,500	<1.0	NA	NA	2,200	8.6J
	7/27/1997	<10	2,800	<10	NA	NA	1,500	<10
	10/26/1997	33J	<50	<50	NA	NA	320	<50
	1/16/1998	2.1J	26	<5.0	NA	NA	10	<10
	4/16/1998	<5.0	1.3J	<5.0	NA	NA	<5.0	<10
	7/24/1998	11	15	<5.0	NA	NA	6	<10
	1/15/1999	10	210	<5.0	29	82	NA	<5.0
	7/29/1999	<5.0	44	<5.0	4.0J	17	21	<2.0
	1/16/2000	<5.0	84	<5.0	10	35	44	<2.0
	7/11/2000	<5.0	100	<5.0	12	38	50	<2.0
	1/10/2001	<5.0	39	<5.0	5.0J	17	22	<2.0
	7/10/2001	10	1,000	<5.0	94	380	470	8.0
	1/14/2002	<5.0	25	<5.0	<5.0	7.0	10	<2.0
	7/29/2002	<5.0	120	<5.0	13	41.0	55	<2.0
	1/21/2003	<5.0	14J	<5.0	<5.0	<5.0	<5.0	<2.0
	1/22/2004	1.0J	29	<5.0	4.0J	10.0	14	<2.0
7/26/2004	12	200D	<5.0	36	180.0	NA	2.0J	
06-GW33	3/18/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
	7/27/1997	<10	<10	<10	NA	NA	<10	<10
	10/24/1997	5.0J	<10	<10	NA	NA	<10	<10
	1/16/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/15/1998	<5.0	0.96J	<5.0	NA	NA	<5.0	<10
	7/25/1998	13.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/15/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	7/28/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2001	<5.0	120	<5.0	23	94	120	<2.0
	1/14/2002	6.0	180	<5.0	32	150	180	<2.0
	7/29/2002	<5.0	94	<5.0	11	54	66	<2.0
	1/21/2003	0.50J	88	<5.0	5.0J	30	35	<2.0
1/22/2004	<5.0	6.0	<5.0	<5.0	0.40J	0.40J	<2.0	
7/28/2004	<5.0	5.0	<5.0	<5.0	0.50J	NA	<2.0	
06-GW34	3/18/1993	1,200	610	1.3	NA	NA	410	<1.0
	7/24/1997	170J	310	<250	NA	NA	<250	<250
	10/24/1997	120	400	<100	NA	NA	170	<100
	1/16/1998	120	510	<25	NA	NA	200	<50

Table C25. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; D, sample dilution required; B, detected in blank; E, concentration exceeds calibration range of GC/MS instrument; R, analytical result is unreliable; AKA, also known as]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
06-GW34— Continued	4/16/1998	170D	250D	<5.0	NA	NA	130	<10
	7/23/1998	88JD	170BD	<12	NA	NA	<64JD	<25
	1/15/1999	350	440	<5.0	56	110	NA	<5.0
	7/28/1999	4,100	470J	<500	<500	<500	<500	<200
	1/12/2000	560D	250D	<5.0	30	66	96	<2.0
	7/11/2000	6,000D	160	<5.0	19	140	160	<2.0
	1/10/2001	850D	200	<5.0	19	44	62	<2.0
	7/11/2001	380J	96	<5.0	21	36	57	<2.0
	1/14/2002	1,800	100	<5.0	18	250	270	<2.0
	7/29/2002	2,400	240	<5.0	33	200	280	<2.0
	1/21/2003	6,300	150	<5.0	13	160	180	<2.0
	1/22/2004	1,000D	33	<5.0	3.0J	41	44	<2.0
	7/26/2004	1,200D	34	<5.0	3.0J	30	NA	<2.0
06-GW35D	3/22/1993	<1.0	3.1J	<1.0	NA	NA	<1.0	<1.0
	7/27/1997	<10	<10	<10	NA	NA	<10	<10
	10/26/1997	<10	<10	<10	NA	NA	<10	<10
	1/18/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/19/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/22/2003	0.50J	3.0J	<5.0	<5.0	0.90J	<5.0	<2.0
1/22/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
06-GW36D	3/30/1993	<1.0	6.4	<1.0	NA	NA	3.4	<1.0
	7/27/1997	<10	<10	<10	NA	NA	<10	<10
	10/25/1997	<10	<10	<10	NA	NA	<10	
	1/19/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/19/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/15/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/21/2003	3.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
1/22/2004	<5.0	0.90J	<5.0	<5.0	0.30J	0.30J	<2.0	

Table C25

Table C25. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; D, sample dilution required; B, detected in blank; E, concentration exceeds calibration range of GC/MS instrument; R, analytical result is unreliable; AKA, also known as]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
06-GW37DW	3/23/1993	<1.0	60	<1.0	NA	NA	120	<1.0
	7/23/1997	<50	88	<50	NA	NA	230	<50
	10/25/1997	<50	8J	<50	NA	NA	230	16J
	1/19/1998	<5.0	7	<5.0	NA	NA	260	27
	4/19/1998	<10	3.1J	<10	NA	NA	210	17J
	7/25/1998	15	91	<10	NA	NA	340	<10
	1/16/1999	7.0	10	<5.0	3.0J	270	NA	30
	7/29/1999	<25	260	<25	60	320	380	11
	1/16/2000	<5.0	<5.0	2.0J	<5.0	470D	470D	39
	7/30/2000	<10	<10	<10	<10	240	240	<4.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0	500D	510D	35
	7/10/2001	<5.0	<5.0	3.0J	<5.0	1,300	1,300	38
	1/13/2002	<5.0	49	<5.0	11	420	430	30
	7/29/2002	23	26	<5.0	5.0	330	400	35
	1/21/2003	<5.0	<5.0	2.0J	2.0J	380	380	31
	1/22/2004	<5.0	4.0J	5.0J	7.0	770D	780D	66
7/28/2004	<5.0	9.0	4.0J	20.0	940D	NA	53	
06-GW38D	7/27/1997	<10	<10	<10	NA	NA	<10	<10
	10/27/1997	<10	<10	<10	NA	NA	<10	<10
	1/16/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/17/1998	<5.0	2.5J	<5.0	NA	NA	<5.0	<10
	1/17/1999	<5.0	29	<5.0	3.0J	5.0	<5.0	<5.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/27/2003	<5.0	2.0J	<5.0	<5.0	<5.0	<5.0	<2.0
1/21/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
06-GW40DA	10/28/1997	<10	<10	<10	NA	NA	<10	<10
	1/18/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/17/1998	<5.0	4.4J	<5.0	NA	NA	<5.0	<10
06-GW40DW	7/24/1997	<10	<10	<10	NA	NA	<10	<10
	10/28/1997	<10	<10	<10	NA	NA	<10	<10
	1/18/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/17/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/18/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	1/19/2000	<5.0	14	<5.0	<5.0	4.0J	4.0J	<2.0
	1/15/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	8/1/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/24/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/22/2004	<5.0	0.60J	<5.0	<5.0	<5.0	<10	<2.0

Table C25. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; D, sample dilution required; B, detected in blank; E, concentration exceeds calibration range of GC/MS instrument; R, analytical result is unreliable; AKA, also known as]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
06-GW41	1/15/1999	<5.0	9.0	<5.0	<5.0	<5.0	<5.0	<5.0
	7/29/1999	<5.0	3.0J	<5.0	<5.0	<5.0	<5.0	<2.0
	1/12/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0	3.0J	3.0J	<2.0
	7/29/2002	6.0	17	<5.0	11	24J	35.0	<2.0
	1/21/2003	<5.0	2.0J	<5.0	<5.0	3.0J	3.0J	<2.0
	1/23/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
	7/26/2004	<5.0	0.70J	<5.0	<5.0	0.60J	NA	<2.0
06-GW42	1/15/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
	1/12/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/22/2004	<5.0	<5.0	<5.0	<5.0	0.60J	0.60J	<2.0
	7/26/2004	<5.0	0.30J	<5.0	<5.0	0.40J	NA	<2.0
06-MW43DW AKA 06-GW43DW	7/28/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/22/2004	<5.0	<5.0	<5.0	<5.0	0.20J	<10	<2.0
	7/28/2004	<5.0	<5.0	<5.0	<5.0	0.30J	NA	<2.0

¹ See Figure C5 or C20 for location

Data sources:

CERCLA Administrative Record files #193, #236, #273, #387, #1272, #1781, #1978, #2037, #2300, #2322, #2337, #2599A, #2609A, #3165, #3276, #3277, #3278, #3410, #3637

Baker Environmental, Inc. 1993k, 1994a, 1997e, 1998g,h,i, 1999de

Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000e

Baker Environmental, Inc. and CH2M Hill, Inc. 2001a, 2002b,g

CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2000b

Michael Baker, Jr., Inc. and CH2M Hill, Inc. 2003

Michael Baker, Jr., Inc. and Engineering and Environment, Inc. 2004

Environmental Science and Engineering, Inc. 1987, 1992b

Haliburton NUS, 1992c

Unknown Author, 1991

Table C26

Table C26. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
06-GW01D	11/4/1992	ND	ND	48	ND
	3/23/1993	6.7J	1.4	52	2.1
	10/27/1997	<1,000	<1,000	<1,000	<1,000
	1/15/1998	<5,000	<5,000	<5,000	<5,000
	4/16/1998	<2,500	<2,500	<2,500	<2,500
	7/23/1998	7.9	1.9J	2.2J	3.9J
	1/16/1999	8.0	<5.0	<5.0	<5.0
	7/29/1999	4.0J	<5.0	<5.0	NA
	1/18/2000	3.0J	<5.0	<5.0	<5.0
	7/30/2000	4.0J	<5.0	<5.0	<5,000
	1/15/2001	<5.0	<5.0	<5.0	<5.0
	7/18/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	7/31/2002	0.20J	0.20J	<5.0	<5.0
	1/24/2003	2.0J	<5.0	<5.0	<5.0
	1/20/2004	0.5J	<5.0	0.4J	0.5J
7/26/2004	6.0	<5.0	0.70J	2.0J	
06-GW01DA	5/3/1993	<1.0	<1.0	<1.0	<1.0
	10/24/1997	<10	<10	<10	<10
	1/15/1998	<5.0	<5.0	<5.0	<5.0
	4/16/1998	<5.0	<5.0	<5.0	<5.0
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	1/13/2000	<5.0	<5.0	<5.0	<5.0
	1/15/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	7/31/2002	<5.0	0.20J	<5.0	<5.0
	1/24/2003	<5.0	<5.0	<5.0	<5.0
1/20/2004	<5.0	<5.0	<5.0	<15	
06-GW01DB	10/24/1997	<10	<10	<10	<10
	1/15/1998	<5.0	<5.0	<5.0	<5.0
	4/16/1998	<5.0	<5.0	<5.0	<5.0
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	1/19/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0
	7/31/2002	<5.0	<5.0	<5.0	<5.0
	1/24/2003	<5.0	<5.0	<5.0	<5.0
	1/20/2004	<5.0	<5.0	<5.0	<15
06-GW01S	11/19/1986	3.1	<6.0	<7.2	NA
	1/21/1987	<1.0	<6.0	<7.2	NA
	6/27/1991	<5.0	<5.0	<5.0	<5.0
	10/24/1992	ND	ND	ND	1.4
	3/23/1993	<1.0	<1.0	<1.0	<1.0
	10/24/1997	<10	<10	<10	<10
	1/15/1998	<5.0	<5.0	<5.0	<5.0

Table C26. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
06-GW01S— Continued	4/16/1998	<5.0	<5.0	<5.0	<5.0
	7/24/1998	<5.0	<5.0	<5.0	<5.0
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	7/28/1999	<5.0	<5.0	<5.0	NA
	1/13/2000	<5.0	<5.0	<5.0	<5.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0
	1/20/2004	<5.0	<5.0	<5.0	<15
	7/26/2004	<5.0	<5.0	0.20J	0.90J
06-GW02DW	6/27/1991	<5.0	<5.0	<5.0	<5.0
	11/3/1992	ND	ND	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	<1.0
	10/27/1997	<10	<10	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	<5.0
	4/18/1998	<5.0	<5.0	<5.0	<5.0
06-GW02S	11/20/1986	<1.0	<6.0	<7.2	NA
	1/21/1987	<1.0	<6.0	<7.2	NA
	1/19/1991	<5.0	<5.0	<5.0	<5.0
	6/27/1991	<5.0	<5.0	<5.0	<5.0
	3/21/1993	<1.0	<1.0	<1.0	<1.0
06-GW03	11/20/1986	<1.0	<6.0	<7.2	NA
	1/22/1987	<1.0	<6.0	<7.2	NA
	1/19/1991	<5.0	<5.0	<5.0	<5.0
	6/27/1991	<5.0	<5.0	<5.0	<5.0
	10/22/1992	ND	ND	ND	ND
	3/22/1993	<1.0	<1.0	<1.0	<1.0
	10/25/1997	<10	<10	<10	<10
	1/15/1998	<5.0	<5.0	<5.0	<5.0
	4/17/1998	<5.0	<5.0	<5.0	<5.0
	7/24/1998	<5.0	<5.0	<5.0	<5.0
	1/16/1999	<5.0	<5.0	<5.0	<5.0
	7/29/1999	<5.0	<5.0	<5.0	NA
	1/13/2000	<5.0	<5.0	<5.0	<5.0
	7/12/2000	<10	<10	<10	<10
	1/10/2001	<5.0	<5.0	<5.0	<5.0
7/11/2001	<5.0	<5.0	<5.0	<5.0	
1/21/2004	<5.0	<5.0	<5.0	<15	
	7/28/2004	<5.0	<5.0	<5.0	0.50J
06-GW04	11/19/1986	<1.0	<6.0	<7.2	NA
	1/21/1987	<1.0	<6.0	<7.2	NA
	1/19/1991	<5.0	<5.0	<5.0	<5.0
	10/21/1992	ND	ND	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	<1.0

Table C26

Table C26. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
06-GW05	11/19/1986	<1.0	<6.0	<7.2	NA
	1/21/1987	<1.0	<6.0	<7.2	NA
	1/19/1991	<5.0	<5.0	<5.0	<5.0
	3/21/1993	<1.0	<1.0	<1.0	<1.0
06-GW06	11/19/1986	<1.0	<6.0	<7.2	NA
	1/22/1987	<1.0	<6.0	<7.2	NA
	1/19/1991	<5.0	<5.0	<5.0	<5.0
	3/20/1993	<1.0	<1.0	<1.0	<1.0
06-GW07DW	11/4/1992	0.6J	0.6J	0.6J	0.6J
	3/19/1993	<1.0	<1.0	<1.0	<1.0
06-GW07S	11/20/1986	<1.0	<6.0	<7.2	NA
	1/22/1987	<1.0	<6.0	<7.2	NA
	1/19/1991	<5.0	<5.0	<5.0	<5.0
	3/19/1993	<1.0	<1.0	<1.0	<1.0
06-GW08	11/20/1986	<1.0	<6.0	<7.2	NA
	1/22/1987	<1.0	<6.0	<7.2	NA
	1/19/1991	<5.0	<5.0	<5.0	<5.0
	3/20/1993	<1.0	<1.0	<1.0	<1.0
06-GW09	3/19/1993	<1.0	<1.0	<1.0	<1.0
06-GW10	3/20/1993	<1.0	<1.0	<1.0	<1.0
06-GW11	6/27/1991	<5.0	<5.0	<5.0	<5.0
	3/21/1993	<1.0	<1.0	<1.0	<1.0
	1/21/2004	<5.0	<5.0	<5.0	<15
	7/28/2004	<5.0	<5.0	<5.0	1.0J
06-GW12	3/20/1993	<1.0	<1.0	<1.0	<1.0
06-GW13	10/20/1992	ND	ND	ND	ND
	3/20/1993	<1.0	<1.0	<1.0	<1.0
06-GW14	10/22/1992	ND	ND	ND	ND
	3/20/1993	<1.0	<1.0	<1.0	<1.0
06-GW15D	5/3/1993	<1.0	<1.0	<1.0	<1.0
	7/26/1997	<10	<10	<10	<10
	10/29/1997	<10	<10	<10	<10
	1/19/1998	<5.0	<5.0	<5.0	<5.0
	4/18/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	8/1/2002	<5.0	<5.0	<5.0	<5.0
	1/24/2003	<5.0	<5.0	<5.0	<5.0
1/20/2004	<5.0	<5.0	<5.0	<15	
06-GW15S	10/23/1992	ND	ND	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	<1.0

Table C26. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
06-GW16	10/21/1992	ND	ND	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	<1.0
	7/27/1997	<10	<10	<10	<10
	10/23/1997	<500	<500	<500	<500
	1/19/1998	<100	<100	<100	<100
	1/15/1999	<5.0	6.0	<5.0	<5.0
	7/29/1999	<5.0	<5.0	<5.0	NA
	1/17/2000	9.0	<5.0	<5.0	<5.0
	7/12/2000	9.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
	1/21/2003	3.0J	2.0J	<5.0	<5.0
	1/20/2004	4.0J	0.20J	<5.0	2.0J
7/28/2004	0.20J	<5.0	<5.0	<15	
06-GW17	10/22/1992	ND	ND	ND	ND
	3/20/1993	<1.0	<1.0	<1.0	<1.0
	7/27/1997	<10	<10	<10	<10
	10/26/1997	<10	<10	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	<5.0
	4/17/1998	<5.0	<5.0	<5.0	<5.0
	06-GW18	3/20/1993	<1.0	<1.0	<1.0
06-GW19	3/20/1993	<1.0	<1.0	<1.0	<1.0
06-GW20	3/21/1993	<1.0	<1.0	<1.0	<1.0
06-GW21	10/22/1992	ND	ND	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	<1.0
	7/27/1997	<10	<10	<10	<10
	10/26/1997	<10	<10	<10	<10
	1/18/1998	<5.0	<5.0	<5.0	<5.0
	4/18/1998	<5.0	<5.0	<5.0	<5.0
	06-GW22	10/22/1992	ND	ND	ND
3/22/1993	<1.0	<1.0	<1.0	<1.0	
06-GW23	10/22/1992	ND	ND	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	<1.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0
	1/29/2004	<5.0	<5.0	<5.0	<15
	7/28/2004	<5.0	<5.0	<5.0	<15
06-GW25	10/23/1992	ND	ND	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	<1.0
06-GW26	10/23/1992	ND	ND	ND	ND
	3/22/1993	<1.0	<1.0	<1.0	<1.0

Table C26

Table C26. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
06-GW27DA	7/23/1997	<10	<10	<10	<10
	10/29/1997	<10	<10	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	<5.0
	4/15/1998	<5.0	<5.0	<5.0	<5.0
	1/16/1999	<5.0	<5.0	<5.0	<5.0
	1/13/2000	<5.0	<5.0	<5.0	<5.0
	1/13/2001	<5.0	<5.0	<5.0	<5.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0
	7/31/2002	<5.0	<5.0	<5.0	<5.0
	1/23/2003	<5.0	<5.0	<10	<10
1/22/2004	<5.0	<5.0	<5.0	<15	
06-GW27DW	11/3/1992	ND	ND	ND	ND
	3/23/1993	<1.0	<1.0	<1.0	<1.0
	7/22/1997	<10	<10	<10	<10
	10/29/1997	<500	<500	<500	<500
	1/18/1998	<100	<100	<100	<100
	4/16/1998	<5.0	<5.0	<5.0	<5.0
	7/24/1998	<120	<120	<120	<120
	1/16/1999	<5.0	<5.0	<5.0	<5.0
	7/29/1999	<5.0	<5.0	<5.0	NA
	1/13/2000	2.0J	<5.0	<5.0	<5.0
	7/30/2000	<5.0	<5.0	<5.0	<5.0
	1/14/2001	<25	<25	<25	<25
	7/18/2001	<5.0	<5.0	<5.0	<5.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0
1/23/2003	0.50J	0.80J	<10	<10	
1/22/2004	0.50J	12	<5.0	<15	
7/26/2004	0.80J	<5.0	<5.0	<15	
06-GW28DW	11/3/1992	ND	ND	ND	ND
	3/23/1993	ND	ND	2.0	ND
	7/25/1997	<250	<250	<250	<250
	10/28/1997	<500	<500	<500	<500
	1/16/1998	<120	<120	<120	<120
	4/18/1998	<50	<50	<50	<50
	7/24/1998	<120	<120	<120	<120
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	7/29/1999	<5.0	<5.0	<5.0	NA
	1/19/2000	<5.0	<5.0	<5.0	<5.0
	7/30/2000	<5.0	<5.0	<5.0	<5.0
	1/14/2001	19	<5.0	<5.0	<5.0
	7/18/2001	19	<5.0	<5.0	<5.0
	1/13/2002	19	<5.0	<5.0	<5.0
8/1/2002	<5.0	0.30J	<5.0	<5.0	

Table C26. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
06-GW28DW— Continued	1/24/2003	32J	<250	<50	<89
	1/22/2004	28	0.50J	0.50J	2.0J
	7/26/2004	20	0.50J	0.70J	3.0J
06-GW28S	10/23/1992	ND	ND	ND	ND
	3/18/1993	<1.0	<1.0	<1.0	<1.0
	7/25/1997	<10	<10	<10	<10
	10/26/1997	<10	<10	<10	<10
	1/16/1998	<5.0	<5.0	<5.0	<5.0
	4/18/1998	<5.0	<5.0	<5.0	<5.0
	7/24/1998	<5.0	<5.0	<5.0	<5.0
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	7/29/1999	<5.0	<5.0	<5.0	NA
	1/19/2000	<5.0	<5.0	<5.0	<5.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
1/24/2003	<5.0	0.40J	<10	2.0J	
1/22/2004	<5.0	<5.0	<5.0	<15	
7/26/2004	<5.0	<5.0	<5.0	<15	
06-GW30DW	3/23/1993	<1.0	<1.0	<1.0	<1.0
	7/24/1997	<10	<10	<10	<10
	10/25/1997	<10	<10	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	<5.0
	4/18/1998	<5.0	<5.0	<5.0	<5.0
06-GW30S	10/23/1992	ND	ND	ND	ND
	3/22/1993	<1.0	<1.0	<1.0	<1.0
	7/24/1997	<10	<10	<10	<10
	10/25/1997	<10	<10	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	<5.0
	4/18/1998	<5.0	<5.0	<5.0	<5.0
	7/25/1998	<5.0	<5.0	<5.0	<5.0
	1/16/1999	<5.0	<5.0	<5.0	<5.0
	7/28/1999	<5.0	<5.0	<5.0	NA
	1/16/2000	<5.0	<5.0	<5.0	<5.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
1/21/2003	<5.0	<5.0	<5.0	<5.0	
1/22/2004	<5.0	<5.0	<5.0	<15	
7/28/2004	<5.0	0.20J	<5.0	<15	

Table C26

Table C26. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
06-GW31	3/6/1993	<1.0	<1.0	<1.0	<1.0
	6/27/1991	<5.0	<5.0	<5.0	<5.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0
	1/21/2004	<5.0	<5.0	<5.0	<15
	7/28/2004	<5.0	<5.0	<5.0	<15
06-GW32	3/18/1993	1.4	<1.0	<1.0	<1.0
	7/27/1997	<10	<10	<10	<10
	10/26/1997	<50	<50	<50	<50
	1/16/1998	<5.0	<5.0	<5.0	<5.0
	4/16/1998	<5.0	<5.0	<5.0	<5.0
	7/24/1998	<5.0	0.98J	<5.0	<5.0
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	7/29/1999	<5.0	<5.0	<5.0	NA
	1/16/2000	<5.0	<5.0	<5.0	<5.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0
	1/22/2004	<5.0	<5.0	<5.0	<15
7/26/2004	0.20J	<5.0	<5.0	<15	
06-GW33	3/18/1993	<1.0	<1.0	<1.0	<1.0
	7/27/1997	<10	<10	<10	<10
	10/24/1997	<10	<10	<10	<10
	1/16/1998	<5.0	<5.0	<5.0	<5.0
	4/15/1998	<5.0	<5.0	<5.0	<5.0
	7/25/1998	<5.0	<5.0	<5.0	<5.0
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	7/28/1999	<5.0	<5.0	<5.0	NA
	1/13/2000	<5.0	<5.0	<5.0	<5.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0
	1/22/2004	<5.0	<5.0	<5.0	<15
7/28/2004	<5.0	0.50J	<5.0	<15	

Table C26. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
06-GW34	3/18/1993	<1.0	<1.0	<1.0	<1.0
	7/24/1997	<250	<250	<250	<250
	10/24/1997	<100	<100	<100	<100
	1/16/1998	<25	<25	<25	<25
	4/16/1998	<5.0	<5.0	<5.0	<5.0
	7/23/1998	<12	<12	<12	<12
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	7/28/1999	<500	<500	<500	NA
	1/12/2000	<5.0	<5.0	<5.0	<5.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0
	1/22/2004	<5.0	<5.0	<5.0	<15
7/26/2004	0.30J	0.20J	<5.0	<15	
06-GW35D	3/22/1993	<1.0	<1.0	<1.0	<1.0
	7/27/1997	<10	<10	<10	<10
	10/26/1997	<10	<10	<10	<10
	1/18/1998	<5.0	<5.0	<5.0	<5.0
	4/19/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0
	1/12/2001	<5.0	<5.0	<5.0	<5.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0
	1/22/2003	<5.0	<5.0	<5.0	<5.0
1/22/2004	<5.0	<5.0	<5.0	<15	
06-GW36D	3/30/1993	<1.0	<1.0	<1.0	<1.0
	7/27/1997	<10	<10	<10	<10
	10/25/1997	<10	<10	<10	<10
	1/19/1998	<5.0	<5.0	<5.0	<5.0
	4/19/1998	<5.0	<5.0	<5.0	<5.0
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0
	1/12/2001	<5.0	<5.0	<5.0	<5.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0
	1/22/2004	<5.0	<5.0	<5.0	<15

Table C26

Table C26. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
06-GW37DW	3/23/1993	<1.0	<1.0	<1.0	<1.0
	7/23/1997	<50	<50	<50	<50
	10/25/1997	7.8J	<50	<50	<50
	1/19/1998	6.9	<5.0	<5.0	<5.0
	4/19/1998	5.3J	<10	<10	<10
	7/25/1998	7.7J	<10	<10	<10
	1/16/1999	4.0J	<5.0	<5.0	<5.0
	7/29/1999	<25	<25	<25	NA
	1/16/2000	3.0J	<5.0	<5.0	<5.0
	7/30/2000	<10	<10	<10	<10
	1/10/2001	3.0J	<5.0	<5.0	<5.0
	7/10/2001	3.0J	<5.0	<5.0	<5.0
	1/13/2002	5.0J	<5.0	<5.0	<5.0
	7/29/2002	3.0J	<5.0	<5.0	<5.0
	1/21/2003	3.0J	<5.0	<5.0	<5.0
	1/22/2004	6.0	<5.0	<5.0	<15
7/28/2004	8.0	0.40J	<5.0	<15	
06-GW38D	7/27/1997	<10	<10	<10	<10
	10/27/1997	<10	<10	<10	<10
	1/16/1998	<5.0	<5.0	<5.0	<5.0
	4/17/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0
	7/30/2002	<5.0	<5.0	<5.0	<5.0
1/27/2003	<5.0	<5.0	<5.0	<5.0	
1/21/2004	<5.0	<5.0	<5.0	<15	
06-GW40DA	10/28/1997	<10	<10	<10	<10
	1/18/1998	<5.0	<5.0	<5.0	<5.0
	4/17/1998	<5.0	<5.0	<5.0	<5.0
06-GW40DW	7/24/1997	<10	<10	<10	<10
	10/28/1997	<10	<10	<10	<10
	1/18/1998	<5.0	<5.0	<5.0	<5.0
	4/17/1998	<5.0	<5.0	<5.0	<5.0
	1/18/1999	<5.0	<5.0	<5.0	<5.0
	1/19/2000	<5.0	<5.0	<5.0	<5.0
	1/15/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	8/1/2002	<5.0	<5.0	<5.0	<5.0
	1/24/2003	<5.0	<5.0	<5.0	<5.0
	1/22/2004	<5.0	<5.0	<5.0	<15

Table C26. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 6, storage/disposal lots 201 and 203, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
06-GW41	1/15/1999	<5.0	<5.0	<5.0	<5.0
	7/29/1999	<5.0	<5.0	<5.0	NA
	1/12/2000	<5.0	<5.0	<5.0	<5.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0
	1/23/2004	<5.0	<5.0	<5.0	<15
7/26/2004	<5.0	<5.0	<5.0	<15	
06-GW42	1/15/1999	<5.0	<5.0	<5.0	<5.0
	7/28/1999	<5.0	<5.0	<5.0	NA
	1/12/2000	<5.0	<5.0	<5.0	<5.0
	7/11/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0
	1/14/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0
	1/22/2004	<5.0	<5.0	<5.0	<15
7/26/2004	<5.0	<5.0	<5.0	<15	
06-MW43DW AKA 06-GW43DW	7/28/1999	<5.0	<5.0	<5.0	<5.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0
	1/22/2004	<5.0	<5.0	<5.0	<15
	7/28/2004	<5.0	<5.0	<5.0	<15

¹ See Figure C5 or C20 for location

Data sources:

CERCLA Administrative Record files #193, #236, #273, #387, #1272, #1781, #1978, #2037, #2300, #2322, #2337, #2599A, #2609A, #3165, #3276, #3277, #3278, #3410, #3637

Baker Environmental, Inc. 1993k, 1994a, 1997e, 1998g,h,i, 1999de

Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000e

Baker Environmental, Inc. and CH2M Hill, Inc. 2001a, 2002bg

CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2000b

Michael Baker, Jr., Inc. and CH2M Hill, Inc. 2003

Michael Baker, Jr., Inc. and Engineering and Environment, Inc. 2004

Environmental Science and Engineering, Inc. 1987, 1992b

Haliburton NUS 1992c

Unknown author 1991

Table C27

Table C27. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 9, fire fighting training pit, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
09-GW01	342970	2502820	28.5	1984	25.0	10–25	BBUAQ
09-GW02	343192	2502720	25.7	1984	21.0	N/A	BBUAQ
09-GW03	343432	2502781	23.9	11//1986	³ 25	⁴ 10–25	BBUAQ, BBUCU(?)
09-GW04	342217	2503183	28.3	9/23/1992	20.3	6.3–20.3	BBUAQ
09-GW05	343113	2502785	28.0	9/22/1992	18.3	4.2–18.5	BBUAQ
09-GW06	343041	2502726	28.7	9/23/1992	19.7	4.9–19.3	BBUAQ
09-GW07D	343333	2502729	26.6	9/29/1992	110	100–109	UCHRBU
09-GW07S	343321	2502720	26.2	9/23/1992	21.5	7.1–21.0	BBUAQ
09-GW08	343070	2502890	26.0	9/23/1992	18.4	3.5–18.0	BBUAQ

¹ See Figure C6 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated depth. See Figure 6-2, Environmental Science and Engineering, Inc. 1990

⁴ Estimated interval. See Figure 6-2, Environmental Science and Engineering, Inc. 1990

Data sources:

CERCLA Administrative Record files #125, #214, #387, #388, #720, #1272, #1559, #1615

Baker Environmental, Inc. 1993g,k,l,m,n

Environmental Sciences and Engineering, Inc. 1985, 1987, 1990

Table C28. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 9, fire fighting training pit, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; ND, constituent not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
09-GW01	7/5/1984	<1.6	<1.2	<1.1	<1.1	NA	NA	<0.80
	11/19/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/9/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
09-GW02	7/5/1984	<1.6	<1.2	<1.1	<1.1	NA	NA	<0.80
	11/19/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/9/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
09-GW03	11/18/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	9/21/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/9/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
09-GW04	3/8/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
09-GW05	3/8/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
09-GW06	10/25/1992	ND	ND	ND	NA	NA	ND	ND
	3/8/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
09-GW07D	11/3/1992	ND	ND	ND	NA	NA	ND	ND
	3/8/1993	<1.0	1.2	<1.0	NA	NA	<1.0	<1.0
09-GW07S	3/8/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
09-GW08	10/25/1992	ND	ND	ND	NA	NA	ND	ND
	3/9/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0

¹ See Figure C6 for location

Data sources:

CERCLA Administrative Record files #387, #388, #1272

Baker Environmental, Inc. 1993k

Environmental Sciences and Engineering, Inc. 1985, 1987

Table C29**Table C29.** Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 9, fire fighting training pit, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; ND, constituent not detected; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
09-GW01	7/5/1984	<0.30	<0.50	<1.0	NA
	11/19/1986	<1.0	<6.0	<7.2	NA
	3/9/1993	<1.0	<1.0	<1.0	<1.0
09-GW02	7/5/1984	<0.30	<0.50	<1.0	NA
	11/19/1986	<1.0	<6.0	<7.2	NA
	3/9/1993	<1.0	<1.0	<1.0	<1.0
09-GW03	11/18/1986	<1.0	<6.0	<7.2	NA
	1/21/1987	<1.0	<6.0	<7.2	NA
	3/9/1993	<1.0	<1.0	<1.0	<1.0
09-GW04	3/8/1993	<1.0	<1.0	<1.0	<1.0
09-GW05	3/8/1993	<1.0	<1.0	<1.0	<1.0
09-GW06	10/25/1992	<0.5	<0.5	<0.5	0.9J
	3/8/1993	<1.0	<1.0	<1.0	<1.0
09-GW07D	11/3/1992	ND	ND	ND	ND
	3/8/1993	<1.0	<1.0	<1.0	<1.0
09-GW07S	3/8/1993	<1.0	<1.0	<1.0	<1.0
09-GW08	10/25/1992	<0.5	<0.5	<0.5	ND
	3/9/1993	<1.0	2.2	3.4	14

¹ See Figure C6 for location

Data sources:

CERCLA Administrative Record files #387, #388, #1272

Baker Environmental, Inc. 1993k

Environmental Sciences and Engineering, Inc. 1985, 1987

Table C30. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 10, original base landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBUAQ, Brewster Boulevard upper aquifer; BBUCU, Brewster Boulevard upper confining unit]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
10-MW02	346534	2501587	27.0	2/27/2001	17.2	7.0–17.0	BBUAQ
10-MW03	345831	2501347	21.6	2/27/2001	13.3	3.0–13.0	BBUAQ
10-MW04	346037	2500627	17.1	2/28/2001	12.6	2.0–12.0	BBUAQ
10-MW06	346952	2501230	18.7	2/27/2001	13.6	3.0–13.0	BBUAQ
10-MW08	345608	2500261	20.8	2/28/2001	14.0	4.0–14.0	BBUAQ
10-MW09	346633	2501145	16.6	2/28/2001	11.0	1.0–11.0	BBUAQ
10-TW01 (old)	346242	2500252	³ 16	9/26/1995	8.0	5.0–8.0	BBUAQ(?)
10-TW02 (old)	346294	2500388	³ 15	9/26/1995	15.0	12.0–15.0	BBUAQ(?)
10-TW03 (old)	346129	2500396	³ 17	9/26/1995	15.0	12.0–15.0	BBUAQ(?)
10-TW01 (new)	346802	2501411	26.2	3/18/1998	16.0	6.0–16.0	BBUAQ
10-TW02 (new)	346530	2501583	27.0	3/18/1998	14.0	4.0–14.0	BBUAQ
10-TW03 (new)	345825	2501343	22.0	3/18/1998	12.0	2.0–12.0	BBUAQ
10-TW04	346037	2500626	17.6	3/18/1998	7.0	2.0–7.0	BBUCU
10-TW05	345640	2500887	23.1	3/18/1998	14.0	4.0–14.0	BBUAQ
10-TW06	346953	2501226	18.6	3/19/1998	12.0	2.0–12.0	BBUAQ
10-TW07	345909	2500273	28.0	3/19/1998	18.0	8.0–18.0	BBUAQ
10-TW08	345609	2500260	20.7	3/19/1998	14.0	4.0–14.0	BBUAQ
10-TW09	346632	2501140	16.6	3/19/1998	6.0	1.0–6.0	BBUAQ

¹ See Figure C7 for location² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983³ Estimated altitude

Data sources:

CERCLA Administrative Record files #3061, #3266

Baker Environmental, Inc. 2001b,c

Table C31

Table C31. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 10, original base landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
10-TW01 (old)	9/26/1995	<10	<10	<10	NA	NA	<10	<10
10-TW02 (old)	9/26/1995	<10	<10	<10	NA	NA	<10	<10
10-TW03 (old)	9/26/1995	<10	<10	<10	NA	NA	<10	<10
10-TW01 (new)	3/22/1998	<10	<10	<10	NA	NA	<10	<10
10-TW02 (new)	3/22/1998	<10	<10	<10	NA	NA	<10	<10
10-TW03 (new)	3/22/1998	<10	<10	<10	NA	NA	<10	<10
10-TW04	3/22/1998	<10	<10	<10	NA	NA	<10	<10
10-TW05	3/22/1998	<10	<10	<10	NA	NA	<10	<10
10-TW06	3/22/1998	<10	<10	<10	NA	NA	<10	<10
10-TW07	3/23/1998	<10	<10	<10	NA	NA	<10	<10
10-TW08	3/23/1998	<10	<10	<10	NA	NA	<10	<10
10-TW09	3/22/1998	<10	<10	<10	NA	NA	<10	<10

¹ See Figure C7 for location

Data sources:

CERCLA Administrative Record file #3266

Baker Environmental, Inc. 2001b

Table C32. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 10, original base landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
10-TW01 (old)	9/26/1995	<10	<10	<10	<10
10-TW02 (old)	9/26/1995	<10	<10	<10	<10
10-TW03 (old)	9/26/1995	<10	<10	<10	<10
10-TW01 (new)	3/22/1998	<10	<10	<10	<10
10-TW02 (new)	3/22/1998	<10	<10	<10	<10
10-TW03 (new)	3/22/1998	<10	<10	<10	<10
10-TW04	3/22/1998	<10	<10	<10	<10
10-TW05	3/22/1998	<10	<10	<10	<10
10-TW06	3/22/1998	<10	<10	<10	<10
10-TW07	3/23/1998	<10	<10	<10	<10
10-TW08	3/23/1998	<10	<10	<10	<10
10-TW09	3/22/1998	<10	<10	<10	<10

¹See Figure C7 for location

Data sources:

CERCLA Administrative Record file #3266

Baker Environmental, Inc. 2001b

Table C33. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 21, transformer storage lot 140, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
21-GW01	340959	2502039	29.7	1984	25.3	³ 10–25	BBUAQ, BBUCU, BBLAQ
21-GW02	341099	2502100	31.3	5/4/1993	19.5	9.7–18.7	BBUAQ, BBUCU, BBLAQ(?)
21-GW03	340805	2501753	29.1	5/4/1993	18.0	8.3–17.2	BBUAQ, BBUCU, BBLAQ(?)
21-GW04	340307	2501140	27.8	5/6/1993	15.0	5.2–14.2	BBUAQ, BBUCU

¹ See Figure C8 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated interval. See Section E–E', Environmental Science and Engineering, Inc. 1988a

Data sources:

- CERCLA Administrative Record files #124, #258, #387, #522, #1271, #1516
- Baker Environmental, Inc. 1994f,g
- Environmental and Safety Designs, Inc. 1995
- Environmental Science and Engineering, Inc. 1987, 1988a, 1992a

Table C34. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 21, transformer storage lot 140, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
21-GW01	11/21/1986	NA	<6.0	<7.2	NA
	1/24/1991	<5.0	<5.0	<5.0	<5.0
21-GW02	5/20/1993	77J	210J	540J	1,300J
21-GW03	5/21/1993	ND	ND	ND	ND

¹ See Figure C8 for location

Data sources:

- CERCLA Administrative Record files #387, #388, #522, #1517
- Baker Environmental, Inc. 1994g
- Environmental Science and Engineering, Inc. 1985, 1987, 1991

Table C35. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 21, transformer storage lot 140, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; ND, constituent not detected, detection or quantitation limit unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
21-GW01	11/21/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	1/24/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
21-GW02	5/20/1993	ND	41J	ND	ND	ND	NA	ND
21-GW03	5/21/1993	ND	ND	ND	ND	ND	NA	ND

¹ See Figure C8 for location

Data sources:

CERCLA Administrative Record files #387, #522, #1517

Baker Environmental, Inc. 1994g

Environmental Science and Engineering, Inc. 1987, 1991

Table C36**Table C36.** Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 22, Industrial Area tank farm, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit; AKA, also known as; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
HPGW22-1 AKA 22_22-1	339740	2501585	29.0	1984	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
HPGW22-2 AKA 22_22-2	340154	2501031	26.2	1984	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
22-MW01	339573	2501718	28.3	2/24/1988	17.0	7.0–17.0	BBUAQ
22-MW02	339809	2501960	30.0	2/24/1988	18.0	7.0–17.0	BBUAQ
22-MW03	339367	2501802	29.0	2/25/1988	15.0	5.0–15.0	BBUAQ
22-MW04	339588	2502080	29.8	2/25/1988	15.0	5.0–15.0	BBUAQ
22-MW05	339792	2501434	28.5	2/25/1988	15.0	5.0–15.0	BBUAQ
22-MW06	340026	2501789	27.8	3/1/1988	17.0	5.0–15.0	BBUAQ
22-MW07	340071	2501495	28.4	3/1/1988	17.0	5.0–15.0	BBUAQ
22-MW07R	N/A	N/A	N/A	12/14/1989	15.0	5.0–15.0	BBUAQ
22-MW08	339959	2501383	27.8	3/1/1988	17.0	5.0–15.0	BBUAQ
22-MW08R	N/A	N/A	N/A	12/14/1989	15.0	5.0–15.0	BBUAQ
22-MW09	339116	2501482	28.8	2/25/1988	15.0	5.0–15.0	BBUAQ
22-MW10	340033	2501940	28.1	2/25/1988	15.0	5.0–15.0	BBUAQ
22-MW11 AKA BOGW11	340014	2501237	26.5	3/2/1988	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
22-MW12 AKA BOGW12	340158	2501386	26.9	3/7/1988	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
22-MW13	340281	2501716	28.8	3/9/1988	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
22-MW14	339578	2501217	27.7	3/8/1988	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
22-MW15	339367	2501442	28.3	3/8/1988	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
22-MW16	339951	2501560	28.4	3/10/1988	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
22-MW17	339717	2501638	29.5	3/9/1988	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
22-MW18	339635	2501874	29.9	3/11/1988	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
22-MW19	339838	2502137	29.4	3/14/1988	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
22-MW20 AKA BOMW20	340181	2501167	26.8	1988	25.0	4.0–24.0	BBUAQ, BBUCU, BBLAQ
22-MW21	340352	2501585	26.7	12/14/1989	19.0	9.0–19.0	BBUAQ, BBUCU
22-MW22	340326	2501329	27.5	12/14/1989	15.0	5.0–15.0	BBUAQ, BBUCU
22-MW23	339433	2501686	27.3	12/14/1989	18.0	8.0–18.0	BBUAQ, BBUCU
22-RW01	339830	2501477	28.6	12/12/1989	34.0	9.0–34.0	BBUAQ, BBUCU, BBLAQ
22-RW02	339541	2501714	29.0	12/13/1989	33.0	8.0–33.0	BBUAQ, BBUCU, BBLAQ

¹ See Figure C9 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

Data sources:

CERCLA Administrative Record files #382, #1516
 Environmental Science and Engineering, Inc. 1992a
 O'Brien and Gere Engineers, Inc. 1990

Table C37. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 22, Industrial Area tank farm, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
HPGW22-1	7/6/1984	17,000	27,000	3,800	NA
	1/9/1987	12,000	15,000	1,800	9,000
	3/8/1987	10,000	18,000	<7,200	<12,000
	5/27/1987	13,000	24,000	<7,200	<12,000
	1/18/1991	7,900	16,000	1,900J	9,800
	5/21/1993	9,200J	18,000J	3,000J	16,000J
	7/9/1995	17,700	14,800	< 1.0	NA
	10/24/1995	9,590	27,300	2,490	NA
	1/17/1996	11,800	28,100	4,230	NA
	4/10/1996	4,900	9,100	800	NA
	7/17/1996	9,500	19,000	2,300	11,000
10/9/1996	8,500	2,000	18,000	10,000	
HPGW22-2	7/6/1984	<0.30	<0.60	<1.0	NA
	1/9/1987	<1.0	<6.0	<7.2	<12
	3/8/1987	<1.0	<6.0	<7.2	<12
	5/27/1987	<1.0	<6.0	<7.2	<12
	1/24/1991	<5.0	<5.0	<5.0	<5.0
22-MW01	4/20/1988	19,000	36,000	3,200	21,000
22-MW02	4/20/1988	29,000	110,000	11,000	48,000
22-MW03	4/20/1988	<1.0	2	<1.0	4.0
22-MW04	4/20/1988	<1.0	<1.0	<1.0	2.0
22-MW05	4/20/1988	<1.0	<1.0	<1.0	2.0
22-MW06	4/20/1988	600	1,700	1,600	7,100
22-MW07	4/21/1988	28,000	26,000	2,800	12,000
22-MW08	4/20/1988	19	1	<1.0	<1.0
22-MW09	4/20/1988	<1.0	<1.0	2.0	8.0
22-MW10	4/20/1988	51	1.0	9.0	14
22-MW11	4/20/1988	1.0	1.0	<1.0	1.0
22-MW12	4/21/1988	19,000	17,000	1,500	8,400
22-MW13	4/20/1988	2.0	2.0	2.0	8.0
22-MW14	4/20/1988	6	<1.0	<1.0	2.0
22-MW15	4/21/1988	4,700	18,000	2,400	13,000
22-MW16	4/21/1988	28,000	28,000	1,900	12,000
22-MW17	4/21/1988	11,000	13,000	2,500	9,100
22-MW18	4/21/1988	24,000	42,000	1,900	12,000
22-MW19	4/21/1988	21	150	53	130
22-MW20	4/21/1988	60	160	79	96

¹ See Figure C9 for location

Data sources:

CERCLA Administrative Record files #124, #258, #382, #388, #522, #1517, #1777, #1778

Baker Environmental, Inc. 1994g, 1996i,j

Environmental Science and Engineering, Inc. 1985, 1988a, 1991

O'Brien and Gere Engineers, Inc. 1990

Water and Air Research, Inc. 1983

Table C38

Table C38. Summary of BTEX free-phase measurements in monitor wells at Installation Restoration Site 22, Industrial Area tank farm, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[BTEX: benzene, toluene, ethylbenzene, and xylene; N/A, not available]

Site name ¹	Sample date	BTEX free-phase thickness, in feet	Site name ¹	Sample date	BTEX free-phase thickness, in feet
22-MW01	3/15/1988	0.00	22-MW13	3/15/1988	0.00
	4/20/1988	0.00		4/20/1988	0.00
	11/6/1989	0.00		11/6/1989	0.00
	12/15/1989	0.00		12/15/1989	0.00
22-MW02	3/15/1988	2.97	22-MW14	3/15/1988	0.00
	4/20/1988	3.17		4/20/1988	0.00
	11/6/1989	3.34		11/6/1989	0.00
	12/15/1989	3.08		12/15/1989	0.00
22-MW03	3/15/1988	0.00	22-MW15	3/15/1988	0.86
	4/20/1988	0.00		4/20/1988	0.24
	11/6/1989	0.00		11/6/1989	0.00
	12/15/1989	0.00		12/15/1989	0.00
22-MW04	3/15/1988	0.00	22-MW16	3/15/1988	14.85
	4/20/1988	0.00		4/20/1988	15.34
	11/6/1989	0.00		11/6/1989	15.07
	12/15/1989	0.00		12/15/1989	14.91
22-MW05	3/15/1988	0.00	22-MW17	3/15/1988	0.00
	4/20/1988	0.00		4/20/1988	0.00
	11/6/1989	0.00		11/6/1989	0.00
	12/15/1989	0.00		12/15/1989	0.00
22-MW06	3/15/1988	0.00	22-MW18	3/15/1988	4.59
	4/20/1988	0.00		4/20/1988	5.10
	11/6/1989	0.00		11/6/1989	5.29
	12/15/1989	0.00		12/15/1989	4.77
22-MW07	3/15/1988	N/A	22-MW19	3/15/1988	0.00
	4/20/1988	0.35		4/20/1988	0.00
	11/6/1989	NA		11/6/1989	0.00
	12/15/1989	NA		12/15/1989	0.00
22-MW08	3/15/1988	0.00	22-MW20	3/15/1988	0.00
	4/20/1988	0.00		4/20/1988	0.00
	11/6/1989	0.00		11/6/1989	0.00
	12/15/1989	0.00		12/15/1989	0.00
22-MW09	3/15/1988	0.00			
	4/20/1988	0.00			
	11/6/1989	0.00			
	12/15/1989	0.00			
22-MW10	3/15/1988	0.00			
	4/20/1988	0.00			
	11/6/1989	0.00			
	12/15/1989	0.00			
22-MW11	3/15/1988	0.00			
	4/20/1988	0.00			
	11/6/1989	0.00			
	12/15/1989	0.00			
22-MW12	3/15/1988	4.33			
	4/20/1988	9.81			
	11/6/1989	8.70			
	12/15/1989	6.89			

¹ See Figure C9 for location

Data sources:

CERCLA Administrative Record files #382, #417

O'Brien and Gere Engineers, Inc. 1988, 1990

Table C39. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 22, Industrial Area tank farm, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
HPGW22-1	7/6/1984	<1.2	<1.0	<0.90	<0.80	NA	NA	<0.60
	1/9/1987	<30	<30	<28	<16	NA	NA	<10
	3/8/1987	<2,000	<1,000	<2,800	<1,600	NA	NA	<1,000
	5/27/1987	<2,000	<1,000	<2,800	<1,600	NA	NA	<1,000
	1/18/1991	<5.0	5.0J	<5.0	NA	NA	<5.0	<10
	5/21/1993	ND	ND	ND	ND	ND	NA	ND
	7/9/1995	<0.5	<0.5	<0.5	<0.5	NA	NA	<0.5
	10/25/1995	<25	<25	<25	<25	NA	NA	<25
	1/19/1996	<25	<25	<25	<25	NA	NA	<25
	4/9/1996	<0.5	<0.5	<0.5	<0.5	NA	NA	<0.5
HPGW22-2	7/6/1984	<2.0	<1.4	<1.3	<1.3	NA	NA	<0.90
	1/9/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	3/8/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	5/27/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/24/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
22-MW01	4/20/1988	<1,000	<1,000	NA	NA	NA	NA	NA
22-MW02	4/20/1988	<1,000	<1,000	NA	NA	NA	NA	NA
22-MW03	4/20/1988	4.0	<1.0	NA	NA	NA	NA	NA
22-MW04	4/20/1988	<1.0	<1.0	NA	NA	NA	NA	NA
22-MW05	4/20/1988	<1.0	<1.0	NA	NA	NA	NA	NA
22-MW06	4/20/1988	<100	<100	NA	NA	NA	NA	NA
22-MW07	4/20/1988	<1,000	<1,000	NA	NA	NA	NA	NA
22-MW08	4/20/1988	<1.0	<1.0	NA	NA	NA	NA	NA
22-MW09	4/20/1988	<1.0	<1.0	NA	NA	NA	NA	NA
22-MW10	4/20/1988	<1.0	<1.0	NA	NA	NA	NA	NA
22-MW11	4/20/1988	<1.0	<1.0	NA	NA	NA	NA	NA
22-MW12	4/21/1988	<1,000	<1,000	NA	NA	NA	NA	NA
22-MW13	4/20/1988	<1.0	<1.0	NA	NA	NA	NA	NA
22-MW14	4/20/1988	<1.0	<1.0	NA	NA	NA	NA	NA
22-MW15	4/21/1988	<1,000	<1,000	NA	NA	NA	NA	NA
22-MW16	4/21/1988	<1,000	<1,000	NA	NA	NA	NA	NA
22-MW17	4/21/1988	<100	<100	NA	NA	NA	NA	NA
22-MW18	4/21/1988	<1,000	<1,000	NA	NA	NA	NA	NA
22-MW19	4/21/1988	<1.0	<1.0	NA	NA	NA	NA	NA
22-MW20	4/21/1988	<1.0	1.0	NA	NA	NA	NA	NA

¹ See Figure C9 for location

Data sources:

CERCLA Administrative Record files #124, #258, #382, #388, #522, #1517, #1777, #1778

Baker Environmental, Inc. 1994g, 1996i,j

Environmental Science and Engineering, Inc. 1985, 1988a, 1991

O'Brien and Gere Engineers, Inc. 1990

Water and Air Research, Inc. 1983

Table C40

Table C40. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 24, Industrial Area fly ash dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit; NA, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
24-GW01	336692	2501024	15.8	7//1984	22.4	⁴ 7.0–22.0	BBUAQ, BBUCU, BBLAQ
24-GW02	336531	2501313	11.4	7//1984	20.6	⁴ 5.0–20.0	BBUAQ, BBUCU, BBLAQ
24-GW03	336501	2502167	13.8	7//1984	21.9	⁴ 6.0–21.0	BBUAQ, BBUCU, BBLAQ
24-GW04	336772	2503141	16.5	7//1984	24.3	⁴ 9.0–24.0	BBUAQ, BBUCU
24-GW05	337190	2501933	24.6	7//1984	NA	NA	BBUAQ (?), BBLAQ (?)
24-GW06	336099	2501244	9.7	1986	27.7	NA	BBUAQ (?), BBLAQ (?)
24-GW07 (old)	335180	2502240	³ 7.5	1986	NA	NA	BBUAQ (?), BBLAQ (?)
24-GW07 (new)	337662	2502854	27.4	4/25/1993	18.0	7.7–17.2	BBUAQ, BBUCU
24-GW08	337152	2502970	23.6	4/25/1993	19.0	9.1–18.2	BBUAQ, BBUCU
24-GW09	336379	2502872	13.8	4/26/1993	12.5	2.6–11.7	BBUAQ
24-GW10	335884	2502053	17.3	4/26/1993	18.0	8.0–17.2	BBUAQ, BBUCU

¹ See Figure C10 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

⁴ Estimated interval. See Section D–D', Environmental Science and Engineering, Inc. 1987

Data sources:

CERCLA Administrative Record files #124, #387, #522, #1271

Baker Environmental, Inc. 1994f,g

Environment and Safety Designs, Inc. 1995

Environmental Science and Engineering, Inc. 1987

Table C41. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 24, Industrial Area fly ash dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit.; NA, constituent concentration not determined or analytical result is unknown; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter						VC
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	
24-GW01	12/3/1986	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
24-GW02	12/3/1986	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
24-GW03	12/3/1986	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
24-GW04	12/3/1986	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
24-GW05	12/3/1986	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
24-GW06	3/4/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
24-GW07	3/4/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
24-GW08	6/2/1993	ND	ND	ND	ND	ND	NA	ND
	7/10/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/9/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/3/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/26/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
24-GW09	6/2/1993	ND	ND	ND	ND	ND	NA	ND
	7/11/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/9/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/3/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/26/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
24-GW10	6/2/1993	ND	ND	ND	ND	ND	NA	ND
	7/11/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/9/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/4/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/26/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50

¹ See Figure C10 for location

Data sources:

CERCLA Administrative Record files #387, #522, #1777, #1778, #1779, #1780, #1977

Baker Environmental, Inc. 1994g, 1996i,j, 1997c,d, 1998k

Environmental Science and Engineering, Inc. 1987

Table C42. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 24, Industrial Area fly ash dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; ND, constituent not detected, detection or quantitation limit unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
24-GW01	7/7/1984	<0.40	NA	NA	NA
	12/3/1986	NA	<6.0	<7.2	NA
24-GW02	7/7/1984	<0.40	NA	NA	NA
	12/3/1986	NA	<6.0	<7.2	NA
24-GW03	7/7/1984	<0.40	NA	NA	NA
	12/3/1986	NA	<6.0	<7.2	NA
24-GW04	7/7/1984	<0.60	NA	NA	NA
	12/3/1986	NA	<6.0	<7.2	NA
24-GW05	7/7/1984	3.0	NA	NA	NA
	12/3/1986	NA	<6.0	<7.2	NA
24-GW06	12/3/1986	NA	<6.0	<7.2	NA
	3/4/1987	NA	<6.0	<7.2	NA
24-GW07 (old)	12/3/1986	NA	<6.0	<7.2	NA
	3/4/1987	NA	<6.0	<7.2	NA
24-GW08	6/2/1993	ND	ND	ND	ND
	7/10/1996	<0.50	<0.50	<0.50	<0.50
	10/9/1996	<0.50	<0.50	<0.50	<0.50
	2/3/1997	<0.50	<0.50	<0.50	<0.50
	4/26/1997	<0.50	<0.50	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	<0.50
24-GW09	6/2/1993	ND	ND	ND	ND
	7/11/1996	<0.50	<0.50	<0.50	<0.50
	10/9/1996	<0.50	<0.50	<0.50	<0.50
	2/3/1997	<0.50	<0.50	<0.50	<0.50
	4/26/1997	<0.50	<0.50	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	<0.50
24-GW10	6/2/1993	ND	ND	ND	ND
	7/11/1996	<0.50	<0.50	<0.50	<0.50
	10/9/1996	<0.50	<0.50	<0.50	<0.50
	2/4/1997	<0.50	<0.50	<0.50	<0.50
	4/26/1997	<0.50	<0.50	<0.50	<0.50
	8/11/1997	<0.50	<0.50	<0.50	<0.50

¹ See Figure C10 for location

Data sources:

CERCLA Administrative Record files #124, #387, #522, #1777, #1778, #1779, #1780, #1977
 Baker Environmental, Inc. 1994g, 1996i,j, 1997c,d, 1998k
 Environment and Safety Designs, Inc. 1995
 Environmental Science and Engineering, Inc. 1987

Table C43. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 28, Industrial Area burn dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, TTCU—Tarawa Terrace confining unit, UCHRBU—Upper Castle Hayne aquifer–River Bend unit; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
28-GW01 (old)	331847	2498323	4.8	1984	16.5	2.5–16.5	BBUAQ, BBUCU, BBLAQ
28-GW01 (new)	331849	2498323	4.8	4/20/1994	17.0	2.5–16.2	BBUAQ, BBUCU, BBLAQ
28-GW01DW	331870	2498323	5.5	4/23/1994	133.0	117–132	TTCU(?), UCHRBU
28-GW02	331604	2498802	3.8	1984	21.7	7.74–21.74	BBUAQ, BBUCU, BBLAQ
28-GW03	331507	2499512	3.6	1984	20.8	6.8–20.8	BBUAQ, BBUCU, BBLAQ
28-GW04	332165	2499566	4.4	1986	29.0	N/A	BBLAQ(?)
28-GW05	331719	2499911	15.6	4/7/1994	24.0	7.0–24.0	BBUAQ, BBUCU, BBLAQ
28-GW06	332194	2498094	17.2	4/7/1994	30.0	15–29.3	BBUAQ, BBUCU, BBLAQ
28-GW07	331751	2499119	3.8	4/8/1994	18.0	2.5–17.5	BBUAQ, BBUCU, BBLAQ
28-GW07DW	331745	2499147	3.6	4/26/1994	131.0	114–129	TTCU(?), UCHRBU
28-GW08 (old)	332239	2499096	11.6	1994	24.0	7.9–22.7	BBUAQ, BBUCU, BBLAQ
28-GW08 (new)	332239	2499096	11.6	8/14/1995	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ
28-GW09DW	332857	2498262	4.5	4/12/1994	126.0	111–126	TTCU(?), UCHRBU
28-GW13	332690	2498621	³ 6	1994	N/A	N/A	BBLAQ(?)
28-TGWPA	331865	2498693	³ 17	1994	N/A	N/A	BBLAQ(?)

¹ See Figure C11 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

Data sources:

CERCLA Administrative Record files #1500, #1749, #2592

Baker Environmental, Inc. 1995l,p, 1996n

Table C44

Table C44. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 28, Industrial Area burn dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
28-GW01 (old)	7/7/1984	<2.1	15	<1.4	38	NA	NA	22
	12/16/1986	<3.0	4.9	<2.8	14	NA	NA	13
	4/14/1993	<10	<10	<10	NA	NA	2.0J	6.0J
	4/25/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-GW01DW	5/7/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-GW02	7/7/1984	<1.9	<1.4	<1.3	<1.3	NA	NA	<1.0
	12/16/1986	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	4/14/1993	<10	<10	<10	NA	NA	<10	<10
	4/20/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-GW03	7/7/1984	<2.3	<1.7	<1.6	<1.5	NA	NA	<1.0
	12/11/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<10
	4/14/1993	<10	<10	<10	NA	NA	<10	<10
	4/21/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-GW04	12/11/1986	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/4/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	4/14/1993	<10	<10	<10	NA	NA	<10	<10
	4/20/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-GW05	4/23/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-GW06	4/21/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-GW07	4/21/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-GW07DW	5/8/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-GW08 (old)	4/21/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-GW09DW	4/25/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-GW13	4/21/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
28-TGWPA01	4/20/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0

¹See Figure C11 for location

Data sources:

CERCLA Administrative Record files #387, #388, #1130, #1500, #1505

Baker Environmental, Inc. 1993o, 1995l,m

Environmental Science and Engineering, Inc. 1985, 1987

Table C45. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 28, Industrial Area burn dump, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
28-GW01 (old)	7/7/1984	<4.0	<0.6	<1.0	NA
	12/16/1986	<1.0	<6.0	<7.2	<12
	4/14/1993	<10	<10	<10	<10
28-GW01 (new)	4/25/1994	<2.0	<2.0	<2.0	<2.0
28-GW01DW	5/7/1994	<2.0	<2.0	<2.0	<2.0
28-GW02	7/7/1984	<0.3	<0.6	<1.0	NA
	12/16/1986	<1.0	<6.0	<7.2	<12
	4/14/1993	<10	<10	<10	<10
	4/20/1994	<2.0	<2.0	<2.0	<2.0
28-GW03	7/7/1984	<0.4	<0.7	<1.0	NA
	12/11/1986	<1.0	<6.0	<7.2	<12
	4/14/1993	<10	<10	<10	<10
	4/21/1993	<2.0	<2.0	<2.0	<2.0
28-GW04	12/11/1986	<1.0	<6.0	<7.2	<12
	3/4/1987	<1.0	<6.0	<7.2	<12
	4/14/1993	<10	<10	<10	<10
	4/20/1994	<2.0	<2.0	<2.0	<2.0
28-GW05	4/23/1994	<2.0	<2.0	<2.0	<2.0
28-GW06	4/21/1994	<2.0	<2.0	<2.0	<2.0
28-GW07	4/21/1994	<2.0	3.0	<2.0	<2.0
28-GW07DW	5/8/1994	<2.0	<2.0	<2.0	<2.0
28-GW08 (old)	4/21/1994	<2.0	<2.0	<2.0	<2.0
28-GW09DW	4/21/1994	<2.0	<2.0	<2.0	<2.0
28-GW13	4/21/1994	<2.0	<2.0	<2.0	<2.0
28-TGWPA	4/20/1994	<2.0	2.0	5.0	19

¹ See Figure C11 for location

Data sources:

CERCLA Administrative Record files #387, #388, #1130, #1500, #1505

Baker Environmental, Inc. 1993o, 1995l,m

Environmental Science and Engineering, Inc. 1985, 1987

Tables C46 and C47

Table C46. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 30, Sneads Ferry Road fuel tank sludge disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBUAQ, Brewster Boulevard upper aquifer]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer
	North	East					
30-GW01	318873	2513451	42.6	7/ /1984	21.5	6.5–21.5	BBUAQ
30-GW02	318381	2512971	36.8	12/ /1986	26.0	11.0–26.0	BBUAQ
30-GW03	318911	2514554	40.5	3/24/1994	17.5	2.5–17.5	BBUAQ
30-PZ01	318829	2512887	32.5	3/23/1994	25.0	20.0–25.0	BBUAQ

¹ See Figure C12 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

Data sources:

- CERCLA Administrative Record files #388, #1498, #1505
- Baker Environmental, Inc. 1995j,m
- Environmental Science and Engineering, Inc. 1985

Table C47. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 30, Sneads Ferry Road fuel tank sludge disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
30-GW01	7/6/1984	<2.0	<1.4	<1.3	<1.3	<0.8	NA	<1.0
	12/4/1986	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	4/13/1993	<10	<10	<10	NA	NA	<10	<10
	4/21/1994	<2.0	<2.	<2.	NA	NA	<2.0	<2.0
30-GW02	12/4/1986	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	3/6/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	4/13/1993	<10	<10	<10	NA	NA	<10	<10
	4/21/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0
30-GW03	4/21/1994	<2.0	<2.0	<2.0	NA	NA	<2.0	<2.0

¹ See Figure C12 for location

Data sources:

- CERCLA Administrative Record files #387, #388, #1130, #1501
- Baker Environmental, Inc. 1993o, 1995o
- Environmental Science and Engineering, Inc. 1985, 1987

Table C48. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 30, Sneads Ferry Road fuel tank sludge disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
30-GW01	7/6/1984	<0.3	<0.6	<1.0	NA
	12/4/1986	<1.0	<6.0	<7.2	<12
	4/13/1993	<10	<10	<10	<10
	4/21/1994	<2.0	<2.0	<2.0	<2.0
30-GW02	12/4/1986	<1.0	<6.0	<7.2	<12
	3/6/1987	<1.0	<6.0	<7.2	<12
	4/13/1993	<10	<10	<10	<10
	4/21/1994	<2.0	<2.0	<2.0	<2.0
30-GW03	4/21/1994	<2.0	<2.0	<2.0	<2.0

¹ See Figure C12 for location

Data sources:

CERCLA Administrative Record files #387, #388, #1130, #1501

Baker Environmental, Inc. 1993o, 1995o

Environmental Science and Engineering, Inc. 1985, 1987

Table C49

Table C49. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 74, mess hall grease pit disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
74-GW01 AKA 74MW01	353331	2501819	33.2	6/ /1984	³ 24	⁴ 9–24	BBUAQ, BBUCU
74-GW02 AKA 74MW02	353013	2591971	33.1	6/ /1984	³ 26	⁴ 11–26	BBUAQ, BBUCU
74-GW03	354145	2500946	33.1	1986	³ 25	⁴ 10–25	BBUAQ, BBUCU
74-GW03A	353878	2501115	33.4	1/18/1994	18.0	8.0–18.0	BBUAQ
74-GW04	353437	2501304	32.7	1/18/1994	19.5	9.5–19.5	BBUAQ
74-GW05	353028	2501327	32.8	1/11/1994	16.5	6.0–16.5	BBUAQ
74-GW06	353337	2501567	31.6	1/11/1994	26.0	15.5–26.0	BBUAQ, BBUCU
74-GW07 AKA 74MW07	352655	2501624	32.4	2/18/1994	16.5	6.5–16.5	BBUAQ
74-GW08	352836	2502538	28.4	2/18/1994	23.0	13.0–23.0	BBUAQ, BBUCU

¹ See Figure C13 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated depth. See Figure 74-2, Environmental and Safety Designs, Inc. 1995

⁴ Estimated interval. See Figure 74-2, Environmental and Safety Designs, Inc. 1995

Data sources:

CERCLA Administrative Record files #124, #387, #1524, #1543, #3428

Baker Environmental, Inc. 1995g,i

Environmental and Safety Designs, Inc. 1995

Environmental Science and Engineering, Inc. 1984, 1987

Table C50. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 74, mess hall grease pit disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
74-GW01	12/4/1986	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	2/16/1994	<10	<10	<10	NA	NA	<10	<10
74-GW02	12/4/1986	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	3/4/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	2/16/1994	<10	<10	<10	NA	NA	<10	<10
74-GW03	12/4/1986	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
74-GW03A	2/16/1994	<10	<10	<10	NA	NA	<10	<10
74-GW04	2/16/1994	<10	<10	<10	NA	NA	<10	<10
74-GW05	2/16/1994	<10	<10	<10	NA	NA	<10	<10
74-GW06	2/16/1994	<10	<10	<10	NA	NA	<10	<10
74-GW07	2/22/1994	<10	<10	<10	NA	NA	<10	<10
74-GW08	2/22/1994	<10	<10	<10	NA	NA	<10	<10

¹ See Figure C13 for location

Data sources:

CERCLA Administrative Record files #387, #1525

Baker Environmental, Inc. 1995h

Environmental Science and Engineering, Inc. 1987

Table C51. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 74, mess hall grease pit disposal area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
74-GW01	12/4/1986	< 1.0	< 6.0	< 7.2	NA
	2/16/1994	< 10	< 10	< 10	< 10
74-GW02	12/4/1986	< 1.0	< 6.0	< 7.2	NA
	3/4/1987	< 1.0	< 6.0	< 7.2	NA
	2/16/1994	< 10	< 10	< 10	< 10
74-GW03	12/4/1986	< 1.0	< 6.0	< 7.2	NA
74-GW03A	2/16/1994	< 10	< 10	< 10	< 10
74-GW04	2/16/1994	< 10	< 10	< 10	< 10
74-GW05	2/16/1994	< 10	< 10	< 10	< 10
74-GW06	2/16/1994	< 10	< 10	< 10	< 10
74-GW07	2/22/1994	< 10	< 10	< 10	< 10
74-GW08	2/22/1994	< 10	< 10	< 10	< 10

¹ See Figure C13 for location

Data sources:

CERCLA Administrative Record files #387, #1525

Baker Environmental, Inc. 1995h

Environmental Science and Engineering, Inc. 1987

Table C52

Table C52. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, Local CU—local confining unit, TTAQ—Tarawa Terrace aquifer, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
78-Bldg900_UST01	340599	2502739	29.5	1995	50.0	45.0–50.0	BBLCU, TTAQ (?)
78-Bldg900_UST02	340491	2502444	29.5	1995	13.9	3.9–13.9	BBUAQ
78-Bldg900_UST03	340654	2502666	29.2	1995	50.0	45.0–50.0	BBLCU, TTAQ (?)
78-Bldg900_UST04	340657	2502669	29.2	1996	14.0	4.1–14.1	BBUAQ
78-Bldg900_UST05	340660	2502768	29.3	1996	14.0	4.1–14.1	BBUAQ
78-Bldg900_UST06	340538	2502721	30.1	1996	13.2	3.2–13.2	BBUAQ
78-Bldg900_UST07	340546	2502806	³ 37	N/A	N/A	N/A	BBUAQ (?)
78-Bldg902_P01	341270	2502816	N/A	1/29/1993	25 (?)	15–25 (?)	BBUAQ, BBUCU
78-Bldg902_P02	341240	2502892	N/A	1/29/1993	23 (?)	13–23 (?)	BBUAQ, BBUCU
78-Bldg902_RW01	341293	2502855	N/A	1/30/1993	25.0	10–24.85	BBUAQ, BBUCU
78-Bdg1611_UG1A	338815	2498889	³ 22	N/A	N/A	N/A	N/A
78-GW01	337222	2499145	30.6	10/31/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW02	337018	2499576	30.0	11/4/1986	25.0	5.0–20.0	BBUAQ, BBUCU, BBLAQ
78-GW03	336765	2499494	29.7	11/4/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW04-1 AKA MW4	337457	2499549	29.1	11/4/1986	25.0	4.5–24.5	BBUAQ, BBCU
78-GW04-2 AKA MW4-2	337543	2499463	29.1	12/ /1990	78.0	65.0–78.0	TTAQ
78-GW04-3 AKA MW4-3	337577	2499436	28.7	12/ /1990	153.0	140.0–153.0	Local CU, UCHLU
78-GW05 AKA MW5	338211	2499027	26.5	11/4/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW06	338641	2498839	25.5	11/18/1986	25.0	5.0–25.0	BBUAQ, BBUCU
78-GW07 AKA MW7	338538	2499392	25.7	11/18/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW08 AKA MW8	338709	2499778	25.6	11/6/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW09-1(Old) AKA MW9	337998	2499701	26.8	11/6/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW09-1(New)	338073	2499643	³ 27	12/9/1993	24.0	6.6–21.6	BBUAQ, BBUCU, BBLAQ
78-GW09-2 AKA MW9-2	337995	2499690	25.6	7/1/1987	75.3	55.3–75.3	BBLCU, TTAQ
78-GW09-3 AKA MW9-3	337981	2499832	24.8	7/20/1987	150.0	130.0–150.0	UCHRBU, Local CU,
78-GW10 AKA MW10	338309	2500046	26.0	11/6/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW11 AKA MW11	337865	2500178	25.8	11/18/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ

Table C52. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, Local CU—local confining unit, TTAQ—Tarawa Terrace aquifer, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
78-GW12 AKA MW12	338457	2500632	27.7	11/18/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW13	339567	2499458	23.6	11/17/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW14	339391	2499956	25.1	11/5/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW15 AKA MW15	339109	2500535	26.8	11/6/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW16 AKA MW16	339006	2501332	30.2	11/19/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW17-1 AKA MW17	339371	2500975	27.9	11/6/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW17-2 AKA MW17-2	339198	2501229	29.7	6/24/1987	73.3	53.3–73.3	BBLCU, TTAQ
78-GW17-3	339236	2501288	31	7/17/1987	150.0	130.0–150.0	UCHRBU, Local CU,
78-GW18	339766	2500665	27.0	11/19/1986	25.0	N/A	BBUAQ(?), BBUCU, BBLAQ
78-GW19	340220	2500628	27.0	11/6/86	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW20	340704	2500752	22.8	11/6/86	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW21	339539	2502400	31.4	11/10/86	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW22	340395	2502740	30.5	11/4/86	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW22A	340372	2502763	30.4	1995?	N/A	N/A	BBUAQ(?), BBUCU(?), BBLAQ(?)
78-GW23	340686	2502468	30.3	11/5/86	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW24-1	341181	2502845	30.8	11/12/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW24-2	341169	2502808	30.8	6/9/1987	76.6	56.6–76.6	BBLCU, TTAQ
78-GW24-3	341153	2502785	30.6	6/18/1987	148.2	128.2–148.2	UCHRBU, Local CU,
78-GW25	340951	2503205	30.4	11/5/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW26	342950	2501860	32.6	11/5/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW29	335465	2499141	26.4	11/17/1986	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-GW30-2	340967	2502302	30.0	12/ /1990	78.0	65.0–78.0	TTAQ

Table C52

Table C52. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, Local CU—local confining unit, TTAQ—Tarawa Terrace aquifer, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
78-GW30-3	340929	2502409	30.0	12/ /1990	153.0	140.0–153.0	Local CU
78-GW31-2 AKA MW31-2	339118	2500537	26.5	12/ /1990	78.0	65.0–78.0	TTAQ
78-GW31-3 AKA MW31-3	338983	2500417	26.4	12/ /1990	153.0	140.0–153.0	Local CU
78-GW32-2 AKA MW32-2	339494	2501261	27.0	12/ /1990	77.0	64.0–77.0	TTAQ
78-GW32-3 AKA MW32-3	339474	2501278	27.3	12/ /1990	153.0	140.0–153.0	UCHRBU
78-GW33	340015	2503216	29.9	5/18/1993	14.0	4.0–13.1	BBUAQ
78-GW34	338591	2503614	29.9	5/18/1993	13.0	2.9–12.0	BBUAQ
78-GW35	338155	2502669	29.2	5/18/1993	20.0	9.8–18.9	BBUAQ, BBUCU(?)
78-GW36	338123	2500767	26.9	5/18/1993	18.0	8.1–17.2	BBUAQ, BBUCU(?)
78-GW37	336951	2500612	18.2	5/19/1993	14.0	3.8–13.1	BBUAQ
78-GW38	334862	2499896	25.9	5/19/1993	29.0	18.9–28.0	BBLAQ
78-GW39	334207	2500098	16.8	1993	20.0	10.0–20.0	BBUAQ, BBUCU, BBLAQ
78-GW40	340651	2502400	29.3	2/6/1998	24.0	4.4–24.0	BBUAQ, BBUCU, BBLAQ
78-GW41	340991	2502751	28.8	2/6/1998	23.8	4.5–23.8	BBUAQ, BBUCU, BBLAQ
78-GW42	337497	2499302	28.0	2/7/1998	23.2	3.9–23.2	BBUAQ, BBUCU, BBLAQ
78-GW43	341094	2502655	30.2	9/ /2000	30.0	25.0–30.0	BBLAQ
78-GW44	341133	2502739	30.5	9/ /2000	31.2	27.5–31.2	BBLAQ
78-GW45	341921	2502820	28.9	9/ /2000	25.0	20.0–25.0	BBLAQ
78-GW46	340618	2502618	30.7	9/ /2000	23.0	18.0–23.0	BBUCU
78-GW47	340644	2502481	30.1	9/ /2000	30.0	25.0–30.0	BBLAQ
78-GW48	340855	2502482	29.4	9/ /2000	23.0	18.0–23.0	BBUCU
78-GW49	337800	2499623	25.9	2001	30.5	25.5–30.5	BBLAQ
78-GW50	337500	2499057	29.6	2001	23.0	18.0–23.0	BBUCU
78-GW51	337929	2499266	27.3	2001	24.0	19.0–24.0	BBLAQ
78-GW52	337716	2499418	27.6	2001	32.0	27.0–32.0	BBLAQ
78-GW53	337500	2499620	28.2	2001	27.0	22.0–27.0	BBLAQ
78-GW54	337465	2498441	29.5	2001	24.0	19.0–24.0	BBUCU
78-GW55	337213	2498668	29.4	2001	23.5	18.5–23.5	BBLAQ
78-GW56	336753	2499673	29.5	2001	29.6	24.6–29.6	BBLAQ
78-GW57	337344	2499351	29.6	2001	28.0	23.0–28.0	BBLAQ
78-GW58	337660	2499606	28	2001	28.0	23.0–28.0	BBLAQ
78-GW59	337012	2499008	28.4	2001	25.0	20.0–25.0	BBLAQ
78-GW60	337987	2499685	27.1	6/ /2002	31.0	25.0–31.0	BBLAQ

Table C52. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, Local CU—local confining unit, TTAQ—Tarawa Terrace aquifer, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
78-GW61	336184	2499555	24.4	6/ /2002	29.0	24.0–29.0	BBLAQ
78-GW62	335934	2498649	25.8	6/ /2002	30.0	25.0–30.0	BBLAQ
78-GW63	336394	2498200	28.2	6/ /2002	29.0	24.0–29.0	BBLAQ
78-GW64	336857	2497671	27.1	6/ /2002	28.0	23.0–28.0	BBLAQ
78-GW65	336309	2498856	28.1	6/ /2002	32.0	27.0–32.0	BBLAQ
78-GW66	336559	2498989	27.5	6/ /2002	29.5	24.5–29.5	BBLAQ
78-GW67	336742	2498540	29.5	6/ /2002	32.5	27.0–32.5	BBLAQ
78-GW68	337253	2498035	28.2	6/ /2002	28.0	23.0–28.0	BBLAQ
78-GW69	341165	2502749	³ 29	6/ /2002	N/A	N/A	BBLAQ(?)
78-GW70	341161	2502726	³ 29	1/ /2003	N/A	N/A	BBLAQ(?)
78-GW71	341120	2502710	³ 29	1/ /2003	N/A	N/A	BBLAQ(?)
78-GW72	341149	2502672	³ 29	1/ /2003	N/A	N/A	BBLAQ(?)
78-GW73	337881	2499631	³ 29	1/ /2003	N/A	N/A	BBLAQ(?)
78-GW74	337901	2499655	³ 29	1/ /2003	N/A	N/A	BBLAQ(?)
78-GW75-1	337927	2499686	³ 29	1/ /2003	N/A	N/A	BBLAQ(?)
78-GW75-2	337926	2499685	³ 29	1/ /2003	N/A	N/A	BBLAQ(?)
78-GW76	337974	2499708	³ 29	1/ /2003	N/A	N/A	BBLAQ(?)
78-GW77	337927	2499637	³ 29	1/ /2003	N/A	N/A	BBLAQ(?)
78-GW78	337953	2499672	³ 29	1/ /2003	N/A	N/A	BBLAQ(?)
78-N-TW01	340513	2502175	³ 32	7/24/1997	22.0	2.0–22.0	BBUAQ, BBUCU, BBLAQ
78-N-TW02	340498	2502328	³ 30	7/25/1997	24.2	4.5–24.2	BBUAQ, BBUCU, BBLAQ
78-N-TW03	340659	2502146	³ 31	7/25/1997	26.0	6.0–26.0	BBUAQ, BBUCU, BBLAQ
78-N-TW04	340698	2502367	³ 32	7/26/1997	27.0	7.0–27.0	BBUAQ, BBUCU, BBLAQ
78-N-TW05	340886	2502373	³ 31	7/26/1997	25.0	5.0–25.0	BBUAQ, BBUCU, BBLAQ
78-N-TW06	340601	2502614	³ 30	7/24/1997	24.0	4.0–24.0	BBUAQ, BBUCU, BBLAQ
78-N-TW07	340785	2502515	³ 30	7/26/1997	24.5	4.5–24.5	BBUAQ, BBUCU, BBLAQ
78-N-TW08	340978	2502779	³ 29	7/25/1997	24.5	4.5–24.5	BBUAQ, BBUCU, BBLAQ
78-N-TW09	340830	2502731	³ 29	7/25/1997	24.0	4.0–24.0	BBUAQ, BBUCU, BBLAQ
78-N-TW10	341320	2502997	³ 30	7/25/1997	23.0	3.0–23.0	BBUAQ, BBUCU, BBLAQ
78-N-TW11	340900	2503075	³ 30	7/25/1997	29.0	9.0–29.0	BBUAQ, BBUCU, BBLAQ
78-N-TW12	340646	2502383	³ 31	2/5/1998	16.0	6.0–16.0	BBUAQ

Table C52

Table C52. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, Local CU—local confining unit, TTAQ—Tarawa Terrace aquifer, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
78-N-TW13	341083	2502740	³ 29	2/6/1998	14.0	4.0–14.0	BBUAQ
78-PZ01	337933	2499704	³ 28	6/ /2002	N/A	N/A	N/A
78-PZ02	337923	2499685	³ 28	6/ /2002	N/A	N/A	N/A
78-PZ03	337925	2499742	³ 28	6/ /2002	N/A	N/A	N/A
78-PZ04	337904	2499761	³ 27	6/ /2002	N/A	N/A	N/A
78-PZ05	337982	2499698	³ 28	6/ /2002	N/A	N/A	N/A
78-PZ06	338249	2499071	³ 27	6/ /2002	N/A	N/A	N/A
78-PZ07	337220	2498928	³ 25	6/ /2002	N/A	N/A	N/A
78-PZ08	337190	2498924	³ 26	6/ /2002	N/A	N/A	N/A
78-PZ09	337262	2498918	³ 25	6/ /2002	N/A	N/A	N/A
78-PZ10	337283	2498901	³ 25	6/ /2002	N/A	N/A	N/A
78-PZ11	337239	2498958	³ 25	6/ /2002	N/A	N/A	N/A
78-PZ12	337234	2498988	³ 25	6/ /2002	N/A	N/A	N/A
78-RW-01N	340144	2502600	³ 29	1994	35.0	15.0–35.0	BBLAQ
78-RW-02N	340325	2502410	³ 29	1994	35.0	15.0–35.0	BBLAQ
78-RW-03N	340609	2502101	³ 31	1994	35.0	15.0–35.0	BBLAQ
78-RW-04N	340795	2501992	³ 29	1994	35.0	15.0–35.0	BBLAQ
78-RW-10N	340676	2502626	³ 29	Before 7/ /1995	35.0	15.0–35.0	BBLAQ
78-RW-11N	341178	2502708	³ 32	1995(?)	35.0	15.0–35.0	BBLAQ
78-RW-12N	340724	2502465	³ 31	1995(?)	N/A	N/A	N/A
78-RW-05S	336911	2499403	³ 26	1994	35.0	15.0–35.0	BBLAQ
78-RW-06S	336976	2499119	³ 25	1994	35.0	15.0–35.0	BBLAQ
78-RW-07S	337243	2498933	³ 25	1994	35.0	15.0–35.0	BBLAQ
78-RW-08S	337587	2498662	³ 25	1994	35.0	15.0–35.0	BBLAQ
78-RW-09S	337849	2498402	³ 26	1994	35.0	15.0–35.0	BBLAQ
78-RW-13S	337434	2499262	³ 29	Before 7/ /2000	N/A	N/A	BBLAQ(?)
78-RW-14S	337649	2499663	³ 28	1998	N/A	N/A	BBLAQ(?)
78-RW-15S	337945	2499729	³ 28	1998	N/A	N/A	BBLAQ(?)
78-S-TW01	337215	2499307	³ 29	7/23/1997	23.0	3.0–23.0	BBUAQ, BBUCU, BBLAQ
78-S-TW02	337397	2499260	³ 29	7/23/1997	23.0	3.0–23.0	BBUAQ, BBUCU, BBLAQ
78-S-TW03	337994	2498469	³ 27	7/24/1997	24.5	4.5–24.5	BBUAQ, BBUCU, BBLAQ
78-S-TW04	338371	2498595	³ 26	7/24/1997	24.5	4.5–24.5	BBUAQ, BBUCU, BBLAQ
78-S-TW05	337594	2499598	³ 28	7/24/1997	24.5	4.5–24.5	BBUAQ, BBUCU, BBLAQ
78-S-TW06	337767	2499355	³ 29	7/22/1997	23.0	3.0–23.0	BBUAQ, BBUCU, BBLAQ

Table C52. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, Local CU—local confining unit, TTAQ—Tarawa Terrace aquifer, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
78-S-TW07	337806	2499550	³ 29	7/23/1997	27.0	7.0–27.0	BBUAQ, BBUCU, BBLAQ
78-S-TW08	337758	2499790	³ 28	7/22/1997	28.0	8.0–28.0	BBUAQ, BBUCU, BBLAQ
78-S-TW09	338001	2499461	³ 29	7/23/1997	25.5	5.5–25.5	BBUAQ, BBUCU, BBLAQ
78-S-TW10	338246	2499721	³ 28	7/23/1997	27.0	7.0–27.0	BBUAQ, BBUCU, BBLAQ
78-S-TW11	337977	2499927	³ 27	7/24/1997	30.0	10.0–30.0	BBUAQ, BBUCU, BBLAQ
78-S-TW12	338090	2499832	³ 27	7/23/1997	29.0	9.0–29.0	BBUAQ, BBUCU, BBLAQ
78-S-TW13	337389	2499250	³ 27	2/5/1998	12.5	2.5–12.5	BBUAQ

¹See Figure C14, C15, or C16 for location. Locations of wells TW01–TW13 not shown

²Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³Estimated altitude

Data sources:

CERCLA Administrative Record files #258, #1271, #1503, #1516, #1777, #1977, #2304, #2608A, #3271, #3272, #3273, #3409, #3453
 Baker Environmental, Inc. 1993p, 1994f, 1996j, 1998j,k
 Baker Environmental, Inc. and CH2M Hill, Inc. 2000a, 2002a
 CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc., 2000a, 2001a
 Engineering and Environment, Inc. and Michael Baker, Jr., Inc. 2004a
 Environmental Science and Engineering, Inc. 1988a, 1992a
 Michael Baker, Jr., Inc. and CH2M Hill Federal Group, Ltd. 2003

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-Bldg900_ UST01	7/23/2002	NA	NA	NA	NA	NA	NA	NA
78-Bldg900_ UST02	7/23/2002	NA	NA	NA	NA	NA	NA	NA
78-Bldg900_ UST03	7/23/2002	NA	NA	NA	NA	NA	NA	NA
78-Bldg900_ UST04	7/23/2002	NA	NA	NA	NA	2.0J	NA	NA
78-Bldg900_ UST05	7/23/2002	NA	NA	NA	NA	NA	NA	NA
78-Bldg1611_ UG1A	7/23/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-GW01	1/9/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/8/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/27/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/16/1991	<5.0	91	<5.0	NA	NA	73	<10
	12/9/1993	NA	62	ND	NA	NA	27	ND
	7/9/1995	<0.50	40.8	<0.50	<0.50	NA	NA	<0.50
	10/25/1995	<0.50	34.9	<0.50	<0.50	NA	NA	<0.50
	1/18/1996	<1.0	44.1	<1.0	<1.0	NA	NA	<1.0
	4/11/1996	<0.50	37	<0.50	<0.50	<0.50	NA	<0.50
	7/17/1996	<0.50	NA	0.50	NA	NA	18	<0.50
	10/9/1996	<2.0	21	<0.50	NA	NA	5	<0.50
	2/4/1997	<0.50	12	<0.50	NA	NA	3	<0.50
	4/30/1997	<0.50	18	<0.50	NA	NA	4	<0.50
	8/11/1997	<0.50	21	<0.50	NA	NA	10	<0.50
	2/6/1998	<5.0	14	<5.0	NA	NA	3.9J	<10
	7/27/1998	<5.0	35	<5.0	NA	NA	7.9	<10
	1/19/1999	<5.0	7.0	<5.0	<5.0	4.0J	NA	<5.0
	7/27/1999	<5.0	5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/9/2000	<5.0	11	<5.0	<5.0	4.0J	4.0J	1.0J
	7/17/2000	<5.0	6.0	<5.0	<5.0	5.0	5.0	<2.0
1/9/2001	<5.0	17	<5.0	<5.0	3.0J	3.0J	<2.0	
5/17/2001	<5.0	25	<5.0	<5.0	6.0	6.0	<2.0	
10/10/2001	<5.0	27	<5.0	<5.0	8.0	8.0	<2.0	
1/11/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
7/24/2002	<5.0	21	<5.0	<5.0	7.0J	7.0J	<2.0	
1/27/2003	<5.0	23	<5.0	<5.0	6.0	6.0	<2.0	
1/25/2004	<5.0	15	0.20J	0.40J	6.0	6.0J	<2.0	

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW02	1/9/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/8/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/27/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/16/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	8/8/1997	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0
78-GW03	1/9/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/8/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/27/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/16/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	8/9/1997	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0
78-GW04-1	1/9/1987	<3.0	3.4	<2.8	1.9	NA	NA	<1.0
	3/8/1987	<3.0	2.2	<2.8	<1.6	NA	NA	<1.0
	5/27/1987	<3.0	7.7	<2.8	4.4	NA	NA	<1.0
	1/11/1991	<5.0	0.9J	<5.0	NA	NA	<5.0	<10
	5/23/1993	ND	2.0J	ND	ND	ND	NA	ND
	7/9/1995	<0.50	4.0	<0.50	<0.50	NA	NA	<0.50
	10/25/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/17/1996	<0.50	8.0	<0.50	<0.50	NA	NA	<0.50
	4/12/1996	<0.50	6.7	0.7	<0.50	NA	NA	2.0
	7/15/1996	<0.50	2.0	<0.50	NA	NA	NA	<0.50
	10/6/1996	<2.0	4.0	<0.50	NA	NA	0.6	<0.50
	2/2/1997	<0.50	8.0	<0.50	NA	NA	2.0	<0.50
	4/27/1997	<0.50	7.0	<0.50	NA	NA	2.0	<0.50
	8/9/1997	<0.50	6.0	<0.50	NA	NA	1.0	<0.50
	2/8/1998	<5.0	<5.0	2.9J	NA	NA	<5.0	<10
	7/25/1998	<5.0	3.0J	<5.0	NA	NA	0.92J	<10
	1/17/1999	<5.0	6.0	<5.0	<5.0	3.0J	NA	<5.0
	7/18/1999	<5.0	4.0J	<5.0	<5.0	<5.0	<5.0	<2.0
	1/17/2000	<5.0	11	<5.0	<5.0	6.0	6.0	<2.0
	7/17/2000	<5.0	4.0J	<5.0	<5.0	<5.0	<5.0	<2.0
1/11/2001	<5.0	9.0	<5.0	<5.0	3.0J	3.0J	<2.0	
5/17/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
10/10/2001	<5.0	3.0J	<5.0	<5.0	<5.0	<5.0	<2.0	
1/11/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
7/24/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/25/2003	<5.0	5.0J	0.4J	4.0J	4.0J	1.0J	<2.0	
1/25/2004	<5.0	100	2.0J	<5.0	4.0J	4.0J	<2.0	
78-GW04-2	1/11/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	5/23/1993	ND	ND	ND	ND	ND	NA	ND
78-GW04-3	5/24/1993	ND	ND	ND	ND	ND	NA	ND

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW05	1/12/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/8/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/27/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/10/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	5/22/1993	ND	ND	ND	ND	ND	NA	ND
	7/9/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/25/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/11/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/17/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/6/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	1/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	5/18/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/16/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
7/24/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/25/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/23/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
78-GW06	1/12/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/8/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/27/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/10/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
78-GW07	1/12/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/9/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/27/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/9/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
78-GW08	1/13/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/9/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/27/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/8/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	5/22/1993	ND	ND	ND	ND	ND	NA	ND
	7/9/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/25/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/11/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/14/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/8/1996	<0.50	<0.50	<0.50	NA	NA	NA	<0.50
	2/4/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/29/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
8/10/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
	2/8/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/25/1998	<5.0	57	<5.0	NA	NA	5.7	<10
	1/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/18/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	5/20/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/16/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/24/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/23/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
78-GW09-1 (old)	1/14/1987	<300	5,000	<280	740	NA	NA	<100
	3/9/1987	<750	6,100	<700	<400	NA	NA	<250
	5/28/1987	<200	<100	<280	2,700	NA	NA	<1.0
	1/17/1991	<5.0	14,000	<5.0	NA	NA	1,200	<10
78-GW09-1 (new)	12/9/1993	NA	2,100D	280D	NA	NA	2,400D	ND
	7/10/1995	<0.50	910	<0.50	6.8	NA	NA	<0.50
	10/25/1995	<10	1,100	101	<10	NA	NA	<10
	1/18/1996	<8.3	946	128	13.3	NA	NA	<8.3
	4/11/1996	<0.50	320	120	7.1	NA	NA	<0.50
	7/11/1996	<0.50	NA	NA	NA	NA	NA	<0.50
	10/4/1996	<0.50	490	36	NA	NA	170	<0.50
	2/2/1997	<5.0	640	78	NA	NA	220	<5.0
	4/27/1997	<5.0	580	140	NA	NA	300	<5.0
	8/9/1997	<5.0	920	91	NA	NA	570	<5.0
	2/8/1998	<10	360	16	NA	NA	91	<20
	7/25/1998	<5.0	0.74J	<5.0	NA	NA	5.7	<10
	1/17/1999	<5.0	130	52	<5.0	38	NA	<5.0
	7/17/1999	<5.0	240D	40	<5.0	71	71	<2.0
	1/17/2000	<5.0	200	33	<5.0	46	46	<2.0
	7/17/2000	<5.0	180D	28	<5.0	37	37	<2.0
	1/12/2001	<5.0	140	12	<5.0	18	18	<2.0
	5/17/2001	<5.0	170	18	<5.0	23	23	<2.0
	10/11/2001	<5.0	140	16	<5.0	22	22	<2.0
	1/11/2002	<5.0	160	22	<5.0	18	18	<2.0
	7/24/2002	<5.0	160	8.0	<5.0	17J	17J	<2.0
	1/25/2003	<5.0	120	5.0J	<5.0	8.0	8.0	<2.0
	1/27/2004	<5.0	0.70J	<5.0	<5.0	<5.0	<10	0.90J

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW09-2	8/6/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/8/1991	<5.0	<5.0	<5.0	NA	NA	11	<10
	5/23/1993	ND	ND	ND	ND	ND	NA	ND
	7/12/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	11/6/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/20/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/11/1996	<2.0	<0.50	<0.50	NA	NA	2.0	<0.50
	10/4/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/2/1997	<0.50	<0.50	<0.50	NA	NA	4.0	<0.50
	4/27/1997	<0.50	<0.50	<0.50	NA	NA	3.0	<0.50
	8/9/1997	<0.50	<0.50	<0.50	NA	NA	5.0	<0.50
	2/8/1998	<5.0	<5.0	<5.0	NA	NA	4.3J	<10
	7/25/1998	<5.0	<5.0	<5.0	NA	NA	1.5J	<10
1/18/1999	<5.0	<5.0	<5.0	<5.0	10	NA	<5.0	
78-GW09-3	8/6/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	5/22/1993	ND	ND	ND	ND	ND	NA	ND
	7/12/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	11/5/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/21/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/15/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/4/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/2/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/27/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	8/9/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/8/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/25/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/18/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	5/19/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
1/11/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
7/24/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/25/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/27/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW10	1/14/1987	<3.0	7.4	<2.8	<1.6	NA	NA	<1.0
	3/9/1987	<3.0	8.6	<2.8	<1.6	NA	NA	<1.0
	5/28/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/9/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/9/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/25/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/12/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/16/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/5/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/3/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/28/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/7/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/25/1998	<5.0	42B	<5.0	NA	NA	5.4	<10
	1/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
5/20/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
10/15/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/11/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
7/24/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/25/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/27/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
78-GW11	1/14/1987	<3.0	49	<2.8	12	NA	NA	<1.0
	3/9/1987	<3.0	34	<2.8	7.2	NA	NA	<1.0
	5/28/1987	<3.0	24	<2.8	6.0	NA	NA	<1.0
	1/9/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/10/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/25/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/12/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/15/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/8/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/5/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/29/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
8/10/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW11— Continued	2/5/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/26/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	5/20/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/24/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/27/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
78-GW12	1/14/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/9/1987	3.6	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/28/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/9/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	5/23/1993	ND	ND	ND	ND	ND	NA	ND
78-GW13	1/14/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/9/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/28/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/12/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
78-GW14	1/14/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/9/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/28/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/10/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	5/23/1993	ND	ND	ND	ND	ND	NA	ND
	7/10/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/26/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/11/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/12/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/5/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/2/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/27/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	8/9/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/8/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/26/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/16/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW15	1/15/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/9/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/28/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/8/1991	<5.0	4.0J	<5.0	NA	NA	7.0	<10
	5/24/1993	1.0	1.0	ND	ND	ND	NA	ND
	7/14/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/7/1996	<2.0	0.90	<0.50	NA	NA	<0.50	<0.50
	2/5/1997	<0.50	1.0	<0.50	NA	NA	<0.50	<0.50
	4/30/1997	<0.50	1.0	<0.50	NA	NA	<0.50	<0.50
	8/9/1997	<0.50	1.0	<0.50	NA	NA	<0.50	<0.50
	2/6/1998	<5.0	1.1J	<5.0	NA	NA	<5.0	<10
	7/26/1998	<5.0	0.89J	<5.0	NA	NA	<5.0	<10
	1/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
5/20/2001	<5.0	8.0	<5.0	<5.0	88	88	1.0J	
78-GW16	1/15/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/10/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/28/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/9/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
78-GW17-1	1/15/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/8/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/28/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/7/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	5/24/1993	ND	ND	ND	ND	ND	NA	ND
	7/12/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/26/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/10/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/15/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/7/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/2/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/29/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	8/9/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/9/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/26/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
1/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0	
7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
7/17/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW17-2	8/5/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/8/1991	<5.0	<5.0	<5.0	NA	NA	1.0J	<10
	5/23/1993	ND	ND	ND	ND	ND	NA	ND
78-GW17-3	8/5/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
78-GW18	1/15/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	3/10/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/28/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	12/9/1993	NA	ND	ND	NA	NA	ND	ND
78-GW19	1/16/1987	<3.0	6.0	<2.8	2.5	NA	NA	<1.0
	3/10/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/28/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/11/1991	2.0J	2.0J	<5.0	NA	NA	0.8J	<10
	5/23/1993	1.0	1.0	ND	ND	ND	NA	ND
	7/10/1995	<0.50	1.5	<0.50	<0.50	NA	NA	<0.50
	10/26/1995	0.80	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/17/1996	0.70	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/10/1996	0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/16/1996	0.80	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/5/1996	0.80	<0.50	<0.50	NA	NA	<0.50	<0.50
78-GW20	1/16/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/10/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	5/28/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/12/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
78-GW21	1/16/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/10/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	5/28/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/17/1991	<5.0	3.0J	<5.0	NA	NA	<5.0	<10
	5/21/1993	ND	2.0	ND	ND	ND	NA	ND
	7/9/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/25/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/10/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/17/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/3/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/3/1997	<5.0	<5.0	<0.50	NA	NA	<5.0	<10
	4/28/1997	<5.0	<5.0	<0.50	NA	NA	<5.0	<10
	8/10/1997	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
2/5/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10	
7/28/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10	

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter							
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC	
78-GW21— Continued	1/17/1999	0.9J	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
78-GW22	1/19/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	NA	<1.0
	3/11/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	NA	<1.0
	5/29/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	NA	<1.0
	1/18/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<5.0	<10
78-GW22A	7/9/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	<0.50
	10/25/1995	<25	<25	<25	<25	NA	NA	NA	<25
	1/19/1996	<25	<25	<25	<25	NA	NA	NA	<25
	4/9/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	<0.50
	7/17/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50
	10/4/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50
	2/5/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50
	4/28/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	NA	NA	7.0	<0.50	<0.50
	2/5/1998	0.95J	<5.0	<5.0	NA	NA	<5.0	<5.0	<10
	7/27/1998	<0.50	<0.50	<0.50	NA	NA	<5.0	<5.0	<10
	1/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0	5.0	5.0	<2.0	<2.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0
	1/24/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0
	7/23/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0
1/25/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	<2.0	
1/23/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	<2.0	
78-GW23	1/19/1987	<30	830	<28	830	NA	NA	NA	<10
	3/11/1987	<200	13,000	<280	6,100	NA	NA	NA	<100
	5/29/1987	<200	4,300	<280	7,100	NA	NA	NA	<100
	1/18/1991	<5.0	3,700	<5.0	NA	NA	8,900	<10	<10
	5/23/1993	ND	440J	ND	190J	14,000J	NA	NA	ND
	7/12/1995	<0.50	39.4	<0.50	248	NA	NA	NA	54
	10/25/1995	<1.3	53.9	4.2	18.7	NA	NA	NA	80.9
	1/17/1996	<25	72	219	<25	NA	NA	NA	180
	4/9/1996	<50	<50	<50	130	NA	NA	NA	360
	7/14/1996	<2.0	NA	5.0	NA	NA	NA	NA	NA

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW23— Continued	10/4/1996	<2.0	40	2.0	NA	NA	6,200	200
	2/5/1997	<5.0	57	4.0	NA	NA	7,900	360
	4/28/1997	<50	<50	<50	NA	NA	9,500	340
	8/10/1997	<0.50	62	4	NA	NA	10,000	590
	2/5/1998	<620	<620	<620	NA	NA	11,000	<560
	7/26/1998	<25	430J	<25	NA	NA	8,400D	61
	1/17/1999	<5.0	17	<5.0	140	7,000	NA	360J
	7/17/1999	<5.0	21	<5.0	120	6,200D	6,200D	380D
	1/17/2000	<5.0	21	<5.0	140	8,100D	8,300D	490D
	7/17/2000	<5.0	13	<5.0	99	7,900D	8,100D	470D
	10/19/2000	<5.0	16	<5.0	130	9,400D	9,600D	480D
	1/11/2001	<5.0	14	<5.0	92	4,500D	2,800	190
	7/12/2001	<5.0	<5.0	6.0	55	5,000	5,000	500
	1/24/2002	<5.0	<12	6.0	62	2,100	2,100	360
	7/22/2002	<5.0	8.0	<5.0	57	1,500	1,600	190
	1/25/2003	<5.0	8.0	0.40J	67	1,600	1,700	190
	1/23/2004	<5.0	5.0	<5.0	92	2,100D	2,200D	310
78-GW24-1	1/19/1987	<300	57	<280	6,400	NA	NA	190
	3/11/1987	<200	<100	<280	4,300	NA	NA	<100
	5/29/1987	<200	<100	<280	4,000	NA	NA	250
	1/8/1991	<5.0	180	65	NA	NA	42,000D	< 25,000
	5/24/1993	ND	ND	7.0	140	3,400	NA	97
	7/9/1995	<0.50	6.4	<0.50	4.9	NA	NA	<0.50
	10/25/1995	<1.3	21.1	<1.3	12.8	NA	NA	11.1
	1/21/1996	<1.3	19.2	<1.3	8.5	NA	NA	5.7
	4/9/1996	<0.50	34	<0.50	8	NA	NA	3.6
	7/16/1996	<0.50	NA	<0.50	NA	NA	NA	10
	10/3/1996	<2.0	20	<0.50	NA	NA	120	6.0
	2/4/1997	<0.50	19	<0.50	NA	NA	120	<0.50
	4/29/1997	<0.50	17	<0.50	NA	NA	130	4.0
	8/10/1997	<0.50	28	0.7	NA	NA	220	7.0
	2/7/1998	<10	12	<10	NA	NA	94	<20
	7/25/1998	<5.0	12D	<5.0	NA	NA	330D	5.7JD
	1/16/1999	<5.0	14	<5.0	18	360	NA	25
	7/17/1999	<5.0	13	<5.0	<5.0	810D	830D	31
	1/17/2000	<5.0	10	<5.0	10	190	200	8.0
7/17/2000	<5.0	14	<5.0	13	260D	260D	11.0	
10/19/2000	<5.0	16	<5.0	14	340D	350D	10.0	
1/11/2001	<5.0	15	<5.0	8.0	150	160	7.0	

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW24-1— Continued	7/12/2001	<5.0	<5.0	20	10	750	780	<2.0
	1/10/2002	<5.0	26	<5.0	18	350	360	12
	7/22/2002	<5.0	20	1.0J	16	340	320	5.0
	1/28/2003	<5.0	14	<5.0	9.0	200	200	3.0
	1/28/2003	<1.0	8.0J	<1.0	5.0J	120	120J	1.0J
	1/23/2004	<5.0	24	0.40J	9.0	150	150	4.0
	1/23/2004	<1.0	24	0.50J	8.0	140	150	4.0
	1/23/2004	<1.0	25	0.30J	8.0	140	150	4.0
78-GW24-2	8/6/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/8/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	5/24/1993	ND	ND	ND	ND	<5.0	NA	ND
	7/12/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	11/5/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/21/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/16/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/17/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/3/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/4/1997	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/29/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/7/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/25/1998	<5.0	0.72JB	<5.0	NA	NA	<5.0	<10
	7/25/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/16/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
7/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/10/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
7/22/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/27/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/23/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
78-GW24-3	8/6/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	5/24/1993	ND	ND	ND	1.0	3.0	NA	ND
	7/12/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	11/5/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/21/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/16/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW24-3	7/15/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
Continued	10/4/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/4/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/30/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/7/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/16/1999	9.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/10/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/22/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/27/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/23/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
78-GW25	1/19/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/11/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/29/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/18/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/9/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/24/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/9/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/16/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/3/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/5/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	4/28/1997	<0.50	<0.50	<0.50	NA	NA	0.7	<0.50
	8/10/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/5/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/28/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/16/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/10/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/23/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/27/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/23/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW26	1/19/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	3/12/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	5/29/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/19/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	12/9/1993	NA	ND	ND	NA	NA	ND	ND
78-GW29	1/20/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	3/12/1987	<3.0	<3.0	<2.8	<1.6	NA	NA	<1.0
	5/29/1987	<3.0	<1.0	<2.8	<1.6	NA	NA	<1.0
	1/19/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
78-GW30-2	1/10/1991	<5.0	<5.0	<5.0	NA	NA	12	12
	12/9/1993	NA	ND	ND	NA	NA	12	33
78-GW30-3	12/9/1993	NA	ND	ND	NA	NA	ND	ND
78-GW31-2	1/17/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	5/24/1993	ND	3.0	ND	ND	<5.0	NA	ND
78-GW31-3	5/24/1993	ND	ND	ND	ND	1.0J	NA	ND
	7/12/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	11/6/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/20/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/11/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/8/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
78-GW32-2	1/12/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	5/23/1993	ND	ND	ND	ND		NA	ND
78-GW32-3	5/23/1993	ND	6.0	ND	ND	ND	NA	ND
78-GW35	6/3/1993	ND	ND	ND	ND	ND	NA	ND
78-GW37	6/3/1993	ND	ND	ND	ND	ND	NA	ND
78-GW38	6/3/1993	ND	ND	ND	ND	ND	NA	ND
78-GW39	6/3/1993	1.0	ND	ND	ND	ND	NA	ND
	7/18/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/9/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/5/1997	0.7	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/30/1997	0.8	<0.50	<0.50	NA	NA	<0.50	<0.50
	8/10/1997	0.7	<0.50	<0.50	NA	NA	<0.50	<0.50
	2/8/1998	1.4J	<5.0	<5.0	NA	NA	<5.0	<10
	2/26/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
7/16/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW39— Continued	1/9/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	5/21/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/24/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/23/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/27/2003	0.60J	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/26/2004	0.70J	0.30J	<5.0	<5.0	<5.0	<10	<2.0
78-GW40	2/9/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/26/1998	<5.0	25	<5.0	NA	NA	2.1J	<10
	1/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/24/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/22/2002	<5.0	<5.0	<5.0	<5.0	1.0J	<5.0	<2.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0	1.0J	<5.0	<2.0
1/23/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
78-GW41	2/9/1998	<5.0	<5.0	<5.0	NA	NA	3.5J	<10
	7/26/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	1/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0	5.0J	5.0J	<2.0
	1/28/2002	<5.0	<5.0	<5.0	<5.0	6.0	6.0	4.0
	1/25/2003	<5.0	1.0J	<5.0	<5.0	6.0	6.0	7.0
1/23/2004	<5.0	0.7J	<5.0	0.20J	9.0	9.0J	0.5J	
78-GW42	2/9/1998	<5.0	9.7	0.81J	NA	NA	30	25
	7/26/1998	<5.0	7.8	<5.0	NA	NA	7.7	2.1J
	1/17/1999	<5.0	<5.0	17	<5.0	27	NA	6.0
	7/17/1999	<5.0	33	<5.0	<5.0	59	59	<2.0
	1/17/2000	<5.0	60	4.0J	<5.0	91	91	<2.0
	1/12/2001	<5.0	280D	11	<5.0	490D	380	7.0
	5/18/2001	<5.0	480D	18	<5.0	960D	960D	12
	10/9/2001	<5.0	940	20	<5.0	1,900	1,900	18
	1/24/2002	<5.0	240	25	<5.0	520	530	21
	7/23/2002	<5.0	320	22	1.0J	830	830	30
	1/25/2003	<5.0	280J	20J	2.0J	710J	710J	37J
1/25/2004	<5.0	250D	34	4.0J	910D	910D	120	

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW43	10/19/2000	<5.0	<5.0	<5.0	8.0	65	73	270D
	1/11/2001	<5.0	<5.0	<5.0	6.0	46	52	210D
	7/12/2001	<5.0	<5.0	<5.0	7.0	53	60	180
	1/10/2002	<5.0	<5.0	<5.0	5.0	24	29	180
	7/23/2002	<5.0	<5.0	<5.0	6.0	52	58	150
	1/28/2003	<5.0	2.0J	<5.0	8.0	78	85	190
	1/28/2003	<1.0	<1.0	<1.0	7.0	100	110	180
	1/23/2004	<5.0	0.70J	<5.0	6.0	110	120	120
	1/23/2004	<1.0	0.80J	<1.0	7.0	120	130	180
78-GW44	10/19/2000	<5.0	<5.0	<5.0	26	200	230	5,000D
	1/11/2001	<5.0	<5.0	<5.0	26	520D	320	6,700D
	7/12/2001	<5.0	<5.0	<5.0	36	2,700	2,800	5,800
	1/10/2002	<5.0	<5.0	<5.0	40	890	930	2,300
	7/22/2002	<5.0	<5.0	0.5J	21	620	620	1,900
	1/28/2003	<5.0	<5.0	<5.0	44	1,000	1,100	2,400
	1/28/2003	<1.0	<1.0	0.9J	34	980	1,000	1,600
	1/23/2004	<5.0	<5.0	0.20J	16J	170D	230J	2,400D
	1/23/2004	<1.0	<1.0	<1.0	18J	170	240J	1,900
78-GW45	10/19/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/28/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/23/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
78-GW46	10/19/2000	<5.0	<5.0	<5.0	<5.0	3.0J	3.0J	<2.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0	3.0J	3.0J	<2.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0	9.0	9.0	<2.0
	1/24/2002	<5.0	<5.0	<5.0	<5.0	14	14	1.0J
	7/23/2002	<5.0	<5.0	<5.0	<5.0	27	27	2.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0	17	17	1.0J
	1/23/2004	<5.0	0.60J	<5.0	0.50J	17	18	4.0
78-GW47	10/19/2000	<5.0	240D	<5.0	6.0	260D	270D	4.0
	1/11/2001	<5.0	44	<5.0	<5.0	61	61	1.0J
	7/12/2001	<5.0	45	45	<5.0	98	100	2.0J
	1/24/2002	<5.0	<10	<5.0	<5.0	7.0	7.0	<2.0
	7/23/2002	<5.0	<5.0	<5.0	<5.0	1.0J	1.0J	<2.0
	1/25/2003	<5.0	3.0J	<5.0	<5.0	1.0J	<5.0	<2.0
	1/23/2004	<5.0	6.0	<5.0	<5.0	<5.0	<10	<2.0

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW48	10/19/2000	<5.0	6.0	<5.0	<5.0	22	22	52
	1/11/2001	<5.0	<5.0	<5.0	<5.0	18	19	43
	7/12/2001	<5.0	4.0J	<5.0	<5.0	17	19	37
	1/24/2002	<5.0	<5.0	<5.0	<5.0	15	15	35
	7/23/2002	<5.0	<5.0	<5.0	0.80J	16	16	24
	1/25/2003	<5.0	0.80J	<5.0	1.0J	16	17	20
	1/23/2004	<5.0	0.30J	0.30J	3.0J	41	44	67
78-GW49	5/19/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/9/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/24/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/27/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
78-GW50	5/18/2001	<5.0	<5.0	<5.0	<5.0	7.0	7.0	<2.0
	10/15/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0	<5.0	4.0J	<2.0
	7/23/2002	<5.0	<5.0	<5.0	<5.0	6.0	6.0	<2.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0	2.0J	2.0J	<2.0
	1/27/2004	<5.0	0.20J	<5.0	<5.0	2.0J	3.0J	0.40J
78-GW51	5/20/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/24/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/25/2003	<5.0	<5.0	<5.0	0.50J	<5.0	<5.0	<2.0
	1/25/2004	<5.0	0.40J	<5.0	<5.0	<5.0	<10	<2.0
78-GW52	5/18/2001	<5.0	8,300D	8.0	75	1,700D	1,800D	7.0
	10/9/2001	6.0	8,000	8.0	17	1,800	1,800	6.0
	1/11/2002	<5.0	3,000	12	<5.0	950	950	10
	7/24/2002	<5.0	2,900	6.0	16	840	850	<2.0
	1/25/2003	1.0J	2,700	7.0	23	850	870	4.0
	1/27/2004	0.50J	3,100D	9.0	23	690D	710D	<2.0
78-GW53	5/20/2001	<5.0	9.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/10/2001	<5.0	13	<5.0	<5.0	<5.0	<5.0	<2.0
	1/11/2002	<5.0	23	<5.0	<5.0	<5.0	<5.0	<2.0
	1/25/2003	<5.0	27	<5.0	<5.0	3.0J	3.0J	<2.0
	1/26/2004	<5.0	12	<5.0	<5.0	1.0J	1.0J	<2.0
78-GW54	5/20/2001	<5.0	9.0	<5.0	<5.0	11	12	<2.0
	10/15/2001	<5.0	10	<5.0	<5.0	11	11	<2.0
	1/11/2002	<5.0	9.0	<5.0	<5.0	10	10	<2.0

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW54— Continued	7/24/2002	<5.0	8.0	<5.0	<5.0	8.0	8.0	<2.0
	1/26/2003	<5.0	5.0	<5.0	<5.0	7.0	7.0	<2.0
	1/25/2004	<5.0	6.0	0.30J	0.50J	6.0	7.0J	0.50J
78-GW55	5/20/2001	<5.0	5.0J	<5.0	<5.0	11	12	<2.0
	10/15/2001	<5.0	9.0	<5.0	<5.0	12	12	<2.0
	1/11/2002	<5.0	9.0	<5.0	<5.0	11	11	<2.0
	7/24/2002	<5.0	11	<5.0	<5.0	10	10	<2.0
	1/26/2003	<5.0	7.0	<5.0	<5.0	8.0	8.0	<2.0
	1/25/2004	<5.0	4.0J	<5.0	0.50J	7.0	8.0J	0.50J
78-GW56	5/18/2001	<5.0	8.0	<5.0	<5.0	3.0J	3.0J	<2.0
	10/15/2001	<5.0	11	<5.0	<5.0	4.0J	4.0J	<2.0
	1/11/2002	<5.0	15	<5.0	<5.0	4.0J	4.0J	<2.0
	7/24/2002	<5.0	8.0	<5.0	<5.0	3.0J	3.0J	<2.0
	1/27/2003	<5.0	5.0J	<5.0	<5.0	3.0J	3.0J	<2.0
	1/26/2004	<5.0	16	<5.0	0.40J	4.0J	4.0J	0.20J
78-GW57	5/18/2001	<5.0	42	27	6.0	140	150	200
	10/10/2001	<5.0	60	42	5.0J	190	190	830
	1/11/2002	<5.0	68	49	6.0	170	170	200
	7/24/2002	<5.0	20	19	2.0J	120	120	200J
	1/27/2003	<5.0	12	18	2.0J	120	120	190
	1/25/2004	<5.0	11	18	3.0J	110	120	160D
78-GW58	5/18/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/15/2001	<5.0	<5.0	<5.0	<5.0	5.0	5.0	<2.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0	4.0J	4.0J	<2.0
	7/23/2002	<5.0	<5.0	<5.0	<5.0	5.0J	5.0J	<2.0
	1/27/2003	<5.0	<5.0	<5.0	<5.0	4.0J	4.0J	<2.0
	1/27/2004	<5.0	<5.0	<5.0	<5.0	3.0J	3.0J	<2.0
78-GW59	5/20/2001	<5.0	47	35	9.0	560D	570D	780D
	10/15/2001	<5.0	50	30	4.0J	200	200	360
	1/11/2002	<5.0	62	31	5.0	190	200	140
	7/24/2002	<5.0	90	11	3.0J	190	190	160
	1/25/2003	<5.0	81	12	3.0J	150	150	170
	1/25/2004	<5.0	22	18	4.0J	140	140	200D
78-GW60	7/25/2002	<5.0	1,800	2.0J	<5.0	14	14	<2.0
	1/28/2003	<5.0	3,100J	2.0J	<5.0	<5.0	<5.0	<2.0
	1/28/2003	<1.0	2,800	<1.0	<1.0	18J	18J	<2.0
	1/26/2004	<5.0	4,900D	<5.0	<5.0	7.0	7.0J	<2.0
	1/26/2004	0.60J	5,100	<1.0	<1.0	<1.0	<2.0	<2.0

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW61	7/25/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
	1/25/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
78-GW62	7/25/2002	<5.0	1.0J	<5.0	<5.0	<5.0	<5.0	<2.0
	1/28/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
78-GW63	7/25/2002	<5.0	0.8	<5.0	<5.0	3.0	3.0	<2.0
	1/26/2003	<5.0	<5.0	<5.0	<5.0	3.0J	3.0J	<2.0
	1/25/2004	<5.0	<5.0	<5.0	<5.0	1.0J	1.0J	<2.0
78-GW64	7/25/2002	<5.0	0.6J	<5.0	<5.0	0.6J	<5.0	<2.0
	1/26/2003	<5.0	<5.0	<5.0	<5.0	1.0J	<5.0	<2.0
	1/25/2004	<5.0	<5.0	<5.0	<5.0	4.0J	4.0J	0.30J
78-GW65	7/25/2002	<5.0	20	4.0J	2.0J	150	210	33
	1/25/2003	<5.0	23	3.0J	1.0J	190	190	26
	1/25/2004	<5.0	24	6.0	2.0J	190D	230	44
78-GW66	7/25/2002	<5.0	19	6.0	1.0J	120	120	55
	1/25/2003	<5.0	21	6.0	1.0J	130	130	61
	1/25/2004	<5.0	23	11	3.0J	150	150	97
78-GW67	7/25/2002	<5.0	8.0	0.40J	<5.0	49	49	1.0J
	1/26/2003	<5.0	8.0	0.30J	0.80J	49	50	0.90J
78-GW68	7/25/2002	<5.0	6.0	<5.0	2.0J	38	41	1.0J
	1/26/2003	<5.0	4.0J	<5.0	2.0J	31	33	0.80J
	1/25/2004	<5.0	2.0J	<5.0	1.0J	12	13	1.0J
78-GW69	1/29/2003	<1.0	<1.0	<1.0	7.0	82	88	610
	1/23/2004	<1.0	<1.0	<1.0	7.0J	68J	75J	560
78-GW70	1/29/2003	<1.0	<1.0	0.90J	24	530	550	1,200
	1/23/2004	<1.0	<1.0	0.50J	21J	230	340J	1,100
78-GW71	1/29/2003	<1.0	<1.0	0.60J	9.0	210	260	410
	1/23/2004	<1.0	<1.0	0.30J	6.0J	140J	150J	500
78-GW72	1/29/2003	<1.0	<1.0	0.80J	18	300	360	150
	1/23/2004	<1.0	2.0	1.0	18	400	420	210
78-GW73	1/30/2003	67	<1.0	<1.0	<1.0	5.0	5.0	<2.0
	1/27/2004	140	<1.0	<1.0	<1.0	15	15	<2.0
78-GW74	1/30/2003	39	3,000	<1.0	8.0	950	950	<2.0
	1/26/2004	4.0	500	<1.0	<1.0	190	190	<2.0
78-GW75-1	1/30/2003	1.0	1,600	<1.0	3.0	410	410	<2.0
	1/26/2004	<1.0	3,600	<1.0	41	3,400	3,400	<2.0
	1/26/2004	<1.0	3,800	<1.0	46	3,400	3,500	<2.0
78-GW75-2	1/30/2003	6.0	8,800	2.0	16	1,900	1,900	<2.0

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-GW76	1/30/2003	<1.0	7,200	1.0	6.0	460	460	<2.0
	1/30/2003	1.0	8,000	1.0	7.0	390	390	<2.0
	1/26/2004	2.0	3,400	2.0	49.0	4,200	4,200	<2.0
78-GW77	1/30/2003	0.5J	410	2.0	<1.0	3.0	3.0	<2.0
	1/26/2004	<1.0	550	<1.0	<1.0	<1.0	<2.0	<2.0
78-GW78	1/30/2003	<1.0	<1.0	<1.0	<1.0	6.0	6.0	<2.0
	1/26/2004	<1.0	160J	<1.0	4.0J	480	480	<2.0
78-N-TW01	7/26/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-N-TW02	7/28/1997	<0.50	<0.50	<0.50	NA	NA	2.0	<0.50
78-N-TW03	7/26/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-N-TW04	7/26/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-N-TW05	7/26/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-N-TW06	7/25/1997	<0.50	0.8	<0.50	NA	NA	3.0	<0.50
78-N-TW07	7/26/1997	<0.50	<0.50	<0.50	NA	NA	9.0	15
78-N-TW08	7/25/1997	<0.50	20	<0.50	NA	NA	50	<0.50
78-N-TW09	7/25/1997	<0.50	8.0	<0.50	NA	NA	4.0	<0.50
78-N-TW10	7/26/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-N-TW11	7/26/1997	<0.50	13	<0.50	NA	NA	2.0	<0.50
78-N-TW12	2/8/1998	<10	<10	<10	NA	NA	<10	<20
78-N-TW13	2/6/1998	<5.0	<5.0	<5.0	NA	NA	4.0J	,10
78-RW01N	7/13/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/29/1995	<50	<50	<0.50	<50	NA	NA	<50
	1/18/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/10/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/17/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/6/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-RW02N	7/13/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/26/1995	<12.5	<12.5	<12.5	<12.5	NA	NA	<12.5
	1/18/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/10/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/10/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/4/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-RW03N	7/9/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/28/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	1/18/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/16/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/18/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/7/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-RW04N	7/13/1995	<0.50	0.6	<0.50	<0.50	NA	NA	<0.50
	10/27/1995	<25	<25	<25	<25	NA	NA	<25
	1/18/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/11/1996	<0.50	0.70	<0.50	<0.50	NA	NA	<0.50
	7/17/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
	10/7/1996	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-RW10N	7/13/1995	<0.50	55.9	<0.50	3.1	NA	NA	<0.50
	10/25/1995	<0.50	8.7	<0.50	<0.50	NA	NA	<0.50
	1/17/1996	<2.0	15.4	<2.0	<2.0	NA	NA	<2.0
	4/9/1996	<0.50	23	<0.50	<0.50	NA	NA	1.8
	1/17/2000	<5.0	140	<5.0	<5.0	190D	190D	21
	7/17/2000	<5.0	100	<5.0	<5.0	200	200	3.0
	1/11/2001	<5.0	64	<5.0	<5.0	96	96	<2.0
	7/12/2001	<5.0	140	<5.0	<5.0	640	650	8.0
	1/24/2002	<5.0	73B	<5.0	<5.0	110	110	5.0
	1/28/2003	<5.0	110	<5.0	2.0J	180	190	6.0
1/23/2004	<5.0	72	0.40J	2.0J	130	130	<2.0	
78-RW11N	7/13/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	192
	10/25/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	85.3
	1/17/1996	<0.50	1.3	3.3	1.5	NA	NA	488
	4/9/1996	<0.50	1.4	<0.50	12	NA	NA	1,300
	1/17/2000	<5.0	<5.0	<5.0	9.0	290D	290D	<2.0
	7/17/2000	<5.0	<5.0	<5.0	3.0J	160	160	190D
	1/11/2001	<5.0	<5.0	<5.0	5.0J	180	180	540D
	7/12/2001	<5.0	<5.0	<5.0	7.0	190	200	1,200
	1/24/2002	<5.0	<5.0	<5.0	3.0J	100	110	150
	7/24/2002	<5.0	<5.0	<5.0	2.0J	68J	69J	110
	1/28/2003	<5.0	0.60J	<5.0	9.0	180	220	440
	1/28/2003	<1.0	<1.0	0.30J	9.0	200	210	280
	1/23/2004	<5.0	<5.0	<5.0	0.70J	13	13	110
1/23/2004	<1.0	<1.0	<1.0	0.70J	16	16	110	
78-RW12N	1/17/2000	<5.0	6.0	<5.0	<5.0	10	10	<2.0
	7/17/2000	<5.0	430D	<5.0	14	1,200D	1,200D	16
	1/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/12/2001	<5.0	1,100	<5.0	18	2,300	2,400	25
	1/24/2002	<5.0	80	<5.0	3.0J	140	140	4.0
	7/24/2002	<5.0	<5.0	<5.0	<5.0	1.0J	1.0J	<2.0
	1/25/2003	<5.0	28	<5.0	<5.0	41	41	<2.0
	1/23/2004	<5.0	2.0J	<5.0	<5.0	2.0J	2.0J	<2.0

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-RW05S	7/14/1995	<0.50	7.9	<0.50	1.4	NA	NA	<0.50
	10/26/1995	<0.50	9.1	<0.50	<0.50	NA	NA	<0.50
	1/19/1996	<0.50	18	<0.50	1.7	NA	NA	<0.50
	4/9/1996	<0.50	13	<0.50	<0.50	NA	NA	<0.50
	1/17/2000	<5.0	49	<5.0	<5.0	33	33	<2.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2001	<5.0	42	<5.0	<5.0	50	50	16
	5/20/2001	<5.0	120	<5.0	<5.0	120	130	45
	10/25/2001	<5.0	140	4.0J	<5.0	150	150	82
1/28/2002	<5.0	36	4.0J	<5.0	48	48	17	
78-RW06S	7/13/1995	<0.50	6.6	<0.50	1.2	NA	NA	<0.50
	10/26/1995	<0.50	17.2	<0.50	<0.50	NA	NA	<0.50
	1/19/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/9/1996	<0.50	74	<0.50	1.8	NA	NA	<0.50
	1/17/2000	<5.0	36	3.0J	<5.0	100	100	23
	7/17/2000	<5.0	<5.0	10	<5.0	77	77	<2.0
	1/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	5/20/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/26/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/24/2002	<5.0	<9.0	<5.0	<5.0	9.0	9.0	<2.0
	1/26/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
1/25/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
78-RW07S	7/13/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/29/1995	<0.50	7.9	<0.50	2.6	NA	NA	<0.50
	1/19/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/9/1996	<0.50	12	<0.50	5.1	NA	NA	<0.50
	1/17/2000	<5.0	7.0	<5.0	<5.0	7.0	7.0	<2.0
	7/17/2000	<5.0	5.0J	<5.0	<5.0	7.0	7.0	<2.0
	1/12/2001	<5.0	<5.0	<5.0	<5.0	8.0	8.0	<2.0
	5/20/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	10/26/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/24/2002	<5.0	<8.0	<5.0	<5.0	18	18	<2.0
	1/26/2003	<5.0	2.0J	<5.0	<5.0	3.0J	3.0J	<2.0
1/25/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
78-RW08S	7/13/1995	<0.50	6.7	<0.50	4.8	NA	NA	1.3
	10/26/1995	<12.5	<12.5	<12.5	13.1	NA	NA	<12.5
	1/19/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/9/1996	<0.50	17	<0.50	6.8	NA	NA	<0.50
	1/17/2000	<5.0	6.0	<5.0	<5.0	6.0	6.0	<2.0

Table C53

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-RW08S— Continued	7/17/2000	<5.0	6.0	<5.0	20	20	<5.0	<2.0
	1/12/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	5/20/2001	<5.0	5.0	<5.0	<5.0	3.0J	3.0J	<2.0
	10/26/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/28/2002	<5.0	10	<5.0	<5.0	5.0J	5.0J	<2.0
	1/26/2003	<5.0	4.0J	<5.0	<5.0	2.0J	2.0J	<2.0
	1/25/2004	<5.0	0.2J	<5.0	<5.0	<5.0	<10	<2.0
78-RW09S	7/13/1995	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	10/28/1995	<0.50	2.2	<0.50	0.7	NA	NA	<0.50
	1/19/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	4/17/1996	<0.50	<0.50	<0.50	<0.50	NA	NA	<0.50
	7/18/1996	<0.50	<0.50	<0.50	NA	NA	2.0	<0.50
	10/7/1996	<2.0	<0.50	<0.50	NA	NA	<0.50	<0.50
	1/12/2001	<5.0	3.0J	<5.0	<5.0	<5.0	<5.0	<2.0
	5/20/2001	<5.0	2.0J	<5.0	<5.0	<5.0	<5.0	<2.0
	10/25/2001	<5.0	3.0J	<5.0	<5.0	<5.0	<5.0	<2.0
	1/28/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/26/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
1/25/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
78-RW13S	1/18/2000	<5.0	68	3.0J	<5.0	42	42	2.0
	7/17/2000	<5.0	31	3.0J	<5.0	220D	220D	3.0
	1/12/2001	<5.0	88	10	2.0J	740D	590	28
	5/18/2001	<5.0	96	14	3.0J	780	780D	41
	10/25/2001	<5.0	130	16	3.0J	1,800	1,800	52
	1/24/2002	<5.0	120	12	4.0J	790	790	46
	1/27/2003	<5.0	94	7.0	3.0J	560	560	45
	1/25/2004	<5.0	31	6.0	1.0J	180D	180D	23
78-RW14S	1/9/2001	<5.0	<5.0	<5.0	<5.0	4.0J	4.0J	<2.0
	5/18/2001	<5.0	<5.0	<5.0	<5.0	3.0J	3.0J	<2.0
	10/25/2001	<5.0	8.0	<5.0	<5.0	22	22	<2.0
	1/24/2002	<5.0	<19	<5.0	<5.0	6.0	6.0	<2.0
	7/25/2002	<5.0	1.0J	<5.0	<5.0	4.0J	4.0J	0.40J
	1/27/2003	<5.0	<5.0	<5.0	<5.0	2.0J	2.0J	<2.0
	1/25/2004	0.40J	<5.0	<5.0	<5.0	2.0J	2.0J	<2.0

Table C53. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, constituent not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
78-RW15S	1/17/2000	<5.0	8,600D	<5.0	<5.0	600D	600D	<2.0
	7/17/2000	<5.0	91	<5.0	<5.0	83	83	<2.0
	1/12/2001	3.0J	3,900D	<5.0	<5.0	46.0	46.0	<2.0
	5/20/2001	4.0J	6,500D	<5.0	<5.0	82	82	<2.0
	10/25/2001	4.0J	2,600	<5.0	<5.0	490	490	<2.0
	1/24/2002	<5.0	1,000	<5.0	<5.0	360	390	<2.0
	7/24/2002	8.0	3,800	0.80J	22	1,300	1,300	<2.0
	1/28/2003	2.0J	3,700	2.0J	19	2,200	2,200	<2.0
	1/28/2003	<20	2,800	<20	16J	2,000	2,000	<40
	1/25/2004	0.50J	280D	<5.0	2.0J	420D	420D	<2.0
	1/26/2004	<1.0	280	0.60J	2.0	420	420	<2.0
78-S-TW01	7/24/1997	<0.50	34	6.0	NA	NA	99	45
78-S-TW02	7/24/1997	<0.50	15	0.8	NA	NA	63	28
78-S-TW03	7/25/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-S-TW04	7/25/1997	<0.50	6.0	<0.50	NA	NA	<0.50	<0.50
78-S-TW05	7/25/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-S-TW06	7/23/1997	<0.50	<0.50	8.0	NA	NA	20	<0.50
78-S-TW07	7/24/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-S-TW08	7/24/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-S-TW09	7/24/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-S-TW10	7/24/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-S-TW11	7/24/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-S-TW12	7/24/1997	<0.50	<0.50	<0.50	NA	NA	<0.50	<0.50
78-S-TW13	2/6/1998	<17	28	<17	NA	NA	370	220

¹ See Figure C14, C15, or C16 for location. Locations of wells TW01–TW13 not shown

Data sources:

CERCLA Administrative Record files #258, #522, #1517, #1777, #1778, #1779, #1780, #1977, #2304, #2321, #2338, #2598A, #2608A, #3272, #3273, #3409, #3453

Baker Environmental, Inc. 1994g, 1996i,j, 1997c,d, 1998j,k, 1999b,c

Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000d

Baker Environmental, Inc. and CH2M Hill, Inc. 2000a, 2002a

CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2000a

Engineering and Environment, Inc. and Michael Baker, Jr., Inc. 2004a

Michael Baker, Jr., Inc. and CH2M Hill Federal Group, Ltd. 2003

Environmental Science and Engineering, Inc. 1988a, 1991

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-Bldg900_UST01	7/23/2002	0.30J	NA	NA	NA
78-Bldg900_UST02	7/23/2002	13	34	180	140
78-Bldg900_UST03	7/23/2002	0.20J	NA	NA	NA
78-Bldg900_UST04	7/23/2002	270	100	540	990
78-Bldg900_UST05	7/23/2002	1.0J	0.7J	NA	NA
78-Bldg1611_UG1A	7/23/1997	<0.50	<0.50	<0.50	<0.50
78-GW01	1/9/1987	43	100	12	62
	3/8/1987	3.9	12	<7.2	<12
	5/27/1987	<1.0	<6.0	<7.2	<12
	1/16/1991	<5.0	<5.0	<5.0	<5.0
	12/9/1993	ND	ND	NA	ND
	7/9/1995	<1.0	<1.0	<1.0	NA
	10/25/1995	<0.50	<0.50	<0.50	NA
	1/18/1996	<1.0	<1.0	<1.0	NA
	4/1/1996	<0.50	0.90	<0.50	NA
	7/17/1996	<0.50	<5.0	<0.50	<0.50
	10/9/1996	<0.50	0.80	<0.50	<0.50
	2/4/1997	<0.50	<0.50	<0.50	<0.50
	4/30/1997	<0.50	<0.50	<0.50	<0.50
	8/11/1997	<0.50	<0.50	<0.50	<0.50
	2/6/1998	<5.0	<5.0	<5.0	<5.0
	7/27/1998	<5.0	<5.0	<5.0	<5.0
	1/19/1999	<5.0	<5.0	<5.0	<5.0
	7/27/1999	<5.0	<5.0	<5.0	<5.0
	1/19/2000	<5.0	<5.0	<5.0	<5.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0
1/9/2001	<5.0	<5.0	<5.0	<5.0	
5/17/2001	<5.0	<5.0	<5.0	<5.0	
10/10/2001	<5.0	<5.0	<5.0	<5.0	
1/11/2002	<5.0	<5.0	<5.0	<5.0	
7/24/2002	0.5J	0.5J	<5.0	NA	
1/27/2003	0.40J	<5.0	<5.0	<5.0	
1/25/2004	0.40J	<5.0	<5.0	<15	
78-GW02	1/9/1987	12	38	<7.2	28
	3/8/1987	<1.0	<6.0	<7.2	<12
	5/27/1987	<1.0	<6.0	<7.2	<12
	1/16/1991	<5.0	<5.0	<5.0	<5.0
	8/8/1997	<0.50	<0.50	<0.50	<0.50
	5/22/1993	ND	ND	ND	ND

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW03	1/9/1987	1.4	<6.0	8.2	<12
	3/8/1987	<1.0	<6.0	9.0	<12
	5/27/1987	<1.0	<6.0	<7.2	<12
	1/16/1991	<5.0	<5.0	<5.0	<5.0
	8/9/1997	<0.50	<0.50	<0.50	<0.50
78-GW04-1	1/12/1987	25	35	<7.2	<12
	3/8/1987	3.2	8.2	<7.2	<12
	5/27/1987	1.6	<6.0	<7.2	<12
	1/11/1991	<5.0	<5.0	<5.0	<5.0
	5/23/1993	ND	ND	ND	ND
	7/9/1995	<1.0	<1.0	<1.0	NA
	10/25/1995	<0.50	<0.50	<0.50	NA
	1/17/1996	<0.50	<0.50	<0.50	NA
	4/12/1996	<0.50	1.0	<0.50	NA
	7/15/1996	<0.50	<0.50	<0.50	<0.50
	10/6/1996	<0.50	<0.50	<0.50	<0.50
	2/2/1997	<0.50	<0.50	<0.50	<0.50
	4/2/1997	<0.50	<0.50	<0.50	<0.50
	8/9/1997	<0.50	<0.50	<0.50	<0.50
	2/8/1998	<5.0	<5.0	<5.0	<5.0
	7/25/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	7/18/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0
1/11/2001	<5.0	<5.0	<5.0	<5.0	
5/17/2001	<5.0	<5.0	<5.0	<5.0	
10/9/2001	<5.0	<5.0	<5.0	<5.0	
1/11/2002	<5.0	<5.0	<5.0	<5.0	
7/24/2002	<5.0	<5.0	<5.0	NA	
1/25/2003	0.20J	<5.0	<5.0	<5.0	
1/25/2004	<5.0	<5.0	<5.0	<15	
78-GW04-2	1/11/1991	<5.0	1.0J	<5.0	<5.0
	5/23/1993	5.0J	ND	ND	ND
78-GW04-3	5/24/1993	30J	ND	ND	ND

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW05	1/12/1987	<1.0	<6.0	<7.2	<12
	3/8/1987	<1.0	<6.0	<7.2	<12
	5/27/1987	<1.0	<6.0	<7.2	<12
	1/10/1991	<5.0	<5.0	<5.0	<5.0
	5/22/1993	ND	ND	ND	ND
	7/9/1995	<1.0	<1.0	<1.0	NA
	10/25/1995	<0.50	1.2	<0.50	NA
	1/17/1996	<0.50	<0.50	<0.50	NA
	4/11/1996	<0.50	1.7	<0.50	NA
	7/17/1996	<0.50	<0.50	<0.50	<0.50
	10/6/1996	<0.50	<0.50	<0.50	<0.50
	1/2/2001	<5.0	<5.0	<5.0	<5.0
	5/17/2001	<5.0	<5.0	<5.0	<5.0
	10/16/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0
	7/24/2002	<5.0	<5.0	<5.0	NA
	1/23/2003	<5.0	<5.0	<5.0	<5.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0
	1/23/2004	<5.0	<5.0	<5.0	<15
78-GW06	1/12/1987	<1.0	<6.0	<7.2	<12
	3/8/1987	<1.0	<6.0	<7.2	<12
	5/27/1987	<1.0	<6.0	<7.2	<12
	1/10/1991	<5.0	<5.0	<5.0	<5.0
78-GW07	1/12/1987	<1.0	<6.0	<7.2	<12
	3/9/1987	<1.0	<6.0	<7.2	<12
	5/27/1987	<1.0	<6.0	<7.2	<12
	1/9/1991	<5.0	<5.0	<5.0	<5.0
78-GW08	1/13/1987	<1.0	<6.0	<7.2	<12
	3/9/1987	<1.0	<6.0	<7.2	<12
	5/27/1987	<1.0	<6.0	<7.2	<12
	1/8/1991	<5.0	<5.0	<5.0	<5.0
	5/22/1993	ND	ND	ND	ND
	7/9/1995	<1.0	<1.0	<1.0	NA
	10/25/1995	<0.50	<0.50	<0.50	NA
	1/17/1996	<0.50	<0.50	<0.50	NA
	4/11/1996	<0.50	1.4	<0.50	NA
	7/14/1996	<0.50	<0.50	<0.50	<0.50
	10/8/1996	<0.50	<0.50	<0.50	<0.50
	2/4/1997	<0.50	<0.50	<0.50	<0.50
	4/29/1997	<0.50	<0.50	<0.50	<0.50

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW08— Continued	8/10/1997	<0.50	<0.50	<0.50	<0.50
	2/8/1998	<5.0	<5.0	<5.0	<5.0
	7/25/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	7/18/1999	<5.0	<5.0	<5.0	<5.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0
	5/20/2001	<5.0	<5.0	<5.0	<5.0
	10/16/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0
	7/24/2002	<5.0	<5.0	<5.0	NA
	1/25/2003	<5.0	<5.0	<5.0	<5.0
	1/27/2004	<5.0	<5.0	<5.0	<15
78-GW09-1 (old)	1/14/1987	<100	<600	1,100	2,500
	3/9/1987	<250	<1,500	<1,800	<3,000
	5/28/1987	<100	<600	<720	4,000
	1/17/1991	<5.0	330J	700	3,300
78-GW09-1 (new)	12/9/1993	ND	ND	NA	ND
	7/10/1995	<1.0	<1.0	<1.0	NA
	10/25/1995	<10	<10	<10	NA
	1/18/1996	<8.3	<8.3	<8.3	NA
	4/11/1996	<0.50	<0.50	<0.50	NA
	7/11/1996	<0.50	<0.50	<0.50	<0.50
	10/4/1996	<0.50	<0.50	<0.50	<0.50
	2/2/1997	<5.0	<5.0	<5.0	<5.0
	4/27/1997	<5.0	<5.0	<5.0	<5.0
	8/9/1997	<0.50	<0.50	<0.50	<0.50
	2/8/1998	<10	<10	<10	<10
	7/25/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0
	1/12/2001	<5.0	<5.0	<5.0	<5.0
	5/18/2001	<5.0	<5.0	<5.0	<5.0
	10/11/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0
7/24/2002	<5.0	<5.0	<5.0	NA	
1/25/2003	<5.0	<5.0	<5.0	<5.0	
1/27/2004	0.20J	<5.0	<5.0	<15	

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW09-2	8/6/1987	<1.0	<6.0	<7.2	<12
	1/8/1991	<5.0	<5.0	<5.0	<5.0
	5/23/1993	6.0	ND	ND	ND
	7/12/1995	<1.0	<1.0	<1.0	NA
	11/6/1995	<0.50	<0.50	<0.50	NA
	1/20/1996	<0.50	<0.6	<0.50	NA
	4/17/1996	<0.50	0.80	<0.50	NA
	7/11/1996	<0.50	<0.50	<0.50	<0.50
	10/4/1996	<0.50	<0.50	<0.50	<0.50
	2/2/1997	<0.50	<0.50	<0.50	<0.50
	4/27/1997	<0.50	<0.50	<0.50	<0.50
	8/9/1997	<0.50	<0.50	<0.50	<0.50
	2/8/1998	<5.0	<5.0	<5.0	<5.0
	7/25/1998	<5.0	0.70J	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	78-GW09-3	8/6/1987	<1.0	<6.0	<7.2
5/22/1993		ND	ND	ND	ND
7/12/1995		<1.0	<1.0	<1.0	NA
11/5/1995		<0.50	<0.50	<0.50	NA
1/21/1996		<0.50	<0.6	<0.50	NA
4/17/1996		<0.50	1.6	<0.50	NA
7/15/1996		<0.50	<0.50	<0.50	<0.50
10/4/1996		<0.50	<0.50	<0.50	<0.50
2/2/1997		<0.50	<0.50	<0.50	<0.50
4/27/1997		<0.50	<0.50	<0.50	<0.50
8/9/1997		<0.50	<0.50	<0.50	<0.50
2/8/1998		<5.0	<5.0	<5.0	<5.0
7/25/1998		<5.0	<5.0	<5.0	<5.0
1/17/1999		<5.0	<5.0	<5.0	<5.0
7/18/1999		<5.0	<5.0	<5.0	<5.0
1/16/2000		<5.0	<5.0	<5.0	<5.0
7/16/2000		<5.0	<5.0	<5.0	<5.0
1/9/2001		<5.0	<5.0	<5.0	<5.0
5/19/2001		<5.0	<5.0	<5.0	<5.0
10/11/2001		<5.0	<5.0	<5.0	<5.0
1/11/2002	<5.0	<5.0	<5.0	<5.0	
7/24/2002	<5.0	<5.0	<5.0	NA	
1/25/2003	<5.0	<5.0	<5.0	<5.0	
1/27/2004	<5.0	<5.0	<5.0	<15	

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW10	1/14/1987	<1.0	<6.0	<7.2	<12
	3/9/1987	<1.0	<6.0	<7.2	<12
	5/28/1987	<1.0	<6.0	<7.2	<12
	1/9/1991	<5.0	<5.0	<5.0	<5.0
	7/9/1995	<1.0	<1.0	<1.0	NA
	10/25/1995	<0.50	<0.50	<0.50	NA
	1/17/1996	<0.50	<0.50	<0.50	NA
	4/12/1996	<0.50	1.0	<0.50	NA
	7/16/1996	<0.50	<0.50	<0.50	<0.50
	10/5/1996	<0.50	<0.50	<0.50	<0.50
	2/3/1997	<0.50	<0.50	<0.50	<0.50
	4/29/1997	<0.50	<0.50	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	<0.50
	2/7/1998	<5.0	<5.0	<5.0	<5.0
	7/25/1998	<5.0	0.66J	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0
	5/20/2001	<5.0	<5.0	<5.0	<5.0
	10/15/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0
7/24/2002	<5.0	<5.0	<5.0	NA	
1/25/2003	<5.0	<5.0	<5.0	<5.0	
1/27/2004	<5.0	<5.0	<5.0	<15	
78-GW11	1/14/1987	<1.0	<6.0	<7.2	<12
	3/9/1987	<1.0	<6.0	<7.2	<12
	5/28/1987	<1.0	<6.0	<7.2	<12
	1/9/1991	<5.0	<5.0	<5.0	<5.0
	7/10/1995	<1.0	<1.0	<1.0	NA
	10/25/1995	<0.50	<0.50	<0.50	NA
	1/17/1996	<0.50	<0.50	<0.50	NA
	4/12/1996	<0.50	1.1	<0.50	NA
	7/15/1996	<0.50	<0.50	<0.50	<0.50
	10/8/1996	<0.50	<0.50	<0.50	<0.50
	2/5/1997	<0.50	<0.50	<0.50	<0.50
	4/29/1997	<0.50	<0.50	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	<0.50
	2/5/1998	<5.0	<5.0	<5.0	<5.0

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW11—Continued	7/26/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0
	5/20/2001	<5.0	<5.0	<5.0	<5.0
	10/11/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0
	7/24/2002	<5.0	<5.0	<5.0	NA
	1/25/2003	<5.0	<5.0	<5.0	<5.0
	1/27/2004	<5.0	<5.0	<5.0	<15
	78-GW12	1/14/1987	<1.0	<6.0	<7.2
3/9/1987		<1.0	<6.0	<7.2	<12
5/28/1987		<1.0	<6.0	<7.2	<12
1/9/1991		<5.0	<5.0	<5.0	<5.0
5/23/1993		ND	ND	ND	ND
78-GW13	1/14/1987	<1.0	<6.0	<7.2	<12
	3/9/1987	<1.0	<6.0	<7.2	<12
	5/28/1987	<1.0	<6.0	<7.2	<12
	1/12/1991	<5.0	<5.0	<5.0	<5.0
78-GW14	1/14/1987	<1.0	<6.0	<7.2	<12
	3/9/1987	<1.0	<6.0	<7.2	<12
	5/28/1987	<1.0	<6.0	<7.2	<12
	1/10/1991	<5.0	<5.0	<5.0	<5.0
	5/23/1993	ND	ND	ND	ND
	7/9/1995	1.3	<1.0	<1.0	NA
	10/26/1995	<0.50	<0.50	<0.50	NA
	1/17/1996	<0.50	<0.50	<0.50	NA
	4/11/1996	<0.50	0.7	<0.50	NA
	7/12/1996	<0.50	<0.50	<0.50	<0.50
	10/5/1996	<0.50	<0.50	<0.50	<0.50
	2/2/1997	<0.50	<0.50	<0.50	<0.50
	4/27/1997	<0.50	<0.50	<0.50	<0.50
	8/9/1997	<0.50	<0.50	<0.50	<0.50
	2/8/1998	<5.0	<5.0	<5.0	<5.0
	7/26/1998	<5.0	<5.0	<5.0	<5.0
	1/16/1999	<5.0	<5.0	<5.0	<5.0
7/17/1999	<5.0	<5.0	<5.0	<5.0	
1/15/2000	<5.0	<5.0	<5.0	<5.0	
7/16/2000	<5.0	<5.0	<5.0	<5.0	

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW15	1/15/1987	<1.0	<6.0	<7.2	<12
	3/9/1987	<1.0	<6.0	<7.2	<12
	5/28/1987	<1.0	<6.0	<7.2	<12
	1/8/1991	<5.0	<5.0	<5.0	<5.0
	5/24/1993	ND	ND	ND	ND
	7/14/1996	<0.50	<0.50	<0.50	NA
	10/7/1996	<0.50	<0.50	<0.50	<0.50
	2/5/1997	<0.50	<0.50	<0.50	<0.50
	4/30/1997	<0.50	<0.50	<0.50	<0.50
	8/9/1997	<0.50	<0.50	<0.50	<0.50
	2/6/1998	<5.0	<5.0	<5.0	<5.0
	7/26/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
7/17/2000	<5.0	<5.0	<5.0	<5.0	
5/20/2001	<5.0	<5.0	<5.0	<5.0	
78-GW16	1/15/1987	<1.0	<6.0	<7.2	<12
	3/10/1987	<1.0	<6.0	<7.2	<12
	5/28/1987	<1.0	<6.0	<7.2	<12
	1/9/1991	<5.0	<5.0	<5.0	<5.0
78-GW17-1	1/15/1987	<1.0	<6.0	<7.2	<12
	3/10/1987	<1.0	<6.0	<7.2	<12
	5/28/1987	<1.0	<6.0	<7.2	<12
	1/7/1991	<5.0	<5.0	<5.0	<5.0
	5/24/1993	ND	ND	ND	ND
	7/12/1995	<1.0	<1.0	<1.0	NA
	10/26/1995	<0.50	<0.50	<0.50	NA
	1/17/1996	<0.50	<0.50	<0.50	NA
	4/10/1996	1.5	5.9	<0.50	NA
	7/15/1996	<1.0	<1.0	<1.0	NA
	10/7/1996	<0.50	<0.50	<0.50	<0.50
	2/2/1997	<0.50	<0.50	<0.50	<0.50
	4/29/1997	<0.50	<0.50	<0.50	<0.50
	8/9/1997	<0.50	<0.50	<0.50	<0.50
	2/9/1998	<5.0	<5.0	<5.0	<5.0
	7/26/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
7/17/1999	<5.0	<5.0	<5.0	<5.0	
1/15/2000	<5.0	<5.0	<5.0	<5.0	
7/17/2000	<5.0	<5.0	<5.0	<5.0	

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW17-2	8/5/1987	<1.0	<6.0	<7.2	<12
	1/8/1991	3.0J	<5.0	<5.0	<5.0
	5/23/1993	ND	ND	ND	ND
78-GW17-3	8/5/1987	<1.0	<6.0	<7.2	<12
78-GW18	1/15/1987	<1.0	<6.0	<7.2	<12
	3/10/1987	<1.0	<6.0	<7.2	<12
	5/28/1987	<1.0	<6.0	<7.2	<12
	12/9/1993	ND	ND	ND	BD
78-GW19	1/16/1987	<1.0	<6.0	<7.2	<12
	3/10/1987	<1.0	<6.0	<7.2	<12
	5/27/1987	<1.0	<6.0	<7.2	<12
	1/11/1991	<5.0	<5.0	<5.0	<5.0
	5/23/1993	ND	ND	ND	ND
	7/10/1995	<1.0	<1.0	<1.0	NA
	10/26/1995	<0.50	<0.50	<0.50	NA
	1/17/1996	<0.50	<0.50	<0.50	NA
	4/10/1996	<0.50	<0.50	<0.50	NA
	7/16/1996	<0.50	<0.50	<0.50	<0.50
10/5/1996	<0.50	<0.50	<0.50	<0.50	
78-GW20	1/16/1987	<1.0	<6.0	<7.2	<12
	3/10/1987	<1.0	<6.0	<7.2	<12
	5/28/1987	<1.0	<6.0	<7.2	<12
78-GW21	1/16/1987	<1.0	<6.0	<7.2	<12
	3/10/1987	<1.0	<6.0	<7.2	<12
	5/28/1987	<1.0	<6.0	<7.2	<12
	1/12/1991	<5.0	<5.0	0.90J	5.0
	5/21/1993	2.0	ND	ND	ND
	7/9/1995	<1.0	<1.0	<1.0	NA
	10/25/1995	<0.50	1.4	<0.50	NA
	1/17/1996	<0.50	0.8	<0.50	NA
	4/10/1996	<0.50	<0.50	<0.50	NA
	7/17/1996	<0.50	<0.50	<0.50	<0.50
	10/3/1996	<0.50	<0.50	<0.50	<0.50
	2/3/1997	<0.50	<0.50	<0.50	<0.50
	4/28/1997	<0.50	<0.50	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	<0.50
	2/5/1998	<5.0	<5.0	<5.0	<5.0
	7/28/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
7/17/1999	<5.0	<5.0	<5.0	<5.0	
1/15/2000	<5.0	<5.0	<5.0	<5.0	
7/16/2000	<5.0	<5.0	<5.0	<5.0	

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW22	1/16/1987	<1.0	<6.0	<7.2	<12
	3/11/1987	<1.0	<6.0	<7.2	<12
	5/29/1987	<1.0	<6.0	<7.2	<12
	1/18/1991	<5.0	<5.0	<5.0	<5.0
78-GW22A	7/9/1995	1.2	<1.0	<1.0	NA
	10/25/1995	<25	<25	<25	NA
	1/19/1996	<25	<25	<25	NA
	4/9/1996	<0.50	<0.50	<0.50	NA
	7/17/1996	<0.50	<0.50	<0.50	<0.50
	10/4/1996	<0.50	<0.50	<0.50	<0.50
	2/5/1997	<0.50	<0.50	<0.50	<0.50
	4/28/1997	<0.50	<0.50	<0.50	<0.50
	8/10/1997	0.8	0.6	<0.50	<0.50
	2/5/1998	<5.0	<5.0	<5.0	<5.0
	2/27/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0
	1/24/2002	<5.0	<5.0	<5.0	<5.0
	7/23/2002	<5.0	<5.0	<5.0	<5.0
	1/25/2003	<5.0	0.20J	0.10J	<5.0
1/23/2004	<5.0	<5.0	<5.0	<15	
78-GW23	1/19/1987	<10	<60	<72	<120
	3/11/1987	<100	<600	<720	<1,200
	5/29/1987	<100	<600	<720	<1,200
	1/18/1991	24	13	9.0	41
	5/23/1993	ND	ND	5.0J	28J
	7/12/1995	30	1.6	7.3	NA
	10/25/1995	23	5.4	35.5	NA
	1/17/1996	<25	<25	<25	NA
	4/9/1996	16	3.5	24	NA
	7/14/1996	17	4.0	9.0	57
	10/4/1996	16	3.0	7.0	51
	2/5/1997	16	3.0	7.0	46
	4/28/1997	<50	<50	<50	<50
	8/10/1997	17	4.0	7.0	50
	2/5/1998	<620	<620	<620	<620
	7/26/1998	18J	9.4J	9.7J	61

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW23—Continued	1/17/1999	18	4.0J	8	57
	7/17/1999	16	4.0J	10	68
	1/17/2000	16	4.0J	9.0	56
	7/17/2000	14	4.0J	8.0	69
	10/19/2000	17	4.0J	8.0	74
	1/11/2001	14	3.0J	5.0	51
	7/12/2001	11	3.0J	8.0	46
	1/24/2002	11	4.0J	8.0	56
	7/22/2002	12	<5.0	10	73
	1/25/2003	10	3.0J	6.0	49
	1/23/2004	11		2.0J	39
78-GW24-1	1/19/1987	2.0	<600	<720	<1,200
	3/11/1987	<100	<600	<720	<1,200
	5/29/1987	<100	<600	<720	<1,200
	1/8/1991	3.0J	13	3.0J	10
	5/24/1993	51	2.0	ND	1.0
	7/9/1995	1.4	<1.0	<1.0	NA
	10/25/1995	<1.3	<1.3	<1.3	NA
	1/21/1996	<1.3	<1.5	<1.3	NA
	4/9/1996	<0.50	<0.50	<0.50	NA
	7/16/1996	0.6	0.7	<0.50	<0.50
	10/3/1996	<0.50	<0.50	<0.50	<0.50
	2/4/1997	<0.50	<0.50	<0.50	<0.50
	4/29/1997	<0.50	<0.50	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	<0.50
	2/7/1998	<10	<10	<10	<10
	7/25/1998	<5.0	1.5JD	<5.0	<5.0
	1/16/1999	<5.0	4.0J	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0
	10/19/2000	<5.0	<5.0	<5.0	<5.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0
	1/10/2002	<5.0	<5.0	<5.0	<5.0
	7/22/2002	0.40J	<5.0	<5.0	0.60J
	1/28/2003	0.40J	0.30J	<5.0	<5.0
	1/28/2003	0.20J	<1.0	<1.0	<1.0
1/23/2004	3.0J	<5.0	<5.0	<15	
1/23/2004	0.30J	<1.0	<1.0	<3.0	
1/23/2004	0.30J	<1.0	<1.0	<3.0	

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW24-2	8/6/1987	<1.0	<6.0	<7.2	<12
	1/8/1991	<5.0	<5.0	<5.0	<5.0
	5/24/1993	ND	ND	ND	ND
	7/12/1995	<1.0	2.1	<1.0	NA
	11/5/1995	<0.50	<0.50	<0.50	NA
	1/21/1996	<0.50	<0.6	<0.50	NA
	4/16/1996	4.8	15	3.5	NA
	7/17/1996	<0.50	<0.50	<0.50	<0.50
	10/3/1996	<0.50	<0.50	<0.50	<0.50
	2/4/1997	<0.50	<0.50	<0.50	<0.50
	4/29/1997	<0.50	<0.50	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	<0.50
	2/7/1998	<5.0	<5.0	<5.0	<5.0
	7/25/1998	<5.0	<5.0	<5.0	<5.0
	1/16/1999	<5.0	<5.0	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0
1/10/2002	<5.0	<5.0	<5.0	<5.0	
7/22/2002	<5.0	<5.0	<5.0	<5.0	
1/27/2003	<5.0	<5.0	<5.0	<5.0	
1/23/2004	<5.0	<5.0	<5.0	<15	
78-GW24-3	8/6/1987	<1.0	<6.0	<7.2	<12
	5/24/1993	35	ND	ND	ND
	7/12/1995	<1.0	<1.0	<1.0	NA
	11/5/1995	<0.50	<0.50	<0.50	NA
	1/12/1996	<0.50	<0.6	<0.50	NA
	4/16/1996	<0.50	0.8	<0.50	NA
	7/15/1996	<0.50	<0.50	<0.50	<0.50
	10/4/1996	<0.50	0.8	<0.50	<0.50
	2/4/1997	<0.50	<0.50	<0.50	<0.50
	4/29/1997	<0.50	<0.50	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	<0.50
	2/7/1998	<5.0	<5.0	<5.0	<5.0
	1/16/1999	<5.0	<5.0	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0
	1/16/2000	<5.0	<5.0	<5.0	<5.0
7/16/2000	<5.0	<5.0	<5.0	<5.0	

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW24-3—Continued	1/9/2001	<5.0	<5.0	<5.0	<5.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0
	1/10/2002	<5.0	<5.0	<5.0	<5.0
	7/22/2002	<5.0	<5.0	<5.0	<5.0
	1/27/2003	<5.0	<5.0	<5.0	<5.0
	1/23/2004	<5.0	<5.0	<5.0	<15
78-GW25	1/19/1987	<1.0	<6.0	<7.2	<12
	3/11/1987	<1.0	<6.0	<7.2	<12
	5/29/1987	<1.0	<6.0	<7.2	<12
	1/18/1991	<5.0	<5.0	<5.0	<5.0
	7/9/1995	<1.0	<1.0	<1.0	NA
	10/24/1995	1.4	6.0	1.4	NA
	1/17/1996	<0.50	<0.50	<0.50	NA
	4/9/1996	<0.50	<0.50	<0.50	NA
	7/17/1996	<0.50	<0.50	<0.50	<0.50
	10/3/1996	<0.50	<0.50	<0.50	<0.50
	2/5/1997	<0.50	<0.50	<0.50	<0.50
	4/28/1997	<0.50	<0.50	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	<0.50
	2/5/1998	<5.0	<5.0	<5.0	<5.0
	7/28/1998	<5.0	<5.0	<5.0	<5.0
	1/16/1999	<5.0	<5.0	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0
	1/12/2001	<5.0	<5.0	<5.0	<5.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0
	1/10/2002	<5.0	<5.0	<5.0	<5.0
7/23/2002	<5.0	<5.0	<5.0	<5.0	
1/27/2003	<5.0	<5.0	<5.0	<5.0	
1/23/2004	<5.0	<5.0	<5.0	<15	
78-GW26	1/19/1987	<1.0	<6.0	<7.2	<12
	3/12/1987	<1.0	<6.0	<7.2	<12
	5/29/1987	<1.0	<6.0	<7.2	<12
	1/19/1991	<5.0	<5.0	<5.0	<5.0
	1/12/1991	<5.0	<5.0	<5.0	<5.0
	12/9/1993	ND	ND	ND	ND
78-GW29	1/20/1987	<1.0	<6.0	<7.2	<12
	3/12/1987	<1.0	<6.0	<7.2	<12
	5/29/1987	<1.0	<6.0	<7.2	<12

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW30-2	1/10/1991	2.0J	2.0J	0.70J	2.0J
	12/9/1993	7.0J	3.0J	NA	3.0J
78-GW30-3	12/9/1993	ND	ND	NA	ND
78-GW31-2	1/17/1991	<5.0	<5.0	<5.0	1.0J
	5/24/1993	ND	ND	ND	ND
78-GW31-3	5/24/1993	15J	ND	ND	ND
	7/12/1995	<1.0	<1.0	<1.0	NA
	11/6/1995	<0.50	<0.50	<0.50	NA
	1/20/1996	<0.50	<0.50	<0.50	NA
	4/17/1996	<0.50	1.1	<0.50	NA
	7/11/1996	<0.50	<0.50	<0.50	<0.50
	10/8/1996	<0.50	<0.50	<0.50	<0.50
78-GW32-2	1/12/1991	27	31	2.0J	8.0
	5/22/1993	ND	ND	ND	ND
78-GW32-3	5/23/1993	ND	ND	ND	ND
78-GW35	6/3/1993	ND	ND	ND	ND
78-GW37	6/3/1993	ND	ND	ND	ND
78-GW38	6/3/1993	ND	ND	ND	ND
78-GW39	6/3/1993	ND	ND	ND	ND
	7/18/1996	<0.50	1.0	<0.50	0.7
	10/9/1996	<0.50	<0.50	<0.50	<0.50
	2/5/1997	<0.50	<0.50	<0.50	<0.50
	4/30/1997	<0.50	<0.50	<0.50	<0.50
	8/10/1997	<0.50	<0.50	<0.50	<0.50
	2/8/1998	<5.0	<5.0	<5.0	<5.0
	7/25/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	7/18/1999	<5.0	<5.0	<5.0	<5.0
	1/15/2000	<5.0	<5.0	<5.0	<5.0
	7/16/2000	<5.0	<5.0	<5.0	<5.0
	1/9/2001	<5.0	<5.0	<5.0	<5.0
	5/21/2001	<5.0	<5.0	<5.0	<5.0
10/16/2001	<5.0	<5.0	<5.0	<5.0	
1/24/2002	<5.0	<5.0	<5.0	<5.0	
7/23/2002	<5.0	<5.0	<5.0	NA	
1/27/2003	<5.0	<5.0	<5.0	<5.0	
1/26/2004	<5.0	<5.0	<5.0	<15	

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW40	2/9/1998	<5.0	<5.0	<5.0	0.79J
	7/26/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0
	1/24/2002	<5.0	<5.0	<5.0	<5.0
	7/22/2002	<5.0	<5.0	<5.0	<5.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0
	1/23/2004	<5.0	<5.0	<5.0	<15
78-GW41	2/9/1998	<5.0	<5.0	<5.0	0.73J
	7/26/1998	<5.0	<5.0	<5.0	<5.0
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	7/17/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0
	1/28/2002	<5.0	<5.0	<5.0	<5.0
	1/25/2003	0.30J	<5.0	<5.0	<5.0
	1/23/2004	0.40J	<5.0	<5.0	<15
	78-GW42	2/9/1998	4.4J	0.90J	<5.0
7/26/1998		<5.0	<5.0	<5.0	<5.0
1/17/1999		<5.0	<5.0	<5.0	<5.0
7/18/1999		<5.0	<5.0	<5.0	<5.0
1/17/2000		<5.0	<5.0	<5.0	<5.0
1/12/2001		<5.0	<5.0	<5.0	<5.0
5/18/2001		<5.0	<5.0	<5.0	<5.0
10/9/2001		2.0J	<5.0	<5.0	<5.0
1/11/2002		2.0J	<5.0	<5.0	<5.0
7/23/2002		2.0J	0.30J	<5.0	NA
1/25/2003		2.0J	0.30J	<10	<10
1/25/2004		3.0J	0.60J	<5.0	<15
78-GW43		10/19/2000	<5.0	3.0J	<5.0
	1/11/2001	<5.0	2.0J	<5.0	7.0
	7/12/2001	<5.0	3.0J	<5.0	7.0
	1/10/2002	<5.0	3.0J	<5.0	8.0
	7/23/2002	1.0J	3.0J	<5.0	<8.0
	1/28/2003	2.0J	3.0J	2.0J	<10
	1/28/2003	2.0J	3.0	2.0	9.0
	1/23/2004	1.0J	1.0J	2.0J	5.0J
	1/23/2004	1.0	2.0	1.0	5.0

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW44	10/19/2000	3.0J	11	<5.0	8.0
	1/11/2001	<5.0	9.0	<5.0	10
	7/12/2001	4.0J	9.0	<5.0	11
	1/10/2002	3.0J	8.0	<5.0	9.0
	7/22/2002	3.0J	8.0	<5.0	<6.0
	1/28/2003	4.0J	7.0	2.0J	<10
	1/28/2003	3.0	7.0	1.0	9.0
	1/23/2004	2.0J	2.0J	0.20J	3.0J
	1/23/2004	2.0J	2.0J	0.20J	3.0J
78-GW45	10/19/2000	<5.0	<5.0	<5.0	<5.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0
	1/28/2002	<5.0	<5.0	<5.0	<5.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0
	1/23/2004	<5.0	<5.0	<5.0	<15
78-GW46	10/19/2000	290D	14	100	320
	1/11/2001	100	3.0J	32	46
	7/12/2001	950	20	540	350
	1/24/2002	170	3.0J	39	77
	7/23/2002	94	2.0J	27	27
	1/25/2003	79	1.0J	27	20
	1/23/2004	76	0.60J	17	10J
78-GW47	10/19/2000	3.0J	<5.0	<5.0	<5.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0
	1/24/2002	4.0J	<5.0	<5.0	<5.0
	7/23/2002	4.0J	<5.0	<5.0	2.0J
	1/25/2003	5.0J	<5.0	<5.0	<10
	1/23/2004	3.0J	<5.0	<5.0	0.60J
78-GW48	10/19/2000	22	70	140	710D
	1/11/2001	19	62	120	440D
	7/12/2001	18	59	100	510
	1/26/2002	17	49	100	520
	7/23/2002	14	40	100	470
	1/25/2003	14	43	96	440
	1/23/2004	19	72	96	520
78-GW49	5/19/2001	<5.0	<5.0	<5.0	<5.0
	10/9/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0
	7/24/2002	<5.0	<5.0	<5.0	NA
	1/25/2003	<5.0	<5.0	<5.0	<5.0
	1/27/2004	<5.0	<5.0	<5.0	<15

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW50	5/18/2001	<5.0	<5.0	<5.0	<5.0
	10/15/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0
	7/23/2002	<5.0	<5.0	<5.0	NA
	1/27/2003	<5.0	<5.0	<5.0	<5.0
	1/27/2004	<5.0	<5.0	<5.0	<15
78-GW51	5/18/2001	<5.0	<5.0	<5.0	<5.0
	10/10/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0
	7/24/2002	<5.0	<5.0	<5.0	NA
	1/25/2003	<5.0	0.50J	<10	<10
	1/25/2004	<5.0	<5.0	0.30J	<15
78-GW52	5/18/2001	1,200D	26	23	21
	10/9/2001	1,300	24	22	23
	1/11/2002	650	30	18	27
	7/24/2002	510	19	10	NA
	1/25/2003	520	17	<10	NA
	1/27/2004	570D	4.0J	12	5.0J
78-GW53	5/20/2001	<5.0	<5.0	<5.0	<5.0
	10/10/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	3.0j	<5.0	9.0
	1/25/2003	<5.0	<5.0	<5.0	<5.0
	1/26/2004	<5.0	<5.0	<5.0	<15
78-GW54	5/20/2001	<5.0	<5.0	<5.0	<5.0
	10/15/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0
	7/24/2002	<5.0	<5.0	<5.0	NA
	1/26/2003	<5.0	0.20J	<5.0	<5.0
	1/25/2004	<5.0	<5.0	<5.0	<15
78-GW55	5/20/2001	<5.0	<5.0	<5.0	<5.0
	10/15/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	9.0	4.0J	17
	7/24/2002	<5.0	<5.0	<5.0	NA
	1/26/2003	<5.0	0.20J	<5.0	<5.0
	1/25/2004	<5.0	<5.0	<5.0	<15
78-GW56	5/18/2001	<5.0	<5.0	<5.0	<5.0
	10/15/2001	<5.0	<5.0	<5.0	<5.0
	1/11/2002	<5.0	<5.0	<5.0	<5.0
	7/24/2002	<5.0	<5.0	<5.0	NA
	1/27/2003	<5.0	<5.0	<5.0	<5.0
	1/26/2004	<5.0	<5.0	<5.0	<15

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW57	5/18/2001	8.0	<5.0	<5.0	<5.0
	10/10/2001	13	<5.0	<5.0	<5.0
	1/11/2002	24	<5.0	<5.0	<5.0
	7/24/2002	42	0.6J	<5.0	NA
	1/27/2003	23	0.40J	<10	<10
	1/25/2004	6.0	<5.0	<5.0	<15
78-GW58	5/18/2001	1,000	14,000D	2,400D	11,000D
	10/15/2001	440	16,000	3,000	13,000
	1/11/2002	250	6,400	1,300	5,800
	7/23/2002	200J	4,400	860	NA
	1/27/2003	280	6,800	1,600	7,000
	1/27/2004	270DJ	6,300DJ	1,500DJ	6,600DJ
78-GW59	5/20/2001	13	<5.0	<5.0	<5.0
	10/15/2001	9.0	<5.0	<5.0	<5.0
	1/11/2002	10	<5.0	<5.0	<5.0
	7/24/2002	0.4J	<5.0	<5.0	NA
	1/25/2003	4.0J	<5.0	<5.0	<5.0
	1/25/2004	4.0J	0.20J	<5.0	<15
78-GW60	7/25/2002	<5.0	1,400	1,600	NA
	1/28/2003	<5.0	980J	1,600J	7,600J
	1/28/2003	<1.0	900	1,500	7,100
	1/26/2004	<5.0	750D	1,500D	7,400D
	1/26/2004	<1.0	870	1,700	8,000
78-GW61	7/25/2002	<5.0	<5.0	<5.0	NA
	1/25/2003	<5.0	<5.0	<5.0	<5.0
	1/25/2004	<5.0	<5.0	<5.0	<15
78-GW62	7/25/2002	<5.0	<5.0	<5.0	NA
	1/28/2003	<5.0	<5.0	<5.0	0.40J
78-GW63	7/25/2002	<5.0	<5.0	<5.0	NA
	1/26/2003	<5.0	<5.0	<5.0	<5.0
	1/25/2004	<5.0	<5.0	<5.0	<15
78-GW64	7/25/2002	<5.0	<5.0	<5.0	NA
	1/26/2003	<5.0	<5.0	<5.0	<5.0
	1/25/2004	<5.0	<5.0	<5.0	<15
78-GW65	7/25/2002	1.0J	<5.0	<5.0	NA
	1/25/2006	1.0J	<5.0	<5.0	<5.0
	1/25/2004	0.90J	<5.0	<5.0	<15
78-GW66	7/25/2002	2.0J	<5.0	<5.0	NA
	1/25/2006	2.0J	<5.0	<5.0	NA
	1/25/2004	2.0J	<5.0	<5.0	<15

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-GW67	7/25/2002	<5.0	<5.0	<5.0	NA
	1/26/2003	<5.0	<5.0	<5.0	<5.0
78-GW68	7/25/2002	<5.0	<5.0	<5.0	NA
	1/26/2003	<5.0	<5.0	<5.0	<5.0
	1/25/2004	<5.0	<5.0	<5.0	<15
78-GW69	1/29/2003	3.0	1.0	<1.0	<2.0
	1/23/2004	2.0J	0.60J	<1.0	0.80J
78-GW70	1/29/2003	2.0	2.0	<1.0	3.0
	1/23/2004	1.0J	0.90J	<1.0	0.90J
78-GW71	1/29/2003	2.0	0.40J	1.0J	0.70J
	1/23/2004	1.0J	0.20J	<1.0	<3.0
78-GW72	1/29/2003	1.0	<1.0	<1.0	0.60J
	1/23/2004	1.0	<1.0	<1.0	<3.0
78-GW73	1/30/2003	<1.0	<1.0	16	98(?)
	1/27/2004	<1.0	<1.0	4.0	49
78-GW74	1/30/2003	370	2,300	700	2,700
	1/26/2004	3,200	9,600	1,100	4,200
78-GW75-1	1/30/2003	5,500	14,000	1,600	6,500
	1/26/2004	3,200	7,800	1,800	6,700
	1/26/2004	3,100	7,200	1,600	6,600
78-GW75-2	1/30/2003	560	1,400	550	2,300
78-GW76	1/30/2003	<1.0	50	250	4,100
	1/30/2003	<1.0	49	230	3,800
	1/26/2004	<1.0	71	280	4,000
78-GW77	1/30/2003	11	1,400	730	2,200
	1/26/2004	34	3,200	2,000	7,800
78-GW78	1/30/2003	150	3,700	1,700	6,000
	1/26/2004	150J	9,500	2,200	8,600
78-N-TW01	7/26/1997	<0.50	<0.50	<0.50	<0.50
78-N-TW02	7/28/1997	6.0	<0.50	<0.50	5.0
78-N-TW03	7/26/1997	<0.50	<0.50	<0.50	<0.50
78-N-TW04	7/26/1997	<0.50	<0.50	<0.50	<0.50
78-N-TW05	7/26/1997	<0.50	<0.50	<0.50	<0.50
78-N-TW06	7/25/1997	34	19	22	83
78-N-TW07	7/26/1997	38	14	100	640
78-N-TW08	7/25/1997	<0.50	<0.50	<0.50	<0.50
78-N-TW09	7/25/1997	<0.50	<0.50	<0.50	<0.50
78-N-TW10	7/26/1997	<0.50	<0.50	<0.50	<0.50

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-N-TW11	7/26/1997	<0.50	<0.50	<0.50	<0.50
78-N-TW12	2/8/1998	7.8J	41	190	890D
78-N-TW13	2/6/1998	<5.0	<5.0	<5.0	<5.0
78-RW01N	7/13/1995	<1.0	<1.0	<1.0	NA
	10/29/1995	<50	<50	<50	NA
	1/18/1996	<0.50	<0.50	<0.50	NA
	4/10/1996	<0.50	<0.50	0.6	NA
	7/17/1996	<0.50	<0.50	<0.50	<0.50
	10/6/1996	<0.50	<0.50	<0.50	<0.50
78-RW02N	7/13/1995	<1.0	<1.0	<1.0	NA
	10/26/1995	<12.5	<12.5	<12.5	NA
	1/18/1996	<0.50	<0.50	<0.50	NA
	4/10/1996	<0.50	<0.50	0.6	NA
	7/10/1996	<0.50	<0.50	<0.50	<0.50
	10/4/1996	<0.50	<0.50	<0.50	<0.50
78-RW03N	7/9/1995	1.7	<1.0	<1.0	NA
	10/28/1995	<0.50	<0.50	<0.50	NA
	1/18/1996	<0.50	<0.50	<0.50	NA
	4/16/1996	<0.50	0.9	<0.50	NA
	7/18/1996	<0.50	<0.50	<0.50	NA
	10/7/1996	<0.50	<0.50	<0.50	<0.50
78-RW04N	7/13/1995	<1.0	<0.50	<0.50	NA
	10/27/1995	<25	<25	<25	NA
	1/18/1996	<0.50	<0.50	<0.50	NA
	4/11/1996	<0.50	1.0	<0.50	NA
	7/17/1996	<0.50	<0.50	<0.50	<0.50
	10/7/1996	<0.50	<0.50	<0.50	<0.50
78-RW10N	7/13/1995	451	66.2	54.7	NA
	10/25/1995	118	12.5	175	NA
	1/17/1996	106	9.8	62.4	NA
	4/9/1996	81	10	33	NA
	1/17/2000	220D	18	85	120
	7/17/2000	200	9.0	69	180
	1/11/2001	29	<5.0	4.0J	20
	7/12/2001	120	<5.0	4.0J	8.0
	1/24/2002	160	4.0J	71	60
	1/28/2003	190	2.0J	45	17
1/23/2004	180	1.0J	23	4.0J	

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-RW11N	7/13/1995	1.2	1.4	<1.0	NA
	10/25/1995	<0.50	<0.50	<0.50	NA
	1/17/1996	1.3	1.3	<0.50	NA
	4/9/1996	1.3	<0.50	0.76	NA
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0
	7/12/2001	<5.0	<5.0	<5.0	<5.0
	1/24/2002	<5.0	<5.0	<5.0	<5.0
	7/24/2002	0.8J	<5.0	<5.0	<5.0
	1/28/2003	<5.0	<5.0	<10	<10
	1/28/2003	2.0	0.80J	0.30J	1.0
	1/23/2004	0.40J	<5.0	<5.0	<15
	1/23/2004	0.40J	<1.0	<1.0	<3.0
78-RW12N	1/17/2000	<5.0	<5.0	<5.0	2.0J
	7/17/2000	5.0J	<5.0	<5.0	<5.0
	1/11/2001	<5.0	<5.0	<5.0	<5.0
	7/12/2001	7.0	<5.0	<5.0	4.0J
	1/24/2002	<5.0	<5.0	<5.0	<5.0
	7/24/2002	<5.0	<5.0	<5.0	<5.0
	1/25/2003	<5.0	<5.0	<10	<10
	1/23/2004	<5.0	<5.0	<5.0	<15
78-RW05S	7/14/1995	<1.0	<1.0	<1.0	NA
	10/26/1995	<0.50	<0.50	<0.50	NA
	1/19/1996	1.0	<0.50	<0.50	NA
	4/9/1996	<0.50	1.0	<0.50	NA
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0
	1/13/2001	<5.0	<5.0	<5.0	<5.0
	5/20/2001	<5.0	<5.0	<5.0	4.0J
	10/25/2001	5.0J	<5.0	<5.0	4.0J
	1/28/2002	<5.0	<5.0	<5.0	<5.0
78-RW06S	7/13/1995	<1.0	<1.0	<1.0	NA
	10/26/1995	<0.50	<0.50	<0.50	NA
	1/19/1996	<0.50	<0.6	<0.50	NA
	4/9/1996	<0.50	<0.50	<0.50	NA
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0
	1/13/2001	<5.0	<5.0	<5.0	<5.0
	5/20/2001	<5.0	<5.0	<5.0	<5.0

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-RW06S—Continued	10/26/2001	<5.0	<5.0	<5.0	<5.0
	1/24/2002	<5.0	<5.0	<5.0	<5.0
	1/26/2003	<5.0	<5.0	<5.0	0.80J
	1/25/2004	<5.0	<5.0	<5.0	<15
78-RW07S	7/13/1995	1.4	1.4	<1.0	NA
	10/29/1995	<0.50	<0.50	<0.50	NA
	1/19/1996	<0.50	<0.6	<0.50	NA
	4/9/1996	<0.50	<0.50	<0.50	NA
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0
	1/12/2001	<5.0	<5.0	<5.0	<5.0
	5/20/2001	<5.0	<5.0	<5.0	<5.0
	10/26/2001	<5.0	<5.0	<5.0	<5.0
	1/24/2002	<5.0	<5.0	<5.0	2.0J
	1/26/2003	<5.0	<5.0	<5.0	<5.0
	1/25/2004	<5.0	<5.0	<5.0	<15
	78-RW08S	7/13/1995	1.5	1.8	<1.0
10/26/1995		<12.5	<12.5	<12.5	NA
1/19/1996		<0.50	<0.6	<0.50	NA
4/9/1996		<0.50	<0.50	<0.50	NA
1/17/2000		<5.0	<5.0	<5.0	<5.0
7/17/2000		<5.0	<5.0	<5.0	<5.0
1/12/2001		<5.0	<5.0	<5.0	<5.0
5/17/2001		<5.0	<5.0	<5.0	<5.0
10/26/2001		<5.0	<5.0	<5.0	<5.0
1/28/2002		<5.0	<5.0	<5.0	<5.0
1/26/2003		<5.0	<5.0	<5.0	<5.0
1/25/2004	<5.0	<5.0	<5.0	<15	
78-RW09S	7/13/1995	<1.0	<1.0	<1.0	NA
	10/28/1995	<0.50	<0.50	<0.50	NA
	1/19/1996	<0.50	<0.50	<0.50	NA
	4/17/1996	<0.50	1.3	<0.50	NA
	7/18/1996	<0.50	<0.50	<0.50	<0.50
	10/7/1996	<0.50	<0.50	<0.50	<0.50
	1/20/2001	<5.0	<5.0	<5.0	<5.0
	5/17/2001	<5.0	<5.0	<5.0	<5.0
	10/25/2001	<5.0	<5.0	<5.0	<5.0
	1/28/2002	<5.0	<5.0	<5.0	<5.0
	1/26/2003	<5.0	<5.0	<5.0	<5.0
	1/25/2004	<5.0	<5.0	<5.0	<15

Table C54

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-RW13S	1/18/2000	<5.0	<5.0	<5.0	6.0
	7/17/2000	<5.0	<5.0	<5.0	<5.0
	1/12/2001	3.0J	<5.0	<5.0	<5.0
	5/18/2001	3.0J	<5.0	<5.0	<5.0
	10/25/2001	3.0J	<5.0	<5.0	<5.0
	1/24/2002	3.0J	<5.0	2.0J	9.0
	1/27/2003	2.0J	7.0	<10	15.0
	1/25/2004	2.0J	<5.0	<5.0	1.0J
78-RW14S	1/12/2001	5.0	89	280D	1,200D
	5/18/2001	<5.0	10	39	110
	10/25/2001	9.0	34	190	330
	1/24/2002	5.0	24	140	270
	7/25/2002	11	80	20	470
	1/27/2003	2.0J	17	<10	87
	1/25/2004	5.0J	72	31	280
78-RW15S	1/17/2000	<5.0	120	190	2,000D
	7/17/2000	<5.0	<5.0	<5.0	42
	1/12/2001	<5.0	9.0	48	920D
	5/20/2001	<5.0	12	78	3,400D
	10/25/2001	<5.0	6.0	70	1,200
	1/24/2002	<5.0	7.0	46	680
	7/24/2002	61	290	190	1,200
	1/28/2003	140	380	290	1,400
	1/28/2003	110	310	230	1,100
	1/25/2004	<5.0	7.0	21	140
	1/26/2004	<1.0	6.0	19	140

Table C54. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 78, Hadnot Point Industrial Area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[J, estimated concentration; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; ND, not detected; D, sample dilution required; B, detected in blank]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
78-S-TW01	7/24/1997	4.0	<0.50	<0.50	<0.50
78-S-TW02	7/24/1997	3.0	<0.50	<0.50	<0.50
78-S-TW03	7/25/1997	<0.50	<0.50	<0.50	11
78-S-TW04	7/22/1997	2.0	<0.50	<0.50	<0.50
78-S-TW05	7/25/1997	160	53	700	1,100
78-S-TW06	7/25/1997	2.0	1.0	3.0	5.0
78-S-TW07	7/24/1997	<0.50	<0.50	<0.50	<0.50
78-S-TW08	7/24/1997	<0.50	<0.50	<0.50	<0.50
78-S-TW09	7/24/1997	<0.50	<0.50	<0.50	<0.50
78-S-TW10	7/24/1997	<0.50	<0.50	<0.50	<0.50
78-S-TW11	7/24/1997	<0.50	<0.50	<0.50	<0.50
78-S-TW12	7/24/1997	<0.50	<0.50	<0.50	<0.50
78-S-TW13	2/6/1998	<17	<17	<17	<17

¹See Figure C14, C15, or C16 for location. Locations of wells TW01–TW13 not shown

Data sources:

CERCLA Administrative Record files #258, #522, #1517, #1777, #1778, #1779, #1780, #1977, #2304, #2321, #2338, #2598A, #2608A, #3272, #3273, #3409, #3453

Baker Environmental, Inc. 1994g, 1996i,j, 1997c,d, 1998j,k, 1999b,c

Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000d

Baker Environmental, Inc. and CH2M Hill, Inc. 2000a, 2002a

CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2000a

Engineering and Environment, Inc. and Michael Baker, Jr., Inc. 2004a

Michael Baker, Jr., Inc. and CH2M Hill Federal Group, Ltd. 2003

Environmental Science and Engineering, Inc. 1988a, 1991

Tables C55 and C56

Table C55. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 80, Paradise Point golf maintenance area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLCU—Brewster Boulevard lower confining unit, TTAQ—Tarawa Terrace aquifer, UCHRBU—Upper Castle Hayne aquifer—River Bend unit]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
80-MW01	356371	2485201	15.7	6/16/1991	20.2	10.0–20.0	BBLCU, TTAQ
80-MW02	356456	2485245	17.2	6/16/1991	22.0	12.0–22.0	BBLCU, TTAQ
80-MW03	356013	2485194	14.6	6/13/1991	14.8	4.8–14.8	BBLCU, TTAQ
80-MW03IW	355988	2485152	14.4	11/5/1994	72.0	57.0–72.0	UCHRBU
80-MW04	356067	2484971	13.7	11/3/1994	26.5	11.5–26.5	BBLCU, TTAQ
80-MW05	356293	2485251	16.2	11/4/1994	27.0	12.0–27.0	BBLCU, TTAQ
80-MW06	356415	2485411	17.1	11/5/1994	27.0	11.0–27.0	BBLCU, TTAQ
80-MW07	355886	2485254	16.2	11/4/1994	27.5	12.5–27.5	BBLCU, TTAQ
80-MW08	356233	2484893	15.0	6/13/1995	25.0	10.0–25.0	BBLCU, TTAQ

¹ See Figure C19 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

Data sources:

CERCLA Administrative Record files #329, #1697

Baker Environmental, Inc. 1996e

Haliburton NUS, 1992b

Table C56. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 80, Paradise Point golf maintenance area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
80-MW01	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	11/20/1994	<10	<10	<10	NA	NA	<10	<10
80-MW02	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	11/21/1994	<10	<10	<10	NA	NA	<10	<10
80-MW03	6/16/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	11/20/1994	<10	<10	<10	NA	NA	<10	<10
80-MW03IW	12/3/1994	<10	<10	<10	NA	NA	<10	<10
80-MW04	11/19/1994	<10	<10	<10	NA	NA	<10	<10
80-MW05	11/20/1994	<10	<10	<10	NA	NA	<10	<10
80-MW06	11/20/1994	<10	<10	<10	NA	NA	<10	<10
80-MW07	11/19/1994	<10	<10	<10	NA	NA	<10	<10
80-MW08	7/14/1995	NA	NA	NA	NA	NA	NA	NA

¹ See Figure C19 for location

Data sources:

CERCLA Administrative Record files #329, #1697

Baker Environmental, Inc. 1996e

Haliburton NUS 1992b

Table C57. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 80, Paradise Point golf maintenance area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
80-MW01	6/27/1991	< 5.0	< 5.0	< 5.0	< 5.0
	11/20/1994	< 10	< 10	< 10	< 10
80-MW02	6/27/1991	< 5.0	< 5.0	< 5.0	< 5.0
	11/21/1994	< 10	< 10	< 10	< 10
80-MW03	6/16/1991	< 5.0	180	5.0	21
	11/20/1994	< 10	< 10	< 10	< 10
80-MW03IW	12/3/1994	< 10	< 10	< 10	< 10
80-MW04	11/19/1994	< 10	< 10	< 10	< 10
80-MW05	11/20/1994	< 10	< 10	< 10	< 10
80-MW06	11/20/1994	< 10	< 10	< 10	< 10
80-MW07	11/19/1994	< 10	< 10	< 10	< 10
80-MW08	7/14/1995	NA	NA	NA	NA

¹ See Figure C19 for location

Data sources:

CERCLA Administrative Record files #329, #1697

Baker Environmental, Inc. 1996e

Haliburton NUS 1992b

Table C58**Table C58.** Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[VOC, volatile organic compound; NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, TTAQ—Tarawa Terrace aquifer, TTCU—Tarawa Terrace confining unit, UCHLU—Upper Castle Hayne aquifer—Lower unit, UCHRBU—Upper Castle Hayne aquifer—River Bend unit; AKA, also known as; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
82-DMW01 ⁴ AKA DMW-1	348383	2503129	³ 15	N/A	N/A	135–155	UCHLU
82-DP01	348089	2503210	³ 29	3/ /1995	100	80–100	TTAQ
82-DP02	347836	2503298	³ 27	3/ /1995	100	80–100	TTAQ
82-DRW01 ⁴	348098	2503431	³ 30	1995	N/A	80–100	TTCU(?), UCHRBU
82-DRW02 ⁴	348703	2502795	³ 25	1996	N/A	90–110	TTCU(?), UCHRBU
82-DRW03 ⁴	348351	2502402	³ 23	1996	N/A	90–110	TTCU(?), UCHRBU
82-DRW04 ⁴	348391	2503128	³ 15	1996	N/A	90–110	UCHRBU
82-MW01	348523	2502130	6.1	6/17/1991	14.2	4–14	BBLAQ
82-MW02	349073	2503529	3.7	6/17/1991	13.2	3–13	BBLAQ
82-MW03	348220	2502375	22.0	6/18/1991	21.5	11–21	BBLAQ
82-MW30	348087	2503799	29.7	1991(?)	25.0	N/A	BBLAQ(?)
82-MW31	351137	2503789	31.0	N/A	N/A	N/A	N/A
82-SP01	348381	2503504	³ 25	12/ /1995	35	15–35	BBLAQ
82-SP02	348351	2503503	³ 26	12/ /1995	35	15–35	BBLAQ
82-SP03	348361	2503602	³ 27	12/ /1995	35	15–35	BBLAQ
82-SRW01 ⁴	348361	2503516	³ 26	3/ /1995	35	15–35	BBLAQ
82-SRW02 ⁴	348700	2503512	³ 4	1996	35	15–35	TTAQ
82-SRW03 ⁴	348673	2503322	³ 5	1996	35	15–35	TTAQ
82-SRW04 ⁴	348726	2503118	³ 15	1996	35	15–35	BBLAQ
82-SRW05 ⁴	348781	2502930	³ 22	1996	35	15–35	BBLAQ
82-SRW06 ⁴ (old)	348826	2502756	³ 21	1996	35	15–35	BBLAQ
82-SRW06 ⁴ (new)	348826	2502756	³ 21	2000	55	35–55	BBLAQ
82-TW01	348969	2502692	³ 6	N/A	N/A	N/A	N/A
82-TW02	349010	2502636	³ 4	N/A	N/A	N/A	N/A
82-TW03	348983	2502760	³ 9	N/A	N/A	N/A	N/A

¹ See Figure C5 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

⁴ Well assigned to Site 6 in Camp Lejeune Water (CLW) documents and CERCLA Administrative Record files published after 1998

Data sources:

CERCLA Administrative Record files #125, #1272, #2013, #2337, #2547, #2609A, #3276, #3278

Baker Environmental, Inc. 1993k,m, 1998a, 1999d

Baker Environmental, Inc. and CH2M Hill, Inc. 2001a, 2002b

CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 200b

James A. Dunn, Jr., OHM Remediation Services Corp., written communication, April 1, 1996

Table C59. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[VOC, volatile organic compound; D, sample dilution required; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; B, detected in blank; E, concentration exceeds calibration range of gas chromatograph/mass spectrometer; R, analytical result is unreliable; ND, constituent not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
82-DRW01 ²	4/17/1998	1,300	35,000D	<500	NA	NA	9,300	<500
	7/28/1998	1,400	36,000	<1,000	NA	NA	10,000	<2,000
	10/19/1998	<2,000	24,000	<2,000	NA	NA	4,900	<2,000
	1/15/1999	790J	21,000	29	990J	2,900	NA	120
	4/17/1999	1,200D	27,000D	19	2,000D	5,400D	NA	95
	7/28/1999	1,700	31,000	<1,000	2,300	5,700	8,000	<400
	10/23/1999	2,500D	71,000D	19	3,400	9,000D	7,300	64
	1/17/2000	2,400D	35,000D	20	3,000D	7,400D	10,000D	87
	7/13/2000	1,600D	25,000D	19	2,700D	5,700D	7,700D	77
	1/10/2001	3,800D	36,000D	15	3,400D	9,300D	13,000D	54
	7/10/2001	4,600J	34,000	18	4,000	11,000	15,000	69
	1/15/2002	1,400	15,000	12	1,100	3,100	4,200	60
	1/27/2003	1,200	14,000	10	1,200	2,800	4,000	41
	1/22/2004	740D	9,600D	8.0	960D	2,200D	NA	27
	7/26/2004	860D	11,000D	6.0J	790D	2,000D	NA	20J
82-DRW02 ²	4/16/1998	1,000	23,000D	<500	NA	NA	12,000	270J
	7/24/1998	780D	19,000BD	20	NA	NA	8,200D	140
	10/19/1998	<1,000	14,000	<1,000	NA	NA	4,600	<1,000
	1/17/1999	520	11,000	20	1,600	4,100	NA	160
	4/17/1999	640	12,000	<500	1,500	4,000	NA	160J
	7/29/1999	760	14,000D	<100	1,900	4,400D	6,100D	170
	10/21/1999	1,000D	26,000D	25	3,300D	8,800D	7,700	160
	1/17/2000	1,700D	45,000D	29	5,900D	14,000D	20,000D	220E
	7/13/2000	610JD	20,000D	25	2,400D	6,400D	8,800D	200E
	1/10/2001	1,800D	12,000D	26	4,400D	11,000D	16,000D	160
	7/10/2001	670J	19,000	18	2,200J	5,500	7,800	110
	1/15/2002	530	7,400	16	1,100	3,100	4,200	100
	1/22/2003	620	7,300	12	1,000	2,700	3,700	68
	1/22/2004	540D	5,500D	21	1,200D	2,700D	NA	77
	7/26/2004	590D	5,000D	13	740D	2,100D	NA	48
82-DRW03 ²	4/16/1998	36J	8,800	<250	NA	NA	5,600	110J
	7/24/1998	<5.0	84	<5.0	NA	NA	53	<10
	10/19/1998	<500	6,400	<500	NA	NA	3,100	<500
	1/16/1999	520	6,500	14	1,200	3,000	NA	66
	4/17/1999	16	6,000D	14	1,100D	2,600D	NA	95
	7/28/1999	23	7,400D	16	1,200D	2,900D	4,100D	77
	10/23/1999	21	12,000D	17	2,100	5,000D	4,800	75
	1/17/2000	7.0	5,500D	21	1,000D	2,400D	3,400D	52
	7/13/2000	14	6,100D	20	3,000D	5,900D	8,800D	150

Table C59

Table C59. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[VOC, volatile organic compound; D, sample dilution required; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; B, detected in blank; E, concentration exceeds calibration range of gas chromatograph/mass spectrometer; R, analytical result is unreliable; ND, constituent not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
82-DRW03 ²⁻ Continued	1/10/2001	12	14,000D	18	2,400D	5,600D	8,000D	83
	7/10/2001	18	9,600	15	2,600	5,700	8,200	70
	1/15/2002	14	2,500	14	590	1,800	2,400	59
	7/31/2002	16	2,900R	14	750R	1,800R	2,500R	34
	1/27/2003	14	2,300	10	480	1,200	1,700	29
	1/22/2004	8.0	1,800D	13	450D	940D	NA	23
	7/26/2004	13.0	2,000D	14	320D	780D	NA	23
82-DRW04 ²	4/16/1998	<620	20,000	<620	NA	NA	7,600	<620
	7/28/1998	150J	21,000	<1,000	NA	NA	7,700	<2,000
	10/19/1998	<1,000	21,000	<1,000	NA	NA	6,300	<1,000
	1/15/1999	1,100	15,000	34	1,100	2,800	NA	240
	4/17/1999	56	17,000D	17J	1,600	4,400D	NA	130
	7/29/1999	79	22,000D	16	1,800D	5,000D	6,100D	110
	10/23/1999	99	24,000D	18	3,000D	7,700D	6,600	110
	1/17/2000	110	33,000D	19	3,300D	7,600D	11,000D	140
	7/13/2000	130	17,000D	18	1,700D	4,700D	6,400D	130
	1/10/2001	140	9,000D	18	3,300D	8,400D	12,000D	100
	7/11/2001	490J	22,000	82	2,700	7,600	10,000	120
	1/15/2002	200	9,300	15	1,000	2,600	3,600	98
	7/31/2002	190	8,000R	14	880R	2,600R	3,500R	60
	1/27/2003	1,900	8,400	18	950	2,300	3,200	79
1/22/2004	180	6,700D	13	920D	2,100D	NA	68	
7/26/2004	190	6,000D	16	570D	1,500D	NA	40	
82-MW01	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	10/23/1992	ND	ND	ND	NA	NA	ND	ND
	3/23/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
82-MW02	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	10/24/1992	ND	ND	ND	NA	NA	ND	1.6
	3/23/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
	7/27/1997	<10	<10	<10	NA	NA	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	4/15/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/25/1998	8.3	<5.0	<5.0	NA	NA	<5.0	<10
	1/16/1999	<5.0	38	<5.0	<5.0	<5.0	NA	<5.0
	7/28/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/12/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
7/12/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	
1/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0	

Table C59. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[VOC, volatile organic compound; D, sample dilution required; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; B, detected in blank; E, concentration exceeds calibration range of gas chromatograph/mass spectrometer; R, analytical result is unreliable; ND, constituent not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
82-MW02— Continued	7/11/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/22/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
	7/28/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	0.30J
82-MW03	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	3/23/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
	7/23/1997	<10	<10	<10	NA	NA	<10	<10
	1/17/1998	1.1J	<5.0	<5.0	NA	NA	<5.0	<10
	4/15/1998	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	7/24/1998	13	1.2J	<5.0	NA	NA	<5.0	<10
	1/16/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<5.0
	7/28/1999	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/12/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/22/2003	<5.0	1.0J	<5.0	<5.0	<5.0	<5.0	<2.0
1/21/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0	
7/26/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0	
82-MW30	3/22/1993	<1.0	1.5J	<1.0	NA	NA	<1.0	<1.0
82-MW31	6/27/1991	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
82-SRW01 ²	4/22/1998	560	1,600	<50	NA	NA	620	<100
	7/23/1998	680D	2,300BD	<120	NA	NA	1,100D	<120
	10/19/1998	360	850D	<50	NA	NA	230	<50
	1/15/1999	680	770	<5.0	89	170	NA	<5.0
	4/17/1999	1100	530	<50	61	150	NA	<50
	1/17/2000	2,400D	1,600D	2.0J	180	550D	790D	<2.0
	7/13/2000	2,100JD	3,600D	3.0J	570E	2,500JD	2,500JD	<2.0
	1/10/2001	2,900D	1,200D	<5.0	62	150	210	<2.0
	7/10/2001	1,600	920J	<5.0	82	200	280	<2.0
	1/15/2002	300J	5,500	11	1,700	4,300	6,000	3.0
	7/31/2002	2,100	1,800	<250	400	1,100J	1,500J	<100
	1/27/2003	1,900	1,200	3.0J	380J	870	1,200	0.50J
1/22/2004	1,900D	190D	0.60J	32	100	140	<2.0	
7/26/2004	3,900D	320D	<5.0	55	160	NA	<2.0	

Table C59

Table C59. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[VOC, volatile organic compound; D, sample dilution required; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; B, detected in blank; E, concentration exceeds calibration range of gas chromatograph/mass spectrometer; R, analytical result is unreliable; ND, constituent not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
82-SRW02 ²	4/22/1998	28	230	<10	NA	NA	190	<20
	7/28/1998	28	280	<12	NA	NA	410	<25
	1/15/1999	8.0	30	<5.0	6.0	25	NA	<5.0
	4/17/1999	6.0	90	<5.0	33	100	NA	2.0J
	10/25/1999	1,100D	24,000D	25	3,300D	8,700D	7,500	160
	1/17/2000	18	74	<5.0	20.0	71	91	<2.0
	7/13/2000	75	840JD	<5.0	200E	920JD	920JD	15
	1/10/2001	3.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/18/2001	14	140	<5.0	54	150	200	4.0
	1/15/2002	18	140	<5.0	60	160	220	8.0
	1/27/2003	26	250	0.60J	120	260	340	25
	1/22/2004	150	310D	1.0J	170	340D	490D	13
	7/26/2004	43	90	<5.0	28	75	NA	1.0J
82-SRW03 ²	4/22/1998	130	1,600	<100	NA	NA	1,500	<100
	7/28/1998	100	1,200	<50	NA	NA	1,500	<100
	10/19/1998	350	2,100	<100	NA	NA	1,500	<100
	1/15/1999	180	520	<5.0	270	860	NA	22
	4/17/1999	220D	1,300D	2.0J	430D	1,100D	NA	10
	7/28/1999	370	2,900	<100	940	2,900	3,800	50
	10/23/1999	21	110	<5.0	27	99	120	<2.0
	1/17/2000	210	1,400	<50	460	1,200	1,700	25
	7/13/2000	72	2,200D	<5.0	660D	2,700D	3,300D	NA
	1/15/2001	66	1,500D	<5.0	640D	1,400D	1,700D	18
	7/10/2001	62	400	<5.0	160	2,000	2,500	11
	1/15/2002	53	520	<5.0	160	780	850	16
	7/31/2002	18	300R	1.0J	86	490R	570R	8.0
	1/27/2003	50	350	2.0J	120	540	670	23
1/22/2004	42	510D	2.0J	230D	790D	1,000D	21	
7/26/2004	58	530D	2.0J	190	700D	NA	22	
82-SRW04 ²	4/23/1998	360	2,800	<170	NA	NA	2,100	<330
	7/28/1998	190	1,400	<100	NA	NA	1,100	<200
	10/19/1998	87	650	<50	NA	NA	720	<50
	1/15/1999	86	960	<5.0	280	1,500	NA	79
	4/17/1999	80	450D	<10	90	350	NA	7.0J
	7/29/1999	560	1,100D	<50	410	1,300	1,700	25
	10/23/1999	82	6,500D	7.0	990D	6,100D	3,200	74
	1/17/2000	130	570D	<5.0	97	340D	430D	12
	7/13/2000	87	550D	<5.0	91	310D	390D	16
	1/10/2001	57	550D	<5.0	94	320D	390D	12

Table C59. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[VOC, volatile organic compound; D, sample dilution required; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; B, detected in blank; E, concentration exceeds calibration range of gas chromatograph/mass spectrometer; R, analytical result is unreliable; ND, constituent not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
82-SRW04 ²⁻	7/10/2001	56	1,100	<5.0	60	720	880	9.0
Continued	1/15/2002	49	180	<5.0	55	180	210	11
	7/31/2002	29	240R	0.4J	29	180	210	5.0
	1/27/2003	43	260	1.0J	50	210	310	9.0
	1/22/2004	36	320D	1.0J	72	290D	410D	15.0
	7/26/2004	14	310D	0.90J	44	240D	NA	9.0
82-SRW05 ²	4/23/1998	120	410	<25	NA	NA	470	<50
	7/28/1998	130	340	<20	NA	NA	380	<40
	10/19/1998	45	70	<2.0	NA	NA	<2.0	<2.0
	1/17/1999	64	200	<5.0	19	300	NA	8.0
	4/17/1999	86	240D	<5.0	<5.0	220D	NA	3.0J
	7/29/1999	130	360	<25	30	280	310	6.0J
	10/23/1999	50	87	<5.0	3.0J	40	44	<2.0
	1/17/2000	110	350D	<5.0	34	310D	340D	8.0
	7/13/2000	61	240D	<5.0	25	190	210	6.0
	1/10/2001	72	350D	<5.0	27	320D	340D	7.0
	7/10/2001	120	1,200	<5.0	12	660	690	6.0
	1/15/2002	72	200	<5.0	21	200	220	6.0
	7/31/2002	53	210	<10	14	180	200	2.0J
	1/22/2003	71	200	0.90J	17	490	610	3.0
	1/22/2004	170	390D	2.0J	84	240D	350	3.0
	7/26/2004	45	150	0.80J	9.0	140	NA	3.0
82-SRW06 ²	1/17/2000	<5.0	120D	<5.0	20	89	110	4.0
(new)	1/15/2001	130	2,600D	<5.0	140	1,300D	1,600D	15
	7/10/2001	120	1,200	<5.0	78	180	260	<2.0
	1/15/2002	42	1,000	2.0J	150	480	570	21
	7/31/2002	320R	1,600R	3.0J	190	690R	880R	12
	1/22/2003	200	1,200	2.0J	160	490	610	10
	1/22/2004	250D	980D	4.0J	220D	700D	930D	16
	7/26/2004	100	490D	1.0J	93	270D	NA	8.0

¹ See Figure C5 for location

² Well assigned to Site 6 in Camp Lejeune Water (CLW) documents and CERCLA Administrative Record files published after 1998

Data sources:

CERCLA Administrative Record files #236, #1272, #1781, #2037, #2300, #2322, #2337, #2599A, #2609A, #3276, #3277, #3278, #3410, #3637
 Baker Environmental, Inc. 1993k, 1994a, 1997e, 1998g,h, 1999d,e
 Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000e
 Baker Environmental, Inc. and CH2M Hill, Inc. 2001a, 2002b,g
 CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2000b
 Michael Baker, Jr., Inc. and CH2M Hill, Inc. 2003
 Michael Baker, Jr., Inc. and Engineering and Environment, Inc. 2004

Table C60

Table C60. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[VOC, volatile organic compound; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
82-DRW01 ²	4/17/1998	<500	<500	<500	<500
	7/28/1998	<1,000	<1,000	<1,000	<1,000
	10/19/1998	<2,000	<2,000	<2,000	NA
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	4/17/1999	2.0J	<5.0	<5.0	2.0J
	7/28/1999	<1,000	<1,000	<1,000	NA
	10/23/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/13/2000	<5.0	<5.0	<5.0	3.0J
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/10/2001	3.0J	<5.0	<5.0	2.0J
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	1/27/2003	1.0J	<10	0.70J	3.0J
	1/22/2004	0.70J	0.70J	0.50J	3.0J
7/26/2004	0.80J	0.90J	0.50J	<15	
82-DRW02 ²	4/16/1998	<500	<500	<500	<500
	7/24/1998	8.0	<5.0	<5.0	<5.0
	10/19/1998	<1,000	<1,000	<1,000	NA
	1/17/1999	11	<5.0	<5.0	<5.0
	4/17/1999	<500	<500	<500	<1,500
	7/29/1999	<100	<100	<100	NA
	10/21/1999	10	<5.0	<5.0	<5.0
	1/17/2000	11	<5.0	<5.0	<5.0
	7/13/2000	10	<5.0	<5.0	<5.0
	1/10/2001	11	<5.0	<5.0	<5.0
	7/10/2001	11	<5.0	<5.0	<5.0
	1/15/2002	<10	<5.0	<5.0	<5.0
	1/22/2003	10	0.20J	0.20J	1.0J
	1/22/2004	9.0	0.20J	0.30J	0.90J
7/26/2004	8.0	<5.0	0.30J	<15	
82-DRW03 ²	4/16/1998	<250	<250	<250	<250
	7/24/1998	<5.0	<5.0	<5.0	<5.0
	10/19/1998	<500	<500	<500	NA
	1/16/1999	<5.0	<5.0	<5.0	<5.0
	4/17/1999	1.0J	<5.0	<5.0	<15
	7/28/1999	<5.0	<5.0	<5.0	NA
	10/23/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/13/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0

Table C60. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[VOC, volatile organic compound; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
82-DRW03 ² — Continued	7/10/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	7/31/2002	2.0J	<5.0	<5.0	<5.0
	1/27/2003	2.0J	<5.0	<5.0	<5.0
	1/22/2004	1.0J	<5.0	<5.0	<15
	7/26/2004	1.0J	<5.0	<5.0	<15
82-DRW04 ²	4/16/1998	<620	<620	<620	<620
	7/28/1998	<1,000	<1,000	<1,000	<1,000
	10/19/1998	<1,000	<1,000	<1,000	NA
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	4/17/1999	<50	<50	<50	<150
	7/29/1999	<5.0	<5.0	<5.0	NA
	10/23/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/13/2000	3.0J	<5.0	<5.0	<5.0
	1/10/2001	5.0J	<5.0	<5.0	<5.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	11	<5.0	<5.0	<5.0
	7/31/2002	8.0	0.20J	<5.0	<5.0
	1/27/2003	9.0	<10	<5.0	<5.0
	1/22/2004	8.0	<5.0	<5.0	<15
7/26/2004	7.0	<5.0	<5.0	<15	
82-MW01	10/23/1992	ND	ND	ND	ND
	3/23/1993	<1.0	<1.0	<1.0	<1.0
82-MW02	10/24/1992	ND	ND	ND	ND
	3/23/1993	<1.0	<1.0	<1.0	<1.0
	7/27/1997	<10	<10	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	<5.0
	4/15/1998	<5.0	<5.0	<5.0	<5.0
	7/25/1998	<5.0	<5.0	<5.0	<5.0
	1/16/1999	<5.0	<5.0	<5.0	<5.0
	7/28/1999	<5.0	<5.0	<5.0	NA
	1/12/2000	<5.0	<5.0	<5.0	<5.0
	7/12/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/11/2001	<5.0	<5.0	<5.0	<5.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0
	1/21/2003	<5.0	<5.0	<5.0	<5.0
	1/22/2004	<5.0	<5.0	<5.0	<15
7/28/2004	<5.0	0.20J	<5.0	<15	

Table C60

Table C60. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[VOC, volatile organic compound; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
82-MW03	3/23/1993	<1.0	<1.0	<1.0	<1.0
	7/23/1997	<10	<10	<10	<10
	1/17/1998	<5.0	<5.0	<5.0	<5.0
	4/15/1998	<5.0	<5.0	<5.0	<5.0
	7/24/1998	<5.0	<5.0	<5.0	<5.0
	1/16/1999	<5.0	<5.0	<5.0	<5.0
	7/28/1999	<5.0	<5.0	<5.0	NA
	1/13/2000	<5.0	<5.0	<5.0	<5.0
	7/12/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0
	1/13/2002	<5.0	<5.0	<5.0	<5.0
	7/29/2002	<5.0	<5.0	<5.0	<5.0
	1/22/2003	<5.0	<5.0	<5.0	<5.0
	1/21/2004	<5.0	<5.0	<5.0	<15
7/26/2004	<5.0	0.30J	<5.0	<15	
82-MW30	3/22/1993	<1.0	<1.0	<1.0	<1.0
82-SRW01 ²	4/22/1998	<50	<50	<50	<50
	7/23/1998	<120	<120	<120	<120
	10/19/1998	<50	<50	<50	NA
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	4/17/1999	<50	<50	<50	<150
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/13/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	7/31/2002	<250	<250	<250	<250
	1/27/2003	0.30J	<5.0	<5.0	<5.0
	1/22/2004	0.20J	<5.0	<5.0	<15
7/26/2004	0.40J	<5.0	<5.0	<15	
82-SRW02 ²	4/22/1998	<10	<10	<10	<10
	7/28/1998	<12	<12	<12	<12
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<15
	10/25/1999	10	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/13/2000	<5.0	<5.0	<5.0	<5.0

Table C60. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[VOC, volatile organic compound; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
82-SRW02 ² — Continued	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/18/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	1/27/2003	<5.0	<10	<5.0	<5.0
	1/22/2004	<5.0	<5.0	<5.0	<15
	7/26/2004	<5.0	<5.0	<5.0	<15
82-SRW03 ²	4/22/1998	<100	<100	<100	<100
	7/28/1998	<50	<50	<50	<50
	10/19/1998	<100	<100	<100	NA
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<15
	7/28/1999	<100	<100	<100	NA
	10/23/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<50	<50	<50	<50
	7/13/2000	<5.0	<5.0	<5.0	<5.0
	1/15/2001	<5.0	<5.0	<5.0	<5.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	7/31/2002	<5.0	<5.0	<5.0	<5.0
	1/27/2003	<5.0	<5.0	<5.0	<5.0
	1/22/2004	<5.0	<5.0	<5.0	<15
7/26/2004	<5.0	<5.0	<5.0	<15	
82-SRW04 ²	4/23/1998	<170	<170	<170	<170
	7/28/1998	<100	<100	<100	<100
	10/19/1998	<50	<50	<50	NA
	1/15/1999	<5.0	<5.0	<5.0	<5.0
	4/17/1999	<10	<10	<10	<30
	7/29/1999	<50	<50	<50	NA
	10/23/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/13/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	7/31/2002	<5.0	<5.0	<5.0	<5.0
	1/27/2003	0.20J	<5.0	<5.0	<5.0
	1/22/2004	0.10J	<5.0	<5.0	<15
7/26/2004	0.10J	<5.0	<5.0	<15	

Table C60

Table C60. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 82, VOC disposal area at Piney Green Road, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[VOC, volatile organic compound; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
82-SRW05 ²	4/23/1998	<25	<25	<25	<25
	7/28/1998	<20	<20	<20	<20
	10/19/1998	<2.0	<2.0	<2.0	NA
	1/17/1999	<5.0	<5.0	<5.0	<5.0
	4/17/1999	<5.0	<5.0	<5.0	<15
	7/29/1999	<25	<25	<25	NA
	10/23/1999	<5.0	<5.0	<5.0	<5.0
	1/17/2000	<5.0	<5.0	<5.0	<5.0
	7/13/2000	<5.0	<5.0	<5.0	<5.0
	1/10/2001	<5.0	<5.0	<5.0	<5.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	7/31/2002	1.0J	<10	<10	<10
	1/22/2003	1.0J	<5.0	<5.0	<5.0
	1/22/2004	0.70J	<5.0	<5.0	<15
7/26/2004	0.80J	<5.0	<5.0	<15	
82-SRW06 ² (new)	1/17/2000	<5.0	<5.0	<5.0	<5.0
	1/15/2001	<5.0	<5.0	<5.0	<5.0
	7/10/2001	<5.0	<5.0	<5.0	<5.0
	1/15/2002	<5.0	<5.0	<5.0	<5.0
	7/31/2002	2.0J	<5.0	<5.0	<5.0
	1/22/2003	1.0J	<5.0	<5.0	<5.0
	1/22/2004	1.0	<5.0	<5.0	<15
	7/26/2004	0.50J	<5.0	<5.0	<15

¹ See Figure C5 for location

² Well assigned to Site 6 in Camp Lejeune Water (CLW) documents and CERCLA Administrative Record files published after 1998

Data sources:

- CERCLA Administrative Record files #236, #1272, #1781, #2037, #2300, #2322, #2337, #2599A, #2609A, #3276, #3277, #3278, #3410, #3637
- Baker Environmental, Inc. 1993k, 1994a, 1997e, 1998g,h, 1999de
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000e
- Baker Environmental, Inc. and CH2M Hill, Inc. 2001a, 2002b,g
- CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2000b
- Michael Baker, Jr., Inc. and CH2M Hill, Inc. 2003
- Michael Baker, Jr., Inc. and Engineering and Environment, Inc. 2004

Table C61. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[Names in parentheses refer to corporations or companies that installed the well: ATEC—American Testing and Engineering Corp. 1992, Baker—Baker Environmental Inc. and CH2M Hill Inc. 2002e, D&D—Dewberry and Davis 1991, Jones—J.A. Jones Environmental Services Company 1999, Law—Law Engineering Inc. 1993, O&G—O'Brien and Gere Engineers Inc. 1992, Wright—R.E. Wright Associates Inc. 1994; NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, TTAQ—Tarawa Terrace aquifer; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
45-1-MW01 (Wright)	361298	2495380	³ 20	Before 1/5/1993	N/A	N/A	BBLAQ(?)
45-1-MW02 (Wright)	361281	2495372	³ 20	Before 1/5/1993	N/A	N/A	BBLAQ(?)
45-1-MW03 (Wright)	361294	2495483	³ 20	Before 1/5/1993	N/A	N/A	BBLAQ(?)
45-1-MW04 (Wright)	361339	2495184	³ 15	Before 1/5/1993	N/A	N/A	BBLAQ(?)
45-1-MW05 (Wright)	361313	2495287	³ 18	Before 1/5/1993	N/A	N/A	BBLAQ(?)
MW15 (Baker)	361295	2495541	21.8	7/31/2001	N/A	N/A	BBLAQ
MW16 (Baker)	361519	2495466	20.1	7/31/2001	20.0	10.0–20.0	TTAQ
MW17 (Baker)	361448	2495309	16.5	7/31/2001	17.5	7.5–17.5	BBLAQ, TTAQ
MW18 (Baker)	361204	2495590	22.8	8/1/2001	15.0	5.0–15.0	BBLAQ
MW19 (Baker)	361296	2495251	18.3	8/1/2001	19.0	9.0–19.0	BBLAQ, TTAQ
MW20 (Baker)	361584	2495131	8.6	8/1/2001	12.0	2.0–12.0	BBLAQ, TTAQ
MW21 (Baker)	361258	2495406	21.4	8/2/2001	15.0	5.0–15.0	BBLAQ, TTAQ
MW22 (Baker)	361414	2495374	19.9	8/3/2001	22.0	8.0–22.0	BBLAQ, TTAQ
MW23 (Baker)	361951	2494960	5.3	8/3/2001	12.0	2.0–12.0	BBLAQ, TTAQ
AST-S781-MW01 (O&G)	361436	2495348	⁴ 22.3	12/4/1991	20.0	5.0–20.0	BBLAQ, BBLCU, TTAQ
AST-S781-MW02 (O&G)	361436	2495348	⁴ 22.1	12/5/1991	30.0	20.0–30.0	TTAQ
AST-S781-MW03 (O&G)	361430	2495235	⁴ 18.6	12/4/1991	15.0	5.0–15.0	BBLAQ, BBLCU, TTAQ
AST-S781-MW04 (O&G)	361430	2495235	⁴ 18.4	12/5/1991	30.0	20.0–30.0	TTAQ
AST-S781-MW05 (O&G)	361589	2495398	⁴ 19.1	12/5/1991	15.0	5.0–15.0	BBLAQ, BBLCU, TTAQ
AST-S781-MW06 (O&G)	361589	2495398	⁴ 18.1	12/6/1991	30.0	20.0–30.0	TTAQ
AST-S781-MW07 (O&G)	361717	2495105	⁴ 8.7	12/6/1991	15.0	5.0–15.0	BBLAQ, BBLCU, TTAQ
AST-S781-MW08 (O&G)	361717	2495105	⁴ 8.9	12/6/1991	30.0	20.0–30.0	TTAQ
AST-S781-MW09 (O&G)	361217	2494823	⁴ 12.9	12/9/1991	15.0	5.0–15.0	BBLAQ, BBLCU, TTAQ
AST-S781-MW10 (O&G)	361217	2494823	⁴ 12.9	12/9/1991	30.0	20.0–30.0	TTAQ
AST-S781-MW11 (O&G)	361168	2495225	⁴ 19.1	12/9/1991	15.0	5.0–15.0	BBLAQ, BBLCU, TTAQ
AST-S781-MW12 (O&G)	361168	2495225	⁴ 19.2	12/10/1991	30.0	20.0–30.0	TTAQ

Table C61**Table C61.** Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[Names in parentheses refer to corporations or companies that installed the well: ATEC—American Testing and Engineering Corp. 1992, Baker—Baker Environmental Inc. and CH2M Hill Inc. 2002e, D&D—Dewberry and Davis 1991, Jones—J.A. Jones Environmental Services Company 1999, Law—Law Engineering Inc. 1993, O&G—O'Brien and Gere Engineers Inc. 1992, Wright—R.E. Wright Associates Inc. 1994; NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, TTAQ—Tarawa Terrace aquifer; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
AST-S781-MW13 (O&G)	361610	2494936	48.9	12/11/1991	12.0	2.0–12.0	BBLAQ, BBLCU, TTAQ
AST-S781-MW14 (O&G)	361610	2494936	48.9	12/10/1991	27.0	17.0–27.0	TTAQ
AST-S781-MWA (D&D) AKA MPMW-1	361523	2495253	11.3	11/27/1990	23.0	8.0–23.0	BBLAQ, BBLCU, TTAQ
AST-S781-MWB (D&D) AKA MPMW-2	361560	2495277	11.7	11/28/1990	18.0	5.0–18.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW01 (ATEC)	361246	2495574	³ 23	8/26/1991	14.6	2.2–14.6	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW02 (ATEC)	361260	2495563	³ 23	8/26/1991	14.5	2.2–14.5	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW03 (ATEC)	361269	2495590	³ 23	8/26/1991	20.0	2.5–20.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW04 (Law)	361145	2495545	³ 22	Before 1/5/1993	21.0	6.0–21.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW05 (Law)	361406	2495558	³ 21	Before 1/5/1993	19.5	4.5–19.5	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW06 (Law)	361360	2495631	³ 20	Before 1/5/1993	50.0	45.0–50.0	TTAQ
UST-Bldg45-MW07 (Law)	361308	2495583	³ 22	Before 1/5/1993	23.0	3.0–23.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW08 (Law)	361356	2495636	³ 20	Before 1/5/1993	19.0	4.0–19.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW09 (Law)	361312	2495579	³ 21	Before 1/5/1993	50.0	45.0–50.0	TTAQ
UST-Bldg45-MW10 (Law)	361308	2495552	³ 22	Before 1/5/1993	18.0	3.0–18.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW11 (Law)	361202	2495617	³ 24	Before 12/2/1993	15.5	5.5–15.5	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW12 (Law)	361166	2495527	³ 22	Before 12/2/1993	16.0	6.0–16.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW13 (Law)	361207	2495416	³ 20	Before 12/2/1993	16.0	6.0–16.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW14 (Law)	361254	2495286	³ 18	Before 1/11/1994	16.0	6.0–16.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW15 (Law)	361316	2495343	³ 19	Before 1/11/1994	16.0	6.0–16.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW16 (Law)	361277	2495399	³ 21	Before 12/2/1993	16.0	6.0–16.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW17 (Law)	361365	2495544	³ 22	Before 1/11/1994	14.8	4.8–14.8	BBLAQ, BBLCU, TTAQ

Table C61. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[Names in parentheses refer to corporations or companies that installed the well: ATEC—American Testing and Engineering Corp. 1992, Baker—Baker Environmental Inc. and CH2M Hill Inc. 2002e, D&D—Dewberry and Davis 1991, Jones—J.A. Jones Environmental Services Company 1999, Law—Law Engineering Inc. 1993, O&G—O'Brien and Gere Engineers Inc. 1992, Wright—R.E. Wright Associates Inc. 1994; NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBLCU—Brewster Boulevard lower confining unit, TTAQ—Tarawa Terrace aquifer; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
UST-Bldg45-MW18 (Law)	361272	2495544	³ 23	Before 1/11/1994	16.0	6.0–16.0	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW19 (Law)	361241	2495675	³ 22	Before 1/11/1994	13.5	3.5–13.5	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW20 (Law)	361294	2495650	³ 21	Before 1/11/1994	14.5	4.5–14.5	BBLAQ, BBLCU, TTAQ
UST-Bldg45-MW21 (Law)	361260	2495281	³ 18	Before 1/11/1994	50.0	45.0–50.0	TTAQ
UST-Bldg45-MW22 (Law)	361111	2495586	³ 23	Before 1/11/1994	50.7	45.7–50.7	TTAQ
UST-Bldg45-PW01 (Law)	361295	2495567	³ 22	Before 1/5/1993	23.0	3.0–23.0	BBLAQ, BBLCU, TTAQ

¹ See Figure C25 for location. Site names are truncated on Figure C25, and they are color-coded by corporation or company that installed the wells. Law wells MW11–MW22 and Baker wells MW15–MW23 are not shown

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

⁴ Altitude at top of casing

Data sources:

CERCLA Administrative Record files #125, #269, #3018, #3269

Leaking Underground Storage Tank Site Assessment report files #730, #742

American Testing and Engineering Corporation, 1992

Baker Environmental, Inc. 2001a

CH2M Hill, Inc. and Baker Environmental, Inc. 2002

Law Engineering, Inc. 1993

Law Engineering and Environmental Services, Inc. 1996

O'Brien and Gere Engineers, Inc. 1992

Table C62

Table C62. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[Names in parentheses refer to corporations or companies who installed the well: ATEC—American Testing and Engineering Corp. 1992, Baker—Baker Environmental Inc. and CH2M Hill Inc. 2002f, Law—Law Engineering Inc. 1993, O&G—O’Brien and Gere Engineers Inc. 1992; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
MW16 (Baker)	8/4/2001	<0.16	NA	<0.12	<0.33
MW17 (Baker)	8/6/2001	<0.16	NA	0.06J	1.8
MW18 (Baker)	8/4/2001	<0.16	NA	<0.12	<0.33
MW19 (Baker)	8/4/2001	<0.16	NA	<0.12	<0.33
MW20 (Baker)	8/5/2001	<0.16	NA	<0.12	<0.33
MW21 (Baker)	8/5/2001	<0.16	NA	<0.12	<0.33
MW22 (Baker)	8/5/2001	<0.16	NA	3.6	<0.33
MW23 (Baker)	8/6/2001	<0.16	NA	<0.12	<0.33
AST-S781-MW01 (O&G)	12/12/1991	<1.0	<1.0	<1.0	<3.0
AST-S781-MW02 (O&G)	12/12/1991	<1.0	<1.0	<1.0	<3.0
AST-S781-MW03 (O&G)	12/12/1991	<10	<10	16	<30
	4/23/1998	3.4J	<10	3.6J	<10
AST-S781-MW04 (O&G)	12/12/1991	<1.0	<1.0	<1.0	<3.0
	4/23/1998	1.5J	<10	6.7J	<10
AST-S781-MW05 (O&G)	12/12/1991	<1.0	<1.0	<1.0	<3.0
AST-S781-MW06 (O&G)	12/12/1991	<1.0	<1.0	<1.0	<3.0
AST-S781-MW07 (O&G)	12/12/1991	<1.0	<1.0	<1.0	<3.0
	4/22/1998	<10	<10	<10	<10
AST-S781-MW08 (O&G)	12/12/1991	<10	<10	<10	<30
	4/22/1998	<10	<10	<10	<10
AST-S781-MW09 (O&G)	12/12/1991	<1.0	<1.0	<1.0	<3.0
AST-S781-MW10 (O&G)	12/12/1991	<1.0	<1.0	<1.0	<3.0
AST-S781-MW11 (O&G)	12/12/1991	<1.0	<1.0	<1.0	<3.0
	4/23/1998	<10	<10	<10	<10
AST-S781-MW12 (O&G)	12/12/1991	<1.0	2.0	<1.0	<3.0
	4/23/1998	<10	<10	<10	<10
AST-S781-MW13 (O&G)	12/12/1991	<1.0	<1.0	<1.0	<3.0
AST-S781-MW14 (O&G)	12/12/1991	<1.0	<1.0	<1.0	<3.0
UST-Bldg45-MW01 (ATEC)	8/28/1991	9,800	16,000	1,000	4,700
UST-Bldg45-MW02 (ATEC)	8/28/1991	290	69	<5.0	83
UST-Bldg45-MW03 (ATEC)	8/28/1991	10	<5.0	<5.0	22
UST-Bldg45-MW04 (Law)	1/5/1993	ND	ND	ND	ND
UST-Bldg45-MW05 (Law)	1/5/1993	ND	ND	ND	ND
UST-Bldg45-MW06 (Law)	1/5/1993	ND	ND	ND	ND
UST-Bldg45-MW07 (Law)	1/5/1993	ND	ND	ND	ND
UST-Bldg45-MW08 (Law)	1/5/1993	ND	ND	ND	ND
	8/6/2001	<0.16	NA	<0.12	<0.33
UST-Bldg45-MW09 (Law)	1/5/1993	ND	ND	ND	ND
	8/5/2001	<0.16	NA	<0.12	<0.33

Table C62. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[Names in parentheses refer to corporations or companies who installed the well: ATEC—American Testing and Engineering Corp. 1992, Baker—Baker Environmental Inc. and CH2M Hill Inc. 2002f, Law—Law Engineering Inc. 1993, O&G—O'Brien and Gere Engineers Inc. 1992; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; ND, not detected]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
UST-Bldg45-MW10 (Law)	1/5/1993	ND	ND	1.6	1.6
	8/5/2001	<0.16	NA	<0.12	<0.33
UST-Bldg45-MW11 (Law)	12/2/1993	ND	ND	ND	ND
UST-Bldg45-MW12 (Law)	12/2/1993	ND	ND	ND	ND
UST-Bldg45-MW13 (Law)	12/2/1993	ND	ND	ND	ND
UST-Bldg45-MW14 (Law)	1/11/1994	ND	ND	ND	ND
UST-Bldg45-MW15 (Law)	1/11/1994	3,800	1,700	800	3,600
UST-Bldg45-MW16 (Law)	12/3/1993	ND	0.70	ND	1.3
UST-Bldg45-MW17 (Law)	1/11/1994	ND	ND	ND	ND
UST-Bldg45-MW18 (Law)	1/11/1994	1,200	74	84	230
UST-Bldg45-MW19 (Law)	1/11/1994	ND	ND	ND	ND
UST-Bldg45-MW20 (Law)	1/11/1994	ND	8.2	4.8	ND
UST-Bldg45-MW21 (Law)	1/11/1994	ND	ND	ND	ND
UST-Bldg45-MW22 (Law)	1/11/1994	ND	ND	ND	ND
UST-Bldg45-PW01 (Law)	1/5/1993	87	700	70	1,900

¹ See Figure C25 for location. Site names are truncated on Figure C25, and they are color-coded by corporation or company that installed the wells. Law wells MW11–MW22 and Baker wells MW16–MW23 are not shown

Data sources:

CERCLA Administrative Record files #269, #270, #2636A, #3268
 Leaking Underground Storage Tank Site Assessment report files #730, #742
 American Testing and Engineering Corporation, 1992
 Baker Environmental, Inc. 1998e
 Baker Environmental, Inc. and CH2M Hill, Inc. 2002e
 Law Engineering and Environmental Services, Inc. 1996
 O'Brien and Gere Engineers, Inc. 1992, 1993

Table C63

Table C63. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans* 1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[Names in parentheses refer to corporations or companies who installed the well: Baker—Baker Environmental Inc. and CH2M Hill Inc. 2002f, Law—Law Engineering Inc. 1993, O&G—O’Brien and Gere Engineers Inc. 1992; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
MW16 (Baker)	8/4/2001	NA	<0.14	NA	NA	NA	NA	NA
MW17 (Baker)	8/6/2001	NA	0.19J	NA	NA	NA	NA	NA
MW18 (Baker)	8/4/2001	NA	<0.14	NA	NA	NA	NA	NA
MW19 (Baker)	8/4/2001	NA	<0.14	NA	NA	NA	NA	NA
MW20 (Baker)	8/5/2001	NA	<0.14	NA	NA	NA	NA	NA
MW21 (Baker)	8/5/2001	NA	<0.14	NA	NA	NA	NA	NA
MW22 (Baker)	8/5/2001	NA	<0.14	NA	NA	NA	NA	NA
MW23 (Baker)	8/6/2001	NA	<0.14	NA	NA	NA	NA	NA
AST-S781-MW01 (O&G)	12/12/1991	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
AST-S781-MW02 (O&G)	12/12/1991	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
AST-S781-MW03 (O&G)	12/12/1991 4/23/1998	<1.0 <10	<1.0 <10	<1.0 <10	NA NA	NA NA	<1.0 <10	<1.0 <10
AST-S781-MW04 (O&G)	12/12/1991 4/23/1998	<1.0 <10	<1.0 <10	<1.0 <10	NA NA	NA NA	2.0 <10	<1.0 <10
AST-S781-MW05 (O&G)	12/12/1991	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
AST-S781-MW06 (O&G)	12/12/1991	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
AST-S781-MW07 (O&G)	12/12/1991 4/22/1998	<1.0 <10	<1.0 <10	<1.0 <10	NA NA	NA NA	<1.0 <10	<1.0 <10
AST-S781-MW08 (O&G)	12/12/1991 4/22/1998	<1.0 <10	<1.0 <10	<1.0 <10	NA NA	NA NA	<1.0 <10	<1.0 <10
AST-S781-MW09 (O&G)	12/12/1991	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
AST-S781-MW10 (O&G)	12/12/1991	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
AST-S781-MW11 (O&G)	12/12/1991 4/23/1998	<1.0 <10	<1.0 <10	<1.0 <10	NA NA	NA NA	<1.0 <10	<1.0 <10
AST-S781-MW12 (O&G)	12/12/1991 4/23/1998	<1.0 <10	<1.0 <10	<1.0 <10	NA NA	NA NA	<1.0 <10	<1.0 <10
AST-S781-MW13 (O&G)	12/12/1991	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0

Table C63. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans* 1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[Names in parentheses refer to corporations or companies who installed the well: Baker—Baker Environmental Inc. and CH2M Hill Inc. 2002f, Law—Law Engineering Inc. 1993, O&G—O'Brien and Gere Engineers Inc. 1992; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
AST-S781-MW14 (O&G)	12/12/1991	< 1.0	< 1.0	< 1.0	NA	NA	< 1.0	< 1.0
UST-Bldg45- 84-MW07 (Law)	8/6/2001	NA	< 0.14	NA	NA	NA	NA	NA
UST-Bldg45- 84-MW08 (Law)	8/6/2001	NA	< 0.14	NA	NA	NA	NA	NA
UST-Bldg45- 84-MW09 (Law)	8/5/2001	NA	< 0.14	NA	NA	NA	NA	NA
UST-Bldg45- 84-MW10 (Law)	8/5/2001	NA	< 0.14	NA	NA	NA	NA	NA

¹ See Figure C25 for location. Site names are truncated on Figure C25, and they are color-coded by corporation or company that installed the wells. Baker wells MW16–MW23 are not shown

Data sources:

CERCLA Administrative Record files #269, #270, #2636A, #3268

Baker Environmental, Inc. 1998e

Baker Environmental, Inc. and CH2M Hill, Inc. 2002e

O'Brien and Gere Engineers, Inc. 1992, 1993

Tables C64 and C65

Table C64. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected at hydropunch locations at Installation Restoration Site 84, Tank S781/Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[Names in parentheses refer to corporations or companies who installed the well: Law—Law Engineering Inc. 1993; NGVD 29, National Geodetic Vertical Datum of 1929; contributing aquifer: BBLAQ—Brewster Boulevard lower aquifer, TTAQ—Tarawa Terrace aquifer; ND, not detected; NA, constituent concentration not determined or analytical result is unknown]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Sample interval, in feet below land surface	Sample date	Contributing aquifer	Concentration, in micrograms per liter			
	North	East					Benzene	Toluene	Ethylbenzene	Total xylene
HP-1 (Law)	361308	2495566	³ 22	8.5–10.0	1993	BBLAQ	ND	ND	ND	ND
HP-2 (Law)	361312	2495566	³ 22	NA	1993	BBLAQ(?)	NA	NA	NA	NA
HP-3 (Law)	361391	2495506	³ 21	16.0–19.0	1993	BBLAQ	ND	1.3	ND	ND
HP-4 (Law)	361199	2495495	³ 22	25.5–27.0	1993	TTAQ	64	83	3.2	17
HP-5 (Law)	361250	2495566	³ 23	8.5–10.0	1993	BBLAQ	ND	0.7	ND	ND
HP-6 (Law)	361338	2495538	³ 22	8.5–10.0	1993	BBLAQ	ND	ND	ND	ND
HP-7 (Law)	361317	2495515	³ 22	8.5–12.0	1993	BBLAQ	ND	0.8	ND	ND
HP-8 (Law)	361284	2495608	³ 21	8.5–10.0	1993	BBLAQ	ND	0.6	ND	ND
HP-9 (Law)	361279	2495609	³ 21	22.0–23.5	1993	TTAQ	1.0	1.3	ND	ND
HP-10 (Law)	361377	2495548	³ 21	28.2–29.7	1993	TTAQ	ND	0.8	ND	ND

¹ See Figure C25 for location. Site names are color-coded by corporation or company that installed the wells

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

Data source:

Leaking Underground Storage Tank Site Assessment report file #742
Law Engineering and Environmental Services, Inc. 1996

Table C65. Summary of BTEX free-phase measurements in monitor wells at Installation Restoration Site 84, Building 45 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[Names in parentheses refer to corporations or companies who installed the well: ATEC—American Testing and Engineering Corp. 1992; BTEX, benzene, toluene, ethylbenzene, and xylene]

Site name ¹	Sample date	BTEX free-phase thickness, in feet
UST-Bldg45-MW02 (ATEC)	1/11/1994	2.29
	9/6/1994	0.61
	9/12/1994	1.06
	9/19/1994	0.80
	9/26/1994	0.66
	2/3/1995	0.15
	2/6/1995	0.15
	2/9/1995	0.00
	2/13/1995	0.00
	2/21/1995	0.00
UST-Bldg45-MW03 (ATEC)	6/5/1995	0.02
	1/11/1994	0.50
	9/12/1994	0.02

¹ See Figure C25 for location. Site names are truncated on Figure C25, and they are color-coded by corporation or company that installed the wells

Data source:

Leaking Underground Storage Tank Site Assessment report file #742
Law Engineering and Environmental Services, Inc. 1996

Table C66. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, TTAQ—Tarawa Terrace aquifer; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
88-EX01	339427	2496473	25.6	12/3/1997	20.0	15.0–19.5	BBUAQ
88-EX02	339440	2496476	25.6	12/3/1997	21.2	16.1–20.7	BBUAQ
88-EX03	339451	2496479	25.6	12/4/1997	19.9	14.6–19.1	BBUAQ
88-EX04	339420	2496500	25.7	12/4/1997	21.1	16.2–20.8	BBUAQ
88-EX04R	339417	2496502	25.7	3/23/1998	19.7	14.8–19.4	BBUAQ
88-EX05	339428	2496504	25.2	12/4/1997	21.8	16.5–21.1	BBUAQ
88-EX06	339438	2496506	25.5	12/5/1997	20.4	15.2–19.8	BBUAQ
88-HCO1	339411	2496484	26.4	N/A	22.7	11.4–20.5	BBUAQ
88-HCO2	339454	2496495	25.9	12/9/1997	20.4	7.5–12.0	BBUAQ
88-IN01	339422	2496487	25.5	12/8/1997	22.5	7.54–11.54	BBUAQ
88-IN02	339433	2496490	25.5	12/8/1997	19.7	7.02–11.02	BBUAQ
88-IN03	339444	2496492	25.8	12/8/1997	20.0	7.4–11.4	BBUAQ
88-IW01	339428	2496495	25.6	8/20/1997	18.5	14.2–18.7	BBUAQ
88-MW01	339268	2496740	26.5	5/1/1997	22.0	7.0–22.0	BBUAQ, BBUCU, BBLAQ
88-MW02	339347	2496489	26.6	5/2/1997	23.0	8.0–23.0	BBUAQ, BBUCU, BBLAQ
88-MW02DW	339364	2496466	26.6	4/20/1997	97.0	92.0–97.0	TTAQ, TTCU
88-MW02IW	339353	2496481	26.6	5/3/1997	50.0	45.0–50.0	BBLAQ
88-MW03	339503	2496545	25.9	5/1/1997	15.0	5.0–15.0	BBUAQ
88-MW03DW	339508	2496540	25.9	4/30/1997	85.0	80.0–85.0	TTAQ
88-MW03IW	339499	2496563	25.9	5/1/1997	50.0	45.0–50.0	BBLAQ
88-MW04	339076	2496489	23.1	5/2/1997	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ
88-MW04DW	339090	2496474	25.0	4/18/1997	85.0	80.0–85.0	TTAQ, TTCU
88-MW04IW	339079	2496481	25.0	5/2/1997	50.0	45.0–50.0	BBLAQ
88-MW05	339618	2496406	24.6	5/3/1997	23.0	8.0–23.0	BBUAQ, BBUCU, BBLAQ
88-MW05DW	339601	2496397	24.7	4/22/1997	80.0	80.0–85.0	TTAQ, TTCU
88-MW05IW	339608	2496405	24.7	5/3/1997	50.0	45.0–50.0	BBLAQ
88-MW06	339340	2496286	24.6	5/4/1997	23.0	8.0–23.0	BBUAQ, BBUCU, BBLAQ
88-MW06IW	339346	2496294	24.6	5/4/1997	50.0	45.0–50.0	BBLAQ
88-MW07	339944	2496027	23.6	5/6/1997	22.0	7.0–22.0	BBUAQ, BBUCU, BBLAQ
88-MW07IW	339945	2496042	23.7	5/5/1997	50.0	45.0–50.0	BBLAQ
88-MW08	339583	2495865	23.2	5/7/1997	20.0	5.0–20.0	BBUAQ, BBUCU, BBLAQ
88-MW08IW	339572	2495868	23.1	5/7/1997	50.0	45.0–50.0	BBLAQ
88-MW09	339080	2496100	22.1	5/5/1997	21.0	6.0–21.0	BBUAQ, BBUCU, BBLAQ
88-MW09IW	339071	2496110	22.0	5/5/1997	50.0	45.0–50.0	BBLAQ
88-MW10IW	339442	2496487	25.8*	NA	39.0	34.2–38.7	BBLAQ
88-MWRAB1	339675	2496307	³ 25	N/A	47.3	45.75–47.25	BBLAQ
88-MWRAB6	339651	2496337	³ 25	N/A	47.3	45.75–47.25	BBLAQ
88-RW01	339435	2496475	25.5	8/19/1997	20.0	15.1–19.3	BBUAQ
88-RW02	339430	2496488	25.5	8/19/1997	20.0	14.6–19.1	BBUAQ
88-RW03	339417	2496467	26.5	N/A	22.0	6.8–10.7	BBUAQ

Table C66

Table C66. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, TTAQ—Tarawa Terrace aquifer; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
88-RW04	339417	2496511	25.8	N/A	23.4	7.6–12.1	BBUAQ
88-RW06	339406	2496507	26.5	N/A	21.1	7.8–12.3	BBUAQ
88-TW01	339409	2496512	26	11/12/1995	N/A	14.6–16.6	BBUAQ
88-TW02	339434	2496477	25.8*	11/12/1995	N/A	14.6–16.6	BBUAQ
88-TW03	339430	2496438	25.9	11/12/1995	N/A	14.6–16.6	BBUAQ
88-TW04	339353	2496455	26.5	11/12/1995	N/A	14.6–16.6	BBUAQ
88-TW04IW	339352	2496459	26.5	8/16/1996	50.0	45.0–50.0	BBLAQ
88-TW05	339225	2496434	25.7	8/16/1996	15.0	5.0–15.0	BBUAQ
88-TW05IW	339228	2496433	26.0	8/18/1996	50.0	45.0–50.0	BBLAQ
88-TW06	339496	2496512	25.6	8/16/1996	15.0	5.0–15.0	BBUAQ
88-TW07	339309	2496617	26.5	8/16/1996	15.0	5.0–15.0	BBUAQ
88-TW08	339548	2496377	24.7	8/16/1996	15.0	5.0–15.0	BBUAQ
88-TW08IW	339541	2496376	24.7	8/18/1996	44.0	39.0–44.0	BBLAQ
88-TW09	339353	2496363	25.7	8/16/1996	18.0	8.0–18.0	BBUAQ
88-TW10	339402	2496594	26	8/17/1996	15.0	5.0–15.0	BBUAQ
88-TW11	339211	2496647	26.1	8/17/1996	15.0	5.0–15.0	BBUAQ
88-TW12	339187	2496531	26.6	8/17/1996	20.0	10.0–20.0	BBUAQ
88-TW13	339262	2496340	25.2	8/17/1996	19.0	9.0–19.0	BBUAQ
88-TW14	339413	2496633	26.1	8/17/1996	15.0	5.0–15.0	BBUAQ
88-TW15	339408	2496330	24.7	8/17/1996	18.0	8.0–18.0	BBUAQ
88-TW16	339085	2496245	23.9	8/18/1996	17.0	7.0–17.0	BBUAQ
88-TW17	338997	2496424	25.0	8/18/1996	19.0	9.0–19.0	BBUAQ
88-TW18	339264	2496021	22.3	8/19/1996	15.0	5.0–15.0	BBUAQ
88-TW19	339573	2495863	23.2	8/20/1996	18.0	8.0–18.0	BBUAQ
88-TW19IW	339577	2495861	23.2	8/19/1996	50.0	45.0–50.0	BBLAQ
88-TW20	339139	2496176	23.0	4/14/1997	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ
88-TW20IW	339130	2496170	23.0	4/14/1997	50.0	45.0–50.0	BBLAQ
88-TW21	339333	2496128	23.8	4/15/1997	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ
88-TW21IW	339325	2496100	23.9	4/15/1997	50.0	45.0–50.0	BBLAQ
88-TW22	339583	2496135	23.4	4/15/1997	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ
88-TW22IW	339596	2496140	23.3	4/15/1997	50.0	45.0–50.0	BBLAQ
88-TW23	339756	2496376	24.0	4/16/1997	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ
88-TW23IW	339760	2496365	24.0	4/16/1997	50.0	45.0–50.0	BBLAQ
88-TW24	339814	2496102	24.3	4/16/1997	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ
88-TW24IW	339820	2496110	24.2	4/16/1997	50.0	45.0–50.0	BBLAQ
88-TW25	339995	2496391	24.7	4/17/1997	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ
88-TW25IW	340078	2496390	24.7	4/17/1997	50.0	45.0–50.0	BBLAQ
88-TW26	339738	2496689	25.8	4/17/1997	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ
88-TW26IW	339700	2496690	25.8	4/17/1997	50.0	45.0–50.0	BBLAQ
88-TW27	339525	2495957	22.6	4/29/1997	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ

Table C66. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, TTAQ—Tarawa Terrace aquifer; N/A, not available]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
88-TW27IW	339576	2495960	22.7	4/29/1997	50.0	45.0–50.0	BBLAQ
88-TW28	339693	2495975	24.4	4/29/1997	25.0	10.0–25.0	BBUAQ, BBUCU, BBLAQ
88-TW28IW	339700	2496000	24.6	4/29/1997	50.0	45.0–50.0	BBLAQ
88-WP01AQT	339439	2496484	25.6*	6/26/1998	23.0	22.0–23.0	BBLAQ
88-WP02AQT	339440	2496485	25.6*	6/26/1998	25.0	24.0–25.0	BBLAQ

¹ See Figures C26 and C27 for location. Test well (TW) locations are not shown

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

Data sources:

CERCLA Administrative Record files #1738, #1747, #2020, #2032, #2302, #2324, #2598, #3187, #3188

Baker Environmental, Inc. 1996h,l, 1998b,c

CH2M Hill, Inc. 2003

Duke Engineering and Services, Inc. and Baker Environmental, Inc. 1998, 1999a, 2000

OHM Remediation Services Corp. 1996a

Table C67**Table C67.** Location coordinates and land-surface altitude at soil boring locations at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Vertical Geodetic Datum of 1929]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29
	North	East			North	East	
88-CPT01	339429	2496571	³ 26	88-IS18	339458	2496462	³ 26
88-CPT02	339440	2496536	³ 26	88-IS19	339433	2496501	³ 26
88-CPT03	339441	2496492	³ 26	88-IS20	339454	2496483	³ 26
88-CPT04	339466	2496498	³ 26	88-IS21	339421	2496501	³ 26
88-CPT05	339487	2496425	³ 25	88-IS22	339425	2496491	³ 26
88-CPT07	339434	2496411	³ 25	88-IS23	339437	2496492	³ 26
88-CPT08	339356	2496402	³ 25	88-IS25	339437	2496485	³ 26
88-CPT09	339341	2496466	³ 26	88-IS26	339435	2496495	³ 26
88-CPT10	339325	2496516	³ 26	88-IS28	339395	2496543	³ 26
88-IS01	339427	2496505	³ 26	88-IS29	339411	2496471	³ 26
88-IS02	339426	2496510	³ 26	88-IS30	339399	2496504	³ 26
88-IS03	339420	2496513	³ 26	88-IS31	339400	2496532	³ 26
88-IS04	339362	2496472	³ 26	88-SB01	339319	2496555	³ 26
88-IS05	339403	2496488	³ 26	88-SB02	339296	2496550	³ 26
88-IS06	339370	2496441	³ 26	88-SB03	339380	2496490	³ 26
88-IS07	339432	2496495	³ 26	88-SB04	339449	2496427	³ 25
88-IS08	339434	2496475	³ 26	88-SB05	339447	2496342	³ 25
88-IS09	339387	2496487	³ 26	88-SB06	339294	2496363	³ 25
88-IS10	339432	2496486	³ 26				
88-IS11	339444	2496484	³ 26				
88-IS12	339440	2496453	³ 26				
88-IS13	339440	2496483	³ 26				
88-IS14	339434	2496511	³ 26				
88-IS15	339451	2496491	³ 26				
88-IS16	339421	2496516	³ 26				
88-IS17	339445	2496469	³ 26				

¹ See Figure C27 for location. 88-SB01–88-SB06 are not shown in Figure C27

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

Data sources:

CERCLA Administrative Record files #1979, #2020, #2324
Baker Environmental, Inc. 1998c
Duke Engineering and Services, Inc. and Baker Environmental, Inc. 1999a
OHM Remediation Services Corp. 1996a

Table C68. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in soil samples collected in monitor well boreholes at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit]

Site name ¹	Sample date	Sample depth or interval, in feet below land surface	Concentration, in micrograms per kilogram							
			PCE	TCE	Total DCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
88-CPT01	11/15/1997	15.2	ND	ND	ND	NA	NA	NA	NA	NA
88-CPT02	11/15/1997	17.2	ND	ND	ND	NA	NA	NA	NA	NA
88-CPT03	11/15/1997	18.2	32	ND	ND	NA	NA	NA	NA	NA
88-CPT04	11/15/1997	18.2	60	ND	ND	NA	NA	NA	NA	NA
88-CPT05	11/15/1997	19.5	1.3	ND	ND	NA	NA	NA	NA	NA
88-CPT07	11/15/1997	17.0	3.9	0.3	ND	NA	NA	NA	NA	NA
88-CPT08	11/15/1997	21.0	8.0	0.3	ND	NA	NA	NA	NA	NA
88-CPT09	11/15/1997	17.6	3.0	ND	ND	NA	NA	NA	NA	NA
88-CPT10	11/15/1997	18.4	0.5	ND	ND	NA	NA	NA	NA	NA
88-EX01	12/3/1997	16.5	3,013	ND	ND	NA	NA	NA	NA	NA
		17.5	44,352	ND	ND	NA	NA	NA	NA	NA
		18.5	29,763	ND	ND	NA	NA	NA	NA	NA
88-EX03	12/4/1997	16.0	1.2	ND	ND	NA	NA	NA	NA	NA
		17.5	19	ND	ND	NA	NA	NA	NA	NA
		19.0	96	ND	ND	NA	NA	NA	NA	NA
88-EX04	12/4/1997	17.0	122	1.8	2.2	NA	NA	NA	NA	NA
		18.5	25	ND	ND	NA	NA	NA	NA	NA
		19.5	11,743	ND	ND	NA	NA	NA	NA	NA
88-EX05	12/4/1997	18.0	2.3	ND	0.40	NA	NA	NA	NA	NA
		19.0	0.8	ND	3.1	NA	NA	NA	NA	NA
		20.0	86	ND	ND	NA	NA	NA	NA	NA
88-EX06	12/5/1997	16.5	0.7	ND	0.5	NA	NA	NA	NA	NA
		18.0	0.8	ND	ND	NA	NA	NA	NA	NA
		19.0	0.5	ND	ND	NA	NA	NA	NA	NA
88-HCO1	12/8/1997	18.5	1,540	ND	ND	NA	NA	NA	NA	NA
		20.0	10,489	ND	ND	NA	NA	NA	NA	NA
		21.0	712	ND	ND	NA	NA	NA	NA	NA
88-HCO2	12/9/1997	16.0	1.2	0.10	0.10	NA	NA	NA	NA	NA
		17.0	17	9.4	0.10	NA	NA	NA	NA	NA
		18.5	25	0.20	ND	NA	NA	NA	NA	NA
88-IN01	12/8/1997	18.0	13,406	ND	ND	NA	NA	NA	NA	NA
		19.5	15,553	ND	ND	NA	NA	NA	NA	NA
		20.5	708	ND	ND	NA	NA	NA	NA	NA
88-IN03	12/8/1997	16.0	5.2	0.10	0.60	NA	NA	NA	NA	NA
		17.5	2.7	ND	ND	NA	NA	NA	NA	NA
		19.0	18	0.20	ND	NA	NA	NA	NA	NA
88-IS01	7/27/1997	5.2–5.3	ND	ND	19	NA	NA	NA	NA	² 1.8
	7/27/1997	8.0–8.25	72.8	6.9	43.3	NA	NA	NA	NA	ND
	7/27/1997	8.5–8.75	101.4	38.6	49.9	NA	NA	NA	NA	ND
	7/27/1997	10.0–10.25	114	8.4	35.1	NA	NA	NA	NA	ND

Table C68

Table C68. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in soil samples collected in monitor well boreholes at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit]

Site name ¹	Sample date	Sample depth or interval, in feet below land surface	Concentration, in micrograms per kilogram							
			PCE	TCE	Total DCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
88-IS02	7/27/1997	8.0–8.25	13.1	2.1	15.1	NA	NA	NA	NA	≈0.33
	7/27/1997	8.5–8.75	0.7	3.0	3.2	NA	NA	NA	NA	ND
	7/27/1997	8.8–9.1	64.8	ND	49.5	NA	NA	NA	NA	≈0.98
	7/27/1997	16.3–16.4	0.1	ND	ND	NA	NA	NA	NA	ND
88-IS03	7/27/1997	2.5–2.75	16.9	0.5	ND	NA	NA	NA	NA	ND
	7/27/1997	5.8–6.0	1.2	ND	ND	NA	NA	NA	NA	ND
	7/27/1997	7.5–7.75	7.2	ND	0.2	NA	NA	NA	NA	ND
88-IS04	7/27/1997	12.0–12.2	7.3	ND	ND	NA	NA	NA	NA	ND
88-IS05	7/27/1997	2.5–2.7	209	ND	ND	NA	NA	NA	NA	ND
	7/27/1997	5.6–5.8	653	ND	ND	NA	NA	NA	NA	ND
	7/27/1997	8.1–8.3	3,508	ND	ND	NA	NA	NA	NA	ND
	7/27/1997	10.2–10.4	372	25.4	ND	NA	NA	NA	NA	ND
88-IS06	7/27/1997	9.1–9.3	3.2	ND	ND	NA	NA	NA	NA	ND
88-IS07	7/27/1997	5.0–5.2	0.1	ND	3.6	NA	NA	NA	NA	≈3.5
	7/27/1997	8.5–8.7	195	6.9	81.5	NA	NA	NA	NA	≈4.8
	7/27/1997	10.9–11.1	58	4.0	32.6	NA	NA	NA	NA	ND
	7/27/1997	18.3–18.5	1,901	ND	ND	NA	NA	NA	NA	ND
88-IS08	7/27/1997	4.6–4.8	1,268	133	ND	NA	NA	NA	NA	ND
	7/27/1997	7.2–7.4	1,577	258	ND	NA	NA	NA	NA	ND
	7/27/1997	17.5–17.75	13,748	ND	ND	NA	NA	NA	NA	ND
	7/27/1997	18.6–18.8	5,997	ND	ND	NA	NA	NA	NA	ND
	7/27/1997	19.3–19.5	2,617	ND	ND	NA	NA	NA	NA	ND
88-IS09	7/27/1997	10.5–10.7	188	ND	ND	NA	NA	NA	NA	ND
	7/27/1997	14.6–14.8	24	ND	ND	NA	NA	NA	NA	ND
88-IS10	7/27/1997	15.3–15.5	80	3.7	3.7	NA	NA	NA	NA	ND
	7/27/1997	16.1–16.4	20	0.6	0.8	NA	NA	NA	NA	ND
	7/27/1997	17.1–17.3	25,829	ND	ND	NA	NA	NA	NA	ND
	7/27/1997	17.7–17.8	3,841	ND	ND	NA	NA	NA	NA	ND
88-IS11	7/27/1997	16.3–16.5	12,169	ND	ND	NA	NA	NA	NA	ND
88-IS12	8/19/1997	15.5–15.7	52	ND	ND	NA	NA	NA	NA	ND
	8/19/1997	16.0–16.2	22	0.2	ND	NA	NA	NA	NA	ND
	8/19/1997	16.2–16.5	NA	NA	NA	NA	NA	NA	NA	NA
	8/19/1997	17.0–17.2	32	ND	ND	NA	NA	NA	NA	ND
88-IS13	8/19/1997	8.5–9.0	NA	NA	NA	NA	NA	NA	NA	ND
	8/19/1997	17.0–17.2	7,760	ND	ND	NA	NA	NA	NA	ND
	8/19/1997	17.5–17.7	25,411	ND	ND	NA	NA	NA	NA	ND
	8/19/1997	18.0–18.2	6,226	ND	ND	NA	NA	NA	NA	NA

Table C68. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in soil samples collected in monitor well boreholes at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit]

Site name ¹	Sample date	Sample depth or interval, in feet below land surface	Concentration, in micrograms per kilogram							
			PCE	TCE	Total DCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
88-IS14	11/18/1997	18.0	0.05	ND	ND	NA	NA	NA	NA	NA
88-IS15	11/18/1997	19.0	3.4	0.05	ND	NA	NA	NA	NA	NA
88-IS16	11/19/1997	18.5	3,261	ND	ND	NA	NA	NA	NA	NA
88-IS17	11/19/1997	18.0	5,930	ND	ND	NA	NA	NA	NA	NA
88-IS18	11/19/1997	18.4	5.4	0.1	ND	NA	NA	NA	NA	NA
88-IS19	11/19/1997	17.4	0.1	ND	ND	NA	NA	NA	NA	NA
88-IS20	11/19/1997	18.5	2.9	ND	ND	NA	NA	NA	NA	NA
88-IS21	11/20/1997	18.7	908	ND	ND	NA	NA	NA	NA	NA
		19.7	8,763	ND	ND	NA	NA	NA	NA	NA
88-IS22	11/20/1997	17.0	3,603	ND	ND	NA	NA	NA	NA	NA
		18.0	2,815	ND	ND	NA	NA	NA	NA	NA
		19.0	909	ND	ND	NA	NA	NA	NA	NA
88-IS23	11/20/1997	17.5	9.3	ND	ND	NA	NA	NA	NA	NA
		18.2	1,476	ND	ND	NA	NA	NA	NA	NA
		19.0	311	ND	ND	NA	NA	NA	NA	NA
88-IS25	11/21/1997	17.0	1,709	ND	ND	NA	NA	NA	NA	NA
		18.0	10,851	ND	ND	NA	NA	NA	NA	NA
		19.0	814	ND	ND	NA	NA	NA	NA	NA
88-IS26	11/21/1997	17.0	208	ND	ND	NA	NA	NA	NA	NA
		17.7	1,611	ND	ND	NA	NA	NA	NA	NA
		18.5	106	ND	ND	NA	NA	NA	NA	NA
88-IS29	11/22/1997	18.8	4,361	ND	ND	NA	NA	NA	NA	NA
88-IS30	11/22/1997	18.8	3,212	ND	ND	NA	NA	NA	NA	NA
88-IS31	11/22/1997	16.8	54	ND	ND	NA	NA	NA	NA	NA
88-IW01	8/20/1997	4.0–4.5	138	ND	ND	NA	NA	NA	NA	ND
	8/20/1997	9.0–9.5	NA	NA	NA	NA	NA	NA	NA	NA
	8/20/1997	17.5–17.7	33,572	ND	ND	NA	NA	NA	NA	ND
	8/20/1997	18.0–18.2	5,140	ND	ND	NA	NA	NA	NA	ND
	8/20/1997	18.0–18.5	NA	NA	NA	NA	NA	NA	NA	NA
	8/20/1997	18.5–18.7	2	ND	22	NA	NA	NA	NA	ND
88-MW02DW	4/20/1997	9.0–11.0	4.0J	<13	NA	<13	NA	NA	NA	<13
		11.0–13.0	260	<13	NA	<13	NA	NA	<13	<13
88-MW03DW	4/30/1997	3.0–5.0	<12	<12	NA	<12	NA	NA	<12	<12
		7.0–9.0	<12	<12	NA	<12	NA	NA	<12	<12
88-MW04DW	4/18/1997	11.0–13.0	<12	<12	NA	<12	NA	NA	<12	<12
		13.0–15.0	<13	<13	NA	<13	NA	NA	<13	<13
88-MW05DW	4/22/1997	9.0–11.0	7.0J	<12	NA	<12	NA	NA	<12	<12
		11.0–13.0	3,500	16	NA	<12	NA	NA	12J	<12

Table C68

Table C68. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in soil samples collected in monitor well boreholes at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit]

Site name ¹	Sample date	Sample depth or interval, in feet below land surface	Concentration, in micrograms per kilogram							
			PCE	TCE	Total DCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
88-MW06IW	5/4/1997	11.0–13.0	<11	<11	NA	<11	NA	NA	<11	<11
		13.0–15.0	<12	<12	NA	<12	NA	NA	<12	<12
88-88RW01	8/19/1997	9.5–10.0	NA	NA	NA	NA	NA	NA	NA	NA
	8/19/1997	17.0–17.2	31	ND	ND	NA	NA	NA	NA	ND
	8/19/1997	18.0–18.2	11,337	ND	ND	NA	NA	NA	NA	ND
	8/19/1997	20.0–20.2	1,483	ND	ND	NA	NA	NA	NA	ND
88-RW02	8/19/1997	9.0–9.5	NA	NA	NA	NA	NA	NA	NA	NA
	8/19/1997	17.0–17.2	16	ND	ND	NA	NA	NA	NA	ND
	8/19/1997	18.0–18.2	1,049	ND	ND	NA	NA	NA	NA	ND
	8/19/1997	18.0–18.5	NA	NA	NA	NA	NA	NA	NA	NA
	8/19/1997	18.5–18.7	4,634	ND	ND	NA	NA	NA	NA	ND
88-RW03	12/9/1997	21.6	287	1.7	ND	NA	NA	NA	NA	NA
88-RW04	12/9/1997	18.0	25	0.10	ND	NA	NA	NA	NA	NA
		19.5	23,057	ND	ND	NA	NA	NA	NA	NA
		20.5	448	ND	ND	NA	NA	NA	NA	NA
88-SB01	4/20/1997	3.0–5.0	200	<17	NA	<17	NA	NA	<17	<17
88-SB02	5/7/1997	7.0–9.0	<12	<12	NA	<12	NA	NA	<12	<12
		9.0–11.0	<12	<12	NA	<12	NA	NA	<12	<12
88-SB03	4/20/1997	3.0–5.0	56J	3.0	NA	<11	NA	NA	<11	<11
88-SB04	5/6/1997	7.0–9.0	38	16	NA	<12	NA	NA	<12	<12
	5/6/1997	9.0–11.0	24	380	NA	<12	NA	NA	240	<12
88-SB05	5/6/1997	9.0–11.0	<11	<11	NA	<11	NA	NA	<11	<11
	5/6/1997	11.0–13.0	<12	<12	NA	<12	NA	NA	<12	<12
88-SB06	5/6/1997	7.0–9.0	<12	<12	NA	<12	NA	NA	<12	<12
	5/6/1997	9.0–11.0	<12	<12	NA	<12	NA	NA	<12	<12
88-TW01	11/12/1995	3.0–8.0	13	<6.0	NA	NA	NA	NA	<6.0	NA
88-TW02	11/12/1995	3.0–8.0	55	<6.0	NA	NA	NA	NA	<9.0	NA
88-TW03	11/12/1995	3.0–8.0	36	<6.0	NA	NA	NA	NA	<6.0	NA
88-TW04	11/12/1995	3.0–8.0	<5.0	<5.0	NA	NA	NA	NA	<5.0	NA
		8/16/1996	6.0–8.0	14.8	0.20	NA	NA	<1.0	<1.0	NA
88-TW04IW	8/16/1996	20.0–22.0	1.5	0.10	NA	NA	<1.0	<1.0	NA	<100
		8/15/1996	6.0–8.0	1.2	0.10	NA	NA	<1.0	<1.0	NA
88-TW06	8/16/1996	4.0–6.0	0.40	<1.0	NA	NA	<1.0	<1.0	NA	<100
88-TW07	8/16/1996	4.0–6.0	0.10	<1.0	NA	NA	<1.0	<1.0	NA	<100
88-TW08	8/16/1996	4.0–6.0	237.8	0.80	NA	NA	<1.0	<1.0	NA	<100
88-TW09	8/17/1996	6.0–8.0	22.6	3.3	NA	NA	<1.0	<1.0	NA	<100
		10.0–12.0	3.1	0.5	NA	NA	<1.0	<1.0	NA	<100

Table C68. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in soil samples collected in monitor well boreholes at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; J, estimated concentration; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit]

Site name ¹	Sample date	Sample depth or interval, in feet below land surface	Concentration, in micrograms per kilogram							
			PCE	TCE	Total DCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
88-TW10	8/17/1996	4.0–6.0	<1.0	<1.0	NA	NA	<1.0	<1.0	NA	<100
88-TW11	8/17/1996	2.0–4.0	<1.0	<1.0	NA	NA	<1.0	<1.0	NA	<100
88-TW12	8/17/1996	8.0–10.0	<1.0	<1.0	NA	NA	<1.0	<1.0	NA	<100
88-TW13	8/17/1996	5.0–7.0	1.5	<1.0	NA	NA	<1.0	<1.0	NA	<100
		9.0–11.0	0.90	<1.0	NA	NA	<1.0	<1.0	NA	<100
88-TW14	8/17/1996	4.0–6.0	0.30	<1.0	NA	NA	<1.0	<1.0	NA	<100
88-TW15	8/17/1996	8.0–10	11.6	8.5	NA	NA	<1.0	21	NA	<100
88-TW16	8/18/1996	7.0–9.0	0.20	<1.0	NA	NA	<1.0	<1.0	NA	<100
88-TW17	8/18/1996	7.0–9.0	0.20	<1.0	NA	NA	<1.0	<1.0	NA	<100
88-TW18	8/20/1996	4.0–6.0	<1.0	<1.0	NA	NA	<1.0	<1.0	NA	<100
88-TW19	8/20/1996	6.0–8.0	<1.0	<1.0	NA	NA	<1.0	<1.0	NA	<100
88-TW20IW	4/22/1997	6.0–8.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
		8.0–10.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
88-TW21IW	4/15/1997	10.0–12.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
		12.0–14.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
88-TW22IW	4/15/1997	8.0–10.0	10	<1.0	NA	<10	<10	<10	NA	<100
		10.0–12.0	399	13	NA	<10	<10	32	NA	<100
88-TW23IW	4/16/1997	8.0–10.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
		10.0–12.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
88-TW24IW	4/16/1997	8.0–10.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
		10.0–12.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
88-TW25IW	4/17/1997	12.0–14.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
		14.0–16.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
88-TW26IW	4/17/1997	8.0–10.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
		10.0–12.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
88-TW27IW	4/29/1997	8.0–10.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
		10.0–12	<1.0	<1.0	NA	<10	<10	<10	NA	<100
88-TW28IW	4/29/1997	10.0–12.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100
		12.0–14.0	<1.0	<1.0	NA	<10	<10	<10	NA	<100

¹ See Figures C26 and C27 for location. Test well (TW) locations are not shown

²Uncorrected for soil water content

Data sources:

CERCLA Administrative Record files #217, #1738, #1747, #2020, #2032, #2324

Baker Environmental, Inc. 1996h, 1998b,c

Duke Engineering and Services, Inc. 1997

Duke Engineering and Services, Inc. and Baker Environmental, Inc. 1999a

OHM Remediation Services Corp. 1996a

Table C69

Table C69. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 88, Building 25 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; D, sample dilution required]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
88-MW01	5/15/1997	NA	NA	<10	NA	NA	<10	NA
	7/27/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/18/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/16/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/14/2001	3.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
88-MW02	5/15/1997	NA	NA	<10	NA	NA	<10	NA
	7/27/1999	1,200D	130	<5.0	<5.0	31	NA	<2.0
	1/18/2000	10,000	370J	<5.0	<5.0	29	29	<2.0
	7/18/2000	15,000D	190	<5.0	<5.0	30	30	<2.0
	1/16/2001	11,000D	80	<5.0	<5.0	13	13	<2.0
	7/14/2001	74	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
88-MW02DW	5/15/1997	NA	NA	<10	NA	NA	<10	NA
88-MW02IW	5/15/1997	NA	NA	<10	NA	NA	<10	NA
	7/27/1999	4,900D	1,000D	<5.0	<5.0	64	NA	<2.0
	1/18/2000	7,500	270J	<5.0	<5.0	81J	81J	<2.0
	7/18/2000	13,000D	590D	<5.0	<5.0	78	78	<2.0
	1/16/2001	9,400D	310J	<5.0	<5.0	60	60	<2.0
	7/14/2001	11,000	700	<5.0	<5.0	92	92	<2.0
88-MW03	5/14/1997	NA	NA	<10	NA	NA	<10	NA
88-MW03DW	5/14/1997	NA	NA	<10	NA	NA	<10	NA
88-MW03IW	5/14/1997	NA	NA	<10	NA	NA	<10	NA
88-MW04	5/14/1997	NA	NA	<10	NA	NA	<10	NA
	7/27/1999	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/18/2000	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	1/16/2001	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
	7/14/2001	5.0J	<5.0	<5.0	<5.0	<5.0	<5.0	<2.0
88-MW04DW	5/14/1997	NA	NA	<10	NA	NA	<10	NA
88-MW04IW	5/14/1997	NA	NA	<10	NA	NA	<10	NA
88-MW05	5/13/1997	NA	NA	<10	NA	NA	<10	NA
	7/27/1999	6,500D	46	<5.0	<5.0	23	NA	<2.0
	1/18/2000	5,700	38J	<5.0	<5.0	23J	23J	<2.0
	7/18/2000	8,600D	35	<5.0	25	18	18	<2.0
	1/16/2001	5,200D	19	<5.0	<5.0	11	11	<2.0
88-MW05DW	5/13/1997	NA	NA	<10	NA	NA	<10	NA
88-MW05IW	5/13/1997	NA	NA	5.0J	NA	NA	<10	NA
	7/27/1999	3,400D	2,100D	11	24	1,800D	NA	<2.0
	1/18/2000	3,900	2,600	10	20	1,900	1,900	<2.0
	7/18/2000	6,400D	3,900D	12	25	3,000D	3,000D	<2.0
	1/16/2001	6,200D	4,600D	11	36	4,200D	2,300	1.0J

Table C69. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 88, Building 25 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; D, sample dilution required]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
88-MW06	5/15/1997	NA	NA	<10	NA	NA	<10	NA
88-MW06IW	5/15/1997	NA	NA	<10	NA	NA	<10	NA
88-MW07	5/18/1997	NA	NA	<10	NA	NA	<10	NA
88-MW07IW	5/18/1997	NA	NA	7.0J	NA	NA	<10	NA
	7/27/1999	<5.0	53	7.0	9.0	94	NA	3.0
	1/18/2000	<5.0	48	6.0	9.0	83	91	2.0J
	7/18/2000	<5.0	48	5.0	8.0	76	84	1.0J
	1/16/2001	<5.0	38	5.0J	8.0	72	80	<2.0
	7/14/2001	<5.0	47	<5.0	7.0	58	65	<2.0
88-MW08	5/16/1997	NA	NA	<10	NA	NA	<10	NA
88-MW08IW	5/16/1997	NA	NA	<10	NA	NA	<10	NA
88-MW09	5/16/1997	NA	NA	<10	NA	NA	<10	NA
88-MW09IW	5/16/1997	NA	NA	<10	NA	NA	<10	NA
	7/27/1999	4.0J	60	<5.0	5.0	37	NA	<2.0
	1/18/2000	<5.0	46	<5.0	3.0J	21	24	<2.0
	7/18/2000	<5.0	52	<5.0	3.0J	17	20	<2.0
	1/16/2001	<5.0	44	<5.0	<5.0	11	11	<2.0
	7/14/2001	<5.0	68	<5.0	7.0	58	65	<2.0
88-MW10IW	5/16/2000	290	160	<5.0	<5.0	44	NA	<2.0
88-RW01	8/22/1997	170,000	3,200	NA	NA	NA	11,000	NA
	5/16/2000	43,000	690	<500	<500	7,900J	NA	910
88-RW02	8/22/1997	150,000	3,500	NA	NA	NA	10,000	NA
	5/16/2000	89,000	NA	<500	<500	1,200	NA	750
88-TW01	11/12/1995	1,620	<100	NA	NA	NA	<10	NA
	8/1/1996	157.2	17.7	NA	<1.0	4.0	<1.0	<50
88-TW02	11/12/1995	416	<50	NA	NA	NA	154	NA
	8/1/1996	649.1	81.5	NA	9.0	445	NA	<50
88-TW03	11/12/1995	4,190	2,750	NA	NA	NA	10,000	NA
	8/1/1996	14,090	838	NA	6.0	1,184	NA	<50
88-TW04	11/12/1995	29,200	<1,250	NA	NA	NA	<1,250	NA
	8/1/1996	32,839	230	NA	1.0	63	NA	<50
88-TW04IW	8/16/1996	21	5.5	NA	<1.0	21	NA	<50
88-TW05	8/16/1996	1,382	20.8	NA	<1.0	3.0	NA	<50
88-TW05IW	8/18/1996	1,143	71.2	NA	1.0	89	NA	<50
88-TW06	8/17/1996	<0.10	<0.10	NA	<1.0	<1.0	NA	<50
88-TW07	8/17/1996	0.20	<0.10	NA	<1.0	<1.0	NA	<50
88-TW08	8/17/1996	53,704	341.2	NA	2.0	271	NA	<50
88-TW08IW	8/18/1996	1,314	823	NA	11	883	NA	<50
88-TW09	8/17/1996	969.2	70.8	NA	<1.0	14	NA	<50

Table C69

Table C69. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 88, Building 25 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, estimated concentration; D, sample dilution required]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
88-TW10	8/18/1996	0.10	0.20	NA	<1.0	<1.0	NA	<50
88-TW11	8/17/1996	1.3	0.20	NA	<1.0	<1.0	NA	<50
88-TW12	8/17/1996	1.5	<0.10	NA	<1.0	<1.0	NA	<50
88-TW13	8/18/1996	44.3	0.6	NA	<1.0	<1.0	NA	<50
88-TW14	8/18/1996	0.1	<0.10	NA	<1.0	<1.0	NA	<50
88-TW15	8/18/1996	4,932	3,031	NA	38	3,725	NA	<50
88-TW16	8/18/1996	0.2	<0.10	NA	<1.0	<1.0	NA	<50
88-TW17	8/20/1996	0.2	<0.10	NA	<1.0	<1.0	NA	<50
88-TW18	8/20/1996	<0.10	<0.10	NA	<1.0	<1.0	NA	<50
88-TW19	8/20/1996	<0.10	<0.10	NA	<1.0	<1.0	NA	<50
88-TW19IW	8/20/1996	<0.10	<0.10	NA	<1.0	<1.0	NA	<50
88-TW20	4/21/1997	<0.10	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW20IW	4/21/1997	0.30	7.1	<0.10	<1.0	<1.0	NA	<50
88-TW21	4/21/1997	<0.10	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW21IW	4/21/1997	<0.10	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW22	4/21/1997	54,882	125	<0.10	2.0	126	NA	<50
88-TW22IW	4/21/1997	26,592	13	0.30	2.0	81	NA	<50
88-TW23	4/21/1997	<0.10	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW23IW	4/21/1997	15.8	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW24	4/21/1997	<0.10	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW24IW	4/20/1997	<0.10	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW25	4/21/1997	<0.10	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW25IW	4/21/1997	0.30	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW26	4/21/1997	<0.10	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW26IW	4/21/1997	<0.10	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW27	4/30/1997	<0.10	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW27IW	4/30/1997	0.40	<0.10	<0.10	<1.0	<1.0	NA	<50
88-TW28	4/30/1997	<0.10	0.70	<0.1	<1.0	<1.0	NA	<50
88-TW28IW	4/30/1997	0.30	4.1	1.9	<1.0	1.0	NA	<50

¹ See Figures C26 and C27 for location. Test well (TW) locations are not shown

Data sources:

- CERCLA Administrative Record files #217, #1747, #2032, #2302, #2606A, #2614A, #3159, #3188, #3341, #3343
- Baker Environmental, Inc. 1996h,l, 1998b
- Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000j, 2001,b
- Baker Environmental, Inc. and CH2M Hill, Inc. 2000b
- CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2001c
- Duke Engineering and Services, Inc. 1997
- Duke Engineering and Services, Inc. and Baker Environmental, Inc. 1998, 1999b

Table C70. Summary of tetrachloroethylene (PCE) free-phase measurements in monitor wells at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[>, greater than]

Site name ¹	Sample date	PCE free product thickness, in feet
88-EX01	1998	1.60
88-EX02	1998	>0.3
88-EX04	7/22/2002	1.66
88-EX04R	7/22/2002	0.54
88-HC01	1998	>0.3
88-IN01	1998	0.30
88-RW01	1998	>0.3
	7/22/2002	0.41
88-RW02	1998	0.50
	7/22/2002	0.06
88-RW03	7/22/2002	0.01
88-RW04	1998	2.80
88-RW06	1998	2.30

¹ See Figures C26 and C27 for location

Data sources:

CERCLA Administrative Record files #2324, #3187

Duke Engineering and Services, Inc. and Baker Environmental, Inc. 1999a

CH2M Hill, Inc. 2003

Table C71

Table C71. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[<, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
88-MW01	7/27/1999	<5.0	<5.0	<5.0	<5.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0
	7/18/2000	<5.0	<5.0	<5.0	<5.0
	1/16/2001	<5.0	<5.0	<5.0	<5.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0
88-MW02	7/27/1999	<5.0	<5.0	<5.0	<1,000
	1/18/2000	<5.0	<5.0	<5.0	<5.0
	7/18/2000	<5.0	<5.0	<5.0	<5.0
	1/16/2001	<5.0	<5.0	<5.0	<5.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0
88-MW02IW	7/27/1999	<5.0	<5.0	<5.0	<5.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0
	1/16/2001	<5.0	<5.0	<5.0	<5.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0
88-MW04	7/27/1999	<5.0	<5.0	<5.0	<5.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0
	7/18/2000	<5.0	<5.0	<5.0	<5.0
	1/16/2001	<5.0	<5.0	<5.0	<5.0
	7/14/2002	<5.0	<5.0	<5.0	<5.0
88-MW05	7/27/1999	<5.0	<5.0	<5.0	<5.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0
	7/18/2000	<5.0	<5.0	<5.0	<5.0
	1/16/2001	<5.0	<5.0	<5.0	<5.0
88-MW05IW	7/27/1999	<5.0	<5.0	<5.0	<5.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0
	7/18/2000	<5.0	<5.0	<5.0	<5.0
	1/16/2001	<5.0	<5.0	<5.0	<5.0
88-MW07IW	7/27/1999	<5.0	<5.0	<5.0	<5.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0
	1/16/2001	<5.0	<5.0	<5.0	<5.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0
88-MW09IW	7/27/1999	<5.0	<5.0	<5.0	<5.0
	1/18/2000	<5.0	<5.0	<5.0	<5.0
	1/16/2001	<5.0	<5.0	<5.0	<5.0
	7/14/2001	<5.0	<5.0	<5.0	<5.0

Table C71. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 88, Building 25, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[<, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
88-88TW05	8/28/1996	<10	<10	<10	<10
88-TW05IW	8/27/1996	<10	<10	<10	<10
88-TW08	8/28/1996	<10	<10	<10	<10
88-TW08IW	8/28/1996	<10	<10	<10	<10
88-TW09	8/27/1996	<10	<10	<10	<10
88-TW19	8/27/1996	<10	<10	<10	<10
88-TW19IW	8/27/1996	<10	<10	<10	<10
88-TW20	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW20IW	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW21	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW21IW	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW22	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW22IW	4/21/1997	<2.0	7.0	<2.0	<2.0
88-TW23	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW23IW	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW24	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW24IW	4/20/1997	<2.0	<2.0	<2.0	<2.0
88-TW25	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW25IW	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW26	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW26IW	4/21/1997	<2.0	<2.0	<2.0	<2.0
88-TW27	4/30/1997	<2.0	<2.0	<2.0	<2.0
88-TW27IW	4/30/1997	<2.0	<2.0	<2.0	<2.0
88-TW28	4/30/1997	<2.0	<2.0	<2.0	<2.0
88-TW28IW	4/30/1997	<2.0	<2.0	<2.0	<2.0

¹ See Figures C26 and C27 for location. Test well (TW) locations are not shown

Data sources:

CERCLA Administrative Record files #1747, #2032, #2606A, #2614A, #3341, #3343

Baker Environmental, Inc. 1996h, 1998b

Baker Environmental, Inc. and CH2M Hill Federal Group, Ltd. 2000j, 2001b

Baker Environmental, Inc. and CH2M Hill, Inc. 2000b

CH2M Hill Federal Group, Ltd. and Baker Environmental, Inc. 2001c

Table C72

Table C72. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected at hydropunch locations at Installation Restoration Site 94, Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit]

Site name ¹	Location coordinates ²		Land surface altitude, in feet above NGVD 29	Sample interval, in feet below land surface	Sample date	Contributing aquifer or confining unit	Concentration, in micrograms per liter			
	North	East					Benzene	Toluene	Ethylbenzene	Total xylene
94-HP01	338380	2498555	³ 30	7–11	3/28/1995	BBUAQ	<0.5	4.2	0.60	<1.5
94-HP01D	338380	2498555	³ 30	17–20	3/29/1995	BBUCU, BBLAQ	<0.5	12.9	0.80	2.0
94-HP02	338549	2498511	³ 26	13–17	3/30/1995	BBUAQ, BBUCU	<0.5	0.90	ND	2.7
94-HP03	338808	2498845	³ 26	15–19	4/12/1995	BBUCU, BBLAQ	<0.5	<0.5	<0.5	<1.5
94-HP04	338365	2498696	³ 26	11–15	4/6/1995	BBUAQ, BBUCU	<0.5	<0.5	<0.5	<1.5
94-HP05	338590	2498676	³ 26	11–15	4/6/1995	BBUAQ, BBUCU	<0.5	10.6	0.80	2.1
94-HP06	338831	2498604	³ 21	15–19	4/12/1995	BBUCU, BBLAQ	<0.5	<0.5	<0.5	<1.5
94-HP07	338340	2498891	³ 26	7–10	4/5/1995	BBUAQ	<0.5	12.8	4.0	149
94-HP08	338603	2498850	³ 26	13–16	4/5/1995	BBUAQ, BBUCU	⁴ 17,300	⁴ 20,700	⁴ 2,140	⁴ 10,800
94-HP09	338808	2498845	³ 26	11–15	4/5/1995	BBUAQ, BBUCU	2.9	11.2	1.1	3
94-HP10	338499	2499115	³ 26	16–20	4/6/1995	BBUCU, BBLAQ	<0.5	21.6	1.3	<1.5
94-HP11	338677	2499052	³ 26	11–15	4/6/1995	BBUAQ, BBUCU	7,700	⁴ 10,800	1,100	5,420
94-HP12	338837	2499053	³ 27	11–15	4/5/1995	BBUAQ, BBUCU	<0.5	14.4	1.4	2.4
94-HP13	338533	2499282	³ 27	12–15	4/6/1995	BBUAQ, BBUCU	<0.5	9.0	<0.5	<1.5
94-HP14	338653	2499244	³ 27	12–15	4/5/1995	BBUAQ, BBUCU	0.60	1.6	<0.5	<1.5
94-HP15	338803	2499213	³ 26	12–15	4/5/1995	BBUAQ, BBUCU	<0.5	44.9	1.7	55.1

¹ See Figure C30 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Estimated altitude

⁴ Minimum concentration

Data source:

CERCLA Administrative Record files #76, #90

Richard Catlin and Associates, Inc. 1996a,b

Table C73. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected at hydropunch locations at Installation Restoration Site 94, Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NA, constituent concentration not determined or analytical result is unknown; ND, constituent not detected]

Site name ¹	Sample date	Sample interval, in feet below land surface	Concentration, in micrograms per liter						
			PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
94-HP01	3/28/1995	7–11	NA	ND	ND	ND	NA	NA	NA
94-HP01D	3/29/1995	17–20	NA	29.2	ND	0.90	NA	NA	NA
94-HP02	3/30/1995	13–17	NA	ND	ND	ND	NA	NA	NA
94-HP03	4/12/1995	15–19	NA	ND	ND	ND	NA	NA	NA
94-HP04	4/6/1995	11–15	NA	ND	ND	ND	NA	NA	NA
94-HP05	4/6/1995	11–15	NA	ND	ND	ND	NA	NA	NA
94-HP06	4/12/1995	15–19	NA	ND	ND	ND	NA	NA	NA
94-HP07	4/5/1995	7–10	NA	ND	ND	ND	NA	NA	NA
94-HP08	4/5/1995	13–16	NA	ND	ND	ND	NA	NA	NA
94-HP09	4/5/1995	11–15	NA	ND	ND	ND	NA	NA	NA
94-HP10	4/6/1995	16–20	NA	ND	1.1	ND	NA	NA	NA
94-HP11	4/6/1995	11–15	NA	ND	ND	ND	NA	NA	NA
94-HP12	4/5/1995	11–15	NA	ND	ND	ND	NA	NA	NA
94-HP13	4/6/1995	12–15	NA	ND	ND	ND	NA	NA	NA
94-HP14	4/5/1995	12–15	NA	ND	ND	ND	NA	NA	NA
94-HP15	4/5/1995	12–15	NA	ND	ND	ND	NA	NA	NA

¹ See Figure C30 for location

Data sources:

CERCLA Administrative Record files #76, #90

Richard Catlin and Associates, Inc. 1996a,b

Table C74

Table C74. Construction, location, and contributing aquifer data for monitor wells at Installation Restoration Site 94, Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BB LAQ—Brewster Boulevard lower aquifer, BB UAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
94-Bldg1613-01	338789	2498888	25.7	4/10/1995	20.0	5.0–20.0	BBUAQ, BBUCU
94-Bldg1613-02	338744	2499181	26.3	4/10/1995	20.0	5.0–20.0	BBUAQ, BBUCU
94-Bldg1613-03	338531	2499191	26.0	4/11/1995	15.4	5.4–15.4	BBUAQ, BBUCU
94-Bldg1613-04	338475	2498807	24.2	4/11/1995	15.0	5.0–15.0	BBUAQ, BBUCU
94-Bldg1613-05	338592	2498715	22.8	4/11/1995	15.0	5.0–15.0	BBUAQ, BBUCU
94-Bldg1613-06	338731	2498760	25.9	4/11/1995	20.0	10.0–20.0	BBUAQ
94-Bldg1613-07	338882	2499329	23.4	4/12/1995	18.5	8.5–18.5	BBUAQ
94-Bldg1613-08	338347	2498639	27.1	4/12/1995	16.0	8.0–16.0	BBUAQ, BBUCU
94-Bldg1613-09 AKA MW09	338334	2498918	26.0	4/13/1995	15.1	5.1–15.1	BBUAQ, BBUCU
94-Bldg1613-10	338641	2499016	26.7	4/18/1995	18.0	8.0–18.0	BBUAQ, BBUCU
94-Bldg1613-11	338563	2498818	26.0	4/18/1995	20.6	10.6–20.6	BBUAQ, BBUCU
94-Bldg1613-12 AKA MW12	338377	2499089	27.0	4/18/1995	20.4	10.4–20.4	BBUAQ, BBUCU
94-Bldg1613-13	338881	2499314	23.6	4/13/1995	50.0	45.0–50.0	BBLCU, TTAQ(?)
94-Bldg1613-14	338646	2499013	25.6	4/17/1995	49.5	44.5–49.5	BBLCU, TTAQ(?)
94-Bldg1613-15	338356	2498629	27.2	4/17/1995	41.0	36.0–41.0	BB LAQ
94-Bldg1613-16	338653	2499022	25.0	4/18/1995	N/A	5.0–35.0	BBUAQ, BBUCU, BB LAQ

¹ See Figure C30 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

Data sources:

CERCLA Administrative Record files #76, #90

Richard Catlin and Associates, Inc. 1996a,b

Table C75. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Installation Restoration Site 94, Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
94-Bldg1613-01	5/3/1995	ND	ND	ND	ND
94-Bldg1613-02	5/3/1995	ND	ND	ND	ND
94-Bldg1613-03	5/3/1995	ND	ND	ND	ND
94-Bldg1613-04	5/3/1995	ND	ND	ND	ND
94-Bldg1613-05	5/3/1995	ND	ND	ND	ND
94-Bldg1613-06	5/3/1995	ND	ND	ND	ND
94-Bldg1613-07	5/3/1995	ND	ND	ND	ND
94-Bldg1613-08	5/3/1995	ND	ND	ND	ND
94-Bldg1613-09	5/3/1995	ND	ND	ND	ND
AKA MW09	7/23/1997	<0.50	<0.50	<0.50	<0.50
94-Bldg1613-10	5/3/1995	804	6,780	1,280	9,290
94-Bldg1613-11	5/3/1995	8.8	4.3	2.3	18.9
94-Bldg1613-12	5/3/1995	ND	ND	ND	ND
AKA MW12	7/23/1997	<0.50	<0.50	<0.50	<0.50
94-Bldg1613-13	5/3/1995	ND	ND	ND	ND
94-Bldg1613-14	5/3/1995	ND	ND	ND	ND
94-Bldg1613-15	5/3/1995	ND	ND	ND	ND
94-Bldg1613-16	5/3/1995	5.0	2.4	ND	44.8

¹ See Figure C30 for location

Data sources:

CERCLA Administrative Record files #76, #90

Richard Catlin and Associates, Inc. 1996a,b

Table C76

Table C76. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Installation Restoration Site 94, Building 1613 area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NA, constituent concentration not determined or analytical result is unknown; ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
94-Bldg1613-01	5/3/1995	NA	ND	ND	ND	NA	NA	NA
94-Bldg1613-02	5/3/1995	NA	ND	ND	ND	NA	NA	NA
94-Bldg1613-03	5/3/1995	NA	ND	ND	ND	NA	NA	NA
94-Bldg1613-04	5/3/1995	NA	ND	ND	ND	NA	NA	NA
94-Bldg1613-05	5/3/1995	NA	ND	ND	ND	NA	NA	NA
94-Bldg1613-06	5/3/1995	NA	ND	ND	ND	NA	NA	NA
94-Bldg1613-07	5/3/1995	NA	ND	ND	ND	NA	NA	NA
94-Bldg1613-08	5/3/1995	NA	ND	ND	ND	NA	NA	NA
94-Bldg1613-09	5/3/1995	NA	32	ND	1.1	NA	NA	NA
	7/23/1997	< 0.50	< 0.50	< 0.50	NA	NA	< 0.50	< 0.50
94-Bldg1613-10	5/3/1995	NA	ND	ND	ND	NA	NA	NA
94-Bldg1613-11	5/3/1995	NA	ND	ND	ND	NA	NA	NA
94-Bldg1613-12	5/3/1995	NA	ND	ND	ND	NA	NA	NA
	7/23/1997	< 0.50	< 0.50	< 0.50	NA	NA	< 0.50	< 0.50
94-Bldg1613-13	5/3/1995	NA	37	ND	1.2	NA	NA	NA
	9/29/2003	NA	54	NA	0.55	6.7	NA	NA
94-Bldg1613-14	5/3/1995	NA	79	0.70	5.6	NA	NA	NA
	9/29/2003	NA	35	NA	0.84	8.1	NA	NA
94-Bldg1613-15	5/3/1995	NA	16	ND	ND	NA	NA	NA
	9/29/2003	NA	21	NA	< 0.27	38	NA	NA
94-Bldg1613-16	5/3/1995	NA	1.3	ND	ND	NA	NA	NA

¹ See Figure C30 for location

Data sources:

CERCLA Administrative Record files #76, #90
Richard Catlin and Associates, Inc. 1996a,b

Table C77. Construction, location, and contributing aquifer data for monitor wells at Site G, proposed Camp Lejeune landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[NGVD 29, National Geodetic Vertical Datum of 1929; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, BBUCU—Brewster Boulevard upper confining unit, TTCU—Tarawa Terrace confining unit, UCHRBU—Upper Castle Hayne aquifer–River Bend unit; N/A, not available; AKA, also known as]

Site name ¹	Location coordinates ²		Land-surface altitude, in feet above NGVD 29	Completion date	Finished well depth, in feet	Screen interval, in feet below land surface	Contributing aquifer or confining unit
	North	East					
G-BP01	347672	2504379	35.7	N/A	N/A	N/A	N/A
G-BP02	347303	2505185	38.5	N/A	N/A	N/A	N/A
G-BP03	346826	2506138	34.8	N/A	N/A	N/A	N/A
G-BP04	346147	2504316	36.8	N/A	N/A	N/A	N/A
G-BP06	344876	2504300	36.4	4/28/1992	25	15–25	BBUAQ
G-BP07 ³	345631	2503937	27.7	4/14/1992	N/A	N/A	BBLAQ(?)
G-BP08	345989	2504914	38.0	1992(?)	N/A	N/A	BBLAQ(?)
G-BP09	346651	2505516	39.6	1992(?)	N/A	N/A	BBLAQ(?)
G-BP10 ⁴	347001	2504808	35.9	4/15/1992	N/A	N/A	BBLAQ(?)
G-MW01	347001	2504808	⁵ 36	1991	N/A	N/A	BBUAQ(?), BBLAQ(?)
G-MW02 AKA 06-MW02	345631	2503937	⁵ 28	1991	N/A	N/A	BBUAQ(?), BBLAQ(?)
G-MW03D AKA 06-MW03D	347811	2504501	34.2	4/1/1993	118	97.5–117.6	TTCU, UCHRBU
G-MW03S AKA 06-MW03S	347850	2504348	29.0	4/22/1992	25	15–25	BBUCU, BBLAQ(?)
G-MW04	347925	2505460	26.1	4/22/1992	25	15–25	BBUCU, BBLAQ(?)
G-MW05	347274	2506033	35.3	4/22/1992	25	15–25	BBUAQ, BBUCU
G-MW06	346261	2505757	37.4	4/17/1992	25	15–25	BBUAQ, BBUCU
G-MW07	345188	2504832	34.2	4/21/1992	25	15–25	BBUAQ, BBUCU
G-MW08 AKA 06-MW08	344849	2503833	28.6	4/21/1992	25	15–25	BBUAQ, BBUCU
G-MW09 AKA 06-MW09	346832	2503699	42.9	4/22/1992	25	15–25	BBUAQ

¹ See Figure C31 for location

² Location coordinates are North Carolina State Plane coordinates, North American Datum of 1983

³ Borehole near monitor well G-MW02

⁴ Borehole near monitor well G-MW01

⁵ Estimated altitude

Data sources:

Baker Environmental, Inc. 1993k,m, 1999d

CERCLA Administrative Record files #125, #345, #1272, #2337

Dewberry and Davis 1992

Table C78

Table C78. Summary of analyses for tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE), *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), total 1,2-dichloroethylene (total 1,2-DCE), and vinyl chloride (VC) in water samples collected in monitor wells at Site G, proposed Camp Lejeune landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[ND, constituent not detected; NA, constituent concentration not determined or analytical result is unknown; <, constituent concentration is less than detection limit. Number following the “<” sign is the detection limit; J, concentration is estimated]

Site name ¹	Sample date	Concentration, in micrograms per liter						
		PCE	TCE	1,1-DCE	<i>trans</i> -1,2-DCE	<i>cis</i> -1,2-DCE	Total 1,2-DCE	VC
G-BP06	10/24/1992	ND	ND	ND	NA	NA	ND	ND
	3/22/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
G-MW01	5/5/1992	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
G-MW02	5/5/1992	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	3/21/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
G-MW03S	5/5/1992	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	3/23/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
	1/22/2003	<5.0	0.60J	<5.0	<5.0	<5.0	<5.0	<2.0
	1/20/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
	7/28/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0
G-MW03D	1/20/2004	<5.0	<5.0	<5.0	<5.0	<5.0	<10	<2.0
	7/26/2004	<5.0	<5.0	<5.0	<5.0	<5.0	NA	<2.0
G-MW04	5/5/1992	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
G-MW05	5/5/1992	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
G-MW06	5/5/1992	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
G-MW07	5/5/1992	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
G-MW08	5/5/1992	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	3/22/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0
G-MW09	5/6/1992	<5.0	<5.0	<5.0	NA	NA	<5.0	<10
	10/24/1992	ND	ND	ND	NA	NA	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	NA	NA	<1.0	<1.0

¹ See Figure C31 for location

Data sources:

CERCLA Administrative Record files #345, #1272, #3410, #3637

Dewberry and Davis, 1992

Baker Environmental, Inc. 1993k

Michael Baker Jr., Inc. and CH2M Hill, Inc. 2003

Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2004

Table C79. Summary of analyses for benzene, toluene, ethylbenzene, and total xylene in water samples collected in monitor wells at Site G, proposed Camp Lejeune landfill, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[ND, constituent not detected; <, constituent concentration is less than detection limit. Number following the "<" sign is the detection limit; J, estimated concentration]

Site name ¹	Sample date	Concentration, in micrograms per liter			
		Benzene	Toluene	Ethylbenzene	Total xylene
G-BP06	10/24/1992	ND	ND	ND	ND
	3/22/1993	<1.0	<1.0	<1.0	<1.0
G-MW01	5/5/1992	<5.0	<5.0	<5.0	<5.0
	10/24/1992	ND	ND	ND	ND
G-MW02	5/5/1992	<5.0	<5.0	<5.0	<5.0
	3/21/1993	<1.0	<1.0	<1.0	<1.0
G-MW03S	5/5/1992	<5.0	<5.0	<5.0	<5.0
	3/23/1993	<1.0	<1.0	<1.0	<1.0
	1/22/2003	<5.0	<5.0	<5.0	<5.0
	1/20/2004	<5.0	<5.0	<5.0	<15
	7/28/2004	<5.0	0.30J	<5.0	<15
G-MW03D	1/20/2004	<5.0	<5.0	<5.0	<15
	7/26/2004	<5.0	<5.0	<5.0	<15
G-MW04	5/5/1992	<5.0	<5.0	<5.0	<5.0
G-MW05	5/5/1992	<5.0	<5.0	<5.0	<5.0
G-MW06	5/5/1992	<5.0	<5.0	<5.0	<5.0
G-MW07	5/5/1992	<5.0	<5.0	<5.0	<5.0
G-MW08	3/22/1993	<1.0	<1.0	<1.0	<1.0
G-MW09	5/6/1992	<5.0	<5.0	<5.0	<5.0
	10/24/1992	ND	ND	ND	ND
	3/21/1993	<1.0	<1.0	<1.0	<1.0

¹ See Figure C31 for location

Data sources:

CERCLA Administrative Record files #345, #1272, #3410, #3637

Dewberry and Davis 1992

Baker Environmental, Inc. 1993k

Michael Baker Jr., Inc. and CH2M Hill, Inc. 2003

Michael Baker Jr., Inc. and Engineering and Environment, Inc. 2004

Table C80

Table C80. Summary of analyses for groundwater contaminants of concern and related contaminant source characterizations and affected water-supply wells within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[Contaminant: PCE—tetrachloroethylene, TCE—trichloroethylene, VC—vinyl chloride; µg/L, microgram per liter; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, MCHAQ—Middle Castle Hayne aquifer, TTAQ—Tarawa Terrace aquifer, UCHLU—Upper Castle Hayne aquifer-Lower unit, UCHRBU—Upper Castle Hayne aquifer–River Bend unit; J, estimated concentration; IR, Installation Restoration Program site; BDL, below detection limits; N/A, constituent concentration at site is consistently below detection limits. Data are not applicable; D, sample dilution required]

Site number ¹	Groundwater contaminants of concern	Maximum observed concentration, in µg/L	Sample date	Contaminant source characterization	Water-bearing units containing contaminants ²	Water-supply wells possibly affected by site contaminants ³
1	PCE	6.8	7/7/1984	dispersed	BBUAQ	⁴ HP-624
	TCE	27	4/24/1994	dispersed	BBLAQ	⁶ HP-638
	VC	4.0J	11/11/1994	dispersed	—	—
	Benzene	BDL	N/A	N/A	—	—
2	PCE	10	10/23/1997	dispersed	BBLAQ	⁴ HP-616
	TCE	7.0	10/23/1999	dispersed	TTAQ	⁷ HP-645
	VC	BDL	N/A	N/A	UCHRBU	⁶ HP-646
	Benzene	0.40	11/2/1995	plume ⁵ (?) off site	—	⁶ HP-647
3	PCE	22	7/22/1998	dispersed or off site	BBUAQ	⁶ HP-613
	TCE	11	1/18/1999	small plume (?)	BBLAQ	⁴ HP-617
	VC	BDL	N/A	N/A	TTAQ	⁶ HP-654
	Benzene	40J	12/1/1994	small plume (?)	UCHRBU	—
6	PCE	6,300	1/21/2003	plume	BBUAQ, BBLAQ	⁷ HP-610
	TCE	180,000	1/16/1999	plume	TTAQ, UCHRBU	⁴ HP-619
	VC	800J	3/23/1993	plume	UCHLU, MCHAQ	⁴ HP-635
	Benzene	32J	1/24/2003	plume (?)	—	⁷ HP-651 ⁷ HP-653
9	PCE	BDL	N/A	N/A	UCHRBU	—
	TCE	1.2	3/8/1993	dispersed	—	—
	VC	BDL	N/A	N/A	—	—
	Benzene	BDL	N/A	N/A	—	—
10	PCE	BDL	N/A	N/A	N/A	—
	TCE	BDL	N/A	N/A	N/A	—
	VC	BDL	N/A	N/A	N/A	—
	Benzene	BDL	N/A	N/A	N/A	—
21	PCE	BDL	N/A	N/A	BBUAQ	⁷ HP-602
	TCE	41J	5/20/1993	plume ⁸ (?) off site	BBLAQ	⁴ HP-604
	VC	BDL	N/A	N/A	—	⁷ HP-637
	Benzene	77J	5/20/1993	plume ⁹ (?) off site	—	—
22	PCE	4.0	4/20/1988	plume ⁸ off site	BBUAQ	^{7,9} HP-602
	TCE	5.0J	1/18/1991	plume ⁸ off site	BBLAQ	⁴ HP-607
	VC	BDL	N/A	N/A	—	⁴ HP-630
	Benzene	29,000	4/20/1988	plume	—	—
24	PCE	BDL	N/A	N/A	BBUAQ(?)	⁴ HP-607
	TCE	BDL	N/A	N/A	BBLAQ(?)	⁴ HP-630
	VC	BDL	N/A	N/A	—	—
	Benzene	3.0	7/7/1984	dispersed or off site	—	—

Table C80. Summary of analyses for groundwater contaminants of concern and related contaminant source characterizations and affected water-supply wells within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[Contaminant: PCE—tetrachloroethylene, TCE—trichloroethylene, VC—vinyl chloride; µg/L, microgram per liter; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, MCHAQ—Middle Castle Hayne aquifer, TTAQ—Tarawa Terrace aquifer, UCHLU—Upper Castle Hayne aquifer-Lower unit, UCHRBU—Upper Castle Hayne aquifer–River Bend unit; J, estimated concentration; IR, Installation Restoration Program site; BDL, below detection limits; N/A, constituent concentration at site is consistently below detection limits. Data are not applicable; D, sample dilution required]

Site number ¹	Groundwater contaminants of concern	Maximum observed concentration, in µg/L	Sample date	Contaminant source characterization	Water-bearing units containing contaminants ²	Water-supply wells possibly affected by site contaminants ³
28	PCE	BDL	N/A	N/A	BBUAQ	—
	TCE	15	7/7/1984	dispersed	BBLAQ	—
	VC	22	7/7/1984	dispersed	—	—
	Benzene	BDL	N/A	N/A	—	—
30	PCE	BDL	N/A	N/A	N/A	—
	TCE	BDL	N/A	N/A	N/A	—
	VC	BDL	N/A	N/A	N/A	—
	Benzene	BDL	N/A	N/A	N/A	—
74	PCE	BDL	N/A	N/A	N/A	⁶ HP-613
	TCE	BDL	N/A	N/A	N/A	⁴ HP-617
	VC	BDL	N/A	N/A	N/A	⁶ HP-654
	Benzene	BDL	N/A	N/A	N/A	—
78	PCE	140	1/27/2004	plume ⁸	BBUAQ	⁴ HP-601, ⁷ HP-602
	TCE	14,000	1/17/1991	plume ⁸	BBLAQ	⁷ HP-603, ⁷ HP-604
	VC	6,700D	1/11/2001	plume	TTAQ	⁴ HP-605, ⁴ HP-607
	Benzene	5,500	1/30/2003	plume ¹⁰	UCHRBU UCHLU	⁷ HP-608, ⁴ HP-630 ⁴ HP-631, ⁷ HP-634 ⁴ HP-635 ⁷ HP-637 ⁶ HP-642 ⁷ HP-652 ⁷ HP-660
80	PCE	BDL	N/A	N/A	N/A	—
	TCE	BDL	N/A	N/A	N/A	—
	VC	BDL	N/A	N/A	N/A	—
	Benzene	BDL	N/A	N/A	N/A	—
82	PCE	4,600J	7/10/2001	plume	BBUAQ	⁷ HP-610
	TCE	71,000D	10/23/1999	plume	BBLAQ	⁴ HP-619
	VC	270J	4/16/1998	plume	TTAQ	⁴ HP-633
	Benzene	11	1/17/1999	plume (?)	—	⁷ HP-651 ⁷ HP-653
84	PCE	BDL	N/A	N/A	BBLAQ	⁶ HP-704
	TCE	0.19J	8/6/2001	dispersed	TTAQ	—
	VC	BDL	N/A	N/A	—	—
	Benzene	3,800	1/11/1994	small plume (?)	—	—

Table C80**Table C80.** Summary of analyses for groundwater contaminants of concern and related contaminant source characterizations and affected water-supply wells within the Hadnot Point–Holcomb Boulevard study area, U.S. Marine Corps Base Camp Lejeune, North Carolina.—Continued

[Contaminant: PCE—tetrachloroethylene, TCE—trichloroethylene, VC—vinyl chloride; µg/L, microgram per liter; BBLAQ—Brewster Boulevard lower aquifer, BBUAQ—Brewster Boulevard upper aquifer, MCHAQ—Middle Castle Hayne aquifer, TTAQ—Tarawa Terrace aquifer, UCHLU—Upper Castle Hayne aquifer-Lower unit, UCHRB—Upper Castle Hayne aquifer–River Bend unit; J, estimated concentration; IR, Installation Restoration Program site; BDL, below detection limits; N/A, constituent concentration at site is consistently below detection limits. Data are not applicable; D, sample dilution required]

Site number ¹	Groundwater contaminants of concern	Maximum observed concentration, in µg/L	Sample date	Contaminant source characterization	Water-bearing units containing contaminants ²	Water-supply wells possibly affected by site contaminants ³
88	PCE	170,000	8/21/1997	small plume	BBUAQ	⁴ HP-601
	TCE	4,600D	1/16/2001	small plume	BBLAQ	⁷ HP-603
	VC	910	5/16/2000	small plume	—	⁷ HP-660
	Benzene	BDL	N/A	N/A	—	—
94	PCE	BDL	N/A	N/A	BBUAQ	⁴ HP-601
	TCE	79	5/3/1995	plume ¹⁰ (?) off site	—	⁷ HP-603
	VC	BDL	N/A	N/A	—	⁷ HP-608
	Benzene	17,300	4/5/1995	small plume	—	⁷ HP-660

¹ See Figure C1 for location

² All BTEX components (benzene, toluene, ethylbenzene, and xylene) were considered when defining a water-bearing unit as contaminated. Water-bearing units are listed by site only and are not related to a specific contaminant of concern on this table

³ Water-supply wells possibly affected by contaminants are listed by site only and are not related to a specific contaminant of concern or water-bearing unit on this table

⁴ Well removed from service prior to beginning of Initial Assessment Study and was never sampled for contaminants of concern. Well contamination suspected because of proximity to known contaminant source or sources and depth of screen openings

⁵ Occurrence of BTEX components in groundwater is possibly related to BTEX contamination of groundwater in the vicinity of supply well HP-645. See Table C10

⁶ Well contamination suspected because of proximity to known contaminant source or sources and depth of screen openings

⁷ Contaminant concentrations in well determined by analysis of water samples. See Tables C7–C10

⁸ Groundwater contamination by PCE or TCE is possibly related to plumes of chlorinated solvents in the northern and southern parts of the Hadnot Point Industrial Area. See Figure C16

⁹ Well contamination by benzene is possibly related to fuel spills or leaks at the Hadnot Point fuel farm. See Figure C9 and Table C37

¹⁰ Groundwater contamination by benzene is possibly related to fuel spills or leaks at the Hadnot Point fuel farm (Figure C9) or near Building 1613 (Figure C30)

Analyses and Historical Reconstruction of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water Within the Service Areas of the Hadnot Point and Holcomb Boulevard Water Treatment Plants and Vicinities, U.S. Marine Corps Base Camp Lejeune, North Carolina—Chapter C: Occurrence of Selected Contaminants in Groundwater at Installation Restoration Program Sites