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Spectrographic analyses of insoluble-residue samples, Joplin 1° x 2° quadrangle, Missouri and Kansas: Drill hole nos. 125, 126, and 127

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 (MGLS) and the Kansas Geological Survey (KGS). None of the holes are company confidential and none intersect economically significant mineralized ground.

The analytical results for drill hole no. 125 (#25178 - MGLS), drill hole no. 126 (#25231 - MGLS), and drill hole no. 127 (#22948 - MGLS) are given in this report. Drill hole no. 125 is located in sec. 17, T. 32 N., R. 31 W. in Barton County, Missouri; drill hole no. 126 is located in sec. 20, T. 31 N., R. 33 W. in Barton County, Missouri; drill hole no. 127 is located in sec. 15, T. 36 N., R. 30 W. in Vernon County, Missouri (fig.1). Data for the insoluble-residue samples from drill holes 125, 126, and 127 are listed in tables 1, 2, and 3 respectively. Well name, well number, township, range, and county allow for identification and location of files at the Missouri Division of Geology and Land Survey and the Kansas Geological Survey.

PREPARATION AND ANALYSIS OF SAMPLES

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

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

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

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

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

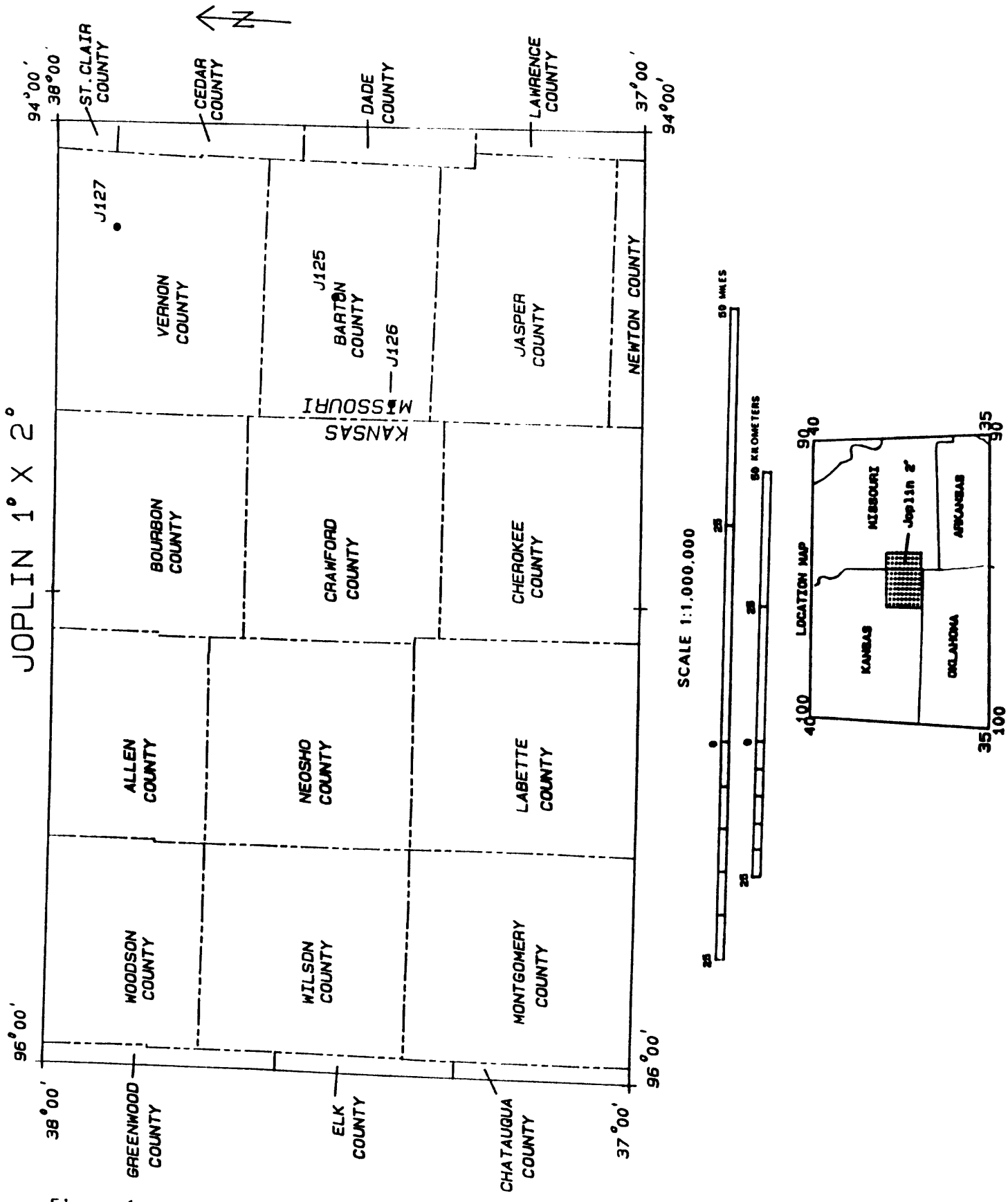

Figure 1. Locations of drill holes 125, 126, and 127, Joplin 1° x 2° quadrangle, Missouri and Kansas.

For those given in percent:

Calcium	0.05
Iron	0.05
Magnesium	0.02
Titanium	0.002

For those given in ppm:

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

DESCRIPTION OF DATA TABLES

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

The stratigraphic unit of the sample is identified by a coded number in the last column of tables 1 through 3. The code and formation names are as follows:

Code	Formation
20	Pennsylvanian Undifferentiated
31	Chattanooga Shale
40	Mississippian Undifferentiated
65	Cotter Dolomite
66	Jefferson City Dolomite
67	Roubidoux Formation
68	Gasconade Dolomite

EXPLANATION OF DATA

The columns in tables 1 through 3 have headings of sample, elements, and formation. The letter S over the columns signifies emission-spectrographic data.

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

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

Because of the formatting used in the computer program that produced tables 1-3, some of the elements listed in these tables (Fe, Mg, Ca, Ti, Ag, and Be) may carry one or more nonsignificant zeros to the right of the significant digits. The analyst did not determine these elements to the accuracy suggested by the extra zeros.

RASS

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

ACKNOWLEDGMENTS

The authors wish to thank the Missouri Division of Geology and Land Survey--Dr. Wallace B. Howe, former Director, and Dr. J. Hadley Williams, Director, and their staffs for making these drill-hole samples available from their sample library.

REFERENCES

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. 125, 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
J1250160	37 31 29	94 21 36	3.00	.20	.30	.300	150	N	N	N
J1250180	37 31 29	94 21 36	2.00	.10	1.00	.150	200	N	N	N
J1250195	37 31 29	94 21 36	2.00	.15	.70	.200	100	N	N	N
J1250210	37 31 29	94 21 36	5.00	.20	.50	.500	200	.5	N	N
J1250230	37 31 29	94 21 36	7.00	1.00	.30	1.000	300	<.5	N	N
J1250250	37 31 29	94 21 36	2.00	.30	.70	.500	150	<.5	N	N
J1250265	37 31 29	94 21 36	2.00	.30	.50	.200	50	<.5	N	N
J1250280	37 31 29	94 21 36	.70	.02	.30	.020	20	N	N	N
J1250300	37 31 29	94 21 36	.70	.05	.10	.010	15	N	N	N
J1250315	37 31 29	94 21 36	.20	.03	.10	.003	10	N	N	N
J1250330	37 31 29	94 21 36	.10	.05	.05	.005	10	N	N	N
J1250350	37 31 29	94 21 36	.10	.03	.20	.007	20	N	N	N
J1250365	37 31 29	94 21 36	.07	.02	.05	.005	<10	N	N	N
J1250380	37 31 29	94 21 36	.10	.05	.15	.010	N	N	N	N
J1250395	37 31 29	94 21 36	.20	.03	.15	.007	20	N	N	N
J1250410	37 31 29	94 21 36	1.00	.15	.20	.100	70	N	N	N
J1250470	37 31 29	94 21 36	7.00	3.00	.70	.700	150	N	N	N
J1250480	37 31 29	94 21 36	10.00	.50	.30	.500	100	N	N	N
J1250485	37 31 29	94 21 36	15.00	2.00	.10	.500	300	.7	N	N
J1250500	37 31 29	94 21 36	5.00	1.00	.50	.200	100	N	N	N
J1250515	37 31 29	94 21 36	3.00	1.00	.20	.150	50	N	N	N
J1250535	37 31 29	94 21 36	.70	.10	.10	.050	<10	N	N	N
J1250555	37 31 29	94 21 36	.30	.20	.30	.030	10	N	N	N
J1250575	37 31 29	94 21 36	.50	.20	.15	.070	15	N	N	N
J1250595	37 31 29	94 21 36	.30	.20	.15	.070	<10	N	N	N
J1250615	37 31 29	94 21 36	.70	.20	.30	.050	15	<.5	N	N
J1250635	37 31 29	94 21 36	.50	.10	.10	.020	<10	N	N	N
J1250655	37 31 29	94 21 36	.50	.15	.20	.050	10	N	N	N
J1250675	37 31 29	94 21 36	.50	.07	.10	.015	<10	N	N	N
J1250695	37 31 29	94 21 36	.30	.30	.30	.050	<10	N	N	N
J1250705	37 31 29	94 21 36	.50	.50	.30	.070	<10	N	N	N
J1250725	37 31 29	94 21 36	.30	.10	.10	.030	<10	N	N	N
J1250745	37 31 29	94 21 36	.70	.10	.10	.030	10	<.5	N	N
J1250760	37 31 29	94 21 36	.20	.15	.10	.020	10	N	N	N
J1250780	37 31 29	94 21 36	.15	.02	<.05	.007	<10	N	N	N
J1250800	37 31 29	94 21 36	.10	.02	<.05	.010	<10	N	N	N
J1250820	37 31 29	94 21 36	.15	<.02	<.05	.003	N	N	N	N
J1250835	37 31 29	94 21 36	.05	<.02	<.05	.100	N	N	N	N
J1250845	37 31 29	94 21 36	<.05	<.02	<.05	.005	N	N	N	N
J1250865	37 31 29	94 21 36	.50	.02	.05	.200	20	N	N	N
J1250880	37 31 29	94 21 36	.05	<.02	<.05	.007	10	N	N	N
J1250895	37 31 29	94 21 36	.30	.05	<.05	.030	<10	N	N	N

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 125, 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
J1250160	150	100	<1.0	N	N	20	50	15	50	N	N	70
J1250180	100	200	N	N	N	15	50	15	50	N	N	70
J1250195	100	100	<1.0	N	N	10	50	10	50	N	N	70
J1250210	200	100	1.0	N	N	30	70	30	70	N	N	200
J1250230	300	150	5.0	N	N	20	150	700	100	N	N	150
J1250250	150	70	1.0	N	N	5	70	50	50	N	N	50
J1250265	100	70	<1.0	N	N	<5	50	20	30	N	N	50
J1250280	70	20	N	N	N	N	10	7	<20	N	N	5
J1250300	50	20	N	N	N	N	N	5	N	N	N	N
J1250315	70	50	N	N	N	N	N	<5	N	N	N	N
J1250330	70	20	N	N	N	N	N	5	N	N	N	N
J1250350	30	<20	N	N	N	N	N	<5	N	N	N	N
J1250365	50	20	N	N	N	N	N	<5	N	N	N	N
J1250380	50	20	N	N	N	N	N	<5	N	N	N	N
J1250395	50	20	N	N	N	N	N	<5	N	N	N	N
J1250410	70	50	N	N	N	N	<10	7	N	N	N	5
J1250470	200	300	1.5	N	N	20	100	70	20	N	<20	70
J1250480	150	100	<1.0	N	N	20	50	70	20	N	<20	100
J1250485	300	200	5.0	N	N	70	70	150	30	N	<20	300
J1250500	100	150	1.0	N	N	<5	20	50	<20	N	N	50
J1250515	200	200	1.0	N	N	<5	30	30	20	N	N	50
J1250535	70	150	N	N	N	N	<10	10	N	N	N	5
J1250555	100	100	N	N	N	N	N	5	N	N	N	<5
J1250575	100	150	N	N	N	N	10	7	N	N	N	5
J1250595	70	100	N	N	N	N	15	7	N	N	N	<5
J1250615	70	70	N	N	N	N	10	15	N	N	N	10
J1250635	100	70	N	N	N	N	20	5	N	<5	N	10
J1250655	100	100	N	N	N	N	<10	7	N	N	N	5
J1250675	70	70	N	N	N	N	N	7	N	N	N	7
J1250695	100	100	N	N	N	N	N	7	N	N	N	5
J1250705	70	150	N	N	N	N	<10	10	N	N	N	5
J1250725	50	100	N	N	N	N	N	5	N	N	N	<5
J1250745	50	70	N	N	N	N	N	7	N	N	N	10
J1250760	50	70	N	N	N	N	N	<5	N	N	N	N
J1250780	10	50	N	N	N	N	N	<5	N	N	N	<5
J1250800	10	70	N	N	N	N	N	<5	N	N	N	N
J1250820	30	20	N	N	N	N	N	<5	N	N	N	N
J1250835	10	30	N	N	N	N	N	5	N	N	N	N
J1250845	<10	30	N	N	N	N	N	N	N	N	N	N
J1250865	15	50	N	N	N	N	N	7	N	N	N	5
J1250880	<10	20	N	N	N	N	N	N	N	N	N	<5
J1250895	20	100	N	N	N	N	N	<5	N	N	N	<5

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 125, 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 #
J1250160	<10	N	5	N	<100	70	N	30	N	100	N	40
J1250180	20	N	<5	N	N	30	N	20	N	100	N	40
J1250195	10	N	5	N	<100	50	N	20	N	70	N	40
J1250210	20	N	10	N	N	100	N	30	N	100	N	40
J1250230	30	N	15	N	100	150	N	30	N	200	N	40
J1250250	10	N	7	N	<100	100	N	20	1,500	70	N	40
J1250265	<10	N	5	N	<100	70	N	20	N	70	N	40
J1250280	N	N	N	N	N	10	N	N	N	<10	N	40
J1250300	N	N	N	N	N	<10	N	N	N	10	N	40
J1250315	N	N	N	N	N	<10	N	N	N	N	N	40
J1250330	N	N	N	N	N	<10	N	N	300	N	N	40
J1250350	N	N	N	N	N	<10	N	N	N	N	N	40
J1250365	N	N	N	N	N	<10	N	N	N	N	N	40
J1250380	N	N	N	N	N	<10	N	N	1,500	<10	N	40
J1250395	N	N	N	N	N	<10	N	N	N	<10	N	40
J1250410	N	N	N	N	N	15	N	N	N	20	N	40
J1250470	50	N	10	N	<100	150	N	20	N	200	N	40
J1250480	20	N	7	N	N	70	N	20	N	200	N	40
J1250485	30	N	15	N	N	500	N	15	N	100	N	31
J1250500	20	N	<5	N	N	100	N	N	N	50	N	65
J1250515	N	N	5	N	<100	70	N	N	N	70	N	65
J1250535	N	N	N	N	N	15	N	N	N	70	N	66
J1250555	N	N	N	N	<100	10	N	N	N	20	N	66
J1250575	N	N	N	N	<100	20	N	N	N	70	N	66
J1250595	N	N	N	N	N	20	N	N	N	50	N	66
J1250615	N	N	N	N	N	15	N	N	N	10	N	66
J1250635	N	N	N	N	N	10	N	N	N	10	N	66
J1250655	N	N	N	N	<100	15	N	N	N	15	N	66
J1250675	N	N	N	N	<100	<10	N	N	N	10	N	66
J1250695	N	N	N	N	<100	10	N	N	N	10	N	66
J1250705	N	N	N	N	<100	15	N	N	N	100	N	66
J1250725	N	N	N	N	100	<10	N	N	N	10	N	67
J1250745	N	N	N	N	150	<10	N	N	N	100	N	67
J1250760	N	N	N	N	300	<10	N	N	N	20	N	67
J1250780	N	N	N	N	N	<10	N	N	N	20	N	67
J1250800	N	N	N	N	N	<10	N	N	N	20	N	67
J1250820	N	N	N	N	N	N	N	N	N	<10	N	67
J1250835	N	N	N	N	N	N	N	N	N	50	N	67
J1250845	N	N	N	N	N	N	N	N	N	50	N	67
J1250865	N	N	N	N	N	<10	N	N	N	30	N	68
J1250880	N	N	N	N	N	<10	N	N	N	50	N	68
J1250895	N	N	N	N	N	10	N	N	N	20	N	68

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 126, 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
J1260020	37 25 30	94 35 0	20.00	1.00	<.05	.500	>5,000	N	N	N
J1260030	37 25 30	94 35 0	>20.00	.70	<.05	.300	>5,000	N	N	N
J1260040	37 25 30	94 35 0	20.00	1.00	.05	.500	>5,000	N	N	N
J1260045	37 25 30	94 35 0	7.00	.70	<.05	.500	1,500	<.5	N	N
J1260060	37 25 30	94 35 0	10.00	1.00	.10	.300	1,000	N	N	N
J1260080	37 25 30	94 35 0	5.00	.50	.05	.300	700	N	N	N
J1260090	37 25 30	94 35 0	20.00	1.50	.10	.700	2,000	N	N	N
J1260105	37 25 30	94 35 0	10.00	1.50	.05	.700	2,000	N	N	N
J1260130	37 25 30	94 35 0	2.00	.50	<.05	.300	300	N	<200	N
J1260150	37 25 30	94 35 0	15.00	1.00	.05	.500	2,000	N	N	N
J1260170	37 25 30	94 35 0	>20.00	1.50	.15	.500	5,000	N	N	N
J1260190	37 25 30	94 35 0	7.00	1.00	.10	.300	500	N	N	N
J1260205	37 25 30	94 35 0	15.00	1.50	.10	.700	3,000	N	N	N
J1260225	37 25 30	94 35 0	10.00	.70	.10	.300	200	N	N	N
J1260240	37 25 30	94 35 0	1.50	.07	.20	.050	100	N	<200	N
J1260260	37 25 30	94 35 0	.70	.02	.30	.020	10	N	N	N
J1260280	37 25 30	94 35 0	.50	<.02	.10	.015	<10	N	N	N
J1260300	37 25 30	94 35 0	2.00	.02	.30	.050	500	N	N	N
J1260320	37 25 30	94 35 0	.50	<.02	.50	.020	<10	N	N	N
J1260340	37 25 30	94 35 0	1.00	<.02	1.50	.020	50	N	N	N
J1260360	37 25 30	94 35 0	3.00	.02	1.50	.050	300	N	N	N
J1260380	37 25 30	94 35 0	.70	<.02	.70	.010	20	N	N	N
J1260400	37 25 30	94 35 0	.10	<.02	.10	.002	<10	N	N	N
J1260420	37 25 30	94 35 0	.10	<.02	.15	.005	10	N	N	N
J1260440	37 25 30	94 35 0	.05	.02	.10	.002	<10	N	N	N
J1260460	37 25 30	94 35 0	.15	.02	.05	.010	<10	N	N	N
J1260480	37 25 30	94 35 0	.10	.02	.30	.010	<10	N	N	N
J1260500	37 25 30	94 35 0	.10	.02	.50	.010	<10	N	N	N
J1260520	37 25 30	94 35 0	.30	.05	.20	.015	<10	N	N	N
J1260540	37 25 30	94 35 0	.15	.02	1.50	.015	10	N	N	N
J1260555	37 25 30	94 35 0	.70	<.02	.15	.010	<10	N	N	N
J1260570	37 25 30	94 35 0	3.00	2.00	.70	.500	30	N	N	N
J1260590	37 25 30	94 35 0	15.00	5.00	3.00	1.000	200	<.5	N	N
J1260610	37 25 30	94 35 0	10.00	1.00	.10	.200	30	N	N	N
J1260630	37 25 30	94 35 0	1.50	.50	.07	.030	<10	N	N	N
J1260650	37 25 30	94 35 0	.20	.50	.20	.015	<10	N	N	N
J1260670	37 25 30	94 35 0	.30	.70	.30	.020	<10	N	N	N
J1260690	37 25 30	94 35 0	.30	.15	.10	.010	N	N	N	N
J1260710	37 25 30	94 35 0	1.00	1.00	1.00	.020	N	N	N	N
J1260730	37 25 30	94 35 0	1.00	.70	1.00	.020	N	N	N	N
J1260750	37 25 30	94 35 0	.15	.50	.20	.007	N	N	N	N
J1260770	37 25 30	94 35 0	.20	.03	.05	.002	N	N	N	N
J1260790	37 25 30	94 35 0	.30	.05	.07	.010	N	N	N	N
J1260810	37 25 30	94 35 0	2.00	.05	.10	.015	N	N	N	N
J1260830	37 25 30	94 35 0	2.00	.50	.20	.030	N	N	N	N

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 126, 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
J1260020	70	500	3.0	N	N	50	100	50	70	5	N	150
J1260030	30	300	5.0	N	N	100	70	70	20	N	N	150
J1260040	70	500	3.0	N	N	70	150	50	50	N	<20	150
J1260045	100	200	2.0	N	<20	15	100	30	20	<5	N	70
J1260060	70	150	1.5	N	<20	20	100	30	20	N	N	70
J1260080	50	150	1.5	N	N	10	50	30	30	N	N	50
J1260090	100	200	3.0	N	N	15	100	70	20	N	N	70
J1260105	100	200	1.5	N	N	15	70	30	20	N	N	50
J1260130	70	50	1.0	N	N	<5	50	N	N	N	N	5
J1260150	100	200	1.5	N	N	10	100	30	30	N	N	20
J1260170	100	300	2.0	N	N	15	70	50	30	N	N	70
J1260190	100	150	1.0	N	N	15	70	30	20	N	N	50
J1260205	200	200	3.0	N	N	50	100	70	50	N	<20	70
J1260225	100	100	N	N	N	10	50	20	N	N	N	50
J1260240	50	50	<1.0	N	N	<5	<10	<5	N	N	N	10
J1260260	70	<20	N	N	N	N	<10	N	N	N	N	5
J1260280	50	N	N	N	N	N	N	N	N	N	N	<5
J1260300	50	30	<1.0	N	N	15	10	10	N	N	N	30
J1260320	50	<20	N	N	N	N	N	N	N	N	N	<5
J1260340	50	20	N	N	N	N	<10	<5	N	N	N	5
J1260360	30	50	<1.0	N	N	5	20	15	N	N	N	15
J1260380	50	<20	N	N	N	N	10	<5	N	N	N	<5
J1260400	100	20	N	N	N	N	N	N	N	N	N	N
J1260420	100	<20	N	N	N	N	<10	N	N	N	N	N
J1260440	70	30	N	N	N	N	<10	N	N	N	N	N
J1260460	50	100	N	N	N	N	N	<5	N	<5	N	5
J1260480	20	<20	N	N	N	N	N	N	N	N	N	5
J1260500	50	<20	N	N	N	N	N	<5	N	N	N	<5
J1260520	50	20	N	N	N	N	N	N	N	N	N	7
J1260540	50	<20	N	N	N	N	N	N	N	N	N	5
J1260555	50	<20	N	N	N	N	N	<5	N	N	N	5
J1260570	150	150	1.0	N	N	5	100	7	20	N	N	20
J1260590	200	300	5.0	N	N	50	150	70	70	5	<20	70
J1260610	70	100	3.0	N	N	15	50	100	20	<5	N	70
J1260630	50	50	N	N	N	<5	<10	20	N	N	N	10
J1260650	50	70	N	N	N	N	N	<5	N	N	N	5
J1260670	20	50	N	N	N	N	<10	5	N	N	N	7
J1260690	30	30	N	N	N	N	N	<5	N	N	N	<5
J1260710	20	30	N	N	N	N	N	5	N	N	N	10
J1260730	50	50	N	N	N	<5	N	5	N	N	N	5
J1260750	50	30	N	N	N	N	N	N	N	N	N	<5
J1260770	70	30	N	N	N	N	N	<5	N	N	N	<5
J1260790	70	30	N	N	N	N	N	<5	N	N	N	<5
J1260810	70	50	N	N	N	<5	N	10	N	N	N	20
J1260830	70	50	N	N	N	5	N	15	N	N	N	15

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 126, 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 #
J1260020	20	N	20	N	100	70	N	50	500	200	N	20
J1260030	20	N	20	N	<100	50	N	30	700	70	N	20
J1260040	30	N	20	N	100	100	N	30	700	200	N	20
J1260045	20	N	10	N	<100	100	N	20	N	200	N	20
J1260060	20	N	10	N	N	100	N	20	<200	150	N	20
J1260080	10	N	7	N	200	70	N	30	<200	200	N	20
J1260090	30	N	15	N	<100	150	N	20	N	100	N	20
J1260105	20	N	10	N	N	100	N	30	N	200	N	20
J1260130	N	N	5	N	N	20	N	20	N	300	N	20
J1260150	10	N	15	N	<100	100	N	50	N	500	N	20
J1260170	15	N	20	N	<100	150	N	30	N	150	N	20
J1260190	<10	N	10	N	N	100	N	70	N	500	N	20
J1260205	20	N	20	N	N	150	N	30	200	200	N	20
J1260225	<10	N	7	N	N	100	N	10	N	70	N	40
J1260240	N	N	N	N	N	10	N	N	N	20	N	40
J1260260	N	N	N	N	N	10	N	N	N	N	N	40
J1260280	N	N	N	N	N	<10	N	N	N	N	N	40
J1260300	N	N	<5	N	N	15	N	N	N	20	N	40
J1260320	N	N	N	N	N	10	N	N	N	N	N	40
J1260340	N	N	N	N	N	10	N	N	N	N	N	40
J1260360	N	N	<5	N	N	15	N	10	N	10	N	40
J1260380	N	N	N	N	N	N	N	10	N	N	N	40
J1260400	N	N	N	N	N	N	N	10	N	N	N	40
J1260420	N	N	N	N	N	N	N	10	N	N	N	40
J1260440	N	N	N	N	N	N	N	10	N	N	N	40
J1260460	N	N	N	N	N	10	N	10	<200	15	N	40
J1260480	N	N	N	N	N	15	N	10	N	N	N	40
J1260500	N	N	N	N	N	10	N	10	N	N	N	40
J1260520	N	N	N	N	N	<10	N	10	N	N	N	40
J1260540	N	N	N	N	N	10	N	10	N	N	N	40
J1260555	N	N	N	N	N	<10	N	10	N	N	N	40
J1260570	<10	N	<5	N	N	150	N	20	N	100	N	40
J1260590	30	N	20	10	100	300	N	50	<200	100	N	40
J1260610	20	N	7	<10	N	200	N	<10	500	30	N	65
J1260630	N	N	N	N	N	15	N	N	N	20	N	66
J1260650	N	N	N	N	N	<10	N	N	N	<10	N	66
J1260670	N	N	N	N	N	10	N	N	N	20	N	66
J1260690	N	N	N	N	N	N	N	N	N	N	N	66
J1260710	N	N	N	N	N	<10	N	N	N	N	N	66
J1260730	N	N	N	N	N	N	N	N	N	N	N	66
J1260750	N	N	N	N	N	N	N	N	N	N	N	66
J1260770	N	N	N	N	N	N	N	N	N	N	N	66
J1260790	N	N	N	N	N	N	N	N	N	N	N	66
J1260810	N	N	N	N	N	<10	N	N	N	N	N	66
J1260830	N	N	N	N	N	10	N	N	N	<10	N	66

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 126, 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
J1260850	37 25 30	94 35 0	2.00	.03	.10	.010	N	N	N	N
J1260870	37 25 30	94 35 0	.50	<.02	N	.002	N	N	N	N
J1260890	37 25 30	94 35 0	.20	<.02	<.05	.005	<10	N	N	N
J1260910	37 25 30	94 35 0	.30	<.02	N	.015	10	N	N	N
J1260930	37 25 30	94 35 0	.05	<.02	N	.005	N	N	N	N
J1260950	37 25 30	94 35 0	.50	.02	<.05	.003	N	N	N	N
J1260970	37 25 30	94 35 0	.05	<.02	N	<.002	N	N	N	N
J1260990	37 25 30	94 35 0	.07	<.02	N	.003	N	N	N	N
J1261010	37 25 30	94 35 0	.15	<.02	N	.007	N	N	N	N
J1261030	37 25 30	94 35 0	.30	<.02	N	.005	<10	N	N	N
J1261050	37 25 30	94 35 0	<.05	<.02	<.05	.002	N	N	N	N
J1261070	37 25 30	94 35 0	.07	.02	<.05	<.002	N	N	N	N
J1261090	37 25 30	94 35 0	.10	<.02	<.05	<.002	N	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
J1260850	50	30	N	N	N	5	N	20	N	N	N	15
J1260870	50	<20	N	N	N	N	N	<5	N	N	N	5
J1260890	N	20	N	N	N	N	N	<5	N	N	N	<5
J1260910	N	20	N	N	N	N	N	<5	N	N	N	<5
J1260930	N	20	N	N	N	N	N	N	N	N	N	N
J1260950	N	30	N	N	N	N	N	<5	N	N	N	<5
J1260970	N	<20	N	N	N	N	N	N	N	N	N	N
J1260990	N	<20	N	N	N	N	N	N	N	N	N	N
J1261010	N	20	N	N	N	N	N	N	N	N	N	N
J1261030	10	20	N	N	N	N	N	<5	N	N	N	<5
J1261050	20	<20	N	N	N	N	N	N	N	N	N	N
J1261070	20	N	N	N	N	N	N	N	N	N	N	N
J1261090	10	<20	N	N	N	N	N	5	N	N	N	<5

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 #
J1260850	N	N	N	N	N	<10	N	N	N	N	N	67
J1260870	N	N	N	N	N	N	N	N	N	N	N	67
J1260890	N	N	N	N	N	N	N	N	N	<10	N	67
J1260910	N	N	N	N	N	N	N	N	N	10	N	67
J1260930	N	N	N	N	N	N	N	N	N	20	N	67
J1260950	N	N	N	N	N	N	N	N	N	<10	N	67
J1260970	N	N	N	N	N	N	N	N	N	<10	N	67
J1260990	N	N	N	N	N	N	N	N	N	10	N	67
J1261010	N	N	N	N	N	N	N	N	N	30	N	68
J1261030	N	N	N	N	N	N	N	N	N	<10	N	68
J1261050	N	N	N	N	N	N	N	N	N	N	N	68
J1261070	N	N	N	N	N	N	N	N	N	N	N	68
J1261090	N	N	N	N	N	N	N	N	N	N	N	68

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 127, 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
J1270240	37 49 0	94 13 14	7.00	1.00	.07	.700	700	N	N	N
J1270260	37 49 0	94 13 14	7.00	.70	.15	.300	300	<.5	N	N
J1270280	37 49 0	94 13 14	2.00	.30	.15	.150	30	N	N	N
J1270300	37 49 0	94 13 14	5.00	.50	.70	.200	20	N	N	N
J1270310	37 49 0	94 13 14	10.00	.70	.30	.300	30	.5	N	N
J1270325	37 49 0	94 13 14	3.00	.10	.70	.150	10	<.5	N	N
J1270345	37 49 0	94 13 14	7.00	1.50	.20	.700	30	1.0	N	N
J1270365	37 49 0	94 13 14	5.00	1.00	.70	.700	50	<.5	N	N
J1270385	37 49 0	94 13 14	3.00	1.00	.30	.500	70	<.5	N	N
J1270405	37 49 0	94 13 14	3.00	.70	.20	.300	50	N	N	N
J1270425	37 49 0	94 13 14	5.00	1.50	.20	>1.000	20	<.5	N	N
J1270445	37 49 0	94 13 14	1.50	.70	.10	.300	10	N	N	N
J1270465	37 49 0	94 13 14	5.00	.03	.05	.050	N	N	N	N
J1270485	37 49 0	94 13 14	2.00	.70	.07	.700	20	N	N	N
J1270505	37 49 0	94 13 14	1.00	.07	.20	.200	N	N	N	N
J1270520	37 49 0	94 13 14	1.50	.50	.10	1.000	20	N	N	N
J1270535	37 49 0	94 13 14	1.50	.30	.15	.300	10	N	N	N
J1270545	37 49 0	94 13 14	15.00	.70	.07	.300	70	<.5	N	N
J1270550	37 49 0	94 13 14	1.50	1.00	.20	.500	15	N	N	N
J1270570	37 49 0	94 13 14	.50	.10	.10	.050	N	N	N	N
J1270590	37 49 0	94 13 14	.20	.15	.20	.050	N	N	N	N
J1270600	37 49 0	94 13 14	.70	.15	.05	.020	10	N	N	N
J1270620	37 49 0	94 13 14	10.00	.50	.20	.300	100	N	N	N
J1270640	37 49 0	94 13 14	.50	.05	.20	.010	N	N	N	N
J1270660	37 49 0	94 13 14	.15	.50	.30	.020	N	N	N	N
J1270680	37 49 0	94 13 14	.30	.05	.07	.015	N	N	N	N
J1270700	37 49 0	94 13 14	.50	.15	.20	.015	N	N	N	N
J1270720	37 49 0	94 13 14	1.00	.20	.15	.030	N	N	N	N
J1270740	37 49 0	94 13 14	.50	.10	.05	.030	N	N	N	N
J1270760	37 49 0	94 13 14	.10	.05	.05	.015	N	N	N	N
J1270780	37 49 0	94 13 14	1.00	.20	.10	.020	N	N	N	N
J1270800	37 49 0	94 13 14	.10	.02	<.05	.010	N	N	N	N
J1270820	37 49 0	94 13 14	.30	.05	.10	.010	N	N	N	N
J1270840	37 49 0	94 13 14	1.00	.02	<.05	.015	N	N	N	N

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 127, 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
J1270240	200	300	3.0	N	N	20	150	20	30	N	<20	70
J1270260	100	150	1.0	N	N	20	70	50	20	N	N	50
J1270280	70	50	N	N	N	5	50	7	N	<5	N	20
J1270300	70	70	N	N	N	5	100	20	20	<5	N	30
J1270310	70	50	<1.0	N	20	10	100	30	30	<5	N	70
J1270325	100	30	N	N	N	5	70	10	20	<5	N	20
J1270345	300	150	1.5	N	N	10	200	30	70	7	<20	50
J1270365	500	100	1.5	N	N	15	200	20	70	7	<20	50
J1270385	300	100	1.5	N	N	10	200	20	70	7	<20	50
J1270405	100	50	1.0	N	N	10	150	15	20	5	<20	30
J1270425	200	150	1.5	N	N	15	150	20	50	<5	<20	100
J1270445	150	70	1.0	N	N	<5	70	5	N	N	N	15
J1270465	70	20	N	N	N	N	N	<5	N	N	N	10
J1270485	100	70	<1.0	N	N	5	30	15	<20	N	N	20
J1270505	70	50	N	N	N	N	20	5	N	N	N	15
J1270520	100	70	<1.0	N	N	5	70	15	N	N	N	20
J1270535	100	30	N	N	N	<5	20	<5	N	N	N	10
J1270545	70	150	1.0	N	<20	10	100	50	20	30	N	50
J1270550	200	300	1.0	N	N	5	100	5	20	N	<20	15
J1270570	100	20	N	N	N	N	<10	<5	N	N	N	5
J1270590	70	50	N	N	N	N	N	<5	N	N	N	5
J1270600	50	<20	N	N	N	N	<10	5	N	N	N	7
J1270620	50	70	1.0	N	<20	20	30	20	N	N	N	50
J1270640	100	70	N	N	N	N	<10	<5	N	<5	N	5
J1270660	100	70	N	N	N	N	<10	N	N	<5	N	5
J1270680	100	30	N	N	N	N	N	<5	N	N	N	7
J1270700	70	20	N	N	N	N	N	<5	N	N	N	7
J1270720	100	20	N	N	N	N	N	7	N	<5	N	7
J1270740	50	30	N	N	N	N	N	<5	N	<5	N	5
J1270760	50	30	N	N	N	N	N	N	N	N	N	5
J1270780	70	30	N	N	N	N	<10	200	N	N	N	15
J1270800	70	<20	N	N	N	N	N	<5	N	<5	N	<5
J1270820	50	50	N	N	N	N	50	<5	N	5	N	<5
J1270840	50	<20	N	N	N	N	N	20	N	N	N	7

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 127, 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 #
J1270240	10	N	15	N	200	100	N	50	<200	200	N	40
J1270260	<10	N	7	N	100	30	N	20	200	100	N	40
J1270280	N	N	<5	N	N	20	N	<10	N	150	N	40
J1270300	N	N	5	N	N	30	N	10	N	100	N	40
J1270310	<10	N	7	N	N	50	N	20	1,000	100	N	40
J1270325	N	N	N	N	N	20	N	10	N	100	N	40
J1270345	15	N	15	N	N	100	N	30	N	200	N	40
J1270365	10	N	10	N	N	100	N	30	<200	150	N	40
J1270385	<10	N	10	N	100	100	N	30	<200	150	N	40
J1270405	N	N	5	N	N	30	N	10	200	150	N	40
J1270425	10	N	15	N	N	150	N	30	N	500	N	40
J1270445	N	N	5	N	N	20	N	10	N	70	N	40
J1270465	N	N	N	N	N	10	N	N	<200	150	N	40
J1270485	N	N	5	N	N	50	N	10	700	100	N	40
J1270505	N	N	N	N	N	15	N	N	1,000	30	N	40
J1270520	N	N	7	N	N	50	N	15	N	300	N	40
J1270535	N	N	<5	N	N	20	N	N	<200	100	N	40
J1270545	20	N	5	N	N	20	N	10	200	200	N	40
J1270550	N	N	5	N	N	50	N	20	N	500	N	40
J1270570	N	N	N	N	N	10	N	N	N	70	N	40
J1270590	N	N	N	N	N	10	N	N	N	70	N	40
J1270600	N	N	N	N	N	10	N	N	500	20	N	40
J1270620	10	N	5	N	N	50	N	N	1,500	200	N	40
J1270640	N	N	N	N	N	N	N	N	N	<10	N	66
J1270660	N	N	N	N	N	N	N	N	N	20	N	66
J1270680	N	N	N	N	N	N	N	N	N	<10	N	66
J1270700	N	N	N	N	N	N	N	N	N	10	N	66
J1270720	N	N	N	N	N	N	N	N	N	30	N	66
J1270740	N	N	N	N	N	10	N	N	N	30	N	66
J1270760	N	N	N	N	N	N	N	N	N	15	N	66
J1270780	N	N	N	N	N	<10	N	N	N	20	N	66
J1270800	N	N	N	N	N	N	N	N	N	<10	N	67
J1270820	N	N	N	N	N	N	N	N	N	<10	N	67
J1270840	N	N	N	N	N	<10	N	N	N	10	N	67