

UNITED STATES DEPARTMENT OF THE INTERIOR  
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**Spectrographic analyses of insoluble-residue samples in and  
around the Joplin 1° x 2° quadrangle, Missouri and Kansas:  
Drill hole nos. 131, 132, and 133**

By

John H. Bullock, Jr.\* and Helen W. Folger\*

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Prepared in cooperation with the Kansas Geological Survey and the Missouri Division of Geology and Land Survey.

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the U.S. Geological Survey.

\*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 (MGLS) 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. 131 (#23538 - MGLS), drill hole no. 132 (#23564 - MGLS), and drill hole no. 133 (#24170 - MGLS) are given in this report. Drill hole no. 131 is located in sec. 35, T. 34 N., R. 31 W. in Vernon County, Missouri; drill hole no. 132 is located in sec. 5, T. 34 N., R. 32 W. in Vernon County, Missouri; drill hole no. 133 is located in sec. 9, T. 27 N., R. 28 W. in Lawrence County, Missouri (fig. 1). Data for the insoluble-residue samples from drill holes 131, 132, and 133 are listed in tables 1, 2, and 3 respectively. Well name, well number, township, range, and county allow for identification and location of files at the Missouri Division of Geology.

## 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:

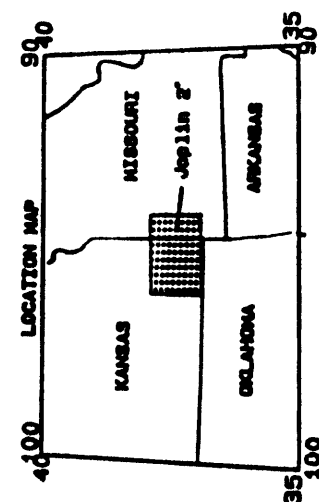
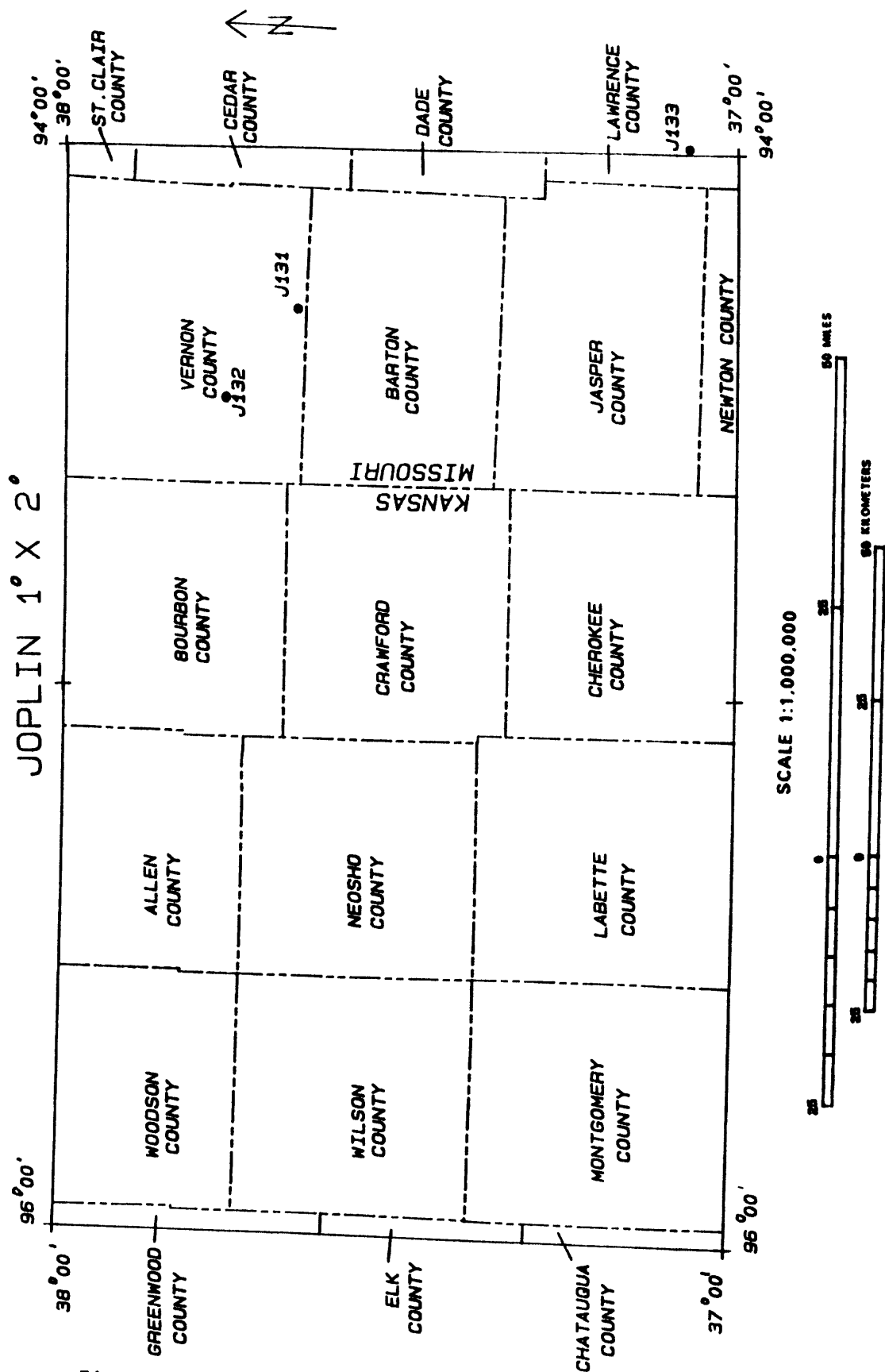


Figure 1. Locations of drill holes 131, 132, and 133, Joplin 1° x 2° quadrangle, Missouri and Kansas.

**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 three digits signify the USGS drill-hole number. The last 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 3. The code and formation names are as follows:

<b><u>Code</u></b>	<b><u>Formation</u></b>
20	Pennsylvanian Undifferentiated
40	Mississippian Undifferentiated
65	Cotter Dolomite
66	Jefferson City Dolomite
67	Roubidoux Formation

**EXPLANATION OF DATA**

The columns in tables 1 through 3 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 1-3, some of the elements listed in these tables (Fe, Mg, Ca, Ti, Ag, and Be) may 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 Missouri Division of Geology and Land Survey--Dr. Wallace B. Howe, former Director, and Dr. J. Hadley Williams, Director, and their staffs for making these drill-hole samples available from their sample library.

### REFERENCES

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- 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. 131, 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
J1310210	37 41	0	94 17 41		10.00	2.00	1.00	.500	100	N	N	N
J1310230	37 41	0	94 17 41		20.00	1.50	1.00	.300	100	<.5	N	N
J1310250	37 41	0	94 17 41		>20.00	1.50	.70	.500	200	.5	N	N
J1310270	37 41	0	94 17 41		2.00	.70	.50	.070	20	N	N	N
J1310285	37 41	0	94 17 41		.30	.30	.20	.015	<10	N	N	N
J1310295	37 41	0	94 17 41		.50	.50	.50	.020	<10	N	N	N
J1310320	37 41	0	94 17 41		.70	.20	.30	.002	10	N	N	N
J1310325	37 41	0	94 17 41		.50	.70	.50	.030	10	N	N	N
J1310340	37 41	0	94 17 41		.30	.20	.30	.005	<10	N	N	N
J1310350	37 41	0	94 17 41		.50	.30	.20	.005	N	N	N	N
J1310370	37 41	0	94 17 41		1.00	.20	.20	.020	<10	N	N	N
J1310390	37 41	0	94 17 41		.70	.30	.30	.015	<10	N	N	N
J1310410	37 41	0	94 17 41		.20	.10	.07	.015	10	N	N	N
J1310430	37 41	0	94 17 41		.20	.05	<.05	.003	N	N	N	N
J1310450	37 41	0	94 17 41		.20	.10	.10	.003	<10	N	N	N
J1310470	37 41	0	94 17 41		.15	.02	N	.005	N	N	N	N
J1310490	37 41	0	94 17 41		.07	.03	.05	.003	N	N	N	N
J1310510	37 41	0	94 17 41		.20	<.02	N	.002	N	N	N	N
J1310525	37 41	0	94 17 41		.50	.05	.07	.020	<10	N	N	N
J1310545	37 41	0	94 17 41		1.00	.02	N	.030	50	N	N	N
J1310565	37 41	0	94 17 41		15.00	2.00	.70	.300	>5,000	N	N	N
J1310580	37 41	0	94 17 41		3.00	.30	.70	.200	1,500	N	N	N
J1310605	37 41	0	94 17 41		5.00	.50	.15	.200	1,000	N	N	N
J1310625	37 41	0	94 17 41		1.50	.30	.15	.150	1,500	N	N	N
J1310645	37 41	0	94 17 41		10.00	.70	.30	.300	5,000	N	N	N
J1310665	37 41	0	94 17 41		20.00	1.50	.10	.500	2,000	N	N	N
J1310685	37 41	0	94 17 41		10.00	1.00	.10	1.000	500	<.5	N	N
J1310705	37 41	0	94 17 41		7.00	3.00	2.00	.300	30	<.5	N	N
J1310725	37 41	0	94 17 41		10.00	3.00	.70	.500	30	.5	N	N
J1310745	37 41	0	94 17 41		5.00	1.50	.50	.300	20	.5	N	N
J1310760	37 41	0	94 17 41		.07	.02	.10	.015	<10	N	N	N
J1310775	37 41	0	94 17 41		<.05	<.02	.20	.007	N	N	N	N
J1310795	37 41	0	94 17 41		1.00	.70	.10	.100	<10	N	N	N
J1310815	37 41	0	94 17 41		.30	.10	.07	.020	<10	N	N	N
J1310835	37 41	0	94 17 41		.50	.05	.05	.015	<10	N	N	N
J1310855	37 41	0	94 17 41		.50	.03	1.00	.015	<10	N	N	N
J1310875	37 41	0	94 17 41		.50	.03	.20	.020	<10	N	N	N
J1310895	37 41	0	94 17 41		15.00	1.50	.20	.500	50	<.5	N	N
J1310915	37 41	0	94 17 41		10.00	1.50	.70	.500	30	<.5	N	N
J1310930	37 41	0	94 17 41		7.00	2.00	1.50	.500	50	N	N	N

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 131, 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
J1310210	100	200	1.0	N	N	20	100	200	20	N	<20	200
J1310230	100	300	1.5	N	N	30	100	300	30	N	N	150
J1310250	150	200	3.0	N	N	30	150	100	200	<5	<20	150
J1310270	50	100	<1.0	N	N	<5	10	15	N	N	N	10
J1310285	70	50	N	N	N	N	<10	<5	N	N	N	<5
J1310295	50	70	N	N	N	N	<10	<5	N	N	N	<5
J1310320	50	50	N	N	N	N	N	<5	N	N	N	5
J1310325	50	50	N	N	N	N	N	5	N	N	N	N
J1310340	30	30	N	N	N	N	N	N	N	N	N	N
J1310350	30	50	N	N	N	N	N	N	N	N	N	N
J1310370	30	30	N	N	N	N	N	15	N	N	N	N
J1310390	30	50	N	N	N	N	N	10	N	N	N	N
J1310410	30	30	N	N	N	N	N	N	N	N	N	N
J1310430	20	30	N	N	N	N	N	N	N	N	N	N
J1310450	20	20	N	N	N	N	N	N	N	N	N	N
J1310470	N	20	N	N	N	N	N	N	N	N	N	<5
J1310490	10	20	N	N	N	N	N	N	N	N	N	<5
J1310510	N	30	N	N	N	N	N	N	N	N	N	<5
J1310525	10	30	N	N	N	N	N	<5	N	N	N	<5
J1310545	N	30	N	N	N	N	N	<5	N	N	N	<5
J1310565	70	1,000	3.0	N	N	50	100	70	20	N	N	30
J1310580	50	500	<1.0	N	N	30	30	10	20	N	N	15
J1310605	50	200	<1.0	N	N	20	20	20	20	N	N	20
J1310625	50	200	<1.0	N	N	20	10	5	20	N	N	15
J1310645	50	1,000	1.0	N	N	100	100	20	50	N	<20	30
J1310665	100	700	1.5	N	N	70	150	30	50	N	<20	50
J1310685	100	300	1.5	N	N	10	150	70	50	N	<20	30
J1310705	200	150	2.0	N	N	30	150	50	200	<5	<20	70
J1310725	200	150	2.0	N	N	30	150	50	200	N	<20	50
J1310745	150	150	1.0	N	N	20	150	70	200	N	<20	30
J1310760	20	N	N	N	N	N	N	N	N	N	N	<5
J1310775	20	20	N	N	N	N	N	<5	N	N	N	<5
J1310795	50	50	N	N	N	<5	20	7	20	N	N	10
J1310815	30	30	N	N	N	N	<10	<5	N	<5	N	<5
J1310835	30	<20	N	N	N	N	N	<5	N	<5	N	5
J1310855	30	20	N	N	N	N	N	<5	N	N	N	<5
J1310875	30	<20	N	N	N	N	N	30	N	N	N	<5
J1310895	100	300	1.0	N	N	10	100	70	200	N	N	50
J1310915	70	300	<1.0	N	N	5	100	50	50	<5	N	30
J1310930	70	300	<1.0	N	N	5	70	15	20	N	N	20



TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 131, 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 #
J1310210	20	N	10	N	N	200	N	20	200	200	N	40
J1310230	30	N	10	N	<100	100	N	30	700	200	N	40
J1310250	30	N	15	N	100	100	N	30	500	300	N	40
J1310270	N	N	N	N	100	20	N	N	N	50	N	40
J1310285	N	N	N	N	N	15	N	N	N	<10	N	40
J1310295	N	N	N	N	N	10	N	N	N	15	N	40
J1310320	N	N	N	N	N	N	N	N	N	N	N	40
J1310325	10	N	N	N	N	20	N	N	N	10	N	40
J1310340	N	N	N	N	N	N	N	N	N	N	N	40
J1310350	<10	N	N	N	N	N	N	N	N	<10	N	40
J1310370	N	N	N	N	N	10	N	N	N	<10	N	40
J1310390	N	N	N	N	N	<10	N	N	N	N	N	40
J1310410	N	N	N	N	N	N	N	N	N	N	N	40
J1310430	N	N	N	N	N	N	N	N	N	N	N	40
J1310450	N	N	N	N	N	N	N	N	N	30	N	40
J1310470	N	N	N	N	N	N	N	N	N	<10	N	40
J1310490	N	N	N	N	N	N	N	N	N	20	N	40
J1310510	N	N	N	N	N	N	N	N	N	N	N	40
J1310525	N	N	N	N	N	<10	N	N	N	70	N	40
J1310545	N	N	N	N	N	10	N	N	N	300	N	40
J1310565	10	N	15	N	100	100	N	30	<200	150	N	40
J1310580	<10	N	5	N	100	50	N	20	N	150	N	40
J1310605	10	N	5	N	100	50	N	15	N	100	N	40
J1310625	N	N	<5	N	<100	30	N	N	N	100	N	66
J1310645	30	N	7	N	<100	70	N	30	<200	150	N	66
J1310665	30	N	20	N	<100	100	N	50	300	200	N	66
J1310685	300	N	20	N	<100	70	N	30	500	150	N	66
J1310705	50	N	15	N	150	100	N	30	N	150	N	66
J1310725	30	N	20	N	100	100	N	30	200	100	N	66
J1310745	30	N	15	N	150	150	N	15	200	100	N	66
J1310760	N	N	N	N	N	N	N	N	N	N	N	66
J1310775	N	N	N	N	N	N	N	N	N	N	N	66
J1310795	N	N	<5	N	N	20	N	N	<200	50	N	67
J1310815	N	N	N	N	N	10	N	N	N	N	N	67
J1310835	N	N	N	N	N	<10	N	N	N	N	N	67
J1310855	N	N	N	N	N	<10	N	N	N	N	N	67
J1310875	N	N	N	N	N	10	N	N	N	N	N	67
J1310895	20	N	15	N	100	100	N	20	200	150	N	67
J1310915	20	N	7	N	N	70	N	30	<200	200	N	67
J1310930	10	N	7	N	N	50	N	30	<200	200	N	67

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 132, 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
J1320030	37 45 42	94 27 42	15.00	1.50	7.00	.700	3,000	N	N	N
J1320035	37 45 42	94 27 42	15.00	1.50	5.00	.500	3,000	N	N	N
J1320050	37 45 42	94 27 42	10.00	.50	1.00	.100	1,000	N	N	N
J1320070	37 45 42	94 27 42	7.00	1.50	.20	.700	1,000	<.5	N	N
J1320090	37 45 42	94 27 42	7.00	1.50	.70	.700	1,000	N	N	N
J1320110	37 45 42	94 27 42	10.00	2.00	.30	.700	700	N	N	N
J1320130	37 45 42	94 27 42	7.00	2.00	.50	.500	700	N	N	N
J1320150	37 45 42	94 27 42	5.00	1.00	1.00	.500	700	N	N	N
J1320170	37 45 42	94 27 42	10.00	.70	1.00	.300	2,000	N	N	N
J1320190	37 45 42	94 27 42	15.00	2.00	2.00	.300	5,000	N	N	N
J1320210	37 45 42	94 27 42	20.00	1.00	1.00	.500	700	N	N	N
J1320230	37 45 42	94 27 42	15.00	3.00	20.00	.200	500	N	N	N
J1320250	37 45 42	94 27 42	3.00	.70	.50	.200	20	N	N	N
J1320270	37 45 42	94 27 42	.70	.50	.50	.050	10	N	N	N
J1320290	37 45 42	94 27 42	2.00	.30	.30	.150	70	N	N	N
J1320310	37 45 42	94 27 42	2.00	.50	.20	.300	50	N	N	N
J1320325	37 45 42	94 27 42	20.00	1.00	.70	.300	1,000	.5	N	N
J1320345	37 45 42	94 27 42	.50	.02	.10	.010	10	N	N	N
J1320365	37 45 42	94 27 42	.20	<.02	.10	.002	N	N	N	N
J1320385	37 45 42	94 27 42	.05	<.02	.10	<.002	N	N	N	N
J1320400	37 45 42	94 27 42	.15	<.02	1.50	<.002	<10	N	N	N
J1320415	37 45 42	94 27 42	1.00	<.02	.10	.003	10	N	N	N
J1320435	37 45 42	94 27 42	1.00	.03	.07	<.002	N	N	N	N
J1320455	37 45 42	94 27 42	.50	.05	<.05	.007	N	N	N	N
J1320475	37 45 42	94 27 42	1.50	.03	.05	.010	10	N	N	N
J1320495	37 45 42	94 27 42	.07	.03	.20	.007	N	N	N	N
J1320515	37 45 42	94 27 42	.20	.02	.50	.007	N	N	N	N
J1320530	37 45 42	94 27 42	1.00	.03	.20	.015	<10	N	N	N
J1320550	37 45 42	94 27 42	2.00	1.00	.70	.300	15	N	N	N
J1320570	37 45 42	94 27 42	7.00	1.00	.20	.300	50	N	N	N
J1320590	37 45 42	94 27 42	5.00	1.50	2.00	.500	30	N	N	N
J1320605	37 45 42	94 27 42	7.00	.50	.50	.150	30	N	N	N
J1320620	37 45 42	94 27 42	10.00	1.00	.70	.300	50	N	N	N
J1320635	37 45 42	94 27 42	2.00	.10	N	.030	20	N	N	N
J1320650	37 45 42	94 27 42	1.00	.07	<.05	.020	<10	N	N	N
J1320670	37 45 42	94 27 42	1.00	.30	<.05	.030	10	N	N	N
J1320690	37 45 42	94 27 42	.70	.50	.05	.050	N	N	N	N
J1320710	37 45 42	94 27 42	2.00	1.00	.05	.150	10	N	N	N
J1320730	37 45 42	94 27 42	1.50	.70	<.05	.100	<10	N	N	N
J1320745	37 45 42	94 27 42	2.00	1.00	<.05	.150	10	N	N	N
J1320760	37 45 42	94 27 42	1.50	.70	.07	.100	<10	N	N	N
J1320770	37 45 42	94 27 42	1.50	.70	<.05	.100	N	N	N	N
J1320785	37 45 42	94 27 42	1.50	.50	<.05	.050	<10	N	N	N

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 132, 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
J1320030	150	500	3	N	N	70	100	50	70	<5	<20	100
J1320035	150	500	3	N	N	50	70	50	70	N	N	70
J1320050	100	150	5	N	N	10	50	20	20	N	N	30
J1320070	150	500	3	N	N	20	70	30	50	N	<20	50
J1320090	70	300	3	N	N	30	70	50	50	<5	<20	50
J1320110	50	300	2	N	N	50	50	50	30	N	<20	50
J1320130	50	500	2	N	N	50	50	30	20	N	N	50
J1320150	30	150	1	N	N	30	20	20	N	N	N	30
J1320170	15	100	1	N	N	15	20	10	20	N	N	20
J1320190	70	300	3	N	N	20	100	30	30	N	N	50
J1320210	100	500	3	N	N	30	150	50	50	N	N	70
J1320230	30	100	1	N	N	20	50	15	70	N	N	70
J1320250	50	150	<1	N	N	10	50	15	20	N	N	30
J1320270	50	50	N	N	N	<5	10	5	N	N	N	10
J1320290	70	70	<1	N	N	5	20	10	N	N	N	15
J1320310	50	70	<1	N	N	5	30	7	20	N	N	20
J1320325	50	300	2	N	N	50	70	70	30	5	N	100
J1320345	20	<20	N	N	N	N	N	N	N	5	N	<5
J1320365	15	20	N	N	N	N	N	N	N	N	N	<5
J1320385	15	20	N	N	N	N	N	N	N	N	N	<5
J1320400	10	20	N	N	N	N	N	N	N	N	N	<5
J1320415	10	500	N	N	N	N	N	<5	N	N	N	5
J1320435	30	<20	N	N	N	N	N	<5	N	N	N	5
J1320455	30	<20	N	N	N	N	N	<5	N	N	N	5
J1320475	30	<20	N	N	N	N	N	5	N	<5	N	10
J1320495	30	20	N	N	N	N	<10	N	N	N	N	<5
J1320515	30	<20	N	N	N	N	<10	<5	N	N	N	<5
J1320530	20	20	N	N	N	N	<10	10	N	N	N	5
J1320550	100	200	<1	N	N	<5	50	5	20	N	<20	7
J1320570	100	150	1	N	<20	15	70	100	N	N	N	50
J1320590	100	200	1	N	N	5	20	15	20	N	N	20
J1320605	70	50	N	N	<20	5	20	20	N	5	N	30
J1320620	100	150	1	N	N	10	50	70	N	<5	N	50
J1320635	20	30	N	N	N	5	N	10	N	N	N	20
J1320650	50	50	N	N	N	<5	N	5	N	N	N	5
J1320670	50	30	N	N	N	15	<10	7	N	N	N	15
J1320690	70	50	<1	N	N	<5	<10	5	N	N	N	5
J1320710	100	30	2	N	N	5	20	15	N	N	N	15
J1320730	70	30	1	N	N	<5	20	15	N	N	N	10
J1320745	100	50	2	N	N	5	30	20	N	N	N	20
J1320760	70	50	1	N	N	N	10	15	N	N	N	10
J1320770	50	30	<1	N	N	N	<10	10	N	N	N	7
J1320785	50	30	<1	N	N	<5	N	50	N	N	N	10

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 132, 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 #
J1320030	70	N	20	N	200	100	N	50	<200	150	N	20
J1320035	70	N	15	N	200	100	N	30	<200	100	N	20
J1320050	50	N	7	N	200	30	N	15	N	50	N	20
J1320070	20	N	15	N	150	70	N	30	<200	300	N	20
J1320090	10	N	20	N	100	50	N	50	<200	200	N	20
J1320110	15	N	20	N	100	70	N	30	N	300	N	20
J1320130	<10	N	15	N	150	50	N	30	<200	300	N	20
J1320150	10	N	10	N	<100	30	N	20	N	300	N	20
J1320170	<10	N	10	N	<100	20	N	20	200	150	N	20
J1320190	20	N	15	N	200	20	N	50	<200	70	N	20
J1320210	30	N	20	N	200	50	N	30	<200	100	N	20
J1320230	30	N	15	N	700	50	N	70	N	70	N	40
J1320250	<10	N	10	N	N	70	N	50	500	70	N	40
J1320270	N	N	N	N	N	15	N	N	N	10	N	40
J1320290	N	N	5	N	N	20	N	50	700	50	N	40
J1320310	N	N	5	N	N	30	N	20	200	70	N	40
J1320325	50	N	10	N	100	50	N	20	200	100	N	40
J1320345	N	N	N	N	N	<10	N	N	500	N	N	40
J1320365	N	N	N	N	N	<10	N	N	N	N	N	40
J1320385	N	N	N	N	N	N	N	N	N	N	N	40
J1320400	N	N	N	N	N	N	N	N	N	N	N	40
J1320415	N	N	N	N	N	<10	N	N	700	N	N	40
J1320435	N	N	N	N	N	N	N	N	<200	N	N	40
J1320455	N	N	N	N	N	N	N	N	N	N	N	40
J1320475	N	N	N	N	N	N	N	N	N	N	N	40
J1320495	N	N	N	N	N	N	N	N	N	N	N	40
J1320515	N	N	N	N	N	N	N	N	N	N	N	40
J1320530	N	N	N	N	N	N	N	N	N	10	N	40
J1320550	<10	N	<5	N	N	30	N	15	N	300	N	40
J1320570	30	N	5	N	N	100	N	15	N	150	N	40
J1320590	20	N	5	N	N	100	N	20	N	200	N	40
J1320605	N	N	<5	N	N	20	N	N	N	70	N	40
J1320620	20	N	7	N	N	50	N	10	<200	200	N	40
J1320635	N	N	N	N	N	15	N	N	N	50	N	65
J1320650	N	N	N	N	N	10	N	N	N	10	N	66
J1320670	N	N	N	N	N	15	N	N	N	10	N	66
J1320690	N	N	N	N	N	15	N	N	N	15	N	66
J1320710	N	N	5	N	N	20	N	N	N	50	N	66
J1320730	N	N	5	N	N	20	N	N	N	70	N	66
J1320745	<10	N	7	N	N	20	N	N	N	70	N	66
J1320760	N	N	N	N	N	15	N	N	N	50	N	66
J1320770	N	N	N	N	N	15	N	N	N	30	N	67
J1320785	N	N	N	N	N	10	N	N	N	30	N	67

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 133, 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
J1330050	37 4 23	94 0 21	.10	<.02	.30	.002	70	N	N	N
J1330070	37 4 23	94 0 21	<.05	<.02	.20	<.002	N	N	N	N
J1330090	37 4 23	94 0 21	.10	<.02	.20	<.002	N	N	N	N
J1330110	37 4 23	94 0 21	.15	<.02	.15	<.002	N	N	N	N
J1330130	37 4 23	94 0 21	.10	<.02	.30	<.002	<10	N	N	N
J1330150	37 4 23	94 0 21	.07	.03	.05	.003	N	N	N	N
J1330170	37 4 23	94 0 21	.10	.03	.20	.003	N	N	N	N
J1330190	37 4 23	94 0 21	.10	.02	.30	.002	N	N	N	N
J1330210	37 4 23	94 0 21	.15	.07	1.00	.010	<10	N	N	N
J1330230	37 4 23	94 0 21	.20	.07	.70	.002	N	N	N	N
J1330250	37 4 23	94 0 21	.20	.05	.50	.010	N	N	N	N
J1330270	37 4 23	94 0 21	.15	.05	.30	.015	10	N	N	N
J1330295	37 4 23	94 0 21	1.00	.05	.50	.015	<10	N	N	N
J1330315	37 4 23	94 0 21	3.00	1.50	.70	.300	30	N	N	N
J1330330	37 4 23	94 0 21	.70	.20	.20	.020	<10	N	N	N
J1330350	37 4 23	94 0 21	.70	.20	.15	.030	<10	N	N	N
J1330370	37 4 23	94 0 21	1.00	.30	.15	.070	10	<.5	N	N
J1330390	37 4 23	94 0 21	1.50	.10	.05	.030	<10	N	N	N
J1330410	37 4 23	94 0 21	2.00	.30	.10	.050	N	N	N	N
J1330430	37 4 23	94 0 21	3.00	.10	.20	.070	10	N	N	N
J1330450	37 4 23	94 0 21	.70	.03	<.05	.010	<10	N	N	N
J1330470	37 4 23	94 0 21	.70	.50	.50	.020	N	N	N	N
J1330490	37 4 23	94 0 21	5.00	.20	.15	.020	10	N	N	N
J1330500	37 4 23	94 0 21	20.00	.20	.10	.200	500	<.5	N	N
J1330520	37 4 23	94 0 21	.50	.02	.05	.002	N	N	N	N
J1330540	37 4 23	94 0 21	1.00	.05	.10	.005	N	N	N	N
J1330560	37 4 23	94 0 21	.20	.10	.15	.015	N	N	N	N
J1330580	37 4 23	94 0 21	.30	.03	.05	.015	N	N	N	N
J1330600	37 4 23	94 0 21	1.00	.10	.10	.015	N	N	N	N
J1330620	37 4 23	94 0 21	.15	.02	.05	<.002	N	N	N	N
J1330640	37 4 23	94 0 21	2.00	.50	.10	.070	<10	N	N	N
J1330660	37 4 23	94 0 21	.70	.30	.15	.030	N	N	N	N
J1330680	37 4 23	94 0 21	1.00	.50	.30	.050	10	N	N	N
J1330700	37 4 23	94 0 21	1.00	.50	1.00	.015	N	N	N	N
J1330720	37 4 23	94 0 21	.50	.02	.05	.010	N	N	N	N
J1330740	37 4 23	94 0 21	.20	.05	.07	.002	N	N	N	N
J1330760	37 4 23	94 0 21	.50	<.02	<.05	.005	N	N	N	N
J1330780	37 4 23	94 0 21	.30	<.02	<.05	.002	N	N	N	N
J1330790	37 4 23	94 0 21	.70	<.02	<.05	.007	N	N	N	N
J1330795	37 4 23	94 0 21	>20.00	.05	.07	.010	50	1.5	<200	N
J1330810	37 4 23	94 0 21	5.00	<.02	<.05	.003	<10	N	N	N
J1330830	37 4 23	94 0 21	1.00	.07	.15	<.002	N	N	N	N
J1330867	37 4 23	94 0 21	.15	<.02	<.05	.002	N	N	N	N

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 133, 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
J1330050	20	<20	N	N	N	N	N	<5	N	N	N	5
J1330070	20	<20	N	N	N	N	N	N	N	N	N	<5
J1330090	30	<20	N	N	N	N	N	N	N	N	N	<5
J1330110	30	<20	N	N	N	N	N	<5	N	N	N	<5
J1330130	30	N	N	N	N	N	N	<5	N	N	N	<5
J1330150	30	N	N	N	N	N	N	N	N	<5	N	5
J1330170	20	N	N	N	N	N	N	N	N	N	N	N
J1330190	20	N	N	N	N	N	N	N	N	<5	N	5
J1330210	30	20	N	N	N	N	N	N	N	N	N	5
J1330230	30	<20	N	N	N	N	N	N	N	N	N	<5
J1330250	30	<20	N	N	N	N	N	N	N	N	N	5
J1330270	20	<20	N	N	N	N	N	N	N	N	N	5
J1330295	10	<20	N	N	N	5	N	<5	N	N	N	15
J1330315	100	150	1.5	N	N	10	100	20	20	N	N	20
J1330330	20	70	N	N	N	N	N	10	N	N	N	7
J1330350	150	30	N	N	N	N	N	15	N	N	N	5
J1330370	50	50	N	N	N	<5	N	20	N	N	N	5
J1330390	200	70	N	N	N	5	70	15	N	5	N	15
J1330410	70	100	N	N	N	5	<10	20	N	<5	N	15
J1330430	1,000	150	N	N	N	5	N	20	N	<5	N	10
J1330450	10	50	N	N	N	N	N	<5	N	N	N	5
J1330470	20	70	N	N	N	N	N	5	N	N	N	<5
J1330490	50	70	N	N	N	5	N	20	N	<5	N	15
J1330500	50	100	N	N	N	15	20	150	N	<5	N	70
J1330520	30	30	N	N	N	N	10	<5	N	N	N	<5
J1330540	70	20	N	N	N	N	20	15	N	<5	N	5
J1330560	50	50	N	N	N	N	N	<5	N	N	N	<5
J1330580	50	20	N	N	N	N	N	<5	N	N	N	<5
J1330600	30	30	N	N	N	<5	N	10	N	<5	N	7
J1330620	50	<20	N	N	N	N	N	N	N	N	N	<5
J1330640	70	100	1.0	N	N	5	100	20	N	5	N	15
J1330660	70	70	N	N	N	N	50	5	N	<5	N	5
J1330680	50	70	N	N	N	N	N	5	N	N	N	5
J1330700	50	50	N	N	N	N	N	5	N	N	N	<5
J1330720	30	30	N	N	N	N	N	20	N	N	N	<5
J1330740	30	20	N	N	N	N	N	15	N	N	N	<5
J1330760	20	30	N	N	N	N	N	5	N	N	N	<5
J1330780	20	30	N	N	N	N	N	<5	N	N	N	<5
J1330790	20	20	N	N	N	N	10	15	N	<5	N	<5
J1330795	20	>5,000	N	N	N	<5	70	200	N	30	N	70
J1330810	20	700	N	N	N	N	N	30	N	<5	N	5
J1330830	15	1,000	N	N	N	N	N	50	N	N	N	<5
J1330867	10	50	N	N	N	N	N	15	N	N	N	<5

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 133, 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 #
J1330050	N	N	N	N	N	N	N	N	N	N	N	40
J1330070	N	N	N	N	N	N	N	N	<200	N	N	40
J1330090	N	N	N	N	N	N	N	N	N	N	N	40
J1330110	N	N	N	N	N	N	N	N	N	N	N	40
J1330130	N	N	N	N	N	N	N	N	N	N	N	40
J1330150	N	N	N	N	N	<10	N	N	N	N	N	40
J1330170	N	N	N	N	N	N	N	N	N	N	N	40
J1330190	N	N	N	N	N	N	N	N	N	N	N	40
J1330210	N	N	N	N	N	<10	N	N	N	N	N	40
J1330230	N	N	N	N	N	N	N	N	N	N	N	40
J1330250	N	N	N	N	N	N	N	N	N	N	N	40
J1330270	N	N	N	N	N	<10	N	N	N	N	N	40
J1330295	N	N	N	N	N	<10	N	N	N	N	N	40
J1330315	<10	N	10	N	100	70	N	20	N	300	N	40
J1330330	150	N	N	70	N	<10	N	N	N	10	N	40
J1330350	N	N	N	N	N	10	N	N	N	10	N	65
J1330370	20	N	N	N	N	15	N	N	N	70	N	65
J1330390	10	N	N	N	N	<10	N	N	500	70	N	65
J1330410	<10	N	N	N	N	10	N	N	N	50	N	65
J1330430	N	N	N	N	N	<10	N	N	200	<10	N	65
J1330450	N	N	N	N	N	N	N	N	N	30	N	65
J1330470	N	N	N	N	N	<10	N	N	N	<10	N	65
J1330490	N	N	N	N	N	10	N	N	N	<10	N	65
J1330500	20	N	N	N	N	15	N	N	N	100	N	65
J1330520	N	N	N	N	N	N	N	N	N	N	N	66
J1330540	N	N	N	N	N	N	N	N	N	N	N	66
J1330560	N	N	N	N	N	N	N	N	N	N	N	66
J1330580	N	N	N	N	N	N	N	N	N	N	N	66
J1330600	N	N	N	N	N	N	N	N	N	N	N	66
J1330620	N	N	N	N	N	N	N	N	N	N	N	66
J1330640	N	N	N	N	N	20	N	N	N	10	N	66
J1330660	100	N	N	N	N	10	N	N	N	<10	N	66
J1330680	N	N	N	N	N	15	N	N	N	10	N	66
J1330700	N	N	N	N	N	N	N	N	N	N	N	66
J1330720	N	N	N	N	N	N	N	N	N	N	N	67
J1330740	N	N	N	N	N	N	N	N	N	N	N	67
J1330760	N	N	N	N	N	N	N	N	N	<10	N	67
J1330780	N	N	N	N	N	N	N	N	N	N	N	67
J1330790	N	N	N	N	N	N	N	N	N	<10	N	67
J1330795	30	N	N	N	200	N	N	N	300	N	N	67
J1330810	N	N	N	N	N	N	N	N	N	N	N	67
J1330830	N	N	N	N	N	N	N	N	N	N	N	67
J1330867	N	N	N	N	N	N	N	N	N	10	N	67