DESCRIPTION OF GEOGRAPHIC-INFORMATION-SYSTEM FILES CONTAINING WATER-RESOURCE-RELATED DATA COMPILED AND COLLECTED FOR WYANDOTTE COUNTY, NORTHEASTERN KANSAS

By Cristi V. Hansen

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WYANDOTTE COUNTY HEALTH DEPARTMENT

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Disclaimer: None of the site locations described in this report, except those in WYCOQW, were field verified.

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CONVERSION FACTORS AND VERTICAL DATUM

Multiply	*By*	*To obtain*
inch	2.54	centimeter
foot	0.3048	meter
mile	1.609	kilometer
square mile	2.590	square kilometer
acre	0.4047	hectare
gallon	3.785	liter
gallon per minute	0.06309	liter per second

Temperature can be converted to degrees Celsius (^{o}C) or degrees Fahrenheit (^{o}F) by the equations:

$$^{o}C = 5/9\ (^{o}F-32)$$

$$^{o}F = 9/5\ (^{o}C) + 32.$$

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

DESCRIPTION OF GEOGRAPHIC-INFORMATION-SYSTEM FILES CONTAINING WATER-RESOURCE-RELATED DATA COMPILED AND COLLECTED FOR WYANDOTTE COUNTY, NORTHEASTERN KANSAS

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ABSTRACT

Water-resource-related data for sites in Wyandotte County were compiled and collected in cooperation with the Wyandotte County Health Department as part of the Kansas Department of Health and Environment's Local Environmental Protection Program (*LEPP*). These data were entered into a geographic information system (*GIS*) to facilitate the spatial analysis required to meet the *LEPP* goals of developing plans for nonpoint-source management and for public-water-supply protection. The data in the *GIS* are organized into digital spatial data sets that are referred to as coverages. The coverage **WYUSGS** contains site, construction, geologic, water-level, and water-quality data compiled by the U.S. Geological Survey for 264 wells. The coverage **WYWWC5** contains site, construction, and geologic data compiled by the Kansas Department of Health and Environment for 631 wells. The coverage **WYHEQW** contains site and water-quality data compiled by the Kansas Department of Health and Environment for 8 wells, 3 public-water-supply distribution systems, 1 stream, and 1 surface-water impoundment. The coverage **WYDWR** contains site and water-withdrawal data compiled by the Division of Water Resources of the Kansas State Board of Agriculture for 92 wells and 27 streams or surface-water impoundments. The coverage **WYDRLG** contains site, construction, geologic, and water-level data compiled by well-drilling contractors and the Kansas Geological Survey for 200 wells. The coverage **WYKGS** contains site, water-level, and water-quality data compiled by the Kansas Geological Survey for 385 wells. The coverage **WYCOQW** contains the site, water-level, and water-quality data collected by the U.S. Geological Survey and the Wyandotte County Health Department at 19 wells, 1 spring, and 1 stream in or near Wyandotte County as a part of the *LEPP*. The data in these seven coverages are available in digital form from the U.S. Geological Survey in Lawrence, Kansas.

INTRODUCTION

The State Water Resource Planning Act established "the protection and improvement of the quality of the water supplies of the state" and "the prevention of the pollution of the water supplies of the state" as two of the State's long-range goals (Kansas Statutes Annotated 82a-903 et seq.). Recommendations on how to achieve these goals are contained in the Kansas Water Plan. The Local Environmental Protection Program (*LEPP*) was developed in response to a recommendation in the Kansas Water Plan for the development of partnerships between State and local agencies (such as county health departments or water districts) for the purpose of protecting the quality of the environment. The *LEPP* began in 1989 with the passage of a law by the Kansas Legislature that declares "the State of Kansas shall provide state environmental protection grants to local health departments or other local entities for the purpose of developing and implementing environmental protection plans and programs" (Kansas Statutes Annotated 75-5657). Local agencies are encouraged by the Kansas Department of Health and Environment (*KDHE*), through the auspices of the *LEPP*, to "establish and operate programs for the prevention and correction of sources of pollution that degrade water quality" as part of a comprehensive Local Environmental Protection Plan for "the management of pollutant sources which may effect water quality" (Kansas Department of Health and Environment, 1991).

The *KDHE* identifies two of the objectives to be included in a Local Environmental Protection Plan as development of a nonpoint-source management plan and development of a public-water-supply protection plan (Kansas Department of Health and Environment, 1991). To meet these objectives, local agencies need (1) to identify the sources of existing water supplies, (2) to define the quality of water of these sources, and (3) to delineate the areas where these sources are contaminated or

susceptible to contamination. These three tasks involve map (spatial) analysis, a type of analysis for which location is a fundamental concept. Maps show spatial relations that are interpreted easily by the user but are not visualized easily when presented in tabular form. For example, the map user can see easily what is to the north, south, east, or west of any feature on the map, the relative sizes of map features, the relative distances between map features, and the nearness to other types of map features. The spatial analysis needed to meet the objectives of the *LEPP* requires water-resource-related (site, construction, geologic, water-level, water-quality, and water-withdrawal) data that are referenced geographically (that is, tied to a specific location on the Earth's surface). Most local agencies do not have enough geographically referenced water-resource-related data to perform these spatial-analysis tasks; fortunately, large quantities of water-resource-related data, many of them geographically referenced, exist in the files of Federal, State, and county agencies, water districts, and privately owned companies. Compilation of these existing data is a logical first step in developing nonpoint-source and public-water-supply management plans as a part of the *LEPP*.

After compilation, these large quantities of existing water-resource-related data are entered into a geographic information system (*GIS*) to facilitate the management of all these data and to facilitate spatial analysis using these data. A *GIS* is a powerful, computer-based tool for the storage, organization, retrieval, manipulation, analysis, and display of map (spatial) and associated tabular data (Juracek, 1992). Computer programs in a *GIS* are used to define the spatial relations among features of computerized (digital) maps, which, in turn, make automated spatial analysis possible. Other computer programs make use of a relational data-base management system to display and manipulate associated data about the map features in tabular form. More specifically, the advantages of using a *GIS* include: (1) improved data access; (2) the ability to perform complex spatial queries; (3) the ability to access multiple data sets simultaneously; (4) more consistent, and reproducible, results (as compared to a manual solution); (5) the ability to facilitate and enhance existing analysis procedures; and (6) the potential to pursue new applications that previously were not feasible (Juracek, 1992). For example, some water-resource-related spatial-analysis tasks that a county might use a *GIS* for are: (1) delineating areas where results of water-quality analyses show that the concentrations of some constituents are larger than established health limits, (2) delineating areas that may be susceptible to nonpoint-source contamination because the soils are sandy and the depth to water is less than 20 feet, (3) determining the location and number of all old or unregulated (and, therefore, potentially abandoned) wells within 2 miles of a public-water supply well, or (4) identifying areas that lack data, allowing best use of resources available for collecting new data. These types of analyses generally are less cumbersome when a *GIS* is used than when attempted manually.

Purpose and Scope

This report describes the site, construction, geologic, water-level, water-quality, and water-withdrawal data compiled and collected for Wyandotte County in cooperation with the Wyandotte County Health Department from June 1991 through September 1992. Specifically, this report describes the type of data compiled, the sources of these data, and the size and format of the files in which these data are stored (tables 1-17 in this report). The data compiled and collected for this project are available separately as computer (digital) files and are not included in this report with the exception of the physical-property, water-level, and water-quality data collected by the U.S. Geological Survey (*USGS*) and the Wyandotte County Health Department as part of the *LEPP* activities. This compilation of existing water-resource-related data is one of several being conducted in Kansas by the *USGS* in cooperation with local agencies.

Methods of Measurement and Sample Collection

The procedures used to measure well depths and water levels and to collect water-quality and microbiological samples included in the **WYCOQW** coverage (tables 18 and 19 in the "Supplemental Data" section) follow. Well

depths and water levels were measured to the nearest 0.01 foot with a steel tape. The tape was cleaned with distilled water before each use.

To ensure that the water-quality samples from wells would be representative of aquifer conditions, samples were collected, where possible, from spigots as close to the well, before any treatment or pressure tanks, and only after enough water had been purged from the system using the pump such that the specific conductance and water temperature had stabilized. This was not possible for wells 29, 190, 302, 312, and 320; at those wells samples were collected using a Teflon[1]-bottom check-valve bailer suspended from a nylon cord. The bailer and cord were rinsed with distilled water before each use. The samples from the spring and stream (sites 416A and 999, respectively) were collected from the stream or spring outflow. All samples were placed immediately on ice.

Values of specific conductance, pH, and water temperature were determined at the time of the sampling. Specific conductance was measured using a portable conductivity meter with temperature compensation designed to express readings in microsiemens per centimeter at 25 °C. The potentiometric method was used to determine the pH value. The pH values were measured using a portable pH meter calibrated with standard buffers bracketing the expected sample pH value. Water temperature was measured using either a mercury thermometer to the nearest 0.5 °C (measurements made in September 1992) or a portable temperature meter designed to measure temperature to the nearest 0.1 °C (measurements made in December 1991).

The inorganic and organic constituents for all samples collected were analyzed by the U.S. Environmental Protection Agency laboratory in Kansas City, Kansas. The microbiological constituents were analyzed by the Board of Public Utilities (Kansas City, Kansas).

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

Acknowledgments

The data described in this report could not have been compiled or collected without the assistance of many people and agencies. The *KDHE* contributed digital data files containing water-well completion (*WWC5*) records and water-quality analyses. The Division of Water Resources (*DWR*) of the Kansas State Board of Agriculture contributed digital data files containing information about sites where water diversions are permitted. The Kansas Geological Survey (*KGS*) contributed digital data files containing geologic and water-level information collected as part of a study of glacial deposits in northeastern Kansas. The *KGS* and Breuer Drilling Company (Basehor, Kansas) allowed the author to copy selected drillers' logs from their files. John Cotter and other employees of the Wyandotte County Health Department and Deborah Hazelbeck and other employees of the U.S. Soil Conservation Service arranged for access to the sites sampled as part of the *LEPP* activities and assisted with the sampling. Renee Harding and other employees of the Board of Public Utilities (Kansas City, Kansas) arranged for and performed the microbiological analyses on the samples collected. Greg Beemont and other employees of the U.S. Environmental Protection Agency arranged for and performed the other water-quality analyses on the samples collected.

DESCRIPTION OF *GIS* FILES

The *GIS* files described in this report contain water-resource-related data for 1,633 ground- and surface-water sites in or near Wyandotte County. The types of water-resource-related data in these files include site, construction, geologic, water-level, water-quality, and water-withdrawal data. Basic site data include such types of data as location, current or past ownership, use of water, and recorded pumping rate. If the site is a well, construction (well depth, casing or screen depth, date of construction) and geologic data (including lithology encountered and aquifer from which the well is yielding water) may be included. These data, along with data about water levels (if the site is a well), water quality, and water withdrawal, can be used to assess the current conditions of water-supply sources, to identify problem areas (for example, areas with

water unsuitable for most uses or large numbers of old or unregulated wells that may have been abandoned), to identify areas lacking data (for example, areas with little or no water-level or water-quality data), to describe "baseline" conditions for future ground-water studies, and to identify trends (for example, declining water levels, decreasing water quality, or increasing water withdrawals for particular uses).

The ARC/INFO *GIS* was used to store and manage the water-resource-related data compiled and collected for the Wyandotte County Health Department by this study. The files described in this report are organized within the ARC/INFO *GIS* into digital spatial data sets (groups of interdependent files) called coverages. A coverage is a digital map that consists of an organized set of spatial and tabular files containing (1) spatial data (data about the location and shape of the map features and about their relation to other map features) and (2) attribute data (descriptive data that are generally non-spatial in nature and that are connected logically to the map features). Typically, each coverage contains data on a single theme. Themes usually are distinguished by the type of map (spatial) features (represented in the *GIS* by points, lines, or areas) or by the attribute data. For example, two coverages may both contain features that are lines, but the attribute data for the lines in one coverage identify the lines as streams whereas the attribute data for the lines in the other coverage identify the lines as roads. The seven coverages described in this report contain water-resource-related data for point features (sites) in or near Wyandotte County; most of these sites are wells. The theme that distinguishes these coverages from each other is the source of the data. Data in the coverages are what were available as of July 1991 from each agency, except for the data in the coverage of water-quality and water-level data collected by the *USGS* in cooperation with the Wyandotte County Health Department in December 1991 and September 1992 as a part of the *LEPP* activities. Locations of all sites in the compiled data were assumed to be correct and were not checked or modified, even if the sites do not plot inside the Wyandotte County boundary.

In order for the spatial data in the coverages to overlay properly when displayed, the coverages must be in the same projection and use the same measurement units. A projection is a formula used to display information from a curved surface (the Earth) onto a flat surface (a map). The Lambert Conformal Conic projection was used for the coverages discussed in this report with 33° 00' 00" north of the Equator as the first standard parallel, 45° 00' 00" north of the Equator as the second standard parallel, 98° 15' 00" west of the prime meridian as the central meridian, 36° 00' 00" north of the Equator as the latitude used for the projection's origin, and zero as the false easting and as the false northing (offsets from the projection's origin). The spatial data in the coverages are stored in meters.

Coverages

A naming convention was used for coverage names and for names of all the files in the coverages. All coverage names begin with the two-character vehicle license-tag abbreviation for Wyandotte County (WY) followed by a three- to four-character abbreviation for the source of the data. The file names in each coverage all have the five- to six-character coverage name as the root followed by a period and a three-character suffix, which is an abbreviation for the type of data stored in the file. The file-name suffixes and the number of records (that is, lines or entries) included in each of the files in each coverage are listed in table 1. The types of files are explained in a subsequent section of this report.

The coverage **WYUSGS** contains site, construction, geologic, water-level, and water-quality data available for 264 wells in Wyandotte County (fig. 1) from the *USGS*'s National Water Information System (*NWIS*), which is the official computerized archive for all water-resource-related data collected or analyzed by the *USGS*.

The coverage **WYWWC5** contains site, construction, and geologic data for 631 wells in Wyandotte County (fig. 2) that were obtained from the *KDHE*'s file of water-well completion (*WWC5*) forms. Since January 1, 1975, well drillers have been required to submit a *WWC5* form to the *KDHE* for each water well they drill.

Table 1. *Number of records in files in each coverage compiled for Wyandotte County*

[Numbers are number of records (lines or entries) for each coverage file; --, no records or file]

File-name suffix	Type of information in files	Coverage name[1]						
		WYUSGS	WYWWC5	WYHEQW	WYDWR	WYDRLG	WYCOQW	WYKGS
LOC	Site locations	264	631	10	119	167	21	385
HED	Site or header descriptions	264	631	13	119	200	21	385
CAS	Well-casing descriptions	173	343	--	--	131	--	--
GRT	Grouting descriptions	--	350	--	--	--	--	--
SCR	Well-screen descriptions	--	614	--	--	24	--	--
LTH	Lithology descriptions	73	589	--	--	244	--	385
AQF	Aquifer identifications	221	--	--	--	--	--	--
GWL	Ground-water levels	--	231	--	--	43	--	--
RWL	Recurring-water levels	1,821	--	--	--	--	10	222
SAM	Sample information	181	--	87	--	--	23	2
CON	Water-quality constituent results	4,528	--	2,645	--	--	1,443	54
BAC	Microbiological constituent results	--	--	--	--	--	22	--

Table 1. *Number of records in files in each coverage compiled for Wyandotte County*--Continued

File-name suffix	Type of information in files	Coverage name[1]						
		WYUSGS	**WYWWC5**	**WYHEQW**	**WYDWR**	**WYDRLG**	**WYCOQW**	**WYKGS**
WUD	Water withdrawals	--	--	--	119	--	--	--
NAR	Narrative descriptions	224	224	224	224	224	224	224
ATT	Attribute descriptions	100	109	61	61	99	78	88

[1] **WYUSGS**, U.S. Geological Survey's National Water Information System; **WYWWC5**, Kansas Department of Health and Environment's water-well completion file; **WYHEQW**, Kansas Department of Health and Environment's water-quality-analyses file; **WYDWR**, Division of Water Resources of the Kansas State Board of Agriculture's file of sites where water is permitted to be diverted; **WYDRLG**, well-drilling contractors' and Kansas Geological Survey's drillers'-logs files; **WYCOQW**, Wyandotte County's water-quality-analyses file; and **WYKGS**, Kansas Geological Survey's glacial-deposits-study file.

The coverage **WYHEQW** contains site and water-quality data for 8 wells, 3 public-water-supply distribution systems, 1 surface-water impoundment (lake or pond), and 1 stream in Wyandotte County (fig. 3) for which *KDHE* has collected and analyzed water-quality samples as a part of its mission to monitor the quality of the State's water supplies. The three public-water-supply distribution-system sites do not have spatial coordinates and are not shown in figure 3 because they cannot be located reliably on a map.

The coverage **WYDWR** contains site and water-withdrawal data for 92 ground-water and 27 surface-water sites where water diversions are permitted by *DWR* in Wyandotte County (fig. 4). Permits to divert water are not required for sites where the water is diverted for domestic use only.

The coverage **WYDRLG** contains site, construction, geologic, and water-level data for 200 wells in Wyandotte County that were drilled before January 1, 1975 (fig. 5). Data about these wells were compiled from the files of well-drilling contractors and the *KGS*. Thirty-three of these wells do not have spatial coordinates and are not shown in figure 5 because they cannot be located reliably on a map.

The coverage **WYCOQW** contains site, water-level, and water-quality data for 19 wells, 1 spring, and 1 stream in or near Wyandotte County at which farmstead well-site surveys were completed and at which water levels were measured or water-quality samples were collected and analyzed as a part of the *LEPP* activities (fig. 6). The samples were collected and analyzed as part of the Wyandotte County Health Department's effort to assess the quality of water in the rural parts of the county.

The coverage **WYKGS** contains site, geologic, water-level, and water-quality data collected by the *KGS* from 385 wells in Wyandotte County as part of a study of the glacial deposits in northeastern Kansas (Denne and others, 1990a and 1990b) (fig. 7).

Each coverage consists of spatial files that contain spatial data about the features in the coverage and data files that contain attribute data about the features in the coverage. Information defining the codes used in the data files are in the explanation files; the explanation files are used by all the coverages and are not part of any one coverage. The spatial files are created by the *GIS*, and the format of these files are unique to the *GIS* used. The spatial files created by the ARC/INFO *GIS* are not described in this report because their format is described in the ARC/INFO user manuals (Environmental

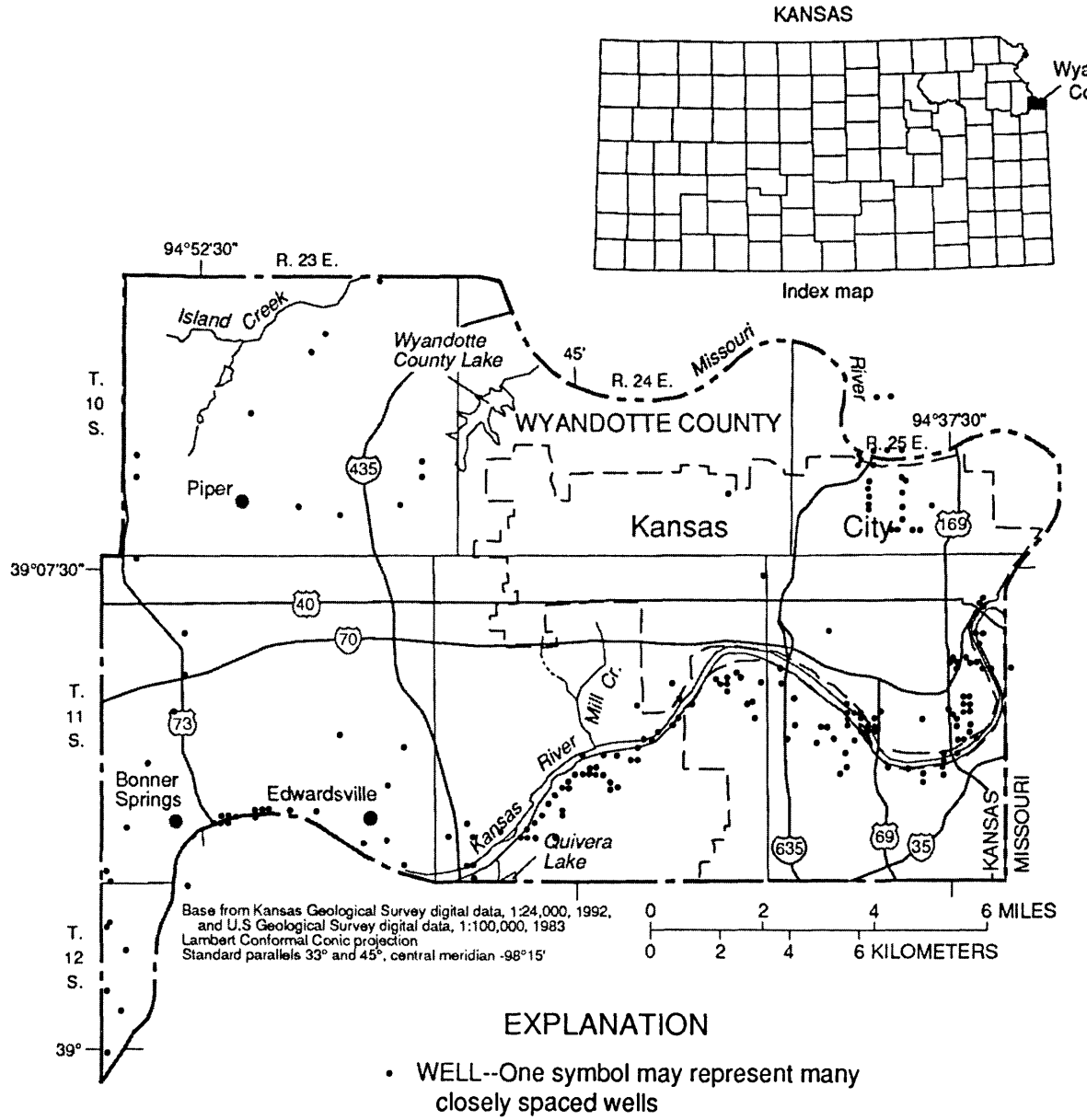

Figure 1. Location of wells in U.S. Geological Survey (**WYUSGS**) coverage.

Systems Research Institute, Inc., 1992). The information in the data and explanation files is stored in a tabular format; each column heading (field) of the tabular format is called an item, and each line in the file is called a record. Some files have a record for each site in the coverage, some may have more than one record for a particular site in the coverage, and some may not have any records for a particular site in the coverage. The item ORIG_ID is used to uniquely identify each site in a coverage and can be used to cross reference data about each site that are contained in the different files within the same coverage. The following text and tables 2-17 of this report describe the type of data and items contained in each of the coverage files.

Data Files

The data files in a coverage contain attribute data about the features in the coverage. Information about the attributes of location, well construction, lithology, aquifer identification, water level, water quality, water withdrawals, and about documentation for the coverage are contained in separate data files in each coverage. Not all coverages will have data files for all these attributes (table 1).

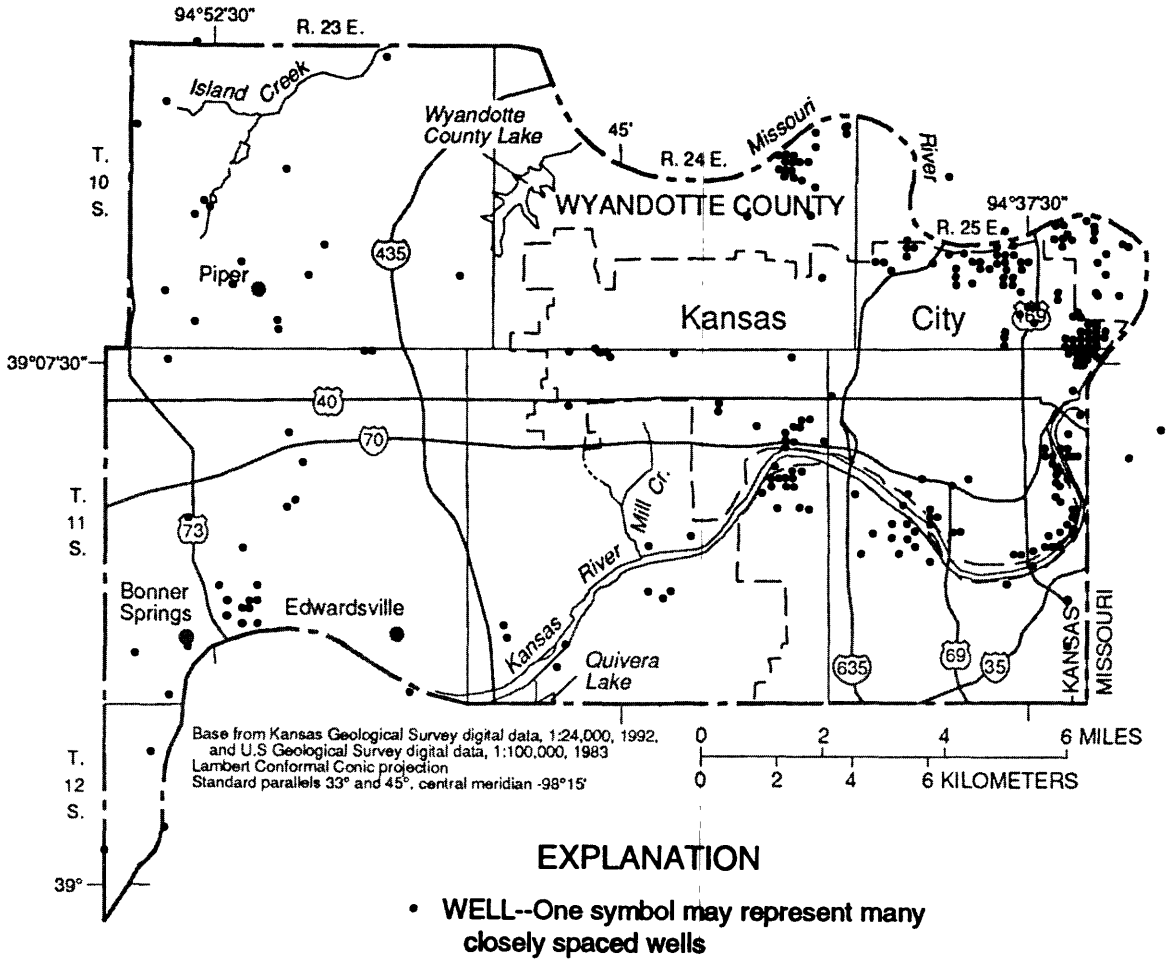

Figure 2. Location of wells in Kansas Department of Health and Environment's water-well completion (**WYWWC5**) coverage.

Files with the LOC suffix contain the item ORIG_ID and a longitude-latitude location for each site (unless spatial coordinates could not be determined for the site because it could not be located reliably on a map) (table 2). This file can be used by readers who do not have the ARC/INFO *GIS* to create a spatial file in a *GIS* or to locate these sites on a map. For the readers who do have the ARC/INFO *GIS*, the item named ORIG_ID has been added to the point-attribute table (PAT) spatial files.

Files with the HED suffix contain basic site or "header" information, such as location, ownership, and availability of other types of data in other files in the coverage. Table 3 contains descriptions of the items in the files with the HED suffix. The items TWP_RNG_SEC and QUALIFIERS described in table 3 contain the definition of each site's location using one of three site-location systems that are modifications of the U.S. Bureau of Land Management's system of land subdivision. The part of the site location contained in the item TWP_RNG_SEC uses the same definition for all three systems. The information contained in the item QUALIFIERS identifies where the site is located within the section defined in TWP_RNG_SEC; each of the three systems defines this location differently. Table 3 contains descriptions of items in the files with the HED suffix, including a more detailed

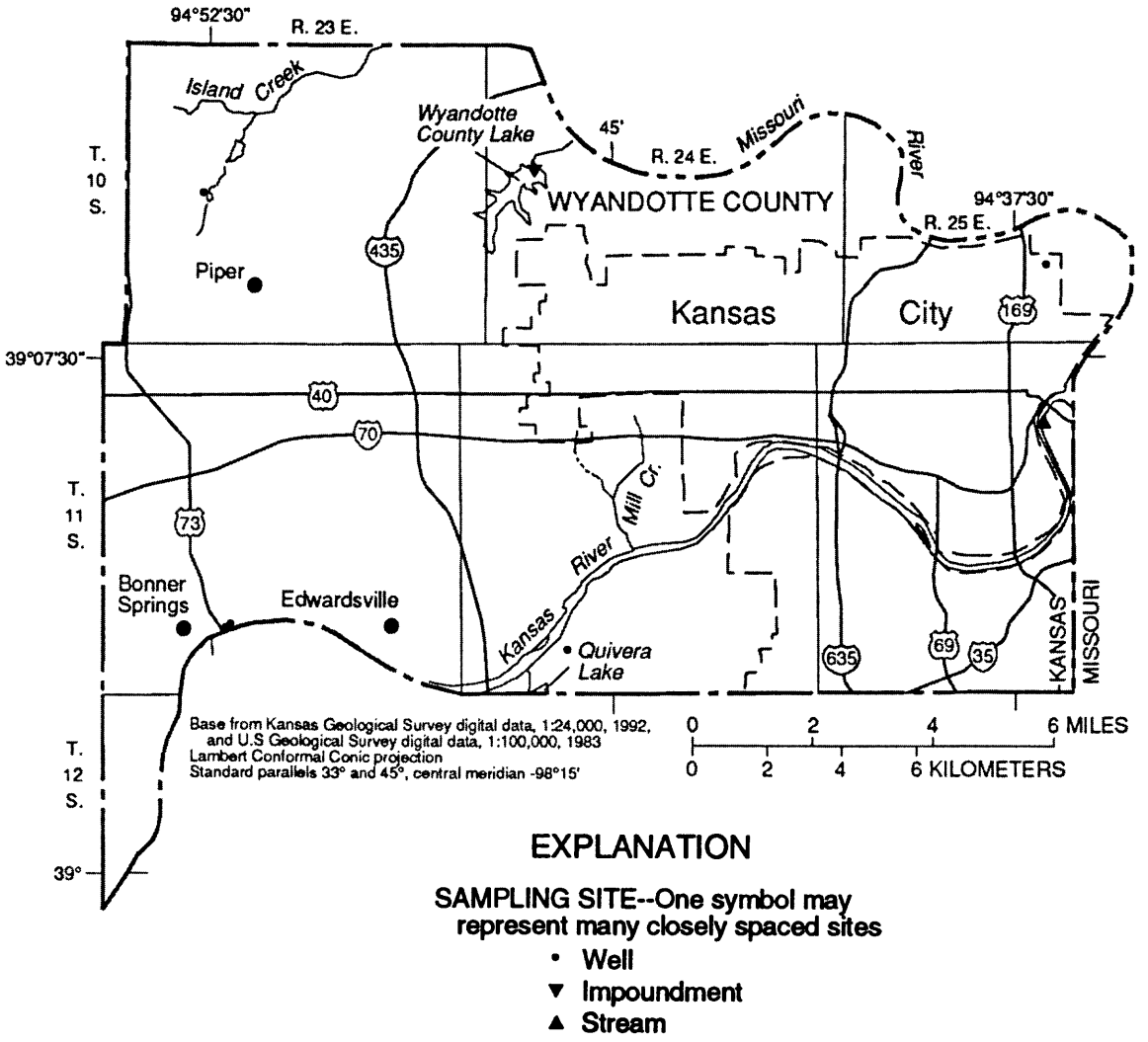

Figure 3. Location of sampling sites in Kansas Department of Health and Environment's water-quality-analyses (**WYHEQW**) coverage.

description of the three location systems. Figure 8 shows how the same site's location would be defined in each of the three systems used in the files with the HED suffix.

The files ending with CAS, GRT, or SCR contain well-construction data for the sites that are wells. The files with the CAS suffix contain data about the well casing. The file with the GRT suffix contains data about the grouting of the well. The files with the SCR suffix contain data about well screens in the well. Tables 4, 5, and 6 contain descriptions of the items in the files with the CAS, GRT, and SCR suffixes, respectively.

The files with the LTH or AQF suffixes contain geologic data about the sites that are wells. Data about the different lithologies encountered in the well are contained in the files with the LTH suffix. The file with the AQF suffix contains data about the aquifer that is the primary source of water to the well. Tables 7 and 8 contain descriptions of the items in the files ending with the LTH and AQF suffixes, respectively.

The files ending with GWL or RWL contain water-level data for the sites that are wells. Data about the different depths at which water was encountered during drilling are in files with the GWL suffix. The files with the RWL suffix

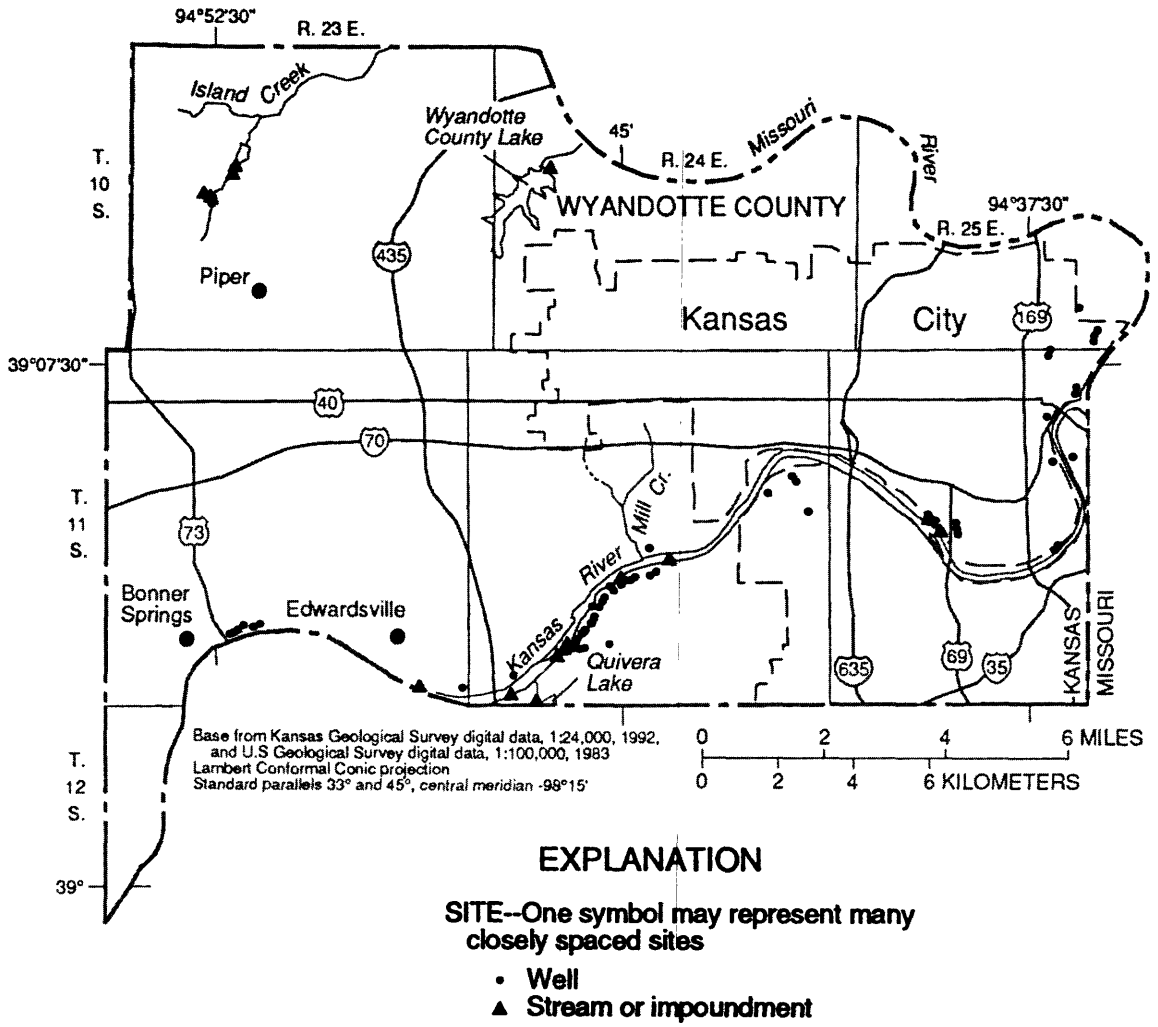

Figure 4. Location of sites in Division of Water Resources of the Kansas State Board of Agriculture's permitted-diversions (**WYDWR**) coverage.

contain data about the water levels measured in the wells at different times after the wells were completed. Tables 9 and 10 contain descriptions of the items in the files with the GWL and RWL suffixes, respectively. Water levels that were measured during September 1992 as a part of the *LEPP* activities are in the WYCOQW.RWL file and are reported in table 19 in the "Supplemental Data" section of this report; the location of these sites is shown in figure 6.

The files ending with the SAM, CON, or BAC suffixes contain data about the quality of water at the site. The files with the SAM suffix contain data about the date and time the water-quality sample was collected. The files with the CON suffix contain data about the results of the constituent measurements or analyses performed on water samples collected from the site. The file with the BAC suffix contains data about microbiological analyses performed on water samples collected from the site. Tables 11, 12, and 13 contain descriptions of the items in the files with the SAM, CON, and BAC suffixes, respectively. Results of water-quality- and microbiological-constituent analyses performed on samples collected from sites in Wyandotte County as a part of the *LEPP* activities are in the WYCOQW.SAM, WYCOQW.CON, and WYCOQW.BAC files and also are reported in tables 18 (water-quality and microbiological samples, December 1991)and 19

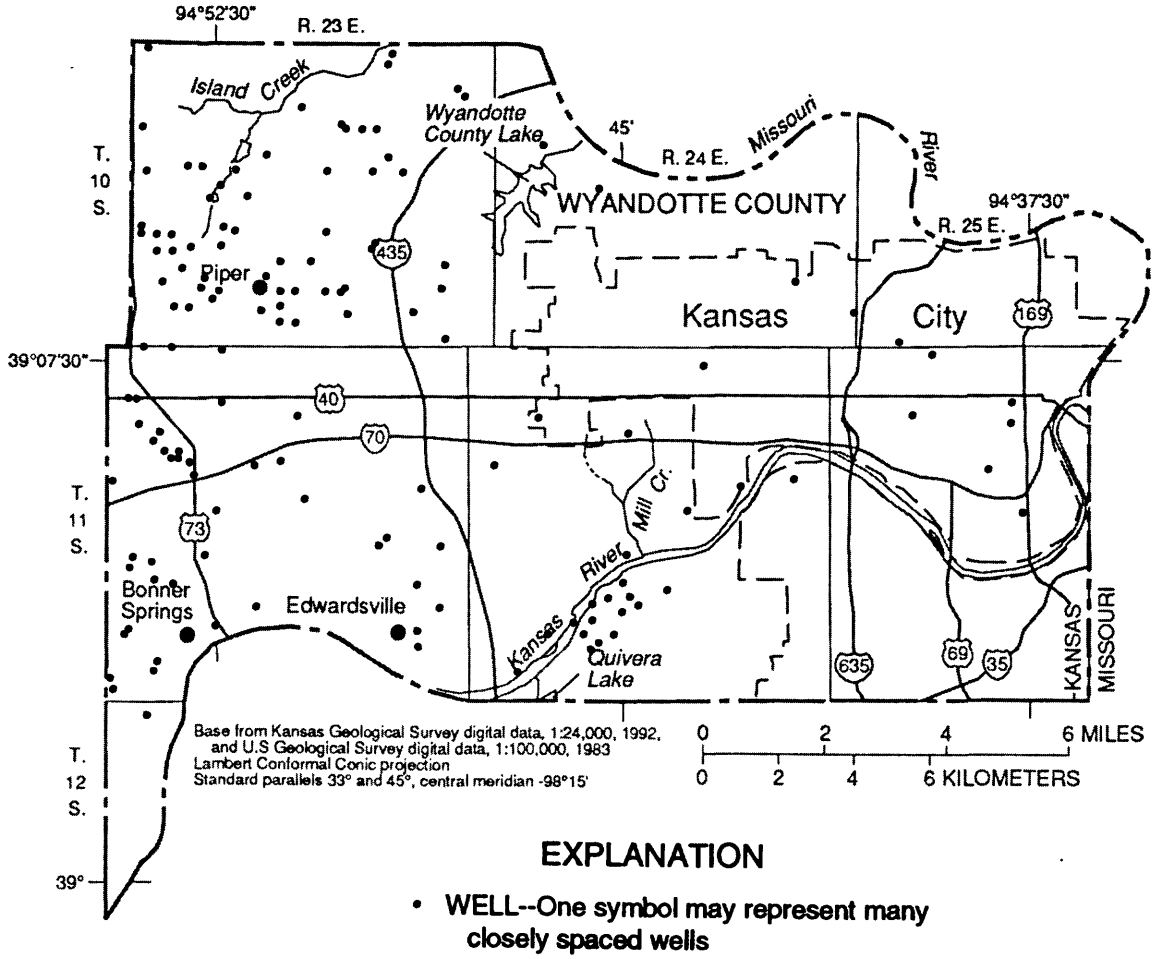

Figure 5. Location of wells in well-drilling contractors' and Kansas Geological Survey's drillers'-logs (**WYDRLG**) coverage.

(microbiological samples, September 1992) in the "Supplemental Data" section of this report; the location of these sites is shown in figure 6.

The file with the WUD suffix contains data about the volume of water withdrawn in 1990 at sites where water diversions are permitted by *DWR*. Table 14 contains descriptions of the items in the file ending with the WUD suffix.

The files with the NAR and ATT suffixes contain information documenting the coverages and the items in the coverages. The files ending with NAR contain a narrative description of the coverage. The files ending with ATT contain brief documentation for each coverage file and for each item in each of the files. Tables 15 and 16 contain descriptions of the items in the files with the NAR and ATT suffixes, respectively.

Explanation Files

The files with the DES suffix are explanation files and are used by all the coverages. All files with the DES suffix contain definitions of codes used for some of the items in the coverage files; the three- to six-character root of the names of the files ending with DES is an abbreviation of the item name or for the part of the item that contains the code in the coverage files. Tables 2-16 explain the purpose of each coded item and refer the reader to the proper file with the DES suffix. The files ending

with DES contain each individual code and its explanation. All DES files contain the same two items, CODE and DESCRIPTION, but the format of each is different and is described in table 17.

AVAILABILITY OF DIGITAL DATA

The files described in this report are available in digital form upon request from the *USGS* office in Lawrence, Kansas. The files can be provided on different media depending on the needs of the requester. The media available at this time (1993) are nine-track tapes with a density of 1,600 bytes per inch, 150 megabyte 0.25-inch cartridge tapes, or 3.5-inch diskettes. The information can be provided in either an ARC/INFO export format, in which case the binary spatial data would be included, or as ASCII files with fixed-field, fixed-length records. To obtain a copy of the files in digital form, contact the *USGS* office at 4821 Quail Crest Place, Lawrence, Kansas 66049 [telephone (913) 842-9909] and request the particular files to be copied and the medium and format desired. The requester will be charged the cost of the tape(s) or diskette(s) and the labor involved in transferring the files to the desired medium (about $100.00 in 1993).

SUMMARY

Water-resource-related data for sites in Wyandotte County were compiled and collected in cooperation with the Wyandotte County Health Department as part of the *KDHE*'s

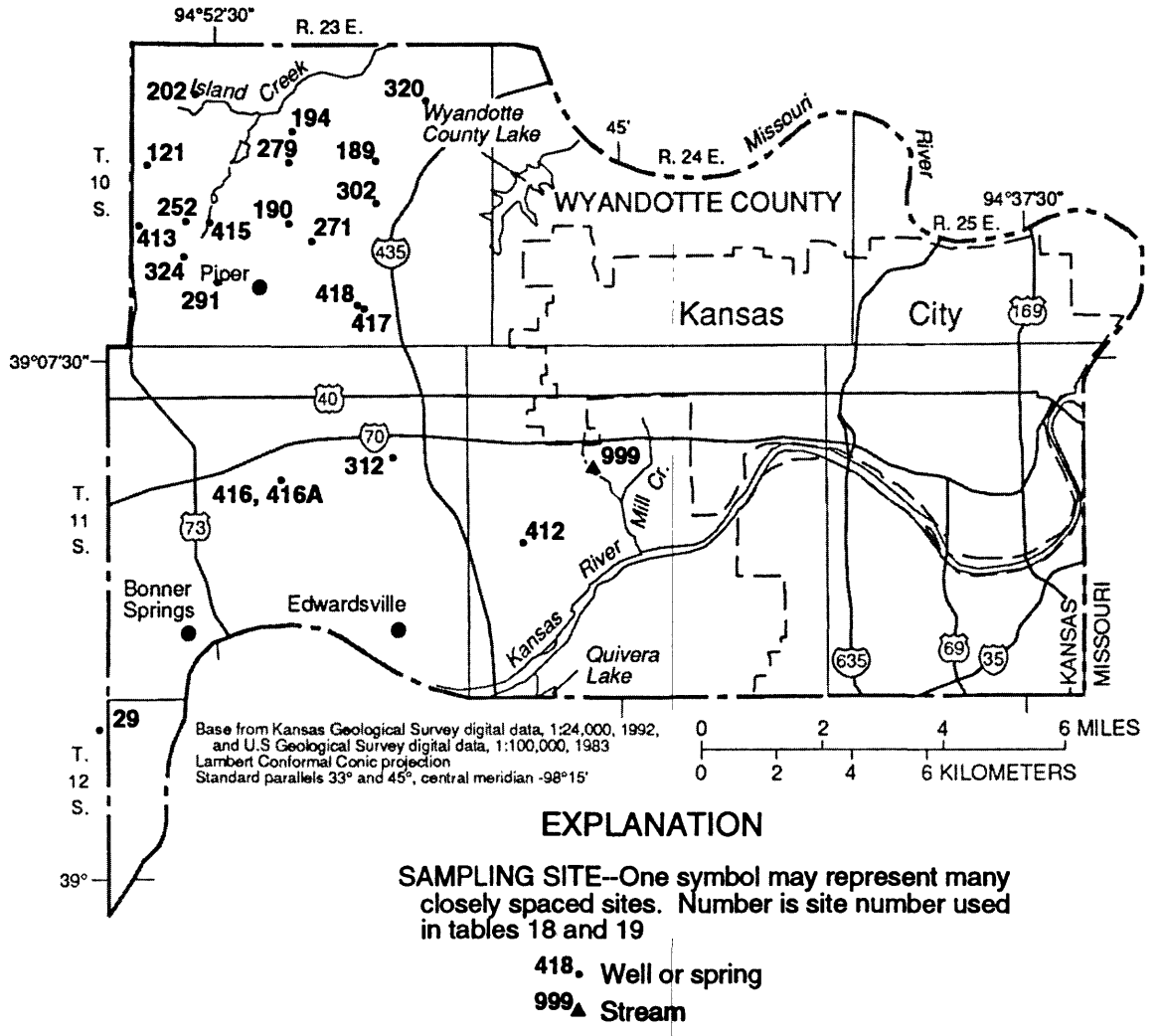

Figure 6. Location of sampling sites in Wyandotte County's water-quality-analyses (**WYCOQW**) coverage.

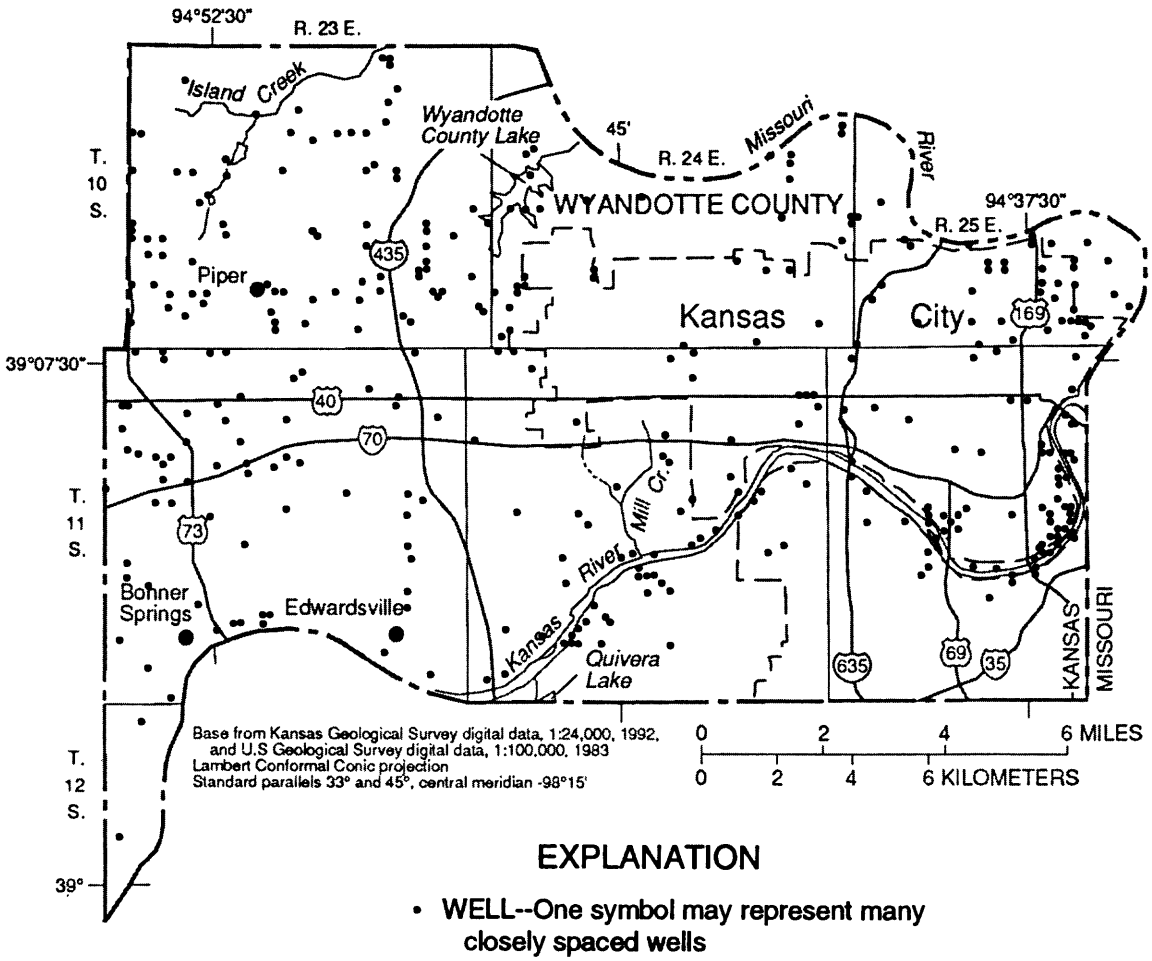

Figure 7. Location of wells in Kansas Geological Survey's glacial-deposits-study (**WYKGS**) coverage.

LEPP. These data were entered into a *GIS* to facilitate the spatial analysis required to meet the *LEPP* goals of developing plans for nonpoint-source management and for public-water-supply protection. The data in the *GIS* are organized into digital spatial data sets that are referred to as coverages. The coverage **WYUSGS** contains site, construction, geologic, water-level, and water-quality data compiled by the *USGS* for 264 wells. The coverage **WYWWC5** contains site, construction, and geologic data compiled by the *KDHE* for 631 wells. The coverage **WYHEQW** contains site and water-quality data compiled by the *KDHE* for 8 wells, 3 public-water-supply distribution systems, 1 surface-water impoundment, and 1 stream. The coverage **WYDWR** contains site and water-withdrawal data compiled by the *DWR* for 92 wells and for 27 streams or surface-water impoundments. The coverage **WYDRLG** contains site, construction, geologic, and water-level data compiled by well-drilling contractors and the *KGS* for 200 wells. The coverage **WYKGS** contains site, water-level, and water-quality data compiled by the *KGS* for 385 wells. The coverage **WYCOQW** contains site, water-level, and water-quality data collected by the *USGS* and the Wyandotte County Health Department at 19 wells, 1 spring, and 1 stream in or near Wyandotte County as a part of the *LEPP*. The data in these seven coverages are available in digital form from the *USGS* in Lawrence, Kansas.

Table 2. *Description and format of site-location (LOC) files*

Item name	Number of columns in item	Item description
ORIG_ID	5	Unique number assigned to each site in this coverage. The number is used to cross reference each site in this file to information about the same site in other files contained in this coverage. This number cannot be used to cross reference sites in files in other coverages.
LONGITUDE	15	Longitude location of site in degrees, minutes, and seconds (DDDD MM SS.SSSS). Negative longitudes are west of the prime meridian.
LATITUDE	15	Latitude location of site in degrees, minutes, and seconds (DDDD MM SS.SSSS). Positive latitudes are north of the Equator.

Table 3. *Description and format of header (HED) files*

Item name	Number of columns in item	Item description
ORIG_ID	5	Unique number assigned to each site in this coverage. The number is used to cross reference each site in this file to information about the same site in other files contained in this coverage. This number cannot be used to cross reference sites in files in other coverages.
AGENCY_IDS	56	Unique identifiers assigned by Federal and State agencies to the site. Columns 1-15 contain an identifier assigned by the U.S. Geological Survey that generally is based on the latitude and longitude of the site's location and a two-digit sequence number; columns 17-24 contain an identifier assigned by the Kansas Department of Health and Environment to water-quality sites; columns 26-36 contain an identifier assigned by the Kansas Department of Health and Environment that is based on the site's township-range-section location and a four-digit extended key (sequence number); columns 37-56 contain an identifier assigned by the Division of Water Resources of the Kansas State Board of Agriculture that is based on the site's application or vested-right code number, township-range-section and qualifiers location, and a two-digit sequence number. Columns 16 and 25 are blank.

Table 3. *Description and format of header (HED) files*--Continued

Item name	Number of columns in item	Item description
DWR_FILE_ID	9	Application or vested-right code number assigned by the Division of Water Resources of the Kansas State Board of Agriculture. If vested right, first two characters are the vehicle license-tag code for Wyandotte County (WY).
SITE_TYPE	1	Code for type of site. See code-description file SITYPE.DES for explanation of codes (table 17).
COUNTY	3	Federal Information Processing System (FIPS) code for the county name. Wyandotte County's FIPS code is 209.
TWP_RNG_SEC	7	Township, range, and section of site's location (TTRRRSS). The site's location is based on a modification of the U.S. Bureau of Land Management's system of land subdivision. The first two digits indicate the township south of the Kansas-Nebraska State line, the next two digits indicate the range followed by a character indicating if the range is east (E) or west (W) of the sixth principal meridian, and the last two digits indicate the section in which the site is located. See figure 8 for example.

Table 3. *Description and format of header (HED) files*--Continued

Item name	Number of columns in item	Item description
QUALIFIERS	8	Location of site within the section defined using one of three site-location systems (the section is defined in item TWP_RNG_SEC). System 1 is an eight-digit number in which the first four digits are the number of feet north and the last four digits are number of feet west of the southeast corner of the section. For the remaining two systems, the location of the site within the section is given in terms of progressively smaller subdivisions of the section. System 2 is a two- to eight-character code in which the two-character codes NE, NW, SE, SW, E2, N2, S2, W2, CE, CN, CS, CW, or NC are used to identify the subdivisions and the direction of these subdivisions within the section. The subdivisions represent progressively smaller areas within the section when read from right to left, with each subsequent code defining a subdivision and the subdivision's direction within the subdivision represented by the code to its right. System 3 is a one- to four-character code in which the one-character codes A, B, C, or D (equivalent to NE, NW, SW, and SE in system 2, respectively), are used to identify the subdivisions and the directions of these subdivisions within the section. The subdivisions represent progressively smaller areas within the section when read from left to right, with each subsequent code defining a subdivision and the subdivision's direction within the subdivision represented by the code to its left. See code-description file QUALFR.DES for explanation of codes (table 17). See figure 8 for examples of these three site-location systems.
PLACE_ACCURACY	1	Code for accuracy with which the site was located. See code-description file PLACC.DES for explanation of codes (table 17).

Table 3. *Description and format of header (HED) files*--Continued

Item name	Number of columns in item	Item description
ADDRESS	75	Columns 1-75 contain the address, location, or directions to site in the Kansas Department of Health and Environment's water-well completion coverage (**WYWWC5**). Columns 1-18 contain the first alias (alternate name assigned by the agency to the site), columns 21-38 contain the second alias, and columns 41-58 contain the third alias of site in the Kansas Department of Health and Environment's water-quality-analyses coverage (**WYHEQW**). Columns 1-9 contain the address code of site owner in the Division of Water Resources of the Kansas State Board of Agriculture's permitted-diversion coverage (**WYDWR**). Columns 1-40 contain the address of site or site owner in the Wyandotte County water-quality-analyses coverage (**WYCOQW**). This item is blank in the U.S. Geological Survey (**WYUSGS**) coverage and the Kansas Geological Survey glacial-deposits-study coverage (**WYKGS**). The first two characters of alias names in coverage **WYHEQW** are codes for the use of the site; see code-description file ALIBEG.DES for explanation of these codes (table 17).
OWNER	15	Name of site owner.
WELL_DEPTH	4	Depth to bottom of well, in feet below land surface.
LAND_SURFACE	4	Altitude of land surface, in feet above sea level.
STATIC_WL	4	Depth to static water level, in feet below land surface; measured at the time well construction was completed.
HOURS_PUMPED	3	Number of hours well was pumped during pump test. Test was performed at the time well construction was completed for coverage **WYWWC5**; test may have been performed at a later time for coverage **WYUSGS**. This item is blank in all other coverages.
YIELD_GPM	4	Well yield from pump test, in gallons per minute.
EST_YIELD	4	Estimated well yield, in gallons per minute; no pump test was performed.

Table 3. *Description and format of header (HED) files*--Continued

Item name	Number of columns in item	Item description
WATER_USE	2	Code for use made of water withdrawn from site. See code-description file WATUSE.DES for explanation of codes (table 17).
CONTAM_TYPE	2	Code assigned by the Kansas Department of Health and Environment identifying type of the potential source of contamination nearest the site. See code-description file CONTAM.DES for explanation of codes (table 17).
CLASS	1	Code assigned by the Kansas Department of Health and Environment identifying class of site.
COMPLET_DATE	6	Date well construction was completed (YYMMDD).
LICENSE_NO	4	Code identifying company or agency that drilled the well; see code-description file LICENS.DES for explanation of codes (table 17). Numeric codes are license numbers assigned to private well-drilling contractors by the Kansas Department of Health and Environment.
INACT_DATE	6	Date the site became inactive (YYMMDD).
STATUS	1	Code for status of site. See code-description file STATUS.DES for explanation of codes (table 17).
CASING	1	Code for availability of well-casing information for site; Y = yes, N = no. The information is in coverage files with the CAS suffix (table 4).
GROUT	1	Code for availability of grouting information for site; Y = yes, N = no. The information is in the coverage file with the GRT suffix (table 5).
SCREEN	1	Code for availability of well-screen information for site; Y = yes, N = no. The information is in coverage files with the SCR suffix (table 6).
LITHOLOGY	1	Code for availability of lithologic information for site; Y = yes, N = no. The information is in coverage files with the LTH suffix (table 7).

Table 3. *Description and format of header (HED) files*--Continued

Item name	Number of columns in item	Item description
AQUIFER	1	Code for availability of information about aquifer from which water is being extracted at site; Y = yes, N = no. The information is in the coverage file with the AQF suffix (table 8).
GWL	1	Code for availability of information about depths at which water was encountered during drilling at site; Y = yes, N = no. Information is in coverage files with the GWL suffix (table 9).
RWL	1	Code for availability of water-level information (other than static water level measured at time of well completion) at site; Y = yes, N = no. The information is in coverage files with the RWL suffix (table 10).
WATER_QUALITY	1	Code for availability of water-quality information for site; Y = yes, N = no. The information is in coverage files with SAM, CON, and BAC suffixes (tables 11, 12, and 13, respectively).
WITHDRAWAL	1	Code for availability of water-withdrawal information for site; Y = yes, N = no. The information is in the coverage file with the WUD suffix (table 14).
REMARKS	80	Miscellaneous information about the site.

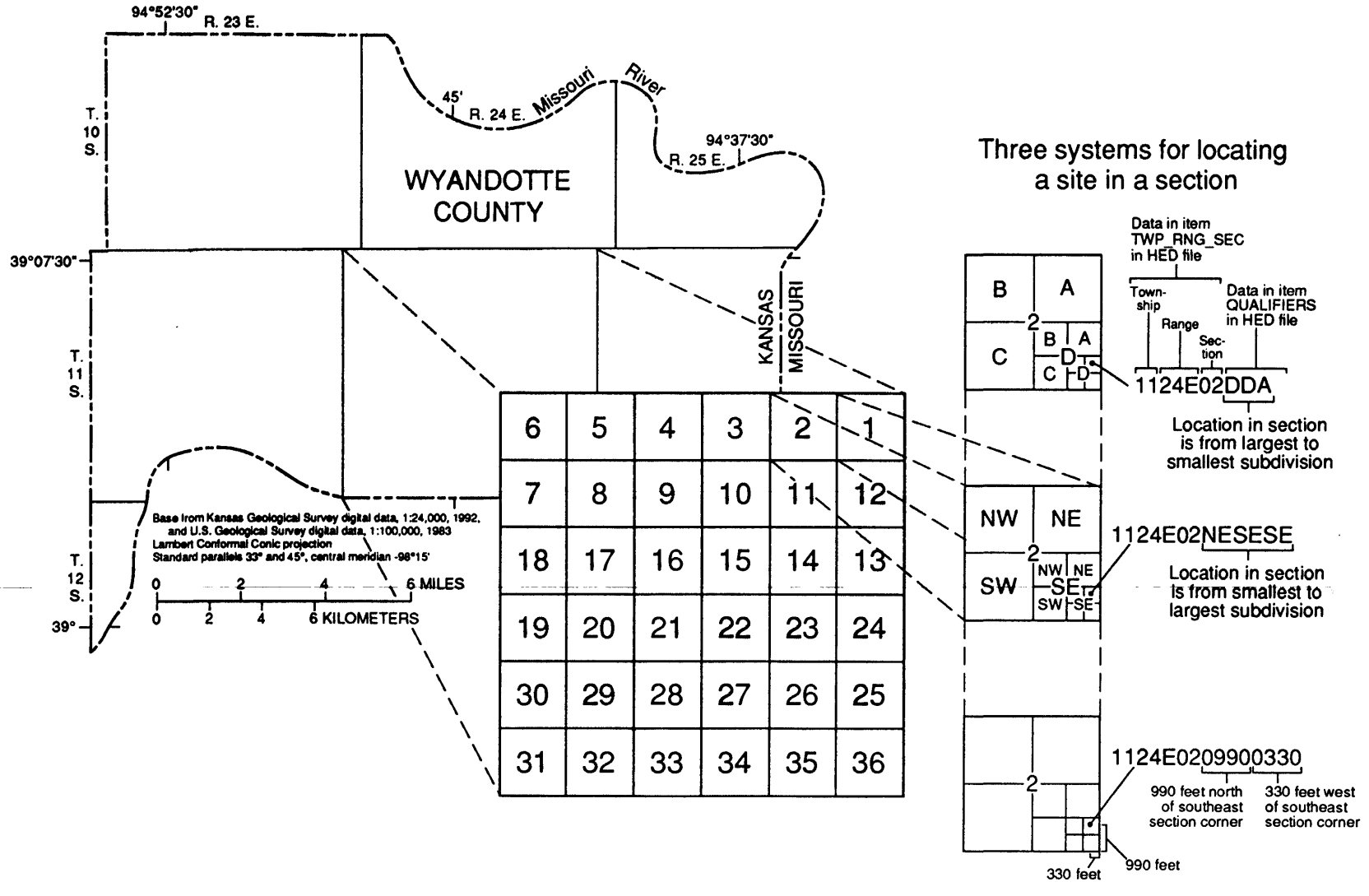

Figure 8. Site-location systems used in geographic-information-system coverages.

Table 4. *Description and format of well-casing (CAS) files*

Item name	Number of columns in item	Item description
ORIG_ID	5	Unique number assigned to each site in this coverage. The number is used to cross reference each site in this file to information about the same site in other files contained in this coverage. This number cannot be used to cross reference sites in files in other coverages.
CASING_TYPE	2	Code for material from which the well casing is made; see code-description file CASTYP.DES for explanation of codes (table 17).
CASING_DIAMETER1	2	Diameter of the first length of well casing, in inches.
CASING_FEET1	4	Length of well casing with a diameter equal to CASING_DIAMETER1, in feet.
CASING_DIAMETER2	2	Diameter of the second length of well casing, in inches.
CASING_FEET2	4	Length of well casing with a diameter equal to CASING_DIAMETER2, in feet.
CASING_DIAMETER3	2	Diameter of the third length of well casing, in inches.
CASING_FEET3	4	Length of well casing with a diameter equal to CASING_DIAMETER3, in feet.

Table 5. *Description and format of grouting (GRT) files*

Item name	Number of columns in item	Item description
ORIG_ID	5	Unique number assigned to each site in this coverage. The number is used to cross reference each site in this file to information about the same site in other files contained in this coverage. This number cannot be used to cross reference sites in files in other coverages.
GROUT_TYPE1	1	Code for material from which first type of grout used is made; see code-description file GRTTYP.DES for explanation of codes (table 17).
GROUT_TYPE2	1	Code for material from which second type of grout used is made; see code-description file GRTTYP.DES for explanation of codes (table 17).
GROUT_FROM_FT1	4	Depth to top of first grouted interval, in feet below land surface.
GROUT_TO_FT1	4	Depth to bottom of first grouted interval, in feet below land surface.
GROUT_FROM_FT2	4	Depth to top of second grouted interval, in feet below land surface.
GROUT_TO_FT2	4	Depth to bottom of second grouted interval, in feet below land surface.
GROUT_FROM_FT3	4	Depth to top of third grouted interval, in feet below land surface.
GROUT_TO_FT3	4	Depth to bottom of third grouted interval, in feet below land surface.

Table 6. *Description and format of well-screen (SCR) files*

Item name	Number of columns in item	Item description
ORIG_ID	5	Unique number assigned to each site in this coverage. The number is used to cross reference each site in this file to information about the same site in other files contained in this coverage. This number cannot be used to cross reference sites in files in other coverages.
SCREEN_TYPE	2	Code for material from which the well screen is made; see code-description file SCRTYP.DES for explanation of codes (table 17).
SCREEN_OPENING	2	Code for type of openings in well screen; see code-description file SCROP.DES for explanation of codes (table 17).
SCREEN_FROM_FT1	4	Depth to top of first screened interval, in feet below land surface.
SCREEN_TO_FT1	4	Depth to bottom of first screened interval, in feet below land surface.
SCREEN_FROM_FT2	4	Depth to top of second screened interval, in feet below land surface.
SCREEN_TO_FT2	4	Depth to bottom of second screened interval, in feet below land surface.
SCREEN_FROM_FT3	4	Depth to top of third screened interval, in feet below land surface.
SCREEN_TO_FT3	4	Depth to bottom of third screened interval, in feet below land surface.
SCREEN_FROM_FT4	4	Depth to top of fourth screened interval, in feet below land surface.
SCREEN_TO_FT4	4	Depth to bottom of fourth screened interval, in feet below land surface.

Table 7. *Description and format of lithology (LTH) files*

Item name	Number of columns in item	Item description
ORIG_ID	5	Unique number assigned to each site in this coverage. The number is used to cross reference each site in this file to information about the same site in other files contained in this coverage. This number cannot be used to cross reference sites in files in other coverages.
SEQUENCE_NO	1	Sequence number, which distinguishes multiple records for the same site when combined with ORIG_ID. Each site can have up to 27 lithologies (3 records) identified.
LITH_DEPTH1	4	Depth to bottom of first lithology encountered during drilling, in feet below land surface.
LITH_CODE1	2	Code for first lithology encountered during drilling; see code-description file LTHCOD.DES for explanation of codes (table 17).
LITH_DEPTH2	4	Depth to bottom of second lithology encountered during drilling, in feet below land surface.
LITH_CODE2	2	Code for second lithology encountered during drilling; see code-description file LTHCOD.DES for explanation of codes (table 17).
LITH_DEPTH3	4	Depth to bottom of third lithology encountered during drilling, in feet below land surface.
LITH_CODE3	2	Code for third lithology encountered during drilling; see code-description file LTHCOD.DES for explanation of codes (table 17).
LITH_DEPTH4	4	Depth to bottom of fourth lithology encountered during drilling, in feet below land surface.
LITH_CODE4	2	Code for fourth lithology encountered during drilling; see code-description file LTHCOD.DES for explanation of codes (table 17).

Table 7. *Description and format of lithology (LTH) files*--Continued

Item name	Number of columns in item	Item description
LITH_DEPTH5	4	Depth to bottom of fifth lithology encountered during drilling, in feet below land surface.
LITH_CODE5	2	Code for fifth lithology encountered during drilling; see code-description file LTHCOD.DES for explanation of codes (table 17).
LITH_DEPTH6	4	Depth to bottom of sixth lithology encountered during drilling, in feet below land surface.
LITH_CODE6	2	Code for sixth lithology encountered during drilling; see code-description file LTHCOD.DES for explanation of codes (table 17).
LITH_DEPTH7	4	Depth to bottom of seventh lithology encountered during drilling, in feet below land surface.
LITH_CODE7	2	Code for seventh lithology encountered during drilling; see code-description file LTHCOD.DES for explanation of codes (table 17).
LITH_DEPTH8	4	Depth to bottom of eighth lithology encountered during drilling, in feet below land surface.
LITH_CODE8	2	Code for eighth lithology encountered during drilling; see code-description file LTHCOD.DES for explanation of codes (table 17).
LITH_DEPTH9	4	Depth to bottom of ninth lithology encountered during drilling, in feet below land surface.
LITH_CODE9	2	Code for ninth lithology encountered during drilling; see code-description file LTHCOD.DES for explanation of codes (table 17).

Table 8. *Description and format of aquifer-identification (AQF) file*

Item name	Number of columns in item	Item description
ORIG_ID	5	Unique number assigned to each site in this coverage. The number is used to cross reference each site in this file to information about the same site in other files contained in this coverage. This number cannot be used to cross reference sites in files in other coverages.
AQUIFER	8	Code for primary aquifer from which water is being extracted at the site; see code-description file AQUIFR.DES for explanation of codes (table 17).

Table 9. *Description and format of ground-water-level (GWL) files*

Item name	Number of columns in item	Item description
ORIG_ID	5	Unique number assigned to each site in this coverage. The number is used to cross reference each site in this file to information about the same site in other files contained in this coverage. This number cannot be used to cross reference sites in files in other coverages.
DEPTH_GW1	4	Depth at which ground water was encountered for the first time during drilling, in feet below land surface.
DEPTH_GW2	4	Depth at which ground water was encountered for the second time during drilling, in feet below land surface.
DEPTH_GW3	4	Depth at which ground water was encountered for the third time during drilling, in feet below land surface.
WATER_DEPTH	4	Depth to water at site, in feet below land surface.

Table 10. *Description and format of recurring water-level (RWL) files*

Item name	Number of columns in item	Item description
ORIG_ID	5	Unique number assigned to each site in this coverage. The number is used to cross reference each site in this file to information about the same site in other files contained in this coverage. This number cannot be used to cross reference sites in files in other coverages.
WATER_LEVEL_DATE	8	Date depth to water was measured (YYYYMMDD).
WATER_LEVEL	7	Depth to water, in feet below land surface.
RWL_STATUS	1	Code for status of site at time depth to water was measured; see code-description file RWLSTA.DES for explanation of codes (table 17).
RWL_METHOD	1	Code for method used to measure depth to water; see code-description file RWLMTH.DES for explanation of codes (table 17).

Table 11. *Description and format of sample-information (SAM) files*

Item name	Number of columns in item	Item description
ORIG_ID	5	Unique number assigned to each site in this coverage. The number is used to cross reference each site in this file to information about the same site in other files contained in this coverage. This number cannot be used to cross reference sites in files in other coverages.
SAMPLE_NO	9	Unique number assigned to samples collected from a site at a particular time on a particular day. This number is used to cross reference analysis results in the CON and BAC files (tables 12 and 13, respectively) in this coverage. This number cannot be used to cross reference analysis results in CON or BAC files contained in other coverages.
DATE	8	Date sample collected (YYYYMMDD).
TIME	4	Time sample was collected (in 24-hour clock time).

Table 12. *Description and format of water-quality-constituent (CON) files*

Item name	Number of columns in item	Item description
SAMPLE_NO	9	Unique number assigned to each sample collected from a site at a particular time on a particular day. This number is used to cross reference sample data in the SAM file (table 11) in this coverage. This number cannot be used to cross reference sample data in SAM files in other coverages.
PARM_CODE	5	Code used for constituent name, reporting units, and method of analysis; see code-description file PARCOD.DES for explanation of codes (table 17). Where possible, the U.S. Environmental Protection Agency's five-digit storage and retrieval system (*STORET*) codes were assigned.
VALUE	12	Value of constituent, in units defined by PARM_CODE.
REMARK	1	Code for remarks about VALUE; see code-description file REMARK.DES for explanation of codes (table 17).

Table 13. *Description and format of microbiological-constituent (BAC) file*

Item name	Number of columns in item	Item description
SAMPLE_NO	9	Unique number assigned to each sample collected from a site at a particular time on a particular day. This number is used to cross reference sample data in the SAM file (table 11) contained in this coverage. This number cannot be used to cross reference sample data in SAM files in other coverages.
ANALYSIS_DATE	8	Date analysis was performed (YYYYMMDD).
ANALYSIS_TIME	4	Time analysis was performed (in 24-hour clock time).

Table 13. *Description and format of microbiological-constituent (BAC) file*--Continued

Item name	Number of columns in item	Item description
MF_COUNT	4	Number of coliform bacteria colonies detected per 100 milliliters of sample by the membrane filter (MF) technique and m-Endo medium. TNTC means the number of bacteria were too numerous to count (generally more than 200 colonies present). Samples with coliform bacteria detected were tested further to determine if the fecal coliform bacteria *Escheridia coli* (*E. coli*) was present. In addition, confirmation tests for the presence of coliform bacteria were performed on these samples using lauryl tryptose and brilliant green media. If large numbers of colonies were detected, this may indicate heterotrophic interference by large numbers of noncoliform (nuisance) bacteria and the sample was tested further for their presence using plate-count agar medium.
MF_REMARK	2	Code for remarks regarding MF_COUNT. NB means nuisance bacteria, and the large MF_COUNT may not be a health risk; < means fewer bacteria than the value in MF_COUNT were detected.
AGAR_COUNT	4	Number of heterotrophic bacteria colony-forming units detected using plate-count agar medium. TNTC means the number of colony-forming units were too numerous to count (generally more than 200 colony-forming units). Large numbers of heterotrophic colony-forming units may signify heterotrophic interference by noncoliform (nuisance) bacteria in the method used to determine the number of coliform bacteria colonies present in MF_COUNT.
AGAR_REMARK	2	Code for remarks regarding AGAR_COUNT. SP means spreading colonies; < means fewer bacteria than the value in AGAR_COUNT were detected.
MF+LT	1	Code for coliform bacteria detection. Blank means not tested; + means coliform bacteria detected; - means coliform bacteria not detected. Test used the lauryl tryptose media.
MF+EC	1	Code for *E. coli* detection. Blank means not tested; + means *E. coli* detected and indicates fecal contamination; - means not detected. Test used *E. coli (EC)* medium.
MF+BG	1	Code for coliform bacteria detection. Blank means not tested; + means coliform bacteria detected; - means not detected. Test used brilliant green medium.

Table 14. *Description and format of water-withdrawal (WUD) file*

Item name	Number of columns in item	Item description
ORIG_ID	5	Unique number assigned to each site in this coverage. The number is used to cross reference each site in this file to information about the same site in other files contained in this coverage. This number cannot be used to cross reference sites in files in other coverages.
REPORT_YEAR	4	Reporting year for METERED_QUANTITY and PUMP_RATE (YYYY).
HOURS_PUMPED	4	Reported number of hours the site was pumped during the reporting year. Used with PUMP_RATE to calculate the volume of water used (GWU).
PUMP_RATE	4	Reported rate of pumpage for the site, in gallons per minute.
METERED_QUANTITY	8	Reported quantity of water pumped during the year, in gallons per minute. Quantity is measured by a meter at the site.
GWU	14	Gallons of water pumped at the site during the reporting year. If METERED_QUANTITY is zero, calculations are made by the Division of Water Resources of the Kansas State Board of Agriculture based on some combination of HOURS_PUMPED, PUMP_RATE, tested rate of the pump, or the quantity of water the site is authorized to pump.
GWI	1	Code for method used to calculate GWU; see code-description file GWI.DES for explanation of codes (table 17).
REPORT_CODE	1	Code for types of data reported; see code-description file REPCOD.DES for explanation of codes (table 17).
ACRES_IRR	4	Number of acres irrigated by water pumped from the site.

Table 15. *Description and format of narrative-description (NAR) files*

Item name	Number of columns in item	Item description
TXT_NARR	80	Narrative description of the coverage and related files. The description includes sections for each of the following: abstract, keywords, applications that use the coverage data, the intended use of the data, limitations of the data, discussion of attributes, procedures used to create or automate the data, revisions made to the data, reviews applied to the data, related spatial and tabular data sets and programs, references cited, and notes.

Table 16. *Description and format of attribute-description (ATT) files*

Item name	Number of columns in item	Item description
TYPE	6	Type of data described in this record. If TYPE is TABLE, the type of data described in this record is a file; if TYPE is COLUMN, the type of data described in this record is an item in a coverage file.
FILENAME	32	Name of coverage file.
ITEMNAME	16	Name of item in coverage file; will be blank if TYPE is TABLE for this record.
ITEMWIDTH	4	Width of the item on input; will be blank if TYPE is TABLE for this record.
ITEMTYPE	1	Code for representation used to store the item values by the computer; will be blank if TYPE is TABLE for this record. See code-description file ITMTYP.DES for explanation of codes (table 17).
NUMDECIMAL	2	Number of places to the right of the decimal point; will be blank if TYPE is TABLE for this record.
SHORTDEF	80	Short definition of data stored in coverage file or in item.
DATADOMAIN	80	Type or range of values expected if TYPE is COLUMN for this record; will be blank if TYPE is TABLE for this record.
DATASOURCE	80	Source of data in the coverage file or item.
ATTACCURACY	80	Accuracy of item; will be blank if TYPE is TABLE for this record.

Table 17. *Description and format of code-description (DES) files*

DES files					Coverage files	
File name	Contains descriptions of codes for	Number of columns in item CODE	Number of columns in item DESCRIP-TION	Number of records in file	Item containing code	Suffix of file containing coded item
ALIBEG.DES	Use of site	2	40	23	ADDRESS	HED
AQUIFR.DES	Aquifer name	8	115	25	AQUIFER	AQF
CASTYP.DES	Well-casing material	2	40	22	CASING_TYPE	CAS
CONTAM.DES	Site's nearest potential source of contamination	2	40	16	CONTAM_TYPE	HED
GRTTYP.DES	Grouting material	2	40	9	GROUT_TYPE1-2	GRT
GWI.DES	Method used to calculate quantity of water withdrawn	1	160	4	GWI	WUD
ITMTYP.DES	Representation of items stored	1	80	6	ITEMTYPE	ATT
LICENS.DES	Company or agency that drilled well	4	144	199	LICENSE_NO	HED
LTHCOD.DES	Lithology	2	60	36	LITH_CODE1-9	LTH
PARCOD.DES	Water-quality constituent	5	80	340	PARM_CODE	CON
PLACC.DES	Accuracy of site's location	1	80	12	PLACE_ACCURACY	HED
QUALFR.DES	Location of site in section	2	40	13	QUALIFIERS	HED

Table 17. *Description and format of code-description (DES) files*--Continued

DES files					Coverage files	
File name	Contains descriptions of codes for	Number of columns in item CODE	Number of columns in item DESCRIP-TION	Number of records in file	Item containing code	Suffix of file containing coded item
REMARK.DES	Remark about value of water-quality constituent	1	80	8	REMARK	CON
REPCOD.DES	Type of data reported	1	80	4	REPORT_CODE	WUD
RWLMTH.DES	Method used to measure depth to water	1	40	14	RWL_METHOD	RWL
RWLSTA.DES	Site status at time of water-level measurement	1	80	17	RWL_STATUS	RWL
SCROP.DES	Type of well-screen openings	2	40	21	SCREEN_OPENING	SCR
SCRTYP.DES	Well-screen material	2	40	22	SCREEN_TYPE	SCR
SITYPE.DES	Type of site	1	20	23	SITE_TYPE	HED
STATUS.DES	Status of site	1	40	8	STATUS	HED
WATUSE.DES	Use of water	2	40	45	WATER_USE	HED

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SUPPLEMENTAL DATA

Table 18. *Physical-property and water-quality data collected from sampling sites, December 1991*

[µS/cm, microsiemens per centimeter at 25 degrees Celsius; mg/L, milligrams per liter; µg/L, micrograms per liter; cfu/mL, colony-forming units per milliliter; <, constituent concentration less than the indicated constituent detection level; --, not analyzed; **, drinking-water regulation not available; *, indicates value is less than the reporting level; TNTC, bacteria colonies too numerous to count; NB, bacteria is nuisance (not coliform) bacteria; +, constituent detected; -, constituent not detected. Drinking-water regulations shown are the lower of those promulgated by State or Federal agencies. Physical properties analyzed by U.S. Geological Survey; values are in units and significant figures reported by that agency. Inorganic and organic constituents analyzed by U.S. Environmental Protection Agency; values are in units and significant figures reported by that agency. Microbiological constituents analyzed by Board of Public Utilities (Kansas City, Kansas); constituent values are in units and significant figures reported by that agency]

Type of data	Unit of measurement	Site number (fig. 6)												Drinking-water regulation
		121	189	194	[1]194	202	271	291	412	413	415	416	416A	999	
Physical properties															
Specific conductance, field	µS/cm	513	729	553	553	594	409	510	2,270	673	393	604	--	--	[2]1,500
pH, field	Standard units	7.2	7.0	7.3	7.3	6.9	6.8	6.9	8.2	7.1	7.0	7.4	--	--	[3]6.5-8.5
Water temperature, field	Degrees Celsius	14.0	14.0	13.5	13.5	13.0	15.5	15.5	14.0	14.0	12.0	13.5	--	--	**
Inorganic constituents															
Major ions															
Calcium, total	mg/L as Ca	75.9	113	72.4	73.0	95.9	57.0	77.1	5.18	105	52.6	84.0	--	100	[2]75-200
Magnesium, total	mg/L as Mg	9.13	16.9	15.5	15.5	13.0	7.72	9.73	< 2.00	10.1	6.37	13.6	--	7.59	[2]50-150
Sodium, total	mg/L as Na	18.6	16.5	21.4	21.7	18.8	12.1	21.7	490	19.2	19.9	22.4	--	64.4	[2]100
Potassium, total	mg/L as K	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	2.54	< 2.00	< 2.00	< 2.00	--	3.48	[2]100
Nutrients															
Nitrogen, nitrate, total	mg/L as N	6.06	549	< .04	< .04	.64	6.84	3.07	< .04	18.00	4.82	2.41	--	1.13	[4]10
Nitrogen, ammonia, total	mg/L as N	< .04	< .04	.22	.23	< .04	< .04	< .04	.60	< .04	< .04	< .04	--	< .04	[2].1
Nitrogen, ammonia plus organic, total	mg/L as N	.32	< .04	.27	.23	< .04	.06	.10	.78	.08	< .04	.41	--	1.08	**
Phosphorus, total	mg/L as P	.059	.035	.158	.066	< .010	.107	< .010	.042	.024	.097	.029	--	.213	[2]5.0
Phosphorus, orthophosphate, total	mg/L as P	.037	.011	< .002	< .002	< .002	.113	.014	< .002	.029	.102	< .002	--	.116	**

Table 18. *Physical-property and water-quality data collected from sampling sites, December 1991*--Continued

Type of data	Unit of measurement	Site number (fig. 6)													Drinking-water regulation
		121	189	194	[1]194	202	271	291	412	413	415	416	416A	999	
Inorganic constituents--Continued															
Metals															
Aluminum, total	µg/L as Al	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	54.6	< 50.0	59.5	--	3,390	[5]50-200
Antimony, total	µg/L as Sb	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	--	< 50.0	**
Arsenic, total	µg/L as As	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	--	< 50.0	[4]50
Barium, total	µg/L as Ba	197	198	135	124	154	111	137	414	294	129	68.1	--	191	[4]1,000
Beryllium, total	µg/L as Be	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	< 2.00	--	< 2.00	**
Cadmium, total	µg/L as Cd	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	--	< 1.00	[6]5
Chromium, total	µg/L as Cr	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	--	< 10.0	[4]50
Cobalt, total	µg/L as Co	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	--	< 10.0	**
Copper, total	µg/L as Cu	< 10.0	<10.0	< 10.0	< 10.0	36.6	42.6	<10.0	< 10.0	16.8	15.0	42.0	--	< 10.0	[3]1,000
Iron, total	µg/L as Fe	< 50.0	190	5,910	3,310	281	< 50.0	88.5	128	208	863	250	--	2,880	[3]300
Lead, total	µg/L as Pb	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	< 5.00	6.00	< 5.00	< 5.00	<5.00	< 5.00	--	5.00	[4]50
Manganese, total	µg/L as Mn	2.51	48.5	35.0	34.2	4.72	<2.00	< 2.00	11.4	4.34	4.20	7.92	--	70.00	[3]50
Mercury, total	µg/L as Hg	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	[4]2
Molybdenum, total	µg/L as Mo	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	--	< 10.0	**
Nickel, total	µg/L as Ni	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	--	< 20.0	**
Selenium, total	µg/L as Se	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	--	< 50.0	[4]10
Silver, total	µg/L as Ag	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	--	< 10.0	[4]50
Thallium, total	µg/L as Tl	< 300	< 300	< 300	< 300	< 300	< 300	< 300	< 300	< 300	< 300	< 300	--	< 300	**
Titanium, total	µg/L as Ti	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	< 50.0	--	59.5	**
Vanadium, total	µg/L as V	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	--	< 10.0	**
Zinc, total	µg/L as Zn	42.6	< 20.0	32.5	22.5	25.5	< 20.0	253	246	23.1	2,420	90.6	--	74.5	[3]5,000

Table 18. *Physical-property and water-quality data collected from sampling sites, December 1991*--Continued

Type of data	Unit of measurement	Site number (fig. 6)													Drinking-water regulation
		121	189	194	[1]194	202	271	291	412	413	415	416	416A	999	
Organic constituents															
Pesticides															
Aldrin, total	µg/L	< 0.004	<0.004	<0.004	<0.004	<0.004	< 0.004	<0.004	<0.004	<0.004	<0.004	<0.004	--	<0.004	[7]0.25
Aroclor 1016 pcb, total	µg/L	< .35	< .35	< .35	< .35	< .35	< .35	< .35	< .35	< .35	< .35	< .35	--	< .35	[8].5
Aroclor 1221 pcb, total	µg/L	< .3	< .3	< .3	< .3	< .3	< .3	< .3	< .3	< .3	< .3	< .3	--	< .3	[8].5
Aroclor 1232 pcb, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	[8].5
Aroclor 1242 pcb, total	µg/L	< .095	< .095	< .095	< .095	< .095	< .095	< .095	< .095	< .095	< .095	< .095	--	< .095	[8].5
Aroclor 1248 pcb, total	µg/L	< .14	< .14	< .14	< .14	< .14	< .14	< .14	< .14	< .14	< .14	< .14	--	< .14	[8].5
Aroclor 1254 pcb, total	µg/L	* .044	* .066	* .10	* .085	* .044	* .11	* .13	* .20	* .13	* .10	* .044	--	* .33	[8].5
Aroclor 1260 pcb, total	µg/L	< .062	< .062	< .062	< .062	< .062	< .062	< .062	< .062	< .062	< .062	< .062	--	< .062	[8].5
Atrazine, total	µg/L	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	--	< 1.5	[6]3
α-Benzene hexachloride, total	µg/L	< .004	< .004	< .004	< .004	< .004	< .004	< .004	< .004	< .004	< .004	< .004	--	< .004	**
β-Benzene hexachloride, total	µg/L	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	< .005	--	< .005	**
δ-Benzene hexachloride, total	µg/L	< .008	< .008	< .008	< .008	< .008	< .008	< .008	< .008	< .008	< .008	< .008	--	< .008	**
Chlordane, total	µg/L	< .014	< .014	< .014	< .014	< .014	< .014	< .014	<.014	< .014	< .014	< .014	--	< .014	[7].56
p,p' DDD, total	µg/L	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	--	< .06	**
p,p' DDE, total	µg/L	< .006	< .006	< .006	< .006	< .006	< .006	< .006	< .006	< .006	< .006	< .006	--	< .006	**
p,p' DDT, total	µg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	--	< .01	[9].83
Dieldrin, total	µg/L	< .006	< .006	< .006	< .006	< .006	< .006	< .006	< .006	< .006	< .006	< .006	--	< .006	[7].038
Endosulfan I, total	µg/L	< .009	< .009	< .009	< .009	< .009	< .009	< .009	< .009	< .009	< .009	< .009	--	< .009	**

Table 18. *Physical-property and water-quality data collected from sampling sites, December 1991*--Continued

Type of data	Unit of measurement	Site number (fig. 6)												Drinking-water regulation
		121	189	194	[1]194	202	271	291	412	413	415	416	416A	999	
Organic constituents--Continued															
Pesticides--Continued															
Endosulfan sulfate, total	µg/L	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	--	<0.007	**
Endosulfan β, total	µg/L	<.065	<.065	<.065	<.065	<.065	<.065	<.065	<.065	<.065	<.065	<.065	--	<.065	**
Endrin, total	µg/L	<.016	<.016	<.016	<.016	<.016	<.016	<.016	<.016	<.016	<.016	<.016	--	<.016	[4].2
Endrin aldehyde, total	µg/L	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004	--	<.004	**
Heptachlor, total	µg/L	<.009	<.009	<.009	<.009	<.009	<.009	<.009	<.009	<.009	<.009	<.009	--	<.009	[6].4
Heptachlor epoxide, total	µg/L	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004	<.004	--	<.004	[6].2
Lindane, total	µg/L	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	<.005	--	<.005	[6].2
Toxaphene, total	µg/L	<.51	<.51	<.51	<.51	<.51	<.51	<.51	<.51	<.51	<.51	<.51	--	<.51	[6].3
Other organic constituents															
cis-Acetylene dichloride, total	µg/L	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	--	<.01	[6]70
trans-Acetylene dichloride, total	µg/L	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	<.01	--	<.01	[10]+
Benzene, total	µg/L	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04	<.04	--	<.04	[10].67
Bromobenzene, total	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	--	<5.0	**
Bromochloromethane, total	µg/L	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	<.1	--	<.1	**
Bromoform, total	µg/L	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	<.5	--	<.5	[11]100
n-Butylbenzene, total	µg/L	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	--	<.05	**
sec-Butylbenzene, total	µg/L	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	<.05	--	<.05	**

Table 18. *Physical-property and water-quality data collected from sampling sites, December 1991*--Continued

Type of data	Unit of measurement	Site number (fig. 6)													Drinking-water regulation
		121	189	194	[1]194	202	271	291	412	413	415	416	416A	999	
Other organic constituents--Continued															
tert-Butylbenzene, total	µg/L	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	--	< 0.03	**
Carbon tetrachloride, total	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	--	< 0.1	[10]0.27
Chlorobenzene, total	µg/L	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	--	< .02	[10]+
Chlorodibromo-, methane, total	µg/L	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	--	< .5	[11]100
Chloroform, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	.5	--	< .1	[11]100
o-Chlorotoluene, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	**
p-Chlorotoluene, total	µg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	--	< .01	**
Cumene, total	µg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	--	< .01	**
p-Cymene, total	µg/L	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	--	< .03	**
1,2-Dibromo-3-chloro-propane, total	µg/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	--	< 3.0	[6].2
m-Dichlorobenzene, total	µg/L	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	--	< .02	[6]600
o-Dichlorobenzene, total	µg/L	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	--	< .02	[6]600
p-Dichlorobenzene, total	µg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	--	< .01	[6]75
Dichlorobromomethane, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	[11]100
Dichlorodifluoro-methane, total	µg/L	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	< 3.0	--	< 3.0	**

Table 18. *Physical-property and water-quality data collected from sampling sites, December 1991*--Continued

Type of data	Unit of measurement	Site number (fig. 6)													Drinking-water regulation
		121	189	194	[1]194	202	271	291	412	413	415	416	416A	999	
Other organic constituents--Continued															
1,3-Dichloropropane, total	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	--	< 0.1	**
2,2-Dichloropropane, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	**
1,1-Dichloropropene, total	µg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	--	< .01	**
cis-1,3-Dichloropropene, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	[10]+
trans-1,3-Dichloropropene, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	[10]+
Ethylbenzene, total	µg/L	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	--	< .02	[10]+
Ethyl chloride, total	µg/L	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	< .2	--	< .2	[10]+
Ethylene dibromide, total	µg/L	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	--	< .5	[6].05
Ethylene dichloride, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	-	- < .1	[10].7
Ethylidene chloride, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	[10]+
Hexachlorobutadiene, total	µg/L	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	--	< .02	**
Mesitylene, total	µg/L	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	--	< .03	**
Methyl bromide, total	µg/L	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	--	< 2.0	[10]+
Methylene bromide, total	µg/L	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	< 3.6	--	< 3.6	**

Table 18. *Physical-property and water-quality data collected from sampling sites, December 1991*--Continued

Type of data	Unit of measurement	Site number (fig. 6)													Drinking-water regulation
		121	189	194	[1]194	202	271	291	412	413	415	416	416A	999	
Other organic constituents--Continued															
Methyl chloride, total	µg/L	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	--	< 2.0	[10]+
Methylene chloride, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	[10]+
Naphthalene, total	µg/L	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	--	< .06	**
n-Propylbenzene, total	µg/L	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	--	< .03	**
Propylene dichloride, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	[10]+
Pseudocumene, total	µg/L	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	--	< .03	**
Styrene, total	µg/L	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	< .05	--	< .05	[6]100
1,1,1,2-Tetrachloroethane, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	**
1,1,2,2-Tetrachloroethane, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	[10].17
Tetrachloroethylene, total	µg/L	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	< .06	--	< .06	[10]1.0
Toluene, total	µg/L	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	< .03	--	< .03	[10]3.5
1,2,3-Trichlorobenzene, total	µg/L	< .01	< .01	< .01	< .01	<.01	< .01	< .01	< .01	< .01	< .01	< .01	--	< .01	**
1,2,4-Trichlorobenzene,, total	µg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	--	< .01	**
1,1,1-Trichloroethane, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	[10]16.8

Table 18. *Physical-property and water-quality data collected from sampling sites, December 1991*--Continued

Type of data	Unit of measurement	Site number (fig. 6) 121	189	194	[1]194	202	271	291	412	413	415	416	416A	999	Drinking-water regulation
Other organic constituents--Continued															
1,1,2-Trichloroethane, total	µg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	--	< 0.1	[10]0.6
Trichloroethylene, total	µg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	--	< .01	[10]1.8
Trichlorofluoromethane, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	**
1,2,3-Trichloropropane, total	µg/L	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	< .5	--	< .5	**
Vinyl chloride, total	µg/L	< .03	< .03	< .03	< .03	< .03	< .03	< .03	.13	< .03	< .03	< .03	--	< .03	[4]1
Vinylidene chloride, total	µg/L	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	< .1	--	< .1	[10].23
Xylenes, total	µg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	--	< .01	[10]+
m- and/or *p*-Xylene, total	µg/L	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	< .01	--	< .01	[10]+
o-Xylene, total	µg/L	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	< .02	--	< .02	[10]+
Microbiological constituents															
Coliform, total, membrane filter, m-Endo media	Colonies/ 100mL	TNTC	< 1	< 1	< 1	NB/74	5	26	NB/ TNTC	< 1	NB/25	NB/ TNTC	TNTC	TNTC	[12]+
Coliform, brilliant green media		+	--	--	--	+	+	+	-	--	--	+	+	+	**
Coliform, lauryl tryptose media		+	--	--	--	+	+	+	+	--	--	+	+	+	**

Table 18. *Physical-property and water-quality data collected from sampling sites, December 1991*--Continued

Type of data	Unit of measurement	Site number (fig. 6)													Drinking-water regulation
		121	189	194	[1]194	202	271	291	412	413	415	416	416A	999	
Microbiological constituents--Continued															
E. coli, E. coli (EC) media		+	--	--	--	+	-	-	-	--	--	+	+	+	[12]+
Heterotrophic plate count, total, plate-count agar	cfu/mL	TNTC	<1	4	1	22	3	102	TNTC	15	10	TNTC	TNTC	TNTC	**

[1] Duplicate sample.

[2] Kansas suggested drinking-water limit (Kansas Department of Health and Environment, 1986).

[3] Kansas secondary drinking-water standard (SDWS); the concentrations in drinking water will affect the aesthetic properties and desirability of water for drinking and domestic uses but are not believed to have health effects (Kansas Department of Health and Environment, 1986).

[4] Kansas primary drinking-water standard (PDWS); the concentrations in drinking water could have adverse health effects (Kansas Department of Health and Environment, 1986).

[5] Federal Secondary Maximum Contaminant Level (SMCL); the concentrations in drinking water will affect the aesthetic quality of drinking water and at large concentrations, health implications also may exist (U.S. Environmental Protection Agency, 1992).

[6] Federal Maximum Contaminant Level (MCL); maximum permissible level of a contaminant in water which is delivered to any user of a public water system. These levels are established by the U.S. Environmental Protection Agency under the authority of the Safe Drinking Water Act (U.S. Environmental Protection Agency, 1992).

[7] Kansas health advisory level (HAL); the concentration in drinking water that produces no adverse health effect with lifetime consumption of the water. For known carcinogens, the HAL is based on a concentration that increases the risk of cancer by no more than one in 100,000 with lifetime consumption (Kansas Department of Health and Environment, 1986).

[8] Total of all PCB compounds not to exceed 0.5 microgram per liter (Federal Maximum Contaminant Level) (U.S. Environmental Protection Agency, 1992).

[9] Total of *p,p'* and *o,p'* DDT not to exceed 0.83 microgram per liter (Kansas HAL, Kansas Department of Health and Environment, 1986).

Table 18. *Physical-property and water-quality data collected from sampling sites, December 1991*

[10] Kansas notification level (KNL); either the concentration should produce no adverse health effect with lifetime consumption or, for carcinogens, the concentration should increase the risk of cancer by no more than one in 1,000,000 with lifetime consumption. The owner of the well is notified, the well is monitored further, and the owner may be required to notify all consumers of the contamination (Kansas Department of Health and Environment, 1986).

[11] Total of all trihalomethane compounds not to exceed 100 micrograms per liter (Kansas action level) (Kansas Department of Health and Environment, 1986).

[12] For public-water systems, no more than 5 percent of the samples per month may be positive for coliforms. For systems collecting fewer than 40 samples per month, no more than one sample per month may be positive (Federal MCL, U.S. Environmental Protection Agency, 1992). MCL is based on presence/absence of total coliforms in sample rather than on an estimate of coliform density. If sample is total coliform-positive, the culture must be analyzed to determine if fecal coliform are present, except that *E. coli* may be used in lieu of fecal coliform. If fecal coliform or *E. coli* is detected, violation of the MCL for total coliform has occurred (U.S. Environmental Protection Agency, 1989).

Table 19. *Water-level, depth-of-well, physical-property, and microbiological-constituent data collected from wells, September 1992*

[µS/cm, microsiemens per centimeter at 25 degrees Celsius; mL, milliliter; cfu/mL, colony-forming units per milliliter; --, not analyzed; **, drinking-water regulation not available; TNTC, bacteria colonies too numerous to count; +, constituent detected; -, constituent not detected. Drinking-water regulations shown are the lower of those promulgated by State or Federal agencies. Water levels, depth of wells, and physical properties analyzed by U.S. Geological Survey; values are in units and significant figures reported by that agency. Microbiological constituents analyzed by Board of Public Utilities (Kansas City, Kansas); constituent values are in units and significant figures reported by that agency]

Type of data	Unit of measurement	Site number (fig. 6)										Drinking-water regulation
		29	190	252	279	302	312	320	324	417	418	
Water level	Feet below land surface	13.9	50.4	65	32.2	9.1	4.0	31.2	7.9	32.7	38.3	**
Depth of well	Feet below land surface	32.0	55.3	78	37.5	21.6	9.2	--	93.6	51.2	76.5	**
Physical properties:												
Specific conductance, field	µS/cm	680	650	523	1,080	753	830	1,030	--	422	577	[1]1,500
Water temperature, field	Degrees Celsius	16.0	17.5	14.0	14.0	18.0	18.0	14.5	--	14.0	15.5	**
Microbiological constituents:												
Coliform, total, membrane filter, m-Endo media	Colonies/100 mL	TNTC	TNTC	TNTC	TNTC	TNTC	TNTC	390	--	TNTC	TNTC	[2]+
Coliform, brilliant green media	cfu/mL	+	+	+	+	+	+	+	--	+	+	**
Coliform, lauryl tryptose media	cfu/mL	+	+	+	+	+	+	+	--	+	+	**
E. coli, *E. coli* (EC) media	cfu/mL	+	+	+	+	+	+	+	--	-	+	[2]+
Heterotrophic plate count, total, plate-count agar	cfu/mL	TNTC	TNTC	187	TNTC	TNTC	TNTC	169	--	TNTC	TNTC	**

[1] Kansas suggested drinking-water limit (Kansas Department of Health and Environment, 1986).

[2] Federal Maximum Contaminant Level (MCL); maximum permissible level of a contaminant in water that is delivered to any user of a public-water system. These levels are established by the U.S. Environmental Protection Agency under the authority of the Safe Drinking Water Act (U.S. Environmental Protection Agency, 1992). For public-water systems, no more than 5 percent of the samples per month may be positive for coliforms. For systems collecting fewer than 40 samples per month, no more than one sample per month may be positive (U.S. Environmental Protection Agency, 1992). MCL is based on presence/absence of total coliforms in sample rather than on an estimate of coliform density. If sample is total coliform-positive, the culture must be analyzed to determine if fecal coliform are present, except that *E. coli* may be used in lieu of fecal coliform. If fecal coliform or *E. coli* is detected, violation of the MCL for total coliform has occurred (U.S. Environmental Protection Agency, 1989).

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