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Spectrographic analyses of insoluble-residue samples, Joplin 1° x 2° quadrangle, Kansas and Missouri: Drill hole nos. 22, 23, 24, 25, and 26

By

John H. Bullock, Jr.* and Helen A. Whitney*

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*U.S. Geological Survey, DFC, Box 25046, MS 973, Denver, CO 80225

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INTRODUCTION

Geochemical studies of the Joplin 1° x 2° quadrangle, Missouri and Kansas, were begun in 1983 as part of a multidisciplinary study of the quadrangle by the U.S. Geological Survey, the Missouri Division of Geology and Land Survey, and the Kansas Geological Survey. The purpose of the study was to assess the mineral resource potential of the area by integrated geologic, geochemical, and geophysical studies.

The geochemical work has been directed at the characterization of the sedimentary rocks in the quadrangle through spectrographic analyses of dilute-hydrochloric-acid insoluble-residue samples of whole rock from widely-spaced drill holes. Drill holes have been selected for study from the sample libraries of the Missouri Division of Geology and Land Survey and the Kansas Geological Survey (KGS). None of the holes are company confidential and none intersect economically significant mineralized ground.

The analytical results for drill hole no. 22 (E. Kimbell - KGS), drill hole no. 23 (#1 Rich - KGS), drill hole no. 24 (#41 - 26 G. Crocker - KGS), drill hole no. 25 (#SWD 1 W. Goff - KGS), and drill hole no. 26 (#1 Carra - KGS) are given in this report. Drill hole no. 22 is located in sec. 19, T. 24 S., R. 14 E. in Woodson County, Kansas; drill hole no. 23 is located in sec. 1, T. 24 S., R. 15 E. in Woodson County, Kansas; drill hole no. 24 is located in sec. 26, T. 34 S., R. 13 E. in Montgomery County, Kansas; drill hole 25 is located in sec. 33, T. 32 S., R. 13 E. in Montgomery County, Kansas; drill hole no. 26 is located in sec. 27, T. 34 S., R. 13 E. in Chatauqua County, Kansas (fig.1). Data for the insoluble-residue samples from drill holes 22, 23, 24, 25, and 26 are listed in tables 1, 2, 3, 4, and 5 respectively. Well name, well number, township, range, and county allow for identification and location of files at the Kansas Geological Survey.

PREPARATION AND ANALYSIS OF SAMPLES

Insoluble residues were prepared by dissolving approximately 80 grams of crushed carbonate rock in repeated applications of 1:5 hydrochloric acid until the carbonate was removed. The samples were then filtered and dried overnight at 50 °C.

The samples were pulverized to minus 140 mesh (0.105 mm) in a vertical grinder equipped with ceramic plates. Some insoluble-residue samples contained only a few milligrams of material, and these were hand ground with an agate mortar and pestle. A hand magnet was passed over the insoluble-residue samples before grinding to remove filings or chips of drill bit that might have been present.

Each sample was analyzed semiquantitatively for 31 elements using a six-step D.C.-arc optical-emission spectrographic method (Grimes and Marranzino, 1968).

The semiquantitative spectrographic values are reported as six steps per order of magnitude (1, 0.7, 0.5, 0.3, 0.2, and 0.15) and are approximate geometric midpoints of the concentration ranges. The precision is shown to be within one adjoining reporting interval on each side of the reported value 83 percent of the time and within two adjoining intervals on each side of the reported value 96 percent of the time (Motooka and Grimes, 1976).

The visual lower limits of determination for the 31 elements that were determined spectrographically for this report are as follows:

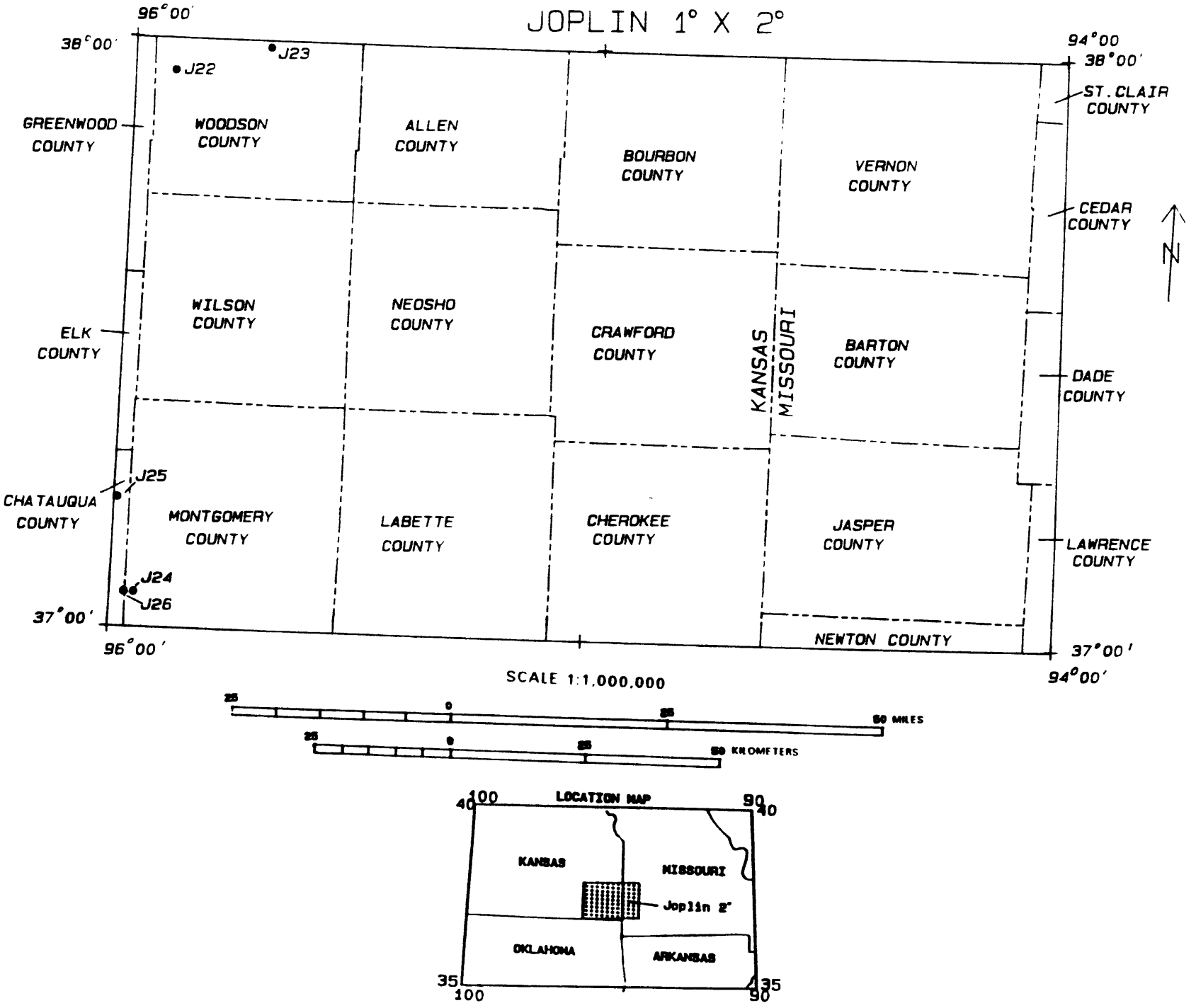

Figure 1. Locations of drill holes 22, 23, 24, 25, and 26, Joplin 1° x 2° quadrangle, Missouri and Kansas.

For those given in percent:

Calcium	0.05
Iron	0.05
Magnesium	0.02
Titanium	0.002

For those given in ppm:

Antimony	100	Molybdenum	5
Arsenic	200	Nickel	5
Barium	20	Niobium	20
Beryllium	1	Scandium	5
Bismuth	10	Silver	0.5
Boron	10	Strontium	100
Cadmium	20	Thorium	100
Chromium	10	Tin	10
Cobalt	5	Tungsten	50
Copper	5	Vanadium	10
Gold	10	Yttrium	10
Lanthanum	20	Zinc	200
Lead	10	Zirconium	10
Manganese	10		

DESCRIPTION OF DATA TABLES

Each sample is identified by an eight-character code beginning with the letter J, signifying Joplin. The next number signifies the USGS drill-hole number. The letter R appears after the drill hole number and signifies insoluble residue. The next four digits identify the depth of the sample from the drill-hole collar. Most samples are composites of approximate 10-foot intervals, dependent upon the original sample intervals and upon the amount of sample material available for analysis.

The stratigraphic unit of the sample is identified by a coded number in the last column of tables 1 through 5. The code and formation names are as follows:

Code	Formation
20	Pennsylvanian Undifferentiated
31	Chattanooga Shale
40	Mississippian Undifferentiated
56	Chattanooga - Ordovician Undifferentiated
60	Ordovician Undifferentiated
78	Cambro - Ordovician Undifferentiated
79	Arbuckle
90	Precambrian Undifferentiated

EXPLANATION OF DATA

The columns in tables 1 through 5 have headings of sample, elements, and formation. The letter S over the columns signifies emission-spectrographic data.

Iron, magnesium, calcium, and titanium are reported in weight percent (%); all other elements are in parts per million. Other symbols shown on the tables are:

N = Not detected at the limit of determination;
< = Detected, but below the limit of determination shown; and
> = Greater than the limit of determination shown.

Because of the formatting used in the computer program that produced tables 1-5, some of the elements listed in these tables (Fe, Mg, Ca, Ti, Ag, and Be) carry one or more nonsignificant zeros to the right of the significant digits. The analyst did not determine these elements to the accuracy suggested by the extra zeros.

RASS

Upon completion of all analytical work, the information from the samples is entered into a computer-based file called RASS (Rock Analysis Storage System). This RASS file contains both descriptive geological information and analytical data. Any or all of this information may be retrieved and placed in a standard form (STATPAC) for computerized statistical manipulation or publication (VanTrump and Miesch, 1977).

ACKNOWLEDGMENTS

The authors wish to thank the Kansas Geological Survey, Dr. Lee C. Gerhart, State Geologist, and their staffs, for making the drill-hole samples available from their sample libraries.

REFERENCES

Grimes, D.J., and Marranzino, A.P., 1968, Direct-current arc and alternating-current spark emission spectrographic field methods for the semiquantitative analysis of geologic materials: U.S. Geological Survey Circular 591, 6 p.

Motooka, J.M., and Grimes, D.J., 1976, Analytical precision of one-sixth order semiquantitative spectrographic analyses: U.S. Geological Survey Circular 738, 25 p.

VanTrump, George, Jr., and Miesch, A.T., 1977, The U.S. Geological Survey RASS-STATPAC system for management and statistical reduction of geochemical data: Computers and Geosciences, v. 3, p. 475-488.

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 22, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	As-ppm s	Au-ppm s
J22R1700	37 56 37	95 54 55	3	.5	<.05	.3	50	N	N	N
J22R1725	37 56 37	95 54 55	2	.5	.05	.3	30	N	N	N
J22R1740	37 56 37	95 54 55	2	.2	.05	.2	30	N	N	N
J22R1800	37 56 37	95 54 55	5	.3	.05	.3	30	N	N	N
J22R2080	37 56 37	95 54 55	5	.7	<.05	.3	50	N	N	N
J22R2110	37 56 37	95 54 55	5	.7	.05	.5	50	N	N	N

Sample	B-ppm s	Ba-ppm s	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s
J22R1700	70	100	1.0	N	N	7	70	20	30	N	<20	50
J22R1725	70	70	1.0	N	N	50	50	50	30	N	<20	70
J22R1740	70	50	N	N	N	5	30	70	N	N	<20	50
J22R1800	70	70	N	N	N	10	50	30	N	N	<20	50
J22R2080	70	300	2.0	N	N	15	50	50	N	30	<20	50
J22R2110	70	200	1.5	N	N	10	70	50	30	15	<20	50

Sample	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	Form.#
J22R1700	20	N	10	N	N	200	N	20	N	200	N	40
J22R1725	20	N	7	N	N	200	N	15	N	150	N	40
J22R1740	70	N	5	N	N	150	N	<10	N	100	N	40
J22R1800	70	N	7	N	N	150	N	10	700	100	N	40
J22R2080	50	N	15	N	N	300	N	15	N	100	N	40
J22R2110	30	N	10	N	100	200	N	15	N	100	N	56

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 23, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	As-ppm s	Au-ppm s
J23R1460	37 59 7	95 42 43	3.0	.50	<.05	.30	30	N	N	N
J23R1480	37 59 7	95 42 43	5.0	.70	<.05	.50	50	N	N	N
J23R1500	37 59 7	95 42 43	2.0	.30	<.05	.30	30	N	N	N
J23R1540	37 59 7	95 42 43	1.0	.20	<.05	.30	15	N	N	N
J23R1580	37 59 7	95 42 43	1.5	.30	<.05	.30	20	N	N	N
J23R1600	37 59 7	95 42 43	.3	.05	<.05	.05	10	N	N	N
J23R1640	37 59 7	95 42 43	.7	.10	<.05	.10	10	N	N	N
J23R1680	37 59 7	95 42 43	.7	.10	<.05	.07	10	N	N	N
J23R1730	37 59 7	95 42 43	2.0	.30	<.05	.30	50	N	N	N
J23R1770	37 59 7	95 42 43	5.0	.70	<.05	.50	50	N	N	N
J23R1800	37 59 7	95 42 43	3.0	.70	<.05	.50	50	N	N	N
J23R1830	37 59 7	95 42 43	3.0	1.50	<.05	.50	100	N	N	N
J23R1841	37 59 7	95 42 43	5.0	1.00	<.05	.30	100	N	N	N
J23R1870	37 59 7	95 42 43	3.0	1.00	<.05	.30	50	N	N	N

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 23, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	B-ppm s	Ba-ppm s	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s
J23R1460	50	300	1.5	N	N	15	70	20	30	N	<20	50
J23R1480	70	150	2.0	N	N	20	70	30	50	N	<20	70
J23R1500	50	700	N	N	N	5	30	15	N	N	<20	20
J23R1540	70	100	N	N	N	<5	30	20	N	N	N	30
J23R1580	70	50	N	N	N	5	50	10	30	N	N	20
J23R1600	50	<20	N	N	N	N	N	<5	N	N	N	10
J23R1640	50	20	N	N	N	<5	N	5	N	N	N	15
J23R1680	50	20	N	N	N	<5	N	5	N	N	N	15
J23R1730	50	50	1.5	N	N	20	100	150	N	N	N	50
J23R1770	50	70	1.0	N	N	20	100	70	N	10	N	50
J23R1800	50	70	1.5	N	N	30	100	200	30	5	N	50
J23R1830	50	200	1.5	N	N	20	100	50	20	20	N	50
J23R1841	50	200	1.5	N	N	30	70	200	N	50	N	50
J23R1870	50	150	1.0	N	N	20	100	30	20	10	N	50

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 23, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	Form.#
J23R1460	30	N	10	N	N	300	N	15	N	150	N	20
J23R1480	30	N	15	N	N	300	N	20	N	200	N	40
J23R1500	10	N	7	N	N	150	N	10	N	150	N	40
J23R1540	<10	N	5	N	N	100	N	10	N	300	N	40
J23R1580	<10	N	7	N	N	150	N	15	N	150	N	40
J23R1600	N	N	N	N	N	15	N	N	N	20	N	40
J23R1640	N	N	N	N	N	50	N	N	N	30	N	40
J23R1680	N	N	N	N	N	50	N	N	N	20	N	40
J23R1730	20	N	15	N	N	150	N	10	N	100	N	40
J23R1770	30	N	15	N	N	200	N	15	N	100	N	40
J23R1800	20	N	15	N	N	200	N	15	N	100	N	31
J23R1830	20	N	20	N	N	500	N	15	N	100	N	60
J23R1841	50	N	20	N	N	300	N	15	N	100	N	60
J23R1870	30	N	15	N	N	200	N	15	N	100	N	60

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 24, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	As-ppm s	Au-ppm s
J24R1040	37 3 37	95 56 49	3.0	1.0	<.05	.50	100	N	N	N
J24R1100	37 3 37	95 56 49	3.0	1.0	.05	.50	100	N	N	N
J24R1140	37 3 37	95 56 49	3.0	1.0	<.05	.30	200	1.0	N	N
J24R1180	37 3 37	95 56 49	5.0	.7	<.05	.30	150	5.0	N	N
J24R1220	37 3 37	95 56 49	2.0	1.0	<.05	.30	150	N	N	N
J24R1260	37 3 37	95 56 49	2.0	.7	<.05	.30	100	N	N	N
J24R1300	37 3 37	95 56 49	3.0	.7	<.05	.30	100	.7	N	N
J24R1360	37 3 37	95 56 49	2.0	.5	<.05	.30	70	N	N	N
J24R1400	37 3 37	95 56 49	2.0	.5	<.05	.30	50	N	N	N
J24R1440	37 3 37	95 56 49	2.0	.5	<.05	.50	70	N	N	N
J24R1500	37 3 37	95 56 49	2.0	.5	<.05	.50	70	N	N	N
J24R1540	37 3 37	95 56 49	1.5	.3	<.05	.20	150	N	N	N
J24R1600	37 3 37	95 56 49	1.5	.5	<.05	.20	50	N	N	N
J24R1680	37 3 37	95 56 49	3.0	.7	<.05	.30	50	N	N	N
J24R1760	37 3 37	95 56 49	2.0	.7	<.05	.30	70	N	N	N
J24R1810	37 3 37	95 56 49	5.0	.7	<.05	.30	50	N	N	N
J24R1900	37 3 37	95 56 49	2.0	.5	.05	.30	50	N	N	N
J24R1950	37 3 37	95 56 49	1.5	.5	.05	.30	20	N	N	N
J24R2000	37 3 37	95 56 49	1.5	.3	.05	.20	20	N	N	N
J24R2040	37 3 37	95 56 49	1.5	.5	<.05	.30	30	N	N	N
J24R2100	37 3 37	95 56 49	2.0	.7	<.05	.30	30	N	N	N
J24R2150	37 3 37	95 56 49	2.0	.7	<.05	.30	50	N	N	N
J24R2200	37 3 37	95 56 49	2.0	.5	<.05	.30	50	N	N	N
J24R2250	37 3 37	95 56 49	2.0	.7	<.05	.30	50	N	N	N
J24R2300	37 3 37	95 56 49	1.5	.5	<.05	.30	50	.5	N	N
J24R2350	37 3 37	95 56 49	5.0	.2	<.05	.20	100	N	N	N
J24R2400	37 3 37	95 56 49	5.0	.5	.07	.30	100	N	N	N
J24R2450	37 3 37	95 56 49	1.5	.3	.10	.15	100	N	N	N
J24R2500	37 3 37	95 56 49	2.0	.7	.15	.20	150	N	N	N
J24R2600	37 3 37	95 56 49	2.0	.5	.10	.20	150	N	N	N

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 24, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	B-ppm s	Ba-ppm s	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s
J24R1040	50	200	1.5	N	N	15	100	50	20	7	N	70
J24R1100	50	200	1.5	N	N	15	100	100	20	7	N	50
J24R1140	50	150	1.5	N	N	15	150	100	20	20	N	70
J24R1180	50	200	2.0	N	N	15	500	150	20	100	N	150
J24R1220	50	200	1.5	N	N	15	50	30	30	N	N	30
J24R1260	50	200	1.5	N	N	15	50	30	30	5	N	30
J24R1300	50	200	2.0	N	N	20	100	70	30	10	N	100
J24R1360	50	300	1.0	N	N	15	50	30	20	N	N	50
J24R1400	50	150	1.5	N	N	15	50	20	30	N	N	50
J24R1440	50	150	1.5	N	N	20	50	20	30	N	N	50
J24R1500	50	100	2.0	N	N	15	70	20	30	N	N	50
J24R1540	50	50	N	N	N	15	30	20	N	7	N	50
J24R1600	50	70	N	N	N	10	30	150	N	N	N	30
J24R1680	50	100	1.5	N	N	15	50	50	30	5	N	50
J24R1760	50	100	1.0	N	N	15	50	50	20	20	N	50
J24R1810	50	150	2.0	N	N	30	30	100	N	150	N	50
J24R1900	50	100	1.0	N	N	10	50	200	30	10	N	30
J24R1950	30	100	1.0	N	N	15	70	20	20	5	N	30
J24R2000	30	100	N	N	N	10	50	20	N	7	N	30
J24R2040	50	100	1.0	N	N	10	50	150	N	N	N	50
J24R2100	50	200	1.5	N	N	15	70	30	30	N	N	50
J24R2150	70	200	1.5	N	N	15	70	30	30	N	N	70
J24R2200	50	150	1.5	N	N	10	50	20	N	N	N	50
J24R2250	50	150	1.5	N	N	15	70	100	N	N	N	70
J24R2300	50	30	N	N	N	15	50	30	N	5	N	30
J24R2350	30	50	N	N	N	20	30	100	N	N	N	50
J24R2400	30	300	N	N	N	20	50	100	N	7	N	50
J24R2450	15	200	1.0	N	N	<5	N	10	20	N	<20	7
J24R2500	15	300	1.5	N	N	5	N	20	20	N	<20	10
J24R2600	10	300	1.5	N	N	50	N	20	N	N	N	15

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 24, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	Form.#
J24R1040	30	N	20	N	N	30	N	20	N	100	N	20
J24R1100	30	N	15	N	N	200	N	20	N	100	N	20
J24R1140	30	N	15	N	N	500	N	15	N	100	N	20
J24R1180	70	N	15	N	N	700	N	10	N	100	N	20
J24R1220	20	N	15	N	N	200	N	20	N	100	N	20
J24R1260	20	N	15	N	N	200	N	15	N	100	N	20
J24R1300	30	N	10	N	N	300	N	15	N	100	N	20
J24R1360	20	N	10	N	N	200	N	20	N	100	N	20
J24R1400	10	N	10	N	N	200	N	20	N	100	N	20
J24R1440	20	N	10	N	N	200	N	20	N	100	N	20
J24R1500	20	N	15	N	N	200	N	20	N	100	N	20
J24R1540	15	N	5	N	N	150	N	10	N	70	N	40
J24R1600	20	N	5	N	N	150	N	10	N	70	N	40
J24R1680	20	N	10	N	N	300	N	20	N	100	N	40
J24R1760	15	N	10	N	N	300	N	20	N	100	N	40
J24R1810	70	N	10	N	N	500	N	20	N	100	N	78
J24R1900	20	N	10	N	N	200	N	15	N	100	N	78
J24R1950	10	N	7	N	N	200	N	10	N	100	N	78
J24R2000	15	N	5	N	N	150	N	<10	N	70	N	78
J24R2040	15	N	10	N	N	200	N	10	N	100	N	78
J24R2100	20	N	15	N	N	200	N	15	N	200	N	78
J24R2150	30	N	10	N	N	200	N	10	N	100	N	78
J24R2200	20	N	10	N	N	200	N	10	N	100	N	78
J24R2250	20	N	10	N	N	300	N	15	N	150	N	78
J24R2300	10	N	7	N	N	150	50	10	N	150	N	78
J24R2350	50	N	5	N	N	100	100	<10	N	70	N	78
J24R2400	20	N	7	N	N	200	50	<10	N	150	N	78
J24R2450	20	N	N	N	N	70	N	20	N	100	N	78
J24R2500	30	N	5	N	N	100	N	20	N	100	N	90
J24R2600	30	N	5	N	N	150	70	15	N	100	N	90

TABLE 4--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 25, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	As-ppm s	Au-ppm s
J25R1110	37 13 13	95 59 26	3.0	.70	<.05	.30	70	N	N	N
J25R1210	37 13 13	95 59 26	3.0	1.00	<.05	.50	100	N	N	N
J25R1290	37 13 13	95 59 26	2.0	.50	.05	.20	70	5.0	N	N
J25R1410	37 13 13	95 59 26	3.0	.70	<.05	.30	70	N	N	N
J25R1530	37 13 13	95 59 26	3.0	.70	<.05	.30	70	N	N	N
J25R1650	37 13 13	95 59 26	2.0	.30	<.05	.30	30	N	N	N
J25R1720	37 13 13	95 59 26	.5	.07	<.05	.10	10	N	N	N
J25R1830	37 13 13	95 59 26	1.0	.15	.07	.15	20	N	N	N
J25R1940	37 13 13	95 59 26	1.5	.30	<.05	.20	30	N	N	N
J25R2030	37 13 13	95 59 26	5.0	1.00	<.05	.50	100	N	N	N
J25R2100	37 13 13	95 59 26	1.5	.30	.05	.20	50	N	N	N
J25R2180	37 13 13	95 59 26	1.0	.20	<.05	.10	20	N	N	N
J25R2240	37 13 13	95 59 26	1.0	.15	<.05	.15	15	N	N	N
J25R2280	37 13 13	95 59 26	1.5	.20	<.05	.15	20	N	N	N
J25R2300	37 13 13	95 59 26	1.0	.20	<.05	.20	20	N	N	N

TABLE 4--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 25, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	B-ppm s	Ba-ppm s	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s
J25R1110	20	100	1.5	N	N	10	30	50	N	N	N	50
J25R1210	30	300	1.5	N	N	15	50	50	20	N	<20	70
J25R1290	50	150	1.5	N	N	10	200	150	N	50	N	100
J25R1410	50	150	1.5	N	N	20	70	50	20	5	N	70
J25R1530	30	150	1.5	N	N	20	70	50	N	N	N	70
J25R1650	30	100	1.0	N	N	10	50	20	N	N	N	5
J25R1720	20	20	N	N	N	N	10	5	N	N	N	20
J25R1830	30	150	N	N	N	N	15	15	N	5	N	20
J25R1940	30	100	N	N	N	N	30	20	N	7	N	30
J25R2030	50	150	2.0	N	N	20	50	50	20	50	N	50
J25R2100	30	150	N	N	N	10	30	50	N	20	N	50
J25R2180	30	70	N	N	N	5	20	20	N	50	N	20
J25R2240	30	150	N	N	N	<5	20	15	N	7	N	20
J25R2280	30	100	N	N	N	<5	20	20	N	30	N	20
J25R2300	30	70	N	N	N	<5	20	15	N	10	N	15

TABLE 4--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 25, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	Form.#
J25R1110	10	N	10	N	N	200	N	10	N	150	N	20
J25R1210	15	N	15	N	N	300	N	15	N	150	N	20
J25R1290	20	N	7	N	150	700	N	N	300	70	N	20
J25R1410	15	N	15	N	N	300	N	15	200	150	N	20
J25R1530	20	N	15	N	100	300	N	10	N	150	N	20
J25R1650	15	N	7	N	N	150	N	10	N	100	N	20
J25R1720	N	N	N	N	N	30	N	N	N	30	N	40
J25R1830	20	N	N	N	N	70	N	N	500	50	N	40
J25R1940	10	N	N	N	N	100	N	<10	N	150	N	40
J25R2030	20	N	10	N	N	500	N	20	N	100	N	31
J25R2100	15	N	N	N	N	100	N	N	500	100	N	60
J25R2180	10	N	N	N	N	70	N	N	N	50	N	60
J25R2240	<10	N	N	N	N	70	N	N	N	50	N	60
J25R2280	15	N	N	N	N	100	N	N	N	50	N	60
J25R2300	<10	N	N	N	N	100	N	N	N	70	N	60

TABLE 5--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 26, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Latitude	Longitude	Fe-pct. s	Mg-pct. s	Ca-pct. s	Ti-pct. s	Mn-ppm s	Ag-ppm s	As-ppm s	Au-ppm s
J26R1620	37 3 37	95 58 0	.7	.10	<.05	.15	20	N	N	N
J26R1710	37 3 37	95 58 0	2.0	.30	<.05	.30	50	N	N	N
J26R1810	37 3 37	95 58 0	1.0	.15	<.05	.20	30	N	N	N
J26R1880	37 3 37	95 58 0	5.0	1.00	<.05	.50	70	N	N	N
J26R1940	37 3 37	95 58 0	5.0	1.00	<.05	.50	70	N	N	N
J26R2040	37 3 37	95 58 0	2.0	.50	<.05	.20	30	N	N	N
J26R2090	37 3 37	95 58 0	2.0	.50	<.05	.20	30	N	N	N
J26R2150	37 3 37	95 58 0	2.0	.50	<.05	.30	30	N	N	N
J26R2250	37 3 37	95 58 0	1.5	.20	<.05	.20	20	N	N	N
J26R2320	37 3 37	95 58 0	2.0	.50	<.05	.30	50	N	N	N
J26R2380	37 3 37	95 58 0	1.5	.30	<.05	.20	30	N	N	N
J26R2450	37 3 37	95 58 0	1.0	.20	<.05	.15	30	N	N	N
J26R2520	37 3 37	95 58 0	.3	.07	<.05	.07	10	N	N	N
J26R2590	37 3 37	95 58 0	.5	.10	<.05	.10	15	N	N	N
J26R2670	37 3 37	95 58 0	2.0	.50	<.05	.20	30	N	N	N
J26R2710	37 3 37	95 58 0	2.0	.30	<.05	.20	50	N	N	N
J26R2770	37 3 37	95 58 0	1.0	.15	<.05	.15	20	N	N	N
J26R2805	37 3 37	95 58 0	.5	.10	<.05	.10	15	N	N	N
J26R2808	37 3 37	95 58 0	1.5	.20	.05	.15	70	N	N	N

TABLE 5--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 26, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	B-ppm s	Ba-ppm s	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s
J26R1620	30	70	N	N	N	<5	20	10	N	N	N	20
J26R1710	30	100	N	N	N	10	50	100	N	5	N	50
J26R1810	30	50	N	N	N	5	30	15	N	N	N	30
J26R1880	50	200	2.0	N	N	20	70	50	50	50	N	100
J26R1940	50	200	1.5	N	N	20	70	70	30	30	N	70
J26R2040	50	100	1.0	N	N	10	50	50	20	5	N	30
J26R2090	30	100	1.0	N	N	7	50	10	20	7	N	30
J26R2150	30	150	1.0	N	N	10	50	30	20	15	N	30
J26R2250	30	50	N	N	N	30	30	20	N	7	N	50
J26R2320	30	100	N	N	N	30	50	20	N	15	N	30
J26R2380	50	70	N	N	N	N	5	15	N	5	N	20
J26R2450	20	30	N	N	N	N	5	15	N	N	N	20
J26R2520	30	30	N	N	N	N	5	5	N	N	N	10
J26R2590	20	20	N	N	N	N	5	10	N	N	N	10
J26R2670	30	150	N	N	N	7	30	20	20	5	N	30
J26R2710	50	100	N	N	N	7	30	20	20	5	N	30
J26R2770	20	300	N	N	N	N	N	10	20	N	N	5
J26R2805	10	100	N	N	N	N	N	5	N	N	N	7
J26R2808	20	700	1.0	N	N	N	N	10	N	N	N	10

TABLE 5--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 26, JOPLIN 1 x 2 QUADRANGLE, MISSOURI AND KANSAS.--Continued

Sample	Pb-ppm s	Sb-ppm s	Sc-ppm s	Sn-ppm s	Sr-ppm s	V-ppm s	W-ppm s	Y-ppm s	Zn-ppm s	Zr-ppm s	Th-ppm s	Form.#
J26R1620	<10	N	N	N	N	70	N	N	N	50	N	40
J26R1710	20	N	5	N	N	150	N	10	N	150	N	40
J26R1810	<10	N	N	N	N	100	N	N	N	100	N	40
J26R1880	50	N	20	N	N	500	N	20	N	300	N	31
J26R1940	70	N	15	N	N	500	N	15	N	200	N	79
J26R2040	20	N	7	N	N	150	N	10	N	70	N	79
J26R2090	15	N	7	N	N	150	N	10	N	100	N	79
J26R2150	30	N	7	N	N	150	N	10	N	70	N	79
J26R2250	15	N	<5	N	N	100	N	N	N	50	N	79
J26R2320	20	N	7	N	N	150	N	<10	N	70	N	79
J26R2380	10	N	5	N	N	150	N	N	N	70	N	79
J26R2450	100	N	<5	N	N	100	N	N	N	50	N	79
J26R2520	10	N	N	N	N	20	N	N	N	20	N	79
J26R2590	15	N	N	N	N	30	N	N	N	20	N	79
J26R2670	200	N	7	N	N	150	N	<10	N	70	N	79
J26R2710	300	N	5	N	N	100	N	<10	N	70	N	79
J26R2770	30	N	N	N	N	30	N	10	N	500	N	79
J26R2805	10	N	N	N	N	15	N	N	N	100	N	79
J26R2808	100	N	<5	N	N	50	N	10	N	150	N	90