

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

**Spectrographic analyses of insoluble-residue samples,
Joplin 1° x 2° quadrangle, Missouri and Kansas:
Drill hole nos. 49 and 51**

By

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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.

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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 (MGS) 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. 49 (#1 Hartley - KGS) and drill hole no. 51 (#28305 - MGS) are given in this report. Drill hole no. 49 is located in sec. 3, T. 34 S., R. 23 E. in Cherokee County, Kansas and drill hole no. 51 is located in sec. 7, T. 26 N., R. 33 W. in Newton County, Missouri (fig.1). Data for the insoluble-residue samples from drill holes 49 and 51 are listed in tables 1 and 2 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).

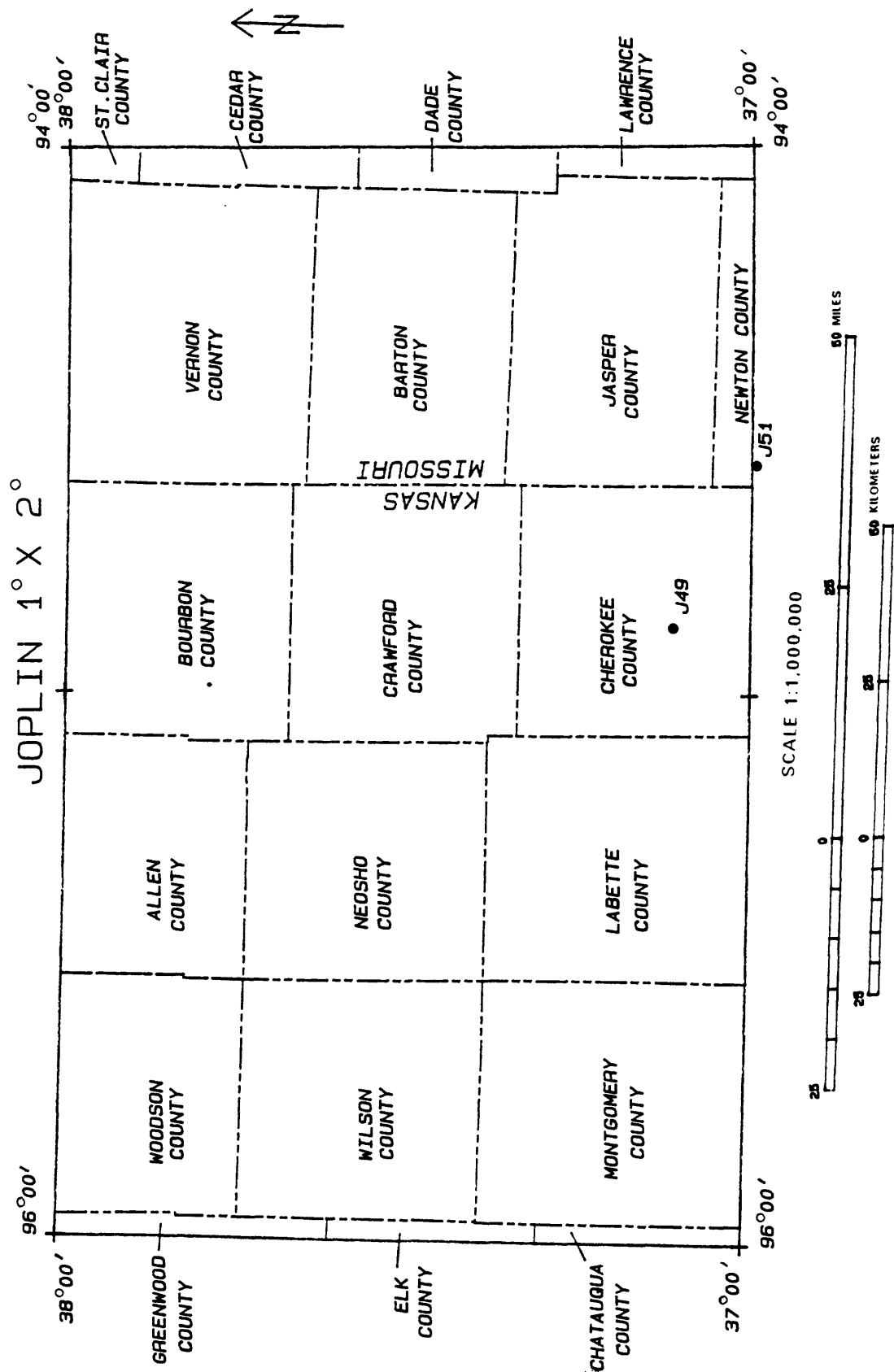


Figure 1. Locations of drill holes 49 and 51, Joplin 1° x 2° quadrangle, Missouri and Kansas.

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

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 in J49 and following the depth in J51 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 2. The code and formation names are as follows:

<u>Code</u>	<u>Formation</u>
20	Pennsylvanian Undifferentiated
31	Chattanooga Shale
40	Mississippian Undifferentiated
60	Ordovician Undifferentiated
80	Cambrian Undifferentiated
85	Cambrian - Lamotte Sandstone
87	Post - Bonneterre Cambrian
90	Precambrian Undifferentiated

EXPLANATION OF DATA

The columns in tables 1 and 2 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 1-2, 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 Missouri Division of Geology and Land Survey--Dr. Wallace B. Howe, former Director, and Dr. J. Hadley Williams, Director--and the Kansas Geological Survey, Dr. Lee C. Gerhart, State Geologist, and their staffs, for making these drill-hole samples available from their sample libraries.

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. 49, 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	Hg-pct. S	Ca-pct. S	Ti-pct. S	Mn-ppm S	Ag-ppm S	As-ppm S	Au-ppm S
J49R0030	37 6 43	94 52 40	10.00	.50	.05	.50	70	N	N	N
J49R0040	37 6 43	94 52 40	3.00	.50	<.05	.70	100	N	N	N
J49R0050	37 6 43	94 52 40	2.00	.50	<.05	.70	100	N	N	N
J49R0060	37 6 43	94 52 40	3.00	.70	<.05	.70	100	N	N	N
J49R0070	37 6 43	94 52 40	2.00	.50	<.05	.70	70	N	N	N
J49R0080	37 6 43	94 52 40	2.00	.30	<.05	.70	50	N	N	N
J49R0090	37 6 43	94 52 40	3.00	.50	<.05	.70	100	N	N	N
J49R0100	37 6 43	94 52 40	3.00	.50	<.05	1.00	70	N	N	N
J49R0110	37 6 43	94 52 40	3.00	.50	<.05	1.00	100	N	N	N
J49R0120	37 6 43	94 52 40	3.00	.70	<.05	1.00	100	N	N	N
J49R0130	37 6 43	94 52 40	3.00	.70	<.05	1.00	100	N	N	N
J49R0140	37 6 43	94 52 40	2.00	.50	<.05	1.00	70	1.0	N	N
J49R0150	37 6 43	94 52 40	3.00	.70	<.05	1.00	150	N	N	N
J49R0160	37 6 43	94 52 40	3.00	.70	<.05	.70	200	N	N	N
J49R0170	37 6 43	94 52 40	2.00	.30	<.05	1.00	50	N	N	N
J49R0180	37 6 43	94 52 40	2.00	.50	<.05	1.00	50	N	N	N
J49R0190	37 6 43	94 52 40	3.00	.70	<.05	1.00	100	N	N	N
J49R0200	37 6 43	94 52 40	2.00	.70	<.05	1.00	70	N	N	N
J49R0210	37 6 43	94 52 40	2.00	.70	<.05	1.00	100	N	N	N
J49R0220	37 6 43	94 52 40	2.00	.70	.05	.70	70	N	N	N
J49R0230	37 6 43	94 52 40	2.00	.20	<.05	.70	70	N	N	N
J49R0240	37 6 43	94 52 40	3.00	.30	.05	.70	50	N	N	N
J49R0250	37 6 43	94 52 40	3.00	.30	<.05	.50	15	N	N	N
J49R0260	37 6 43	94 52 40	3.00	.50	.05	.70	50	N	N	N
J49R0270	37 6 43	94 52 40	7.00	.50	.07	.70	50	N	N	N
J49R0280	37 6 43	94 52 40	7.00	.15	.07	.30	30	N	N	N
J49R0290	37 6 43	94 52 40	2.00	.10	.05	.20	15	N	N	N
J49R0300	37 6 43	94 52 40	.30	.05	.05	.10	<10	N	N	N
J49R0310	37 6 43	94 52 40	.20	.05	.05	.10	<10	N	N	N
J49R0320	37 6 43	94 52 40	.30	.05	.05	.15	<10	N	N	N
J49R0330	37 6 43	94 52 40	.30	.07	.05	.10	<10	N	N	N
J49R0340	37 6 43	94 52 40	.30	.05	.05	.10	10	N	N	N
J49R0350	37 6 43	94 52 40	.20	.03	.05	.05	<10	N	N	N
J49R0360	37 6 43	94 52 40	.20	.05	.05	.05	<10	N	N	N
J49R0370	37 6 43	94 52 40	.20	.05	.05	.07	<10	N	N	N
J49R0380	37 6 43	94 52 40	.50	.07	.05	.07	20	N	N	N
J49R0390	37 6 43	94 52 40	1.00	.07	.07	.15	10	N	N	N
J49R0400	37 6 43	94 52 40	.50	.05	.50	.10	15	N	N	N
J49R0410	37 6 43	94 52 40	.30	.05	.05	.07	15	N	N	N
J49R0420	37 6 43	94 52 40	.15	.03	.05	.05	<10	N	N	N
J49R0430	37 6 43	94 52 40	3.00	.03	.05	.05	30	N	N	N
J49R0440	37 6 43	94 52 40	1.00	.03	.05	.07	10	N	N	N
J49R0450	37 6 43	94 52 40	.50	.07	.05	.10	10	N	N	N
J49R0460	37 6 43	94 52 40	.70	.20	.07	.20	30	N	N	N

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 49, 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
J49R0030	200	300	3.0	N	N	7	200	70	50	10	<20	100
J49R0040	150	200	1.5	N	N	10	100	30	30	N	<20	20
J49R0050	150	150	1.5	N	N	7	100	15	30	N	<20	20
J49R0060	150	200	3.0	N	N	15	150	50	50	N	<20	70
J49R0070	150	200	1.5	N	N	7	100	10	50	N	<20	30
J49R0080	150	200	2.0	N	N	7	100	20	30	N	<20	50
J49R0090	150	200	3.0	N	N	10	150	50	50	N	<20	100
J49R0100	150	200	3.0	N	N	10	150	30	50	N	<20	70
J49R0110	150	200	2.0	N	N	20	150	20	30	N	<20	70
J49R0120	150	300	2.0	N	N	20	150	30	50	N	<20	100
J49R0130	200	300	3.0	N	N	15	200	30	50	N	<20	100
J49R0140	150	300	2.0	N	N	15	100	20	50	N	<20	50
J49R0150	200	300	2.0	N	N	20	200	30	50	N	<20	100
J49R0160	200	300	2.0	N	N	15	150	30	50	N	<20	100
J49R0170	150	200	2.0	N	N	10	150	20	50	N	<20	50
J49R0180	200	200	2.0	N	N	7	150	20	50	N	<20	50
J49R0190	200	300	3.0	N	N	15	200	20	50	N	<20	70
J49R0200	200	200	3.0	N	N	20	200	100	50	N	<20	70
J49R0210	200	200	2.0	N	N	10	200	30	50	N	<20	70
J49R0220	200	200	3.0	N	N	7	150	30	50	N	<20	30
J49R0230	150	200	1.5	N	N	5	150	30	50	N	<20	20
J49R0240	200	200	2.0	N	N	5	150	15	50	N	<20	30
J49R0250	200	150	2.0	N	N	5	150	20	30	N	<20	20
J49R0260	200	200	3.0	N	N	7	200	20	50	N	<20	50
J49R0270	200	200	2.0	N	N	10	200	30	50	N	<20	70
J49R0280	200	100	1.0	N	N	7	100	20	20	N	<20	50
J49R0290	50	100	N	N	N	5	50	10	20	N	N	15
J49R0300	30	70	N	N	N	N	15	<5	N	N	N	5
J49R0310	30	70	N	N	N	N	15	<5	N	N	N	5
J49R0320	50	70	N	N	N	N	20	<5	N	N	N	5
J49R0330	50	50	N	N	N	N	15	<5	N	N	N	N
J49R0340	50	70	N	N	N	N	20	<5	N	N	N	N
J49R0350	20	30	N	N	N	N	N	<5	N	N	N	5
J49R0360	30	30	N	N	N	N	N	<5	N	N	N	N
J49R0370	50	30	N	N	N	N	N	7	N	N	N	5
J49R0380	50	70	N	N	N	N	15	5	N	N	N	7
J49R0390	50	70	N	N	N	7	20	10	N	N	N	20
J49R0400	50	50	N	N	N	N	10	5	N	N	N	N
J49R0410	50	50	N	N	N	N	N	5	N	N	N	N
J49R0420	70	50	N	N	N	N	N	<5	N	N	N	N
J49R0430	100	30	N	N	N	N	10	7	N	N	N	10
J49R0440	50	50	N	N	N	N	15	5	N	N	N	7
J49R0450	50	50	N	N	N	N	20	5	N	N	N	7
J49R0460	100	100	1.0	N	N	N	50	10	20	N	N	15

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 49, 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#
J49R0030	50	N	15	N	150	150	N	20	N	150	N	20
J49R0040	<10	N	10	N	150	100	N	20	N	300	N	20
J49R0050	N	N	10	N	150	100	N	20	N	300	N	20
J49R0060	15	N	15	N	100	200	N	20	1,000	200	N	20
J49R0070	15	N	10	N	100	200	N	30	200	500	N	20
J49R0080	10	N	10	N	150	150	N	20	N	500	N	20
J49R0090	50	N	15	N	150	200	N	20	N	150	N	20
J49R0100	20	N	15	N	150	200	N	20	N	150	N	20
J49R0110	15	N	15	N	150	150	N	20	200	200	N	20
J49R0120	15	N	20	N	150	200	N	30	N	300	N	20
J49R0130	30	N	20	N	200	200	N	30	N	200	N	20
J49R0140	15	N	10	N	150	200	N	30	N	200	N	20
J49R0150	30	N	20	N	150	300	N	30	N	300	N	20
J49R0160	30	N	15	N	100	200	N	20	N	150	N	20
J49R0170	15	N	15	N	100	150	N	30	500	200	N	20
J49R0180	20	N	15	N	100	200	N	30	N	200	N	20
J49R0190	50	N	15	N	100	200	N	20	N	150	N	20
J49R0200	10	N	20	N	100	200	N	30	N	150	N	20
J49R0210	20	N	15	N	100	200	N	30	N	200	N	20
J49R0220	20	N	15	N	100	200	N	20	N	200	N	20
J49R0230	10	N	10	N	100	100	N	20	N	300	N	20
J49R0240	20	N	15	N	100	150	N	20	N	200	N	20
J49R0250	<10	N	15	N	100	150	N	20	N	150	N	20
J49R0260	70	N	15	N	100	200	N	20	N	200	N	20
J49R0270	200	N	15	N	100	200	N	20.	1,000	200	N	40
J49R0280	10	N	7	N	N	100	N	15	N	500	N	40
J49R0290	500	N	5	N	N	30	N	<10	N	70	N	40
J49R0300	500	N	N	N	N	10	N	N	500	30	N	40
J49R0310	200	N	N	N	N	10	N	N	N	50	N	40
J49R0320	100	N	N	N	N	20	N	N	N	50	N	40
J49R0330	N	N	N	N	N	10	N	N	N	20	N	40
J49R0340	100	N	N	N	N	30	N	N	N	30	N	40
J49R0350	10	N	N	N	N	N	N	N	N	10	N	40
J49R0360	30	N	N	N	N	N	N	N	N	15	N	40
J49R0370	70	N	N	N	N	10	N	N	N	15	N	40
J49R0380	N	N	N	N	N	20	N	N	N	20	N	40
J49R0390	50	N	N	N	N	30	N	N	N	30	N	40
J49R0400	1,000	N	N	N	N	10	N	N	N	20	N	40
J49R0410	70	N	N	N	N	10	N	N	N	15	N	40
J49R0420	N	N	N	N	N	N	N	N	N	15	N	40
J49R0430	200	N	N	N	N	10	N	N	N	10	N	40
J49R0440	1,000	N	N	N	N	15	N	N	N	20	N	40
J49R0450	5,000	N	N	N	N	20	N	N	N	20	N	40
J49R0460	100	N	5	N	N	50	N	10	N	70	N	40

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, 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
J510010R	36 59 40	94 34 50	.30	.05	.05	.015	20	N	N	N
J510020R	36 59 40	94 34 50	.30	.05	.05	.020	150	N	N	N
J510030R	36 59 40	94 34 50	.20	.05	.05	.010	50	N	N	N
J510040R	36 59 40	94 34 50	.20	.05	1.00	.010	70	N	N	N
J510050R	36 59 40	94 34 50	1.00	.05	.05	.007	100	N	N	N
J510060R	36 59 40	94 34 50	.20	.05	.70	.010	70	N	N	N
J510070R	36 59 40	94 34 50	.20	.05	1.50	.007	100	N	N	N
J510080R	36 59 40	94 34 50	.50	.05	.50	.015	100	N	N	N
J510090R	36 59 40	94 34 50	.30	.05	.70	.015	70	N	N	N
J510100R	36 59 40	94 34 50	.10	.05	.50	.005	50	N	N	N
J510110R	36 59 40	94 34 50	.20	.05	.70	.007	30	N	N	N
J510120R	36 59 40	94 34 50	.07	.03	1.00	.007	20	N	N	N
J510130R	36 59 40	94 34 50	.10	.03	.50	.005	50	N	N	N
J510140R	36 59 40	94 34 50	.20	.03	.70	.015	50	N	N	N
J510150R	36 59 40	94 34 50	.10	.03	.70	.015	50	N	N	N
J510160R	36 59 40	94 34 50	.10	.03	.70	.007	50	N	N	N
J510170R	36 59 40	94 34 50	.10	.03	.50	.010	30	N	N	N
J510180R	36 59 40	94 34 50	.15	.05	.30	.015	30	N	N	N
J510190R	36 59 40	94 34 50	.20	.05	1.00	.015	50	N	N	N
J510200R	36 59 40	94 34 50	.70	.10	.30	.030	50	N	N	N
J510210R	36 59 40	94 34 50	.30	.07	.50	.020	30	N	N	N
J510220R	36 59 40	94 34 50	.50	.15	2.00	.050	100	N	N	N
J510230R	36 59 40	94 34 50	.50	.15	.20	.050	70	N	N	N
J510240R	36 59 40	94 34 50	.50	.20	2.00	.050	50	N	N	N
J510250R	36 59 40	94 34 50	.50	.20	.50	.020	30	N	N	N
J510260R	36 59 40	94 34 50	1.00	.20	1.50	.070	70	N	N	N
J510270R	36 59 40	94 34 50	1.00	.20	.30	.070	20	N	N	N
J510280R	36 59 40	94 34 50	.50	.20	.20	.070	50	N	N	N
J510290R	36 59 40	94 34 50	2.00	.50	.50	.100	30	N	N	N
J510300R	36 59 40	94 34 50	1.50	.50	.30	.050	15	N	N	N
J510310R	36 59 40	94 34 50	1.50	.50	.50	.020	30	N	N	N
J510320R	36 59 40	94 34 50	2.00	.50	.50	.200	50	N	N	N
J510330R	36 59 40	94 34 50	.70	.70	1.00	.050	20	N	N	N
J510340R	36 59 40	94 34 50	1.00	.70	.70	.070	20	N	N	N
J510350R	36 59 40	94 34 50	1.50	1.50	1.00	.150	50	N	N	N
J510360R	36 59 40	94 34 50	.70	1.00	.70	.070	20	N	N	N
J510370R	36 59 40	94 34 50	2.00	.70	.50	.200	30	N	N	N
J510380R	36 59 40	94 34 50	2.00	1.50	1.50	.200	50	N	N	N
J510390R	36 59 40	94 34 50	.70	1.00	.70	.150	30	N	N	N
J510400R	36 59 40	94 34 50	.50	.50	.30	.050	10	N	N	N
J510410R	36 59 40	94 34 50	1.50	.50	.30	.100	15	N	N	N
J510420R	36 59 40	94 34 50	2.00	.50	.20	.150	20	N	N	N
J510430R	36 59 40	94 34 50	1.50	.50	.20	.150	15	N	N	N
J510440R	36 59 40	94 34 50	1.00	.50	.30	.100	15	N	N	N
J510450R	36 59 40	94 34 50	.50	.20	.30	.070	10	N	N	N

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, 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
J510010R	50	50	N	N	N	N	N	N	N	N	N	N
J510020R	70	50	N	N	N	N	N	<5	N	N	N	5
J510030R	70	50	N	N	N	20	10	<5	N	N	N	30
J510040R	70	50	N	N	N	N	N	<5	N	N	N	5
J510050R	100	30	N	N	N	N	N	<5	N	N	N	5
J510060R	70	30	N	N	N	N	N	<5	N	N	N	5
J510070R	70	30	N	N	N	N	N	<5	N	N	N	5
J510080R	70	30	N	N	N	N	N	<5	N	N	N	7
J510090P	70	50	N	N	N	N	N	<5	N	N	N	5
J510100R	70	50	N	N	N	N	N	<5	N	N	N	N
J510110R	70	50	N	N	N	N	N	<5	N	N	N	5
J510120R	70	50	N	N	N	20	N	<5	N	N	N	20
J510130R	70	50	N	N	N	N	N	<5	N	N	N	N
J510140R	70	50	N	N	N	N	N	<5	N	N	N	N
J510150R	70	30	N	N	N	N	N	<5	N	N	N	N
J510160R	70	30	N	N	N	N	N	<5	N	N	N	N
J510170R	100	50	N	N	N	N	N	<5	N	N	N	N
J510180R	70	50	N	N	N	N	N	<5	N	N	N	N
J510190R	70	70	N	N	N	N	N	<5	N	N	N	N
J510200R	70	50	N	N	N	N	N	<5	N	N	N	N
J510210R	70	50	N	N	N	N	N	<5	N	N	N	10
J510220R	100	50	N	N	N	N	N	<5	N	N	N	7
J510230R	70	200	N	N	N	N	N	<5	N	N	N	5
J510240R	70	200	1.0	N	N	N	N	<5	N	N	N	10
J510250R	70	700	1.5	N	N	N	N	<5	N	N	N	10
J510260R	70	100	N	N	N	N	N	<5	N	N	N	10
J510270R	70	150	1.0	N	N	5	10	<5	N	N	N	20
J510280R	70	150	1.0	N	N	N	10	5	N	N	N	20
J510290R	70	150	1.0	N	N	N	10	<5	N	N	N	20
J510300R	100	200	1.0	N	N	20	10	20	N	<5	N	50
J510310R	100	100	N	N	N	20	N	15	N	7	N	30
J510320R	100	150	1.5	N	N	N	20	10	N	N	N	20
J510330R	100	150	1.0	N	N	N	N	<5	N	N	N	10
J510340R	100	150	N	N	N	15	N	10	N	N	N	20
J510350R	100	200	1.0	N	N	10	20	20	N	5	N	30
J510360R	70	100	1.0	N	N	N	N	7	N	5	N	10
J510370R	100	200	1.5	N	N	15	30	20	N	10	N	50
J510380R	100	150	2.0	N	N	15	50	20	N	15	N	50
J510390R	100	100	1.5	N	N	5	15	7	N	N	N	15
J510400R	100	100	N	N	N	5	N	5	N	N	N	10
J510410R	100	100	1.0	N	N	5	10	20	N	N	N	20
J510420R	100	150	1.0	N	N	7	20	15	N	7	N	30
J510430R	100	300	1.0	N	N	5	30	15	N	N	N	20
J510440R	100	150	<1.0	N	N	N	10	10	N	N	N	15
J510450R	100	200	<1.0	N	N	N	N	7	N	N	N	10

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, 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#
J510010R	N	N	N	N	N	N	N	20	N	N	N	40
J510020R	N	N	N	N	N	N	N	N	N	N	N	40
J510030R	N	N	N	N	N	N	N	20	N	20	N	40
J510040R	N	N	N	N	N	N	N	10	N	N	N	40
J510050R	N	N	N	N	N	N	N	20	N	N	N	40
J510060R	N	N	N	N	N	N	N	10	N	N	N	40
J510070R	N	N	N	N	N	N	N	10	N	N	N	40
J510080R	N	N	N	N	N	N	N	10	N	N	N	40
J510090R	N	N	N	N	N	N	N	N	N	100	N	40
J510100P	N	N	N	N	N	N	N	N	N	200	N	40
J510110R	N	N	N	N	N	N	N	50	N	N	N	40
J510120R	N	N	N	N	N	N	N	N	N	N	N	40
J510130R	10	N	N	N	N	N	N	N	N	30	N	40
J510140R	10	N	N	N	N	N	N	N	N	N	N	40
J510150R	50	N	N	N	N	N	N	N	200	N	N	40
J510160R	70	N	N	N	N	N	N	N	500	N	N	40
J510170R	200	N	N	N	N	N	N	10	<200	N	N	40
J510180R	70	N	N	N	N	N	N	N	700	N	N	40
J510190R	50	N	N	N	N	N	N	15	200	N	N	40
J510200R	100	N	N	N	N	N	N	N	<200	N	N	40
J510210R	20	N	N	N	N	15	N	N	500	N	N	40
J510220R	7,000	N	N	N	N	N	N	10	500	N	N	40
J510230R	70	N	N	N	N	N	N	N	<200	20	N	40
J510240R	20	N	N	N	N	30	N	N	N	20	N	40
J510250R	<10	N	N	N	N	10	N	N	N	20	N	40
J510260R	<10	N	N	N	N	20	N	N	N	20	N	40
J510270R	10	N	N	N	N	30	N	N	N	30	N	40
J510280R	15	N	N	N	N	30	N	N	N	30	N	40
J510290R	10	N	N	N	N	30	N	N	N	50	N	40
J510300R	30	N	N	N	N	50	N	N	N	70	N	70
J510310R	20	N	N	N	100	15	N	N	N	10	N	70
J510320R	15	N	N	N	N	20	N	N	N	50	N	70
J510330R	10	N	N	N	N	10	N	N	N	50	N	70
J510340R	30	N	N	N	N	15	N	N	N	70	N	70
J510350R	50	N	N	N	N	50	N	N	N	100	N	70
J510360R	20	N	N	N	N	15	N	N	N	50	N	70
J510370R	70	N	N	N	N	50	N	N	N	100	N	70
J510380R	70	N	N	N	N	70	N	N	N	50	N	70
J510390R	10	N	N	N	N	30	N	N	N	50	N	70
J510400R	N	N	N	N	N	15	N	N	N	30	N	70
J510410P	20	N	N	N	N	15	N	N	N	30	N	70
J510420R	15	N	N	N	N	20	N	N	N	70	N	70
J510430P	20	N	N	N	N	50	N	N	N	100	N	70
J510440P	10	N	N	N	N	20	N	N	N	50	N	70
J510450R	10	N	N	N	N	10	N	N	N	50	N	70

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, JOPLIN 1 x 2 QUADRANGLE,
MISSOURI AND KANSAS.--Continued

Sample	Latitude	Longitude	Fe-pct. S	Mg-pct. S	Ca-pct. S	Ti-pct. S	Mn-ppm S	Ag-pdm S	As-ppm S	Au-ppm S
J510460R	36 59 40	94 34 50	1.50	.30	.20	.150	20	N	N	N
J510470R	36 59 40	94 34 50	1.00	.20	.10	.100	15	N	N	N
J510480R	36 59 40	94 34 50	2.00	.50	.10	.200	30	N	N	N
J510490R	36 59 40	94 34 50	2.00	.70	.30	.200	30	N	N	N
J510500R	36 59 40	94 34 50	1.00	.50	.20	.150	20	N	N	N
J510510R	36 59 40	94 34 50	1.50	.50	.20	.100	20	N	N	N
J510520R	36 59 40	94 34 50	.10	.05	.05	.005	N	N	N	N
J510530R	36 59 40	94 34 50	.50	.30	.30	.050	10	N	N	N
J510540R	36 59 40	94 34 50	.20	.20	.20	.020	15	N	N	N
J510550R	36 59 40	94 34 50	.15	.07	.07	.020	N	N	N	N
J510560R	36 59 40	94 34 50	.20	.20	.30	.015	N	N	N	N
J510570R	36 59 40	94 34 50	.50	.20	.20	.020	N	N	N	N
J510580R	36 59 40	94 34 50	1.00	.70	.50	.100	15	N	N	N
J510590R	36 59 40	94 34 50	.15	.07	.05	.010	N	N	N	N
J510600R	36 59 40	94 34 50	.07	.05	.05	.005	N	N	N	N
J510610R	36 59 40	94 34 50	.20	.07	.05	.015	N	N	N	N
J510620R	36 59 40	94 34 50	5.00	.50	.05	.300	50	N	N	N
J510630R	36 59 40	94 34 50	1.00	.10	.05	.070	10	N	N	N
J510640R	36 59 40	94 34 50	.15	.03	<.05	.007	N	N	N	N
J510650R	36 59 40	94 34 50	.50	.05	<.05	.020	N	N	N	N
J510660R	36 59 40	94 34 50	2.00	.50	.05	.200	50	N	N	N
J510670R	36 59 40	94 34 50	5.00	1.00	.10	.300	50	.7	N	N
J510680R	36 59 40	94 34 50	3.00	.70	.05	.300	70	N	N	N
J510690R	36 59 40	94 34 50	2.00	.50	.07	.200	50	N	N	N
J510700R	36 59 40	94 34 50	.50	.20	.20	.015	<10	N	N	N
J510710R	36 59 40	94 34 50	1.00	.20	.15	.070	15	N	N	N
J510720R	36 59 40	94 34 50	.30	.20	.20	.050	<10	N	N	N
J510730R	36 59 40	94 34 50	.20	.10	.05	.030	N	N	N	N
J510740R	36 59 40	94 34 50	.50	.10	.05	.020	N	N	N	N
J510750R	36 59 40	94 34 50	1.00	.15	.07	.050	10	N	N	N
J510760R	36 59 40	94 34 50	.70	.10	<.05	.050	<10	N	N	N
J510770R	36 59 40	94 34 50	.70	.10	<.05	.050	<10	N	N	N
J510780R	36 59 40	94 34 50	5.00	1.00	<.05	.300	100	N	N	N
J510790R	36 59 40	94 34 50	.50	.03	<.05	.015	<10	N	N	N
J510800R	36 59 40	94 34 50	.50	.10	<.05	.070	10	N	N	N
J510810R	36 59 40	94 34 50	.70	.10	<.05	.070	<10	N	N	N
J510830R	36 59 40	94 34 50	1.00	.02	<.05	.003	N	N	N	N
J510840R	36 59 40	94 34 50	.50	.10	<.05	.050	<10	N	N	N
J510850R	36 59 40	94 34 50	.50	.05	<.05	.020	<10	N	N	N
J510860R	36 59 40	94 34 50	.10	.03	<.05	.002	N	N	N	N
J510870R	36 59 40	94 34 50	.10	.02	<.05	.005	N	N	N	N
J510880R	36 59 40	94 34 50	.05	.02	<.05	.003	N	N	N	N
J510890R	36 59 40	94 34 50	.07	.02	<.05	.005	N	N	N	N
J510900R	36 59 40	94 34 50	.70	.05	<.05	.010	N	N	N	N
J510910R	36 59 40	94 34 50	1.00	.10	<.05	.070	15	N	N	N

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, JOPLIN 1 x 2 QUADRANGLE,
MISSOURI AND KANSAS.--Continued

Sample	R-ppm S	Ra-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
J510460R	100	200	1.0	N	N	7	30	15	N	5	N	20
J510470R	50	200	1.0	N	N	N	10	5	N	N	N	15
J510480R	100	200	2.0	N	N	7	50	20	N	5	N	50
J510490R	100	300	1.5	N	N	7	50	30	N	50	N	30
J510500R	50	150	1.5	N	N	N	50	30	N	10	N	15
J510510R	50	200	1.5	N	N	5	30	30	N	30	N	20
J510520R	50	100	N	N	N	N	N	N	N	N	N	N
J510530R	50	100	N	N	N	N	N	10	N	20	N	10
J510540R	50	50	N	N	N	N	N	N	N	N	N	5
J510550R	70	50	N	N	N	N	N	<5	N	N	N	5
J510560R	70	100	N	N	N	N	N	<5	N	N	N	5
J510570P	50	30	N	N	N	N	N	7	N	15	N	10
J510580R	50	100	1.0	N	N	5	10	15	N	50	N	15
J510590R	20	20	N	N	N	N	N	<5	N	N	N	N
J510600P	50	70	N	N	N	N	N	<5	N	N	N	N
J510610R	50	50	N	N	N	N	N	<5	N	N	N	N
J510620R	70	300	2.0	N	N	15	100	50	N	50	N	50
J510630R	50	50	N	N	N	N	N	5	N	10	N	5
J510640R	50	30	N	N	N	N	N	N	N	N	N	5
J510650R	50	50	N	N	N	N	N	5	N	5	N	5
J510660R	100	200	3.0	N	N	15	70	30	N	50	N	30
J510670P	100	500	2.0	N	N	20	70	150	N	70	N	70
J510680R	100	500	1.5	N	N	10	70	70	N	15	N	50
J510690R	100	300	2.0	N	N	7	30	50	N	10	N	50
J510700P	20	<20	N	N	N	N	N	<5	N	N	N	5
J510710R	70	30	N	N	N	N	N	30	N	5	N	10
J510720R	20	30	N	N	N	N	N	<5	N	N	N	5
J510730R	100	30	N	N	N	N	N	<5	N	N	N	5
J510740R	50	70	N	N	N	N	N	<5	N	N	N	5
J510750R	70	70	N	N	N	N	20	5	N	5	N	10
J510760R	30	50	N	N	N	N	N	<5	N	N	N	7
J510770R	20	50	<1.0	N	N	N	N	5	N	N	N	10
J510780R	200	200	2.0	N	N	20	100	30	N	15	N	100
J510790R	50	50	N	N	N	N	N	<5	N	N	N	5
J510800R	30	70	N	N	N	N	N	<5	N	N	N	7
J510810R	70	50	N	N	N	N	N	5	N	10	N	10
J510830R	20	100	N	N	N	N	N	<5	N	N	N	5
J510840R	20	50	N	N	N	N	N	10	N	N	N	5
J510850R	10	20	N	N	N	N	N	150	N	N	N	7
J510860R	30	100	N	N	N	N	N	100	N	20	N	5
J510870R	10	20	N	N	N	N	N	7	N	N	N	N
J510880R	10	20	N	N	N	N	N	<5	N	N	N	N
J510890R	10	20	N	N	N	N	N	<5	N	N	N	N
J510900R	10	20	N	N	N	N	N	<5	N	N	N	10
J510910R	15	30	N	N	N	N	N	<5	N	5	N	15

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, 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#
J510460R	20	N	N	N	N	50	N	N	N	50	N	70
J510470R	10	N	N	N	N	20	N	N	N	50	N	70
J510480R	20	N	N	N	N	50	N	20	200	70	N	70
J510490R	30	N	N	N	N	50	N	10	N	100	N	70
J510500R	30	N	N	N	N	30	N	N	N	50	N	70
J510510R	50	N	N	N	N	50	N	N	N	50	N	70
J510520R	N	N	N	N	N	10	N	N	N	20	N	70
J510530R	10	N	N	N	N	20	N	N	N	20	N	70
J510540R	N	N	N	N	N	10	N	N	N	N	N	70
J510550R	N	N	N	N	N	10	N	N	N	N	N	70
J510560R	N	N	N	N	N	N	N	N	N	N	N	70
J510570R	10	N	N	N	N	15	N	N	N	15	N	70
J510580R	70	N	N	N	N	15	N	N	N	50	N	70
J510590R	N	N	N	N	N	N	N	N	N	15	N	70
J510600R	N	N	N	N	N	N	N	N	N	N	N	70
J510610R	N	N	N	N	N	N	N	N	N	N	N	70
J510620R	50	N	N	N	N	50	N	15	N	100	N	70
J510630R	N	N	N	N	N	15	N	N	N	20	N	70
J510640R	N	N	N	N	N	N	N	N	N	15	N	70
J510650R	N	N	N	N	N	N	N	N	N	N	N	70
J510660R	15	N	N	N	N	50	N	N	N	50	N	70
J510670R	100	N	N	N	N	100	N	10	N	100	N	70
J510680R	20	N	N	N	N	50	N	N	N	100	N	70
J510690R	15	N	N	N	N	70	N	N	N	70	N	70
J510700R	N	N	N	N	N	<10	N	N	N	N	N	70
J510710R	10	N	N	N	N	10	N	N	N	10	N	70
J510720P	N	N	N	N	N	10	N	N	N	10	N	67
J510730R	N	N	N	N	N	10	N	N	N	N	N	67
J510740P	N	N	N	N	N	10	N	N	N	10	N	67
J510750R	N	N	N	N	N	10	N	N	N	15	N	67
J510760R	N	N	N	N	N	10	N	N	N	30	N	67
J510770R	N	N	N	N	N	10	N	N	N	20	N	67
J510780R	100	N	N	N	N	200	N	N	N	70	N	67
J510790R	N	N	N	N	N	<10	N	N	N	20	N	67
J510800R	N	N	N	N	N	10	N	N	N	50	N	67
J510810R	N	N	N	N	N	15	N	N	N	10	N	67
J510830P	N	N	N	N	N	<10	N	N	N	N	N	67
J510840R	N	N	N	N	N	10	N	N	N	50	N	67
J510850R	N	N	N	N	N	10	N	N	N	70	N	67
J510860R	N	N	N	N	N	<10	N	N	N	N	N	67
J510870R	N	N	N	N	N	<10	N	N	N	20	N	67
J510880P	N	N	N	N	N	<10	N	N	N	30	N	67
J510890R	N	N	N	N	N	<10	N	N	N	15	N	67
J510900R	N	N	N	N	N	15	N	N	N	200	N	68
J510910R	N	N	N	N	N	15	N	N	N	50	N	68

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, JOPLIN 1 x 2 QUADRANGLE,
MISSOURI AND KANSAS.--Continued

Sample	Latitude	Longitude	Fe-pct. S	Mg-pct. S	Ca-pct. S	Ti-pct. S	Mn-pdm S	Ag-pdm S	As-pdm S	Au-ppm S
J510920R	36 59 40	94 34 50	.50	.05	<.05	.020	50	N	N	N
J510930R	36 59 40	94 34 50	2.00	.15	<.05	.150	10	.5	N	N
J510940R	36 59 40	94 34 50	3.00	.10	<.05	.070	20	N	N	N
J510950R	36 59 40	94 34 50	2.00	.50	.07	.200	20	N	N	N
J510960R	36 59 40	94 34 50	.05	.02	<.05	.005	N	N	N	N
J510970R	36 59 40	94 34 50	1.50	.50	.07	.200	20	N	N	N
J510990R	36 59 40	94 34 50	2.00	.70	.10	.200	20	N	N	N
J511000R	36 59 40	94 34 50	.50	.15	.05	.070	<10	N	N	N
J511010R	36 59 40	94 34 50	.07	.05	.05	.020	N	N	N	N
J511020R	36 59 40	94 34 50	.70	.07	.05	.020	10	N	N	N
J511030R	36 59 40	94 34 50	.15	.10	.10	.015	N	N	N	N
J511040R	36 59 40	94 34 50	.20	.05	<.05	.010	N	N	N	N
J511050R	36 59 40	94 34 50	.05	.03	<.05	.002	N	N	N	N
J511070R	36 59 40	94 34 50	.15	.07	.05	.010	N	N	N	N
J511080R	36 59 40	94 34 50	.05	.05	.05	.002	N	N	N	N
J511090R	36 59 40	94 34 50	.30	.05	.05	.015	N	N	N	N
J511100R	36 59 40	94 34 50	.20	.10	.05	.010	N	N	N	N
J511110R	36 59 40	94 34 50	1.50	.07	.05	.100	15	N	N	N
J511120R	36 59 40	94 34 50	1.00	.10	.05	.020	10	N	N	N
J511130R	36 59 40	94 34 50	5.00	1.00	.10	.300	200	3.0	200	N
J511140R	36 59 40	94 34 50	1.00	.15	.15	.020	10	N	N	N
J511150R	36 59 40	94 34 50	15.00	.50	.05	.200	200	2.0	500	N
J511160R	36 59 40	94 34 50	2.00	.20	.07	.150	15	N	N	N
J511170R	36 59 40	94 34 50	1.00	.20	.10	.070	10	.5	N	N
J511180R	36 59 40	94 34 50	.70	.50	.30	.050	10	N	N	N
J511190R	36 59 40	94 34 50	5.00	.70	.05	.300	50	N	N	N
J511200R	36 59 40	94 34 50	1.00	.10	.05	.015	<10	N	N	N
J511210R	36 59 40	94 34 50	3.00	1.00	.200	.200	70	<.5	N	N
J511220R	36 59 40	94 34 50	2.00	.10	.05	.050	10	1.0	200	N
J511240R	36 59 40	94 34 50	10.00	.50	.30	.070	100	1.0	200	N
J511250R	36 59 40	94 34 50	3.00	.50	.05	.150	30	.5	<200	N
J511270R	36 59 40	94 34 50	20.00	.50	.20	.100	50	2.0	1,500	N
J511290R	36 59 40	94 34 50	3.00	.15	.05	.100	30	<.5	200	N
J511300R	36 59 40	94 34 50	20.00	1.00	1.00	.020	30	3.0	1,000	N
J511310R	36 59 40	94 34 50	1.50	.50	.30	.050	15	N	N	N
J511320R	36 59 40	94 34 50	1.00	.15	.20	.010	<10	N	N	N
J511330R	36 59 40	94 34 50	>20.00	.70	.50	.010	70	5.0	5,000	N
J511350R	36 59 40	94 34 50	5.00	1.50	1.50	.050	50	<.5	<200	N
J511360R	36 59 40	94 34 50	5.00	.70	.70	.010	30	1.0	N	N
J511370R	36 59 40	94 34 50	>20.00	.10	.07	.007	50	1.5	500	N
J511380R	36 59 40	94 34 50	2.00	.20	.20	.020	15	N	<200	N
J511390R	36 59 40	94 34 50	.70	.15	.20	.015	<10	N	N	N
J511400R	36 59 40	94 34 50	.15	.15	.10	.020	<10	N	N	N
J511410R	36 59 40	94 34 50	.50	.15	.10	.015	<10	N	N	N
J511420R	36 59 40	94 34 50	.70	.15	.20	.020	10	N	N	N

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, JOPLIN 1 x 2 QUADRANGLE,
MISSOURI AND KANSAS.--Continued

Sample	B-ppm S	Ba-ppm S	Re-ppm S	Rh-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
J510920R	10	20	N	N	N	N	N	<5	N	N	N	10
J510930R	30	30	1.0	N	N	20	10	20	N	100	N	50
J510940R	20	20	1.0	N	N	15	N	15	N	30	N	50
J510950R	70	70	1.0	N	N	5	50	15	N	15	N	30
J510960R	30	100	N	N	N	N	N	N	N	N	N	N
J510970R	50	100	1.5	N	N	20	50	30	N	300	N	50
J510990R	70	50	1.0	N	N	N	50	10	N	20	N	20
J511000R	30	20	N	N	N	N	N	<5	N	N	N	N
J511010R	30	30	N	N	N	N	N	N	N	N	N	N
J511020R	30	30	N	N	N	N	N	15	N	N	N	5
J511030R	20	<20	N	N	N	N	N	N	N	N	N	5
J511040R	30	50	N	N	N	N	N	<5	N	N	N	5
J511050R	30	70	N	N	N	N	N	<5	N	N	N	5
J511070R	30	30	N	N	N	N	N	<5	N	30	N	5
J511080R	30	50	N	N	N	N	N	N	N	N	N	5
J511090R	30	50	N	N	N	N	N	10	N	70	N	10
J511100R	20	30	N	N	N	N	N	5	N	50	N	7
J511110R	30	30	<1.0	N	N	10	10	20	N	100	N	30
J511120R	20	30	N	N	N	N	10	5	N	30	N	15
J511130R	100	100	2.0	N	N	50	150	200	N	500	N	150
J511140R	30	20	N	N	N	5	N	10	N	50	N	20
J511150R	50	300	1.5	N	N	50	150	150	N	500	N	150
J511160R	50	50	1.0	N	N	10	30	20	N	70	N	50
J511170R	30	100	N	N	N	5	N	5	N	100	N	20
J511180R	70	70	N	N	N	N	N	5	N	50	N	10
J511190R	70	100	2.0	N	N	20	50	30	N	50	N	50
J511200R	20	50	<1.0	N	N	10	N	20	N	50	N	20
J511210R	100	100	1.5	N	N	20	70	50	N	100	N	50
J511220R	50	500	<1.0	N	N	10	10	30	N	100	N	30
J511240R	50	50	1.0	N	N	30	30	200	N	150	N	50
J511250R	70	50	1.5	N	N	30	30	100	N	2,000	N	70
J511270R	50	20	1.5	N	N	50	15	300	N	500	N	150
J511290R	50	30	1.0	N	N	20	30	50	N	200	N	50
J511300R	15	<20	N	N	N	70	N	150	N	30	N	300
J511310R	50	20	<1.0	N	N	5	N	20	N	50	N	20
J511320R	50	20	N	N	N	N	N	10	N	15	N	10
J511330R	N	<20	N	N	N	50	N	1,000	N	100	N	150
J511350R	50	30	<1.0	N	N	10	20	70	N	100	N	50
J511360R	30	70	<1.0	N	N	20	N	200	N	50	N	100
J511370R	10	2,000	N	N	N	50	N	150	N	30	N	150
J511380R	70	50	N	N	N	N	10	15	N	30	N	70
J511390R	70	30	N	N	N	N	N	7	N	20	N	10
J511400R	70	50	N	N	N	N	N	7	N	20	N	7
J511410R	100	20	N	N	N	N	N	<5	N	5	N	7
J511420R	100	70	N	N	N	5	N	5	N	15	N	5

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, 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#
J510920R	N	N	N	N	N	10	N	N	N	50	N	68
J510930R	20	N	N	N	N	20	N	N	N	100	N	68
J510940R	30	N	N	N	N	10	N	N	N	30	N	68
J510950R	15	N	N	N	N	30	N	N	N	50	N	68
J510960R	N	N	N	N	N	N	N	N	N	N	N	68
J510970R	10	N	N	N	N	70	N	N	N	30	N	68
J510990R	20	N	N	N	N	70	N	N	N	30	N	68
J511000R	N	N	N	N	N	10	N	N	N	N	N	68
J511010R	N	N	N	N	N	N	N	N	N	N	N	68
J511020R	N	N	N	N	N	N	N	N	N	N	N	68
J511030R	N	N	N	N	N	N	N	N	N	N	N	68
J511040R	N	N	N	N	N	N	N	N	N	N	N	68
J511050R	N	N	N	N	N	N	N	N	N	N	N	68
J511070R	N	N	N	N	N	N	N	N	N	N	N	68
J511080R	N	N	N	N	N	N	N	N	N	N	N	68
J511090R	N	N	N	N	N	10	N	N	N	N	N	68
J511100R	N	N	N	N	N	10	N	N	N	N	N	68
J511110R	15	N	N	N	N	20	N	N	N	30	N	68
J511120R	N	N	N	N	N	20	N	N	N	10	N	68
J511130R	150	N	N	N	N	200	N	10	N	100	N	68
J511140R	N	N	N	N	N	15	N	N	N	N	N	68
J511150R	100	N	N	N	N	70	N	15	N	100	N	68
J511160R	10	N	N	N	N	50	N	N	N	30	N	68
J511170R	15	N	N	N	N	15	N	N	N	50	N	69
J511180P	N	N	N	N	N	10	N	N	N	70	N	69
J511190R	50	N	N	N	N	50	N	N	N	100	N	69
J511200R	10	N	N	N	N	20	N	N	N	N	N	81
J511210R	50	N	N	N	N	70	N	N	N	100	N	81
J511220R	50	N	N	N	N	15	N	N	N	20	N	81
J511240R	150	N	N	N	N	20	N	N	N	20	N	81
J511250R	150	N	N	N	N	70	N	N	N	50	N	81
J511270R	500	N	N	N	N	50	N	N	N	30	N	81
J511290R	50	N	N	N	N	20	N	N	N	50	N	81
J511300R	500	N	N	N	N	N	N	N	N	N	N	81
J511310P	20	N	N	N	N	15	N	N	N	30	N	81
J511320R	N	N	N	N	N	10	N	N	N	N	N	81
J511330R	500	N	N	N	N	N	N	N	N	N	N	81
J511350R	50	N	N	N	N	15	N	N	N	30	N	81
J511360R	50	N	N	N	N	100	N	N	N	N	N	81
J511370R	100	N	N	N	N	10	N	N	N	N	N	81
J511380R	15	N	N	N	N	N	N	N	N	30	N	81
J511390R	10	N	N	N	N	10	N	N	N	N	N	81
J511400R	N	N	N	N	N	10	N	N	N	N	N	82
J511410R	N	N	N	N	N	10	N	N	N	N	N	82
J511420R	<10	N	N	N	N	N	N	N	N	20	N	82

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, JOPLIN 1 x 2 QUADRANGLE,
MISSOURI AND KANSAS.--Continued

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
J511430R	36 59 40	94 34 50	20.00	.10	.15	.030	50	N	N	N
J511440R	36 59 40	94 34 50	7.00	.10	.20	.030	30	N	N	N
J511450R	36 59 40	94 34 50	1.00	.15	.15	.030	10	N	N	N
J511460R	36 59 40	94 34 50	10.00	.50	.05	.300	70	N	N	N
J511470R	36 59 40	94 34 50	7.00	1.00	.10	.500	50	N	N	N
J511480R	36 59 40	94 34 50	10.00	1.00	.20	.500	70	N	N	N
J511490R	36 59 40	94 34 50	5.00	1.00	.20	.700	30	N	N	N
J511500R	36 59 40	94 34 50	7.00	1.00	.20	.500	50	N	N	N
J511510R	36 59 40	94 34 50	3.00	1.00	.15	.500	50	N	N	N
J511520R	36 59 40	94 34 50	3.00	1.50	.30	.500	70	N	N	N
J511530R	36 59 40	94 34 50	5.00	1.00	.20	.500	50	N	N	N
J511540R	36 59 40	94 34 50	3.00	1.50	.20	.700	50	N	N	N
J511550R	36 59 40	94 34 50	3.00	1.00	.10	.500	50	N	N	N
J511560R	36 59 40	94 34 50	7.00	1.50	.07	.200	30	N	N	N
J511570R	36 59 40	94 34 50	10.00	.70	.05	.200	50	N	N	N
J511580R	36 59 40	94 34 50	5.00	1.00	.20	.300	50	N	N	N
J511590R	36 59 40	94 34 50	10.00	1.00	.05	.150	30	N	N	N
J511600R	36 59 40	94 34 50	2.00	.70	.10	.200	50	N	N	N
J511610R	36 59 40	94 34 50	.70	.10	<.05	.050	10	N	N	N
J511620R	36 59 40	94 34 50	.50	.07	<.05	.100	N	N	N	N
J511630R	36 59 40	94 34 50	.50	.15	<.05	.150	10	N	N	N
J511640R	36 59 40	94 34 50	.15	.05	<.05	.100	10	N	N	N
J511650R	36 59 40	94 34 50	.50	.05	<.05	.100	10	N	N	N
J511660R	36 59 40	94 34 50	1.50	.20	<.05	.150	20	N	N	N
J511670R	36 59 40	94 34 50	3.00	.07	<.05	.100	20	N	N	N
J511680R	36 59 40	94 34 50	1.00	.20	<.05	.150	30	N	N	N
J511685R	36 59 40	94 34 50	1.00	.15	<.05	.100	20	N	N	N

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, JOPLIN 1 x 2 QUADRANGLE,
MISSOURI AND KANSAS.--Continued

Sample	R-ppm S	Ba-ppm S	Be-ppm S	Ri-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
J511430R	20	50	N	N	N	15	N	150	N	50	N	70
J511440R	100	50	N	N	N	1,000	N	50	N	30	N	70
J511450R	100	100	N	N	N	20	N	10	N	10	N	30
J511460R	70	500	2.0	N	N	20	50	100	50	50	N	100
J511470R	100	500	2.0	N	N	15	50	70	70	30	20	30
J511480R	100	700	1.5	N	N	7	50	70	50	30	N	30
J511490R	150	500	2.0	N	N	5	50	50	70	5	N	50
J511500R	150	500	2.0	N	N	5	50	30	50	10	N	20
J511510R	100	700	1.5	N	N	N	30	15	50	5	N	15
J511520R	150	700	1.5	N	N	N	50	20	50	N	N	15
J511530R	100	500	1.5	N	N	7	30	15	50	N	N	15
J511540R	150	700	1.5	N	N	5	30	10	50	N	N	10
J511550R	150	700	2.0	N	N	15	30	15	70	N	N	15
J511560R	200	500	15.0	N	N	15	20	7	20	N	N	15
J511570R	100	500	1.5	N	N	20	10	70	70	20	N	20
J511580R	100	700	2.0	N	N	10	10	50	100	5	N	15
J511590R	150	700	7.0	N	N	30	20	70	30	20	N	20
J511600R	100	700	7.0	N	N	5	10	15	N	N	N	10
J511610R	20	100	1.0	N	N	N	N	5	N	N	N	5
J511620P	15	200	N	N	N	N	N	<5	N	N	N	N
J511630R	50	300	1.0	N	N	N	N	5	N	N	N	5
J511640R	20	100	<1.0	N	N	N	N	<5	N	N	N	5
J511650R	20	150	<1.0	N	N	N	N	<5	N	N	N	5
J511660R	100	300	1.0	N	N	5	N	5	N	N	N	7
J511670R	50	300	1.0	N	N	N	N	7.	N	N	N	5
J511680R	70	500	1.5	N	N	N	10	<5	N	N	N	7
J511685R	50	150	1.5	N	N	N	N	100	N	N	N	10

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 51, 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	Y-ppm S	W-ppm S	Y-ppm S	Zn-ppm S	Zr-ppm S	Th-ppm S	Form#
J511430R	50	N	N	N	N	N	N	N	N	10	N	82
J511440R	10	N	N	N	N	N	100	N	N	50	N	82
J511450R	20	N	N	N	N	N	N	N	N	30	N	83
J511460R	100	N	N	N	N	15	N	20	N	200	N	83
J511470R	100	N	N	N	100	50	N	30	N	500	N	83
J511480R	100	N	N	N	100	30	N	30	N	300	N	83
J511490R	30	N	N	N	100	50	N	30	N	200	N	83
J511500R	100	N	N	N	100	50	N	30	N	200	N	83
J511510R	30	N	N	N	100	50	N	30	N	200	N	83
J511520R	30	N	N	N	100	50	70	30	N	200	N	71
J511530R	30	N	N	N	100	50	N	30	N	200	N	71
J511540R	20	N	N	N	100	50	N	30	N	300	N	71
J511550R	30	N	N	N	100	50	N	30	N	150	N	71
J511560R	15	N	N	N	100	30	N	20	N	200	N	71
J511570R	50	N	N	N	100	30	N	30	N	200	N	71
J511580R	70	N	N	N	100	30	N	30	N	200	N	71
J511590R	70	N	N	N	100	30	N	15	N	100	N	71
J511600R	20	N	N	N	<100	20	N	20	N	700	N	71
J511610R	N	N	N	N	N	10	N	N	N	300	N	86
J511620R	N	N	N	N	N	15	N	10	N	1,000	N	86
J511630R	N	N	N	N	N	15	N	10	N	300	N	86
J511640R	N	N	N	N	N	10	N	15	N	300	N	86
J511650R	N	N	N	N	N	20	N	10	N	200	N	86
J511660R	10	N	N	N	N	30	50	20	N	200	N	86
J511670R	N	N	N	N	N	15	N	20.	N	300	N	86
J511680R	<10	N	N	N	N	20	N	20	N	200	N	86
J511685R	<10	N	N	15	N	15	N	20	N	300	N	90