U.S. Department of the Interior
U.S. Geological Survey

Prepared in cooperation with
National Guard Bureau

Water-Quality Data and Methods of Analysis for Samples Collected Near a Plume of Sewage-Contaminated Ground Water, Ashumet Valley, Cape Cod, Massachusetts, 1993-94

Water-Resources Investigations Report 97-4269

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Edited by JENNIFER SAVOIE and DENIS R. LEBLANC

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1998

U.S. DEPARTMENT OF THE INTERIOR
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CONVERSION FACTORS

Multiply	By	To Obtain
cubic foot per second (ft^3/s)	0.02832	cubic meter per second
foot (ft)	0.3048	meter
inch (in)	25.4	millimeter
mile (mi)	1.609	kilometer
million gallons per day (Mgal/d)	0.04381	cubic meter per second
pound per square inch (lb/in^2)	6.895	kilopascal
square mile (mi^2)	2.590	square kilometer

Temperature in degrees Fahrenheit (°F) can be converted to degrees Celsius (°C) as follows: °C = 5/9 (°F - 32).

VERTICAL DATUM

Sea Level: In this report "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)—a geodetic datum derived from a general adjustment of the first-order level nets of the United States and Canada, formerly called Sea Level Datum of 1929.

CHEMICAL ABBREVIATIONS

amu	atomic mass unit
cm/s	centimeter per second
g	gram
L	liter
L/min	liter per minute
µg	microgram
µg/L	microgram per liter
µL	microliter
µm	micrometer
mg/L	milligram per liter
mL	milliliter
mL/min	milliliter per minute
mL/cm^2	milliliter per square centimeter
mm	millimeter
M	molar
nm	nanometer
N	normal
NTU	Nephelometric Turbidity Unit
µM	micromolar
µS/cm	microsiemen per centimeter at 25°C

Water-Quality Data and Methods of Analysis for Samples Collected Near a Plume of Sewage-Contaminated Ground Water, Ashumet Valley, Cape Cod, Massachusetts, 1993-94

Edited by Jennifer Savoie *and* Denis R. LeBlanc

Abstract

Water-quality data were collected and analyzed by the U.S. Geological Survey and ABB Environmental Services, Inc., in 1993-94 to characterize the nature and extent of a sewage-contaminated ground-water plume underlying the Ashumet Valley in northeastern Falmouth on Cape Cod, Massachusetts. The source of the plume was the disposal of wastewater and chemicals at the Massachusetts Military Reservation's (MMR) sewage-treatment plant and former fire-training area. The plume of contaminated ground water extends more than 18,000 ft downgradient from the source area on the MMR toward coastal ponds and Vineyard Sound. Residents and Federal, State, and local officials are concerned about contamination of drinking water supplies by the plume and discharge of contaminated ground water to ecologically sensitive streams, ponds, and coastal environments.

Water samples were collected from 315 observation wells, 31 multilevel samplers, 14 screened-auger borings, and the sewage-treatment-plant effluent to describe the plume, provide information for use in developing remedial alternatives, and improve the understanding of the fate and transport of ground-water contaminants. A field test of the effects of pumping rate and filtration on the measured concentration of inorganic solutes and the development of new laboratory methods to analyze the ground-water samples also were part of this study. The chemical and microbiological data from the samples, along with the sampling procedures and methods of analysis, are presented in this report. The data include analyses of physical properties, major ions, nutrients, metals, dissolved gases, organic compounds, other sewage-plume constituents, such as methylene blue active substances and boron, and microbiological data, such as bacterial size and abundance.

INTRODUCTION

Ground water in the Ashumet Valley, Cape Cod, Massachusetts, has been contaminated by two sources on the Massachusetts Military Reservation (MMR)—a sewage-treatment plant and a former fire-training area. The MMR sewage-treatment plant discharged treated sewage to rapid-infiltration beds near the southern boundary of the reservation from 1936 to 1995. The disposal created a plume that extends southward from the sewage-treatment plant toward the coast. The sewage plume, which was first described by LeBlanc (1984), is about 3,000 to 5,500 ft wide, 100 to 150 ft thick, and 18,000 ft long. The former fire-training area is about 1,000 ft north of the sewage-infiltration beds and was used from 1958 to 1985 (ABB Environmental Services, Inc., 1995). During this period, waste fuels, oils, and solvents were spilled directly on the ground at the site. Contaminated ground water was first identified downgradient from the fire-training area in 1985; removal and treatment of about 28,000 tons of contaminated soil at the source was completed in September 1997. Because the plumes from the fire-training area and the sewage-infiltration beds are contiguous and may partially mix together, the overall zone of contaminated ground water from the two sources is referred to as the Ashumet Valley Plume. The locations of the MMR, the plume, and the two source areas are shown in figures 1 and 2.

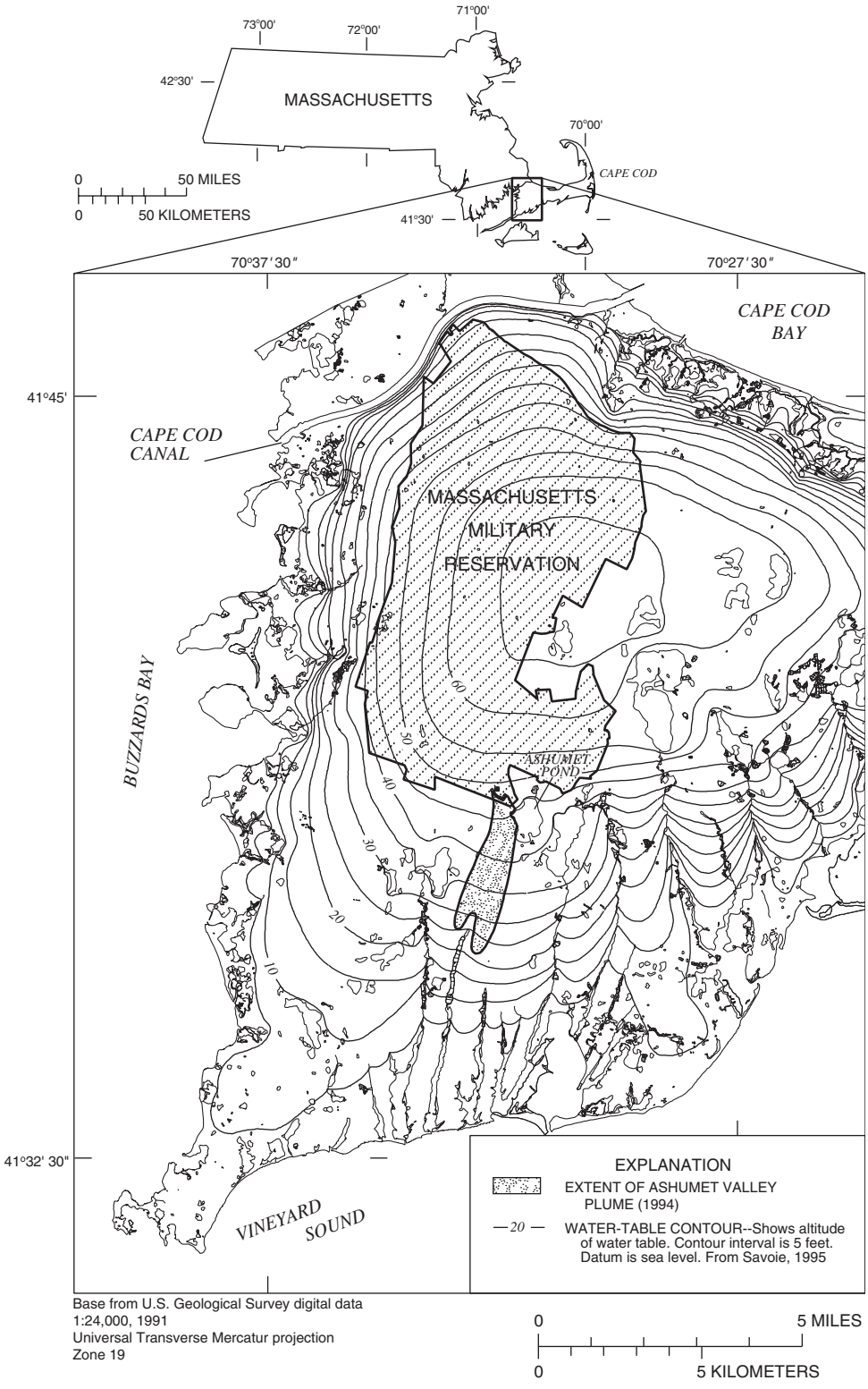

Figure 1. Location of study area, Ashumet Valley Plume, and water-table contours, western Cape Cod, Massachusetts.

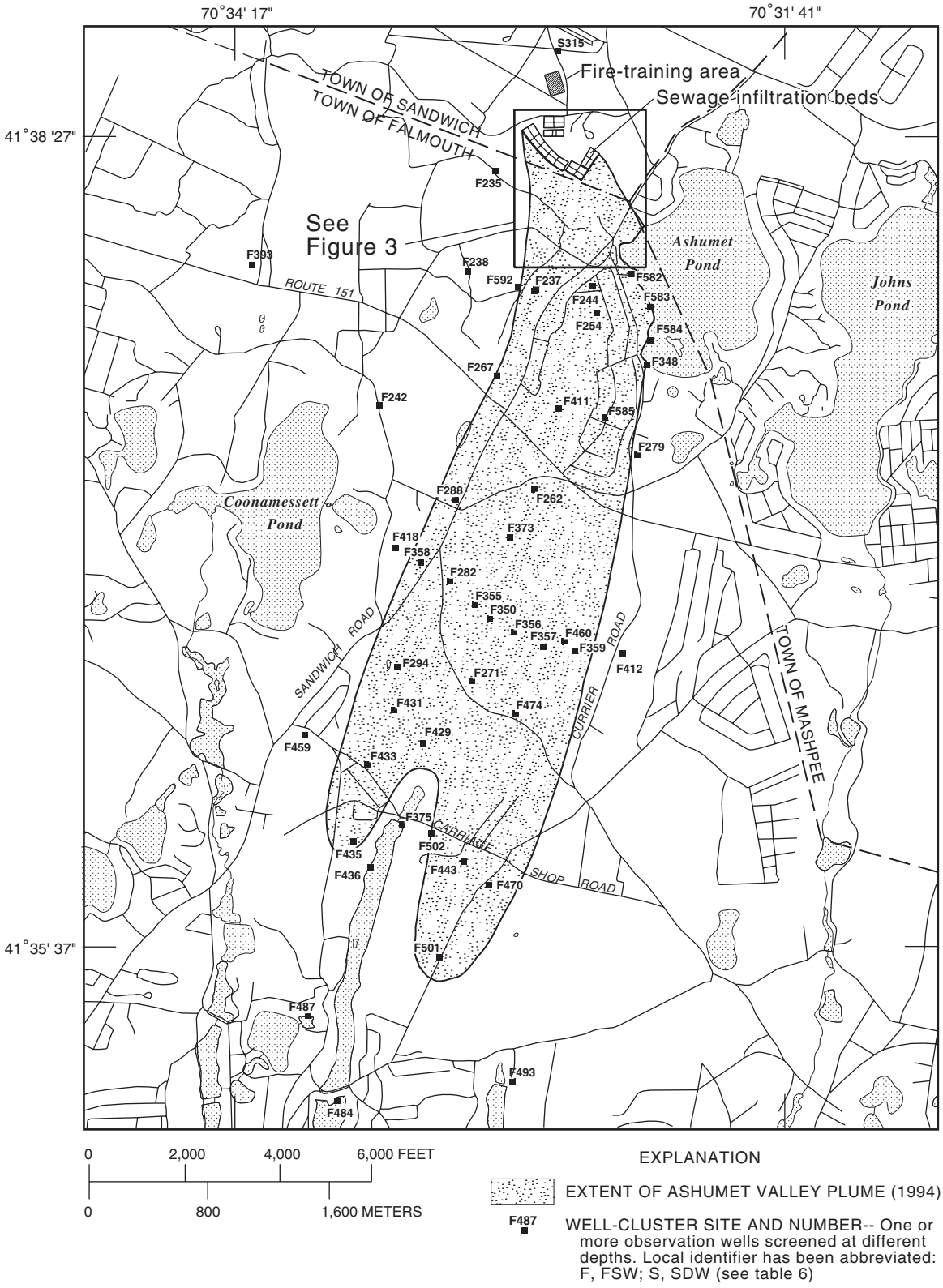

Figure 2. Location of well-cluster sites used for water-quality sampling, Ashumet Valley, Cape Cod, Massachusetts, 1993-94.

Ground water is the sole source of freshwater for domestic, industrial, and agricultural use on Cape Cod. Ground water also discharges to ecologically sensitive streams, ponds, and coastal environments. Because of concerns about ground-water quality in Ashumet Valley, the U.S. Geological Survey (USGS), in cooperation with the National Guard Bureau (NGB), conducted a comprehensive sampling in 1994 of the Ashumet Valley Plume to characterize the nature and extent of contamination. The effort was conducted jointly by the USGS, Water Resources Division (WRD), Massachusetts-Rhode Island District and National Research Program, with additional support by the USGS Toxic Substances Hydrology Program.

During this investigation, water samples were collected from 315 observation wells, 31 multilevel samplers (MLS), and 14 screened-auger borings near and south of the sewage-treatment plant. Samples of the sewage-treatment-plant effluent also were collected. Samples for volatile organic compounds (VOCs) analysis were collected by the USGS only from selected wells to complement VOC data collected in 1993 and 1994 by ABB Environmental Services, Inc. The USGS and ABB Environmental Services, Inc., data sets for VOCs were combined for presentation in this report for the convenience of the reader.

This report presents chemical and microbiological data that were collected in the plume of sewage-contaminated ground water during 1993-94, and the methods used to collect and analyze the samples. Chemical data include analyses of physical properties, major ions, nutrients, metals, dissolved gases, organic compounds, and other sewage-plume indicators, such as methylene blue active substances (MBAS) and boron. Microbiological data include bacterial size and abundance. The report describes selected analytical methods in detail because they have not been documented elsewhere. This report also describes the results of field tests of the effects of pumping and filtration on inorganic solutes concentrations.

The data collected in this study will be useful to residents, government officials, and consultants in assessing the contamination and evaluating possible remediation alternatives in the Ashumet Valley. This comprehensive data set also will aid researchers who are examining the plume, which has been a field study site of the USGS Toxic Substances Hydrology Program since 1983, to improve our understanding of the fate of contaminants in ground water.

Water-Quality Properties and Constituents

Sewage-contaminated ground water is a complex mixture of inorganic and organic solutes. In this study, water samples from wells and multilevel samplers in the Ashumet Valley were collected and analyzed for physical properties, common and trace chemical constituents, and other indicators of sewage contamination.

Physical properties, such as specific conductance, and chemical properties, such as pH, dissolved oxygen, and alkalinity, were measured to provide a general indication of the geochemical conditions in the plume. Other species, such as methylene blue active substances (MBAS), which is a general measure of detergents, and boron, which is an indicator of sewage contamination (LeBlanc, 1984), were measured to delineate the zone of sewage-contaminated ground water.

The major cations, such as calcium and magnesium, and anions, such as chloride and sulfate, were measured to determine the cation-anion balance in the ground water for use in understanding the geochemical processes affecting the fate of the contaminants. Calcium and magnesium, along with dissolved silica, are indicators of weathering reactions occurring on the minerals that comprise the aquifer solids. Iron and manganese are reactive solutes that are indicative of the oxidation-reduction (redox) state of the ground water; the presence of iron and manganese can indicate a reducing environment. Copper, phosphorus, and zinc are constituents of the sewage plume that react extensively with surfaces of the aquifer sediment grains (Rea and others, 1991, 1996; Walter and others, 1996). Because redox processes and reactive inorganic contaminants occur in distinct, commonly thin zones in the sewage plume (Smith and others, 1991; Kent and others, 1994), detailed vertical profiles of trace-metals concentrations, dissolved oxygen, and pH were obtained at the multilevel samplers.

Nutrients and dissolved gases were measured because these species affect the eutrophication, or biological productivity, of aquatic environments. Sewage contains dissolved nutrients (for example, nitrate, sulfate, and phosphate) at concentrations that are usually much greater than those in natural environments. The result of sewage contamination is a modest stimulation of biological processes because of the enhanced availability of those nutrients that were previously limiting biological growth. In ground waters, microorganisms, such as bacteria and protozoa, are the biota affected by sewage contamination. In general, an aquifer is an environment characterized by low nutrients concentrations and, hence, low biological activity. This is one of the primary reasons that ground water is commonly used as a drinking-water supply. The effect of sewage contamination on subsurface microbial populations can be examined by quantifying concentrations of nutrients and metabolic products of microbial processes and by monitoring temporal changes in microbial abundance. Intermediate products of microbial transformations of inorganic nitrogen include nitrite and nitrous oxide; end products include carbon dioxide, which is the product of aerobic microbial respiration, and methane and ammonium, which are products of anaerobic microbial processes. Analyses of these chemical species in a water sample can provide insight into the kinds of microbial processes that have affected a parcel of water within the transport interval between the site of contamination and the site of sample collection.

Several different measurements of organic matter and volatile organic compounds were made in this study. Organic matter is a major component of the nutrient cycle and is produced and consumed by biological activity. The complex character of natural and synthetic organic compounds makes them suitable for use as chemical tracers of geochemical processes occurring in ground water. Many organic compounds (volatile and non-volatile) have toxic or other detrimental properties for humans and aquatic organisms; therefore, the concentrations and characteristics of organics are of great interest to regulators and public-health officials.

Organic matter in ground water and wastewater is present as a continuum from macroscopic particles to dissolved molecules, and consists of thousands of specific low-molecular-weight compounds and high-molecular-weight macromolecules with varying chemical structures (Thurman, 1985). Organic matter is typically measured in terms of its carbon content. Evaluation of the bulk organic chemical composition of a water sample requires measurement of the total organic carbon (TOC), as well as measurement of the individual compounds comprising the TOC. As a result, the characterization of natural and synthetic organic matter is a complex endeavor that requires a hierarchical analytical approach (Leenheer, 1981; Barber, 1992) that measures (1) total and dissolved carbon, (2) operationally defined fractions, (3) molecular weight characteristics, (4) specific compounds classes and functional group characteristics, and (5) specific organic compounds. Measurements made for this study included various analyses of the organic and inorganic carbon, as well as analyses of specific compounds, such as anionic surfactants and caffeine.

Bacterial abundance and size distribution were measured at selected sites in the sewage plume and in adjacent pristine water to provide information on the response of the natural microbial populations to sewage contamination (Harvey and others, 1984). Bacteria in ground water play a critical role in many of the geochemical processes that affect contaminants in the subsurface. In addition, the potential effects of sewage-derived microorganisms (bacteria, protozoa, and viruses) on public-water supplies have long been a public health concern.

Acknowledgments

The authors thank the staff of ABB Environmental Services, Inc., especially Binks Colby-George for his contribution to the collection and compilation of the VOC data and Lauren E. Foster for her help in the collection of the screened-auger samples. The authors also thank Paul P. Mathisen of Worcester Polytechnic Institute and Richard J. Bastow, Mary H. Kruger, John P. Masterson, Timothy D. McCobb, George M. Sechen, Shirley J. Steinmacher, and Donald A. Walter of the USGS for their assistance in collecting the water samples.

COLLECTION OF WATER SAMPLES

By Jennifer Savoie, Denis R. LeBlanc, Stephen P. Coppola, *and* Kathryn M. Hess (U.S. Geological Survey)

Water-quality samples were collected by the USGS from 315 observation wells at 84 well-cluster sites (figs. 2 and 3) and 31 multilevel samplers at 23 sites (fig. 4) from June to December 1994. The effluent from the MMR sewage-treatment plant was sampled in February 1995 at the point of discharge onto the sewage-infiltration beds (located at well site S317) for analysis of major chemical constituents and trace metals. Location coordinates, diameter of casing, land-surface and screen altitudes, and water levels for the observation wells are shown in table 6, at back of report. Location coordinates and land-surface and sampling-port altitudes for the multilevel samplers are shown in table 7, at back of report. Samples were analyzed for major ions, trace metals, selected organic compounds, and volatile organic compounds. The abundances and size distributions of free-living bacteria were determined for samples collected from seven selected wells. ABB Environmental Services, Inc., collected 103 water-quality samples from screened-auger borings at 14 sites during February and March 1994 (fig. 4). The screened-auger method allows detailed vertical profiles of ground-water chemistry to be obtained during drilling and prior to well installation. Screened-auger samples were analyzed by the USGS for specific conductance, boron, iron, and phosphate. Location coordinates, land-surface altitudes, and water levels for the screened-auger borings are shown in table 8, at back of report. The constituents analyzed, the analyst, and the methods used to preserve the water samples for laboratory analyses are summarized in table 1.

Water samples were collected from 132 of the 315 observation wells in May 1993 and March 1994 by ABB Environmental Services, Inc., for analysis of VOCs as part of a separate investigation of the Ashumet Valley plume (ABB Environmental Services, Inc., 1993, 1994). The USGS collected samples from the remaining 183 wells for analysis of VOCs to augment the ABB Environmental Services, Inc., data set. The USGS did not resample all 315 wells for VOCs in this study to reduce analytical costs. Nine sites that had been previously sampled by ABB Environmental Services, Inc., in 1993-94, were resampled by the USGS in order to compare the results of the two investigations. Analytical results for water samples from the nine wells do not match the 1993-94 results from ABB Environmental Services, Inc., exactly, but are similar enough to indicate that the ABB Environmental Services, Inc., and USGS data sets can be used together to describe the VOC distributions in the plume.

Observation Wells

Observation wells were installed using hollow-stem-auger, drive-and-wash, or cable-tool drilling methods. The wells were constructed with 1.25-, 2.0-, or 2.5-inch-diameter polyvinyl chloride (PVC) well casing and screens and finished with protective steel casings at land surface. The aquifer material was allowed to collapse naturally around the casing and screen.

Wells were sampled by two different methods, depending on the casing diameter. The 2- and 2.5-inch-diameter wells were sampled using a Keck Model SP-81 submersible pump fitted with Teflon tubing and an isolation packer. The pumping rate for the 2-inch-diameter wells averaged about 1.3 L/min. The 1.25-inch-diameter wells were first purged using a centrifugal pump and subsequently sampled using a GeoPump2 peristaltic suction pump fitted with Norprene tubing in the pump head and Teflon tubing to lower into the well. The pumping rate for the 1.25-inch-diameter wells averaged about 300 mL/min with the peristaltic pump. At least three well-casing volumes were withdrawn before samples were collected.

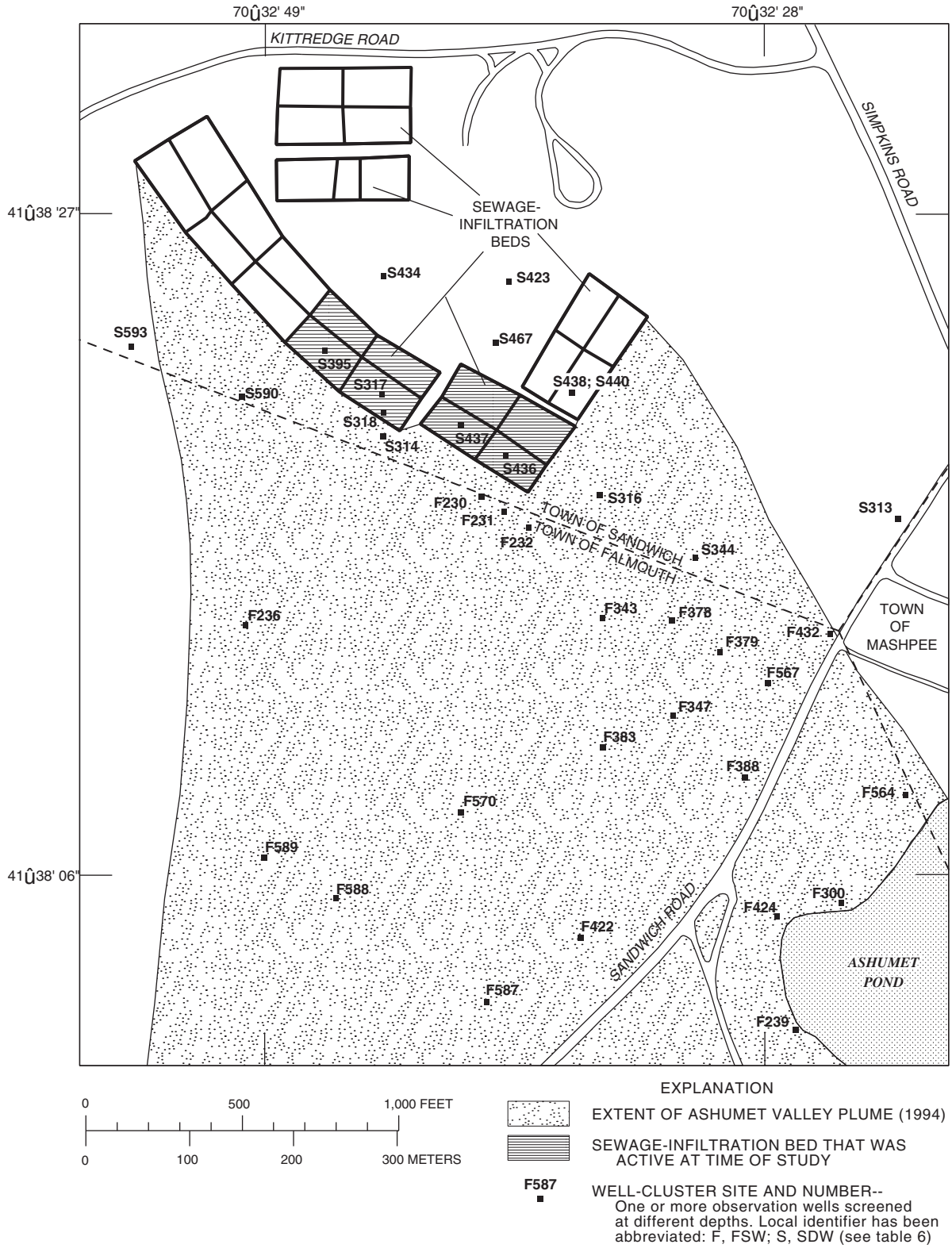

Figure 3. Location of well-cluster sites used for water-quality sampling near the sewage-infiltration beds, Ashumet Valley, Cape Cod, Massachusetts, 1993-94.

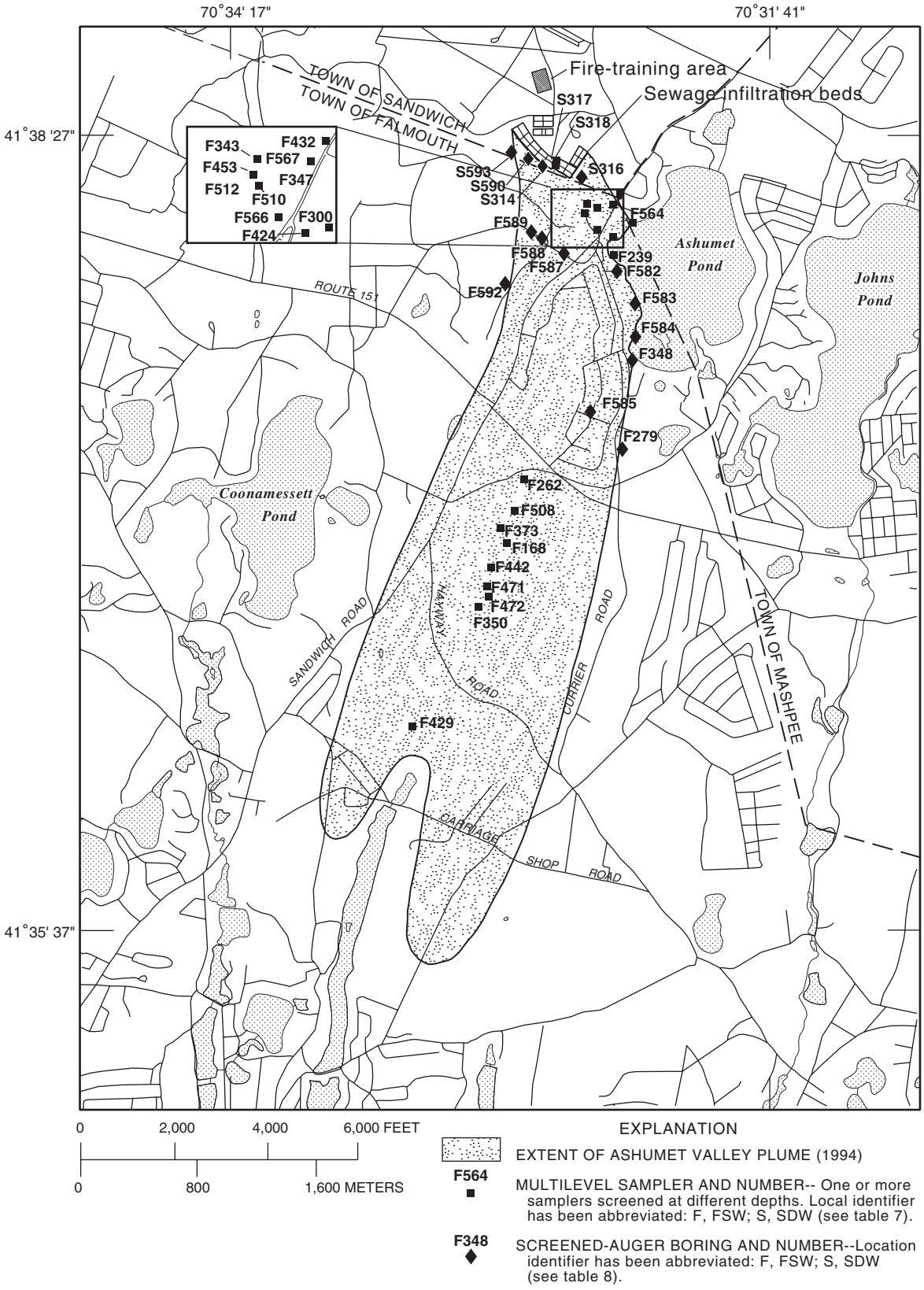

Figure 4. Location of multilevel samplers and screened-auger borings used for water-quality sampling, Ashumet Valley, Cape Cod, Massachusetts, 1993-94.

Table 1. Constituents measured, analyst, and method of preservation for water samples collected in the Ashumet Valley, Massachusetts, June through December 1994

[USGS NWQL: U.S. Geological Survey National Water Quality Laboratory, Arvada, Colorado. NRP: U.S. Geological Survey, Water Resources Division, National Research Program; USGS: U.S. Geological Survey. µm, micrometer; °C, degrees Celsius]

Chemical constituent	Analyst	Filtration	Preservation
Wells:			
Aluminum, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, molybdenum, nickel, potassium, silica, silver, sodium, strontium, vanadium, zinc	USGS NWQL	0.45-µm Gelman capsule filter	Nitric acid
Boron, bromide, chloride, fluoride, sulfate	USGS NWQL	0.45-µm Gelman capsule filter	None
Ammonia, ammonia plus organic nitrogen, nitrite, nitrite plus nitrate, phosphorus	USGS NWQL	0.45-µm Gelman capsule filter	Mercuric chloride, chilled to 4°C
Dissolved organic carbon	USGS NWQL and Larry B. Barber, II, NRP	0.45-µm silver filter	Chilled to 4°C
Volatile organic compounds	USGS NWQL	None	Hydrochloric acid, chilled to 4°C
Total organic carbon	Larry B. Barber, II, NRP	None	Chilled to 4°C
Methylene blue active substances	USGS NWQL and Larry B. Barber, II, NRP	None	Chilled to 4°C for USGS NWQL Formalin, chilled to 4°C for NRP
Microbial abundances and size distributions	David W. Metge, NRP	None	Formalin, chilled to 4°C
Dissolved gases: Dissolved inorganic carbon plus carbon dioxide, methane, nitrous oxide	Richard L. Smith, NRP	None	Sodium hydroxide
Multilevel samplers:			
Dissolved organic carbon	Larry B. Barber, II, NRP	0.45-µm Gelman capsule filter	Chilled to 4°C
Total organic carbon	Larry B. Barber, II, NRP	None	Chilled to 4°C
Methylene blue active substances	Larry B. Barber, II, NRP	None	Formalin, chilled to 4°C
Aluminum, boron, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, phosphorus, potassium, silicon, sodium, zinc	Douglas B. Kent, NRP	0.45-µm Millipore Millex filter	Hydrochloric acid
Nitrate, nitrite, sulfate	Richard L. Smith, NRP	0.45-µm Gelman capsule filter	Frozen
Ammonium	Richard L. Smith, NRP	0.45-µm Gelman capsule filter	Sulfuric acid
Dissolved gases: Dissolved inorganic carbon plus carbon dioxide, methane, nitrous oxide	Richard L. Smith, NRP	None	Sodium hydroxide
Screened-auger borings:			
Ferrous iron, phosphate	Kimberly W. Bussey, USGS	0.45-µm Nuclepore filter	Hydrochloric acid
Boron	USGS NWQL	0.45-µm Nuclepore filter	None

Field properties—specific conductance, pH, temperature, and turbidity—were monitored for stabilization during the purging of each well. After the well was purged and samples were collected and preserved, the dissolved-oxygen concentration was measured with a Yellow Springs Instruments (YSI) Model 54 dissolved-oxygen meter and electrode in a flow-through chamber or by a quantitative colorimetric method that uses self-filling reagent ampoules (CHEMetrics Models R-7501, R-7540, and R-7512). Because of an equipment malfunction, dissolved oxygen was not measured in 86 wells. Alkalinity was determined in the field by an incremental titration method (Fishman and Friedman, 1989). The specific conductance was measured with a HACH Model 44600 conductivity meter. The pH was measured with a Beckman Model Φ-11 meter and an Orion Ross Sure-Flow Model 81-72 pH electrode. Temperature was measured with the YSI dissolved-oxygen meter. Turbidity was measured with a HACH Model 2100P portable turbidimeter. Sampling methods used by ABB Environmental Services, Inc., are documented by the U.S. Environmental Protection Agency (1995).

The sampling pump and equipment were decontaminated after sampling at each well with laboratory-grade deionized water to prevent carry-over from well to well. The pumps and discharge lines were decontaminated by rinsing the pump and line exteriors and by passing 13 L of deionized water through them. Other cleansers, such as methanol, isopropyl alcohol, or detergents, were not used because of concerns that their use could bias the organic carbon and MBAS analyses. Equipment-rinsewater samples were collected after sampling selected wells and decontaminating the pump and equipment. Analyses of the equipment-rinsewater samples verified that decontamination with deionized water was sufficient.

Samples also were collected for quality assurance and quality control (QA/QC) and include rinsewater blanks, equipment-rinsewater samples, trip blanks, and duplicates. Rinsewater blanks were collected to check the quality of the deionized water used for pump decontamination and preparation of the VOC trip blanks. Equipment-rinsewater samples were collected from the sampling pump after the pump was decontaminated with deionized water. These samples were collected to assess the effectiveness of using only deionized water for decontamination. Trip blanks were made with deionized water at the beginning of the sampling week and accompanied VOC samples during storage and shipping. Trip blanks were collected to assess any inadvertent VOC contamination of samples during handling and shipping. Sample duplicates were collected to check the method of sampling and to assess the precision of laboratory analysis. Duplicate samples are identified in data tables in this report with the suffix D.

Multilevel Samplers

Multilevel samplers (MLS) were installed using a hollow-stem-auger drilling method and natural collapse of the aquifer material. Each MLS consists of 15 color-coded polyethylene tubes (0.25-inch outside diameter). Within a 1.25-inch-diameter PVC casing, the tubes extend from land surface, down the PVC casing, and out into the aquifer through holes drilled in the PVC at various depths. The open bottom end of each polyethylene tube, referred to as the sampling port, is screened with a fine nylon fabric.

The MLS were sampled using a GeoPump2 peristaltic suction pump fitted with Norprene tubing that was connected directly to the MLS tubing. Each MLS port was pumped until at least three tubing volumes were withdrawn. The pumping rate for each MLS port averaged 300 mL/min. Specific conductance, pH, and turbidity were monitored for stabilization during the purging of each port. Field parameters except dissolved oxygen were determined by the same methods used for the wells. After the MLS port was purged, dissolved oxygen was measured using a quantitative colorimetric method (CHEMetrics Models R-7501 and R-7540). When dissolved-oxygen concentrations were greater than 1 mg/L, samples were collected in glass biological-oxygen-demand bottles and analyzed in the laboratory with a YSI Model 54 dissolved-oxygen meter and electrode. For selected ports where the dissolved-oxygen concentration was at or near 0 mg/L, the ferrous iron concentration was measured using a quantitative colorimetric method (CHEMetrics Model R-6001).

After each MLS port was sampled, the peristaltic pump tubing was rinsed by pumping 1.5 L of water from the next port through it. At selected MLS, about 1.5 L of deionized water was used for rinsing before the first port was sampled and after the last port was sampled, and equipment-rinsewater samples were

collected. Analyses of equipment-rinsewater samples verified that rinsing with water from the next port was sufficient to prevent carry-over from port to port.

Samples also were collected for QA/QC and include rinsewater blanks, equipment-rinsewater samples, and duplicates. Rinsewater blanks were collected to check the quality of the deionized water used for decontamination. Equipment-rinsewater samples were collected from the sampling equipment after equipment was decontaminated with deionized water. These samples were collected to assess the effectiveness of using only deionized water for decontamination. MLS sample duplicates were collected to check the sampling procedure and to assess the precision of the laboratory analysis. Duplicate samples are identified in the data tables in this report with the suffix D.

Screened-Auger Borings

Water samples were collected from screened-auger boreholes in cooperation with ABB Environmental Services, Inc., at 14 sites (fig. 4). This method allows for collection of water samples through a screened hollow-stem auger during drilling so that vertical profiles of water quality can be determined prior to installation of permanent wells. Samples were collected using a submersible pump after three auger volumes had been purged. The screened-auger sampling procedure is described in ABB Environmental Services, Inc. (1993). Specific conductance, boron, ferrous iron, and phosphate analyses were performed on 288 ground-water samples from the 14 sites. Specific conductance was measured with a HACH Model 44600 conductivity meter at the USGS laboratory in Marlborough, Mass.

Effects of Pumping Rate and Filtration on Measured Concentrations of Inorganic Solutes

By Douglas B. Kent (U.S. Geological Survey)

The protocol for collection of ground-water samples for analysis of inorganic-solutes concentrations in the Ashumet Valley for this study included pumping at rates of about 1.3 L/min from wells and 300 mL/min from MLS; samples were filtered in-line during collection. Sampling procedures in which wells are pumped at rates greater than 400 mL/min have been criticized because of the possibility that otherwise immobile colloidal and particulate material adjacent to or inside the well can end up in the sample (Puls and Powell, 1992a; Backhus and others, 1993). The effects of pumping rate on the mobilization of otherwise immobile colloids during sampling of MLS have not been investigated. Concerns also have been raised that mobile colloids, which can enhance the mobility of solutes in ground water, especially inorganic solutes, are removed by filtration (Ryan and Gschwend, 1990, 1994; Puls and Powell, 1992b). Therefore, low pumping rates without filtration are preferable for collecting mobile colloids and preventing mobilization of otherwise immobile colloidal and particulate material and subsequent contamination of ground-water samples. However, low pumping rates could not be used in this study because of equipment limitations, and sample filtration was required by laboratory protocols.

Therefore, water samples were collected by the USGS from one observation well and three MLS ports under a variety of experimental conditions to determine if sample filtration and pumping rates during purging and sampling affected the concentrations of inorganic solutes. Samples of unfiltered water and water filtered through 0.1-, 0.4-, 0.45-, and 8.0-µm pore-size filters were collected and analyzed for selected inorganic solutes. In two cases, the composition of samples collected after small purge volumes were compared to those collected after much greater purge volumes. Filtered and unfiltered samples were analyzed to determine whether particles were generated or removed by the sampling protocol previously discussed and whether a bias in the analytical concentrations of inorganic constituents was introduced.

Most of the filtered and unfiltered water samples were collected from site SDW 318 because of its location in one of the sewage-infiltration beds (fig. 3). Well SDW 318-0036 is a 2-inch-diameter observation well with a 2-foot-long screen. Two sampling ports (SDW 318 M01-07O and SDW 318 M01-08GY) on the adjacent MLS are opposite the screened interval of the well. Aquifer solids at this site are contaminated with copper (Cu), zinc (Zn), and phosphorus (P) (Rea and others, 1996). Dissolved-oxygen concentrations

and pH were sufficiently high in ground water at the depths sampled that concentrations of dissolved iron (Fe), manganese (Mn), and aluminum (Al) would likely be less than or equal to the method detection limits. Therefore, sampling procedures that generate colloidal material at site SDW 318 could yield artificially high concentrations of these inorganic solutes.

Additional samples of filtered and unfiltered water were collected from site FSW 343, where mobile colloids that were about 0.1 µm in diameter and contained Fe(II) (iron in the plus two oxidation state) and P had been previously reported (Gschwend and Reynolds, 1987). One MLS port (FSW 343 M02-11GN) was sampled as part of this work. In previous sampling at this site, dissolved oxygen was absent and dissolved Fe(II) and Mn were present at high concentrations (Gschwend and Reynolds, 1987; Kent and others, 1994).

The two different types of filters used in sampling the wells and MLS in the Ashumet Valley plume were tested in this experiment: (1) Gelman capsule filters, which are media filters with a nominal pore size of 0.45 µm, used to filter samples collected from wells; and (2) Millex filters, which are three-dimensional membranes made of polyvinylidene fluoride (PVDF) with a surface modification to improve wetting and a nominal pore size of 0.45 µm, used to filter samples collected from MLS. In addition, polycarbonate (PC) membrane filters with pore sizes of 0.1, 0.4, and 8 µm also were used to examine the effect of pore size. Except for the capsule filters, the volume of sample passed through the filters was maintained at less than 17 mL (1 mL/cm^2 of filter area) to avoid overloading the filters with particles, which can decrease the effective pore size of the filter (Ryan and Gschwend, 1990).

The experimental conditions and field measurements made during the experiments are shown in tables 2 and 3. Field properties stabilized rapidly in all tests. Table 3 also presents the inorganic-solutes concentrations measured in the eight sets of water samples collected during the experiment. The concentrations were measured by the USGS, WRD, National Research Program laboratory in Menlo Park, Calif.

Table 2. Field measurements for samples collected during tests of the effects of pumping rate and filtration on measured concentrations of inorganic solutes, Ashumet Valley, Massachusetts, September 1994

[**Elapsed time:** Time from start of pumping. **Purge volumes:** Volumes of standing water in well casing or multilevel-sampler tube pumped since start of test. L/min, liter per minute; m, meter; mL/min, milliliter per minute; MLS, multilevel sampler; NTU, Nephelometric Turbidity Unit; --, no data]

Elapsed time (hours)	Purge volumes	Pumping rate (L/min)	Water-level drawdown (m)	Turbidity (NTU)
Sets A and B: Low Pumping Rate, Well SDW 318-0036				
Pumping rate = 120 to 180 mL/min				
0.00	0.0	2.00	--	--
.10	1.2	.37	--	--
.13	1.3	--	0.021	--
.18	1.4	--	--	1.23
.27	1.8	.51	--	--
.30	1.9	.51	--	1.23
.37	2.1	.12	--	--
.53	2.3	.12	--	--
.75	2.4	--	.006	--
.97	2.7	.17	--	1.14
1.50	3.3	.18	.009	1.05
1.80	3.6	.18	.006	1.03
1.97	3.8	.18	--	--
2.33	4.2	.18	--	--
2.87	4.8	.20	.003	1.00
3.22	5.3	.18	.003	.95
3.95	6.1	.18	.006	--
4.12	6.3	--	.006	.95
Set C: High Pumping Rate, Well SDW 318-0036				
Pumping rate = 1 L/min				
0.05	0.3	0.94	--	--
.13	.8	--	--	1.05
.17	1.0	--	0.015	--
.22	1.3	--	--	1.00
.25	1.5	.92	--	--
.27	1.6	--	.015	--
.30	1.7	--	--	.98
.32	1.8	--	.015	--
.37	2.1	.92	--	--
.38	2.2	--	.015	1.00
.47	2.7	--	.015	1.00
.52	3.0	.92	--	--
.70	4.0	--	--	1.00
Sets D and E: Low Pumping Rate, MLS Port SDW 318 M01-07O				
Pumping rate = 215 mL/min				
0.25	97	0.215	--	0.65
.32	120	--	--	.43
.50	190	--	--	.42
.70	270	.200	--	--
.82	310	--	--	.43

Table 3. Pumping rate, purge volumes, pH, dissolved-oxygen concentration, and solutes concentrations for samples collected during tests of the effects of pumping rate and filtration on measured concentrations of inorganic solutes, Ashumet Valley, Massachusetts, September 1994

[**Filter pore size and type:** PC, polycarbonate membrane; PVDF, polyvinylidene fluoride membrane. Purge volumes: Volumes of standing water in well casing or multilevel-sampler tube pumped prior to sample collection. MLS, multilevel sampler. µm, micrometer; mg/L, milligram per liter; <, actual value is less than method detection limit; --, no data]

Filter pore size and type	Alumi-num (mg/L)	Boron (mg/L)	Calcium (mg/L)	Copper (mg/L)	Iron (mg/L)	Magne-sium (mg/L)	Manga-nese (mg/L)	Phos-phorus (mg/L)	Potas-sium (mg/L)	Sodium (mg/L)	Silicon (mg/L)	Zinc (mg/L)
Set A: Low Pumping Rate, Well SDW 318-0036 Pumping rate = 120 to 180 mL/min, 3.6 purge volumes, pH= 5.96, dissolved oxygen= 0.7 mg/L												
Unfiltered sample	0.133	0.40	11.9	0.096	0.059	2.55	0.019	6.79	12.7	51	4.8	0.022
0.1-µm PC filter	.135	.40	12.1	.087	.057	2.54	.019	6.83	13.0	51	4.8	.034
0.4-µm PC filter	.116	.39	12.1	.081	.034	2.56	.019	6.82	13.1	51	4.9	.024
0.45-µm capsule filter	.107	.40	12.3	.074	.031	2.60	.019	6.98	13.2	52	5.0	<.016
8.0-µm PC filter	.131	.39	12.2	.076	.056	2.58	.019	6.94	13.0	52	4.9	.022
Set B: Low Pumping Rate, Well SDW 318-0036 Pumping rate = 120 to 180 mL/min, 6.0 purge volumes, pH= 6.06, dissolved oxygen= 0.9 mg/L												
Unfiltered sample	0.119	0.38	11.7	0.070	0.052	2.47	0.018	6.81	13.0	50	4.8	<0.016
0.1-µm PC filter	.101	.41	12.3	.076	.025	2.60	.019	7.16	13.8	53	5.1	.023
0.4-µm PC filter	.103	.39	11.5	.071	.032	2.44	.017	6.74	12.9	50	4.8	.019
0.45-µm capsule filter	.116	.39	12.4	.071	.034	2.62	.019	7.02	13.1	52	5.0	<.016
8.0-µm PC filter	.131	.40	12.4	.074	.054	2.61	.019	7.00	13.1	52	5.0	.020
Set C: High Pumping Rate, Well SDW 318-0036 Pumping rate = 1 L/min, 4.3 purge volumes, pH= 6.02, dissolved oxygen= 0.5 mg/L												
Unfiltered sample	0.141	0.39	12.0	0.084	0.052	2.57	0.019	6.91	12.4	48	5.1	0.020
0.1-µm PC filter	.125	.38	11.6	.081	.021	2.46	.018	6.95	12.2	46	5.0	.038
0.4-µm PC filter	.130	.38	11.6	.075	.026	2.45	.018	6.84	12.2	46	5.0	.023
0.45-µm capsule filter	.116	.36	11.3	.073	.027	2.40	.018	6.33	11.4	44	4.7	.025
0.45-µm PVDF filter	.120	.38	11.1	.076	.030	2.33	.018	7.51	11.7	47	5.0	<.016
8.0-µm PC filter	.130	.38	11.5	.073	.049	2.47	.018	7.06	12.4	47	5.0	<.016
Set D: Low Pumping Rate, MLS Port SDW 318 M01-07O Pumping rate = 215 mL/min, 21 purge volumes, pH= 6.13, dissolved oxygen= 0.3 mg/L												
Unfiltered sample	0.110	0.35	19.4	0.054	0.020	4.27	0.014	4.29	12.3	47	5.5	<0.016
0.1-µm PC filter	.099	.36	19.2	.053	.018	4.21	.014	4.28	12.2	46	5.5	.017
0.4-µm PC filter	.103	.36	18.9	.052	.016	4.21	.014	4.21	12.0	46	5.4	<.016
8.0-µm PC filter	.102	.35	18.8	.053	.018	4.18	.014	4.22	12.6	46	5.4	<.016
Set E: Low Pumping Rate, MLS Port SDW 318 M01-07O Pumping rate = 215 mL/min, 270 purge volumes, pH= 6.22, dissolved oxygen= 0.3 mg/L												
Unfiltered sample	0.102	0.35	18.5	0.052	0.019	4.09	0.014	4.17	12.1	46	5.4	<0.016
0.1-µm PC filter	.098	.35	18.5	.051	.012	4.09	.014	4.15	11.9	46	5.4	<.016
0.4-µm PC filter	.095	.34	18.6	.051	.015	4.09	.013	4.17	12.0	46	5.4	<.016
8.0-µm PC filter	.132	.35	18.4	.052	.019	4.07	.014	4.16	11.9	46	5.4	<.016
Set F: High Pumping Rate, MLS Port SDW 318 M01-07O Pumping rate = 300 mL/min, 62 purge volumes, pH= 5.96, dissolved oxygen= 0.4 mg/L												
Unfiltered sample	0.122	0.34	18.5	0.056	0.017	4.12	0.014	4.31	11.5	43	5.6	<.016
0.1-µm PC filter	.124	.34	18.4	.054	.012	4.09	.014	4.26	11.4	43	5.6	.025
0.4-µm PC filter	.129	.34	18.8	.055	.014	4.14	.014	4.32	11.3	43	5.7	.020
0.45-µm PVDF filter	.122	.34	18.7	.054	.013	4.15	.014	4.37	12.1	43	5.6	<.016
8.0-µm PC filter	.120	.35	19.0	.055	.017	4.22	.015	4.42	11.3	44	5.7	.021

Table 3. Pumping rate, purge volumes, pH, dissolved-oxygen concentration, and solutes concentrations for samples collected during field tests of the effects of pumping rate and filtration on measured concentrations of inorganic solutes, Ashumet Valley, Massachusetts, September 1994—*Continued*

Filter pore size and type	Aluminum (mg/L)	Boron (mg/L)	Calcium (mg/L)	Copper (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Phosphorus (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Silicon (mg/L)	Zinc (mg/L)
Set G: High Pumping Rate, MLS Port SDW 318 M01-08GY Pumping rate = 300 mL/min, 9 purge volumes, pH= 6.22, dissolved oxygen= 0.3 mg/L												
Unfiltered sample	0.138	0.38	15.3	0.064	0.054	3.34	0.016	5.07	14.3	50	5.3	0.021
0.1-µm PC filter	.108	.37	15.0	.061	.016	3.26	.016	4.96	14.2	49	5.2	.029
0.4-µm PC filter	.104	.38	15.0	.058	.023	3.28	.016	5.03	13.8	50	5.2	.018
0.45-µm PVDF filter	.112	.38	15.2	.060	.035	3.37	.016	5.12	13.8	51	5.3	.018
8.0-µm PC filter	.144	.38	15.1	.060	.055	3.31	.016	5.05	13.9	50	5.3	.018
Set H: High Pumping Rate, MLS Port FSW 343 M02-11GN Pumping rate = 230 mL/min, 54 purge volumes, pH= --, dissolved oxygen= 0 mg/L												
Unfiltered sample	<0.05	0.32	8.4	<0.1	17.1	4.99	0.263	2.49	8.6	50	6.2	<0.016
0.1-µm PC filter	<.05	.30	8.3	<.1	16.7	4.91	.257	2.48	8.7	48	6.1	<.016
0.4-µm PC filter	<.05	.32	8.4	<.1	17.0	4.97	.261	2.49	8.2	49	6.1	<.016
0.45-µm PVDF filter	<.05	.31	8.4	<.1	16.8	4.93	.259	2.49	8.4	49	6.1	<.016
8.0-µm PC filter	<.05	.32	8.4	<.1	17.2	4.99	.264	2.54	8.4	50	6.2	<.016

Water samples were collected at well SDW 318-0036 during low and high pumping rates. For the samples collected at the low pumping rate (sets A and B, tables 2 and 3), the pump was lowered slowly into the well and set at the top of the screen. After starting the pump at a rate of about 2 L/min (which is required to start the pump), the pumping rate was decreased to about 120 mL/min. Further decreases in the pumping rate caused the pump to stall. The pumping rate slowly increased during the sampling from 120 to 180 mL/min for unknown reasons. The samples were collected after the turbidity had reached a minimum value (as recommended by Puls and Powell, 1992b) and 3.6 and 6 purge volumes had been pumped. For the samples collected at the high pumping rate (set C, tables 2 and 3), the protocol used to sample the wells in the Ashumet Valley was followed. The pump was set 5 ft above the top of the screen. After starting the pump at a rate of about 2 L/min, the pumping rate was decreased to about 1 L/min. The samples were collected after 4.3 purge volumes had been pumped.

Water samples also were collected at MLS SDW 318 M01 during low and high pumping rates. Samples were collected at MLS port SDW 318 M01-07O after 21 and 270 purge volumes had been pumped at the low rate of 215 mL/min (sets D and E, tables 2 and 3) and after 62 purge volumes had been pumped at the high rate of 300 mL/min (set F, table 3). Samples were collected from MLS port SDW 318 M01-08GY after 9 purge volumes had been pumped at the high rate of 300 mL/min (set G, table 3). The pumping rate of 300 mL/min is the approximate rate used to sample the MLS in the Ashumet Valley.

Samples were collected at MLS port FSW 343 M02-11GN after 54 purge volumes had been pumped at 230 mL/min (set H, table 3). This was the maximum pumping rate that could be achieved at this port. Sputtering and out-gassing were observed during sampling.

Procedural blanks, in which laboratory-grade distilled water was passed through the appropriate filter, also were analyzed. Concentrations of all inorganic solutes in these blanks were less than the method detection limits.

Differences in concentrations of the inorganic solutes, except Fe, were not significant among filtered and unfiltered samples, among filter types, or among filter pore sizes. Differences in concentrations were not significant among samples collected at low and high pumping rates or among samples collected sequentially at low pumping rates. For some inorganic solutes, differences would have been difficult to detect because concentrations were low and, consequently, analytical uncertainty was large (for example, Cu, Zn, Al, and Mn at well SDW 318-0036).

Only Fe showed significant concentration differences (0.02-0.03 mg/L) between filtration protocols. In water samples collected from well

SDW 318-0036 at the low and high pumping rates, and from MLS port SDW 318 M01-08GY at the high pumping rate, Fe concentrations were significantly higher in the samples that were unfiltered or filtered through 8-µm filters than in samples filtered through 0.1-, 0.4-, and 0.45-µm filters (sets A, B, C, and G, table 3). The Fe concentration in the samples for well SDW 318-0036 filtered through the 0.1-µm filter was significantly higher than concentrations in samples filtered through the 0.4- and 0.45-µm filters only for the first sampling during purging at the low pumping rate (set A, table 3). The small differences in Fe concentrations observed among filtration protocols at MLS port SDW 318 M01-07O are not significant because they are less than the analytical precision.

Differences among Fe concentrations at well SDW 318-0036 and MLS port SDW 318 M01-08GY may have been caused by sediment particles included in the water samples during collection. Fe could have dissolved from the particles following sample acidification. It is not known if the sediment particles are mobile under natural conditions or were artificially mobilized by the sampling method. Particles in the size range 0.4 to 8 µm are potentially mobile under natural conditions (Harvey and Garabedian, 1991); therefore, the results of these field experiments do not exclude the possibility that there are mobile Fe-containing particles in the aquifer.

Results of this set of field experiments indicate that the pumping rates used to sample wells and MLS in 1994 in the Ashumet Valley produce measurements of field properties and concentrations of inorganic solutes that are the same as those obtained with low pumping rate methods. The sampling protocols described in previous sections of this report also do not introduce a significant bias in the analytical concentrations of inorganic solutes because of filtration. A possible exception involves Fe, for which a small bias (0.02 to 0.03 mg/L) may be introduced in samples from some wells and MLS.

WATER-QUALITY DATA

Water samples collected from 315 wells, 31 multilevel samplers, 14 screened-auger borings, and the MMR wastewater-treatment plant in the Ashumet Valley were analyzed for physical properties, common and trace chemical constituents, and other indicators of sewage contamination. The results of the field measurements and laboratory analyses are shown in tables 9-34, at back of report. The tables are organized into three groups: data for samples collected from wells and associated samples collected for QA/QC are shown in tables 9-25, data for samples associated with the multilevel samplers are shown in tables 26-33, and data for the screened-auger samples are shown in table 34.

The chemical data presented in this report are consistent with earlier descriptions of the plume (for example, LeBlanc, 1984). MBAS (an indicator of detergents) concentrations as high 1.4 mg/L, boron concentrations as high as 470 µg/L, total VOCs concentrations (assumed for the purposes of this report to equal the sum of concentrations of dichloroethylene, trichloroethylene, and tetrachloroethylene) as high as 188 µg/L, and specific conductance as high as 537 µS/cm were measured in the plume. In uncontaminated ground water outside the plume, the MBAS concentration is less than 0.1 mg/L, the boron concentration is less than 50 µg/L, the total VOCs concentration is less than 5 µg/L (generally less than the analytical detection limits), and specific conductance is less than 100 µS/cm. The areal extent of the plume shown in figures 1-4 is where MBAS, boron, and total VOCs concentrations generally exceed 0.1 mg/L, 50 µg/L, and 5 µg/L, respectively. The Ashumet Valley plume extends more than 18,000 ft downgradient from the source area on the MMR toward the coastal ponds and Vineyard Sound.

The plume contains elevated concentrations of nutrients characteristic of sewage-derived wastewater, including nitrate, ammonium, and phosphorus (tables 12, 28, and 29). Nitrate concentrations as high as 29 mg/L (as nitrogen) and phosphorus concentrations as high as 5.7 mg/L were measured. The concentrations of dissolved orthophosphorus reported in table 12 may be less than the actual concentrations because phosphorus may have been removed from solution after sample collection and before chemical analysis. The samples sent to the USGS National Water Quality Laboratory (NWQL) for phosphorus analysis were not preserved by acidification to keep metals in solution (table 1). In samples containing concentrations of dissolved iron greater than about 1 mg/L, the iron precipitates as hydrous ferric oxide in the sample bottle after exposure to oxygen. Phosphorus is removed from solution by coprecipitation with the iron or adsorption onto the precipitate (Donald A. Walter, U.S. Geological Survey, written commun., 1996). The sample-preservation bias

most likely occurs within 2,000 ft of the sewage-infiltration beds where dissolved iron and phosphorus are known to be present at significantly elevated concentrations (Bussey and Walter, 1996; Walter and others, 1996).

The predominant VOCs present in the plume are dichloroethylene, trichloroethylene, and tetrachloroethylene (table 19). Many of the VOCs were not detected in any samples collected by the USGS or ABB Environmental Services, Inc., and are not included in table 19. The complete list of VOCs for which analyses were performed is shown in table 18.

The concentrations of many inorganic and organic species are reported as dissolved concentrations because the samples were passed through a 0.45-µm filter. Although this is only an operational definition (some particulates and colloids can be smaller than 0.45 µm), the field test of the effects of pumping rate and filtration on measured concentrations of inorganic species described earlier in this report suggests that the reported concentrations represent dissolved species.

The duplicate analyses in tables 10-20 and 27-30 for the wells and multilevel samplers and the QA/QC data in tables 22-25 and 31-33 show that the sampling protocol and the laboratory precision were of sufficient quality to produce unbiased and precise water-quality data. Formal data validation and statistical analysis of the QA/QC data were not part of this study.

METHODS OF ANALYSIS

Major Organic and Inorganic Constituents for Samples from Wells

Samples collected from wells were analyzed for major organic and inorganic constituents by the USGS National Water Quality Laboratory (NWQL) in Arvada, Colo. (table 1). Samples were analyzed according to USGS methods and protocols described in Wershaw and others (1987) and Fishman and Friedman (1989). The major cations, trace metals, and silica were determined by inductively coupled plasma atomic emission spectrometry. Potassium was determined by flame atomic adsorption spectrometry. Sulfate and chloride were determined by ion chromatography. Fluoride was determined by ion-selective electrode. Aluminum and boron were determined by direct-current plasma atomic emission spectrometry. Several species were determined colorimetrically on an automated-segmented flow system—bromide by the fluorescein method, orthophosphorus by the ammonium molybdate method, nitrite by the diazotization method, and ammonia by the salicylate hypochlorite method. Nitrite plus nitrate was determined by the cadmium-reduction method and colorimetric determination of nitrite. Ammonia plus organic nitrogen was determined by the acid digestion method and colorimetric determination of ammonia. Dissolved organic carbon was determined by persulfate oxidation and infrared spectrometry. Methylene blue active substances were determined colorimetrically. Volatile organic compounds were determined by purge and trap capillary gas chromatography/mass spectrometry. The results of analyses by the USGS NWQL are shown in tables 10-13, 17-19, and 22-25.

Organic Carbon Fractionation and Specific Organic Compounds

By Larry B. Barber, II (U.S. Geological Survey)

Organic carbon fractionation and concentrations of organic and inorganic carbon and specific organic compounds were determined for water samples from wells, MLS, and the MMR sewage-treatment-plant effluent by the USGS, WRD, National Research Program's laboratory in Boulder, Colo. (table 1). Water samples were collected in precleaned amber glass bottles and processed in the field for analysis of total organic carbon (TOC), total inorganic carbon (TIC), dissolved organic carbon (DOC), dissolved inorganic carbon (DIC), DOC fractionation (DOC_f), ultraviolet/visible light absorption, methylene blue active substances (MBAS), branched- and linear-chained alkylbenzene sulfonate (ABS and LAS), caffeine, ethylenediaminetetraacetic acid (EDTA), and nitrilotriacetic acid (NTA) analysis. Samples from wells for DOC and DOC_f analysis were pressure-filtered with nitrogen gas (5-10 lb/in^2) through 0.45-µm-pore-size silver membranes. Samples from MLS for DOC and DOC_f analysis were filtered in-line (0.45-µm Gelman capsule filter). Samples for TOC analysis were collected without filtration. Samples for ABS, LAS, EDTA, NTA, and caffeine analysis were collected without filtration and preserved with

1 percent formalin. All samples were chilled to 4°C until analysis. The results of analyses described in this section are shown in tables 14-16, 27, and 31.

Total and Dissolved Organic and Inorganic Carbon

TOC, TIC, DOC, and DIC were measured by heated persulfate oxidation using an Oceanographic International Model 700 Carbon Analyzer (Barber and others, 1995). This method involves acidifying the water sample to convert inorganic carbon to carbon dioxide (CO_2) and measuring the CO_2 by an infrared (IR) detector. After removal of inorganic carbon, sodium persulfate is added and the sample is heated to oxidize organic carbon to CO_2, which is measured by IR. Samples were analyzed in duplicate, and concentrations were calculated using a six-point calibration curve prepared from potassium hydrogen phthalate. Distilled water blanks and quality-assurance standards were analyzed for about 1 of every 10 samples. The detection limit for this method is about 0.1 mg/L.

Dissolved Organic Carbon Fractionation

The total dissolved organic carbon was fractionated into six fractions exhibiting different sorptive behaviors (Leenheer and Huffman, 1976, 1979; Leenheer, 1981). This method is based on chromatographic separation using macroreticular resins. Because of the operational factors involved with the separation techniques, it is necessary to use filtered water samples; thus, the measurements are restricted to DOC.

A variety of sorption resins was used in the DOC_f method. The method is based on Amberlite XAD-8 resin as the hydrophobic reverse-phase adsorbent. XAD-8 is a macroreticular, polymethacrylate ester polymer, which has a polar structure because of its ester cross-linkages. In this study, Supelco Amberchrom GC-71m, a polymethacrylate polymer, with similar properties to XAD-8, was used. Macroreticular styrene divinylbenzene ion-exchange resins also were used: BIO-RAD AG MP 1, a Type I strong-base anion-exchange resin with quaternary ammonium basic functional groups in the chloride form was used for anion exchange, and BIO-RAD AG MP 50, a Type I strong-acid cation-exchange resin with sulfonic acid functional groups was used for cation exchange.

The ion exchange and CG-71m resins were cleaned before packing the cartridges (each containing 500 mg of resin) by sequential 24-hour soxhlet extractions with acetonitrile followed by methanol. The cleaned resins (with the exception of CG-71m) were air dried and sieved to obtain the less-than-250-µm size fraction. The CG-71m was packed as received. The macroreticular resins were custom packed by Waters Chromatography into long-body SepPak cartridges using radial compression technology.

The DOC_f method was automated using a Waters Millilab 1A solid-phase extraction robotics workstation. The reagents required for DOC_f are 0.1 and 1.0 N aqueous solutions of sodium hydroxide (NaOH) and sulfuric acid (H_2SO_4) and distilled water (DW). Each cartridge was conditioned immediately prior to use, and a DW cartridge blank was collected. The CG-71m resin was conditioned with 5 mL of DW, 5 mL of 1 N NaOH, 5 mL of 1 N H_2SO_4, and 100 mL of DW. The anion exchange resins were conditioned with 5 mL of DW, 20 mL of 1 N NaOH, and 100 mL of DW. The cation exchange resins were conditioned with 5 mL of DW, 20 mL of 1 N H_2SO_4, and 100 mL of DW. The flow rates through the cartridges ranged from 1 to 4 mL/min (one pore volume equaled 1 mL).

The fractionation consisted of several steps: (1) A sample of the water to be analyzed for DOC_f was collected and its DOC concentration was measured; (2) a 100-mL filtered sample of the water was passed through a GC-71m cartridge at neutral pH (7.0 ±1.0, as determined by pH strip) to isolate the hydrophobic neutral (HPOn) and base (HPOb) fractions; (3) the HPOb fraction was determined by extracting the GC-71m with 0.1 N H_2SO_4, and the HPOn fraction was determined by difference; (4) the sample that passed through the column was acidified to pH 2 with H_2SO_4 and passed through the GC-71m resin again, and the hydrophobic acid (HPOa) fraction was determined by difference between the cartridge influent and effluent [the hydrophilic (HPI) fraction is the DOC that passes through the GC-71m column at pH 2]; (5) the HPI DOC was fractionated into the hydrophilic base (HPIb) fraction by passing the sample through a strong-acid cation-exchange resin, and the HPIb fraction was determined by difference between influent and effluent concentrations; (6) the sample was passed through a strong-base anion-exchange resin and the acid fraction (HPIa) was determined by difference; and (7) the

hydrophilic neutral (HPIn) fraction is the outflow of the anion-exchange resin. Each DOC_f sample resulted in 13 subsamples for analysis consisting of blanks, cartridge influents and effluents, and cartridge extracts. Each set of subsamples was analyzed as a set, including a DW blank and two DOC standards (1 and 5 mg/L). DOC analysis was performed as described above.

Ultraviolet and Visible Absorbance

The light absorbance of the filtered water samples from the wells and filtered and unfiltered samples from the MLS were measured at two wavelengths: 254 nm (ultraviolet range) and 400 nm (visible range). This measurement provides an indication of the humic and fulvic acid contribution to the total DOC (Thurman, 1985). Absorbance was measured in a 1-cm quartz cell using a Bausch and Lomb Spectronics Model 710 spectrophotometer. The absorbance at 400 nm was calibrated against a platinum/cobalt standard (Standard Method 204A; American Public Health Association and others, 1985). The color standard was prepared from potassium chloroplatinate and cobaltous chloride to give a stock concentration of 500 platinum/cobalt (Pt/Co) units (1 mg/L platinum, 0.5 mg/L cobalt). The stock solution was serially diluted to give a standard calibration curve. The detection limit for this method is about 1 Pt/Co unit. The 254-nm absorbance is a measurement of the aromatic ring structure, and a 5-mg carbon per liter (C/L) Swannee River fulvic acid standard was used as a calibration standard.

Methylene Blue Active Substances

Methylene blue active substances (MBAS) analysis is a measurement of total anionic surfactants and includes linear- and branch-chained alkylbenzenesulfonates (LAS and ABS); sulfophenyl carboxylic acid (SPC) degradation products of LAS and ABS; dialkyltetralin- and dialkylindane-sulfonates (DATS), which are impurities in LAS and ABS formulations; alkylsulfates; and other natural and synthetic strong-acid hydrophobic compounds. Filtered formalin-preserved samples were analyzed for MBAS using a modification of the method described in Wershaw and others (1987). Water samples are acidified, methylene blue is added, and the methylene-blue/surfactant ion pair is extracted into chloroform. The chloroform extract is measured by a spectrophotometer at a wavelength of 635 nm. Quantification was based on a six-point standard curve. Each set of samples had a distilled water blank and from one to three quality-assurance standards. Replicate analysis was performed on selected samples. The detection limit for this method is about 20 µg/L.

Anionic Surfactants by Solid-Phase Extraction, Derivatization, and Gas Chromatography/Mass Spectrometry

Samples were analyzed for linear- and branched-chained alkylbenzene sulfonate (LAS and ABS) anionic surfactants using solid-phase extraction (SPE) and the injection-port derivatization, gas chromatography/mass spectrometry (GC/MS) method of Field and others (1992, 1994).

The SPE part of this method was performed using a Waters Millilab 1A robotics workstation. Octadecyl surface-modified C_{18} silica cartridges containing 1 g of adsorbent were used for reverse-phase isolation. Distilled water was used for reagent blanks and recovery experiments.

Immediately before processing the formalin-preserved water samples, the C_{18} cartridges were conditioned with 5 mL of methanol and 5 mL of DW. The samples (450 mL) were passed through the cartridges at a flow rate of 4 mL/min after an ionic strength adjustment with sodium chloride (0.1 M final concentration) and addition of 5 µg C_9-LAS (final concentration 10 µg/L). The C_9-LAS surrogate standard for LAS was added to the aqueous sample prior to SPE to evaluate whole method recovery. After SPE isolation, the cartridges were blown dry with nitrogen gas (N_2) and eluted with 12 mL of tetrabutylammonium hydrogen sulfate (TBA)/chloroform (0.005 M TBA in chloroform) at a flow rate of 1 mL/min. The extracts were dried over sodium sulfate, concentrated to a final volume of 200 µL, and spiked with 5 µg of C_8-LAS. The C_8-LAS standard was added to the SPE extract to evaluate the derivatization. LAS external standards were spiked into DW or ground-water quality-assurance samples and processed through the entire procedure in the same manner as the field samples.

The TBA/chloroform extracts were analyzed by electron impact GC/MS using a Hewlett Packard Model 5890 GC with a Model 5970 Mass Selective Detector in both the full scan and selected ion monitoring (SIM) modes. The conditions for the

analysis were: column, Hewlett Packard Ultra II, 25-m long, 0.2-mm inside diameter, 20-µm film thickness; carrier gas, ultra high purity helium, 27 cm/s; source temperature, 250°C; source pressure, 1×10^{-5} torr; ionization energy, 70 electron volts; scan range, 45 to 550 amu; scan time, 1 scan/sec; split mode, 10:1 split ratio; injection port temperature, 300°C; initial oven temperature, 110°C; initial time, 0 min; ramp rate, 20°C/min to 200°C, followed by 6°C/min to 300°C; final hold time, 5 min. Selected ion monitoring data were collected for the $[M\text{-}55]^+$ ions (molecular ion minus loss of the butyl functional group) of the butylated esters of the individual homologs [mass/charge (*m/z*) of 271 for C_8, 285 for C_9, 299 for C_{10}, 313 for C_{11}, 327 for C_{12}, 341 for C_{13}, and 355 for C_{14}] and for their base peaks (*m/z* of 91, 171, and 185). Quantitation of LAS was based on the molecular ion peak area of the C_9-LAS surrogate standard and the molecular ion peak areas for the individual C_{10}-C_{14} LAS isomers and homologs. The detection limit for LAS and ABS is about 0.1 µg/L.

Ethylenediaminetetraacetic Acid (EDTA) and Nitrilotriacetic Acid (NTA)

EDTA and NTA were measured using the method of Schaffner and Giger (1984) with some modifications. A 100-mL formalin-preserved sample was spiked with 1 µg of d_{12}-EDTA as a surrogate standard, and the sample was evaporated to dryness in an oven at 90°C for 24 hours. The sample residue was acidified with 2 mL of a 50:50 mixture of formic acid and water and vacuum evaporated to dryness. The residue was then derivatized to form the tetrapropyl esters of EDTA and the tripropyl esters of NTA by adding 1.5 mL of propanol/acetyl chloride reagent, heating at 85°C for 1 hr, and extracting the esters into chloroform. The chloroform extracts were taken to dryness, redissolved in 100 µL of toluene, and analyzed by GC/MS.

The extracts were analyzed in the full scan and SIM modes by GC/MS using the same splitless conditions described above with the following changes: injection port temperature, 280°C; initial oven temperature, 100°C; initial time, 1 min; ramp rate, 20°C/min to 140°C, followed by 7°C/min to 300°C; final hold time, 5 min. SIM data were collected for the $[M]^+$ of the propyl ester derivatives of EDTA and NTA (*m/z* of 460 for EDTA, 472 for d_{12}-EDTA and NTA) and for the base peaks of the compounds (*m/z* of 230 for EDTA and NTA and 236 for d_{12}-EDTA). Quantitation of EDTA and NTA was based on the molecular ion peak area of the d_{12}-EDTA surrogate standard. The detection limit for EDTA and NTA is about 0.1 µg/L.

Caffeine

The samples were analyzed for caffeine by SPE followed by GC/MS analysis in the full scan and SIM modes. Caffeine was extracted from 100- to 1,000-mL formalin-preserved water samples using C_{18}-silica SepPak cartridges. The cartridges were conditioned with 5 mL of ethyl acetate, 5 mL of methanol, and 5 mL of DW. The water sample was passed through the cartridge (4 mL/min), the cartridge was blown dry with N_2, and the cartridge was eluted with 14 mL of ethyl acetate or TBA/chloroform. The switch was made from ethyl acetate to TBA/chloroform to allow the simultaneous measurement of caffeine, LAS, and ABS. The recovery of caffeine was the same for both eluting solvents. The solvent extract was dried over sodium sulfate and the volume reduced to 100 µL.

The extracts were analyzed in the full scan and SIM modes by GC/MS using the same splitless conditions as above, with the following changes: injection port temperature, 280°C; initial oven temperature, 60°C; initial time, 1 min; ramp rate, 8°C/min; final temperature, 300°C; final hold time, 0 min. SIM data were collected for the $[M]^+$ of caffeine and the ^{13}C caffeine surrogate standard (*m/z* of 194 and 197) and for the base peaks of the compounds (*m/z* of 109 and 180). Quantitation of caffeine was based on the molecular ion peak area of the ^{13}C caffeine surrogate standard, or on the molecular ion peak area of caffeine determined from an external standard calibration curve. The detection limit for caffeine is about 0.1 µg/L.

Selected Inorganic Solutes

By Jennifer A. Coston (U.S. Geological Survey), Robert H. Abrams (Stanford University), *and* Douglas B. Kent (U.S. Geological Survey)

Selected inorganic-solutes concentrations were determined for water samples from the MLS and the MMR sewage-treatment-plant effluent by the USGS, WRD, National Research Program laboratory in Menlo

Park, Calif. (table 1). Inorganic solutes analyzed include aluminum, boron, calcium, copper, iron, lead, manganese, magnesium, phosphorus, potassium, sodium, silicon, and zinc. The results of analyses described in this section are shown in tables 29 and 33. Results for chromium, lead, and nickel are not presented in table 29 because their concentrations were less than the method detection limits described below. Samples were filtered in-line (0.45-µm Millex filter; see Effects of Pumping Rate and Filtration on Measured Concentrations of Inorganic Solutes, p. 11) during collection, acidified with 6N hydrochloric acid (trace metal grade) to pH 2, and chilled within minutes. Samples were shipped to Menlo Park, Calif., and analyzed within 3 months of collection.

Inorganic solutes were analyzed by inductively coupled plasma atomic emission spectroscopy (ICPAES). Element lines were standardized on the instrument (Thermo-Jarrell Ash Model 61) with the two-point uncalibrated method recommended by the manufacturer. Multi-element standards were matrix matched to the samples to minimize viscosity effects during analysis. All standards discussed here were mixed from certified ICPAES 1,000 mg/L stock standards and acidified, double-deionized water.

A quality-control standard was run at the beginning of each MLS set (every 10 to 16 samples). The quality-control standard contained concentrations of calcium and magnesium similar to those in typical ground water from the sewage plume (10 and 5 mg/L, respectively); all other inorganic solutes had concentrations of 1 mg/L. When analysis of the quality-control standard gave a concentration outside the established concentration range (±5 percent) for any of the three critical inorganic solutes (calcium, copper, or zinc), the instrument was re-standardized.

A consistency standard (CS) having concentrations of selected solutes similar to those in sewage-contaminated ground water near the sewage-infiltration beds was prepared using double-deionized water. Inorganic-solutes concentrations were lower and phosphorus concentrations were higher in the CS than in the quality-control standard. The method detection limits (MDL) and statistical summary for the inorganic solutes measured in the consistency standard are reported in table 4 and were estimated from repeated measurements of solutions spiked with low concentrations of the inorganic solutes of interest. Thus, the MDL are instrument and solution-matrix dependent and represent the minimum quantifiable concentrations of the inorganic solutes. The relative accuracy is within 5 percent for all the inorganic solutes except iron and magnesium, although the precision of all the analyses degrades when concentrations approach the MDL.

Measured concentrations of inorganic solutes in the CS are shown in table 5. Results for aluminum, chromium, and nickel are not presented in table 5 because they were not added to the CS. The CS was analyzed in the middle of the set of samples from a particular MLS. CS names in table 5 refer to the MLS sample set with which the CS analysis is associated. At MLS SDW 318 M01, three different filtering procedures were compared. In addition to the normal protocol, sets of unfiltered ("ra" for raw acidified) and filtered samples, where a new filter was used for each sample ("nf" for new filter), were collected.

Table 4. Method detection limits for inorganic solutes and statistical summary of measured inorganic-solutes concentrations in the consistency standard

[Total number of replicate analyses performed, 36. **Percent relative standard deviation:** (2 × (standard deviation)/average element concentration in sample) × 100. **Percent relative accuracy**: (measured concentration / known concentration) × 100. mg/L, milligram per liter; --, not included in consistency standard]

Element	Method detection limit (mg/L)	Average measured concentration (mg/L)	Percent relative standard deviation	Percent relative accuracy
Aluminum	0.05	--	--	--
Boron	.003	0.37	11	102
Calcium	.010	20.0	9.0	102
Chromium	.010	--	--	--
Copper	.006	.061	12	104
Iron	.008	.051	15	106
Lead	.08	.10	22	103
Magnesium	.04	3.63	8.2	109
Manganese	.01	.051	9.8	103
Nickel	.03	--	--	--
Phosphorus	.1	5.2	9.1	103
Potassium	.40	9.7	15	99.6
Silicon	.1	2.82	8.6	102
Sodium	.1	52	13	105
Zinc	.016	.061	9.7	104

Table 5. Measured concentrations of inorganic solutes in the consistency standard

[**Multilevel-sampler No.:** Numbers ending in CS show sample set associated with the consistency standard. No., number.; nf, new filter; ra, raw acidified. mg/L, milligram per liter]

Multilevel-sampler No.	Boron (mg/L)	Calcium (mg/L)	Copper (mg/L)	Iron (mg/L)	Lead (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Phosphorus (mg/L)	Potassium (mg/L)	Silicon (mg/L)	Sodium (mg/L)	Zinc (mg/L)
FSW 343 M03CS	0.36	19.9	0.061	0.054	0.10	3.60	0.051	5.18	10.0	2.90	51	0.061
FSW 347 M01CS	.37	20.1	.060	.053	.09	3.60	.051	5.18	9.8	2.90	52	.060
FSW 432 M01CS	.37	20.6	.063	.054	.11	3.67	.051	5.23	10.1	2.96	52	.063
FSW 567 M01CS	.37	20.2	.064	.054	.10	3.62	.052	5.17	10.2	2.92	51	.062
FSW 567 M02CS	.35	19.6	.059	.052	.10	3.51	.050	4.97	9.5	2.82	49	.060
FSW 168 M015CS	.36	19.1	.057	.047	.09	3.42	.048	4.93	9.2	2.70	48	.060
FSW 239 M01CS	.37	19.5	.061	.049	.12	3.56	.050	5.14	9.5	2.79	50	.060
FSW 262 M01CS	.35	19.3	.056	.053	.11	3.45	.048	4.92	9.2	2.67	48	.058
FSW 300 M02CS	.34	18.7	.057	.046	.09	3.38	.049	4.95	8.7	2.65	49	.057
FSW 300 M03CS	.37	20.2	.059	.047	.10	3.63	.051	5.22	10.1	2.84	52	.061
FSW 343 M01CS	.39	19.5	.067	.052	.12	3.78	.053	5.21	9.6	2.91	57	.063
FSW 343 M02CSra	.38	20.7	.061	.063	.09	3.66	.053	5.30	9.6	2.84	52	.063
FSW 343 M02CS	.38	19.2	.060	.054	.10	3.69	.051	5.19	8.7	2.85	57	.062
FSW 347 M06CS	.39	19.6	.063	.054	.10	3.75	.055	5.53	9.6	2.90	55	.063
FSW 350 M01CS	.38	20.0	.057	.052	.12	3.65	.051	5.23	10.4	2.84	52	.059
FSW 373 M01CS	.39	23.0	.067	.057	.11	3.93	.058	5.77	10.4	3.09	51	.070
FSW 424 M01CS	.37	19.9	.059	.046	.11	3.62	.052	5.17	10.2	2.79	53	.059
FSW 424 M02CS	.35	19.2	.056	.048	.09	3.49	.049	4.96	9.0	2.72	50	.057
FSW 429 M01CS	.34	19.8	.058	.048	.10	3.59	.050	4.88	10.6	2.66	51	.059
FSW 442 M01CS	.33	19.2	.056	.047	.10	3.45	.048	4.72	9.7	2.55	46	.058
FSW 453 M02CS	.41	19.6	.063	.055	.11	3.81	.052	5.37	8.6	2.94	61	.062
FSW 471 M01CS	.35	21.2	.063	.051	.10	3.83	.054	5.00	11.1	2.73	57	.062
FSW 472 M01CS	.40	20.7	.060	.054	.12	3.80	.053	5.44	10.7	2.96	55	.061
FSW 508 M01CS	.35	19.1	.060	.048	.09	3.39	.047	4.98	8.7	2.69	48	.059
FSW 510 M01CS	.41	19.5	.062	.052	.09	3.81	.052	5.37	8.7	2.93	61	.063
FSW 512 M01CS	.38	18.6	.058	.050	.10	3.58	.050	5.14	8.0	2.78	56	.059
FSW 564 M01CS	.36	20.0	.059	.046	.10	3.58	.052	5.06	9.9	2.79	51	.059
FSW 566 M01CS	.37	20.4	.064	.053	.10	3.70	.052	5.19	10.6	2.88	52	.063
FSW 566 M02CS	.36	20.0	.064	.052	.11	3.65	.052	5.08	10.4	2.83	52	.062
SDW 317 M01CS	.42	22.3	.072	.060	.12	4.03	.058	5.83	11.0	3.11	58	.068
SDW 317 M02CS	.36	19.3	.057	.046	.09	3.45	.048	4.94	9.6	2.70	50	.057
SDW 318 M01CSnf	.35	19.1	.055	.046	.08	3.38	.046	4.84	8.9	2.65	50	.055
SDW 318 M01CS	.35	19.5	.057	.047	.09	3.50	.048	4.99	9.3	2.71	51	.057
SDW 318 M01CSra	.38	21.4	.065	.053	.11	3.73	.054	5.48	10.7	2.96	52	.066
WATER BLANKS CS	.36	20.0	.064	.051	.10	3.63	.051	5.13	10.4	2.81	52	.063
MMR STP EFF CS	.37	20.4	.062	.051	.12	3.63	.052	5.20	10.0	2.84	48	.064

Dissolved Gases, Nitrogen Species, and Sulfate

By Richard L. Smith (U.S. Geological Survey)

Dissolved-gases concentrations were determined for water samples from the wells and MLS by the USGS, WRD, National Research Program laboratory in Boulder, Colo. (table 1). The dissolved gases include nitrous oxide (N_2O), dissolved inorganic carbon (DIC) plus carbon dioxide (CO_2), and methane (CH_4). Samples were collected in pretreated 30-mL serum bottles. The serum bottles were prepared by adding 200 µL of 12N NaOH, sealing with thick butyl rubber septa and crimps, and then flushing with ultra-high-purity-grade helium for 10 minutes. Ground-water samples were collected in a syringe, and 15 mL of the sample was injected into the serum bottle through a 22-gauge needle. N_2O and CH_4 in the headspace gas of the serum bottles were analyzed by GC after equilibration at 35°C, as described by Brooks and others (1992) and Smith and others (1993), respectively. After the N_2O and CH_4 analyses were performed, 0.1 mL of concentrated H_2SO_4 was added to the bottle with a syringe, and CO_2 in the headspace was analyzed as described by Smith and others (1991). Aqueous concentrations of each gas were calculated using temperature-corrected Bunsen solubility coefficients. The results of the dissolved-gases analyses are shown in tables 20 and 30.

Nitrate (NO_3^-), nitrite (NO_2^-), ammonium (NH_4^+), and sulfate (SO_4^{2-}) analyses also were performed by the laboratory in Boulder, Colo., on all samples collected from the MLS and the treated sewage (table 1). Samples for NO_3^-, NO_2^-, and SO_4^{2-} determinations were filtered in-line (0.45-µm filter) on site and frozen. Samples for NH_4^+ determination were filtered in-line (0.45-µm filter), then acidified to pH 1 with concentrated H_2SO_4. NO_3^-, NO_2^-, and NH_4^+ were analyzed using a flow injection autoanalyzer as described by Antweiler and others (1996). SO_4^{2-} was analyzed using anion-exchange separation (AS4 separator column) with an ion chromatograph (Dionex Model DX-300). The results of the NO_3^-, NO_2^-, NH_4^+, and SO_4^{2-} analyses are shown in tables 28 and 32.

Free-Living Bacterial Abundance and Size Distribution

By David W. Metge *and* Ronald W. Harvey (U.S. Geological Survey)

Abundance and size distribution of free-living bacterial populations in contaminated and uncontaminated ground water were determined for water samples from seven observation wells. Samples were shipped to the USGS, WRD, National Research Program laboratory in Boulder, Colo., for analysis (table 1). The results of the analyses described in this section are presented in table 21. Well FSW 393-0037 is outside of the Ashumet Valley sewage plume in a pristine part of the aquifer. Other chemical analyses were not performed on ground water from this site.

Ground-water bacterial abundance was determined by fluorescent labeling methodologies developed by Harvey and others (1984) (modified from Hobbie and others, 1977). Size distributions of free-living bacterial populations were determined using an image system composed of a Nikon Optiphot II epifluorescence microscope, a Dage SIT66 black-and-white camera, and an Image Technology Corporation image processor. The image system was optimized to determine length, width, area, and perimeter of fluorescently stained bacteria in samples that were analyzed previously for bacterial abundance. The digitized images of fluorescently stained bacteria were transferred electronically to a personal computer. Measurements from the image system were standardized by using fluorescently labeled 0.45-, 0.95-, and 1.07-µm-diameter microspheres (Polysciences) to convert pixel measurements to micrometers. All analyses were performed at a microscope magnification of 788 times actual size.

Ferrous Iron and Phosphate for Screened-Auger Samples

By Kimberly W. Bussey (U.S. Geological Survey)

Ferrous iron (Fe(II)) and phosphate concentrations were determined for water samples from screened-auger borings at a USGS field laboratory at the MMR (table 1). The samples were filtered in-line (0.45-µm filter) and acidified with hydrochloric acid on site. The results of the analyses described in this section are shown in table 34. There are no Fe(II) and phosphate results for sites FSW 279, FSW 582, FSW 584, and FSW 585 because samples had not been preserved properly in the field.

Samples for Fe(II) were analyzed using spectrophotometric determination. The analysis method is based on a linear concentration-versus-absorbance response for Fe(II) concentrations within a range of 0 to 1 mg/L (Gibbs, 1979). Water samples that contained Fe(II) concentrations greater than 1 mg/L were diluted using deionized water at a ratio of 1:50. The total volume of sample solution used for analysis was 10 mL. Each sample was treated with 0.4 mL of Ferrozine reagent (1.5 mM) and 1.0 mL of buffer solution. The absorbance was determined using a Milton Roy spectrophotometer at a wavelength of 562 nm. Standards were run at the beginning and end of each set of as many as 80 samples. The measured absorbance was converted to concentration by linear regression determined from the standards and multiplied by the dilution factor.

Samples for phosphate also were analyzed using spectrophotometric determination. The analysis method has a linear response range of 0 to 20 µM. Some samples were diluted using deionized water at a ratio of up to 1:20 to keep measurements within the linear range. The total volume of sample solution used for analysis was 6 mL. Each sample was treated with 8 mL of mixed reagent. The mixed reagent was prepared each day and consisted of 50 mL of ammonium molybdate solution, 125 mL of diluted H_2SO_4, 50 mL of ascorbic acid solution, and 25 mL of potassium antimonyl-tartrate solution. The absorbance was determined using a Milton Roy spectrophotometer at a wavelength of 885 nm. Standards were run at the beginning and end of each set of as many as 80 samples. The measured absorbance was converted to concentration by linear regression determined from the standards and multiplied by the dilution factor.

SUMMARY

The U.S. Geological Survey and ABB Environmental Services, Inc., conducted a comprehensive sampling in 1993-94 of 315 wells, 31 multilevel samplers, 14 screened-auger borings, and the Massachusetts Military Reservation sewage-treatment-plant effluent to characterize a plume of sewage-contaminated ground water in the Ashumet Valley, in northeastern Falmouth, Cape Cod, Massachusetts. The source of the plume was the disposal of wastewater and chemicals at the MMR sewage-treatment plant and former fire-training area. The chemical and microbiological data, along with the sampling procedures and methods of analysis, are presented in this report. Methods of analyses not previously documented for selected constituents are described in detail. The results of a field experiment also are presented which show that the pumping rates and filtration procedures used to sample wells and multilevel samplers in this study produce measurements of field properties and concentrations of inorganic solutes that are the same as those obtained with low pumping rates and unfiltered samples.

The water-quality data contained in this report will be useful to residents and officials concerned about future drinking water supplies and the discharge of contaminated ground water to ecologically sensitive streams, ponds, and coastal environments in and near the Ashumet Valley. The comprehensive data set also will aid researchers in understanding the fate and transport of contaminants in ground water. The water-quality data include analyses of physical properties, major ions, nutrients, metals, dissolved gases, organic compounds, other sewage-related constituents, such as boron and MBAS, and bacterial size and abundance. These data show that the plume of contaminated ground water extends more than 18,000 ft downgradient from the sources on the MMR.

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TABLES

Table 6. Location coordinates, diameter of casing, land-surface and screen altitudes, and water levels for observation wells, Ashumet Valley, Massachusetts

[**Well cluster site and well No.:** Number in parentheses assigned by the Massachusetts Military Reservation. Locations of well clusters and wells are shown in figures 2 and 3. No., number. Latitude and longitude are given in degrees, minutes, and seconds. Altitudes are in feet above or (-) below sea level]

Well cluster site and well No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Diameter of casing (inch)	Altitude of land surface (feet)	Altitude, top of screen (feet)	Altitude, bottom of screen (feet)	Water-level date	Altitude of water level (feet)
FSW 230-0042	413818	0703240	2.00	87.06	46.7	44.7	7-20-94	48.15
FSW 230-0048	413818	0703240	2.00	86.20	47.8	37.8	7-20-94	48.16
FSW 230-0049	413818	0703240	2.00	86.14	38.7	36.7	7-20-94	48.18
FSW 230-0058	413818	0703240	2.00	85.93	29.9	27.9	7-20-94	48.18
FSW 230-0068	413818	0703240	2.00	86.33	20.2	18.2	7-21-94	48.20
FSW 230-0078	413818	0703240	2.00	86.46	10.5	8.5	7-22-94	48.17
FSW 230-0088	413818	0703240	2.00	86.35	.3	-1.7	7-21-94	48.18
FSW 230-0108	413818	0703240	2.00	86.13	-20.0	-22.0	7-21-94	48.16
FSW 230-0127	413818	0703240	2.00	86.06	-39.3	-41.3	7-22-94	48.18
FSW 231-0057	413817	0703239	2.00	84.52	47.8	27.8	8-12-94	47.52
FSW 232-0058	413817	0703238	2.00	94.78	47.3	37.3	9-22-94	46.84
FSW 235-0094	413820	0703303	2.00	99.41	8.9	5.9	6-07-94	49.25
FSW 236-0070	413814	0703250	2.00	98.05	30.1	28.1	10-20-94	46.20
FSW 236-0089	413814	0703250	2.00	98.16	11.2	9.2	10-20-94	46.20
FSW 236-0106	413814	0703250	2.00	98.00	-4.9	-7.9	10-20-94	46.07
FSW 236-0121	413814	0703250	2.00	98.09	-20.6	-22.6	10-20-94	46.21
FSW 236-0141	413814	0703250	2.00	97.69	-41.2	-43.2	10-20-94	46.21
FSW 237-0088	413755	0703252	2.00	90.46	5.5	2.5	6-07-94	45.34
FSW 238-0106	413759	0703311	2.00	94.97	-8.2	-11.2	6-10-94	45.70
FSW 239-0010	413801	0703227	2.00	51.32	45.1	41.1	6-06-94	45.62
FSW 239-0064	413801	0703227	2.00	50.98	-9.7	-12.7	6-06-94	45.61
FSW 239-0121	413801	0703227	2.00	51.47	-67.6	-69.5	6-06-94	45.65
FSW 242-0077	413731	0703336	2.00	61.20	-12.7	-15.7	6-10-94	39.08
FSW 244-0070	413754	0703236	2.00	69.88	4.2	-.3	8-12-94	44.47
FSW 244-0090	413754	0703236	2.00	69.50	-17.7	-20.7	8-11-94	44.44
FSW 244-0119	413754	0703236	2.00	69.64	-47.6	-49.6	8-11-94	44.50
FSW 254-0026	413750	0703235	1.25	56.05	32.9	29.9	7-12-94	44.57
FSW 254-0054	413750	0703235	1.25	56.05	5.3	2.3	7-12-94	44.61
FSW 254-0072	413750	0703235	1.25	56.05	-12.8	-15.8	7-12-94	44.62
FSW 254-0107	413750	0703235	1.25	56.05	-47.7	-50.7	7-12-94	44.62
FSW 254-0140	413750	0703235	1.25	56.05	-81.0	-84.0	7-13-94	44.61
FSW 254-0168	413750	0703235	1.25	56.05	-109.5	-112.5	7-13-94	44.60
FSW 254-0216	413750	0703235	1.25	56.05	-157.5	-160.5	7-13-94	44.60
FSW 262-0041	413713	0703253	1.25	46.60	8.3	5.3	7-14-94	39.00
FSW 262-0069	413713	0703253	1.25	46.60	-19.0	-22.0	7-14-94	38.99
FSW 262-0085	413713	0703253	1.25	46.60	-35.3	-38.3	7-14-94	39.01
FSW 262-0109	413713	0703253	1.25	46.60	-59.4	-62.4	7-14-94	38.99
FSW 262-0126	413713	0703253	2.00	46.56	-77.3	-79.3	8-29-94	38.00
FSW 262-0159	413713	0703253	1.25	46.60	-109.4	-112.4	7-14-94	38.83

Table 6. Location coordinates, diameter of casing, land-surface and screen altitudes, and water levels for observation wells, Ashumet Valley, Massachusetts—*Continued*

Well cluster site and well No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Diameter of casing (inch)	Altitude of land surface (feet)	Altitude, top of screen (feet)	Altitude, bottom of screen (feet)	Water-level date	Altitude of water level (feet)
FSW 267-0088	413737	0703303	1.25	54.02	-30.6	-33.6	7-08-94	42.49
FSW 267-0111	413737	0703303	1.25	54.12	-53.7	-56.7	7-08-94	42.53
FSW 267-0136	413737	0703303	1.25	54.13	-78.4	-81.4	7-07-94	42.49
FSW 267-0155	413737	0703303	1.25	54.05	-98.1	-101.1	7-07-94	42.38
FSW 271-0041	413633	0703311	1.25	35.38	-2.9	-5.9	6-28-94	32.30
FSW 271-0069	413633	0703311	2.00	35.91	-31.3	-33.3	6-22-94	32.37
FSW 271-0084	413633	0703311	2.00	36.06	-45.9	-47.9	6-22-94	32.36
FSW 271-0085	413633	0703311	1.25	35.44	-46.2	-49.2	6-23-94	32.29
FSW 271-0099	413633	0703311	2.00	35.89	-61.6	-63.6	6-22-94	32.35
FSW 271-0114	413633	0703311	2.00	35.88	-76.5	-78.5	6-23-94	32.32
FSW 271-0141	413633	0703311	1.25	35.34	-102.7	-105.7	6-23-94	32.32
FSW 271-0165	413633	0703311	1.25	35.37	-127.0	-130.0	6-24-94	32.30
FSW 279-0061	413721	0703224	2.00	80.35	22.3	19.3	10-17-94	39.16
FSW 279-0086	413721	0703224	2.00	80.35	-3.1	-6.1	10-17-94	39.12
FSW 279-0100 (AVP/MW586)	413721	0703224	2.00	79.53	-15.5	-20.5	10-17-94	39.41
FSW 282-0049	413654	0703317	1.25	46.88	1.1	-1.9	6-29-94	35.27
FSW 282-0070	413654	0703317	1.25	47.05	-20.2	-23.2	6-30-94	35.27
FSW 282-0083	413654	0703317	2.00	46.98	-34.5	-36.5	6-30-94	35.12
FSW 282-0094	413654	0703317	1.25	46.95	-44.3	-47.3	6-29-94	35.27
FSW 282-0123	413654	0703317	1.25	46.96	-73.1	-76.1	6-29-94	35.28
FSW 288-0091	413711	0703315	1.25	59.83	-28.6	-31.6	7-12-94	37.94
FSW 294-0064	413636	0703332	2.00	36.56	-25.8	-27.8	7-19-94	31.27
FSW 294-0077	413636	0703332	2.00	36.25	-39.0	-41.0	7-19-94	31.22
FSW 294-0089	413636	0703332	1.25	35.73	-50.7	-53.7	7-19-94	31.28
FSW 294-0109	413636	0703332	2.00	36.57	-70.4	-72.4	7-19-94	31.24
FSW 300-0010	413805	0703225	2.00	47.23	39.30	37.3	6-20-94	45.54
FSW 300-0030	413805	0703225	2.00	47.14	19.5	17.5	6-21-94	45.55
FSW 300-0050	413805	0703225	2.00	47.22	-1.2	-3.2	6-22-94	45.57
FSW 300-0073	413805	0703225	2.00	47.11	-24.0	-26.0	6-21-94	45.58
FSW 300-0099	413805	0703225	2.00	46.88	-50.5	-52.5	6-21-94	45.58
FSW 300-0118	413805	0703225	2.00	46.94	-69.2	-71.2	6-21-94	45.59
FSW 300-0138	413805	0703225	2.00	47.13	-88.4	-90.4	6-21-94	45.66
FSW 343-0036	413815	0703235	2.00	68.91	34.5	32.5	8-31-94	46.65
FSW 343-0057	413815	0703235	2.00	68.94	14.1	12.1	8-31-94	46.63
FSW 343-0079	413815	0703235	2.00	68.82	-8.4	-10.4	8-30-94	46.64
FSW 343-0099	413815	0703235	2.00	68.81	-28.1	-30.1	8-30-94	46.64
FSW 343-0114	413815	0703235	2.00	69.20	-42.9	-44.9	8-30-94	46.65
FSW 343-0129	413815	0703235	2.00	69.33	-57.5	-59.5	8-30-94	46.67
FSW 343-0145	413815	0703235	2.00	69.10	-73.8	-75.8	8-31-94	46.66

Table 6. Location coordinates, diameter of casing, land-surface and screen altitudes, and water levels for observation wells, Ashumet Valley, Massachusetts—*Continued*

Well cluster site and well No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Diameter of casing (inch)	Altitude of land surface (feet)	Altitude, top of screen (feet)	Altitude, bottom of screen (feet)	Water-level date	Altitude of water level (feet)
FSW 347-0020	413811	0703232	2.00	59.68	42.0	40.0	10-18-94	45.30
FSW 347-0031	413811	0703232	2.00	59.71	30.9	28.9	10-18-94	44.90
FSW 347-0038	413811	0703232	2.00	59.53	23.9	21.9	1-11-94	45.09
FSW 347-0046	413811	0703232	2.00	59.75	15.9	13.9	10-18-94	45.32
FSW 347-0067	413811	0703232	2.00	59.97	-4.4	-7.4	10-19-94	45.30
FSW 347-0101	413811	0703232	2.00	59.73	-39.2	-41.2	10-19-94	46.34
FSW 347-0116	413811	0703232	2.00	59.95	-54.0	-56.0	10-18-94	45.33
FSW 347-0131	413811	0703232	2.00	60.27	-69.0	-71.0	10-18-94	45.35
FSW 347-0145	413811	0703232	2.00	60.08	-82.7	-84.6	10-19-94	45.33
FSW 348-0021	413739	0703221	2.00	50.54	32.0	30.0	10-25-94	42.11
FSW 348-0043	413739	0703221	2.00	50.88	9.5	7.5	10-25-94	41.87
FSW 348-0073	413739	0703221	2.00	50.90	-20.2	-22.2	10-25-94	41.87
FSW 348-0098	413739	0703221	2.00	50.78	-44.5	-46.5	10-25-94	41.85
FSW 348-0148 (AVP/MW591)	413739	0703221	2.00	48.34	-94.7	-99.7	10-25-94	41.82
FSW 350-0013	413646	0703306	2.00	37.85	27.1	25.1	9-06-94	33.28
FSW 350-0052	413646	0703306	2.00	37.85	-11.8	-13.8	9-06-94	33.30
FSW 350-0064	413646	0703306	2.00	37.81	-25.3	-26.6	9-07-94	33.25
FSW 350-0077	413646	0703306	2.00	37.99	-37.1	-39.1	9-06-94	33.30
FSW 350-0084	413646	0703306	2.00	37.71	-44.1	-46.1	9-07-94	33.31
FSW 350-0110	413646	0703306	2.00	37.79	-70.8	-72.1	9-07-94	33.26
FSW 350-0125	413646	0703306	2.00	38.00	-85.3	-87.3	9-08-94	33.26
FSW 350-0140	413646	0703306	2.00	38.27	-99.2	-101.2	9-08-94	33.24
FSW 355-0079	413649	0703310	2.00	71.88	-6.2	-7.5	9-22-94	33.40
FSW 355-0104	413649	0703310	2.00	71.99	-30.2	-31.5	9-22-94	33.41
FSW 355-0149	413649	0703310	2.00	71.38	-76.0	-77.3	9-22-94	33.37
FSW 356-0079	413643	0703259	2.00	65.37	-12.5	-13.8	6-09-94	34.69
FSW 356-0108	413643	0703259	2.00	65.24	-41.9	-43.2	6-09-94	34.69
FSW 356-0134	413643	0703259	2.00	65.47	-67.1	-68.4	6-09-94	34.64
FSW 357-0079	413640	0703251	2.00	70.67	-6.2	-8.2	9-01-94	33.08
FSW 357-0099	413640	0703251	2.00	70.75	-26.3	-28.3	8-31-94	33.08
FSW 357-0119	413640	0703251	2.00	70.60	-47.1	-48.4	8-31-94	33.08
FSW 357-0139	413640	0703251	2.00	70.52	-66.9	-68.9	9-01-94	33.06
FSW 358-0049	413658	0703325	2.00	73.75	26.9	24.9	10-13-94	33.99
FSW 358-0089	413658	0703325	2.00	73.89	-12.8	-14.8	10-13-94	34.01
FSW 358-0104	413658	0703325	2.00	73.83	-27.9	-29.9	10-13-94	34.00
FSW 358-0119	413658	0703325	2.00	73.67	-43.9	-45.2	10-13-94	34.01
FSW 358-0132	413658	0703325	2.00	73.72	-56.0	-58.0	10-13-94	33.95
FSW 359-0050	413639	0703242	2.00	69.91	22.0	20.0	9-13-94	32.84
FSW 359-0088	413639	0703242	2.00	70.36	-16.0	-18.0	9-13-94	32.82
FSW 359-0107	413639	0703242	2.00	70.25	-34.6	-36.6	9-13-94	32.83
FSW 359-0119	413639	0703242	2.00	70.18	-47.7	-49.0	9-13-94	32.81
FSW 359-0141	413639	0703242	2.00	70.34	-68.3	-70.3	9-14-94	32.82

Table 6. Location coordinates, diameter of casing, land-surface and screen altitudes, and water levels for observation wells, Ashumet Valley, Massachusetts—*Continued*

Well cluster site and well No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Diameter of casing (inch)	Altitude of land surface (feet)	Altitude, top of screen (feet)	Altitude, bottom of screen (feet)	Water-level date	Altitude of water level (feet)
FSW 373-0024	413703	0703300	2.00	48.68	26.9	24.9	8-24-94	36.57
FSW 373-0060	413703	0703300	2.00	48.91	-2.2	-11.2	8-24-94	36.56
FSW 373-0073	413703	0703300	2.00	48.76	-24.4	-26.4	8-25-94	36.57
FSW 373-0082	413703	0703300	2.00	48.93	-31.6	-33.6	8-24-94	36.56
FSW 373-0113	413703	0703300	2.00	49.11	-62.3	-64.3	8-25-94	36.56
FSW 375-0015	413603	0703331	2.00	29.25	16.7	14.7	8-15-94	23.66
FSW 375-0041	413603	0703331	2.00	29.30	-9.7	-11.7	8-15-94	23.76
FSW 375-0055	413603	0703331	2.00	29.19	-23.8	-25.8	8-16-94	23.65
FSW 375-0071	413603	0703331	2.00	29.46	-39.7	-41.7	8-16-94	23.75
FSW 375-0081	413603	0703331	2.00	29.25	-49.4	-51.4	8-16-94	23.81
FSW 375-0099	413603	0703331	2.00	29.44	-67.3	-69.3	8-16-94	24.13
FSW 375-0119	413603	0703331	2.00	29.44	-87.6	-89.6	8-17-94	25.58
FSW 378-0081	413814	0703232	2.00	70.38	-8.4	-10.3	11-14-94	45.38
FSW 379-0076	413813	0703230	2.00	68.31	-5.4	-7.4	11-14-94	45.10
FSW 383-0023	413810	0703236	2.00	64.56	43.6	41.6	8-10-94	46.26
FSW 383-0030	413810	0703236	2.00	64.58	36.8	34.8	8-10-94	46.25
FSW 383-0040	413810	0703236	2.00	64.58	26.2	24.2	8-09-94	46.27
FSW 383-0061	413810	0703236	2.00	64.39	5.8	3.8	8-10-94	46.25
FSW 383-0082	413810	0703236	2.00	64.32	-16.1	-18.1	8-10-94	46.25
FSW 383-0106	413810	0703236	2.00	64.87	-39.7	-41.7	8-10-94	46.27
FSW 383-0129	413810	0703236	2.00	64.74	-62.1	-64.1	8-11-94	46.26
FSW 388-0037	413809	0703229	2.00	68.78	34.2	32.2	6-07-94	46.42
FSW 388-0072	413809	0703229	2.00	68.81	-1.4	-3.4	6-07-94	46.40
FSW 393-0037	413802	0703410	2.00	56.83	23.9	19.9	5-17-95	40.20
FSW 411-0036	413730	0703246	2.00	52.56	19.0	17.0	9-20-94	40.53
FSW 411-0054	413730	0703246	2.00	52.44	.1	-1.9	9-20-94	40.54
FSW 411-0065	413730	0703246	2.00	52.35	-11.0	-13.0	9-20-94	40.53
FSW 411-0081	413730	0703246	2.00	52.18	-27.0	-29.0	9-20-94	40.53
FSW 411-0094	413730	0703246	2.00	52.01	-40.2	-42.2	9-20-94	40.53
FSW 411-0106	413730	0703246	2.00	52.69	-50.9	-52.9	9-21-94	40.46
FSW 411-0122	413730	0703246	2.00	52.61	-67.6	-69.6	9-21-94	40.40
FSW 412-0042	413637	0703229	2.00	45.40	5.9	3.9	9-13-94	32.77
FSW 412-0064	413637	0703229	2.00	45.17	-16.6	-18.6	9-13-94	32.78
FSW 412-0078	413637	0703229	2.00	44.99	-30.6	-32.6	9-12-94	32.78
FSW 412-0091	413637	0703229	2.00	44.95	-44.1	-46.1	9-12-94	32.79
FSW 412-0108	413637	0703229	2.00	44.86	-61.2	-63.2	9-12-94	32.77
FSW 418-0049	413701	0703332	2.00	73.79	26.7	24.7	9-26-94	34.28
FSW 418-0089	413701	0703332	2.00	73.64	-13.0	-15.0	9-27-94	34.29
FSW 418-0103	413701	0703332	2.00	73.71	-27.7	-29.7	9-26-94	34.28
FSW 418-0122	413701	0703332	2.00	73.84	-46.1	-48.1	9-26-94	34.34
FSW 418-0141	413701	0703332	2.00	73.86	-64.7	-66.7	9-27-94	34.22

Table 6. Location coordinates, diameter of casing, land-surface and screen altitudes, and water levels for observation wells, Ashumet Valley, Massachusetts—*Continued*

Well cluster site and well No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Diameter of casing (inch)	Altitude of land surface (feet)	Altitude, top of screen (feet)	Altitude, bottom of screen (feet)	Water-level date	Altitude of water level (feet)
FSW 422-0045	413804	0703236	2.00	73.33	30.0	28.0	6-15-94	46.23
FSW 422-0065	413804	0703236	2.00	73.40	10.3	8.3	6-15-94	46.22
FSW 422-0085	413804	0703236	2.00	73.41	-9.7	-11.7	6-15-94	46.23
FSW 422-0105	413804	0703236	2.00	73.26	-29.9	-31.9	6-15-94	46.23
FSW 424-0020	413804	0703228	2.00	58.03	43.8	38.8	7-06-94	45.63
FSW 424-0089 (AVP/MW581C)	413804	0703228	2.00	55.65	-28.4	-33.4	7-06-94	45.53
FSW 424-0144 (AVP/MW581B)	413804	0703228	2.00	56.00	-83.0	-88.0	7-06-94	45.58
FSW 424-0183 (AVP/MW581A)	413804	0703228	2.50	56.29	-121.7	-126.7	7-06-94	45.62
FSW 429-0012	413620	0703325	2.00	32.14	21.9	19.9	10-05-94	27.85
FSW 429-0068	413620	0703325	2.00	32.43	-33.9	-35.9	10-05-94	27.84
FSW 429-0078	413620	0703325	2.00	32.26	-43.6	-45.6	10-05-94	27.84
FSW 429-0094	413620	0703325	2.00	32.05	-60.2	-62.2	10-05-94	27.85
FSW 431-0013	413627	0703333	2.00	35.57	24.4	22.4	10-05-94	28.60
FSW 431-0018	413627	0703333	2.00	35.85	20.1	18.2	10-05-94	28.61
FSW 431-0065	413627	0703333	2.00	35.51	-27.9	-29.9	10-05-94	28.60
FSW 431-0078	413627	0703333	2.00	35.45	-40.3	-42.3	10-05-94	28.74
FSW 431-0093	413627	0703333	2.00	35.36	-55.2	-57.2	10-05-94	28.81
FSW 432-0026	413814	0703225	2.00	68.66	46.6	42.6	8-23-94	45.93
FSW 432-0059	413814	0703225	2.00	68.34	11.2	9.2	8-23-94	45.94
FSW 432-0079	413814	0703225	2.00	68.41	-9.0	-11.0	8-24-94	45.95
FSW 432-0092	413814	0703225	2.00	68.52	-21.5	-23.5	8-24-94	45.98
FSW 433-0064	413615	0703341	2.00	59.35	-2.8	-4.8	6-09-94	26.77
FSW 433-0090	413615	0703341	2.00	59.34	-29.2	-31.2	6-09-94	26.81
FSW 433-0104	413615	0703341	2.00	59.67	-41.9	-43.9	6-08-94	26.80
FSW 433-0118	413615	0703341	2.00	59.65	-56.1	-58.1	6-08-94	26.82
FSW 433-0140	413615	0703341	2.00	59.46	-78.4	-80.4	6-09-94	26.99
FSW 435-0064	413601	0703346	2.00	57.39	-4.9	-6.9	9-19-94	21.28
FSW 435-0090	413601	0703346	2.00	57.22	-31.0	-33.0	9-16-94	21.27
FSW 435-0105	413601	0703346	2.00	57.16	-45.8	-47.8	9-15-94	21.31
FSW 435-0121	413601	0703346	2.00	57.22	-62.0	-64.0	9-15-94	21.75
FSW 435-0140	413601	0703346	2.00	57.37	-81.0	-83.0	9-16-94	21.72
FSW 436-0036	413554	0703340	2.00	24.47	-9.2	-11.2	8-17-94	20.61
FSW 436-0060	413554	0703340	2.00	25.06	-33.1	-35.1	8-17-94	20.63
FSW 436-0076	413554	0703340	2.00	24.97	-49.0	-51.0	8-18-94	20.57
FSW 436-0091	413554	0703340	2.00	24.65	-64.4	-66.4	8-18-94	20.59
FSW 436-0115	413554	0703340	2.00	24.37	-89.0	-91.0	8-18-94	20.52
FSW 436-0141	413554	0703340	2.00	24.58	-114.1	-116.1	8-19-94	20.19
FSW 443-0089	413555	0703314	2.00	58.26	-28.7	-30.7	9-30-94	22.43
FSW 443-0104	413555	0703314	2.00	58.27	-43.9	-45.9	10-03-94	22.40
FSW 443-0117	413555	0703314	2.00	58.25	-56.5	-58.5	10-03-94	22.39
FSW 443-0140	413555	0703314	2.00	58.49	-79.5	-81.5	10-03-94	22.39

Table 6. Location coordinates, diameter of casing, land-surface and screen altitudes, and water levels for observation wells, Ashumet Valley, Massachusetts—*Continued*

Well cluster site and well No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Diameter of casing (inch)	Altitude of land surface (feet)	Altitude, top of screen (feet)	Altitude, bottom of screen (feet)	Water-level date	Altitude of water level (feet)
FSW 459-0064	413622	0703358	2.00	61.82	-0.1	-2.1	10-04-94	25.80
FSW 459-0091	413622	0703358	2.00	61.14	-27.9	-29.9	10-04-94	25.81
FSW 459-0106	413622	0703358	2.00	61.43	-43.1	-45.1	10-04-94	25.82
FSW 459-0121	413622	0703358	2.00	61.10	-57.7	-59.7	10-04-94	25.77
FSW 459-0136	413622	0703358	2.00	61.45	-72.4	-74.4	10-04-94	25.80
FSW 460-0080	413641	0703245	2.00	70.20	-7.5	-9.5	8-25-94	33.30
FSW 460-0100	413641	0703245	2.00	70.44	-27.4	-29.4	8-25-94	33.31
FSW 460-0120	413641	0703245	2.00	70.32	-47.5	-49.5	8-26-94	33.31
FSW 460-0140	413641	0703245	2.00	70.20	-68.0	-70.0	8-26-94	33.32
FSW 470-0091	413550	0703307	2.00	57.50	-30.7	-32.7	9-21-94	21.33
FSW 470-0106	413550	0703307	2.00	57.66	-45.9	-47.9	9-21-94	21.76
FSW 470-0119	413550	0703307	2.00	58.07	-59.3	-61.3	9-21-94	21.74
FSW 470-0142	413550	0703307	2.00	57.99	-81.8	-83.8	9-21-94	21.77
FSW 474-0080	413626	0703259	2.00	67.70	-10.1	-12.1	9-15-94	30.12
FSW 474-0100	413626	0703259	2.00	67.68	-29.8	-31.8	9-15-94	30.14
FSW 474-0115	413626	0703259	2.00	67.70	-44.9	-46.9	9-14-94	30.14
FSW 474-0129	413626	0703259	2.00	67.66	-59.2	-61.2	9-14-94	30.15
FSW 474-0147	413626	0703259	2.00	67.70	-77.7	-79.7	9-14-94	30.16
FSW 484-0007	413505	0703350	2.00	12.69	7.3	5.3	10-06-94	10.87
FSW 484-0023	413505	0703350	2.00	11.85	-9.2	-11.2	10-06-94	10.84
FSW 484-0078	413505	0703350	2.00	11.87	-64.5	-66.5	10-06-94	10.82
FSW 484-0108	413505	0703350	2.00	11.85	-93.9	-95.9	10-06-94	10.50
FSW 487-0012	413523	0703358	2.00	20.36	10.0	8.0	10-11-94	12.88
FSW 487-0023	413523	0703358	2.00	19.94	-1.3	-3.3	10-11-94	12.90
FSW 487-0078	413523	0703358	2.00	20.14	-56.2	-58.2	10-11-94	12.89
FSW 487-0112	413523	0703358	2.00	20.23	-90.3	-92.3	10-12-94	13.08
FSW 493-0008	413508	0703301	2.00	16.11	9.7	7.7	10-12-94	11.87
FSW 493-0024	413508	0703301	2.00	15.71	-6.0	-8.0	10-12-94	11.84
FSW 493-0074	413508	0703301	2.00	15.67	-56.3	-58.3	10-12-94	11.80
FSW 493-0115	413508	0703301	2.00	15.72	-97.4	-99.4	10-12-94	10.84
FSW 501-0087	413535	0703321	2.00	50.88	-33.6	-35.6	9-30-94	17.11
FSW 501-0102	413535	0703321	2.00	51.23	-48.5	-50.5	9-29-94	17.13
FSW 501-0117	413535	0703321	2.00	50.40	-64.3	-66.3	9-29-94	17.19
FSW 502-0087	413601	0703323	2.00	59.53	-25.4	-27.4	9-29-94	23.57
FSW 502-0102	413601	0703323	2.00	59.58	-40.2	-42.2	9-29-94	23.57
FSW 502-0117	413601	0703323	2.00	59.74	-55.7	-57.7	9-27-94	23.58
FSW 502-0128	413601	0703323	2.00	59.76	-65.9	-67.9	9-27-94	23.61
FSW 502-0139	413601	0703323	2.00	59.72	-77.5	-79.5	9-27-94	23.57
FSW 564-0016	413809	0703222	2.00	54.90	48.20	39.2	10-24-94	44.15
FSW 564-0100 (AVP/MW580)	413809	0703222	2.00	54.20	-40.4	-45.4	10-24-94	44.16
FSW 564-0138	413809	0703222	2.00	55.08	-81.3	-83.3	10-24-94	44.23
FSW 567-0136	413812	0703228	2.00	68.76	-65.2	-67.2	11-09-94	44.90

Table 6. Location coordinates, diameter of casing, land-surface and screen altitudes, and water levels for observation wells, Ashumet Valley, Massachusetts—*Continued*

Well cluster site and well No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Diameter of casing (inch)	Altitude of land surface (feet)	Altitude, top of screen (feet)	Altitude, bottom of screen (feet)	Water-level date	Altitude of water level (feet)
FSW 570-0056	413808	0703241	2.00	95.98	42.4	40.4	11-14-94	44.85
FSW 570-0073	413808	0703241	2.00	96.17	25.0	23.0	11-14-94	44.83
FSW 570-0091	413808	0703241	2.00	96.10	7.4	5.4	11-10-94	44.97
FSW 570-0111	413808	0703241	2.00	96.17	-12.6	-14.5	11-10-94	44.83
FSW 582-0013 (AVP/MW582D)	413759	0703223	2.00	46.41	38.4	33.4	10-26-94	43.59
FSW 582-0038 (AVP/MW582C)	413759	0703223	2.00	46.31	13.3	8.3	10-26-94	43.57
FSW 582-0073 (AVP/MW582B)	413759	0703223	2.00	46.08	-21.9	-26.9	10-26-94	43.58
FSW 582-0168 (AVP/MW582A)	413759	0703223	2.50	45.73	-117.3	-122.3	10-26-94	43.59
FSW 583-0013 (AVP/MW583E)	413752	0703220	2.00	47.20	39.2	34.2	10-28-94	43.30
FSW 583-0058 (AVP/MW583D)	413752	0703220	2.00	46.85	-6.2	-11.2	10-27-94	43.23
FSW 583-0089 (AVP/MW583C)	413752	0703220	2.00	47.25	-36.8	-41.8	10-27-94	43.20
FSW 583-0138 (AVP/MW583B)	413752	0703220	2.00	47.52	-85.5	-90.5	10-28-94	43.09
FSW 583-0173 (AVP/MW583A)	413752	0703220	2.00	46.88	-121.1	-126.1	10-27-94	43.08
FSW 584-0013 (AVP/MW584D)	413744	0703221	2.00	46.15	38.1	33.1	10-27-94	42.69
FSW 584-0103 (AVP/MW584C)	413744	0703221	2.00	45.99	-52.0	-57.0	10-27-94	42.58
FSW 584-0148 (AVP/MW584B)	413744	0703221	2.00	46.08	-96.9	-101.9	10-27-94	42.48
FSW 584-0198 (AVP/MW584A)	413744	0703221	2.00	46.13	-146.9	-151.9	10-26-94	42.47
FSW 585-0048 (AVP/MW585D)	413728	0703232	2.00	81.34	43.3	33.3	11-08-94	39.79
FSW 585-0084 (AVP/MW585C)	413728	0703232	2.00	81.47	2.5	-2.5	11-08-94	39.80
FSW 585-0099 (AVP/MW585B)	413728	0703232	2.00	81.35	-12.7	-17.7	11-08-94	39.81
FSW 585-0124 (AVP/MW585A)	413728	0703232	2.00	81.47	-38.0	-42.0	11-08-94	40.79
FSW 587-0045 (AVP/MW587D)	413802	0703240	2.00	84.23	49.1	39.1	11-07-94	44.06
FSW 587-0098 (AVP/MW587C)	413802	0703240	2.00	84.55	-8.7	-13.7	11-07-94	43.26
FSW 587-0118 (AVP/MW587B)	413802	0703240	2.00	84.42	-28.3	-33.5	11-07-94	44.05
FSW 587-0167 (AVP/MW587A)	413802	0703240	2.00	84.22	-78.4	-83.2	11-07-94	44.05
FSW 588-0089 (AVP/MW588)	413804	0703246	2.00	94.55	10.5	5.5	11-09-94	44.29
FSW 589-0078 (AVP/MW589)	413806	0703249	2.00	95.07	22.1	17.1	11-09-94	44.60
FSW 592-0115 (AVP/MW592)	413757	0703254	2.00	92.90	-17.1	-22.1	11-09-94	43.13
SDW 313-0020	413817	0703221	2.00	55.52	37.3	35.3	6-02-94	47.33
SDW 313-0038	413817	0703221	2.00	55.52	19.4	17.4	6-02-94	47.36
SDW 313-0060	413817	0703221	2.00	55.44	-1.7	-4.7	6-03-93	47.32
SDW 313-0080	413817	0703221	2.00	55.42	-22.3	-24.3	6-02-94	47.35
SDW 314-0035	413820	0703243	2.00	78.00	45.7	43.7	6-16-94	48.90
SDW 314-0051	413820	0703243	2.00	78.09	28.8	26.8	6-16-94	48.89
SDW 314-0075	413820	0703243	2.00	77.85	5.3	3.3	6-16-94	48.86
SDW 314-0098	413820	0703243	2.00	77.78	-17.9	-19.9	6-16-94	48.93
SDW 314-0108 (AVP/MW314)	413820	0703243	2.00	77.94	-25.1	-30.1	10-07-94	47.25
SDW 315-0061	413845	0703245	2.00	108.55	48.4	47.1	11-02-94	51.15
SDW 315-0082	413845	0703245	2.00	108.38	28.2	26.2	11-02-94	51.15
SDW 315-0104	413845	0703245	2.00	108.42	6.0	4.7	11-02-94	51.05
SDW 315-0126	413845	0703245	2.00	108.34	-15.4	-17.4	11-02-94	51.17
SDW 315-0149	413845	0703245	2.00	108.18	-39.2	-40.5	11-02-94	51.18

Table 6. Location coordinates, diameter of casing, land-surface and screen altitudes, and water levels for observation wells, Ashumet Valley, Massachusetts—*Continued*

Well cluster site and well No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Diameter of casing (inch)	Altitude of land surface (feet)	Altitude, top of screen (feet)	Altitude, bottom of screen (feet)	Water-level date	Altitude of water level (feet)
SDW 316-0051	413818	0703235	2.00	95.50	46.3	44.3	10-31-94	46.37
SDW 316-0066	413818	0703235	2.00	95.47	31.7	29.7	11-01-94	46.35
SDW 316-0082	413818	0703235	2.00	95.42	15.1	13.1	10-31-94	46.36
SDW 316-0100	413818	0703235	2.00	95.39	-3.1	-5.1	10-31-94	46.39
SDW 316-0114 (AVP/MW316C)	413818	0703235	2.00	95.72	-13.6	-18.0	11-01-94	45.85
SDW 316-0134	413818	0703235	2.00	95.07	-36.6	-38.6	10-31-94	46.42
SDW 316-0148 (AVP/MW316B)	413818	0703235	2.00	95.70	-47.6	-52.3	11-01-94	46.28
SDW 316-0163 (AVP/MW316A)	413818	0703235	2.00	95.59	-62.9	-67.7	11-01-94	46.29
SDW 317-0027[1]	413821	0703245	2.00	68.90	51.1	42.1	10-14-94	47.40
SDW 317-0051	413821	0703245	2.00	68.77	20.1	18.1	10-14-94	47.40
SDW 318-0036	413820	0703244	2.00	68.58	34.6	32.6	6-17-94	49.03
SDW 318-0064	413820	0703244	2.00	68.77	7.0	5.1	6-17-94	49.03
SDW 344-0038	413816	0703231	2.00	79.87	43.4	41.4	11-03-94	45.63
SDW 344-0061	413816	0703231	2.00	80.13	21.1	19.1	11-03-94	45.60
SDW 344-0080	413816	0703231	2.00	80.04	1.3	-0.7	11-03-94	45.62
SDW 344-0100	413816	0703231	2.00	79.99	-18.1	-20.0	11-03-94	45.64
SDW 395-0028 (CS16MW7)	413821	0703245	2.00	68.72	50.5	40.5	10-19-94	47.52
SDW 423-0058 (FTA1MW428B)	413823	0703238	2.00	87.34	34.0	29.0	11-04-94	47.27
SDW 423-0098 (FTA1MW428A)	413823	0703238	2.00	87.58	-5.7	-10.7	11-04-94	47.21
SDW 434-0014 (CS16MW3)	413825	0703244	2.00	54.53	50.5	40.5	7-05-94	49.53
SDW 434-0025 (CS16MW3B)	413825	0703244	2.00	54.74	34.5	29.5	7-05-94	49.60
SDW 434-0076 (CS16MW3A)	413825	0703244	2.00	54.74	-16.0	-21.0	7-05-94	49.46
SDW 436-0028 (CS16MW5)	413819	0703239	2.00	69.23	51.0	41.0	11-08-94	46.64
SDW 437-0029 (CS16MW6)	413820	0703242	2.00	68.98	50.4	40.4	11-08-94	46.74
SDW 438-0041 (CS16MW8)	413820	0703236	2.00	79.14	48.1	38.1	10-20-94	46.99
SDW 440-0078	413820	0703236	2.00	79.56	3.8	1.8	10-19-94	47.96
SDW 467-0058	413822	0703240	2.00	81.42	25.1	23.1	6-30-94	49.19
SDW 590-0074 (AVP/MW590)	413820	0703247	2.00	94.88	24.8	20.4	11-03-94	46.98
SDW 593-0075 (AVP/MW593)	413823	0703251	2.00	99.26	28.9	24.0	11-03-94	46.98

[1] Sewage-treatment-plant effluent was sampled near site SDW 317.

Table 7. Location coordinates and land-surface and sampling-port altitudes for multilevel samplers, Ashumet Valley, Massachusetts

[**Multilevel-sampler port No.:** Locations of multilevel samplers are shown in figure 4. No., number. Latitude and longitude are given in degrees, minutes, and seconds. Altitudes are in feet above or (-) below sea level]

Multilevel-sampler port No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Altitude of land surface (feet)	Altitude of sampling port (feet)
FSW 168 M15-01PT	413700	0703258	44.71	20.71
FSW 168 M15-02GNT	413700	0703258	44.71	10.71
FSW 168 M15-03RT	413700	0703258	44.71	.71
FSW 168 M15-04BUT	413700	0703258	44.71	-4.29
FSW 168 M15-05BKT	413700	0703258	44.71	-9.29
FSW 168 M15-06WT	413700	0703258	44.71	-14.29
FSW 168 M15-07O	413700	0703258	44.71	-19.29
FSW 168 M15-08GY	413700	0703258	44.71	-24.29
FSW 168 M15-09Y	413700	0703258	44.71	-29.29
FSW 168 M15-10P	413700	0703258	44.71	-34.29
FSW 168 M15-11GN	413700	0703258	44.71	-39.29
FSW 168 M15-12R	413700	0703258	44.71	-44.29
FSW 168 M15-13BU	413700	0703258	44.71	-49.29
FSW 168 M15-14BK	413700	0703258	44.71	-54.29
FSW 168 M15-15W	413700	0703258	44.71	-59.29
FSW 239 M01-01PT	413801	0703227	51.10	41.15
FSW 239 M01-02GNT	413801	0703227	51.10	36.15
FSW 239 M01-03RT	413801	0703227	51.10	31.15
FSW 239 M01-04BUT	413801	0703227	51.10	26.18
FSW 239 M01-05BKT	413801	0703227	51.10	21.18
FSW 239 M01-06WT	413801	0703227	51.10	16.20
FSW 239 M01-07O	413801	0703227	51.10	11.20
FSW 239 M01-08GY	413801	0703227	51.10	6.23
FSW 239 M01-09Y	413801	0703227	51.10	1.23
FSW 239 M01-10P	413801	0703227	51.10	-8.75
FSW 239 M01-11GN	413801	0703227	51.10	-18.74
FSW 239 M01-12R	413801	0703227	51.10	-28.71
FSW 239 M01-13BU	413801	0703227	51.10	-38.70
FSW 239 M01-14BK	413801	0703227	51.10	-48.68
FSW 239 M01-15W	413801	0703227	51.10	-58.67
FSW 262 M01-02GNT	413713	0703253	46.43	12.43
FSW 262 M01-03RT	413713	0703253	46.43	-2.56
FSW 262 M01-04BUT	413713	0703253	46.43	-7.56
FSW 262 M01-05BKT	413713	0703253	46.43	-12.55
FSW 262 M01-06WT	413713	0703253	46.43	-17.55
FSW 262 M01-07O	413713	0703253	46.43	-22.53
FSW 262 M01-08GY	413713	0703253	46.43	-27.53
FSW 262 M01-09Y	413713	0703253	46.43	-32.55
FSW 262 M01-10P	413713	0703253	46.43	-37.55
FSW 262 M01-11GN	413713	0703253	46.43	-42.53
FSW 262 M01-12R	413713	0703253	46.43	-47.53
FSW 262 M01-13BU	413713	0703253	46.43	-57.52
FSW 300 M02-01PT	413805	0703225	46.90	7.07
FSW 300 M02-02GNT	413805	0703225	46.90	5.07
FSW 300 M02-03RT	413805	0703225	46.90	2.07
FSW 300 M02-04BUT	413805	0703225	46.90	-.94
FSW 300 M02-05BKT	413805	0703225	46.90	-3.94
FSW 300 M02-06WT	413805	0703225	46.90	-6.94
FSW 300 M02-07O	413805	0703225	46.90	-9.95
FSW 300 M02-08GY	413805	0703225	46.90	-12.95
FSW 300 M02-09Y	413805	0703225	46.90	-16.95
FSW 300 M02-10P	413805	0703225	46.90	-20.96
FSW 300 M02-11GN	413805	0703225	46.90	-24.96
FSW 300 M02-12R	413805	0703225	46.90	-28.96
FSW 300 M02-13BU	413805	0703225	46.90	-32.96
FSW 300 M02-14BK	413805	0703225	46.90	-43.05
FSW 300 M02-15W	413805	0703225	46.90	-52.96
FSW 300 M03-01PT	413805	0703225	46.90	40.34
FSW 300 M03-02GNT	413805	0703225	46.90	37.34
FSW 300 M03-03RT	413805	0703225	46.90	34.34
FSW 300 M03-04BUT	413805	0703225	46.90	31.32
FSW 300 M03-05BKT	413805	0703225	46.90	28.32
FSW 300 M03-06WT	413805	0703225	46.90	26.32
FSW 300 M03-07O	413805	0703225	46.90	24.32
FSW 300 M03-08GY	413805	0703225	46.90	22.31
FSW 300 M03-09Y	413805	0703225	46.90	20.31
FSW 300 M03-10P	413805	0703225	46.90	18.31
FSW 300 M03-11GN	413805	0703225	46.90	16.31
FSW 300 M03-12R	413805	0703225	46.90	14.31
FSW 300 M03-13BU	413805	0703225	46.90	12.31
FSW 300 M03-14BK	413805	0703225	46.90	10.31
FSW 300 M03-15W	413805	0703225	46.90	8.31
FSW 343 M01-01PT	413815	0703235	68.90	-5.52
FSW 343 M01-02GNT	413815	0703235	68.90	-10.52
FSW 343 M01-03RT	413815	0703235	68.90	-15.52
FSW 343 M01-04BUT	413815	0703235	68.90	-20.52
FSW 343 M01-05BKT	413815	0703235	68.90	-25.52
FSW 343 M01-06WT	413815	0703235	68.90	-30.52
FSW 343 M01-07O	413815	0703235	68.90	-35.52
FSW 343 M01-08GY	413815	0703235	68.90	-40.52
FSW 343 M01-09Y	413815	0703235	68.90	-43.52
FSW 343 M01-10P	413815	0703235	68.90	-46.52
FSW 343 M01-11GN	413815	0703235	68.90	-49.52
FSW 343 M01-12R	413815	0703235	68.90	-52.52
FSW 343 M01-13BU	413815	0703235	68.90	-55.52
FSW 343 M01-14BK	413815	0703235	68.90	-58.52
FSW 343 M01-15W	413815	0703235	68.90	-61.52
FSW 343 M02-01PT	413815	0703235	68.90	36.51
FSW 343 M02-02GNT	413815	0703235	68.90	33.51
FSW 343 M02-03RT	413815	0703235	68.90	30.51
FSW 343 M02-04BUT	413815	0703235	68.90	27.51
FSW 343 M02-05BKT	413815	0703235	68.90	24.51
FSW 343 M02-06WT	413815	0703235	68.90	21.51
FSW 343 M02-07O	413815	0703235	68.90	18.51
FSW 343 M02-08GY	413815	0703235	68.90	15.51
FSW 343 M02-09Y	413815	0703235	68.90	12.51
FSW 343 M02-10P	413815	0703235	68.90	9.51
FSW 343 M02-11GN	413815	0703235	68.90	6.51
FSW 343 M02-12R	413815	0703235	68.90	3.51
FSW 343 M02-13BU	413815	0703235	68.90	.51
FSW 343 M02-14BK	413815	0703235	68.90	-2.49
FSW 343 M02-15W	413815	0703235	68.90	-5.49
FSW 343 M03-02GNT 1-19	413815	0703235	68.65	44.41
FSW 343 M03-03RT 1-19	413815	0703235	68.65	43.58
FSW 343 M03-04BUT 1-19	413815	0703235	68.65	42.68
FSW 343 M03-05BKT 1-19	413815	0703235	68.65	41.84
FSW 343 M03-06WT 1-19	413815	0703235	68.65	41.01
FSW 343 M03-07O 1-19	413815	0703235	68.65	40.18
FSW 343 M03-08GY 1-19	413815	0703235	68.65	39.34
FSW 343 M03-09Y 1-19	413815	0703235	68.65	38.51
FSW 343 M03-10P 1-19	413815	0703235	68.65	37.68
FSW 343 M03-11GN 1-19	413815	0703235	68.65	36.84
FSW 343 M03-12R 1-19	413815	0703235	68.65	36.01
FSW 343 M03-13BU 1-19	413815	0703235	68.65	35.18
FSW 343 M03-14BK 1-19	413815	0703235	68.65	34.34
FSW 343 M03-15W 1-19	413815	0703235	68.65	33.51

Table 7. Location coordinates and land-surface and sampling-port altitudes for multilevel samplers, Ashumet Valley, Massachusetts—*Continued*

Multilevel-sampler port No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Altitude of land surface (feet)	Altitude of sampling port (feet)
FSW 347 M01-01PT	413811	0703232	59.90	41.53
FSW 347 M01-02GNT	413811	0703232	59.90	39.63
FSW 347 M01-03RT	413811	0703232	59.90	37.73
FSW 347 M01-04BUT	413811	0703232	59.90	35.83
FSW 347 M01-05BKT	413811	0703232	59.90	33.88
FSW 347 M01-06WT	413811	0703232	59.90	31.98
FSW 347 M01-07O	413811	0703232	59.90	30.08
FSW 347 M01-08GY	413811	0703232	59.90	28.18
FSW 347 M01-09Y	413811	0703232	59.90	26.28
FSW 347 M01-10P	413811	0703232	59.90	24.40
FSW 347 M01-11GN	413811	0703232	59.90	22.50
FSW 347 M01-12R	413811	0703232	59.90	20.60
FSW 347 M01-13BU	413811	0703232	59.90	18.70
FSW 347 M01-14BK	413811	0703232	59.90	16.80
FSW 347 M01-15W	413811	0703232	59.90	14.90
FSW 347 M06-01PT	413811	0703232	59.90	19.88
FSW 347 M06-02GNT	413811	0703232	59.90	14.88
FSW 347 M06-03RT	413811	0703232	59.90	9.88
FSW 347 M06-04BUT	413811	0703232	59.90	4.89
FSW 347 M06-05BKT	413811	0703232	59.90	-.11
FSW 347 M06-06WT	413811	0703232	59.90	-5.13
FSW 347 M06-07O	413811	0703232	59.90	-10.13
FSW 347 M06-08GY	413811	0703232	59.90	-15.16
FSW 347 M06-09Y	413811	0703232	59.90	-20.16
FSW 347 M06-10P	413811	0703232	59.90	-25.20
FSW 347 M06-11GN	413811	0703232	59.90	-30.20
FSW 347 M06-12R	413811	0703232	59.90	-35.18
FSW 347 M06-13BU	413811	0703232	59.90	-40.18
FSW 347 M06-14BK	413811	0703232	59.90	-45.18
FSW 350 M01-01PT	413646	0703306	37.80	27.22
FSW 350 M01-02GNT	413646	0703306	37.80	17.25
FSW 350 M01-03RT	413646	0703306	37.80	7.26
FSW 350 M01-04BUT	413646	0703306	37.80	-2.74
FSW 350 M01-05BKT	413646	0703306	37.80	-12.75
FSW 350 M01-06WT	413646	0703306	37.80	-22.75
FSW 350 M01-07O	413646	0703306	37.80	-27.71
FSW 350 M01-08GY	413646	0703306	37.80	-32.71
FSW 350 M01-09Y	413646	0703306	37.80	-37.72
FSW 350 M01-10P	413646	0703306	37.80	-42.72
FSW 350 M01-11GN	413646	0703306	37.80	-47.74
FSW 350 M01-12R	413646	0703306	37.80	-52.74
FSW 350 M01-13BU	413646	0703306	37.80	-57.76
FSW 350 M01-14BK	413646	0703306	37.80	-62.76
FSW 350 M01-15W	413646	0703306	37.80	-72.76
FSW 373 M01-01PT	413703	0703300	48.48	21.85
FSW 373 M01-02GNT	413703	0703300	48.48	11.84
FSW 373 M01-03RT	413703	0703300	48.48	1.79
FSW 373 M01-04BUT	413703	0703300	48.48	-3.24
FSW 373 M01-05BKT	413703	0703300	48.48	-8.24
FSW 373 M01-06WT	413703	0703300	48.48	-13.27
FSW 373 M01-07O	413703	0703300	48.48	-18.27
FSW 373 M01-08GY	413703	0703300	48.48	-23.31
FSW 373 M01-09Y	413703	0703300	48.48	-28.31
FSW 373 M01-10P	413703	0703300	48.48	-33.34
FSW 373 M01-11GN	413703	0703300	48.48	-38.34
FSW 373 M01-12R	413703	0703300	48.48	-43.37
FSW 373 M01-13BU	413703	0703300	48.48	-48.37
FSW 373 M01-14BK	413703	0703300	48.48	-53.40
FSW 373 M01-15W	413703	0703300	48.48	-58.40
FSW 424 M01-01PT	413804	0703228	57.88	5.81
FSW 424 M01-02GNT	413804	0703228	57.88	.82
FSW 424 M01-03RT	413804	0703228	57.88	-4.18
FSW 424 M01-04BUT	413804	0703228	57.88	-9.17
FSW 424 M01-05BKT	413804	0703228	57.88	-14.17
FSW 424 M01-06WT	413804	0703228	57.88	-19.16
FSW 424 M01-07O	413804	0703228	57.88	-24.16
FSW 424 M01-08GY	413804	0703228	57.88	-29.15
FSW 424 M01-09Y	413804	0703228	57.88	-34.15
FSW 424 M01-10P	413804	0703228	57.88	-39.14
FSW 424 M01-11GN	413804	0703228	57.88	-44.14
FSW 424 M01-12R	413804	0703228	57.88	-49.12
FSW 424 M01-13BU	413804	0703228	57.88	-54.12
FSW 424 M01-14BK	413804	0703228	57.88	-59.10
FSW 424 M01-15W	413804	0703228	57.88	-64.10
FSW 424 M02-01PT 72-13	413804	0703228	56.87	44.04
FSW 424 M02-02GNT 72-13	413804	0703228	56.87	41.54
FSW 424 M02-03RT 72-13	413804	0703228	56.87	39.04
FSW 424 M02-04BUT 72-13	413804	0703228	56.87	36.52
FSW 424 M02-05BKT 72-13	413804	0703228	56.87	34.02
FSW 424 M02-06WT 72-13	413804	0703228	56.87	31.52
FSW 424 M02-07O 72-13	413804	0703228	56.87	29.02
FSW 424 M02-08GY 72-13	413804	0703228	56.87	26.50
FSW 424 M02-09Y 72-13	413804	0703228	56.87	24.00
FSW 424 M02-10P 72-13	413804	0703228	56.87	21.50
FSW 424 M02-11GN 72-13	413804	0703228	56.87	19.00
FSW 424 M02-12R 72-13	413804	0703228	56.87	16.48
FSW 424 M02-13BU 72-13	413804	0703228	56.87	13.98
FSW 424 M02-14BK 72-13	413804	0703228	56.87	11.48
FSW 424 M02-15W 72-13	413804	0703228	56.87	8.98

Table 7. Location coordinates and land-surface and sampling-port altitudes for multilevel samplers, Ashumet Valley, Massachusetts—*Continued*

Multilevel-sampler port No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Altitude of land surface (feet)	Altitude of sampling port (feet)
FSW 429 M01-01PT	413620	0703325	32.23	19.08
FSW 429 M01-02GNT	413620	0703325	32.23	4.09
FSW 429 M01-03RT	413620	0703325	32.23	-10.92
FSW 429 M01-04BUT	413620	0703325	32.23	-20.90
FSW 429 M01-05BKT	413620	0703325	32.23	-30.90
FSW 429 M01-06WT	413620	0703325	32.23	-35.90
FSW 429 M01-07O	413620	0703325	32.23	-40.90
FSW 429 M01-08GY	413620	0703325	32.23	-45.90
FSW 429 M01-09Y	413620	0703325	32.23	-50.91
FSW 429 M01-10P	413620	0703325	32.23	-55.91
FSW 429 M01-11GN	413620	0703325	32.23	-60.90
FSW 429 M01-12R	413620	0703325	32.23	-65.90
FSW 429 M01-13BU	413620	0703325	32.23	-75.91
FSW 429 M01-14BK	413620	0703325	32.23	-85.90
FSW 432 M01-03RT	413814	0703225	68.54	31.30
FSW 432 M01-06WT	413814	0703225	68.54	16.31
FSW 432 M01-08GY	413814	0703225	68.54	6.32
FSW 432 M01-09Y	413814	0703225	68.54	1.32
FSW 432 M01-10P	413814	0703225	68.54	-8.66
FSW 432 M01-13BU	413814	0703225	68.54	-38.62
FSW 432 M01-15W	413814	0703225	68.54	-58.62
FSW 442 M01-01PT	413654	0703303	42.33	21.81
FSW 442 M01-02GNT	413654	0703303	42.33	11.81
FSW 442 M01-03RT	413654	0703303	42.33	1.81
FSW 442 M01-04BUT	413654	0703303	42.33	-3.29
FSW 442 M01-05BKT	413654	0703303	42.33	-8.29
FSW 442 M01-06WT	413654	0703303	42.33	-13.31
FSW 442 M01-07O	413654	0703303	42.33	-18.31
FSW 442 M01-08GY	413654	0703303	42.33	-23.33
FSW 442 M01-09Y	413654	0703303	42.33	-28.33
FSW 442 M01-10P	413654	0703303	42.33	-33.34
FSW 442 M01-11GN	413654	0703303	42.33	-38.34
FSW 442 M01-12R	413654	0703303	42.33	-43.37
FSW 442 M01-13BU	413654	0703303	42.33	-48.37
FSW 442 M01-14BK	413654	0703303	42.33	-53.40
FSW 442 M01-15W	413654	0703303	42.33	-58.40
FSW 453 M02-02GNT	413812	0703234	67.41	43.08
FSW 453 M02-03RT	413812	0703234	67.41	39.78
FSW 453 M02-04BUT	413812	0703234	67.41	36.50
FSW 453 M02-05BKT	413812	0703234	67.41	33.20
FSW 453 M02-06WT	413812	0703234	67.41	29.90
FSW 453 M02-07O	413812	0703234	67.41	26.59
FSW 453 M02-08GY	413812	0703234	67.41	23.29
FSW 453 M02-09Y	413812	0703234	67.41	19.99
FSW 453 M02-10P	413812	0703234	67.41	16.50
FSW 453 M02-11GN	413812	0703234	67.41	13.20
FSW 453 M02-12R	413812	0703234	67.41	9.90
FSW 453 M02-13BU	413812	0703234	67.41	6.60
FSW 453 M02-14BK	413812	0703234	67.41	3.30
FSW 453 M02-15W	413812	0703234	67.41	.00
FSW 471 M01-01PT	413650	0703304	40.80	14.55
FSW 471 M01-02GNT	413650	0703304	40.80	4.55
FSW 471 M01-03RT	413650	0703304	40.80	-5.45
FSW 471 M01-04BUT	413650	0703304	40.80	-10.45
FSW 471 M01-05BKT	413650	0703304	40.80	-15.45
FSW 471 M01-06WT	413650	0703304	40.80	-20.45
FSW 471 M01-07O	413650	0703304	40.80	-25.45
FSW 471 M01-08GY	413650	0703304	40.80	-30.45
FSW 471 M01-09Y	413650	0703304	40.80	-35.45
FSW 471 M01-10P	413650	0703304	40.80	-40.45
FSW 471 M01-11GN	413650	0703304	40.80	-45.45
FSW 471 M01-12R	413650	0703304	40.80	-50.45
FSW 471 M01-13BU	413650	0703304	40.80	-55.45
FSW 471 M01-14BK	413650	0703304	40.80	-60.45
FSW 471 M01-15W	413650	0703304	40.80	-65.45
FSW 472 M01-01PT	413648	0703304	40.29	14.61
FSW 472 M01-02GNT	413648	0703304	40.29	4.61
FSW 472 M01-03RT	413648	0703304	40.29	-5.39
FSW 472 M01-04BUT	413648	0703304	40.29	-10.39
FSW 472 M01-05BKT	413648	0703304	40.29	-15.39
FSW 472 M01-06WT	413648	0703304	40.29	-20.39
FSW 472 M01-07O	413648	0703304	40.29	-25.39
FSW 472 M01-08GY	413648	0703304	40.29	-30.39
FSW 472 M01-09Y	413648	0703304	40.29	-35.39
FSW 472 M01-10P	413648	0703304	40.29	-40.39
FSW 472 M01-11GN	413648	0703304	40.29	-45.39
FSW 472 M01-12R	413648	0703304	40.29	-50.39
FSW 472 M01-13BU	413648	0703304	40.29	-55.39
FSW 472 M01-14BK	413648	0703304	40.29	-60.39
FSW 472 M01-15W	413648	0703304	40.29	-65.39
FSW 508 M01-01PT	413706	0703256	45.20	21.67
FSW 508 M01-02GNT	413706	0703256	45.20	11.67
FSW 508 M01-03RT	413706	0703256	45.20	1.67
FSW 508 M01-04BUT	413706	0703256	45.20	-3.33
FSW 508 M01-05BKT	413706	0703256	45.20	-8.33
FSW 508 M01-06WT	413706	0703256	45.20	-13.33
FSW 508 M01-07O	413706	0703256	45.20	-18.33
FSW 508 M01-08GY	413706	0703256	45.20	-23.33
FSW 508 M01-09Y	413706	0703256	45.20	-28.33
FSW 508 M01-10P	413706	0703256	45.20	-33.33
FSW 508 M01-11GN	413706	0703256	45.20	-38.33
FSW 508 M01-12R	413706	0703256	45.20	-43.33
FSW 508 M01-13BU	413706	0703256	45.20	-48.33
FSW 508 M01-14BK	413706	0703256	45.20	-53.33
FSW 508 M01-15W	413706	0703256	45.20	-58.33
FSW 510 M01-03RT	413712	0703403	61.86	40.73
FSW 510 M01-04BUT	413712	0703403	61.86	38.65
FSW 510 M01-07O	413712	0703403	61.86	31.59
FSW 510 M01-08GY	413712	0703403	61.86	29.09
FSW 510 M01-09Y	413712	0703403	61.86	26.59
FSW 510 M01-10P	413712	0703403	61.86	24.06
FSW 510 M01-12R	413712	0703403	61.86	19.06
FSW 510 M01-13BU	413712	0703403	61.86	16.56
FSW 510 M01-14BK	413712	0703403	61.86	14.03
FSW 510 M01-15W	413712	0703403	61.86	11.53

Table 7. Location coordinates and land-surface and sampling-port altitudes for multilevel samplers, Ashumet Valley, Massachusetts—*Continued*

Multilevel-sampler port No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Altitude of land surface (feet)	Altitude of sampling port (feet)
FSW 512 M01-02GNT	413810	0703236	64.52	42.86
FSW 512 M01-03RT	413810	0703236	64.52	40.77
FSW 512 M01-04BUT	413810	0703236	64.52	38.68
FSW 512 M01-05BKT	413810	0703236	64.52	36.60
FSW 512 M01-06WT	413810	0703236	64.52	34.10
FSW 512 M01-07O	413810	0703236	64.52	31.60
FSW 512 M01-08GY	413810	0703236	64.52	29.10
FSW 512 M01-09Y	413810	0703236	64.52	26.60
FSW 512 M01-10P	413810	0703236	64.52	24.05
FSW 512 M01-11GN	413810	0703236	64.52	21.55
FSW 512 M01-12R	413810	0703236	64.52	19.05
FSW 512 M01-13BU	413810	0703236	64.52	16.55
FSW 512 M01-14BK	413810	0703236	64.52	14.02
FSW 512 M01-15W	413810	0703236	64.52	11.52
FSW 564 M01-01PT	413809	0703222	54.71	41.56
FSW 564 M01-02GNT	413809	0703222	54.71	36.60
FSW 564 M01-03RT	413809	0703222	54.71	31.60
FSW 564 M01-04BUT	413809	0703222	54.71	26.61
FSW 564 M01-05BKT	413809	0703222	54.71	21.61
FSW 564 M01-06WT	413809	0703222	54.71	16.62
FSW 564 M01-07O	413809	0703222	54.71	11.62
FSW 564 M01-08GY	413809	0703222	54.71	6.59
FSW 564 M01-09Y	413809	0703222	54.71	1.59
FSW 564 M01-10P	413809	0703222	54.71	-8.41
FSW 564 M01-11GN	413809	0703222	54.71	-18.41
FSW 564 M01-12R	413809	0703222	54.71	-28.42
FSW 564 M01-13BU	413809	0703222	54.71	-38.43
FSW 564 M01-14BK	413809	0703222	54.71	-48.43
FSW 564 M01-15W	413809	0703222	54.71	-58.41
FSW 566 M01-01PT	413807	0703232	60.08	6.96
FSW 566 M01-02GNT	413807	0703232	60.08	1.95
FSW 566 M01-04BUT	413807	0703232	60.08	-8.03
FSW 566 M01-05BKT	413807	0703232	60.08	-13.03
FSW 566 M01-06WT	413807	0703232	60.08	-18.01
FSW 566 M01-07O	413807	0703232	60.08	-23.01
FSW 566 M01-08GY	413807	0703232	60.08	-28.00
FSW 566 M01-09Y	413807	0703232	60.08	-33.00
FSW 566 M01-10P	413807	0703232	60.08	-38.01
FSW 566 M01-11GN	413807	0703232	60.08	-43.01
FSW 566 M01-12R	413807	0703232	60.08	-47.99
FSW 566 M01-13BU	413807	0703232	60.08	-52.99
FSW 566 M01-14BK	413807	0703232	60.08	-57.98
FSW 566 M01-15W	413807	0703232	60.08	-62.98
FSW 566 M02-01PT 65-12	413807	0703232	60.08	41.00
FSW 566 M02-02GNT 65-12	413807	0703232	60.08	38.92
FSW 566 M02-03RT 65-12	413807	0703232	60.08	36.84
FSW 566 M02-04BUT 65-12	413807	0703232	60.08	34.76
FSW 566 M02-05BKT 65-12	413807	0703232	60.08	32.68
FSW 566 M02-06WT 65-12	413807	0703232	60.08	30.54
FSW 566 M02-07O 65-12	413807	0703232	60.08	28.46
FSW 566 M02-08GY 65-12	413807	0703232	60.08	26.38
FSW 566 M02-09Y 65-12	413807	0703232	60.08	24.30
FSW 566 M02-10P 65-12	413807	0703232	60.08	22.22
FSW 566 M02-11GN 65-12	413807	0703232	60.08	20.22
FSW 566 M02-12R 65-12	413807	0703232	60.08	18.14
FSW 566 M02-13BU 65-12	413807	0703232	60.08	16.06
FSW 566 M02-14BK 65-12	413807	0703232	60.08	13.98
FSW 566 M02-15W 65-12	413807	0703232	60.08	11.90
FSW 567 M01-01PT	413812	0703228	68.57	41.81
FSW 567 M01-02GNT	413812	0703228	68.57	37.81
FSW 567 M01-03RT	413812	0703228	68.57	33.81
FSW 567 M01-04BUT	413812	0703228	68.57	29.83
FSW 567 M01-05BKT	413812	0703228	68.57	25.83
FSW 567 M01-06WT	413812	0703228	68.57	21.83
FSW 567 M01-07O	413812	0703228	68.57	17.83
FSW 567 M01-08GY	413812	0703228	68.57	14.83
FSW 567 M01-09Y	413812	0703228	68.57	11.83
FSW 567 M01-10P	413812	0703228	68.57	7.85
FSW 567 M01-11GN	413812	0703228	68.57	4.85
FSW 567 M01-12R	413812	0703228	68.57	1.85
FSW 567 M01-13BU	413812	0703228	68.57	-1.15
FSW 567 M01-14BK	413812	0703228	68.57	-4.15
FSW 567 M01-15W	413812	0703228	68.57	-7.15
FSW 567 M02-01PT	413812	0703228	68.35	-8.84
FSW 567 M02-02GNT	413812	0703228	68.35	-11.86
FSW 567 M02-03RT	413812	0703228	68.35	-14.86
FSW 567 M02-04BUT	413812	0703228	68.35	-17.86
FSW 567 M02-05BKT	413812	0703228	68.35	-20.87
FSW 567 M02-06WT	413812	0703228	68.35	-23.87
FSW 567 M02-07O	413812	0703228	68.35	-26.87
FSW 567 M02-08GY	413812	0703228	68.35	-30.87
FSW 567 M02-09Y	413812	0703228	68.35	-33.87
FSW 567 M02-10P	413812	0703228	68.35	-36.87
FSW 567 M02-11GN	413812	0703228	68.35	-40.87
FSW 567 M02-12R	413812	0703228	68.35	-44.87
FSW 567 M02-13BU	413812	0703228	68.35	-48.87
FSW 567 M02-14BK	413812	0703228	68.35	-52.89
FSW 567 M02-15W	413812	0703228	68.35	-57.89
SDW 317 M01-02GNT	413821	0703245	68.76	45.82
SDW 317 M01-03RT	413821	0703245	68.76	43.82
SDW 317 M01-04BUT	413821	0703245	68.76	41.82
SDW 317 M01-05BKT	413821	0703245	68.76	39.89
SDW 317 M01-06WT	413821	0703245	68.76	37.89
SDW 317 M01-07O	413821	0703245	68.76	35.89
SDW 317 M01-08GY	413821	0703245	68.76	33.89
SDW 317 M01-09Y	413821	0703245	68.76	31.89
SDW 317 M01-10P	413821	0703245	68.76	29.89
SDW 317 M01-11GN	413821	0703245	68.76	27.96
SDW 317 M01-12R	413821	0703245	68.76	25.96
SDW 317 M01-13BU	413821	0703245	68.76	23.96
SDW 317 M01-14BK	413821	0703245	68.76	21.96
SDW 317 M01-15W	413821	0703245	68.76	19.96
SDW 317 M02-01PT	413821	0703245	68.76	19.90
SDW 317 M02-02GNT	413821	0703245	68.76	17.90
SDW 317 M02-03RT	413821	0703245	68.76	15.90
SDW 317 M02-04BUT	413821	0703245	68.76	13.90
SDW 317 M02-05BKT	413821	0703245	68.76	11.98
SDW 317 M02-06WT	413821	0703245	68.76	9.98
SDW 317 M02-07O	413821	0703245	68.76	7.98
SDW 317 M02-08GY	413821	0703245	68.76	5.98
SDW 317 M02-09Y	413821	0703245	68.76	3.98
SDW 317 M02-10P	413821	0703245	68.76	1.98
SDW 317 M02-11GN	413821	0703245	68.76	.05
SDW 317 M02-12R	413821	0703245	68.76	-1.95
SDW 317 M02-13BU	413821	0703245	68.76	-3.95
SDW 317 M02-14BK	413821	0703245	68.76	-5.95
SDW 317 M02-15W	413821	0703245	68.76	-7.95

Table 7. Location coordinates and land-surface and sampling-port altitudes for multilevel samplers, Ashumet Valley, Massachusetts—*Continued*

Multilevel-sampler port No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Altitude of land surface (feet)	Altitude of sampling port (feet)
SDW 318 M01-02GNT	413820	0703244	68.04	44.81
SDW 318 M01-03RT	413820	0703244	68.04	42.81
SDW 318 M01-04BUT	413820	0703244	68.04	40.81
SDW 318 M01-05BKT	413820	0703244	68.04	38.81
SDW 318 M01-06WT	413820	0703244	68.04	36.86
SDW 318 M01-07O	413820	0703244	68.04	34.86
SDW 318 M01-08GY	413820	0703244	68.04	32.86
SDW 318 M01-09Y	413820	0703244	68.04	30.86
SDW 318 M01-10P	413820	0703244	68.04	28.86
SDW 318 M01-11GN	413820	0703244	68.04	26.91
SDW 318 M01-12R	413820	0703244	68.04	24.91
SDW 318 M01-13BU	413820	0703244	68.04	22.91
SDW 318 M01-14BK	413820	0703244	68.04	20.91
SDW 318 M01-15W	413820	0703244	68.04	18.91

Table 8. Location coordinates, land-surface altitude, and water levels for screened-auger borings, Ashumet Valley, Massachusetts

[**Screened-auger boring No:** Number in parentheses assigned by the Massachusetts Military Reservation. Locations of screened-auger borings are shown in figure 4. No., number. Latitude and longitude are given in degrees, minutes, and seconds. Altitudes are in feet above or (-) below sea level]

Screened-auger boring No.	Latitude (° ′ ″)	Longitude (° ′ ″)	Altitude of land surface (feet)	Water-level date	Altitude of water level (feet)
FSW 279-A01 (AVP/MW586)	413721	0703224	79.53	10-17-94	39.1
FSW 348-A01 (AVP/MW591)	413739	0703221	48.34	10-25-94	42.1
FSW 582-A01 (AVP/MW582A)	413759	0703223	45.73	10-26-94	43.5
FSW 583-A01 (AVP/MW583A)	413752	0703220	46.88	10-27-94	43.3
FSW 584-A01 (AVP/MW584A)	413744	0703221	46.13	10-26-94	42.7
FSW 585-A01 (AVP/MW585A)	413728	0703232	81.47	11-08-94	39.8
FSW 587-A01 (AVP/MW587A)	413802	0703240	84.22	11-07-94	44.0
FSW 588-A01 (AVP/MW588)	413804	0703246	94.55	11-09-94	44.3
FSW 589-A01 (AVP/MW589)	413806	0703249	95.07	11-09-94	44.6
FSW 592-A01 (AVP/MW592)	413757	0703254	92.90	11-09-94	43.1
SDW 314-A01 (AVP/MW314)	413820	0703243	77.94	10-07-94	48.9
SDW 316-A01 (AVP/MW316A)	413818	0703235	95.59	11-01-94	46.4
SDW 590-A01 (AVP/MW590)	413820	0703247	94.88	11-03-94	47.0
SDW 593-A01 (AVP/MW593)	413822	0703251	99.26	11-03-94	47.0

Table 9. Field water-quality analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994

[**Well cluster site and well No.:** Number in parentheses assigned by the Massachusetts Military Reservation. Locations of well clusters and wells are shown in figures 2 and 3. No., number; MMR STP, Massachusetts Military Reservation sewage-treatment plant. **Dissolved-oxygen method:** C, CHEMetrics colorimetric; M, meter. µS/cm, microsiemen per centimeter at 25 degrees Celsius; mg/L, milligram per liter; NTU, Nephelometric Turbidity Unit. >, actual value is greater than method detection limit; --, no data]

Well cluster site and well No.	Date	Specific conductance (µS/cm)	pH (standard units)	Temperature (degrees Celsius)	Turbidity (NTU)	Oxygen, dissolved (mg/L)	Dissolved-oxygen method	Alkalinity (mg/L as $CaCO_3$)
FSW 230-0042	7-20-94	148	4.58	10.5	1.5	>1	C	2
FSW 230-0048	7-20-94	345	5.68	9.5	.24	--	--	15
FSW 230-0049	7-20-94	537	5.40	9.5	.78	>1	C	20
FSW 230-0058	7-20-94	297	5.52	9.5	.40	.5	C	13
FSW 230-0068	7-21-94	100	5.40	9.5	1.3	.2	C	3
FSW 230-0078	7-22-94	85	5.69	9.5	1.5	.2	C	6
FSW 230-0088	7-21-94	104	5.63	10.0	1.5	.2	C	11
FSW 230-0108	7-21-94	122	5.57	10.0	.69	--	--	4
FSW 230-0127	7-22-94	63	5.49	10.0	.85	--	--	2
FSW 231-0057	8-12-94	219	5.80	11.5	1.3	--	--	12
FSW 232-0058	9-22-94	407	5.58	10.5	.58	--	--	12
FSW 235-0094	6-07-94	118	5.52	12.5	--	--	--	3
FSW 236-0070	10-20-94	70	6.24	11.0	32	6.5	C	8
FSW 236-0089	10-20-94	85	6.03	11.0	.75	6.0	C	8
FSW 236-0106	10-20-94	201	5.84	11.5	13	8.0	C	5
FSW 236-0121	10-20-94	120	5.67	11.0	.51	8.0	C	2
FSW 236-0141	10-20-94	65	5.64	11.0	2.2	7.0	C	7
FSW 237-0088	6-07-94	92	6.21	12.0	--	.2	C	8
FSW 238-0106	6-10-94	112	5.73	9.5	--	--	--	4
FSW 239-0010	6-06-94	148	5.51	9.5	--	--	--	3
FSW 239-0064	6-06-94	308	6.37	12.0	--	.25	C	44
FSW 239-0121	6-06-94	83	6.43	11.5	--	.3	C	12
FSW 242-0077	6-10-94	52	5.77	9.5	--	--	--	4
FSW 244-0070	8-12-94	331	6.30	10.0	1.6	.15	C	39
FSW 244-0090	8-11-94	290	6.49	10.0	.28	.06	C	44
FSW 244-0119	8-11-94	184	6.19	10.0	.82	.2	C	20
FSW 254-0026	7-12-94	118	5.47	8.5	.20	--	--	3
FSW 254-0054	7-12-94	240	6.19	10.0	.20	.3	C	32
FSW 254-0072	7-12-94	217	6.74	10.5	4.4	.3	C	46
FSW 254-0107	7-12-94	124	6.91	10.5	1.0	.2	C	22
FSW 254-0140	7-13-94	206	6.30	10.5	8.8	0	C	45
FSW 254-0168	7-13-94	118	6.37	10.5	.80	0	C	23
FSW 254-0216	7-13-94	89	6.66	10.5	2.0	.3	C	16
FSW 262-0041	7-14-94	93	5.35	9.5	.50	--	--	7
FSW 262-0069	7-14-94	140	6.47	10.0	.20	.02	C	21
FSW 262-0085	7-14-94	151	6.23	10.0	.30	.06	C	19
FSW 262-0109	7-14-94	170	6.25	10.0	.30	.15	C	30
FSW 262-0126	8-29-94	180	6.61	10.0	38	.1	C	44
FSW 262-0159	7-14-94	153	6.53	10.0	20	.2	C	38

Table 9. Field water-quality analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Specific conductance (µS/cm)	pH (standard units)	Temperature (degrees Celsius)	Turbidity (NTU)	Oxygen, dissolved (mg/L)	Dissolved-oxygen method	Alkalinity (mg/L as $CaCO_3$)
FSW 267-0088	7-08-94	120	5.67	9.5	0.60	--	--	3
FSW 267-0111	7-08-94	88	6.21	9.5	1.2	--	--	8
FSW 267-0136	7-07-94	84	6.72	9.5	1.6	--	--	12
FSW 267-0155	7-07-94	128	6.88	9.5	1.1	0	C	28
FSW 271-0041	6-28-94	54	5.37	--	.70	--	--	3
FSW 271-0069	6-22-94	112	5.58	10.0	5.1	--	--	7
FSW 271-0084	6-22-94	127	5.72	10.0	1.3	--	--	10
FSW 271-0085	6-23-94	127	5.83	9.0	2.5	--	--	10
FSW 271-0099	6-22-94	163	5.90	10.0	13	.3	C	23
FSW 271-0114	6-23-94	186	5.88	9.0	19	.06	C	26
FSW 271-0141	6-23-94	135	6.19	9.0	3.3	.4	C	24
FSW 271-0165	6-24-94	138	6.97	9.0	11	.4	C	35
FSW 279-0061	10-17-94	89	5.68	11.5	.42	2.5	C	4
FSW 279-0086	10-17-94	79	5.74	12.0	.41	1.0	C	5
FSW 279-0100 (AVP/MW586)	10-17-94	79	5.73	12.0	.47	1.0	C	5
FSW 282-0049	6-29-94	87	6.01	--	1.3	--	--	3
FSW 282-0070	6-30-94	95	6.05	9.5	2.9	.1	C	9
FSW 282-0083	6-30-94	138	6.18	9.5	23	.15	C	16
FSW 282-0094	6-29-94	138	6.32	--	2.2	.4	C	15
FSW 282-0123	6-29-94	141	6.32	--	1.1	.8	C	28
FSW 288-0091	7-12-94	142	6.35	9.5	.40	.3	C	11
FSW 294-0064	7-19-94	65	5.88	9.5	11	--	--	4
FSW 294-0077	7-19-94	122	6.19	9.5	2.5	>1	C	9
FSW 294-0089	7-19-94	148	6.38	9.0	1.4	.03	C	20
FSW 294-0109	7-19-94	146	6.39	9.0	--	.2	C	32
FSW 300-0010	6-20-94	88	5.22	10.5	.90	--	--	2
FSW 300-0030	6-21-94	196	6.41	9.5	2.1	.3	C	46
FSW 300-0050	6-22-94	240	6.37	12.0	1.0	.2	C	53
FSW 300-0073	6-21-94	171	6.36	9.5	7.2	.2	C	27
FSW 300-0099	6-21-94	96	6.28	9.0	3.8	.2	C	10
FSW 300-0118	6-21-94	86	6.11	9.0	1.9	--	--	9
FSW 300-0138	6-21-94	82	6.23	8.0	5.3	--	--	10
FSW 343-0036	8-31-94	460	5.93	8.5	.33	.15	C	30
FSW 343-0057	8-31-94	422	6.55	8.5	1.1	0	C	96
FSW 343-0079	8-30-94	379	6.52	9.0	1.6	0	C	95
FSW 343-0099	8-30-94	136	5.73	9.5	1.7	--	--	6
FSW 343-0114	8-30-94	76	5.74	9.5	.37	--	--	3
FSW 343-0129	8-30-94	76	5.72	10.0	14	--	--	4
FSW 343-0145	8-31-94	92	5.60	9.5	.35	--	--	4

Table 9. Field water-quality analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Specific conductance (μS/cm)	pH (standard units)	Temperature (degrees Celsius)	Turbidity (NTU)	Oxygen, dissolved (mg/L)	Dissolved-oxygen method	Alkalinity (mg/L as $CaCO_3$)
FSW 347-0020	10-18-94	94	5.01	14.0	0.29	8.0	C	0
FSW 347-0031	10-18-94	221	5.94	12.0	.75	.1	C	27
FSW 347-0038	10-18-94	410	5.94	11.5	.42	.2	C	24
FSW 347-0046	10-18-94	224	6.20	12.0	.52	.2	C	36
FSW 347-0067	10-19-94	179	6.28	11.0	.21	0	C	41
FSW 347-0101	10-19-94	96	5.38	11.5	.60	5.0	C	3
FSW 347-0116	10-18-94	69	5.56	11.0	.86	6.5	C	3
FSW 347-0131	10-18-94	83	5.47	10.5	.79	8.0	C	4
FSW 347-0145	10-19-94	89	5.71	11.0	.88	8.0	C	5
FSW 348-0021	10-25-94	83	6.25	18.5	1.1	.2	C	8
FSW 348-0043	10-25-94	84	6.24	14.0	14	.1	C	8
FSW 348-0073	10-25-94	86	6.29	13.5	13	.15	C	10
FSW 348-0098	10-25-94	80	6.25	12.5	2.4	2.0	C	8
FSW 348-0148 (AVP/MW591)	10-25-94	83	5.95	13.0	.33	.1	C	8
FSW 350-0013	9-06-94	59	4.68	10.0	.42	--	--	1
FSW 350-0052	9-06-94	85	5.59	9.0	.58	--	--	6
FSW 350-0064	9-07-94	105	5.90	9.0	.52	.1	C	12
FSW 350-0077	9-06-94	174	6.00	9.0	1.0	.1	C	26
FSW 350-0084	9-07-94	195	5.85	9.0	5.4	.1	C	29
FSW 350-0110	9-07-94	191	6.02	9.0	.31	.1	C	32
FSW 350-0125	9-08-94	155	6.31	9.0	9.7	.03	C	34
FSW 350-0140	9-08-94	135	6.58	9.0	--	--	--	32
FSW 355-0079	9-22-94	148	5.52	9.0	.44	--	--	5
FSW 355-0104	9-22-94	131	6.35	9.0	5.1	.06	C	15
FSW 355-0149	9-22-94	166	6.62	9.0	8.1	.05	C	41
FSW 356-0079	6-09-94	124	5.34	11.5	--	--	--	5
FSW 356-0108	6-09-94	142	6.38	10.5	--	.4	C	22
FSW 356-0134	6-09-94	162	5.91	9.5	--	--	--	21
FSW 357-0079	9-01-94	146	5.51	9.5	1.6	--	--	5
FSW 357-0099	8-31-94	75	5.53	9.5	5.2	--	--	7
FSW 357-0119	8-31-94	196	6.33	9.5	2.7	.04	C	33
FSW 357-0139	9-01-94	207	6.03	9.5	49	.1	C	42
FSW 358-0049	10-13-94	53	5.28	10.0	.77	8.0	C	3
FSW 358-0089	10-13-94	54	5.89	10.0	.75	8.0	C	5
FSW 358-0104	10-13-94	139	6.19	10.0	1.6	.15	C	12
FSW 358-0119	10-13-94	150	6.20	10.0	12	.06	C	10
FSW 358-0132	10-13-94	153	6.20	10.0	120	.06	C	12
FSW 359-0050	9-14-94	80	5.24	9.0	.87	--	--	2
FSW 359-0088	9-13-94	97	5.40	9.0	1.4	--	--	5
FSW 359-0107	9-13-94	128	5.37	9.5	1.0	--	--	5
FSW 359-0119	9-13-94	101	5.64	9.5	.50	.5	C	5
FSW 359-0141	9-14-94	107	5.72	9.5	.50	.3	C	8

Table 9. Field water-quality analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Specific conductance (µS/cm)	pH (standard units)	Temperature (degrees Celsius)	Turbidity (NTU)	Oxygen, dissolved (mg/L)	Dissolved-oxygen method	Alkalinity (mg/L as $CaCO_3$)
FSW 373-0024	8-24-94	83	5.24	8.5	0.40	--	--	1
FSW 373-0060	8-24-94	80	5.72	9.5	.23	>1	C	4
FSW 373-0073	8-25-94	172	6.10	9.5	.50	.06	C	20
FSW 373-0082	8-24-94	125	6.33	9.5	.53	.03	C	17
FSW 373-0113	8-25-94	183	6.14	9.5	1.1	.15	C	35
FSW 375-0015	8-15-94	61	5.29	16.0	.48	.1	C	5
FSW 375-0041	8-15-94	59	5.42	10.0	.97	.3	C	2
FSW 375-0055	8-16-94	69	5.84	10.0	1.3	.05	C	6
FSW 375-0071	8-16-94	140	6.42	8.5	223	--	--	29
FSW 375-0081	8-16-94	134	6.36	9.0	40	.15	C	30
FSW 375-0099	8-16-94	83	6.15	9.0	21	.1	C	14
FSW 375-0119	8-17-94	106	7.00	9.0	32	0	C	29
FSW 378-0081	11-14-94	97	6.15	11.0	.77	.06	C	16
FSW 379-0076	11-14-94	401	6.40	11.5	3.3	.08	C	116
FSW 383-0023	8-10-94	112	5.67	10.5	1.2	--	--	5
FSW 383-0030	8-10-94	365	5.92	11.0	.31	.15	C	23
FSW 383-0040	8-09-94	371	6.04	11.0	1.5	.3	C	25
FSW 383-0061	8-10-94	163	6.23	11.0	2.9	0	C	43
FSW 383-0082	8-10-94	127	5.91	11.0	2.4	0	C	20
FSW 383-0106	8-10-94	129	5.75	10.5	2.9	.1	C	4
FSW 383-0129	8-11-94	109	5.62	10.0	1.1	--	--	5
FSW 388-0037	6-07-94	146	5.93	9.0	--	--	--	16
FSW 388-0072	6-07-94	294	6.46	10.0	--	>1	C	55
FSW 393-0037	7-24-94	52.6	5.7	11.0	--	9.0	C	--
FSW 411-0036	9-20-94	115	5.02	8.0	.13	--	--	2
FSW 411-0054	9-20-94	88	5.25	9.5	.10	--	--	2
FSW 411-0065	9-20-94	276	6.53	10.0	1.4	.03	C	57
FSW 411-0081	9-20-94	179	6.34	10.5	.46	.04	C	30
FSW 411-0094	9-20-94	137	6.23	10.5	16	.1	C	21
FSW 411-0106	9-21-94	162	6.22	10.5	9.4	.07	C	32
FSW 411-0122	9-21-94	124	7.12	10.5	61	.1	C	30
FSW 412-0042	9-13-94	41	5.52	9.0	.93	--	--	2
FSW 412-0064	9-13-94	313	5.41	9.5	.20	--	--	4
FSW 412-0078	9-12-94	278	5.66	9.5	1.1	--	--	5
FSW 412-0091	9-12-94	276	5.69	9.5	.66	--	--	5
FSW 412-0108	9-12-94	513	5.48	9.5	1.2	--	--	4
FSW 418-0049	9-26-94	71	5.45	8.5	.83	5.5	C	2
FSW 418-0089	9-27-94	72	5.73	9.0	.74	5.5	C	4
FSW 418-0103	9-26-94	183	5.89	9.0	.50	.7	C	8
FSW 418-0122	9-26-94	106	6.32	9.0	20	2.0	C	16
FSW 418-0141	9-27-94	124	6.27	9.0	12	1.5	C	12

Table 9. Field water-quality analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Specific conductance (µS/cm)	pH (standard units)	Temperature (degrees Celsius)	Turbidity (NTU)	Oxygen, dissolved (mg/L)	Dissolved-oxygen method	Alkalinity (mg/L as $CaCO_3$)
FSW 422-0045	6-15-94	87	5.64	10.0	3.9	--	--	4
FSW 422-0065	6-15-94	254	6.26	9.5	--	0.6	C	27
FSW 422-0085	6-15-94	257	6.30	10.0	45	.2	C	27
FSW 422-0105	6-15-94	124	6.11	10.0	4.2	.2	C	25
FSW 424-0020	7-06-94	144	5.46	11.0	.50	--	--	4
FSW 424-0089 (AVP/MW581C)	7-06-94	210	6.10	10.0	30	.25	C	33
FSW 424-0144 (AVP/MW581B)	7-06-94	91	6.21	10.0	8.4	--	--	9
FSW 424-0183 (AVP/MW581A)	7-06-94	78	6.43	10.0	15	--	--	17
FSW 429-0012	10-05-94	60	4.92	11.5	7.4	4.0	C	2
FSW 429-0068	10-05-94	159	5.76	10.0	.40	3.0	C	8
FSW 429-0078	10-05-94	122	6.13	10.0	8.8	.1	C	20
FSW 429-0094	10-05-94	116	6.44	10.0	18	.08	C	24
FSW 431-0013	10-05-94	94	4.73	12.5	8.5	1.0	C	2
FSW 431-0018	10-05-94	76	5.25	9.5	.35	6.0	C	2
FSW 431-0065	10-05-94	128	5.82	10.0	.48	4.5	C	6
FSW 431-0078	10-05-94	157	5.97	10.0	250	.3	C	15
FSW 431-0093	10-05-94	146	5.91	10.0	3.3	.2	C	17
FSW 432-0026	8-23-94	67	6.05	9.0	1.2	--	--	2
FSW 432-0059	8-23-94	104	5.81	9.5	.25	--	--	6
FSW 432-0079	8-24-94	116	5.68	9.5	.20	--	--	4
FSW 432-0092	8-24-94	112	5.71	9.5	.61	--	--	4
FSW 433-0064	6-09-94	82	5.17	9.0	--	--	--	2
FSW 433-0090	6-09-94	129	5.76	9.0	--	--	--	6
FSW 433-0104	6-08-94	162	6.00	9.0	--	>1	C	25
FSW 433-0118	6-08-94	162	6.43	9.0	--	.8	C	35
FSW 433-0140	6-09-94	125	6.55	9.0	--	.2	C	26
FSW 435-0064	9-19-94	76	5.37	9.0	.97	--	--	3
FSW 435-0090	9-16-94	139	6.08	9.0	4.8	--	--	3
FSW 435-0105	9-15-94	203	8.27	9.0	16	.05	C	64
FSW 435-0121	9-15-94	179	8.41	9.0	43	.03	C	54
FSW 435-0140	9-16-94	137	7.34	9.0	1,000	.4	C	47
FSW 436-0036	8-17-94	73	5.36	9.0	.29	--	--	6
FSW 436-0060	8-17-94	102	5.75	9.0	2.2	--	--	4
FSW 436-0076	8-18-94	123	6.48	9.5	6.8	.2	C	25
FSW 436-0091	8-18-94	118	7.10	9.5	2.6	0	C	34
FSW 436-0115	8-18-94	94	6.84	9.0	8.0	0	C	23
FSW 436-0141	8-19-94	113	7.62	9.5	130	.2	C	35
FSW 443-0089	9-30-94	108	5.50	9.0	.60	4.5	C	7
FSW 443-0104	10-03-94	146	5.74	9.5	1.5	>1	C	16
FSW 443-0117	10-03-94	198	6.00	10.0	11	.2	C	29
FSW 443-0140	10-03-94	162	5.95	10.0	4.4	.1	C	23

Table 9. Field water-quality analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Specific conductance (µS/cm)	pH (standard units)	Temperature (degrees Celsius)	Turbidity (NTU)	Oxygen, dissolved (mg/L)	Dissolved-oxygen method	Alkalinity (mg/L as $CaCO_3$)
FSW 459-0064	10-04-94	74	5.22	11.0	2.0	2.0	C	6
FSW 459-0091	10-04-94	62	5.51	10.5	2.6	10.0	C	3
FSW 459-0106	10-04-94	63	5.72	10.0	2.0	7.0	C	4
FSW 459-0121	10-04-94	63	5.96	10.0	19	--	--	7
FSW 459-0136	10-04-94	72	6.15	10.0	4.7	6.0	C	8
FSW 460-0080	8-25-94	94	5.40	9.0	.77	--	--	6
FSW 460-0100	8-25-94	94	5.40	9.5	1.7	--	--	8
FSW 460-0120	8-26-94	102	5.46	9.5	1.5	--	--	7
FSW 460-0140	8-26-94	233	6.32	9.5	11	.1	C	50
FSW 470-0091	9-21-94	62	5.87	9.0	18	--	--	8
FSW 470-0106	9-21-94	58	6.00	9.5	280	>1	C	9
FSW 470-0119	9-21-94	80	6.02	9.5	11	--	--	11
FSW 470-0142	9-21-94	105	4.87	9.5	12	.01	C	2
FSW 474-0080	9-15-94	69	5.38	9.0	.44	--	--	17
FSW 474-0100	9-15-94	111	5.43	9.0	.45	--	--	5
FSW 474-0115	9-14-94	101	5.39	9.0	.49	--	--	6
FSW 474-0129	9-14-94	92	5.45	9.5	1.0	--	--	7
FSW 474-0147	9-14-94	254	6.11	9.0	2.8	.7	C	48
FSW 484-0007	10-06-94	84	5.40	13.5	9.6	2.0	C	4
FSW 484-0023	10-06-94	73	5.42	11.0	4.9	5.0	C	3
FSW 484-0078	10-06-94	81	6.04	10.5	92	7.0	C	78
FSW 484-0108	10-06-94	81	6.19	10.5	2.0	0	C	11
FSW 487-0012	10-11-94	83	4.85	12.0	1.6	>1	C	3
FSW 487-0023	10-11-94	339	5.15	10.5	.49	--	--	3
FSW 487-0078	10-11-94	82	5.48	10.5	.81	>1	C	4
FSW 487-0112	10-12-94	82	6.75	10.0	120	7.0	C	19
FSW 493-0008	10-12-94	81	5.63	20.0	3.2	.25	C	5
FSW 493-0024	10-12-94	82	5.52	19.0	.70	.06	C	3
FSW 493-0074	10-12-94	76	6.55	10.5	1,000	0	C	17
FSW 493-0115	10-12-94	83	6.81	10.5	260	0	C	23
FSW 501-0087	9-30-94	102	5.66	9.0	5.3	2.0	C	11
FSW 501-0102	9-29-94	170	6.07	9.0	110	.04	C	7
FSW 501-0117	9-29-94	174	6.82	9.5	150	.01	C	49
FSW 502-0087	9-29-94	60	5.47	9.0	.76	3.5	C	4
FSW 502-0102	9-29-94	81	5.70	9.0	5.3	6.0	C	34
FSW 502-0117	9-27-94	134	6.03	9.0	46	.4	C	23
FSW 502-0128	9-27-94	93	6.84	9.0	1,000	.2	C	20
FSW 502-0139	9-27-94	91	6.86	9.0	430	.01	C	17
FSW 564-0016	10-24-94	89	4.94	14.0	.68	2.0	C	2
FSW 564-0100 (AVP/MW580)	10-24-94	91	5.84	11.5	.24	>1	C	7
FSW 564-0138	10-24-94	62	6.25	11.0	.56	11.0	C	10
FSW 567-0136	11-09-94	140	6.45	11.0	2.9	.07	C	23

Table 9. Field water-quality analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Specific conductance (µS/cm)	pH (standard units)	Temperature (degrees Celsius)	Turbidity (NTU)	Oxygen, dissolved (mg/L)	Dissolved-oxygen method	Alkalinity (mg/L as $CaCO_3$)
FSW 570-0056	11-14-94	55	5.28	11.5	0.21	11.0	M	1
FSW 570-0073	11-14-94	361	5.92	11.5	.73	.25	M	20
FSW 570-0091	11-10-94	440	5.83	12.0	3.3	.2	C	31
FSW 570-0111	11-10-94	285	5.97	11.5	1.3	.15	C	26
FSW 582-0013 (AVP/MW582D)	10-26-94	323	6.30	13.5	.45	.1	C	50
FSW 582-0038 (AVP/MW582C)	10-26-94	355	6.56	11.5	.84	.03	C	71
FSW 582-0073 (AVP/MW582B)	10-26-94	271	6.52	11.5	.61	.2	C	53
FSW 582-0168 (AVP/MW582A)	10-26-94	82	6.56	11.0	1.2	6.1	M	17
FSW 583-0013 (AVP/MW583E)	10-28-94	84	6.12	16.0	.86	.03	C	5
FSW 583-0058 (AVP/MW583D)	10-27-94	92	6.19	12.0	1.6	.1	C	11
FSW 583-0089 (AVP/MW583C)	10-27-94	272	6.60	12.0	.96	.06	C	46
FSW 583-0138 (AVP/MW583B)	10-28-94	147	6.85	12.0	23	.1	C	26
FSW 583-0173 (AVP/MW583A)	10-27-94	71	6.48	12.0	.17	6.7	M	14
FSW 584-0013 (AVP/MW584D)	10-27-94	88	6.28	16.5	1.4	.15	C	9
FSW 584-0103 (AVP/MW584C)	10-27-94	86	6.13	12.0	3.5	1.8	M	6
FSW 584-0148 (AVP/MW584B)	10-27-94	125	5.76	11.5	1.0	.1	C	12
FSW 584-0198 (AVP/MW584A)	10-26-94	84	6.67	12.0	.64	6.5	M	22
FSW 585-0048 (AVP/MW585D)	11-08-94	65	5.46	10.5	7.9	10.7	M	4
FSW 585-0084 (AVP/MW585C)	11-08-94	155	6.31	11.0	12	.08	C	25
FSW 585-0099 (AVP/MW585B)	11-08-94	240	6.85	11.0	.89	.07	C	61
FSW 585-0124 (AVP/MW585A)	11-08-94	195	6.12	10.5	10	0	C	40
FSW 587-0045 (AVP/MW587D)	11-07-94	51	4.99	10.0	.27	11.0	M	0
FSW 587-0098 (AVP/MW587C)	11-07-94	387	5.77	11.0	.18	.1	C	19
FSW 587-0118 (AVP/MW587B)	11-07-94	281	5.73	11.0	.19	.09	C	18
FSW 587-0167 (AVP/MW587A)	11-07-94	94	6.33	11.0	.25	.15	C	12
FSW 588-0089 (AVP/MW588)	11-09-94	301	6.03	11.0	.34	.06	C	19
FSW 589-0078 (AVP/MW589)	11-09-94	78	5.73	10.5	.42	6.3	M	5
FSW 592-0115 (AVP/MW592)	11-09-94	103	5.61	10.5	1.2	10.2	M	4
SDW 313-0020	6-02-94	64	5.67	8.5	--	--	--	2
SDW 313-0038	6-02-94	212	5.11	9.5	--	--	--	2
SDW 313-0060	6-03-94	373	5.00	8.0	--	--	--	2
SDW 313-0080	6-02-94	222	5.78	11.0	--	--	--	4
SDW 314-0035	6-16-94	473	5.69	5.0	1.1	--	--	12
SDW 314-0051	6-16-94	488	5.94	6.5	1.1	.1	C	25
SDW 314-0075	6-16-94	364	5.98	10.0	1.1	.3	C	32
SDW 314-0098	6-16-94	84	5.73	8.5	1.7	--	--	11
SDW 314-0108 (AVP/MW314)	10-07-94	134	5.43	11.0	.83	6.0	C	4
SDW 315-0061	11-15-94	101	5.44	11.5	7.6	11.1	M	3
SDW 315-0082	11-02-94	128	5.44	11.0	.51	10.7	M	2
SDW 315-0104	11-02-94	54	5.67	11.0	1.0	11.2	M	3
SDW 315-0126	11-02-94	76	5.74	11.0	12	10.9	M	4
SDW 315-0149	11-02-94	73	5.92	11.0	1.2	11.7	M	9

Table 9. Field water-quality analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Specific conductance (µS/cm)	pH (standard units)	Temperature (degrees Celsius)	Turbidity (NTU)	Oxygen, dissolved (mg/L)	Dissolved-oxygen method	Alkalinity (mg/L as $CaCO_3$)
SDW 316-0051	10-31-94	129	4.74	11.5	2.0	8.6	M	0
SDW 316-0066	11-01-94	230	5.90	11.5	.23	.1	C	24
SDW 316-0082	10-31-94	148	5.83	12.0	.26	.1	C	12
SDW 316-0100	10-31-94	156	6.39	11.5	3.4	0	C	30
SDW 316-0114 (AVP/MW316C)	11-01-94	169	5.55	11.0	.51	6.9	M	6
SDW 316-0134	10-31-94	197	5.75	11.5	.68	4.7	M	6
SDW 316-0148 (AVP/MW316B)	11-01-94	68	5.79	11.0	12	10.3	M	5
SDW 316-0163 (AVP/MW316A)	11-01-94	81	5.52	11.5	.91	10.2	M	4
SDW 317-0027	10-14-94	379	5.95	19.5	4.0	--	--	45
SDW 317-0051	10-14-94	422	5.74	9.5	.54	.2	C	26
SDW 318-0036	6-17-94	--	5.90	10.0	.40	.1	C	44
SDW 318-0064	6-17-94	--	5.94	8.0	3.5	.1	C	29
SDW 344-0038	11-03-94	187	5.71	11.5	.48	7.4	M	10
SDW 344-0061	11-03-94	389	6.17	12.0	.51	.15	C	58
SDW 344-0080	11-03-94	204	6.67	11.5	2.1	0	C	53
SDW 344-0100	11-03-94	203	6.79	11.0	2.2	0	C	33
SDW 395-0028 (CS16MW7)	10-19-94	420	5.58	19.0	1.5	3.0	C	14
SDW 423-0058 (FTA1MW428B)	11-04-94	95	5.35	11.0	.25	10.0	M	4
SDW 423-0098 (FTA1MW428A)	11-04-94	125	5.55	11.0	2.9	11.0	M	3
SDW 434-0014 (CS16MW3)	7-05-94	85	5.38	11.0	.30	--	--	4
SDW 434-0025 (CS16MW3B)	7-05-94	82	5.74	9.5	1.4	--	--	9
SDW 434-0076 (CS16MW3A)	7-05-94	57	5.63	10.0	1.4	--	--	3
SDW 436-0028 (CS16MW5)	11-08-94	439	5.58	20.0	.40	1.2	M	15
SDW 437-0029 (CS16MW6)	11-08-94	456	5.52	15.0	.85	5.1	M	11
SDW 438-0041 (CS16MW8)	10-20-94	424	5.82	19.5	1.6	.8	C	24
SDW 440-0078	10-19-94	113	5.96	11.5	10	.2	C	14
SDW 467-0058	6-30-94	85	5.41	10.5	.30	--	--	5
SDW 590-0074 (AVP/MW590)	11-03-94	413	5.65	9.0	.51	.15	C	16
SDW 593-0075 (AVP/MW593)	11-03-94	95	5.58	10.5	.59	8.8	M	4
MMR STP Effluent at S317	02-02-95	516	6.56	--	26	--	--	25

Table 10. Major cations and silica analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994

[Source of data: U.S. Geological Survey National Water Quality Laboratory. **Well cluster site and well No.:** Number in parentheses assigned by the Massachusetts Military Reservation. Locations of well clusters and wells are shown in figures 2 and 3. No., number; D, duplicate sample; MMR STP, Massachusetts Military Reservation sewage-treatment plant. mg/L, milligram per liter]

Well cluster site and well No.	Date	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Silica, dissolved (mg/L as SiO_2)
FSW 230-0042	7-20-94	4.6	1.7	13	2	7.0
FSW 230-0048	7-20-94	16	3.4	33	7	7.6
FSW 230-0049	7-20-94	30	5.5	47	11	8.3
FSW 230-0058	7-20-94	25	5.4	11	8	9.9
FSW 230-0068	7-21-94	3.0	.7	6.6	7	10
FSW 230-0078	7-22-94	1.4	.4	10	2	10
FSW 230-0088	7-21-94	2.6	1.7	15	.6	6.8
FSW 230-0108	7-21-94	3.5	3.0	11	1	9.4
FSW 230-0127	7-22-94	2.9	1.5	4.4	.5	10
FSW 231-0057	8-12-94	8.4	1.9	23	6	9.9
FSW 232-0058	9-22-94	17	3.6	46	7	12
FSW 232-0058-D	9-22-94	17	3.6	47	8	12
FSW 235-0094	6-07-94	5.0	2.8	8.9	2	9.2
FSW 236-0070	10-20-94	2.8	1.3	7.1	2	9.4
FSW 236-0089	10-20-94	2.6	2.2	8.7	1	10
FSW 236-0106	10-20-94	5.2	5.9	19	1	9.6
FSW 236-0121	10-20-94	6.9	3.1	8.0	1	11
FSW 236-0141	10-20-94	3.7	1.5	5.3	1	12
FSW 237-0088	6-07-94	1.2	1.6	6.9	3	10
FSW 238-0106	6-10-94	4.2	3.8	7.4	.8	9.1
FSW 239-0010	6-06-94	4.8	1.4	17	.9	4.3
FSW 239-0064	6-06-94	6.6	3.5	38	3	15
FSW 239-0121	6-06-94	2.4	1.2	9.5	1	12
FSW 242-0077	6-10-94	1.2	1.6	4.8	.5	7.9
FSW 244-0070	8-12-94	9.4	6.5	30	4	12
FSW 244-0090	8-11-94	4.4	4.4	31	5	13
FSW 244-0119	8-11-94	5.2	2.8	13	4	17
FSW 254-0026	7-12-94	1.7	1.2	17	1	5.7
FSW 254-0054	7-12-94	3.8	5.5	18	5	8.6
FSW 254-0072	7-12-94	1.1	1.0	17	5	10
FSW 254-0107	7-12-94	5.9	3.2	8.7	2	8.0
FSW 254-0140	7-13-94	11	4.5	18	2	15
FSW 254-0168	7-13-94	5.8	2.7	9.4	.9	17
FSW 254-0216	7-13-94	3.2	1.8	7.1	1	18
FSW 262-0041	7-14-94	2.7	2.1	8.1	2	7.8
FSW 262-0069	7-14-94	.6	.5	13	2	4.4
FSW 262-0085	7-14-94	4.9	2.5	14	2	9.1
FSW 262-0109	7-14-94	8.7	3.4	17	1	14
FSW 262-0109-D	7-14-94	8.4	3.4	17	1	14
FSW 262-0126	8-29-94	13	4.4	13	2	19
FSW 262-0159	7-14-94	10	3.6	11	2	18

Table 10. Major cations and silica analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Silica, dissolved (mg/L as SiO_2)
FSW 267-0088	7-08-94	2.8	1.7	14	0.6	11
FSW 267-0111	7-08-94	3.6	1.8	8.4	2	16
FSW 267-0136	7-07-94	4.0	1.7	8.0	.7	14
FSW 267-0155	7-07-94	7.5	3.1	8.0	2	21
FSW 271-0041	6-28-94	1.2	1.0	5.4	.7	5.9
FSW 271-0069	6-22-94	1.9	2.2	12	.7	8.4
FSW 271-0084	6-22-94	2.7	1.9	17	.8	7.9
FSW 271-0085	6-23-94	2.7	1.8	16	.8	7.6
FSW 271-0099	6-22-94	3.8	2.1	24	.9	8.0
FSW 271-0114	6-23-94	5.4	2.9	23	1	9.8
FSW 271-0141	6-23-94	7.6	3.5	11	1	16
FSW 271-0165	6-24-94	8.3	3.0	9.6	2	17
FSW 279-0061	10-17-94	2.2	1.8	8.6	1	3.9
FSW 279-0086	10-17-94	1.6	1.5	8.2	1	2.9
FSW 279-0100 (AVP/MW586)	10-17-94	1.5	1.6	8.3	1	2.9
FSW 282-0049	6-29-94	.4	.6	12	.4	7.6
FSW 282-0070	6-30-94	.9	.6	16	.5	6.5
FSW 282-0083	6-30-94	4.6	2.2	16	.8	9.2
FSW 282-0094	6-29-94	4.3	2.1	16	.7	9.3
FSW 282-0123	6-29-94	8.5	3.7	10	1	15
FSW 288-0091	7-12-94	2.3	1.3	12	2	9.8
FSW 294-0064	7-19-94	1.0	1.3	7.4	.5	8.3
FSW 294-0077	7-19-94	4.0	2.7	7.2	2	11
FSW 294-0089	7-19-94	5.9	2.8	14	.9	13
FSW 294-0109	7-19-94	8.0	3.7	11	1	18
FSW 300-0010	6-20-94	1.7	1.4	9.7	.7	6.1
FSW 300-0030	6-21-94	3.9	2.5	22	5	13
FSW 300-0050	6-22-94	8.8	4.8	15	4	14
FSW 300-0073	6-21-94	5.2	3.8	13	3	13
FSW 300-0099	6-21-94	1.1	.6	12	2	13
FSW 300-0099-D	6-21-94	1.1	.6	11	2	14
FSW 300-0118	6-21-94	4.4	2.0	6.5	.7	14
FSW 300-0138	6-21-94	3.5	1.5	7.9	.7	12
FSW 343-0036	8-31-94	25	5.0	45	10	12
FSW 343-0057	8-31-94	8.9	4.1	52	9	12
FSW 343-0057-D	8-31-94	8.8	4.1	52	9	12
FSW 343-0079	8-30-94	6.9	3.8	38	10	12
FSW 343-0099	8-30-94	3.7	3.9	11	2	9.2
FSW 343-0114	8-30-94	2.6	2.2	5.8	.8	9.4
FSW 343-0129	8-30-94	3.5	1.8	5.0	1	11
FSW 343-0145	8-31-94	3.7	2.2	6.7	1	12

Table 10. Major cations and silica analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Silica, dissolved (mg/L as SiO_2)
FSW 347-0020	10-18-94	2.2	1.8	9.5	1	8.1
FSW 347-0031	10-18-94	6.7	2.2	30	3	14
FSW 347-0038	10-18-94	18	7.3	38	10	13
FSW 347-0046	10-18-94	7.7	3.6	27	7	13
FSW 347-0067	10-19-94	9.7	4.1	7.8	6	12
FSW 347-0067-D	10-19-94	9.8	4.2	8.0	6	13
FSW 347-0101	10-19-94	4.0	1.5	6.2	6	12
FSW 347-0101-D	10-19-94	4.0	1.4	6.1	5	12
FSW 347-0116	10-18-94	2.5	1.4	4.6	2	13
FSW 347-0131	10-18-94	3.6	2.1	5.7	2	15
FSW 347-0145	10-19-94	3.5	1.5	8.3	1	14
FSW 348-0021	10-25-94	2.5	2.1	8.8	1	1.3
FSW 348-0043	10-25-94	3.0	2.0	8.7	1	1.6
FSW 348-0073	10-25-94	2.9	2.0	9.5	1	1.6
FSW 348-0098	10-25-94	2.6	1.7	8.6	1	1.7
FSW 348-0148 (AVP/MW591)	10-25-94	2.6	1.8	9.3	.7	7.9
FSW 350-0013	9-06-94	.5	1.0	5.7	.4	5.1
FSW 350-0052	9-06-94	1.3	1.7	11	.5	8.2
FSW 350-0064	9-07-94	1.7	1.1	16	.6	7.3
FSW 350-0077	9-06-94	5.7	2.7	23	.9	10
FSW 350-0084	9-07-94	7.7	3.5	24	1	12
FSW 350-0110	9-07-94	9.8	4.4	20	1	16
FSW 350-0125	9-08-94	9.5	4.0	12	1	17
FSW 350-0140	9-08-94	8.6	3.4	9.9	2	18
FSW 355-0079	9-22-94	2.7	2.9	17	1	8.3
FSW 355-0104	9-22-94	3.5	1.7	17	.8	8.1
FSW 355-0149	9-22-94	11	5.1	11	2	18
FSW 356-0079	6-09-94	2.5	1.5	15	1	6.4
FSW 356-0108	6-09-94	2.4	1.6	21	.7	7.1
FSW 356-0134	6-09-94	7.4	3.0	17	1	14
FSW 357-0079	9-01-94	2.2	4.1	16	1	8.3
FSW 357-0099	8-31-94	1.7	2.2	7.3	.6	8.0
FSW 357-0119	8-31-94	5.9	4.0	25	1	5.6
FSW 357-0139	9-01-94	11	4.1	22	1	15
FSW 358-0049	10-13-94	1.2	1.0	5.1	.8	5.9
FSW 358-0089	10-13-94	1.2	1.1	6.0	.5	9.2
FSW 358-0104	10-13-94	4.6	2.5	11	2	9.6
FSW 358-0119	10-13-94	7.9	3.7	12	.9	8.6
FSW 358-0132	10-13-94	7.0	3.2	14	1	12
FSW 359-0050	9-14-94	2.3	2.5	5.9	1	6.9
FSW 359-0088	9-13-94	2.1	3.3	8.2	.6	8.3
FSW 359-0107	9-13-94	2.9	3.4	11	2	8.4
FSW 359-0119	9-13-94	1.9	2.1	11	2	8.6
FSW 359-0141	9-14-94	1.9	1.8	12	2	9.0

Table 10. Major cations and silica analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Silica, dissolved (mg/L as SiO_2)
FSW 373-0024	8-24-94	0.9	2.0	9.0	0.9	6.8
FSW 373-0060	8-24-94	1.6	1.7	8.8	.8	8.6
FSW 373-0060-D	8-24-94	1.6	1.6	8.8	.8	8.4
FSW 373-0073	8-25-94	2.8	1.6	12	3	6.6
FSW 373-0082	8-24-94	5.9	2.8	10	2	14
FSW 373-0113	8-25-94	9.0	3.8	18	2	18
FSW 375-0015	8-15-94	.9	.9	7.0	.7	6.3
FSW 375-0041	8-15-94	.8	1.0	6.6	.7	6.0
FSW 375-0055	8-16-94	2.6	1.2	7.0	.6	6.6
FSW 375-0055-D	8-16-94	2.7	1.2	7.1	.7	6.7
FSW 375-0071	8-16-94	8.8	3.6	11	2	17
FSW 375-0081	8-16-94	8.0	3.5	11	2	18
FSW 375-0099	8-16-94	3.5	1.6	8.5	.9	15
FSW 375-0119	8-17-94	5.6	2.0	9.9	2	20
FSW 378-0081	11-14-94	3.1	2.5	7.1	4	11
FSW 379-0076	11-14-94	11	8.0	48	8	12
FSW 383-0023	8-10-94	2.9	1.4	12	2	9.5
FSW 383-0030	8-10-94	14	4.4	39	10	13
FSW 383-0040	8-09-94	18	4.3	37	8	13
FSW 383-0061	8-10-94	1.0	.2	29	1	15
FSW 383-0082	8-10-94	1.7	.6	18	.6	12
FSW 383-0106	8-10-94	5.0	2.5	9.4	2	9.2
FSW 383-0129	8-11-94	5.7	2.1	6.9	2	16
FSW 388-0037	6-07-94	4.1	1.3	20	3	11
FSW 388-0072	6-07-94	6.0	3.3	37	7	11
FSW 411-0036	9-20-94	8.9	1.5	4.7	2	4.0
FSW 411-0054	9-20-94	1.7	2.1	8.8	.9	7.9
FSW 411-0065	9-20-94	3.1	2.8	21	9	5.0
FSW 411-0081	9-20-94	3.8	2.0	13	4	9.4
FSW 411-0094	9-20-94	7.1	3.2	12	2	12
FSW 411-0106	9-21-94	10	4.4	12	2	21
FSW 411-0122	9-21-94	8.4	3.0	8.5	2	20
FSW 412-0042	9-13-94	.6	1.1	3.9	.4	5.7
FSW 412-0064	9-13-94	1.7	2.9	49	1	6.9
FSW 412-0078	9-12-94	.84	1.0	45	.9	6.0
FSW 412-0091	9-12-94	.82	1.1	46	1	6.4
FSW 412-0108	9-12-94	3.0	3.5	83	2	6.7
FSW 418-0049	9-26-94	1.0	1.8	7.7	.7	6.0
FSW 418-0089	9-27-94	2.6	2.2	6.1	.6	9.8
FSW 418-0103	9-26-94	10	4.6	12	1	9.7
FSW 418-0122	9-26-94	5.1	2.4	9.7	1	16
FSW 418-0141	9-27-94	6.2	3.0	11	1	15

Table 10. Major cations and silica analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Silica, dissolved (mg/L as SiO_2)
FSW 422-0045	6-15-94	2.4	1.8	8.4	2	8.3
FSW 422-0065	6-15-94	7.1	4.5	28	2	15
FSW 422-0065-D	6-15-94	7.2	4.6	28	2	15
FSW 422-0085	6-15-94	4.7	2.6	35	3	15
FSW 422-0105	6-15-94	3.5	1.7	15	2	15
FSW 424-0020	7-06-94	3.7	1.1	18	.8	5.3
FSW 424-0089 (AVP/MW581C)	7-06-94	6.6	4.5	18	2	13
FSW 424-0144 (AVP/MW581B)	7-06-94	4.4	1.9	7.8	.8	13
FSW 424-0183 (AVP/MW581A)	7-06-94	3.9	1.6	7.1	.7	15
FSW 429-0012	10-05-94	.6	1.1	6.3	.7	5.8
FSW 429-0068	10-05-94	3.0	2.0	21	.9	8.8
FSW 429-0078	10-05-94	5.7	2.4	13	.9	14
FSW 429-0094	10-05-94	6.4	2.9	9.9	1	15
FSW 431-0013	10-05-94	.6	1.0	10	.7	5.8
FSW 431-0018	10-05-94	1.1	1.4	8.6	.9	6.2
FSW 431-0065	10-05-94	2.0	1.4	18	.7	8.6
FSW 431-0078	10-05-94	6.7	3.2	15	1	12
FSW 431-0093	10-05-94	5.8	2.8	15	1	12
FSW 432-0026	8-23-94	1.1	1.2	6.3	.6	6.2
FSW 432-0059	8-23-94	2.6	1.6	12	1	9.1
FSW 432-0079	8-24-94	2.5	3.1	12	.9	8.9
FSW 432-0092	8-24-94	2.5	2.7	11	.9	8.8
FSW 433-0064	6-09-94	1.7	2.1	7.7	.9	6.3
FSW 433-0090	6-09-94	1.3	1.2	19	.7	8.2
FSW 433-0104	6-08-94	8.2	3.7	15	1	15
FSW 433-0118	6-08-94	9.4	2.7	13	1	17
FSW 433-0140	6-09-94	7.1	3.4	8.8	2	20
FSW 435-0064	9-19-94	1.9	1.9	6.8	.9	7.1
FSW 435-0090	9-16-94	5.9	3.0	13	.9	12
FSW 435-0105	9-15-94	27	1.9	9.4	.7	15
FSW 435-0121	9-15-94	23	2.0	7.0	1	19
FSW 435-0140	9-16-94	9.3	3.5	7.8	3	27
FSW 436-0036	8-17-94	1.5	1.8	7.2	.8	6.5
FSW 436-0060	8-17-94	2.1	1.8	12	.8	8.6
FSW 436-0076	8-18-94	9.8	1.7	9.8	1	15
FSW 436-0091	8-18-94	9.3	1.7	8.2	1	19
FSW 436-0115	8-18-94	6.0	1.3	7.3	1	20
FSW 436-0141	8-19-94	7.1	3.5	7.8	2	20
FSW 443-0089	9-30-94	2.7	3.4	9.3	.8	7.9
FSW 443-0104	10-03-94	3.9	2.8	17	.9	9.1
FSW 443-0117	10-03-94	7.0	3.9	22	1	12
FSW 443-0140	10-03-94	6.6	3.2	17	1	12

Table 10. Major cations and silica analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Silica, dissolved (mg/L as SiO_2)
FSW 459-0064	10-04-94	3.2	1.8	4.8	1	7.3
FSW 459-0091	10-04-94	1.2	1.5	6.4	.6	8.2
FSW 459-0106	10-04-94	1.4	1.3	6.6	.5	9.1
FSW 459-0121	10-04-94	1.8	1.2	6.8	.6	9.5
FSW 459-0136	10-04-94	2.5	1.3	7.2	.8	12
FSW 460-0080	8-25-94	1.8	2.7	9.0	.8	8.1
FSW 460-0100	8-25-94	1.7	2.3	9.7	.8	8.2
FSW 460-0120	8-26-94	2.1	2.5	10	1	8.5
FSW 460-0140	8-26-94	6.6	4.5	30	2	5.5
FSW 470-0091	9-21-94	1.9	1.0	6.8	.6	11
FSW 470-0106	9-21-94	2.1	.8	6.3	.6	14
FSW 470-0119	9-21-94	3.3	1.4	8.5	.7	13
FSW 470-0142	9-21-94	2.5	1.5	10	.9	13
FSW 474-0080	9-15-94	1.3	2.6	5.4	.7	7.9
FSW 474-0100	9-15-94	1.5	2.5	12	.8	7.7
FSW 474-0115	9-14-94	2.5	3.8	7.9	.8	8.8
FSW 474-0129	9-14-94	2.5	3.2	7.5	.6	8.4
FSW 474-0147	9-14-94	7.5	3.8	35	1	8.4
FSW 484-0007	10-06-94	2.2	1.5	8.3	2	6.1
FSW 484-0023	10-06-94	1.9	1.4	7.1	1	7.1
FSW 484-0078	10-06-94	2.9	1.5	8.4	.7	11
FSW 484-0108	10-06-94	3.6	1.8	6.4	.8	19
FSW 487-0012	10-11-94	2.7	1.6	6.3	1	6.2
FSW 487-0023	10-11-94	4.1	2.0	50	2	6.3
FSW 487-0078	10-11-94	1.2	1.9	9.0	.6	7.6
FSW 487-0112	10-12-94	4.0	1.8	8.5	.7	19
FSW 493-0008	10-12-94	1.9	1.3	9.4	1	4.6
FSW 493-0024	10-12-94	1.8	1.3	9.5	2	4.6
FSW 493-0074	10-12-94	3.0	1.3	7.1	.9	21
FSW 493-0115	10-12-94	3.7	1.5	7.2	1	23
FSW 501-0087	9-30-94	3.4	3.1	9.0	--	9.4
FSW 501-0102	9-29-94	8.6	4.2	15	1	16
FSW 501-0117	9-29-94	11	5.8	11	3	19
FSW 502-0087	9-29-94	.9	.9	7.7	.5	6.2
FSW 502-0102	9-29-94	2.0	1.8	8.9	.7	8.1
FSW 502-0117	9-27-94	6.9	3.3	12	1	15
FSW 502-0128	9-27-94	5.1	2.0	7.2	1	19
FSW 502-0139	9-27-94	4.9	2.0	7.3	1	19
FSW 564-0016	10-24-94	1.4	1.1	12	.4	5.4
FSW 564-0100 (AVP/MW580)	10-24-94	3.9	2.1	6.6	1	15
FSW 564-0138	10-24-94	2.6	1.1	6.7	.5	13
FSW 567-0136	11-09-94	3.6	2.5	9.8	4	11

Table 10. Major cations and silica analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Silica, dissolved (mg/L as SiO_2)
FSW 570-0056	11-14-94	0.9	1.1	5.7	0.5	7.4
FSW 570-0073	11-14-94	15	4.4	39	9	12
FSW 570-0091	11-10-94	15	6.1	49	8	11
FSW 570-0111	11-10-94	7.0	4.6	33	4	11
FSW 582-0013 (AVP/MW582D)	10-26-94	3.4	5.3	39	4	5.7
FSW 582-0038 (AVP/MW582C)	10-26-94	7.2	6.7	44	4	10
FSW 582-0038 (AVP/MW582C)-D	10-26-94	7.2	6.7	44	4	10
FSW 582-0073 (AVP/MW582B)	10-26-94	6.7	4.4	25	5	12
FSW 582-0073 (AVP/MW582B)	10-26-94	6.6	4.4	24	4	11
FSW 582-0168 (AVP/MW582A)	10-26-94	4.5	1.8	8.1	.8	16
FSW 583-0013 (AVP/MW583E)	10-28-94	2.0	1.6	8.8	.9	1.6
FSW 583-0058 (AVP/MW583D)	10-27-94	3.3	2.2	9.3	1	2.7
FSW 583-0089 (AVP/MW583C)	10-27-94	1.2	.8	24	6	1.9
FSW 583-0138 (AVP/MW583B)	10-28-94	1.5	1.0	10	4	3.3
FSW 583-0173 (AVP/MW583A)	10-27-94	3.5	1.5	7.5	.6	15
FSW 584-0013 (AVP/MW584D)	10-27-94	2.2	2.1	8.8	1	1.9
FSW 584-0103 (AVP/MW584C)	10-27-94	2.9	1.9	8.6	1	2.0
FSW 584-0148 (AVP/MW584B)	10-27-94	2.4	2.0	17	.9	4.6
FSW 584-0198 (AVP/MW584A)	10-26-94	4.6	2.4	8.3	.8	19
FSW 585-0048 (AVP/MW585D)	11-08-94	.8	1.6	6.8	.8	6.9
FSW 585-0084 (AVP/MW585C)	11-08-94	.52	.51	17	3	4.9
FSW 585-0099 (AVP/MW585B)	11-08-94	3.2	1.9	19	5	4.0
FSW 585-0124 (AVP/MW585A)	11-08-94	9.6	4.5	17	1	17
FSW 587-0045 (AVP/MW587D)	11-07-94	.8	.7	5.0	.7	5.0
FSW 587-0098 (AVP/MW587C)	11-07-94	8.6	4.2	48	6	12
FSW 587-0118 (AVP/MW587B)	11-07-94	5.0	3.4	34	3	10
FSW 587-0167 (AVP/MW587A)	11-07-94	4.7	2.0	7.7	.8	13
FSW 588-0089 (AVP/MW588)	11-09-94	11	4.0	31	3	15
FSW 589-0078 (AVP/MW589)	11-09-94	2.9	1.1	7.4	.9	11
FSW 592-0115 (AVP/MW592)	11-09-94	3.2	2.5	8.4	2	10
SDW 313-0020	6-02-94	1.0	1.5	6.5	.6	7.1
SDW 313-0038	6-02-94	3.6	2.9	28	2	5.0
SDW 313-0060	6-03-94	6.4	8.2	42	3	8.1
SDW 313-0080	6-02-94	5.5	5.2	23	1	9.2
SDW 314-0035	6-16-94	22	4.6	48	12	10
SDW 314-0051	6-16-94	24	5.2	49	9	10
SDW 314-0075	6-16-94	14	2.8	45	7	12
SDW 314-0075	6-16-94	14	2.7	44	6	13
SDW 314-0098	6-16-94	3.0	1.2	8.6	2	10
SDW 314-0108 (AVP/MW314)	10-07-94	4.1	4.0	10	2	9.4

Table 10. Major cations and silica analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Calcium, dissolved (mg/L)	Magnesium, dissolved (mg/L)	Sodium, dissolved (mg/L)	Potassium, dissolved (mg/L)	Silica, dissolved (mg/L as SiO_2)
SDW 315-0061	11-15-94	2.9	1.5	9.9	1	7.8
SDW 315-0082	11-02-94	2.3	2.9	14	.9	7.7
SDW 315-0104	11-02-94	1.9	1.9	3.9	.5	8.4
SDW 315-0126	11-02-94	3.5	2.5	4.5	.6	9.2
SDW 315-0149	11-02-94	3.1	1.8	6.7	.6	10
SDW 316-0051	10-31-94	4.4	2.1	12	1	9.1
SDW 316-0066	11-01-94	15	5.4	15	4	9.2
SDW 316-0066-D	11-01-94	15	5.4	15	5	9.2
SDW 316-0082	10-31-94	9.2	3.1	11	2	9.3
SDW 316-0100	10-31-94	5.0	1.8	8.2	2	10
SDW 316-0114 (AVP/MW316C)	11-01-94	7.3	2.7	17	2	8.9
SDW 316-0134	10-31-94	8.5	4.5	16	3	9.7
SDW 316-0148 (AVP/MW316B)	11-01-94	2.2	2.2	5.4	.8	10
SDW 316-0163 (AVP/MW316A)	11-01-94	3.5	2.3	5.7	.7	10
SDW 317-0027	10-14-94	14	2.5	49	10	8.0
SDW 317-0051	10-14-94	19	3.8	47	9	10
SDW 318-0036	6-17-94	18	2.9	48	8	11
SDW 318-0064	6-17-94	11	2.0	54	11	6.8
SDW 344-0038	11-03-94	6.4	3.1	20	4	11
SDW 344-0061	11-03-94	15	6.4	45	8	12
SDW 344-0080	11-03-94	9.9	3.8	10	3	11
SDW 344-0100	11-03-94	8.7	3.8	13	3	11
SDW 395-0028 (CS16MW7)	10-19-94	20	3.5	43	12	13
SDW 423-0058 (FTA1MW428B)	11-04-94	1.9	3.2	7.9	2	8.2
SDW 423-0098 (FTA1MW428A)	11-04-94	2.1	2.3	15	.7	8.3
SDW 434-0014 (CS16MW3)	7-05-94	4.2	1.0	6.4	2	6.4
SDW 434-0025 (CS16MW3B)	7-05-94	2.5	.7	9.9	1	8.9
SDW 434-0076 (CS16MW3A)	7-05-94	1.8	1.9	4.3	.5	8.7
SDW 436-0028 (CS16MW5)	11-08-94	20	3.9	47	14	13
SDW 437-0029 (CS16MW6)	11-08-94	23	4.1	48	10	11
SDW 438-0041 (CS16MW8)	10-20-94	22	4.3	46	13	13
SDW 440-0078	10-19-94	7.1	1.3	10	3	9.5
SDW 440-0078-D	10-19-94	7.0	1.3	9.9	3	9.4
SDW 467-0058	6-30-94	2.0	2.5	7.5	.8	7.4
SDW 590-0074 (AVP/MW590)	11-03-94	16	2.8	51	9	11
SDW 593-0075 (AVP/MW593)	11-03-94	2.2	2.5	9.3	.8	8.3
MMR STP Effluent at S317	2-02-95	23	4.1	55	13	12

Table 11. Major anions analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994

[Source of data: U.S. Geological Survey National Water Quality Laboratory. **Well cluster site and well No.:** Number in parentheses assigned by the Massachusetts Military Reservation. Location of well clusters and wells are shown in figures 2 and 3. No., number; D, duplicate sample; MMR STP, Massachusetts Military Reservation sewage-treatment plant. mg/L, milligram per liter; <, actual value is less than method detection limit]

Well cluster site and well No.	Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Bromide, dissolved (mg/L)
FSW 230-0042	7-20-94	11	21	<0.1	0.030
FSW 230-0048	7-20-94	17	41	.2	.060
FSW 230-0049	7-20-94	22	58	.3	.080
FSW 230-0058	7-20-94	22	35	.3	.050
FSW 230-0068	7-21-94	12	13	.1	.020
FSW 230-0078	7-22-94	7.0	11	<.1	.020
FSW 230-0088	7-21-94	12	15	<.1	.040
FSW 230-0108	7-21-94	14	19	<.1	.020
FSW 230-0127	7-22-94	10	6.0	<.1	.020
FSW 231-0057	8-12-94	15	23	.4	.020
FSW 232-0058	9-22-94	25	47	.6	.060
FSW 232-0058-D	9-22-94	25	49	.6	.060
FSW 235-0094	6-07-94	22	13	<.1	.030
FSW 236-0070	10-20-94	6.2	14	<.1	.020
FSW 236-0089	10-20-94	9.5	15	<.1	.030
FSW 236-0106	10-20-94	8.8	49	<.1	.060
FSW 236-0121	10-20-94	6.0	30	<.1	.030
FSW 236-0141	10-20-94	14	6.5	<.1	.030
FSW 237-0088	6-07-94	7.8	10	<.1	.030
FSW 238-0106	6-10-94	22	11	<.1	.040
FSW 239-0010	6-06-94	6.6	33	<.1	.040
FSW 239-0064	6-06-94	40	32	<.1	.070
FSW 239-0121	6-06-94	6.2	6.8	<.1	.030
FSW 242-0077	6-10-94	7.7	7.9	<.1	.030
FSW 244-0070	8-12-94	24	27	<.1	.060
FSW 244-0090	8-11-94	25	28	.1	.070
FSW 244-0119	8-11-94	16	15	<.1	.040
FSW 254-0026	7-12-94	5.6	28	<.1	.040
FSW 254-0054	7-12-94	15	18	<.1	.050
FSW 254-0072	7-12-94	18	15	<.1	.13
FSW 254-0107	7-12-94	11	7.5	<.1	.050
FSW 254-0140	7-13-94	20	15	<.1	.14
FSW 254-0168	7-13-94	14	10	.1	.060
FSW 254-0216	7-13-94	13	6.8	<.1	.040
FSW 262-0041	7-14-94	5.7	11	<.1	.030
FSW 262-0069	7-14-94	9.2	11	<.1	.020
FSW 262-0085	7-14-94	12	14	<.1	.050
FSW 262-0109	7-14-94	18	13	<.1	.080
FSW 262-0109-D	7-14-94	19	13	<.1	.080
FSW 262-0126	8-29-94	14	13	<.1	.080
FSW 262-0159	7-14-94	14	11	.1	.090

Table 11. Major anions analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Bromide, dissolved (mg/L)
FSW 267-0088	7-08-94	15	17	<0.1	0.050
FSW 267-0111	7-08-94	11	7.3	<.1	.040
FSW 267-0136	7-07-94	9.8	7.3	<.1	.040
FSW 267-0155	7-07-94	15	9.3	.1	.060
FSW 271-0041	6-28-94	8.0	9.1	<.1	.020
FSW 271-0069	6-22-94	6.8	16	<.1	.040
FSW 271-0084	6-22-94	10	14	<.1	.040
FSW 271-0085	6-23-94	11	14	<.1	.040
FSW 271-0099	6-22-94	18	16	<.1	.060
FSW 271-0114	6-23-94	21	19	<.1	.080
FSW 271-0141	6-23-94	12	14	<.1	.050
FSW 271-0165	6-24-94	13	11	<.1	.040
FSW 279-0061	10-17-94	12	12	<.1	.040
FSW 279-0086	10-17-94	11	11	<.1	.040
FSW 279-0100 (AVP/MW586)	10-17-94	12	11	<.1	.050
FSW 282-0049	6-29-94	3.1	18	<.1	.030
FSW 282-0070	6-30-94	9.6	11	<.1	.030
FSW 282-0083	6-30-94	11	14	<.1	.050
FSW 282-0094	6-29-94	11	15	<.1	.060
FSW 282-0123	6-29-94	18	11	<.1	.040
FSW 288-0091	7-12-94	15	13	<.1	.040
FSW 294-0064	7-19-94	5.3	12	<.1	.030
FSW 294-0077	7-19-94	12	11	<.1	.050
FSW 294-0089	7-19-94	13	15	<.1	.050
FSW 294-0109	7-19-94	6.8	13	<.1	.060
FSW 300-0010	6-20-94	7.3	18	<.1	.030
FSW 300-0030	6-21-94	14	18	<.1	.040
FSW 300-0050	6-22-94	21	22	<.1	.050
FSW 300-0073	6-21-94	15	21	<.1	.040
FSW 300-0099	6-21-94	9.6	9.1	<.1	.020
FSW 300-0099-D	6-21-94	9.7	9.1	<.1	.030
FSW 300-0118	6-21-94	13	7.9	<.1	.040
FSW 300-0138	6-21-94	11	7.3	<.1	.040
FSW 343-0036	8-31-94	26	53	<.1	.070
FSW 343-0057	8-31-94	26	47	.2	.10
FSW 343-0057-D	8-31-94	27	49	.2	.090
FSW 343-0079	8-30-94	25	37	<.1	.070
FSW 343-0099	8-30-94	9.5	25	<.1	.030
FSW 343-0114	8-30-94	9.1	11	<.1	.020
FSW 343-0129	8-30-94	15	5.8	<.1	.020
FSW 343-0145	8-31-94	18	6.7	<.1	.040

Table 11. Major anions analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Bromide, dissolved (mg/L)
FSW 347-0020	10-18-94	10	14	<0.1	0.040
FSW 347-0031	10-18-94	18	16	<.1	.020
FSW 347-0038	10-18-94	26	48	.1	.060
FSW 347-0046	10-18-94	18	23	.2	.050
FSW 347-0067	10-19-94	13	17	.3	.23
FSW 347-0067-D	10-19-94	13	17	.3	.37
FSW 347-0101	10-19-94	13	13	<.1	.030
FSW 347-0101-D	10-19-94	13	13	<.1	.020
FSW 347-0116	10-18-94	11	6.0	<.1	.020
FSW 347-0131	10-18-94	16	7.0	<.1	.040
FSW 347-0145	10-19-94	16	7.1	<.1	.040
FSW 348-0021	10-25-94	9.5	13	<.1	.040
FSW 348-0043	10-25-94	9.6	12	<.1	.020
FSW 348-0073	10-25-94	9.9	12	<.1	.040
FSW 348-0098	10-25-94	10	11	<.1	.030
FSW 348-0148 (AVP/MW591)	10-25-94	11	11	<.1	.050
FSW 350-0013	9-06-94	6.6	11	<.1	.020
FSW 350-0052	9-06-94	4.3	15	<.1	.030
FSW 350-0064	9-07-94	13	12	<.1	.030
FSW 350-0077	9-06-94	21	17	<.1	.060
FSW 350-0084	9-07-94	25	20	<.1	.080
FSW 350-0110	9-07-94	20	19	<.1	.10
FSW 350-0125	9-08-94	8.8	15	<.1	.060
FSW 350-0140	9-08-94	11	12	<.1	.050
FSW 355-0079	9-22-94	4.1	25	<.1	.050
FSW 355-0104	9-22-94	8.1	14	<.1	.050
FSW 355-0149	9-22-94	12	13	<.1	.050
FSW 356-0079	6-09-94	13	19	<.1	.030
FSW 356-0108	6-09-94	15	16	<.1	.060
FSW 356-0134	6-09-94	9.1	19	<.1	.090
FSW 357-0079	9-01-94	12	19	<.1	.040
FSW 357-0099	8-31-94	5.6	10	<.1	.030
FSW 357-0119	8-31-94	28	16	<.1	.070
FSW 357-0139	9-01-94	16	22	<.1	.11
FSW 358-0049	10-13-94	3.4	11	<.1	.030
FSW 358-0089	10-13-94	5.0	8.3	<.1	.030
FSW 358-0104	10-13-94	10	17	<.1	.060
FSW 358-0119	10-13-94	13	19	<.1	.070
FSW 358-0132	10-13-94	13	20	<.1	.070
FSW 359-0050	9-14-94	8.0	12	<.1	.030
FSW 359-0088	9-13-94	6.1	12	<.1	.030
FSW 359-0107	9-13-94	3.0	21	<.1	.050
FSW 359-0119	9-13-94	5.2	16	<.1	.050
FSW 359-0141	9-14-94	8.3	13	<.1	.050

Table 11. Major anions analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Bromide, dissolved (mg/L)
FSW 373-0024	8-24-94	5.9	16	<0.1	0.050
FSW 373-0060	8-24-94	5.9	16	<.1	<.010
FSW 373-0060-D	8-24-94	6.7	12	<.1	.030
FSW 373-0073	8-25-94	13	17	<.1	.050
FSW 373-0082	8-24-94	6.5	11	<.1	.050
FSW 373-0113	8-25-94	16	16	<.1	.090
FSW 375-0015	8-15-94	1.2	12	<.1	.020
FSW 375-0041	8-15-94	6.3	10	<.1	.020
FSW 375-0055	8-16-94	6.7	11	<.1	.040
FSW 375-0055-D	8-16-94	6.7	11	<.1	.010
FSW 375-0071	8-16-94	9.7	13	<.1	.070
FSW 375-0081	8-16-94	8.6	12	<.1	.050
FSW 375-0099	8-16-94	8.4	9.1	<.1	.040
FSW 375-0119	8-17-94	8.3	7.7	.1	.070
FSW 378-0081	11-14-94	6.7	13	<.1	.030
FSW 379-0076	11-14-94	8.8	47	.4	.090
FSW 383-0023	8-10-94	10	14	<.1	.040
FSW 383-0030	8-10-94	24	30	.1	.050
FSW 383-0040	8-09-94	27	40	.1	.080
FSW 383-0061	8-10-94	10	13	.2	.040
FSW 383-0082	8-10-94	14	13	.1	.050
FSW 383-0106	8-10-94	14	22	<.1	.030
FSW 383-0129	8-11-94	22	7.1	<.1	.040
FSW 388-0037	6-07-94	9.7	16	<.1	.030
FSW 388-0072	6-07-94	22	32	.2	.070
FSW 411-0036	9-20-94	16	11	<.1	.020
FSW 411-0054	9-20-94	7.7	14	<.1	.030
FSW 411-0065	9-20-94	27	20	<.1	.10
FSW 411-0081	9-20-94	14	14	<.1	.060
FSW 411-0094	9-20-94	16	10	<.1	.060
FSW 411-0106	9-21-94	17	13	<.1	.090
FSW 411-0122	9-21-94	12	9.1	<.1	.040
FSW 412-0042	9-13-94	4.9	6.0	<.1	.020
FSW 412-0064	9-13-94	16	75	<.1	.040
FSW 412-0078	9-12-94	19	61	<.1	.050
FSW 412-0091	9-12-94	33	50	<.1	.050
FSW 412-0108	9-12-94	19	130	<.1	.060
FSW 418-0049	9-26-94	6.1	14	<.1	.030
FSW 418-0089	9-27-94	5.4	12	<.1	.030
FSW 418-0103	9-26-94	8.8	31	<.1	.060
FSW 418-0122	9-26-94	7.3	12	<.1	.040
FSW 418-0141	9-27-94	6.9	17	<.1	.050

Table 11. Major anions analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Bromide, dissolved (mg/L)
FSW 422-0045	6-15-94	6.2	14	<0.1	0.050
FSW 422-0065	6-15-94	22	21	<.1	.040
FSW 422-0065-D	6-15-94	21	21	<.1	.040
FSW 422-0085	6-15-94	19	24	<.1	.050
FSW 422-0105	6-15-94	8.1	11	<.1	.12
FSW 424-0020	7-06-94	6.1	31	<.1	.030
FSW 424-0089 (AVP/MW581C)	7-06-94	25	18	<.1	.050
FSW 424-0144 (AVP/MW581B)	7-06-94	11	6.9	<.1	.040
FSW 424-0183 (AVP/MW581A)	7-06-94	5.7	7.9	<.1	.040
FSW 429-0012	10-05-94	5.9	12	<.1	.030
FSW 429-0068	10-05-94	11	27	<.1	.050
FSW 429-0078	10-05-94	8.8	14	<.1	.070
FSW 429-0094	10-05-94	8.6	12	<.1	.050
FSW 431-0013	10-05-94	10	19	<.1	.030
FSW 431-0018	10-05-94	4.3	17	<.1	.040
FSW 431-0065	10-05-94	4.6	25	<.1	.060
FSW 431-0078	10-05-94	20	16	<.1	.070
FSW 431-0093	10-05-94	15	17	<.1	.070
FSW 432-0026	8-23-94	7.1	11	<.1	<.010
FSW 432-0059	8-23-94	19	9.9	<.1	.030
FSW 432-0079	8-24-94	13	18	<.1	.030
FSW 432-0092	8-24-94	9.2	21	<.1	.030
FSW 433-0064	6-09-94	6.6	14	<.1	.020
FSW 433-0090	6-09-94	8.8	21	<.1	.050
FSW 433-0104	6-08-94	13	19	<.1	.080
FSW 433-0118	6-08-94	13	16	<.1	.080
FSW 433-0140	6-09-94	13	11	<.1	.070
FSW 435-0064	9-19-94	6.5	12	<.1	.030
FSW 435-0090	9-16-94	8.7	22	<.1	.070
FSW 435-0105	9-15-94	14	12	<.1	.050
FSW 435-0121	9-15-94	12	12	<.1	.050
FSW 435-0140	9-16-94	6.4	9.0	<.1	.080
FSW 436-0036	8-17-94	5.1	12	<.1	.060
FSW 436-0060	8-17-94	5.5	20	<.1	.080
FSW 436-0076	8-18-94	11	11	<.1	.050
FSW 436-0091	8-18-94	9.6	8.9	<.1	.030
FSW 436-0115	8-18-94	9.6	7.2	<.1	.050
FSW 436-0141	8-19-94	7.4	7.5	.1	.030
FSW 443-0089	9-30-94	9.3	15	<.1	.040
FSW 443-0104	10-03-94	17	17	<.1	.070
FSW 443-0117	10-03-94	21	23	<.1	.11
FSW 443-0140	10-03-94	13	20	<.1	.080

Table 11. Major anions analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Bromide, dissolved (mg/L)
FSW 459-0064	10-04-94	6.7	9.6	<0.1	0.040
FSW 459-0091	10-04-94	6.0	11	<.1	.030
FSW 459-0106	10-04-94	5.6	11	<.1	.030
FSW 459-0121	10-04-94	4.8	8.0	<.1	.030
FSW 459-0136	10-04-94	5.8	8.0	<.1	.030
FSW 460-0080	8-25-94	8.4	13	<.1	.040
FSW 460-0100	8-25-94	6.7	12	<.1	.040
FSW 460-0120	8-26-94	5.0	15	<.1	.060
FSW 460-0140	8-26-94	23	19	<.1	.060
FSW 470-0091	9-21-94	3.0	9.4	<.1	.050
FSW 470-0106	9-21-94	2.1	8.9	<.1	.040
FSW 470-0119	9-21-94	1.8	11	<.1	.050
FSW 470-0142	9-21-94	13	17	<.1	.090
FSW 474-0080	9-15-94	8.4	8.5	<.1	.020
FSW 474-0100	9-15-94	8.2	19	<.1	.040
FSW 474-0115	9-14-94	6.9	14	<.1	.030
FSW 474-0129	9-14-94	8.1	11	<.1	.030
FSW 474-0147	9-14-94	28	24	<.1	.10
FSW 484-0007	10-06-94	8.8	15	<.1	.020
FSW 484-0023	10-06-94	7.1	11	<.1	.030
FSW 484-0078	10-06-94	4.7	14	<.1	.060
FSW 484-0108	10-06-94	12	9.7	<.1	.040
FSW 487-0012	10-11-94	8.1	12	<.1	.020
FSW 487-0023	10-11-94	9.2	89	<.1	.060
FSW 487-0078	10-11-94	8.1	13	<.1	.040
FSW 487-0112	10-12-94	2.1	12	<.1	.050
FSW 493-0008	10-12-94	7.6	16	<.1	.020
FSW 493-0024	10-12-94	7.6	16	<.1	.020
FSW 493-0074	10-12-94	9.2	7.6	<.1	.040
FSW 493-0115	10-12-94	9.0	7.8	<.1	.040
FSW 501-0087	9-30-94	11	13	<.1	--
FSW 501-0102	9-29-94	9.8	20	<.1	.10
FSW 501-0117	9-29-94	13	15	<.1	.060
FSW 502-0087	9-29-94	6.4	9.9	<.1	.020
FSW 502-0102	9-29-94	4.8	12	<.1	.030
FSW 502-0117	9-27-94	6.1	17	<.1	.050
FSW 502-0128	9-27-94	11	7.7	<.1	.080
FSW 502-0139	9-27-94	12	8.0	<.1	.040
FSW 564-0016	10-24-94	5.8	20	<.1	.030
FSW 564-0100 (AVP/MW580)	10-24-94	11	6.8	<.1	.040
FSW 564-0138	10-24-94	4.8	7.4	<.1	.040
FSW 567-0136	11-09-94	9.0	20	<.1	.020

Table 11. Major anions analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Bromide, dissolved (mg/L)
FSW 570-0056	11-14-94	4.4	11	<0.1	0.030
FSW 570-0073	11-14-94	19	41	<.1	.070
FSW 570-0091	11-10-94	26	44	<.1	.080
FSW 570-0111	11-10-94	17	30	<.1	.060
FSW 582-0013 (AVP/MW582D)	10-26-94	46	31	<.1	.060
FSW 582-0038 (AVP/MW582C)	10-26-94	50	28	<.1	.070
FSW 582-0038 (AVP/MW582C)-D	10-26-94	50	29	<.1	.070
FSW 582-0073 (AVP/MW582B)	10-26-94	34	21	<.1	.050
FSW 582-0073 (AVP/MW582B)	10-26-94	34	21	<.1	.050
FSW 582-0168 (AVP/MW582A)	10-26-94	7.0	8.8	<.1	.040
FSW 583-0013 (AVP/MW583E)	10-28-94	11	13	<.1	.040
FSW 583-0058 (AVP/MW583D)	10-27-94	12	12	<.1	.040
FSW 583-0089 (AVP/MW583C)	10-27-94	25	27	<.1	.060
FSW 583-0138 (AVP/MW583B)	10-28-94	13	9.9	<.1	.040
FSW 583-0173 (AVP/MW583A)	10-27-94	4.7	9.1	<.1	.040
FSW 584-0013 (AVP/MW584D)	10-27-94	10	13	<.1	.030
FSW 584-0103 (AVP/MW584C)	10-27-94	11	12	<.1	.050
FSW 584-0148 (AVP/MW584B)	10-27-94	17	15	<.1	.13
FSW 584-0198 (AVP/MW584A)	10-26-94	3.9	9.9	<.1	.040
FSW 585-0048 (AVP/MW585D)	11-08-94	3.9	13	<.1	.030
FSW 585-0084 (AVP/MW585C)	11-08-94	16	12	<.1	.050
FSW 585-0099 (AVP/MW585B)	11-08-94	19	17	<.1	.17
FSW 585-0124 (AVP/MW585A)	11-08-94	17	22	<.1	.10
FSW 587-0045 (AVP/MW587D)	11-07-94	4.8	9.3	<.1	.020
FSW 587-0098 (AVP/MW587C)	11-07-94	27	41	<.1	.080
FSW 587-0118 (AVP/MW587B)	11-07-94	25	27	<.1	.060
FSW 587-0167 (AVP/MW587A)	11-07-94	7.6	7.4	<.1	.040
FSW 588-0089 (AVP/MW588)	11-09-94	14	31	<.1	.080
FSW 589-0078 (AVP/MW589)	11-09-94	6.5	12	<.1	.020
FSW 592-0115 (AVP/MW592)	11-09-94	7.2	20	<.1	.030
SDW 313-0020	6-02-94	5.0	12	<.1	.030
SDW 313-0038	6-02-94	3.0	57	<.1	.030
SDW 313-0060	6-03-94	5.9	100	<.1	.030
SDW 313-0080	6-02-94	12	52	<.1	.030
SDW 314-0035	6-16-94	24	52	.3	.040
SDW 314-0051	6-16-94	29	60	.7	.070
SDW 314-0075	6-16-94	23	44	.2	.040
SDW 314-0075	6-16-94	22	46	.2	.040
SDW 314-0098	6-16-94	8.3	7.5	<.1	.030
SDW 314-0108 (AVP/MW314)	10-07-94	13	25	<.1	.030

Table 11. Major anions analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Sulfate, dissolved (mg/L)	Chloride, dissolved (mg/L)	Fluoride, dissolved (mg/L)	Bromide, dissolved (mg/L)
SDW 315-0061	11-15-94	6.7	21	<0.1	0.030
SDW 315-0082	11-02-94	10	25	<.1	.020
SDW 315-0104	11-02-94	8.5	5.8	<.1	.020
SDW 315-0126	11-02-94	14	6.8	<.1	.030
SDW 315-0149	11-02-94	12	6.1	<.1	.040
SDW 316-0051	10-31-94	12	15	<.1	.020
SDW 316-0066	11-01-94	16	29	.2	.040
SDW 316-0066-D	11-01-94	16	28	.2	.040
SDW 316-0082	10-31-94	11	26	.1	.040
SDW 316-0100	10-31-94	12	16	<.1	.050
SDW 316-0114 (AVP/MW316C)	11-01-94	11	30	<.1	.040
SDW 316-0134	10-31-94	9.7	39	<.1	.040
SDW 316-0148 (AVP/MW316B)	11-01-94	8.7	7.8	<.1	.030
SDW 316-0163 (AVP/MW316A)	11-01-94	16	6.3	<.1	.030
SDW 317-0027	10-14-94	20	50	1.1	.10
SDW 317-0051	10-14-94	27	48	.2	.040
SDW 318-0036	6-17-94	27	53	.9	.050
SDW 318-0064	6-17-94	23	49	.2	.030
SDW 344-0038	11-03-94	14	23	<.1	.030
SDW 344-0061	11-03-94	13	47	.2	.060
SDW 344-0080	11-03-94	9.1	21	.3	.080
SDW 344-0100	11-03-94	7.2	32	.2	.050
SDW 395-0028 (CS16MW7)	10-19-94	24	47	.9	.070
SDW 423-0058 (FTA1MW428B)	11-04-94	4.3	20	<.1	.040
SDW 423-0098 (FTA1MW428A)	11-04-94	12	21	<.1	.020
SDW 434-0014 (CS16MW3)	7-05-94	5.2	15	<.1	.020
SDW 434-0025 (CS16MW3B)	7-05-94	7.0	11	<.1	.030
SDW 434-0076 (CS16MW3A)	7-05-94	9.8	5.9	<.1	.020
SDW 436-0028 (CS16MW5)	11-08-94	24	52	.5	.090
SDW 437-0029 (CS16MW6)	11-08-94	24	56	.6	.080
SDW 438-0041 (CS16MW8)	10-20-94	26	50	.7	.10
SDW 440-0078	10-19-94	8.7	18	.5	.030
SDW 440-0078-D	10-19-94	8.4	18	.4	.030
SDW 467-0058	6-30-94	9.1	14	<.1	.030
SDW 590-0074 (AVP/MW590)	11-03-94	27	49	.5	.060
SDW 593-0075 (AVP/MW593)	11-03-94	7.8	17	<.1	.030
MMR STP Effluent at S317	2-02-95	25	54	.9	.060

Table 12. Nitrogen and phosphorus analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994

[Source of data: U.S. Geological Survey National Water Quality Laboratory. **Well cluster site and well No.:** Number in parentheses assigned by the Massachusetts Military Reservation. Locations of well clusters and wells are shown in figures 2 and 3. No., number; D, duplicate sample; MMR STP, Massachusetts Military Reservation sewage-treatment plant. mg/L, milligram per liter; <, actual value is less than method detection limit]

Well cluster site and well No.	Date	Nitrogen, nitrite, dissolved (mg/L as N)	Nitrogen, nitrite plus nitrate, dissolved (mg/L as N)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, ammonia plus organic, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)[1]
FSW 230-0042	7-20-94	<0.01	3.5	0.01	<0.20	0.23
FSW 230-0048	7-20-94	<.01	14.0	.01	<.20	1.1
FSW 230-0049	7-20-94	<.01	29.0	.02	.20	1.1
FSW 230-0058	7-20-94	.02	9.4	.01	<.20	.80
FSW 230-0068	7-21-94	.04	.74	.01	<.20	.06
FSW 230-0078	7-22-94	.05	.93	.02	<.20	.15
FSW 230-0088	7-21-94	.07	.82	.02	<.20	.10
FSW 230-0108	7-21-94	<.01	.90	.02	<.20	.13
FSW 230-0127	7-22-94	<.01	.89	<.01	<.20	.15
FSW 231-0057	8-12-94	.02	6.7	.02	.30	2.7
FSW 232-0058	9-22-94	<.01	17.0	<.01	.30	3.0
FSW 235-0094	6-07-94	<.01	.77	<.01	<.20	<.01
FSW 236-0070	10-20-94	<.01	.40	<.01	<.20	.09
FSW 236-0089	10-20-94	<.01	.72	<.01	<.20	.08
FSW 236-0106	10-20-94	<.01	1.2	<.01	<.20	<.01
FSW 236-0121	10-20-94	<.01	.57	<.01	<.20	.02
FSW 236-0141	10-20-94	<.01	.49	<.01	<.20	.04
FSW 237-0088	6-07-94	<.01	1.8	1.9	2.2	<.01
FSW 238-0106	6-10-94	<.01	.92	<.01	<.20	<.01
FSW 239-0010	6-06-94	<.01	.81	.02	<.20	<.01
FSW 239-0064	6-06-94	<.01	<.05	1.6	1.9	.05
FSW 239-0121	6-06-94	<.01	2.0	.35	.30	.03
FSW 242-0077	6-10-94	<.01	.93	<.01	<.20	<.01
FSW 244-0070	8-12-94	<.01	11.0	3.5	3.3	.03
FSW 244-0090	8-11-94	<.01	3.5	5.2	5.8	.07
FSW 244-0119	8-11-94	<.01	4.7	4.2	4.3	.04
FSW 254-0026	7-12-94	<.01	.72	<.01	<.20	<.01
FSW 254-0054	7-12-94	<.01	2.1	.02	4.7	<.01
FSW 254-0072	7-12-94	<.01	<.05	8.7	10	.04
FSW 254-0107	7-12-94	<.01	2.5	.95	1.0	.03
FSW 254-0140	7-13-94	<.01	.99	<.01	<.20	<.01
FSW 254-0168	7-13-94	<.01	2.9	<.01	<.20	<.01
FSW 254-0216	7-13-94	<.01	<.05	.08	<.20	<.01

[1]Values reported for dissolved orthophosphorus may be less than actual values because of potential sample preservation bias (see text, p. 15).

Table 12. Nitrogen and phosphorus analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nitrogen, nitrite, dissolved (mg/L as N)	Nitrogen, nitrite plus nitrate, dissolved (mg/L as N)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, ammonia plus organic, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)[1]
FSW 262-0041	7-14-94	<0.01	3.0	<0.01	<0.20	0.03
FSW 262-0069	7-14-94	<.01	2.9	6.3	6.1	.02
FSW 262-0085	7-14-94	<.01	3.4	1.3	1.3	.02
FSW 262-0109	7-14-94	<.01	1.5	<.01	<.20	.01
FSW 262-0109-D	7-14-94	<.01	1.5	<.01	<.20	<.01
FSW 262-0126	8-29-94	<.01	1.1	<.01	<.20	.07
FSW 262-0159	7-14-94	<.01	.26	<.01	<.20	.05
FSW 267-0088	7-08-94	<.01	.91	.01	<.20	.02
FSW 267-0111	7-08-94	<.01	2.2	.02	<.20	.03
FSW 267-0136	7-07-94	<.01	.72	.03	<.20	.03
FSW 267-0155	7-07-94	<.01	<.05	.07	<.20	<.01
FSW 271-0041	6-28-94	<.01	<.05	.02	<.20	<.01
FSW 271-0069	6-22-94	<.01	2.4	<.01	<.20	<.01
FSW 271-0084	6-22-94	<.01	3.1	.01	<.20	.01
FSW 271-0085	6-23-94	<.01	2.9	.01	<.20	.02
FSW 271-0099	6-22-94	.01	1.5	.01	<.20	.03
FSW 271-0114	6-23-94	.02	1.1	<.01	<.20	.02
FSW 271-0141	6-23-94	<.01	.42	.01	<.20	<.01
FSW 271-0165	6-24-94	<.01	<.05	.02	<.20	<.01
FSW 279-0061	10-17-94	<.01	.49	.03	<.20	.02
FSW 279-0086	10-17-94	<.01	<.05	.75	.70	1.4
FSW 279-0100 (AVP/MW586)	10-17-94	<.01	.14	<.01	<.20	<.01
FSW 282-0049	6-29-94	<.01	.07	.01	<.20	<.01
FSW 282-0070	6-30-94	<.01	1.6	<.01	<.20	.02
FSW 282-0083	6-30-94	<.01	3.1	.01	<.20	<.01
FSW 282-0094	6-29-94	<.01	3.0	.02	<.20	.02
FSW 282-0123	6-29-94	<.01	.18	<.01	<.20	<.01
FSW 288-0091	7-12-94	<.01	3.0	3.7	3.8	.03
FSW 294-0064	7-19-94	<.01	.10	.01	<.20	.02
FSW 294-0077	7-19-94	<.01	2.1	.02	<.20	.03
FSW 294-0089	7-19-94	<.01	2.4	.02	<.20	.05
FSW 294-0109	7-19-94	<.01	2.6	.02	<.20	.02
FSW 300-0010	6-20-94	<.01	<.05	.02	<.20	<.01
FSW 300-0030	6-21-94	<.01	.11	.70	.90	1.1
FSW 300-0050	6-22-94	<.01	.06	4.1	4.5	.83
FSW 300-0073	6-21-94	<.01	<.05	2.0	2.2	.22
FSW 300-0099	6-21-94	<.01	1.7	1.7	1.8	.07
FSW 300-0099-D	6-21-94	<.01	1.9	1.7	1.7	.07
FSW 300-0118	6-21-94	<.01	.97	<.01	<.20	.03
FSW 300-0138	6-21-94	<.01	.75	.02	<.20	.03

[1]Values reported for dissolved orthophosphorus may be less than actual values because of potential sample preservation bias (see text, p. 15).

Table 12. Nitrogen and phosphorus analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nitrogen, nitrite, dissolved (mg/L as N)	Nitrogen, nitrite plus nitrate, dissolved (mg/L as N)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, ammonia plus organic, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)[1]
FSW 343-0036	8-31-94	0.14	18.0	0.01	0.30	0.09
FSW 343-0057	8-31-94	<.01	<.05	1.5	1.6	.06
FSW 343-0057-D	8-31-94	<.01	<.05	1.5	1.5	.05
FSW 343-0079	8-30-94	<.01	<.05	1.9	1.9	.04
FSW 343-0099	8-30-94	<.01	.62	.01	<.20	.04
FSW 343-0114	8-30-94	<.01	.72	.01	<.20	.09
FSW 343-0129	8-30-94	<.01	.67	.01	<.20	.18
FSW 343-0145	8-31-94	<.01	1.0	<.01	<.20	.19
FSW 347-0020	10-18-94	<.01	1.3	<.01	<.20	.01
FSW 347-0031	10-18-94	.09	.14	.01	.20	1.1
FSW 347-0038	10-18-94	.03	15.	<.01	.20	1.5
FSW 347-0046	10-18-94	.16	3.3	<.01	<.20	.56
FSW 347-0067	10-19-94	<.01	.20	.04	<.20	.02
FSW 347-0067-D	10-19-94	<.01	<.05	.76	.80	1.7
FSW 347-0101	10-19-94	<.01	.68	.01	<.20	.30
FSW 347-0101-D	10-19-94	<.01	.83	<.01	<.20	.29
FSW 347-0116	10-18-94	<.01	.79	.02	<.20	.24
FSW 347-0131	10-18-94	<.01	.81	.01	<.20	.09
FSW 347-0145	10-19-94	<.01	.93	<.01	<.20	.03
FSW 348-0021	10-25-94	<.01	.12	<.01	<.20	<.01
FSW 348-0043	10-25-94	.02	.23	<.01	<.20	<.01
FSW 348-0073	10-25-94	<.01	<.05	.01	<.20	<.01
FSW 348-0098	10-25-94	<.01	.10	<.01	<.20	<.01
FSW 348-0148 (AVP/MW591)	10-25-94	<.01	.28	<.01	<.20	<.01
FSW 350-0013	9-06-94	<.01	<.05	.01	<.20	<.01
FSW 350-0052	9-06-94	<.01	1.2	<.01	<.20	<.01
FSW 350-0064	9-07-94	<.01	.54	.02	<.20	.03
FSW 350-0077	9-06-94	<.01	1.2	.01	<.20	.02
FSW 350-0084	9-07-94	.02	.31	.02	<.20	.03
FSW 350-0110	9-07-94	<.01	1.1	.01	<.20	.03
FSW 350-0125	9-08-94	<.01	1.5	<.01	<.20	.03
FSW 350-0140	9-08-94	<.01	.18	<.01	<.20	.02
FSW 355-0079	9-22-94	<.01	4.0	.06	<.20	<.01
FSW 355-0104	9-22-94	<.01	3.1	<.01	<.20	.03
FSW 355-0149	9-22-94	<.01	1.1	<.01	<.20	.05
FSW 356-0079	6-09-94	<.01	1.1	<.01	<.20	<.01
FSW 356-0108	6-09-94	<.01	.66	<.01	<.20	.03
FSW 356-0134	6-09-94	<.01	2.3	<.01	<.20	.02
FSW 357-0079	9-01-94	<.01	3.6	.02	<.20	<.01
FSW 357-0099	8-31-94	<.01	.81	.01	<.20	<.01
FSW 357-0119	8-31-94	<.01	.58	.02	<.20	.02
FSW 357-0139	9-01-94	<.01	.47	.06	<.20	.03

[1]Values reported for dissolved orthophosphorus may be less than actual values because of potential sample preservation bias (see text, p. 15).

Table 12. Nitrogen and phosphorus analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nitrogen, nitrite, dissolved (mg/L as N)	Nitrogen, nitrite plus nitrate, dissolved (mg/L as N)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, ammonia plus organic, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)[1]
FSW 358-0049	10-13-94	<0.01	0.42	<0.01	<0.20	<0.01
FSW 358-0089	10-13-94	<.01	.43	<.01	<.20	.03
FSW 358-0104	10-13-94	<.01	3.4	1.9	1.9	.03
FSW 358-0119	10-13-94	<.01	3.9	<.01	<.20	<.01
FSW 358-0132	10-13-94	<.01	3.4	<.01	<.20	<.01
FSW 359-0050	9-14-94	<.01	.98	<.01	<.20	<.01
FSW 359-0088	9-13-94	<.01	2.8	<.01	<.20	<.01
FSW 359-0107	9-13-94	<.01	4.1	<.01	<.20	<.01
FSW 359-0119	9-13-94	<.01	1.6	<.01	<.20	<.01
FSW 359-0141	9-14-94	<.01	2.4	<.01	<.20	<.01
FSW 373-0024	8-24-94	<.01	<.05	<.01	<.20	<.01
FSW 373-0060	8-24-94	<.01	1.1	<.01	<.20	<.01
FSW 373-0060-D	8-24-94	<.01	1.1	<.01	<.20	<.01
FSW 373-0073	8-25-94	<.01	2.9	6.1	6.3	.03
FSW 373-0082	8-24-94	<.01	2.3	.38	.30	.03
FSW 373-0113	8-25-94	<.01	1.3	<.01	<.20	.03
FSW 375-0015	8-15-94	<.01	.09	.05	<.20	<.01
FSW 375-0041	8-15-94	<.01	<.05	<.01	<.20	<.01
FSW 375-0055	8-16-94	<.01	<.05	.01	<.20	<.01
FSW 375-0055-D	8-16-94	<.01	<.05	<.01	<.20	.02
FSW 375-0071	8-16-94	<.01	1.2	<.01	<.20	.04
FSW 375-0081	8-16-94	<.01	.96	<.01	<.20	.03
FSW 375-0099	8-16-94	<.01	<.05	<.01	<.20	<.01
FSW 375-0119		<.01	<.05	.06	<.20	.19
FSW 378-0081	11-14-94	.09	.50	<.01	<.20	.03
FSW 379-0076	11-14-94	<.01	<.05	2.3	2.6	2.1
FSW 383-0023	8-10-94	<.01	2.3	.06	<.20	.14
FSW 383-0030	8-10-94	.12	16.0	.02	.20	.52
FSW 383-0040	8-09-94	.13	12.0	.02	<.20	.10
FSW 383-0061	8-10-94	<.01	<.05	.15	<.20	.43
FSW 383-0082	8-10-94	<.01	<.05	.11	<.20	.48
FSW 383-0106	8-10-94	<.01	.34	.07	<.20	.19
FSW 383-0129	8-11-94	<.01	1.5	.29	.30	.06
FSW 388-0037	6-07-94	<.01	3.2	.02	<.20	2.4
FSW 388-0072	6-07-94	<.01	.06	2.8	3.1	3.9
FSW 411-0036	9-20-94	<.01	3.0	<.01	<.20	<.01
FSW 411-0054	9-20-94	<.01	.85	<.01	<.20	<.01
FSW 411-0065	9-20-94	<.01	.71	10.0	10	.04
FSW 411-0081	9-20-94	<.01	2.6	5.6	5.5	.04
FSW 411-0094	9-20-94	<.01	2.3	.10	<.20	.02
FSW 411-0106	9-21-94	<.01	1.2	<.01	<.20	.05
FSW 411-0122	9-21-94	<.01	<.05	.03	<.20	.20

[1]Values reported for dissolved orthophosphorus may be less than actual values because of potential sample preservation bias (see text, p. 15).

Table 12. Nitrogen and phosphorus analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nitrogen, nitrite, dissolved (mg/L as N)	Nitrogen, nitrite plus nitrate, dissolved (mg/L as N)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, ammonia plus organic, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)[1]
FSW 412-0042	9-13-94	<0.01	<0.05	<0.01	<0.20	<0.01
FSW 412-0064	9-13-94	<.01	.44	<.01	<.20	<.01
FSW 412-0078	9-12-94	<.01	.53	<.01	<.20	<.01
FSW 412-0091	9-12-94	<.01	.52	<.01	<.20	<.01
FSW 412-0108	9-12-94	<.01	.65	<.01	<.20	<.01
FSW 418-0049	9-26-94	<.01	<.05	<.01	<.20	<.01
FSW 418-0089	9-27-94	<.01	1.3	<.01	<.20	<.01
FSW 418-0103	9-26-94	<.01	3.8	.02	<.20	.02
FSW 418-0122	9-26-94	<.01	1.6	<.01	<.20	<.01
FSW 418-0141	9-27-94	<.01	2.5	<.01	<.20	.02
FSW 422-0045	6-15-94	<.01	8.5	.53	1.0	4.6
FSW 422-0065	6-15-94	<.01	8.3	.72	.90	.04
FSW 422-0065-D	6-15-94	<.01	8.5	.72	1.0	.08
FSW 422-0085	6-15-94	<.01	7.3	1.4	1.7	.60
FSW 422-0105	6-15-94	<.01	2.1	.62	.70	.09
FSW 424-0020	7-06-94	<.01	.46	.03	<.20	<.01
FSW 424-0089 (AVP/MW581C)	7-06-94	<.01	1.1	.83	.80	.28
FSW 424-0144 (AVP/MW581B)	7-06-94	<.01	2.1	.07	<.20	.01
FSW 424-0183 (AVP/MW581A)	7-06-94	<.01	.52	.02	<.20	.02
FSW 429-0012	10-05-94	<.01	<.05	<.01	<.20	<.01
FSW 429-0068	10-05-94	<.01	2.0	<.01	<.20	.02
FSW 429-0078	10-05-94	<.01	2.0	<.01	<.20	.02
FSW 429-0094	10-05-94	<.01	.98	<.01	<.20	.03
FSW 431-0013	10-05-94	<.01	<.05	<.01	<.20	<.01
FSW 431-0018	10-05-94	<.01	<.05	.01	<.20	<.01
FSW 431-0065	10-05-94	<.01	1.7	<.01	<.20	.02
FSW 431-0078	10-05-94	<.01	2.1	<.01	<.20	.02
FSW 431-0093	10-05-94	.01	2.0	<.01	<.20	.02
FSW 432-0026	8-23-94	<.01	<.05	<.01	<.20	<.01
FSW 432-0059	8-23-94	<.01	.22	<.01	<.20	<.01
FSW 432-0079	8-24-94	<.01	.44	<.01	<.20	<.01
FSW 432-0092	8-24-94	<.01	.38	<.01	<.20	.01
FSW 433-0064	6-09-94	<.01	1.3	<.01	<.20	<.01
FSW 433-0090	6-09-94	<.01	1.7	.01	<.20	.02
FSW 433-0104	6-08-94	<.01	<.05	<.01	<.20	.05
FSW 433-0118	6-08-94	<.01	.06	.02	<.20	.02
FSW 433-0140	6-09-94	<.01	<.05	.01	<.20	.01
FSW 435-0064	9-19-94	<.01	1.1	<.01	<.20	<.01
FSW 435-0090	9-16-94	<.01	.57	<.01	<.20	.03
FSW 435-0105	9-15-94	<.01	<.05	.02	<.20	.07
FSW 435-0121	9-15-94	<.01	<.05	.12	<.20	.13
FSW 435-0140	9-16-94	<.01	<.05	.18	<.20	.12

[1]Values reported for dissolved orthophosphorus may be less than actual values because of potential sample preservation bias (see text, p. 15).

Table 12. Nitrogen and phosphorus analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nitrogen, nitrite, dissolved (mg/L as N)	Nitrogen, nitrite plus nitrate, dissolved (mg/L as N)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, ammonia plus organic, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)[1]
FSW 436-0036	8-17-94	<0.01	0.95	<0.01	<0.20	<0.01
FSW 436-0060	8-17-94	<.01	.39	.03	<.20	.02
FSW 436-0076	8-17-94	<.01	.37	<.01	<.20	.02
FSW 436-0091	8-18-94	<.01	<.05	.08	<.20	<.01
FSW 436-0115	8-18-94	<.01	<.05	.08	<.20	<.01
FSW 436-0141	8-19-94	<.01	<.05	.09	<.20	.21
FSW 443-0089	9-30-94	<.01	2.0	<.01	<.20	<.01
FSW 443-0104	10-03-94	<.01	1.0	<.01	<.20	.02
FSW 443-0117	10-03-94	<.01	.81	.01	<.20	.02
FSW 443-0140	10-03-94	<.01	1.7	<.01	<.20	.01
FSW 459-0064	10-04-94	<.01	1.0	<.01	<.20	<.01
FSW 459-0091	10-04-94	<.01	.17	<.01	<.20	<.01
FSW 459-0106	10-04-94	<.01	.20	<.01	<.20	.01
FSW 459-0121	10-04-94	<.01	1.2	<.01	<.20	.03
FSW 459-0136	10-04-94	<.01	1.4	.01	<.20	.05
FSW 460-0080	8-25-94	<.01	1.0	<.01	<.20	<.01
FSW 460-0100	8-25-94	<.01	1.6	<.01	<.20	<.01
FSW 460-0120	8-26-94	<.01	1.8	<.01	<.20	<.01
FSW 460-0140	8-26-94	<.01	.82	<.01	<.20	.03
FSW 470-0091	9-21-94	<.01	.36	.02	<.20	.02
FSW 470-0106	9-21-94	<.01	.36	<.01	<.20	<.01
FSW 470-0119	9-21-94	<.01	1.0	<.01	<.20	<.01
FSW 470-0142	9-21-94	<.01	<.05	<.01	<.20	<.01
FSW 474-0080	9-15-94	<.01	.83	<.01	<.20	<.01
FSW 474-0100	9-15-94	<.01	1.1	<.01	<.20	<.01
FSW 474-0115	9-14-94	<.01	1.8	<.01	<.20	<.01
FSW 474-0129	9-14-94	<.01	1.6	<.01	<.20	.01
FSW 474-0147	9-14-94	<.01	.14	<.01	<.20	.04
FSW 484-0007	10-06-94	<.01	.09	<.01	<.20	<.01
FSW 484-0023	10-06-94	<.01	1.0	<.01	<.20	.01
FSW 484-0078	10-06-94	<.01	.64	<.01	<.20	.02
FSW 484-0108	10-06-94	<.01	<.05	<.01	<.20	<.01
FSW 487-0012	10-11-94	<.01	1.4	<.01	<.20	<.01
FSW 487-0023	10-11-94	<.01	.12	.01	<.20	<.01
FSW 487-0078	10-11-94	<.01	1.2	<.01	<.20	<.01
FSW 487-0112	10-12-94	<.01	.59	<.01	<.20	.03
FSW 493-0008	10-12-94	<.01	<.05	.06	<.20	<.01
FSW 493-0024	10-12-94	<.01	.17	<.01	<.20	<.01
FSW 493-0074	10-12-94	<.01	<.05	.03	<.20	.05
FSW 493-0115	10-12-94	<.01	<.05	.03	<.20	.04
FSW 501-0087	9-30-94	<.01	1.0	.01	<.20	.02
FSW 501-0102	9-29-94	<.01	1.5	.02	<.20	.02
FSW 501-0117	9-29-94	<.01	<.05	.03	<.20	.03

[1]Values reported for dissolved orthophosphorus may be less than actual values because of potential sample preservation bias (see text, p. 15).

Table 12. Nitrogen and phosphorus analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nitrogen, nitrite, dissolved (mg/L as N)	Nitrogen, nitrite plus nitrate, dissolved (mg/L as N)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, ammonia plus organic, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)[1]
FSW 502-0087	9-29-94	<0.01	0.08	<0.01	<0.20	<0.01
FSW 502-0102	9-29-94	<.01	.94	<.01	<.20	<.01
FSW 502-0117	9-27-94	<.01	1.7	<.01	<.20	.01
FSW 502-0128	9-27-94	<.01	<.05	.02	<.20	.07
FSW 502-0139	9-27-94	<.01	<.05	.02	<.20	.08
FSW 564-0016	10-24-94	<.01	<.05	<.01	<.20	<.01
FSW 564-0100 (AVP/MW580)	10-24-94	<.01	2.9	.95	1.0	.04
FSW 564-0138	10-24-94	<.01	.53	<.01	<.20	.03
FSW 567-0136	11-09-94	<.01	.23	2.8	2.8	.92
FSW 570-0056	11-14-94	<.01	.10	<.01	<.20	<.01
FSW 570-0073	11-14-94	.05	16.0	.01	.20	.05
FSW 570-0091	11-10-94	.15	20.0	<.01	.20	.37
FSW 570-0111	11-10-94	.01	11.0	.15	.30	.05
FSW 582-0013 (AVP/MW582D)	10-26-94	<.01	.29	6.1	6.4	<.01
FSW 582-0038 (AVP/MW582C)	10-26-94	<.01	<.05	4.7	5.0	<.01
FSW 582-0038 (AVP/MW582C)-D	10-26-94	<.01	<.05	4.7	4.9	<.01
FSW 582-0073 (AVP/MW582B)	10-26-94	<.01	<.05	7.4	7.4	.02
FSW 582-0073 (AVP/MW582B)	10-26-94	<.01	<.05	7.4	7.5	.02
FSW 582-0168 (AVP/MW582A)	10-26-94	<.01	.58	.04	<.20	.02
FSW 583-0013 (AVP/MW583E)	10-28-94	<.01	<.05	.15	.20	<.01
FSW 583-0058 (AVP/MW583D)	10-27-94	<.01	<.05	<.01	<.20	<.01
FSW 583-0089 (AVP/MW583C)	10-27-94	<.01	<.05	7.7	13	<.01
FSW 583-0138 (AVP/MW583B)	10-28-94	<.01	2.2	7.4	7.7	.04
FSW 583-0173 (AVP/MW583A)	10-27-94	<.01	.51	<.01	<.20	.02
FSW 584-0013 (AVP/MW584D)	10-27-94	<.01	<.05	.18	.20	<.01
FSW 584-0103 (AVP/MW584C)	10-27-94	<.01	.19	.01	<.20	<.01
FSW 584-0148 (AVP/MW584B)	10-27-94	<.01	.66	.05	<.20	<.01
FSW 584-0198 (AVP/MW584A)	10-26-94	<.01	.27	<.01	<.20	.05
FSW 585-0048 (AVP/MW585D)	11-08-94	<.01	<.05	<.01	<.20	<.01
FSW 585-0084 (AVP/MW585C)	11-08-94	<.01	1.4	4.7	5.1	.02
FSW 585-0099 (AVP/MW585B)	11-08-94	<.01	.12	9.8	10	.06
FSW 585-0124 (AVP/MW585A)	11-08-94	<.01	<.05	.07	<.20	.02
FSW 587-0045 (AVP/MW587D)	11-07-94	<.01	<.05	.01	<.20	<.01
FSW 587-0098 (AVP/MW587C)	11-07-94	<.01	17.0	.57	.80	.07
FSW 587-0118 (AVP/MW587B)	11-07-94	<.01	9.6	.74	.80	.03
FSW 587-0167 (AVP/MW587A)	11-07-94	<.01	2.9	.01	<.20	.01
FSW 588-0089 (AVP/MW588)	11-09-94	<.01	14.0	1.9	2.1	.69
FSW 589-0078 (AVP/MW589)	11-09-94	<.01	.43	.01	<.20	.16
FSW 592-0115 (AVP/MW592)	11-09-94	<.01	.59	<.01	<.20	.02

[1]Values reported for dissolved orthophosphorus may be less than actual values because of potential sample preservation bias (see text, p. 15).

Table 12. Nitrogen and phosphorus analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nitrogen, nitrite, dissolved (mg/L as N)	Nitrogen, nitrite plus nitrate, dissolved (mg/L as N)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, ammonia plus organic, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)[1]
SDW 313-0020	6-02-94	<0.01	<0.05	0.02	<0.20	<0.01
SDW 313-0038	6-02-94	<.01	.23	.02	<.20	<.01
SDW 313-0060	6-03-94	<.01	.52	.02	<.20	<.01
SDW 313-0080	6-02-94	<.01	.50	.02	<.20	<.01
SDW 314-0035	6-16-94	<.01	22.0	.32	.70	3.1
SDW 314-0051	6-16-94	<.01	<.05	.01	.50	<.01
SDW 314-0075	6-16-94	<.01	1.6	.01	<.20	.01
SDW 314-0075	6-16-94	<.01	8.0	.53	1.1	4.7
SDW 314-0098	6-16-94	<.01	1.5	.03	<.20	.54
SDW 314-0108 (AVP/MW314)	10-07-94	<.01	.71	<.01	<.20	.05
SDW 315-0061	11-15-94	<.01	.11	.02	<.20	.01
SDW 315-0082	11-02-94	<.01	.35	<.01	<.20	<.01
SDW 315-0104	11-02-94	<.01	.51	<.01	<.20	.01
SDW 315-0126	11-02-94	<.01	.42	<.01	<.20	.02
SDW 315-0149	11-02-94	<.01	.37	<.01	<.20	.04
SDW 316-0051	10-31-94	<.01	4.4	<.01	<.20	.23
SDW 316-0066	11-01-94	.30	3.8	<.01	<.20	1.1
SDW 316-0066-D	11-01-94	.30	3.8	.01	<.20	1.1
SDW 316-0082	10-31-94	<.01	<.05	<.01	<.20	.55
SDW 316-0100	10-31-94	<.01	<.05	.04	<.20	2.0
SDW 316-0114 (AVP/MW316C)	11-01-94	<.01	1.9	<.01	<.20	.40
SDW 316-0134	10-31-94	<.01	1.9	.01	<.20	.29
SDW 316-0148 (AVP/MW316B)	11-01-94	<.01	.84	<.01	<.20	.70
SDW 316-0163 (AVP/MW316A)	11-01-94	<.01	.67	<.01	<.20	.21
SDW 317-0027	10-14-94	<.01	6.8	<.01	.40	4.0
SDW 317-0051	10-14-94	.01	15.	.02	.50	
SDW 318-0036	6-17-94	<.01	11.0	.93	1.4	4.3
SDW 318-0064	6-17-94	.05	7.8	2.2	3.1	3.5
SDW 344-0038	11-03-94	<.01	5.3	<.01	<.20	1.4
SDW 344-0061	11-03-94	.50	9.2	<.01	.30	3.2
SDW 344-0080	11-03-94	<.01	<.05	.81	.90	1.6
SDW 344-0100	11-03-94	<.01	<.05	.77	.80	1.9
SDW 395-0028 (CS16MW7)	10-19-94	<.01	18.0	.02	.40	4.6
SDW 423-0058 (FTA1MW428B)	11-04-94	<.01	.23	<.01	<.20	.02
SDW 423-0098 (FTA1MW428A)	11-04-94	<.01	.41	<.01	<.20	.01
SDW 434-0014 (CS16MW3)	7-05-94	<.01	.60	.03	<.20	.04
SDW 434-0025 (CS16MW3B)	7-05-94	<.01	.29	.02	.30	.46
SDW 434-0076 (CS16MW3A)	7-05-94	<.01	.27	.01	<.20	.01
SDW 436-0028 (CS16MW5)	11-08-94	.02	19.0	.03	.40	4.6
SDW 437-0029 (CS16MW6)	11-08-94	<.01	20.0	.02	.40	3.6
SDW 438-0041 (CS16MW8)	10-20-94	.01	18.0	.01	.40	3.7

[1]Values reported for dissolved orthophosphorus may be less than actual values because of potential sample preservation bias (see text, p. 15).

Table 12. Nitrogen and phosphorus analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nitrogen, nitrite, dissolved (mg/L as N)	Nitrogen, nitrite plus nitrate, dissolved (mg/L as N)	Nitrogen, ammonia, dissolved (mg/L as N)	Nitrogen, ammonia plus organic, dissolved (mg/L as N)	Phosphorus, ortho, dissolved (mg/L as P)[1]
SDW 440-0078	10-19-94	0.09	0.14	0.01	<0.20	1.2
SDW 440-0078-D	10-19-94	.09	.12	.01	<.20	1.1
SDW 467-0058	6-30-94	<.01	.56	.02	<.20	<.01
SDW 590-0074 (AVP/MW590)	11-03-94	<.01	15	.27	. 70	1.8
SDW 593-0075 (AVP/MW593)	11-03-94	<.01	.18	<.01	<.20	.09
MMR STP Effluent at S317	2-02-95	.02	21.0	2.5	4.5	3.1

[1]Values reported for dissolved orthophosphorus may be less than actual values because of potential sample preservation bias (see text, p. 15).

Table 13. Other plume constituents analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994

[Source of data: U.S. Geological Survey National Water Quality Laboratory. **Well cluster site and well No.:** Number in parentheses assigned by the Massachusetts Military Reservation. Locations of well clusters and wells are shown in figures 2 and 3. No., number; D, duplicate sample; MMR STP, Massachusetts Military Reservation sewage-treatment plant. mg/L, milligram per liter; µg/L, microgram per liter; <, actual value is less than method detection limit; --, no data available]

Well cluster site and well No.	Date	Boron, dissolved (µg/L)	Iron, dissolved, (µg/L)	Manganese, dissolved (µg/L)	Carbon, organic, dissolved (mg/L as C)	Methylene blue active substances (mg/L)
FSW 230-0042	7-20-94	60	19	150	1.0	0.04
FSW 230-0048	7-20-94	170	17	69	1.8	.07
FSW 230-0049	7-20-94	260	26	68	2.1	.05
FSW 230-0058	7-20-94	80	15	70	1.2	.02
FSW 230-0068	7-21-94	30	21	46	.8	<.02
FSW 230-0078	7-22-94	40	11	58	.8	<.02
FSW 230-0088	7-21-94	70	4	2	.2	<.02
FSW 230-0108	7-21-94	50	9	34	.2	<.02
FSW 230-0127	7-22-94	10	7	38	.1	<.02
FSW 231-0057	8-12-94	140	10	31	2.5	.03
FSW 232-0058	9-22-94	360	16	43	3.0	.05
FSW 232-0058-D	9-22-94	360	17	43	3.1	.06
FSW 235-0094	6-07-94	20	<3	4	.2	<.02
FSW 236-0070	10-20-94	20	6	16	.4	<.02
FSW 236-0089	10-20-94	30	<3	20	.2	<.02
FSW 236-0106	10-20-94	30	140	120	.2	<.02
FSW 236-0121	10-20-94	10	<3	170	.2	<.02
FSW 236-0141	10-20-94	10	<3	10	.1	<.02
FSW 237-0088	6-07-94	30	6	72	.3	<.02
FSW 238-0106	6-10-94	20	6	3	.2	<.02
FSW 239-0010	6-06-94	10	<3	5	.3	<.02
FSW 239-0064	6-06-94	310	110	3,200	1.5	.04
FSW 239-0121	6-06-94	50	7	460	.1	<.02
FSW 242-0077	6-10-94	20	180	38	0.1	<0.02
FSW 244-0070	8-12-94	220	8	2,800	1.2	.13
FSW 244-0090	8-11-94	240	4	280	1.2	.12
FSW 244-0119	8-11-94	90	4	150	.6	.07
FSW 254-0026	7-12-94	10	6	16	.3	<.02
FSW 254-0054	7-12-94	130	7	480	.8	.03
FSW 254-0072	7-12-94	160	410	660	.9	.09
FSW 254-0107	7-12-94	50	4	5	.2	.03
FSW 254-0140	7-13-94	140	500	83	.6	.14
FSW 254-0168	7-13-94	<10	1,600	24	.3	<.02
FSW 254-0216	7-13-94	<10	3,000	35	<.1	<.02

Table 13. Other plume constituents analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Boron, dissolved (µg/L)	Iron, dissolved, (µg/L)	Manganese, dissolved (µg/L)	Carbon, organic, dissolved (mg/L as C)	Methylene blue active substances (mg/L)
FSW 262-0041	7-14-94	10	<3	66	.3	<.02
FSW 262-0069	7-14-94	120	4	5	.6	.06
FSW 262-0085	7-14-94	80	<3	4	.4	.06
FSW 262-0109	7-14-94	170	<3	4	.9	.55
FSW 262-0109-D	7-14-94	170	7	5	.6	.54
FSW 262-0126	8-29-94	10	5	2	.4	.35
FSW 262-0159	7-14-94	20	750	64	.2	.14
FSW 267-0088	7-08-94	50	6	16	.3	<.02
FSW 267-0111	7-08-94	20	6	2	.2	<.02
FSW 267-0136	7-07-94	10	<3	<1	.2	<.02
FSW 267-0155	7-07-94	<10	3,500	290	.1	<.02
FSW 271-0041	6-28-94	10	<3	24	.2	<.02
FSW 271-0069	6-22-94	10	<3	5	.2	<.02
FSW 271-0084	6-22-94	90	3	2	.3	<.02
FSW 271-0085	6-23-94	90	4	3	.3	<.02
FSW 271-0099	6-22-94	210	6	14	.7	.22
FSW 271-0114	6-23-94	190	14	13	1.0	.81
FSW 271-0141	6-23-94	<10	140	3	.1	<.02
FSW 271-0165	6-24-94	<10	4,500	240	.1	<.02
FSW 279-0061	10-17-94	30	15	6	.2	<.02
FSW 279-0086	10-17-94	40	21	5	--	<.02
FSW 279-0100 (AVP/MW586)	10-17-94	40	4	5	.2	<.02
FSW 282-0049	6-29-94	<10	<3	<1	.2	<.02
FSW 282-0070	6-30-94	110	4	4	.4	<.02
FSW 282-0083	6-30-94	80	<3	15	.2	.04
FSW 282-0094	6-29-94	90	5	8	.3	.05
FSW 282-0123	6-29-94	<10	30	8	.1	<.02
FSW 288-0091	7-12-94	60	<3	10	.3	.03
FSW 294-0064	7-19-94	20	4	1	.2	<.02
FSW 294-0077	7-19-94	30	89	460	.7	<.02
FSW 294-0089	7-19-94	90	<3	10	.5	.15
FSW 294-0109	7-19-94	10	12	3	.2	.10
FSW 300-0010	6-20-94	10	<3	37	0.3	<0.02
FSW 300-0030	6-21-94	200	4	4,100	1.3	.04
FSW 300-0050	6-22-94	220	7	6,400	1.5	.05
FSW 300-0073	6-21-94	100	6	2,800	.6	.02
FSW 300-0099	6-21-94	40	5	130	.4	<.02
FSW 300-0099-D	6-21-94	40	<3	120	.3	<.02
FSW 300-0118	6-21-94	20	<3	1	.1	<.02
FSW 300-0138	6-21-94	<10	9	2	<.1	<.02

Table 13. Other plume constituents analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Boron, dissolved (µg/L)	Iron, dissolved, (µg/L)	Manganese, dissolved (µg/L)	Carbon, organic, dissolved (mg/L as C)	Methylene blue active substances (mg/L)
FSW 343-0036	8-31-94	380	22	500	2.6	.09
FSW 343-0057	8-31-94	340	17,000	270	2.1	.14
FSW 343-0057-D	8-31-94	340	16,000	270	1.8	.14
FSW 343-0079	8-30-94	230	22,000	310	1.8	.16
FSW 343-0099	8-30-94	30	6	21	.3	<.02
FSW 343-0114	8-30-94	20	5	6	.2	<.02
FSW 343-0129	8-30-94	20	290	63	.2	<.02
FSW 343-0145	8-31-94	10	9	46	.1	<.02
FSW 347-0020	10-18-94	30	4	39	.6	<.02
FSW 347-0031	10-18-94	220	7	610	2.5	.11
FSW 347-0038	10-18-94	320	13	1,100	2.5	.15
FSW 347-0046	10-18-94	180	7	340	1.4	.05
FSW 347-0067	10-19-94	60	7,300	800	.8	<.02
FSW 347-0067-D	10-19-94	70	7,400	810	.8	.04
FSW 347-0101	10-19-94	30	<3	120	.6	<.02
FSW 347-0101-D	10-19-94	30	<3	120	.4	<.02
FSW 347-0116	10-18-94	10	16	1,100	.2	<.02
FSW 347-0131	10-18-94	30	<3	250	.2	<.02
FSW 347-0145	10-19-94	30	<3	33	.2	<.02
FSW 348-0021	10-25-94	40	<3	<1	.4	<.02
FSW 348-0043	10-25-94	30	21	2	.5	<.02
FSW 348-0073	10-25-94	50	4	1	.5	<.02
FSW 348-0098	10-25-94	40	3	<1	.4	<.02
FSW 348-0148 (AVP/MW591)	10-25-94	50	4	5	.2	<.02
FSW 350-0013	9-06-94	<10	10	63	.4	<.02
FSW 350-0052	9-06-94	10	4	2	.2	<.02
FSW 350-0064	9-07-94	160	<3	5	.5	.06
FSW 350-0077	9-06-94	230	4	17	.7	.24
FSW 350-0084	9-07-94	250	4	20	1.1	.57
FSW 350-0110	9-07-94	120	5	12	.8	1.2
FSW 350-0125	9-08-94	10	<3	4	.2	.11
FSW 350-0140	9-08-94	10	150	6	5.6	<.02
FSW 355-0079	9-22-94	20	<3	2	.2	<.02
FSW 355-0104	9-22-94	90	<3	12	.2	.02
FSW 355-0149	9-22-94	10	11	2	.1	.07
FSW 356-0079	6-09-94	30	4	980	<0.1	<0.02
FSW 356-0108	6-09-94	200	4	7	.6	.05
FSW 356-0134	6-09-94	<10	<3	4	.2	1.0
FSW 357-0079	9-01-94	10	17	15	.3	.03
FSW 357-0099	8-31-94	20	51	5	.2	<.02
FSW 357-0119	8-31-94	210	8	12	1.2	.18
FSW 357-0139	9-01-94	100	190	70	1.0	1.2

Table 13. Other plume constituents analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Boron, dissolved (µg/L)	Iron, dissolved, (µg/L)	Manganese, dissolved (µg/L)	Carbon, organic, dissolved (mg/L as C)	Methylene blue active substances (mg/L)
FSW 358-0049	10-13-94	10	<3	19	.2	<.02
FSW 358-0089	10-13-94	20	<3	<1	.1	<.02
FSW 358-0104	10-13-94	60	<3	17	.2	<.02
FSW 358-0119	10-13-94	70	<3	15	.2	<.02
FSW 358-0132	10-13-94	60	4	33	.2	.07
FSW 359-0050	9-14-94	<10	<3	30	.3	<.02
FSW 359-0088	9-13-94	20	4	4	.2	.04
FSW 359-0107	9-13-94	10	<3	9	.2	<.02
FSW 359-0119	9-13-94	30	<3	4	.1	<.02
FSW 359-0141	9-14-94	70	<3	6	.2	<.02
FSW 373-0024	8-24-94	<10	<3	5	.3	<.02
FSW 373-0060	8-24-94	20	<3	6	.3	.03
FSW 373-0060-D	8-24-94	30	<3	6	.4	<.02
FSW 373-0073	8-25-94	80	<3	26	.5	.02
FSW 373-0082	8-24-94	40	3	8	.3	.02
FSW 373-0113	8-25-94	30	4	6	.7	1.1
FSW 375-0015	8-15-94	10	1,300	28	7.4	.05
FSW 375-0041	8-15-94	10	16	140	1.1	<.02
FSW 375-0055	8-16-94	20	4	2	.7	<.02
FSW 375-0055-D	8-16-94	20	6	2	.8	<.02
FSW 375-0071	8-16-94	10	6	<1	.2	.02
FSW 375-0081	8-16-94	<10	6	1	<.1	.03
FSW 375-0099	8-16-94	<10	520	6	.2	<.02
FSW 375-0119	8-17-94	10	1,800	130	.2	<.02
FSW 378-0081	11-14-94	50	<3	97	.5	.02
FSW 379-0076	11-14-94	430	1,200	680	2.8	.18
FSW 383-0023	8-10-94	60	<3	8	.6	<.02
FSW 383-0030	8-10-94	320	9	310	2.3	.08
FSW 383-0040	8-09-94	370	99	390	1.9	.18
FSW 383-0061	8-10-94	260	3,300	71	1.4	.02
FSW 383-0082	8-10-94	100	3,500	140	1.0	.03
FSW 383-0106	8-10-94	20	4	2,300	.3	<.02
FSW 383-0129	8-11-94	10	3	180	.2	<.02
FSW 388-0037	6-07-94	160	5	60	1.3	<.02
FSW 388-0072	6-07-94	190	33	1,200	1.5	.05
FSW 411-0036	9-20-94	20	<3	81	0.4	<0.02
FSW 411-0054	9-20-94	<10	<3	18	.3	<.02
FSW 411-0065	9-20-94	230	<3	44	1.3	.12
FSW 411-0081	9-20-94	150	<3	5	.6	.04
FSW 411-0094	9-20-94	90	<3	5	.4	.04
FSW 411-0106	9-21-94	50	<3	10	.3	.06
FSW 411-0122	9-21-94	<10	120	710	<.1	.03

Table 13. Other plume constituents analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Boron, dissolved (µg/L)	Iron, dissolved, (µg/L)	Manganese, dissolved (µg/L)	Carbon, organic, dissolved (mg/L as C)	Methylene blue active substances (mg/L)
FSW 412-0042	9-13-94	10	<3	2	.2	<.02
FSW 412-0064	9-13-94	10	<3	10	.2	.05
FSW 412-0078	9-12-94	20	<3	4	.3	<.02
FSW 412-0091	9-12-94	20	<3	5	.2	<.02
FSW 412-0108	9-12-94	20	<3	12	.2	<.02
FSW 418-0049	9-26-94	10	<3	12	.3	<.02
FSW 418-0089	9-27-94	10	<3	1	.1	<.02
FSW 418-0103	9-26-94	30	<3	<1	.2	<.02
FSW 418-0122	9-26-94	<10	4	<1	<.1	<.02
FSW 418-0141	9-27-94	<10	<3	1	<.1	<.02
FSW 422-0045	6-15-94	40	<3	12	.4	<.02
FSW 422-0065	6-15-94	260	6	1,400	1.3	<.02
FSW 422-0065-D	6-15-94	260	7	1,400	1.2	<.02
FSW 422-0085	6-15-94	260	8	1,500	1.0	<.02
FSW 422-0105	6-15-94	80	4	2,000	1.7	.03
FSW 424-0020	7-06-94	20	8	10	.3	<.02
FSW 424-0089 (AVP/MW581C)	7-06-94	270	35	4,900	1.1	.13
FSW 424-0144 (AVP/MW581B)	7-06-94	20	<3	6	.2	<.02
FSW 424-0183 (AVP/MW581A)	7-06-94	20	8	120	<.1	<.02
FSW 429-0012	10-05-94	<10	<3	35	.4	<.02
FSW 429-0068	10-05-94	50	<3	1	.2	<.02
FSW 429-0078	10-05-94	<10	<3	4	.4	.42
FSW 429-0094	10-05-94	<10	<3	<1	.3	.04
FSW 431-0013	10-05-94	20	260	66	1.1	.02
FSW 431-0018	10-05-94	<10	<3	6	.3	<.02
FSW 431-0065	10-05-94	60	<3	<1	.2	.02
FSW 431-0078	10-05-94	200	<3	9	.4	.17
FSW 431-0093	10-05-94	230	<3	5	.5	.13
FSW 432-0026	8-23-94	10	5	37	.4	<.02
FSW 432-0059	8-23-94	40	<3	2	.2	.05
FSW 432-0079	8-24-94	10	<3	8	.2	<.02
FSW 432-0092	8-24-94	20	<3	9	.2	<.02
FSW 433-0064	6-09-94	20	<3	11	.3	<.02
FSW 433-0090	6-09-94	70	<3	2	<.1	<.02
FSW 433-0104	6-08-94	60	4	19	.6	.43
FSW 433-0118	6-08-94	20	2,700	47	.4	.17
FSW 433-0140	6-09-94	<10	1,100	40	.2	<.02
FSW 435-0064	9-19-94	<10	<3	9	0.3	<0.02
FSW 435-0090	9-16-94	10	15	4	.1	<.02
FSW 435-0105	9-15-94	10	62	27	.2	.05
FSW 435-0121	9-15-94	10	20	43	.2	<.02
FSW 435-0140	9-16-94	10	2,300	290	.2	<.02

Table 13. Other plume constituents analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Boron, dissolved (µg/L)	Iron, dissolved, (µg/L)	Manganese, dissolved (µg/L)	Carbon, organic, dissolved (mg/L as C)	Methylene blue active substances (mg/L)
FSW 436-0036	8-17-94	20	<3	21	.2	<.02
FSW 436-0060	8-17-94	20	<3	<1	.2	<.02
FSW 436-0076	8-18-94	<10	<3	<1	.1	<.02
FSW 436-0091	8-18-94	<10	3,300	80	.2	<.02
FSW 436-0115	8-18-94	10	2,600	73	.2	<.02
FSW 436-0141	8-19-94	20	150	200	.3	<.02
FSW 443-0089	9-30-94	<10	<3	5	.3	<.02
FSW 443-0104	10-03-94	170	23	10	.5	.03
FSW 443-0117	10-03-94	180	4	11	1.2	1.4
FSW 443-0140	10-03-94	<10	<3	4	.7	.84
FSW 459-0064	10-04-94	<10	<3	190	.4	<.02
FSW 459-0091	10-04-94	<10	<3	2	.2	<.02
FSW 459-0106	10-04-94	10	<3	1	.2	<.02
FSW 459-0121	10-04-94	<10	<3	<1	.1	<.02
FSW 459-0136	10-04-94	<10	<3	<1	.2	<.02
FSW 460-0080	8-25-94	40	<3	7	.3	<.02
FSW 460-0100	8-25-94	20	4	5	.2	<.02
FSW 460-0120	8-26-94	30	<3	13	.3	<.02
FSW 460-0140	8-26-94	260	11	24	1.2	.34
FSW 470-0091	9-21-94	<10	<3	<1	.2	<.02
FSW 470-0106	9-21-94	<10	5	1	.1	<.02
FSW 470-0119	9-21-94	<10	<3	1	.2	<.02
FSW 470-0142	9-21-94	<10	750	4	<.1	.03
FSW 474-0080	9-15-94	10	<3	7	.2	<.02
FSW 474-0100	9-15-94	<10	<3	6	.2	<.02
FSW 474-0115	9-14-94	<10	<3	6	.2	<.02
FSW 474-0129	9-14-94	20	<3	4	.2	<.02
FSW 474-0147	9-14-94	360	<3	29	1.6	.85
FSW 484-0007	10-06-94	10	85	27	1.4	.02
FSW 484-0023	10-06-94	<10	<3	3	.2	<.02
FSW 484-0078	10-06-94	<10	7	<1	.2	<.02
FSW 484-0108	10-06-94	<10	880	16	.2	<.02
FSW 487-0012	10-11-94	20	5	75	.7	<.02
FSW 487-0023	10-11-94	<10	<3	89	.3	<.02
FSW 487-0078	10-11-94	10	<3	5	.2	<.02
FSW 487-0112	10-12-94	<10	7	<1	.1	<.02
FSW 493-0008	10-12-94	20	190	4	1.5	.02
FSW 493-0024	10-12-94	20	6	30	.9	<.02
FSW 493-0074	10-12-94	<10	2,800	44	.2	.04
FSW 493-0115	10-12-94	10	2,700	54	.1	<.02
FSW 501-0087	9-30-94	--	110	4	--	--
FSW 501-0102	9-29-94	20	950	130	0.5	0.54
FSW 501-0117	9-29-94	<10	1,100	48	.1	<.02

Table 13. Other plume constituents analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Boron, dissolved (µg/L)	Iron, dissolved, (µg/L)	Manganese, dissolved (µg/L)	Carbon, organic, dissolved (mg/L as C)	Methylene blue active substances (mg/L)
FSW 502-0087	9-29-94	20	<3	9	.2	<.02
FSW 502-0102	9-29-94	20	<3	3	.2	<.02
FSW 502-0117	9-27-94	<10	<3	3	.1	<.02
FSW 502-0128	9-27-94	<10	1,200	75	.1	<.02
FSW 502-0139	9-27-94	<10	1,400	57	.1	<.02
FSW 564-0016	10-24-94	20	9	150	.5	<.02
FSW 564-0100 (AVP/MW580)	10-24-94	20	<3	19	.3	<.02
FSW 564-0138	10-24-94	20	4	3	.2	<.02
FSW 567-0136	11-09-94	50	5	700	.4	.03
FSW 570-0056	11-14-94	20	<3	13	.4	<.02
FSW 570-0073	11-14-94	340	13	440	1.7	.06
FSW 570-0091	11-10-94	400	18	3,400	2.2	.14
FSW 570-0111	11-10-94	250	10	2,700	1.4	.09
FSW 582-0013 (AVP/MW582D)	10-26-94	290	80	40	1.9	.09
FSW 582-0038 (AVP/MW582C)	10-26-94	320	20	300	1.4	.06
FSW 582-0038 (AVP/MW582C)-D	10-26-94	310	21	300	1.4	.09
FSW 582-0073 (AVP/MW582B)	10-26-94	220	11	180	1.2	.06
FSW 582-0073 (AVP/MW582B)	10-26-94	240	7	180	1.3	.06
FSW 582-0168 (AVP/MW582A)	10-26-94	20	<3	41	.2	<.02
FSW 583-0013 (AVP/MW583E)	10-28-94	40	490	440	1.0	<.02
FSW 583-0058 (AVP/MW583D)	10-27-94	40	35	4	.6	<.02
FSW 583-0089 (AVP/MW583C)	10-27-94	190	45	<1	2.1	.11
FSW 583-0138 (AVP/MW583B)	10-28-94	130	13	77	.6	.04
FSW 583-0173 (AVP/MW583A)	10-27-94	20	<3	4	.2	<.02
FSW 584-0013 (AVP/MW584D)	10-27-94	30	32	890	.8	<.02
FSW 584-0103 (AVP/MW584C)	10-27-94	40	<3	2	.4	<.02
FSW 584-0148 (AVP/MW584B)	10-27-94	190	4	22	.7	.08
FSW 584-0198 (AVP/MW584A)	10-26-94	20	<3	2	.1	<.02
FSW 585-0048 (AVP/MW585D)	11-08-94	10	<3	8	.3	<.02
FSW 585-0084 (AVP/MW585C)	11-08-94	150	15	11	.8	.04
FSW 585-0099 (AVP/MW585B)	11-08-94	220	8	52	.9	.10
FSW 585-0124 (AVP/MW585A)	11-08-94	10	3,100	100	.5	.16
FSW 587-0045 (AVP/MW587D)	11-07-94	<10	<3	64	.3	<.02
FSW 587-0098 (AVP/MW587C)	11-07-94	440	14	5,100	1.8	.11
FSW 587-0118 (AVP/MW587B)	11-07-94	300	11	2,300	1.3	.11
FSW 587-0167 (AVP/MW587A)	11-07-94	40	4	18	.2	<.02
FSW 588-0089 (AVP/MW588)	11-09-94	180	5	2,500	1.4	.10
FSW 589-0078 (AVP/MW589)	11-09-94	30	<3	710	0.4	<0.02
FSW 592-0115 (AVP/MW592)	11-09-94	20	<3	15	.1	<.02

Table 13. Other plume constituents analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Boron, dissolved (µg/L)	Iron, dissolved, (µg/L)	Manganese, dissolved (µg/L)	Carbon, organic, dissolved (mg/L as C)	Methylene blue active substances (mg/L)
SDW 313-0020	6-02-94	20	5	6	.3	<.02
SDW 313-0038	6-02-94	20	<3	9	.2	<.02
SDW 313-0060	6-03-94	30	3	12	.2	<.02
SDW 313-0080	6-02-94	30	4	4	.3	<.02
SDW 314-0035	6-16-94	380	15	33	4.9	.07
SDW 314-0051	6-16-94	390	13	26	3.6	.12
SDW 314-0075	6-16-94	320	14	110	3.7	.09
SDW 314-0075	6-16-94	310	12	110	3.8	.09
SDW 314-0098	6-16-94	30	3	110	.6	.04
SDW 314-0108 (AVP/MW314)	10-07-94	30	<3	47	.2	<.02
SDW 315-0061	11-15-94	30	<3	14	.4	<.02
SDW 315-0082	11-02-94	<10	<3	5	.2	<.02
SDW 315-0104	11-02-94	20	<3	1	.2	<.02
SDW 315-0126	11-02-94	30	<3	2	.2	<.02
SDW 315-0149	11-02-94	10	<3	<1	.1	<.02
SDW 316-0051	10-31-94	40	3	44	1.6	.05
SDW 316-0066	11-01-94	80	7	160	1.2	.02
SDW 316-0066-D	11-01-94	90	8	160	1.0	.04
SDW 316-0082	10-31-94	20	8	110	.6	.04
SDW 316-0100	10-31-94	50	18,000	170	.6	.03
SDW 316-0114 (AVP/MW316C)	11-01-94	80	7	26	.5	.03
SDW 316-0134	10-31-94	50	12	22	.3	<.02
SDW 316-0148 (AVP/MW316B)	11-01-94	10	42	12	.2	<.02
SDW 316-0163 (AVP/MW316A)	11-01-94	20	3	51	.3	<.02
SDW 317-0027	10-14-94	380	20	10	2.5	.06
SDW 317-0051	10-14-94	330	11	67	3.4	.10
SDW 318-0036	6-17-94	360	15	24	3.6	.05
SDW 318-0064	6-17-94	280	13	56	4.9	.25
SDW 344-0038	11-03-94	110	7	12	1.1	<.02
SDW 344-0061	11-03-94	380	13	64	2.8	.08
SDW 344-0080	11-03-94	50	14,000	250	1.1	.04
SDW 344-0100	11-03-94	50	9,100	210	.6	<.02
SDW 395-0028 (CS16MW7)	10-19-94	300	25	8	2.9	.04
SDW 423-0058 (FTA1MW428B)	11-04-94	20	<3	17	.4	<.02
SDW 423-0098 (FTA1MW428A)	11-04-94	30	7	2	.2	<.02
SDW 434-0014 (CS16MW3)	7-05-94	10	<3	28	.9	<.02
SDW 434-0025 (CS16MW3B)	7-05-94	20	4	13	.6	<.02
SDW 434-0076 (CS16MW3A)	7-05-94	<10	4	2	.2	<.02
SDW 436-0028 (CS16MW5)	11-08-94	370	21	32	3.2	.06
SDW 437-0029 (CS16MW6)	11-08-94	340	17	58	2.8	0.05

Table 13. Other plume constituents analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Boron, dissolved (μg/L)	Iron, dissolved, (μg/L)	Manganese, dissolved (μg/L)	Carbon, organic, dissolved (mg/L as C)	Methylene blue active substances (mg/L)
SDW 438-0041 (CS16MW8)	10-20-94	390	38	24	3.5	.05
SDW 440-0078	10-19-94	30	110	37	.7	<.02
SDW 440-0078	10-19-94	20	110	37	.8	<.02
SDW 467-0058	6-30-94	70	<3	11	.3	<.02
SDW 590-0074 (AVP/MW590)	11-03-94	410	29	58	3.0	.12
SDW 593-0075 (AVP/MW593)	11-03-94	20	6	10	.3	<.02
MMR STP Effluent at S317	2-02-95	400	200	28	16	<.02

Table 14. Organic carbon, inorganic carbon, and ultraviolet/visible absorbance analyses for water samples from selected wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through November 1994

[Source of data: Larry B. Barber, II, U.S. Geological Survey, Water Resources Division, National Research Program. **Well cluster site and well No.:** Number in parentheses assigned by the Massachusetts Military Reservation. Locations of well clusters and wells are shown in figures 2 and 3. No., number; MMR STP, Massachusetts Military Reservation sewage-treatment plant. **Dissolved organic carbon fractionation:** Y, dissolved organic carbon fractionation data in table 15. nm, nanometer; mg/L, milligram per liter; <, actual value is less than method detection limit; --, no data available]

Well cluster site and well No.	Date	Carbon, organic, total (mg/L)	Carbon, inorganic, total (mg/L)	Carbon, organic, dissolved (mg/L)	Carbon, inorganic, dissolved (mg/L)	Dissolved organic carbon fraction-ation	Absorbance, filtered sample, 254-nm wavelength (x1,000)	Absorbance, filtered sample, 400-nm wavelength (x1,000)
FSW 230-0042	7-20-94	0.9	10.0	1.1	6.3	--	26	--
FSW 230-0048	7-20-94	1.9	16.7	1.8	7.4	--	53	--
FSW 230-0049	7-20-94	2.3	18.2	2.2	13.9	Y	72	5
FSW 230-0058	7-20-94	1.2	11.7	1.2	5.2	--	34	2
FSW 230-0068	7-21-94	.9	4.4	.9	3.2	--	98	--
FSW 230-0078	7-22-94	.8	4.9	.9	2.1	--	11	2
FSW 230-0088	7-21-94	.8	12.1	.8	5.0	--	5	1
FSW 230-0108	7-21-94	.2	3.4	.3	1.4	-	0	1
FSW 230-0127	7-22-94	<.1	1.8	.1	.6	--	0	1
FSW 236-0070	10-20-94	.3	3.5	.3	2.5	--	0	1
FSW 236-0089	10-20-94	.2	3.1	.2	2.8	--	0	1
FSW 236-0106	10-20-94	.2	2.8	.2	2.5	--	0	1
FSW 236-0121	10-20-94	.1	2.0	.1	1.0	--	0	1
FSW 236-0141	10-20-94	.1	2.8	.1	1.5	--	0	1
FSW 244-0070	8-12-94	1.3	12.9	1.3	10.3	--	29	--
FSW 244-0090	8-11-94	1.4	13.6	1.4	11.6	--	30	--
FSW 244-0119	8-11-94	.7	7.3	.5	7.2	--	15	--
FSW 254-0026	7-12-94	.2	3.1	.2	.5	--	8	--
FSW 254-0054	7-12-94	.9	10.5	1.0	--	--	65	--
FSW 254-0072	7-12-94	1.0	13.4	1.1	13.5	--	43	--
FSW 254-0107	7-12-94	.3	5.8	.4	--	--	24	--
FSW 254-0140	7-13-94	.6	12.9	.6	14.2	--	18	--
FSW 254-0168	7-13-94	.2	5.3	<.1	--	--	7	--
FSW 254-0216	7-13-94	.1	2.8	.2	--	--	11	--
FSW 262-0041	7-14-94	.1	2.0	0.3	1.8	--	10	--
FSW 262-0069	7-14-94	.7	5.5	.7	5.4	--	19	--
FSW 262-0085	7-14-94	.4	5.3	.4	5.4	--	15	--
FSW 262-0109	7-14-94	.7	9.0	.7	8.7	--	16	--
FSW 262-0126	8-29-94	.6	7.5	1.3	7.3	--	15	--
FSW 262-0159	7-14-94	.3	9.8	.2	9.6	--	11	--
FSW 271-0041	6-28-94	<.1	1.7	<.1	1.2	--	15	--
FSW 271-0069	6-22-94	<.1	3.0	<.1	2.6	--	15	--
FSW 271-0084	6-22-94	<.1	4.1	<.1	4.0	--	10	--
FSW 271-0085	6-23-94	<.1	4.4	<.1	3.5	--	10	--
FSW 271-0099	6-22-94	.5	8.0	.6	7.9	--	20	--
FSW 271-0114	6-23-94	1.0	8.9	1.1	8.3	--	23	--
FSW 271-0141	6-23-94	<.1	7.0	--	--	--	--	--
FSW 271-0165	6-24-94	<.1	7.4	<.1	7.6	--	10	--

Table 14. Organic carbon, inorganic carbon, and ultraviolet/visible absorbance analyses for water samples from selected wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through November 1994—*Continued*

Well cluster site and well No.	Date	Carbon, organic, total (mg/L)	Carbon, inorganic, total (mg/L)	Carbon, organic, dissolved (mg/L)	Carbon, inorganic, dissolved (mg/L)	Dissolved organic carbon fraction-ation	Absorbance, filtered sample, 254-nm wavelength (x1,000)	Absorbance, filtered sample, 400-nm wavelength (x1,000)
FSW 300-0010	6-20-94	.5	1.3	.4	.6	--	10	--
FSW 300-0030	6-21-94	1.6	11.5	1.4	11.2	--	35	--
FSW 300-0050	6-22-94	1.6	14.2	1.5	13.8	--	34	--
FSW 300-0073	6-21-94	1.6	12.9	.9	7.2	--	24	--
FSW 300-0099	6-21-94	.2	2.8	.4	2.4	--	14	--
FSW 300-0118	6-21-94	<.1	2.3	.1	2.2	--	11	--
FSW 300-0138	6-21-94	<.1	2.6	.1	2.2	--	8	--
FSW 343-0036	8-31-94	2.7	7.8	2.7	7.8	--	63	--
FSW 343-0057	8-31-94	2.2	13.0	2.4	23.7	--	41	--
FSW 343-0079	8-30-94	1.9	11.8	2.0	10.6	--	33	--
FSW 343-0099	8-30-94	.4	2.0	.5	2.0	--	0	--
FSW 343-0114	8-30-94	.3	1.3	.3	1.3	--	0	--
FSW 343-0129	8-30-94	.4	1.4	1.6	1.6	--	18	--
FSW 343-0145	8-31-94	.4	1.7	.3	1.3	--	0	--
FSW 347-0020	10-18-94	.6	3.2	.7	1.9	Y	3	--
FSW 347-0031	10-18-94	2.7	11.5	2.6	10.1	Y	60	--
FSW 347-0038	10-18-94	2.7	11.8	2.6	10.3	Y	53	--
FSW 347-0046	10-18-94	1.7	13.2	1.6	11.3	Y	31	--
FSW 347-0067	10-19-94	1.0	12.5	1.0	11.2	Y	29	--
FSW 347-0101	10-19-94	.4	2.8	.4	1.2	--	0	--
FSW 347-0116	10-18-94	.4	2.3	.3	2.1	--	0	--
FSW 347-0131	10-18-94	.3	3.0	.3	1.6	--	0	--
FSW 347-0145	10-19-94	.3	3.5	.3	1.8	--	0	--
FSW 350-0013	9-06-94	.3	.8	.5	1.5	--	2	--
FSW 350-0052	9-06-94	.3	3.0	.4	3.0	Y	2	--
FSW 350-0064	9-07-94	.4	6.0	.6	3.5	Y	10	--
FSW 350-0077	9-06-94	1.0	7.2	1.0	6.5	Y	18	--
FSW 350-0084	9-07-94	1.7	9.1	1.7	9.2	Y	--	--
FSW 350-0110	9-07-94	1.4	8.7	1.4	15.1	Y	15	--
FSW 350-0125	9-08-94	.2	11.3	.3	11.8	--	3	--
FSW 350-0140	9-08-94	1.5	10.1	--	--	--	--	--
FSW 375-0015	8-15-94	8.1	9.6	7.5	1.9	Y	382	--
FSW 375-0041	8-15-94	1.2	3.8	1.2	1.2	--	25	--
FSW 375-0055	8-16-94	.9	4.0	.8	3.7	--	12	--
FSW 375-0071	8-16-94	.3	11.4	.3	10.7	--	6	--
FSW 375-0081	8-16-94	.1	11.2	.1	10.4	--	3	--
FSW 375-0099	8-16-94	.2	5.5	.2	5.2	--	1	--
FSW 375-0119	8-17-94	.4	6.8	.4	7.0	--	113	--
FSW 383-0023	8-10-94	.6	2.5	.7	2.8	--	12	--
FSW 383-0030	8-10-94	2.5	8.1	2.5	8.5	--	64	--
FSW 383-0040	8-09-94	2.1	9.8	2.4	8.1	--	44	--
FSW 383-0061	8-10-94	1.6	12.8	1.6	13.0	--	51	--
FSW 383-0082	8-10-94	1.0	7.2	1.0	6.8	--	18	--
FSW 383-0106	8-10-94	.3	1.5	.4	1.7	--	6	--
FSW 383-0129	8-11-94	.1	1.9	.2	1.9	--	4	--

Table 14. Organic carbon, inorganic carbon, and ultraviolet/visible absorbance analyses for water samples from selected wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through November 1994—*Continued*

Well cluster site and well No.	Date	Carbon, organic, total (mg/L)	Carbon, inorganic, total (mg/L)	Carbon, organic, dissolved (mg/L)	Carbon, inorganic, dissolved (mg/L)	Dissolved organic carbon fraction-ation	Absorbance, filtered sample, 254-nm wavelength (x1,000)	Absorbance, filtered sample, 400-nm wavelength (x1,000)
FSW 411-0036	9-20-94	.5	1.6	.5	1.6	--	13	--
FSW 411-0054	9-20-94	--	--	.2	1.4	--	5	--
FSW 411-0065	9-20-94	1.6	15.4	1.6	15.0	--	40	--
FSW 411-0081	9-20-94	.7	8.7	.7	8.4	--	21	--
FSW 411-0094	9-20-94	.5	6.0	.5	5.9	--	13	--
FSW 411-0106	9-21-94	.4	9.0	.5	9.1	--	13	--
FSW 411-0122	9-21-94	.2	7.7	.2	7.9	--	9	--
FSW 422-0045	6-15-94	.1	1.0	.4	.8	--	10	--
FSW 422-0065	6-15-94	1.3	6.6	1.4	6.6	--	35	--
FSW 422-0085	6-15-94	1.0	6.9	1.2	7.0	--	27	--
FSW 422-0105	6-15-94	.8	6.5	.9	6.2	--	18	--
FSW 424-0020	7-06-94	.6	--	.5	--	--	11	--
FSW 436-0036	8-17-94	.3	2.5	.4	3.0	--	9	--
FSW 436-0060	8-17-94	.2	.6	.1	1.3	--	19	--
FSW 436-0076	8-18-94	.1	7.6	.1	8.1	--	9	--
FSW 436-0091	8-18-94	.2	7.8	.2	7.8	--	26	--
FSW 436-0115	8-18-94	.1	4.7	.3	5.1	--	134	48
FSW 436-0141	8-19-94	.4	8.4	.2	8.6	--	1	2
FSW 484-0007	10-06-94	1.7	4.0	1.6	3.2	--	37	--
FSW 484-0023	10-06-94	.3	3.4	.2	1.5	--	5	0
FSW 484-0078	10-06-94	.2	3.2	.2	2.4	--	3	1
FSW 484-0108	10-06-94	.2	2.3	.2	3.1	--	4	2
FSW 567-0136	11-09-94	.6	5.9	.6	5.0	--	4	1
SDW 314-0035	6-16-94	3.2	3.1	3.6	3.3	Y	117	15
SDW 314-0051	6-16-94	3.9	7.0	4.0	6.4	Y	120	15
SDW 314-0075	6-16-94	4.0	7.6	4.2	8.2	Y	94	--
SDW 314-0098	6-16-94	.6	3.2	.6	2.9	Y	18	--
SDW 314-0108 (AVP/MW314)	10-07-94	.4	3.1	.4	2.2	Y	9	--
SDW 315-0061	11-15-94	.5	2.0	.4	2.1	--	4	--
SDW 315-0082	11-02-94	.3	1.5	.3	1.1	--	3	--
SDW 315-0104	11-02-94	.2	2.3	.3	2.2	--	3	--
SDW 315-0126	11-02-94	.2	2.6	.4	1.8	--	5	--
SDW 315-0149	11-02-94	.2	4.6	.3	3.4	--	1	--
SDW 316-0051	10-31-94	1.7	2.1	1.7	3.0	--	30	--
SDW 316-0066	11-01-94	1.1	12.9	1.2	9.6	--	25	--
SDW 316-0082	10-31-94	.7	6.4	.6	5.9	--	14	--
SDW 316-0100	10-31-94	.5	5.8	.5	5.3	--	6	5
SDW 316-0114 (AVP/MW316C)	11-01-94	.5	4.2	.5	3.2	--	0	2
SDW 316-0134	10-31-94	.4	3.8	.4	2.7	--	0	1
SDW 316-0148 (AVP/MW316B)	11-01-94	.1	2.3	--	--	--	26	--
SDW 316-0163 (AVP/MW316A)	11-01-94	.2	2.8	.3	.8	--	0	1
SDW 318-0036	6-17-94	3.9	5.3	4.1	6.2	Y	139	18
SDW 318-0064	6-17-94	5.2	11.4	5.1	11.1	Y	74	7

Table 14. Organic carbon, inorganic carbon, and ultraviolet/visible absorbance analyses for water samples from selected wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through November 1994—*Continued*

Well cluster site and well No.	Date	Carbon, organic, total (mg/L)	Carbon, inorganic, total (mg/L)	Carbon, organic, dissolved (mg/L)	Carbon, inorganic, dissolved (mg/L)	Dissolved organic carbon fraction-ation	Absorbance, filtered sample, 254-nm wavelength (x1,000)	Absorbance, filtered sample, 400-nm wavelength (x1,000)
SDW 344-0038	11-03-94	1.2	5.6	1.1	4.2	--	28	--
SDW 344-0061	11-03-94	2.8	19.1	2.9	17.5	--	74	--
SDW 344-0080	11-03-94	1.0	10.7	1.0	9.4	--	22	--
SDW 344-0100	11-03-94	.6	6.7	.8	6.2	--	16	5
SDW 423-0058 (FTA1/MW428B)	11-04-94	.3	2.5	.3	2.0	--	0	2
SDW 423-0098 (FTA1/MW428A)	11-04-94	.2	1.5	.2	1.2	--	0	0
SDW 590-0074 (AVP/MW590)	11-03-94	3.3	6.1	3.4	5.2	--	85	--
SDW 593-0075 (AVP/MW593)	11-03-94	.5	1.6	.3	1.3	--	0	1
MMR STP effluent at S317	2-02-95	30.5	7.2	17.4	6.6	--	188	19

Table 15. Dissolved organic carbon fractionation analyses for water samples from selected wells, Ashumet Valley, Massachusetts, June through October 1994

[Source of data: Larry B. Barber, II, U.S. Geological Survey, Water Resources Division, National Research Program. **Well cluster site and well No.:** Locations of well clusters and wells are shown in figures 2 and 3. No., number; D, duplicate sample. mg/L, milligram per liter; <, actual value is less than method detection limit]

Well cluster site and well No.	Date	Carbon, organic, dissolved (mg/L)	Total hydrophobic fraction, (mg/L)	Hydrophobic acid fraction (mg/L)	Hydrophobic base fraction (mg/L)	Hydrophobic neutral fraction (mg/L)	Total hydrophilic fraction, (mg/L)	Hydrophilic acid fraction (mg/L)	Hydrophilic base fraction (mg/L)	Hydrophilic neutral fraction (mg/L)
FSW 230-0049	7-20-94	3.4	1.6	1.4	<0.1	0.2	1.8	1.0	0.5	0.3
FSW 347-0020	10-18-94	.6	.3	.3	<.1	.1	.3	<.1	<.1	.2
FSW 347-0031	10-18-94	2.5	1.6	1.3	<.1	.3	.9	.5	.2	.2
FSW 347-0038	10-18-94	2.5	1.4	1.0	<.1	.4	1.2	.5	.3	.3
FSW 347-0046	10-18-94	1.5	.8	.7	<.1	.1	.7	.3	.1	.3
FSW 347-0067	10-19-94	.8	.4	.3	<.1	.1	.4	.1	.1	.2
FSW 350-0052	9-6-94	.2	.1	.2	<.1	<.1	.1	<.1	<.1	.2
FSW 350-0064	9-7-94	.6	.3	.2	<.1	.1	.3	<.1	.1	.2
FSW 350-0077	9-6-94	1.0	.6	.3	<.1	.3	.4	.1	<.1	.2
FSW 350-0084	9-7-94	1.3	.9	.4	<.1	.4	.4	.1	<.1	.2
FSW 350-0084-D	9-7-94	1.5	1.0	.5	<.1	.4	.5	.2	<.1	.3
FSW 350-0084-D	9-7-94	1.4	1.0	.6	<.1	.4	.5	.1	<.1	.3
FSW 350-0110	9-7-94	1.3	.9	.4	<.1	.4	.4	.2	<.1	.2
FSW 375-0015	8-15-94	7.9	5.7	3.9	<.1	1.7	2.3	1.6	.5	.2
SDW 314-0035	6-16-94	3.1	1.5	1.2	<.1	.3	1.5	.8	.4	.3
SDW 314-0035-D	6-16-94	3.0	1.6	1.1	<.1	.4	1.5	.9	.6	<.1
SDW 314-0051	6-16-94	3.4	1.6	1.4	<.1	.1	1.8	1.0	.4	.3
SDW 314-0051-D	6-16-94	3.8	2.2	1.7	<.1	.5	1.6	.9	.6	.1
SDW 314-0075	6-16-94	3.5	1.9	1.6	<.1	.2	1.6	1.0	.5	.1
SDW 314-0098	6-16-94	.7	.4	.3	<.1	.1	.3	.1	.1	.1
SDW 314-0108	10-7-94	.2	.1	.1	<.1	<.1	.1	<.1	<.1	.1
SDW 318-0036	6-17-94	3.7	2.0	1.6	<.1	.4	1.7	1.0	.6	.2
SDW 318-0064	6-17-94	2.5	1.2	.9	<.1	.2	1.4	.8	.4	.2

Table 16. Methylene blue active substances, linear-chained alkylbenzene sulfonate, approximate branched-chained alkylbenzene sulfonate, caffeine, ethylenediaminetetraactetic acid, and nitrilotriacetic acid analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through November 1994

[Source of data: Larry B. Barber, II, U.S. Geological Survey, Water Resources Division, National Research Program. **Well cluster site and well No.:** Number in parentheses assigned by the Massachusetts Military Reservation. Locations of well clusters and wells are shown in figures 2 and 3. No., number; MMR STP, Massachusetts Military Reservation sewage-treatment plant; D, duplicate. µg/L, microgram per liter; <, actual value is less than method detection limit; --, no data available]

Well cluster site and well No.	Date	Methylene blue active substances (µg/L)	Linear-chained alkylbenzene sulfonate (µg/L)	Approximate branched-chained alkylbenzene sulfonate (µg/L)	Caffeine (µg/L)	Ethylene diamine tetra-acetic acid (µg/L)	Nitrilotri-acetic acid (µg/L)
FSW 230-0042	7-20-94	30	<1	<1	--	58.3	0.8
FSW 230-0048	7-20-94	180	<1	<1	--	206	1.8
FSW 230-0049	7-20-94	220	<1	<1	--	258	1.8
FSW 230-0058	7-20-94	120	<1	<1	--	104	1.3
FSW 230-0068	7-21-94	50	<1	<1	--	--	--
FSW 230-0078	7-22-94	<20	--	--	--	--	--
FSW 230-0088	7-21-94	70	--	--	--	--	--
FSW 230-0108	7-21-94	70	--	--	--	--	--
FSW 230-0127	7-22-94	<20	--	--	--	--	--
FSW 236-0070	10-20-94	60	--	--	--	--	--
FSW 236-0089	10-20-94	60	--	--	--	--	--
FSW 236-0106	10-20-94	90	--	--	--	--	--
FSW 236-0121	10-20-94	60	--	--	--	--	--
FSW 236-0141	10-20-94	--	--	--	--	--	--
FSW 244-0070	8-12-94	120	<1	<1	<0.1	30.3	<.1
FSW 244-0090	8-11-94	120	<1	<1	<.1	121	.3
FSW 244-0119	8-11-94	170	<1	<1	<.1	--	--
FSW 254-0026	7-12-94	<20	<1	<1	<.1	.8	<.1
FSW 254-0054	7-12-94	190	<1	<1	<.1	3.6	<.1
FSW 254-0072	7-12-94	--	--	--	--	--	--
FSW 254-0107	7-12-94	150	<1	<1	<.1	7.1	<.1
FSW 254-0140	7-13-94	220	<1	<1	<.1	2.3	<.1
FSW 254-0168	7-13-94	110	<1	<1	<.1	<.1	<.1
FSW 254-0216	7-13-94	80	<1	<1	<.1	.2	<.1
FSW 262-0041	7-14-94	90	<1	<1	--	.2	<.1
FSW 262-0069	7-14-94	140	<1	<1	--	16.9	<.1
FSW 262-0085	7-14-94	160	<1	<1	--	3.4	<.1
FSW 262-0109	7-14-94	530	<1	25	--	.9	<.1
FSW 262-0126	8-29-94	460	<1	25	--	.2	<.1
FSW 262-0159	7-14-94	200	<1	10	--	<.1	<.1
FSW 271-0041	6-28-94	80	<1	<1	<.1	<.1	<.1
FSW 271-0069	6-22-94	110	<1	<1	<.1	.8	<.1
FSW 271-0084	6-22-94	120	<1	<1	<.1	1.7	<.1
FSW 271-0085	6-23-94	100	<1	<1	<.1	1.7	<.1
FSW 271-0099	6-22-94	270	<1	10	<.1	--	--
FSW 271-0114	6-23-94	1050	<1	50	<.1	158	.2
FSW 271-0141	6-23-94	80	<1	<1	<.1	.1	<.1
FSW 271-0165	6-24-94	70	<1	<1	<.1	.1	<.1
FSW 300-0010	6-20-94	70	<1	<1	<.1	.4	<.1
FSW 300-0030	6-21-94	150	<1	<1	<.1	20.2	<.1
FSW 300-0050	6-22-94	170	<1	<1	<.1	16.7	<.1
FSW 300-0073	6-21-94	90	<1	<1	<.1	14.9	1.8
FSW 300-0090	6-21-94	110	<1	<1	<.1	.8	<.1
FSW 300-0118	6-21-94	80	<1	<1	<.1	.8	<.1
FSW 300-0138	6-21-94	80	<1	<1	<.1	.2	<.1

Table 16. Methylene blue active substances, linear-chained alkylbenzene sulfonate, approximate branched-chained alkylbenzene sulfonate, caffeine, ethylenediaminetetraactetic acid, and nitrilotriacetic acid analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through November 1994—*Continued*

Well cluster site and well No.	Date	Methylene blue active substances (µg/L)	Linear-chained alkylbenzene sulfonate (µg/L)	Approximate branched-chained alkylbenzene sulfonate (µg/L)	Caffeine (µg/L)	Ethylene diamine tetra-acetic acid (µg/L)	Nitrilotri-acetic acid (µg/L)
FSW 343-0036	8-31-94	--	--	--	--	--	--
FSW 343-0057	8-31-94	210	<1	<1	<0.1	89.5	0.2
FSW 343-0079	8-30-94	260	<1	<1	<.1	90.7	.1
FSW 343-0099	8-30-94	80	<1	<1	<.1	3.5	<.1
FSW 343-0114	8-30-94	80	--	--	--	--	--
FSW 343-0129	8-30-94	60	--	--	--	--	--
FSW 343-0145	8-31-94	80	--	--	--	--	--
FSW 347-0020	10-18-94	60	<1	<1	--	--	--
FSW 347-0031	10-18-94	230	<1	<1	--	22.3	.2
FSW 347-0038	10-18-94	310	<1	<1	--	34.5	.2
FSW 347-0046	10-18-94	150	<1	<1	--	36.4	.4
FSW 347-0067	10-19-94	80	<1	<1	--	4.8	.5
FSW 347-0101	10-19-94	80	--	--	--	--	--
FSW 347-0116	10-18-94	60	--	--	--	--	--
FSW 347-0131	10-18-94	70	--	--	--	--	--
FSW 347-0145	10-19-94	60	--	--	--	--	--
FSW 350-0013	9-06-94	<20	<1	<1	<.1	.1	<.1
FSW 350-0052	9-06-94	50	<1	<1	<.1	.4	<.1
FSW 350-0064	9-07-94	--	--	--	--	--	--
FSW 350-0077	9-06-94	330	<1	100	<.1	6.4	<.1
FSW 350-0084	9-07-94	630	<1	100	<.1	4.0	<.1
FSW 350-0110	9-07-94	1000	<1	100	<.1	2.5	<.1
FSW 350-0125	9-08-94	180	<1	50	<.1	.7	<.1
FSW 350-0140	9-08-94	<20	<1	10	<.1	.1	<.1
FSW 375-0015	8-15-94	110	--	--	--	.1	<.1
FSW 375-0041	8-15-94	110	--	--	--	.1	<.1
FSW 375-0055	8-16-94	110	--	--	--	<.1	<.1
FSW 375-0071	8-16-94	90	--	--	--	.3	<.1
FSW 375-0081	8-16-94	90	--	--	--	<.1	<.1
FSW 375-0099	8-16-94	<20	--	--	--	<.1	<.1
FSW 375-0119	8-16-94	40	--	--	--	--	--
FSW 383-0023	8-10-94	110	<1	<1	<.1	10.4	<.1
FSW 383-0030	8-10-94	200	<1	<1	<.1	184	2.2
FSW 383-0040	8-09-94	300	--	--	--	226	1.5
FSW 383-0061	8-10-94	100	<1	<1	<.1	202	.8
FSW 383-0070	8-10-94	--	--	--	--	--	--
FSW 383-0082	8-10-94	90	--	--	--	103	.4
FSW 383-0106	8-10-94	<20	<1	<1	<.1	--	--
FSW 383-0129	8-11-94	<20	<1	<1	<.1	--	--
FSW 411-0036	9-20-94	90	<1	<1	<.1	<.1	<.1
FSW 411-0054	9-20-94	70	<1	<1	<.1	.3	<.1
FSW 411-0065	9-20-94	270	<1	<1	<.1	115	<.1
FSW 411-0081	9-20-94	120	<1	<1	<.1	7.1	.2
FSW 411-0094	9-20-94	70	<1	<1	<.1	20.1	<.1
FSW 411-0106	9-21-94	90	<1	<1	<.1	1.4	<.1
FSW 411-0122	9-21-94	30	<1	<1	<.1	<.1	<.1

Table 16. Methylene blue active substances, linear-chained alkylbenzene sulfonate, approximate branched-chained alkylbenzene sulfonate, caffeine, ethylenediaminetetraactetic acid, and nitrilotriacetic acid analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through November 1994—*Continued*

Well cluster site and well No.	Date	Methylene blue active substances (µg/L)	Linear-chained alkylbenzene sulfonate (µg/L)	Approximate branched-chained alkylbenzene sulfonate (µg/L)	Caffeine (µg/L)	Ethylene diamine tetra-acetic acid (µg/L)	Nitrilotri-acetic acid (µg/L)
FSW 422-0045	6-15-94	60	<1	<1	<0.1	5.0	<0.1
FSW 422-0065	6-15-94	220	<1	<1	<.1	35.6	.2
FSW 422-0085	6-15-94	220	<1	<1	<.1	16.5	.4
FSW 422-0105	6-15-94	120	<1	<1	<.1	8.3	<.1
FSW 436-0036	8-17-94	60	--	--	--	--	--
FSW 436-0060	8-17-94	40	--	--	--	--	--
FSW 436-0076	8-18-94	40	--	--	--	--	--
FSW 436-0091	8-18-94	60	--	--	--	--	--
FSW 436-0115	8-18-94	30	--	--	--	--	--
FSW 436-0141	8-19-94	40	--	--	--	--	--
FSW 484-0007	10-06-94	30	--	--	--	--	--
FSW 484-0023	10-06-94	--	--	--	--	--	--
FSW 484-0078	10-06-94	90	--	--	--	--	--
FSW 484-0108	10-06-94	90	--	--	--	--	--
FSW 567-0136	11-09-94	80	--	--	--	--	--
SDW 314-0035	6-16-94	370	<1	<1	<.1	318	.3
SDW 314-0051	6-16-94	340	<1	<1	<.1	432	.6
SDW 314-0075	6-16-94	250	<1	<1	<.1	228	.3
SDW 314-0098	6-16-94	90	<1	<1	<.1	34.3	<.1
SDW 314-0108 (AVP/MW314)	10-07-94	60	<1	<1	<.1	4.1	.8
SDW 315-0061	11-15-94	70	--	--	--	.7	<.1
SDW 315-0082	11-02-94	50	--	--	--	.4	.1
SDW 315-0104	11-02-94	40	--	--	--	.9	<.1
SDW 315-0126	11-02-94	50	--	--	--	.2	<.1
SDW 315-0149	11-02-94	40	--	--	--	.2	<.1
SDW 316-0051	10-31-94	90	1	<1	<.1	9.1	<.1
SDW 316-0066	11-01-94	100	1	<1	<.1	12.6	.2
SDW 316-0082	10-31-94	60	--	--	--	--	--
SDW 316-0100	10-31-94	60	--	--	--	--	--
SDW 316-0114 (AVP/MW316C)	11-01-94	60	--	--	--	--	--
SDW 316-0134	10-31-94	--	--	--	--	--	--
SDW 316-0148 (AVP/MW316B)	11-01-94	40	--	--	--	--	--
SDW 316-0163 (AVP/MW316A)	11-01-94	20	--	--	--	--	--
SDW 318-0036	6-17-94	250	--	--	--	59.9	.7
SDW 318-0064	6-17-94	540	--	--	--	69.1	1.1
SDW 344-0038	11-03-94	120	<1	<1	--	22.7	.3
SDW 344-0061	11-03-94	190	<1	<1	--	56.6	.4
SDW 344-0080	11-03-94	80	<1	<1	--	--	--
SDW 344-0100	11-03-94	70	--	--	--	--	--
SDW 423-0058 (FTA1/MW428B)	11-04-94	70	--	--	--	--	--
SDW 423-0098 (FTA1/MW428A)	11-04-94	80	--	--	--	--	--
SDW 590-0074 (AVP/MW590)	11-03-94	360	<1	<1	<.1	41.5	.7
SDW 593-0075 (AVP/MW593)	11-03-94	70	--	--	--	--	--
MMR STP effluent at S317	2-02-95	830	--	--	--	140	18.9
MMR STP effluent at S317-D	2-02-95	810	--	--	--	160	21.0

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994

[Source of data: U.S. Geological Survey National Water Quality Laboratory. **Well cluster site and well No.:** Names in parentheses assigned by the Massachusetts Military Reservation. Locations of well clusters and wells are shown in figures 2 and 3. No., number; MMR STP, Massachusetts Military Reservation sewage-treatment plant; D, duplicate sample. µg/L, microgram per liter; <, actual value is less than method detection limit]

Well cluster site and well No.	Date	Aluminum, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)
FSW 230-0042	7-20-94	210	21	<0.5	<1.0	8	<3
FSW 230-0048	7-20-94	90	3	<.5	<1.0	<5	5
FSW 230-0049	7-20-94	60	4	<.5	2.0	<5	20
FSW 230-0058	7-20-94	50	3	<.5	<1.0	<5	20
FSW 230-0068	7-21-94	60	6	<.5	<1.0	<5	10
FSW 230-0078	7-22-94	<10	3	<.5	<1.0	<5	9
FSW 230-0088	7-21-94	<10	3	<.5	<1.0	<5	<3
FSW 230-0108	7-21-94	<10	10	<.5	<1.0	6	4
FSW 230-0127	7-22-94	<10	5	<.5	<1.0	<5	4
FSW 231-0057	8-12-94	80	<2	<.5	<1.0	<5	<3
FSW 232-0058	9-22-94	180	<2	<.5	2.0	6	4
FSW 232-0058-D	9-22-94	200	<2	<.5	2.0	6	6
FSW 235-0094	6-07-94	10	17	<.5	2.0	7	<3
FSW 236-0070	10-20-94	<10	11	<.5	<1.0	<5	<3
FSW 236-0089	10-20-94	<10	7	<.5	<1.0	6	<3
FSW 236-0106	10-20-94	10	22	<.5	<1.0	9	<3
FSW 236-0121	10-20-94	10	10	<.5	<1.0	8	3
FSW 236-0141	10-20-94	<10	5	<.5	<1.0	<5	<3
FSW 237-0088	6-07-94	<10	13	<.5	1.0	<5	<3
FSW 238-0106	6-10-94	<10	6	<.5	<1.0	7	<3
FSW 239-0010	6-06-94	40	12	<.5	<1.0	<5	<3
FSW 239-0064	6-06-94	<10	14	<.5	<1.0	<5	9
FSW 239-0121	6-06-94	<10	2	<.5	<1.0	<5	<3
FSW 242-0077	6-10-94	<10	4	<.5	<1.0	6	<3
FSW 244-0070	8-12-94	<10	28	<.5	<1.0	<5	8
FSW 244-0090	8-11-94	<10	22	<.5	<1.0	<5	<3
FSW 244-0119	8-11-94	<10	11	<.5	<1.0	<5	<3
FSW 254-0026	7-12-94	50	36	<.5	1.0	<5	<3
FSW 254-0054	7-12-94	<10	19	<.5	5.0	<5	<3
FSW 254-0072	7-12-94	<10	8	<.5	<1.0	<5	6
FSW 254-0107	7-12-94	30	3	<.5	<1.0	<5	<3
FSW 254-0140	7-13-94	40	5	<.5	<1.0	<5	<3
FSW 254-0168	7-13-94	10	5	<.5	<1.0	<5	3
FSW 254-0216	7-13-94	<10	2	<.5	3.0	<5	5
FSW 262-0041	7-14-94	50	74	<.5	1.0	<5	<3
FSW 262-0069	7-14-94	<10	6	<.5	<1.0	<5	<3
FSW 262-0085	7-14-94	<10	4	<.5	2.0	<5	<3
FSW 262-0109	7-14-94	<10	5	<.5	<1.0	<5	<3
FSW 262-0109-D	7-14-94	<10	6	<.5	2.0	<5	3
FSW 262-0126	8-29-94	<10	5	<.5	<1.0	<5	<3
FSW 262-0159	7-14-94	<10	4	<.5	2.0	<5	<3
FSW 267-0088	7-08-94	<10	6	<.5	<1.0	<5	<3
FSW 267-0111	7-08-94	<10	4	<.5	<1.0	<5	<3
FSW 267-0136	7-07-94	<10	<2	<.5	<1.0	<5	<3
FSW 267-0155	7-07-94	<10	3	<.5	<1.0	<5	20

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Copper, dissolved (µg/L)	Iron, dissolved (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, dissolved (µg/L)	Molybdenum, dissolved (µg/L)
FSW 230-0042	7-20-94	10	19	<10	<4	150	<10
FSW 230-0048	7-20-94	30	17	<10	<4	69	<10
FSW 230-0049	7-20-94	20	26	10	<4	68	<10
FSW 230-0058	7-20-94	<10	15	<10	<4	70	<10
FSW 230-0068	7-21-94	<10	21	20	5	46	<10
FSW 230-0078	7-22-94	<10	11	<10	<4	58	<10
FSW 230-0088	7-21-94	<10	4	<10	<4	2	<10
FSW 230-0108	7-21-94	<10	9	<10	<4	34	<10
FSW 230-0127	7-22-94	<10	7	10	<4	38	<10
FSW 231-0057	8-12-94	30	10	<10	4	31	<10
FSW 232-0058	9-22-94	40	16	<10	<4	43	<10
FSW 232-0058-D	9-22-94	30	17	<10	<4	43	<10
FSW 235-0094	6-07-94	<10	<3	<10	<4	4	<10
FSW 236-0070	10-20-94	<10	6	20	<4	16	<10
FSW 236-0089	10-20-94	<10	<3	<10	<4	20	<10
FSW 236-0106	10-20-94	<10	140	30	<4	120	<10
FSW 236-0121	10-20-94	<10	<3	10	<4	170	<10
FSW 236-0141	10-20-94	<10	<3	<10	<4	10	<10
FSW 237-0088	6-07-94	<10	6	<10	<4	72	<10
FSW 238-0106	6-10-94	<10	6	<10	<4	3	<10
FSW 239-0010	6-06-94	<10	<3	<10	<4	5	<10
FSW 239-0064	6-06-94	<10	110	<10	<4	3,200	<10
FSW 239-0121	6-06-94	<10	7	<10	<4	460	<10
FSW 242-0077	6-10-94	<10	180	<10	<4	38	<10
FSW 244-0070	8-12-94	<10	8	<10	<4	2,800	<10
FSW 244-0090	8-11-94	<10	4	<10	<4	280	<10
FSW 244-0119	8-11-94	<10	4	<10	<4	150	<10
FSW 254-0026	7-12-94	<10	6	10	<4	16	<10
FSW 254-0054	7-12-94	<10	7	<10	<4	480	<10
FSW 254-0072	7-12-94	<10	410	40	<4	660	<10
FSW 254-0107	7-12-94	<10	4	<10	<4	5	<10
FSW 254-0140	7-13-94	<10	500	<10	<4	83	<10
FSW 254-0168	7-13-94	<10	1,600	10	<4	24	<10
FSW 254-0216	7-13-94	<10	3,000	<10	<4	35	<10
FSW 262-0041	7-14-94	<10	<3	<10	<4	66	<10
FSW 262-0069	7-14-94	<10	4	10	<4	5	<10
FSW 262-0085	7-14-94	<10	<3	10	<4	4	<10
FSW 262-0109	7-14-94	<10	<3	<10	<4	4	<10
FSW 262-0109-D	7-14-94	<10	7	40	<4	5	20
FSW 262-0126	8-29-94	<10	5	<10	<4	2	<10
FSW 262-0159	7-14-94	<10	750	<10	<4	64	<10
FSW 267-0088	7-08-94	<10	6	<10	<4	16	<10
FSW 267-0111	7-08-94	<10	6	<10	<4	2	<10
FSW 267-0136	7-07-94	<10	<3	<10	<4	<1	<10
FSW 267-0155	7-07-94	<10	3,500	<10	<4	290	<10

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nickel, dissolved (µg/L)	Silver, dissolved (µg/L)	Strontium, dissolved (µg/L)	Vanadium, dissolved (µg/L)	Zinc, dissolved (µg/L)
FSW 230-0042	7-20-94	10	<1.0	51	<6	170
FSW 230-0048	7-20-94	10	<1.0	72	7	170
FSW 230-0049	7-20-94	20	<1.0	84	10	320
FSW 230-0058	7-20-94	20	<1.0	65	<6	240
FSW 230-0068	7-21-94	20	<1.0	21	<6	310
FSW 230-0078	7-22-94	10	<1.0	12	<6	69
FSW 230-0088	7-21-94	<10	<1.0	24	<6	9
FSW 230-0108	7-21-94	<10	1.0	17	<6	8
FSW 230-0127	7-22-94	<10	1.0	27	<6	65
FSW 231-0057	8-12-94	<10	<1.0	39	9	69
FSW 232-0058	9-22-94	<10	<1.0	67	<6	180
FSW 232-0058-D	9-22-94	20	<1.0	71	<6	170
FSW 235-0094	6-07-94	<10	<1.0	50	<6	3
FSW 236-0070	10-20-94	<10	3.0	7	<6	22
FSW 236-0089	10-20-94	<10	3.0	13	<6	<3
FSW 236-0106	10-20-94	<10	2.0	43	<6	8
FSW 236-0121	10-20-94	<10	3.0	56	<6	<3
FSW 236-0141	10-20-94	<10	2.0	34	<6	<3
FSW 237-0088	6-07-94	<10	2.0	17	<6	21
FSW 238-0106	6-10-94	<10	1.0	42	<6	32
FSW 239-0010	6-06-94	<10	<1.0	50	<6	<3
FSW 239-0064	6-06-94	<10	3.0	50	<6	24
FSW 239-0121	6-06-94	<10	<1.0	19	<6	<3
FSW 242-0077	6-10-94	<10	<1.0	13	<6	160
FSW 244-0070	8-12-94	<10	1.0	64	<6	5
FSW 244-0090	8-11-94	<10	<1.0	44	<6	15
FSW 244-0119	8-11-94	10	1.0	52	<6	3
FSW 254-0026	7-12-94	10	2.0	25	<6	11
FSW 254-0054	7-12-94	<10	<1.0	41	<6	14
FSW 254-0072	7-12-94	<10	2.0	15	<6	<3
FSW 254-0107	7-12-94	<10	<1.0	50	<6	<3
FSW 254-0140	7-13-94	<10	<1.0	89	<6	<3
FSW 254-0168	7-13-94	<10	1.0	30	<6	9
FSW 254-0216	7-13-94	<10	1.0	19	<6	4
FSW 262-0041	7-14-94	<10	<1.0	40	<6	<3
FSW 262-0069	7-14-94	<10	<1.0	9	<6	<3
FSW 262-0085	7-14-94	<10	<1.0	44	<6	6
FSW 262-0109	7-14-94	<10	<1.0	69	<6	<3
FSW 262-0109-D	7-14-94	<10	3.0	69	<6	<3
FSW 262-0126	8-29-94	<10	<1.0	83	<6	<3
FSW 262-0159	7-14-94	<10	1.0	61	<6	6
FSW 267-0088	7-08-94	<10	<1.0	28	<6	17
FSW 267-0111	7-08-94	<10	<1.0	36	<6	4
FSW 267-0136	7-07-94	<10	<1.0	28	<6	<3
FSW 267-0155	7-07-94	<10	<1.0	45	<6	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Aluminum, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)
FSW 271-0041	6-28-94	40	12	<0.5	<1.0	<5	<3
FSW 271-0069	6-22-94	20	7	<.5	<1.0	<5	<3
FSW 271-0084	6-22-94	10	4	<.5	<1.0	<5	<3
FSW 271-0085	6-23-94	<10	3	<.5	<1.0	9	<3
FSW 271-0099	6-22-94	10	4	<.5	<1.0	<5	<3
FSW 271-0114	6-23-94	<10	4	<.5	<1.0	<5	<3
FSW 271-0141	6-23-94	<10	3	<.5	<1.0	<5	<3
FSW 271-0165	6-24-94	<10	4	<.5	1.0	<5	<3
FSW 279-0061	10-17-94	20	11	<.5	<1.0	6	<3
FSW 279-0086	10-17-94	10	10	<.5	<1.0	<5	<3
FSW 279-0100 (AVP/MW586)	10-17-94	<10	11	<.5	<1.0	6	4
FSW 282-0049	6-29-94	<10	3	<.5	<1.0	<5	<3
FSW 282-0070	6-30-94	<10	2	<.5	<1.0	<5	<3
FSW 282-0083	6-30-94	<10	3	<.5	<1.0	<5	<3
FSW 282-0094	6-29-94	<10	3	<.5	<1.0	<5	<3
FSW 282-0123	6-29-94	<10	3	<.5	<1.0	<5	<3
FSW 288-0091	7-12-94	<10	6	<.5	<1.0	<5	<3
FSW 294-0064	7-19-94	<10	3	<.5	<1.0	<5	<3
FSW 294-0077	7-19-94	<10	9	<.5	<1.0	5	4
FSW 294-0089	7-19-94	<10	3	<.5	<1.0	<5	<3
FSW 294-0109	7-19-94	20	3	<.5	<1.0	<5	<3
FSW 300-0010	6-20-94	50	21	<.5	<1.0	<5	<3
FSW 300-0030	6-21-94	<10	8	<.5	<1.0	<5	<3
FSW 300-0050	6-22-94	10	22	<.5	<1.0	<5	7
FSW 300-0073	6-21-94	<10	9	<.5	<1.0	<5	4
FSW 300-0099	6-21-94	<10	3	<.5	<1.0	<5	<3
FSW 300-0099-D	6-21-94	<10	3	<.5	<1.0	<5	<3
FSW 300-0118	6-21-94	<10	3	<.5	<1.0	<5	<3
FSW 300-0138	6-21-94	<10	2	<.5	<1.0	<5	<3
FSW 343-0036	8-31-94	<10	47	<.5	<1.0	<5	<3
FSW 343-0057	8-31-94	<10	15	<.5	1.0	<5	30
FSW 343-0057-D	8-31-94	<10	15	<.5	2.0	<5	30
FSW 343-0079	8-30-94	40	22	<.5	3.0	<5	40
FSW 343-0099	8-30-94	<10	9	<.5	<1.0	<5	<3
FSW 343-0114	8-30-94	<10	3	<.5	<1.0	<5	<3
FSW 343-0129	8-30-94	30	6	<.5	<1.0	<5	<3
FSW 343-0145	8-31-94	<10	4	<.5	<1.0	<5	<3
FSW 347-0020	10-18-94	70	25	<.5	<1.0	7	3
FSW 347-0031	10-18-94	20	15	<.5	<1.0	<5	<3
FSW 347-0038	10-18-94	<10	43	<.5	<1.0	<5	10
FSW 347-0046	10-18-94	<10	17	<.5	<1.0	<5	9
FSW 347-0067	10-19-94	<10	11	<.5	2.0	<5	30
FSW 347-0067-D	10-19-94	10	12	<.5	2.0	<5	30
FSW 347-0101	10-19-94	10	43	<.5	<1.0	<5	<3
FSW 347-0101-D	10-19-94	20	41	<.5	<1.0	<5	<3
FSW 347-0116	10-18-94	<10	5	<.5	<1.0	<5	5
FSW 347-0131	10-18-94	10	5	<.5	<1.0	<5	<3
FSW 347-0145	10-19-94	<10	4	<.5	<1.0	<5	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Copper, dissolved (µg/L)	Iron, dissolved (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, dissolved (µg/L)	Molybdenum, dissolved (µg/L)
FSW 271-0041	6-28-94	<10	<3	<10	<4	24	<10
FSW 271-0069	6-22-94	<10	<3	<10	<4	5	<10
FSW 271-0084	6-22-94	<10	3	<10	<4	2	<10
FSW 271-0085	6-23-94	<10	4	<10	<4	3	<10
FSW 271-0099	6-22-94	<10	6	<10	<4	14	<10
FSW 271-0114	6-23-94	<10	14	10	<4	13	<10
FSW 271-0141	6-23-94	<10	140	<10	<4	3	<10
FSW 271-0165	6-24-94	<10	4,500	<10	<4	240	<10
FSW 279-0061	10-17-94	<10	15	20	<4	6	<10
FSW 279-0086	10-17-94	<10	21	<10	<4	5	<10
FSW 279-0100 (AVP/MW586)	10-17-94	<10	4	<10	<4	5	<10
FSW 282-0049	6-29-94	<10	<3	<10	<4	<1	<10
FSW 282-0070	6-30-94	<10	4	10	<4	4	<10
FSW 282-0083	6-30-94	<10	<3	<10	<4	15	<10
FSW 282-0094	6-29-94	<10	5	<10	<4	8	<10
FSW 282-0123	6-29-94	<10	30	<10	<4	8	<10
FSW 288-0091	7-12-94	<10	<3	<10	<4	10	<10
FSW 294-0064	7-19-94	<10	4	<10	<4	1	<10
FSW 294-0077	7-19-94	<10	89	<10	<4	460	<10
FSW 294-0089	7-19-94	<10	<3	<10	<4	10	<10
FSW 294-0109	7-19-94	<10	12	<10	<4	3	<10
FSW 300-0010	6-20-94	<10	<3	<10	<4	37	<10
FSW 300-0030	6-21-94	<10	4	<10	<4	4,100	<10
FSW 300-0050	6-22-94	<10	7	20	<4	6,400	<10
FSW 300-0073	6-21-94	<10	6	<10	<4	2,800	10
FSW 300-0099	6-21-94	<10	5	<10	<4	130	<10
FSW 300-0099-D	6-21-94	<10	<3	<10	<4	120	10
FSW 300-0118	6-21-94	<10	<3	<10	<4	1	<10
FSW 300-0138	6-21-94	<10	9	<10	<4	2	<10
FSW 343-0036	8-31-94	<10	22	<10	<4	500	<10
FSW 343-0057	8-31-94	<10	17,000	<10	<4	270	<10
FSW 343-0057-D	8-31-94	<10	16,000	<10	<4	270	<10
FSW 343-0079	8-30-94	<10	22,000	<10	<4	310	<10
FSW 343-0099	8-30-94	<10	6	<10	<4	21	<10
FSW 343-0114	8-30-94	<10	5	<10	<4	6	<10
FSW 343-0129	8-30-94	<10	290	<10	<4	63	<10
FSW 343-0145	8-31-94	<10	9	<10	<4	46	<10
FSW 347-0020	10-18-94	<10	4	<10	<4	39	<10
FSW 347-0031	10-18-94	10	7	30	<4	610	<10
FSW 347-0038	10-18-94	<10	13	<10	<4	1,100	<10
FSW 347-0046	10-18-94	<10	7	10	<4	340	<10
FSW 347-0067	10-19-94	<10	7,300	20	<4	800	<10
FSW 347-0067-D	10-19-94	<10	7,400	<10	<4	810	10
FSW 347-0101	10-19-94	<10	<3	20	<4	120	<10
FSW 347-0101-D	10-19-94	<10	<3	10	<4	120	<10
FSW 347-0116	10-18-94	<10	16	<10	<4	1,100	<10
FSW 347-0131	10-18-94	<10	<3	<10	<4	250	<10
FSW 347-0145	10-19-94	<10	<3	<10	<4	33	<10

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nickel, dissolved (µg/L)	Silver, dissolved (µg/L)	Strontium, dissolved (µg/L)	Vanadium, dissolved (µg/L)	Zinc, dissolved (µg/L)
FSW 271-0041	6-28-94	<10	<1.0	30	<6	<3
FSW 271-0069	6-22-94	<10	<1.0	24	<6	<3
FSW 271-0084	6-22-94	<10	<1.0	29	<6	4
FSW 271-0085	6-23-94	<10	<1.0	29	<6	4
FSW 271-0099	6-22-94	<10	<1.0	40	<6	6
FSW 271-0114	6-23-94	<10	<1.0	58	<6	3
FSW 271-0141	6-23-94	<10	<1.0	49	<6	<3
FSW 271-0165	6-24-94	<10	<1.0	50	<6	4
FSW 279-0061	10-17-94	<10	3.0	21	<6	<3
FSW 279-0086	10-17-94	<10	3.0	21	<6	<3
FSW 279-0100 (AVP/MW586)	10-17-94	<10	4.0	24	<6	5
FSW 282-0049	6-29-94	<10	<1.0	8	<6	<3
FSW 282-0070	6-30-94	<10	<1.0	10	<6	5
FSW 282-0083	6-30-94	<10	<1.0	38	<6	<3
FSW 282-0094	6-29-94	<10	<1.0	36	<6	<3
FSW 282-0123	6-29-94	<10	<1.0	47	<6	<3
FSW 288-0091	7-12-94	<10	<1.0	23	<6	8
FSW 294-0064	7-19-94	<10	<1.0	12	<6	28
FSW 294-0077	7-19-94	<10	<1.0	29	<6	7
FSW 294-0089	7-19-94	<10	<1.0	46	<6	<3
FSW 294-0109	7-19-94	<10	<1.0	59	<6	20
FSW 300-0010	6-20-94	<10	<1.0	24	<6	<3
FSW 300-0030	6-21-94	<10	<1.0	11	<6	3
FSW 300-0050	6-22-94	<10	4.0	58	<6	<3
FSW 300-0073	6-21-94	<10	1.0	45	<6	4
FSW 300-0099	6-21-94	<10	2.0	12	<6	<3
FSW 300-0099-D	6-21-94	<10	<1.0	11	<6	<3
FSW 300-0118	6-21-94	<10	<1.0	38	<6	<3
FSW 300-0138	6-21-94	<10	<1.0	30	<6	10
FSW 343-0036	8-31-94	<10	<1.0	190	<6	<3
FSW 343-0057	8-31-94	<10	<1.0	57	<6	6
FSW 343-0057-D	8-31-94	<10	<1.0	57	<6	<3
FSW 343-0079	8-30-94	<10	<1.0	39	<6	<3
FSW 343-0099	8-30-94	<10	<1.0	22	<6	<3
FSW 343-0114	8-30-94	<10	<1.0	10	<6	<3
FSW 343-0129	8-30-94	<10	<1.0	26	<6	<3
FSW 343-0145	8-31-94	<10	<1.0	33	<6	1,200
FSW 347-0020	10-18-94	<10	3.0	27	<6	62
FSW 347-0031	10-18-94	10	2.0	21	<6	7
FSW 347-0038	10-18-94	<10	1.0	59	<6	<3
FSW 347-0046	10-18-94	<10	1.0	38	<6	3
FSW 347-0067	10-19-94	<10	<1.0	24	<6	11
FSW 347-0067-D	10-19-94	<10	<1.0	25	<6	7
FSW 347-0101	10-19-94	<10	3.0	16	<6	3
FSW 347-0101-D	10-19-94	<10	2.0	16	<6	11
FSW 347-0116	10-18-94	<10	3.0	17	<6	<3
FSW 347-0131	10-18-94	<10	2.0	34	<6	<3
FSW 347-0145	10-19-94	<10	1.0	33	<6	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Aluminum, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)
FSW 348-0021	10-25-94	<10	6	<0.5	<1.0	<5	<3
FSW 348-0043	10-25-94	<10	5	<.5	<1.0	<5	<3
FSW 348-0073	10-25-94	<10	5	<.5	<1.0	<5	<3
FSW 348-0098	10-25-94	<10	5	<.5	<1.0	5	<3
FSW 348-0148 (AVP/MW591)	10-25-94	<10	5	<.5	3.0	<5	<3
FSW 350-0013	9-06-94	490	27	<.5	<1.0	<5	<3
FSW 350-0052	9-06-94	<10	6	<.5	<1.0	<5	<3
FSW 350-0064	9-07-94	20	2	<.5	<1.0	<5	<3
FSW 350-0077	9-06-94	<10	4	<.5	<1.0	<5	<3
FSW 350-0084	9-07-94	10	5	<.5	<1.0	<5	<3
FSW 350-0110	9-07-94	<10	5	<.5	<1.0	<5	<3
FSW 350-0125	9-08-94	<10	<2	<.5	<1.0	<5	<3
FSW 350-0140	9-08-94	40	4	<.5	<1.0	<5	<3
FSW 355-0079	9-22-94	10	9	<.5	1.0	<5	<3
FSW 355-0104	9-22-94	<10	<2	<.5	<1.0	<5	<3
FSW 355-0149	9-22-94	<10	2	<.5	1.0	<5	<3
FSW 356-0079	6-09-94	30	36	<.5	<1.0	6	<3
FSW 356-0108	6-09-94	<10	3	<.5	<1.0	<5	<3
FSW 356-0134	6-09-94	<10	5	<.5	<1.0	<5	<3
FSW 357-0079	9-01-94	20	25	<.5	<1.0	<5	<3
FSW 357-0099	8-31-94	<10	7	<.5	<1.0	<5	<3
FSW 357-0119	8-31-94	<10	6	<.5	<1.0	<5	<3
FSW 357-0139	9-01-94	<10	6	<.5	<1.0	7	<3
FSW 358-0049	10-13-94	20	24	<.5	<1.0	<5	<3
FSW 358-0089	10-13-94	10	<2	<.5	<1.0	<5	<3
FSW 358-0104	10-13-94	<10	5	<.5	<1.0	<5	<3
FSW 358-0119	10-13-94	<10	5	<.5	<1.0	<5	<3
FSW 358-0132	10-13-94	<10	3	<.5	<1.0	<5	<3
FSW 359-0050	9-14-94	40	31	.6	<1.0	<5	<3
FSW 359-0088	9-13-94	20	10	2	<1.0	<5	<3
FSW 359-0107	9-13-94	30	17	<.5	<1.0	5	<3
FSW 359-0119	9-13-94	<10	11	1	<1.0	<5	<3
FSW 359-0141	9-14-94	<10	11	<.5	1.0	5	<3
FSW 373-0024	8-24-94	30	21	<.5	<1.0	<5	<3
FSW 373-0060	8-24-94	10	6	<.5	2.0	<5	<3
FSW 373-0060-D	8-24-94	<10	6	<.5	<1.0	<5	<3
FSW 373-0073	8-25-94	<10	10	<.5	<1.0	<5	<3
FSW 373-0082	8-24-94	<10	4	<.5	<1.0	<5	<3
FSW 373-0113	8-25-94	<10	3	<.5	<1.0	<5	<3
FSW 375-0015	8-15-94	390	9	<.5	<1.0	<5	<3
FSW 375-0041	8-15-94	20	13	<.5	<1.0	<5	<3
FSW 375-0055	8-16-94	<10	<2	<.5	<1.0	<5	<3
FSW 375-0055-D	8-16-94	<10	<2	<.5	<1.0	<5	<3
FSW 375-0071	8-16-94	<10	3	<.5	<1.0	<5	4
FSW 375-0081	8-16-94	<10	2	<.5	<1.0	<5	4
FSW 375-0099	8-16-94	<10	<2	<.5	<1.0	<5	3
FSW 375-0119	8-17-94	20	<2	<.5	<1.0	<5	5
FSW 378-0081	11-14-94	<10	7	.6	<1.0	<5	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Copper, dissolved (µg/L)	Iron, dissolved (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, dissolved (µg/L)	Molybdenum, dissolved (µg/L)
FSW 348-0021	10-25-94	<10	<3	<10	<4	<1	<10
FSW 348-0043	10-25-94	<10	21	<10	<4	2	<10
FSW 348-0073	10-25-94	<10	4	<10	<4	1	20
FSW 348-0098	10-25-94	<10	3	<10	<4	<1	10
FSW 348-0148 (AVP/MW591)	10-25-94	<10	4	<10	<4	5	20
FSW 350-0013	9-06-94	<10	10	<10	<4	63	<10
FSW 350-0052	9-06-94	<10	4	<10	<4	2	<10
FSW 350-0064	9-07-94	<10	<3	<10	<4	5	<10
FSW 350-0077	9-06-94	<10	4	<10	<4	17	<10
FSW 350-0084	9-07-94	<10	4	<10	<4	20	<10
FSW 350-0110	9-07-94	<10	5	<10	5	12	<10
FSW 350-0125	9-08-94	<10	<3	<10	<4	4	<10
FSW 350-0140	9-08-94	<10	150	<10	<4	6	<10
FSW 355-0079	9-22-94	<10	<3	<10	<4	2	<10
FSW 355-0104	9-22-94	<10	<3	<10	<4	12	<10
FSW 355-0149	9-22-94	<10	11	<10	<4	2	<10
FSW 356-0079	6-09-94	<10	4	<10	<4	980	<10
FSW 356-0108	6-09-94	<10	4	<10	<4	7	<10
FSW 356-0134	6-09-94	<10	<3	<10	<4	4	<10
FSW 357-0079	9-01-94	<10	17	<10	<4	15	<10
FSW 357-0099	8-31-94	<10	51	<10	<4	5	<10
FSW 357-0119	8-31-94	<10	8	<10	<4	12	<10
FSW 357-0139	9-01-94	<10	190	<10	<4	70	<10
FSW 358-0049	10-13-94	<10	<3	<10	<4	19	<10
FSW 358-0089	10-13-94	<10	<3	<10	<4	<1	<10
FSW 358-0104	10-13-94	<10	<3	<10	<4	17	<10
FSW 358-0119	10-13-94	<10	<3	<10	<4	15	<10
FSW 358-0132	10-13-94	<10	4	<10	<4	33	<10
FSW 359-0050	9-14-94	<10	<3	<10	<4	30	<10
FSW 359-0088	9-13-94	<10	4	<10	<4	4	<10
FSW 359-0107	9-13-94	<10	<3	<10	<4	9	<10
FSW 359-0119	9-13-94	<10	<3	<10	<4	4	<10
FSW 359-0141	9-14-94	<10	<3	<10	<4	6	<10
FSW 373-0024	8-24-94	<10	<3	<10	<4	5	<10
FSW 373-0060	8-24-94	<10	<3	<10	<4	6	<10
FSW 373-0060-D	8-24-94	<10	<3	<10	<4	6	<10
FSW 373-0073	8-25-94	<10	<3	<10	<4	26	<10
FSW 373-0082	8-24-94	<10	3	<10	<4	8	<10
FSW 373-0113	8-25-94	<10	4	<10	<4	6	<10
FSW 375-0015	8-15-94	<10	1,300	<10	<4	28	<10
FSW 375-0041	8-15-94	<10	16	<10	<4	140	<10
FSW 375-0055	8-16-94	<10	4	<10	<4	2	<10
FSW 375-0055-D	8-16-94	<10	6	<10	<4	2	<10
FSW 375-0071	8-16-94	<10	6	<10	<4	<1	<10
FSW 375-0081	8-16-94	<10	6	<10	<4	1	<10
FSW 375-0099	8-16-94	<10	520	<10	<4	6	<10
FSW 375-0119	8-17-94	<10	1,800	<10	<4	130	<10
FSW 378-0081	11-14-94	<10	<3	<10	<4	97	<10

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nickel, dissolved (µg/L)	Silver, dissolved (µg/L)	Strontium, dissolved (µg/L)	Vanadium, dissolved (µg/L)	Zinc, dissolved (µg/L)
FSW 348-0021	10-25-94	<10	<1.0	27	<6	<3
FSW 348-0043	10-25-94	<10	2.0	25	<6	<3
FSW 348-0073	10-25-94	<10	1.0	22	<6	<3
FSW 348-0098	10-25-94	<10	<1.0	20	<6	<3
FSW 348-0148 (AVP/MW591)	10-25-94	<10	<1.0	24	<6	6
FSW 350-0013	9-06-94	<10	<1.0	21	<6	4
FSW 350-0052	9-06-94	<10	2.0	17	<6	<3
FSW 350-0064	9-07-94	<10	<1.0	18	<6	<3
FSW 350-0077	9-06-94	<10	<1.0	53	<6	<3
FSW 350-0084	9-07-94	<10	<1.0	71	<6	<3
FSW 350-0110	9-07-94	<10	<1.0	83	<6	<3
FSW 350-0125	9-08-94	<10	<1.0	62	<6	<3
FSW 350-0140	9-08-94	<10	1.0	48	<6	4
FSW 355-0079	9-22-94	<10	<1.0	30	<6	<3
FSW 355-0104	9-22-94	<10	<1.0	30	<6	<3
FSW 355-0149	9-22-94	<10	<1.0	64	<6	7
FSW 356-0079	6-09-94	<10	<1.0	46	<6	<3
FSW 356-0108	6-09-94	<10	1.0	26	<6	<3
FSW 356-0134	6-09-94	<10	<1.0	65	<6	<3
FSW 357-0079	9-01-94	<10	<1.0	28	<6	1,100
FSW 357-0099	8-31-94	<10	<1.0	22	<6	<3
FSW 357-0119	8-31-94	<10	<1.0	54	<6	<3
FSW 357-0139	9-01-94	<10	<1.0	90	<6	<3
FSW 358-0049	10-13-94	<10	<1.0	26	<6	<3
FSW 358-0089	10-13-94	<10	<1.0	13	<6	4
FSW 358-0104	10-13-94	<10	1.0	47	<6	<3
FSW 358-0119	10-13-94	<10	<1.0	67	<6	<3
FSW 358-0132	10-13-94	<10	<1.0	59	<6	<3
FSW 359-0050	9-14-94	<10	<1.0	28	<6	4
FSW 359-0088	9-13-94	<10	1.0	25	<6	<3
FSW 359-0107	9-13-94	<10	<1.0	42	<6	4
FSW 359-0119	9-13-94	<10	<1.0	29	<6	<3
FSW 359-0141	9-14-94	<10	1.0	27	<6	4
FSW 373-0024	8-24-94	<10	<1.0	15	<6	<3
FSW 373-0060	8-24-94	<10	<1.0	19	<6	7
FSW 373-0060-D	8-24-94	<10	<1.0	19	<6	<3
FSW 373-0073	8-25-94	<10	<1.0	32	<6	<3
FSW 373-0082	8-24-94	<10	<1.0	47	<6	6
FSW 373-0113	8-25-94	<10	<1.0	65	<6	11
FSW 375-0015	8-15-94	<10	<1.0	12	<6	6
FSW 375-0041	8-15-94	<10	<1.0	11	<6	5
FSW 375-0055	8-16-94	<10	<1.0	22	<6	3
FSW 375-0055-D	8-16-94	<10	<1.0	22	<6	5
FSW 375-0071	8-16-94	<10	<1.0	48	<6	3
FSW 375-0081	8-16-94	<10	<1.0	46	<6	6
FSW 375-0099	8-16-94	<10	<1.0	22	<6	8
FSW 375-0119	8-17-94	<10	<1.0	37	<6	6
FSW 378-0081	11-14-94	<10	<1.0	18	<6	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Aluminum, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)
FSW 379-0076	11-14-94	<10	18	0.7	<1.0	<5	20
FSW 383-0023	8-10-94	<10	17	<.5	<1.0	<5	<3
FSW 383-0030	8-10-94	20	38	<.5	<1.0	<5	4
FSW 383-0040	8-09-94	20	42	<.5	<1.0	<5	5
FSW 383-0061	8-10-94	<10	<2	<.5	1.0	<5	20
FSW 383-0082	8-10-94	<10	4	<.5	<1.0	<5	7
FSW 383-0106	8-10-94	<10	8	<.5	1.0	<5	8
FSW 383-0129	8-11-94	10	8	<.5	<1.0	<5	<3
FSW 388-0037	6-07-94	<10	11	<.5	<1.0	<5	<3
FSW 388-0072	6-07-94	<10	16	<.5	<1.0	<5	7
FSW 411-0036	9-20-94	160	110	<.5	<1.0	10	<3
FSW 411-0054	9-20-94	<10	10	<.5	1.0	<5	<3
FSW 411-0065	9-20-94	<10	21	<.5	<1.0	7	<3
FSW 411-0081	9-20-94	<10	<2	<.5	<1.0	5	<3
FSW 411-0094	9-20-94	<10	2	<.5	3.0	<5	<3
FSW 411-0106	9-21-94	20	<2	<.5	<1.0	7	<3
FSW 411-0122	9-21-94	20	<2	<.5	1.0	<5	<3
FSW 412-0042	9-13-94	10	13	<.5	<1.0	<5	<3
FSW 412-0064	9-13-94	20	40	<.5	1.0	<5	<3
FSW 412-0078	9-12-94	10	15	<.5	<1.0	<5	<3
FSW 412-0091	9-12-94	<10	13	<.5	<1.0	<5	<3
FSW 412-0108	9-12-94	20	44	<.5	<1.0	<5	<3
FSW 418-0049	9-26-94	20	17	<.5	<1.0	<5	<3
FSW 418-0089	9-27-94	<10	4	<.5	<1.0	<5	<3
FSW 418-0103	9-26-94	<10	6	<.5	<1.0	<5	<3
FSW 418-0122	9-26-94	<10	4	<.5	<1.0	<5	<3
FSW 418-0141	9-27-94	<10	4	<.5	<1.0	<5	<3
FSW 422-0045	6-15-94	10	24	<.5	<1.0	<5	<3
FSW 422-0065	6-15-94	20	33	<.5	<1.0	<5	<3
FSW 422-0065-D	6-15-94	<10	34	<.5	<1.0	5	<3
FSW 422-0085	6-15-94	<10	11	<.5	<1.0	<5	<3
FSW 422-0105	6-15-94	<10	6	<.5	<1.0	<5	<3
FSW 424-0020	7-06-94	40	19	<.5	<1.0	<5	<3
FSW 424-0089 (AVP/MW581C)	7-06-94	10	11	<.5	<1.0	<5	20
FSW 424-0144 (AVP/MW581B)	7-06-94	<10	3	<.5	<1.0	<5	<3
FSW 424-0183 (AVP/MW581A)	7-06-94	10	3	<.5	1.0	<5	<3
FSW 429-0012	10-05-94	160	17	<.5	<1.0	7	<3
FSW 429-0068	10-05-94	<10	5	<.5	<1.0	<5	<3
FSW 429-0078	10-05-94	<10	3	<.5	<1.0	<5	<3
FSW 429-0094	10-05-94	<10	<2	<.5	<1.0	<5	<3
FSW 431-0013	10-05-94	1100	66	<.5	<1.0	20	<3
FSW 431-0018	10-05-94	30	18	<.5	<1.0	<5	<3
FSW 431-0065	10-05-94	<10	4	<.5	<1.0	<5	<3
FSW 431-0078	10-05-94	<10	5	<.5	<1.0	<5	<3
FSW 431-0093	10-05-94	<10	6	<.5	<1.0	<5	<3
FSW 432-0026	8-23-94	140	22	<.5	<1.0	6	<3
FSW 432-0059	8-23-94	<10	12	<.5	2.0	<5	<3
FSW 432-0079	8-24-94	<10	8	<.5	<1.0	<5	<3
FSW 432-0092	8-24-94	<10	6	<.5	4.0	<5	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Copper, dissolved (µg/L)	Iron, dissolved (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, dissolved (µg/L)	Molybdenum, dissolved (µg/L)
FSW 379-0076	11-14-94	<10	1,200	<10	<4	680	<10
FSW 383-0023	8-10-94	<10	<3	<10	<4	8	<10
FSW 383-0030	8-10-94	<10	9	<10	<4	310	<10
FSW 383-0040	8-09-94	<10	99	<10	<4	390	<10
FSW 383-0061	8-10-94	<10	3,300	<10	<4	71	<10
FSW 383-0082	8-10-94	<10	3,500	<10	<4	140	<10
FSW 383-0106	8-10-94	<10	4	<10	<4	2,300	<10
FSW 383-0129	8-11-94	<10	3	<10	<4	180	<10
FSW 388-0037	6-07-94	<10	5	<10	<4	60	<10
FSW 388-0072	6-07-94	<10	33	<10	<4	1,200	<10
FSW 411-0036	9-20-94	<10	<3	<10	<4	81	<10
FSW 411-0054	9-20-94	<10	<3	<10	<4	18	<10
FSW 411-0065	9-20-94	<10	<3	<10	<4	44	<10
FSW 411-0081	9-20-94	<10	<3	<10	<4	5	<10
FSW 411-0094	9-20-94	<10	<3	<10	<4	5	<10
FSW 411-0106	9-21-94	<10	<3	<10	<4	10	<10
FSW 411-0122	9-21-94	<10	120	<10	<4	710	<10
FSW 412-0042	9-13-94	<10	<3	<10	<4	2	<10
FSW 412-0064	9-13-94	<10	<3	<10	<4	10	<10
FSW 412-0078	9-12-94	<10	<3	<10	<4	4	<10
FSW 412-0091	9-12-94	<10	<3	<10	<4	5	<10
FSW 412-0108	9-12-94	<10	<3	<10	<4	12	<10
FSW 418-0049	9-26-94	<10	<3	<10	<4	12	<10
FSW 418-0089	9-27-94	<10	<3	<10	<4	1	<10
FSW 418-0103	9-26-94	<10	<3	<10	<4	<1	<10
FSW 418-0122	9-26-94	<10	4	<10	<4	<1	<10
FSW 418-0141	9-27-94	<10	<3	<10	<4	1	<10
FSW 422-0045	6-15-94	<10	<3	<10	<4	12	20
FSW 422-0065	6-15-94	<10	6	<10	<4	1,400	<10
FSW 422-0065-D	6-15-94	<10	7	<10	<4	1,400	<10
FSW 422-0085	6-15-94	<10	8	<10	<4	1,500	<10
FSW 422-0105	6-15-94	<10	4	<10	<4	2,000	<10
FSW 424-0020	7-06-94	<10	8	<10	<4	10	<10
FSW 424-0089 (AVP/MW581C)	7-06-94	<10	35	<10	<4	4,900	<10
FSW 424-0144 (AVP/MW581B)	7-06-94	<10	<3	<10	<4	6	<10
FSW 424-0183 (AVP/MW581A)	7-06-94	<10	8	<10	<4	120	<10
FSW 429-0012	10-05-94	<10	<3	<10	<4	35	<10
FSW 429-0068	10-05-94	<10	<3	<10	<4	1	<10
FSW 429-0078	10-05-94	<10	<3	<10	<4	4	<10
FSW 429-0094	10-05-94	<10	<3	<10	<4	<1	<10
FSW 431-0013	10-05-94	<10	260	<10	<4	66	<10
FSW 431-0018	10-05-94	<10	<3	<10	<4	6	<10
FSW 431-0065	10-05-94	<10	<3	<10	<4	<1	<10
FSW 431-0078	10-05-94	<10	<3	<10	<4	9	<10
FSW 431-0093	10-05-94	<10	<3	<10	<4	5	<10
FSW 432-0026	8-23-94	<10	5	<10	<4	37	<10
FSW 432-0059	8-23-94	<10	<3	<10	<4	2	<10
FSW 432-0079	8-24-94	<10	<3	<10	<4	8	<10
FSW 432-0092	8-24-94	<10	<3	<10	<4	9	<10

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nickel, dissolved (µg/L)	Silver, dissolved (µg/L)	Strontium, dissolved (µg/L)	Vanadium, dissolved (µg/L)	Zinc, dissolved (µg/L)
FSW 379-0076	11-14-94	<10	<1.0	32	<6	4
FSW 383-0023	8-10-94	<10	<1.0	14	<6	<3
FSW 383-0030	8-10-94	<10	<1.0	82	<6	<3
FSW 383-0040	8-09-94	<10	<1.0	75	<6	<3
FSW 383-0061	8-10-94	<10	<1.0	5	<6	<3
FSW 383-0082	8-10-94	<10	<1.0	6	<6	<3
FSW 383-0106	8-10-94	<10	2.0	22	<6	5
FSW 383-0129	8-11-94	<10	<1.0	51	<6	4
FSW 388-0037	6-07-94	<10	<1.0	17	<6	<3
FSW 388-0072	6-07-94	<10	1.0	11	<6	<3
FSW 411-0036	9-20-94	<10	<1.0	17	<6	<3
FSW 411-0054	9-20-94	<10	<1.0	20	<6	4
FSW 411-0065	9-20-94	<10	<1.0	37	<6	<3
FSW 411-0081	9-20-94	<10	<1.0	40	<6	8
FSW 411-0094	9-20-94	<10	<1.0	55	<6	8
FSW 411-0106	9-21-94	<10	<1.0	61	<6	<3
FSW 411-0122	9-21-94	<10	<1.0	44	<6	6
FSW 412-0042	9-13-94	<10	<1.0	12	<6	<3
FSW 412-0064	9-13-94	<10	<1.0	23	<6	<3
FSW 412-0078	9-12-94	<10	<1.0	8	<6	<3
FSW 412-0091	9-12-94	<10	<1.0	9	<6	3
FSW 412-0108	9-12-94	<10	<1.0	42	<6	<3
FSW 418-0049	9-26-94	<10	<1.0	13	<6	<3
FSW 418-0089	9-27-94	<10	<1.0	24	<6	<3
FSW 418-0103	9-26-94	<10	<1.0	86	<6	9
FSW 418-0122	9-26-94	<10	<1.0	37	<6	6
FSW 418-0141	9-27-94	<10	<1.0	50	<6	4
FSW 422-0045	6-15-94	<10	<1.0	18	<6	<3
FSW 422-0065	6-15-94	<10	<1.0	22	<6	<3
FSW 422-0065-D	6-15-94	<10	<1.0	22	<6	<3
FSW 422-0085	6-15-94	<10	<1.0	18	<6	7
FSW 422-0105	6-15-94	<10	<1.0	29	<6	<3
FSW 424-0020	7-06-94	<10	<1.0	37	<6	<3
FSW 424-0089 (AVP/MW581C)	7-06-94	<10	<1.0	47	<6	8
FSW 424-0144 (AVP/MW581B)	7-06-94	<10	<1.0	40	<6	6
FSW 424-0183 (AVP/MW581A)	7-06-94	<10	<1.0	29	<6	7
FSW 429-0012	10-05-94	<10	<1.0	21	<6	<3
FSW 429-0068	10-05-94	<10	<1.0	32	<6	5
FSW 429-0078	10-05-94	<10	<1.0	45	<6	<3
FSW 429-0094	10-05-94	<10	<1.0	42	<6	<3
FSW 431-0013	10-05-94	<10	1.0	17	<6	<3
FSW 431-0018	10-05-94	<10	<1.0	30	<6	<3
FSW 431-0065	10-05-94	<10	2.0	22	<6	18
FSW 431-0078	10-05-94	<10	<1.0	62	<6	<3
FSW 431-0093	10-05-94	<10	<1.0	52	<6	<3
FSW 432-0026	8-23-94	<10	<1.0	22	<6	110
FSW 432-0059	8-23-94	<10	<1.0	15	<6	5
FSW 432-0079	8-24-94	<10	<1.0	23	<6	3
FSW 432-0092	8-24-94	<10	<1.0	27	<6	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Aluminum, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)
FSW 433-0064	6-09-94	30	34	<0.5	<1.0	10	<3
FSW 433-0090	6-09-94	20	5	<.5	<1.0	<5	<3
FSW 433-0104	6-08-94	30	5	<.5	<1.0	<5	<3
FSW 433-0118	6-08-94	60	3	<.5	<1.0	<5	<3
FSW 433-0140	6-09-94	30	3	<.5	<1.0	<5	<3
FSW 435-0064	9-19-94	180	32	<.5	<1.0	8	<3
FSW 435-0090	9-16-94	<10	4	<.5	<1.0	5	<3
FSW 435-0105	9-15-94	10	2	<.5	<1.0	<5	<3
FSW 435-0121	9-15-94	<10	<2	<.5	<1.0	<5	<3
FSW 435-0140	9-16-94	210	3	.5	<1.0	<5	5
FSW 436-0036	8-17-94	40	21	<.5	1.0	<5	5
FSW 436-0060	8-17-94	<10	3	<.5	<1.0	<5	<3
FSW 436-0076	8-18-94	20	3	<.5	<1.0	<5	4
FSW 436-0091	8-18-94	10	<2	<.5	<1.0	<5	3
FSW 436-0115	8-18-94	<10	<2	<.5	<1.0	10	<3
FSW 436-0141	8-19-94	20	<2	<.5	<1.0	6	<3
FSW 443-0089	9-30-94	10	9	<.5	<1.0	6	<3
FSW 443-0104	10-03-94	<10	7	<.5	<1.0	5	<3
FSW 443-0117	10-03-94	<10	7	<.5	<1.0	<5	<3
FSW 443-0140	10-03-94	<10	3	<.5	<1.0	<5	<3
FSW 459-0064	10-04-94	50	25	.5	<1.0	7	<3
FSW 459-0091	10-04-94	<10	4	<.5	<1.0	<5	<3
FSW 459-0106	10-04-94	<10	3	<.5	<1.0	6	<3
FSW 459-0121	10-04-94	<10	2	<.5	<1.0	<5	<3
FSW 459-0136	10-04-94	<10	3	<.5	<1.0	<5	<3
FSW 460-0080	8-25-94	10	13	1	<1.0	<5	<3
FSW 460-0100	8-25-94	20	10	<.5	2.0	6	<3
FSW 460-0120	8-26-94	20	11	<.5	<1.0	6	<3
FSW 460-0140	8-26-94	<10	8	<.5	<1.0	<5	<3
FSW 470-0091	9-21-94	<10	<2	<.5	<1.0	6	<3
FSW 470-0106	9-21-94	<10	<2	<.5	<1.0	<5	<3
FSW 470-0119	9-21-94	<10	2	<.5	<1.0	<5	<3
FSW 470-0142	9-21-94	110	<2	<.5	<1.0	50	7
FSW 474-0080	9-15-94	10	22	<.5	<1.0	6	<3
FSW 474-0100	9-15-94	20	12	<.5	<1.0	<5	<3
FSW 474-0115	9-14-94	20	14	<.5	<1.0	6	<3
FSW 474-0129	9-14-94	<10	9	<.5	<1.0	<5	<3
FSW 474-0147	9-14-94	<10	7	<.5	<1.0	<5	<3
FSW 484-0007	10-06-94	50	15	<.5	<1.0	9	<3
FSW 484-0023	10-06-94	20	15	<.5	<1.0	<5	<3
FSW 484-0078	10-06-94	<10	2	<.5	<1.0	<5	<3
FSW 484-0108	10-06-94	<10	<2	<.5	<1.0	7	<3
FSW 487-0012	10-11-94	280	53	<.5	1.0	10	<3
FSW 487-0023	10-11-94	80	77	<.5	<1.0	8	<3
FSW 487-0078	10-11-94	20	21	<.5	<1.0	<5	<3
FSW 487-0112	10-12-94	<10	<2	<.5	1.0	<5	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Copper, dissolved (µg/L)	Iron, dissolved (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, dissolved (µg/L)	Molybdenum, dissolved (µg/L)
FSW 433-0064	6-09-94	<10	<3	<10	<4	11	<10
FSW 433-0090	6-09-94	<10	<3	<10	<4	2	<10
FSW 433-0104	6-08-94	<10	4	<10	<4	19	<10
FSW 433-0118	6-08-94	<10	2,700	<10	<4	47	<10
FSW 433-0140	6-09-94	<10	1,100	<10	<4	40	<10
FSW 435-0064	9-19-94	<10	<3	20	<4	9	<10
FSW 435-0090	9-16-94	<10	15	<10	<4	4	<10
FSW 435-0105	9-15-94	<10	62	<10	<4	27	<10
FSW 435-0121	9-15-94	<10	20	<10	<4	43	<10
FSW 435-0140	9-16-94	<10	2,300	<10	4	290	<10
FSW 436-0036	8-17-94	<10	<3	<10	<4	21	<10
FSW 436-0060	8-17-94	<10	<3	<10	<4	<1	<10
FSW 436-0076	8-18-94	<10	<3	<10	<4	<1	<10
FSW 436-0091	8-18-94	<10	3,300	<10	<4	80	<10
FSW 436-0115	8-18-94	<10	2,600	<10	<4	73	<10
FSW 436-0141	8-19-94	<10	150	<10	<4	200	<10
FSW 443-0089	9-30-94	<10	<3	<10	<4	5	<10
FSW 443-0104	10-03-94	<10	23	<10	<4	10	<10
FSW 443-0117	10-03-94	<10	4	<10	<4	11	<10
FSW 443-0140	10-03-94	<10	<3	<10	<4	4	<10
FSW 459-0064	10-04-94	<10	<3	<10	<4	190	<10
FSW 459-0091	10-04-94	<10	<3	<10	<4	2	<10
FSW 459-0106	10-04-94	<10	<3	10	<4	1	<10
FSW 459-0121	10-04-94	<10	<3	<10	<4	<1	<10
FSW 459-0136	10-04-94	<10	<3	20	<4	<1	<10
FSW 460-0080	8-25-94	<10	<3	<10	<4	7	<10
FSW 460-0100	8-25-94	<10	4	<10	<4	5	<10
FSW 460-0120	8-26-94	<10	<3	<10	<4	13	<10
FSW 460-0140	8-26-94	<10	11	<10	<4	24	<10
FSW 470-0091	9-21-94	<10	<3	<10	<4	<1	<10
FSW 470-0106	9-21-94	<10	5	<10	<4	1	<10
FSW 470-0119	9-21-94	<10	<3	<10	<4	1	<10
FSW 470-0142	9-21-94	<10	750	<10	<4	4	<10
FSW 474-0080	9-15-94	<10	<3	10	<4	7	<10
FSW 474-0100	9-15-94	<10	<3	<10	<4	6	<10
FSW 474-0115	9-14-94	<10	<3	<10	<4	6	<10
FSW 474-0129	9-14-94	<10	<3	<10	<4	4	<10
FSW 474-0147	9-14-94	<10	<3	<10	<4	29	<10
FSW 484-0007	10-06-94	<10	85	<10	<4	27	<10
FSW 484-0023	10-06-94	<10	<3	<10	<4	3	<10
FSW 484-0078	10-06-94	<10	7	<10	<4	<1	<10
FSW 484-0108	10-06-94	<10	880	<10	<4	16	<10
FSW 487-0012	10-11-94	<10	5	<10	<4	75	<10
FSW 487-0023	10-11-94	<10	<3	<10	<4	89	<10
FSW 487-0078	10-11-94	<10	<3	<10	<4	5	<10
FSW 487-0112	10-12-94	<10	7	<10	<4	<1	<10

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nickel, dissolved (µg/L)	Silver, dissolved (µg/L)	Strontium, dissolved (µg/L)	Vanadium, dissolved (µg/L)	Zinc, dissolved (µg/L)
FSW 433-0064	6-09-94	<10	2.0	27	<6	<3
FSW 433-0090	6-09-94	<10	<1.0	16	<6	<3
FSW 433-0104	6-08-94	<10	<1.0	74	<6	4
FSW 433-0118	6-08-94	<10	1.0	61	<6	<3
FSW 433-0140	6-09-94	<10	1.0	45	<6	<3
FSW 435-0064	9-19-94	<10	<1.0	24	<6	3
FSW 435-0090	9-16-94	<10	<1.0	48	<6	6
FSW 435-0105	9-15-94	<10	<1.0	150	<6	<3
FSW 435-0121	9-15-94	<10	<1.0	100	<6	<3
FSW 435-0140	9-16-94	<10	<1.0	48	<6	5
FSW 436-0036	8-17-94	<10	2.0	24	<6	9
FSW 436-0060	8-17-94	<10	<1.0	23	<6	9
FSW 436-0076	8-18-94	<10	<1.0	58	<6	5
FSW 436-0091	8-18-94	<10	<1.0	54	<6	5
FSW 436-0115	8-18-94	<10	<1.0	37	<6	5
FSW 436-0141	8-19-94	<10	<1.0	30	<6	7
FSW 443-0089	9-30-94	<10	1.0	39	<6	5
FSW 443-0104	10-03-94	<10	<1.0	41	<6	<3
FSW 443-0117	10-03-94	<10	<1.0	68	<6	<3
FSW 443-0140	10-03-94	<10	<1.0	65	<6	8
FSW 459-0064	10-04-94	<10	1.0	34	<6	<3
FSW 459-0091	10-04-94	<10	<1.0	14	<6	7
FSW 459-0106	10-04-94	<10	<1.0	14	<6	5
FSW 459-0121	10-04-94	<10	<1.0	18	<6	<3
FSW 459-0136	10-04-94	<10	<1.0	22	<6	<3
FSW 460-0080	8-25-94	<10	<1.0	21	<6	6
FSW 460-0100	8-25-94	<10	<1.0	24	<6	5
FSW 460-0120	8-26-94	<10	1.0	26	<6	<3
FSW 460-0140	8-26-94	<10	<1.0	64	<6	<3
FSW 470-0091	9-21-94	<10	<1.0	17	<6	4
FSW 470-0106	9-21-94	<10	<1.0	17	<6	<3
FSW 470-0119	9-21-94	<10	<1.0	28	<6	4
FSW 470-0142	9-21-94	<10	<1.0	19	<6	<3
FSW 474-0080	9-15-94	<10	<1.0	18	<6	5
FSW 474-0100	9-15-94	<10	<1.0	19	<6	4
FSW 474-0115	9-14-94	<10	<1.0	35	<6	5
FSW 474-0129	9-14-94	<10	<1.0	34	<6	<3
FSW 474-0147	9-14-94	<10	<1.0	72	<6	<3
FSW 484-0007	10-06-94	<10	<1.0	40	<6	<3
FSW 484-0023	10-06-94	<10	1.0	26	<6	<3
FSW 484-0078	10-06-94	<10	<1.0	26	<6	<3
FSW 484-0108	10-06-94	<10	1.0	27	<6	<3
FSW 487-0012	10-11-94	10	<1.0	34	<6	<3
FSW 487-0023	10-11-94	<10	<1.0	64	<6	<3
FSW 487-0078	10-11-94	<10	<1.0	19	<6	<3
FSW 487-0112	10-12-94	<10	<1.0	30	<6	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Aluminum, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)
FSW 493-0008	10-12-94	60	15	<0.5	<1.0	8	<3
FSW 493-0024	10-12-94	30	10	<.5	<1.0	7	<3
FSW 493-0074	10-12-94	10	3	<.5	<1.0	<5	3
FSW 493-0115	10-12-94	20	3	<.5	<1.0	<5	<3
FSW 501-0087	9-30-94	--	5	<.5	<1.0	<5	<3
FSW 501-0102	9-29-94	20	7	<.5	<1.0	<5	3
FSW 501-0117	9-29-94	20	8	<.5	<1.0	<5	<3
FSW 502-0087	9-29-94	20	14	<.5	<1.0	<5	<3
FSW 502-0102	9-29-94	<10	5	<.5	<1.0	<5	<3
FSW 502-0117	9-27-94	<10	5	<.5	<1.0	<5	<3
FSW 502-0128	9-27-94	20	<2	<.5	<1.0	<5	5
FSW 502-0139	9-27-94	10	<2	<.5	<1.0	<5	<3
FSW 564-0016	10-24-94	60	18	<.5	<1.0	5	<3
FSW 564-0100 (AVP/MW580)	10-24-94	<10	4	<.5	<1.0	<5	<3
FSW 564-0138	10-24-94	<10	<2	<.5	<1.0	<5	<3
FSW 567-0136	11-09-94	<10	7	.7	<1.0	<5	<3
FSW 570-0056	11-14-94	20	18	.7	<1.0	<5	<3
FSW 570-0073	11-14-94	10	56	.6	<1.0	5	<3
FSW 570-0091	11-10-94	<10	35	.7	<1.0	<5	20
FSW 570-0111	11-10-94	10	24	.6	<1.0	<5	4
FSW 582-0013 (AVP/MW582D)	10-26-94	20	30	<.5	<1.0	<5	<3
FSW 582-0038 (AVP/MW582C)	10-26-94	<10	39	<.5	<1.0	<5	<3
FSW 582-0038 (AVP/MW582C)-D	10-26-94	<10	38	<.5	<1.0	<5	<3
FSW 582-0073 (AVP/MW582B)	10-26-94	<10	21	<.5	<1.0	6	<3
FSW 582-0073 (AVP/MW582B)	10-26-94	<10	21	<.5	<1.0	<5	<3
FSW 582-0168 (AVP/MW582A)	10-26-94	<10	3	<.5	<1.0	<5	<3
FSW 583-0013 (AVP/MW583E)	10-28-94	20	5	<.5	<1.0	<5	<3
FSW 583-0058 (AVP/MW583-D	10-27-94	20	6	<.5	1.0	<5	<3
FSW 583-0089 (AVP/MW583C)	10-27-94	20	26	<.5	<1.0	<5	<3
FSW 583-0138 (AVP/MW583B)	10-28-94	20	8	<.5	<1.0	<5	<3
FSW 583-0173 (AVP/MW583A)	10-27-94	<10	<2	<.5	<1.0	<5	<3
FSW 584-0013 (AVP/MW584D)	10-27-94	20	5	<.5	<1.0	<5	<3
FSW 584-0103 (AVP/MW584C)	10-27-94	<10	7	<.5	<1.0	<5	<3
FSW 584-0148 (AVP/MW584B)	10-27-94	<10	11	<.5	<1.0	<5	<3
FSW 584-0198 (AVP/MW584A)	10-26-94	<10	2	<.5	<1.0	<5	<3
FSW 585-0048 (AVP/MW585D)	11-08-94	30	14	.9	<1.0	<5	<3
FSW 585-0084 (AVP/MW585C)	11-08-94	<10	8	.6	<1.0	<5	<3
FSW 585-0099 (AVP/MW585B)	11-08-94	<10	10	.7	<1.0	<5	<3
FSW 585-0124 (AVP/MW585A)	11-08-94	<10	8	.7	<1.0	<5	8
FSW 587-0045 (AVP/MW587D)	11-07-94	140	15	.8	<1.0	5	<3
FSW 587-0098 (AVP/MW587C)	11-07-94	<10	33	.7	<1.0	<5	10
FSW 587-0118 (AVP/MW587B)	11-07-94	<10	19	.7	<1.0	<5	4
FSW 587-0167 (AVP/MW587A)	11-07-94	<10	2	.8	<1.0	<5	<3
FSW 588-0089 (AVP/MW588)	11-09-94	<10	19	.8	<1.0	<5	5
FSW 589-0078 (AVP/MW589)	11-09-94	<10	4	.6	<1.0	<5	<3
FSW 592-0115 (AVP/MW592)	11-09-94	<10	8	.6	<1.0	<5	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Copper, dissolved (µg/L)	Iron, dissolved (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, dissolved (µg/L)	Molybdenum, dissolved (µg/L)
FSW 493-0008	10-12-94	<10	190	<10	<4	4	<10
FSW 493-0024	10-12-94	<10	6	<10	<4	30	<10
FSW 493-0074	10-12-94	<10	2,800	<10	<4	44	<10
FSW 493-0115	10-12-94	<10	2,700	<10	<4	54	<10
FSW 501-0087	9-30-94	<10	110	<10	<4	4	<10
FSW 501-0102	9-29-94	<10	950	<10	<4	130	<10
FSW 501-0117	9-29-94	<10	1,100	<10	<4	48	<10
FSW 502-0087	9-29-94	<10	<3	<10	<4	9	<10
FSW 502-0102	9-29-94	<10	<3	<10	<4	3	<10
FSW 502-0117	9-27-94	<10	<3	<10	<4	3	<10
FSW 502-0128	9-27-94	<10	1,200	<10	<4	75	<10
FSW 502-0139	9-27-94	<10	1,400	<10	<4	57	<10
FSW 564-0016	10-24-94	<10	9	<10	<4	150	<10
FSW 564-0100 (AVP/MW580)	10-24-94	<10	<3	<10	<4	19	<10
FSW 564-0138	10-24-94	<10	4	<10	<4	3	10
FSW 567-0136	11-09-94	<10	5	<10	<4	700	<10
FSW 570-0056	11-14-94	<10	<3	<10	<4	13	<10
FSW 570-0073	11-14-94	<10	13	<10	<4	440	<10
FSW 570-0091	11-10-94	<10	18	<10	<4	3,400	<10
FSW 570-0111	11-10-94	<10	10	<10	<4	2,700	<10
FSW 582-0013 (AVP/MW582D)	10-26-94	<10	80	<10	<4	40	20
FSW 582-0038 (AVP/MW582C)	10-26-94	<10	20	<10	<4	300	<10
FSW 582-0038 (AVP/MW582C)-D	10-26-94	<10	21	<10	<4	300	20
FSW 582-0073 (AVP/MW582B)	10-26-94	<10	11	<10	<4	180	<10
FSW 582-0073 (AVP/MW582B)	10-26-94	<10	7	<10	<4	180	<10
FSW 582-0168 (AVP/MW582A)	10-26-94	<10	<3	10	<4	41	<10
FSW 583-0013 (AVP/MW583E)	10-28-94	<10	490	<10	<4	440	20
FSW 583-0058 (AVP/MW583D)	10-27-94	<10	35	10	4	4	20
FSW 583-0089 (AVP/MW583C)	10-27-94	<10	45	<10	<4	<1	<10
FSW 583-0138 (AVP/MW583B)	10-28-94	<10	13	<10	<4	77	<10
FSW 583-0173 (AVP/MW583A)	10-27-94	<10	<3	<10	<4	4	<10
FSW 584-0013 (AVP/MW584D)	10-27-94	<10	32	<10	<4	890	20
FSW 584-0103 (AVP/MW584C)	10-27-94	<10	<3	<10	<4	2	20
FSW 584-0148 (AVP/MW584B)	10-27-94	<10	4	<10	<4	22	<10
FSW 584-0198 (AVP/MW584A)	10-26-94	<10	<3	<10	<4	2	<10
FSW 585-0048 (AVP/MW585D)	11-08-94	<10	<3	<10	<4	8	<10
FSW 585-0084 (AVP/MW585C)	11-08-94	<10	15	<10	<4	11	<10
FSW 585-0099 (AVP/MW585B)	11-08-94	<10	8	<10	<4	52	<10
FSW 585-0124 (AVP/MW585A)	11-08-94	<10	3,100	<10	<4	100	<10
FSW 587-0045 (AVP/MW587D)	11-07-94	<10	<3	<10	<4	64	<10
FSW 587-0098 (AVP/MW587C)	11-07-94	<10	14	<10	<4	5,100	<10
FSW 587-0118 (AVP/MW587B)	11-07-94	<10	11	<10	<4	2,300	<10
FSW 587-0167 (AVP/MW587A)	11-07-94	<10	4	<10	<4	18	<10
FSW 588-0089 (AVP/MW588)	11-09-94	<10	5	<10	<4	2,500	<10
FSW 589-0078 (AVP/MW589)	11-09-94	<10	<3	<10	<4	710	<10
FSW 592-0115 (AVP/MW592)	11-09-94	<10	<3	<10	<4	15	<10

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nickel, dissolved (µg/L)	Silver, dissolved (µg/L)	Strontium, dissolved (µg/L)	Vanadium, dissolved (µg/L)	Zinc, dissolved (µg/L)
FSW 493-0008	10-12-94	<10	<1.0	19	<6	<3
FSW 493-0024	10-12-94	<10	<1.0	24	<6	<3
FSW 493-0074	10-12-94	<10	<1.0	24	<6	7
FSW 493-0115	10-12-94	<10	<1.0	27	<6	<3
FSW 501-0087	9-30-94	<10	1.0	38	<6	<3
FSW 501-0102	9-29-94	<10	<1.0	73	<6	7
FSW 501-0117	9-29-94	<10	<1.0	83	<6	<3
FSW 502-0087	9-29-94	<10	<1.0	11	<6	<3
FSW 502-0102	9-29-94	<10	<1.0	23	<6	<3
FSW 502-0117	9-27-94	<10	<1.0	53	<6	<3
FSW 502-0128	9-27-94	<10	2.0	31	<6	<3
FSW 502-0139	9-27-94	<10	<1.0	31	<6	<3
FSW 564-0016	10-24-94	<10	<1.0	22	<6	4
FSW 564-0100 (AVP/MW580)	10-24-94	<10	1.0	35	<6	<3
FSW 564-0138	10-24-94	<10	<1.0	22	<6	5
FSW 567-0136	11-09-94	<10	<1.0	33	<6	<3
FSW 570-0056	11-14-94	<10	<1.0	10	<6	<3
FSW 570-0073	11-14-94	<10	<1.0	45	<6	<3
FSW 570-0091	11-10-94	<10	<1.0	41	<6	<3
FSW 570-0111	11-10-94	<10	<1.0	54	<6	<3
FSW 582-0013 (AVP/MW582D)	10-26-94	<10	<1.0	42	<6	4
FSW 582-0038 (AVP/MW582C)	10-26-94	<10	<1.0	47	<6	<3
FSW 582-0038 (AVP/MW582C)-D	10-26-94	<10	3.0	47	<6	<3
FSW 582-0073 (AVP/MW582B)	10-26-94	<10	<1.0	64	<6	4
FSW 582-0073 (AVP/MW582B)	10-26-94	<10	2.0	64	<6	<3
FSW 582-0168 (AVP/MW582A)	10-26-94	<10	<1.0	35	<6	29
FSW 583-0013 (AVP/MW583E)	10-28-94	<10	1.0	21	<6	5
FSW 583-0058 (AVP/MW583D)	10-27-94	<10	<1.0	27	<6	<3
FSW 583-0089 (AVP/MW583C)	10-27-94	<10	<1.0	17	<6	<3
FSW 583-0138 (AVP/MW583B)	10-28-94	<10	1.0	16	<6	<3
FSW 583-0173 (AVP/MW583A)	10-27-94	<10	<1.0	28	<6	16
FSW 584-0013 (AVP/MW584D)	10-27-94	<10	1.0	26	<6	6
FSW 584-0103 (AVP/MW584C)	10-27-94	<10	<1.0	22	<6	5
FSW 584-0148 (AVP/MW584B)	10-27-94	<10	2.0	27	<6	<3
FSW 584-0198 (AVP/MW584A)	10-26-94	<10	2.0	32	<6	4
FSW 585-0048 (AVP/MW585D)	11-08-94	<10	<1.0	11	<6	<3
FSW 585-0084 (AVP/MW585C)	11-08-94	<10	<1.0	8	<6	<3
FSW 585-0099 (AVP/MW585B)	11-08-94	<10	<1.0	36	<6	<3
FSW 585-0124 (AVP/MW585A)	11-08-94	<10	<1.0	54	<6	10
FSW 587-0045 (AVP/MW587D)	11-07-94	<10	<1.0	13	<6	<3
FSW 587-0098 (AVP/MW587C)	11-07-94	<10	<1.0	61	<6	11
FSW 587-0118 (AVP/MW587B)	11-07-94	<10	<1.0	54	<6	<3
FSW 587-0167 (AVP/MW587A)	11-07-94	<10	<1.0	31	<6	32
FSW 588-0089 (AVP/MW588)	11-09-94	<10	1.0	66	<6	<3
FSW 589-0078 (AVP/MW589)	11-09-94	<10	<1.0	14	<6	<3
FSW 592-0115 (AVP/MW592)	11-09-94	<10	<1.0	35	<6	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Aluminum, dissolved (µg/L)	Barium, dissolved (µg/L)	Beryllium, dissolved (µg/L)	Cadmium, dissolved (µg/L)	Chromium, dissolved (µg/L)	Cobalt, dissolved (µg/L)
SDW 313-0020	6-02-94	20	14	<0.5	2.0	<5	4
SDW 313-0038	6-02-94	20	26	<.5	3.0	<5	<3
SDW 313-0060	6-03-94	20	42	<.5	3.0	<5	<3
SDW 313-0080	6-02-94	10	15	<.5	2.0	<5	<3
SDW 314-0035	6-16-94	70	2	.6	<1.0	<5	<3
SDW 314-0051	6-16-94	70	4	<.5	<1.0	<5	3
SDW 314-0075	6-16-94	10	24	<.5	<1.0	<5	10
SDW 314-0075	6-16-94	<10	24	<.5	<1.0	<5	10
SDW 314-0098	6-16-94	<10	7	<.5	<1.0	6	<3
SDW 314-0108 (AVP/MW314)	10-07-94	<10	17	<.5	<1.0	7	<3
SDW 315-0061	11-15-94	30	23	.6	<1.0	6	<3
SDW 315-0082	11-02-94	<10	11	<.5	<1.0	<5	<3
SDW 315-0104	11-02-94	<10	5	<.5	<1.0	<5	<3
SDW 315-0126	11-02-94	<10	4	<.5	<1.0	<5	<3
SDW 315-0149	11-02-94	<10	3	<.5	<1.0	<5	<3
SDW 316-0051	10-31-94	310	26	.5	<1.0	<5	<3
SDW 316-0066	11-01-94	40	4	<.5	<1.0	<5	<3
SDW 316-0066-D	11-01-94	<10	4	<.5	<1.0	<5	<3
SDW 316-0082	10-31-94	<10	3	<.5	1.0	<5	<3
SDW 316-0100	10-31-94	<10	3	<.5	3.0	<5	70
SDW 316-0114 (AVP/MW316C)	11-01-94	<10	7	<.5	<1.0	6	<3
SDW 316-0134	10-31-94	<10	12	<.5	<1.0	<5	<3
SDW 316-0148 (AVP/MW316B)	11-01-94	140	3	<.5	<1.0	<5	<3
SDW 316-0163 (AVP/MW316A)	11-01-94	10	4	<.5	<1.0	5	<3
SDW 317-0027	10-14-94	90	<2	<.5	<1.0	<5	<3
SDW 317-0051	10-14-94	30	7	<.5	<1.0	5	7
SDW 318-0036	6-17-94	140	<2	<.5	<1.0	<5	<3
SDW 318-0064	6-17-94	20	27	<.5	<1.0	<5	8
SDW 344-0038	11-03-94	10	26	<.5	<1.0	<5	<3
SDW 344-0061	11-03-94	350	16	<.5	<1.0	<5	3
SDW 344-0080	11-03-94	<10	6	<.5	2.0	<5	60
SDW 344-0100	11-03-94	<10	7	.5	<1.0	<5	40
SDW 395-0028 (CS16MW7)	10-19-94	160	<2	<.5	<1.0	6	<3
SDW 423-0058 (FTA1MW428B)	11-04-94	<10	27	<.5	<1.0	<5	<3
SDW 423-0098 (FTA1MW428A)	11-04-94	10	10	<.5	<1.0	<5	<3
SDW 434-0014 (CS16MW3)	7-05-94	70	4	<.5	1.0	<5	3
SDW 434-0025 (CS16MW3B)	7-05-94	10	4	<.5	<1.0	<5	3
SDW 434-0076 (CS16MW3A)	7-05-94	<10	4	<.5	<1.0	<5	<3
SDW 436-0028 (CS16MW5)	11-08-94	140	4	.8	<1.0	5	<3
SDW 437-0029 (CS16MW6)	11-08-94	180	<2	.6	<1.0	<5	<3
SDW 438-0041 (CS16MW8)	10-20-94	80	<2	<.5	<1.0	<5	<3
SDW 440-0078	10-19-94	20	<2	<.5	<1.0	<5	<3
SDW 440-0078	10-19-94	20	<2	<.5	<1.0	6	<3
SDW 467-0058	6-30-94	10	11	<.5	<1.0	<5	<3
SDW 590-0074 (AVP/MW590)	11-03-94	150	24	<.5	1.0	6	3
SDW 593-0075 (AVP/MW593)	11-03-94	20	10	<.5	<1.0	<5	<3
MMR STP Effluent at S317	2-02-95	50	3	<.5	<1.0	<5	<3

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Copper, dissolved (µg/L)	Iron, dissolved (µg/L)	Lead, dissolved (µg/L)	Lithium, dissolved (µg/L)	Manganese, dissolved (µg/L)	Molybdenum, dissolved (µg/L)
SDW 313-0020	6-02-94	<10	5	<10	<4	6	<10
SDW 313-0038	6-02-94	<10	<3	<10	<4	9	<10
SDW 313-0060	6-03-94	<10	3	<10	<4	12	<10
SDW 313-0080	6-02-94	<10	4	<10	<4	4	<10
SDW 314-0035	6-16-94	70	15	10	<4	33	<10
SDW 314-0051	6-16-94	40	13	<10	<4	26	<10
SDW 314-0075	6-16-94	20	14	<10	<4	110	<10
SDW 314-0075	6-16-94	20	12	<10	<4	110	<10
SDW 314-0098	6-16-94	<10	3	20	<4	110	<10
SDW 314-0108 (AVP/MW314)	10-07-94	<10	<3	<10	<4	47	<10
SDW 315-0061	11-15-94	<10	<3	<10	<4	14	<10
SDW 315-0082	11-02-94	<10	<3	<10	<4	5	<10
SDW 315-0104	11-02-94	<10	<3	<10	<4	1	<10
SDW 315-0126	11-02-94	<10	<3	<10	<4	2	<10
SDW 315-0149	11-02-94	<10	<3	<10	<4	<1	<10
SDW 316-0051	10-31-94	10	3	<10	<4	44	<10
SDW 316-0066-D	11-01-94	<10	7	<10	<4	160	<10
SDW 316-0066	11-01-94	<10	8	<10	<4	160	<10
SDW 316-0082	10-31-94	<10	8	<10	<4	110	<10
SDW 316-0100	10-31-94	<10	18,000	<10	<4	170	<10
SDW 316-0114 (AVP/MW316C)	11-01-94	<10	7	<10	<4	26	<10
SDW 316-0134	10-31-94	<10	12	<10	<4	22	<10
SDW 316-0148 (AVP/MW316B)	11-01-94	<10	42	<10	<4	12	<10
SDW 316-0163 (AVP/MW316A)	11-01-94	<10	3	<10	<4	51	<10
SDW 317-0027	10-14-94	40	20	<10	<4	10	<10
SDW 317-0051	10-14-94	40	11	<10	<4	67	<10
SDW 318-0036	6-17-94	50	15	<10	<4	24	<10
SDW 318-0064	6-17-94	30	13	<10	<4	56	<10
SDW 344-0038	11-03-94	<10	7	<10	<4	12	<10
SDW 344-0061	11-03-94	<10	13	<10	<4	64	<10
SDW 344-0080	11-03-94	<10	14,000	<10	<4	250	<10
SDW 344-0100	11-03-94	<10	9,100	<10	<4	210	<10
SDW 395-0028 (CS16MW7)	10-19-94	30	25	<10	4	8	20
SDW 423-0058 (FTA1MW428B)	11-04-94	<10	<3	<10	<4	17	<10
SDW 423-0098 (FTA1MW428A)	11-04-94	<10	7	<10	<4	2	<10
SDW 434-0014 (CS16MW3)	7-05-94	20	<3	<10	<4	28	<10
SDW 434-0025 (CS16MW3B)	7-05-94	<10	4	<10	<4	13	<10
SDW 434-0076 (CS16MW3A)	7-05-94	<10	4	<10	<4	2	<10
SDW 436-0028 (CS16MW5)	11-08-94	80	21	10	<4	32	<10
SDW 437-0029 (CS16MW6)	11-08-94	50	17	<10	<4	58	<10
SDW 438-0041 (CS16MW8)	10-20-94	60	38	20	<4	24	<10
SDW 440-0078	10-19-94	<10	110	<10	<4	37	<10
SDW 440-0078	10-19-94	<10	110	<10	<4	37	<10
SDW 467-0058	6-30-94	<10	<3	<10	<4	11	<10
SDW 590-0074 (AVP/MW590)	11-03-94	10	29	<10	<4	58	<10
SDW 593-0075 (AVP/MW593)	11-03-94	<10	6	<10	<4	10	<10
MMR STP Effluent at S317	2-02-95	30	200	<10	<4	28	<10

Table 17. Metals analyses for water samples from wells and the sewage-treatment-plant effluent, Ashumet Valley, Massachusetts, June through December 1994—*Continued*

Well cluster site and well No.	Date	Nickel, dissolved (µg/L)	Silver, dissolved (µg/L)	Strontium, dissolved (µg/L)	Vanadium, dissolved (µg/L)	Zinc, dissolved (µg/L)
SDW 313-0020	6-02-94	<10	2.0	13	<6	<3
SDW 313-0038	6-02-94	<10	<1.0	56	<6	<3
SDW 313-0060	6-03-94	<10	<1.0	92	<6	4
SDW 313-0080	6-02-94	<10	<1.0	61	<6	<3
SDW 314-0035	6-16-94	<10	<1.0	90	<6	99
SDW 314-0051	6-16-94	<10	<1.0	64	7	92
SDW 314-0075	6-16-94	<10	<1.0	52	<6	<3
SDW 314-0075	6-16-94	<10	<1.0	51	<6	<3
SDW 314-0098	6-16-94	<10	<1.0	8	<6	<3
SDW 314-0108 (AVP/MW314)	10-07-94	<10	2.0	18	<6	6
SDW 315-0061	11-15-94	<10	<1.0	28	<6	5
SDW 315-0082	11-02-94	<10	<1.0	30	<6	<3
SDW 315-0104	11-02-94	<10	<1.0	19	<6	<3
SDW 315-0126	11-02-94	<10	<1.0	30	<6	<3
SDW 315-0149	11-02-94	<10	<1.0	27	<6	<3
SDW 316-0051	10-31-94	<10	<1.0	36	<6	170
SDW 316-0066	11-01-94	10	1.0	71	7	5
SDW 316-0066-D	11-01-94	10	1.0	71	<6	5
SDW 316-0082	10-31-94	<10	<1.0	41	<6	<3
SDW 316-0100	10-31-94	<10	<1.0	4	<6	<3
SDW 316-0114 (AVP/MW316C)	11-01-94	<10	1.0	10	<6	7
SDW 316-0134	10-31-94	<10	<1.0	35	<6	<3
SDW 316-0148 (AVP/MW316B)	11-01-94	<10	1.0	11	<6	4
SDW 316-0163 (AVP/MW316A)	11-01-94	<10	2.0	25	<6	8
SDW 317-0027	10-14-94	<10	<1.0	45	<6	4
SDW 317-0051	10-14-94	10	<1.0	67	<6	130
SDW 318-0036	6-17-94	<10	<1.0	48	<6	15
SDW 318-0064	6-17-94	<10	<1.0	41	<6	58
SDW 344-0038	11-03-94	<10	<1.0	45	<6	100
SDW 344-0061	11-03-94	<10	<1.0	19	<6	6
SDW 344-0080	11-03-94	<10	<1.0	28	<6	<3
SDW 344-0100	11-03-94	<10	<1.0	39	<6	<3
SDW 395-0028 (CS16MW7)	10-19-94	<10	4.0	61	<6	21
SDW 423-0058 (FTA1MW428B)	11-04-94	<10	<1.0	25	<6	7
SDW 423-0098 (FTA1MW428A)	11-04-94	<10	<1.0	24	<6	<3
SDW 434-0014 (CS16MW3)	7-05-94	<10	<1.0	24	<6	120
SDW 434-0025 (CS16MW3B)	7-05-94	<10	<1.0	11	<6	28
SDW 434-0076 (CS16MW3A)	7-05-94	<10	<1.0	11	<6	<3
SDW 436-0028 (CS16MW5)	11-08-94	10	<1.0	78	<6	91
SDW 437-0029 (CS16MW6)	11-08-94	<10	<1.0	81	<6	38
SDW 438-0041 (CS16MW8)	10-20-94	<10	2.0	80	<6	41
SDW 440-0078	10-19-94	<10	2.0	32	<6	5
SDW 440-0078	10-19-94	<10	3.0	31	6	5
SDW 467-0058	6-30-94	<10	<1.0	22	<6	<3
SDW 590-0074 (AVP/MW590)	11-03-94	<10	<1.0	56	<6	<3
SDW 593-0075 (AVP/MW593)	11-03-94	<10	1.0	10	<6	<3
MMR STP Effluent at S317	2-02-95	<10	<1.0	63	<6	42

Table 18. Volatile organic compounds analyzed and detected

[Results of major compounds detected are shown in table 19. ×, compound detected; --, compound not detected]

Compound Name	Compound Detected
Methylenechloride	--
Chloroform	×
Carbontetrachloride	--
Bromoform	
Chlorodibromomethane	--
Dichlorobromomethane	--
Dichlorodifluoromethane	--
Trichlorofluoromethane	--
Trichlorotrifluoroethane	--
1,1-Dichloroethane	×
1,2-Dichloroethane	--
1,1,1-Trichloroethane	×
1,2-Dichloropropane	--
1,1-Dichloroethylene	×
Trichloroethylene	×
Tetrachloroethylene	×
trans-1,2-Dichloroethene	×
cis-1,2-Dichloroethene	×
Vinyl Chloride	--
Benzene	×
Toluene	×
Chlorobenzene	--
1,2-Dichlorobenzene	×
1,3-Dichlorobenzene	--
1,4-Dichlorobenzene	×
Ethylbenzene	×
Styrene	--
Xylene	×