OCCURRENCE OF PESTICIDES, NITRATE, VOLATILE ORGANIC COMPOUNDS, AND TRACE ELEMENTS IN GROUND WATER AND STREAMS, SOUTHEASTERN MISSOURI, 1986-87

By Thomas O. Mesko and Gale M. Carlson

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CONVERSION FACTORS

For readers who prefer to use metric units, conversion factors for inch-pound units used in this report are listed below:

Multiply inch-pound units	By	To obtain SI units
acre	0.4047	hectare
acre-foot	0.001233	cubic hectometer
foot (ft)	0.3048	meter
foot squared per day (ft^2/day)	0.09290	meter squared per day
gallon (gal)	3.785	liter
gallon per minute (gpm)	0.06308	liter per second
inch (in.)	25.40	millimeter
pound (lb)	0.4536	kilogram
square mile (mi^2)	259.0	hectare

To convert degrees Celsius (°C) to degrees Fahrenheit (°F) use the following:

$$°F=9/5\ °C + 32.$$

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BY

Thomas O. Mesko[1] and Gale M. Carlson[2]

ABSTRACT

Ground-water, surface-water, and streambed-sediment samples were collected from domestic, irrigation, and public supply wells and streams in southeastern Missouri during 1986-87 and analyzed for pesticides, total nitrate, volatile organic compounds, and total recoverable trace elements. Laboratory analyses identified 23 pesticides, nitrate, 3 volatile organic compounds, and 9 trace elements in some of the samples. During the 2-year study 129 sites were sampled. These included 74 domestic wells, 25 irrigation wells, 25 public-supply wells, and 5 stream sites. Of these sites, 26 domestic wells, 4 irrigation wells, 4 public-supply wells, and all 5 stream sites contained water with detectable concentrations of some pesticides, some volatile organic compounds, or some trace elements (including iron and manganese). Total nitrate as nitrogen was detected in 81 of 137 domestic well samples and concentrations in 24 of those samples were equal to or greater than 10 milligrams per liter.

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Use of trade names in this report is for identification purposes only and does not constitue endorsement by the U.S. Geological Survey.

INTRODUCTION

Land in southeastern Missouri has been intensively developed for agricultural production. Large-scale production of cotton, rice, grain sorghum, wheat, soybeans, and corn is associated with use of pesticides. Increased and prolonged use of these pesticides can effect shallow ground- and surface-water supplies that are used as sources of domestic, public, and irrigation supplies. As a result of these concerns the U.S. Geological Survey, in cooperation with the Missouri Department of Health and the Missouri Department of Natural Resources, collected water samples from domestic and irrigation wells, and water and streambed-sediment samples from streams in southeastern Missouri in June-July and November 1986 and July and September 1987. In addition, the Missouri Department of Natural Resources, Division of Environmental Quality, Public Drinking Water Program, collected water samples from public-supply wells in November 1986.

During 1984, southeastern Missouri produced 100 percent of the State's cotton, 97 percent of the rice, 36 percent of the grain sorghum, 20 percent of the wheat, 20 percent of the soybeans, and 7.2 percent of the corn. The total harvested acreage during 1984 was more than 2,300,000 acres, excluding miscellaneous crops, but decreased slightly during 1985 and 1986 (Missouri Department of Agriculture, 1985, 1986, 1987).

Based on 1984 crop acreage and the average rate of pesticide application for the most commonly used pesticides, an estimated 1 Mgal (million gallons) of liquid and one-half million lb (pounds) of dry pesticides were applied to agricultural land in the area. This corresponds to about 0.40 gal (gallon) plus 0.20 lb per acre of chemicals applied to the entire area (Mesko, 1987). The pesticide-use data were estimated by multiplying the harvested acreage of a crop by the application rate of the most commonly used pesticides on that crop type. An average soil type was assumed, and total harvested acreage was used for the six principal crop types in the area: cotton, rice, grain sorghum, wheat, soybeans, and corn. Pesticides widely used were atrazine, alachlor, cyanazine, metolachlor, trifluralin, propanil, 2,4-D, and 2,4,5-T. Many other pesticides used in lesser quantities have been identified by the Missouri Department of Health from data supplied by the University of Missouri at Columbia.

Purpose and Scope

The purpose of this report is to present the results of water-quality analyses of ground water from domestic, irrigation, and public-supply wells and surface water and streambed sediment collected in June-July and November 1986, and July and September 1987. Also included in this report is information concerning the site location, description, well depth, and use of water.

Study Area

The Mississippi Alluvial Plain of Missouri encompasses about 4,000 mi^2 (square miles), or 2.5 million acres, of prime agricultural land in the Gulf Coastal Plain Province (fig. 1). This region was originally covered by forests and swamps but has become intensively developed for agricultural production. The Mississippi River Valley alluvial aquifer is the surficial unit in the area, except where older units crop out on Crowley's Ridge (table 1, in the back of this report). The thickness of the alluvial aquifer ranges from 0 to more than 250 ft (feet), but generally is 100 to 200 ft thick (Luckey and Fuller, 1985). Water levels fluctuate seasonally, but generally range from 10 to 20 ft below land surface in the spring. Declines of 10 to 20 ft are common during the summer and fall, but water levels seasonally return to previous levels during recharge from precipitation that averages 44 to 50 in. (inches) per year. The aquifer is characterized by large transmissivities that can exceed 50,000 ft^2/day (feet squared per day). Water wells easily can yield 1,500 gpm (gallons per minute) and can exceed 3,500 gpm. The aquifer is a significant source of water for domestic, irrigation, and public-supply use that annually provides an estimated 95,000 acre-feet of water for irrigation and 17,000 acre-feet of water for municipal, industry, and domestic use (Luckey and Fuller, 1985).

Previous Investigations

The geohydrology and water quality of southeastern Missouri and the northern Mississippi Alluvial Plain have been studied in detail, but sparse information is available on the occurrence of organic chemicals in ground or surface water. Cushing and others (1964) described the general geology of the Mississippi embayment. Boswell and others (1968) described the availability and chemical nature of ground water from Quaternary aquifers in the Mississippi embayment. Hosman and others (1968) described the Tertiary aquifers and the availability and chemical nature of water in these aquifers. Cushing and others (1970) summarized the availability of water in the Mississippi embayment. Luckey and Fuller (1980) tabulated well construction, geologic, water-level, and ground-water quality data for wells in southeastern Missouri. The U.S. Army, Corps of Engineers (1980) reported pesticide concentrations in water, streambed sediment, and fish tissue samples from streams and ditches in Mississippi County. Luckey and Fuller (1985) described the ground- and surface-water systems in southeastern Missouri and documented, in detail, the movement and occurrence of water in the alluvial aquifer. They reported pesticides in small concentrations in water and streambed-sediment samples from selected ditches and rivers draining southeastern Missouri. Brahana and others (1985) tabulated the results of chemical analyses for major constituents, trace constituents, dissolved gases, and stable and radioactive isotopes for wells sampled in the northern Mississippi embayment. Crisp (1987) reported pesticide concentrations in surface-water, streambed sediment, and fish samples taken from ditches and streams in southeastern Missouri. Brahana and Mesko (1988) described regional flow in the upper Cretaceous and adjacent aquifers in the northern Mississippi embayment. Mesko and Berkas (1988) described general aquifer characteristics and statistical water-quality information about the alluvial and underlying aquifers in southeastern Missouri. Mesko (in press, a) described the subsurface geology of Paleozoic, Mesozoic, and Cenozoic units in southeastern Missouri, and in a related report, Mesko (in press, b) described the geohydrology and water quality of Cenozoic and Mesozoic units of southeastern Missouri.

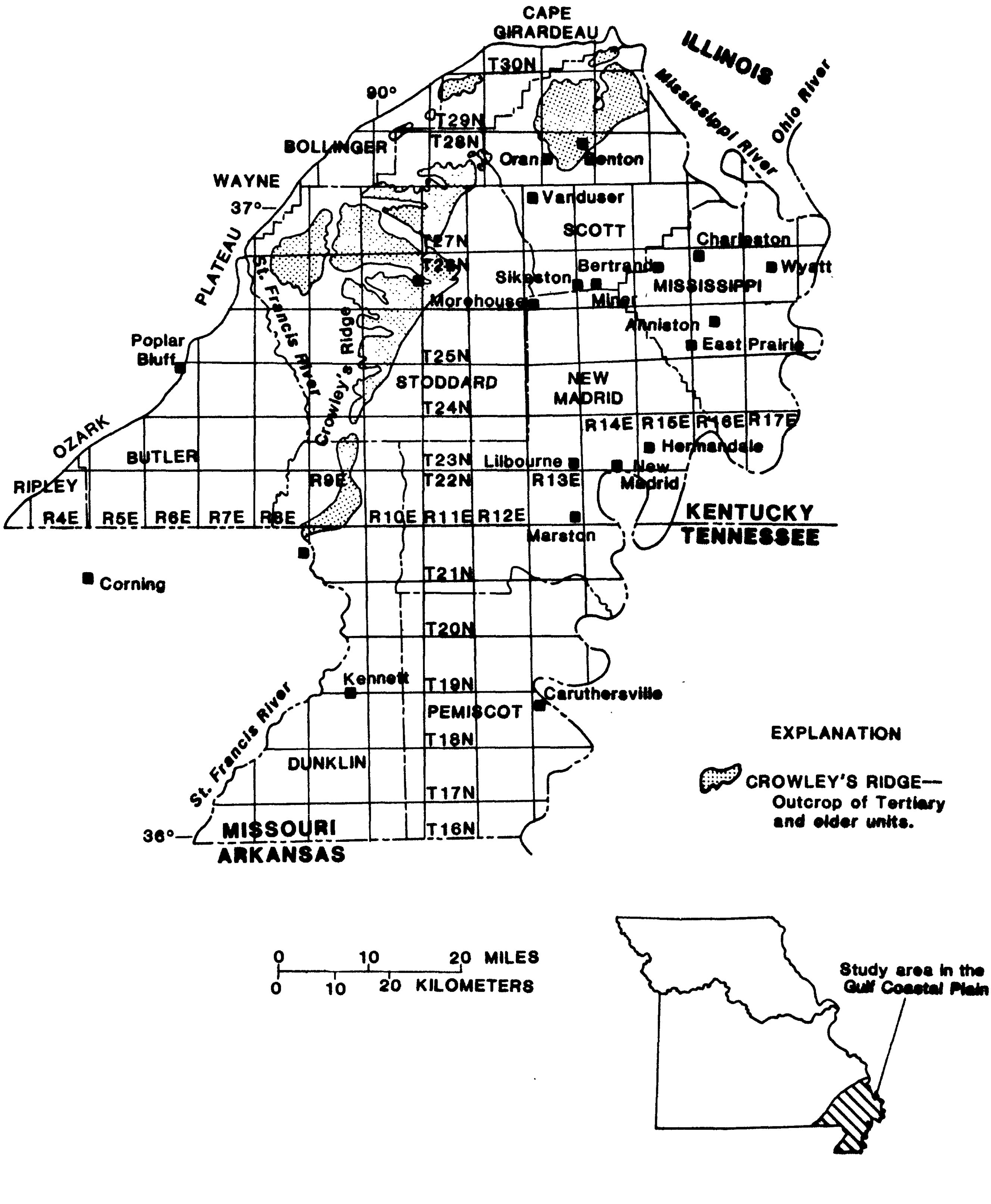

Figure 1.--Location of study area and physiographic features.

Current (1988) investigations in the area are part of the Gulf Coast Regional Aquifer-Systems Analysis (Grubb, 1984). The Cretaceous, Tertiary, and younger sediments are being studied to evaluate the major aquifer systems in the Gulf Coastal Plain.

Well-Numbering System

In this report, location of wells follows the General Land Office coordinate system. According to this system (fig. 2), the first three sets of numbers of a well number designate township, range, and section. The letters that follow indicate quarter section, quarter-quarter section, and quarter-quarter-quarter section. The quarter sections are represented by letters A, B, C, and D in counterclockwise order, starting in the northeast quadrant. This number is referred to as the local number. In addition, the latitude and longitude of sites are also used. Latitude, shown first is in DDMMSS (degrees, minutes, and seconds), and longitude is second, also shown in DDMMSS.

Selection and Description of Sampling Sites

The location of all sites sampled are shown in figures 3 and 4; descriptions of the sites are given in table 2 (in the back of this report). Sampling of wells and streams (sites 1-45) began in June 1986. Sites 1-40 (fig. 3) were selected because they were rural, shallow, alluvial, domestic wells used as primary sources of drinking water. Depths of these wells ranged from 17 to 100 ft, averaging slightly less than 35 ft. Wide areal coverage was selected for the best spatial coverage in rural areas. Sites 41-45 (fig. 4) were selected because they were at the ditches and streams that drain the five major basins in the region. Stream transport of pesticides in water or sediment from the region can be monitored from these five sites. In July 1986, sites 110-112 (fig. 3) were selected because they were typical irrigation wells. The depth of wells 110 and 112 were 116 and 90 ft and because they were capable of producing large quantities of water, their radius of influence during pumping was much greater than low-yielding domestic wells. Therefore, a more representative sample of ground water in the aquifer could be obtained on a regional basis.

In November 1986, sites 1-40 and 43 were resampled. In a coordinated effort, the Public Drinking Water Program of the Missouri Division of Environmental Quality sampled sites PDWP 1-25 (fig 3.), which were all public-supply wells. Some of the public-supply wells were completed in the shallow Mississippi River Valley alluvial aquifer. However, other wells were completed into the underlying Wilcox, Claiborne, and upper Cretaceous aquifers. For public-supply wells, data indicate well depths range from about 90 to 1,650 ft, averaging about 337 ft.

In July 1987, sites 1-40, except sites 6, 18, 21, and 26 were re-sampled and sites 51-108 were established (fig. 3; no sites were established for 84 and 95) and sampled. Of these, 70 were domestic wells and 22 were irrigation wells. The additional domestic wells (sites 51-68, 70-73, 75-83, 92, 94, and 104) ranged in depth from 15 to 98 ft, averaging about 38 ft. The additional irrigation wells (sites 69, 74, 85-91, 93, 96-103, and 105-108) ranged in depth from 30 to 100 ft, averaging about 82 ft. In September 1987, selected sites that had been previously sampled were resampled. For all domestic wells sampled, depths ranged from 15 to 100 ft and averaged about 36 ft. For all irrigation wells sampled, depths ranged from 30 to 116 ft and averaged about 84 ft.

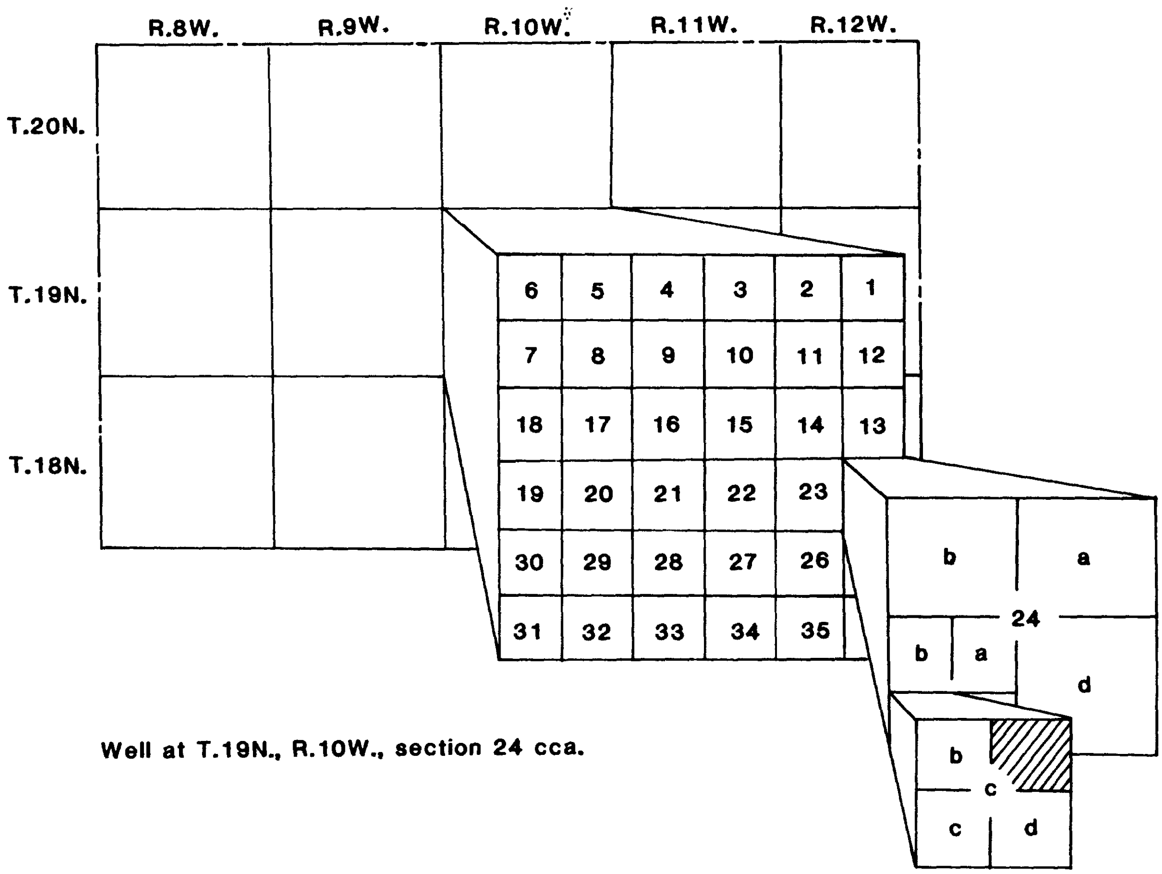

Figure 2.--Well-numbering system.

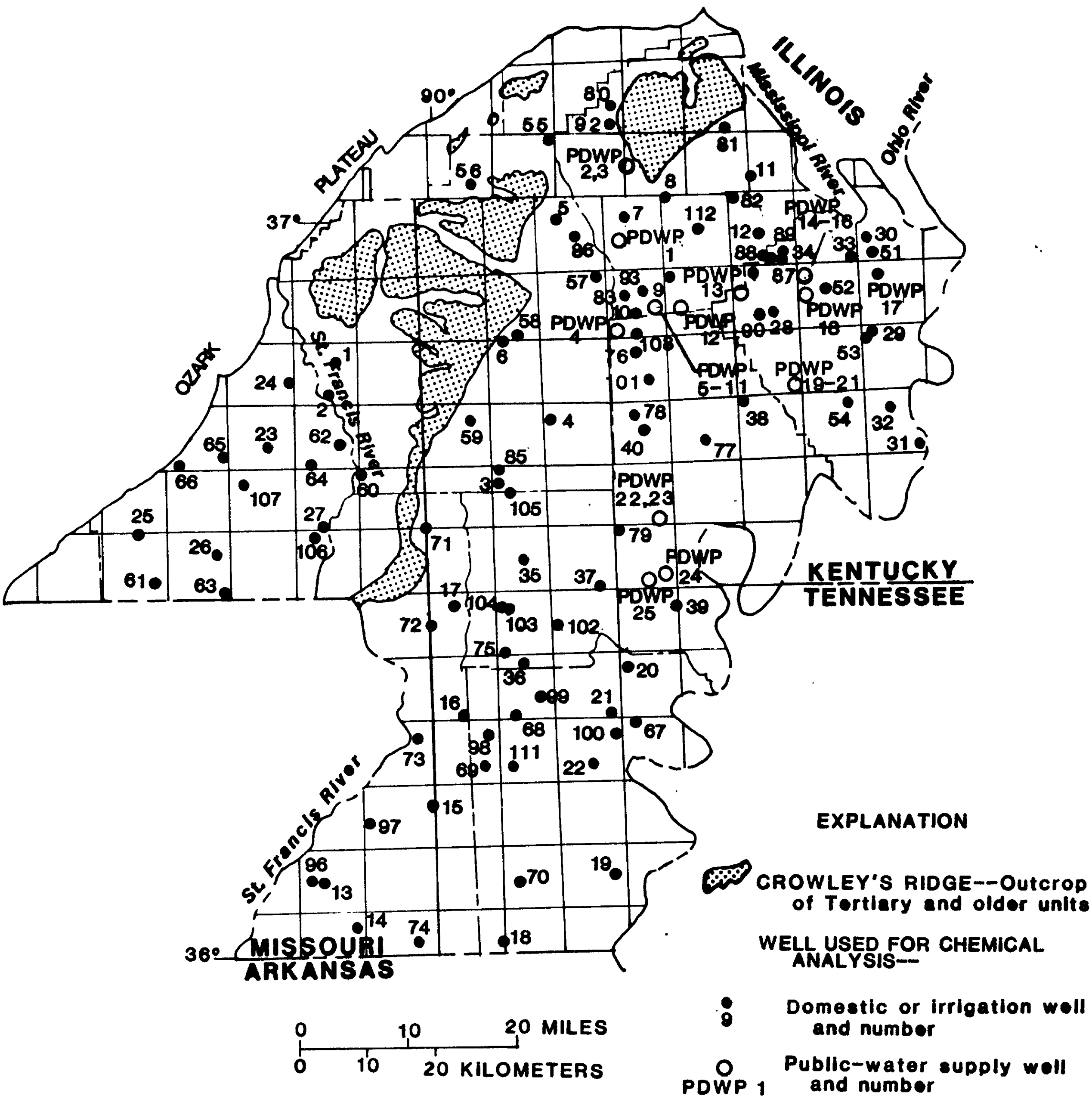

Figure 3.--Ground-water sampling sites.

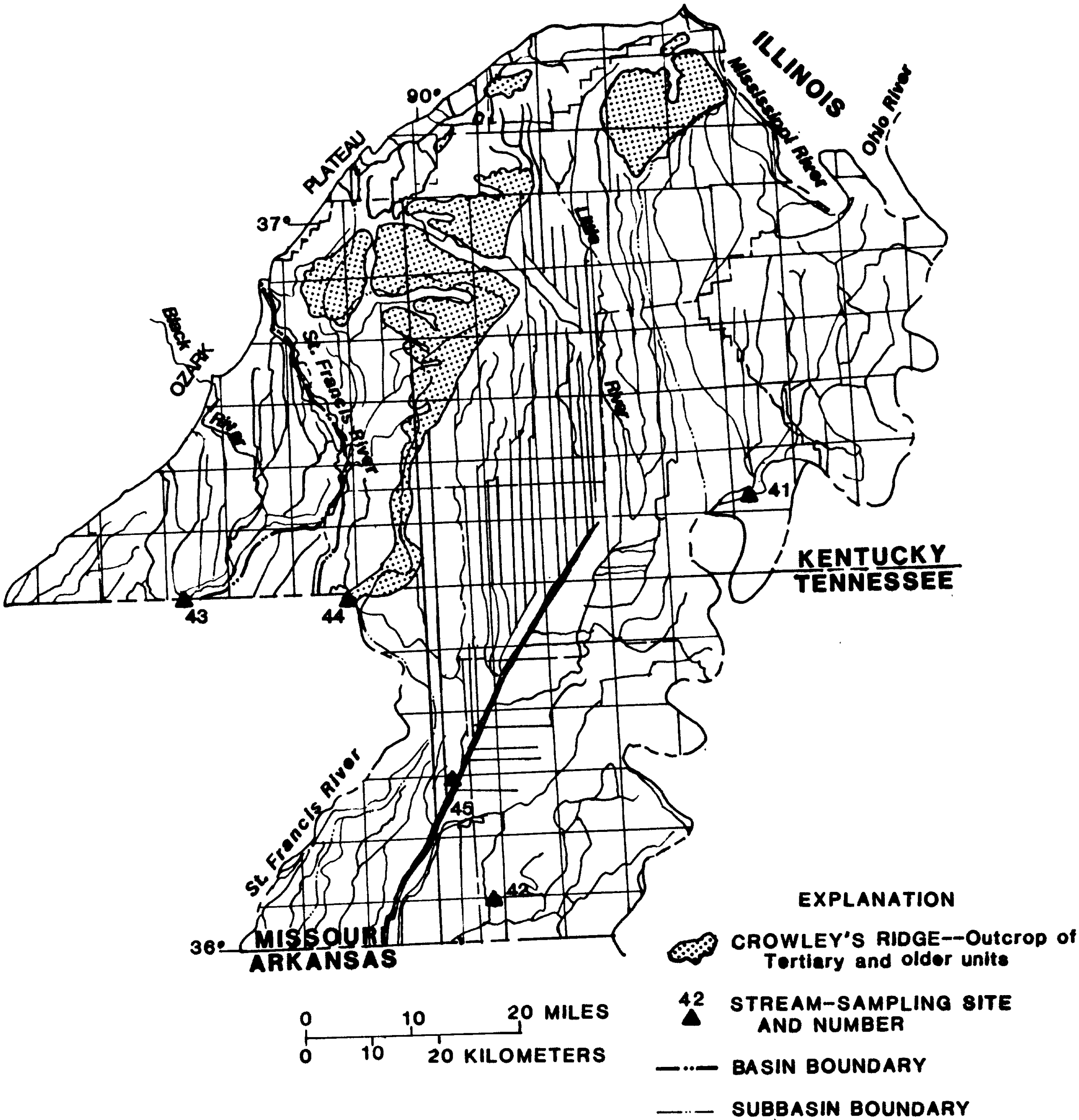

Figure 4.--Stream-sampling sites.

METHODOLOGY AND QUALITY CONTROL

During 1986-87, 129 sites, which included 74 domestic wells, 25 irrigation wells, 25 public-supply wells, and 5 streams that drain the 5 major drainage basins in the region, were sampled. Personnel from the U.S. Geological Survey, Missouri Department of Health, Missouri Department of Natural Resources, and county health officials collected the samples. Analyses were made by the University of Missouri Environmental Trace Substances Laboratory for pesticides in samples collected in June-July and November 1986 and for volatile organic compounds in samples collected in June 1986. Also, the Missouri Department of Health Laboratory analyzed samples collected during 1986 for physical properties, common constituents, nitrate, trace elements, and duplicate pesticide samples. All pesticide analyses are considered total recoverable concentrations from unfiltered water samples. All nitrate as nitrogen (N) analyses (as presented in this report) were made by the Missouri Department of Health Laboratory and are considered total concentrations of nitrate as N. All trace-element analyses also were made by the Missouri Department of Health Laboratory and are considered total recoverable concentrations of trace elements. Samples collected in July 1987 were analyzed for pesticides by the University of Iowa Hygienic Laboratory and for physical properties, nitrate, and trace elements by the Missouri Department of Health Laboratory. Samples collected in September 1987 were analyzed for pesticides by both the University of Iowa Hygienic and Missouri Department of Health Laboratories. A summary list of pesticides that were analyzed or detected during a given sampling period is presented in table 3 (in the back of this report).

Raw water samples collected for pesticides analyses in June-July and November 1986 were treated in the field with 50 milliliters of methylene chloride per gallon of sample as a preservative. Samples for trace elements were acidified in the field. All other water samples were raw and untreated. Volatile organic compound samples were collected by completely filling a sample bottle, ensuring no air bubbles were trapped inside, and sealing the cap with paraffin to prevent purgeable compounds from escaping. Streambed-sediment samples were not treated. Ground-water samples were collected by purging a well system as completely as possible and collecting the sample at or near the pressure tank. Care was taken to ensure water did not travel through treatment or softener systems. Information was obtained from the owner about crop types grown near the well in recent years and if pesticides had been used at or near the well recently. Stream and streambed-sediment samples were collected according to techniques suggested by the U.S. Geological Survey (Guy and Norman, 1970).

Generally, well selection was based on a wide spatial distribution in rural agricultural areas. Most domestic wells in the area are shallow, averaging less than 35 ft in depth. Wells with known contamination or locations near agricultural chemical storage and distribution facilities were not selected for sampling. Also, widespread spatial distribution was used to minimize the effects of soil type and associations, as described by Allgood and Persinger (1979).

Because of the extremely small detection limits and concentrations of pesticides analyzed, quality control and duplication of results were difficult. Depending on the analyzing laboratory, several methods were used to ensure quality results (tables 4A and 4B, in the back of this report). Distilled water spike 41, dated November 19, 1986, was prepared by the Missouri Department of

Health Laboratory, spiked with chlordane at a concentration of 25.0 µg/L (micrograms per liter), and analyzed by the University of Missouri Environmental Trace Substances Laboratory. Chlordane was identified in this sample at a concentration of 13.7 µg/L. Distilled water blank 42, dated November 19, 1986, was a blank sample prepared by the Missouri Department of Health Laboratory and analyzed by the University of Missouri Environmental Trace Substances Laboratory. No pesticides were detected in this sample. Distilled water spikes 19 and 22, dated July 24, 1987, were prepared by a private laboratory, spiked with alachlor and pendimethalin and analyzed by the University of Iowa Hygienic Laboratory. Sample 19 was spiked with 0.1 µg/L of alachlor and 0.1 µg/L of pendimethalin. Alachlor was detected in the sample at a concentration of 0.86 µg/L and pendimethalin was detected at a concentration of 0.85 µg/L. Sample 22 was spiked with 2.0 µg/L of alachlor and 2.0 µg/L of pendimethalin. Alachlor was detected in the sample at a concentration of 0.73 µg/L and pendimethalin was detected at a concentration of 0.74 µg/L. Distilled water blanks 1-4, dated July 24, 1987, were prepared and analyzed by the University of Iowa Hygienic Laboratory to check for contamination during sample processing. No pesticides were detected in these samples.

Water samples were randomly selected from those collected in the field in June-July and November 1986 and known quantities of a single pesticide were added to the field water sample (matrix spike) and then analyzed by the University of Missouri Environmental Trace Substances Laboratory (tables 4C and 4D, in the back of this report). The percentage of recovery for that particular pesticide was then calculated by the following equation:

$$\text{Percent recovery} = \frac{SSR - SR}{SA} \times 100 \qquad (1)$$

where SSR = concentration of the pesticide determined from analysis after the spike was added;

SR = concentration of the pesticide (if any) determined from analysis of the unspiked field water sample; and

SA = concentration of the spike added to the sample.

Generally, acceptable recovery ranges from about 75 to 125 percent, but this is not a set rule and many variables must be considered.

A range of percent recovery also was calculated for various pesticides using pesticide-free water as a medium (tables 4C and 4D). A known quantity of a single pesticide was added to pesticide-free water and analyzed. The concentration of the pesticide was compared to the original quantity added and a percentage of recovery was calculated using equation 1 and setting SR equal to zero. Recovery tests for pesticides from distilled water blanks were conducted at three concentration levels representing the minimum and maximum known pesticide concentrations.

As a final form of quality assurance, both the University of Iowa Hygienic and University of Missouri Environmental Trace Substances Laboratories randomly split field samples and analyzed them as duplicates (indicated as XXdup in tables 5, 7, 8, and 13, in the back of this report). In some instances, an individual pesticide was detected in the original sample but not in the duplicate sample, or conversely. This may be a result of the extremely small concentrations of the pesticides detected or a result of being outside the range of the percent recovery as shown in tables 4C and 4D.

PESTICIDES

Water and streambed-sediment samples were collected in June-July 1986 from 40 domestic wells, 3 irrigation wells, and 5 stream sites and analyzed for 34 pesticides (table 5, in the back of this report). The results of these analyses indicate that 15 pesticides were detected at 29 sites. The sites included 21 domestic wells, 3 irrigation wells, and all 5 surface-water sites. Pesticides detected included alachlor, atrazine, carbofuran, chlordane, cyanazine, diazinon, methomyl, molinate, PCNB, pendimethalin, propanil, terbufos, trifluralin, 2,4-D, and 2,4,5-T. In addition, 4 duplicate samples were collected in June from sites 9, 15, 26, and 36 and analyzed for 26 pesticides by the Missouri Department of Health Laboratory (table 6, in the back of this report). No pesticides were detected in these four samples.

Water samples were collected in November 1986 from 40 domestic wells, 25 public water-supply wells, and 1 stream site and analyzed for 30 pesticides (table 7, in the back of this report). The results of these analyses indicate that 15 pesticides were detected at 19 sites. These sites included 15 domestic wells and 4 public water-supply wells. Pesticides detected included alachlor, atrazine, carbaryl, cyanazine, diazinon, fluometuron, linuron, metribuzin, molinate, monocrotophos, paraquat, PCNB, trifluralin, 2,4-D, and 2,4,5-T.

Water samples were collected in July 1987 from 70 domestic wells and 22 irrigation wells and analyzed for 18 pesticides (table 8, in the back of this report). The results of these analyses indicate that six pesticides were detected at five sites. The sites included four domestic and one irrigation well. Pesticides detected included alachlor, atrazine, cyanazine, metolachlor, propachlor, and trifluralin.

Water samples collected in September 1987 from 30 domestic and 3 irrigation wells were analyzed for 5 pesticides. The results of the analyses are shown in tables 9A and 9B (in the back of this report). One pesticide, 2,4-D, was detected at two domestic wells.

PHYSICAL PROPERTIES, COMMON CONSTITUENTS, AND NITRATE

Samples collected in June 1986 indicate specific conductance ranged from 250 to 1,175 μS/cm (microsiemens per centimeter at 25 °Celsius) and pH ranged from 5.1 to 7.0 (table 10, in the back of this report). Analyses of common constituents included calcium, magnesium, sodium, potassium, bicarbonate, sulfate, chloride, and fluoride. Residue on evaporation (at 180 °Celsius) ranged from 207 to 866 mg/L (milligrams per liter). Of 40 samples analyzed, 24 had detectable concentrations of total nitrate as N and 10 samples had total nitrate as N in concentrations equal to or greater than 10 mg/L. All samples were from domestic wells.

Samples collected in November 1986 indicate specific conductance ranged from 250 to 1,110 μS/cm and pH ranged from 4.5 to 6.6 (table 11, in the back of this report). Analyses of common constituents included calcium, magnesium, sodium, potassium, bicarbonate, sulfate, chloride, and fluoride. Residue on evaporation ranged from 161 to 738 mg/L. Of 32 samples analyzed for total nitrate as N, 23 had detectable concentrations, and 8 samples had concentrations equal to or greater than 10 mg/L. All samples were from domestic wells.

Samples collected in July 1987 indicate specific conductance ranged from 135 to 1,200 μS/cm and pH ranged from 5.2 to 8.0 (table 12, in the back of this report). No analyses were conducted for common constituents during this sampling program. Of 65 samples analyzed, 34 had detectable concentrations of total nitrate as N, and 6 had concentrations equal to or greater than 10 mg/L. Thirty-three of these samples were from domestic wells and one was from an irrigation well.

VOLATILE ORGANIC COMPOUNDS

Samples collected in June 1986 were analyzed for 25 volatile organic compounds (table 13, in the back of this report). Three volatile organic compounds were detected in two domestic well samples. These compounds were chloroform, trichlorfluoromethane, and 1,1,1-trichloroethane.

TRACE ELEMENTS

Samples collected in June 1986 indicate the presence of several trace elements (table 14, in the back of this report). These included arsenic, barium, cadmium, iron, manganese, and zinc. All samples were from domestic wells.

Samples collected in November 1986 indicate the presence of several trace elements (table 15, in the back of this report). These included arsenic, barium, iron, lead, manganese, nickel, and zinc. All samples were from domestic wells.

Of 65 samples collected in July 1987, 33 indicated the presence of several trace elements (table 16, in the back of this report). These included arsenic, barium, chromium, iron, lead, manganese, nickel, and zinc. Twenty-six samples were from domestic wells and seven were from irrigation wells.

SUMMARY

During 1986-87, a total of 129 sites, including 74 domestic, 25 irrigation, and 25 public-supply wells, and 5 stream sites, were sampled and analyzed for 55 pesticides, physical properties, common constituents, total nitrate, 25 volatile organic compounds, and 10 total recoverable trace elements. One or more pesticides were detected at 39 of these 129 sites during the study. Pesticides detected include: alachlor, atrazine, carbaryl, carbofuran, chlordane, cyanazine, diazinon, fluometuron, linuron, methomyl, metolachlor, metribuzin, molinate, monocrotophos, paraquat, PCNB, pendimethalin, propachlor, propanil, terbufos, trifluralin, 2,4-D, and 2,4,5-T. Total nitrate as nitrogen was detected at 47 sites and concentrations exceeded 10 mg/L at 14 of those sites.

Results of analyses in June 1986 indicate specific conductance ranged from 250 to 1,175 μS/cm, pH ranged from 5.1 to 7.0, and residue on evaporation ranged from 207 to 866 mg/L. Total nitrate as N was detected in 24 of 40 samples, and 10 of these were equal to or greater than 10 mg/L. In November 1986, specific conductance ranged from 250 to 1,110 μS/cm, pH ranged from 4.5 to 6.6, and residue on evaporation ranged from 161 to 738 mg/L. Total nitrate as N was detected in 23 of 32 samples; 8 of these were equal to or greater than 10 mg/L.

In July 1987, specific conductance ranged from 135 to 1,200 µS/cm, pH ranged from 5.2 to 8.0, and residue on evaporation was not measured. Total nitrate as N was detected in 34 of 65 samples, and 6 of these were equal to or greater than 10 mg/L. Of the 25 volatile organics analyzed in the June 1986 samples, 3 were detected: chloroform, trichlorfluoromethane, and 1,1,1-trichloroethane.

Total recoverable concentrations of trace elements detected in samples collected in June 1986 included arsenic, barium, cadmium, iron, manganese, and zinc and in November 1986 included arsenic, barium, iron, lead, manganese, nickel, and zinc. Total recoverable concentrations of trace elements detected in samples collected in July 1987 included arsenic, barium, chromium, iron, lead, manganese, nickel, and zinc.

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TABLES

Table 1.--Generalized section of geologic formations and their hydrologic properties in southeastern Missouri

Erathem	System and Series	Aquifer Name	Group	Formation	Hydrologic Properties
CENOZOIC	QUATERNARY	Mississippi River Valley Alluvial Aquifer		Alluvium	Major aquifer in southeast Missouri. May yield 3,000 gallons per minute. Transmissivities of 50,000 feet squared per day. Thickness ranges from 0 to more than 250 feet.
	TERTIARY	Claiborne Aquifer	Claiborne	Jackson Formation	May be a semiconfining unit where present. Thickness ranges from 0 to about 100 feet.
				Cockfield Formation	May be a distinct aquifer where the Jackson Formation overlies it, but normally has water-table conditions where it is in contact with the alluvium. Thickness ranges from 0 to about 140 feet.
				Cook Mountain Formation	May be a confining unit where present. Thickness ranges from 0 to more than 150 feet.
				Memphis Sand	Secondary aquifer that is used for public and municipal supplies. May be confined where the overlying Cook Mountain or Jackson Formatione are present as clay. Thickness ranges from outcrop(?) to more than 700 feet.
		Wilcox Aquifer	Wilcox	Flour Island Formation	May be a semiconfining unit present. Thickness ranges from outcrop(?) to more than 100 feet.
				Fort Pillow Sand (?)	A secondary aquifer that ie used for public and municipal uee. May yield as much as 1,500 gallons per minute. Transmieeivities may be 17,000 feet squared per day. Thickness ranges from outcrop to more than 400 feet. Mey be confined east of Crowley's Ridge.
			Midway	Old Breastworke(?) Formation	A silty clay, less than 38 feet thick, tenatively assigned to the Midway group.
				Porters Creek Clay undivided	A major confining unit thoughout the area. May be leaky where faulting has occurred. Thicknese ranges from outcrop to more than 600 feet.
				Clayton Formation	Hydrologic propertiee are unknown. Thickness may be as much as 30 feet.
MESOZOIC	UPPER CRETACEOUS	McNairy Aquifer		Owl Creek Formation	May be a confining unit where present. Thickness may be as much as 100 feet.
				McNairy Sand	A major aquifer used for public and municipal use. Transmissivities may range from less than 1,500 to more than 4,000 feet squared per day. In confined areae east of Crowley's Ridge, wells generally are flowing artesian with a positive hydraulic head ranging from 1 foot to more than 40 feet with flow rates that may be more than 300 gallons per minute.
PALEOZOIC	ORDOVICIAN AND CAMBRIAN	Ozark Aquifer		Sedimentary rocks, undifferentiated	An aquifer in southern Missouri that underlies the unconsolidated sediments in southeast Missouri as bedrock.
	CAMBRIAN	St. Francois Aquifer		Sedimentary rocks, undifferentiated	An aquifer in southern Missouri that underlies the unconsolidated sediments in southeast Missouri as bedrock.

Table 2.--Location and description of sampled wells and streams

[Domestic and irrigation wells sampled by the U.S. Geological Survey and the Missouri Department of Health; Public- and municipal-supply wells sampled by the Missouri Department of Natural Resources, Division of Environmental Quality; DDMMSS-DDMMSS, degrees, minutes, seconds; T, township; N, north; R, range; E, east; H, domestic; --, no data; I, irrigation; PDWP, Public Drinking Water Program; P, public supply]

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Well depth, in feet	Use of water
1	6-17-86 11-18-86 7-21-87	Stoddard	3649360901016	T25NR08E11CBB	24	H
2	6-17-86 11-18-86 7-21-87	Stoddard	3648180901101	T25NR08E22BAA	80	H
3	6-17-86 11-18-86 7-22-87	Stoddard	3639240895410	T23NR11E07AAA	17	H
4	6-17-86 11-18-86 7-22-87 9-15-87	Stoddard	3643480894831	T24NR12E07CCB	20	H
5	6-17-86 11-18-86 7-22-87 9-15-87	Stoddard	3659340894553	T27NR12E09DDD	--	H
6	6-17-86 11-18-86 9-15-87	Stoddard	3651390894638	T26NR12E32AAA	30	H

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Well depth, in feet	Use of water
7	6-18-86	Scott	3659560893951	T27NR13E09BCA	20	H
	11-18-86					
	7-22-87					
	9-15-87					
8	6-17-86	Scott	3702190893504	T27NR14E06ABB	20	H
	11-18-86					
	7-22-87					
	9-14-87					
9	6-18-86	Scott	3656040893455	T26NR14E06ABB	40	H
	11-18-86					
	7-21-87					
	9-14-87					
10	6-18-86	Scott	3652070893809	T26NR13E27BCD	25	H
	11-18-86					
	7-21-87					
	9-14-87					
11	6-17-86	Scott	3703360892656	T28NR15E30CBC	20	H
	11-18-86					
	7-21-87					
12	6-17-86	Scott	3658440892549	T27NR15E21AAA	23	H
	11-18-86					
	7-21-87					
	9-14-87					
13	6-18-86	Dunklin	3606440901351	T17NR08E17CCC	25	H
	11-18-86					
	7-21-87					

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Well depth, in feet	Use of water
14	6-18-86	Dunklin	3602190900934	T16NR08E11DAA	30	H
	11-18-86					
	7-21-87					
	9-16-87					
	9-14-87					
15	6-18-86	Dunklin	3611490900302	T18NR09E13CCB	31	H
	11-18-86					
	7-22-87					
	9-16-87					
16	6-18-86	Dunklin	3619550895915	T20NR10E33ACC	35	H
	11-18-86					
	7-21-87					
	9-16-87					
17	6-18-86	Dunklin	3628530895927	T21NR10E09BBD	25	H
	11-18-86					
	7-21-87					
	9-16-87					
18	6-17-86	Pemiscot	3600320895532	T16NR10E24BCC	37	H
	11-18-86					
	9-16-87					
19	6-17-86	Pemiscot	3605260894406	T17NR12E23CCB	--	H
	11-18-86					
	7-21-87					
	9-14-87					
20	6-18-86	Pemiscot	3622520894202	T20NR13E07CBC	26	H
	11-18-86					
	7-21-87					

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Well depth, in feet	Use of water
21	6-18-86 11-18-86	Pemiscot	3619200894328	T20NR12E35DCD	--	H
22	6-18-86 11-18-86 7-22-87	Pemiscot	3614550894433	T19NR12E27DCB	40	H
23	6-17-86 11-18-86 7-21-87	Butler	3643110901754	T24NR07E22BBB	--	H
24	6-17-86 11-18-86 7-21-87	Butler	3648480901338	T25NR08E18ADD	48	H
25	6-18-86 11-18-86 7-21-87	Butler	3635290903035	T23NR05E34DCC	25	H
26	6-18-86 11-18-86 9-15-87	Butler	3633440902157	T22NR06E12DCC	30	H
27	6-17-86 11-18-86 7-21-87 9-14-87	Butler	3635450901207	T23NR08E33DCB	19	H
28	6-17-86 11-18-86 7-22-87	Mississippi	3653020892558	T26NR15E22CBB	30	H

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Well depth, in feet	Use of water
29	6-17-86	Mississippi	3650370891527	T25NR17E06BDD	40	H
	11-18-86					
	7-21-87					
	9-16-87					
30	6-17-86	Mississippi	3657520891524	T27NR17E30ABB	100	H
	11-18-86					
	7-21-87					
	9-16-87					
31	6-17-86	Mississippi	3640550891032	T24NR17E35ADD	20	H
	11-18-86					
	7-21-87					
32	6-17-86	Mississippi	3643310891237	T24NR17E15BCC	45	H
	11-18-86					
	7-21-87					
33	6-16-86	Mississippi	3656420891605	T27NR16E36ADD	25	H
	11-18-86					
	7-21-87					
	9-16-87					
34	6-16-86	Mississippi	3656090892359	T27NR15E35DCC	35	H
	11-18-86					
	7-21-87					
35	6-18-86	New Madrid	3631220895137	T22NR11E22CDC	23	H
	11-18-86					
	7-21-87					

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Well depth, in feet	Use of water
36	6-18-86 11-18-86 7-21-87	New Madrid	3623120895137	T20NR11E10BCC	25	H
37	6-18-86 11-19-86 7-21-87	New Madrid	3630130894422	T22NR12E34ACC	25	H
38	6-18-86 11-19-86 7-21-87	New Madrid	3644530892824	T24NR15E06CDD	50	H
39	6-18-86 11-19-86 7-21-87	New Madrid	3627180893611	T21NR13E13CDC	70	H
40	6-18-87 11-19-86 7-21-87	New Madrid	3642550893842	T24NR13E15CCC	25	H
41	6-17-86	New Madrid	3636450892750	St. Johns Bayou near New Madrid, Missouri		--
42	6-17-86	Pemiscot	3601000895730	Main Ditch near Hermondale, Missouri		--
43	6-18-86 11-19-86	Clay	3624070903229	Black River near Corning, Arkansas		--
44	6-18-86	Clay	3627210900813	St. Francis River at St. Francis, Arkansas		--

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Well depth, in feet	Use of water
45	6-18-86	Dunklin	3614080895841	Little River Ditches near Kennett, Missouri		--
51	7-21-87 9-16-87	Mississippi	3656420891419	T27NR17E32ACA	23	H
52	7-21-87	Mississippi	3652380892032	T26NR16E20DDD	30	H
53	7-21-87	Mississippi	3649130891539	T25NR17E07CCD	20	H
54	7-21-87	Mississippi	3644210891718	T24NR16E11DAB	50	H
55	7-21-87	Stoddard	3707330894641	T28NR11E01AAB	24	H
56	7-21-87	Stoddard	3704060895451	T28NR10E26BAA	--	H
57	7-21-87 9-15-87	Stoddard	3655060894325	T26NR12E01CAA	25	H
58	7-21-87 9-15-87	Stoddard	3650480895217	T26NR11E33CDC	20	H
59	7-21-87 9-15-87	Stoddard	3643530895658	T24NR10E11CDC	20	H
60	7-21-87	Stoddard	3638440900523	T23NR09E09DCD	75	H
61	7-21-87	Butler	3631510903010	T22NR05E26BBC	26	H
62	7-21-87	Butler	3642400901019	T24NR08E23BCC	50	H

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Well depth, in feet	Use of water
63	7-21-87	Butler	3630040902234	T22NR06E36CCB	24	H
64	7-21-87 9-15-87	Butler	3640320901311	T24NR08E32CDC	40	H
65	7-21-87	Butler	3641370902156	T24NR06E25CDD	60	H
66	7-21-87	Butler	3642280902772	T24NR06E30BBA	65	H
67	7-23-87	Pemiscot	3618400893957	T19NR13E05DBD	20	H
68	7-22-87	Pemiscot	3619440895316	T20NR11E32ACC	40	H
69	7-23-87	Pemiscot	3615360895627	T19NR10E26ABD	90	I
70	7-21-87	Pemiscot	3605510895420	T17NR11E19BDA	26	H
71	7-21-87	Dunklin	3635380900124	T23NR10E31BDC	20	H
72	7-21-87	Dunklin	3627200900029	T21NR10E17CDC	30	H
73	7-21-87	Dunklin	3617420900318	T19NR09E11DDC	20	H
74	7-21-87	Dunklin	3601410900235	T16NR09E14AAD	50	I
75	7-21-87	New Madrid	3624570895353	T21NR11E31DDA	50	H
76	7-21-87	New Madrid	3649240893912	T25NR13E09DAC	30	H
77	7-21-87	New Madrid	3641450893218	T24NR14E27DCB	20	H

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Well depth, in feet	Use of water
78	7-21-87	New Madrid	3644110893948	T24NR13E09CBB	23	H
79	7-21-87	New Madrid	3634200894206	T22NR13E06BBC	20	H
80	7-22-87 9-15-87	Scott	3709190894049	T29NR12E24CDC	98	H
81	7-22-87 9-16-87	Scott	3707580893006	T29NR14E34CAC	27	H
82	7-21-87	Scott	3700320892805	T27NR15E06DDD	15	H
83	7-21-87 9-15-87	Scott	3653210894102	T26NR13E17CCD	17	H
85	7-22-87 9-15-87	Stoddard	3638560895437	T23NR11E07CAA	90	I
86	7-22-87 9-15-87	Stoddard	3659320894610	T27NR12E16ABB	80	I
87	7-21-87	Mississippi	3656100892402	T27NR15E35DCC	30	I
88	7-22-87 9-16-87	Mississippi	3656120892517	T27NR15E34CDD	35	I
89	7-22-87	Mississippi	3656300892411	T27NR15E35CAA	--	I
90	7-22-87	Mississippi	3653180892547	T26NR15E21ADD	--	I
91	7-22-87	Mississippi	3655210892453	T26NR15E03DBB	90	I

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Well depth, in feet	Use of water
92	7-22-87 9-16-87	Scott	3709170894107	T29NR12E25BBB	65	H
93	7-22-87	Scott	3654210893804	T26NR13E10DDD	80	I
94	7-22-87 9-14-87	Scott	3654200893800	T26NR13E11CCC	30	H
96	7-22-87	Dunklin	3605380901445	T17NR08E19CBD	100	I
97	7-22-87	Dunklin	3611350900817	T18NR09E18CCD	95	I
98	7-22-87	Pemiscot	3617450895500	T19NR10E12DBD	100	I
99	7-22-87	Pemiscot	3621040895006	T20NR11E23CCC	100	I
100	7-22-87	Pemiscot	3617300894223	T19NR12E12DCA	100	I
101	7-22-87	New Madrid	3647140893816	T25NR13E27ABB	90	I
102	7-22-87	New Madrid	3627120894753	T21NR12E18DCC	--	I
103	7-22-87	New Madrid	3628220895302	T21NR11E08DBD	80	I
104	7-22-87	New Madrid	3628000895252	T21NR11E08DDD	33	H
105	7-22-87	New Madrid	3636500895323	T23NR11E20DCC	100	I
106	7-22-87	Butler	3635040901225	T22NR08E04BDA	--	I
107	7-22-87	Butler	3639160901924	T23NR07E08DBB	80	I

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Well depth, in feet	Use of water
108	7-22-87	New Madrid	3651200893953	T26NR13E33BCC	80	I
110	7-22-86	Stoddard	3649510890347	T25NR09E10ACD	116	I
111	7-23-86	Pemiscot	3616250894909	T19NR11E24BAD	--	I
112	7-23-86	Scott	3759270893126	T27NR14E15ABA	90	I

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Name of public supply	Well depth, in feet	Use of water
PDWP 1	11-18-86	Scott	3659250894105	T27NR13E17BBA	Vanduser well 1	122	P
PDWP 2	11-18-86	Scott	3705000893901	T28NR13E18DBB	Oran well 1	90	P
PDWP 3	11-18-86	Scott	3705000893901	T28NR13E17CDA	Oran well 2	144	P
PDWP 4	11-18-86	New Madrid	3656310894130	--	Morehouse well 2	96	P
PDWP 5	11-19-86	Scott	3652430893500	T26NR14E19CDC	Sikeston well 1	422	P
PDWP 6	11-19-86	Scott	3659390893528	T26NR14E19CDD	Sikeston well 4	375	P
PDWP 7	11-19-86	Scott	3659390893528	T26NR14E19CDD	Sikeston well 6	409	P
PDWP 8	11-19-86	Scott	3652450893502	T26NR14E19DCB	Sikeston well 7	400	P
PDWP 9	11-19-86	Scott	--	--	Sikeston well 8	143	P
PDWP 10	11-19-86	Scott	--	--	Sikeston well 10	--	P
PDWP 11	11-19-86	Scott	--	--	Sikeston well 9	145	P
PDWP 12	11-19-86	Scott	--	--	Miner well 1	--	P
PDWP 13	11-19-86	Mississippi	3654300892650	T26NR15E09CCB	Bertrand well 1	115	P
PDWP 14	11-19-86	Mississippi	3655320892056	T26NR16E05CAC	Charleston well 1	400	P
PDWP 15	11-19-86	Mississippi	3655330892057	T26NR16E05CAC	Charleston well 2	405	P
PDWP 16	11-19-86	Mississippi	3655330892057	T26NR16E08AAA	Charleston well 4	405	P

Table 2.--Location and description of sampled wells and streams--Continued

Sample location (figs. 3 and 4)	Sample date	County	Latitude-longitude (DDMMSS-DDMMSS)	Local number	Name of public supply	Well depth, in feet	Use of water
PDWP 17	11-19-86	Mississippi	3654430891321	T26NR17E09CAD	Wyatt well 1	465	P
PDWP 18	11-19-86	Mississippi	3649480891942	T26NR16E09CAA	Anniston well 1	116	P
PDWP 19	11-19-86	Mississippi	--	--	East Prairie well 4	--	P
PDWP 20	11-19-86	Mississippi	--	--	East Prairie well 5	--	P
PDWP 21	11-19-86	Mississippi	--	--	East Prairie well 6	--	P
PDWP 22	11-19-86	New Madrid	--	T23NR13E35--	Lilbourn well 1	--	P
PDWP 23	11-19-86	New Madrid	--	T23NR13E35--	Lilbourn well 2	--	P
PDWP 24	11-19-86	New Madrid	3631070893634	T22NR13E25CBB	Marston well 1 (Artesian)	1,650	P
PDWP 25	11-19-86	New Madrid	3631300893700	T22NR13E26DBB	Marston well 2	130	P

Table 3.--Frequency of detection of pesticides in ground water, streams, and sediment from southeastern Missouri, 1986-87

Pesticide	June-July 1986		November 1986		July 1987		September 1987	
	Number of analyses	Number of detections	Number of analyses	Number of detections	Number of analyses	Number of detections	Number of analyses	Number of detections
Alachlor	58	5	71	1	94	3	0	0
Aldrin	4	0	0	0	0	0	0	0
Arochlor[1]	4	0	0	0	0	0	0	0
Atrazine	58	3	71	2	94	5	0	0
Bentazon	50	0	71	0	0	0	0	0
Butylate	0	0	0	0	94	0	0	0
Carbaryl	58	0	71	1	94	0	0	0
Carbofuran	58	3	71	0	94	0	0	0
Chloramben	0	0	0	0	0	0	19	0
Chlordane	58	3	71	0	0	0	0	0
Chlorpyrifos	56	0	71	0	94	0	0	0
Cyanazine	58	3	71	4	94	1	0	0
Cypermethrin	50	0	0	0	0	0	0	0
DDD	4	0	0	0	0	0	0	0
DDE	4	0	0	0	0	0	0	0
DDT	4	0	0	0	0	0	0	0
Dianat	0	0	0	0	0	0	19	0
Diazinon	56	1	71	3	94	0	0	0
Dieldrin	4	0	0	0	0	0	0	0
Dimethoate	56	0	71	0	0	0	0	0
Endrin	4	0	0	0	0	0	0	0
Ethoprop	0	0	0	0	94	0	0	0
Fluometuron	58	0	71	1	0	0	0	0
Fonofos	0	0	0	0	94	0	0	0
Glyphosate	50	0	0	0	0	0	0	0
Heptachlor	4	0	0	0	0	0	0	0
Lindane	4	0	0	0	0	0	0	0
Linuron	58	0	71	1	0	0	0	0
Malathion	56	0	71	0	0	0	0	0
Methomyl	58	1	71	0	0	0	0	0
Methoxychlor	4	0	0	0	0	0	0	0
Methyl parathion	56	0	71	0	0	0	0	0
Metolachlor	50	0	71	0	94	1	0	0
Metribuzin	58	0	71	8	94	0	0	0
Molinate	58	1	71	1	0	0	0	0

Table 3.--Frequency of detection of pesticides in ground water, streams, and sediment from southeastern Missouri, 1986-87--Continued

Pesticide	June-July 1986 Number of analyses	June-July 1986 Number of detections	November 1986 Number of analyses	November 1986 Number of detections	July 1987 Number of analyses	July 1987 Number of detections	September 1987 Number of analyses	September 1987 Number of detections
Monocrotophos	56	0	71	1	0	0	0	0
Naptalam	50	0	0	0	0	0	0	0
Paraquat	50	0	70	2	0	0	0	0
PCNB	58	2	71	2	0	0	0	0
Pendimethalin	58	2	71	0	94	0	0	0
Permethrin	50	0	0	0	0	0	0	0
Phorate	0	0	0	0	94	0	0	0
Picloram	4	0	0	0	0	0	0	0
Propachlor	4	0	0	0	94	2	0	0
Propanil	58	3	71	0	94	0	0	0
Sethoxydim	50	0	71	0	0	0	0	0
Silvex	0	0	0	0	0	0	37	0
Simazine	4	0	0	0	0	0	0	0
Terbufos	56	5	71	0	94	0	0	0
Thiobencarb	0	0	71	0	0	0	0	0
Toxaphene	58	0	71	0	0	0	0	0
Trifluralin	58	9	71	1	94	2	0	0
Tunic	50	0	0	0	0	0	0	0
2,4-D	58	1	71	2	0	0	37	2
2,4,5-T	58	15	71	1	0	0	37	0

[1] Use of trade names in this report is for identification purposes only and does not constitue endorsement by the U.S. Geological Survey.

Table 4A.--Laboratory quality control and assurance data for sampling program, November 1986

[Analyses by the University of Missouri Environmental Trace Substances Laboratory, Columbia, Missouri; concentrations are total recoverable in micrograms per liter; <, less than the minimum detection limit]

Sample	Sample date	Alachlor	Atrazine	Bentazon	Carbaryl	Carbofuran	Chlordane	Chlorpyrifos
Distilled water spike 41	11-19-86	<0.02	<0.1	<2.0	<0.2	<0.1	[a]13.7	<0.2
Distilled water blank 42	11-19-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2

Sample	Cyanazine	Diazinon	Dimethoate	Fluometuron	Linuron	Malathion	Methomyl	Methyl parathion
Distilled water spike 41	<0.2	<0.2	<0.2	<0.5	<0.2	<0.2	<5.0	<0.2
Distilled water blank 42	<.2	<.2	<.2	<.5	<.2	<.2	<5.0	<.2

Sample	Metolachlor	Metribuzin	Molinate	Monocrotophos	PCNB	Pendimethalin	Propanil
Distilled water spike 41	<0.05	<0.2	<0.1	<0.2	<0.005	<0.02	<0.04
Distilled water blank 42	<.05	<.2	<.1	<.2	.005	<.02	<.04

Sample	Sethoxydim	Terbufos	Thiobencarb	Toxaphene	Trifluralin	2,4-D	2,4,5-T
Distilled water spike 41	<2.0	<0.2	<0.2	<0.1	<0.05	<0.05	<0.05
Distilled water blank 42	<2.0	<.2	<.2	<.1	<.05	<.05	<.05

[a] Distilled water spike 41 concentration was 25.0 micrograms per liter.

Table 4B.--Laboratory quality control and assurance data for sampling program, July 1987

[Analyses by the University of Iowa Hygienic Laboratory, Iowa City, Iowa; concentrations are total recoverable in micrograms per liter; <, less than the minimum detection limit]

Sample	Sample date	Alachlor	Atrazine	Butylate	Carbaryl	Carbofuran	Chlorpyrifos	Cyanazine	Diazinon	Ethoprop
Distilled water spike 19	7-24-87	[a]0.86	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Distilled water spike 22	7-24-87	[b].73	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

Sample	Fonofos	Metolachlor	Metribuzin	Pendimethalin	Phorate	Propachlor	Propanil	Terbufos	Trifluralin
Distilled water spike 19	<0.1	<0.1	<0.1	[c]0.85	<0.1	<0.1	<0.1	<0.1	<0.1
Distilled water spike 22	<.1	<.1	<.1	[d].74	<.1	<.1	<.1	<.1	<.1

Sample	Sample date	Alachlor	Atrazine	Butylate	Carbaryl	Carbofuran	Chlorpyrifos	Cyanazine	Diazinon	Ethoprop
Distilled water blank 1	7-24-87	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Distilled water blank 2	7-24-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Distilled water blank 3	7-24-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Distilled water blank 4	7-24-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

Sample	Fonofos	Metolachlor	Metribuzin	Pendimethalin	Phorate	Propachlor	Propanil	Terbufos	Trifluralin
Blank 1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Blank 2	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Blank 3	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
Blank 4	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

[a] Distilled water spike 19 concentration was 0.1 micrograms per liter.
[b] Distilled water spike 22 concentration was 2.0 micrograms per liter.
[c] Distilled water spike 19 concentration was 0.1 micrograms per liter.
[d] Distilled water spike 22 concentration was 2.0 micrograms per liter.

Table 4C.--Laboratory quality control data for sampling program, June-July 1986

[Analyses by the University of Missouri Environmental Trace Substances Laboratory, Columbia, Missouri; --, no data]

	Percent recovery of pesticides from matrix spiked water samples					Percent recovery of pesticides from distilled water samples		
	Sample location (fig. 3)					1 x spiked blank validation	5 x spiked blank validation	20 x spiked blank validation
	1	10	19	27	36			
Alachlor	148	74	48	--	--	--	93 to 93	88 to 93
Atrazine	76	75	77	--	--	125 to --	--	--
Carbaryl	80	80	--	--	--	--	--	--
Carbofuran	--	--	96	--	--	75 to 133	--	--
Chlordane	114	92	--	--	101	--	98 to 102	98 to 98
Chlorpyrifos	117	--	126	131	100	--	106 to 107	115 to 130
Cyanazine	103	103	--	--	--	63 to 70	--	--
Diazinon	99	--	97	114	105	--	86 to 118	120 to 127
Dimethoate	--	--	--	--	--	--	183 to --	--
Fluometuron	74	64	107	--	--	--	--	--
Linuron	100	100	120	--	--	63 to 80	--	--
Malathion	70	--	97	120	101	--	--	116 to --
Methomyl	106	--	120	--	--	--	--	--
Methyl parathion	--	--	90	116	102	--	106 to 107	115 to 130
Metribuzin	49	49	85	--	--	46 to 132	--	--
Molinate	68	--	74	--	--	93 to 119	--	--
Monocrotophos	--	--	--	138	145	--	--	--
Paraquat	91	--	--	--	--	--	--	--
PCNB	98	65	48	--	66	--	68 to 89	79 to 82
Pendimethalin	118	48	--	--	93	--	88 to 103	88 to 103
Propanil	--	--	--	--	--	--	--	93 to --
Terbufos	85	--	92	112	85	--	105 to 115	120 to 125
Trifluralin	62	57	--	--	90	--	69 to 73	60 to 60
2,4-D	--	79	86	--	--	--	--	--
2,4,5-T	--	121	--	--	--	--	--	--

Table 4D.--Laboratory quality control data for sampling program, November 1986

[Analyses by the University of Missouri Environmental Trace Substances Laboratory, Columbia, Missouri; --, no data]

Pesticide	Percent recovery of pesticides from matrix spiked water samples: Sample location (fig. 3) 8	16	24	31	Percent range of recovery of pesticides distilled water spiked samples: 1 x spiked blank validation	2 x spiked blank validation	5 x spiked blank validation
Alachlor	110	115	100	--	90 to 110	60 to 100	80 to 90
Atrazine	108	80	80	120	60 to 65	52 to 96	74 to 106
Bentazon	--	--	--	--	38 to --	--	81 to --
Carbaryl	--	80	--	50	35 to 44	36 to 40	40 to 42
Carbofuran	--	64	--	76	50 to 50	36 to 44	44 to 46
Chlordane	110	105	--	117	76 to 150	100 to 130	130 to 135
Chlorpyrifos	90	90	60	90	68 to 96	60 to 120	95 to 120
Cyanazine	104	80	80	104	50 to 64	60 to 96	80 to 118
Diazinon	100	80	70	130	--	--	40 to 95
Dimethoate	90	40	--	--	--	--	40 to --
Fluometuron	--	108	104	--	60 to 115	104 to 120	95 to 120
Linuron	--	120	116	80	85 to --	140 to --	--
Malathion	50	70	50	90	60 to 60	70 to 70	90 to 120
Methomyl	--	--	--	--	42 to --	93 to --	105 to --
Methyl parathion	40	--	--	80	80 to 80	60 to 100	95 to 120
Metolachlor	130	--	--	100	110 to --	60 to --	65 to --
Metribuzin	104	84	68	88	45 to 50	44 to 76	52 to 72
Molinate	130	80	89	76	70 to 96	60 to 90	40 to 80
Monocrotophos	60	--	80	70	--	--	60 to 70
Paraquat	--	90	--	--	--	--	--
PCNB	103	80	80	105	110 to 120	60 to 100	70 to 90
Pendimethalin	100	80	--	105	120 to 120	80 to 110	95 to 105
Propanil	130	100	115	--	100 to --	60 to --	100 to --
Sethoxydim	--	--	--	--	97 to --	75 to --	44 to --
Terbufos	60	40	--	70	96 to 100	90 to 100	100 to 120
Thiobencarb	140	120	90	--	90 to --	50 to --	62 to --
Trifluralin	--	--	--	--	30 to 58	--	--
2,4-D	--	--	--	--	106 to 115	80 to 88	82 to 90
2,4,5-T	--	--	--	70	106 to 150	90 to 125	75 to 97

Table 5.--Pesticide concentrations in water from alluvial wells and streams and sediment contents from streams, June-July 1986

[Analyses by the University of Missouri Environmental Trace Substances Laboratory, Columbia, Missouri; concentrations are total recoverable in micrograms per liter, except for sediment contents that are in micrograms per kilogram; <, less than the minimum detection limit; dup, duplicate sample; --, no data; sed, sediment sample]

Sample location (figs. 3 and 4)	Sample date	Alachlor	Atrazine	Bentazon	Carbaryl	Carbofuran	Chlordane	Chlorpyrifos	Cyanazine	Cypermethrin	Diazinon	Dimethoate
1	6-17-86	<0.01	<0.5	<5.0	<1.0	<1.0	<0.01	<0.05	<0.5	<5.0	<0.05	<0.05
2	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
3	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
4	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
5	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
5dup	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	.09	<.05	<.5	<5.0	<.05	<.05
6	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
7	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
8	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
9	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
10	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
11	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
12	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
12dup	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
13	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
14	6-18-86	<.01	.8	<5.0	<1.0	2.0	<.01	<.05	<.5	<5.0	<.05	<.05
15	6-18-86	<.01	.8	<5.0	<1.0	<1.0	.07	<.05	<.5	<5.0	<.05	<.05
16	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
17	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
18	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
19	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
20	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
21	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
22	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
22dup	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
23	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
24	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
25	6-18-86	<.01	<.5	<5.0	<1.0	13.3	<.01	<.05	<.5	<5.0	<.05	<.05
26	6-18-86	.01	<.5	<5.0	<1.0	<1.0	.02	<.05	<.5	<5.0	<.05	<.05
27	6-17-86	<.01	16.7	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
28	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
29	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
29dup	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
30	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
31	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05

Table 5.--Pesticide concentrations in water from alluvial wells and streams and sediment contents from streams, June-July 1986--Continued

Sample location (figs. 3 and 4)	Sample date	Alachlor	Atrazine	Bentazon	Carbaryl	Carbofuran	Chlordane	Chlorpyrifos	Cyanazine	Cypermethrin	Diazinon	Dimethoate
32	6-17-86	<0.01	<0.5	<5.0	<1.0	<1.0	<0.01	<0.05	<0.5	<5.0	<0.05	<0.05
33	6-16-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
34	6-16-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
35	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
36	6-18-86	.08	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
37	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
38	6-18-86	<.01	<.5	<5.0	<1.0	2.0	<.01	<.05	<.5	<5.0	<.05	<.05
38dup	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
39	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
40	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
41	6-17-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
42	6-17-86	.02	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
43	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	<.05	<.5	<5.0	<.05	<.05
44	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	--	<.5	<5.0	--	--
45	6-18-86	<.01	<.5	<5.0	<1.0	<1.0	<.01	--	<.5	<5.0	--	--
110	7-22-86	<.01	<.5	--	<1.0	<1.0	<.01	<.05	<.5	--	<.05	<.05
111	7-23-86	.02	<.5	--	<1.0	<1.0	<.01	<.05	<.5	--	<.05	<.05
112	7-23-86	.03	<.5	--	<1.0	<1.0	<.01	<.05	<.5	--	<.05	<.05
41sed	6-17-86	<2,000	<20	--	<50	<50	<5,000	<1,000	<20	--	<1,000	<1,000
42sed	6-17-86	<2,000	<20	--	<50	<50	<5,000	<1,000	71	--	<1,000	<1,000
43sed	6-18-86	<2,000	<20	--	<50	<50	<5,000	<1,000	71	--	<1,000	<1,000
44sed	6-18-86	<2,000	<20	--	<50	<50	<5,000	<1,000	53	--	<1,000	<1,000
45sed	6-18-86	<2,000	<20	--	<50	<50	<5,000	<1,000	<20	--	<1,000	<1,000

Table 5.--Pesticide concentrations in water from alluvial wells and streams and sediment contents from streams, June-July 1986--Continued

Sample location (figs. 3 and 4)	Sample date	Fluometuron	Glyphosate	Linuron	Malathion	Methomyl	Methyl parathion	Metolachlor	Metribuzin	Molinate	Mono-crotophos	Naptalam
1	6-17-86	<1.0	<5.0	<1.0	<0.05	<1.0	<0.05	<5.0	<0.5	<0.5	<0.05	<5.0
2	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
3	6-17-86	<1.0	<5.0	<1.0	<.05	8.1	<.05	<5.0	<.5	<.5	<.05	<5.0
4	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
5	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
5dup	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
6	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
7	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
8	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
9	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
10	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
11	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
12	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
12dup	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
13	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
14	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
15	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
16	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
17	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
18	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
19	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
20	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
21	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
22	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
22dup	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
23	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
24	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
25	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
26	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
27	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
28	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
29	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
29dup	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
30	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
31	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0

Table 5.--Pesticide concentrations in water from alluvial wells and streams and sediment contents from streams, June-July 1986--Continued

Sample location (figs. 3 and 4)	Sample date	Fluometuron	Glyphosate	Linuron	Malathion	Methomyl	Methyl parathion	Metolachlor	Metribuzin	Molinate	Mono-crotophos	Naptalam
32	6-17-86	<1.0	<5.0	<1.0	<0.05	<1.0	<0.05	<5.0	<0.5	<0.5	<0.05	<5.0
33	6-16-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
34	6-16-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
35	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
36	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
37	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
38	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
38dup	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
39	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
40	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
41	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
42	6-17-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
43	6-18-86	<1.0	<5.0	<1.0	<.05	<1.0	<.05	<5.0	<.5	<.5	<.05	<5.0
44	6-18-86	<1.0	<5.0	<1.0	--	<1.0	--	<5.0	<.5	<.5	--	<5.0
45	6-18-86	<1.0	<5.0	<1.0	--	<1.0	--	<5.0	<.5	<.5	--	<5.0
110	7-22-86	<1.0	--	<1.0	<.05	<1.0	<.05	--	<.5	<.5	<.05	--
111	7-23-86	<1.0	--	<1.0	<.05	<1.0	<.05	--	<.5	<.5	<.05	--
112	7-23-86	<1.0	--	<1.0	<.05	<1.0	<.05	--	<.5	<.5	<.05	--
41sed	6-17-86	<50	--	<50	<1,000	<50	<1000	--	<20	<20	<1,000	--
42sed	6-17-86	<50	--	<50	<1,000	<50	<1000	--	<20	41.6	<1,000	--
43sed	6-18-86	<50	--	<50	<1,000	<50	<1000	--	<20	<20	<1,000	--
44sed	6-18-86	<50	--	<50	<1,000	<50	<1000	--	<20	<20	<1,000	--
45sed	6-18-86	<50	--	<50	<1,000	<50	<1000	--	<20	<20	<1,000	--

Table 5.--Pesticide concentrations in water from alluvial wells and streams and sediment contents from streams, June-July 1986--Continued

Sample location (figs. 3 and 4)	Sample date	Paraquat	PCNB	Pendi-methalin	Permethrin	Propanil	Sethoxydim	Terbufos	Toxaphene	Trifluralin	Tunic	2,4-D	2,4,5-T
1	6-17-86	<500	<0.005	<0.01	<5.0	<0.02	<5.0	<0.05	<0.1	<0.005	<5.0	<0.01	<0.01
2	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
3	6-17-86	<500	<.005	<.01	<5.0	.07	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
4	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	.024	<5.0	<.01	.03
5	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
5dup	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	.007	<5.0	<.01	.07
6	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.11
7	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.12
8	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	.015	<5.0	<.01	.16
9	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.02
10	6-18-86	<500	<.005	.05	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.07
11	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
12	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.02
12dup	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
13	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.41
14	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.17
15	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.02
16	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
17	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
18	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.02
19	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
20	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
21	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
22	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
22dup	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
23	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
24	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
25	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
26	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.01
27	6-17-86	<500	.275	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
28	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
29	6-17-86	<500	<.005	<.01	<5.0	.06	<5.0	<.05	<.1	<.005	<5.0	.03	<.01
29dup	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
30	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
31	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01

Table 5.--Pesticide concentrations in water from alluvial wells and streams and sediment contents from streams, June-July 1986--Continued

Sample location (figs. 3 and 4)	Sample date	Paraquat	PCNB	Pendi-methalin	Permethrin	Propanil	Sethoxydim	Terbufos	Toxaphene	Trifluralin	Tunic	2,4-D	2,4,5-T
32	6-17-86	<500	<0.005	<0.01	<5.0	<0.02	<5.0	<0.05	<0.1	<0.005	<5.0	<0.01	<0.01
33	6-16-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.52
34	6-16-86	<500	<.005	.02	<5.0	<.02	<5.0	<.05	<.1	.143	<5.0	<.01	<.01
35	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
36	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
37	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
38	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
38dup	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
39	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
40	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
41	6-17-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	.01
42	6-17-86	<500	<.005	<.01	<5.0	.11	<5.0	<.05	<.1	.006	<5.0	<.01	<.01
43	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	<.05	<.1	<.005	<5.0	<.01	<.01
44	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	--	<.1	<.005	<5.0	<.01	<.01
45	6-18-86	<500	<.005	<.01	<5.0	<.02	<5.0	--	<.1	<.005	<5.0	<.01	<.01
110	7-22-86	--	<.005	<.01	--	<.02	--	<.05	<.1	.008	--	<.01	<.01
111	7-23-86	--	<.005	<.01	--	<.02	--	<.05	<.1	.006	--	<.01	<.01
112	7-23-86	--	<.005	<.01	--	<.02	--	.06	<.1	.009	--	<.01	<.01
41sed	6-17-86	--	<1,000	<1,000	--	<2,000	--	<1,000	<20,000	<1,000	--	<2,000	<2,000
42sed	6-17-86	--	<1,000	<1,000	--	<2,000	--	2,000	<20,000	<1,000	--	<2,000	<2,000
43sed	6-18-86	--	1,900	<1,000	--	<2,000	--	3,100	<20,000	[a]300	--	<2,000	<2,000
44sed	6-18-86	--	<1,000	<1,000	--	<2,000	--	5,300	<20,000	<1,000	--	<2,000	<2,000
45sed	6-18-86	--	<1,000	<1,000	--	<2,000	--	1,800	<20,000	<1,000	--	<2,000	<2,000

[a] Concentration reported by laboratory is below reported detection limit.

Table 6.--Pesticide concentrations in water from alluvial wells, June 1986

[Analyses by the Missouri Department of Health Laboratory, Jefferson City, Missouri; concentrations are total recoverable in micrograms per liter; <, less than the minimum detection limit; *, indicates gross scan for pesticide was negative]

Sample location (fig. 3)	Sample date	Alachlor	Aldrin	Arochlor[1]	Atrazine	Chlordane	Chlorpyrifos	DDD	DDE	DDT
9	6-18-86	<0.05	<0.05	<1.0	<0.5	<0.1	<0.1	<0.05	<0.05	<0.05
15	6-18-86	<.05	<.05	<1.0	<.5	<.1	<.1	<.05	<.05	<.05
26	6-18-86	<.05	<.05	<1.0	<.5	<.1	<.1	<.05	<.05	<.05
36	6-18-86	<.05	<.05	<1.0	<.5	<.1	<.1	<.05	<.05	<.05

Sample location (fig. 3)	Diazinon	Dieldrin	Endrin	Heptachlor	Lindane	Malathion	Methoxychlor	Methyl parathion
9	<0.05	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.05
15	<.05	<.1	<.1	<.1	<.1	<.5	<.5	<.05
26	<.05	<.1	<.1	<.1	<.1	<.5	<.5	<.05
36	<.05	<.1	<.1	<.1	<.1	<.5	<.5	<.05

Sample location (fig. 3)	Metolachlor	Picloram	Propachlor	Propanil	Simazine	Toxaphene	Trifluralin	2,4-D	2,4,5-T
9	<0.5	<0.1	<0.1	<0.2	*	<1.0	<0.05	<0.1	<0.05
15	<.5	<.1	<.1	<.2	*	<1.0	<.05	<.1	<.05
26	<.5	<.1	<.1	<.2	*	<1.0	<.05	<.1	<.05
36	<.5	<.1	<.1	<.2	*	<1.0	<.05	<.1	<.05

[1] Analyses made for Arochlor 1016, 1221, 1232, 1242, 1248, 1254, and 1260.

Table 7.--Pesticide concentrations in water from alluvial wells and stream, November 1986

[Analyses by the University of Missouri Environmental Trace Substances Laboratory, Columbia, Missouri; concentrations are total recoverable in micrograms per liter; <, less than the minimum detection limit; dup, duplicate sample; PDWP, Public Drinking Water Program; --, no data]

Sample location (figs. 3 and 4)	Sample date	Alachlor	Atrazine	Bentazon	Carbaryl	Carbofuran	Chlordane	Chlor-pyrifos	Cyanazine	Diazinon	Dimethoate	Fluo-meturon
1	11-18-86	<0.02	<0.1	<2.0	<0.2	<0.1	<0.04	<0.2	<0.2	<0.2	<0.2	<0.5
2	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
3	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
4	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
5	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
6	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
7	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
8	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
9	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
9dup	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
10	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
11	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
12	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
13	11-18-86	<.02	.2	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	.8
14	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	.3	<.2	<.5
15	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	.2	<.2	<.5
15dup	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	.3	<.2	<.5
16	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
17	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
18	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
19	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
20	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
21	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
22	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
23	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
24	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
25	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
26	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
26dup	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
27	11-18-86	<.02	22.5	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
28	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
29	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	1.2	<.2	<.2	<.5
29dup	11-18-86	<.02	<.1	<2.0	.3	<.1	<.04	<.2	.5	<.2	<.2	<.5
30	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
31	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5

Table 7.--Pesticide concentrations in water from alluvial wells and stream, November 1986--Continued

Sample location (figs. 3 and 4)	Sample date	Alachlor	Atrazine	Bentazon	Carbaryl	Carbofuran	Chlordane	Chlor-pyrifos	Cyanazine	Diazinon	Dimethoate	Fluo-meturon
32	11-18-86	<0.02	<0.1	<2.0	<0.2	<0.1	<0.04	<0.2	<0.2	<0.2	<0.2	<0.5
33	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
34	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
35	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
36	11-18-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
37	11-19-86	.03	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
38	11-19-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
38dup	11-19-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	.2	<.2	<.2	<.5
39	11-19-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	.8	<.2	<.2	<.5
40	11-19-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
43	11-19-86	<.02	<.1	<2.0	<.2	<.1	<.04	<.2	<.2	<.2	<.2	<.5
PDWP 1	11-18-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 2	11-18-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 3	11-18-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 4	11-18-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 5	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 6	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 7	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 8	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 9	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 10	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 11	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 12	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 13	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 14	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 15	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 16	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 17	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 18	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 19	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 20	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 21	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 22	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 23	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 24	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5
PDWP 25	11-19-86	<.02	<.5	<2.0	<.5	<.5	<.04	<.2	<.5	<.2	<.2	<.5

Table 7.--Pesticide concentrations in water from alluvial wells and stream, November 1986--Continued

Sample location (figs. 3 and 4)	Sample date	Linuron	Malathion	Methomyl	Methyl parathion	Metol-achlor	Metri-buzin	Molinate	Mono-crotophos	Paraquat	PCNB	Pendimethalin
1	11-18-86	<0.2	<0.2	<5.0	<0.2	<0.05	<0.2	<0.1	<0.2	<100	<0.005	<0.02
2	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
3	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
4	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
5	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
6	11-18-86	<.2	<.2	<5.0	<.2	<.05	.4	<.1	<.2	100	.008	<.02
7	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
8	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
9	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
9dup	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
10	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
11	11-18-86	<.2	<.2	<5.0	<.2	<.05	.4	<.1	<.2	<100	<.005	<.02
12	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
13	11-18-86	<.2	<.2	<5.0	<.2	<.05	.2	<.1	<.2	<100	<.005	<.02
14	11-18-86	<.2	<.2	<5.0	<.2	<.05	.2	<.1	<.2	<100	<.005	<.02
15	11-18-86	<.2	<.2	<5.0	<.2	<.05	.2	<.1	<.2	<100	<.005	<.02
15dup	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	.4	<100	<.005	<.02
16	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
17	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
18	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
19	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
20	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
21	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
22	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
23	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
24	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
25	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
26	11-18-86	.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
26dup	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
27	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
28	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
29	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
29dup	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
30	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
31	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02

Table 7.--Pesticide concentrations in water from alluvial wells and stream, November 1986--Continued

Sample location (figs. 3 and 4)	Sample date	Linuron	Malathion	Methomyl	Methyl parathion	Metol-achlor	Metri-buzin	Molinate	Mono-crotophos	Paraquat	PCNB	Pendimethalin
32	11-18-86	<0.2	<0.2	<5.0	<0.2	<0.05	<0.2	<0.1	<0.2	<100	<0.005	<0.02
33	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
34	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	.014	<.02
35	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
36	11-18-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	100	<.005	<.02
37	11-19-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
38	11-19-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
38dup	11-19-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	--	<.005	<.02
39	11-19-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
40	11-19-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
43	11-19-86	<.2	<.2	<5.0	<.2	<.05	<.2	<.1	<.2	<100	<.005	<.02
PDWP 1	11-18-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 2	11-18-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 3	11-18-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 4	11-18-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 5	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 6	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 7	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 8	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 9	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 10	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	1.5	<.2	<100	<.005	<.02
PDWP 11	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 12	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 13	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 14	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 15	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 16	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 17	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 18	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 19	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 20	11-19-86	<.5	<.2	<5.0	<.2	<.05	7.0	<.5	<.2	<100	<.005	<.02
PDWP 21	11-19-86	<.5	<.2	<5.0	<.2	<.05	14.0	<.5	<.2	<100	<.005	<.02
PDWP 22	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 23	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02
PDWP 24	11-19-86	<.5	<.2	<5.0	<.2	<.05	2.0	<.5	<.2	<100	<.005	<.02
PDWP 25	11-19-86	<.5	<.2	<5.0	<.2	<.05	<1.0	<.5	<.2	<100	<.005	<.02

Table 7.--Pesticide concentrations in water from alluvial wells and stream, November 1986--Continued

Sample location (figs. 3 and 4)	Sample date	Propanil	Sethoxydim	Terbufos	Thiobencarb	Toxaphene	Trifluralin	2,4-D	2,4,5-T
1	11-18-86	<0.04	<0.2	<0.2	<0.2	<0.1	<0.05	0.07	<0.05
2	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	.30	<.05
3	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
4	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	.09
5	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
6	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
7	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
8	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
9	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
9dup	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
10	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
11	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
12	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
13	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
14	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
15	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
15dup	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
16	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
17	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
18	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
19	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
20	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
21	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
22	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
23	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
24	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
25	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
26	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
26dup	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
27	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
28	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
29	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
29dup	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
30	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
31	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05

Table 7.--Pesticide concentrations in water from alluvial wells and stream, November 1986--Continued

Sample location (figs. 3 and 4)	Sample date	Propanil	Sethoxydim	Terbufos	Thiobencarb	Toxaphene	Trifluralin	2,4-D	2,4,5-T
32	11-18-86	<0.04	<0.2	<0.2	<0.2	<0.1	<0.05	<0.05	<0.05
33	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
34	11-18-86	<.04	<.2	<.2	<.2	<.1	.15	<.05	<.05
35	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
36	11-18-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
37	11-19-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
38	11-19-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
38dup	11-19-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
39	11-19-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
40	11-19-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
43	11-19-86	<.04	<.2	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 1	11-18-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 2	11-18-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 3	11-18-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 4	11-18-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 5	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 6	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 7	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 8	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 9	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 10	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 11	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 12	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 13	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 14	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 15	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 16	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 17	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 18	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 19	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 20	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 21	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 22	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 23	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 24	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05
PDWP 25	11-19-86	<.04	<2.0	<.2	<.2	<.1	<.05	<.05	<.05

Table 8.--Pesticide concentrations in water from alluvial wells, July 1987

[Analyses the by University of Iowa Hygienic Laboratory, Iowa City, Iowa; concentrations are total recoverable in micrograms per liter; <, less than the minimum detection limit; dup, duplicate sample]

Sample location (fig. 3)	Sample date	Alachlor	Atrazine	Butylate	Carbaryl	Carbofuran	Chlorpyrifos	Cyanazine	Diazinon	Ethoprop	Fonofos
1	7-21-87	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
3	7-22-87	.1	.6	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
4	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
5	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
7	7-22-87	.3	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
8	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
9	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
10	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
11	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
12	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
13	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
14	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
15	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
15dup	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
16	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
17	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
19	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
20	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
22	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
23	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
24	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
25	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
27	7-21-87	<.1	6.0	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
28	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
29	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
30	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
31	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
32	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
33	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
34	7-21-87	<.1	.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
35	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
36	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
37	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
38	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

Table 8.--Pesticide concentrations in water from alluvial wells, July 1987--Continued

Sample location (fig. 3)	Sample date	Alachlor	Atrazine	Butylate	Carbaryl	Carbofuran	Chlorpyrifos	Cyanazine	Diazinon	Ethoprop	Fonofos
39	7-21-87	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
39dup	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
40	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
51	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
52	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
53	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
54	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
55	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
56	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
57	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
58	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
59	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
60	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
61	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
62	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
63	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
64	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
65	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
66	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
67	7-23-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
68	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
69	7-23-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
70	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
71	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
72	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
73	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
74	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
75	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
76	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
77	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
78	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
79	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
80	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
81	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
82	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

Table 8.--Pesticide concentrations in water from alluvial wells, July 1987--Continued

Sample location (fig. 3)	Sample date	Alachlor	Atrazine	Butylate	Carbaryl	Carbofuran	Chlorpyrifos	Cyanazine	Diazinon	Ethoprop	Fonofos
83	7-21-87	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
85	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
86	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
87	7-21-87	<.1	3.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
88	7-22-87	22	150	<.1	<.1	<.1	<.1	.7	<.1	<.1	<.1
89	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
90	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
91	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
92	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
93	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
94	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
96	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
97	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
98	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
99	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
100	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
101	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
102	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
103	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
104	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
105	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
106	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
107	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
108	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

Table 8.--Pesticide concentrations in water from alluvial wells, July 1987--Continued

Sample location (fig. 3)	Sample date	Metolachlor	Metribuzin	Pendimethalin	Phorate	Propachlor	Propanil	Terbufos	Trifluralin
1	7-21-87	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
3	7-22-87	<.1	<.1	<.1	<.1	.1	<.1	<.1	<.1
4	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
5	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
7	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
8	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
9	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
10	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
11	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
12	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
13	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
14	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
15	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
15dup	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
16	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
17	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
19	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
20	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
22	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
23	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
24	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
25	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
27	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
28	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
29	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
30	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
31	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
32	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
33	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
34	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	.2
35	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
36	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
37	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
38	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

Table 8.--Pesticide concentrations in water from alluvial wells, July 1987--Continued

Sample location (fig. 3)	Sample date	Metolachlor	Metribuzin	Pendimethalin	Phorate	Propachlor	Propanil	Terbufos	Trifluralin
39	7-21-87	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
39dup	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
40	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
51	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
52	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
53	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
54	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
55	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
56	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
57	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
58	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
59	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
60	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
61	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
62	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
63	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
64	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
65	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
66	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
67	7-23-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
68	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
69	7-23-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
70	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
71	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
72	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
73	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
74	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
75	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
76	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
77	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
78	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
79	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
80	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
81	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
82	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

Table 8.--Pesticide concentrations in water from alluvial wells, July 1987--Continued

Sample location (fig. 3)	Sample date	Metolachlor	Metribuzin	Pendimethalin	Phorate	Propachlor	Propanil	Terbufos	Trifluralin
83	7-21-87	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
85	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
86	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
87	7-21-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
88	7-22-87	120	<.1	<.1	<.1	.4	<.1	<.1	.3
89	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
90	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
91	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
92	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
93	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
94	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
96	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
97	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
98	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
99	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
100	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
101	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
102	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
103	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
104	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
105	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
106	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
107	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1
108	7-22-87	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1

Table 9A.--Pesticide concentrations in water from alluvial wells, September 1987, (analyses by the University of Iowa Hygienic Laboratory, Iowa City, Iowa)

[concentrations are total recoverable in micrograms per liter; <, less than the minimum detection limit]

Sample location (fig. 3)	Sample date	Chloramben	Dianat	Silvex	2,4-D	2,4,5-T
4	9-15-87	<0.1	<0.1	<0.1	<0.1	<0.1
5	9-15-87	<.1	<.1	<.1	<.1	<.1
6	9-15-87	<.1	<.1	<.1	<.1	<.1
7	9-15-87	<.1	<.1	<.1	<.1	<.1
9	9-14-87	<.1	<.1	<.1	<.1	<.1
12	9-14-87	<.1	<.1	<.1	<.1	<.1
14	9-16-87	<.1	<.1	<.1	<.1	<.1
15	9-16-87	<.1	<.1	<.1	<.1	<.1
16	9-16-87	<.1	<.1	<.1	<.1	<.1
17	9-16-87	<.1	<.1	<.1	<.1	<.1
18	9-16-87	<.1	<.1	<.1	<.1	<.1
26	9-15-87	<.1	<.1	<.1	.2	<.1
29	9-16-87	<.1	<.1	<.1	.1	<.1
33	9-16-87	<.1	<.1	<.1	<.1	<.1
51	9-16-87	<.1	<.1	<.1	<.1	<.1
81	9-16-87	<.1	<.1	<.1	<.1	<.1
86	9-15-87	<.1	<.1	<.1	<.1	<.1
88	9-16-87	<.1	<.1	<.1	<.1	<.1
94	9-14-87	<.1	<.1	<.1	<.1	<.1

Table 9B.--Pesticide concentrations in water from alluvial wells, September 1987, (analyses by the Missouri Department of Health Laboratory, Jefferson City, Missouri)

[concentrations are total recoverable in micrograms per liter; <, less than the minimum detection limit]

Sample location (fig. 3)	Sample date	Silvex	2,4-D	2,4,5-T
7	9-15-87	<0.017	<0.03	<0.04
8	9-14-87	<.017	<.03	<.04
9	9-14-87	<.017	<.03	<.04
10	9-14-87	<.017	<.03	<.04
12	9-14-87	<.017	<.03	<.04
13	9-14-87	<.017	<.03	<.04
19	9-16-87	<.017	<.03	<.04
26	9-15-87	<.017	<.03	<.04
27	9-15-87	<.017	<.03	<.04
30	9-16-87	<.017	<.03	<.04
57	9-15-87	<.017	<.03	<.04
58	9-15-87	<.017	<.03	<.04
59	9-15-87	<.017	<.03	<.04
64	9-15-87	<.017	<.03	<.04
80	9-15-87	<.017	<.03	<.04
83	9-15-87	<.017	<.03	<.04
85	9-15-87	<.017	<.03	<.04
92	9-16-87	<.017	<.03	<.04

Table 10.--Physical properties, common constituents, and nitrate concentrations in water from alluvial wells, June 1986

[Analyses by the Missouri Department of Health Laboratory, Jefferson City, Missouri; values reported are those given to the U.S. Geological Survey by the laboratory; water samples were clear and unfiltered; µS/cm, microsiemens per centimeter at 25 °Celsius; °C, degrees Celsius, mg/L, milligrams per liter; <, less than the minimum detection limit; ROE, residue on evaporation; --, no data]

Sample location (fig. 3)	Sample date	Specific conductance µS/cm	pH, standard units	Hardness, total as $CaCO_3$, mg/L	Hardness, carbonate as $CaCO_3$, mg/L	Calcium as Ca, dissolved, mg/L	Magnesium as Mg, dissolved, mg/L	Sodium as Na, dissolved, mg/L	Potassium as K, dissolved, mg/L	Alkalinity, bicarbonate as HCO_3, mg/L	Alkalinity, total, mg/L	Sulfate as SO_4, dissolved, mg/L	Chloride as Cl, dissolved, mg/L	Fluoride as F, dissolved, mg/L	ROE at 180 °C, mg/L	Nitrate as N, total, mg/L
1	6-17-86	300	5.5	28	28	7.0	2.6	49.5	<0.5	97.6	80	<10	36	0.3	237	3.9
2	6-17-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<.05
3	6-17-86	250	5.1	72	44	15.9	7.8	12.2	1.7	53.7	44	<10	10	14	210	10
4	6-17-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.9
5	6-17-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<.05
6	6-17-86	425	6.1	182	179	45.3	16.7	16.2	.8	218	179	32	20	.29	302	<.05
7	6-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14
8	6-17-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12
9	6-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19
10	6-18-86	550	6.2	219	80	53.1	21.1	12.1	1.1	17.6	80	48	32	.16	426	24
11	6-17-86	300	7.0	148	145	46.0	8.0	6.8	.5	177	145	24	8	<.1	211	<.05
12	6-17-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<.05
13	6-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.5
14	6-18-86	350	6.2	136	121	37.2	10.5	6.8	13.7	148	121	46	7	<.1	269	7.0
15	6-18-86	250	6.2	97	50	25.9	7.8	5.3	2.1	61.0	50	32	17	<.1	232	8.0
16	6-18-86	300	6.1	55	55	15.1	4.3	6.8	34.9	70.8	58	30	10	<.1	207	7.4
17	6-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14
18	6-17-86	475	6.4	226	210	60.8	17.9	9.7	<.5	256	210	46	5	.3	321	<.05
19	6-17-86	1,175	6.5	439	348	116	36.2	73.7	4.0	425	348	<10	190	.28	866	<.05
20	6-18-86	275	6.0	92	68	20.0	10.1	14.9	1.6	83	68	37	24	.26	226	<.05
21	6-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<.05
22	6-18-86	750	6.5	283	218	74.4	23.7	42.7	2.0	266	218	68	78	.29	508	<.05
23	6-17-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<.05
24	6-17-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<.05
25	6-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15
26	6-18-86	700	6.0	181	166	50.8	13.1	64.9	1.9	203	166	76	38	<.1	489	15
27	6-17-86	475	6.4	167	151	49.6	10.5	28.2	1.9	184	151	44	13	.19	349	8.3
28	6-17-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21
29	6-17-86	400	6.6	228	212	50.8	24.6	7.7	<.5	259	212	12	3	.21	259	<.05
30	6-17-86	1,000	6.8	448	333	130	30.0	35.4	<.5	406	333	35	114	.25	699	<.05

Table 10.--Physical properties, common constituents, and nitrate concentrations in water from alluvial wells, June 1986--Continued

Sample location (fig. 3)	Sample date	Specific conductance µS/cm	pH, standard units	Hardness, total as $CaCO_3$, mg/L	Hardness, carbonate as $CaCO_3$, mg/L	Calcium as Ca, dissolved, mg/L	Magnesium as Mg, dissolved, mg/L	Sodium as Na, dissolved, mg/L	Potassium as K, dissolved, mg/L	Alkalinity, bicarbonate as HCO_3, mg/L	Alkalinity, total, mg/L	Sulfate as SO_4, dissolved, mg/L	Chloride as Cl, dissolved, mg/L	Fluoride as F, dissolved, mg/L	ROE at 180 °C, mg/L	Nitrate as N, total, mg/L
31	6-17-86	950	6.7	549	471	143	46.7	8.0	2.2	574	471	51	2	0.23	641	5.4
32	6-17-86	700	6.7	338	304	80	33.5	28.9	1.8	371	304	66	18	.23	464	1.5
33	6-16-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.07
34	6-16-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.0
35	6-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.3
36	6-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<.05
37	6-18-86	325	6.1	120	108	29.2	11.5	14.5	<.5	132	108	53	8	.36	235	.09
38	6-18-86	325	5.4	111	19	30.1	8.7	6.5	10.8	23.2	19	39	9	<.1	305	22
39	6-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<.05
40	6-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.0

Table 11.--Physical properties, common constituents, and nitrate concentrations in water from alluvial wells and stream, November 1986

[Analyses by Missouri Department of Health Laboratory, Jefferson City, Missouri; values reported are those given to the U.S. Geological Survey by the laboratory; water samples were clear and unfiltered; µS/cm, microsiemens per centimeter at 25 °Celsius; °C, degrees Celsius; mg/L, milligrams per liter; ROE, residue on evaporation; --, no data; <, less than the minimum detection limit]

Sample location (figs. 3 and 4)	Sample date	Specific conductance µS/cm	pH, standard units	Hardness, total as $CaCO_3$, mg/L	Hardness, carbonate as $CaCO_3$, mg/L	Calcium as Ca, dissolved, mg/L	Magnesium as Mg, dissolved, mg/L	Sodium as Na, dissolved, mg/L	Potassium as K, dissolved, mg/L	Alkalinity, bicarbonate as HCO_3, mg/L	Alkalinity, total, mg/L	Sulfate as SO_4, dissolved, mg/L	Chloride as Cl, dissolved, mg/L	Fluoride as F, dissolved, mg/L	ROE at 180 °C, mg/L	Nitrate as N, total, mg/L
1	11-18-86	--	5.6	39	--	9.9	3.4	45.4	0.6	67.1	55	--	41	0.35	202	2.9
2	11-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<.05
3	11-18-86	250	5.0	70	34	15.1	7.6	12.2	2.3	41.5	34	21	9	.14	192	8.9
4	11-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.2
6	11-18-86	420	5.5	187	167	47.3	16.8	14.6	1.1	204	167	21	19	.26	269	<.05
7	11-18-86	270	6.0	120	80	30.1	10.8	5.7	1.6	97.6	80	18	14	.25	181	.18
8	11-18-86	260	4.8	48	21	12.2	4.3	13.9	7.3	25.6	21	21	17	<.10	161	11
9	11-18-86	440	5.9	147	116	41.7	10.5	7.5	38.3	142	116	33	13	.25	304	11
10	11-18-86	420	5.5	165	109	39.9	15.9	14.2	6.4	133	109	44	12	.20	291	8.6
11	11-18-86	310	6.5	142	136	44.5	7.4	6.7	1.2	166	136	<10	7	<.10	205	<.05
13	11-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.6
14	11-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.4
15	11-18-86	260	5.6	110	47	30.3	8.3	5.5	2.5	57.3	47	25	15	<.10	183	6.8
16	11-18-86	300	5.3	64	30	18.6	4.3	12.3	44.8	36.6	38	25	11	<.10	210	10
17	11-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12
18	11-18-86	350	5.8	238	185	66.0	17.7	11.3	1.9	226	185	44	7	.32	312	<.05
19	11-18-86	1,110	6.0	410	283	107	34.8	95.7	4.2	345	283	<10	204	.29	738	<.05
20	11-18-86	620	5.6	238	54	55.6	24.0	24.0	2.7	66	54	28	135	.19	431	<.05
22	11-18-86	600	6.0	268	188	68.9	23.3	30.0	7.2	220	188	67	61	.29	472	<.05
25	11-18-86	490	4.5	141	10	32.2	14.7	30.3	7.9	12.2	10	119	22	<.10	365	17
26	11-18-86	610	5.9	187	160	48.9	15.8	63.8	2.0	195	160	61	30	<.10	433	10
27	11-18-86	460	6.0	165	128	48.9	10.3	27.9	2.0	156	128	58	4	.19	352	9.1
28	11-18-86	400	4.7	156	21	42.5	12.1	4.6	1.5	25.6	21	34	27	<.10	268	22
29	11-18-86	400	6.3	189	177	54.5	12.8	8.2	1.8	216	177	<10	7	.20	264	<.05
30	11-18-86	950	6.4	415	300	122	26.9	37.0	4.2	366	300	32	135	.24	652	<.05
31	11-18-86	970	6.4	509	432	131	44.3	8.5	2.4	527	432	56	24	.23	648	5.3
32	11-18-86	760	6.5	364	290	87.8	35.1	24.9	2.1	354	290	76	24	.22	501	1.4
33	11-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	.13
34	11-18-86	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.8
37	11-19-86	330	5.8	128	95	30.5	12.5	15.3	.6	116	95	42	8	.35	220	.14
38	11-19-86	290	5.0	91	12	25.2	6.8	5.7	9.7	14.6	12	33	6	<.10	231	17
43	11-19-86	280	6.6	137	119	28.5	15.9	3.5	1.3	145	119	<10	2	<.10	179	.11

Table 12.--Physical properties and nitrate concentrations in water from alluvial wells, July 1987

[Analyses by the Missouri Department of Health Laboratory, Jefferson City, Missouri; values reported are those given to the U.S. Geological Survey by the laboratory; µS/cm, microsiemens per centimeter at 25 °Celsius; mg/L, milligrams per liter; <, less than the minimum detection limit; --, no data]

Sample location (fig. 3)	Sample date	Specific conductance, µS/cm	pH, standard units	Nitrate as N, total, mg/L
1	7-21-87	375	6.3	4.4
8	7-22-87	135	5.7	7.1
11	7-21-87	150	7.5	<.05
19	7-21-87	1,200	6.9	.06
20	7-21-87	550	6.8	6.5
22	7-22-87	--	6.7	.07
23	7-21-87	450	7.0	<.05
24	7-21-87	500	7.4	<.05
25	7-21-87	500	5.7	14
27	7-21-87	500	7.0	6.4
28	7-22-87	400	6.1	21
29	7-21-87	400	7.1	.06
30	7-21-87	1,150	7.1	<.05
31	7-21-87	750	7.1	<.05
32	7-21-87	750	7.3	.36
33	7-21-87	950	7.1	.07
34	7-21-87	200	6.5	6.5
35	7-21-87	300	6.3	1.8
36	7-21-87	550	7.4	<.05
37	7-21-87	350	6.7	.07
38	7-21-87	300	5.9	16
39	7-21-87	350	7.1	<.05
40	7-21-87	400	7.1	2.1
51	7-21-87	650	7.4	5.2
52	7-21-87	350	5.7	15
53	7-21-87	500	5.2	.07
54	7-21-87	400	7.4	.83
55	7-21-87	700	7.6	<.05
56	7-21-87	400	7.2	<.05
57	7-21-87	600	7.4	<.05

Table 12.--Physical properties and nitrate concentrations in water from alluvial wells, July 1987--Continued

Sample location (fig. 3)	Sample date	Specific conductance, µS/cm	pH, standard units	Nitrate as N, total, mg/L
58	7-21-87	350	5.7	.11
68	7-22-87	1,000	6.5	.10
69	7-23-87	610	7.2	1.4
71	7-21-87	350	7.6	<.05
72	7-21-87	340	6.7	10
73	7-21-87	350	7.1	1.7
77	7-21-87	260	5.9	8.7
78	7-21-87	300	6.1	2.2
79	7-21-87	600	7.0	<.05
80	7-22-87	870	7.3	<.05
81	7-22-87	140	5.8	.49
83	7-21-87	300	6.0	4.1
85	7-22-87	390	7.4	<.05
86	7-22-87	700	7.5	<.05
87	7-21-87	350	8.0	<.05
88	7-22-87	250	5.8	14
89	7-22-87	250	7.8	<.05
90	7-22-87	300	7.8	<.05
91	7-22-87	300	7.6	<.05
92	7-22-87	700	7.2	<.05
93	7-22-87	400	7.1	<.05
94	7-22-87	300	7.1	<.05
96	7-22-87	350	7.5	<.05
97	7-22-87	300	7.6	.14
98	7-22-87	450	7.1	<.05
99	7-22-87	450	7.3	<.05
100	7-22-87	600	7.1	.09
101	7-22-87	400	7.4	<.05
102	7-22-87	600	7.2	<.05
103	7-22-87	400	7.1	<.05
104	7-22-87	550	6.8	.12
105	7-22-87	400	7.2	<.05
106	7-22-87	400	7.2	<.05
107	7-22-87	500	7.1	<.05
108	7-22-87	350	7.0	.11

Table 13.--Concentrations of volatile organic compounds in water from alluvial wells, June 1986

[Analyses by the University of Missouri Environmental Trace Substances Laboratory, Columbia, Missouri; concentrations are total recoverable in micrograms per liter; <, less than the minimum detection limit; dup, duplicate sample;]

Sample location (fig. 3)	Sample date	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon tetra-chloride	Chloro-benzene	Chloro-ethane	Chloro-form	Chloro-methane	Cis-1,3-dichloro-propene	Dibromo-chloro-methane	Dichloro-difluoro-methane
1	6-17-87	<1.1	<2.9	<0.5	<1.0	<0.8	<4.0	<0.2	<3.3	<0.4	<0.4	<0.8
2	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
3	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
4	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
5	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
5dup	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
6	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
7	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
8	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
9	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
10	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
11	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
12	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
12dup	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
13	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
14	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
15	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
16	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
17	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
18	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
19	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
20	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
21	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
22	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
22dup	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
23	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
24	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
25	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
26	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
27	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
28	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
29	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
29dup	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
30	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
31	6-17-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8

Table 13.--Concentrations of volatile organic compounds in water from alluvial wells, June 1986--Continued

Sample location (fig. 3)	Sample date	Bromo-dichloro-methane	Bromo-form	Bromo-methane	Carbon tetra-chloride	Chloro-benzene	Chloro-ethane	Chloro-form	Chloro-methane	Cis-1,3-dichloro-propene	Dibromo-chloro-methane	Dichloro-difluoro-methane
32	6-17-86	<1.1	<2.9	<.5	<1.0	<0.8	<4.0	<0.2	<3.3	<0.4	<0.4	<0.8
33	6-16-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
35	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
36	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
37	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	2.3	<3.3	<.4	<.4	<.8
38	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	.6	<3.3	<.4	<.4	<.8
38dup	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
39	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8
40	6-18-86	<1.1	<2.9	<.5	<1.0	<.8	<4.0	<.2	<3.3	<.4	<.4	<.8

Table 13.--Concentrations of volatile organic compounds in water from alluvial wells, June 1986--Continued

Sample location (fig. 3)	Sample date	Tetra-chloro-ethylene	Trans-1,-2-di-chloro-ethylene	Trans-1,-3-di-chloroph-rophylene	Trichloro-ethylene	Trichlor-fluoro-methane	Vinyl chloride	1,1-Di-chloro-ethane	1,2-Di-chloro-ethane	1,1-Di-chloro-ethylene	1,2-Di-chloro-propane
1	6-17-86	<0.3	<0.2	<2.5	<0.4	<0.2	<3.3	<0.3	<0.1	<0.2	<1.0
2	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
3	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
4	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
5	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
5dup	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
6	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
7	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
8	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
9	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
10	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
11	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
12	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
12dup	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
13	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
14	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
15	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
16	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
17	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
18	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
19	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
20	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
21	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
22	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
22dup	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
23	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
24	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
25	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
26	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
27	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
28	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
29	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
29dup	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
30	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
31	6-17-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0

Table 13.--Concentrations of volatile organic compounds in water from alluvial wells, June 1986--Continued

Sample location (fig. 3)	Sample date	Tetra-chloro-ethylene	Trans-1,-2-di-chloro-ethylene	Trans-1,-3-di-chloroph-rophylene	Trichloro-ethylene	Trichlor-fluoro-methane	Vinyl chloride	1,1-Di-chloro-ethane	1,2-Di-chloro-ethane	1,1-Di-chloro-ethylene	1,2-Di-chloro-propane
32	6-17-86	<0.3	<0.2	<2.5	<0.4	<0.2	<3.3	<0.3	<0.1	<0.2	<1.0
33	6-16-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
35	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
36	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
37	6-18-86	<.3	<.2	<2.5	<.4	.4	<3.3	<.3	<.1	<.2	<1.0
38	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
38dup	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
39	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0
40	6-18-86	<.3	<.2	<2.5	<.4	<.2	<3.3	<.3	<.1	<.2	<1.0

Table 13.--Concentrations of volatile organic compounds in water from alluvial wells, June 1986--Continued

Sample location (fig. 3)	Sample date	1,1,2,2-Tetra-chloroethane	1,1,1-Tri-chloroethane	1,1,2-Tri-chloroethane	2-Chloroethly-vinyl ether
1	6-17-86	<0.3	<1.0	<0.4	<0.3
2	6-17-86	<.3	<1.0	<.4	<.3
3	6-17-86	<.3	<1.0	<.4	<.3
4	6-17-86	<.3	<1.0	<.4	<.3
5	6-17-86	<.3	<1.0	<.4	<.3
5dup	6-17-86	<.3	<1.0	<.4	<.3
6	6-17-86	<.3	<1.0	<.4	<.3
7	6-18-86	<.3	<1.0	<.4	<.3
8	6-17-86	<.3	<1.0	<.4	<.3
9	6-18-86	<.3	<1.0	<.4	<.3
10	6-18-86	<.3	<1.0	<.4	<.3
11	6-17-86	<.3	<1.0	<.4	<.3
12	6-17-86	<.3	<1.0	<.4	<.3
12dup	6-17-86	<.3	<1.0	<.4	<.3
13	6-18-86	<.3	<1.0	<.4	<.3
14	6-18-86	<.3	<1.0	<.4	<.3
15	6-18-86	<.3	<1.0	<.4	<.3
16	6-18-86	<.3	<1.0	<.4	<.3
17	6-18-86	<.3	<1.0	<.4	<.3
18	6-17-86	<.3	<1.0	<.4	<.3
19	6-17-86	<.3	<1.0	<.4	<.3
20	6-18-86	<.3	<1.0	<.4	<.3
21	6-18-86	<.3	<1.0	<.4	<.3
22	6-18-86	<.3	<1.0	<.4	<.3
22dup	6-18-86	<.3	<1.0	<.4	<.3
23	6-17-86	<.3	<1.0	<.4	<.3
24	6-17-86	<.3	<1.0	<.4	<.3
25	6-18-86	<.3	<1.0	<.4	<.3
26	6-18-86	<.3	<1.0	<.4	<.3
27	6-17-86	<.3	<1.0	<.4	<.3
28	6-17-86	<.3	<1.0	<.4	<.3
29	6-17-86	<.3	<1.0	<.4	<.3
29dup	6-17-86	<.3	<1.0	<.4	<.3
30	6-17-86	<.3	<1.0	<.4	<.3
31	6-17-86	<.3	<1.0	<.4	<.3

Table 13.--Concentrations of volatile organic compounds in water from alluvial wells, June 1986--Continued

Sample location (fig. 3)	Sample date	1,1,2,2-Tetra-chloroethane	1,1,1-Tri-chloroethane	1,1,2-Tri-chloroethane	2-Chloroethly-vinyl ether
32	6-17-86	<0.3	<1.0	<0.4	<0.3
33	6-16-86	<.3	<1.0	<.4	<.3
35	6-18-86	<.3	<1.0	<.4	<.3
36	6-18-86	<.3	<1.0	<.4	<.3
37	6-18-86	<.3	1.3	<.4	<.3
38	6-18-86	<.3	<1.0	<.4	<.3
38dup	6-18-86	<.3	<1.0	<.4	<.3
39	6-18-86	<.3	<1.0	<.4	<.3
40	6-18-86	<.3	<1.0	<.4	<.3

Table 14.--Trace-element concentrations in water from alluvial wells, June 1986

[Analyses by the Missouri Department of Health Laboratory, Jefferson City, Missouri; values reported are those given to the U.S. Geological Survey by the laboratory; concentrations are in micrograms per liter; total, total recoverable; <, less than the minimum detection limit]

Sample location (fig. 3)	Sample date	Total arsenic as As	Total barium as Ba	Total cadmium as Cd	Total chromium as Cr	Total iron as Fe	Total lead as Pb	Total manganese as Mn	Total mercury as Hg	Total nickel as Ni	Total selenium as Se	Total silver as Ag	Total zinc as Zn
1	6-17-86	<5.0	<100	14	<5.0	<50	<5.0	<10	<0.5	<50	<5.0	<2.0	20
3	6-17-86	<5.0	210	<2.0	<5.0	<50	<5.0	160	<.5	<50	<5.0	<2.0	170
6	6-17-86	7	340	<2.0	<5.0	11,000	<5.0	2,860	<.5	<50	<5.0	<2.0	10
10	6-18-86	<5.0	<100	<2.0	<5.0	370	<5.0	560	<.5	<50	<5.0	<2.0	410
11	6-17-86	13	630	<2.0	<5.0	300	<5.0	950	<.5	<50	<5.0	<2.0	40
14	6-18-86	<5.0	110	<2.0	<5.0	70	<5.0	570	<.5	<50	<5.0	<2.0	100
15	6-18-86	<5.0	<100	<2.0	<5.0	60	<5.0	50	<.5	<50	<5.0	<2.0	50
16	6-18-86	<5.0	250	<2.0	<5.0	180	<5.0	20	<.5	<50	<5.0	<2.0	260
18	6-17-86	<5.0	320	<2.0	<5.0	12,800	<5.0	1,210	<.5	<50	<5.0	<2.0	80
19	6-17-86	<5.0	510	<2.0	<5.0	18,100	<5.0	2,520	<.5	<50	<5.0	<2.0	30
20	6-18-86	<5.0	140	<2.0	<5.0	2,080	<5.0	480	<.5	<50	<5.0	<2.0	40
22	6-18-86	<5.0	440	<2.0	<5.0	13,300	<5.0	850	<.5	<50	<5.0	<2.0	20
26	6-18-86	<5.0	230	<2.0	<5.0	<50	<5.0	690	<.5	<50	<5.0	<2.0	10
27	6-17-86	<5.0	430	<2.0	<5.0	130	<5.0	910	<.5	<50	<5.0	<2.0	10
29	6-17-86	7	390	<2.0	<5.0	11,000	<5.0	1,440	<.5	<50	<5.0	<2.0	30
30	6-17-86	<5.0	280	<2.0	<5.0	7,640	<5.0	1,390	<.5	<50	<5.0	<2.0	60
31	6-17-86	<5.0	200	<2.0	<5.0	80	<5.0	420	<.5	<50	<5.0	<2.0	60
32	6-17-86	<5.0	<100	<2.0	<5.0	130	<5.0	80	<.5	<50	<5.0	<2.0	30
37	6-18-86	<5.0	280	<2.0	<5.0	7,080	<5.0	1,490	<.5	<50	<5.0	<2.0	10
38	6-18-86	<5.0	270	<2.0	<5.0	<50	<5.0	210	<.5	<50	<5.0	<2.0	<10

Table 15.--Trace-element concentrations in water from alluvial wells and stream, November 1986

[Analyses by the Missouri Department of Health Laboratory, Jefferson City, Missouri; values reported are those given to the U.S. Geological Survey by the laboratory; concentrations are in micrograms per liter; total, total recoverable; <, less than the minimum detection limit; --; no data]

Sample location (figs. 3 and 4)	Sample date	Total arsenic as As	Total barium as Ba	Total cadmium as Cd	Total chromium as Cr	Total iron as Fe	Total lead as Pb	Total manganese as Mn	Total mercury as Hg	Total nickel as Ni	Total selenium as Se	Total silver as Ag	Total zinc as Zn
1	11-18-86	<5.0	--	<2.0	--	<50	<5.0	30	<0.5	<50	<5.0	<2.0	120
3	11-18-86	<5.0	220	<2.0	<5.0	<50	<5.0	120	<.5	<50	<5.0	<2.0	900
6	11-18-8	<5.0	340	<2.0	<5.0	10,700	<5.0	1,700	<.5	<50	<5.0	<2.0	130
7	11-18-86	<5.0	100	<2.0	<5.0	240	<5.0	300	<.5	<50	<5.0	<2.0	30
8	11-18-86	<5.0	200	<2.0	<5.0	1,340	28.0	70	<.5	<50	<5.0	<2.0	60
9	11-18-86	<5.0	180	<2.0	<5.0	50	<5.0	720	<.5	<50	<5.0	<2.0	50
10	11-18-86	<5.0	170	<2.0	<5.0	140	<5.0	740	<.5	<50	<5.0	<2.0	40
11	11-18-86	15	820	<2.0	<5.0	280	<5.0	910	<.5	<50	<5.0	<2.0	100
15	11-18-86	<5.0	170	<2.0	<5.0	<50	<5.0	50	<.5	<50	<5.0	<2.0	100
16	11-18-86	<5.0	220	<2.0	<5.0	<50	<5.0	10	<.5	<50	<5.0	<2.0	80
18	11-18-86	<5.0	500	<2.0	<5.0	13,000	<5.0	1,160	<.5	<50	<5.0	<2.0	380
19	11-18-86	<5.0	500	<2.0	<5.0	22,300	<5.0	1,400	<.5	<50	<5.0	<2.0	20
20	11-18-86	<5.0	210	<2.0	<5.0	4,350	<5.0	1,030	<.5	<50	<5.0	<2.0	690
22	11-18-86	<5.0	480	<2.0	<5.0	14,900	<5.0	770	<.5	<50	<5.0	<2.0	110
25	11-18-86	<5.0	<100	<2.0	<5.0	150	<5.0	280	<.5	100	<5.0	<2.0	90
26	11-18-86	<5.0	290	<2.0	<5.0	50	<5.0	580	<.5	<50	<5.0	<2.0	50
27	11-18-86	<5.0	480	<2.0	<5.0	90	<5.0	820	<.5	<50	<5.0	<2.0	40
28	11-18-86	<5.0	300	<2.0	<5.0	<50	<5.0	50	<.5	<50	<5.0	<2.0	70
29	11-18-86	<5.0	460	<2.0	<5.0	9,240	<5.0	1,410	<.5	<50	<5.0	<2.0	70
30	11-18-86	17	350	<2.0	<5.0	6,840	<5.0	1,430	<.5	<50	<5.0	<2.0	70
31	11-18-86	<5.0	250	<2.0	<5.0	60	<5.0	430	<.5	50	<5.0	<2.0	110
32	11-18-86	<5.0	210	<2.0	<5.0	30	<5.0	80	<.5	<50	<5.0	<2.0	190
37	11-19-86	<5.0	130	<2.0	<5.0	5,240	<5.0	1,370	<.5	<50	<5.0	<2.0	20
38	11-19-86	<5.0	<100	<2.0	<5.0	<50	<5.0	60	<.5	<50	<5.0	<2.0	90
43	11-19-86	<5.0	<100	<2.0	<5.0	660	11	150	<.5	<50	<5.0	<2.0	60

Table 16.--Trace-element concentrations in water from alluvial wells, July 1987

[Analyses from Missouri Department of Health Laboratory, Jefferson City, Missouri; values reported are those given to the U.S. Geological Survey by the laboratory; concentrations are in micrograms per liter; total, total recoverable; <, less than the minimum detection limit; --, no data]

Sample location (fig. 3)	Sample date	Total arsenic as As	Total barium as Ba	Total cadmium as Cd	Total chromium as Cr	Total iron as Fe	Total lead as Pb	Total manganese as Mn	Total nickel as Ni	Total silver as Ag	Total zinc as Zn
1	7-21-87	<5.0	<100	<2.0	8	<50	<5.0	<100	<50	<2.0	50
8	7-22-87	<5.0	200	<2.0	<5.0	8,900	62	40	<50	<2.0	120
11	7-21-87	23	980	<2.0	<5.0	250	<5.0	890	<50	<2.0	90
19	7-21-87	<5.0	950	<2.0	<5.0	17,000	<5.0	2,500	50	<2.0	<10
20	7-21-87	<5.0	350	<2.0	<5.0	<50	<5.0	540	50	<2.0	10
22	7-22-87	<5.0	770	<2.0	<5.0	21,600	<5.0	760	<50	<2.0	50
23	7-21-87	<5.0	1,060	<2.0	<5.0	15,100	<5.0	520	<50	<2.0	130
24	7-21-87	<5.0	880	<2.0	<5.0	3,920	<5.0	1,190	<50	<2.0	30
25	7-21-87	<5.0	<100	<2.0	<5.0	130	<5.0	330	110	<2.0	100
27	7-21-87	<5.0	680	<2.0	<5.0	110	<5.0	850	<50	<2.0	20
28	7-22-87	<5.0	430	<2.0	<5.0	<50	<5.0	70	<50	<2.0	30
29	7-21-87	5	770	<2.0	<5.0	18,800	<5.0	1,460	<50	<2.0	50
30	7-21-87	15	510	<2.0	<5.0	14,100	<5.0	1,480	<50	<2.0	40
31	7-21-87	<5.0	410	<2.0	<5.0	17,700	<5.0	610	<50	<2.0	20
32	7-21-87	<5.0	320	<2.0	<5.0	70	<5.0	370	<50	<2.0	200
33	7-21-87	<5.0	370	<2.0	<5.0	600	<5.0	1,920	<50	<2.0	220
34	7-21-87	<5.0	<100	<2.0	<5.0	100	<5.0	40	<50	<2.0	330
35	7-21-87	<5.0	220	<2.0	<5.0	110	<5.0	250	<50	<2.0	250
36	7-21-87	5.0	<100	<2.0	<5.0	80	<5.0	10	<50	<2.0	40
37	7-21-87	<5.0	190	<2.0	<5.0	12,900	<5.0	1,340	<50	<2.0	30
38	7-21-87	<5.0	130	<2.0	<5.0	<50	<5.0	80	<50	<2.0	50
39	7-21-87	<5.0	160	<2.0	<5.0	3,380	<5.0	320	<50	<2.0	180
40	7-21-87	<5.0	270	<2.0	<5.0	<50	<5.0	690	<50	<2.0	40
51	7-21-87	<5.0	460	<2.0	<5.0	50	<5.0	630	<50	<2.0	90
52	7-21-87	<5.0	550	<2.0	<5.0	<50	<5.0	20	<50	<2.0	30
53	7-21-87	<5.0	700	<2.0	<5.0	21,800	<5.0	1,430	<50	<2.0	40
54	7-21-87	<5.0	300	<2.0	<5.0	50	<5.0	640	<50	<2.0	40
55	7-21-87	<5.0	290	<2.0	<5.0	2,250	<5.0	200	<50	<2.0	380
56	7-21-87	<5.0	570	<2.0	<5.0	5,800	<5.0	740	<50	<2.0	<10
57	7-21-87	<5.0	720	<2.0	<5.0	3,750	<5.0	250	<50	<2.0	20
58	7-21-87	<5.0	240	<2.0	<5.0	<50	<5.0	440	<50	<2.0	250
68	7-22-87	<5.0	640	<2.0	<5.0	16,000	<5.0	3,500	60	<2.0	110
69	7-23-87	6	430	<2.0	<5.0	600	<5.0	510	50	<2.0	20
71	7-21-87	<5.0	180	<2.0	<5.0	390	<5.0	520	50	<2.0	70
72	7-21-87	<5.0	240	<2.0	<5.0	200	<5.0	10	70	<2.0	210

Table 16.--Trace-element concentrations in water from alluvial wells, July 1987--Continued

Sample location (fig. 3)	Sample date	Total arsenic as As	Total barium as Ba	Total cadmium as Cd	Total chromium as Cr	Total iron as Fe	Total lead as Pb	Total manganese as Mn	Total nickel as Ni	Total silver as Ag	Total zinc as Zn
73	7-21-87	<5.0	230	<2.0	<5.0	540	<5.0	900	50	<2.0	10
77	7-21-87	<5.0	170	<2.0	<5.0	50	<5.0	30	<50	<2.0	130
78	7-21-87	<5.0	220	<2.0	<5.0	<50	<5.0	80	<50	<2.0	80
79	7-21-87	5	720	<2.0	<5.0	19,100	<5.0	600	<50	<2.0	10
80	7-22-87	<5.0	350	<2.0	<5.0	2,320	<5.0	210	<50	<2.0	130
81	7-22-87	<5.0	<100	<2.0	6	190	<5.0	10	<50	<2.0	40
83	7-21-87	<5.0	120	<2.0	<5.0	230	<5.0	300	<50	<2.0	70
85	7-22-87	7	700	<2.0	<5.0	3,440	<5.0	370	<50	<2.0	140
86	7-22-87	8	810	<2.0	<5.0	2,110	5	220	<50	<2.0	20
87	7-21-87	<5.0	380	<2.0	<5.0	220	<5.0	320	50	<2.0	10
88	7-22-87	<5.0	390	<2.0	<5.0	120	<5.0	220	<50	<2.0	60
89	7-22-87	<5.0	410	<2.0	<5.0	310	<5.0	390	50	<2.0	50
90	7-22-87	<5.0	550	<2.0	<5.0	10,200	<5.0	970	60	<2.0	60
91	7-22-87	<5.0	570	<2.0	<5.0	1,610	<5.0	680	<50	<2.0	20
92	7-22-87	12	540	<2.0	<5.0	4,740	<5.0	420	60	<2.0	30
93	7-22-87	<5.0	650	<2.0	<5.0	3,330	<5.0	1,650	50	<2.0	50
94	7-22-87	<5.0	<100	<2.0	<5.0	1,260	<5.0	10	50	<2.0	40
96	7-22-87	<5.0	290	<2.0	<5.0	1,970	<5.0	660	<50	<2.0	<10
97	7-22-87	<5.0	350	<2.0	<5.0	1,210	<5.0	460	<50	<2.0	<10
98	7-22-87	<5.0	510	<2.0	<5.0	13,000	<5.0	530	<50	<2.0	70
99	7-22-87	<5.0	580	<2.0	<5.0	4,150	<5.0	290	<50	<2.0	10
100	7-22-87	<5.0	380	<2.0	<5.0	10,400	<5.0	430	<50	<2.0	30
101	7-22-87	<5.0	830	<2.0	--	2,500	<5.0	760	<50	<2.0	20
102	7-22-87	<5.0	610	<2.0	<5.0	19,000	<5.0	410	<50	<2.0	30
103	7-22-87	<5.0	570	<2.0	<5.0	10,900	<5.0	420	<50	<2.0	80
104	7-22-87	<5.0	460	<2.0	<5.0	10,900	<5.0	680	<50	<2.0	130
105	7-22-87	<5.0	1,030	<2.0	<5.0	4,590	<5.0	410	<50	<2.0	80
106	7-22-87	<5.0	320	<2.0	<5.0	3,510	<5.0	900	<50	<2.0	20
107	7-22-87	<5.0	600	<2.0	<5.0	12,100	<5.0	830	<50	<2.0	10
108	7-22-87	<5.0	460	<2.0	<5.0	10,000	<5.0	450	<50	<2.0	30