

UNITED STATES DEPARTMENT OF THE INTERIOR
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**Spectrographic analyses of insoluble-residue samples,
in and adjacent to the Joplin 1° x 2° quadrangle,
Kansas and Missouri: Drill hole nos. 59, 60, and 61**

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 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. 59 (#31 Manwarren - KGS), drill hole no. 60 (#1 Oaks - KGS), and drill hole no. 61 (#1 Gillam - KGS) are given in this report. Drill hole no. 59 is located in sec. 1, T. 27 S., R. 12 E. in Greenwood County, Kansas; drill hole no. 60 is located in sec. 30, T. 27 S., R. 12 E. in Greenwood County, Kansas; drill hole no. 61 is located in sec. 4, T. 35 S., R. 15 E. in Montgomery County, Kansas (fig. 1). Data for the insoluble-residue samples from drill holes 59, 60, and 61 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 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:

For those given in percent:

Calcium	0.05
Iron	0.05
Magnesium	0.02
Titanium	0.002

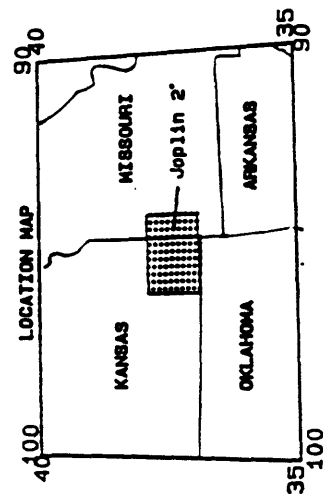
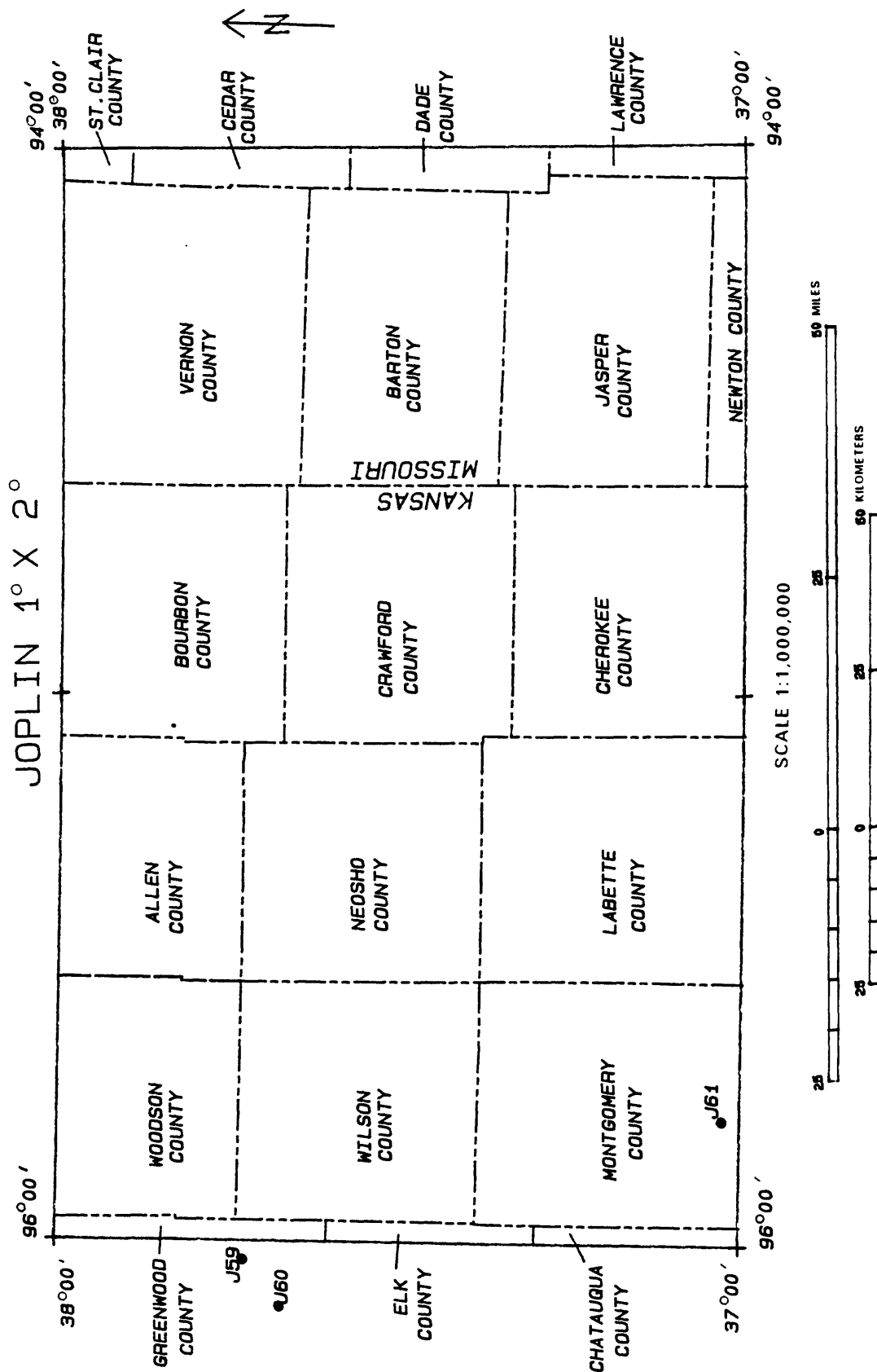


Figure 1. Locations of drill holes 59, 60, and 61, Joplin 1° x 2° quadrangle, Missouri and Kansas.

<u>For those given in ppm:</u>			
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 3. 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

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) 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 his staff, for making these drill-hole samples available from their sample library.

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. 59, 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
J59R0420	37 43 15	96 2 55	2.0	.50	.07	.70	70	N	N	N
J59R0490	37 43 15	96 2 55	2.0	.50	.07	.70	100	N	N	N
J59R0530	37 43 15	96 2 55	3.0	.70	.20	.70	100	N	N	N
J59R0570	37 43 15	96 2 55	3.0	1.00	.10	.70	100	N	N	N
J59R0620	37 43 15	96 2 55	3.0	.70	.30	.70	100	N	N	N
J59R0650	37 43 15	96 2 55	3.0	1.00	.10	.70	150	N	N	N
J59R0700	37 43 15	96 2 55	2.0	1.00	.07	.70	100	N	N	N
J59R0750	37 43 15	96 2 55	2.0	.70	.05	.50	70	N	N	N
J59R0800	37 43 15	96 2 55	2.0	.70	.07	.70	100	N	N	N
J59R0850	37 43 15	96 2 55	3.0	1.00	.05	.70	150	N	N	N
J59R0900	37 43 15	96 2 55	3.0	1.00	.10	.50	70	N	N	N
J59R0950	37 43 15	96 2 55	3.0	1.00	.15	.50	150	.7	N	N
J59R1000	37 43 15	96 2 55	3.0	1.00	.20	.70	150	.5	N	N
J59R1050	37 43 15	96 2 55	3.0	1.00	.07	.50	200	N	N	N
J59R1100	37 43 15	96 2 55	3.0	1.00	.07	.70	200	<.5	N	N
J59R1150	37 43 15	96 2 55	3.0	1.00	.07	.50	100	<.5	N	N
J59R1200	37 43 15	96 2 55	2.0	1.00	.05	.50	150	N	N	N
J59R1250	37 43 15	96 2 55	3.0	1.00	.10	.50	150	.5	N	N
J59R1300	37 43 15	96 2 55	3.0	1.00	.10	.70	150	<.5	N	N
J59R1350	37 43 15	96 2 55	5.0	1.00	.05	.70	150	<.5	N	N
J59R1400	37 43 15	96 2 55	5.0	1.00	.05	.70	200	<.5	N	N
J59R1450	37 43 15	96 2 55	3.0	1.00	<.05	.70	200	<.5	N	N
J59R1500	37 43 15	96 2 55	3.0	1.00	<.05	.70	200	<.5	N	N
J59R1550	37 43 15	96 2 55	3.0	.70	<.05	.50	100	N	N	N
J59R1600	37 43 15	96 2 55	3.0	.70	<.05	.30	100	N	N	N
J59R1620	37 43 15	96 2 55	2.0	.20	<.05	.20	50	N	N	N
J59R1640	37 43 15	96 2 55	1.0	.15	<.05	.15	20	1.0	N	N
J59R1657	37 43 15	96 2 55	.7	.10	<.05	.10	15	N	N	N
J59R1670	37 43 15	96 2 55	1.0	.15	.05	.20	30	N	N	N
J59R1690	37 43 15	96 2 55	1.0	.15	.05	.20	30	N	N	N
J59R1710	37 43 15	96 2 55	1.0	.20	.05	.20	30	N	N	N
J59R1730	37 43 15	96 2 55	.7	.10	.05	.20	30	N	N	N
J59R1750	37 43 15	96 2 55	1.5	.20	.10	.20	50	N	N	N
J59R1790	37 43 15	96 2 55	1.5	.20	.07	.20	30	N	N	N
J59R1820	37 43 15	96 2 55	2.0	.30	.05	.20	50	N	N	N
J59R1830	37 43 15	96 2 55	3.0	.70	.05	.30	100	N	N	N
J59R1890	37 43 15	96 2 55	3.0	.70	.05	.50	100	N	N	N
J59R1950	37 43 15	96 2 55	5.0	1.00	<.05	.50	100	N	N	N
J59R1950	37 43 15	96 2 55	1.0	.20	.07	.20	50	N	N	N
J59R2000	37 43 15	96 2 55	2.0	.30	.05	.30	50	N	N	N
J59R2060	37 43 15	96 2 55	1.5	.20	.05	.15	20	N	N	N

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 59, 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
J59R0420	150	500	3.0	N	N	10	100	30	70	N	<20	30
J59R0490	100	300	2.0	N	N	7	100	50	50	N	<20	30
J59R0530	150	500	3.0	N	N	15	100	200	50	N	<20	50
J59R0570	150	300	3.0	N	N	15	100	50	50	N	<20	50
J59R0620	100	1,000	2.0	N	20	15	100	100	50	N	<20	50
J59R0650	100	1,000	2.0	N	N	10	100	50	50	N	<20	50
J59R0700	100	700	2.0	N	N	10	100	70	50	N	<20	30
J59R0750	100	500	2.0	N	N	10	70	100	20	N	<20	20
J59R0800	150	500	3.0	N	N	10	100	300	50	N	<20	30
J59R0850	150	700	3.0	N	N	15	100	30	50	N	<20	50
J59R0900	150	500	2.0	N	N	15	100	30	50	N	<20	50
J59R0950	150	500	2.0	N	N	15	150	100	50	20	<20	100
J59R1000	150	300	2.0	N	<20	15	150	150	20	20	<20	100
J59R1050	150	500	2.0	N	N	20	100	70	20	<5	<20	70
J59R1100	100	700	2.0	N	N	20	100	50	30	7	<20	100
J59R1150	150	300	3.0	N	N	20	150	50	50	7	<20	100
J59R1200	100	300	2.0	N	N	15	70	50	50	N	<20	20
J59R1250	150	500	3.0	N	N	20	200	50	30	5	<20	70
J59R1300	150	500	3.0	N	N	20	150	70	50	10	<20	100
J59R1350	150	700	3.0	N	N	30	150	70	300	7	<20	70
J59R1400	150	500	3.0	N	N	30	100	50	50	5	<20	70
J59R1450	150	500	3.0	N	N	30	100	50	50	<5	<20	70
J59R1500	100	500	2.0	N	N	30	100	150	50	5	<20	70
J59R1550	100	200	3.0	N	N	30	150	70	70	<5	<20	100
J59R1600	100	150	3.0	N	N	20	100	30	30	N	<20	50
J59R1620	100	100	1.5	N	N	10	50	15	20	N	N	20
J59R1640	100	100	1.0	N	N	<5	15	20	N	N	N	10
J59R1657	70	70	N	N	N	N	N	15	N	N	N	10
J59R1670	100	100	1.0	N	N	5	20	5	20	N	N	15
J59R1690	100	70	1.0	N	N	7	20	10	N	N	N	15
J59R1710	100	100	1.0	N	N	5	20	7	N	N	N	15
J59R1730	100	100	1.0	N	N	N	10	7	N	N	N	10
J59R1750	100	100	1.0	N	N	7	30	15	N	N	N	15
J59R1790	100	70	1.0	N	N	7	20	50	N	<5	N	30
J59R1820	100	150	1.5	N	N	5	50	15	20	N	<20	20
J59R1830	100	150	1.5	N	N	20	50	20	20	15	<20	50
J59R1890	150	200	2.0	N	N	10	100	20	20	10	<20	30
J59R1950	150	200	3.0	N	N	30	100	30	30	50	<20	50
J59R1950	100	100	1.0	N	N	5	10	10	N	N	N	15
J59R2000	100	150	2.0	N	N	15	50	50	20	N	N	70
J59R2060	100	150	N	N	N	15	20	10	N	5	N	15

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 59, 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#
J59R0420	50	N	15	N	150	200	<50	20	N	200	N	20
J59R0490	70	N	10	N	100	150	50	30	<200	300	N	20
J59R0530	700	N	15	N	150	150	N	20	<200	200	N	20
J59R0570	100	N	20	N	100	200	50	20	<200	500	N	20
J59R0620	50	N	20	N	200	150	<50	50	2,000	300	N	20
J59R0650	N	N	20	N	200	200	<50	50	<200	500	N	20
J59R0700	N	N	15	N	150	150	N	30	N	200	N	20
J59R0750	50	N	10	N	100	150	N	20	200	150	N	20
J59R0800	70	N	20	N	150	200	N	30	700	300	N	20
J59R0850	30	N	20	N	150	200	<50	30	N	300	N	20
J59R0900	30	N	15	N	100	150	N	30	N	200	N	20
J59R0950	50	N	10	N	100	200	N	20	200	200	N	20
J59R1000	15	N	10	N	100	200	N	20	700	200	N	20
J59R1050	15	N	10	N	100	200	N	20	N	200	N	20
J59R1100	100	N	15	N	150	200	N	20	300	200	N	20
J59R1150	20	N	15	N	100	200	N	20	300	150	N	20
J59R1200	10	N	15	N	150	150	N	20	N	300	N	20
J59R1250	30	N	15	N	150	200	N	20	<200	200	N	20
J59R1300	15	N	15	N	150	200	N	20	300	200	N	20
J59R1350	15	N	20	N	150	200	N	50	500	200	N	20
J59R1400	15	N	15	N	150	150	N	50	N	200	N	20
J59R1450	20	N	20	N	150	150	N	30	200	200	N	20
J59R1500	20	N	20	N	150	200	N	30	<200	200	N	20
J59R1550	20	N	15	N	200	150	N	30	N	150	N	20
J59R1600	70	N	10	N	100	100	N	30.	N	150	N	20
J59R1620	15	N	7	N	100	70	N	20	200	100	N	40
J59R1640	N	N	<5	N	N	30	N	10	N	50	N	40
J59R1657	N	N	N	N	N	20	N	N	N	30	N	40
J59R1670	N	N	<5	N	100	50	N	N	N	70	N	40
J59R1690	N	N	5	N	N	70	N	10	N	70	N	40
J59R1710	N	N	<5	N	N	70	N	N	N	100	N	40
J59R1730	N	N	N	N	N	30	N	N	N	100	N	40
J59R1750	N	N	5	N	N	50	N	N	N	100	N	40
J59R1790	N	N	5	N	N	70	N	N	N	70	N	40
J59R1820	N	N	7	N	N	100	N	15	N	100	N	40
J59R1830	10	N	10	N	N	150	N	20	N	150	N	31
J59R1890	15	N	10	N	100	150	N	15	N	200	N	60
J59R1950	50	N	15	N	N	200	N	30	N	150	N	60
J59R1950	N	N	<5	N	N	50	N	N	N	70	N	60
J59R2000	<10	N	10	N	100	100	N	10	N	100	N	60
J59R2060	N	N	N	N	N	30	N	N	N	70	N	60

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 60, 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
J60R0150	37 39 35	96 6 48	3.0	.50	.05	.70	50	N	N	N
J60R0200	37 39 35	96 6 48	2.0	.50	.05	.50	70	N	N	N
J60R0250	37 39 35	96 6 48	1.5	.30	.05	.50	50	N	N	N
J60R0300	37 39 35	96 6 48	2.0	.30	.05	.50	50	N	N	N
J60R0350	37 39 35	96 6 48	2.0	.30	.05	.50	50	N	N	N
J60R0400	37 39 35	96 6 48	2.0	.50	.05	.70	70	N	N	N
J60R0450	37 39 35	96 6 48	1.5	.30	.05	.50	50	N	N	N
J60R0500	37 39 35	96 6 48	1.5	.30	.05	.50	50	N	N	N
J60R0550	37 39 35	96 6 48	3.0	.70	.07	.50	70	N	N	N
J60R0600	37 39 35	96 6 48	2.0	.70	.05	.50	70	N	N	N
J60R0650	37 39 35	96 6 48	2.0	.70	.05	.50	70	N	N	N
J60R0750	37 39 35	96 6 48	3.0	.50	.07	.50	70	N	N	N
J60R0800	37 39 35	96 6 48	5.0	.50	.10	.50	70	N	N	N
J60R0850	37 39 35	96 6 48	2.0	.70	.07	.50	100	N	N	N
J60R0870	37 39 35	96 6 48	2.0	.50	.05	.50	100	N	N	N
J60R0890	37 39 35	96 6 48	2.0	.70	.05	.50	100	N	N	N
J60R0910	37 39 35	96 6 48	2.0	.70	.05	.50	100	N	N	N
J60R0930	37 39 35	96 6 48	2.0	.70	.05	.50	100	N	N	N
J60R0950	37 39 35	96 6 48	2.0	.70	.05	.50	100	N	N	N
J60R0970	37 39 35	96 6 48	3.0	.70	.05	.50	100	N	N	N
J60R0990	37 39 35	96 6 48	5.0	1.00	.05	.70	100	N	N	N
J60R1010	37 39 35	96 6 48	3.0	1.00	.05	.50	100	N	N	N
J60R1030	37 39 35	96 6 48	5.0	.70	.05	.50	70	N	N	N
J60R1050	37 39 35	96 6 48	5.0	.70	.07	.50	70	N	N	N
J60R1070	37 39 35	96 6 48	5.0	.50	.07	.50	50	N	N	N
J60R1090	37 39 35	96 6 48	5.0	.50	.07	.50	50	<.5	N	N
J60R1120	37 39 35	96 6 48	3.0	.50	.07	.50	70	N	N	N
J60R1150	37 39 35	96 6 48	3.0	.50	.07	.50	70	N	N	N
J60R1180	37 39 35	96 6 48	3.0	.50	.07	.50	70	N	N	N
J60R1210	37 39 35	96 6 48	2.0	.50	.07	.50	70	N	N	N
J60R1230	37 39 35	96 6 48	2.0	.50	.05	.30	70	N	N	N
J60R1250	37 39 35	96 6 48	3.0	1.00	.05	.50	100	N	N	N
J60R1270	37 39 35	96 6 48	3.0	1.00	.07	.50	150	N	N	N
J60R1290	37 39 35	96 6 48	3.0	1.00	.05	.50	150	N	N	N
J60R1310	37 39 35	96 6 48	3.0	1.00	.05	.70	150	N	N	N
J60R1330	37 39 35	96 6 48	3.0	.70	.05	.50	150	N	N	N
J60R1360	37 39 35	96 6 48	3.0	.70	.07	.50	150	N	N	N
J60R1380	37 39 35	96 6 48	2.0	.70	.05	.50	150	N	N	N
J60R1410	37 39 35	96 6 48	3.0	.70	.05	.50	150	N	N	N
J60R1430	37 39 35	96 6 48	3.0	.70	<.05	.50	100	N	N	N
J60R1450	37 39 35	96 6 48	5.0	1.00	.10	.50	150	N	N	N
J60R1470	37 39 35	96 6 48	3.0	1.00	.10	.50	150	.5	N	N
J60R1490	37 39 35	96 6 48	3.0	1.00	.10	.50	150	1.0	N	N
J60R1520	37 39 35	96 6 48	3.0	1.00	.07	.50	100	.7	N	N
J60R1530	37 39 35	96 6 48	3.0	.70	.05	.50	100	N	N	N

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 60, JOPLIN 1 x 2 QUADRANGLE,
MISSOURI AND KANSAS.---Continued

Sample	P-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
J60R0150	100	700	2.0	N	N	10	100	20	50	N	<20	20
J60R0200	100	500	2.0	N	N	7	100	15	50	N	<20	30
J60R0250	100	300	1.5	N	N	5	100	50	30	N	<20	20
J60R0300	100	200	2.0	N	N	7	100	15	50	N	<20	20
J60R0350	100	200	2.0	N	N	10	70	50	50	N	<20	30
J60R0400	150	300	3.0	N	N	30	100	30	50	N	<20	30
J60R0450	100	200	2.0	N	N	15	100	10	50	N	<20	20
J60R0500	100	200	2.0	N	N	7	100	10	50	N	<20	20
J60R0550	150	200	2.0	N	N	30	150	200	50	N	<20	50
J60R0600	150	300	3.0	N	N	10	150	20	70	N	<20	30
J60R0650	100	300	3.0	N	N	10	100	20	70	N	<20	30
J60R0750	100	700	2.0	N	N	15	100	50	30	N	<20	50
J60R0800	150	500	2.0	N	N	20	100	100	50	5	<20	70
J60R0850	100	300	2.0	N	N	15	100	20	50	N	<20	30
J60R0870	100	300	2.0	N	N	15	100	30	50	N	<20	20
J60R0890	100	300	2.0	N	N	20	100	30	50	N	<20	30
J60R0910	100	300	2.0	N	N	20	100	20	50	N	<20	30
J60R0930	100	300	2.0	N	N	15	100	30	50	N	<20	30
J60R0950	100	300	2.0	N	N	15	100	50	50	N	<20	30
J60R0970	100	500	3.0	N	N	10	100	30	50	N	<20	50
J60R0990	100	500	3.0	N	N	15	150	50	70	N	<20	50
J60R1010	100	300	2.0	N	N	15	150	100	70	N	<20	50
J60R1030	100	200	3.0	N	N	20	100	200	20	N	<20	50
J60R1050	100	300	3.0	N	<20	15	100	150	30	N	<20	50
J60R1070	100	300	2.0	N	N	15	100	70	N	N	<20	50
J60R1090	150	300	2.0	N	<20	15	100	20	20	N	<20	50
J60R1120	100	150	2.0	N	N	10	100	100	20	N	<20	50
J60R1150	100	200	3.0	N	N	15	150	30	20	7	<20	70
J60R1180	100	200	2.0	N	N	10	100	20	20	7	<20	70
J60R1210	100	200	2.0	N	N	7	100	20	20	N	<20	30
J60R1230	100	150	2.0	N	N	7	70	15	20	N	<20	20
J60R1250	100	150	3.0	N	N	20	100	70	20	N	<20	50
J60R1270	100	150	3.0	N	N	20	100	50	20	N	<20	70
J60R1290	100	200	3.0	N	N	20	100	50	20	N	<20	100
J60R1310	100	200	3.0	N	N	30	100	50	20	N	<20	70
J60R1330	100	200	2.0	N	N	20	100	50	20	N	<20	50
J60R1360	100	200	2.0	N	N	15	100	100	20	N	<20	50
J60R1380	100	200	2.0	N	N	20	100	70	20	N	<20	30
J60R1410	100	200	2.0	N	N	20	100	30	20	N	<20	50
J60R1430	100	150	2.0	N	N	20	100	20	N	N	<20	50
J60R1450	100	200	3.0	N	<20	20	100	30	30	<5	<20	70
J60R1470	100	200	3.0	N	<20	30	200	70	20	15	<20	100
J60R1490	100	700	2.0	10	<20	20	150	50	20	10	<20	100
J60R1520	100	500	2.0	N	<20	20	300	200	30	30	<20	150
J60R1530	100	300	2.0	N	N	20	100	20	50	5	<20	50

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 60, 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#
J60R0150	15	N	10	N	150	150	N	30	N	300	N	20
J60R0200	10	N	15	N	150	150	N	30	N	200	N	20
J60R0250	N	N	10	N	100	100	N	20	N	300	N	20
J60R0300	N	N	10	N	100	100	N	20	700	300	N	20
J60R0350	N	N	15	N	100	100	N	30	N	200	N	20
J60R0400	<10	N	15	N	150	150	N	30	<200	200	N	20
J60R0450	N	N	10	N	150	100	N	30	N	300	N	20
J60R0500	N	N	10	N	100	100	N	20	N	300	N	20
J60R0550	<10	N	20	N	150	100	N	30	N	300	N	20
J60R0600	<10	N	20	N	150	150	N	50	<200	200	N	20
J60R0650	<10	N	20	N	150	200	N	50	N	200	N	20
J60R0750	<10	N	15	N	150	150	N	20	<200	150	N	20
J60R0800	20	N	20	N	150	150	N	30	200	150	N	20
J60R0850	15	N	15	N	200	150	50	20	N	300	N	20
J60R0870	<10	N	15	N	1,500	150	N	20	N	200	N	20
J60R0890	<10	N	15	N	1,000	150	N	30	N	200	N	20
J60R0910	<10	N	15	N	500	150	N	30	N	150	N	20
J60R0930	<10	N	15	N	1,000	150	N	30	N	200	N	20
J60R0950	<10	N	15	N	300	200	N	30	N	150	N	20
J60R0970	<10	N	15	N	700	150	N	20	300	150	N	20
J60R0990	<10	N	20	N	1,000	200	N	30	500	150	N	20
J60R1010	10	N	20	N	100	150	N	20	N	150	N	20
J60R1030	15	N	15	N	100	150	N	20	N	100	N	20
J60R1050	10	N	15	N	1,000	200	N	20	1,000	150	N	20
J60R1070	10	N	15	N	200	200	50	20	N	100	N	20
J60R1090	<10	N	15	N	100	150	N	20	1,000	150	N	20
J60R1120	10	N	10	N	N	150	N	20	N	100	N	20
J60R1150	10	N	15	N	N	200	N	20	500	200	N	20
J60R1180	10	N	10	N	N	150	N	15	300	150	N	20
J60R1210	<10	N	10	N	N	100	N	20	N	200	N	20
J60R1230	<10	N	7	N	N	100	N	15	N	100	N	20
J60R1250	N	N	15	N	N	100	N	20	N	150	N	20
J60R1270	15	N	15	N	150	150	N	20	200	100	N	20
J60R1290	15	N	15	N	150	200	N	15	300	100	N	20
J60R1310	10	N	15	N	100	200	N	20	N	150	N	20
J60R1330	N	N	10	N	100	100	N	30	N	200	N	20
J60R1360	N	N	7	N	100	100	N	20	N	200	N	20
J60R1380	N	N	7	N	100	100	N	15	N	200	N	20
J60R1410	<10	N	10	N	100	100	N	20	N	200	N	20
J60R1430	<10	N	10	N	100	150	N	20	N	150	N	20
J60R1450	10	N	15	N	100	100	N	20	700	150	N	20
J60R1470	20	N	10	N	N	150	N	20	700	150	N	20
J60R1490	10,000	N	10	N	200	100	N	20	500	100	N	20
J60R1520	70	N	10	N	100	200	N	20	700	150	N	20
J60R1530	10	N	15	N	150	100	N	30	N	200	N	20

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 60, JOPLIN 1 x 2 QUADRANGLE,
MISSOURI AND KANSAS.--Continued

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
J60R1550	37 39 35	96 6 48	5.0	1.00	<.05	.70	200	N	N	N
J60R1570	37 39 35	96 6 48	5.0	1.00	<.05	.70	200	N	N	N
J60R1590	37 39 35	96 6 48	5.0	1.00	.07	.50	200	.5	N	N
J60R1620	37 39 35	96 6 48	5.0	1.00	.05	.70	200	N	N	N
J60R1650	37 39 35	96 6 48	5.0	.70	<.05	.50	150	N	N	N
J60R1670	37 39 35	96 6 48	3.0	.70	<.05	.70	150	N	N	N
J60R1690	37 39 35	96 6 48	3.0	.70	<.05	.50	150	N	N	N
J60R1700	37 39 35	96 6 48	2.0	.70	.07	.50	70	N	N	N
J60R1710	37 39 35	96 6 48	3.0	.70	<.05	.50	150	N	N	N
J60R1730	37 39 35	96 6 48	5.0	.70	<.05	.50	150	N	N	N
J60R1750	37 39 35	96 6 48	5.0	.70	<.05	.50	150	N	N	N
J60R1770	37 39 35	96 6 48	5.0	.70	<.05	.50	100	N	N	N
J60R1790	37 39 35	96 6 48	5.0	.70	<.05	.50	100	N	N	N
J60R1810	37 39 35	96 6 48	5.0	.70	<.05	.50	100	N	N	N
J60R1820	37 39 35	96 6 48	5.0	.70	<.05	.50	70	N	N	N
J60R1840	37 39 35	96 6 48	5.0	.70	.05	.70	100	N	N	N
J60R1860	37 39 35	96 6 48	3.0	.50	.05	.20	70	N	N	N
J60R1880	37 39 35	96 6 48	3.0	.50	.05	.30	100	N	N	N
J60R1900	37 39 35	96 6 48	5.0	.70	.05	.30	100	<.5	N	N
J60R1920	37 39 35	96 6 48	5.0	.30	.05	.20	100	<.5	N	N
J60R1940	37 39 35	96 6 48	2.0	.20	.07	.15	30	N	N	N
J60R1960	37 39 35	96 6 48	2.0	.15	.05	.15	50	N	N	N
J60R1980	37 39 35	96 6 48	2.0	.20	.05	.20	50	N	N	N
J60R2000	37 39 35	96 6 48	1.5	.15	.07	.15	30	N	N	N
J60R2020	37 39 35	96 6 48	1.5	.20	.05	.20	50	N	N	N
J60R2040	37 39 35	96 6 48	2.0	.20	.05	.20	50	N	N	N
J60R2060	37 39 35	96 6 48	2.0	.20	.05	.20	70	N	N	N
J60R2080	37 39 35	96 6 48	2.0	.20	.07	.20	50	N	N	N
J60R2100	37 39 35	96 6 48	3.0	.30	.07	.30	50	N	N	N
J60R2120	37 39 35	96 6 48	3.0	.50	.07	.50	70	N	N	N
J60R2140	37 39 35	96 6 48	5.0	.70	.05	.50	100	N	N	N
J60R2160	37 39 35	96 6 48	5.0	.70	<.05	.50	100	N	N	N
J60R2180	37 39 35	96 6 48	5.0	1.00	.05	.50	150	N	N	N
J60R2197	37 39 35	96 6 48	5.0	.50	.10	.50	70	N	N	N

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 60, 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
J60R1550	100	200	2.0	N	N	30	100	50	50	N	<20	50
J60R1570	100	200	3.0	N	N	30	100	30	50	N	<20	50
J60R1590	100	700	3.0	N	20	30	100	100	50	10	<20	100
J60R1620	150	200	3.0	N	N	30	100	50	70	<5	<20	70
J60R1650	150	200	3.0	N	N	30	100	50	50	7	<20	70
J60R1670	200	200	3.0	N	N	20	100	50	50	N	<20	50
J60R1690	100	200	2.0	N	N	20	70	20	20	N	<20	30
J60R1700	100	500	3.0	N	N	15	100	20	70	N	<20	50
J60R1710	100	300	3.0	N	N	20	100	50	50	N	<20	50
J60R1730	150	200	3.0	N	N	30	100	15	50	N	<20	70
J60R1750	150	200	3.0	N	N	30	100	150	70	N	<20	100
J60R1770	100	200	3.0	N	N	30	100	100	50	N	<20	100
J60R1790	150	300	3.0	N	N	30	100	50	50	N	<20	100
J60R1810	150	200	3.0	N	N	30	100	50	50	N	<20	100
J60R1820	150	200	3.0	N	N	30	100	50	50	N	<20	100
J60R1840	200	150	3.0	N	N	30	100	30	50	5	<20	70
J60R1860	100	100	2.0	N	N	7	70	300	30	7	<20	50
J60R1880	150	150	2.0	N	N	10	100	50	20	N	<20	50
J60R1900	150	150	2.0	N	N	15	100	50	20	<5	<20	70
J60R1920	100	100	1.5	N	N	15	70	30	30	N	<20	70
J60R1940	150	70	1.0	N	N	5	50	10	20	N	<20	30
J60R1960	100	70	1.0	N	N	7	50	15	20	N	<20	20
J60R1980	100	100	1.0	N	<20	7	30	70	20	N	<20	20
J60R2000	100	100	N	N	5	5	30	7	20	N	<20	15
J60R2020	100	100	1.0	N	<20	7	50	10	20	N	N	30
J60R2040	100	100	1.0	N	N	5	50	10	20	N	N	20
J60R2060	100	100	1.5	N	N	10	70	15	50	N	N	50
J60R2080	100	100	1.5	N	N	10	70	20	30	N	N	50
J60R2100	100	100	1.5	N	N	10	70	20	30	N	<20	70
J60R2120	150	150	2.0	N	N	20	150	100	50	N	<20	100
J60R2140	100	200	2.0	N	N	30	150	20	100	5	<20	100
J60R2160	100	200	3.0	N	N	20	100	30	50	15	<20	70
J60R2180	100	300	3.0	N	N	30	150	50	100	15	<20	70
J60R2197	100	200	1.5	N	N	30	50	30	20	7	<20	50

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 60, 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#
J60R1550	15	N	20	N	100	200	N	50	N	300	N	20
J60R1570	10	N	20	N	100	200	N	30	N	200	N	20
J60R1590	50	N	15	N	100	200	N	20	2,000	300	N	20
J60R1620	30	N	30	N	300	200	N	50	300	300	N	20
J60R1650	20	N	15	N	150	150	N	30	N	200	N	20
J60R1670	10	N	15	N	200	150	N	50	N	300	N	20
J60R1690	<10	N	15	N	150	100	N	30	N	200	N	20
J60R1700	<10	N	20	N	150	200	N	30	500	200	N	20
J60R1710	10	N	15	N	150	150	N	30	N	200	N	20
J60R1730	10	N	20	N	150	200	N	30	N	200	N	20
J60R1750	15	N	20	N	150	200	N	70	N	150	N	20
J60R1770	20	N	20	N	150	150	N	50	N	200	N	20
J60R1790	50	N	20	N	150	200	N	30	N	150	N	20
J60R1810	70	N	20	N	100	200	N	30	N	200	N	20
J60R1820	50	N	20	N	200	200	N	70	300	200	N	20
J60R1840	50	N	20	N	150	200	N	50	N	200	N	40
J60R1860	30	N	5	N	N	150	N	10	700	100	N	40
J60R1880	<10	N	10	N	N	200	N	15	N	150	N	40
J60R1900	15	N	10	N	N	200	N	20	200	100	N	40
J60R1920	20	N	7	N	100	100	N	20	200	70	N	40
J60R1940	N	N	<5	N	N	50	N	10	N	50	N	40
J60R1960	N	N	<5	N	100	50	N	10	N	70	N	40
J60R1980	N	N	5	N	100	50	N	10	1,000	70	N	40
J60R2000	N	N	<5	N	N	50	N	10	N	50	N	40
J60R2020	N	N	5	N	100	70	N	10.	700	70	N	40
J60R2040	N	N	5	N	100	70	N	10	N	70	N	40
J60R2060	<10	N	7	N	200	70	N	10	N	70	N	40
J60R2080	10	N	7	N	150	70	N	15	N	100	N	40
J60R2100	10	N	10	N	100	100	N	20	200	100	N	40
J60R2120	20	N	15	N	150	150	N	30	N	150	N	40
J60R2140	10	N	20	N	200	200	N	30	N	150	N	31
J60R2160	50	N	15	N	100	150	N	30	N	150	N	31
J60R2180	150	N	15	N	500	150	N	30	N	150	N	60
J60R2197	30	N	10	N	150	70	N	20	N	70	N	60

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 61, 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
J61R1020	37 1 49	95 46 35	3.0	.50	<.05	.5	100	N	N	N
J61R1030	37 1 49	95 46 35	2.0	.50	<.05	.5	100	N	N	N
J61R1040	37 1 49	95 46 35	2.0	.50	<.05	.5	150	N	N	N
J61R1050	37 1 49	95 46 35	2.0	.70	<.05	.5	100	N	N	N
J61R1060	37 1 49	95 46 35	2.0	.70	<.05	.7	150	N	N	N
J61R1070	37 1 49	95 46 35	2.0	.50	<.05	.5	70	N	N	N
J61R1080	37 1 49	95 46 35	2.0	.50	<.05	.7	100	N	N	N
J61R1090	37 1 49	95 46 35	2.0	.50	<.05	.7	70	N	N	N
J61R1100	37 1 49	95 46 35	2.0	.50	<.05	.5	150	N	N	N
J61R1110	37 1 49	95 46 35	2.0	.30	<.05	.5	100	N	N	N
J61R1120	37 1 49	95 46 35	2.0	.30	<.05	.5	70	N	N	N
J61R1130	37 1 49	95 46 35	3.0	.50	<.05	.5	100	N	N	N
J61R1140	37 1 49	95 46 35	2.0	.50	<.05	.5	70	N	N	N
J61R1150	37 1 49	95 46 35	2.0	.50	.07	.7	150	N	N	N
J61R1160	37 1 49	95 46 35	2.0	.50	<.05	.7	100	N	N	N
J61R1170	37 1 49	95 46 35	2.0	.50	<.05	.5	100	N	N	N
J61R1180	37 1 49	95 46 35	2.0	.50	<.05	.5	100	N	N	N
J61R1190	37 1 49	95 46 35	2.0	.50	<.05	.5	100	N	N	N
J61R1200	37 1 49	95 46 35	2.0	.50	<.05	.5	100	N	N	N
J61R1210	37 1 49	95 46 35	2.0	.50	<.05	.7	150	N	N	N
J61R1220	37 1 49	95 46 35	2.0	.50	<.05	.7	150	N	N	N
J61R1230	37 1 49	95 46 35	2.0	.50	<.05	.7	100	N	N	N
J61R1240	37 1 49	95 46 35	2.0	.50	<.05	.5	100	N	N	N
J61R1270	37 1 49	95 46 35	2.0	.50	.05	.7	100	N	N	N
J61R1280	37 1 49	95 46 35	2.0	.70	.05	1.0	150	N	N	N
J61R1290	37 1 49	95 46 35	3.0	.70	.05	.7	150	N	N	N
J61R1300	37 1 49	95 46 35	3.0	.70	<.05	.7	150	N	N	N
J61R1310	37 1 49	95 46 35	5.0	.70	<.05	1.0	100	N	N	N
J61R1320	37 1 49	95 46 35	5.0	.70	<.05	.7	100	N	N	N
J61R1330	37 1 49	95 46 35	5.0	.50	<.05	.7	100	N	N	N
J61R1340	37 1 49	95 46 35	3.0	.50	.05	.5	150	N	N	N
J61R1350	37 1 49	95 46 35	5.0	.70	<.05	.5	100	N	N	N
J61R1360	37 1 49	95 46 35	2.0	.30	<.05	.5	70	N	N	N
J61R1370	37 1 49	95 46 35	2.0	.30	.05	.5	70	N	N	N
J61R1380	37 1 49	95 46 35	3.0	.50	.05	.7	70	N	N	N
J61R1390	37 1 49	95 46 35	2.0	.30	.05	.5	70	N	N	N
J61R1400	37 1 49	95 46 35	2.0	.50	.07	.5	70	N	N	N
J61R1410	37 1 49	95 46 35	3.0	.50	.07	.7	100	N	N	N
J61R1420	37 1 49	95 46 35	1.5	.50	.07	.5	50	N	N	N
J61R1430	37 1 49	95 46 35	2.0	.30	.10	.5	50	N	N	N
J61R1440	37 1 49	95 46 35	2.0	.30	.07	.3	50	N	N	N
J61R1450	37 1 49	95 46 35	2.0	.20	.07	.2	50	N	N	N
J61R1460	37 1 49	95 46 35	1.5	.20	.07	.2	50	N	N	N
J61R1470	37 1 49	95 46 35	2.0	.20	.05	.2	70	N	N	N
J61R1480	37 1 49	95 46 35	2.0	.30	.05	.3	50	N	N	N

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 61, 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
J61R1020	150	200	3.0	N	N	30	100	20	70	N	<20	70
J61R1030	100	200	2.0	N	N	15	100	10	70	N	<20	20
J61R1040	100	100	3.0	N	N	10	100	20	50	5	<20	30
J61R1050	100	300	2.0	N	N	20	100	20	50	N	<20	50
J61R1060	150	300	3.0	N	N	20	100	30	70	N	<20	30
J61R1070	100	200	3.0	N	N	7	100	15	50	N	<20	30
J61R1080	100	300	2.0	N	N	15	100	15	70	N	<20	20
J61R1090	100	200	3.0	N	N	15	100	50	50	5	<20	70
J61R1100	100	300	3.0	N	N	30	100	20	50	N	<20	30
J61R1110	100	1,000	2.0	N	N	15	100	30	50	5	<20	20
J61R1120	100	150	2.0	N	N	10	100	20	50	N	<20	20
J61R1130	100	150	3.0	N	N	20	100	20	70	<5	<20	50
J61R1140	100	150	2.0	N	N	20	100	20	30	<5	<20	50
J61R1150	100	150	2.0	N	N	15	100	20	50	N	<20	30
J61R1160	100	200	2.0	N	N	15	100	20	50	N	<20	20
J61R1170	100	200	3.0	N	N	15	70	20	50	<5	<20	20
J61R1180	100	300	2.0	N	N	15	100	15	50	N	<20	30
J61R1190	100	200	2.0	N	N	15	100	20	50	N	<20	20
J61R1200	100	200	2.0	N	N	15	50	20	50	N	<20	20
J61R1210	100	300	2.0	N	N	20	70	30	50	N	<20	30
J61R1220	100	300	2.0	N	N	10	70	20	50	N	<20	20
J61R1230	100	300	2.0	N	N	10	70	15	50	N	<20	15
J61R1240	100	200	2.0	N	N	7	70	10	50	N	<20	15
J61R1270	100	200	1.5	N	N	20	70	10	30	N	<20	20
J61R1280	100	300	2.0	N	N	20	100	20	50	N	<20	20
J61R1290	150	200	3.0	N	N	15	150	20	50	N	<20	30
J61R1300	150	200	5.0	N	N	20	200	30	70	N	<20	70
J61R1310	150	200	3.0	N	N	20	150	20	70	<5	<20	70
J61R1320	100	300	3.0	N	N	30	150	20	70	N	<20	70
J61R1330	100	200	3.0	N	N	20	150	20	70	N	<20	70
J61R1340	100	100	2.0	N	N	15	100	20	30	5	<20	70
J61R1350	150	150	2.0	N	N	10	150	30	50	7	<20	50
J61R1360	200	300	2.0	N	N	10	100	15	50	N	<20	30
J61R1370	150	200	1.5	N	N	10	100	10	50	N	<20	20
J61R1380	100	200	3.0	N	N	15	150	20	50	5	<20	50
J61R1390	150	200	2.0	N	N	20	100	20	20	N	<20	50
J61R1400	150	200	2.0	N	N	10	100	15	50	N	<20	30
J61R1410	150	200	3.0	N	N	20	200	50	70	N	<20	20
J61R1420	150	150	1.0	N	N	10	100	30	30	N	<20	20
J61R1430	100	200	1.5	N	N	10	100	15	30	N	<20	30
J61R1440	100	150	1.0	N	N	7	70	20	30	5	<20	30
J61R1450	100	150	1.0	N	N	7	70	10	30	N	<20	20
J61R1460	100	100	1.0	N	N	5	50	10	30	N	<20	20
J61R1470	100	150	1.5	N	N	10	100	10	30	N	<20	30
J61R1480	100	150	1.5	N	N	10	100	10	30	N	<20	20

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 61, 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#
J61R1020	15	N	15	N	150	200	N	30	N	150	N	20
J61R1030	10	N	15	N	100	150	N	30	N	150	N	20
J61R1040	20	N	10	N	100	150	N	20	N	150	N	20
J61R1050	15	N	15	N	200	150	N	20	N	200	N	20
J61R1060	N	N	20	N	100	150	N	50	N	200	N	20
J61R1070	10	N	15	N	100	150	N	30	N	200	N	20
J61R1080	10	N	20	N	150	150	N	50	N	300	N	20
J61R1090	20	N	20	N	150	200	N	20	500	150	N	20
J61R1100	10	N	20	N	100	150	N	30	N	150	N	20
J61R1110	10	N	15	N	200	150	N	20	N	200	N	20
J61R1120	10	N	15	N	100	150	N	20	N	200	N	20
J61R1130	<10	N	20	N	150	200	N	20	200	150	N	20
J61R1140	15	N	15	N	150	200	N	20	N	150	N	20
J61R1150	10	N	20	N	200	150	N	20	N	200	N	20
J61R1160	10	N	15	N	150	100	N	20	N	200	N	20
J61R1170	<10	N	15	N	100	150	N	20	N	200	N	20
J61R1180	N	N	15	N	100	150	N	20	N	300	N	20
J61R1190	10	N	15	N	100	150	N	20	N	200	N	20
J61R1200	10	N	15	N	100	100	N	20	N	200	N	20
J61R1210	10	N	15	N	100	150	N	30	N	300	N	20
J61R1220	10	N	10	N	100	100	N	20	N	300	N	20
J61R1230	<10	N	10	N	150	100	N	20	N	300	N	20
J61R1240	<10	N	15	N	100	100	N	20	N	300	N	20
J61R1270	N	N	10	N	100	150	N	30	N	500	N	20
J61R1280	10	N	15	N	100	150	N	20	N	500	N	20
J61R1290	10	N	15	N	100	200	N	20	N	300	N	20
J61R1300	20	N	20	N	150	300	N	20	<200	200	N	20
J61R1310	20	N	30	N	100	500	N	50	<200	300	N	20
J61R1320	15	N	20	N	100	300	N	20	N	150	N	20
J61R1330	15	N	20	N	100	200	N	20	N	200	N	20
J61R1340	30	N	10	N	100	150	N	15	N	100	N	20
J61R1350	30	N	15	N	100	200	N	20	N	150	N	20
J61R1360	15	N	10	N	100	100	<50	20	N	100	N	20
J61R1370	10	N	10	N	100	100	<50	15	N	150	N	40
J61R1380	15	N	20	N	100	150	<50	20	N	150	N	40
J61R1390	10	N	10	N	100	100	<50	15	N	100	N	40
J61R1400	10	N	10	N	100	100	<50	15	N	100	N	40
J61R1410	15	N	20	N	150	200	<50	20	300	200	N	40
J61R1420	<10	N	10	N	100	100	<50	15	N	100	N	40
J61R1430	10	N	10	N	100	100	<50	15	<200	100	N	40
J61R1440	<10	N	7	N	100	100	N	10	N	100	N	40
J61R1450	<10	N	7	N	100	100	N	10	300	100	N	40
J61R1460	<10	N	5	N	100	100	N	<10	N	70	N	40
J61R1470	10	N	10	N	100	100	N	15	N	100	N	40
J61R1480	<10	N	7	N	100	100	N	10	500	100	N	40

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 61, 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
J61R1490	37 1 49	95 46 35	2.0	.30	.07	.3	50	N	N	N
J61R1500	37 1 49	95 46 35	2.0	.50	.05	.5	70	N	N	N
J61R1510	37 1 49	95 46 35	1.5	.20	.07	.3	50	N	N	N
J61R1520	37 1 49	95 46 35	1.5	.15	.05	.2	50	N	N	N
J61R1530	37 1 49	95 46 35	1.5	.20	.07	.3	70	N	N	N
J61R1540	37 1 49	95 46 35	1.5	.30	.10	.3	50	N	N	N
J61R1550	37 1 49	95 46 35	2.0	.30	.05	.5	70	N	N	N
J61R1560	37 1 49	95 46 35	1.0	.20	.07	.2	50	N	N	N
J61R1570	37 1 49	95 46 35	1.5	.20	.07	.3	50	N	N	N
J61R1580	37 1 49	95 46 35	3.0	.50	.07	.7	70	N	N	N
J61R1590	37 1 49	95 46 35	3.0	.50	.70	.7	50	N	N	N
J61R1600	37 1 49	95 46 35	2.0	.50	<.05	.3	100	N	N	N
J61R1610	37 1 49	95 46 35	2.0	.50	<.05	.3	70	N	N	N
J61R1620	37 1 49	95 46 35	2.0	.30	.07	.3	70	N	N	N
J61R1630	37 1 49	95 46 35	2.0	.50	.07	.5	100	N	N	N
J61R1640	37 1 49	95 46 35	3.0	.50	.05	.5	100	N	N	N
J61R1650	37 1 49	95 46 35	3.0	.70	.10	.7	100	N	N	N
J61R1660	37 1 49	95 46 35	2.0	.70	.05	.5	100	N	N	N
J61R1670	37 1 49	95 46 35	3.0	1.00	<.05	.7	150	N	N	N
J61R1680	37 1 49	95 46 35	3.0	1.00	<.05	.7	100	N	N	N
J61R1690	37 1 49	95 46 35	5.0	1.50	<.05	.5	200	N	N	N
J61R1700	37 1 49	95 46 35	7.0	1.00	<.05	.3	200	N	N	N
J61R1710	37 1 49	95 46 35	5.0	1.00	<.05	.2	150	N	N	N
J61R1713	37 1 49	95 46 35	2.0	.20	<.05	.1	100	N	N	N

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 61, 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
J61R1490	100	200	1.0	N	N	7	50	10	30	N	<20	20
J61R1500	100	200	1.5	N	N	7	100	15	50	N	<20	30
J61R1510	100	100	N	N	N	<5	50	10	20	N	N	15
J61R1520	100	70	N	N	N	N	30	7	N	N	N	15
J61R1530	150	100	1.0	N	N	5	50	10	20	N	N	20
J61R1540	100	100	1.5	N	N	5	50	10	20	N	N	20
J61R1550	150	200	2.0	N	N	7	100	15	20	5	N	50
J61R1560	100	70	N	N	N	<5	20	7	20	N	N	15
J61R1570	100	150	1.0	N	N	5	50	10	20	N	N	20
J61R1580	100	200	2.0	N	N	15	100	20	30	N	<20	50
J61R1590	150	200	2.0	N	N	10	100	20	20	5	<20	70
J61R1600	100	200	1.5	N	N	5	70	20	20	7	N	30
J61R1610	100	150	1.5	N	N	7	50	20	20	5	N	30
J61R1620	100	200	1.5	N	N	7	70	15	20	N	N	30
J61R1630	100	200	2.0	N	N	10	70	20	50	<5	N	50
J61R1640	100	200	2.0	N	N	20	100	20	50	<5	N	50
J61R1650	150	200	3.0	N	N	20	150	30	50	N	N	70
J61R1660	100	200	1.5	N	N	15	100	20	50	N	N	50
J61R1670	150	200	2.0	N	N	20	100	50	50	5	N	70
J61R1680	100	200	2.0	N	N	20	100	30	50	N	N	70
J61R1690	100	300	3.0	N	N	20	100	30	30	<5	N	50
J61R1700	100	300	2.0	N	N	30	70	50	20	30	N	70
J61R1710	100	200	3.0	N	N	30	50	70	N	70	N	70
J61R1713	100	70	1.0	N	N	200	200	50	N	50	N	50

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 61, 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#
J61R1490	<10	N	7	N	100	100	N	15	N	100	N	40
J61R1500	15	N	15	N	150	200	N	20	N	100	N	40
J61R1510	10	N	5	N	100	70	N	N	N	100	N	40
J61R1520	N	N	N	N	100	70	N	N	N	70	N	40
J61R1530	N	N	5	N	100	70	N	<10	N	100	N	40
J61R1540	N	N	5	N	100	100	N	<10	N	100	N	40
J61R1550	10	N	15	N	100	200	N	20	N	150	N	40
J61R1560	N	N	<5	N	100	70	N	N	N	70	N	40
J61R1570	N	N	5	N	100	100	N	10	N	100	N	40
J61R1580	N	N	20	N	100	300	N	20	N	200	N	40
J61R1590	10	N	15	N	100	200	N	20	N	300	N	31
J61R1600	N	N	5	N	100	200	N	10	N	150	N	31
J61R1610	N	N	5	N	N	200	N	15	N	150	N	31
J61R1620	N	N	7	N	100	150	N	10	N	100	N	31
J61R1630	N	N	10	N	150	200	N	20	N	150	N	31
J61R1640	15	N	20	N	100	300	N	20	N	150	N	31
J61R1650	10	N	20	N	100	200	N	30	N	200	N	31
J61R1660	10	N	15	N	100	200	N	30	N	200	N	31
J61R1670	10	N	20	N	100	200	N	50	N	300	N	31
J61P1680	10	N	15	N	100	200	N	30	200	200	N	31
J61R1690	10	N	15	N	100	200	N	20	<200	150	N	31
J61R1700	20	N	15	N	N	200	N	20	300	100	N	31
J61R1710	30	N	10	N	N	200	N	20	N	70	N	31
J61R1713	N	N	N	N	N	50	200	N	N	30	N	60