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Spectrographic analyses of insoluble-residue samples, Joplin 1° x 2° quadrangle, Kansas and Missouri: Drill hole nos. 39, 40, 41, and 42

By

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

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

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INTRODUCTION

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

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

The analytical results for drill hole no. 39 (#1 C.R. Burney - KGS), drill hole no. 40 (#8 Harris - KGS), drill hole no. 41 (#1 Wright - KGS), and drill hole no.42 (#2 R.B. Smith - KGS) are given in this report. Drill hole no. 39 is located in sec. 22, T. 25 S., R. 25 E. in Bourbon County, Kansas; drill hole no. 40 is located in sec. 8, T. 24 S., R. 17 E. in Woodson County, Kansas; drill hole no. 41 is located in sec. 3, T. 25 S., R. 17 E. in Woodson County, Kansas; drill hole no.42 is located in sec. 32, T. 29 S. R. 20 E. (fig.1). Data for the insoluble-residue samples from drill holes 39, 40, 41, and 42 are listed in tables 1, 2, 3, and 4 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) with a vertical grinder equipped with ceramic plates. Some insoluble-residue samples contained only a few milligrams of material, and these were hand ground in 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:

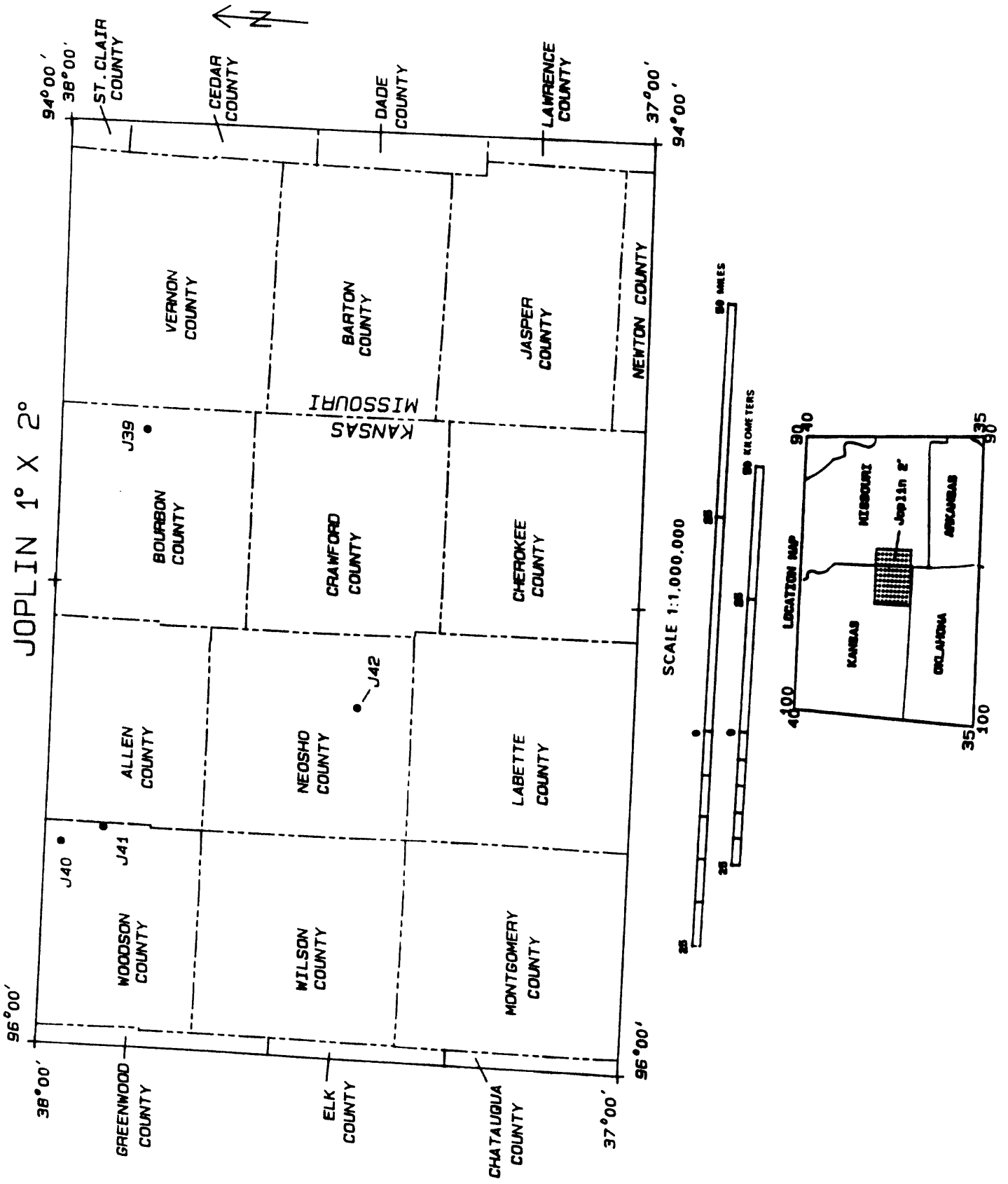

Figure 1. Locations of drill holes 39, 40, 41, and 42, Joplin 1° x 2° quadrangle, Missouri and Kansas.

For those given in percent:

Calcium	0.05
Iron	0.05
Magnesium	0.02
Titanium	0.002

For those given in ppm:

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

DESCRIPTION OF DATA TABLES

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

The stratigraphic unit of the sample is identified by a coded number in the last column of tables 1 through 4. The code and formation names are as follows:

Code	Formation
20	Pennsylvanian Undifferentiated
31	Chattanooga Shale
40	Mississippian Undifferentiated
60	Ordovician Undifferentiated
78	Cambro-Ordovician Undifferentiated
85	Lamotte Sandstone
90	Precambrian Undifferentiated

EXPLANATION OF DATA

The columns in tables 1 through 4 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 1-4, 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 the drill-hole samples available from their sample libraries.

REFERENCES

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

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

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

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 39, 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
J39R1200	37 51 17	94 39 55	.50	.02	.05	.005	<10	N	N	N
J39R1220	37 51 17	94 39 55	.30	.02	.05	.010	10	N	N	N
J39R1240	37 51 17	94 39 55	.10	.02	<.05	.005	N	N	N	N
J39R1260	37 51 17	94 39 55	.10	.02	.05	.005	<10	N	N	N
J39R1280	37 51 17	94 39 55	.10	.02	.05	.005	N	N	N	N
J39R1300	37 51 17	94 39 55	.10	.02	.05	.005	N	N	N	N
J39R1320	37 51 17	94 39 55	.10	.02	.05	.007	N	N	N	N
J39R1340	37 51 17	94 39 55	.15	.02	.05	.005	N	N	N	N
J39R1360	37 51 17	94 39 55	.10	.02	<.05	.007	N	N	N	N
J39R1380	37 51 17	94 39 55	.20	.02	<.05	.007	N	N	N	N
J39R1400	37 51 17	94 39 55	.50	.03	.07	.015	50	N	N	N
J39R1420	37 51 17	94 39 55	1.50	.05	.07	.020	10	N	N	N
J39R1440	37 51 17	94 39 55	1.50	.07	.05	.050	15	N	N	N
J39R1460	37 51 17	94 39 55	2.00	.07	.05	.100	50	N	N	N
J39R1500	37 51 17	94 39 55	5.00	.20	.20	.150	100	N	N	N
J39R1520	37 51 17	94 39 55	10.00	.02	.05	.150	100	N	700	N
J39R1540	37 51 17	94 39 55	5.00	.03	.07	.150	70	N	300	N
J39R1560	37 51 17	94 39 55	1.50	.03	.05	.100	30	N	N	N
J39R1580	37 51 17	94 39 55	3.00	.10	.05	.100	15	N	N	N
J39R1600	37 51 17	94 39 55	2.00	.10	.05	.100	15	N	N	N
J39R1620	37 51 17	94 39 55	3.00	.30	.05	.200	20	N	N	N
J39R1660	37 51 17	94 39 55	2.00	.30	<.05	.300	20	N	N	N
J39R1680	37 51 17	94 39 55	1.00	.10	<.05	.100	70	N	N	N
J39R1700	37 51 17	94 39 55	.15	.02	<.05	.010	N	N	N	N
J39R1720	37 51 17	94 39 55	.07	<.02	<.05	.010	N	N	N	N
J39R1740	37 51 17	94 39 55	.05	<.02	<.05	.015	10	N	N	N
J39R1760	37 51 17	94 39 55	.05	<.02	<.05	.010	N	N	N	N
J39R1780	37 51 17	94 39 55	.10	<.02	<.05	.015	10	N	N	N
J39R1800	37 51 17	94 39 55	.20	<.02	<.05	.020	<10	N	N	N
J39R1840	37 51 17	94 39 55	1.00	.07	<.05	.100	<10	N	N	N
J39R1860	37 51 17	94 39 55	7.00	.10	<.05	.100	30	N	N	N
J39R1957	37 51 17	94 39 55	2.00	.50	.10	.200	70	N	N	N
J39R1965	37 51 17	94 39 55	3.00	.70	1.50	.500	300	N	N	N
J39R1975	37 51 17	94 39 55	2.00	.70	1.00	.300	200	N	N	N

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 39, 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
J39R1200	30	20	N	N	N	N	N	<5	N	N	N	N
J39R1220	50	50	N	N	N	N	N	5	N	N	N	N
J39R1240	50	<20	N	N	N	N	N	10	N	N	N	N
J39R1260	50	30	N	N	N	N	N	7	N	N	N	N
J39R1280	50	50	N	N	N	N	N	7	N	N	N	N
J39R1300	30	20	N	N	N	N	N	10	N	N	N	N
J39R1320	50	30	N	N	N	N	N	7	N	N	N	N
J39R1340	50	30	N	N	N	N	N	7	N	N	N	N
J39R1360	10	30	N	N	N	N	N	<5	N	N	N	N
J39R1380	20	20	N	N	N	N	N	10	N	N	N	N
J39R1400	30	50	N	N	N	N	N	15	N	N	N	N
J39R1420	100	20	N	N	N	5	N	20	N	N	N	10
J39R1440	100	20	N	N	N	5	N	30	N	N	N	15
J39R1460	100	100	1.0	N	N	5	15	150	N	5	N	10
J39R1500	150	50	2.0	N	N	5	100	50	N	10	N	20
J39R1520	15	20	N	N	N	N	N	100	N	50	N	20
J39R1540	20	20	N	N	N	N	N	50	N	20	N	15
J39R1560	50	70	N	N	N	N	N	100	N	5	N	10
J39R1580	70	150	<1.0	N	N	5	N	50	N	7	N	20
J39R1600	70	150	<1.0	N	N	5	N	15	20	5	N	10
J39R1620	150	300	1.5	N	N	7	10	20	20	15	N	20
J39R1660	150	500	1.5	N	N	5	10	10	30	N	N	7
J39R1680	70	200	1.0	N	N	5	N	20	20	N	N	5
J39R1700	10	20	N	N	N	N	N	20	N	N	N	N
J39R1720	N	20	N	N	N	N	N	<5	N	N	N	N
J39R1740	N	20	N	N	N	N	N	<5	N	N	N	N
J39R1760	N	<20	N	N	N	N	N	<5	N	N	N	N
J39R1780	N	20	N	N	N	N	N	<5	N	N	N	N
J39R1800	N	<20	N	N	N	N	N	<5	N	N	N	N
J39R1840	50	70	N	N	N	N	N	<5	20	N	N	N
J39R1860	50	200	N	N	N	N	N	<5	N	N	N	5
J39R1957	70	300	1.0	N	N	7	10	5	20	N	N	5
J39R1965	30	500	1.5	N	N	7	15	<5	20	N	N	7
J39R1975	15	500	1.5	N	N	7	15	<5	30	N	N	7

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 39, 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.#
J39R1200	N	N	N	N	N	N	N	N	N	10	N	78
J39R1220	N	N	N	N	N	N	N	N	N	10	N	78
J39R1240	N	N	N	N	N	N	N	N	N	N	N	78
J39R1260	N	N	N	N	N	N	N	N	N	N	N	78
J39R1280	N	N	N	N	N	N	N	N	N	N	N	78
J39R1300	N	N	N	N	N	N	N	N	N	N	N	78
J39R1320	N	N	N	N	N	N	N	N	N	N	N	78
J39R1340	N	N	N	N	N	N	N	N	N	N	N	78
J39R1360	N	N	N	N	N	N	N	N	N	20	N	78
J39R1380	N	N	N	N	N	N	N	N	N	70	N	78
J39R1400	N	N	N	N	N	N	N	N	N	50	N	78
J39R1420	N	N	N	N	N	10	N	N	N	10	N	78
J39R1440	N	N	N	N	N	15	N	N	N	15	N	78
J39R1460	10	N	N	N	N	15	N	15	N	200	N	78
J39R1500	15	N	5	N	N	70	N	15	N	100	N	78
J39R1520	50	N	N	N	N	10	N	N	N	30	N	78
J39R1540	10	N	N	N	N	N	N	N	N	10	N	78
J39R1560	15	N	N	N	N	N	N	10	N	50	N	78
J39R1580	30	N	N	N	N	10	N	10	N	70	N	78
J39R1600	30	N	N	N	N	10	N	10	N	150	N	78
J39R1620	30	N	<5	N	N	50	N	30	N	200	N	78
J39R1660	20	N	<5	N	N	70	N	30	N	300	N	78
J39R1680	N	N	N	N	N	10	N	10	N	200	N	85
J39R1700	N	N	N	N	N	N	N	N	N	50	N	85
J39R1720	N	N	N	N	N	N	N	N	N	300	N	85
J39R1740	N	N	N	N	N	N	N	N	N	70	N	85
J39R1760	N	N	N	N	N	N	N	N	N	70	N	85
J39R1780	N	N	N	N	N	N	N	10	N	15	N	85
J39R1800	N	N	N	N	N	N	N	N	N	50	N	85
J39R1840	N	N	<5	N	100	10	N	20	N	1,000	N	90
J39R1860	N	N	<5	N	100	20	N	20	N	300	N	90
J39R1957	20	N	5	N	N	50	N	20	N	100	N	90
J39R1965	15	N	10	N	150	70	N	30	N	150	N	90
J39R1975	15	N	10	N	150	70	N	30	N	150	N	90

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 40, 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
J40R1270	37 58 11	95 33 49	1.0	.05	.05	.07	10	N	N	N
J40R1350	37 58 11	95 33 49	.2	.02	.07	.02	<10	N	N	N
J40R1470	37 58 11	95 33 49	2.0	.30	.70	.20	300	N	N	N

Sample	B-ppm s	Ba-ppm s	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s
J40R1270	70	50	N	N	N	N	10	5	N	N	N	15
J40R1350	100	30	N	N	N	N	N	<5	N	N	N	7
J40R1470	30	1,000	1	N	N	7	15	10	30	N	N	10

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.#
J40R1270	<10	N	N	N	N	20	N	N	N	50	N	40
J40R1350	N	N	N	N	N	N	N	N	N	10	N	40
J40R1470	10	N	10	N	100	100	N	30	N	200	N	40

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 41, 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
J41R1220	37 53 50	95 31 39	1.50	.07	.05	.150	10	N	N	N
J41R1240	37 53 50	95 31 39	3.00	.07	.05	.100	10	N	N	N
J41R1257	37 53 50	95 31 39	1.50	.02	.10	.030	10	N	N	N
J41R1300	37 53 50	95 31 39	1.00	.07	.05	.200	10	N	N	N
J41R1330	37 53 50	95 31 39	.07	<.02	<.05	.005	N	N	N	N
J41R1360	37 53 50	95 31 39	.10	<.02	<.05	.010	N	N	N	N
J41R1380	37 53 50	95 31 39	.10	.02	<.05	.010	N	N	N	N
J41R1410	37 53 50	95 31 39	.50	.02	.05	.010	<10	N	N	N
J41R1430	37 53 50	95 31 39	.30	.02	.05	.015	N	N	N	N
J41R1500	37 53 50	95 31 39	2.00	1.00	.05	.700	70	N	N	N
J41R1530	37 53 50	95 31 39	5.00	.70	.05	.500	70	N	N	N
J41R1550	37 53 50	95 31 39	5.00	1.00	<.05	.500	100	N	N	N
J41R1570	37 53 50	95 31 39	1.50	.05	.05	.030	<10	N	N	N
J41R1605	37 53 50	95 31 39	.50	.05	.05	.020	N	N	N	N
J41R1635	37 53 50	95 31 39	.30	.05	.05	.020	N	N	N	N
J41R1670	37 53 50	95 31 39	.50	.07	.07	.020	N	N	N	N
J41R1700	37 53 50	95 31 39	1.00	.07	.05	.050	N	N	N	N
J41R1730	37 53 50	95 31 39	.50	.02	.05	.015	N	N	N	N
J41R1800	37 53 50	95 31 39	.50	.03	.05	.015	100	N	N	N

Sample	B-ppm s	Ba-ppm s	Be-ppm s	Bi-ppm s	Cd-ppm s	Co-ppm s	Cr-ppm s	Cu-ppm s	La-ppm s	Mo-ppm s	Nb-ppm s	Ni-ppm s
J41R1220	100	70	N	N	N	5	20	5	30	N	N	30
J41R1240	100	50	N	N	N	10	20	15	30	N	N	70
J41R1257	70	20	N	N	N	5	N	7	N	N	N	20
J41R1300	70	30	N	N	N	N	30	5	50	N	N	15
J41R1330	100	20	N	N	N	N	N	N	N	N	N	N
J41R1360	70	20	N	N	N	N	N	N	N	N	N	N
J41R1380	100	20	N	N	N	N	N	N	N	N	N	N
J41R1410	70	30	N	N	N	N	N	<5	N	N	N	10
J41R1430	70	20	N	N	N	N	N	<5	N	N	N	5
J41R1500	150	200	2	N	N	10	100	30	20	N	N	50
J41R1530	150	100	2	N	N	20	100	30	20	N	N	150
J41R1550	200	300	3	N	N	20	100	50	20	50	N	100
J41R1570	70	70	N	N	N	N	N	7	N	N	N	10
J41R1605	70	70	N	N	N	N	N	5	N	N	N	7
J41R1635	70	50	N	N	N	N	N	<5	N	N	N	5
J41R1670	70	50	N	N	N	N	N	<5	N	N	N	5
J41R1700	100	70	N	N	N	N	N	10	N	N	N	10
J41R1730	100	100	N	N	N	N	N	5	N	N	N	5
J41R1800	100	200	N	N	N	N	N	10	N	N	N	7

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 41, 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.#
J41R1220	N	N	5	N	N	30	N	50	N	70	N	40
J41R1240	N	N	5	N	N	30	N	20	N	100	N	40
J41R1257	N	N	N	N	N	10	N	10	N	15	N	40
J41R1300	N	N	N	N	N	N	N	15	N	100	N	40
J41R1330	15	N	N	N	N	N	N	N	N	N	N	40
J41R1360	N	N	N	N	N	N	N	N	N	N	N	40
J41R1380	N	N	N	N	N	N	N	N	N	N	N	40
J41R1410	N	N	N	N	N	N	N	N	200	10	N	40
J41R1430	N	N	N	N	N	N	N	N	N	10	N	40
J41R1500	100	N	15	50	N	200	N	30	N	200	N	40
J41R1530	200	N	15	100	N	500	N	20	N	150	N	40
J41R1550	20	N	15	N	N	500	N	20	N	150	N	31
J41R1570	N	N	N	N	N	15	N	N	N	20	N	60
J41R1605	N	N	N	N	N	N	N	N	N	10	N	60
J41R1635	N	N	N	N	N	N	N	N	N	10	N	60
J41R1670	N	N	N	N	N	N	N	N	N	15	N	60
J41R1700	N	N	N	N	N	10	N	N	N	15	N	60
J41R1730	N	N	N	N	N	N	N	N	N	20	N	60
J41R1800	300	N	N	50	N	N	N	N	N	20	N	60

TABLE 4--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 42, 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
J42R0020	37 28 39	95 14 35	3.0	.70	.10	.50	200	1.5	N	N
J42R0030	37 28 39	95 14 35	2.0	.70	.10	.50	200	1.0	N	N
J42R0040	37 28 39	95 14 35	3.0	.50	.05	.50	200	1.5	N	N
J42R0050	37 28 39	95 14 35	3.0	.70	.05	.50	200	N	N	N
J42R0060	37 28 39	95 14 35	5.0	.70	<.05	.70	200	N	N	N
J42R0070	37 28 39	95 14 35	3.0	.70	<.05	.50	200	N	N	N
J42R0080	37 28 39	95 14 35	5.0	1.00	<.05	.50	200	N	N	N
J42R0090	37 28 39	95 14 35	3.0	.70	.05	.50	150	.5	N	N
J42R0100	37 28 39	95 14 35	2.0	.70	.15	.50	70	N	N	N
J42R0110	37 28 39	95 14 35	1.5	.50	.07	.50	50	N	N	N
J42R0120	37 28 39	95 14 35	3.0	1.00	.10	.50	100	<.5	N	N
J42R0130	37 28 39	95 14 35	3.0	1.00	.10	.50	100	N	N	N
J42R0140	37 28 39	95 14 35	2.0	1.00	.10	.50	100	N	N	N
J42R0150	37 28 39	95 14 35	3.0	.70	.05	.50	150	N	N	N
J42R0160	37 28 39	95 14 35	3.0	1.00	.10	.50	300	N	N	N
J42R0185	37 28 39	95 14 35	1.5	.50	.05	.50	100	N	N	N
J42R0200	37 28 39	95 14 35	2.0	.50	.05	.70	100	N	N	N
J42R0310	37 28 39	95 14 35	5.0	1.00	<.05	.70	200	N	N	N
J42R0320	37 28 39	95 14 35	3.0	1.00	<.05	.70	200	N	N	N
J42R0330	37 28 39	95 14 35	3.0	1.00	.05	.50	100	.5	N	N
J42R0340	37 28 39	95 14 35	3.0	.70	.15	.50	150	.5	N	N
J42R0350	37 28 39	95 14 35	3.0	1.00	.07	.50	150	2.0	N	N
J42R0355	37 28 39	95 14 35	2.0	1.00	.15	.50	150	.5	N	N
J42R0360	37 28 39	95 14 35	2.0	.70	.10	.30	100	5.0	N	N
J42R0370	37 28 39	95 14 35	2.0	.50	<.05	.50	100	N	N	N
J42R0380	37 28 39	95 14 35	2.0	.50	<.05	.70	100	N	N	N
J42R0390	37 28 39	95 14 35	2.0	.50	<.05	.50	100	N	N	N
J42R0400	37 28 39	95 14 35	3.0	.70	<.05	.50	200	N	N	N
J42R0410	37 28 39	95 14 35	3.0	1.00	<.05	.70	200	N	N	N
J42R0420	37 28 39	95 14 35	3.0	.70	<.05	.70	200	N	N	N
J42R0430	37 28 39	95 14 35	3.0	1.00	<.05	.70	200	N	N	N
J42R0440	37 28 39	95 14 35	3.0	1.00	<.05	.70	200	N	N	N
J42R0450	37 28 39	95 14 35	3.0	1.00	<.05	.70	200	N	N	N
J42R0460	37 28 39	95 14 35	3.0	.70	<.05	1.00	150	N	N	N
J42R0470	37 28 39	95 14 35	3.0	1.00	.10	1.00	200	N	N	N
J42R0480	37 28 39	95 14 35	5.0	.70	1.00	.50	500	2.0	N	N
J42R0490	37 28 39	95 14 35	5.0	.70	<.05	.70	150	N	N	N
J42R0500	37 28 39	95 14 35	5.0	.70	<.05	.70	200	N	N	N
J42R0670	37 28 39	95 14 35	2.0	.50	<.05	.70	200	N	N	N
J42R0680	37 28 39	95 14 35	3.0	.70	<.05	.70	200	N	N	N
J42R0690	37 28 39	95 14 35	5.0	.70	.05	.70	700	N	N	N
J42R0700	37 28 39	95 14 35	2.0	.70	.05	.70	100	N	N	N
J42R0710	37 28 39	95 14 35	1.5	.50	<.05	.70	70	N	N	N
J42R0720	37 28 39	95 14 35	5.0	.70	<.05	.70	150	N	N	N
J42R0730	37 28 39	95 14 35	2.0	.50	<.05	.70	100	N	N	N

TABLE 4--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 42, 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
J42R0020	200	500	2.0	N	30	15	200	100	20	50	N	150
J42R0030	150	200	2.0	N	N	10	200	70	50	20	N	100
J42R0040	200	150	2.0	N	N	10	150	50	30	30	N	100
J42R0050	150	300	1.5	N	N	15	100	20	50	N	N	50
J42R0060	150	200	1.5	N	N	30	100	30	50	N	N	70
J42R0070	150	200	2.0	N	N	15	100	20	50	N	N	50
J42R0080	200	200	2.0	N	N	20	100	20	50	5	N	50
J42R0090	150	500	2.0	N	N	20	100	20	30	15	N	70
J42R0100	150	100	1.5	N	N	7	100	100	30	N	N	30
J42R0110	150	150	1.5	N	N	7	100	20	20	N	N	30
J42R0120	150	5,000	2.0	N	N	100	100	1,000	20	N	N	100
J42R0130	200	1,000	2.0	N	N	10	500	150	30	N	N	100
J42R0140	200	1,500	2.0	N	N	30	200	100	30	N	N	100
J42R0150	100	100	1.5	N	N	10	50	10	30	N	N	20
J42R0160	200	200	2.0	N	N	15	70	20	50	N	N	30
J42R0185	100	100	1.0	N	N	7	150	10	20	N	N	15
J42R0200	100	200	1.5	N	N	7	50	15	30	N	N	20
J42R0310	200	500	2.0	N	N	20	100	20	50	N	N	30
J42R0320	200	300	2.0	N	N	10	100	20	50	N	N	20
J42R0330	200	150	2.0	N	N	7	150	20	20	7	N	20
J42R0340	200	200	2.0	N	N	10	100	50	30	10	N	30
J42R0350	200	150	2.0	N	N	10	500	100	30	30	N	100
J42R0355	200	150	2.0	N	N	30	150	200	30	10	N	50
J42R0360	200	150	5.0	N	N	15	700	150	30	50	N	200
J42R0370	100	200	2.0	N	N	10	70	10	30	N	N	20
J42R0380	100	300	2.0	N	N	7	50	30	50	N	N	20
J42R0390	100	300	2.0	N	N	10	50	15	30	N	N	30
J42R0400	150	700	2.0	N	N	10	70	30	30	N	N	30
J42R0410	150	300	2.0	N	N	10	70	10	50	N	N	30
J42R0420	150	300	2.0	N	N	15	70	10	50	N	N	30
J42R0430	150	300	3.0	N	N	15	100	10	50	N	N	30
J42R0440	150	300	3.0	N	N	10	100	10	50	N	N	30
J42R0450	150	300	3.0	N	N	15	100	20	50	N	N	50
J42R0460	150	700	3.0	N	N	20	100	30	50	5	N	50
J42R0470	150	300	3.0	N	N	15	100	20	50	N	N	50
J42R0480	200	200	5.0	N	N	15	300	100	30	20	N	150
J42R0490	200	200	5.0	N	N	20	150	20	50	N	N	70
J42R0500	200	200	3.0	N	N	20	100	20	50	N	N	50
J42R0670	200	200	5.0	N	N	10	150	20	50	N	N	50
J42R0680	200	200	5.0	N	N	20	150	30	50	N	N	50
J42R0690	150	200	3.0	N	N	20	100	20	50	N	N	50
J42R0700	200	200	5.0	N	N	15	100	20	30	N	N	50
J42R0710	150	150	2.0	N	N	7	100	10	30	N	N	30
J42R0720	150	200	3.0	N	N	10	100	15	30	N	N	30
J42R0730	150	200	5.0	N	N	10	150	15	50	N	N	50

TABLE 4--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 42, 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.#
J42R0020	20	N	10	N	100	500	N	15	2,000	100	N	20
J42R0030	20	N	10	N	100	200	N	15	700	100	N	20
J42R0040	30	N	10	N	100	300	N	15	500	200	N	20
J42R0050	10	N	15	N	100	150	N	20	N	200	N	20
J42R0060	30	N	15	N	100	200	N	30	N	200	N	20
J42R0070	15	N	15	N	100	200	N	20	N	150	N	20
J42R0080	15	N	15	N	100	200	N	20	<200	150	N	20
J42R0090	20	N	10	N	100	200	N	20	N	200	N	20
J42R0100	10	N	7	N	100	100	N	20	N	300	N	20
J42R0110	N	N	5	N	150	100	N	15	N	200	N	20
J42R0120	30	N	10	N	100	150	N	20	N	150	N	20
J42R0130	100	N	15	N	100	300	N	20	700	150	N	20
J42R0140	10	N	10	N	100	200	N	20	N	150	N	20
J42R0150	N	N	7	N	100	100	N	20	200	200	N	20
J42R0160	10	N	15	N	100	150	N	30	500	200	N	20
J42R0185	N	N	5	N	100	70	N	15	N	300	N	20
J42R0200	N	N	10	N	100	100	N	20	N	200	N	20
J42R0310	<10	N	20	N	100	200	N	30	200	200	N	20
J42R0320	10	N	20	N	150	200	N	30	300	150	N	20
J42R0330	<10	N	10	N	100	100	N	15	<200	100	N	20
J42R0340	500	N	10	N	100	100	N	20	200	100	N	20
J42R0350	50	N	15	N	100	300	N	20	300	100	N	20
J42R0355	30	N	10	N	100	150	N	20	200	100	N	20
J42R0360	70	N	15	N	100	500	N	10	1,000	100	N	20
J42R0370	<10	N	15	N	100	150	N	30	N	200	N	20
J42R0380	N	N	10	N	100	150	N	30	N	300	N	20
J42R0390	N	N	10	N	100	100	N	30	N	300	N	20
J42R0400	<10	N	15	N	100	100	N	30	200	200	N	20
J42R0410	10	N	15	N	100	150	N	30	<200	200	N	20
J42R0420	10	N	15	N	100	150	N	50	<200	200	N	20
J42R0430	10	N	15	N	100	150	N	20	<200	200	N	20
J42R0440	10	N	15	N	100	200	N	20	<200	150	N	20
J42R0450	10	N	20	N	100	200	N	30	N	150	N	20
J42R0460	20	N	15	N	100	150	N	30	700	150	N	20
J42R0470	10	N	20	N	100	200	N	20	N	150	N	20
J42R0480	200	N	15	N	100	300	N	20	1,500	100	N	20
J42R0490	15	N	20	N	100	200	N	20	N	150	N	20
J42R0500	15	N	20	N	100	200	N	30	N	150	N	20
J42R0670	15	N	20	N	100	200	N	30	N	150	N	20
J42R0680	20	N	20	N	100	300	N	30	200	200	N	20
J42R0690	15	N	20	N	100	200	N	30	<200	200	N	20
J42R0700	10	N	15	N	100	200	N	20	200	200	N	20
J42R0710	N	N	10	N	100	100	N	30	200	500	N	20
J42R0720	10	N	15	N	100	150	N	20	N	200	N	20
J42R0730	20	N	20	N	100	200	N	30	N	200	N	20

TABLE 4--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 42, 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
J42R0740	37 28 39	95 14 35	3.0	.70	<.05	.70	200	N	N	N
J42R0750	37 28 39	95 14 35	3.0	.70	<.05	.70	100	N	N	N
J42R0760	37 28 39	95 14 35	3.0	.70	<.05	.70	200	N	N	N
J42R0770	37 28 39	95 14 35	3.0	.70	<.05	.50	150	N	N	N
J42R0780	37 28 39	95 14 35	3.0	.70	<.05	.70	150	N	N	N
J42R0790	37 28 39	95 14 35	5.0	.50	<.05	.50	150	N	N	N
J42R0800	37 28 39	95 14 35	2.0	.15	<.05	.20	30	N	N	N
J42R0810	37 28 39	95 14 35	1.0	.15	.07	.20	30	N	N	N
J42R0820	37 28 39	95 14 35	.7	.20	.20	.15	30	N	N	N
J42R0830	37 28 39	95 14 35	2.0	.05	.10	.10	50	N	N	N
J42R0840	37 28 39	95 14 35	.3	.05	.20	.05	15	N	N	N
J42R0850	37 28 39	95 14 35	1.0	.10	.20	.10	30	N	N	N
J42R0860	37 28 39	95 14 35	1.0	.05	.20	.07	15	N	N	N
J42R0870	37 28 39	95 14 35	1.0	.07	.05	.15	20	N	N	N
J42R0880	37 28 39	95 14 35	.5	.10	.05	.10	15	N	N	N
J42R0890	37 28 39	95 14 35	.5	.10	.07	.10	10	N	N	N
J42R0900	37 28 39	95 14 35	.1	.02	.20	.01	<10	N	N	N
J42R0910	37 28 39	95 14 35	.3	.02	.10	.01	<10	N	N	N
J42R0920	37 28 39	95 14 35	.1	.02	.05	.01	N	N	N	N
J42R0930	37 28 39	95 14 35	.1	.02	.05	.01	N	N	N	N
J42R0940	37 28 39	95 14 35	.3	.02	.05	.02	10	N	N	N
J42R0950	37 28 39	95 14 35	.5	.05	.05	.10	15	N	N	N
J42R0960	37 28 39	95 14 35	.7	.10	.10	.10	20	N	N	N
J42R0970	37 28 39	95 14 35	.5	.10	.20	.10	20	N	N	N
J42R0980	37 28 39	95 14 35	1.0	.20	.20	.10	30	N	N	N
J42R0990	37 28 39	95 14 35	.5	.10	.07	.07	20	N	N	N
J42R1000	37 28 39	95 14 35	.5	.10	.07	.05	10	N	N	N
J42R1010	37 28 39	95 14 35	.3	.10	.10	.07	20	N	N	N
J42R1020	37 28 39	95 14 35	.7	.20	.05	.15	20	N	N	N
J42R1030	37 28 39	95 14 35	1.0	.10	.10	.07	15	N	N	N
J42R1040	37 28 39	95 14 35	2.0	.50	.15	.30	70	N	N	N
J42R1050	37 28 39	95 14 35	2.0	.50	.20	.50	70	N	N	N
J42R1060	37 28 39	95 14 35	1.5	.50	.30	.50	50	N	N	N
J42R1070	37 28 39	95 14 35	3.0	.30	.10	.30	50	N	N	N
J42R1080	37 28 39	95 14 35	5.0	1.00	.07	.50	70	N	N	N
J42R1090	37 28 39	95 14 35	2.0	1.50	.20	.50	100	N	N	N
J42R1100	37 28 39	95 14 35	2.0	1.00	<.05	.50	70	N	N	N
J42R1110	37 28 39	95 14 35	3.0	1.00	.15	.50	70	N	N	N
J42R1115	37 28 39	95 14 35	1.0	.70	.30	.50	70	N	N	N

TABLE 4--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 42, 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
J42R0740	200	200	5.0	N	N	15	100	20	50	N	N	50
J42R0750	200	200	3.0	N	N	15	150	30	50	N	N	100
J42R0760	200	200	3.0	N	N	15	150	30	50	N	N	70
J42R0770	200	150	2.0	N	N	10	150	150	50	N	N	70
J42R0780	150	200	2.0	N	N	15	200	50	50	N	N	70
J42R0790	200	200	3.0	N	N	7	200	20	50	N	N	50
J42R0800	100	70	1.0	N	N	5	50	7	20	N	N	15
J42R0810	100	70	<1.0	N	N	N	30	5	20	N	N	20
J42R0820	70	50	N	N	N	N	20	<5	N	N	N	10
J42R0830	100	50	N	N	N	N	15	15	N	N	N	30
J42R0840	70	20	N	N	N	N	N	<5	N	N	N	10
J42R0850	100	50	1.0	N	N	N	20	10	N	N	N	20
J42R0860	100	20	N	N	N	N	15	<5	70	N	N	7
J42R0870	100	20	N	N	N	N	30	<5	30	N	N	10
J42R0880	100	20	1.0	N	N	N	30	<5	50	N	N	7
J42R0890	100	30	1.0	N	N	N	50	<5	100	N	N	7
J42R0900	100	20	N	N	N	N	N	N	N	N	N	N
J42R0910	70	20	N	N	N	N	N	<5	N	N	N	5
J42R0920	100	20	N	N	N	N	N	N	N	N	N	N
J42R0930	100	20	N	N	N	N	N	N	N	N	N	N
J42R0940	100	20	N	N	N	N	N	<5	N	N	N	7
J42R0950	100	30	N	N	N	N	10	<5	N	N	N	10
J42R0960	100	30	1.0	N	N	N	20	10	N	N	N	20
J42R0970	100	30	N	N	N	N	15	5	N	N	N	10
J42R0980	100	50	1.0	N	N	5	50	5	N	N	N	30
J42R0990	70	30	N	N	N	N	10	<5	N	N	N	15
J42R1000	70	20	N	N	N	N	N	<5	N	N	N	30
J42R1010	70	30	N	N	N	N	N	<5	N	N	N	10
J42R1020	100	70	<1.0	N	N	N	20	<5	N	N	N	50
J42R1030	70	50	N	N	N	20	10	30	N	N	N	300
J42R1040	150	100	1.5	N	N	30	100	20	20	7	N	1,000
J42R1050	200	100	2.0	N	N	15	100	70	30	N	N	200
J42R1060	150	200	2.0	N	N	7	100	7	30	N	N	70
J42R1070	150	200	1.5	N	N	10	70	50	30	N	N	100
J42R1080	200	200	3.0	N	N	15	100	50	30	N	N	100
J42R1090	200	200	2.0	N	N	15	150	20	30	N	N	50
J42R1100	200	150	3.0	N	N	10	200	50	30	N	N	30
J42R1110	200	150	3.0	N	N	10	150	15	30	N	N	30
J42R1115	150	100	1.0	N	N	7	100	10	20	N	N	20

TABLE 4--SPECTROGRAPHIC ANALYSES OF INSOLUBLE RESIDUE SAMPLES FROM DRILL HOLE NO. 42, 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.#
J42R0740	20	N	20	N	100	200	N	30	N	200	N	20
J42R0750	20	N	20	N	100	300	N	30	N	200	N	20
J42R0760	15	N	20	N	100	200	N	50	N	300	N	20
J42R0770	15	N	20	N	100	200	N	30	N	200	N	20
J42R0780	15	N	20	N	100	200	N	30	N	200	N	20
J42R0790	30	N	20	N	100	200	N	30	N	200	N	20
J42R0800	<10	N	5	N	N	30	N	20	N	100	N	20
J42R0810	N	N	<5	N	N	30	N	20	N	100	N	40
J42R0820	N	N	N	N	N	15	N	<10	N	100	N	40
J42R0830	N	N	N	N	N	15	N	N	N	100	N	40
J42R0840	N	N	N	N	N	N	N	N	N	20	N	40
J42R0850	N	N	N	N	N	20	N	N	N	70	N	40
J42R0860	N	N	N	N	N	10	N	<10	N	30	N	40
J42R0870	N	N	N	N	N	20	N	15	N	70	N	40
J42R0880	N	N	N	N	N	20	N	10	N	50	N	40
J42R0890	N	N	5	N	N	30	N	50	N	70	N	40
J42R0900	N	N	N	N	N	N	N	N	N	N	N	40
J42R0910	N	N	N	N	N	N	N	N	N	N	N	40
J42R0920	N	N	N	N	N	N	N	N	N	N	N	40
J42R0930	N	N	N	N	N	N	N	N	N	N	N	40
J42R0940	N	N	N	N	N	N	N	N	N	10	N	40
J42R0950	N	N	N	N	N	10	N	N	N	50	N	40
J42R0960	N	N	5	N	N	30	N	N	N	50	N	40
J42R0970	N	N	5	N	N	30	N	N	N	30	N	40
J42R0980	10	N	5	N	N	70	N	<10	N	30	N	40
J42R0990	N	N	N	N	N	20	N	N	N	20	N	40
J42R1000	N	N	N	N	N	20	N	N	N	15	N	40
J42R1010	N	N	N	N	N	15	N	N	N	15	N	40
J42R1020	<10	N	5	N	N	50	N	N	500	30	N	40
J42R1030	N	N	N	N	N	20	N	N	N	30	N	40
J42R1040	20	N	10	N	100	100	N	20	N	100	N	40
J42R1050	50	N	15	N	100	150	N	20	N	150	N	40
J42R1060	20	N	15	N	100	100	N	15	N	150	N	40
J42R1070	30	N	15	N	N	100	N	20	N	150	N	40
J42R1080	30	N	15	N	N	200	N	20	N	150	N	40
J42R1090	10	N	15	N	N	300	N	30	N	200	N	40
J42R1100	10	N	15	N	N	300	N	20	N	150	N	40
J42R1110	15	N	15	N	N	200	N	20	N	150	N	40
J42R1115	<10	N	7	N	N	100	N	20	N	200	N	40