CHEMICAL CONSTITUENTS IN WATER FROM WELLS IN THE VICINITY OF THE NAVAL REACTORS FACILITY, IDAHO NATIONAL ENGINEERING LABORATORY, IDAHO, 1991-93

By Betty J. Tucker, LeRoy L. Knobel, and Roy C. Bartholomay

U.S. GEOLOGICAL SURVEY

Open-File Report 95-725

Prepared in cooperation with the
U.S. DEPARTMENT OF ENERGY

Idaho Falls, Idaho
November 1995

U.S. DEPARTMENT OF THE INTERIOR
BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY
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CONVERSION FACTORS, VERTICAL DATUM, AND ABBREVIATED UNITS

Multiply	By	To obtain
foot (ft)	0.3048	meter
inch (in.)	25.4	millimeter
mile (mi)	1.609	kilometer
square mile (mi^2)	2.590	square kilometer
acre-foot (acre-ft)	1,233	cubic meter
foot per mile (ft/mi)	0.1894	meter per kilometer
picocurie per liter (pCi/L)	0.037	becquerel per liter

For temperature, degrees Celsius (°C) can be converted to degrees Fahrenheit (°F) by using the equation:
$°F = (1.8)(°C) + 32$.

Sea level: In this report, "sea level" refers to the National Geodetic Vertical Datum 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.

Abbreviated units used in report: mg/L (milligram per liter); µg/L (microgram per liter); and µS/cm (microsiemens per centimeter at 25 degrees Celsius).

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Abstract

The U.S. Geological Survey, in response to a request from the U.S. Department of Energy's Pittsburgh Naval Reactors Office, Idaho Branch Office, sampled 14 wells during 1991-93 as part of a long-term project to monitor water quality of the Snake River Plain aquifer in the vicinity of the Naval Reactors Facility, Idaho National Engineering Laboratory, Idaho. Water samples were analyzed for manmade contaminants and naturally occurring constituents. One hundred sixty-one samples were collected from 10 ground-water monitoring wells and 4 production wells. Twenty-one quality-assurance samples also were collected and analyzed; 2 were blank samples and 19 were replicate samples. The two blank samples contained concentrations of six inorganic constituents that were slightly greater than the laboratory reporting levels (the smallest measured concentration of a constituent that can be reported using a given analytical method). Concentrations of other constituents in the blank samples were less than their respective reporting levels. The 19 replicate samples and their respective primary samples generated 614 pairs of analytical results for a variety of chemical and radiochemical constituents. Of the 614 data pairs, 588 were statistically equivalent at the 95-percent confidence level; about 96 percent of the analytical results were in agreement. Two pairs of turbidity measurements were not evaluated because of insufficient information and one primary sample collected in January 1992 contained tentatively identified organic compounds when the replicate sample did not.

INTRODUCTION

The Idaho National Engineering Laboratory (INEL), encompassing about 890 mi^2 of the eastern Snake River Plain in southeastern Idaho (fig. 1), is operated by the U.S. Department of Energy (DOE). INEL facilities are used in the development of peacetime atomic-energy applications, nuclear safety research, defense programs, and advanced energy concepts. Activities at the Naval Reactors Facility (NRF), one facility at the INEL, have involved previous limited releases of some constituents to the environment as described in the NRF history report (Bettis Atomic Power Laboratory, 1992).

This study was conducted by the U.S. Geological Survey (USGS) in cooperation with the DOE's Pittsburgh Naval Reactors Office, Idaho Branch Office (IBO). IBO is responsible for the Naval Reactors Facility at the INEL. That office requires information about the mobility of radionuclide- and chemical-waste constituents in the Snake River Plain aquifer. Waste-constituent mobility is, in part, determined by (1) the rate and direction of ground-water flow; (2) the locations, quantities, and methods of waste disposal; (3) waste-constituent chemistry; and (4) the geochemical processes taking place in the aquifer (Orr and Cecil, 1991, p. 2).

Purpose and Scope

In 1989, the IBO of the Pittsburgh Naval Reactors Office, DOE, requested that the USGS initiate a water-quality data-collection program in the vicinity of the Naval Reactors

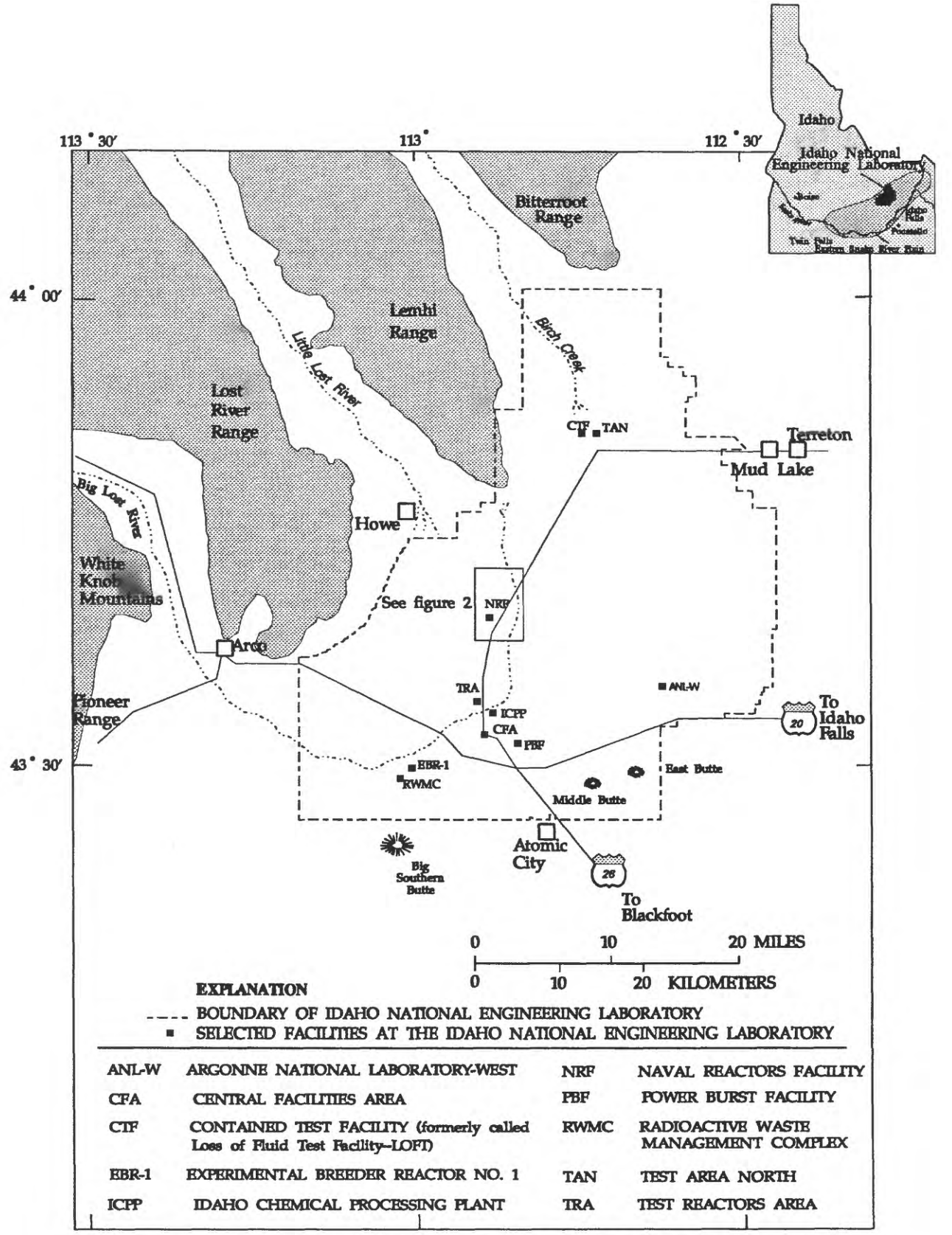

Figure 1.—Location of the Idaho National Engineering Laboratory, Naval Reactors Facility, and other selected facilities.

Facility at the INEL (fig. 1). The purpose of the data-collection program is to provide the Idaho Branch Office with water-chemistry data to evaluate the impact of NRF activities on the water quality of the Snake River Plain aquifer.

The sample-collection program consists of three rounds of data collection. Round one was a one-time sampling of each well for a comprehensive suite of chemical constituents that approximates those contained in the U.S. Environmental Protection Agency's Ground-Water Monitoring List—Appendix IX (U.S. Environmental Protection Agency, 1989, p. 636-642). Round two consisted of five bi-monthly samples from each well that were analyzed for the chemical constituents listed in Appendix III-EPA Interim Primary Drinking Water Standards, the constituents listed as parameters establishing ground-water quality, and selected measurements used as indicators of ground-water contamination (U.S. Environmental Protection Agency, 1989, p. 660-661, 730). Additional constituents analyzed for in round-two samples included copper, nickel, zinc, and extractable acid and base/neutral compounds. Round three is ongoing; samples are collected on a quarterly basis. Constituents include chloride, chromium, iron, lead, mercury, nickel, nitrate as nitrogen, silver, sodium, and sulfate. Other round-three measurements are gross alpha- and gross beta-particle radioactivity, pH, specific conductance, and total organic carbon (TOC). As a result of expanded laboratory procedures, all three rounds of the sample-collection program include analyses for constituents in addition to those described above.

This report presents a compilation of round-one, round-two, and round-three water-chemistry data collected during 1991-93. Additional round-three water-chemistry data will be presented in subsequent reports.

Hydrologic Conditions

The Snake River Plain aquifer is one of the most productive aquifers in the United States (U.S. Geological Survey, 1985, p. 193). The aquifer underlies the eastern Snake River Plain and consists of a thick sequence of basalts and sedimentary interbeds filling a large, arcuate, structural basin in southeastern Idaho (fig. 1).

Surface Water

The Big Lost River drains more than 1,400 mi^2 of mountainous area that includes parts of the Lost River Range and the Pioneer Range west of the INEL (fig. 1). Flow in the Big Lost River infiltrates to the Snake River Plain aquifer along its channel and at sinks and playas at the river's terminus. Since 1958, excess runoff has been diverted to spreading areas in the southwestern part of the INEL where much of the water rapidly infiltrates to the aquifer. Other surface drainages that provide recharge to the Snake River Plain aquifer at the INEL include Birch Creek and the Little Lost River (fig. 1) (Orr and Cecil, 1991, p. 23).

Ground Water

Recharge to the Snake River Plain aquifer is principally from infiltration of applied irrigation water, infiltration of streamflow, and alluvial ground-water inflow from adjoining mountain drainage basins. Some recharge may be from direct infiltration of precipitation, although the small amount of annual precipitation on the plain (8 in. at the INEL), evapotranspiration, and the great depth to water (in places exceeding 900 ft) probably minimize this source of recharge (Orr and Cecil, 1991, p. 22-23).

Water in the Snake River Plain aquifer moves principally through fractures and interflow zones in the basalt. A significant proportion of ground water moves through the upper 800 ft of saturated rocks. Hydraulic conductiv-

ities of basalt in the upper 800 ft of the aquifer, estimated from INEL-wide transmissivity data, range from 0.0086 to 5,500 ft/day (Ackerman, 1991, p. 30). Hydraulic conductivities estimated in a 10,365-ft deep test hole near NRF are smaller; at depths exceeding 1,500 ft, hydraulic conductivities range from 0.002 to 0.03 ft/day. The effective base of the Snake River Plain aquifer at the INEL probably ranges from about 850 to 1,220 ft below land surface (Mann, 1986, p. 21).

Depth to water in wells completed in the Snake River Plain aquifer ranges from about 200 ft in the northern part of the INEL to more than 900 ft in the southeastern part; in the vicinity of NRF, depth to water is about 375 ft. In July 1988, the altitude of the water table was about 4,590 ft above sea level near Test Area North (TAN) and about 4,420 ft above sea level near the Radioactive Waste Management Complex (RWMC); near the NRF, the altitude was about 4,500 ft above sea level. Water flowed southward and southwestward beneath the INEL at an average hydraulic gradient of about 4 ft/mi; beneath the NRF, water generally flowed southward. Locally, however, the hydraulic gradient ranged from about 1 to 15 ft/mi. From July 1985 to July 1988, water-level changes in INEL wells ranged from a 26.8-ft decline near the RWMC to a 4.3-ft rise north of TAN; near the NRF, the water-level decline was about 1 to 3 ft. Water levels generally declined in the southern two-thirds of the INEL during that time and rose in the northern one-third (Orr and Cecil, 1991, p. 25-27).

Ground water moves southwestward from the INEL and eventually discharges to springs along the Snake River downstream from Twin Falls, about 100 mi southwest of the INEL. Approximately 4.3 million acre-ft of ground water discharged to these springs in 1988 (Mann, 1989, p. 2).

Guidelines for Interpreting Results of Radiochemical Analyses

Concentrations of radionuclides are reported with an estimated sample standard deviation, **s**, that is obtained by propagating sources of analytical uncertainty in measurements. The following guidelines for interpreting analytical results are based on an extension of a method proposed by Currie (1984).

In the analysis for a particular radionuclide, laboratory measurements are made on a target sample and a prepared blank. Instrument signals for the sample and the blank vary randomly. Therefore, it is essential to distinguish between two key aspects of the problem of detection: (1) the instrument signal for the sample must be larger than the signal observed for the blank before the decision can be made that the radionuclide was detected; and (2) an estimation must be made of the minimum radionuclide concentration that will yield a sufficiently large observed signal before the correct decision can be made for detection or nondetection of the radionuclide. The first aspect of the problem is a qualitative decision based on an observed signal and a definite criterion for detection. The second aspect of the problem is an estimation of the detection capabilities of a given measurement process.

In the laboratory, instrument signals must exceed a critical level of 1.6**s** before the qualitative decision can be made as to whether the radionuclide was detected. At 1.6**s**, there is a 95-percent probability that the correct conclusion—not detected—will be made. Given a large number of samples, as many as 5 percent of the samples with measured concentrations larger than or equal to 1.6**s**, which were concluded as being detected, might not contain the radionuclide. These measurements are referred to as false positives and are errors of the first kind in hypothesis testing.

Once the critical level of 1.6s has been defined, the minimum detectable concentration may be determined. Radionuclide concentrations that equal 3s represent a measurement at the minimum detectable concentration. For true concentrations of 3s or larger, there is a 95-percent or larger probability that the radionuclide was detected in a sample. In a large number of samples, the conclusion—not detected—will be made in 5 percent of the samples that contain true concentrations at the minimum detectable concentration of 3s. These measurements are referred to as false negatives and are errors of the second kind in hypothesis testing.

True radionuclide concentrations between 1.6s and 3s have larger errors of the second kind. That is, there is a larger-than-5-percent probability of false negative results for samples with true concentrations between 1.6s and 3s. Although the radionuclide might have been detected, such detection may not be considered reliable; at 1.6s, the probability of a false negative is about 50 percent.

The critical level and minimum detectable concentration are based on counting statistics alone and do not include systematic or random errors inherent in laboratory procedures. The values 1.6s and 3s vary slightly with background or blank counts, with the number of gross counts for individual analyses, and for different radionuclides. In this report, radionuclide concentrations less than 3s are considered to be below a "reporting level." The critical level, minimum detectable concentration, and reporting level aid the reader in the interpretation of analytical results and do not represent absolute concentrations of radioactivity which may or may not have been detected.

Many analytical results of environmental radioactivity measurements are at or near zero. If the true concentration for a given radionuclide is zero, a given set of analytical results for that radionuclide should be distributed about zero, with an equal number of negative and positive measurements. Negative analytical results occur if the radioactivity of a water sample is less than the background radioactivity or the radioactivity of the prepared blank sample in the laboratory (American Society for Testing and Materials, 1992, p. 126; Knobel and others, 1992, p. 50).

Guidelines for Interpreting Results of Inorganic and Organic Analyses

The term "reporting level" used for radiochemical analyses should not be confused with the term "laboratory reporting level", which is used for inorganic and organic analyses. In this report the term "laboratory reporting level" is the smallest measured concentration of a nonradioactive constituent that may be reliably reported using a given analytical method. Because of unpredictable matrix effects on detection limits, the laboratory reporting levels are set somewhat higher than the analytical method detection limits (Pritt and Jones, 1989).

Acknowledgments

Steven J. Price, Kent R. Shelley, and Kelly D. Willie of Westinghouse Electric Corporation provided logistical support during sample collection. The authors are grateful to Linda M. Williams of the USGS and Bruce E. Olenick, Adolfo Sierra, and Kelly D. Willie of Westinghouse Electric Corporation for technically reviewing the manuscript.

METHODS AND QUALITY ASSURANCE

The methods used for collecting water samples generally followed the guidelines established by the USGS (Goerlitz and Brown, 1972; Stevens and others, 1975; Wood, 1981; Claassen, 1982; W.L. Bradford, USGS,

written commun., 1985; Wershaw and others, 1987; Fishman and Friedman, 1989; Hardy and others, 1989; Faires, 1992; Fishman, 1993). The methods used in the field and the quality assurance practices are described in following sections.

Sample Containers and Preservatives

Sample containers and preservatives differed depending on the constituent(s) for which analyses were requested. Samples analyzed by the U.S. Geological Survey's NWQL were placed in containers and preserved in accordance with laboratory requirements specified by Pritt and Jones (1989). Containers and preservatives were supplied by the NWQL and had undergone a rigorous quality-control procedure (Pritt, 1989, p. 75) to eliminate sample contamination. The containers and preservatives used for this study are listed in table 1 (all tables located at the end of this report).

Sampling Locations and Sample Collection

Samples were collected from 14 locations (fig. 2): 10 ground-water monitoring wells (NRF-6, -7, USGS 12, 15, 17, 97-99, 102, and Water Supply INEL-1), and 4 production wells (NRF-1, -2, -3, and -4). The ground-water monitoring wells were equipped with dedicated submersible pumps and the production wells were equipped with line-shaft turbine pumps. The production wells are located within the NRF boundary; USGS 102 is located west of the boundary; NRF-6, -7, USGS 12, 15, and 17 are upgradient of the facility; and the remaining monitoring wells are located downgradient (fig. 2).

Samples were collected from a portable sampling apparatus at the wells with dedicated submersible pumps and from sampling ports on the discharge lines of the turbine pumps. All portable equipment was decontaminated after sampling at each site. After collection, sample containers were sealed with laboratory film, labeled, and stored under secured conditions. Water samples were placed in ice chests, sealed, and shipped as soon as possible by overnight-delivery mail to the NWQL.

Conditions at the sampling site during sample collection were recorded in a field logbook and a chain-of-custody record was used to track samples from the time of collection until delivery to the NWQL. These records are available for inspection at the U.S. Geological Survey's Project Office at the INEL. The results of field measurements for pH, specific conductance, and water temperature are listed in table 2.

Quality Assurance

Detailed descriptions of internal quality control and the overall quality-assurance practices used by the NWQL are provided in reports by Friedman and Erdmann (1982), Jones (1987), and Pritt and Raese (1992). The water samples were collected by personnel assigned to the INEL Project Office in accordance with a draft quality-assurance plan for quality-of-water activities; the draft plan was finalized in June 1989 and is available for inspection at the U.S. Geological Survey's Project Office at the INEL. A comparative study to determine agreement between analytical results for water-sample pairs by laboratories involved in the INEL Project Office's quality-assurance program was summarized by Wegner (1989). Additional quality assurance instituted for this sampling program included a blank sample prepared with organic-free water, an equipment blank prepared with inorganic-free water flushed through the sampling apparatus, and 19 replicate samples. Concentrations in the blank samples were not included in the computation of statistical parameters. Subsequent to collection of the primary (routine) sample, another sample was

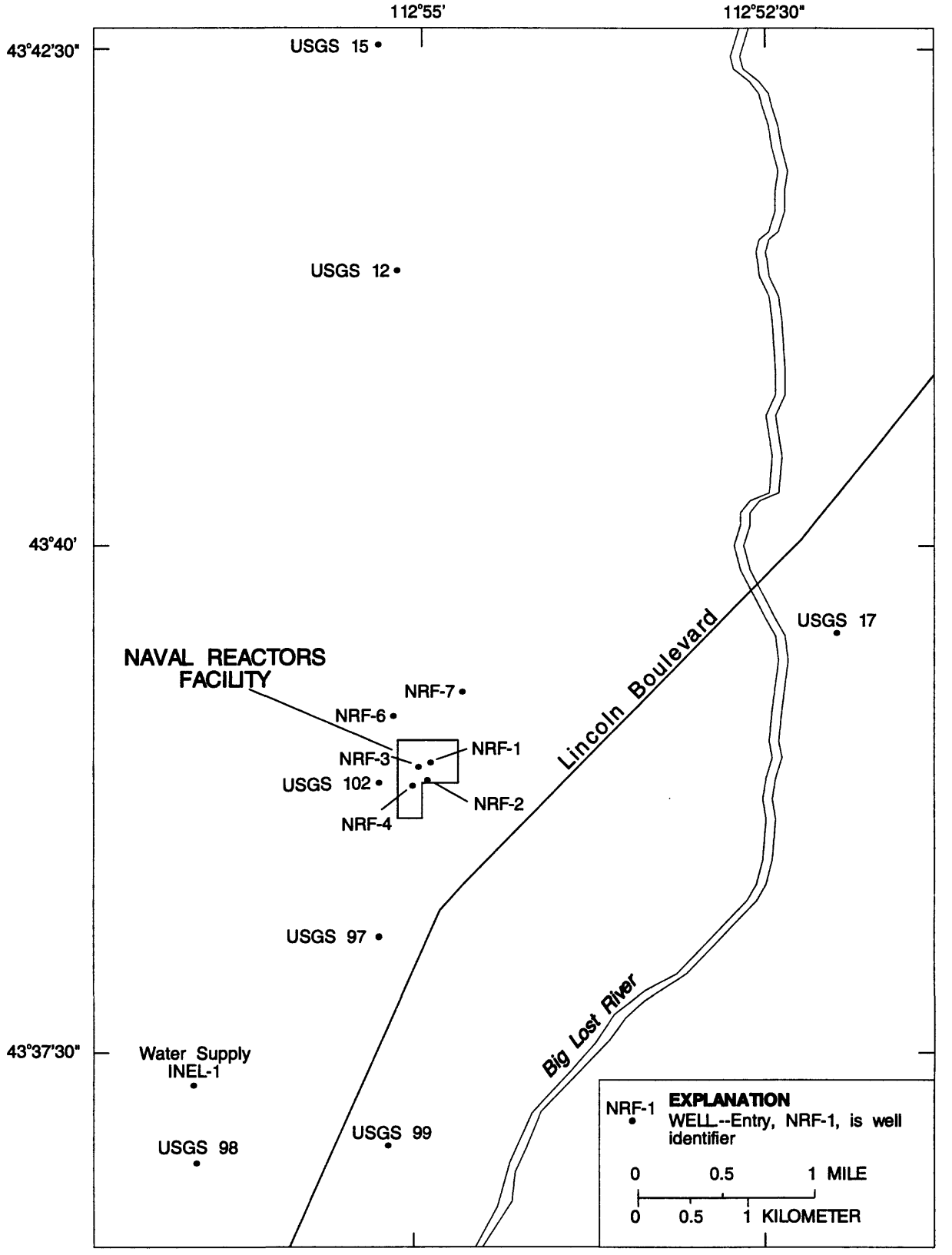

Figure 2. Location of wells, Naval Reactors Facility and vicinity, Idaho National Engineering Laboratory.

immediately collected and was called the replicate (quality-assurance) sample. The replicate-sample analytical results were then compared to the primary-sample analytical results to evaluate the combined effects of laboratory reproducibility in analytical measurements and of consistency in field-collection methods. Many organizations use the term "sequential replicate" in place of "replicate" sample. Analytical results for primary- and replicate-water samples were statistically compared in a study of the quality-assurance and quality-control data collected by the USGS at the INEL during 1989-93 (L.M. Williams, U.S. Geological Survey, written commun., October 11, 1994).

If standard deviations of primary- and replicate-sample results are known, it is possible to determine—within specified confidence limits—whether the results of the pair of samples are statistically equivalent. This can be done using an adaptation of the equation to determine the standard deviate or the number of standard deviations that the variable deviates from the mean (Volk, 1969, p. 55), where Z is the ratio of the absolute value of the difference of the two results and the pooled standard deviation (Taylor, 1987, p. 29). In that way, a comparison can be made of two analytical results on the basis of the precision—or an approximation of the precision—associated with each of the results:

$$Z = \frac{|x-y|}{\sqrt{\left(S_x\right)^2+\left(S_y\right)^2}}, \qquad (1)$$

where

x = result of the primary (routine) sample,

y = result of the replicate (quality assurance) sample,

S_x = standard deviation of x, and

S_y = standard deviation of y.

If the Z value is less than or equal to 1.96, the analytical results of the primary and replicate pair are considered statistically equivalent at the 95-percent confidence limit.

Equation 1 cannot be applied directly to the results for which no standard deviations or uncertainties are reported. The NWQL does not report standard deviations with analytical results for nonradiochemical constituents; however, the U.S. Geological Survey's Branch of Quality Assurance conducts a Blind Sample Program (BSP) (Maloney and others, 1993) that allows the calculation of a most probable deviation at any concentration for most constituents. A minimum MPD has been established for a few constituents that are generally present at small concentrations (Maloney and others, 1993, p. 4). Linear regression equations generated from BSP data can be used to determine if the analytical results of the primary- and replicate-samples are statistically equivalent by calculating an MPD for each result and substituting them for the standard deviations in equation 1 (L.M. Williams, U.S. Geological Survey, written commun., October 11, 1994). Analytical results for the quality-assurance samples will be discussed, along with similar data, in subsequent sections of this report.

Calculation of Estimated Experimental Standard Errors

The analytical results for radionuclides are presented with calculated analytical uncertainties. There is about a 67-percent probability that the true radionuclide concentration is in a range of the reported concentration plus or minus the uncertainty. The uncertainties are expressed as one **s** (sample standard deviation).

The associated uncertainties presented with mean concentrations are experimental standard errors and are an estimate of the uncertainty of the mean concentration. The estimated experimental standard errors (EESE) were calculated

using the following equation (Iman and Conover, 1983, p. 158):

$EESE = \sigma/(n)^{0.5}$

where σ = population standard deviation, and

n = sample size.

The population standard deviation, σ, is customarily estimated by s (Iman and Conover, 1983, p. 106). The sample standard deviation is the square root of the sample variance (Iman and Conover, 1983, p. 100-101).

ANALYTICAL RESULTS FOR ROUND-THREE WATER SAMPLES

During the period beginning in March 1991 and ending in December 1993, 12 sets of quarterly water samples were collected for round three of the NRF sampling program (table 2). Seven wells (NRF-1, -2, -4, USGS 17, 97, 99, and Water Supply INEL-1) were sampled all 12 times, 4 wells (NRF-3, USGS 12, 15, and 102) were sampled 11 times, USGS 98 was sampled 10 times, NRF-7 was sampled 6 times, and NRF-6 was sampled 5 times. A quality-assurance blank sample (QAS-23) and an equipment blank (QAS-30) were collected during round three. Seventeen replicate samples were collected during round three as follows: NRF-1 (QAS-18), NRF-2 (QAS-13 and QAS-31), NRF-3 (QAS-16 and QAS-26), NRF-4 (QAS-28), USGS 12 (QAS-17 and QAS-33), USGS 15 (QAS-22), USGS 17 (QAS-14 and QAS-29), USGS 97 (QAS-15 and QAS-32), USGS 98 (QAS-25), USGS 99 (QAS-24), USGS 102 (QAS-27), and Water Supply INEL-1 (QAS-19).

Dissolved Anions and Total Recoverable Sodium

Round-three water samples were analyzed for concentrations of dissolved bromide, chloride, fluoride, and sulfate, and concentrations of total recoverable sodium (table 3). Statistical parameters for these constituents are provided by well in table 4 and were calculated using the data presented in this report.

The concentrations in the equipment blank (QAS-30) were all less than or near to the respective laboratory reporting levels. The blank sample (QAS-23) contained concentrations of bromide (0.07 mg/L), chloride (0.8 mg/L), and sodium (0.7 mg/L) that were larger than the laboratory reporting levels of 0.01, 0.1, and 0.1 mg/L, respectively. Eighty-two of 85 replicate-sample concentrations listed in table 3 were statistically equivalent to their primary-sample concentrations. The bromide concentration of QAS-22 (0.01 mg/L) was not statistically equivalent to the bromide concentration in the primary water sample, USGS 15 (0.02 mg/L). The sodium concentrations of two replicate samples were not statistically equivalent to the sodium concentrations in their primary water samples: QAS-22 (8.7 mg/L) and USGS 15 (5.7 mg/L); and QAS-25 (11 mg/L) and USGS 98 (8.6 mg/L).

Total Recoverable Trace Elements

Round-three water samples were analyzed for concentrations of total recoverable chromium, iron, lead, mercury, nickel, and silver (table 5). Statistical parameters for these constituents are provided by well in table 6 and were calculated using the data presented in this report.

The concentrations of all constituents in the blank sample (QAS-23) were less than the laboratory reporting levels. Concentrations of total recoverable chromium, mercury, nickel, and silver in the equipment blank sample (QAS-30) were less than the reporting levels; however, iron (110 µg/L) and lead (17 µg/L) concentrations were larger than the laboratory reporting levels of 10 and 1 µg/L, respectively. Ninety-five of 101 replicate-sample concentra-

tions listed in table 5 were statistically equivalent to the primary-sample concentrations. The primary and replicate nickel samples from USGS 97 collected on November 4, 1993, were ruined and no analysis was completed. The iron concentrations of six replicate samples were not statistically equivalent to the iron concentrations in the primary water samples: QAS-18 (240 µg/L) and NRF-1 (470 µg/L); QAS-16 (120 µg/L) and NRF-3 (60 µg/L); QAS-26 (100 µg/L) and NRF-3 (320 µg/L); QAS-17 (90 µg/L) and USGS 12 (50 µg/L); QAS-33 (270 µg/L) and USGS 12 (140 µg/L); and QAS-32 (390 µg/L) and USGS 97 (730 µg/L).

Dissolved Nutrients

Filtered round-three water samples were analyzed for concentrations of either ammonia as nitrogen or ammonia plus organic nitrogen as nitrogen, nitrite as nitrogen, nitrite plus nitrate as nitrogen, and orthophosphate as phosphorus (table 7). Beginning with the December 1991 sample collection round, the NWQL was requested to analyze water samples for ammonia as nitrogen. Prior to that sample round, the laboratory had been requested to analyze water samples for ammonia plus organic nitrogen as nitrogen. Because of the difference in the two categories of ammonia compounds, the analytical results are not directly comparable. Statistical parameters for these constituents are provided by well in table 8 and were calculated using the data presented in this report.

Concentrations of all constituents in the blank sample (QAS-23) were less than the laboratory reporting levels. In the equipment blank sample (QAS-30), all constituents except for ammonia as nitrogen were less than the laboratory reporting levels. The concentration of ammonia as nitrogen in QAS-30 was 0.02 mg/L compared to the laboratory reporting level of 0.01 mg/L. Sixty-three of 68 replicate-sample concentrations for nitrogen and phosphorus compounds listed in table 7 were statistically equivalent to their primary-sample concentrations. The orthophosphate as phosphorus concentrations in QAS-15 (0.01 mg/L), QAS-22 (0.02 mg/L), QAS-29 (0.02 mg/L), and QAS-33 (0.02 mg/L) were not statistically equivalent to the concentrations in the respective primary water samples, USGS 97 (0.02 mg/L), USGS 15 (0.01 mg/L), USGS 17 (0.03 mg/L), and USGS 12 (0.03 mg/L). The statistical equivalence of the ammonia plus organic nitrogen (as nitrogen) concentration in the replicate water sample (QAS-13) and the primary water sample (NRF-2) was uncertain.

Total Organic Carbon

Round-three water samples were analyzed for concentrations of TOC (table 7). Statistical parameters for TOC are provided by well in table 8 and were calculated using the data presented in this report.

The concentration of TOC in the blank sample (QAS-23) was less than the laboratory reporting level of 0.1 mg/L and TOC analysis was not requested for the equipment blank sample (QAS-30). Fourteen of 17 replicate-sample TOC concentrations listed in table 7 are statistically equivalent to their primary-sample concentrations. The TOC concentrations of QAS-31 (1.8 mg/L), QAS-16 (0.5 mg/L), and QAS-28 (0.5 mg/L) were not statistically equivalent to the concentrations in their respective primary water samples, NRF-2 (0.5 mg/L), NRF-3 (1.8 mg/L), and NRF-4 (1.0 mg/L).

Gross Alpha- and Gross Beta-Particle Radioactivity

Round-three water samples were analyzed for concentrations of both dissolved and suspended gross alpha- and gross beta-particle

radioactivity prior to the June 1993 sampling round. Beginning with the June 1993 sample round, analysis of the suspended fraction of water samples for gross alpha- and gross beta-particle radioactivity was discontinued because of potential precipitation of radionuclides onto suspended material or the container walls (Ann Mullin, U.S. Geological Survey, oral commun., 1995). Concentrations were determined by the laboratory using a residue procedure.

Concentrations of radioactive constituents that are greater than or equal to 3 times the 1s uncertainty are considered to be above the reporting level in this report; however, all analytical measurements are listed in tables 9 and 10. Concentrations which meet or exceed the reporting level are shown in boldface type. For a more detailed discussion of reporting levels for radioactive constituents and measurements see the section of this report titled "Guidelines for Interpreting Results of Radiochemical Analyses".

Gross alpha-particle radioactivity.—Gross alpha-particle radioactivity is a measure of the total radioactivity given off as alpha particles during the radioactive decay process. For convenience, laboratories report the radioactivity as if it all were given off by one radionuclide. In this report, concentrations are reported two ways: as natural uranium in micrograms per liter and as thorium-230 in picocuries per liter. Concentrations of both dissolved and suspended gross alpha-particle radioactivity are listed in table 9. Statistical parameters are provided by well in table 11 and were calculated using the data presented in this report.

Concentrations of gross alpha-particle radioactivity in the blank sample (QAS-23) and the equipment blank (QAS-30) were less than the reporting levels. Fifty-three of 60 replicate-sample concentrations listed in table 9 were statistically equivalent to their primary-sample concentration. The concentration as dissolved uranium in QAS-25 (**2.97±0.52** µg/L) was not statistically equivalent to the concentration in the primary sample, USGS 98 (**1.49±0.356** µg/L). The concentrations as dissolved thorium-230 in QAS-32 (**3.79±0.96** pCi/L) and QAS-25 (**2.13±0.377** pCi/L) also were not statistically equivalent to the concentrations in the respective primary water samples, USGS 97 (1.70±0.66 pCi/L) and USGS 98 (**1.02±0.242** pCi/L). Concentrations as suspended uranium in QAS-13 (-0.122±0.118 µg/L) and QAS-26 (0.122±0.168 µg/L) were not statistically equivalent to the concentrations in the respective primary water samples, NRF-2 (0.539±0.298 µg/L) and NRF-3 (-0.348±0.164 µg/L). Finally, the concentrations as suspended thorium-230 in QAS-13 (-0.066±0.064 pCi/L) and QAS-26 (0.066±0.092 pCi/L) were not statistically equivalent to the concentrations in the respective primary water samples, NRF-2 (0.291±0.164 pCi/L) and NRF-3 (-0.200±0.096 pCi/L).

Gross beta-particle radioactivity.—Gross beta-particle radioactivity is a measure of the total radioactivity given off as beta particles during the radioactive decay process. For convenience, laboratories report the radioactivity as if it all were given off by one radionuclide or a chemically similar pair of radionuclides in equilibrium. In this report, concentrations are reported in two ways: as strontium-90 in equilibrium with yttrium-90 (Sr^{90}/Y^{90}) in picocuries per liter, and as cesium-137 in picocuries per liter. Concentrations of both dissolved and suspended gross beta-particle radioactivity are listed in table 10. Statistical parameters are provided by well in table 11 and were calculated using the data presented in this report.

Concentrations of gross beta-particle radioactivity in the blank sample (QAS-23) and the equipment blank (QAS-30) were less than the reporting levels. All 60 replicate-

sample concentrations listed in table 10 were statistically equivalent to their primary-sample concentration.

ANALYTICAL RESULTS FOR ROUND-TWO WATER SAMPLES

During the period beginning in November 1991 and ending in July 1992, five sets of bimonthly water samples were collected for round two of the NRF sampling program. Two wells (NRF-6 and NRF-7) were sampled all five times (table 2). Two replicate samples were collected during this period; NRF-6 (QAS-21) and NRF-7 (QAS-20). The round-two data in this report completes publication of analytical results for samples collected during the bimonthly sampling program. Previous round-two analytical results for NRF-1, -2, -3, -4, USGS 12, 15, 17, 97, 98, 99, 102, and Water Supply INEL-1 and for associated quality-assurance samples were published by Bartholomay and others (1993).

Selected Inorganic Constituents

Round-two water samples were analyzed for concentrations of dissolved bromide, chloride, fluoride, sulfate, ammonia as nitrogen, nitrite as nitrogen, nitrite plus nitrate as nitrogen, and orthophosphate as phosphorus, and for concentrations of total recoverable sodium, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, and zinc (table 12). Statistical parameters for these constituents are provided by well in tables 4, 6, and 8 and were calculated using the data presented in this report. Forty-two of 43 replicate-sample concentrations listed in table 12 were statistically equivalent to the primary-sample concentrations. The iron concentration of QAS-21 (80 µg/L) was not statistically equivalent to the concentration in the primary water sample, NRF-6 (120 µg/L). The January 1992 replicate-water sample (QAS-20) and the corresponding primary-water sample (NRF-7) for determinations of total recoverable copper were ruined by the laboratory.

Total Organic Carbon and Phenols

Round-two water samples were analyzed for TOC concentrations and total phenol concentrations (table 13). Statistical parameters are provided by well in table 8 and were calculated using the data presented in this report. Three of four replicate-sample concentrations for these constituents listed in table 13 were statistically equivalent to the primary-sample concentrations. The statistical equivalence of the total phenol concentration in the replicate-water sample (QAS-20) and the primary-water sample (NRF-7) was uncertain.

Turbidity

Round-two water samples were analyzed for turbidity (table 13). Statistical parameters are provided by well in table 8 and were calculated using the data presented in this report. The two replicate-sample measurements listed in table 13, 0.6 nephelometric turbidity units (NTU) for QAS-21 and 1.9 NTU for QAS-20, are similar to measurements for the respective primary-water samples, 0.5 NTU for NRF-6 and 2.0 NTU for NRF-7.

Extractable Acid and Base/Neutral Organic Compounds

Round-two primary- and replicate-water samples were analyzed by the NWQL for 57 extractable acid and base/neutral organic compounds (table 14). None of the 57 compounds were detected at concentrations greater than laboratory reporting levels (table 14). Analytical results for extractable acid and base/neutral compounds listed in table 14 have

been confirmed by direct comparison with reference standards. Therefore, compound identification is positive, and reported concentrations are quantitative. The compounds listed in table 15 for the January 1992 NRF-7 sample are tentatively identified organic compounds (TIOC's[1]). The replicate sample (QAS-20) of the January 1992 NRF-7 sample did not contain concentrations of TIOC's.

Selected Pesticides

Round-two water samples were analyzed for concentrations of 15 organochlorine insecticides, gross polychlorinated biphenyls, gross polychlorinated naphthalenes, and 4 chlorophenoxy-acid herbicides (table 16). Pesticides were not detected in any round-two samples at concentrations larger than laboratory reporting levels.

Gross Alpha- and Gross Beta-Particle Radioactivity

Round-two water samples were analyzed for concentrations of both dissolved and suspended gross alpha- and gross beta-particle radioactivity using a residue procedure.

Gross alpha-particle radioactivity.— Concentrations of gross alpha-particle radioactivity for round-two water samples are reported two ways: as natural uranium in micrograms per liter and as thorium-230 in picocuries per liter. Concentrations of both dissolved and suspended gross alpha-particle radioactivity for round-two samples are listed in table 17. Statistical parameters for gross alpha-particle radioactivity are provided by well in table 11 and were calculated using the data presented in this report. All eight replicate-sample concentrations of gross alpha-particle radioactivity listed in table 17 were statistically equivalent to the respective primary-sample concentrations.

Gross beta-particle radioactivity.— Concentrations of gross beta-particle radioactivity for round-two water samples are reported two ways: as strontium-90 in equilibrium with yttrium-90 (Sr^{90}/Y^{90}) in picocuries per liter and as cesium-137 in picocuries per liter. Concentrations of both dissolved and suspended gross beta-particle radioactivity for round-two samples are listed in table 17. Statistical parameters are provided by well in table 11 and were calculated from the data presented in this report. All eight replicate-sample concentrations of gross beta-particle radioactivity listed in table 17 were statistically equivalent to the respective primary-sample concentrations.

Selected Dissolved Radium Isotopes

Round-two water samples were analyzed for dissolved concentrations of radium-226 by radon emanation and radium-228 by separation and beta counting (table 17). Statistical parameters for radium-226 and radium-228 are provided by well in table 11 and were calculated using the data presented in this report. All four replicate-sample concentrations for radium isotopes listed in table 17 were statistically equivalent to the primary-sample concentrations.

ANALYTICAL RESULTS FOR ROUND-ONE WATER SAMPLES

During September 1991, water samples were collected for the round-one NRF sampling program at wells NRF-6 and NRF-7 (table 2). Quality-assurance sampling for the round-one sampling program consisted of a

[1]Data for TIOC's in this report are based on comparison of sample spectra with library spectra followed by visual examination by gas chromatograph/mass spectrometer analysts. TIOC data have not been confirmed by direct comparison with reference standards. Therefore, TIOC identification is tentative, and reported concentrations are semiquantitative.

blank sample (QAS-1) and a replicate sample (QAS-4); the analytical results for these samples were published by Knobel and others (1992). The data in this report completes publication of analytical results for samples collected during round one. Previous round-one analytical results for NRF-1, -2, -3, -4, USGS 12, 15, 17, 97, 98, 99, 102, and Water Supply INEL-1 were published by Knobel and others (1992).

Selected Inorganic Constituents

Round-one water samples were analyzed for concentrations of dissolved bromide, chloride, fluoride, sulfate, thallium, cyanide, and orthophosphate as phosphorus, and for concentrations of total recoverable calcium, potassium, magnesium, sodium, aluminum, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, zinc, ammonia as nitrogen, ammonia plus organic nitrogen as nitrogen, nitrite as nitrogen, nitrite plus nitrate as nitrogen, phosphorus, and orthophosphate as phosphorus (table 18). Statistical parameters for selected constituents are provided by well in tables 4, 6, and 8 and were calculated using the data presented in this report.

Total Organic Carbon and Phenols

Round-one water samples were analyzed for TOC concentrations and total phenol concentrations (table 19). Statistical parameters are provided in table 8 and were calculated using the data presented in this report.

Total Recoverable Anionic Surfactants and Turbidity

Round-one water samples were analyzed for total recoverable anionic surfactants reported as methylene blue active substances and measured for turbidity as NTU's (table 19). Statistical parameters for turbidity are provided in table 8 and were calculated using the data presented in this report. Data were not sufficient to calculate statistical parameters for anionic surfactants.

Extractable Acid and Base/Neutral Organic Compounds

Round-one water samples were analyzed for 57 extractable acid and base/neutral organic compounds (table 14). None of the 57 compounds were detected at concentrations greater than the respective laboratory reporting levels (table 14). In addition, no TIOC's were detected in the water samples.

Purgeable Organic Compounds

Round-one water samples (table 2) were analyzed for 36 purgeable organic compounds (POC's) which are listed in table 20. The sample from NRF-6 contained 0.4 µg/L of chloroform, 0.5 µg/L of tetrachloroethylene, and 0.6 µg/L of toluene; the sample from NRF-7 contained 0.4 µg/L of 1,1,1-trichloroethane. Other POC's listed in table 20 were not detected at concentrations larger than the respective laboratory reporting levels.

Pesticides

Round-one water samples were analyzed for concentrations of 24 triazine herbicides, 4 chlorophenoxy-acid herbicides, 12 carbamate insecticides, 11 organophosphorus insecticides, 15 organochlorine insecticides, 3 benzene hexachlorides, gross polychlorinated biphenyls, gross polychlorinated naphthalenes, and 7 aroclors (tables 21-22). Pesticides were not detected in any round-one samples at concentrations larger than the laboratory reporting levels.

Gross Alpha- and Gross Beta-Particle Radioactivity

Round-one water samples were analyzed for concentrations of both dissolved and suspended gross alpha- and gross beta-particle radioactivity using a residue procedure.

Gross alpha-particle radioactivity.— Concentrations of gross alpha-particle radioactivity for round-one water samples are reported two ways: as natural uranium in micrograms per liter and as thorium-230 in picocuries per liter. Concentrations of both dissolved and suspended gross alpha-particle radioactivity for round-one samples are listed in table 23. Statistical parameters for gross alpha-particle radioactivity are provided by well in table 11 and were calculated using the data presented in this report.

Gross beta-particle radioactivity.— Concentrations of gross beta-particle radioactivity for round-one water samples are reported two ways: as strontium-90 in equilibrium with yttrium-90 (Sr^{90}/Y^{90}) in picocuries per liter, and as cesium-137 in picocuries per liter. Concentrations of both dissolved and suspended gross beta-particle radioactivity for round-one samples are listed in table 23. Statistical parameters are provided by well in table 11 and were calculated using the data presented in this report.

Selected Dissolved Radium Isotopes and Tritium

Round-one water samples were analyzed for dissolved concentrations of radium-226 by radon emanation and radium-228 by separation and beta counting, and for total tritium by liquid scintillation (table 23). Statistical parameters for radium-226 and radium-228 are provided by well in table 11 and were calculated using the data presented in this report. Data were not sufficient to calculate statistical parameters for tritium.

SUMMARY

The USGS, in response to a request from the U.S. Department of Energy's Pittsburgh Naval Reactors Office, Idaho Branch Office, sampled 14 wells during 1991-93 as part of a long-term project to monitor water quality of the Snake River Plain aquifer in the vicinity of the NRF, INEL, Idaho. Water samples were collected and analyzed for manmade contaminants and naturally occurring constituents. One hundred sixty-one samples were collected from 10 ground-water monitoring wells and 4 production wells. Twenty-one quality-assurance samples also were collected and analyzed; 2 blank samples and 19 replicate samples. The two quality-assurance blank samples contained larger concentrations than the laboratory reporting levels for bromide, chloride, iron, lead, sodium, and ammonia as nitrogen. Concentrations of other constituents in the blank samples were less than the respective laboratory reporting levels. The 19 replicate samples and their respective primary samples generated 614 pairs of analytical results for a variety of chemical and radiochemical constituents. Of the 614 data pairs, 588 were statistically equivalent at the 95-percent confidence level; about 96 percent of the analytical results were in agreement. Of the 24 data pairs not statistically equivalent, 1 was ammonia plus organic nitrogen as nitrogen, 1 was bromide, 4 were gross alpha-particle radioactivity as thorium, 3 were gross alpha-particle radioactivity as uranium, 7 were iron, 4 were orthophosphate as phosphorus, 1 was phenol, 2 were sodium, and 3 were TOC. In addition, two pairs of data for turbidity samples were not evaluated because of insufficient information and the sample collected from NRF-7 in January 1992 contained TIOC's when the replicate sample (QAS-20) did not.

SELECTED REFERENCES

Ackerman, D.J., 1991, Transmissivity of the Snake River Plain aquifer at the Idaho National Engineering Laboratory, Idaho: U.S. Geological Survey Water-Resources Investigations Report 91-4058 (DOE/ID-22097), 35 p.

American Society for Testing and Materials, 1992, ASTM standards on precision and bias for various applications: Philadelphia, Pennsylvania, American Society for Testing and Materials Publication code number (PCN) 03-511092-34, 478 p.

Bartholomay, R.C., Knobel, L.L., and Tucker, B.J., 1993, Chemical constituents in water from wells in the vicinity of the Naval Reactors Facility, Idaho National Engineering Laboratory, Idaho, 1990-91: U.S. Geological Survey Open-File Report 93-94 (DOE/ID-22106), 70 p.

Bettis Atomic Power Laboratory, 1992, Naval Reactors Facility Site Environmental Summary Report: Westinghouse Electric Corporation NRFRC-EC-1046, 26 p.

Claassen, H.C., 1982, Guidelines and techniques for obtaining water samples that accurately represent the water chemistry of an aquifer: U.S. Geological Survey Open-File Report 82-1024, 49 p.

Currie, L.A., 1984, Lower limit of detection—Definition and elaboration of a proposed position for radiological effluent and environmental measurements: U.S. Nuclear Regulatory Commission NUREG/CR-4077, 139 p.

Faires, L.M., 1992, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory—Determination of metals in water by inductively coupled plasma—mass spectrometry: U.S. Geological Survey Open-File Report 92-634, 28 p.

Fishman, M.J., ed., 1993, Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory— Determination of inorganic and organic constituents in water and fluvial sediments: U.S. Geological Survey Open-File Report 93-125, 217 p.

Fishman, M.J., and Friedman, L.C., eds., 1989, Methods for determination of inorganic substances in water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A1, 545 p.

Friedman, L.C., and Erdmann, D.E., 1982, Quality assurance practices for the chemical and biological analyses of water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A6, 181 p.

Goerlitz, D.F., and Brown, Eugene, 1972, Methods for analysis of organic substances in water: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A3, 40 p.

Hardy, M.A., Leahy, P.P., and Alky, W.M., 1989, Well installation and documentation, and ground-water sampling protocols for the pilot national water-quality assessment program: U.S. Geological Survey Open-File Report 89-396, 36 p.

Iman, R.L., and Conover, W.J., 1983, A modern approach to statistics: New York, John Wiley & Sons, Inc., 497 p.

Jones, B.E., 1987, Quality control manual of the U.S. Geological Survey's National Water Quality Laboratory: U.S. Geological Survey Open-File Report 87-457, 17 p.

Knobel, L.L., Bartholomay, R.C., Wegner, S.J., and Edwards, D.D., 1992, Chemical constituents in water from wells in the vicinity of the Naval Reactors Facility, Idaho National Engineering Laboratory, Idaho, 1989-90: U.S. Geological Survey Open-File Report 92-156 (DOE/ID-22103), 38 p.

Knobel, L.L., Orr, B.R., and Cecil, L.D., 1992, Summary of background concentrations of selected radiochemical and chemical constituents in groundwater from the Snake River Plain aquifer, Idaho: estimated from an analysis of previously published data: Journal of the Idaho Academy of Science, v. 28, no. 1, p. 48-61.

Maloney, T.J., Ludtke, A.S., Krizman, T.L., 1993, Quality-assurance data for routine water analysis in the laboratories of the U.S. Geological Survey for water year 1990: U.S. Geological Survey Water-Resources Investigations Report 93-4082, 145 p.

Mann, L.J., 1986, Hydraulic properties of rock units and chemical quality of water for INEL-1—a 10,365-foot deep test hole drilled at the Idaho National Engineering Laboratory, Idaho: U.S. Geological Survey Water-Resources Investigations Report 86-4020 (DOE/ID-22070), 23 p.

----- 1989, Tritium concentrations in flow from selected springs that discharge to the Snake River, Twin Falls-Hagerman area, Idaho: U.S. Geological Survey Water-Resources Investigations Report 89-4156 (DOE/ID-22084), 20 p.

Orr, B.R., and Cecil, L.D., 1991, Hydrologic conditions and distribution of selected chemical constituents in water, Snake River Plain aquifer, Idaho National Engineering Laboratory, Idaho, 1986 to 1988: U.S. Geological Survey Water-Resources Investigations Report 91-4047 (DOE/ID-22096), 56 p.

Pritt, J.W., 1989, Quality assurance of sample containers and preservatives at the U.S. Geological Survey National Water Quality Laboratory, in Pederson, G.L., and Smith, M.M., compilers, U.S. Geological Survey Second National Symposium on Water Quality—Abstracts of the Technical Sessions, Orlando, Fla., November 12-17, 1989: U.S. Geological Survey Open-File Report 89-409, p. 75.

Pritt, Jeffrey, and Jones, B.E., eds., 1989, 1990 National Water Quality Laboratory services catalog: U.S. Geological Survey Open-File Report 89-386, unnumbered.

Pritt, J.W., and Raese, J.W., eds., 1992, Quality assurance/quality control manual, National Water Quality Laboratory: U.S. Geological Survey Open-File Report 92-495, 33 p.

Stevens, H.H., Jr., Ficke, J.F., and Smoot, G.F., 1975, Water temperature—influential factors, field measurement, and data presentation: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. D1, 65 p.

Taylor, J.K., 1987, Quality assurance of chemical measurements: Chelsea, Michigan, Lewis Publishers, Inc., 328 p.

Thatcher, L.L., Janzer, V.J., and Edwards, K.W., 1977, Methods for determination of radioactive substances in water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A5, 95 p.

U.S. Environmental Protection Agency, 1989, Protection of Environment, Code of Federal Regulations 40: Office of the Federal Register, National Archives and Records Administration, pts. 190 to 299, 1,027 p.

U.S. Geological Survey, 1985, National water summary, 1984—Hydrologic events, selected water-quality trends, and ground-water resources: U.S. Geological Survey Water-Supply Paper 2275, 467 p.

Volk, William, 1969, Applied statistics for engineers (2d ed.): New York, McGraw-Hill Book Company, 415 p.

Wegner, S.J., 1989, Selected water quality assurance data for water samples collected by the U.S. Geological Survey, Idaho National Engineering Laboratory, Idaho, 1980 to 1988: U.S. Geological Survey Water-Resources Investigations Report 89-4168 (DOE/ID-22085), 91 p.

Wershaw, R.L., Fishman, M.J., Grabbe, R.R., and Lowe, L.E., 1987, Method for the determination of organic substances in water and fluvial sediments: U.S. Geological Survey Techniques of Water-Resources Investigations, book 5, chap. A3, 80 p.

Wood, W.W., 1981, Guidelines for collection and field analysis of ground-water samples for selected unstable constituents: U.S. Geological Survey Techniques of Water-Resources Investigations, book 1, chap. D2, 24 p.

Table 1.—***Containers and preservatives used for water samples, Naval Reactors Facility and vicinity***

[Analyses by U.S. Geological Survey's National Water Quality Laboratory. Abbreviations: L, liter; mL, milliliter; H_3PO_4, phosphoric acid; $CuSO_4$, copper sulfate; $HgCl_2$, mercuric chloride; NaCl, sodium chloride; HNO_3, nitric acid; $K_2Cr_2O_7$, potassium dichromate; HCl, hydrochloric acid; NaOH, sodium hydroxide; °C, degrees Celsius. Teflon: *The use of trade names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.* Samples were shipped by overnight-delivery mail]

Type of constituent	Container		Preservative		Other treatment
	Type	Size	Type	Volume	
Anions	Polyethylene	250 mL	None	None	Filter
Cations, total recoverable	Polyethylene, acid-rinsed	250 mL	HNO_3	1 mL	None
Trace elements, total recoverable	Polyethylene, acid-rinsed	1 L	HNO_3	4 mL	None
	Polyethylene, acid-rinsed	500 mL	HNO_3	2 mL	None
	Polyethylene, acid-rinsed	250 mL	HNO_3	1 mL	None
Mercury, total recoverable	Glass, acid-rinsed	250 mL	$K_2Cr_2O_7/HNO_3$	10 mL	None
Thallium, dissolved	Teflon, acid-rinsed	250 mL	HNO_3, ultrapure	1 mL	Filter
Nutrients, total recoverable	Polyethylene, brown	250 mL	$HgCl_2$/NaCl	1 mL	Chill 4°C
Nutrients, dissolved	Polyethylene, brown	250 mL	$HgCl_2$/NaCl	1 mL	Filter, chill 4°C
Nutrients, dissolved	Polyethylene, brown	125 mL	$HgCl_2$/NaCl	.5 mL	Filter, chill 4°C
Cyanide	Polyethylene	250 mL	NaOH	5 mL	Chill 4°C
Total organic carbon	Glass, baked	125 mL	None	None	Chill 4°C
Anionic surfactants	Polyethylene	250 mL	None	None	Chill 4°C
Turbidity	Polyethylene	125 mL	None	None	None
Purgeable organic compounds	Glass, baked	40 mL	None	None	Chill 4°C
Extractable acid and base/ neutral organic compounds	Glass, baked	1 L	None	None	Chill 4°C
Phenols, total	Glass, baked	1 L	$H_3PO_4/CuSO_4$	10 mL	Chill 4°C

Table 1.—***Containers and preservatives used for water samples, Naval Reactors Facility and vicinity***—*Continued*

Type of constituent	Container		Preservative		Other treatment
	Type	Size	Type	Volume	
Pesticides	Glass, baked	1 L	None	None	Chill 4°C
Gross alpha and beta	Polyethylene, acid-rinsed	1 L	None	None	None
Gross alpha and beta	Polyethylene, acid-rinsed	1 L	HNO_3	4 mL	Filter
Tritium	Polyethylene, acid-rinsed	250 mL	None	None	None
Radium-226	Polyethylene, acid-rinsed	1 L	HCl	5 mL	Filter
Radium-228	Polyethylene, acid-rinsed	1 L	HCl	5 mL	Filter

Table 2.—***Results of field measurements for pH, specific conductance, and temperature of water, Naval Reactors Facility and vicinity***

[Units: pH, negative base-10 logarithm of hydrogen ion activity in moles per liter; specific conductance, microsiemens per centimeter at 25°C (degrees Celsius); temperature,°C. Sample identifier: see figure 2 for location of wells; Blank - indicates sample was organic free water from the U.S. Geological Survey's National Water Quality Laboratory (NWQL); Equipment blank - sample was inorganic free water from the NWQL. Date sampled: (m/d/y) indicates month/day/year of sample collection. Remarks: QAS indicates quality-assurance sample (values for field measurements for each pair of primary and replicate samples are the same measurement); data are from round three unless otherwise indicated. Symbol: NM indicates not measured]

Sample identifier	Date sampled (m/d/y)	Time	pH	Specific conductance	Temperature	Remarks
Blank	6/12/92	1030	8.9	9	22.0	QAS-23
Equipment blank	6/15/93	1300	6.4	1	22.5	QAS-30
NRF-1	3/5/91	1125	8.1	585	12.5	
	6/17/91	1135	8.0	572	13.0	
	9/9/91	1144	8.0	578	12.0	
	9/9/91	1100	8.0	578	12.0	QAS-18, replicate
	12/4/91	0940	8.0	559	12.0	
	3/11/92	1105	8.0	565	12.0	
	6/11/92	1235	8.0	590	12.5	
	9/16/92	1120	8.0	578	12.5	
	12/3/92	1045	8.0	579	12.0	
	4/7/93	1020	7.9	578	12.0	
	6/15/93	1012	8.0	598	12.0	
	9/15/93	1015	7.9	604	11.0	
	11/4/93	0915	7.8	600	12.0	
NRF-2	3/5/91	1145	8.2	645	13.0	
	3/5/91	0900	8.2	645	13.0	QAS-13, replicate
	6/17/91	1035	7.9	625	13.0	
	9/9/91	1049	8.0	630	12.5	
	12/4/91	1033	8.0	630	13.0	
	3/11/92	1024	8.0	612	12.5	
	6/11/92	1008	8.0	638	13.0	

Table 2.—***Results of field measurements for pH, specific conductance, and temperature of water, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Time	pH	Specific conductance	Temperature	Remarks
NRF-2 - cont.	9/16/92	1038	8.0	624	12.5	
	12/3/92	1000	8.0	620	12.5	
	4/7/93	0927	7.9	632	14.0	
	6/15/93	1048	7.9	650	12.5	
	9/15/93	1050	7.9	664	12.0	
	9/15/93	1030	7.9	664	12.0	QAS-31, replicate
	11/4/93	1037	7.9	664	12.0	
NRF-3	6/17/91	1120	7.9	575	12.0	
	6/17/91	1100	7.9	575	12.0	QAS-16, replicate
	9/26/91	1440	8.0	590	13.0	
	12/4/91	0923	7.9	558	11.5	
	3/11/92	1310	8.0	570	12.0	
	6/11/92	1304	8.0	588	12.0	
	9/16/92	1255	8.0	588	12.0	
	12/3/92	1123	8.0	572	11.5	
	12/3/92	1100	8.0	572	11.5	QAS-26, replicate
	4/8/93	0945	NM	602	11.5	
	6/15/93	0940	7.9	598	11.5	
	9/15/93	0945	7.8	609	10.0	
	11/4/93	1055	7.9	607	11.5	
NRF-4	3/5/91	1040	8.0	630	12.0	
	6/17/91	1155	8.0	578	12.0	
	9/9/91	0937	8.0	600	12.0	
	12/4/91	1209	8.0	602	12.0	
	3/11/92	1000	7.9	605	12.0	
	6/11/92	0910	8.0	600	12.0	
	9/16/92	1325	8.0	610	12.0	
	12/3/92	0929	7.8	605	11.5	

Table 2.—***Results of field measurements for pH, specific conductance, and temperature of water, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Time	pH	Specific conductance	Temperature	Remarks
NRF-4 - cont.	4/7/93	1122	7.9	610	12.0	
	4/7/93	1100	7.9	610	12.0	QAS-28, replicate
	6/15/93	0907	7.9	650	12.0	
	9/15/93	0905	7.8	662	11.0	
	11/4/93	0954	7.9	656	11.5	
NRF-6	9/9/91	1330	7.8	1,380	12.0	Round one
	11/6/91	1415	7.8	1,360	12.0	Round two
	1/8/92	1450	7.8	1,310	12.0	Round two
	3/10/92	1255	7.9	1,320	12.0	Round two
	3/10/92	1230	7.9	1,320	12.0	QAS-21, replicate, round two
	5/14/92	1320	7.9	1,340	12.0	Round two
	7/8/92	1445	7.9	1,390	12.5	Round two
	9/18/92	1515	8.0	1,400	12.0	
	12/9/92	1255	7.9	1,400	12.0	
	4/9/93	1350	7.9	1,470	12.0	
	9/14/93	1400	7.8	1,450	11.5	
	11/4/93	1435	7.8	1,430	12.0	
NRF-7	9/10/91	1300	8.5	254	15.5	Round one
	11/6/91	1245	8.5	242	15.0	Round two
	1/8/92	1310	8.5	232	15.0	Round two
	1/8/92	1400	8.5	232	15.0	QAS-20, replicate, round two
	3/10/92	1130	8.5	232	15.5	Round two
	5/14/92	1120	8.4	240	15.0	Round two
	7/8/92	1230	8.3	255	16.0	Round two
	9/18/92	1400	8.5	244	15.0	
	12/9/92	1140	8.3	243	15.0	
	4/9/93	1230	8.3	243	15.0	

Table 2.—***Results of field measurements for pH, specific conductance, and temperature of water, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Time	pH	Specific conductance	Temperature	Remarks
NRF-7 - cont.	6/10/93	1400	8.4	245	14.5	
	9/14/93	1215	8.1	254	14.0	
	11/3/93	1455	8.1	257	14.0	
USGS 12	6/10/91	1200	7.8	575	13.5	
	9/6/91	1505	7.9	590	12.5	
	9/6/91	1400	7.9	590	12.5	QAS-17, replicate
	12/5/91	1125	7.9	565	12.0	
	3/12/92	1520	7.8	610	12.5	
	6/19/92	1500	7.9	580	12.5	
	9/18/92	0945	8.0	560	12.0	
	12/1/92	1505	7.9	560	12.0	
	4/13/93	1450	7.8	582	12.0	
	6/14/93	1500	7.9	600	12.0	
	9/16/93	1455	7.8	580	11.5	
	11/5/93	1435	7.8	590	12.0	
	11/5/93	1400	7.8	590	12.0	QAS-33, replicate
USGS 15	6/10/91	1530	7.9	403	12.0	
	9/6/91	1240	7.9	495	11.5	
	12/4/91	1715	8.0	326	11.5	
	3/12/92	1240	8.1	315	12.0	
	3/12/92	1300	8.1	315	12.0	QAS-22, replicate
	6/19/92	1240	8.0	410	11.5	
	9/17/92	1445	8.0	415	12.0	
	12/1/92	1245	8.1	307	11.5	
	4/13/93	1230	8.0	298	12.0	
	6/14/93	1240	8.1	345	11.5	
	9/16/93	1235	7.8	421	11.0	
	11/5/93	1215	7.9	345	11.5	

Table 2.—***Results of field measurements for pH, specific conductance, and temperature of water, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Time	pH	Specific conductance	Temperature	Remarks
USGS 17	3/13/91	1145	8.2	292	13.0	
.	3/13/91	1200	8.2	292	13.0	QAS-14, replicate
	6/6/91	1300	8.2	291	14.0	
	9/5/91	1150	8.2	299	13.5	
	12/3/91	1215	8.2	286	13.5	
	3/16/92	1140	8.2	285	13.5	
	6/11/92	1435	8.2	298	13.5	
	9/16/92	1445	8.2	295	13.5	
	12/3/92	1330	8.2	298	13.0	
	4/7/93	1310	8.2	289	13.5	
	6/11/93	1510	8.2	298	13.0	
	6/11/93	1500	8.2	298	13.0	QAS-29, replicate
	9/15/93	1225	8.1	298	12.5	
	11/8/93	1325	8.0	299	13.0	
USGS 97	3/13/91	1245	8.0	580	11.5	
	6/7/91	1050	8.0	582	12.0	
	6/7/91	1000	8.0	582	12.0	QAS-15, replicate
	9/5/91	1350	8.0	595	12.0	
	12/3/91	1425	8.0	579	11.5	
	3/16/92	1355	7.9	575	12.0	
	6/17/92	0950	7.9	572	12.0	
	9/21/92	1315	7.9	590	12.0	
	12/8/92	1530	8.0	557	12.0	
	4/6/93	1250	7.9	578	11.5	
	6/9/93	1125	8.0	585	11.5	
	9/13/93	1320	7.8	600	11.0	
	11/4/93	1230	7.8	601	11.5	
	11/4/93	1300	7.8	601	11.5	QAS-32, replicate

Table 2.—***Results of field measurements for pH, specific conductance, and temperature of water, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Time	pH	Specific conductance	Temperature	Remarks
USGS 98	3/13/91	0930	8.0	410	12.0	
	6/7/91	0900	8.0	405	12.5	
	9/5/91	1045	8.0	411	12.5	
	12/3/91	0940	8.0	395	12.5	
	3/16/92	1025	8.0	398	12.0	
	6/16/92	0940	8.0	400	12.0	
	9/21/92	1050	8.0	405	12.5	
	9/21/92	1030	8.0	405	12.5	QAS-25, replicate
	12/8/92	1310	8.1	393	12.0	
	4/6/93	1035	8.0	398	12.0	
	6/8/93	1510	8.0	398	12.0	
USGS 99	3/13/91	1340	8.0	515	11.5	
	6/7/91	0955	8.0	515	12.0	
	9/5/91	1450	8.0	525	12.0	
	12/3/91	1510	8.0	500	12.0	
	3/16/92	1455	8.0	501	12.0	
	6/16/92	1310	8.0	502	12.0	
	6/16/92	1345	8.0	502	12.0	QAS-24, replicate
	9/21/92	1205	7.9	510	12.0	
	12/8/92	1425	8.0	495	12.0	
	4/6/93	1140	7.9	498	11.5	
	6/9/93	1000	8.0	510	11.5	
	9/13/93	1230	7.8	520	11.0	
	11/2/93	1410	7.9	519	11.5	
USGS 102	6/7/91	1210	8.0	556	12.0	
	9/5/91	1250	8.0	575	12.0	
	12/3/91	1335	8.0	550	11.5	
	3/16/92	1300	8.0	555	12.0	

Table 2.—***Results of field measurements for pH, specific conductance, and temperature of water, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Time	pH	Specific conductance	Temperature	Remarks
USGS 102 - cont.	6/16/92	1455	8.0	550	12.0	
	9/21/92	1405	7.9	570	12.0	
	12/9/92	1405	8.0	557	12.0	
	12/9/92	1330	8.0	557	12.0	QAS-27, replicate
	4/6/93	1350	7.9	560	11.5	
	6/9/93	1245	8.0	570	12.5	
	9/13/93	1425	7.8	582	11.0	
	11/4/93	1340	7.8	587	11.5	
Water Supply INEL-1	3/13/91	1035	7.9	755	12.0	
	6/5/91	1040	8.0	730	12.0	
	9/5/91	0950	7.9	798	12.5	
	12/3/91	1100	7.9	725	12.0	
	12/3/91	1100	7.9	725	12.0	QAS-19, replicate
	3/16/92	0930	7.9	705	12.0	
	6/16/92	1125	7.9	718	12.0	
	9/21/92	0945	8.1	750	12.0	
	12/8/92	1155	8.0	708	12.0	
	4/6/93	0930	7.9	698	12.0	
	6/8/93	1345	7.9	710	12.5	
	9/13/93	1050	7.6	713	10.5	
	11/2/93	1230	7.8	689	12.0	

Table 3.—***Concentrations of dissolved anions and total recoverable sodium in water from round-three samples, Naval Reactors Facility and vicinity***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory. Analytical results in milligrams per liter. Abbreviations: (m/d/y), month/day/year. Symbol: < indicates concentration is less than the specified laboratory reporting level. Sample identifier: see figure 2 for location of wells; QAS indicates quality-assurance sample, 23 and 30 are blank samples, others are replicates]

Sample identifier	Date sampled (m/d/y)	Bromide	Chloride	Fluoride	Sulfate	Sodium
QAS-23	6/12/92	0.07	0.8	<0.1	<0.1	0.7
QAS-30	6/15/93	<.01	<.1	<.1	.2	<.1
NRF-1	3/5/91	.06	34	.1	39	13
	6/17/91	.07	37	.2	38	14
	9/9/91	.07	31	.2	36	15
QAS-18	9/9/91	.08	31	.2	39	14
NRF-1	12/4/91	.08	36	.2	42	12
	3/11/92	.06	38	.2	42	14
	6/11/92	.08	40	.2	41	15
	9/16/92	.08	37	.2	39	15
	12/3/92	.08	36	.2	41	15
	4/7/93	.08	37	.2	41	14
	6/15/93	.08	39	.2	43	13
	9/15/93	.07	37	.2	44	16
	11/4/93	.07	33	.2	40	16
NRF-2	3/5/91	.06	54	.2	52	20
QAS-13	3/5/91	.07	55	.1	53	19
NRF-2	6/17/91	.07	49	.2	49	19
	9/9/91	.08	45	.2	47	19
	12/4/91	.08	52	.2	55	12
	3/11/92	.07	52	.2	50	18
	6/11/92	.08	54	.2	50	20
	9/16/92	.08	48	.2	47	17
	12/3/92	.07	43	.1	47	19

Table 3.—***Concentrations of dissolved anions and total recoverable sodium in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Bromide	Chloride	Fluoride	Sulfate	Sodium
NRF-2	4/7/93	.09	49	.2	50	20
	6/15/93	.09	45	.2	49	14
	9/15/93	.07	47	.2	51	19
QAS-31	9/15/93	.07	48	.2	53	19
NRF-2	11/4/93	.07	47	.2	51	20
NRF-3	6/17/91	.07	36	.2	38	13
QAS-16	6/17/91	.07	36	.2	38	13
NRF-3	9/26/91	.07	37	.2	40	15
	12/4/91	.07	36	.2	42	10
	3/11/92	.06	39	.2	41	14
	6/11/92	.07	41	.2	40	14
	9/16/92	.08	41	.2	40	15
	12/3/92	.08	35	.1	41	14
QAS-26	12/3/92	.07	36	.1	41	14
NRF-3	4/8/93	.09	37	.2	40	15
	6/15/93	.08	38	.2	42	14
	9/15/93	.07	38	.2	43	16
	11/4/93	.07	36	.2	41	16
NRF-4	3/5/91	.07	42	.1	45	17
	6/17/91	.07	36	.2	37	14
	9/9/91	.07	38	.2	42	16
	12/4/91	.08	46	.2	51	9.3
	3/11/92	.07	48	.2	49	17
	6/11/92	.07	45	.2	44	16
	9/16/92	.09	46	.2	46	17
	12/3/92	.08	35	.2	36	14
	4/7/93	.09	43	.2	46	17
QAS-28	4/7/93	.09	45	.2	46	18

Table 3.—***Concentrations of dissolved anions and total recoverable sodium in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Bromide	Chloride	Fluoride	Sulfate	Sodium
NRF-4	6/15/93	.09	49	.2	51	16
	9/15/93	.08	49	.2	54	19
	11/4/93	.07	45	.2	50	19
NRF-6	9/18/92	.09	210	.3	240	90
	12/9/92	.09	210	.2	240	95
	4/9/93	.10	230	.2	250	100
	9/14/93	.08	210	.2	240	97
	11/4/93	.08	200	.2	230	95
NRF-7	9/18/92	.08	39	.3	35	11
	12/9/92	.03	5.5	.2	16	8.4
	4/9/93	.03	5.4	.2	15	8.1
	6/10/93	.03	5.5	.2	15	7.8
	9/14/93	.02	5	.2	15	8.5
	11/3/93	.01	4.8	.3	15	8.7
USGS 12	6/10/91	.08	31	.2	26	13
	9/6/91	.08	29	.2	29	13
QAS-17	9/6/91	.08	30	.2	32	14
USGS 12	12/5/91	.08	36	.2	36	12
	3/12/92	.07	40	.2	38	14
	6/19/92	.08	40	.2	35	15
	9/18/92	.03	6.3	.3	15	8.5
	12/1/92	.01	7.1	.2	19	7.7
	4/13/93	.1	37	.2	36	14
	6/14/93	.09	38	.2	37	13
	9/16/93	.08	36	.2	38	15
	11/5/93	.08	37	.2	35	16
QAS-33	11/5/93	.08	33	.2	36	16
USGS 15	6/10/91	.04	11	.2	15	12

Table 3.—***Concentrations of dissolved anions and total recoverable sodium in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Bromide	Chloride	Fluoride	Sulfate	Sodium
USGS 15	9/6/91	.05	19	.1	24	17
	12/4/91	.03	10	.2	22	6.1
	3/12/92	.02	8.1	.1	18	5.7
QAS-22	3/12/92	.01	8.1	.2	19	8.7
USGS 15	6/19/92	.04	21	.2	25	17
	9/17/92	.05	18	.2	24	14
	12/1/92	.08	43	.2	47	18
	4/13/93	.04	6.5	.1	18	7.2
	6/14/93	.03	9.3	.1	20	8.6
	9/16/93	.04	14	<.1	25	14
	11/5/93	.02	9	.2	19	11
USGS 17	3/13/91	.02	7.1	.2	19	5.6
QAS-14	3/13/91	.02	6.9	.2	18	5.4
USGS 17	6/6/91	.02	7.4	.2	12	6.5
	9/5/91	.03	7.2	.3	22	6.3
	12/3/91	.03	7.1	.3	22	5.7
	3/16/92	.02	7.0	.3	19	5.4
	6/11/92	.02	7.1	.2	22	6.7
	9/16/92	.03	7.0	.3	19	7.0
	12/3/92	.02	5.9	.2	20	6.4
	4/7/93	.04	10	.2	19	6.8
	6/11/93	.03	5.9	.2	19	5.6
QAS-29	6/11/93	.03	5.9	.2	19	5.8
USGS 17	9/15/93	.02	6.0	.2	19	6.7
	11/8/93	.01	5.6	.2	19	6.9
USGS 97	3/13/91	.07	34	.2	36	12
	6/7/91	.08	29	.2	27	13
QAS-15	6/7/91	.08	28	.2	33	15

Table 3.—***Concentrations of dissolved anions and total recoverable sodium in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Bromide	Chloride	Fluoride	Sulfate	Sodium
USGS 97	9/5/91	.08	37	.2	38	14
	12/3/91	.08	36	.2	38	12
	3/16/92	.07	33	.2	34	11
	6/17/92	.08	32	.2	36	14
	9/21/92	.09	38	.2	36	15
	12/8/92	.08	33	.1	37	13
	4/6/93	.09	34	.2	36	15
	6/9/93	.09	34	.1	37	12
	9/13/93	.08	35	.2	37	14
	11/4/93	.07	32	.2	36	15
QAS-32	11/4/93	.08	32	.2	36	15
USGS 98	3/13/91	.04	15	.2	22	8.7
	6/7/91	.04	16	<.1	11	10
	9/5/91	.05	14	.2	21	8.8
	12/3/91	.04	17	.2	24	7.8
	3/16/92	.03	17	.2	21	8.3
	6/16/92	.04	14	.2	33	9.3
	9/21/92	.05	17	.2	23	8.6
QAS-25	9/21/92	.05	18	.3	21	11
USGS 98	12/8/92	.05	14	.2	22	9.5
	4/6/93	.05	14	.2	21	9.7
	6/8/93	.04	18	.2	22	8.9
USGS 99	3/13/91	.06	21	.1	26	10
	6/7/91	.05	17	.2	18	12
	9/5/91	.06	24	.2	30	12
	12/3/91	.05	20	.2	27	8.8
	3/16/92	.05	22	.2	25	11
	6/16/92	.05	20	.2	27	12

Table 3.—***Concentrations of dissolved anions and total recoverable sodium in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Bromide	Chloride	Fluoride	Sulfate	Sodium
QAS-24	6/16/92	.05	20	.2	26	12
USGS 99	9/21/92	.06	23	.1	28	13
	12/8/92	.06	18	.1	27	12
	4/6/93	.07	20	.1	26	12
	6/9/93	.05	20	.1	27	11
	9/13/93	.05	19	.2	27	13
	11/2/93	.04	18	.2	27	14
USGS 102	6/7/91	.07	23	.2	23	12
	9/5/91	.07	36	.2	39	13
	12/3/91	.07	32	.2	35	9.7
	3/16/92	.07	31	.2	34	11
	6/16/92	.12	30	.2	35	13
	9/21/92	.08	35	.2	35	13
	12/9/92	.07	31	.2	36	13
QAS-27	12/9/92	.07	31	.2	36	13
USGS 102	4/6/93	.09	31	.2	35	12
	6/9/93	.09	33	.2	36	12
	9/13/93	.08	33	.2	36	14
	11/4/93	.09	30	.2	35	14
Water Supply INEL-1	3/13/91	.30	100	.1	50	15
	6/5/91	.31	96	<.1	46	18
	9/5/91	.33	99	.2	53	19
	12/3/91	.31	110	.2	61	15
QAS-19	12/3/91	.31	100	.2	55	15
Water Supply INEL-1	3/16/92	.28	94	<.1	49	14
	6/16/92	.30	99	.2	53	18
	9/21/92	.32	80	.2	40	13

Table 3.—***Concentrations of dissolved anions and total recoverable sodium in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Bromide	Chloride	Fluoride	Sulfate	Sodium
Water Supply INEL-1	12/8/92	.30	96	.1	53	18
	4/6/93	.29	94	.1	50	18
	6/8/93	.28	94	.1	52	16
	9/13/93	.27	89	.2	50	18
	11/2/93	.24	80	.2	49	18

Table 4.—*Statistical parameters for dissolved anions and total recoverable sodium, by well*

[See figure 2 for location of wells. Units are milligrams per liter. Symbol: < indicates concentration is less than the specified laboratory reporting level. Values are derived from tables 3, 12, and 18. Quality-assurance replicates are included in the calculation of statistical parameters. Mean and median sample size: includes all samples with concentrations greater than laboratory reporting level]

Constituent	Statistical parameter					
	Minimum	Maximum	Median	Mean	Sample size	Mean and median sample size
				NRF-1		
Bromide	0.06	0.08	0.08	0.07	13	13
Chloride	31	40	37	36	13	13
Fluoride	.1	.2	.2	.2	13	13
Sulfate	36	44	41	40	13	13
Sodium	12	16	14	14	13	13
				NRF-2		
Bromide	.06	.09	.07	.08	14	14
Chloride	43	55	48.5	49	14	14
Fluoride	.1	.2	.2	.2	14	14
Sulfate	47	55	50	50	14	14
Sodium	12	20	19	18	14	14
				NRF-3		
Bromide	.06	.09	.07	.07	13	13
Chloride	35	41	37	37	13	13
Fluoride	.1	.2	.2	.2	13	13
Sulfate	38	43	41	41	13	13
Sodium	10	16	14	14	13	13
				NRF-4		
Bromide	.07	.09	.08	.08	13	13
Chloride	35	49	45	44	13	13
Fluoride	.1	.2	.2	.2	13	13
Sulfate	36	54	46	46	13	13
Sodium	9.3	19	17	16	13	13

Table 4.—*Statistical parameters for dissolved anions and total recoverable sodium, by well—Continued*

Constituent	Statistical parameter					
	Minimum	Maximum	Median	Mean	Sample size	Mean and median sample size
			NRF-6			
Bromide	.08	.10	.08	.09	12	12
Chloride	190	230	205	206	12	12
Fluoride	<.1	.3	.2	.2	12	10
Sulfate	210	250	235	232	12	12
Sodium	54	100	90	86	12	12
			NRF-7			
Bromide	.01	.08	.02	.03	13	13
Chloride	4.8	39	5.5	8.3	13	13
Fluoride	.2	.5	.2	.3	13	13
Sulfate	14	35	16	18	13	13
Sodium	7.0	11	8.5	8.6	13	13
			USGS 12			
Bromide	.01	.1	.08	.07	13	13
Chloride	6.3	40	36	31	13	13
Fluoride	.2	.3	.2	.2	13	13
Sulfate	15	38	35	32	13	13
Sodium	7.7	16	14	13	13	13
			USGS 15			
Bromide	.01	.08	.04	.04	12	12
Chloride	6.5	43	10.5	15	12	12
Fluoride	<.1	.2	.2	.2	12	11
Sulfate	15	47	21	23	12	12
Sodium	5.7	18	11.5	12	12	12

Table 4.—*Statistical parameters for dissolved anions and total recoverable sodium, by well—Continued*

Constituent	Statistical parameter					
	Minimum	Maximum	Median	Mean	Sample size	Mean and median sample size
			USGS 17			
Bromide	.01	.04	.02	.02	14	14
Chloride	5.6	10	7.0	6.9	14	14
Fluoride	.2	.3	.2	.2	14	14
Sulfate	12	22	19	19	14	14
Sodium	5.4	7.0	6.35	6.2	14	14
			USGS 97			
Bromide	.07	.09	.08	.08	14	14
Chloride	28	38	33.5	33	14	14
Fluoride	.1	.2	.2	.2	14	14
Sulfate	27	38	36	36	14	14
Sodium	11	15	14	14	14	14
			USGS 98			
Bromide	.03	.05	.04	.04	11	11
Chloride	14	18	16	16	11	11
Fluoride	<.1	.3	.2	.2	11	10
Sulfate	11	33	22	22	11	11
Sodium	7.8	11	8.9	9.1	11	11
			USGS 99			
Bromide	.04	.07	.05	.05	13	13
Chloride	17	24	20	20	13	13
Fluoride	.1	.2	.2	.2	13	13
Sulfate	18	30	27	26	13	13
Sodium	8.8	14	12	12	13	13

Table 4.—***Statistical parameters for dissolved anions and total recoverable sodium, by well***—*Continued*

Constituent	Statistical parameter					
	Minimum	Maximum	Median	Mean	Sample size	Mean and median sample size
			USGS 102			
Bromide	.07	.12	.075	.08	12	12
Chloride	23	36	31	31	12	12
Fluoride	.2	.2	.2	.2	12	12
Sulfate	23	39	35	35	12	12
Sodium	9.7	14	13	12	12	12
			Water Supply INEL-1			
Bromide	.24	.33	.30	.30	13	13
Chloride	80	110	96	95	13	13
Fluoride	<.1	.2	.2	.2	13	11
Sulfate	40	61	50	51	13	13
Sodium	13	19	18	17	13	13

Table 5.—***Concentrations of selected total recoverable trace elements in water from round-three samples, Naval Reactors Facility and vicinity***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory. Analytical results in micrograms per liter. Abbreviations: (m/d/y), month/day/year. Symbols: < indicates concentration is less than the specified laboratory reporting level; SR indicates sample ruined. Sample identifier: see figure 2 for location of wells; QAS indicates quality-assurance sample, 23 and 30 are blank samples, others are replicates]

Sample identifier	Date sampled (m/d/y)	Chromium	Iron	Lead	Mercury	Nickel	Silver
QAS-23	6/12/92	<1	<10	<1	<0.1	<1	<1
QAS-30	6/15/93	<1	110	17	<.1	<1	<1
NRF-1	3/5/91	9	190	1	<.1	2	<1
	6/17/91	9	140	4	<.1	6	<1
	9/9/91	12	470	1	<.1	2	<1
QAS-18	9/9/91	11	240	<1	<.1	2	<1
NRF-1	12/4/91	8	190	2	<.1	1	<1
	3/11/92	9	890	2	<.1	2	<1
	6/11/92	6	120	3	<.1	<1	<1
	9/16/92	7	80	<1	<.1	1	<1
	12/3/92	13	620	<1	<.1	<1	4
	4/7/93	21	3,200	3	<.1	<1	<1
	6/15/93	9	540	<1	<.1	<1	<1
	9/15/93	6	30	<1	<.1	<1	<1
	11/4/93	8	150	<1	<.1	SR	<1
NRF-2	3/5/91	14	<10	<1	<.1	<1	<1
QAS-13	3/5/91	15	10	<1	<.1	<1	<1
NRF-2	6/17/91	13	20	1	<.1	5	<1
	9/9/91	11	30	4	<.1	2	<1
	12/4/91	13	<10	<1	<.1	2	<1
	3/11/92	<1	<10	<1	<.1	<1	<1
	6/11/92	11	20	<1	<.1	<1	<1
	9/16/92	10	80	<1	<.1	<1	<1
	12/3/92	12	30	<1	<.1	2	<1
	4/7/93	12	<10	<1	<.1	<1	<1
	6/15/93	6	10	<1	<.1	<1	<1

Table 5.—***Concentrations of selected total recoverable trace elements in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Chromium	Iron	Lead	Mercury	Nickel	Silver
NRF-2	9/15/93	9	20	<1	<.1	<1	<1
QAS-31	9/15/93	10	<10	<1	<.1	<1	<1
NRF-2	11/4/93	9	20	<1	<.1	SR	<1
NRF-3	6/17/91	7	60	2	<.1	4	<1
QAS-16	6/17/91	7	120	2	<.1	3	<1
NRF-3	9/26/91	9	300	2	<.1	1	<1
	12/4/91	6	120	<1	<.1	2	<1
	3/11/92	8	920	<1	<.1	<1	<1
	6/11/92	4	30	<1	<.1	<1	<1
	9/16/92	13	4,900	3	<.1	14	<1
	12/3/92	10	320	<1	<.1	2	<1
QAS-26	12/3/92	4	100	<1	<.1	<1	<1
NRF-3	4/8/93	7	140	1	<.1	<1	<1
	6/15/93	6	170	<1	<.1	<1	<1
	9/15/93	5	630	2	<.1	<1	<1
	11/4/93	6	90	<1	<.1	SR	<1
NRF-4	3/5/91	8	70	1	<.1	<1	<1
	6/17/91	12	40	1	<.1	<1	<1
	9/9/91	10	170	<1	<.1	2	<1
	12/4/91	10	20	<1	<.1	2	<1
	3/11/92	11	<10	<1	<.1	<1	<1
	6/11/92	6	20	<1	<.1	<1	<1
	9/16/92	10	300	<1	<.1	<1	<1
	12/3/92	6	100	<1	<.1	<1	<1
	4/7/93	9	<10	<1	<.1	<1	<1
QAS-28	4/7/93	9	<10	<1	<.1	<1	<1
NRF-4	6/15/93	8	<10	<1	<.1	<1	<1
	9/15/93	10	<10	<1	<.1	<1	<1
	11/4/93	9	10	<1	<.1	SR	<1
NRF-6	9/18/92	<1	140	<1	<.1	10	<1

Table 5.—***Concentrations of selected total recoverable trace elements in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Chromium	Iron	Lead	Mercury	Nickel	Silver
NRF-6	12/9/92	41	100	<1	<.1	8	<1
	4/9/93	11	280	<1	<.1	13	<1
	9/14/93	42	1,100	<1	<.1	48	<1
	11/4/93	32	400	<1	<.1	SR	<1
NRF-7	9/18/92	5	180	<1	<.1	<1	<1
	12/9/92	11	210	<1	<.1	6	<1
	4/9/93	13	330	<1	<.1	5	<1
	6/10/93	11	600	<1	<.1	6	<1
	9/14/93	10	180	<1	<.1	4	<1
	11/3/93	12	330	<1	<.1	SR	<1
USGS 12	6/10/91	4	120	1	<.1	1	<1
	9/6/91	7	50	<1	<.1	1	<1
QAS-17	9/6/91	6	90	<1	<.1	2	<1
USGS 12	12/5/91	6	70	<1	<.1	1	<1
	3/12/92	7	20	<1	<.1	<1	<1
	6/19/92	5	50	<1	<.1	1	<1
	9/18/92	9	260	<1	<.1	6	<1
	12/1/92	10	3,000	<1	<.1	7	<1
	4/13/93	5	40	<1	<.1	<1	<1
	6/14/93	5	40	<1	<.1	1	<1
	9/16/93	6	40	<1	<.1	<1	<1
	11/5/93	5	140	<1	<.1	2	<1
QAS-33	11/5/93	6	270	<1	<.1	2	<1
USGS 15	6/10/91	3	30	2	<.1	1	<1
	9/6/91	6	40	<1	<.1	2	<1
	12/4/91	8	<10	<1	<.1	1	<1
	3/12/92	6	10	<1	<.1	<1	<1
QAS-22	3/12/92	8	<10	<1	<.1	<1	<1
USGS 15	6/19/92	71	30,000	16	<.1	86	<1
	9/17/92	<1	250	<1	<.1	1	<1

Table 5.—***Concentrations of selected total recoverable trace elements in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Chromium	Iron	Lead	Mercury	Nickel	Silver
USGS 15	12/1/92	13	80	<1	<.1	3	<1
	4/13/93	6	70	<1	<.1	<1	<1
	6/14/93	7	<10	<1	<.1	<1	<1
	9/16/93	6	20	<1	<.1	<1	<1
	11/5/93	6	30	<1	<.1	2	<1
USGS 17	3/13/91	3	130	<1	<.1	1	<1
QAS-14	3/13/91	4	110	1	<.1	1	<1
USGS 17	6/6/91	1	140	2	<.1	<1	<1
	9/5/91	1	210	<1	<.1	2	<1
	12/3/91	<1	270	<1	<.1	2	<1
	3/16/92	<1	360	<1	<.1	2	<1
	6/11/92	<1	90	<1	<.1	1	<1
	9/16/92	5	130	1	<.1	<1	<1
	12/3/92	<1	90	<1	<.1	<1	<1
	4/7/93	1	130	<1	<.1	<1	<1
	6/11/93	<1	50	<1	<.1	<1	<1
QAS-29	6/11/93	1	30	<1	<.1	<1	<1
USGS 17	9/15/93	<1	70	<1	<.1	<1	<1
	11/8/93	<1	80	<1	<.1	2	<1
USGS 97	3/13/91	8	110	2	<.1	2	<1
	6/7/91	5	30	3	<.1	<1	<1
QAS-15	6/7/91	8	20	3	<.1	<1	<1
USGS 97	9/5/91	9	150	3	<.1	<1	<1
	12/3/91	7	260	6	<.1	2	<1
	3/16/92	6	90	<1	<.1	<1	<1
	6/17/92	5	60	1	<.1	<1	<1
	9/21/92	6	230	3	<.1	<1	<1
	12/8/92	3	140	2	<.1	2	<1
	4/6/93	6	50	2	<.1	<1	<1
	6/9/93	5	20	<1	<.1	<1	<1

Table 5.—***Concentrations of selected total recoverable trace elements in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Chromium	Iron	Lead	Mercury	Nickel	Silver
USGS 97	9/13/93	6	110	1	<.1	<1	<1
	11/4/93	7	730	2	<.1	SR	<1
QAS-32	11/4/93	13	390	3	<.1	SR	<1
USGS 98	3/13/91	8	110	2	<.1	<1	<1
	6/7/91	5	100	2	<.1	<1	<1
	9/5/91	7	60	2	<.1	2	<1
	12/3/91	5	70	<1	<.1	1	<1
	3/16/92	4	80	<1	<.1	<1	<1
	6/16/92	3	30	1	<.1	<1	<1
	9/21/92	5	80	1	<.1	<1	<1
QAS-25	9/21/92	4	70	1	<.1	<1	<1
USGS 98	12/8/92	9	140	<1	<.1	2	<1
	4/6/93	4	130	1	<.1	<1	<1
	6/8/93	3	50	2	<.1	<1	<1
USGS 99	3/13/91	9	1,000	4	<.1	2	<1
	6/7/91	3	90	4	<.1	<1	<1
	9/5/91	5	150	3	<.1	1	<1
	12/3/91	5	200	<1	<.1	2	<1
	3/16/92	5	90	<1	<.1	<1	<1
	6/16/92	3	40	1	<.1	<1	<1
QAS-24	6/16/92	2	70	2	<.1	1	<1
USGS 99	9/21/92	5	160	2	<.1	1	<1
	12/8/92	8	160	1	<.1	2	<1
	4/6/93	4	130	1	<.1	<1	<1
	6/9/93	5	80	1	<.1	<1	<1
	9/13/93	6	70	1	<.1	<1	<1
	11/2/93	5	70	2	<.1	2	<1
USGS 102	6/7/91	6	100	1	<.1	<1	<1
	9/5/91	7	160	<1	<.1	2	<1
	12/3/91	7	2,100	2	<.1	3	<1

Table 5.—***Concentrations of selected total recoverable trace elements in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Chromium	Iron	Lead	Mercury	Nickel	Silver
USGS 102	3/16/92	6	130	<1	<.1	<1	<1
	6/16/92	6	90	<1	<.1	1	<1
	9/21/92	6	110	<1	<.1	<1	<1
	12/9/92	4	30	<1	<.1	2	<1
QAS-27	12/9/92	8	40	<1	<.1	2	<1
USGS 102	4/6/93	7	1,200	<1	<.1	1	<1
	6/9/93	5	70	<1	<.1	<1	<1
	9/13/93	6	190	<1	<.1	<1	<1
	11/4/93	6	440	<1	<.1	SR	<1
Water Supply INEL-1	3/13/91	11	200	2	<.1	2	<1
	6/5/91	10	90	2	<.1	<1	<1
	9/5/91	10	250	<1	<.1	2	<1
	12/3/91	9	200	3	<.1	1	<1
QAS-19	12/3/91	7	170	<1	<.1	<1	<1
Water Supply INEL-1	3/16/92	7	150	<1	<.1	<1	<1
	6/16/92	8	520	4	<.1	1	<1
	9/21/92	10	770	5	<.1	2	<1
	12/8/92	14	430	1	<.1	1	<1
	4/6/93	10	340	1	<.1	<1	<1
	6/8/93	8	280	5	<.1	<1	<1
	9/13/93	7	310	1	<.1	<1	<1
	11/2/93	10	2,000	2	<.1	2	<1

Table 6.—*Statistical parameters for selected total recoverable trace elements, by well*

[See figure 2 for location of wells. Units are micrograms per liter. Symbol: < indicates concentration is less than the specified laboratory reporting level. Values are derived from tables 5, 12, and 18. Quality-assurance replicates are included in the calculation of statistical parameters. Mean and median sample size: includes all samples with concentrations greater than laboratory reporting level]

Constituent	Statistical parameter					
	Minimum	Maximum	Median	Mean	Sample size	Mean and median sample size
				NRF-1		
Chromium	6	21	9	10	13	13
Iron	30	3,200	190	528	13	13
Lead	<1	4	2	2	13	7
Nickel	<1	6	2	2	12	7
				NRF-2		
Chromium	<1	15	11	11	14	13
Iron	<10	80	20	27	14	9
Lead	<1	4	2.5	2	14	2
Nickel	<1	5	2	3	13	4
				NRF-3		
Chromium	4	13	7	7	13	13
Iron	30	4,900	140	608	13	13
Lead	<1	3	2	2	13	6
Nickel	<1	14	2.5	4	12	6
				NRF-4		
Chromium	6	12	9	9	13	13
Iron	<10	300	55	91	13	8
Lead	<1	1	1	1	13	2
Nickel	<1	2	2	2	12	2
				NRF-6		
Arsenic	3	4	3	3	7	7
Barium	<100	200	100	125	7	4
Chromium	<1	45	38.5	36	12	10
Copper	<1	6	5	4	5	3
Iron	70	1,100	120	238	12	12

Table 6.—***Statistical parameters for selected total recoverable trace elements, by well***—*Continued*

Constituent	Statistical parameter					
	Minimum	Maximum	Median	Mean	Sample size	Mean and median sample size
			NRF-6 - cont.			
Manganese	<10	40	30	30	7	4
Nickel	5	48	13	16	11	11
Selenium	1	3	2	2	7	7
Zinc	<10	30	10	16	7	5
			NRF-7			
Arsenic	<1	2	2	2	7	6
Barium	<100	100	100	100	6	2
Chromium	<1	13	10	10	12	11
Copper	2	4	2	3	3	3
Iron	180	3,900	330	662	12	12
Lead	<1	4	3.5	4	12	2
Manganese	<10	40	20	27	6	3
Nickel	<1	9	5	5	11	10
Selenium	<1	2	1	1	7	5
Zinc	<10	40	30	27	6	3
			USGS 12			
Chromium	4	10	6	6	13	13
Iron	20	3,000	70	322	13	13
Nickel	<1	7	1.5	2	13	10
			USGS 15			
Chromium	<1	71	6	13	12	11
Iron	<10	30,000	40	3,390	12	9
Lead	<1	16	9	9	12	2
Nickel	<1	86	2	14	12	7
			USGS 17			
Chromium	<1	5	1	2	14	7
Iron	30	360	120	135	14	14
Lead	<1	2	1	1	14	3
Nickel	<1	2	2	2	14	7

Table 6.—***Statistical parameters for selected total recoverable trace elements, by well***—*Continued*

Constituent	Statistical parameter					
	Minimum	Maximum	Median	Mean	Sample size	Mean and median sample size
			USGS 97			
Chromium	3	13	6	7	14	14
Iron	20	730	110	171	14	14
Lead	<1	6	2.5	3	14	12
Nickel	<1	2	2	2	12	3
			USGS 98			
Chromium	3	9	5	5	11	11
Iron	30	140	80	84	11	11
Lead	<1	2	1.5	2	11	8
Nickel	<1	2	2	2	11	3
			USGS 99			
Chromium	2	9	5	5	13	13
Iron	40	1,000	90	178	13	13
Lead	<1	4	2	2	13	11
Nickel	<1	2	2	2	13	7
			USGS 102			
Chromium	4	8	6	6	12	12
Iron	30	2,100	120	388	12	12
Lead	<1	2	1.5	2	12	2
Nickel	<1	3	2	2	11	6
			Water Supply INEL-1			
Chromium	7	14	10	9	13	13
Iron	90	2,000	280	439	13	13
Lead	<1	5	2	3	13	10
Nickel	<1	2	2	2	13	7

Table 7.—***Concentrations of dissolved nutrients and total organic carbon in water from round-three samples, Naval Reactors Facility and vicinity***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory. Analytical results are in milligrams per liter. Abbreviations: (m/d/y), month/day/year. Symbols: < indicates concentration is less than the specified laboratory reporting level; NR indicates analysis not requested; BB indicates bottle broke during shipment. Sample identifier: see figure 2 for location of wells; QAS indicates quality-assurance sample, 23 and 30 are blank samples, others are replicates]

Sample identifier	Date sampled (m/d/y)	Ammonia (as nitrogen)	Ammonia plus organic nitrogen (as nitrogen)	Nitrite (as nitrogen)	Nitrite plus nitrate (as nitrogen)	Ortho-phosphate (as phosphorus)	Total organic carbon
QAS-23	6/12/92	<0.01	NR	<0.01	<0.05	<0.01	<0.1
QAS-30	6/15/93	.02	NR	<.01	<.05	<.01	NR
NRF-1	3/5/91	NR	.6	<.01	1.6	.02	.5
	6/17/91	NR	.2	<.01	1.8	.02	.4
	9/9/91	NR	.3	.01	1.7	<.01	.4
QAS-18	9/9/91	NR	.3	<.01	1.6	<.01	.4
NRF-1	12/4/91	.01	NR	<.01	1.7	.02	.5
	3/11/92	.08	NR	<.01	1.8	.02	1.0
	6/11/92	<.01	NR	<.01	1.8	.02	.3
	9/16/92	<.01	NR	<.01	1.8	.02	.9
	12/3/92	<.01	NR	<.01	1.9	.02	.7
	4/7/93	<.01	NR	<.01	1.8	.02	1.0
	6/15/93	.03	NR	<.01	1.9	.02	.5
	9/15/93	.02	NR	<.01	1.9	.03	.4
	11/4/93	.02	NR	<.01	1.9	.04	.7
NRF-2	3/5/91	NR	.3	<.01	1.9	.02	.5
QAS-13	3/5/91	NR	<.2	<.01	1.9	.02	.4
NRF-2	6/17/91	NR	<.2	<.01	2.0	.02	.4
	9/9/91	NR	.4	<.01	1.8	<.01	.4
	12/4/91	.01	NR	<.01	1.9	.02	.6
	3/11/92	.08	NR	<.01	2.0	.02	.4
	6/11/92	<.01	NR	<.01	2.0	.03	.3
	9/16/92	<.01	NR	<.01	1.9	.02	.9

Table 7.—***Concentrations of dissolved nutrients and total organic carbon in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Ammonia (as nitrogen)	Ammonia plus organic nitrogen (as nitrogen)	Nitrite (as nitrogen)	Nitrite plus nitrate (as nitrogen)	Ortho-phosphate (as phosphorus)	Total organic carbon
NRF-2	12/3/92	<.01	NR	<.01	2.0	.02	.5
	4/7/93	<.01	NR	<.01	1.9	.02	.6
	6/15/93	.03	NR	<.01	2.0	.02	.4
	9/15/93	.02	NR	<.01	2.0	.03	.5
QAS-31	9/15/93	.02	NR	<.01	2.0	.02	1.8
NRF-2	11/4/93	.01	NR	<.01	2.0	.03	.4
NRF-3	6/17/91	NR	.4	<.01	1.8	.03	1.8
QAS-16	6/17/91	NR	.2	<.01	1.8	.02	.5
NRF-3	9/26/91	NR	<.2	<.01	1.8	.03	.5
	12/4/91	.01	NR	<.01	1.7	.02	.6
	3/11/92	.07	NR	<.01	1.8	.02	.5
	6/11/92	<.01	NR	<.01	1.8	.02	.7
	9/16/92	.02	NR	<.01	1.8	.02	1.8
	12/3/92	<.01	NR	.01	1.9	.02	.7
QAS-26	12/3/92	<.01	NR	<.01	1.9	.02	.7
NRF-3	4/8/93	<.01	NR	<.01	1.8	.02	1.9
	6/15/93	.03	NR	<.01	1.8	.02	1.4
	9/15/93	.02	NR	<.01	1.9	.02	1.0
	11/4/93	.01	NR	<.01	1.9	.02	1.2
NRF-4	3/5/91	NR	.3	<.01	1.9	.03	.4
	6/17/91	NR	.2	<.01	1.9	.02	.3
	9/9/91	NR	.4	<.01	1.9	<.01	.4
	12/4/91	.02	NR	<.01	1.9	.02	.7
	3/11/92	.07	NR	<.01	2.1	.03	.5
	6/11/92	<.01	NR	<.01	2.0	.03	.4
	9/16/92	.01	NR	<.01	2.0	.02	.9
	12/3/92	<.01	NR	.01	2.1	.02	.4

Table 7.—***Concentrations of dissolved nutrients and total organic carbon in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Ammonia (as nitrogen)	Ammonia plus organic nitrogen (as nitrogen)	Nitrite (as nitrogen)	Nitrite plus nitrate (as nitrogen)	Ortho-phosphate (as phosphorus)	Total organic carbon
NRF-4	4/7/93	<.01	NR	<.01	2.0	.02	1.0
QAS-28	4/7/93	<.01	NR	<.01	2.0	.02	.5
NRF-4	6/15/93	.03	NR	<.01	2.1	.02	.5
	9/15/93	.02	NR	<.01	2.2	.03	1.4
	11/4/93	.02	NR	<.01	2.2	.02	.6
NRF-6	9/18/92	.01	NR	<.01	1.7	.08	.9
	12/9/92	<.01	NR	.01	1.8	.07	.6
	4/9/93	<.01	NR	<.01	1.9	.08	1.2
	9/14/93	.01	NR	<.01	1.8	.07	BB
	11/4/93	.02	NR	<.01	1.9	.07	.6
NRF-7	9/18/92	.02	NR	<.01	1.8	.02	.8
	12/9/92	<.01	NR	.03	.54	.02	.1
	4/9/93	<.01	NR	<.01	.47	.01	.5
	6/10/93	.02	NR	<.01	.48	.03	.2
	9/14/93	.02	NR	<.01	.53	.02	.1
	11/3/93	.03	NR	<.01	.53	.02	.1
USGS 12	6/10/91	NR	<.2	.01	1.8	.01	.3
	9/6/91	NR	.2	<.01	1.8	<.01	.4
QAS-17	9/6/91	NR	.3	<.01	1.7	<.01	.4
USGS 12	12/5/91	.01	NR	<.01	1.8	.02	.5
	3/12/92	.06	NR	<.01	1.9	.02	.4
	6/19/92	.01	NR	<.01	2.0	.04	.3
	9/18/92	.01	NR	<.01	.46	.01	.6
	12/1/92	<.01	NR	.02	2.0	.02	.4
	4/13/93	<.01	NR	<.01	2.0	.02	.4
	6/14/93	.02	NR	<.01	2.1	.03	.6
	9/16/93	.02	NR	<.01	2.0	.03	1.7

Table 7.—***Concentrations of dissolved nutrients and total organic carbon in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Ammonia (as nitrogen)	Ammonia plus organic nitrogen (as nitrogen)	Nitrite (as nitrogen)	Nitrite plus nitrate (as nitrogen)	Ortho-phosphate (as phosphorus)	Total organic carbon
USGS 12	11/5/93	.02	NR	<.01	2.0	.03	.4
QAS-33	11/5/93	.02	NR	<.01	2.0	.02	.6
USGS 15	6/10/91	NR	<.02	<.01	.85	<.01	.2
	9/6/91	NR	<.02	<.01	1.3	<.01	.3
	12/4/91	.01	NR	<.01	.48	.02	.3
	3/12/92	<.01	NR	<.01	.30	.01	<.1
QAS-22	3/12/92	.04	NR	<.01	.34	.02	.2
USGS 15	6/19/92	.02	NR	<.01	.98	.04	3.8
	9/17/92	<.01	NR	<.01	.95	.02	.4
	12/1/92	<.01	NR	.03	.45	.02	.4
	4/13/93	<.01	NR	<.01	.32	.01	.4
	6/14/93	.02	NR	<.01	.54	.02	.3
	9/16/93	.03	NR	<.01	1.0	.03	.2
	11/5/93	.04	NR	<.01	.55	.02	.4
USGS 17	3/13/91	NR	<.2	.02	.34	.01	.1
QAS-14	3/13/91	NR	<.2	.02	.31	.01	.4
USGS 17	6/6/91	NR	<.2	<.01	.32	<.01	.1
	9/5/91	NR	<.2	<.01	.31	.03	.1
	12/3/91	.01	NR	<.01	.33	.01	.4
	3/16/92	<.01	NR	<.01	.30	.01	<.1
	6/11/92	<.01	NR	<.01	.33	.01	.1
	9/16/92	.01	NR	<.01	.34	.01	1.0
	12/3/92	<.01	NR	<.01	.36	<.01	.2
	4/7/93	.04	NR	<.01	.31	.02	.4
	6/11/93	.02	NR	<.01	.35	.03	.1
QAS-29	6/11/93	.02	NR	<.01	.34	.02	.5
USGS 17	9/15/93	.02	NR	<.01	.36	.01	.2

Table 7.—***Concentrations of dissolved nutrients and total organic carbon in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Ammonia (as nitrogen)	Ammonia plus organic nitrogen (as nitrogen)	Nitrite (as nitrogen)	Nitrite plus nitrate (as nitrogen)	Ortho-phosphate (as phosphorus)	Total organic carbon
USGS 17	11/8/93	<.01	NR	<.01	.4	.02	.1
USGS 97	3/13/91	NR	<.2	.02	1.9	.02	.3
	6/7/91	NR	.2	<.01	1.9	.02	.3
QAS-15	6/7/91	NR	.2	<.01	2.0	.01	.4
USGS 97	9/5/91	NR	.3	<.01	2.0	<.01	.6
	12/3/91	<.01	NR	<.01	1.9	.02	.6
	3/16/92	<.01	NR	<.01	1.9	.02	.3
	6/17/92	.02	NR	<.01	2.0	.02	.8
	9/21/92	.01	NR	<.01	1.9	.03	.6
	12/8/92	<.01	NR	.01	2.1	.03	.4
	4/6/93	<.01	NR	<.01	2.0	.02	.5
	6/9/93	.02	NR	<.01	1.9	.02	.4
	9/13/93	.02	NR	<.01	2.1	.02	.5
	11/4/93	.01	NR	<.01	2.0	.03	.4
QAS-32	11/4/93	.02	NR	<.01	2.0	.04	.5
USGS 98	3/13/91	NR	<.2	<.01	1.1	.02	.1
	6/7/91	NR	<.2	<.01	1.1	<.01	.2
	9/5/91	NR	.4	<.01	1.1	<.01	.2
	12/3/91	.01	NR	<.01	1.1	.02	.4
	3/16/92	<.01	NR	<.01	1.0	.01	<.1
	6/16/92	.02	NR	<.01	1.1	.02	.2
	9/21/92	<.01	NR	<.01	1.0	.01	.5
QAS-25	9/21/92	.02	NR	<.01	1.0	.02	.5
USGS 98	12/8/92	<.01	NR	.02	1.1	.02	.3
	4/6/93	.04	NR	<.01	1.1	.02	1.0
	6/8/93	.01	NR	<.01	1.0	.02	.2
USGS 99	3/13/91	NR	<.2	.02	1.6	.02	.3

Table 7.—***Concentrations of dissolved nutrients and total organic carbon in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Ammonia (as nitrogen)	Ammonia plus organic nitrogen (as nitrogen)	Nitrite (as nitrogen)	Nitrite plus nitrate (as nitrogen)	Ortho-phosphate (as phosphorus)	Total organic carbon
USGS 99	6/7/91	NR	<.2	<.01	1.6	<.01	.3
	9/5/91	NR	.3	<.01	1.5	<.01	.7
	12/3/91	.01	NR	<.01	1.5	.02	.4
	3/16/92	<.01	NR	<.01	1.5	.02	.1
	6/16/92	.02	NR	<.01	1.5	.02	.3
QAS-24	6/16/92	.01	NR	<.01	1.5	.02	.4
USGS 99	9/21/92	<.01	NR	<.01	1.5	.02	.7
	12/8/92	<.01	NR	.01	1.6	.02	.6
	4/6/93	<.01	NR	<.01	1.5	.02	1.7
	6/9/93	.01	NR	<.01	1.5	.02	.3
	9/13/93	.02	NR	<.01	1.6	.01	.5
	11/2/93	.03	NR	<.01	1.6	.02	.4
USGS 102	6/7/91	NR	.2	<.01	1.8	.01	.4
	9/5/91	NR	<.2	<.01	1.8	<.01	.2
	12/3/91	<.01	NR	<.01	1.8	.02	.5
	3/16/92	<.01	NR	<.01	1.7	.02	.2
	6/16/92	.02	NR	<.01	1.8	.03	.4
	9/21/92	.02	NR	<.01	1.8	.02	.8
	12/9/92	<.01	NR	.02	1.9	.02	.4
QAS-27	12/9/92	<.01	NR	.02	1.9	.02	.4
USGS 102	4/6/93	<.01	NR	<.01	1.8	.02	.8
	6/9/93	.01	NR	<.01	1.8	.02	.4
	9/13/93	.02	NR	<.01	2.0	.02	.5
	11/4/93	.01	NR	<.01	2.0	.03	.4
Water Supply INEL-1	3/13/91	NR	.4	.02	5.2	.01	.7
	6/5/91	NR	.5	<.01	5.2	<.01	.5
	9/5/91	NR	.4	<.01	5.1	<.01	.9

Table 7.—***Concentrations of dissolved nutrients and total organic carbon in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Ammonia (as nitrogen)	Ammonia plus organic nitrogen (as nitrogen)	Nitrite (as nitrogen)	Nitrite plus nitrate (as nitrogen)	Ortho-phosphate (as phosphorus)	Total organic carbon
Water Supply INEL-1	12/3/91	.02	NR	<.01	5.1	.01	.9
QAS-19	12/3/91	.02	NR	<.01	5.4	.01	.7
Water Supply INEL-1	3/16/92	<.01	NR	<.01	4.5	.01	.5
	6/16/92	.02	NR	<.01	5.0	.01	.8
	9/21/92	<.01	NR	<.01	5.0	.01	1.2
	12/8/92	<.01	NR	.01	5.0	.02	.7
	4/6/93	<.01	NR	<.01	4.5	.02	.8
	6/8/93	.01	NR	<.01	4.6	.01	.6
	9/13/93	.02	NR	<.01	4.6	<.01	.8
	11/2/93	.04	NR	<.01	4.6	.01	.8

Table 8.—*Statistical parameters for dissolved nutrients, total organic carbon, total phenols, and turbidity, by well*

[See figure 2 for location of wells. Units are milligrams per liter. Symbol: < indicates concentration is less than the specified laboratory reporting level. Values are derived from tables 7, 12, 13, 18, and 19. Quality-assurance replicates are included in the calculation of statistical parameters. Mean and median sample size: includes all samples with concentrations greater than laboratory reporting level]

Constituent or physical characteristic	Statistical parameter					
	Minimum	Maximum	Median	Mean	Sample size	Mean and median sample size
				NRF-1		
Ammonia (as nitrogen)	<0.01	0.08	0.02	0.03	9	5
Ammonia plus organic nitrogen (as nitrogen)	.2	.6	.3	.4	4	4
Nitrite plus nitrate (as nitrogen)	1.6	1.9	1.8	1.8	13	13
Orthophosphate (as phosphorus)	<.01	.04	.02	.02	13	11
Organic carbon	.3	1.0	.5	.6	13	13
				NRF-2		
Ammonia (as nitrogen)	<.01	.08	.02	.03	10	6
Ammonia plus organic nitrogen (as nitrogen)	<.2	.4	.35	.4	4	2
Nitrite plus nitrate (as nitrogen)	1.8	2.0	2.0	2.0	14	14
Orthophosphate (as phosphorus)	<.01	.03	.02	.02	14	13
Organic carbon	.3	1.8	.4	.6	14	14
				NRF-3		
Ammonia (as nitrogen)	<.01	.07	.02	.03	10	6
Ammonia plus organic nitrogen (as nitrogen)	<.2	.4	.3	.3	3	2
Nitrite plus nitrate (as nitrogen)	1.7	1.9	1.8	1.8	13	13
Orthophosphate (as phosphorus)	.02	.03	.02	.02	13	13
Organic carbon	.5	1.9	.7	1.0	13	13
				NRF-4		
Ammonia (as nitrogen)	<.01	.07	.02	.03	10	6

Table 8.—*Statistical parameters for dissolved nutrients, total organic carbon, total phenols, and turbidity, by well—Continued*

Constituent or physical characteristic	Statistical parameter					
	Minimum	Maximum	Median	Mean	Sample size	Mean and median sample size
				NRF-4 - cont.		
Ammonia plus organic nitrogen (as nitrogen)	.2	.4	.3	.3	3	3
Nitrite plus nitrate (as nitrogen)	1.9	2.2	2.0	2.0	13	13
Orthophosphate (as phosphorus)	<.01	.03	.02	.02	13	12
Organic carbon	.3	1.4	.5	.6	13	13
				NRF-6		
Ammonia (as nitrogen)	<.01	.02	.02	.02	11	7
Nitrite plus nitrate (as nitrogen)	1.6	1.9	1.7	1.7	11	11
Orthophosphate (as phosphorus)	.02	.08	.07	.07	12	12
Organic carbon	.5	1.2	.6	.8	11	11
Phenols	1	5	2	2	7	7
Turbidity	.3	.7	.5	.5	7	7
				NRF-7		
Ammonia (as nitrogen)	<.01	.05	.02	.02	12	7
Nitrite plus nitrate (as nitrogen)	.38	1.8	.465	.57	12	12
Orthophosphate (as phosphorus)	<.01	.03	.02	.02	12	9
Organic carbon	.1	.9	.4	.4	13	13
Phenols	<1	2	1	1	7	5
Turbidity	1.7	7.3	3.6	3.6	7	7
				USGS 12		
Ammonia (as nitrogen)	<.01	.06	.02	.02	10	8
Ammonia plus organic nitrogen (as nitrogen)	<.2	.3	.25	.2	3	2
Nitrite (as nitrogen)	<.01	.02	.015	.02	13	2
Nitrite plus nitrate (as nitrogen)	.46	2.1	2.0	1.8	13	13

Table 8.—***Statistical parameters for dissolved nutrients, total organic carbon, total phenols, and turbidity, by well***—*Continued*

Constituent or physical characteristic	Statistical parameter					
	Minimum	Maximum	Median	Mean	Sample size	Mean and median sample size
			USGS 12 - cont.			
Orthophosphate (as phosphorus)	<.01	.04	.02	.02	13	11
Organic carbon	.3	1.7	.4	.5	13	13
			USGS 15			
Ammonia (as nitrogen)	<.01	.04	.025	.03	10	6
Nitrite plus nitrate (as nitrogen)	.30	1.3	.545	.67	12	12
Orthophosphate (as phosphorus)	<.01	.04	.02	.02	12	10
Organic carbon	<.1	3.8	.3	.6	12	11
			USGS 17			
Ammonia (as nitrogen)	<.01	.04	.02	.02	10	6
Nitrite (as nitrogen)	<.01	.02	.02	.02	14	2
Nitrite plus nitrate (as nitrogen)	.30	.4	.335	.34	14	14
Orthophosphate (as phosphorus)	<.01	.03	.01	.02	14	12
Organic carbon	<.01	1.0	.2	.3	14	13
			USGS 97			
Ammonia (as nitrogen)	<.01	.02	.02	.02	10	6
Ammonia plus organic nitrogen (as nitrogen)	<.2	.3	.2	.2	4	3
Nitrite (as nitrogen)	<.01	.02	.015	.02	14	2
Nitrite plus nitrate (as nitrogen)	1.9	2.1	2.0	2.0	14	14
Orthophosphate (as phosphorus)	<.01	.04	.02	.02	14	13
Organic carbon	.3	.8	.45	.5	14	14
			USGS 98			
Ammonia (as nitrogen)	<.01	.04	.02	.02	8	5
Nitrite plus nitrate (as nitrogen)	1.0	1.1	1.1	1.1	11	11

Table 8.—*Statistical parameters for dissolved nutrients, total organic carbon, total phenols, and turbidity, by well—Continued*

Constituent or physical characteristic	Statistical parameter					
	Minimum	Maximum	Median	Mean	Sample size	Mean and median sample size
			USGS 98 - cont.			
Orthophosphate (as phosphorus)	<.01	.02	.02	.02	11	9
Organic carbon	<.1	1	.25	.4	11	10
			USGS 99			
Ammonia (as nitrogen)	<.01	.03	.015	.02	10	6
Nitrite (as nitrogen)	<.01	.02	.015	.02	13	2
Nitrite plus nitrate (as nitrogen)	1.5	1.6	1.5	1.5	13	13
Orthophosphate (as phosphorus)	<.01	.02	.02	.02	13	11
Organic carbon	.1	1.7	.4	.5	13	13
			USGS 102			
Ammonia (as nitrogen)	<.01	.02	.02	.02	10	5
Nitrite (as nitrogen)	<.01	.02	.02	.02	12	2
Nitrite plus nitrate (as nitrogen)	1.7	2	1.8	1.8	12	12
Orthophosphate (as phosphorus)	<.01	.03	.02	.02	12	11
Organic carbon	.2	.8	.4	.4	12	12
			Water Supply INEL-1			
Ammonia (as nitrogen)	<.01	.04	.02	.02	10	6
Ammonia plus organic nitrogen (as nitrogen)	.4	.5	.4	.4	3	3
Nitrite (as nitrogen)	<.01	.02	.015	.02	13	2
Nitrite plus nitrate (as nitrogen)	4.5	5.4	5.0	4.9	13	13
Orthophosphate (as phosphorus)	<.01	.02	.01	.01	13	10
Organic carbon	.5	1.2	.8	.8	13	13

Table 9.—***Concentrations of gross alpha-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory using a residue procedure. Raw field samples were processed in laboratory prior to analysis. Analytical results and uncertainties—for example, **2.77±0.444**—in indicated units. Analytical uncertainties are reported as 1s. Concentrations that meet or exceed the reporting level of 3 times the 1s value are shown in boldface type. Abbreviations: (m/d/y), month/day/year; µg/L, microgram per liter; pCi/L, picocurie per liter. Symbol: NR indicates analysis not requested. Sample identifier: see figure 2 for location of wells; QAS indicates quality-assurance samples, 23 and 30 are blank samples, others are replicates]

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as uranium (µg/L)	as thorium-230 (pCi/L)	as uranium (µg/L)	as thorium-230 (pCi/L)
QAS-23	6/12/92	0.231±0.164	0.157±0.111	0.019±0.166	0.010±.090
QAS-30	6/15/93	-.018±0.060	-.011±0.036	NR	NR
NRF-1	3/5/91	**2.77±0.444**	**2.50±0.422**	.132±0.145	.073±0.083
	6/17/91	**4.01±0.60**	**2.78±0.423**	-.111±0.079	-.061±0.045
	9/9/91	**3.33±0.56**	**2.33±0.392**	-.119±0.116	-.064±0.062
QAS-18	9/9/91	**3.12±0.52**	**2.19±0.368**	-.028±0.148	-.016±0.084
NRF-1	12/4/91	**3.92±0.60**	**2.80±0.428**	.029±0.256	.016±0.137
	3/11/92	**1.77±0.394**	**1.23±0.276**	.028±0.138	.015±0.076
	6/11/92	**2.45±0.474**	**1.69±0.328**	.606±0.316	.333±0.186
	9/16/92	**2.67±0.488**	**1.87±0.344**	.075±0.154	.041±0.084
	12/3/92	**6.37±1.36**	**4.73±1.01**	.636±0.346	.370±0.204
	4/7/93	**4.14±0.76**	**2.99±0.54**	.004±0.096	.002±0.053
	6/15/93	**3.83±1.15**	**2.72±0.82**	NR	NR
	9/15/93	**6.76±1.52**	**5.01±1.12**	NR	NR
	11/4/93	**5.42±1.36**	**3.91±0.98**	NR	NR
NRF-2	3/5/91	**2.81±0.442**	**2.84±0.447**	.539±0.298	.291±0.164
QAS-13	3/5/91	**3.01±0.436**	**3.02±0.440**	-.122±0.118	-.066±0.064
NRF-2	6/17/91	**3.85±0.60**	**2.66±0.424**	-.085±0.162	-.048±0.092
	9/9/91	**3.50±0.56**	**2.43±0.392**	.113±0.191	.060±0.102
	12/4/91	**3.56±0.57**	**2.48±0.400**	-.162±0.214	-.086±0.115
	3/11/92	**4.64±0.70**	**2.90±0.464**	-.083±0.158	-.044±0.084
	6/11/92	**2.28±0.450**	**1.58±0.314**	-.274±0.124	-.158±0.077

Table 9.—***Concentrations of gross alpha-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as uranium (µg/L)	as thorium-230 (pCi/L)	as uranium (µg/L)	as thorium-230 (pCi/L)
NRF-2	9/16/92	**3.69±0.58**	**2.63±0.412**	.019±0.164	.010±0.089
	12/3/92	**5.49±1.36**	**3.97±0.98**	-.046±0.191	-.024±0.101
	4/7/93	**4.53±0.82**	**2.82±0.53**	-.067±0.028	-.036±0.016
	6/15/93	**3.97±1.18**	**3.06±0.90**	NR	NR
	9/15/93	**4.56±1.30**	**3.38±0.96**	NR	NR
QAS-31	9/15/93	**5.73±1.50**	**4.42±1.16**	NR	NR
NRF-2	11/4/93	**4.68±1.40**	**3.38±1.00**	NR	NR
NRF-3	6/17/91	**4.38±0.64**	**3.04±0.436**	.083±0.126	.047±0.072
QAS-16	6/17/91	**3.66±0.60**	**2.26±0.390**	-.028±0.152	-.015±0.082
NRF-3	9/26/91	**3.21±0.56**	**1.98±0.365**	-.028±0.148	-.016±0.084
	12/4/91	**3.24±0.57**	**2.01±0.372**	.065±0.176	.036±0.097
	3/11/92	**4.00±0.63**	**2.81±0.442**	.159±0.200	.086±0.110
	6/11/92	**1.53±0.345**	**1.01±0.228**	-.092±0.178	-.053±0.103
	9/16/92	**3.02±0.52**	**2.11±0.370**	**6.58±1.84**	**5.08±1.60**
	12/3/92	**5.13±1.22**	**3.69±0.88**	-.348±0.164	-.200±0.096
QAS-26	12/3/92	**5.12±1.42**	**3.95±1.09**	.122±0.168	.066±0.092
NRF-3	4/8/93	**3.38±0.72**	**2.12±0.461**	.090±0.170	.049±0.092
	6/15/93	**6.17±1.48**	**3.95±0.96**	NR	NR
	9/15/93	**4.96±1.37**	**3.82±1.06**	NR	NR
	11/4/93	**3.47±1.04**	**2.44±0.73**	NR	NR
NRF-4	3/5/91	**2.89±0.428**	**2.87±0.432**	.074±0.152	.041±0.086
	6/17/91	**3.78±0.60**	**2.69±0.424**	.401±0.212	.218±0.120
	9/9/91	**3.77±0.58**	**2.66±0.410**	.066±0.179	.036±0.098
	12/4/91	**3.80±0.60**	**2.72±0.426**	-.067±0.236	-.036±0.128
	3/11/92	**3.40±0.56**	**2.37±0.388**	.029±0.145	.015±0.076
	6/11/92	**1.60±0.382**	**.972±0.240**	-.345±0.180	-.190±0.103
	9/16/92	**4.37±0.66**	**2.71±0.438**	.009±0.183	.005±0.096
	12/3/92	**4.40±1.14**	**3.27±0.84**	.056±0.198	.030±0.107

Table 9.—***Concentrations of gross alpha-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as uranium (µg/L)	as thorium-230 (pCi/L)	as uranium (µg/L)	as thorium-230 (pCi/L)
NRF-4	4/7/93	**3.56±0.61**	**2.49±0.431**	.120±0.136	.065±0.074
QAS-28	4/7/93	**3.03±0.62**	**2.10±0.436**	.217±0.194	.116±0.106
NRF-4	6/15/93	**4.75±1.42**	**3.04±0.92**	NR	NR
	9/15/93	**6.48±1.70**	**4.11±1.08**	NR	NR
	11/4/93	1.35±0.68	.996±0.50	NR	NR
NRF-6	9/18/92	**5.08±0.70**	**3.53±0.487**	.068±0.184	.036±0.098
	12/9/92	2.88±1.72	2.13±1.28	-.091±0.178	-.049±0.096
	4/9/93	**3.45±0.94**	**2.38±0.64**	.111±0.121	.058±0.064
	9/14/93	5.92±2.62	4.20±1.86	NR	NR
	11/4/93	3.63±2.16	2.80±1.66	NR	NR
NRF-7	9/18/92	**3.37±0.54**	**2.32±0.368**	.064±0.174	.037±0.099
	12/9/92	**2.55±0.63**	**1.84±0.452**	-.134±0.162	-.082±0.101
	4/9/93	**1.91±0.426**	**1.33±0.298**	.225±0.190	.130±0.114
	6/10/93	**2.69±0.68**	**1.99±0.50**	NR	NR
	9/14/93	1.46±0.58	.935±0.370	NR	NR
	11/3/93	**1.92±0.58**	**1.37±0.416**	NR	NR
USGS 12	6/10/91	**4.26±0.62**	**2.95±0.436**	.086±0.130	.045±0.070
	9/6/91	**3.16±0.55**	**2.23±0.389**	.034±0.099	.022±0.065
QAS-17	9/6/91	**3.03±0.54**	**2.09±0.372**	.175±0.156	.098±0.090
USGS 12	12/5/91	**4.21±0.62**	**2.89±0.434**	-.212±0.214	-.112±0.114
	3/12/92	**3.46±0.58**	**2.41±0.410**	.373±0.212	.197±0.117
	6/19/92	**3.33±0.54**	**2.30±0.376**	.028±0.140	.015±0.076
	9/18/92	**1.51±0.390**	**1.05±0.272**	.163±0.175	.097±0.106
	12/1/92	**1.84±0.57**	**1.17±0.362**	**3.75±1.06**	**3.72±1.06**
	4/13/93	**3.28±0.62**	**2.29±0.436**	-.018±0.120	-.010±0.064
	6/14/93	**4.48±1.13**	**3.24±0.82**	NR	NR
	9/16/93	**5.38±1.39**	**3.85±1.00**	NR	NR
	11/5/93	**4.50±1.24**	**3.33±0.92**	NR	NR

Table 9.—***Concentrations of gross alpha-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as uranium (µg/L)	as thorium-230 (pCi/L)	as uranium (µg/L)	as thorium-230 (pCi/L)
QAS-33	11/5/93	**5.15±1.26**	**3.59±0.88**	NR	NR
USGS 15	6/10/91	**3.72±0.58**	**2.56±0.410**	-.076±0.136	-.040±.073
	9/6/91	**2.33±0.490**	**1.45±0.315**	.028±0.251	.016±.142
	12/4/91	**2.15±0.431**	**1.47±0.294**	-.236±0.144	-.126±0.080
	3/12/92	**1.87±0.426**	**1.37±0.312**	.066±0.178	.035±0.096
QAS-22	3/12/92	**2.48±0.474**	**1.74±0.334**	-.009±0.087	-.005±0.048
USGS 15	6/19/92	**1.90±0.395**	**1.29±0.267**	29.0±14.9	22.4±11.45
	9/17/92	**1.62±0.380**	**1.12±0.263**	.342±0.238	.205±0.144
	12/1/92	**3.96±1.24**	**3.06±0.95**	.499±0.254	.274±0.148
	4/13/93	**2.04±0.461**	**1.28±0.296**	-.066±0.104	-.035±0.056
	6/14/93	**3.71±0.86**	**2.85±0.66**	NR	NR
	9/16/93	**3.54±0.96**	**2.56±0.69**	NR	NR
	11/5/93	**2.24±0.73**	**1.72±0.56**	NR	NR
USGS 17	3/13/91	**1.26±0.292**	**1.26±0.293**	.107±0.216	.056±0.114
QAS-14	3/13/91	**1.51±0.318**	**1.35±0.296**	.365±0.208	.197±0.117
USGS 17	6/6/91	**2.56±0.492**	**1.83±0.352**	.215±0.192	.117±0.106
	9/5/91	**2.21±0.454**	**1.58±0.325**	-.121±0.118	-.067±0.066
	12/3/91	**2.06±0.432**	**1.42±0.301**	.061±0.254	.037±0.153
	3/16/92	**2.07±0.434**	**1.42±0.300**	.216±0.166	.131±0.104
	6/11/92	**1.51±0.386**	**.931±0.244**	.064±0.172	.040±0.108
	9/16/92	**4.11±0.62**	**2.94±0.443**	-.292±0.154	-.157±0.088
	12/3/92	**3.14±0.74**	**2.00± 0.472**	.046±0.210	.026±0.122
	4/7/93	**2.02±0.420**	**1.39±0.289**	-.029±0.154	-.015±0.081
	6/11/93	**1.91±0.58**	**1.38±0.414**	NR	NR
QAS-29	6/11/93	**2.81±0.72**	**2.08±0.53**	NR	NR
USGS 17	9/15/93	**2.04±0.68**	**1.45±0.480**	NR	NR
	11/8/93	**2.31±0.68**	**1.66±0.488**	NR	NR
USGS 97	3/13/91	**3.18±0.453**	**3.21±0.461**	.280±0.284	.150±0.153

Table 9.—***Concentrations of gross alpha-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as uranium (µg/L)	as thorium-230 (pCi/L)	as uranium (µg/L)	as thorium-230 (pCi/L)
USGS 97	6/7/91	**4.96±0.68**	**3.47±0.482**	.185±0.165	.097±0.087
QAS-15	6/7/91	**4.50±0.64**	**3.13±0.453**	.039±0.114	.020±0.060
USGS 97	9/5/91	**3.78±0.58**	**2.60±0.396**	.018±0.159	.011±0.094
	12/3/91	**3.67±0.58**	**2.55±0.403**	-.305±0.180	-.162±0.100
	3/16/92	**2.74±0.484**	**1.87±0.330**	.009±0.183	.005±0.096
	6/17/92	**2.15±0.469**	**1.34±0.302**	-.028±0.152	-.015±0.083
	9/21/92	**3.23±0.54**	**2.26±0.383**	.212±0.190	.112±0.102
	12/8/92	**2.58±0.78**	**1.86±0.56**	.122±0.168	.068±0.094
	4/6/93	**3.20±0.74**	**2.33±0.54**	-.030±0.100	-.016±0.054
	6/9/93	**5.93±1.41**	**4.19±1.00**	NR	NR
	9/13/93	**5.93±1.30**	**4.17±0.92**	NR	NR
	11/4/93	2.29±0.88	1.70±0.66	NR	NR
QAS-32	11/4/93	**5.31±1.34**	**3.79±0.96**	NR	NR
USGS 98	3/13/91	**1.98±0.360**	**1.76±0.336**	.179±0.160	.096±0.088
	6/7/91	**2.97±0.54**	**1.83±0.350**	.131±0.144	.071±0.078
	9/5/91	**1.93±0.448**	**1.20±0.286**	-.009±0.085	-.005±0.051
	12/3/91	**2.03±0.427**	**1.40±0.294**	.205±0.184	.126±0.116
	3/16/92	**3.04±0.54**	**2.12±0.377**	.127±0.175	.066±0.092
	6/16/92	**2.45±0.488**	**1.70±0.342**	-.046±0.192	-.026±0.106
	9/21/92	**1.49±0.356**	**1.02±0.242**	.107±0.216	.056±0.114
QAS-25	9/21/92	**2.97±0.52**	**2.13±0.377**	.255±0.224	.136±0.122
USGS 98	12/8/92	**3.27±0.84**	**2.43±0.62**	.121±0.168	.066±0.092
	4/6/93	**2.12±0.450**	**1.52±0.324**	-.028±0.150	-.015±0.082
	6/8/93	**3.44±0.96**	**2.20±0.62**	NR	NR
USGS 99	3/13/91	**2.22±0.394**	**2.29±0.407**	.169±0.150	.106±0.096
	6/7/91	**3.58±0.60**	**2.21±0.392**	.084±0.128	.045±0.070
	9/5/91	**2.85±0.50**	**1.96±0.350**	.222±0.199	.119±0.107
	12/3/91	**3.23±0.55**	**2.25±0.382**	-.065±0.102	-.036±0.057

Table 9.—***Concentrations of gross alpha-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as uranium (µg/L)	as thorium-230 (pCi/L)	as uranium (µg/L)	as thorium-230 (pCi/L)
USGS 99	3/16/92	**2.87±0.50**	**1.99±0.349**	-.028±0.152	-.015±0.081
	6/16/92	**1.82±0.403**	**1.27±0.280**	-.185±0.155	-.103±0.088
QAS-24	6/16/92	**1.76±0.419**	**1.28±0.304**	.418±0.284	.232±0.164
USGS 99	9/21/92	**2.43±0.478**	**1.69±0.334**	-.105±0.206	-.055±0.110
	12/8/92	**5.08±1.22**	**3.24±0.78**	-.230±0.140	-.122±0.076
	4/6/93	**3.07±0.56**	**2.15±0.398**	.029±0.145	.015±0.076
	6/9/93	**2.91±0.94**	**2.08±0.68**	NR	NR
	9/13/93	**3.80±1.10**	**2.43±0.71**	NR	NR
	11/2/93	**4.47±1.20**	**2.85±0.77**	NR	NR
USGS 102	6/7/91	**5.73±0.74**	**4.11±0.54**	-.019±0.123	-.010±0.067
	9/5/91	**3.16±0.56**	**2.20±0.392**	.164±0.176	.096±0.104
	12/3/91	**4.48±0.64**	**3.10±0.436**	-.092±0.180	-.052±0.102
	3/16/92	**3.87±0.58**	**2.66±0.400**	-.066±0.104	-.035±0.056
	6/16/92	**1.98±0.444**	**1.38±0.310**	.163±0.205	.089±0.112
	9/21/92	**3.64±0.62**	**2.27±0.402**	-.029±0.153	-.015±0.082
	12/9/92	**3.04±1.00**	**2.15±0.71**	.215±0.192	.117±0.106
QAS-27	12/9/92	**4.92±1.24**	**3.48±0.88**	.104±0.210	.055±0.112
USGS 102	4/6/93	**3.89±0.70**	**2.71±0.490**	-.042±0.072	-.023±0.039
	6/9/93	**3.55±1.06**	**2.53±0.76**	NR	NR
	9/13/93	**5.42±1.40**	**3.89±1.00**	NR	NR
	11/4/93	**3.13±0.98**	**2.26±0.71**	NR	NR
Water Supply INEL-1	3/13/91	**2.39±0.404**	**2.40±0.407**	.227±0.174	.123±0.098
	6/5/91	**2.64±0.51**	**1.82±0.353**	-.120±0.116	-.063±0.062
	9/5/91	**2.19±0.468**	**1.54±0.330**	.226±0.245	.134±0.148
	12/3/91	**2.72±0.52**	**1.69±0.338**	.388±0.247	.217±0.144
QAS-19	12/3/91	**3.33±0.55**	**2.29±0.385**	-.118±0.230	-.065±0.126

Table 9.—***Concentrations of gross alpha-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as uranium (µg/L)	as thorium-230 (pCi/L)	as uranium (µg/L)	as thorium-230 (pCi/L)
Water Supply INEL-1	3/16/92	**2.87±0.54**	**1.80±0.356**	.419±0.222	.223±0.124
	6/16/92	**2.52±0.473**	**1.74±0.330**	-.108±0.210	-.075±0.147
	9/21/92	**2.75±0.51**	**1.92±0.356**	.131±0.251	.071±0.138
	12/8/92	3.32±1.24	2.56±0.96	-.140±0.170	-.076±0.094
	4/6/93	**2.15±0.56**	**1.48±0.388**	.433±0.274	.238±0.156
	6/8/93	1.64±0.82	1.26±0.63	NR	NR
	9/13/93	2.54±1.04	1.96±0.80	NR	NR
	11/2/93	3.40±1.21	2.60±0.925	NR	NR

Table 10.—***Concentrations of gross beta-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory using a residue procedure. Raw field samples were processed in laboratory prior to analysis. Analytical results and uncertainties—for example, **2.45±0.414**—in picocuries per liter. Analytical uncertainties are reported as 1s. Concentrations that meet or exceed the reporting level of 3 times the 1s value are shown in boldface type. Abbreviations: (m/d/y), month/day/year; Sr-90/Y-90, strontium-90 in equilibrium with yttrium-90. Symbol: NR indicates analysis not requested. Sample identifier: see figure 2 for location of wells; QAS indicates quality-assurance sample, 23 and 30 are blank samples, others are replicates]

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as Sr-90/Y-90	as cesium-137	as Sr-90/Y-90	as cesium-137
QAS-23	6/12/92	0.188±0.164	0.196±0.172	0.181±0.238	0.186±0.246
QAS-30	6/15/93	-.070±0.150	-.072±0.153	NR	NR
NRF-1	3/5/91	**2.45±0.414**	**3.28±0.56**	.480±0.278	.567±0.328
	6/17/91	**2.45±0.403**	**3.23±0.53**	.219±0.216	.229±0.226
	9/9/91	**2.45±0.59**	**3.33±0.69**	.415±0.272	.439±0.289
QAS-18	9/9/91	**2.76±0.52**	**3.59±0.68**	.174±0.258	.184±0.273
NRF-1	12/4/91	**3.02±0.50**	**4.03±0.67**	.312±0.251	.330±0.266
	3/11/92	**2.54±0.424**	**3.38±0.56**	.588±0.258	.623±0.273
	6/11/92	**1.67±0.326**	**2.21±0.432**	.279±0.244	.292±0.254
	9/16/92	**2.19±0.378**	**2.89±0.50**	.139±0.252	.143±0.258
	12/3/92	**2.33±0.389**	**3.13±0.52**	.720±0.274	.764±0.291
	4/7/93	**2.39±0.430**	**3.20±0.58**	.453±0.232	.480±0.246
	6/15/93	**2.54±0.407**	**3.37±0.54**	NR	NR
	9/15/93	**2.51±0.411**	**3.33±0.54**	NR	NR
	11/4/93	**3.14±0.58**	**3.95±0.72**	NR	NR
NRF-2	3/5/91	**2.92±0.488**	**3.86±0.64**	.582±0.236	.731±0.296
QAS-13	3/5/91	**2.88±0.481**	**3.83±0.64**	.447±0.249	.467±0.260
NRF-2	6/17/91	**2.24±0.407**	**3.01±0.54**	.138±0.215	.147±0.228
	9/9/91	**2.70±0.490**	**3.76±0.73**	.262±0.240	.270±0.248
	12/4/91	**3.79±0.58**	**5.05±0.77**	.116±0.230	.120±0.238
	3/11/92	**2.99±0.466**	**4.00±0.62**	.190±0.228	.197±0.236
	6/11/92	**2.71±0.463**	**3.57±0.61**	.086±0.232	.088±0.238

Table 10.—***Concentrations of gross beta-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as Sr-90/Y-90	as cesium-137	as Sr-90/Y-90	as cesium-137
NRF-2	9/16/92	**2.60±0.410**	**3.48±0.55**	.119±0.227	.126±0.240
	12/3/92	**3.09±0.436**	**4.09±0.58**	.291±0.265	.300±0.272
	4/7/93	**2.91±0.470**	**3.89±0.63**	.400±0.210	.413±0.218
	6/15/93	**2.80±0.439**	**3.76±0.59**	NR	NR
	9/15/93	**3.64±0.488**	**4.89±0.65**	NR	NR
QAS-31	9/15/93	**3.61±0.50**	**4.83±0.67**	NR	NR
NRF-2	11/4/93	**2.83±0.74**	**3.70±0.94**	NR	NR
NRF-3	6/17/91	**2.02±0.378**	**2.68±0.50**	.078±0.232	.080±0.240
QAS-16	6/17/91	**2.20±0.402**	**2.94±0.54**	.427±0.236	.453±0.250
NRF-3	9/26/91	**3.09±0.482**	**4.12±0.64**	.212±0.250	.218±0.258
	12/4/91	**3.51±0.54**	**4.70±0.72**	.113±0.242	.117±0.250
	3/11/92	**2.76±0.412**	**3.66±0.54**	.453±0.225	.474±0.235
	6/11/92	**2.31±0.424**	**3.10±0.56**	.212±0.236	.225±0.250
	9/16/92	**2.12±0.354**	**2.83±0.474**	**4.52±0.52**	**4.91±0.56**
	12/3/92	**2.38±0.387**	**3.14±0.51**	.200±0.258	.209±0.270
QAS-26	12/3/92	**2.03±0.370**	**2.74±0.497**	.468±0.284	.483±0.294
NRF-3	4/8/93	**2.48±0.431**	**3.32±0.58**	.100±0.229	.103±0.236
	6/15/93	**2.93±0.442**	**3.93±0.60**	NR	NR
	9/15/93	**3.28±0.458**	**4.41±0.62**	NR	NR
	11/4/93	**3.04±0.453**	**4.04±0.60**	NR	NR
NRF-4	3/5/91	**3.47±0.52**	**4.54±0.68**	.111±0.222	.141±0.281
	6/17/91	**2.40±0.411**	**3.21±0.55**	.295±0.254	.303±0.261
	9/9/91	**3.22±0.53**	**4.44±0.82**	.098±0.245	.103±0.256
	12/4/91	**3.17±0.54**	**4.23±0.72**	.355±0.240	.371±0.252
	3/11/92	**3.08±0.69**	**4.23±0.76**	.267±0.236	.283±0.250
	6/11/92	**2.42±0.402**	**3.26±0.54**	-.484±0.224	-.500±0.231
	9/16/92	**3.74±0.479**	**5.03±0.64**	.061±0.230	.063±0.238
	12/3/92	**2.56±0.403**	**3.44±0.54**	.434±0.243	.460±0.258

Table 10.—*Concentrations of gross beta-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity—Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as Sr-90/Y-90	as cesium-137	as Sr-90/Y-90	as cesium-137
NRF-4	4/7/93	**2.70±0.425**	**3.56±0.56**	.250±0.230	.262±0.240
QAS-28	4/7/93	**3.76±0.51**	**5.00±0.68**	.308±0.222	.327±0.234
NRF-4	6/15/93	**2.78±0.450**	**3.73±0.60**	NR	NR
	9/15/93	**3.10±0.444**	**4.11±0.59**	NR	NR
	11/4/93	**3.50±0.50**	**4.69±0.67**	NR	NR
NRF-6	9/18/92	**5.00±0.80**	**6.61±1.06**	.388±0.224	.411±0.237
	12/9/92	**5.43±0.84**	**7.28±1.12**	-.042±0.248	-.043±0.256
	4/9/93	**5.53±0.92**	**7.34±1.22**	.177±0.220	.182±0.226
	9/14/93	**6.83±0.96**	**9.01±1.28**	NR	NR
	11/4/93	**6.41±1.19**	**8.69±1.73**	NR	NR
NRF-7	9/18/92	**2.29±0.376**	**3.07±0.50**	.290±0.202	.304±0.212
	12/9/92	**2.62±0.356**	**3.42±0.55**	.595±0.254	.631±0.270
	4/9/93	**3.16±0.52**	**4.13±0.61**	.666±0.268	.688±0.277
	6/10/93	**2.71±0.458**	**3.49±0.55**	NR	NR
	9/14/93	**3.29±0.398**	**4.32±0.64**	NR	NR
	11/3/93	**3.29±0.396**	**4.33±0.64**	NR	NR
USGS 12	6/10/91	**1.79±0.378**	**2.36±0.498**	.744±0.262	.765±0.270
	9/6/91	**2.31±0.460**	**2.95±0.59**	.672±0.263	.693±0.271
QAS-17	9/6/91	**1.67±0.400**	**2.27±0.57**	.418±0.245	.430±0.252
USGS 12	12/5/91	**2.70±0.467**	**3.54±0.62**	-.215±0.222	-.221±0.228
	3/12/92	**2.91±0.456**	**3.81±0.60**	-.016±0.240	-.016±0.246
	6/19/92	**2.28±0.384**	**3.06±0.52**	-.013±0.238	-.013±0.244
	9/18/92	**3.06±0.380**	**4.07±0.59**	.723±0.245	.747±0.253
	12/1/92	**1.55±0.292**	**2.10±0.424**	**2.92±0.413**	**3.15±0.446**
	4/13/93	**2.09±0.403**	**2.80±0.54**	.235±0.228	.245±0.238
	6/14/93	**2.81±0.462**	**3.74±0.62**	NR	NR
	9/16/93	**2.85±0.433**	**3.73±0.56**	NR	NR
	11/5/93	**3.05±0.80**	**3.79±1.02**	NR	NR

Table 10.—***Concentrations of gross beta-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as Sr-90/Y-90	as cesium-137	as Sr-90/Y-90	as cesium-137
QAS-33	11/5/93	**2.98±0.431**	**3.99±0.58**	NR	NR
USGS 15	6/10/91	**1.83±0.318**	**2.53±0.474**	.298±0.232	.311±0.243
	9/6/91	**1.81±0.386**	**2.48±0.56**	.003±0.222	.003±0.229
	12/4/91	**1.69±0.304**	**2.29±0.445**	.048±0.247	.051±0.262
	3/12/92	**1.48±0.296**	**1.98±0.422**	.251±0.234	.266±0.248
QAS-22	3/12/92	**1.40±0.286**	**1.89±0.410**	.303±0.237	.313±0.244
USGS 15	6/19/92	**1.90±0.331**	**2.48±0.430**	**32.2±4.27**	**35.4±4.70**
	9/17/92	**2.14±0.345**	**2.83±0.50**	.520±0.258	.544±0.270
	12/1/92	**2.69±0.414**	**3.62±0.56**	-.187±0.239	-.193±0.247
	4/13/93	**1.16±0.274**	**1.57±0.388**	.262±0.240	.270±0.248
	6/14/93	**1.79±0.312**	**2.44±0.461**	NR	NR
	9/16/93	**1.55±0.296**	**2.11±0.432**	NR	NR
	11/5/93	**2.17±0.372**	**2.90±0.56**	NR	NR
USGS 17	3/13/91	**2.12±0.336**	**2.86±0.51**	.520±0.242	.646±0.300
QAS-14	3/13/91	**2.26±0.337**	**3.02±0.50**	.531±0.250	.672±0.316
USGS 17	6/6/91	**2.39±0.458**	**3.20±0.53**	.236±0.234	.243±0.242
	9/5/91	**2.54±0.360**	**3.42±0.54**	.377±0.238	.394±0.249
	12/3/91	**2.29±0.341**	**3.05±0.51**	.343±0.246	.354±0.254
	3/16/92	**1.99±0.320**	**2.67±0.471**	.592±0.275	.627±0.292
	6/11/92	**2.16±0.417**	**2.85±0.496**	.631±0.265	.669±0.281
	9/16/92	**2.48±0.393**	**3.30±0.52**	.699±0.249	.740±0.264
	12/3/92	**2.18±0.421**	**2.88±0.50**	.412±0.248	.431±0.260
	4/7/93	**2.73±0.370**	**3.66±0.58**	.439±0.252	.453±0.261
	6/11/93	**2.02±0.336**	**2.70±0.50**	NR	NR
QAS-29	6/11/93	**2.32±0.444**	**3.08±0.52**	NR	NR
USGS 17	9/15/93	**2.74±0.480**	**3.61±0.56**	NR	NR
	11/8/93	**2.51±0.466**	**3.33±0.54**	NR	NR
USGS 97	3/13/91	**2.59±0.420**	**3.48±0.56**	.239±0.264	.282±0.312

Table 10.—***Concentrations of gross beta-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as Sr-90/Y-90	as cesium-137	as Sr-90/Y-90	as cesium-137
USGS 97	6/7/91	**3.20±0.488**	**4.25±0.65**	.360±0.223	.381±0.236
QAS-15	6/7/91	**2.36±0.466**	**3.09±0.61**	.409±0.240	.427±0.252
USGS 97	9/5/91	**2.75±0.496**	**3.75±0.73**	.419±0.255	.438±0.266
	12/3/91	**2.50±0.475**	**3.29±0.62**	.269±0.248	.277±0.256
	3/16/92	**2.18±0.371**	**2.88±0.490**	.380±0.246	.398±0.258
	6/17/92	**3.04±0.446**	**4.03±0.60**	-.242±0.240	-.250±0.248
	9/21/92	**3.07±0.430**	**4.06±0.57**	.513±0.230	.529±0.237
	12/8/92	**2.13±0.368**	**2.82±0.486**	.314±0.244	.323±0.250
	4/6/93	**2.20±0.420**	**2.88±0.55**	-.029±0.240	-.031±0.254
	6/9/93	**2.08±0.406**	**2.73±0.54**	NR	NR
	9/13/93	**2.96±0.468**	**3.93±0.62**	NR	NR
	11/4/93	**3.14±0.437**	**4.15±0.58**	NR	NR
QAS-32	11/4/93	**2.66±0.440**	**3.53±0.58**	NR	NR
USGS 98	3/13/91	**2.98±0.409**	**3.90±0.54**	.495±0.278	.524±0.294
	6/7/91	**2.22±0.358**	**2.95±0.475**	.312±0.219	.330±0.232
	9/5/91	**1.83±0.444**	**2.49±0.52**	.368±0.253	.378±0.260
	12/3/91	**2.32±0.357**	**3.21±0.56**	.241±0.260	.256±0.276
	3/16/92	**1.96±0.447**	**2.69±0.50**	.174±0.261	.179±0.268
	6/16/92	**2.31±0.340**	**3.17±0.52**	-.274±0.238	-.283±0.246
	9/21/92	**2.74±0.56**	**3.76±0.59**	.463±0.247	.490±0.262
QAS-25	9/21/92	**2.72±0.397**	**3.63±0.53**	.607±0.227	.635±0.238
USGS 98	12/8/92	**2.76±0.378**	**3.81±0.59**	.504±0.256	.518±0.264
	4/6/93	**2.19±0.491**	**3.01±0.53**	.517±0.236	.548±0.251
	6/8/93	**2.13±0.356**	**2.78±0.464**	NR	NR
USGS 99	3/13/91	**1.71±0.360**	**2.26±0.476**	.407±0.224	.511±0.282
	6/7/91	**2.34±0.416**	**3.14±0.56**	.488±0.246	.510±0.257
	9/5/91	**2.31±0.432**	**3.20±0.64**	.087±0.224	.092±0.238
	12/3/91	**2.08±0.412**	**2.76±0.54**	.514±0.252	.537±0.263

Table 10.—***Concentrations of gross beta-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as Sr-90/Y-90	as cesium-137	as Sr-90/Y-90	as cesium-137
USGS 99	3/16/92	**1.89±0.334**	**2.53±0.446**	-.063±0.246	-.065±0.254
	6/16/92	**1.70±0.339**	**2.25±0.446**	.438±0.254	.457±0.266
QAS-24	6/16/92	**1.82±0.339**	**2.43±0.454**	.453±0.252	.480±0.268
USGS 99	9/21/92	**1.94±0.352**	**2.55±0.462**	-.260±0.228	-.267±0.234
	12/8/92	**1.40±0.312**	**1.88±0.418**	.274±0.272	.283±0.281
	4/6/93	**1.83±0.364**	**2.45±0.485**	.266±0.230	.278±0.241
	6/9/93	**2.40±0.382**	**3.22±0.52**	NR	NR
	9/13/93	**2.64±0.400**	**3.47±0.52**	NR	NR
	11/2/93	**2.33±0.398**	**3.04±0.52**	NR	NR
USGS 102	6/7/91	**2.95±0.442**	**3.95±0.59**	.586±0.250	.602±0.258
	9/5/91	**2.67±0.458**	**3.73±0.70**	.229±0.238	.237±0.246
	12/3/91	**3.23±0.52**	**4.28±0.68**	.076±0.248	.080±0.259
	3/16/92	**2.53±0.433**	**3.34±0.57**	-.048±0.242	-.050±0.250
	6/16/92	**2.43±0.410**	**3.20±0.54**	-.070±0.220	-.073±0.230
	9/21/92	**3.22±0.439**	**4.28±0.58**	.389±0.225	.400±0.232
	12/9/92	**2.18±0.372**	**2.88±0.490**	.022±0.248	.023±0.255
QAS-27	12/9/92	**2.44±0.384**	**3.25±0.51**	.231±0.260	.242±0.272
USGS 102	4/6/93	**2.49±0.423**	**3.34±0.56**	.095±0.237	.099±0.248
	6/9/93	**2.73±0.423**	**3.62±0.56**	NR	NR
	9/13/93	**2.57±0.418**	**3.37±0.55**	NR	NR
	11/4/93	**3.06±0.480**	**4.06±0.64**	NR	NR
Water Supply INEL-1	3/13/91	**4.33±0.66**	**5.80±0.88**	.781±0.274	.807±0.283
	6/5/91	**3.63±0.58**	**4.82±0.77**	.446±0.249	.460±0.257
	9/5/91	**3.78±0.60**	**4.95±0.78**	.244±0.244	.255±0.254
	12/3/91	**3.78±0.63**	**4.99±0.83**	.054±0.240	.055±0.247
QAS-19	12/3/91	**4.04±0.64**	**5.44±0.86**	.371±0.260	.384±0.271
Water Supply INEL-1	3/16/92	**3.45±0.53**	**4.58±0.70**	.269±0.240	.282±0.250

Table 10.—***Concentrations of gross beta-particle radioactivity in water from round-three samples, Naval Reactors Facility and vicinity***—*Continued*

Sample identifier	Date sampled (m/d/y)	Dissolved		Suspended	
		as Sr-90/Y-90	as cesium-137	as Sr-90/Y-90	as cesium-137
Water Supply INEL-1	6/16/92	**2.54±0.448**	**3.40±0.60**	.292±0.246	.301±0.254
	9/21/92	**3.61±0.50**	**4.79±0.67**	**.872±0.270**	**.911±0.283**
	12/8/92	**3.29±0.480**	**4.42±0.64**	.736±0.275	.780±0.292
	4/6/93	**3.70±0.55**	**4.86±0.72**	.791±0.287	.817±0.296
	6/8/93	**3.43±0.496**	**4.55±0.66**	NR	NR
	9/13/93	**3.96±0.54**	**5.30±0.73**	NR	NR
	11/2/93	**2.82±0.55**	**3.66±0.71**	NR	NR

Table 11.—*Statistical parameters for gross alpha-particle radioactivity, gross beta-particle radioactivity, radium-226, and radium-228, by well*

[See figure 2 for location of wells. Gross alpha-particle radioactivity is expressed as uranium in micrograms per liter and thorium-230 in picocuries per liter. All other units are picocuries per liter. Gross beta-particle radioactivity is expressed as strontium-90 in equilibrium with yttrium-90 and as cesium-137. Values are derived from tables 9, 10, 17, and 23. Quality-assurance replicates are included in the calculation of statistical parameters. See section on calculation of estimated experimental standard error for the estimated uncertainty of the mean concentration. Abbreviation: Sr-90/Y-90, strontium-90 in equilibrium with yttrium-90]

Radioactivity or radionuclide	Statistical parameter				
	Minimum	Maximum	Median	Mean	Sample size
			NRF-1		
Uranium (dissolved)	1.77±0.394	6.76±1.52	3.83±1.15	3.89±0.416	13
Thorium-230 (dissolved)	1.23±0.276	5.01±1.12	2.78±0.423	2.83±0.311	13
Uranium (suspended)	-.119±0.116	.636±0.346	.0285±0.145	.125±0.086	10
Thorium-230 (suspended)	-.064±0.062	.370±0.204	.0155±0.078	.071±0.049	10
SR-90/Y-90 (dissolved)	1.67±0.326	3.14±0.58	2.45±0.403	2.50±0.101	13
Cesium-137 (dissolved)	2.21±0.432	4.03±0.67	3.33±0.69	3.30±0.125	13
SR-90/Y-90 (suspended)	.139±0.252	.720±0.274	.3635±0.185	.378±0.059	10
Cesium-137 (suspended)	.143±0.258	.764±0.291	.3845±0.196	.405±0.065	10
			NRF-2		
Uranium (dissolved)	2.28±0.450	5.73±1.50	3.91±0.66	4.02±0.259	14
Thorium-230 (dissolved)	1.58±0.314	4.42±1.15	2.87±0.322	2.97±0.184	14
Uranium (suspended)	-.274±0.124	.539±0.298	-.075±0.080	-.017±0.070	10
Thorium-230 (suspended)	-.158±0.077	.291±0.164	-.040±0.043	-.010±0.038	10
SR-90/Y-90 (dissolved)	2.24±0.407	3.79±0.58	2.895±0.336	2.98±0.115	14
Cesium-137 (dissolved)	3.01±0.54	5.05±0.77	3.845±0.454	3.98±0.154	14
SR-90/Y-90 (suspended)	.086±0.232	.582±0.236	.226±0.166	.263±0.053	10
Cesium-137 (suspended)	.088±0.238	.731±0.296	.2335±0.171	.286±0.066	10
			NRF-3		
Uranium (dissolved)	1.53±0.345	6.17±1.48	3.66±0.60	3.94±0.333	13
Thorium-230 (dissolved)	1.01±0.228	3.95±0.96	2.44±0.73	2.71±0.257	13
Uranium (suspended)	-.348±0.164	6.58±1.84	.074±0.108	.660±0.66	10
Thorium-230 (suspended)	-.200±0.096	5.08±1.60	.0415±0.060	.508±0.51	10
SR-90/Y-90 (dissolved)	2.02±0.378	3.51±0.54	2.48±0.431	2.63±0.140	13
Cesium-137 (dissolved)	2.68±0.50	4.70±0.72	3.32±0.58	3.51±0.188	13

Table 11.—*Statistical parameters for gross alpha-particle radioactivity, gross beta-particle radioactivity, radium-226, and radium-228, by well—Continued*

Radioactivity or radionuclide	Statistical parameter				
	Minimum	Maximum	Median	Mean	Sample size
			NRF-3 - cont.		
SR-90/Y-90 (suspended)	.078±0.232	4.52±0.52	.212±0.172	.678±0.429	10
Cesium-137 (suspended)	.080±0.240	4.91±0.56	.2215±0.180	.727±0.467	10
			NRF-4		
Uranium (dissolved)	1.35±0.68	6.48±1.70	3.77±0.58	3.63±0.366	13
Thorium-230 (dissolved)	.972±0.240	4.11±1.08	2.69±0.424	2.54±0.234	13
Uranium (suspended)	-.345±0.180	.401±0.212	.061±0.133	.056±0.060	10
Thorium-230 (suspended)	-.190±0.103	.218±0.120	.033±0.073	.030±0.028	10
SR-90/Y-90 (dissolved)	2.40±0.411	3.76±0.51	3.10±0.444	3.07±0.130	13
Cesium-137 (dissolved)	3.21±0.55	5.03±0.64	4.23±0.76	4.11±0.174	13
SR-90/Y-90 (suspended)	-.484±0.224	.434±0.243	.2585±0.165	.170±0.082	10
Cesium-137 (suspended)	-.500±0.231	.460±0.258	.2725±0.173	.181±0.085	10
			NRF-6		
Uranium (dissolved)	2.88±1.72	7.03±2.74	4.14±0.440	4.28±0.355	12
Thorium-230 (dissolved)	1.97±0.352	5.22±2.04	2.89±0.309	3.04±0.271	12
Uranium (suspended)	-.135±0.164	.216±0.194	.0895±0.131	.050±0.035	10
Thorium-230 (suspended)	-.076±0.092	.116±0.106	.047±0.070	.027±0.019	10
SR-90/Y-90 (dissolved)	1.85±0.68	6.83±0.96	5.465±0.60	5.16±0.354	12
Cesium-137 (dissolved)	2.43±0.89	9.01±1.28	7.055±0.75	6.79±0.480	12
SR-90/Y-90 (suspended)	-.042±0.248	.520±0.238	.2105±0.167	.216±0.061	10
Cesium-137 (suspended)	-.043±0.256	.537±0.246	.2235±0.177	.226±0.064	10
Radium-226 (dissolved)	.013±0.004	.052±0.007	.029±0.004	.030±0.005	7
Radium-228 (dissolved)	-.044±0.121	.259±0.143	.197±0.134	.167±0.039	7
			NRF-7		
Uranium (dissolved)	.833±0.268	3.37±0.54	1.98±0.422	2.05±0.197	13
Thorium-230 (dissolved)	.553±0.178	2.32±0.368	1.37±0.416	1.43±0.145	13
Uranium (suspended)	-.134±0.162	.494±0.242	.1415±0.148	.156±0.054	10
Thorium-230 (suspended)	-.082±0.101	.408±0.214	.0975±0.087	.112±0.041	10
SR-90/Y-90 (dissolved)	2.27±0.335	3.29±0.396	2.71±0.458	2.77±0.094	13
Cesium-137 (dissolved)	3.03±0.498	4.33±0.64	3.49±0.55	3.65±0.123	13

Table 11.—*Statistical parameters for gross alpha-particle radioactivity, gross beta-particle radioactivity, radium-226, and radium-228, by well—Continued*

Radioactivity or radionuclide	Statistical parameter				
	Minimum	Maximum	Median	Mean	Sample size
			NRF-7 - cont.		
SR-90/Y-90 (suspended)	.290±0.202	.928±0.286	.6145±0.184	.606±0.063	10
Cesium-137 (suspended)	.304±0.212	.963±0.297	.643±0.193	.631±0.062	10
Radium-226 (dissolved)	.033±0.006	.047±0.006	.042±0.007	.041±0.002	7
Radium-228 (dissolved)	.110±0.122	.328±0.152	.189±0.120	.216±0.033	7
			USGS 12		
Uranium (dissolved)	1.51±0.390	5.38±1.39	3.46±0.585	3.66±0.321	13
Thorium-230 (dissolved)	1.05±0.272	3.85±1.00	2.41±0.410	2.57±0.237	13
Uranium (suspended)	-.212±0.214	3.75±1.06	.086±0.130	.487±0.411	9
Thorium-230 (suspended)	-.112±0.114	3.72±1.06	.045±0.070	.452±0.413	9
SR-90/Y-90 (dissolved)	1.55±0.292	3.06±0.380	2.70±0.467	2.47±0.152	13
Cesium-137 (dissolved)	2.10±0.424	4.07±0.59	3.54±0.62	3.25±0.193	13
SR-90/Y-90 (suspended)	-.215±0.222	2.92±0.413	.418±0.245	.608±0.312	9
Cesium-137 (suspended)	-.221±0.228	3.15±0.446	.430±0.252	.642±0.336	9
			USGS 15		
Uranium (dissolved)	1.62±0.380	3.96±1.24	2.285±0.440	2.63±0.245	12
Thorium-230 (dissolved)	1.12±0.263	3.06±0.95	1.595±0.316	1.87±0.199	12
Uranium (suspended)	-.236±0.144	29.0±14.9	.028±0.251	3.28±3.21	9
Thorium-230 (suspended)	-.126±0.080	22.4±11.4	.016±0.142	2.52±2.48	9
SR-90/Y-90 (dissolved)	1.16±0.278	2.69±0.414	1.80±0.248	1.80±0.117	12
Cesium-137 (dissolved)	1.57±0.388	3.62±0.56	2.46±0.365	2.43±0.155	12
SR-90/Y-90 (suspended)	-.187±0.239	32.2±4.27	.262±0.240	3.74±3.57	9
Cesium-137 (suspended)	-.193±0.247	35.4±4.70	.270±0.248	4.11±3.91	9
			USGS 17		
Uranium (dissolved)	1.26±0.292	4.11±0.62	2.065±0.306	2.25±0.196	14
Thorium-230 (dissolved)	.931±0.244	2.94±0.443	1.435±0.283	1.62±0.129	14
Uranium (suspended)	-.292±0.154	.365±0.208	.0625±0.153	.063±0.059	10
Thorium-230 (suspended)	-.157±0.088	.197±0.117	.0385±0.094	.036±0.032	10
SR-90/Y-90 (dissolved)	1.99±0.320	2.74±0.480	2.305±0.280	2.34±0.064	14
Cesium-137 (dissolved)	2.67±0.471	3.66±0.58	3.065±0.364	3.12±0.084	14

Table 11.—***Statistical parameters for gross alpha-particle radioactivity, gross beta-particle radioactivity, radium-226, and radium-228, by well***—*Continued*

Radioactivity or radionuclide	Statistical parameter				
	Minimum	Maximum	Median	Mean	Sample size
			USGS 17 - cont.		
SR-90/Y-90 (suspended)	.236±0.234	.699±0.249	.4795±0.175	.478±0.045	10
Cesium-137 (suspended)	.243±0.242	.740±0.264	.540±0.196	.523±0.053	10
			USGS 97		
Uranium (dissolved)	2.15±0.469	5.93±1.30	3.45±0.398	3.82±0.347	14
Thorium-230 (dissolved)	1.34±0.302	4.19±1.00	2.575±0.282	2.75±0.248	14
Uranium (suspended)	-.305±0.180	.280±0.284	.0285±0.098	.050±0.052	10
Thorium-230 (suspended)	-.162±0.100	.150±0.153	.0155±0.056	.027±0.028	10
SR-90/Y-90 (dissolved)	2.08±0.406	3.20±0.488	2.625±0.304	2.63±0.107	14
Cesium-137 (dissolved)	2.73±0.54	4.25±0.65	3.505±0.403	3.49±0.146	14
SR-90/Y-90 (suspended)	-.242±0.240	.513±0.230	.337±0.165	.263±0.073	10
Cesium-137 (suspended)	-.250±0.248	.529±0.237	.352±0.172	.277±0.076	10
			USGS 98		
Uranium (dissolved)	1.49±0.356	3.44±0.96	2.45±0.488	2.52±0.195	11
Thorium-230 (dissolved)	1.02±0.242	2.43±0.62	1.76±0.336	1.76±0.134	11
Uranium (suspended)	-.046±0.192	.255±0.224	.124±0.121	.104±0.032	10
Thorium-230 (suspended)	-.026±0.106	.136±0.122	.066±0.065	.057±0.018	10
SR-90/Y-90 (dissolved)	1.83±0.444	2.98±0.409	2.31±0.340	2.38±0.111	11
Cesium-137 (dissolved)	2.49±0.52	3.90±0.54	3.17±0.52	3.22±0.148	11
SR-90/Y-90 (suspended)	-.274±0.238	.607±0.227	.4155±0.177	.341±0.079	10
Cesium-137 (suspended)	-.283±0.246	.635±0.238	.434±0.185	.358±0.084	10
			USGS 99		
Uranium (dissolved)	1.76±0.419	5.08±1.22	2.91±0.94	3.08±0.270	13
Thorium-230 (dissolved)	1.27±0.280	3.24±0.78	2.15±0.398	2.13±0.152	13
Uranium (suspended)	-.230±0.140	.418±0.284	.0005±0.105	.031±0.063	10
Thorium-230 (suspended)	-.122±0.076	.232±0.164	0±0.056	.019±0.036	10
SR-90/Y-90 (dissolved)	1.40±0.312	2.64±0.400	1.94±0.352	2.03±0.098	13
Cesium-137 (dissolved)	1.88±0.412	3.47±0.52	2.55±0.462	2.71±0.131	13
SR-90/Y-90 (suspended)	-.260±0.228	.514±0.252	.3405±0.176	.260±0.082	10
Cesium-137 (suspended)	-.267±0.234	.537±0.263	.370±0.193	.282±0.088	10

Table 11.—***Statistical parameters for gross alpha-particle radioactivity, gross beta-particle radioactivity, radium-226, and radium-228, by well***—*Continued*

Radioactivity or radionuclide	Statistical parameter				
	Minimum	Maximum	Median	Mean	Sample size
			USGS 102		
Uranium (dissolved)	1.98±0.444	5.73±0.74	3.755±0.424	3.90±0.311	12
Thorium-230 (dissolved)	1.38±0.310	4.11±0.54	2.595±0.429	2.73±0.228	12
Uranium (suspended)	-.092±0.180	.215±0.192	-.019±0.123	.044±0.039	9
Thorium-230 (suspended)	-.052±0.102	.117±0.106	-.010±0.067	.025±0.021	9
SR-90/Y-90 (dissolved)	2.18±0.372	3.23±0.52	2.62±0.310	2.71±0.096	12
Cesium-137 (dissolved)	2.88±0.490	4.28±0.58	3.495±0.392	3.61±0.131	12
SR-90/Y-90 (suspended)	-.070±0.220	.586±0.250	.095±0.237	.168±0.072	9
Cesium-137 (suspended)	-.073±0.230	.602±0.258	.099±0.248	.173±0.074	9
			Water Supply INEL-1		
Uranium (dissolved)	1.64±0.82	3.40±1.21	2.64±0.51	2.65±0.141	13
Thorium-230 (dissolved)	1.26±0.63	2.60±0.92	1.82±0.353	1.93±0.117	13
Uranium (suspended)	-.140±0.170	.433±0.274	.1785±0.175	.134±0.076	10
Thorium-230 (suspended)	-.076±0.094	.238±0.156	.097±0.085	.073±0.042	10
SR-90/Y-90 (dissolved)	2.54±0.448	4.33±0.66	3.63±0.58	3.57±0.134	13
Cesium-137 (dissolved)	3.40±0.60	5.80±0.88	4.82±0.77	4.74±0.182	13
SR-90/Y-90 (suspended)	.054±0.240	.872±0.270	.4085±0.180	.486±0.090	10
Cesium-137 (suspended)	.055±0.247	.911±0.283	.422±0.187	.505±0.094	10

Table 12.—***Concentrations of selected inorganic constituents in water from round-two samples, wells NRF-6 and NRF-7***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory. Concentrations are total recoverable unless otherwise indicated. See figure 2 for location of wells. Abbreviations: (m/d/y), month/day/year; mg/L, milligram per liter; µg/L, microgram per liter; QAS, quality-assurance replicate of previous sample. Symbols: < indicates concentration is less than the specified laboratory reporting level; LS indicates that laboratory lost sample; SR indicates sample ruined]

Constituent	Sample identifier and date sampled (m/d/y)											
	NRF-6 11/6/91	NRF-6 1/8/92	NRF-6 3/10/92	QAS-21 3/10/92	NRF-6 5/14/92	NRF-6 7/8/92	NRF-7 11/6/91	NRF-7 1/8/92	QAS-20 1/8/92	NRF-7 3/10/92	NRF-7 5/14/92	NRF-7 7/8/92
Bromide, dissolved (mg/L)	0.08	0.10	0.08	0.08	0.08	0.08	0.02	0.02	0.03	0.01	0.03	0.02
Chloride, dissolved (mg/L)	210	200	200	190	190	200	6.1	6.5	6.5	6.5	5.1	5.1
Fluoride, dissolved (mg/L)	.2	.3	.2	.2	<.1	<.1	.3	.3	.3	.2	.5	.2
Sulfate, dissolved (mg/L)	240	230	230	220	210	220	17	19	19	17	15	16
Sodium (mg/L)	90	54	81	82	72	91	8.9	8.1	8.4	7.0	8.7	8.9
Arsenic (µg/L)	3	3	4	4	3	3	2	2	<1	2	2	2
Barium (µg/L)	200	100	<100	100	<100	<100	<100	100	100	LS	<100	<100
Cadmium (µg/L)	<1	<1	<1	<1	<1	<1	<1	<1	<1	LS	<1	<1
Chromium (µg/L)	36	41	45	43	35	<1	8	9	8	LS	8	<1
Copper (µg/L)	SR	SR	5	6	<1	<1	SR	SR	SR	LS	2	2
Iron (µg/L)	260	110	120	80	80	70	250	330	350	LS	620	3,900
Lead (µg/L)	<1	SR	<1	2	<1	<1	<1	4	3	LS	<1	<1
Manganese (µg/L)	40	<10	<10	<10	30	<10	20	<10	<10	LS	40	<10

Table 12.—***Concentrations of selected inorganic constituents in water from round-two samples, wells NRF-6 and NRF-7***—*Continued*

Constituent	Sample identifier and date sampled (m/d/y)											
	NRF-6 11/6/91	NRF-6 1/8/92	NRF-6 3/10/92	QAS-21 3/10/92	NRF-6 5/14/92	NRF-6 7/8/92	NRF-7 11/6/91	NRF-7 1/8/92	QAS-20 1/8/92	NRF-7 3/10/92	NRF-7 5/14/92	NRF-7 7/8/92
Mercury (µg/L)	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Nickel (µg/L)	21	16	21	17	5	7	5	4	3	LS	5	3
Selenium (µg/L)	3	2	2	2	2	1	2	<1	1	1	1	1
Silver (µg/L)	<1	<1	<1	<1	<1	<1	<1	<1	<1	LS	<1	<1
Zinc (µg/L)	<10	30	20	10	10	<10	<10	30	40	LS	10	<10
Ammonia, dissolved, as nitrogen (mg/L)	.02	<.01	.02	.02	<.01	.01	.02	<.01	<.01	.05	<.01	.01
Nitrite, dissolved, as nitrogen (mg/L)	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01
Nitrite plus nitrate, dissolved, as nitrogen (mg/L)	1.6	1.6	1.7	1.7	1.7	1.8	.39	.39	.38	.44	.42	.46
Orthophosphate, dissolved, as phosphorus (mg/L)	.06	.07	.07 —	.07	.06	.07	.01	.02	.01	<.01	<.01	<.01

Table 13.—***Concentrations of total organic carbon and total phenols in water, and turbidity from round-two samples, wells NRF-6 and NRF-7***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory. See figure 2 for location of wells. Analytical results in milligrams per liter for organic carbon, micrograms per liter for phenols, and nephelometric turbidity units for turbidity. Abbreviations: (m/d/y), month/day/year; QAS, quality-assurance replicate of previous sample. Symbol: < indicates concentration is less than the specified laboratory reporting level]

Constituent or physical characteristic	Sample identifier and date sampled (m/d/y)											
	NRF-6 11/6/91	NRF-6 1/8/92	NRF-6 3/10/92	QAS-21 3/10/92	NRF-6 5/14/92	NRF-6 7/8/92	NRF-7 11/6/91	NRF-7 1/8/92	QAS-20 1/8/92	NRF-7 3/10/92	NRF-7 5/14/92	NRF-7 7/8/92
Organic carbon	1.2	0.9	0.6	0.5	0.6	0.6	0.9	0.6	0.5	0.5	0.2	0.1
Phenols	5	1	2	1	2	2	<1	1	<1	2	2	1
Turbidity	.3	.5	.5	.6	.7	.6	3.6	2.0	1.9	1.7	4.6	3.9

Table 14.—***Extractable acid and base/neutral organic compounds for which round-one and round-two water samples were analyzed***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory using gas chromatography to separate the compounds and mass spectrometry and flame ionization for identification and quantification. Initial extraction was with methylene chloride. Laboratory reporting levels are in micrograms per liter (C.A. Watterson and A.T. Kasuba, U.S. Geological Survey, written commun., 1993); 1,2,5,6-Dibenzanthracene was reported as Dibenzo (a, h) anthracene for previous round-one and round-two samples]

Compound	Reporting level	Compound	Reporting level
Acenaphthene	5	2,4-Dinitrophenol	20
Acenaphthylene	5	2,4-Dinitrotoluene	5
Anthracene	5	2,6-Dinitrotoluene	5
Benzidine	40	Di-n-octyl phthalate	10
Benzo (a) anthracene	10	1,2-Diphenylhydrazine	5
Benzo (b) fluoranthene	10	bis (2-Ethylhexyl) phthalate	5
Benzo (k) fluoranthene	10	Fluoranthene	5
Benzo (g,h,i) perylene	10	Fluorene	5
Benzo (a) pyrene	10	Hexachlorobenzene	5
4-Bromophenyl phenyl ether	5	Hexachlorobutadiene	5
Butyl benzyl phthalate	5	Hexachlorocyclopentadiene	5
bis (2-Chloroethoxy) methane	5	Hexachloroethane	5
bis (2-Chloroethyl) ether	5	Indeno (1,2,3-cd) pyrene	10
bis (2-Chloroisopropyl) ether	5	Isophorone	5
4-Chloro-3-methylphenol	30	2-Methyl-4,6-dinitrophenol	30
2-Chloronaphthalene	5	Naphthalene	5
2-Chlorophenol	5	Nitrobenzene	5
4-Chlorophenyl phenyl ether	5	2-Nitrophenol	5
Chrysene	10	4-Nitrophenol	30
1,2,5,6-Dibenzanthracene	10	n-Nitrosodimethylamine	5
1,2-Dichlorobenzene	5	n-Nitrosodi-n-propylamine	5
1,3-Dichlorobenzene	5	n-Nitrosodiphenylamine	5
1,4-Dichlorobenzene	5	Pentachlorophenol	30
3,3'-Dichlorobenzidine	20	Phenanthrene	5
2,4-Dichlorophenol	5	Phenol	5
Diethyl phthalate	5	Pyrene	5
Dimethyl phthalate	5	1,2,4-Trichlorobenzene	5
2,4-Dimethylphenol	5	2,4,6-Trichlorophenol	20
Di-n-butyl phthalate	5		

Table 15.—*Concentrations of extractable acid and base/neutral organic compounds in water from round-one and round-two samples, wells NRF-6 and NRF-7*

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory. Analytical results in micrograms per liter. Compounds listed are tentatively identified organic compounds (TIOC's); the reported concentration generally is accurate to one order of magnitude. Data for TIOC's in this report are based on a comparison of sample spectra with library spectra followed by visual examination by gas chromatograph/mass spectrometer analysts. TIOC data have not been confirmed by direct comparison with reference standards. Therefore, TIOC identification is tentative, and reported concentrations are semiquantitative. Sample identifier: see figure 2 for location of wells; QAS indicates quality-assurance replicate of previous sample. Date sampled: m/d/y indicates month/day/year. Retention time: time required for a compound to pass through the column of a gas chromatograph. Remarks: BRL indicates concentrations of all compounds in table 14 are less than the reporting level; CAS No. indicates Chemical Abstract Services number - no entry indicates CAS No. not listed in Pritt and Jones (1989) or on laboratory analytical result sheet]

Sample identifier	Date sampled (m/d/y)	Compound	Concentration	Retention time (minutes)	Remarks
NRF-6	9/9/91	See remarks			BRL
	11/6/91	See remarks			BRL
	1/8/92	See remarks			BRL
	3/10/92	See remarks			BRL
QAS-21	3/10/92	See remarks			BRL
NRF-6	5/14/92	See remarks			BRL
	7/8/92	See remarks			BRL
NRF-7	9/10/91	See remarks			BRL
	11/6/91	See remarks			BRL
	1/8/92	Hydrocarbon	6	37.02	
		Pentacosane	100	41.35	CAS. No. 629992
		Hydrocarbon	3	42.09	
		Hexacosane	200	42.67	CAS No. 630013
		Hydrocarbon	6	43.37	
		Hydrocarbon	2	43.51	
		Heptacosane	300	43.96	CAS No. 593497
		Hydrocarbon	10	44.61	
		Hydrocarbon	6	44.74	
		Octacosane	300	45.17	CAS No. 630024
		Nonacosane	10	45.80	CAS No. 630035
		Hydrocarbon	9	45.93	

Table 15.—***Concentrations of extractable acid and base/neutral organic compounds in water from round-one and round-two samples, wells NRF-6 and NRF-7***—*Continued*

Sample identifier	Date sampled (m/d/y)	Compound	Concentration	Retention time (minutes)	Remarks
NRF-7	1/8/92 (cont.)	Hydrocarbon	300	46.34	
		Triacontane	10	46.95	CAS No. 638686
		Hydrocarbon	6	47.09	
		Triacontane	200	47.52	CAS No. 638686
		Hydrocarbon	10	48.23	
		Alkane	10	48.23	
		Hydrocarbon	8	48.39	
		Hydrocarbon	200	48.87	
		Hydrocarbon	9	49.42	
		Hydrocarbon	10	49.70	
		Hydrocarbon	7	49.89	
		Hydrocarbon	100	50.40	
		Nitrogen-containing compound	7	50.69	
		Triacontane	5	51.39	CAS No. 638686
		Hentriacontane	4	51.63	CAS No. 630046
		Hydrocarbon	70	52.19	
		Nitrogen-containing compound	4	52.59	
		Hydrocarbon	3	53.65	
		Hydrocarbon	30	54.28	
		Nitrogen-containing compound	3	54.83	
		Hydrocarbon	20	56.78	
		Hydrocarbon	3	59.77	
		See remarks			BRL
QAS-20	1/8/92	See remarks			BRL
NRF-7	3/10/92	See remarks			BRL
	5/14/92	See remarks			BRL
	7/8/92	See remarks			BRL

Table 16.—***Pesticides for which round-two water samples were analyzed***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory using the following methods: chlorophenoxy-acid herbicides by converting the compounds to methyl esters followed by identification with gas chromatography and an electron-capture detector; organochlorine insecticides and gross polychlorinated compounds by extracting with hexane and identification with gas chromatography using electron-capture detectors (Wershaw and others, 1987, p. 27-28 and 40). Laboratory reporting levels are from Pritt and Jones (1989). Abbreviation: µg/L, microgram per liter]

Organochlorine insecticides: reporting level is 0.01 µg/L except for chlordane and perthane (0.1 µg/L), and toxaphene (1.0 µg/L)	
Aldrin	Heptachlor
Chlordane	Heptachlor epoxide
DDD	Lindane
DDE	Methoxychlor
DDT	Mirex
Dieldrin	Perthane
Endosulfan	Toxaphene
Endrin	
Gross polychlorinated compounds: reporting level is 0.1 µg/L	
Gross polychlorinated biphenyls (PCB)	
Gross polychlorinated naphthalenes (PCN)	
Chlorophenoxy-acid herbicides: reporting level is 0.01 µg/L	
2,4-D	Silvex
2,4-DP	2,4,5-T

Table 17.—***Concentrations of radioactivity, dissolved radium-226, and dissolved radium-228 in water from round-two samples, wells NRF-6 and NRF-7***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory using the following methods: gross alpha- and gross beta-particle radioactivity by residue procedure; radium-226 by radon emanation; and radium-228 by separation and beta counting. Raw field samples were processed in laboratory prior to analyses. Analytical results and uncertainties—for example, **4.17±0.625**—are in indicated units. Analytical uncertainties are reported as 1s. Concentrations that meet or exceed the reporting level of 3 times the 1s value are shown in boldface type. Abbreviations: (m/d/y), month/day/year; µg/L, microgram per liter; pCi/L, picocurie per liter; Sr-90/Y-90, strontium-90 in equilibrium with yttrium-90. Sample identifier: see figure 2 for location of wells; QAS indicates quality-assurance replicate of previous sample]

Sample identifier	Date sampled (m/d/y)	Gross alpha-particle radioactivity			
		Dissolved		Suspended	
		as uranium (µg/L)	as thorium-230 (pCi/L)	as uranium (µg/L)	as thorium-230 (pCi/L)
NRF-6	11/6/91	**4.17±0.62**	**2.92±0.441**	0.111±0.186	0.058±0.099
	1/8/92	**4.33±0.62**	**2.98±0.420**	-.135±0.164	-.076±0.092
	3/10/92	4.35±2.00	3.35±1.54	-.009±0.086	-.005±0.046
QAS-21	3/10/92	**2.88±0.51**	**1.97±0.352**	.216±0.194	.116±0.106
NRF-6	5/14/92	**4.11±0.62**	**2.86±0.434**	-.018±0.121	-.010±0.064
	7/8/92	**3.47±0.59**	**2.16±0.386**	.121±0.167	.069±0.096
NRF-7	11/6/91	**2.59±0.482**	**1.86±0.346**	.265±0.247	.167±0.159
	1/8/92	**1.85±0.422**	**1.28±0.294**	.017±0.150	.012±0.105
QAS-20	1/8/92	**1.98±0.422**	**1.36±0.293**	.094±0.191	.065±0.132
NRF-7	3/10/92	**.833±0.268**	**.553±0.178**	.270±0.184	.147±0.104
	5/14/92	**.947±0.280**	**.621±0.184**	.494±0.242	.408±0.214
	7/8/92	**2.02±0.442**	**1.42±0.311**	.077±0.222	.057±0.163

Table 17.—***Concentrations of radioactivity, dissolved radium-226, and dissolved radium-228 in water from round-two samples, wells NRF-6 and NRF-7***—*Continued*

Sample identifier	Date sampled (m/d/y)	Gross beta-particle radioactivity			
		Dissolved		Suspended	
		as Sr-90/Y-90 (pCi/L)	as cesium-137 (pCi/L)	as Sr-90/Y-90 (pCi/L)	as cesium-137 (pCi/L)
NRF-6	11/6/91	**5.65±0.86**	**7.61±1.16**	.235±0.233	.249±0.247
	1/8/92	**5.50±0.86**	**7.24±1.14**	.016±0.236	.017±0.244
	3/10/92	**5.53±0.78**	**6.87±0.98**	.520±0.238	.537±0.246
QAS-21	3/10/92	**4.78±0.76**	**5.87±0.94**	.403±0.254	.421±0.266
NRF-6	5/14/92	**4.71±0.87**	**6.20±1.15**	.308±0.252	.327±0.268
	7/8/92	**4.74±0.80**	**6.35±1.07**	.186±0.240	.198±0.254
NRF-7	11/6/91	**2.62±0.347**	**3.45±0.52**	.634±0.266	.655±0.275
	1/8/92	**2.55±0.455**	**3.34±0.54**	.676±0.261	.696±0.269
QAS-20	1/8/92	**2.61±0.353**	**3.48±0.54**	.573±0.248	.608±0.262
NRF-7	3/10/92	**3.03±0.403**	**4.12±0.54**	.325±0.244	.344±0.258
	5/14/92	**2.72±0.362**	**3.55±0.56**	.784±0.284	.813±0.294
	7/8/92	**2.27±0.335**	**3.03±0.498**	.586±0.263	.607±0.272

Table 17.—***Concentrations of radioactivity, dissolved radium-226, and dissolved radium-228 in water from round-two samples, wells NRF-6 and NRF-7***—*Continued*

Sample identifier	Date sampled (m/d/y)	Radium-226 (pCi/L)	Radium-228 (pCi/L)
NRF-6	11/6/91	.026±0.040	.171±0.140
	1/8/92	**.052±0.007**	-.044±0.121
	3/10/92	.017±0.006	.232±0.140
QAS-21	3/10/92	**.029±0.004**	.233±0.152
NRF-6	5/14/92	**.038±0.006**	.259±0.143
	7/8/92	**.013±0.004**	.197±0.134
NRF-7	11/6/91	.045±0.044	.328±0.152
	1/8/92	**.047±0.006**	.175±0.128
QAS-20	1/8/92	**.042±0.007**	.126±0.134
NRF-7	3/10/92	**.043±0.006**	.315±0.138
	5/14/92	**.033±0.006**	.110±0.122
	7/8/92	**.040±0.006**	.189±0.120

Table 18.—***Concentrations of selected inorganic constituents in water from round-one samples, wells NRF-6 and NRF-7***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory. Concentrations are total recoverable unless otherwise indicated. See figure 2 for location of wells. Abbreviations: mg/L, milligram per liter; µg/L, microgram per liter. Symbols: < indicates concentration is less than the specified laboratory reporting level; NAL indicates constituent not determined by laboratory]

Constituent	NRF-6 (9/9/91)	NRF-7 (9/10/91)	Remarks
Calcium (mg/L)	140	30	
Potassium (mg/L)	NAL	2.8	
Magnesium (mg/L)	34	9.0	
Sodium (mg/L)	88	9.3	
Bromide (mg/L)	.09	.02	dissolved
Chloride (mg/L)	220	6.7	dissolved
Fluoride (mg/L)	.2	.2	dissolved
Sulfate (mg/L)	240	14	dissolved
Aluminum (µg/L)	10	400	
Arsenic (µg/L)	3	2	
Barium (µg/L)	100	<100	
Beryllium (µg/L)	<10	<10	
Cadmium (µg/L)	<1	<1	
Chromium (µg/L)	29	10	
Cobalt (µg/L)	<1	<1	
Copper (µg/L)	1	4	
Iron (µg/L)	120	670	
Lead (µg/L)	<1	<1	
Manganese (µg/L)	20	20	
Mercury (µg/L)	<.1	<.1	
Nickel (µg/L)	7	9	
Selenium (µg/L)	2	<1	
Silver (µg/L)	<1	<1	
Thallium (µg/L)	<1	<1	dissolved
Zinc (µg/L)	10	<10	
Ammonia as nitrogen (mg/L)	<.01	.01	
Ammonia plus organic nitrogen as nitrogen (mg/L)	.3	<.2	
Nitrite as nitrogen (mg/L)	<.01	<.01	
Nitrite plus nitrate as nitrogen (mg/L)	1.4	.38	
Cyanide (mg/L)	<.01	<.01	dissolved
Phosphorus as phosphorus (mg/L)	.06	.154	
Phosphorus, orthophosphate (mg/L)	.02	<.01	
Phosphorus, orthophosphate (mg/L)	.02	NAL	dissolved

Table 19.—***Concentrations of total recoverable anionic surfactants, total organic carbon, and total phenols in water, and turbidity of water, from round-one samples, wells NRF-6 and NRF-7***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory. See figure 2 for location of wells. Abbreviations: mg/L, milligram per liter; µg/L, microgram per liter]

Constituent or physical characteristic	NRF-6 (9/9/91)	NRF-7 (9/10/91)
Anionic surfactants as methylene blue active substances (mg/L)	0.06	0.01
Organic carbon (mg/L)	.9	.4
Phenols (µg/L)	2	1
Turbidity as nephelometric turbidity units	.5	7.3

Table 20.—***Purgeable organic compounds for which round-one water samples were analyzed***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory using an analytical method that conforms to U.S. Environmental Protection Agency method 524.2. The laboratory reporting level for all compounds is 0.2 microgram per liter (µg/L) except methylene chloride which is 0.3 µg/L (Pritt and Jones, 1989). Concentrations of all listed compounds were less than the laboratory reporting levels except as follows: NRF-6 (September 9, 1991)—chloroform (0.4 µg/L), tetrachloroethylene (0.5 µg/L), and toluene (0.6 µg/L); and NRF-7 (September 10, 1991)—1,1,1-trichloroethane (0.4 µg/L)]

Compound	Compound
Benzene	Cis-1,3-Dichloropropene
Bromoform	Trans-1,3-Dichloropropene
Carbon tetrachloride	1,3-Dichloropropene
Chlorobenzene	Ethylbenzene
Chloroethane	Methyl bromide
2-Chloroethyl vinyl ether	Styrene
Chloroform	Methylene chloride
Chloromethane	1,1,2,2-Tetrachloroethane
Dibromochloromethane	Tetrachloroethylene
Dichlorobromomethane	Toluene
1,2-Dichlorobenzene	Trichlorofluoromethane
1,3-Dichlorobenzene	1,1,1-Trichloroethane
1,4-Dichlorobenzene	1,1,2-Trichloroethane
Dichlorodifluoromethane	Trichloroethylene
1,2-Dibromoethane	Vinyl chloride
1,1-Dichloroethane	Xylenes, mixed
1,2-Dichloroethane	
1,1-Dichloroethylene	
1,2-trans-Dichloroethylene	
1,2-Dichloropropane	

Table 21.—***Herbicides for which round-one water samples were analyzed***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory using the following methods: triazine herbicides by gas chromatography with a nitrogen phosphorus detector; chlorophenoxy-acid herbicides by converting the compounds to methyl esters followed by identification with gas chromatography and an electron-capture detector (Wershaw and others, 1987, p. 40, 47). Laboratory reporting levels are from C.A. Watterson and A.T. Kashuba (U.S. Geological Survey, written commun., 1993). Abbreviation: µg/L, microgram per liter]

Triazine herbicides			
Herbicide	Reporting level (µg/L)	Herbicide	Reporting level (µg/L)
Alachlor	0.2	Hexazinone	0.2
Ametryn	.1	Metolachlor	.2
Atrazine	.1	Metribuzin	.1
Bromacil	.2	Prometon	.2
Butachlor	.1	Prometryn	.1
Butylate	.1	Propachlor	.1
Carboxin	.2	Propazine	.1
Cyanazine	.2	Simazine	.1
Cycloate	.1	Simetryn	.1
De-ethylatrazine	.2	Terbacil	.2
De-isopropylatrazine	.2	Trifluralin	.1
Diphenamid	.1	Vernolate	.1

Chlorophenoxy-acid herbicides: reporting level is 0.01 µg/L	
Herbicide	Herbicide
2,4-D	Silvex
2,4-DP	2,4,5-T

Table 22.—***Insecticides, benzene hexachlorides, gross polychlorinated compounds, and aroclors for which round-one water samples were analyzed***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory using the following methods: carbamate insecticides are extracted with methylene chloride, concentrated, and analyzed by high-performance liquid chromatography using a dual-channel variable-wavelength ultraviolet detector; organophosphorus compounds are extracted with hexane and determined on a gas chromatograph with flame-photometric detectors; and organochlorine compounds are extracted with hexane and determined by gas chromatography using electron-capture detectors (Wershaw and others, 1987, p. 27-28 and 49). Laboratory reporting levels are from Pritt and Jones (1989) except those for carbamate insecticides which are from C.A. Watterson and A.T. Kasuba (U.S. Geological Survey, written commun., 1993). Abbreviation: µg/L, microgram per liter]

Carbamate insecticides: reporting level is 0.5 µg/L		
Aldicarb	Carbofuran	1-Naphthol
Aldicarb sulfone	3-Hydroxycarbofuran	Oxamyl
Aldicarb sulfoxide	Methiocarb	Propham
Carbaryl (Sevin)	Methomyl	Propoxur

Organophosphorus insecticides: reporting level is 0.01 µg/L		
Chlorpyrifos; Dursban	Fonofos	Phorate
Diazinon	Malathion	Phosphorotrithioate, S,S,S-tributyl-(DEF)
Disulfoton (Di-syston)	Methyl parathion	Trithion
Ethion	Parathion	

Organochlorine insecticides: reporting level is 0.01 µg/L except for chlordane and perthane (0.1 µg/L), and toxaphene (1.0 µg/L),		
Aldrin	Dieldrin	Lindane
Chlordane	Endosulfan	Methoxychlor
DDD	Endrin	Mirex
DDE	Heptachlor	Perthane
DDT	Heptachlor epoxide	Toxaphene

Table 22.—***Insecticides, benzene hexachlorides, gross polychlorinated compounds, and aroclors for which round-one water samples were analyzed***—*Continued*

Benzene hexachlorides: reporting level is 0.01 µg/L

alpha-Benzene hexachloride (alpha-BHC)

beta-Benzene hexachloride (beta-BHC)

delta-Benzene hexachloride (delta-BHC)

Gross polychlorinated compounds: reporting level is 0.1 µg/L

Gross polychlorinated biphenyls (PCB)

Gross polychlorinated naphthalenes (PCN)

Aroclors: reporting level is 0.1 µg/L

Aroclor 1016	Aroclor 1242	Aroclor 1260
Aroclor 1221	Aroclor 1248	
Aroclor 1232	Aroclor 1254	

Table 23.—***Concentrations of radioactivity and selected radionuclides in water from round-one samples, wells NRF-6 and NRF-7***

[Analyses were performed by the U.S. Geological Survey's National Water Quality Laboratory using the following methods: gross alpha- and gross beta-particle radioactivity by residue procedure; radium-226 by radon emanation; radium-228 by separation and beta counting; and tritium by liquid scintillation. Raw field samples were processed in laboratory prior to analysis. Analytical results and uncertainties—for example, 7.03±2.74—are in indicated units. Analytical uncertainties are reported as 1s. Concentrations which meet or exceed the reporting level of three times the 1s value are shown in boldface type. See figure 2 for location of wells. Abbreviations: µg/L, microgram per liter; pCi/L, picocurie per liter; Sr-90/Y-90, strontium-90 in equilibrium with yttrium-90]

Radioactivity or radionuclide	NRF-6 (9/9/91)	NRF-7 (9/10/91)
Gross alpha-particle radioactivity		
dissolved as uranium (µg/L)	7.03±2.74	**2.54±0.484**
dissolved as thorium-230 (pCi/L)	5.22±2.04	**1.77±0.336**
suspended as uranium (µg/L)	.127±0.244	.189±0.226
suspended as thorium-230 (pCi/L)	.075±0.144	.174±0.214
Gross beta-particle radioactivity		
dissolved as Sr-90/Y-90 (pCi/L)	1.85±0.68	**2.80±0.364**
dissolved as cesium-137 (pCi/L)	2.43±0.89	**3.75±0.56**
suspended as Sr-90/Y-90 (pCi/L)	-.035±0.240	**.928±0.286**
suspended as cesium-137 (pCi/L)	-.036±0.252	**.963±0.297**
Radium-226, dissolved (pCi/L)	**.035±0.006**	**.038±0.007**
Radium-228, dissolved (pCi/L)	.122±0.155	.266±0.165
Tritium, total (pCi/L)	**124.8±12.8**	19.2±12.8