

# **A Seepage Investigation of an Area at and near Oak Ridge National Laboratory, Oak Ridge, Tennessee, March through August 1993**

**By GREGORY C. JOHNSON**

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## CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To obtain
foot (ft)	0.3048	meter
cubic foot per second (ft <sup>3</sup> /s)	0.02832	cubic meters per second
acre	0.4047	square hectometer
mile (mi)	1.609	kilometer
square mile (mi <sup>2</sup> )	2.590	square kilometer

Temperature in degrees Celsius (°C) can be converted to degrees Fahrenheit (°F) as follows: °F = 1.8 x °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.

Water-quality unit:

µS/cm      microsiemens per centimeter at 25 degrees Celsius

# A SEEPAGE INVESTIGATION OF AN AREA AT AND NEAR OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TENNESSEE, MARCH THROUGH AUGUST 1993

BY GREGORY C. JOHNSON

## ABSTRACT

A seepage investigation was conducted of an area surrounding the Oak Ridge National Laboratory for the period of March through August 1993. The project was divided into three phases: a reconnaissance to inventory and map seeps, springs, and stream-measurement sites; a high base flow seepage investigation; and a low base flow seepage investigation.

The reconnaissance consisted of following each tributary to its source to inventory each site where water was issuing from the ground. Stream-measurement sites were located along stream reaches at approximately 500-foot intervals. A total of 822 sites were identified. A global positioning system was used to locate 483 sites to within 3- to 5-meter accuracy.

The high base flow seepage investigation was conducted from April 29 through May 3, 1993, and from May 7 through May 10, 1993. Measurements were made at 604 of the 822 sites identified in the reconnaissance. Flow rates ranged from 0 to 2.15 cubic feet per second ( $\text{ft}^3/\text{s}$ ) for the streams, from 0 to  $0.07 \text{ ft}^3/\text{s}$  for the seeps, and from 0 to  $0.55 \text{ ft}^3/\text{s}$  for the springs. Values of pH ranged from 5.1 to 8.5 for the streams, from 4.8 to 8.3 for the seeps, and from 5.9 to 8.0 for the springs. Specific conductance ranged from 21 to 1,004 microsiemens per centimeter ( $\mu\text{S}/\text{cm}$ ) for the streams, 14 to  $687 \mu\text{S}/\text{cm}$  for the seeps, and from 28 to  $589 \mu\text{S}/\text{cm}$  for the springs.

Two stream reaches, one on Center Seven Tributary to Melton Branch and one on Bearden Creek, were intensively sampled in conjunction with the high base flow seepage investigation. On April 30, 1993 at Center Seven Tributary to Melton Branch, the pH ranged from 6.4 to 7.6; specific conductance, from 121 to  $265 \mu\text{S}/\text{cm}$ ; and temperature, from 11.5 to  $20.0^\circ\text{C}$ . On May 8, 1993 at Bearden Creek, the pH ranged from 7.7 to 8.0; specific conductance, from 371 to  $458 \mu\text{S}/\text{cm}$ ; and temperature, from 14.0 to  $22.0^\circ\text{C}$ .

The low base flow investigation was conducted from August 8 through August 10, 1993. The seeps and springs that were flowing during the high base flow seepage investigation were revisited. Twenty-seven of the 147 seeps visited were flowing; discharge ranged from 0 to  $0.07 \text{ ft}^3/\text{s}$ ; pH, from 6.7 to 8.1; specific conductance, from 59 to  $516 \mu\text{S}/\text{cm}$ ; and temperature, from 14.0 to  $23.0^\circ\text{C}$ . Forty of the 61 springs visited were flowing; discharge ranged from 0 to  $0.34 \text{ ft}^3/\text{s}$ ; pH, from 6.6 to 8.0; specific conductance, from 87 to  $572 \mu\text{S}/\text{cm}$ ; and temperature, from 13.0 to  $20.5^\circ\text{C}$ .

## INTRODUCTION

The U.S. Geological Survey (USGS), in cooperation with the U.S. Department of Energy, conducted a seepage investigation on 4,328 acres surrounding the Oak Ridge National Laboratory (ORNL). The information from this project will aid the ORNL

Environmental Restoration Program, Groundwater Operable Units Remedial Investigations Project to develop a better understanding of ground-water and surface-water interaction on the Oak Ridge Reservation.

## Purpose and Scope

This report describes the results of a seepage investigation conducted at ORNL from March through August 1993. The report includes a map showing site locations, and tables showing discharge, pH, specific conductance, temperature, and the site coordinates.

## Approach

The study involved three phases of activity: (1) a reconnaissance to inventory and map seeps, springs, and stream-measurement sites (2) the measurement of discharge and water-quality characteristics during high base flow conditions, and (3) the measurement of discharge and water-quality characteristics under low base flow conditions.

## Description of the Study Area

The Oak Ridge Reservation (ORR) is located in East Tennessee. It is in the Valley and Ridge Province at a point where the Tennessee salient of the Appalachian foreland fold-thrust belt is narrowest and most convex (Hatcher and others, 1992). Ordovician and Cambrian rocks that underlie the Valley and Ridge Province are predominantly carbonate, siltstone, shale, and some sandstone.

The 58,000-acre ORR is bounded on the northeast, southeast, and southwest by the Clinch River, and on the northwest by Blackoak Ridge (McMaster, 1967). The three major facilities in the area are X-10, the Oak Ridge National Laboratory, a research and development center; Y-12, a research, development, and production center; and K-25, the Gaseous Diffusion Plant (ORGDP), a production center that was closed in 1986.

The ORNL seepage investigation study area is bounded by Copper Ridge on the southeast, Clinch River on the southwest, Bearden Creek watershed on the northeast, and an arbitrary boundary along the electric power lines on the northwest (fig. 1). Certain areas within the study area were not sampled due to safety or security concerns. Eighteen sampling areas

encompassing a total area of 4,328 acres were included in the study (table 1).

## SEEP AND SPRING INVENTORY

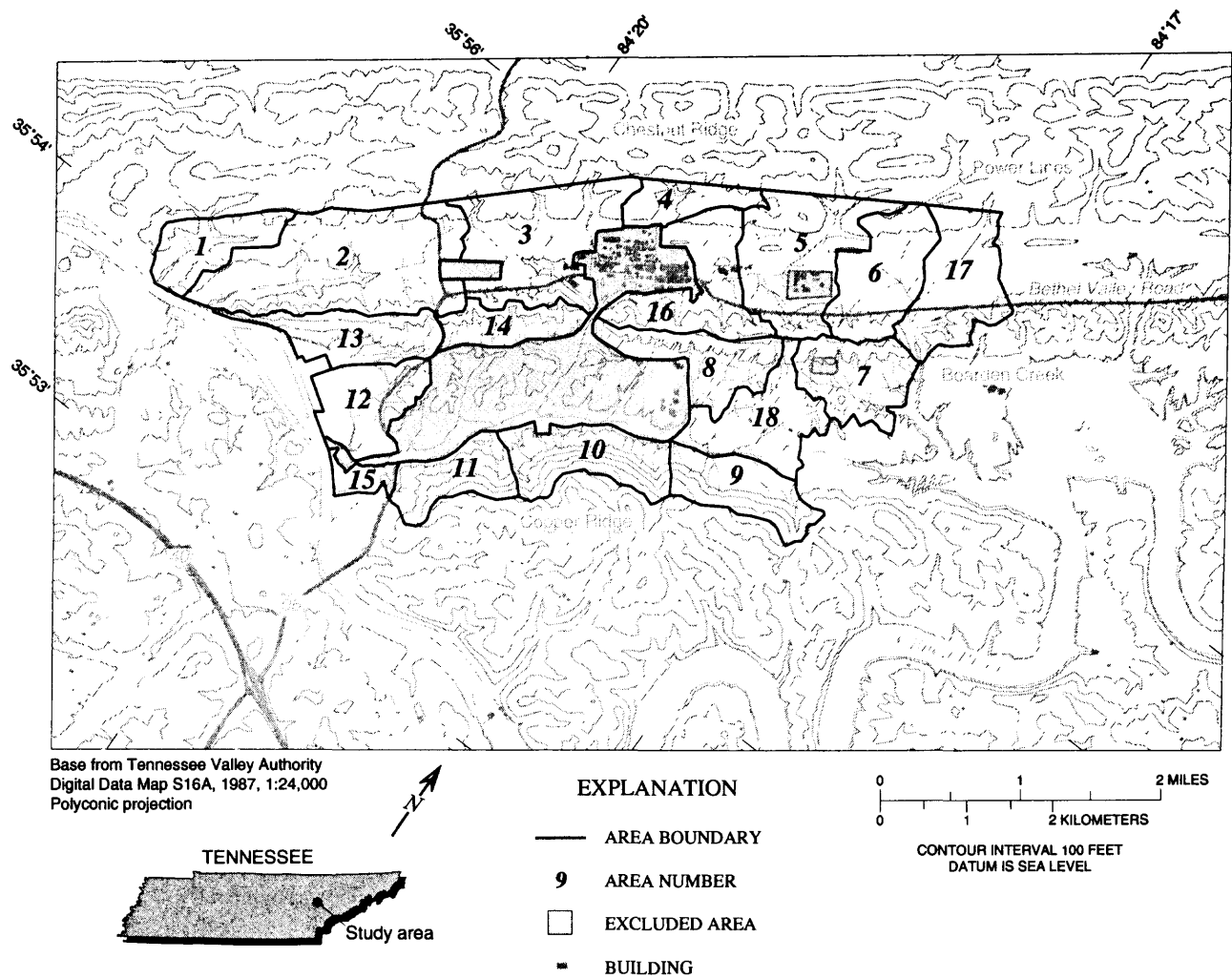
A reconnaissance was conducted from March 28 to April 20, 1993 to inventory and map the location of seeps, springs, and stream-measurement sites. For each of the 18 sampling areas, all streams and tributaries were followed to their source or to an area boundary. A total of 822 sites were staked and assigned unique identification numbers. The inventory consists of 279 seeps, 68 springs, and 475 stream-measurement sites (plate 1).

## Site-Numbering System

Each site was assigned a unique identification number in which the sampling area number was used for the first two digits, and an upstream order number from 001 to 999 for the last three digits (table 2, located in back of report). This approach assigns the lowest number to the most downstream site in the

**Table 1.** Size of sub-basin sampling areas in the Oak Ridge National Laboratory seepage investigation

Sampling area	Area, in acres	Area, in square miles
1	168.1	0.26
2	609.0	.95
3	413.5	.65
4	112.6	.18
5	345.7	.54
6	263.4	.41
7	207.8	.32
8	207.1	.32
9	199.7	.31
10	237.6	.37
11	167.2	.26
12	205.7	.32
13	205.7	.32
14	135.0	.21
15	46.5	.07
16	281.0	.44
17	280.5	.44
18	242.4	.38
Total	4,328.5	6.75



**Figure 1.** Study area at Oak Ridge National Laboratory, Oak Ridge, Tennessee.

basin, and increasingly larger numbers to sites upstream. When a tributary is reached, site numbers increase along the tributary upstream to its source, and numbering resumes along the main channel. Included within sampling areas 18 and 6 are two intensively sampled stream reaches identified as areas 19 and 20 (locations shown in figs. 3 and 4, respectively).

The sites were classified as either a seep (SE), spring (SP), or stream-measurement site (Q) (table 3, located at back of report). A seep was defined as a discharge of water from the ground without a distinguishable point outlet and generally at a low flow rate. A spring was defined as a discharge of water at a defined outlet or where water was upwelling. The presence of watercress usually was an indicator of a spring. Stream-measurement sites were located about every 500 feet along each channel with flowing water, and at the confluence of tributaries with flow. In some cases, every seep could not be defined; therefore, some sites are noted as seepage reaches (SE/R) or seepage areas (SE/A). A seepage reach is where multiple seeps occur along a section of the channel reach, and a seepage area is where multiple undifferentiated seeps occur in a defined area.

## Site Coordinates

A global positioning system (GPS) was used to determine the coordinates of 483 sites to within 3- to 5-meter accuracy. The remaining sites were mapped by measuring their distances from the GPS points or other control points, plotting locations on field maps, and digitizing these points. Locations of 894 sites, consisting of the seepage investigation sites and sites along the intensively sampled stream reaches, are reported in ORNL grid coordinates and State plane coordinates (table 2, located at back of report).

## RESULTS OF SEEPAGE INVESTIGATION

Two seepage investigations were conducted, one during high base flow and one during low base flow. A waiting period of 72 hours after rainfall events was used to minimize the possible influence of ephemeral streams and springs (Mulholland, 1991). Measurements in each sampling area were completed in 1 day to minimize variations in flow rates. During the high base flow seepage investigation, discharge and water-quality measurements were made at each site with flowing water. For the low base flow seepage

investigation, only the seeps and springs that were flowing during the high base flow canvass were revisited.

## Field Methods

Four methods were used to measure discharge: (1) volumetric measurements, (2) current-meter measurements, (3) surface velocity measurements, and (4) estimations.

Volumetric measurements are typically the most accurate method for quantifying discharge during low-flow conditions. For this study, a volume of water was collected during a timed interval for four iterations, and the discharge was calculated as the average of the four measurements.

Pygmy-type current meters were used where practical. Using standard USGS current-meter discharge-measurement procedures, the accuracy of measurements range from about 5 percent error on some of the larger streams to greater than 8 percent error on some sites with low discharge.

The third type of discharge measurement involved the use of floats. The cross-sectional area of a stream was measured, and the average time for a float to travel a known distance for four iterations was determined. Discharge was then calculated and reported to one one-hundredth of a cubic foot per second.

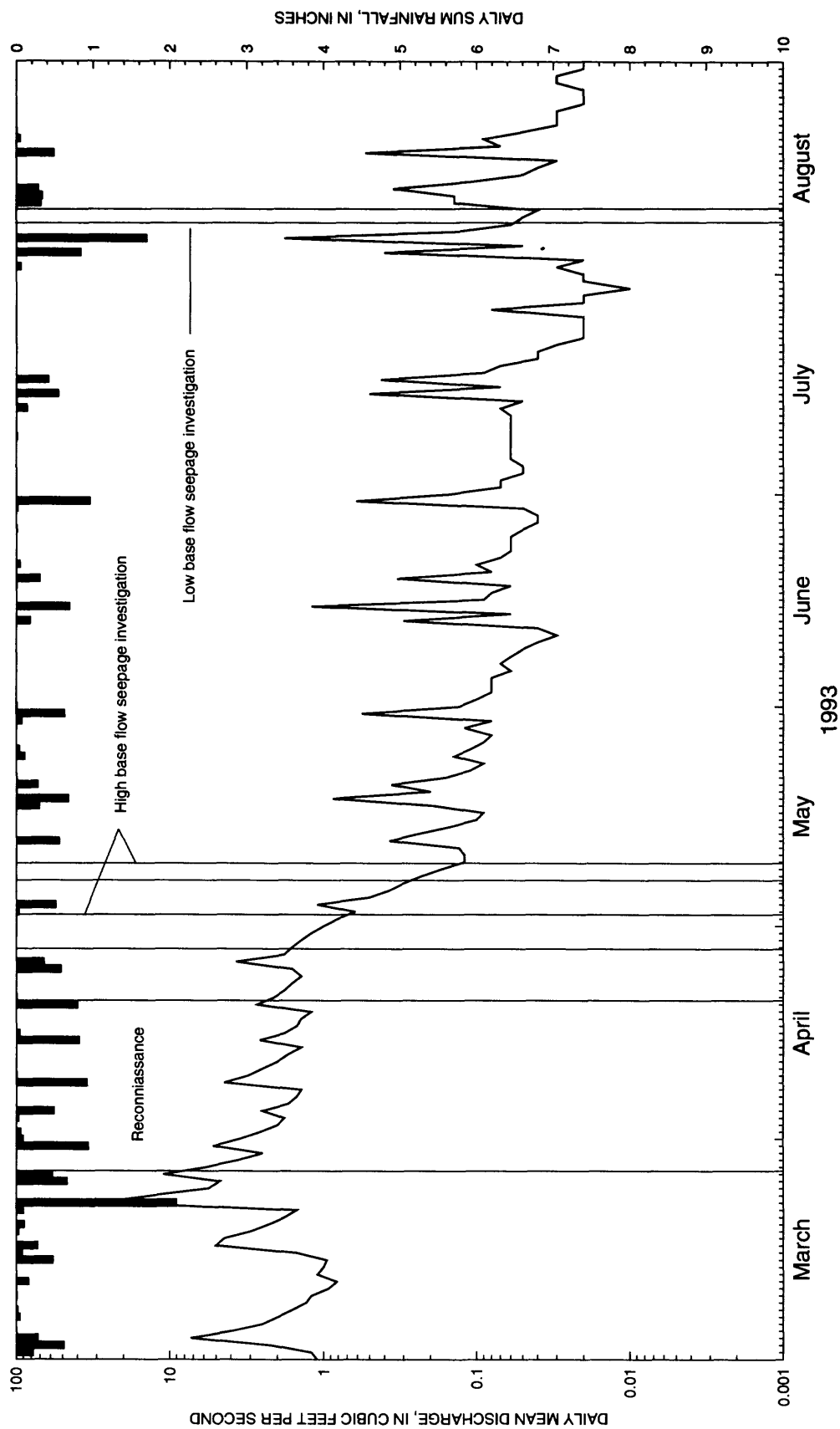
The final, and least accurate, method was to estimate the discharge. This method was used in cases where the discharge was very small, and no other method was practical.

A notation was made to indicate sites where flow was visible, but less than the minimum reportable discharge. At sites where the flow was less than five one-thousandths of a cubic foot per second or 0.005 ft<sup>3</sup>/s, the flow was reported as zero. For flows greater than five one-thousandths of a cubic foot per second, the discharge was rounded to the nearest hundredth of a cubic foot per second.

Conductance and pH meters were used to collect specific conductance, temperature, and pH. The meters were calibrated every morning before use, and again in the field if questionable values occurred.

Discharge at the Whiteoak Creek near Melton Hill, Tennessee, stream gage (03536320) and rainfall at Whiteoak Creek near Melton Valley Road (03536550) were used as indicators of the hydrologic conditions for the study area (fig. 2). During the





**Figure 2.** Daily mean discharge at Whiteoak Creek near Melton Hill, Tennessee, and daily rainfall at Whiteoak Creek near Melton Valley Road, at Oak Ridge, Tennessee, from March 1, 1993 through September 1, 1993.

reconnaissance, March 28 through April 20, 1993, daily mean discharge at Whiteoak Creek ranged from 1.2 to 5.8 ft<sup>3</sup>/s. The daily mean discharge ranged from 0.12 to 1.4 ft<sup>3</sup>/s during the high base flow seepage investigation and from 0.04 to 0.06 ft<sup>3</sup>/s during the low base flow seepage investigation.

## High Base Flow Seepage Investigation

The high base flow seepage investigation was conducted from April 29 through May 3, 1993, and from May 7 through May 10, 1993. All 822 sites identified during the reconnaissance were revisited. Discharge and water-quality measurements were made at 604 sites with flowing water (plate 1, table 3, located at back of report). At 236 of the 604 sites with flowing water, the flow was reported as zero with a notation that the flow was less than the minimum reportable discharge (0.005 ft<sup>3</sup>/s). Flow rates ranged from 0 to 2.15 ft<sup>3</sup>/s for the streams, from 0 to 0.07 ft<sup>3</sup>/s for the seeps, and from 0 to 0.55 ft<sup>3</sup>/s for the springs (table 4). Values for pH ranged from 5.1 to 8.5 for the streams, from 4.8 to 8.3 for the seeps, and from 5.9 to 8.0 for the springs. Specific conductance ranged from 21 to 1,004 microsiemens per centimeter (μS/cm) for the streams, 14 to 687 μS/cm for the seeps, and from 28 to 589 μS/cm for the springs. Temperature ranged from 9.5 to 24.0 °C for the streams, 11.0 to 21.0 °C for the seeps, and 11.5 to 18.5 °C for the springs.

In conjunction with the high base flow seepage investigation, two stream reaches were intensively sampled for pH, specific conductance, and temperature. The data were collected at points where changes in flow contribution, geology, or channel morphology occurred. Center Seven Tributary to Melton Branch was evaluated on April 30, 1993, and Bearden Creek was evaluated on May 8, 1993 (plate 1). Coordinates for these points are listed in table 2.

Center Seven Tributary to Melton Branch (fig. 3) was selected for sampling due to the number of reaches where the stream flowed into the ground through macropores in the stream bed (swallets) and then reemerged downstream. Center Seven Tributary is also characterized by having braided channel reaches. The site numbering system for this part of the study (table 5, and fig. 3) used 19 for the first two digits and 001 through 051 for the last three digits. The sampling on Center Seven Tributary to Melton Branch started at site 18070 (plate 1). The temperature ranged

from 11.5 to 20.0 °C; specific conductance, from 121 to 265 μS/cm; and pH, from 6.4 to 7.6 (table 6).

A section of Bearden Creek (fig. 4) was also selected for intensive sampling based on the occurrence of many limestone and shale outcroppings in the stream bed. Water-quality measurements were taken adjacent to these outcroppings. The sampling on Bearden Creek started at the triple channel junction where sites 06020 and 06055 are located (plate 1). The east and middle branches of the channels were flowing, and temperature, specific conductance, and pH were measured at points along these channels (table 7). The site numbering system for this study uses 20 for the first two digits and 001 through 019 for the last three digits. The temperature ranged from 14.0 to 22.0 °C; specific conductance, from 371 to 458 μS/cm; and pH, from 7.7 to 8.0 (table 8).

## Low Base Flow Seepage Investigation

The seeps and springs that were flowing during the high base flow seepage investigation were revisited during the low base flow seepage investigation (plate 2, table 9, located at back of report). Stream sites were not revisited. Two additional seeps, 03718 and 08280a, and two springs, 02356 and 05070a, not identified during the reconnaissance, were added during the low base flow seepage phase of the study. At 20 spring sites and 19 seep sites, the flow rate was reported as zero with a notation that the flow was less than the minimum reportable discharge (0.005 ft<sup>3</sup>/s). Twenty-seven of the 147 seeps visited were flowing, and had discharge ranging from 0 to 0.07 ft<sup>3</sup>/s; pH, from 6.7 to 8.1; specific conductance, from 59 to 516 μS/cm; and temperature, from 14.0 to 23.0 °C. Forty of the 61 springs revisited were flowing, and had discharge ranging from 0 to 0.34 ft<sup>3</sup>/s; pH, from 6.6 to 8.0; specific conductance, from 87 to 572 μS/cm; and temperature, from 13.0 to 20.5 °C (table 10).

## SUMMARY

A seepage investigation was conducted in the area surrounding Oak Ridge National Laboratory for the period of March through August 1993. The study was performed in three phases: a reconnaissance and mapping of the sites, a high base flow seepage investigation, and a low base flow seepage investigation.

The reconnaissance was conducted from March 28 through April 20, 1993, to identify and map seeps,

**Table 4.** Statistical summary of discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory

[ft<sup>3</sup>/s, cubic feet per second; μS/cm, microsiemens per centimeter at 25 °C; °C, degrees Celsius; --, not meaningful]

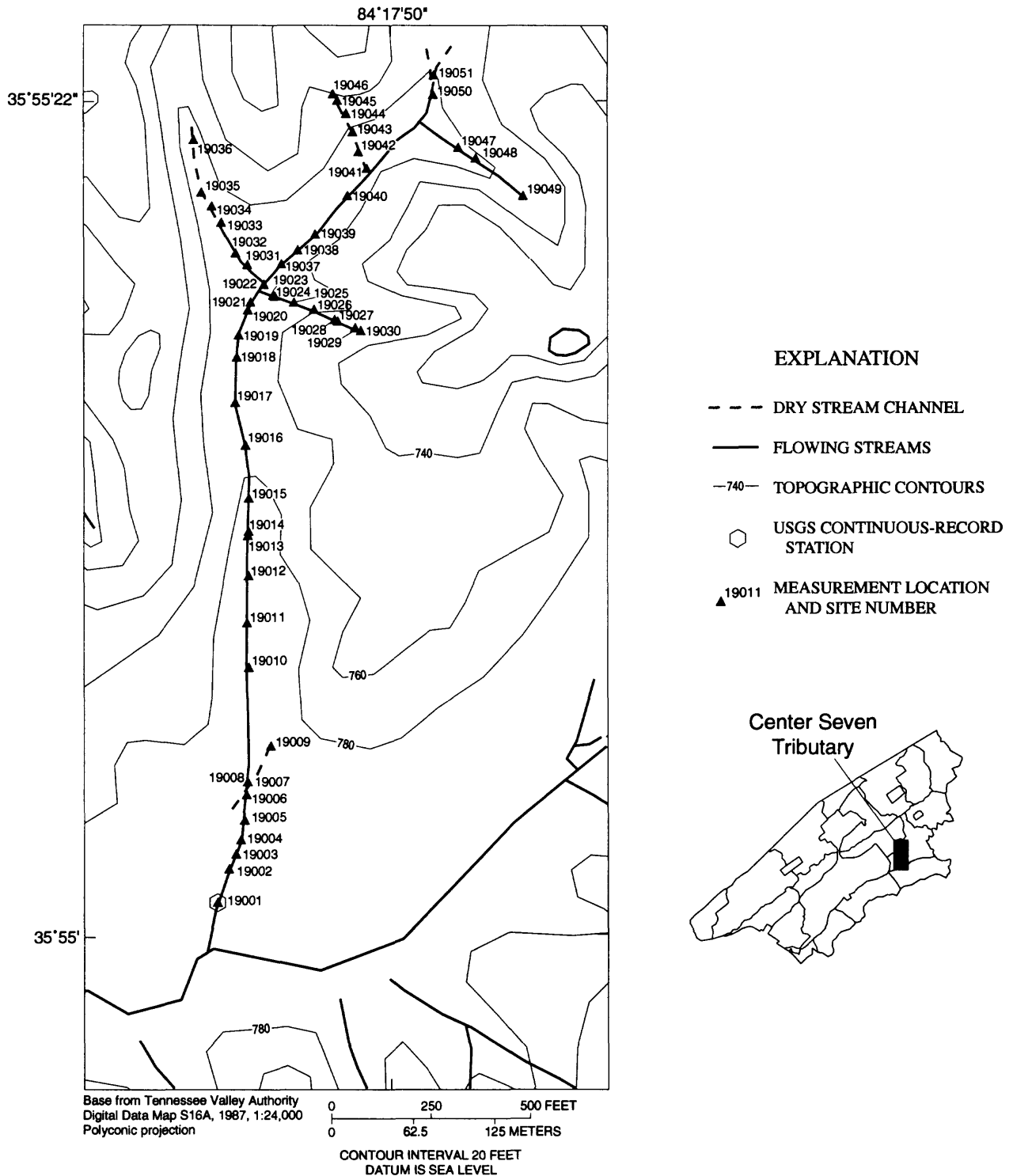
Stream-measurement sites (excluding 69 dry sites, and 1 unmeasured site)				
Statistic	Discharge (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
Number of measurements	404	400	404	404
Number of missed measurements	1	5	1	1
Minimum value	0	5.1	21	9.5
Maximum value	2.15	8.5	1,004	24.0
Mean	.12	--	244	15.2
Standard deviation	.27	.6	135	2.5
25th percentile	0	7.2	139	13.5
Median	.02	7.4	225	15.2
75th percentile	.07	7.8	333	16.5

Seep sites (excluding 137 dry sites, and 2 unmeasured sites)				
Statistic	Discharge (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
Number of measurements	136	138	138	139
Number of missed measurements	4	2	2	1
Minimum value	0	4.8	14	11.0
Maximum value	.07	8.3	687	21.0
Mean	0	--	248	14.5
Standard deviation	.01	.7	185	2.0
25th percentile	0	6.5	90	13.0
Median	0	6.9	186	14.0
75th percentile	0	7.4	370	15.0

Spring sites (excluding 8 dry sites, and 1 unmeasured site)				
Statistic	Discharge (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
Number of measurements	58	59	59	59
Number of missed measurements	1	0	0	0
Minimum value	0	5.9	28	11.5
Maximum value	.55	8.0	589	18.5
Mean	.05	--	272	13.5
Standard deviation	.09	.4	136	1.3
25th percentile	.01	6.8	193	12.5
Median	.03	7.1	255	13.5
75th percentile	.05	7.3	351	14.0



**Figure 3.** Sampling area 19 showing location of sites for intensive sampling on Center Seven Tributary to Melton Branch, April 30, 1993.

**Table 5. Water-quality data for Center Seven Tributary to Melton Branch at Oak Ridge National Laboratory on April 30, 1993**[°C, degrees Celsius;  $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 °C; ft, feet; a, multiple measurements at different times during the day]

Site number	Temperature (°C)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH
19001	12.5	238	7.3
19002	15.5	239	7.2
19003	15.5	168	7.2
19004	12.5	244	7.3
19005	12.5	248	7.4
19006	12.5	248	7.4
19007	12.5	255	7.5
19008	13.0	198	7.0
19009	13.0	180	6.7
19010	13.0	260	7.3
19011	13.5	261	7.4
19012a	13.5	257	
	15.5	260	7.5
	16.0	260	7.6
19013	16.0	259	7.4
19014	13.5	253	7.3
19015	16.5	243	7.4
19016	16.5	226	7.5
19017	16.5	226	7.6
19018	16.5	212	7.3
19019	16.5	202	7.3
19020	16.5	158	7.4
19021	16.5	175	7.4
19022	16.0	193	7.4
19023	14.0	180	6.7
19024	16.0	186	7.4
19025	17.0	198	7.1
19026	20.0	189	7.3
19027	19.5	194	7.1
19028	16.5	157	7.4
19029	19.5	155	6.8
19030	16.0	188	6.4
19031	14.0	173	7.0
19032	13.5	134	7.0
19033	14.5	185	7.0
19034	13.5	177	7.0
19035	14.0	179	7.0
19036	13.0	183	6.5
19037	17.0	189	7.6
19038	16.5	183	7.6
19039	16.5	187	7.6
19040	16.5	188	7.4
19041	16.5	174	7.2
19042	17.0	197	7.2
19043	16.5	206	7.3
19044	16.5	199	7.2
19045	17.0	257	7.5
19046	16.0	176	7.2
19047	15.0	235	7.4
19048	14.0	263	7.4
19049	11.5	265	7.6
19050	15.5	121	6.9
19051	14.0	122	6.4

**Table 6.** Statistical summary of water-quality data for Center Seven Tributary to Melton Branch at Oak Ridge National Laboratory on April 30, 1993

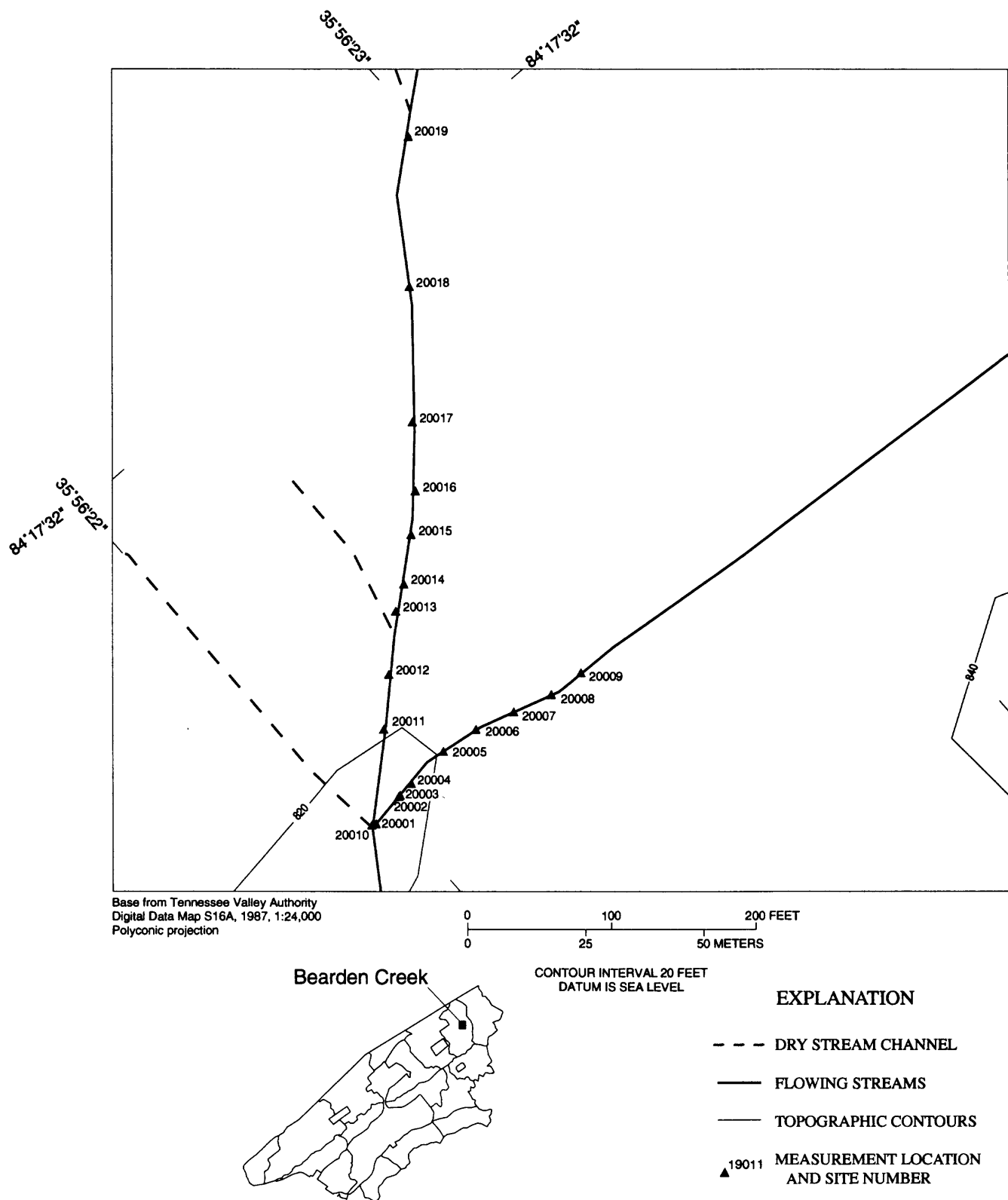
[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 °C; °C, degrees Celsius; --, not meaningful]

Statistic	pH	Specific conductance ( $\mu\text{S}/\text{cm}$ )	Temperature (°C)
Number of measurements	52	53	53
Minimum value	6.4	121	11.5
Maximum value	7.6	265	20.0
Mean	--	206	15.2
Standard deviation	0.3	39	1.9
25th percentile	7.0	179	13.5
Median	7.3	197	15.5
75th percentile	7.4	244	16.5

**Table 7.** Water-quality data for Bearden Creek at Oak Ridge National Laboratory on May 8, 1993

[°C, degree Celsius;  $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 °C; a, site measured twice at different times during the day]

Site number	Temperature (°C)	Specific conductance ( $\mu\text{S}/\text{cm}$ )	pH
20001	14.0	405	7.9
20001a	18.5	393	8.0
20002	14.5	379	7.9
20003	14.0	425	7.8
20004	14.0	450	7.7
20005	14.5	456	7.8
20006	14.5	451	7.8
20007	14.5	452	7.8
20008	14.5	457	7.8
20009	15.5	458	7.8
20010	18.5	379	7.9
20011	19.0	380	7.9
20012	19.0	380	7.8
20013	19.0	380	7.8
20014	19.0	380	7.7
20015	19.5	376	7.8
20016	20.5	371	8.0
20017	21.0	371	8.0
20018	21.5	372	7.9
20019	22.0	374	7.7



**Figure 4.** Sampling area 20 showing location of sites for intensive sampling on Bearden Creek, May 8, 1993.

**Table 8.** Statistical summary of water-quality data for Bearden Creek at Oak Ridge National Laboratory on May 8, 1993[ $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 °C; °C, degrees Celsius; --, not meaningful]

Statistic	pH	Specific conductance ( $\mu\text{S}/\text{cm}$ )	Temperature (°C)
Number of measurements	20	20	20
Minimum value	7.7	371	14.0
Maximum value	8.0	458	22.0
Mean	--	406	17.6
Standard deviation	0.1	36	2.8
25th percentile	7.8	376	14.5
Median	7.8	380	18.5
75th percentile	7.9	450	19.0

**Table 10.** Statistical summary of discharge and water-quality data for the low base flow seepage investigation at Oak Ridge National Laboratory[ $\text{ft}^3/\text{s}$ , cubic feet per second;  $\mu\text{S}/\text{cm}$ , microsiemens per centimeter at 25 °C; °C, degrees Celsius; --, not meaningful]

Seep sites (excluding 120 dry sites)				
Statistic	Discharge ( $\text{ft}^3/\text{s}$ )	pH	Specific conductance ( $\mu\text{S}/\text{cm}$ )	Temperature (°C)
Number of measurements	27	27	27	27
Minimum value	0	6.7	59	14.0
Maximum value	.07	8.1	516	23.0
Mean	.01	--	245	18.2
Standard deviation	.02	.4	103	2.0
25th percentile	0	7.2	197	17.0
Median	0	7.4	259	18.5
75th percentile	.01	7.5	275	19.5

Spring sites (excluding 21 dry sites)				
Statistic	Discharge ( $\text{ft}^3/\text{s}$ )	pH	Specific conductance ( $\mu\text{S}/\text{cm}$ )	Temperature (°C)
Number of measurements	39	39	40	40
Number of missed measurements	<sup>a</sup> 1	1	0	0
Minimum value	0	6.6	87	13.0
Maximum value	.34	8.0	572	20.5
Mean	.02	--	315	16.0
Standard deviation	.06	.3	113	2.0
25th percentile	0	7.1	254	14.0
Median	0	7.3	288	16.0
75th percentile	.02	7.6	394	17.5

<sup>a</sup> Two adjacent springs, 05070 and 05070a, were quantified with one discharge measurement.



springs, and stream-measurement sites. A total of 822 sites were identified, which consisted of 279 seeps, 68 springs, and 475 stream-measurement sites.

The high base flow seepage investigation was conducted from April 29 through May 3, 1993, and from May 7 to May 10, 1993. Measurements were made at 604 of the 822 sites identified in the reconnaissance. At 236 of the 604 sites with flowing water, flow was insufficient to measure and was reported as zero with a notation that the flow was less than the minimum reportable discharge ( $0.005 \text{ ft}^3/\text{s}$ ). Flow rates ranged from 0 to  $2.15 \text{ ft}^3/\text{s}$  for the streams, from 0 to  $0.07 \text{ ft}^3/\text{s}$  for the seeps, and from 0 to  $0.55 \text{ ft}^3/\text{s}$  for the springs. Values for pH ranged from 5.1 to 8.5 for the streams, from 4.8 to 8.3 for the seeps, and from 5.9 to 8.0 for the springs. Specific conductance ranged from 21 to  $1,004 \text{ }\mu\text{S}/\text{cm}$  for the streams, 14 to  $687 \text{ }\mu\text{S}/\text{cm}$  for the seeps, and from 28 to  $589 \text{ }\mu\text{S}/\text{cm}$  for the springs.

Two stream reaches, one on Center Seven Tributary to Melton Branch and one on Bearden Creek, were intensively sampled in conjunction with the high base flow seepage investigation. On April 30, 1993, at Center Seven Tributary to Melton Branch, the pH ranged from 6.4 to 7.6; specific conductance, from 121 to  $265 \text{ }\mu\text{S}/\text{cm}$ ; and temperature, from  $11.5$  to  $20.0^\circ\text{C}$ . On May 8, 1993, at Bearden Creek, the pH ranged from 7.7 to 8.0; specific conductance, from 371 to  $458 \text{ }\mu\text{S}/\text{cm}$ ; and temperature, from  $14.0$  to  $22.0^\circ\text{C}$ .

The low base flow investigation was conducted from August 8 through August 10, 1993. The seeps and springs that were flowing during the high base flow seepage investigation were revisited. Two addi-

tional seeps and two springs were identified during the low base flow investigation. At 19 seep sites and 20 spring sites, the flow rate was reported as zero with a notation that the flow was less than the minimum reportable discharge ( $0.005 \text{ ft}^3/\text{s}$ ). Twenty-seven of the 147 seeps visited were flowing and had discharge ranging from 0 to  $0.07 \text{ ft}^3/\text{s}$ ; pH, from 6.7 to 8.1; specific conductance, from 59 to  $516 \text{ }\mu\text{S}/\text{cm}$ ; and temperature, from  $14.0$  to  $23.0^\circ\text{C}$ . Forty of the 61 springs revisited were flowing, and had discharge ranging from 0 to  $0.34 \text{ ft}^3/\text{s}$ ; pH, from 6.6 to 8.0; specific conductance, from 87 to  $572 \text{ }\mu\text{S}/\text{cm}$ ; and temperature, from  $13.0$  to  $20.5^\circ\text{C}$ .

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- McMaster, W.M., 1967, Hydrologic data for the Oak Ridge area Tennessee: U.S. Geological Survey Water-Supply Paper 1839-N, 90 p.
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**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory

[Method: GPS, global positioning system; DIG, digitized; a, second site identified at the same location; Latitude and Longitude in degrees, minutes, and seconds]

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
01025	15823	21678	35	54	9.2	-84	21	32.2	GPS
01030	15841	21681	35	54	9.3	-84	21	32.0	GPS
01032	15951	21868	35	54	11.5	-84	21	32.2	DIG
01034	15919	22185	35	54	13.9	-84	21	34.7	DIG
01035	16163	22037	35	54	14.0	-84	21	31.2	GPS
01040	16231	22029	35	54	14.3	-84	21	30.5	GPS
01045	15941	22506	35	54	16.7	-84	21	36.6	GPS
01050	15811	22622	35	54	16.9	-84	21	38.7	GPS
01055	16497	22064	35	54	16.1	-84	21	28.0	DIG
01320	16818	22645	35	54	22.6	-84	21	28.7	GPS
01325	16826	22901	35	54	24.8	-84	21	30.3	GPS
01330	16711	22878	35	54	24.0	-84	21	31.3	GPS
01335	16705	23044	35	54	25.3	-84	21	32.5	GPS
01340	17002	23452	35	54	30.3	-84	21	32.3	GPS
01395	16846	22472	35	54	21.4	-84	21	27.2	GPS
01397	16874	22429	35	54	21.2	-84	21	26.7	DIG
01400	18148	22513	35	54	28.9	-84	21	14.4	GPS
02160	17304	20481	35	54	7.5	-84	21	9.1	GPS
02165	17636	20616	35	54	10.5	-84	21	6.7	GPS
02170	17847	20693	35	54	12.3	-84	21	5.1	GPS
02175	18265	20755	35	54	15.1	-84	21	1.3	GPS
02180	18544	20768	35	54	16.7	-84	20	58.6	GPS
02185	18694	20793	35	54	17.7	-84	20	57.2	GPS
02186	18314	20745	35	54	15.3	-84	21	0.7	DIG
02190	18803	20908	35	54	19.3	-84	20	56.9	GPS
02194	19175	20205	35	54	15.6	-84	20	48.4	DIG
02195	19205	20959	35	54	21.9	-84	20	53.2	GPS
02200	19745	21099	35	54	26.0	-84	20	48.7	DIG
02205	19873	21310	35	54	28.5	-84	20	48.8	DIG
02211	19783	21371	35	54	28.5	-84	20	50.1	DIG
02212	20024	21817	35	54	33.5	-84	20	50.7	DIG
02214	20065	21947	35	54	34.8	-84	20	51.2	DIG
02215	19742	21393	35	54	28.4	-84	20	50.7	DIG
02220	19767	21732	35	54	31.4	-84	20	52.7	DIG
02225	19905	21964	35	54	34.0	-84	20	52.9	DIG
02230	19966	22014	35	54	34.8	-84	20	52.6	DIG
02235	19859	22271	35	54	36.3	-84	20	55.5	DIG
02240	19556	22704	35	54	38.2	-84	21	1.4	DIG
02245	19930	22418	35	54	37.9	-84	20	55.7	DIG
02250	19946	22363	35	54	37.5	-84	20	55.2	DIG
02255	20344	22646	35	54	42.1	-84	20	53.1	DIG
02260	20475	22759	35	54	43.7	-84	20	52.5	DIG
02265	19768	21075	35	54	26.0	-84	20	48.3	DIG
02266	20221	20377	35	54	22.7	-84	20	39.0	DIG
02275	20374	21139	35	54	29.8	-84	20	42.6	DIG
02280	20949	21180	35	54	33.3	-84	20	37.1	DIG
02285	21324	21283	35	54	36.3	-84	20	34.0	DIG
02290	21586	21419	35	54	38.8	-84	20	32.3	GPS
02295	21805	21779	35	54	43.0	-84	20	32.5	GPS
02300	21767	22013	35	54	44.7	-84	20	34.4	GPS

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
02305	21837	22136	35	54	46.1	-84	20	34.6	GPS
02310	21924	22122	35	54	46.4	-84	20	33.6	GPS
02315	21714	22041	35	54	44.6	-84	20	35.2	DIG
02320	21574	22288	35	54	45.9	-84	20	38.2	DIG
02325	21275	22782	35	54	48.3	-84	20	44.6	DIG
02330	21408	23313	35	54	53.4	-84	20	46.9	DIG
02335	21584	22574	35	54	48.3	-84	20	40.1	DIG
02341	21780	21374	35	54	39.5	-84	20	30.0	DIG
02350	22002	21299	35	54	40.1	-84	20	27.2	GPS
02355	21966	20733	35	54	35.3	-84	20	23.8	DIG
02356	22140	20317	35	54	32.8	-84	20	19.2	DIG
02515	22337	21441	35	54	43.1	-84	20	24.8	GPS
02520	22670	21535	35	54	45.7	-84	20	22.1	GPS
02525	23601	20599	35	54	43.2	-84	20	6.4	GPS
02527	23619	21007	35	54	46.6	-84	20	8.9	GPS
02528	23434	21042	35	54	45.9	-84	20	11.0	DIG
02530	23360	20805	35	54	43.5	-84	20	10.2	GPS
02535	23405	21290	35	54	47.8	-84	20	13.0	DIG
02540	23309	21320	35	54	47.5	-84	20	14.2	GPS
02545	23070	21623	35	54	48.6	-84	20	18.6	GPS
02550	23089	21658	35	54	49.0	-84	20	18.7	GPS
02555	23381	22173	35	54	54.9	-84	20	19.2	GPS
02556	23330	22627	35	54	58.3	-84	20	22.8	GPS
02557	23307	22787	35	54	59.5	-84	20	24.1	GPS
02559	23248	23216	35	55	2.7	-84	20	27.6	GPS
02560	23308	21731	35	54	50.8	-84	20	17.0	DIG
02565	23321	21711	35	54	50.8	-84	20	16.7	GPS
02570	24361	20689	35	54	48.1	-84	19	59.3	GPS
02575	24300	20859	35	54	49.1	-84	20	1.0	GPS
02580	24092	21154	35	54	50.4	-84	20	5.1	GPS
02585	23863	21394	35	54	51.1	-84	20	9.1	GPS
02590	23682	21748	35	54	53.0	-84	20	13.3	DIG
02595	23665	21779	35	54	53.2	-84	20	13.7	GPS
02600	23991	22026	35	54	57.0	-84	20	12.1	GPS
02605	24475	22076	35	55	0.1	-84	20	7.5	GPS
02610	23970	22242	35	54	58.7	-84	20	13.7	GPS
02615	24182	22612	35	55	2.9	-84	20	14.1	GPS
02620	24231	22679	35	55	3.7	-84	20	14.1	GPS
02625	24689	22957	35	55	8.5	-84	20	11.3	GPS
02630	24620	23398	35	55	11.8	-84	20	15.0	DIG
02635	24758	22903	35	55	8.5	-84	20	10.2	GPS
02640	24874	23181	35	55	11.4	-84	20	11.0	DIG
02645	25024	23093	35	55	11.5	-84	20	8.8	DIG
02680	25070	20737	35	54	52.4	-84	19	52.5	DIG
03001	29735	20624	35	55	17.1	-84	19	4.6	GPS
03003	29642	20810	35	55	18.1	-84	19	6.8	GPS
03005	29665	21338	35	55	22.6	-84	19	10.1	GPS
03050	29673	22571	35	55	32.8	-84	19	18.3	GPS
03060	29489	23155	35	55	36.6	-84	19	24.2	GPS
03065	29572	23482	35	55	39.7	-84	19	25.5	GPS
03070	29566	23534	35	55	40.1	-84	19	25.9	GPS
03075	29582	23549	35	55	40.3	-84	19	25.9	GPS
03080	29621	23559	35	55	40.6	-84	19	25.6	GPS

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
03085	29616	23656	35	55	41.4	-84	19	26.3	GPS
03090	29646	23745	35	55	42.3	-84	19	26.6	GPS
03095	29686	23772	35	55	42.7	-84	19	26.3	GPS
03100	29696	23853	35	55	43.4	-84	19	26.8	GPS
03110	29568	23696	35	55	41.4	-84	19	27.0	GPS
03115	29585	23815	35	55	42.5	-84	19	27.7	GPS
03485	29559	24259	35	55	46.0	-84	19	30.9	GPS
03490	29528	24436	35	55	47.3	-84	19	32.4	GPS
03495	29498	24463	35	55	47.3	-84	19	32.9	GPS
03500	29583	24778	35	55	50.4	-84	19	34.2	GPS
03510	29259	20995	35	55	17.5	-84	19	11.9	DIG
03515	29118	21099	35	55	17.6	-84	19	14.0	GPS
03520	28941	21262	35	55	18.0	-84	19	16.9	GPS
03525	28838	21390	35	55	18.5	-84	19	18.8	GPS
03530	28878	21596	35	55	20.4	-84	19	19.8	GPS
03535	28611	21558	35	55	18.6	-84	19	22.2	GPS
03537	28291	21138	35	55	13.4	-84	19	22.6	GPS
03538	28257	21038	35	55	12.4	-84	19	22.3	GPS
03540	28446	21788	35	55	19.6	-84	19	25.4	GPS
03545	28342	21945	35	55	20.3	-84	19	27.6	GPS
03550	28156	22033	35	55	20.0	-84	19	30.0	GPS
03555	28103	22106	35	55	20.3	-84	19	31.1	GPS
03560	28062	22164	35	55	20.6	-84	19	31.9	GPS
03565	28099	22551	35	55	23.9	-84	19	34.1	GPS
03570	28176	22646	35	55	25.1	-84	19	34.0	GPS
03575	28235	22739	35	55	26.2	-84	19	34.0	GPS
03580	28281	23094	35	55	29.4	-84	19	35.9	GPS
03585	28382	21775	35	55	19.1	-84	19	26.0	GPS
03590	28206	21815	35	55	18.5	-84	19	28.1	GPS
03591	27794	21521	35	55	13.8	-84	19	30.2	GPS
03592	27657	21483	35	55	12.7	-84	19	31.4	GPS
03593	26969	21396	35	55	8.2	-84	19	37.7	GPS
03594	27641	21382	35	55	11.8	-84	19	30.8	GPS
03595	27648	21372	35	55	11.8	-84	19	30.7	GPS
03598	27671	21367	35	55	11.9	-84	19	30.4	GPS
03600	27925	21070	35	55	10.8	-84	19	25.9	GPS
03607	27629	21220	35	55	10.4	-84	19	29.9	GPS
03610	27615	21093	35	55	9.3	-84	19	29.1	GPS
03615	27766	20795	35	55	7.7	-84	19	25.6	GPS
03620	27760	20643	35	55	6.4	-84	19	24.6	GPS
03625	27792	21965	35	55	17.4	-84	19	33.3	GPS
03630	27718	22235	35	55	19.2	-84	19	35.8	GPS
03635	27652	22639	35	55	22.2	-84	19	39.2	GPS
03640	27617	22883	35	55	24.0	-84	19	41.2	GPS
03645	27469	23241	35	55	26.1	-84	19	45.2	GPS
03648	27141	23053	35	55	22.8	-84	19	47.2	GPS
03650	27146	23294	35	55	24.8	-84	19	48.8	GPS
03654	26811	23263	35	55	22.7	-84	19	51.9	GPS
03655	26675	23715	35	55	25.7	-84	19	56.4	GPS
03660	27828	23283	35	55	28.5	-84	19	41.8	GPS
03670	27898	23903	35	55	34.0	-84	19	45.3	GPS
03672	27888	23968	35	55	34.4	-84	19	45.8	GPS
03673	27856	24161	35	55	35.8	-84	19	47.5	DIG

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
03674	27885	24139	35	55	35.8	-84	19	47.0	GPS
03675	27820	24212	35	55	36.0	-84	19	48.2	GPS
03680	27330	22136	35	55	16.3	-84	19	39.1	GPS
03685	26839	22143	35	55	13.7	-84	19	44.1	GPS
03686	26791	22137	35	55	13.3	-84	19	44.5	DIG
03690	25827	23039	35	55	15.5	-84	20	0.4	GPS
03695	25609	23422	35	55	17.4	-84	20	5.2	GPS
03697	25732	23758	35	55	20.8	-84	20	6.2	GPS
03698	25745	23846	35	55	21.6	-84	20	6.7	GPS
03699	25873	23994	35	55	23.6	-84	20	6.4	DIG
03700	26719	22030	35	55	12.1	-84	19	44.5	GPS
03705	26623	21648	35	55	8.4	-84	19	42.9	GPS
03710	26234	21360	35	55	3.9	-84	19	44.9	GPS
03715	26248	20932	35	55	0.5	-84	19	41.9	GPS
03718	26368	20726	35	54	59.4	-84	19	39.3	DIG
03720	26368	20726	35	54	59.2	-84	19	39.3	GPS
04003	31665	23456	35	55	51.0	-84	19	4.2	GPS
04006	31927	23465	35	55	52.5	-84	19	1.6	GPS
04009	32120	23687	35	55	55.4	-84	19	1.2	GPS
04012	32151	23723	35	55	55.9	-84	19	1.1	GPS
04015	32123	23778	35	55	56.2	-84	19	1.8	GPS
04018	32112	23774	35	55	56.1	-84	19	1.8	GPS
04021	32116	23815	35	55	56.4	-84	19	2.1	GPS
04024	32144	23908	35	55	57.3	-84	19	2.4	GPS
04027	32151	24033	35	55	58.4	-84	19	3.2	DIG
04030	32086	24125	35	55	58.8	-84	19	4.5	GPS
04033	32304	24116	35	55	59.9	-84	19	2.2	GPS
04036	33054	24937	35	56	10.8	-84	19	0.2	GPS
04037	33078	24941	35	56	11.0	-84	19	0.0	DIG
04039	33118	24949	35	56	11.3	-84	18	59.6	DIG
04051	32404	24548	35	56	4.0	-84	19	4.1	GPS
04054	32440	24870	35	56	6.9	-84	19	5.9	GPS
04057	32166	24735	35	56	4.3	-84	19	7.8	GPS
04060	32083	24918	35	56	5.3	-84	19	9.9	GPS
05005	34698	21709	35	55	53.3	-84	18	21.7	DIG
05010	34867	21843	35	55	55.3	-84	18	20.9	DIG
05015	35033	21863	35	55	56.4	-84	18	19.4	DIG
05020	35037	22818	35	56	4.3	-84	18	25.8	DIG
05035	35271	23096	35	56	7.9	-84	18	25.3	DIG
05040	35678	23189	35	56	10.9	-84	18	21.9	DIG
05045	36171	23374	35	56	15.1	-84	18	18.1	DIG
05050	35021	23534	35	56	10.1	-84	18	30.8	DIG
05055	35296	21876	35	55	58.0	-84	18	16.8	DIG
05060	35354	21594	35	55	56.0	-84	18	14.3	GPS
05065	35331	21504	35	55	55.1	-84	18	14.0	GPS
05070	35426	21367	35	55	54.5	-84	18	12.1	GPS
05070a	35426	21367	35	55	54.5	-84	18	12.1	DIG
05075	35295	21346	35	55	53.6	-84	18	13.3	GPS
05077	35260	21196	35	55	52.2	-84	18	12.6	GPS
05080	35081	20964	35	55	49.3	-84	18	12.8	GPS
05085	35373	21617	35	55	56.3	-84	18	14.3	GPS
05090	35761	21333	35	55	56.1	-84	18	8.5	GPS
05095	35585	20726	35	55	50.1	-84	18	6.1	GPS

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
05100	35571	20449	35	55	47.8	-84	18	4.4	GPS
05105	36112	20805	35	55	53.7	-84	18	1.3	GPS
05108	35841	20534	35	55	49.9	-84	18	2.3	GPS
05110	36330	20447	35	55	51.9	-84	17	56.7	GPS
05112	36135	20096	35	55	48.0	-84	17	56.3	GPS
05115	36399	20181	35	55	50.1	-84	17	54.2	GPS
05120	36425	20213	35	55	50.5	-84	17	54.2	GPS
05125	36835	20412	35	55	54.4	-84	17	51.4	GPS
05130	36946	20130	35	55	52.7	-84	17	48.4	GPS
05135	37057	20065	35	55	52.8	-84	17	46.8	GPS
05150	37376	20029	35	55	54.2	-84	17	43.3	GPS
05155	35346	21908	35	55	58.5	-84	18	16.5	DIG
05160	35472	21832	35	55	58.6	-84	18	17.8	DIG
05165	35577	21502	35	55	56.4	-84	18	11.5	GPS
05170	36054	21138	35	55	56.1	-84	18	4.2	GPS
05175	36319	20786	35	55	54.6	-84	17	59.1	GPS
05180	35893	21848	35	56	1.0	-84	18	10.6	DIG
05182	36081	21854	35	56	2.1	-84	18	8.7	DIG
05183	36183	21607	35	56	0.6	-84	18	6.1	DIG
05184	36151	21575	35	56	0.2	-84	18	6.2	DIG
05188	36495	20868	35	55	56.3	-84	17	57.9	GPS
05190	36130	21898	35	56	2.7	-84	18	8.6	DIG
05192	36283	21873	35	56	3.4	-84	18	6.8	DIG
05195	36095	21954	35	56	3.0	-84	18	9.3	DIG
05197	36333	22205	35	56	6.4	-84	18	8.6	GPS
05199	36870	22286	35	56	10.0	-84	18	3.7	GPS
05200	36341	22216	35	56	6.5	-84	18	8.6	GPS
05209	36584	22855	35	56	13.1	-84	18	10.4	GPS
05212	36522	22915	35	56	13.3	-84	18	11.5	GPS
05218	36502	22997	35	56	13.8	-84	18	12.2	GPS
05219	36763	22510	35	56	11.3	-84	18	6.3	GPS
05221	36857	22996	35	56	15.8	-84	18	8.6	GPS
05224	36788	23057	35	56	15.9	-84	18	9.7	DIG
05227	36645	23144	35	56	15.8	-84	18	11.8	GPS
05230	36704	23150	35	56	16.2	-84	18	11.2	GPS
05236	36844	23130	35	56	16.8	-84	18	9.7	DIG
05239	36806	23222	35	56	17.3	-84	18	10.7	GPS
05242	36863	23237	35	56	17.8	-84	18	10.2	DIG
05245	37257	22911	35	56	17.3	-84	18	4.0	DIG
05247	37593	23157	35	56	21.1	-84	18	2.3	GPS
05248	37483	23178	35	56	20.7	-84	18	3.5	GPS
05251	37516	23184	35	56	20.9	-84	18	3.2	GPS
05255	38494	23186	35	56	26.3	-84	17	53.4	DIG
05260	38908	23144	35	56	28.3	-84	17	48.9	DIG
05265	37872	23905	35	56	28.8	-84	18	4.5	GPS
05270	37886	23958	35	56	29.3	-84	18	4.7	GPS
05275	37743	24076	35	56	29.5	-84	18	7.0	DIG
05278	37477	24257	35	56	29.5	-84	18	10.9	DIG
05280	37442	24347	35	56	30.1	-84	18	11.8	DIG
05285	37234	24565	35	56	30.7	-84	18	15.4	DIG
05290	37899	24269	35	56	32.0	-84	18	6.7	GPS
05295	37907	24164	35	56	31.1	-84	18	5.9	GPS
05300	38037	24162	35	56	31.8	-84	18	4.6	GPS

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
05305	38061	24270	35	56	32.9	-84	18	5.1	GPS
05310	38013	24394	35	56	33.6	-84	18	6.4	GPS
05315	38133	24317	35	56	33.6	-84	18	4.7	GPS
05320	38136	24382	35	56	34.2	-84	18	5.1	GPS
05325	38176	24390	35	56	34.5	-84	18	4.7	GPS
05328	38191	24361	35	56	34.3	-84	18	4.4	GPS
05330	38225	24438	35	56	35.1	-84	18	4.6	GPS
05335	38259	24453	35	56	35.4	-84	18	4.3	GPS
05340	38057	24137	35	56	31.7	-84	18	4.2	GPS
05345	38120	24182	35	56	32.5	-84	18	3.9	GPS
05350	38144	24168	35	56	32.5	-84	18	3.6	GPS
05355	38221	24144	35	56	32.7	-84	18	2.6	GPS
06005	40534	21137	35	56	20.7	-84	17	18.9	GPS
06010	40730	22300	35	56	31.3	-84	17	24.8	DIG
06015	40235	21600	35	56	22.9	-84	17	25.0	GPS
06020	40133	21716	35	56	23.3	-84	17	26.9	GPS
06025	39198	21350	35	56	15.1	-84	17	33.8	GPS
06030	38941	21200	35	56	12.5	-84	17	35.4	GPS
06040	38551	20861	35	56	7.5	-84	17	37.1	GPS
06042	38429	20712	35	56	5.6	-84	17	37.3	GPS
06044	38159	20449	35	56	2.0	-84	17	38.2	DIG
06045	38460	20613	35	56	5.0	-84	17	36.3	GPS
06048	38446	20474	35	56	3.8	-84	17	35.5	GPS
06050	38556	20168	35	56	1.9	-84	17	32.3	GPS
06055	40099	21754	35	56	23.4	-84	17	27.5	GPS
06056	39879	21815	35	56	22.7	-84	17	30.1	DIG
06060	39760	21992	35	56	23.5	-84	17	32.5	GPS
06065	39622	22063	35	56	23.3	-84	17	34.4	GPS
06070	39525	22188	35	56	23.8	-84	17	36.2	GPS
06075	39323	22420	35	56	24.6	-84	17	39.8	GPS
06080	40115	21802	35	56	23.9	-84	17	27.6	GPS
06085	40098	22257	35	56	27.5	-84	17	30.9	GPS
06087	39950	22978	35	56	32.6	-84	17	37.3	GPS
06090	40176	22759	35	56	32.1	-84	17	33.5	GPS
06095	40330	23035	35	56	35.2	-84	17	33.8	GPS
06100	40419	23242	35	56	37.4	-84	17	34.3	GPS
07005	40486	18938	35	56	2.4	-84	17	4.5	GPS
07010	40652	18757	35	56	1.8	-84	17	1.6	GPS
07015	40268	18858	35	56	0.5	-84	17	6.2	GPS
07020	40252	18231	35	55	55.3	-84	17	2.1	GPS
07021	40215	18284	35	55	55.5	-84	17	2.8	DIG
07022	40278	18341	35	55	56.3	-84	17	2.6	DIG
07025	39959	18752	35	55	57.9	-84	17	8.6	GPS
07030	39953	19111	35	56	0.9	-84	17	11.1	GPS
07035	40122	18187	35	55	54.2	-84	17	3.1	GPS
07038	39797	18206	35	55	52.6	-84	17	6.5	GPS
07040	39846	18227	35	55	53.0	-84	17	6.2	GPS
07045	39625	18656	35	55	55.3	-84	17	11.3	GPS
07050	39603	19052	35	55	58.4	-84	17	14.2	GPS
07100	39538	17501	35	55	45.3	-84	17	4.4	GPS
07105	39474	17465	35	55	44.7	-84	17	4.8	GPS
07110	39371	17152	35	55	41.6	-84	17	3.7	DIG
07115	39215	17628	35	55	44.6	-84	17	8.5	GPS

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
07120	39020	17337	35	55	41.1	-84	17	8.5	DIG
07125	39241	17642	35	55	44.9	-84	17	8.3	GPS
07130	39164	17739	35	55	45.2	-84	17	9.8	GPS
07135	39217	18164	35	55	49.0	-84	17	12.1	GPS
07140	39254	18510	35	55	52.1	-84	17	14.1	GPS
07145	39202	18931	35	55	55.3	-84	17	17.5	GPS
07200	39095	17751	35	55	45.0	-84	17	10.6	GPS
07205	39093	18037	35	55	47.3	-84	17	12.5	GPS
07210	38753	17812	35	55	43.6	-84	17	14.4	GPS
07215	38627	17810	35	55	42.9	-84	17	15.7	GPS
07220	38527	17465	35	55	39.5	-84	17	14.4	GPS
07225	38350	17370	35	55	37.7	-84	17	15.5	GPS
07228	38354	17243	35	55	36.7	-84	17	14.6	GPS
07230	38062	17537	35	55	37.5	-84	17	19.5	GPS
07235	38510	18029	35	55	44.0	-84	17	18.3	GPS
07240	38520	18089	35	55	44.6	-84	17	18.6	GPS
07245	38517	18223	35	55	45.7	-84	17	19.6	GPS
07250	38754	18514	35	55	49.4	-84	17	19.2	GPS
07255	38600	18897	35	55	51.7	-84	17	23.3	GPS
07260	38664	19265	35	55	55.0	-84	17	25.1	GPS
07300	38500	18227	35	55	45.6	-84	17	19.8	GPS
07345	38117	18798	35	55	48.2	-84	17	27.5	GPS
07350	38145	19378	35	55	53.1	-84	17	31.1	GPS
07353	37964	17933	35	55	40.2	-84	17	23.2	GPS
07355	38022	18172	35	55	42.5	-84	17	24.2	GPS
07360	37761	17904	35	55	38.9	-84	17	25.1	GPS
07362	37923	18215	35	55	42.3	-84	17	25.5	GPS
07365	37867	18560	35	55	44.9	-84	17	28.4	GPS
07370	37860	18253	35	55	42.3	-84	17	26.4	GPS
07375	37417	18233	35	55	39.7	-84	17	30.8	GPS
07380	37179	18322	35	55	39.1	-84	17	33.8	GPS
07385	37231	18084	35	55	37.5	-84	17	31.6	GPS
07395	36955	18274	35	55	37.5	-84	17	35.7	GPS
07400	37159	18434	35	55	39.9	-84	17	34.7	GPS
07405	36864	18742	35	55	40.8	-84	17	39.8	GPS
07410	36791	18808	35	55	41.0	-84	17	41.0	GPS
07415	37200	18498	35	55	40.7	-84	17	34.8	GPS
07420	37140	18904	35	55	43.7	-84	17	38.1	GPS
07425	37268	19357	35	55	48.1	-84	17	39.9	GPS
07430	37496	19601	35	55	51.4	-84	17	39.2	GPS
08005	29856	19812	35	55	11.1	-84	18	57.8	GPS
08010	30094	19780	35	55	12.1	-84	18	55.2	GPS
08013	30096	19598	35	55	10.7	-84	18	54.0	GPS
08015	30178	19666	35	55	11.7	-84	18	53.6	GPS
08020	30185	19431	35	55	9.8	-84	18	51.9	GPS
08025	30388	19640	35	55	12.6	-84	18	51.3	GPS
08028	30543	19438	35	55	11.8	-84	18	48.4	GPS
08030	30721	19329	35	55	11.9	-84	18	45.8	GPS
08031	30799	19448	35	55	13.3	-84	18	45.9	GPS
08033	30817	19458	35	55	13.5	-84	18	45.7	GPS
08034	30897	19434	35	55	13.7	-84	18	44.8	GPS
08035	30825	19529	35	55	14.1	-84	18	46.1	GPS
08037	31126	19060	35	55	11.9	-84	18	39.9	GPS



**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
08039	31193	19258	35	55	13.9	-84	18	40.6	GPS
08043	31317	19516	35	55	16.7	-84	18	41.1	GPS
08045	31316	19649	35	55	17.8	-84	18	42.0	GPS
08050	31539	19075	35	55	14.3	-84	18	35.8	GPS
08055	31821	19090	35	55	16.0	-84	18	33.1	GPS
08060	31874	19227	35	55	17.4	-84	18	33.5	GPS
08065	32041	19337	35	55	19.2	-84	18	32.6	GPS
08070	32322	19435	35	55	21.6	-84	18	30.4	GPS
08075	31876	19355	35	55	18.4	-84	18	34.3	GPS
08080	31869	19475	35	55	19.4	-84	18	35.2	GPS
08085	31911	19437	35	55	19.3	-84	18	34.5	DIG
08090	32119	19538	35	55	21.3	-84	18	33.1	DIG
08095	32268	19608	35	55	22.7	-84	18	32.1	DIG
08100	32388	18988	35	55	18.2	-84	18	26.7	GPS
08105	32523	19208	35	55	20.8	-84	18	26.8	DIG
08107	32559	19327	35	55	22.0	-84	18	27.3	DIG
08110	32743	19471	35	55	24.2	-84	18	26.4	GPS
08115	32641	19507	35	55	23.9	-84	18	27.6	GPS
08120	33260	17432	35	55	10.3	-84	18	7.4	DIG
08125	33697	17639	35	55	14.4	-84	18	4.3	DIG
08130	33799	17686	35	55	15.3	-84	18	3.6	DIG
08135	33897	17527	35	55	14.5	-84	18	1.6	DIG
08140	33972	17112	35	55	11.5	-84	17	58.0	DIG
08145	33957	17612	35	55	15.6	-84	18	1.5	DIG
08150	34212	17606	35	55	16.9	-84	17	58.9	DIG
08155	33704	17703	35	55	14.9	-84	18	4.7	DIG
08160	34066	18154	35	55	20.6	-84	18	4.1	DIG
08165	34277	18284	35	55	22.8	-84	18	2.8	DIG
08170	34663	18307	35	55	25.2	-84	17	59.1	DIG
08185	35020	18277	35	55	26.9	-84	17	55.3	DIG
08190	35134	18786	35	55	31.7	-84	17	57.6	DIG
08195	35340	19250	35	55	36.6	-84	17	58.6	DIG
08200	35414	19309	35	55	37.5	-84	17	58.3	DIG
08205	35443	19450	35	55	38.8	-84	17	58.9	DIG
08210	35132	18187	35	55	26.8	-84	17	53.6	DIG
08215	35267	18103	35	55	26.8	-84	17	51.6	DIG
08220	35120	18373	35	55	28.2	-84	17	54.9	DIG
08225	35195	18428	35	55	29.1	-84	17	54.5	DIG
08230	35367	18523	35	55	30.8	-84	17	53.4	DIG
08235	35433	18648	35	55	32.2	-84	17	53.6	DIG
08238	35561	18533	35	55	32.0	-84	17	51.6	DIG
08240	35952	18913	35	55	37.2	-84	17	50.2	DIG
08245	35948	19474	35	55	41.8	-84	17	54.0	DIG
08250	34284	18333	35	55	23.3	-84	18	3.1	DIG
08255	34304	18543	35	55	25.1	-84	18	4.3	DIG
08260	34276	18770	35	55	26.8	-84	18	6.1	DIG
08265	34194	19241	35	55	30.3	-84	18	10.2	DIG
08270	34476	18730	35	55	27.6	-84	18	3.8	DIG
08272	34758	18700	35	55	28.9	-84	18	0.8	DIG
08275	34476	18939	35	55	29.3	-84	18	5.3	DIG
08280	34761	19237	35	55	33.3	-84	18	4.4	DIG
08280a	34761	19237	35	55	33.3	-84	18	4.4	DIG
08285	35068	19379	35	55	36.2	-84	18	2.2	DIG

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates <sup>a</sup>						Method
	East	North	Latitude			Longitude			
08290	33284	17476	35	55	10.8	-84	18	7.4	DIG
08295	33630	17885	35	55	16.0	-84	18	6.7	DIG
08300	33860	18287	35	55	20.6	-84	18	7.1	DIG
08305	33852	18422	35	55	21.7	-84	18	8.1	DIG
08310	33209	17963	35	55	14.3	-84	18	11.5	DIG
08315	33297	18245	35	55	17.1	-84	18	12.5	DIG
08320	33402	18353	35	55	18.6	-84	18	12.2	DIG
08330	33462	18480	35	55	20.0	-84	18	12.4	DIG
08335	33415	18667	35	55	21.3	-84	18	14.1	DIG
08340	33757	18837	35	55	24.5	-84	18	11.8	DIG
08350	33288	18886	35	55	22.4	-84	18	16.9	DIG
08355	33548	18883	35	55	23.8	-84	18	14.3	DIG
08360	33804	19345	35	55	29.0	-84	18	14.8	DIG
08365	33727	19513	35	55	29.9	-84	18	16.7	DIG
08375	33214	18294	35	55	17.1	-84	18	13.6	DIG
08380	33041	18525	35	55	18.0	-84	18	17.0	DIG
08385	33058	18833	35	55	20.7	-84	18	18.9	DIG
08390	33245	19157	35	55	24.4	-84	18	19.1	DIG
08395	33173	19517	35	55	26.9	-84	18	22.3	GPS
08400	33165	19536	35	55	27.0	-84	18	22.5	GPS
09025	32645	16175	35	54	56.5	-84	18	5.1	GPS
09030	32853	15714	35	54	53.9	-84	17	59.9	DIG
09035	32647	15983	35	54	55.0	-84	18	3.7	GPS
09040	33338	15931	35	54	58.4	-84	17	56.4	GPS
09045	33400	15603	35	54	56.0	-84	17	53.6	GPS
09050	33249	15228	35	54	52.1	-84	17	52.6	GPS
09055	33165	15513	35	54	54.0	-84	17	55.3	GPS
09060	33794	15727	35	54	59.2	-84	17	50.4	GPS
09065	33636	15129	35	54	53.4	-84	17	48.0	GPS
09070	33936	15677	35	54	59.5	-84	17	48.7	GPS
09075	34026	15501	35	54	58.6	-84	17	46.6	GPS
09080	34011	15470	35	54	58.3	-84	17	46.5	GPS
09085	33878	14672	35	54	51.0	-84	17	42.5	GPS
09090	34213	15055	35	54	56.0	-84	17	41.7	GPS
09095	34191	14575	35	54	51.9	-84	17	38.6	GPS
09100	34601	15807	35	55	4.3	-84	17	42.8	GPS
09103	34987	15352	35	55	2.7	-84	17	35.8	GPS
09105	34768	15378	35	55	1.7	-84	17	38.2	GPS
09110	34711	15079	35	54	58.9	-84	17	36.8	GPS
09115	34994	14946	35	54	59.4	-84	17	33.0	GPS
09125	35249	15676	35	55	6.8	-84	17	35.4	DIG
09130	35479	15270	35	55	4.7	-84	17	30.3	DIG
09135	35635	14898	35	55	2.5	-84	17	26.2	DIG
09140	35906	14560	35	55	1.2	-84	17	21.2	DIG
09375	36133	15100	35	55	6.9	-84	17	22.6	DIG
09385	36291	14702	35	55	4.5	-84	17	18.3	DIG
09390	36455	14397	35	55	2.9	-84	17	14.6	DIG
09395	36798	14122	35	55	2.5	-84	17	9.2	DIG
09400	36780	13580	35	54	58.0	-84	17	5.8	DIG
10005	26822	16355	35	54	26.0	-84	19	5.1	GPS
10010	26941	16002	35	54	23.7	-84	19	1.5	DIG
10015	27120	15773	35	54	22.9	-84	18	58.2	GPS
10020	27430	15025	35	54	18.4	-84	18	50.0	GPS

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
10170	27244	16393	35	54	28.6	-84	19	1.1	GPS
10175	27581	15812	35	54	25.7	-84	18	53.8	GPS
10180	27383	16062	35	54	26.7	-84	18	57.5	GPS
10185	27412	15725	35	54	24.1	-84	18	54.9	GPS
10189	27521	15548	35	54	23.2	-84	18	52.6	DIG
10190	27711	15478	35	54	23.7	-84	18	50.2	GPS
10195	27765	15482	35	54	24.0	-84	18	49.7	GPS
10200	27948	15323	35	54	23.7	-84	18	46.8	GPS
10205	27853	16664	35	54	34.2	-84	18	56.8	GPS
10220	27937	16302	35	54	31.7	-84	18	53.5	GPS
10225	28164	16020	35	54	30.6	-84	18	49.3	GPS
10230	28214	16072	35	54	31.3	-84	18	49.1	GPS
10235	28361	15789	35	54	29.8	-84	18	45.7	GPS
10240	28441	15879	35	54	31.0	-84	18	45.5	GPS
10325	28658	16548	35	54	37.7	-84	18	47.9	DIG
10335	28534	16279	35	54	34.8	-84	18	47.3	DIG
10340	28541	16102	35	54	33.4	-84	18	46.0	GPS
10350	28713	15835	35	54	32.1	-84	18	42.5	GPS
10355	28804	16318	35	54	36.6	-84	18	44.8	DIG
10360	28845	15827	35	54	32.8	-84	18	41.1	DIG
10365	29550	16600	35	54	43.0	-84	18	39.2	DIG
10370	29422	16240	35	54	39.4	-84	18	38.1	DIG
10390	29518	16417	35	54	41.3	-84	18	38.3	DIG
10395	29771	15873	35	54	38.3	-84	18	32.1	DIG
10400	29832	16581	35	54	44.4	-84	18	36.2	GPS
10405	29953	16340	35	54	43.1	-84	18	33.4	GPS
10410	30063	15979	35	54	40.7	-84	18	29.8	GPS
10430	30541	16564	35	54	48.2	-84	18	29.0	GPS
10450	30374	16339	35	54	45.4	-84	18	29.1	GPS
10460	31023	16382	35	54	49.3	-84	18	22.9	GPS
10470	30877	15849	35	54	44.1	-84	18	20.7	GPS
10475	31280	16279	35	54	49.9	-84	18	19.6	GPS
10480	31225	15932	35	54	46.7	-84	18	17.8	GPS
10485	31589	16195	35	54	50.9	-84	18	15.9	GPS
10490	31630	16048	35	54	49.9	-84	18	14.5	GPS
10510	31551	15360	35	54	43.8	-84	18	10.6	GPS
10600	32143	16097	35	54	53.1	-84	18	9.6	GPS
10605	31923	15525	35	54	47.2	-84	18	8.0	GPS
10607	31974	15323	35	54	45.8	-84	18	6.1	GPS
10610	31982	15159	35	54	44.6	-84	18	4.9	GPS
11005	23200	14275	35	53	49.0	-84	19	27.6	GPS
11010	23511	14139	35	53	49.6	-84	19	23.6	DIG
11015	23388	14290	35	53	50.1	-84	19	25.8	DIG
11020	23256	14394	35	53	50.3	-84	19	27.9	GPS
11025	23679	14302	35	53	51.8	-84	19	23.0	DIG
11030	23278	14476	35	53	51.1	-84	19	28.2	GPS
11035	23455	14510	35	53	52.3	-84	19	26.6	DIG
11040	23824	15178	35	53	59.8	-84	19	27.4	DIG
11045	23812	14998	35	53	58.3	-84	19	26.3	DIG
11050	24284	15146	35	54	2.1	-84	19	22.6	DIG
11055	24284	14922	35	54	0.3	-84	19	21.1	DIG
11060	24756	15264	35	54	5.7	-84	19	18.6	DIG
11070	24843	14816	35	54	2.5	-84	19	14.7	DIG

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
11080	25617	15880	35	54	15.5	-84	19	14.1	DIG
11082	25659	15755	35	54	14.7	-84	19	12.8	DIG
11085	26029	16197	35	54	20.3	-84	19	12.1	DIG
11087	26389	16288	35	54	23.1	-84	19	9.0	DIG
11089	26436	16110	35	54	21.9	-84	19	7.4	DIG
11093	26465	15710	35	54	18.7	-84	19	4.4	DIG
11095	26649	15274	35	54	16.2	-84	18	59.6	DIG
11100	26732	14829	35	54	13.0	-84	18	55.7	DIG
11105	26678	15293	35	54	16.5	-84	18	59.4	DIG
11110	26742	15188	35	54	16.0	-84	18	58.0	DIG
12010	21564	18020	35	54	10.8	-84	20	9.5	GPS
12015	21570	17595	35	54	7.3	-84	20	6.5	GPS
12020	22179	17580	35	54	10.5	-84	20	0.3	GPS
12025	22343	17762	35	54	12.9	-84	19	59.9	GPS
12040	22311	15996	35	53	58.2	-84	19	48.3	DIG
12045	22496	16431	35	54	2.8	-84	19	49.3	DIG
12090	21890	16635	35	54	1.2	-84	19	56.8	DIG
12095	21697	16770	35	54	1.2	-84	19	59.7	DIG
12100	21642	17274	35	54	5.1	-84	20	3.6	DIG
12105	22438	17280	35	54	9.5	-84	19	55.7	DIG
12110	22543	17269	35	54	10.0	-84	19	54.5	DIG
12115	22759	17160	35	54	10.3	-84	19	51.6	DIG
12120	22806	17468	35	54	13.1	-84	19	53.2	DIG
12125	22878	17481	35	54	13.6	-84	19	52.6	DIG
12130	23164	17794	35	54	17.7	-84	19	51.8	DIG
12132	23271	17809	35	54	18.4	-84	19	50.8	DIG
12135	23693	17793	35	54	20.6	-84	19	46.4	DIG
12140	23464	18195	35	54	22.7	-84	19	51.5	DIG
12145	23494	18131	35	54	22.3	-84	19	50.7	DIG
12148	23722	18160	35	54	23.8	-84	19	48.6	DIG
12150	24076	17908	35	54	23.7	-84	19	43.4	DIG
12155	23951	18328	35	54	26.4	-84	19	47.5	DIG
12160	24283	18147	35	54	26.8	-84	19	42.9	DIG
13140	20908	18950	35	54	14.8	-84	20	22.4	DIG
13150	20963	19082	35	54	16.2	-84	20	22.7	DIG
13155	21147	19196	35	54	18.1	-84	20	21.6	DIG
13160	21223	19306	35	54	19.4	-84	20	21.6	DIG
13162	21239	19256	35	54	19.1	-84	20	21.1	DIG
13165	21421	19439	35	54	21.6	-84	20	20.5	DIG
13170	21399	19487	35	54	21.9	-84	20	21.1	DIG
13175	21098	18649	35	54	13.4	-84	20	18.4	DIG
13180	21317	18391	35	54	12.4	-84	20	14.5	DIG
13185	21262	18431	35	54	12.5	-84	20	15.3	DIG
13190	21614	18581	35	54	15.6	-84	20	12.8	DIG
13195	21792	18650	35	54	17.2	-84	20	11.4	DIG
13200	21808	18718	35	54	17.8	-84	20	11.7	GPS
13205	21867	18754	35	54	18.5	-84	20	11.4	GPS
13210	22047	18995	35	54	21.4	-84	20	11.2	GPS
13215	22124	19005	35	54	21.9	-84	20	10.5	GPS
13220	22585	19095	35	54	25.2	-84	20	6.4	GPS
13225	22707	19439	35	54	28.7	-84	20	7.5	GPS
13230	22215	19520	35	54	26.7	-84	20	13.1	GPS
13235	22307	19420	35	54	26.3	-84	20	11.5	DIG

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
13250	22351	18664	35	54	20.4	-84	20	5.9	GPS
13255	23066	18768	35	54	25.2	-84	19	59.4	GPS
13260	22800	18765	35	54	23.7	-84	20	2.0	GPS
13265	22908	18887	35	54	25.3	-84	20	1.8	GPS
13270	22918	18771	35	54	24.4	-84	20	0.9	GPS
13274	23174	18950	35	54	27.3	-84	19	59.5	GPS
13275	23200	19007	35	54	27.9	-84	19	59.6	GPS
13280	23263	19342	35	54	31.0	-84	20	1.3	GPS
13285	23530	19253	35	54	31.7	-84	19	58.0	GPS
13290	23526	19730	35	54	35.6	-84	20	1.2	GPS
13295	23508	19838	35	54	36.4	-84	20	2.1	GPS
13300	22944	18770	35	54	24.5	-84	20	0.6	GPS
13305	23348	18820	35	54	27.1	-84	19	56.9	DIG
13310	23363	18746	35	54	26.6	-84	19	56.2	GPS
13315	23649	18798	35	54	28.6	-84	19	53.7	GPS
13320	23710	18942	35	54	30.1	-84	19	54.0	GPS
13326	23928	18830	35	54	30.4	-84	19	51.1	DIG
13328	24255	18760	35	54	31.6	-84	19	47.3	DIG
13330	23913	18902	35	54	30.9	-84	19	51.7	DIG
13335	23972	18945	35	54	31.6	-84	19	51.4	DIG
13340	24174	18964	35	54	32.9	-84	19	49.5	DIG
13345	24098	19242	35	54	34.7	-84	19	52.2	DIG
13350	23905	19554	35	54	36.2	-84	19	56.2	DIG
13355	24162	19255	35	54	35.2	-84	19	51.6	DIG
13358	24338	19430	35	54	37.6	-84	19	51.0	DIG
13360	24372	19670	35	54	39.8	-84	19	52.3	DIG
13365	24330	19697	35	54	39.8	-84	19	52.9	DIG
13370	24251	19868	35	54	40.7	-84	19	54.8	DIG
14005	24924	19077	35	54	37.9	-84	19	42.7	GPS
14010	24958	19106	35	54	38.4	-84	19	42.5	GPS
14015	24982	19167	35	54	39.0	-84	19	42.7	GPS
14025	24860	19412	35	54	40.3	-84	19	45.6	GPS
14060	25054	19537	35	54	42.4	-84	19	44.5	GPS
14070	25238	19189	35	54	40.6	-84	19	40.3	DIG
14075	25019	19088	35	54	38.5	-84	19	41.8	GPS
14080	25487	19230	35	54	42.3	-84	19	38.0	DIG
14095	25256	19442	35	54	42.8	-84	19	41.8	DIG
14100	25238	19629	35	54	44.2	-84	19	43.3	DIG
14110	25604	19256	35	54	43.1	-84	19	37.0	GPS
14130	25480	19926	35	54	48.0	-84	19	42.8	GPS
14135	26080	19191	35	54	45.2	-84	19	31.8	DIG
14140	26026	19332	35	54	46.1	-84	19	33.3	DIG
14145	26028	19447	35	54	47.0	-84	19	34.0	DIG
14160	26230	19561	35	54	49.1	-84	19	32.8	DIG
14175	25992	19791	35	54	49.7	-84	19	36.7	DIG
14180	26013	19928	35	54	50.9	-84	19	37.5	DIG
14190	25830	20081	35	54	51.2	-84	19	40.3	GPS
14280	26455	19171	35	54	47.1	-84	19	27.9	DIG
14285	26400	19347	35	54	48.3	-84	19	29.6	DIG
14290	26616	19537	35	54	51.0	-84	19	28.7	DIG
14295	26401	19400	35	54	48.7	-84	19	30.0	DIG
14297	26501	19860	35	54	53.0	-84	19	32.1	DIG
14305	26819	19192	35	54	49.3	-84	19	24.3	DIG

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
14310	26894	19475	35	54	52.0	-84	19	25.5	DIG
14315	26923	19717	35	54	54.2	-84	19	26.8	DIG
14320	26997	19789	35	54	55.2	-84	19	26.6	DIG
14325	27075	19870	35	54	56.3	-84	19	26.3	DIG
14330	27033	20255	35	54	59.2	-84	19	29.4	DIG
14335	27014	20414	35	55	0.4	-84	19	30.6	DIG
14340	27166	20567	35	55	2.5	-84	19	30.1	DIG
14345	27196	19390	35	54	53.0	-84	19	21.9	DIG
14350	27307	19582	35	54	55.2	-84	19	22.0	DIG
14355	27477	19520	35	54	55.6	-84	19	19.9	DIG
14360	27496	19762	35	54	57.7	-84	19	21.3	DIG
14365	27499	19924	35	54	59.1	-84	19	22.4	DIG
14370	27418	20069	35	54	59.8	-84	19	24.2	DIG
14375	27842	20054	35	55	2.0	-84	19	19.8	DIG
14380	27888	20173	35	55	3.2	-84	19	20.2	DIG
14685	28293	19527	35	55	0.2	-84	19	11.7	DIG
14690	28291	19640	35	55	1.1	-84	19	12.5	DIG
14695	28413	20076	35	55	5.3	-84	19	14.2	DIG
14700	28288	20092	35	55	4.8	-84	19	15.6	DIG
14705	28494	19633	35	55	2.1	-84	19	10.4	DIG
14710	28654	19881	35	55	5.1	-84	19	10.4	DIG
14715	29093	19671	35	55	5.7	-84	19	4.6	DIG
14720	29047	19878	35	55	7.2	-84	19	6.5	DIG
14725	28981	20155	35	55	9.1	-84	19	9.0	DIG
14870	29360	19892	35	55	9.0	-84	19	3.4	DIG
14875	29256	20121	35	55	10.3	-84	19	6.0	DIG
15004	22500	14742	35	53	49.0	-84	19	37.9	GPS
15005	22536	14507	35	53	47.2	-84	19	35.9	GPS
15010	22574	14775	35	53	49.6	-84	19	37.3	GPS
15015	22581	14593	35	53	48.2	-84	19	36.0	GPS
15025	22877	14864	35	53	52.1	-84	19	34.9	GPS
15030	23009	14775	35	53	52.0	-84	19	32.9	DIG
15035	23080	14570	35	53	50.7	-84	19	30.8	GPS
15038	23134	14509	35	53	50.5	-84	19	29.9	GPS
15045	23095	14432	35	53	49.7	-84	19	29.8	GPS
15050	23144	14236	35	53	48.4	-84	19	27.9	GPS
15055	23078	14410	35	53	49.4	-84	19	29.8	GPS
15060	23068	14309	35	53	48.5	-84	19	29.2	GPS
15065	21370	14128	35	53	37.7	-84	19	45.1	GPS
15070	21588	14045	35	53	38.2	-84	19	42.4	DIG
15080	22054	14418	35	53	43.9	-84	19	40.2	DIG
16005	30349	20635	35	55	20.6	-84	18	58.4	DIG
16010	30522	20487	35	55	20.3	-84	18	55.7	DIG
16015	30641	20320	35	55	19.6	-84	18	53.3	DIG
16020	30871	20964	35	55	26.2	-84	18	55.4	DIG
16023	31215	20734	35	55	26.1	-84	18	50.3	DIG
16025	31197	20698	35	55	25.8	-84	18	50.3	DIG
16030	31446	20302	35	55	23.9	-84	18	45.1	DIG
16035	32787	21260	35	55	39.1	-84	18	38.0	GPS
16040	32775	21032	35	55	37.2	-84	18	36.6	GPS
16045	32775	20986	35	55	36.8	-84	18	36.3	GPS
16050	32787	20809	35	55	35.4	-84	18	35.0	GPS
16055	32719	20671	35	55	33.9	-84	18	34.7	GPS

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
16060	32726	20766	35	55	34.7	-84	18	35.3	GPS
16065	32732	20630	35	55	33.6	-84	18	34.3	GPS
16075	32687	20437	35	55	31.8	-84	18	33.5	GPS
16080	32671	20106	35	55	29.0	-84	18	31.4	GPS
16085	32684	20079	35	55	28.8	-84	18	31.1	GPS
16090	33468	21061	35	55	41.2	-84	18	29.8	GPS
16095	33621	20928	35	55	41.0	-84	18	27.3	GPS
16100	33617	20900	35	55	40.7	-84	18	27.2	GPS
16105	34041	20886	35	55	42.9	-84	18	22.8	GPS
16110	34184	20715	35	55	42.3	-84	18	20.2	GPS
16115	33901	20426	35	55	38.4	-84	18	21.1	GPS
16120	34209	20630	35	55	41.8	-84	18	19.4	GPS
16125	34152	20492	35	55	40.3	-84	18	19.0	GPS
16130	34160	20503	35	55	40.4	-84	18	19.0	GPS
16135	34188	19946	35	55	36.0	-84	18	15.0	GPS
16140	33568	21564	35	55	45.9	-84	18	32.2	GPS
16145	33598	21592	35	55	46.3	-84	18	32.1	GPS
16150	33731	21618	35	55	47.3	-84	18	30.9	GPS
16155	33753	21625	35	55	47.4	-84	18	30.7	GPS
16160	33471	22582	35	55	53.7	-84	18	40.1	GPS
16165	33445	22836	35	55	55.7	-84	18	42.0	GPS
16700	33732	22998	35	55	58.6	-84	18	40.2	GPS
16175	34287	23111	35	56	2.6	-84	18	35.4	GPS
16180	34298	23125	35	56	2.8	-84	18	35.4	GPS
16185	34392	23185	35	56	3.8	-84	18	34.8	GPS
16300	34270	21611	35	55	50.2	-84	18	25.4	GPS
16305	34512	21605	35	55	51.4	-84	18	22.9	GPS
16310	34511	21179	35	55	47.9	-84	18	20.1	GPS
16315	34516	21159	35	55	47.8	-84	18	19.9	GPS
16320	34780	20688	35	55	45.4	-84	18	14.0	GPS
16325	34797	20662	35	55	45.3	-84	18	13.7	GPS
16330	34810	20622	35	55	45.0	-84	18	13.3	GPS
16335	34868	20473	35	55	44.1	-84	18	11.7	GPS
16340	35283	20157	35	55	43.8	-84	18	5.3	GPS
16345	35590	20046	35	55	44.6	-84	18	1.5	GPS
17005	40856	19128	35	56	6.0	-84	17	2.1	GPS
17007	40851	19142	35	56	6.1	-84	17	2.2	DIG
17010	40854	19368	35	56	7.9	-84	17	3.7	GPS
17015	40718	19496	35	56	8.2	-84	17	5.9	GPS
17020	40748	19534	35	56	8.7	-84	17	5.9	GPS
17025	40748	19667	35	56	9.8	-84	17	6.8	GPS
17030	40650	19628	35	56	8.9	-84	17	7.5	GPS
17035	40559	19900	35	56	10.7	-84	17	10.3	GPS
17038	40567	20231	35	56	13.4	-84	17	12.4	GPS
17040	41297	20339	35	56	18.3	-84	17	5.8	GPS
17050	41558	20454	35	56	20.7	-84	17	3.9	GPS
17055	41741	20116	35	56	18.9	-84	16	59.8	GPS
17060	40536	20305	35	56	13.9	-84	17	13.3	GPS
17065	40549	20404	35	56	14.8	-84	17	13.8	GPS
17070	40744	20961	35	56	20.4	-84	17	15.6	GPS
17075	40390	20685	35	56	16.2	-84	17	17.3	GPS
17080	40534	21077	35	56	20.2	-84	17	18.5	GPS
17085	40846	21332	35	56	24.0	-84	17	17.1	GPS

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
17090	40890	21368	35	56	24.6	-84	17	16.9	GPS
17095	41142	21567	35	56	27.6	-84	17	15.7	GPS
17100	41192	21670	35	56	28.7	-84	17	15.9	GPS
17105	41228	22099	35	56	32.4	-84	17	18.4	GPS
17110	41503	22351	35	56	36.0	-84	17	17.3	GPS
17115	41691	22563	35	56	38.8	-84	17	16.8	GPS
17120	41880	22550	35	56	39.7	-84	17	14.8	GPS
17125	42217	22836	35	56	43.9	-84	17	13.4	GPS
17130	42454	23100	35	56	47.4	-84	17	12.8	GPS
17135	42649	23533	35	56	52.0	-84	17	13.7	GPS
17140	42790	23775	35	56	54.8	-84	17	13.9	GPS
17145	42906	24164	35	56	58.6	-84	17	15.4	GPS
18012	32507	16262	35	54	56.5	-84	18	7.1	DIG
18045	32597	16275	35	54	57.1	-84	18	6.2	DIG
18050	33142	16177	35	54	59.3	-84	18	0.1	DIG
18055	33299	16004	35	54	58.7	-84	17	57.3	DIG
18060	33365	15993	35	54	59.0	-84	17	56.6	DIG
18065	33566	16037	35	55	0.5	-84	17	54.8	DIG
18070	33668	16120	35	55	1.7	-84	17	54.4	DIG
18075	33898	16300	35	55	4.5	-84	17	53.3	DIG
18080	34012	16352	35	55	5.5	-84	17	52.5	DIG
18085	34094	16543	35	55	7.5	-84	17	52.9	DIG
18090	34377	16994	35	55	12.8	-84	17	53.1	DIG
18095	34662	17276	35	55	16.7	-84	17	52.1	DIG
18100	34789	17078	35	55	15.8	-84	17	49.5	DIG
18105	34648	17372	35	55	17.4	-84	17	52.9	DIG
18110	34736	17735	35	55	20.9	-84	17	54.5	DIG
18115	34718	17333	35	55	17.5	-84	17	52.0	DIG
18120	35033	17403	35	55	19.8	-84	17	49.2	DIG
18125	35260	17320	35	55	20.3	-84	17	46.4	DIG
18130	35312	17116	35	55	18.9	-84	17	44.5	DIG
18135	35279	17459	35	55	21.6	-84	17	47.1	DIG
18140	33671	15900	35	54	59.9	-84	17	52.9	DIG
18145	33987	15745	35	55	0.4	-84	17	48.6	DIG
18150	34219	15824	35	55	2.3	-84	17	46.8	DIG
18155	34621	15860	35	55	4.8	-84	17	43.0	DIG
18160	34687	15903	35	55	5.5	-84	17	42.6	DIG
18165	34848	15865	35	55	6.1	-84	17	40.7	GPS
18170	35100	15858	35	55	7.4	-84	17	38.1	GPS
18175	35514	15783	35	55	9.1	-84	17	33.4	DIG
18195	36001	15457	35	55	9.1	-84	17	26.3	GPS
18200	36212	15365	35	55	9.5	-84	17	23.6	GPS
18205	36281	15307	35	55	9.4	-84	17	22.5	GPS
18210	36154	15263	35	55	8.3	-84	17	23.5	GPS
18215	35163	15762	35	55	7.0	-84	17	36.8	GPS
18220	34722	15905	35	55	5.7	-84	17	42.3	GPS
18225	34798	16054	35	55	7.4	-84	17	42.5	GPS
18230	35136	15992	35	55	8.7	-84	17	38.7	GPS
18235	35492	16001	35	55	10.8	-84	17	35.1	GPS
18240	35141	16080	35	55	9.5	-84	17	39.2	GPS
18245	35519	16311	35	55	13.5	-84	17	37.0	GPS
18250	35490	16237	35	55	12.7	-84	17	36.8	DIG
18255	35936	16063	35	55	13.7	-84	17	31.1	GPS



**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
18260	36121	15918	35	55	13.5	-84	17	28.2	DIG
18265	36372	15965	35	55	15.3	-84	17	26.0	GPS
18270	36206	16131	35	55	15.8	-84	17	28.8	GPS
18275	35635	16451	35	55	15.3	-84	17	36.7	GPS
18276	35620	16455	35	55	15.2	-84	17	36.9	DIG
18277	35609	16587	35	55	16.2	-84	17	37.9	DIG
18280	35924	16638	35	55	18.4	-84	17	35.1	GPS
18285	36239	16911	35	55	22.4	-84	17	33.7	GPS
18290	36270	16870	35	55	22.2	-84	17	33.1	DIG
18295	36387	16679	35	55	21.3	-84	17	30.7	DIG
18300	36639	17156	35	55	26.6	-84	17	31.4	DIG
18310	37016	16770	35	55	25.5	-84	17	24.9	DIG
18315	36990	17210	35	55	29.0	-84	17	28.2	DIG
18320	37423	17374	35	55	32.7	-84	17	24.9	DIG
18325	37435	17287	35	55	32.0	-84	17	24.2	DIG
18330	37512	16834	35	55	28.7	-84	17	20.4	DIG
18335	35730	16809	35	55	18.7	-84	17	38.2	DIG
18340	35810	17277	35	55	23.0	-84	17	40.5	DIG
18345	35846	17453	35	55	24.7	-84	17	41.4	DIG
18348	36050	17592	35	55	26.9	-84	17	40.2	DIG
18350	36220	17609	35	55	28.0	-84	17	38.7	DIG
18355	36495	17917	35	55	32.0	-84	17	38.0	DIG
18370	36223	17836	35	55	29.9	-84	17	40.2	DIG
18375	35792	17490	35	55	24.7	-84	17	42.2	DIG
18380	35861	17959	35	55	28.9	-84	17	44.6	DIG
18385	35861	18076	35	55	29.9	-84	17	45.4	DIG
18389	36043	18163	35	55	31.6	-84	17	44.2	DIG
18390	36179	18547	35	55	35.5	-84	17	45.4	DIG
18405	36086	18122	35	55	31.5	-84	17	43.5	DIG
18410	36353	18550	35	55	36.5	-84	17	43.7	DIG
18415	36261	19024	35	55	39.8	-84	17	47.8	DIG
18420	36335	19157	35	55	41.3	-84	17	47.9	DIG
18435	36347	19401	35	55	43.4	-84	17	49.5	DIG
19001	33681	16109	35	55	1.7	-84	17	54.2	DIG
19002	33754	16162	35	55	2.5	-84	17	53.8	DIG
19003	33788	16181	35	55	2.9	-84	17	53.6	DIG
19004	33817	16203	35	55	3.2	-84	17	53.4	DIG
19005	33853	16239	35	55	3.7	-84	17	53.3	DIG
19006	33896	16290	35	55	4.4	-84	17	53.2	DIG
19007	33911	16312	35	55	4.6	-84	17	53.2	DIG
19008	33914	16310	35	55	4.6	-84	17	53.2	DIG
19009	34012	16356	35	55	5.5	-84	17	52.5	DIG
19010	34081	16546	35	55	7.5	-84	17	53.1	DIG
19011	34139	16641	35	55	8.6	-84	17	53.1	DIG
19012	34209	16735	35	55	9.7	-84	17	53.1	DIG
19013	34267	16819	35	55	10.8	-84	17	53.0	DIG
19014	34274	16827	35	55	10.9	-84	17	53.0	DIG
19015	34325	16895	35	55	11.7	-84	17	53.0	DIG
19016	34393	17006	35	55	13.0	-84	17	53.0	DIG
19017	34431	17107	35	55	14.0	-84	17	53.3	DIG
19018	34498	17199	35	55	15.2	-84	17	53.3	DIG
19019	34528	17242	35	55	15.7	-84	17	53.3	DIG
19020	34589	17278	35	55	16.3	-84	17	52.9	DIG

**Table 2.** Coordinates for seeps, springs, and stream-measurement sites at Oak Ridge National Laboratory--Continued

Site number	ORNL coordinates		State plane coordinates						Method
	East	North	Latitude			Longitude			
19021	34606	17292	35	55	16.5	-84	17	52.8	DIG
19022	34657	17309	35	55	16.9	-84	17	52.4	DIG
19023	34661	17274	35	55	16.7	-84	17	52.1	DIG
19024	34662	17270	35	55	16.6	-84	17	52.1	DIG
19025	34694	17230	35	55	16.5	-84	17	51.5	DIG
19026	34725	17187	35	55	16.3	-84	17	50.9	DIG
19027	34753	17140	35	55	16.1	-84	17	50.3	DIG
19028	34757	17130	35	55	16.0	-84	17	50.2	DIG
19029	34783	17090	35	55	15.8	-84	17	49.7	DIG
19030	34792	17073	35	55	15.7	-84	17	49.5	DIG
19031	34652	17373	35	55	17.4	-84	17	52.9	DIG
19032	34644	17414	35	55	17.7	-84	17	53.2	DIG
19033	34659	17496	35	55	18.5	-84	17	53.7	DIG
19034	34663	17543	35	55	18.9	-84	17	53.9	DIG
19035	34662	17587	35	55	19.2	-84	17	54.2	DIG
19036	34720	17707	35	55	20.5	-84	17	54.5	DIG
19037	34723	17327	35	55	17.4	-84	17	51.9	DIG
19038	34777	17333	35	55	17.8	-84	17	51.4	DIG
19039	34834	17339	35	55	18.2	-84	17	50.8	DIG
19040	34956	17372	35	55	19.1	-84	17	49.8	DIG
19041	35035	17403	35	55	19.8	-84	17	49.2	DIG
19042	35041	17448	35	55	20.2	-84	17	49.5	DIG
19043	35058	17497	35	55	20.7	-84	17	49.6	DIG
19044	35072	17548	35	55	21.2	-84	17	49.8	DIG
19045	35076	17595	35	55	21.6	-84	17	50.1	DIG
19046	35075	17609	35	55	21.7	-84	17	50.2	DIG
19047	35254	17314	35	55	20.3	-84	17	46.4	DIG
19048	35275	17267	35	55	20.0	-84	17	45.9	DIG
19049	35317	17118	35	55	19.0	-84	17	44.4	DIG
19050	35279	17457	35	55	21.6	-84	17	47.1	DIG
19051	35315	17503	35	55	22.1	-84	17	47.1	DIG
20001	40118	21727	35	56	23.3	-84	17	27.1	DIG
20002	40111	21751	35	56	23.4	-84	17	27.3	DIG
20003	40111	21751	35	56	23.4	-84	17	27.3	DIG
20004	40109	21763	35	56	23.5	-84	17	27.4	DIG
20005	40104	21793	35	56	23.7	-84	17	27.7	DIG
20006	40104	21821	35	56	24.0	-84	17	27.9	DIG
20007	40109	21849	35	56	24.2	-84	17	28.0	DIG
20008	40115	21877	35	56	24.5	-84	17	28.1	DIG
20009	40114	21903	35	56	24.7	-84	17	28.3	DIG
20010	40117	21724	35	56	23.2	-84	17	27.1	DIG
20011	40068	21768	35	56	23.3	-84	17	27.9	DIG
20012	40038	21793	35	56	23.4	-84	17	28.3	DIG
20013	40005	21822	35	56	23.4	-84	17	28.9	DIG
20014	39992	21837	35	56	23.5	-84	17	29.1	DIG
20015	39968	21860	35	56	23.5	-84	17	29.5	DIG
20016	39945	21880	35	56	23.6	-84	17	29.9	DIG
20017	39905	21905	35	56	23.6	-84	17	30.5	DIG
20018	39827	21957	35	56	23.6	-84	17	31.6	DIG
20019	39742	22017	35	56	23.6	-84	17	32.9	DIG

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993

[Type of site: Q, stream-measurement sites; SE, seep; SP, spring; /R, site associated with a seepage reach; /A, site is associated with a seepage or spring area; Methods for measurement: B, backwater conditions; D, no flowing water; E, estimation; L, less than minimum reportable flow; P, pygmy meter measurement; R, rating from stream gage; V, volumetric measurement; ft<sup>3</sup>/s, cubic feet per second;  $\mu$ S/cm, microsiemens per centimeter at 25 °C; °C, degree Celsius; --, no data]

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance ( $\mu$ S/cm)	Temperature (°C)
01025	Q	4/29/93	B	--	--	--	--
01030	Q	4/29/93	P	0.01	6.8	469	12.5
01032	Q	4/29/93	P	1.5	7.4	134	11.0
01034	SE	4/29/93	D	0	--	--	--
01035	Q	4/29/93	P	1.5	6.9	134	10.0
01040	Q	4/29/93	P	.03	7.3	144	11.0
01045	Q	4/29/93	L	0	7.7	21	10.5
01050	SE	4/29/93	L	0	4.8	20	11.0
01055	Q	4/29/93	P	1.41	7.8	135	14.5
01320	Q	4/29/93	L	0	7.5	304	13.5
01325	SP	4/29/93	P	.03	7.6	351	13.5
01330	SE	4/29/93	L	0	7.7	347	17.5
01335	Q	4/29/93	P	1.13	7.8	109	16.0
01340	Q	4/29/93	P	1.15	7.8	106	16.5
01395	Q	4/29/93	P	1.34	7.8	123	15.0
01397	SE	4/29/93	L	0	7.6	370	19.5
01400	Q	4/29/93	D	0	--	--	--
02160	SE	4/29/93	P	.03	7.1	570	12.5
02165	SE	4/29/93	B	--	--	--	--
02170	Q	4/29/93	P	.72	7.6	367	10.0
02175	Q	4/29/93	E	.01	7.9	408	9.5
02180	Q	4/29/93	P	.02	7.8	409	11.0
02185	SP	4/29/93	P	.02	6.8	416	12.0
02186	Q	4/29/93	P	.68	7.9	362	10.5
02190	Q	4/29/93	P	.68	7.8	353	11.0
02194	SE	4/29/93	L	0	6.5	141	11.5
02195	Q	4/29/93	P	.76	8.0	352	11.5
02200	Q	4/29/93	P	.09	7.6	379	16.5
02205	SP	4/29/93	E	.01	7.2	412	11.5
02211	Q	4/29/93	L	0	7.7	343	15.5
02212	Q	4/29/93	P	0.04	7.5	331	12.0
02214	SP/A	4/29/93	P	.04	7.1	322	12.5
02215	Q	4/29/93	P	.04	7.8	388	16.5
02220	Q	4/29/93	P	.07	7.2	408	11.0
02225	Q	4/29/93	L	0	7.6	284	17.0
02230	SE/R	4/29/93	L	0	7.4	282	16.5
02235	Q	4/29/93	V	.01	7.5	459	12.5
02240	SE	4/29/93	L	0	7.2	592	16.0
02245	SE	4/29/93	L	0	7.2	601	16.0
02250	Q	4/29/93	V	.01	7.5	541	14.0
02255	Q	4/29/93	L	0	7.9	567	16.5
02260	SP/A	4/29/93	L	0	7.3	589	15.0
02265	Q	4/29/93	P	.56	8.4	348	16.0
02266	SE	4/29/93	E	.01	--	70	13.5
02275	Q	4/29/93	P	.59	8.1	342	17.0
02280	Q	4/29/93	P	.44	8.3	346	16.5
02285	Q	4/29/93	P	.43	8.2	348	16.0

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
02290	Q	4/29/93	P	.18	7.9	366	15.5
02295	Q	4/29/93	P	.18	7.8	366	15.0
02300	Q	4/29/93	P	.18	7.3	356	11.5
02305	SP	4/29/93	P	.03	6.9	313	12.5
02310	SP	4/29/93	P	.13	7.1	363	12.0
02315	Q	4/29/93	P	.07	7.5	366	10.5
02320	Q	4/29/93	P	.05	7.3	369	12.5
02325	Q	4/29/93	P	.02	7.3	166	13.5
02330	SP	4/29/93	P	.04	7.1	330	14.0
02335	SP	4/29/93	P	.02	7.2	359	12.5
02341	Q	4/29/93	P	.24	--	--	--
02350	Q	4/29/93	P	.06	7.8	333	15.0
02355	Q	4/29/93	P	.04	--	295	14.5
02515	Q	4/29/93	P	.16	8.3	344	17.5
02520	Q	4/29/93	P	.16	8.2	345	16.5
02525	SP	4/29/93	P	.06	7.1	156	12.0
02527	Q	4/29/93	P	.04	7.6	218	12.0
02528	SP	4/29/93	--	--	--	--	--
02530	SE	4/29/93	L	0	6.9	309	12.0
02535	Q	4/29/93	L	0	7.0	259	11.0
02540	Q	4/29/93	P	.06	7.6	225	11.5
02545	Q	4/29/93	P	0.06	7.6	230	11.0
02550	Q	4/29/93	V	.12	7.5	389	10.5
02555	Q	4/29/93	L	0	7.4	430	10.0
02556	Q	4/29/93	V	.04	7.6	335	15.5
02557	SE	4/29/93	L	0	7.5	288	14.5
02559	SP	4/29/93	V	.01	6.7	201	12.0
02560	Q	4/29/93	E	.01	7.7	418	10.5
02565	Q	4/29/93	P	.09	7.6	392	11.0
02570	SE	4/29/93	F	.05	7.6	243	13.0
02575	Q	4/29/93	P	.04	7.5	293	12.0
02580	Q	4/29/93	P	.04	7.7	308	12.0
02585	Q	4/29/93	P	.04	7.9	309	12.0
02590	Q	4/29/93	P	.50	7.2	387	12.0
02595	Q	4/29/93	F	.03	7.3	415	11.0
02600	Q	4/29/93	D	0	--	--	--
02605	Q	4/29/93	D	0	--	--	--
02610	Q	4/29/93	D	0	--	--	--
02615	Q	4/29/93	P	.02	7.5	424	14.0
02620	SE	4/29/93	F	.02	7.3	428	14.0
02625	Q	4/29/93	L	0	7.4	86	13.0
02630	SE	4/29/93	L	0	6.8	118	13.5
02635	Q	4/29/93	L	0	7.6	240	14.5
02640	SE	4/29/93	L	0	7.4	288	20.0
02645	SE	4/29/93	L	0	7.1	305	14.0
02680	SE	4/29/93	L	0	7.2	139	12.0
03001	Q	5/8/93	P	.83	7.7	279	16.0
03003	Q	5/8/93	P	.75	7.8	281	15.0
03005	Q	5/8/93	P	.66	7.8	243	15.5
03050	Q	5/8/93	P	.41	7.6	249	15.0
03060	Q	5/8/93	P	.48	7.8	226	14.5

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
03065	SE	5/8/93	D	0	--	--	--
03070	SP	5/8/93	D	0	--	--	--
03075	SP	5/8/93	P	.07	7.1	204	13.0
03080	SE	5/8/93	D	0	--	--	--
03085	SP	5/8/93	E	.02	7.2	244	13.0
03090	SP	5/8/93	P	.02	7.4	255	13.5
03095	SE	5/8/93	D	0	--	--	--
03100	SP	5/8/93	P	0.24	6.9	207	13.5
03110	Q	5/8/93	V	.01	7.7	318	20.5
03115	Q	5/8/93	V	.02	7.9	269	22.0
03485	SE	5/8/93	D	0	--	--	--
03490	SE	5/8/93	D	0	--	--	--
03495	Q	5/8/93	D	0	--	--	--
03500	SP	5/8/93	D	0	--	--	--
03510	Q	5/8/93	P	.32	8.2	310	17.5
03515	Q	5/8/93	P	.02	7.5	278	19.0
03520	Q	5/8/93	P	.21	8.1	370	17.0
03525	Q	5/8/93	P	.05	7.9	250	22.0
03530	Q	5/8/93	P	.02	8.5	275	22.5
03535	Q	5/8/93	P	.13	7.8	450	14.5
03537	SE	5/8/93	D	0	--	--	--
03538	SE	5/8/93	D	0	--	--	--
03540	Q	5/8/93	P	.08	7.7	243	15.5
03545	SE	5/8/93	L	0	7.3	415	18.0
03550	SP	5/8/93	P	.03	7.5	376	17.5
03555	SP	5/8/93	D	0	--	--	--
03560	Q	5/8/93	V	.01	8.3	375	17.0
03565	SP	5/8/93	P	.04	7.5	335	13.0
03570	SP	5/8/93	D	0	--	--	--
03575	Q	5/8/93	D	0	--	--	--
03580	SP	5/8/93	L	0	7.2	45	18.5
03585	SE	5/8/93	D	0	--	--	--
03590	Q	5/8/93	P	.03	7.9	456	19.5
03591	Q	5/8/93	D	0	--	--	--
03592	Q	5/8/93	D	0	--	--	--
03593	SE	5/8/93	D	0	--	--	--
03594	SE	5/8/93	D	0	--	--	--
03595	SE	5/8/93	D	0	--	--	--
03598	Q	5/8/93	L	0	7.2	360	15.5
03600	SE	5/8/93	--	--	--	--	--
03605	SE	5/8/93	D	0	--	--	--
03610	Q	5/8/93	L	0	8.3	177	18.0
03615	SE	5/8/93	L	0	7.2	159	13.5
03620	SE	5/8/93	L	0	7.8	217	14.5
03625	Q	5/8/93	P	0.02	6.9	641	14.5
03630	Q	5/8/93	D	0	--	--	--
03635	Q	5/8/93	D	0	--	--	--
03640	Q	5/8/93	D	0	--	--	--
03645	SE	5/8/93	L	0	7.6	555	15.0
03648	SE	5/8/93	D	0	--	--	--
03650	SE	5/8/93	D	0	--	--	--
03654	SE	5/8/93	D	0	--	--	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
03655	SE	5/8/93	D	0	--	--	--
03660	Q	5/8/93	L	0	7.2	309	13.0
03670	Q	5/8/93	P	0.04	7.8	220	13.5
03672	SE	5/8/93	L	0	7.4	296	13.0
03673	SE	5/8/93	L	0	7.2	274	14.0
03674	SE	5/8/93	P	.03	7.1	225	13.0
03675	Q	5/8/93	D	0	--	--	--
03680	Q	5/8/93	D	0	--	--	--
03685	Q	5/8/93	D	0	--	--	--
03686	Q	5/8/93	D	0	--	--	--
03690	Q	5/8/93	D	0	--	--	--
03695	Q	5/8/93	L	0	8.2	134	16.5
03697	SE/R	5/8/93	--	--	7.1	248	13.0
03698	Q	5/8/93	P	.03	7.2	75	14.5
03699	SE	5/8/93	L	0	7.0	285	13.5
03700	Q	5/8/93	D	0	--	--	--
03705	Q	5/8/93	E	.02	8.3	295	20.0
03710	Q	5/8/93	V	.01	7.4	271	17.5
03715	Q	5/8/93	V	.01	7.7	192	17.5
03720	Q	5/8/93	L	0	5.5	44	13.5
04003	SP	4/29/93	P	.55	7.3	248	13.5
04006	Q	4/29/93	P	.36	7.6	236	13.5
04009	SE	4/29/93	L	0	7.1	312	15.0
04012	SE	4/29/93	E	.01	6.9	146	14.0
04015	SE	4/29/93	L	0	7.1	251	14.0
04018	Q	4/29/93	P	.51	7.3	229	13.5
04021	SE	4/29/93	L	0	6.9	297	13.0
04024	SP/A	4/29/93	L	0	7.2	200	14.0
04027	Q	4/29/93	P	.07	7.1	204	14.5
04030	SP	4/29/93	--	--	6.8	208	13.5
04033	SP	4/29/93	P	0.35	6.8	220	14.0
04036	SE	4/29/93	D	0	--	--	--
04037	SE	4/29/93	D	0	--	--	--
04039	SP	4/29/93	D	0	--	--	--
04051	Q	4/29/93	D	0	--	--	--
04054	SE	4/29/93	D	0	--	--	--
04057	SE	4/29/93	D	0	--	--	--
04060	SP	4/29/93	D	0	--	--	--
05005	Q	5/9/93	P	.27	7.8	341	15.5
05010	Q	5/9/93	R	.21	7.9	331	15.5
05015	Q	5/9/93	D	0	--	--	--
05020	Q	5/9/93	D	0	--	--	--
05035	Q	5/9/93	L	0	7.4	501	21.5
05040	Q	5/9/93	D	0	--	--	--
05045	SE	5/9/93	D	0	--	--	--
05050	SE	5/9/93	D	0	--	--	--
05055	Q	5/9/93	P	.07	7.2	369	15.0
05060	Q	5/9/93	P	.03	7.6	487	15.0
05065	SE	5/9/93	D	0	--	--	--
05070	SP	5/9/93	P	.08	7.1	488	14.5
05075	Q	5/9/93	D	0	--	--	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
05077	SE	5/9/93	L	0	7.8	518	18.5
05080	SE	5/9/93	D	0	--	--	--
05085	Q	5/9/93	P	.03	8.2	318	15.5
05090	Q	5/9/93	P	.06	8.2	313	15.5
05095	SE	5/9/93	D	0	--	--	--
05100	SE	5/9/93	D	0	--	--	--
05105	Q	5/9/93	P	.05	7.8	306	16.0
05108	SE	5/9/93	D	0	--	--	--
05110	Q	5/9/93	P	.05	7.9	261	14.5
05112	SE	5/9/93	L	0	5.3	59	16.5
05115	SP	5/9/93	P	.04	7.0	255	13.0
05120	Q	5/9/93	L	0	7.0	107	15.0
05125	SE	5/9/93	D	0	--	--	--
05130	Q	5/9/93	L	0	7.0	54	15.5
05135	SP	5/9/93	L	0	6.5	49	14.5
05150	SE	5/9/93	D	0	--	--	--
05155	Q	5/9/93	P	0.10	7.1	267	16.0
05160	Q	5/9/93	D	0	--	--	--
05165	SE	5/9/93	D	0	--	--	--
05170	Q	5/9/93	D	0	--	--	--
05175	SE	5/9/93	D	0	--	--	--
05180	Q	5/9/93	P	.09	7.8	261	15.5
05182	Q	5/9/93	L	0	7.3	457	15.0
05183	Q	5/9/93	L	0	7.8	254	16.5
05184	Q	5/9/93	D	0	--	--	--
05188	Q	5/9/93	D	0	--	--	--
05190	Q	5/9/93	P	.02	7.7	343	17.5
05192	Q	5/9/93	P	.02	7.8	241	15.0
05195	Q	5/9/93	P	.07	8.0	278	19.0
05197	Q	5/9/93	D	0	--	--	--
05199	SE	5/9/93	D	0	--	--	--
05200	Q	5/9/93	P	.08	8.0	217	15.5
05209	Q	5/9/93	D	0	--	--	--
05212	SE	5/9/93	D	0	--	--	--
05218	SE	5/9/93	D	0	--	--	--
05219	Q	5/9/93	P	.16	8.2	217	15.0
05221	Q	5/9/93	D	0	--	--	--
05224	Q	5/9/93	D	0	--	--	--
05227	SE	5/9/93	D	0	--	--	--
05230	SE	5/9/93	D	0	--	--	--
05236	SE	5/9/93	D	0	--	--	--
05239	SE	5/9/93	D	0	--	--	--
05242	SE	5/9/93	L	0	7.5	608	20.5
05245	Q	5/9/93	P	.46	7.2	217	15.0
05247	SE	5/9/93	--	--	7.1	655	14.5
05248	Q	5/9/93	P	.45	8.1	202	15.5
05251	Q	5/9/93	D	0	--	--	--
05255	Q	5/9/93	D	0	--	--	--
05260	SE	5/9/93	D	0	--	--	--
05265	Q	5/9/93	P	.48	7.8	212	13.5
05270	Q	5/9/93	E	.01	7.5	368	15.5
05275	Q	5/9/93	D	0	--	--	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
05278	Q	5/9/93	D	0	--	--	--
05280	SE	5/9/93	D	0	--	--	--
05285	Q	5/9/93	D	0	--	--	--
05290	SP	5/9/93	P	0.06	6.8	163	12.5
05295	SE/R	5/9/93	L	0	7.2	244	14.0
05300	Q	5/9/93	P	.40	7.9	217	14.5
05305	Q	5/9/93	P	.23	8.1	236	15.0
05310	SE	5/9/93	L	0	6.9	159	15.0
05315	SP	5/9/93	P	.01	7.2	202	13.5
05320	SE	5/9/93	L	0	6.9	146	12.5
05325	SP	5/9/93	P	.02	6.9	146	12.5
05328	SE	5/9/93	D	0	--	--	--
05330	SP	5/9/93	P	.08	6.9	147	12.5
05335	SP	5/9/93	P	.04	6.9	150	12.5
05340	SE	5/9/93	D	0	--	--	--
05345	SE	5/9/93	L	0	6.5	104	16.5
05350	SE	5/9/93	D	0	--	--	--
05355	Q	5/9/93	P	.07	7.4	282	13.0
06005	Q	5/1/93	P	.27	7.4	311	12.0
06010	SP	5/1/93	L	0	6.3	140	14.0
06015	Q	5/1/93	P	.09	7.6	328	12.0
06020	Q	5/1/93	D	0	--	--	--
06025	Q	5/1/93	L	0	7.8	127	12.5
06030	Q	5/1/93	P	.02	7.6	123	12.5
06040	Q	5/1/93	P	.05	7.1	121	12.5
06042	Q	5/1/93	E	.01	7.0	216	12.5
06044	SE	5/1/93	D	0	--	--	--
06045	SE	5/1/93	E	.01	6.5	79	11.5
06048	SP	5/1/93	P	0.03	6.0	48	12.0
06050	SE	5/1/93	D	0	--	--	--
06055	Q	5/1/93	P	.14	7.8	319	12.0
06056	SE	5/1/93	L	0	6.8	417	12.5
06060	Q	5/1/93	P	.1	7.5	312	13.0
06065	Q	5/1/93	D	0	--	--	--
06070	SP	5/1/93	P	.03	7.3	320	16.0
06075	SP	5/1/93	P	.1	7.1	308	13.5
06080	Q	5/1/93	P	.01	7.7	423	12.5
06085	Q	5/1/93	P	.02	7.0	447	12.5
06087	Q	5/1/93	P	.02	7.3	191	14.0
06090	Q	5/1/93	D	0	--	--	--
06095	Q	5/1/93	P	0.06	7.4	237	13.5
06100	SP	5/1/93	P	.18	7.1	238	14.5
07005	SE	5/7/93	D	0	--	--	--
07010	Q	5/7/93	D	0	--	--	--
07015	SP	5/7/93	D	0	--	--	--
07020	Q	5/7/93	L	0	6.0	97	12.5
07021	SE	5/7/93	--	--	5.9	58	12.5
07022	Q	5/7/93	L	0	6.9	63	14.5
07025	Q	5/7/93	V	.01	6.6	39	15.0
07030	SP	5/7/93	L	0	5.9	28	15.0
07035	Q	5/7/93	L	0	--	122	14.5
07038	SE	5/7/93	V	.01	6.1	92	14.0



**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
07040	Q	5/7/93	D	0	--	--	--
07045	Q	5/7/93	D	0	--	--	--
07050	SE	5/7/93	D	0	--	--	--
07100	Q	5/7/93	P	.1	6.7	218	16.0
07105	Q	5/7/93	L	0	7.4	230	14.5
07110	SE	5/7/93	D	0	--	--	--
07115	Q	5/7/93	L	0	7.2	207	14.5
07120	SE	5/7/93	L	0	6.7	240	14.0
07125	Q	5/7/93	P	.07	7.9	218	16.0
07130	Q	5/7/93	L	0	6.9	81	14.5
07135	Q	5/7/93	L	0	6.8	55	15.0
07140	Q	5/7/93	L	0	7.1	79	14.0
07145	SE/R	5/7/93	D	0	--	--	--
07200	Q	5/7/93	L	0	6.7	100	14.0
07205	Q	5/7/93	L	0	6.2	121	14.0
07210	Q	5/7/93	P	.06	7.9	237	14.5
07215	Q	5/7/93	L	0	7.6	236	14.0
07220	SE	5/7/93	D	0	--	--	--
07225	Q	5/7/93	D	0	--	--	--
07228	SE	5/7/93	L	0	7.3		15.0
07230	SE	5/7/93	D	0	--	--	--
07235	Q	5/7/93	P	.07	8.0	243	15.0
07240	Q	5/7/93	P	.01	7.5	124	14.5
07245	Q	5/7/93	E	.01	7.4	106	13.5
07250	Q	5/7/93	E	.01	7.1	126	15.0
07255	Q	5/7/93	D	0	--	--	--
07260	SE	5/7/93	D	0	--	--	--
07300	Q	5/7/93	L	0	7.3	133	14.5
07345	Q	5/7/93	L	0	7.6	42	17.0
07350	SE	5/7/93	D	0	--	--	--
07353	SE	5/7/93	D	0	--	--	--
07355	Q	5/7/93	P	0.03	8.0	275	18.0
07360	SE	5/7/93	D	0	--	--	--
07362	Q	5/7/93	V	.01	7.8	392	15.0
07365	Q	5/7/93	V	.01	7.2	397	15.0
07370	Q	5/7/93	P	.02	7.9	276	18.5
07375	Q	5/7/93	P	.02	8.2	269	18.0
07380	Q	5/7/93	L	0	6.3	163	13.0
07385	SE	5/7/93	D	0	--	--	--
07395	SE	5/7/93	D	0	--	--	--
07400	Q	5/7/93	V	.01	8.1	213	16.5
07405	SE	5/7/93	D	0	--	--	--
07410	SP	5/7/93	L	0	6.6	556	14.5
07415	Q	5/7/93	P	.02	7.6	183	16.0
07420	Q	5/7/93	P	.02	7.2	65	17.0
07425	Q	5/7/93	L	0	7.5	71	16.5
07430	SP	5/7/93	L	0	6.5	57	14.0
08005	Q	5/10/93	D	0	--	--	--
08010	SE	5/10/93	D	0	--	--	--
08013	SE	5/10/93	D	0	--	--	--
08015	SE	5/10/93	D	0	--	--	--
08020	SE	5/10/93	L	0	6.0	200	16.0

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
08025	SE	5/10/93	L	0	6.8	186	14.5
08028	SE	5/10/93	D	0	--	--	--
08030	Q	5/10/93	L	0	7.3	112	17.0
08031	SE	5/10/93	L	0	7.2	103	16.0
08033	SE	5/10/93	D	0	--	--	--
08034	SE	5/10/93	D	0	--	--	--
08035	SE	5/10/93	D	0	--	--	--
08037	Q	5/10/93	D	0	--	--	--
08039	SE	5/10/93	E	.01	6.8	186	15.0
08043	SE	5/10/93	L	0	6.8	128	18.0
08045	SE	5/10/93	L	0	6.7	116	20.5
08050	SE	5/10/93	D	0	--	--	--
08055	Q	5/10/93	F	.04	7.4	135	18.0
08060	SE	5/10/93	D	0	--	--	--
08065	Q	5/10/93	D	0	--	--	--
08070	SE	5/10/93	D	0	--	--	--
08075	SE/A	5/10/93	L	0	6.6	53	15.5
08080	SE	5/10/93	D	0	--	--	--
08085	SE	5/10/93	L	0	6.6	56	18.5
08090	SE	5/10/93	V	.01	7.2	159	14.0
08095	SE	5/10/93	D	0	--	--	--
08100	Q	5/10/93	L	0	6.8	74	21.0
08105	SE	5/10/93	D	0	--	--	--
08107	SE	5/10/93	D	0	--	--	--
08110	SE	5/10/93	L	0	5.8	167	19.0
08115	SE	5/10/93	E	.02	6.4	72	14.5
08120	Q	5/10/93	P	.03	7.8	191	20.5
08125	Q	5/10/93	L	0	7.6	183	20.0
08130	SE	5/10/93	L	0	7.5	182	20.0
08135	Q	5/10/93	L	0	7.1	273	15.5
08140	SE	5/10/93	D	0	--	--	--
08145	Q	5/10/93	L	0	6.3	76	14.5
08150	SE	5/10/93	D	0	--	--	--
08155	Q	5/10/93	L	0	7.4	153	19.5
08160	Q	5/10/93	P	.03	7.7	163	20.0
08165	Q	5/10/93	L	0	7.7	175	19.5
08170	Q	5/10/93	L	0	7.7	182	18.5
08185	Q	5/10/93	L	0	7.7	139	17.5
08190	Q	5/10/93	L	0	7.4	161	16.5
08195	SE/R	5/10/93	L	0	6.7	180	14.0
08200	Q	5/10/93	D	0	--	--	--
08205	SE	5/10/93	D	0	--	--	--
08210	Q	5/10/93	D	0	--	--	--
08215	SE	5/10/93	D	0	--	--	--
08220	Q	5/10/93	L	0	7.7	221	15.5
08225	Q	5/10/93	L	0	6.9	160	15.5
08230	Q	5/10/93	L	0	7.3	154	15.5
08235	SE	5/10/93	D	0	--	--	--
08238	Q	5/10/93	L	0	7.6	133	22.5
08240	Q	5/10/93	L	0	6.1	71	18.0
08245	SE	5/10/93	L	0	6.6	56	14.5
08250	Q	5/10/93	V	0.01	7.8	158	19.5

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
08255	Q	5/10/93	V	.01	7.6	155	17.5
08260	Q	5/10/93	D	0	--	--	--
08265	Q	5/10/93	L	0	7.1	82	16.0
08270	Q	5/10/93	L	0	6.9	121	22.5
08272	SE	5/10/93	D	0	--	--	--
08275	Q	5/10/93	P	.01	7.7	168	18.0
08280	SE	5/10/93	L	0	6.9	217	15.0
08285	SE	5/10/93	L	0	6.5	50	15.5
08290	Q	5/10/93	D	0	--	--	--
08295	Q	5/10/93	D	0	--	--	--
08300	Q	5/10/93	D	0	--	--	--
08305	SE	5/10/93	D	0	--	--	--
08310	Q	5/10/93	P	.01	7.9	183	21.5
08315	Q	5/10/93	D	0	--	--	--
08320	Q	5/10/93	L	0	7.4	131	18.5
08330	Q	5/10/93	L	0	7.4	137	17.0
08335	Q	5/10/93	L	0	7.7	121	19.0
08340	Q	5/10/93	D	0	--	--	--
08350	SE	5/10/93	D	0	--	--	--
08355	Q	5/10/93	L	0	7.4	92	19.0
08360	SE	5/10/93	D	0	--	--	--
08365	SE/R	5/10/93	L	0	6.6	48	14.5
08375	Q	5/10/93	P	.01	8.0	229	21.0
08380	Q	5/10/93	P	.02	7.5	253	24.0
08385	Q	5/10/93	L	0	7.5	76	19.0
08390	SE	5/10/93	D	0	--	--	--
08395	SE	5/10/93	L	0	6.3	51	15.5
08400	SE	5/10/93	L	0	6.6	51	14.5
09025	Q	5/7/93	L	0	6.5	80	14.5
09030	SE	5/7/93	D	0	--	--	--
09035	SE	5/7/93	D	0	--	--	--
09040	Q	5/7/93	L	0	7.8	162	18.0
09045	SE	5/7/93	D	0	--	--	--
09050	SE/R	5/7/93	L	0	7.4	471	17.0
09055	SE	5/7/93	D	0	--	--	--
09060	SE	5/7/93	L	0	6.8	245	13.0
09065	SE	5/7/93	D	0	--	--	--
09070	SE	5/7/93	P	0.04	8.2	412	15.5
09075	Q	5/7/93	P	.04	8.0	419	15.5
09080	Q	5/7/93	L	0	7.8	330	14.5
09085	SE	5/7/93	D	0	--	--	--
09090	Q	5/7/93	P	.02	8.0	470	14.5
09095	SE	5/7/93	L	0	7.5	483	12.5
09100	Q	5/7/93	L	0	7.4	138	19.0
09103	SE	5/7/93	D	0	--	--	--
09105	Q	5/7/93	L	0	7.3	140	17.0
09110	SE	5/7/93	D	0	--	--	--
09115	Q	5/7/93	L	0	7.0	235	16.5
09125	Q	5/7/93	P	.05	8.4	382	20.0
09130	Q	5/7/93	P	.05	8.3	390	19.5
09135	Q	5/7/93	P	.04	8.3	410	19.0
09140	SP	5/7/93	P	.03	7.5	436	13.0
09375	Q	5/7/93	P	.01	7.8	351	16.5

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
09385	Q	5/7/93	L	0	7.5	399	16.0
09390	SE/A	5/7/93	D	0	--	--	--
09395	SE	5/7/93	D	0	--	--	--
09400	SE	5/7/93	D	0	--	--	--
10005	Q	5/10/93	L	0	7.4	156	15.5
10010	Q	5/10/93	L	0	7.2	152	14.5
10015	Q	5/10/93	D	0	--	--	--
10020	SE	5/10/93	D	0	--	--	--
10170	Q	5/10/93	V	.04	8.0	464	16.5
10175	SE	5/10/93	L	0	7.2	652	15.0
10180	Q	5/10/93	P	.02	7.9	476	16.0
10185	Q	5/10/93	P	.02	8.1	512	15.5
10189	SP	5/10/93	P	.04	7.2	545	13.0
10190	Q	5/10/93	D	0	--	--	--
10195	SE	5/10/93	V	.01	7.4	477	13.0
10200	SP	5/10/93	V	.01	7.7	475	13.5
10205	Q	5/10/93	L	0	7.5	288	17.0
10220	Q	5/10/93	V	.01	8.0	471	19.5
10225	SE	5/10/93	D	0	--	--	--
10230	Q	5/10/93	L	0	7.2	565	12.5
10235	SE	5/10/93	D	0	--	--	--
10240	SE	5/10/93	D	0	--	--	--
10325	Q	5/10/93	V	0.01	8.2	442	14.5
10335	SE	5/10/93	D	0	--	--	--
10340	Q	5/10/93	L	0	7.3	226	15.0
10350	SE	5/10/93	D	0	--	--	--
10355	Q	5/10/93	P	.02	7.8	464	14.5
10360	SE	5/10/93	L	0	8.3	491	15.0
10365	Q	5/10/93	V	.01	7.9	390	15.5
10370	Q	5/10/93	L	0	7.8	479	15.0
10390	Q	5/10/93	L	0	7.7	396	14.0
10395	SE	5/10/93	L	0	7.4	600	13.5
10400	Q	5/10/93	L	0	7.4	379	14.0
10405	Q	5/10/93	L	0	7.4	465	13.0
10410	SE	5/10/93	D	0	--	--	--
10430	SE	5/10/93	D	0	--	--	--
10450	SE	5/10/93	D	0	--	--	--
10460	SE	5/10/93	D	0	--	--	--
10470	SE	5/10/93	L	0	7.3	587	13.0
10475	Q	5/10/93	D	0	--	--	--
10480	SE	5/10/93	L	0	7.6	619	14.5
10485	Q	5/10/93	L	0	7.7	215	15.0
10490	Q	5/10/93	L	0	7.1	135	13.5
10510	SE	5/10/93	L	0	7.4	590	13.5
10600	Q	5/10/93	P	.03	8.1	429	15.5
10605	Q	5/10/93	P	.05	8.0	460	15.0
10607	SE	5/10/93	E	.02	8.0	451	13.5
10610	SE	5/10/93	E	0	7.4	439	13.0
11005	Q	5/7/93	P	.02	7.5	484	16.0
11010	SP	5/7/93	P	.09	7.3	528	13.5
11015	SE	5/7/93	D	0	7.3	505	14.5
11020	Q	5/7/93	V	.01	8.1	676	20.5

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
11025	SP	5/7/93	V	.01	7.4	274	13.5
11030	Q	5/7/93	L	0	7.8	1004	21.5
11035	SE/R	5/7/93	L	0	7.0	320	16.5
11040	Q	5/7/93	D	0	--	--	--
11045	SE	5/7/93	D	0	--	--	--
11050	Q	5/7/93	V	.01	7.8	515	15.0
11055	SE	5/7/93	L	0	7.4	354	12.5
11060	Q	5/7/93	V	0.01	7.3	337	14.5
11070	SP	5/7/93	L	0	8.0	414	14.5
11080	Q	5/7/93	L	0	7.6	477	15.5
11082	SE	5/7/93	L	0	7.3	632	13.5
11085	Q	5/7/93	L	0	7.7	114	14.5
11087	Q	5/7/93	P	.08	8.1	374	14.0
11089	SE	5/7/93	D	0	--	--	--
11093	Q	5/7/93	P	.04	8.2	378	14.0
11095	Q	5/7/93	P	.04	8.2	407	14.0
11100	SP	5/7/93	V	.01	7.6	376	13.5
11105	Q	5/7/93	L	0	7.9	376	14.5
11110	SE/R	5/7/93	L	0	7.6	386	14.5
12005	Q	5/2/93	P	.01	6.5	99	15.0
12010	Q	5/2/93	P	.01	6.9	100	15.0
12015	Q	5/2/93	P	.02	6.8	73	15.5
12020	Q	5/2/93	P	.01	6.2	59	13.5
12025	SE	5/2/93	F	.01	5.6	82	12.5
12040	Q	5/2/93	F	.01	6.7	123	16.0
12045	Q	5/2/93	L	0	6.4	161	14.0
12090	Q	5/2/93	L	0	6.8	191	14.0
12095	Q	5/2/93	P	.06	7.1	219	16.0
12100	Q	5/2/93	P	.04	7.3	230	15.5
12105	Q	5/2/93	P	.04	7.1	234	15.5
12110	Q	5/2/93	L	0	7.4	139	15.0
12115	Q	5/2/93	P	.02	7.1	223	14.5
12120	Q	5/2/93	P	.04	7.4	191	14.5
12125	Q	5/2/93	L	0	7.6	506	13.0
12130	Q	5/2/93	P	.03	7.1	197	14.5
12132	Q	5/2/93	E	.02	7.3	218	14.5
12135	Q	5/2/93	E	.01	7.0	217	16.5
12140	Q	5/2/93	L	0	6.8	142	14.5
12145	Q	5/2/93	P	.02	7.1	171	14.5
12148	Q	5/2/93	L	0	6.6	130	14.5
12150	SE	5/2/93	L	0	6.9	119	13.0
12155	Q	5/2/93	P	.01	6.7	163	15.0
12160	Q	5/2/93	E	.01	6.7	117	16.0
13140	Q	4/29/93	P	.11	7.4	167	15.5
13150	SE	4/29/93	E	.01	5.9	72	13.0
13155	Q	4/29/93	P	0.07	7.2	202	15.0
13160	SP	4/29/93	P	.06	7.2	230	14.0
13162	Q	4/29/93	F	.04	6.6	32	16.0
13165	SE	4/29/93	E	.01	5.4	30	11.5
13170	SE	4/29/93	E	.01	4.9	25	12.0
13175	Q	4/29/93	P	.24	7.5	142	16.5
13180	Q	4/29/93	P	.02	6.6	80	16.5
13185	Q	4/29/93	P	.16	7.5	150	16.0

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
13190	Q	4/29/93	P	.2	7.4	145	16.0
13195	SE/R	4/29/93	L	0	6.6	174	15.0
13200	Q	4/29/93	P	.28	7.4	149	15.5
13205	Q	4/29/93	P	.05	7.2	142	15.0
13210	Q	4/29/93	P	.03	7.3	116	13.5
13215	Q	4/29/93	P	.02	6.1	61	12.5
13220	Q	4/29/93	L	0	5.4	65	12.0
13225	SE	4/29/93	E	.01	5.5	69	13.0
13230	SE	4/29/93	L	0	5.1	40	13.0
13235	SP	4/29/93	P	.04	7.4	274	14.0
13250	Q	4/29/93	P	.20	7.7	158	16.5
13255	SE	4/29/93	--	--	5.5	45	13.5
13260	Q	4/29/93	P	.10	7.9	161	16.0
13265	SE	4/29/93	L	0	5.7	47	12.0
13270	Q	4/29/93	P	.06	7.2	53	14.0
13274	Q	4/29/93	P	.04	6.7	49	16.5
13275	Q	4/29/93	V	.01	5.4	42	11.5
13280	SE	4/29/93	D	0	--	--	--
13285	Q	4/29/93	P	.01	6.3	52	12.5
13290	Q	4/29/93	--	--	7.2	72	14.0
13295	SE	4/29/93	L	0	6.1	76	14.5
13300	Q	4/29/93	P	.06	7.6	196	17.0
13305	SE	4/29/93	L	0	6.7	89	14.5
13310	Q	4/29/93	P	.06	7.7	199	17.0
13315	SE	4/29/93	L	0	5.9	46	13.0
13320	SE	4/29/93	D	0	--	--	--
13326	Q	4/29/93	L	0	7.1	344	16.0
13328	SE/R	4/29/93	L	0	6.8	229	12.0
13330	Q	4/29/93	P	.07	7.6	204	16.5
13335	SE	4/29/93	V	.01	6.5	157	15.0
13340	Q	4/29/93	L	0	6.0	193	12.5
13345	Q	4/29/93	L	0	6.5	31	14.5
13350	Q	4/29/93	L	0	5.6	48	13.5
13355	Q	4/29/93	P	0.04	8.0	242	15.0
13358	SE	4/29/93	L	0	5.9	93	14.5
13360	SE/A	4/29/93	P	.07	8.0	243	14.5
13365	Q	4/29/93	P	.05	7.8	234	14.0
13370	SP	4/29/93	P	.05	7.5	273	14.0
14005	Q	5/9/93	L	0	6.7	68	15.5
14010	SE	5/9/93	D	0	--	--	--
14015	Q	5/9/93	D	0	--	--	--
14025	Q	5/9/93	D	0	--	--	--
14060	SE	5/9/93	D	0	--	--	--
14070	SE	5/9/93	D	0	--	--	--
14075	SE	5/9/93	D	0	--	--	--
14080	SE	5/9/93	D	0	--	--	--
14095	SE	5/9/93	D	0	--	--	--
14100	SE	5/9/93	D	0	--	--	--
14110	Q	5/9/93	L	0	6.5	62	17.0
14130	SE	5/9/93	D	0	--	--	--
14135	Q	5/9/93	V	.01	7.1	148	18.5
14140	SE	5/9/93	L	0	7.6	90	18.0
14145	Q	5/9/93	V	.01	8	116	19.0

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
14160	SE	5/9/93	D	0	--	--	--
14175	Q	5/9/93	P	.02	7.9	124	17.0
14180	SE	5/9/93	D	0	--	--	--
14190	Q	5/9/93	E	.01	7.3	134	13.0
14280	Q	5/9/93	L	0	5.9	41	15.0
14285	Q	5/9/93	L	0	6.0	57	14.0
14290	SE	5/9/93	D	0	--	--	--
14295	Q	5/9/93	D	0	--	--	--
14297	Q	5/9/93	D	0	--	--	--
14305	Q	5/9/93	P	.05	7.8	221	18.5
14310	Q	5/9/93	P	.03	8	223	18.0
14315	SE	5/9/93	D	0	--	--	--
14320	Q	5/9/93	P	.08	8.1	228	17.5
14325	SE	5/9/93	L	0	6.6	76	15.5
14330	SE/A	5/9/93	P	.04	8.1	237	16.5
14335	Q	5/9/93	P	0.05	8.2	247	15.0
14340	SP	5/9/93	P	.01	7.3	219	13.0
14345	Q	5/9/93	D	0	--	--	--
14350	SE	5/9/93	D	0	--	--	--
14355	Q	5/9/93	L	0	6.8	58	19.5
14360	Q	5/9/93	L	0	7.0	66	19.0
14365	Q	5/9/93	L	0	7.4	90	18.5
14370	SE	5/9/93	L	0	6.6	103	15.5
14375	Q	5/9/93	L	0	7.2	58	17.0
14380	SE	5/9/93	L	0	6.3	105	15.0
14685	Q	5/9/93	L	0	6.0	60	18.0
14690	Q	5/9/93	D	0	--	--	--
14695	SE	5/9/93	D	0	--	--	--
14700	SE	5/9/93	D	0	--	--	--
14705	SE	5/9/93	D	0	--	--	--
14710	SE	5/9/93	D	0	--	--	--
14715	Q	5/9/93	L	0	6.9	62	18.5
14720	Q	5/9/93	L	0	7.2	96	18.0
14725	SE	5/9/93	L	0	6.2	89	14.0
14870	Q	5/9/93	L	0	7.5	94	19.5
14875	SE	5/9/93	L	0	6.9	95	15.0
15004	Q	5/2/93	L	0	7.4	569	17.5
15005	SE	5/2/93	L	0	7.8	14	19.5
15010	Q	5/2/93	L	0	7.2	575	16.5
15015	SE	5/2/93	D	0	--	--	--
15025	Q	5/2/93	P	.09	7.7	526	14.5
15030	SE	5/2/93	L	0	6.9	655	14.5
15035	Q	5/2/93	E	.02	7.6	501	14.5
15038	SE	5/2/93	L	0	7.2	602	14.0
15045	Q	5/2/93	P	.04	7.6	466	14.0
15050	SE	5/2/93	L	0	6.9	480	13.5
15055	Q	5/2/93	L	0	7.2	488	14.0
15060	SE/R	5/2/93	L	0	6.7	498	13.0
15065	Q	5/2/93	E	.01	6.5	139	14.0
15070	Q	5/2/93	D	0	--	--	--
15080	Q	5/2/93	L	0	7.2	219	17.0
16005	Q	5/1/93	D	0	--	--	--
16010	Q	5/1/93	D	0	--	--	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
16015	SE	5/1/93	V	0.01	7.5	70	13.0
16020	Q	5/1/93	P	.05	7.9	211	15.0
16023	SE	5/1/93	L	0	7.8	444	21.0
16025	Q	5/1/93	P	.03	7.5	182	15.5
16030	SP	5/1/93	P	.03	6.4	147	12.5
16035	Q	5/1/93	P	.08	8.0	287	15.0
16040	Q	5/1/93	P	.06	7.6	272	15.0
16045	SE	5/1/93	L	0	7.1	354	15.0
16050	SP	5/1/93	L	0	7.0	518	12.5
16055	SE	5/1/93	L	0	7.2	498	13.5
16060	Q	5/1/93	P	.03	7.7	234	14.5
16065	SE	5/1/93	L	0	7.3	338	13.5
16075	Q	5/1/93	P	.03	7.8	167	15.0
16080	Q	5/1/93	F	.04	7.2	119	14.0
16085	SP	5/1/93	L	0	7.0	130	13.0
16090	Q	5/1/93	P	.01	--	185	13.5
16095	Q	5/1/93	P	.08	--	219	15.0
16100	SE	5/1/93	L	0	7.7	396	16.0
16105	Q	5/1/93	P	.06	7.8	196	16.0
16110	SE	5/1/93	D	0	--	--	--
16115	SE	5/1/93	D	0	--	--	--
16120	SE	5/1/93	L	0	7.2	350	17.0
16125	SE	5/1/93	D	0	--	--	--
16130	Q	5/1/93	P	.06	7.7	144	15.0
16135	SP	5/1/93	E	.01	6.8	107	12.5
16140	Q	5/1/93	P	2.15	8.1	246	17.0
16145	Q	5/1/93	V	.02	7.6	489	17.5
16150	Q	5/1/93	P	1.96	8.0	264	18.0
16155	Q	5/1/93	P	.61	7.8	266	18.5
16160	Q	5/1/93	L	0	7.7	622	16.5
16165	SE	5/1/93	D	0	--	--	--
16170	Q	5/1/93	L	0	7.2	609	15.5
16175	Q	5/1/93	L	0	7.0	466	16.5
16180	SE	5/1/93	D	0	--	--	--
16185	SE/R	5/1/93	L	0	7.9	687	17.0
16300	Q	5/1/93	P	1.26	8.2	211	15.0
16305	Q	5/1/93	P	.01	8.2	346	15.0
16310	Q	5/1/93	V	.01	7.9	347	14.0
16315	SE	5/1/93	D	0	--	--	--
16320	SE	5/1/93	D	0	--	--	--
16325	Q	5/1/93	P	0.03	7.2	216	12.5
16330	SP	5/1/93	L	0	6.7	268	11.5
16335	SE	5/1/93	D	0	--	--	--
16340	SP	5/1/93	D	0	--	--	--
16345	SE	5/1/93	L	0	--	--	--
17005	Q	5/3/93	P	1.12	7.9	276	13.5
17007	SE	5/3/93	L	0	7.4	143	13.5
17010	SP	5/3/93	P	.06	7.3	193	13.0
17015	SE	5/3/93	P	.04	7.8	148	13.5
17020	Q	5/3/93	P	.81	7.9	285	13.5
17025	SP	5/3/93	V	.01	7.4	237	13.5
17030	SE	5/3/93	P	.04	7.8	171	14.0



**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
17035	Q	5/3/93	P	.92	7.9	210	13.0
17038	Q	5/3/93	P	.04	7.6	121	14.0
17040	Q	5/3/93	P	.06	7.4	124	13.5
17050	SE	5/3/93	L	0	6.1	56	13.0
17055	SE/A	5/3/93	V	.02	6.9	63	13.0
17060	Q	5/3/93	P	.64	7.8	292	13.5
17065	Q	5/3/93	P	.05	7.7	393	13.5
17070	SE/R	5/3/93	P	.01	7.1	370	12.5
17075	Q	5/3/93	P	.62	7.8	287	14.0
17080	Q	5/3/93	P	.59	7.8	290	13.5
17085	SE/R	5/3/93	E	.02	7.8	407	13.0
17090	Q	5/3/93	P	.38	7.2	281	13.5
17095	SE	5/3/93	D	0	--	--	--
17100	Q	5/3/93	P	.43	7.6	275	13.5
17105	Q	5/3/93	P	.34	7.6	274	13.5
17110	Q	5/3/93	P	.35	7.4	272	13.5
17115	SP	5/3/93	P	.04	5.9	286	13.0
17120	Q	5/3/93	P	.15	7.4	245	13.5
17125	Q	5/3/93	P	.11	7.9	245	13.5
17130	Q	5/3/93	P	.19	8.0	246	13.5
17135	Q	5/3/93	P	.31	7.8	243	13.5
17140	Q	5/3/93	P	.34	7.2	242	13.5
17145	Q	5/3/93	P	.32	7.1	234	13.5
18012	Q	4/30/93	V	.01	7.0	137	12.5
18045	Q	4/30/93	P	0.59	7.9	272	12.5
18050	Q	4/30/93	P	.48	7.9	310	12.5
18055	Q	4/30/93	V	.01	7.0	154	12.5
18060	Q	4/30/93	P	.64	8.1	286	13.0
18065	Q	4/30/93	P	.1	7.6	239	13.0
18070	Q	4/30/93	V	.10	7.3	238	12.5
18075	Q	4/30/93	V	.01	7.4	248	12.5
18080	SE	4/30/93	L	0	6.7	180	13.0
18085	Q	4/30/93	P	.06	7.3	260	13.0
18090	Q	4/30/93	P	.05	7.5	226	16.5
18095	Q	4/30/93	L	0	6.6	185	13.0
18100	SE	4/30/93	L	0	6.6	196	13.5
18105	Q	4/30/93	P	.01	6.8	190	13.0
18110	SE	4/30/93	D	0	--	--	--
18115	Q	4/30/93	P	.01	6.8	188	12.5
18120	SE	4/30/93	L	0	6.6	172	13.5
18125	Q	4/30/93	F	.04	7.4	263	13.0
18130	SP	4/30/93	E	.04	7.5	273	13.0
18135	SE	4/30/93	L	0	6.9	124	14.0
18140	Q	4/30/93	R	.38	8.0	289	14.0
18145	Q	4/30/93	P	.09	8.1	408	13.5
18150	Q	4/30/93	P	.33	8.1	264	15.5
18155	Q	4/30/93	P	.02	7.5	124	14.5
18160	Q	4/30/93	P	.2	8.1	350	16.5
18165	Q	4/30/93	E	.01	7.1	346	12.5
18170	Q	4/30/93	P	.06	8.0	289	12.5
18175	Q	4/30/93	D	0	--	--	--
18195	Q	4/30/93	P	.04	7.6	352	14.0
18200	Q	4/30/93	D	0	--	--	--

**Table 3.** Discharge and water-quality data for the high base flow seepage investigation at Oak Ridge National Laboratory, April 29 through May 10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
18205	SE	4/30/93	L	0	5.7	50	13.0
18210	Q	4/30/93	P	.05	7.6	321	13.5
18215	Q	4/30/93	P	.17	8.2	377	13.0
18220	Q	4/30/93	P	.12	7.6	199	11.5
18225	Q	4/30/93	P	.12	7.6	200	11.5
18230	Q	4/30/93	L	0	6.5	87	11.5
18235	SE	4/30/93	D	0	--	--	--
18240	Q	4/30/93	P	.16	7.9	204	13.0
18245	Q	4/30/93	P	.14	7.7	201	16.5
18250	Q	4/30/93	P	0.02	7.7	214	15.5
18255	Q	4/30/93	E	.01	7.4	237	14.5
18260	SE	4/30/93	L	0	6.3	146	13.5
18265	Q	4/30/93	L	0	6.6	212	14.0
18270	Q	4/30/93	V	.01	6.6	226	17.5
18275	Q	4/30/93	P	.11	7.1	164	16.5
18276	Q	4/30/93	P	.11	7.2	177	17.0
18277	SP	4/30/93	P	.04	6.9	201	15.5
18280	Q	4/30/93	P	.06	6.8	183	16.0
18285	Q	4/30/93	P	.04	6.7	175	17.5
18290	Q	4/30/93	L	0	7.4	28	12.5
18295	SE	4/30/93	L	0	7.2	298	12.5
18300	Q	4/30/93	P	.06	7.3	171	13.0
18310	SE/R	4/30/93	L	0	6.6	203	13.0
18315	Q	4/30/93	P	.03	6.8	142	14.0
18320	SE	4/30/93	L	0	6.2	111	13.5
18325	Q	4/30/93	V	.01	6.6	130	13.5
18330	SE	4/30/93	L	0	6.0	102	13.0
18335	Q	4/30/93	P	.06	7.0	197	17.0
18340	Q	4/30/93	P	.05	7.2	152	17.0
18345	Q	4/30/93	P	.01	7.1	194	16.5
18348	Q	4/30/93	V	.01	7.3	144	14.5
18350	Q	4/30/93	L	0	8.2	198	22.5
18355	SE	4/30/93	L	0	5.6	54	14.5
18370	SE	4/30/93	L	0	6.5	215	14.5
18375	Q	4/30/93	P	.07	7.2	133	15.5
18380	Q	4/30/93	P	.07	7.0	115	13.5
18385	Q	4/30/93	L	0	6.6	150	13.0
18389	Q	4/30/93	L	0	6.7	166	13.0
18390	Q	4/30/93	V	.01	5.6	100	13.5
18405	Q	4/30/93	P	.04	6.6	83	13.5
18410	Q	4/30/93	V	.02	6.0	45	12.5
18415	Q	4/30/93	L	0	5.1	36	13.0
18420	SE	4/30/93	L	0	4.9	29	12.5
18435	SE	4/30/93	L	0	5.0	40	13.0

**Table 9.** Discharge and water-quality data for the low base flow seepage investigation at Oak Ridge National Laboratory, September 8-10, 1993

[a, second site identified at the same location; Type of site: Q, stream measurement sites; SE, seep; SP, spring; /R, site associated with a seepage reach; /A, site is associated with a seepage or spring area; Methods for measurement: B, backwater conditions; D, no flowing water; E, estimation; L, less than minimum reportable discharge; P, pygmy meter measurement; V, volumetric measurement; ft<sup>3</sup>/s, cubic feet per second;  $\mu$ S/cm, microsiemens per centimeter; °C, degree Celsius; --, no data]

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance ( $\mu$ S/cm)	Temperature (°C)
01050	SE	9/8/93	D	0	--	--	--
01325	SP	9/8/93	P	0.01	6.8	330	14.0
01330	SE	9/8/93	E	.01	7.6	379	18.0
01397	SE	9/8/93	D	0	--	--	--
02160	SE	9/8/93	D	0	--	--	--
02165	SE	9/8/93	D	0	--	--	--
02185	SP	9/8/93	D	0	--	--	--
02194	SE	9/8/93	D	0	--	--	--
02205	SP	9/8/93	D	0	--	--	--
02214	SP/A	9/8/93	D	0	--	--	--
02230	SE/R	9/8/93	D	0	--	--	--
02240	SE	9/8/93	D	0	--	--	--
02245	SE	9/8/93	D	0	--	--	--
02260	SP/A	9/8/93	D	0	--	--	--
02266	SE	9/8/93	D	0	--	--	--
02305	SP	9/8/93	E	.01	7.1	394	17.0
02310	SP	9/8/93	D	0	--	--	--
02330	SP	9/8/93	D	0	--	--	--
02335	SP	9/8/93	D	0	--	--	--
02356	SE	9/8/93	L	0	7.4	275	18.0
02525	SP	9/8/93	L	0	7.3	289	13.0
02528	SP	9/8/93	D	0	--	--	--
02530	Q	9/8/93	D	0	--	--	--
02557	SE	9/8/93	D	0	--	--	--
02559	SP	9/8/93	L	0	7.3	260	17.5
02570	SE	9/8/93	L	0	7.6	269	18.0
02620	SE	9/8/93	D	0	--	--	--
02625	Q	9/8/93	D	0	--	--	--
02630	SE	9/8/93	D	0	--	--	--
02640	SE	9/8/93	D	0	--	--	--
02645	SE	9/8/93	D	0	--	--	--
02680	SE	9/8/93	D	0	--	--	--
03075	SP	9/9/93	L	0	7.0	282	14.5
03085	SP	9/9/93	L	0	6.8	386	16.5
03090	SP	9/9/93	P	0.02	7.3	308	14.5
03100	SP	9/9/93	P	.11	7.2	254	14.0
03545	SE	9/9/93	D	0	--	--	--
03550	SP	9/9/93	D	0	--	--	--
03565	SP	9/9/93	L	0	7.2	457	15.5
03580	SP	9/9/93	D	0	--	--	--
03600	SE	9/9/93	D	0	--	--	--
03615	SE	9/9/93	D	0	--	--	--
03620	SE	9/9/93	D	0	--	--	--
03645	SE	9/9/93	D	0	--	--	--
03672	SE	9/9/93	D	0	--	--	--
03673	SE	9/9/93	D	0	--	--	--

**Table 9.** Discharge and water-quality data for the low base flow seepage investigation at Oak Ridge National Laboratory, September 8-10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
03674	SE	9/9/93	E	.04	7.1	305	15.5
03697	SE/R	9/9/93	E	.01	7.2	308	15.0
03699	SE	9/9/93	D	0	--	--	--
03718	SE	9/9/93	L	0	7.4	268	17.0
03720	SE	9/9/93	E	.01	7.2	271	16.0
04003	SP	9/8/93	P	.34	7.5	286	17.5
04009	SE	9/8/93	D	0	--	--	--
04012	SE	9/8/93	D	0	--	--	--
04015	SE	9/8/93	D	0	--	--	--
04021	SE	9/8/93	L	0	6.9	279	16.5
04024	SP/A	9/8/93	D	0	--	--	--
04027	SE	9/8/93	P	.07	7.5	213	18.0
04030	SP	9/8/93	E	.01	6.9	223	15.5
04033	SP	9/8/93	P	.07	7.6	257	14.0
05070	SP	9/9/93	P	<sup>a</sup> .06	7.1	520	17.5
05070a	SP	9/9/93			7.4	389	18.5
05077	SE	9/9/93	D	0	--	--	--
05112	SE	9/9/93	D	0	--	--	--
05115	SP	9/9/93	P	.02	7.0	299	14.0
05135	SP	9/9/93	L	0	6.6	87	18.0
05242	SE	9/9/93	D	0	--	--	--
05247	SE	9/9/93	D	0	--	--	--
05290	SP	9/9/93	E	0.01	7.0	264	13.5
05295	SE/R	9/9/93	L	0	7.3	323	19.0
05310	SE	9/9/93	D	0	--	--	--
05315	SP	9/9/93	L	0	7.6	246	13.5
05320	SE	9/9/93	L	0	7.6	258	14.0
05325	SP	9/9/93	P	.01	7.5	261	13.5
05330	SP	9/9/93	L	0	7.3	258	15.5
05335	SP	9/9/93	E	.01	7.6	260	13.5
05345	SE	9/9/93	D	0	--	--	--
06010	SP	9/9/93	D	0	--	--	--
06045	SE	9/9/93	D	0	--	--	--
06048	SE	9/9/93	D	0	--	--	--
06056	SE	9/9/93	D	0	--	--	--
06070	SP	9/9/93	D	0	--	--	--
06075	SP	9/9/93	D	0	--	--	--
06100	SP	9/9/93	D	0	--	--	--
07021	SE	9/9/93	D	0	--	--	--
07030	SP	9/9/93	D	0	--	--	--
07038	SE	9/9/93	D	0	--	--	--
07120	SE	9/9/93	D	0	--	--	--
07228	SE	9/9/93	D	0	--	--	--
07410	SP	9/9/93	D	0	--	--	--
07430	SP	9/9/93	L	0	6.8	137	20.5
08020	SE	9/10/93	D	0	--	--	--
08025	SE	9/10/93	L	0	7.4	271	19.5
08031	SE	9/10/93	D	0	--	--	--
08039	SE	9/10/93	D	0	--	--	--
08043	SE	9/10/93	D	0	--	--	--
08045	SE	9/10/93	D	0	--	--	--

**Table 9.** Discharge and water-quality data for the low base flow seepage investigation at Oak Ridge National Laboratory, September 8-10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
08075	SE/A	9/10/93	D	0	--	--	--
08085	SE	9/10/93	D	0	--	--	--
08090	SE	9/10/93	L	0	7.2	188	15.0
08110	SE	9/10/93	D	0	--	--	--
08115	SE	9/10/93	L	0	6.7	82	18.5
08130	SE	9/10/93	D	0	--	--	--
08195	SE/R	9/10/93	D	0	--	--	--
08245	SE	9/10/93	L	0	6.8	120	18.5
08265	Q	9/10/93	D	0	--	--	--
08280	SE <sup>b</sup>	9/10/93	L	0	7.4	259	19.0
08280a	SE	9/10/93	L	0	7.6	189	18.0
08285	SE	9/10/93	D	0	--	--	--
08365	SE/R	9/10/93	D	0	--	--	--
08395	SE	9/10/93	D	0	--	--	--
08400	SE	9/10/93	L	0	6.8	59	18.5
09050	SE/R	9/10/93	D	0	--	--	--
09060	SE	9/10/93	D	0	--	--	--
09070	SE	9/10/93	D	0	--	--	--
09115	Q	9/10/93	D	0	--	--	--
09140	SP	9/10/93	L	0	7.6	463	14.5
10175	SE	9/10/93	D	0	--	--	--
10189	SP	9/10/93	L	0	7.8	537	18.5
10195	SE	9/10/93	D	0	--	--	--
10200	SP	9/10/93	D	0	--	--	--
10350	SE	9/10/93	D	0	--	--	--
10395	SE	9/10/93	D	0	--	--	--
10470	SE	9/10/93	D	0	--	--	--
10480	SE	9/10/93	D	0	--	--	--
10510	SE	9/10/93	D	0	--	--	--
10607	SE	9/10/93	L	0	8.1	449	20.5
10610	SE	9/10/93	D	0	--	--	--
11010	SP	9/10/93	L	0	7.4	572	17.5
11025	SP	9/10/93	L	0	7.3	514	17.0
11035	SE/R	9/10/93	D	0	--	--	--
11055	SE	9/10/93	D	0	--	--	--
11070	SE	9/10/93	D	0	--	--	--
11082	SE	9/10/93	D	0	--	--	--
11100	SP	9/10/93	L	0	--	455	17.5
11105	Q	9/10/93	L	0	7.7	425	20.0
11110	SE	9/10/93	D	0	--	--	--
12025	SE	9/8/93	D	0	--	--	--
12045	Q	9/8/93	D	0	--	--	--
12090	Q	9/8/93	D	0	--	--	--
12125	Q	9/8/93	D	0	--	--	--
12135	Q	9/8/93	D	0	--	--	--
12150	SE	9/8/93	D	0	--	--	--
13150	SP	9/8/93	D	0	--	--	--
13155	Q	9/8/94	E	0.02	7.5	322	14.5
13160	SP	9/8/93	E	.02	7.2	286	14.0
13165	SE	9/8/93	D	0	--	--	--
13170	SE	9/8/93	D	0	--	--	--

**Table 9.** Discharge and water-quality data for the low base flow seepage investigation at Oak Ridge National Laboratory, September 8-10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
13195	SE/R	9/8/93	D	0	--	--	--
13230	SE	9/8/93	D	0	--	--	--
13235	SP	9/8/93	E	.01	7.6	343	15.0
13255	SE	9/8/93	D	0	--	--	--
13265	SE	9/8/93	D	0	--	--	--
13305	SE	9/8/93	D	0	--	--	--
13315	SE	9/8/93	D	0	--	--	--
13328	SE/R	9/8/93	D	0	--	--	--
13335	SE	9/8/93	D	0	--	--	--
13340	SE	9/8/93	D	0	--	--	--
13350	Q	9/8/93	D	0	--	--	--
13358	SE	9/8/93	D	0	--	--	--
13360	SE/A	9/8/93	D	0	--	--	--
13370	SP	9/8/93	E	.02	7.4	316	14.5
14140	SE	9/9/93	D	0	--	--	--
14190	SP	9/9/93	L	0	7.2	188	17.5
14325	SE	9/9/93	D	0	--	--	--
14330	SE/A	9/9/93	L	0	7.9	262	23.0
14340	SP	9/9/93	E	.02	8.0	235	16.0
14370	SE	9/9/93	L	0	7.2	208	20.0
14375	SE	9/9/93	L	0	6.9	78	19.0
14725	SE	9/9/93	L	0	7.2	161	21.0
14875	SE	9/9/93	L	0	7.4	197	20.0
15005	SE	9/8/93	D	0	--	--	--
15030	SE	9/8/93	D	0	--	--	--
15038	SE	9/8/93	D	0	--	--	--
15050	SE	9/8/93	D	0	--	--	--
15060	SE/R	9/8/93	D	0	--	--	--
16015	SE	9/10/93	D	0	--	--	--
16023	SE	9/10/93	D	0	--	--	--
16030	SP	9/10/93	L	0	7.4	296	16.0
16045	SE	9/10/93	D	0	--	--	--
16050	SP	9/10/93	D	0	--	--	--
16055	SE	9/10/93	D	0	--	--	--
16065	SE	9/10/93	D	0	--	--	--
16085	SP	9/10/93	L	0	7.4	180	18.0
16100	SE	9/10/93	D	0	--	--	--
16120	SE	9/10/93	D	0	--	--	--
16135	SP	9/10/93	E	0.01	7.6	141	14.5
16185	SE/R	9/10/93	D	0	--	--	--
16330	SP	9/10/93	D	0	--	--	--
16345	SE	9/10/93	D	0	--	--	--
17007	SE	9/10/93	D	0	--	--	--
17010	SP	9/10/93	E	.03	7.5	241	13.5
17015	SE	9/10/93	E	.01	7.8	232	18.0
17025	SP	9/10/93	L	0	7.5	272	20.5
17030	SE	9/10/93	E	.02	7.8	215	16.5
17050	SE	9/10/93	D	0	--	--	--
17055	SE/A	9/10/93	E	.01	7.5	170	19.5
17065	Q	9/10/93	D	0	--	--	--
17070	SE/R	9/10/93	L	0	7.1	516	19.5

**Table 9.** Discharge and water-quality data for the low base flow seepage investigation at Oak Ridge National Laboratory, September 8-10, 1993--Continued

Site number	Type of site	Date sampled (month/day/year)	Method	Flow (ft <sup>3</sup> /s)	pH	Specific conductance (μS/cm)	Temperature (°C)
17085	SE/R	9/10/93	D	0	--	--	--
17115	SP	9/10/93	E	.02	7.6	324	16.5
18100	SE	9/10/93	D	0	--	--	--
18120	SE	9/10/93	D	0	--	--	--
18130	SP	9/10/93	L	0	7.7	405	18.5
18135	Q	9/10/93	D	0	--	--	--
18205	SE	9/10/93	D	0	--	--	--
18260	SE	9/10/93	D	0	--	--	--
18270	Q	9/10/93	D	0	--	--	--
18277	SP	9/10/93	L	0	7.2	404	18.0
18385	Q	9/10/93	D	0	--	--	--
18295	SE	9/10/93	D	0	--	--	--
18330	SE	9/10/93	D	0	--	--	--
18310	SE	9/10/93	D	0	--	--	--
18320	SE	9/10/93	D	0	--	--	--
18355	SE	9/10/93	D	0	--	--	--
18370	SE	9/10/93	D	0	--	--	--
18420	SE	9/10/93	D	0	--	--	--
18435	SE	9/10/93	D	0	--	--	--

<sup>a</sup> Combined flow from two adjacent springs.

<sup>b</sup> Two adjacent seeps located a few feet apart.