

UNITED STATES DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

**Spectrographic analyses of insoluble-residue samples,  
Joplin 1° x 2° quadrangle, Kansas and Missouri:  
Drill hole nos. 7, 8, and 9**

By

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

Open-File Report 89-120

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

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

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

1989

## CONTENTS

	Page
Introduction.....	1
Preparation and analysis of samples.....	1
Description of data tables.....	3
Explanation of data.....	3
RASS.....	4
Acknowledgments.....	4
References.....	4

## FIGURE

Figure 1. Locations of drill hole nos. 7, 8, and 9, Joplin 1° x 2° quadrangle, Missouri and Kansas 2.....	2
--	---

## TABLES

Table 1. Spectrographic analyses of insoluble-residue samples from drill hole no. 7, Joplin 1° x 2° quadrangle, Missouri and Kansas.....	5
Table 2. Spectrographic analyses of insoluble-residue samples from drill hole no. 8, Joplin 1° x 2° quadrangle, Missouri and Kansas.....	14
Table 3. Spectrographic analyses of insoluble-residue samples from drill hole no. 9, Joplin 1° x 2° quadrangle, Missouri and Kansas.....	20

## 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. 7 (M.E. Greathouse - KGS), drill hole no. 8 (#10 Springer - KGS), and drill hole no. 9 (#4 Fee - KGS) are given in this report. Drill hole no. 7 is located in sec. 4, T. 28 S., R. 14 E. in Wilson County, Kansas; drill hole no. 8 is located in sec. 28, T. 32 S., R. 14 E. in Montgomery County, Kansas; drill hole no. 9 is located in sec. 25, T. 26 S., R. 14 E. in Greenwood County, Kansas (fig.1). Data for the insoluble-residue samples from drill holes 7, 8, and 9 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 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:

### For those given in percent:

Calcium	0.05
Iron	0.05
Magnesium	0.02
Titanium	0.002

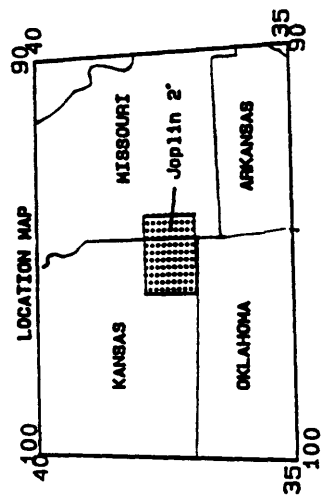
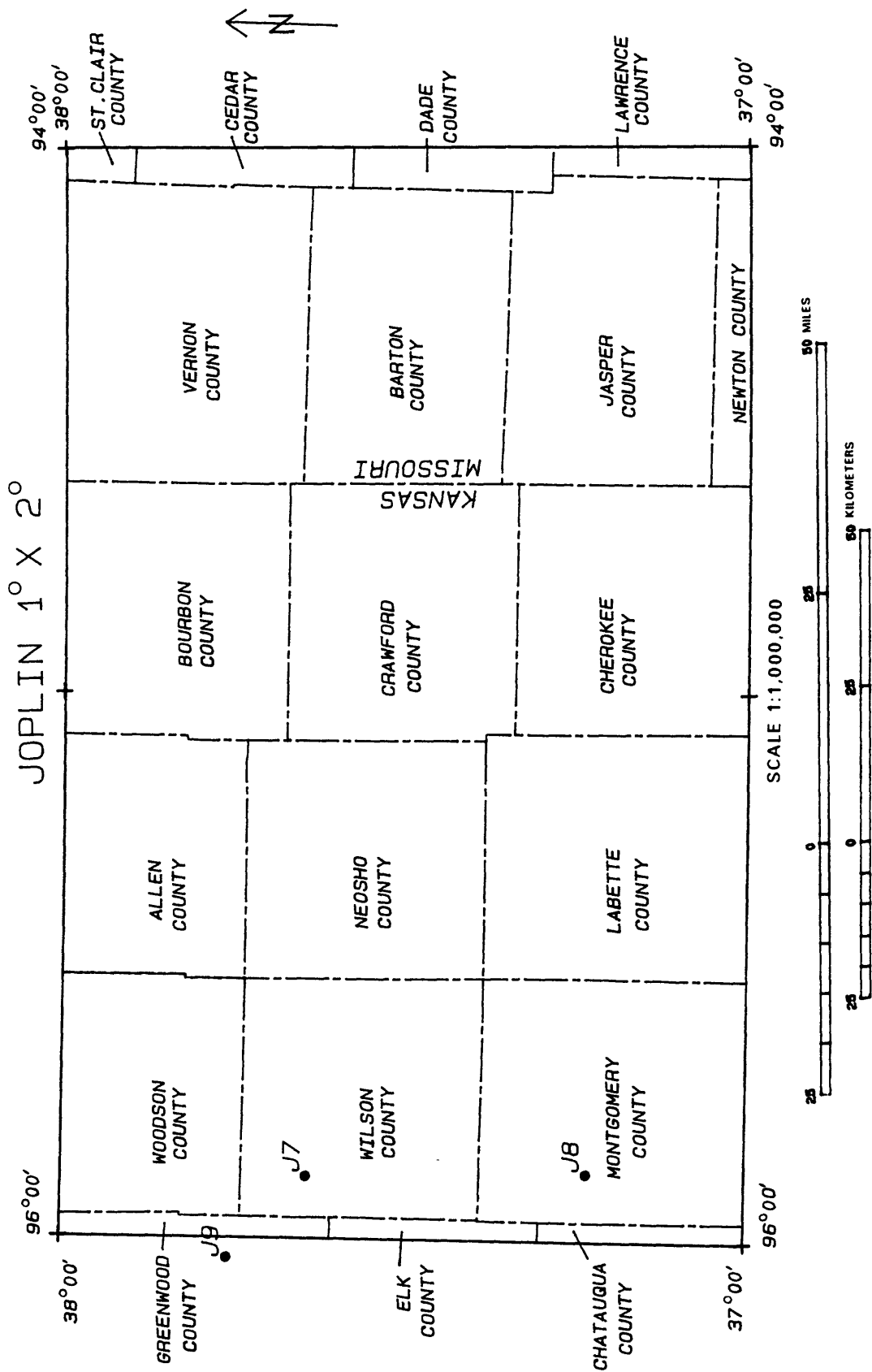


Figure 1. Locations of drill holes 7, 8, and 9, Joplin 1° x 2° quadrangle, Missouri and Kansas.

**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 a seven-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
21	Pn. Cherokee Group
22	Pn. Marmaton Group
31	Ms-D Chattanooga Shale
40	Mississippian Undifferentiated
60	Ordovician Undifferentiated
78	Cambro - Ordovician Undifferentiated
79	Arbuckle
90	Precambrian 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 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 Missouri Division of Geology and Land Survey--Dr. Wallace B. Howe, former Director, and Dr. J. Hadley Williams, Director--and the Kansas Geological Survey, Dr. Lee Gerhard, State Geologist, and their staffs, for making these 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. 7, JOPLIN 1 x 2 QUADRANGLE,  
MISSOURI AND KANSAS.

Sample	Latitude	Longitude	Fe-pct. S	Mg-pct. S	Ca-pct. S	Ti-pct. S	Mn-pdm S	Ag-pdm S	As-pdm S	Au-ppm S
J7R0470	37 38 17	95 53 11	2.00	.70	2.00	.30	200	N	N	N
J7R0480	37 38 17	95 53 11	3.00	.70	.10	.50	200	N	N	N
J7R0490	37 38 17	95 53 11	2.00	.30	.30	.50	200	N	N	N
J7R0500	37 38 17	95 53 11	2.00	.50	.30	.50	200	N	N	N
J7R0510	37 38 17	95 53 11	1.50	.30	.10	.50	100	N	N	N
J7R0520	37 38 17	95 53 11	1.50	.20	.07	.50	70	N	N	N
J7R0530	37 38 17	95 53 11	3.00	.50	.10	.50	200	N	N	N
J7R0540	37 38 17	95 53 11	3.00	.70	.05	.50	200	N	N	N
J7R0550	37 38 17	95 53 11	5.00	.70	<.05	.50	200	N	N	N
J7R0560	37 38 17	95 53 11	10.00	1.00	<.05	>1.00	500	N	N	N
J7R0570	37 38 17	95 53 11	7.00	1.00	.15	1.00	300	N	N	N
J7R0580	37 38 17	95 53 11	7.00	.70	.10	1.00	300	N	N	N
J7R0590	37 38 17	95 53 11	5.00	.70	.07	1.00	200	N	N	N
J7R0600	37 38 17	95 53 11	3.00	.70	.70	1.00	200	N	N	N
J7R0610	37 38 17	95 53 11	7.00	.70	.15	.70	200	N	N	N
J7R0620	37 38 17	95 53 11	.30	.10	.15	.07	20	N	N	N
J7R0630	37 38 17	95 53 11	1.50	.50	2.00	.30	70	N	N	N
J7R0640	37 38 17	95 53 11	.20	.10	.15	.10	20	N	N	N
J7R0650	37 38 17	95 53 11	1.00	.20	.50	.20	50	N	N	N
J7R0660	37 38 17	95 53 11	1.50	.50	.10	.20	150	N	N	N
J7R0670	37 38 17	95 53 11	1.50	.30	1.00	.20	100	N	N	N
J7R0680	37 38 17	95 53 11	2.00	.50	.10	.50	200	N	N	N
J7R0690	37 38 17	95 53 11	3.00	.50	3.00	.50	200	N	N	N
J7R0700	37 38 17	95 53 11	1.50	.50	.30	.15	150	2.0	N	N
J7R0710	37 38 17	95 53 11	3.00	.50	.15	.50	200	N	N	N
J7R0720	37 38 17	95 53 11	3.00	.70	.10	.50	200	N	N	N
J7R0730	37 38 17	95 53 11	5.00	.70	.05	.50	300	N	N	N
J7R0740	37 38 17	95 53 11	2.00	.70	.20	.30	200	5.0	N	N
J7R0750	37 38 17	95 53 11	2.00	.50	.10	.30	300	.5	N	N
J7R0760	37 38 17	95 53 11	1.50	.30	.15	.20	100	N	N	N
J7R0770	37 38 17	95 53 11	3.00	.50	2.00	.50	200	.7	N	N
J7R0780	37 38 17	95 53 11	1.50	.20	2.00	.20	70	N	N	N
J7R0790	37 38 17	95 53 11	3.00	.70	.07	.50	500	N	N	N
J7R0800	37 38 17	95 53 11	3.00	.70	.20	.30	300	3.0	N	N
J7R0810	37 38 17	95 53 11	3.00	.70	.10	.30	200	N	N	N
J7R0820	37 38 17	95 53 11	5.00	1.00	.05	.50	300	1.0	N	N
J7R0830	37 38 17	95 53 11	3.00	.70	.07	.50	200	N	N	N
J7R0840	37 38 17	95 53 11	3.00	1.00	<.05	.50	200	N	N	N
J7R0850	37 38 17	95 53 11	3.00	.70	.05	.50	150	N	N	N
J7R0860	37 38 17	95 53 11	3.00	.70	.05	.30	150	N	N	N
J7R0870	37 38 17	95 53 11	5.00	1.00	<.05	1.00	200	N	N	N
J7R0880	37 38 17	95 53 11	3.00	.70	<.05	.50	150	N	N	N
J7R0890	37 38 17	95 53 11	3.00	1.00	.05	.50	200	N	N	N
J7R0900	37 38 17	95 53 11	2.00	.50	.05	.50	200	N	N	N
J7R0910	37 38 17	95 53 11	5.00	1.00	<.05	1.00	500	N	N	N

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 7, JOPLIN 1 x 2 QUADRANGLE,  
MISSOURI AND KANSAS.--Continued

Sample	R-ppm S	Ba-ppm S	Re-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
J7R0470	150	300	1.5	N	20	10	70	50	50	N	N	30
J7R0480	200	300	2.0	N	20	20	200	70	50	N	<20	100
J7R0490	100	150	1.0	N	20	7	100	15	50	N	N	20
J7R0500	100	150	1.5	N	20	10	100	15	50	N	N	50
J7R0510	100	70	1.0	N	N	5	100	15	70	N	N	10
J7R0520	100	100	1.0	N	N	5	50	10	30	N	N	10
J7R0530	100	200	1.5	N	N	15	100	100	50	N	N	50
J7R0540	150	200	2.0	N	N	30	100	50	70	N	N	70
J7R0550	150	200	2.0	N	N	30	100	150	50	N	N	70
J7R0560	300	300	2.0	N	N	20	150	100	50	N	N	70
J7R0570	200	300	2.0	N	N	30	100	50	50	N	N	70
J7R0580	200	200	2.0	N	30	20	100	30	50	N	N	70
J7R0590	200	200	1.5	N	N	20	150	70	70	N	N	50
J7R0600	200	200	2.0	N	N	15	100	50	30	N	N	50
J7R0610	300	200	2.0	N	20	30	150	100	30	10	N	150
J7R0620	30	50	<1.0	N	20	N	20	<5	20	N	N	5
J7R0630	200	200	1.5	N	N	5	70	150	20	7	N	70
J7R0640	50	70	<1.0	N	N	N	20	10	20	N	N	10
J7R0650	70	100	1.0	N	N	N	50	50	20	N	N	50
J7R0660	100	100	1.0	N	N	5	70	30	20	N	N	30
J7R0670	100	100	1.0	N	20	5	100	50	20	15	N	70
J7R0680	200	200	1.5	N	<20	10	150	100	20	10	N	100
J7R0690	300	200	1.0	N	20	20	150	700	N	20	N	150
J7R0700	150	150	1.0	N	30	N	300	100	20	50	N	100
J7R0710	200	200	1.0	N	N	5	100	50	20	5	N	50
J7R0720	200	200	1.5	N	N	15	150	50	20	10	N	70
J7R0730	200	200	1.5	N	N	20	100	70	50	N	N	50
J7R0740	200	200	1.0	N	50	10	700	150	30	100	N	200
J7R0750	200	150	1.5	N	<20	10	150	70	20	15	N	70
J7R0760	150	150	1.0	N	N	5	70	50	20	N	N	30
J7R0770	200	200	1.5	N	N	15	200	100	50	N	N	70
J7R0780	150	150	1.5	N	N	N	50	50	N	5	N	30
J7R0790	200	200	2.0	N	N	20	100	100	30	N	N	100
J7R0800	200	200	2.0	N	30	15	500	150	20	30	N	150
J7R0810	200	200	2.0	N	N	20	100	100	30	N	N	70
J7R0820	200	200	2.0	N	N	20	200	100	30	N	N	100
J7R0830	200	200	1.5	N	N	15	100	30	30	N	N	50
J7R0840	200	200	2.0	N	N	20	150	700	30	N	N	70
J7R0850	200	200	2.0	N	N	20	200	50	30	N	N	50
J7R0860	150	200	1.5	N	N	15	100	20	20	N	N	50
J7R0870	200	200	1.5	N	N	20	100	10	20	N	N	50
J7R0880	200	200	2.0	N	N	15	100	70	20	N	N	50
J7R0890	200	700	2.0	N	N	15	500	20	20	N	N	100
J7R0900	150	1,000	1.5	N	N	15	70	10	20	N	N	30
J7R0910	200	500	2.0	N	N	20	150	70	30	N	N	50



TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 7, JOPLIN 1 x 2 QUADRANGLE,  
MISSOURI AND KANSAS.--Continued

Sample	Pb-ppm S	Sb-ppm S	Sc-ppm S	Sn-ppm S	Si-ppm S	V-ppm S	W-ppm S	Y-ppm S	Zn-ppm S	Zr-ppm S	Th-ppm S	Form.#
J7R0470	300	N	15	10	300	150	N	20	200	100	N	20
J7R0480	50	N	15	N	100	200	N	15	1,000	100	N	20
J7R0490	20	N	10	N	100	100	N	50	500	300	N	20
J7R0500	20	N	10	N	100	100	N	30	500	300	N	20
J7R0510	<10	N	N	N	100	70	N	50	N	500	N	20
J7R0520	15	N	5	N	100	70	N	30	N	500	N	20
J7R0530	20	N	15	N	100	150	N	30	N	200	N	20
J7R0540	15	N	15	N	100	200	N	20	N	100	N	20
J7R0550	10	N	20	N	150	200	N	30	N	100	N	20
J7R0560	15	N	20	N	150	300	N	30	N	100	N	20
J7R0570	20	N	20	N	200	300	N	30	N	100	N	20
J7R0580	20	N	20	N	150	200	N	30	2,000	100	N	20
J7R0590	20	N	15	N	150	200	N	30	N	200	N	20
J7R0600	20	N	15	N	150	150	N	20	N	100	N	20
J7R0610	30	N	15	N	150	200	N	15	1,000	100	N	20
J7R0620	N	N	N	N	N	20	N	N	500	30	N	20
J7R0630	50	N	10	N	100	100	N	15	N	70	N	20
J7R0640	N	N	N	N	100	20	N	N	N	30	N	20
J7R0650	<10	N	N	N	100	50	N	N	N	50	N	20
J7R0660	15	N	N	N	100	100	N	N	<200	100	N	20
J7R0670	15	N	5	N	300	100	N	N	300	100	N	20
J7R0680	50	N	7	N	100	150	N	N	<200	150	N	20
J7R0690	50	N	7	N	200	150	N	10	700	100	N	20
J7R0700	15	N	5	N	150	500	N	15	700	50	N	20
J7R0710	10	N	5	N	100	150	N	N	N	100	N	20
J7R0720	15	N	10	N	100	150	N	10	N	150	N	20
J7R0730	30	N	15	N	100	200	N	20	N	100	N	22
J7R0740	20	N	10	N	100	1,500	N	15	1,000	70	N	22
J7R0750	20	N	7	N	100	150	N	10	500	100	N	22
J7R0760	<10	N	5	N	100	100	N	10	N	70	N	22
J7R0770	30	N	15	N	150	200	N	15	N	150	N	22
J7R0780	N	N	7	N	100	100	N	10	N	100	N	22
J7R0790	20	N	15	N	100	200	N	10	N	100	N	22
J7R0800	50	N	10	N	100	300	N	15	1,000	100	N	22
J7R0810	30	N	10	N	100	200	N	15	<200	100	N	22
J7R0820	50	N	15	N	150	200	N	20	500	100	N	22
J7R0830	N	N	10	N	100	150	N	20	N	200	N	22
J7R0840	15	N	15	N	100	200	N	20	N	100	N	22
J7R0850	15	N	15	N	100	200	N	20	N	150	N	22
J7R0860	<10	N	15	N	100	150	N	20	N	100	N	22
J7R0870	N	N	10	N	100	150	N	20	N	200	N	22
J7R0880	N	N	10	N	100	150	N	20	N	150	N	22
J7R0890	15	N	15	N	100	200	N	20	200	150	N	22
J7R0900	N	N	10	N	150	150	N	20	N	200	N	22
J7R0910	20	N	15	N	100	150	N	20	N	200	N	22

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 7, 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-pptm S	Ag-pptm S	As-pptm S	Pu-pptm S
J7R0920	37 38 17	95 53 11	1.50	.70	<.05	.30	150	N	N	N
J7R0930	37 38 17	95 53 11	1.50	.50	.05	.30	200	N	N	N
J7R0940	37 38 17	95 53 11	2.00	.50	.05	.30	150	N	N	N
J7R0950	37 38 17	95 53 11	1.00	.30	.05	.20	100	N	N	N
J7R0960	37 38 17	95 53 11	3.00	.70	<.05	.50	200	N	N	N
J7R0970	37 38 17	95 53 11	3.00	.70	<.05	.30	150	N	N	N
J7R0980	37 38 17	95 53 11	3.00	1.00	.05	.30	200	N	N	N
J7R0990	37 38 17	95 53 11	3.00	.70	.05	.20	200	N	N	N
J7P1000	37 38 17	95 53 11	2.00	.70	.20	.20	200	N	N	N
J7P1010	37 38 17	95 53 11	3.00	.70	.50	.20	300	1.5	N	N
J7R1020	37 38 17	95 53 11	3.00	.70	.10	.20	100	.5	N	N
J7R1030	37 38 17	95 53 11	2.00	.70	.05	.30	200	N	N	N
J7P1040	37 38 17	95 53 11	2.00	.50	.07	.20	200	N	N	N
J7R1050	37 38 17	95 53 11	3.00	.70	.50	.20	200	2.0	N	N
J7P1060	37 38 17	95 53 11	2.00	.70	.15	.30	200	1.0	N	N
J7R1070	37 38 17	95 53 11	2.00	.50	.30	.20	150	2.0	N	N
J7R1080	37 38 17	95 53 11	2.00	.50	.07	.30	200	1.5	N	N
J7R1090	37 38 17	95 53 11	5.00	.50	.15	.20	300	1.5	N	N
J7R1100	37 38 17	95 53 11	3.00	.50	.05	.30	300	N	N	N
J7R1110	37 38 17	95 53 11	3.00	.50	<.05	.30	200	N	N	N
J7R1120	37 38 17	95 53 11	5.00	.70	<.05	.50	300	N	N	N
J7R1130	37 38 17	95 53 11	5.00	.70	.07	.30	300	.5	N	N
J7R1140	37 38 17	95 53 11	3.00	.70	.30	.30	300	.5	N	N
J7R1150	37 38 17	95 53 11	2.00	.50	.05	.30	200	1.0	N	N
J7R1160	37 38 17	95 53 11	3.00	.70	<.05	.50	300	N	N	N
J7R1170	37 38 17	95 53 11	2.00	.50	.05	.50	200	N	N	N
J7R1180	37 38 17	95 53 11	3.00	.70	<.05	.50	300	N	N	N
J7R1190	37 38 17	95 53 11	2.00	.50	<.05	.50	500	.5	N	N
J7R1200	37 38 17	95 53 11	3.00	.50	<.05	.50	200	N	N	N
J7R1210	37 38 17	95 53 11	3.00	.50	<.05	.50	200	N	N	N
J7R1220	37 38 17	95 53 11	5.00	.70	<.05	.50	300	N	N	N
J7R1230	37 38 17	95 53 11	2.00	.30	<.05	.50	100	.5	N	N
J7R1240	37 38 17	95 53 11	1.50	.50	<.05	.50	100	N	N	N
J7R1250	37 38 17	95 53 11	3.00	.50	<.05	.50	100	N	N	N
J7R1260	37 38 17	95 53 11	3.00	.50	<.05	.50	100	N	N	N
J7R1270	37 38 17	95 53 11	2.00	.30	<.05	.50	70	N	N	N
J7R1280	37 38 17	95 53 11	3.00	.50	<.05	.50	70	N	N	N
J7R1290	37 38 17	95 53 11	5.00	.50	<.05	.50	100	N	N	N
J7R1300	37 38 17	95 53 11	3.00	.50	<.05	.70	100	N	N	N
J7R1310	37 38 17	95 53 11	3.00	.50	<.05	.50	100	N	N	N
J7R1320	37 38 17	95 53 11	3.00	.50	<.05	.50	100	N	N	N
J7R1330	37 38 17	95 53 11	2.00	.30	<.05	.50	100	N	N	N
J7R1340	37 38 17	95 53 11	3.00	.50	<.05	1.00	70	N	N	N
J7R1350	37 38 17	95 53 11	2.00	.50	<.05	.50	100	N	N	N
J7R1360	37 38 17	95 53 11	2.00	.50	<.05	.50	100	N	N	N

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 7, JOPLIN 1 x 2 QUADRANGLE,  
MISSOURI AND KANSAS.--Continued

Sample	P-ppm S	Ba-ppm S	Be-ppm S	Ri-ppm S	Cd-ppm S	Co-ppm S	Cr-ppm S	Cu-ppm S	La-ppm S	Mo-ppm S	Nb-ppm S	Ni-ppm S
J7F0920	100	200	2.0	N	N	N	70	15	50	N	N	20
J7F0930	100	100	1.5	N	N	5	70	10	30	N	N	20
J7F0940	100	150	1.5	N	N	10	70	20	30	N	N	30
J7F0950	50	100	1.0	N	N	5	100	10	20	N	N	15
J7F0960	150	150	1.5	N	N	20	100	150	50	N	N	70
J7F0970	100	200	2.0	N	N	20	100	30	50	N	N	70
J7F0980	150	500	2.0	N	N	20	100	50	50	N	N	70
J7F0990	100	500	1.5	N	N	20	100	30	20	N	N	70
J7F1000	150	300	2.0	N	N	15	100	50	20	N	N	100
J7F1010	150	150	2.0	N	<20	20	500	100	30	20	N	200
J7F1020	100	200	1.5	N	N	20	100	50	20	5	N	100
J7F1030	100	300	1.5	N	N	15	70	70	20	N	N	70
J7F1040	100	200	2.0	N	N	20	100	20	30	N	N	70
J7F1050	150	700	2.0	N	<20	20	300	100	30	30	N	200
J7F1060	150	200	2.0	N	<20	15	200	50	30	10	N	100
J7F1070	150	200	2.0	N	<20	15	500	100	50	30	N	200
J7F1080	150	500	2.0	N	<20	20	200	100	50	20	N	150
J7F1090	150	500	2.0	N	20	20	300	200	20	30	N	150
J7F1100	100	500	2.0	N	N	20	100	30	50	5	N	70
J7F1110	100	500	1.5	N	N	20	100	100	50	N	N	70
J7F1120	150	500	1.5	N	N	30	100	50	50	N	N	70
J7F1130	100	500	2.0	N	N	30	100	20	50	N	N	100
J7F1140	200	500	2.0	N	N	20	300	100	50	20	N	150
J7F1150	200	500	1.5	N	N	20	500	200	50	15	N	100
J7F1160	200	500	1.5	N	N	20	300	100	50	10	N	100
J7F1170	200	500	1.5	N	N	20	150	30	50	N	N	70
J7F1180	200	500	2.0	N	N	15	200	70	50	N	N	70
J7F1190	200	500	2.0	N	N	20	150	50	50	N	N	70
J7F1200	200	500	2.0	N	N	20	150	50	70	N	N	70
J7F1210	200	500	2.0	N	N	20	150	50	70	N	N	70
J7F1220	200	500	1.5	N	N	20	150	30	50	N	N	70
J7F1230	200	300	1.5	N	N	15	150	30	70	5	N	70
J7F1240	200	300	1.5	N	N	20	150	50	70	N	N	50
J7F1250	200	500	2.0	N	N	20	200	15	70	N	N	70
J7F1260	200	700	2.0	N	N	20	150	200	50	N	N	70
J7F1270	200	500	2.0	N	N	15	150	30	70	N	N	50
J7F1280	200	300	2.0	N	N	20	200	200	70	N	N	70
J7F1290	200	300	1.5	N	N	20	150	100	70	N	N	70
J7F1300	200	300	1.5	N	N	20	200	30	70	N	N	100
J7F1310	200	300	1.5	N	N	15	200	50	50	N	N	70
J7F1320	200	500	2.0	N	N	20	200	200	70	N	N	70
J7F1330	200	300	1.5	N	N	20	200	30	50	N	N	100
J7F1340	200	300	1.5	N	N	20	200	30	50	N	N	100
J7F1350	200	500	2.0	N	N	10	200	30	70	N	N	70
J7F1360	200	300	2.0	N	N	20	150	30	70	N	N	100

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 7, JOPLIN 1 x 2 QUADRANGLE,  
MISSOURI AND KANSAS.--Continued

Sample	Ph-ppm S	Sb-ppm S	Sc-ppm S	Sn-ppm S	Str-ppm S	V-ppm S	W-ppm S	Y-ppm S	Zn-ppm S	Zr-ppm S	Th-ppm S	Form.#
J7R0920	10	N	70	N	100	100	N	30	N	150	N	22
J7R0930	N	N	7	N	100	70	N	20	N	200	N	22
J7R0940	<10	N	7	N	100	100	N	20	N	200	N	22
J7R0950	N	N	5	N	100	50	N	15	N	200	N	22
J7R0960	<10	N	15	N	100	150	N	30	N	200	N	22
J7R0970	<10	N	15	N	100	100	N	30	N	70	N	22
J7R0980	20	N	15	N	100	100	N	20	N	70	N	22
J7R0990	30	N	10	N	100	70	N	20	<200	100	N	22
J7R1000	15	N	15	N	100	150	N	15	<200	100	N	22
J7R1010	100	N	15	N	100	200	N	15	500	100	N	21
J7R1020	20	N	10	N	N	100	N	10	N	50	N	21
J7R1030	<10	N	10	N	300	100	N	20	N	150	N	21
J7R1040	15	N	10	N	150	70	N	20	N	100	N	21
J7R1050	50	N	10	N	150	300	N	20	500	100	N	21
J7R1060	30	N	10	N	100	200	N	20	300	100	N	21
J7R1070	70	N	15	N	100	300	N	20	500	70	N	21
J7R1080	70	N	15	N	100	200	N	20	300	100	N	21
J7R1090	50	N	10	N	100	150	N	20	1,000	100	N	21
J7R1100	20	N	10	N	200	100	N	30	300	200	N	21
J7R1110	15	N	15	N	150	100	N	30	200	150	N	21
J7R1120	20	N	15	N	100	150	N	30	N	150	N	21
J7R1130	20	N	15	N	100	150	N	30	N	100	N	21
J7R1140	50	N	15	N	100	200	N	30	500	100	N	21
J7R1150	50	N	15	N	100	100	N	20	500	100	N	21
J7R1160	20	N	10	N	150	200	N	20	300	150	N	21
J7R1170	10	N	15	N	150	150	N	30	<200	100	N	21
J7R1180	15	N	15	N	150	200	N	30	<200	150	N	21
J7R1190	30	N	15	N	150	150	N	30	200	100	N	21
J7R1200	20	N	15	N	200	150	N	30	N	150	N	21
J7R1210	70	N	15	N	150	150	N	30	200	100	N	21
J7R1220	30	N	15	N	200	200	N	30	300	200	N	21
J7R1230	50	N	15	N	150	150	N	30	N	150	N	21
J7R1240	30	N	15	N	150	150	N	30	N	150	N	21
J7R1250	20	N	20	N	200	300	N	30	N	150	N	21
J7R1260	15	N	20	N	200	200	N	30	N	200	N	21
J7R1270	10	N	20	N	200	200	N	30	N	200	N	21
J7R1280	20	N	20	N	500	200	N	30	N	150	N	21
J7R1290	20	N	20	N	200	200	N	30	N	150	N	21
J7R1300	10	N	20	N	200	200	N	30	N	150	N	21
J7R1310	15	N	20	N	200	200	N	30	N	100	N	21
J7R1320	20	N	20	N	200	200	N	30	N	100	N	21
J7R1330	20	N	15	N	150	150	N	30	700	150	N	21
J7R1340	30	N	20	N	150	300	N	30	<200	150	N	21
J7R1350	20	N	20	N	150	200	N	30	N	100	N	21
J7R1360	20	N	20	N	150	150	N	30	N	100	N	21

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 7, 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
J7R1370	37 38 17	95 53 11	2.00	.50	<.05	.50	70	.7	N	N
J7R1380	37 38 17	95 53 11	.70	.20	.05	.30	30	N	N	N
J7R1390	37 38 17	95 53 11	2.00	.50	<.05	.50	70	N	N	N
J7R1400	37 38 17	95 53 11	.30	.15	.05	.15	15	N	N	N
J7R1410	37 38 17	95 53 11	.05	.05	.05	.03	N	N	N	N
J7R1420	37 38 17	95 53 11	.50	.30	20.00	.03	500	N	N	N
J7R1430	37 38 17	95 53 11	.50	.10	.10	.07	20	N	N	N
J7R1440	37 38 17	95 53 11	.20	.05	.05	.05	10	N	N	N
J7R1450	37 38 17	95 53 11	.15	.02	<.05	.01	N	N	N	N
J7R1460	37 38 17	95 53 11	.10	.03	<.05	.02	N	N	N	N
J7R1470	37 38 17	95 53 11	.50	.05	.05	.03	N	N	N	N
J7R1480	37 38 17	95 53 11	.20	.05	<.05	.03	N	N	N	N
J7R1490	37 38 17	95 53 11	.50	.10	<.05	.07	20	N	N	N
J7R1500	37 38 17	95 53 11	.50	.15	<.05	.10	20	N	N	N
J7R1510	37 38 17	95 53 11	.20	.07	.07	.05	10	N	N	N
J7R1520	37 38 17	95 53 11	.50	.10	.10	.10	30	N	N	N
J7R1530	37 38 17	95 53 11	.50	.10	.05	.07	20	N	N	N
J7R1540	37 38 17	95 53 11	.70	.20	.15	.15	50	N	N	N
J7R1550	37 38 17	95 53 11	.50	.15	.10	.10	20	N	N	N
J7R1560	37 38 17	95 53 11	.30	.10	.15	.07	20	N	N	N
J7R1570	37 38 17	95 53 11	.20	.10	.05	.07	15	N	N	N
J7R1580	37 38 17	95 53 11	1.00	.20	.15	.15	50	N	N	N
J7R1590	37 38 17	95 53 11	1.00	.15	.10	.10	50	N	N	N
J7R1600	37 38 17	95 53 11	2.00	.70	.10	.30	200	N	N	N
J7R1610	37 38 17	95 53 11	3.00	.50	.20	.30	100	N	N	N
J7R1620	37 38 17	95 53 11	3.00	.50	.50	.20	150	N	N	N
J7R1630	37 38 17	95 53 11	3.00	1.00	<.05	.50	150	N	N	N
J7R1640	37 38 17	95 53 11	3.00	1.00	.05	.30	200	N	N	N
J7R1650	37 38 17	95 53 11	3.00	1.00	.07	.30	200	N	N	N
J7R1660	37 38 17	95 53 11	5.00	1.00	.05	.50	300	N	N	N
J7R1670	37 38 17	95 53 11	7.00	1.00	.05	.30	200	N	N	N
J7R1680	37 38 17	95 53 11	2.00	.70	.10	.30	100	N	N	N
J7R1690	37 38 17	95 53 11	3.00	.70	.20	.30	50	N	N	N

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 7, JOPLIN 1 x 2 QUADRANGLE,  
MISSOURI AND KANSAS.--Continued

Sample	R--ppm S	Ra--ppm S	Re--ppm S	Ri--ppm S	Cd--ppm S	Co--ppm S	Cr--ppm S	Cu--ppm S	La--ppm S	Mo--ppm S	Nb--ppm S	Ni--ppm S
J7R1370	200	300	1.5	N	N	15	200	20	70	N	N	100
J7R1380	150	150	1.5	N	N	N	150	20	70	N	N	50
J7R1390	200	150	1.5	N	N	15	150	20	30	N	N	70
J7R1400	200	100	1.5	N	N	20	100	7	50	N	N	50
J7P1410	150	30	N	N	N	N	15	<5	N	N	N	7
J7R1420	50	20	N	N	N	N	20	<5	N	N	N	7
J7R1430	100	50	N	N	N	N	30	<5	N	N	N	10
J7R1440	100	30	N	N	N	N	10	<5	N	N	N	5
J7R1450	100	30	N	N	N	N	N	<5	N	N	N	5
J7F1460	100	20	N	N	N	N	N	<5	N	N	N	5
J7R1470	100	30	N	N	N	N	N	<5	N	N	N	5
J7P1480	100	20	N	N	N	N	N	<5	N	N	N	7
J7R1490	100	50	N	N	N	N	10	<5	N	N	N	10
J7R1500	100	50	N	N	N	N	15	5	N	N	N	15
J7P1510	100	30	<1.0	N	N	N	N	<5	N	N	N	7
J7R1520	100	50	N	N	N	N	15	<5	N	N	N	10
J7P1530	100	50	<1.0	N	N	N	10	5	N	N	N	10
J7R1540	100	50	<1.0	N	N	N	20	15	N	N	N	10
J7R1550	100	50	<1.0	N	N	N	15	5	N	N	N	70
J7P1560	100	50	<1.0	N	N	N	10	50	N	N	N	15
J7R1570	100	30	<1.0	N	N	15	10	<5	N	N	N	50
J7P1580	100	50	<1.0	N	N	30	20	100	N	N	N	100
J7R1590	100	50	<1.0	N	N	20	20	10	N	N	N	100
J7R1600	300	200	2.0	N	N	15	200	50	30	N	N	100
J7P1610	200	100	1.5	N	N	30	100	200	30	N	N	700
J7R1620	200	100	1.5	N	N	20	100	70	30	N	N	70
J7R1630	200	200	1.5	N	N	15	200	10	30	N	N	50
J7R1640	200	200	2.0	N	N	20	150	20	30	N	N	70
J7R1650	200	200	2.0	N	N	15	100	20	30	N	N	50
J7R1660	300	200	2.0	N	N	30	150	70	50	50	N	70
J7R1670	200	200	2.0	N	N	30	100	70	30	50	N	70
J7R1680	200	150	1.5	N	N	15	100	30	30	N	N	50
J7P1690	200	100	1.5	N	N	20	100	30	50	N	N	70

TABLE 1--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 7, JOPLIN 1 x 2 QUADRANGLE,  
MISSOURI AND KANSAS.--Continued

Sample	Pb-ppm %	Sb-ppm S	Sc-ppm %	Sn-ppm S	Sr-ppm S	V-ppm S	W-ppm S	Y-ppm %	Zn-ppm S	Zr-ppm S	Th-ppm %	Form.#
J7R1370	20	N	20	N	150	150	N	30	N	150	N	40
J7R1380	10	N	15	N	150	150	N	70	N	150	N	40
J7R1390	10	N	10	N	100	100	N	20	N	100	N	40
J7R1400	N	N	N	N	70	70	N	30	N	70	N	40
J7R1410	N	N	N	N	20	20	N	N	N	N	N	40
J7R1420	30	N	N	N	20	20	N	50	N	10	N	40
J7R1430	N	N	N	N	30	30	N	N	N	50	N	40
J7R1440	N	N	N	N	20	20	N	N	N	20	N	40
J7R1450	N	N	N	N	<10	<10	N	N	N	10	N	40
J7R1460	N	N	N	N	10	10	N	N	N	10	N	40
J7R1470	N	N	N	N	15	15	N	N	N	10	N	40
J7R1480	N	N	N	N	20	20	N	N	N	10	N	40
J7R1490	N	N	N	N	30	30	N	N	N	20	N	40
J7R1500	N	N	N	N	50	50	N	N	200	30	N	40
J7R1510	N	N	N	N	30	30	N	N	N	30	N	40
J7R1520	N	N	N	N	50	50	N	N	N	30	N	40
J7R1530	N	N	N	N	30	30	N	N	200	20	N	40
J7R1540	N	N	N	N	50	50	N	N	N	30	N	40
J7R1550	N	N	N	N	30	30	N	N	N	30	N	40
J7R1560	N	N	N	N	30	30	N	N	N	20	N	40
J7R1570	N	N	N	N	30	30	N	N	N	20	N	40
J7R1580	N	N	N	N	50	50	N	N	N	50	N	40
J7R1590	10	N	N	N	20	20	N	N	N	30	N	40
J7R1600	20	N	20	N	200	200	N	20	N	100	N	40
J7R1610	30	N	10	N	100	100	N	20	N	100	N	40
J7R1620	30	N	10	N	100	100	N	20	N	100	N	40
J7R1630	N	N	10	N	200	200	N	20	N	200	N	40
J7R1640	20	N	10	N	200	200	N	20	N	100	N	40
J7R1650	30	N	10	N	200	200	N	30	N	200	N	40
J7R1660	50	N	15	N	300	300	N	30	N	300	N	31
J7R1670	30	N	15	N	200	200	N	20	N	150	N	60
J7R1680	<10	N	10	N	100	100	N	20	N	200	N	60
J7R1690	10	N	15	N	150	150	N	30	N	200	N	60

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 8, 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
JBR1610	37 14 6	95 53 38	5.0	.5	.05	.20	100	N	N	N
JBR1620	37 14 6	95 53 38	5.0	1.0	.05	.20	100	N	N	N
JBR1630	37 14 6	95 53 38	5.0	1.0	<.05	.20	150	N	N	N
JBR1640	37 14 6	95 53 38	3.0	1.0	<.05	.20	70	N	N	N
JBR1650	37 14 6	95 53 38	3.0	1.0	<.05	.20	100	N	N	N
JBR1660	37 14 6	95 53 38	5.0	1.0	<.05	.20	100	N	N	N
JBR1670	37 14 6	95 53 38	5.0	1.0	<.05	.20	150	N	N	N
JBR1680	37 14 6	95 53 38	5.0	1.0	<.05	.20	100	N	N	N
JBR1690	37 14 6	95 53 38	3.0	.7	<.05	.20	100	N	N	N
JBR1700	37 14 6	95 53 38	3.0	.5	.05	.20	50	N	N	N
JBR1710	37 14 6	95 53 38	5.0	.5	<.05	.20	70	N	N	N
JBR1720	37 14 6	95 53 38	2.0	.3	<.05	.15	50	N	N	N
JBR1730	37 14 6	95 53 38	3.0	.7	<.05	.30	100	N	N	N
JBR1740	37 14 6	95 53 38	2.0	.5	<.05	.30	70	N	N	N
JBR1750	37 14 6	95 53 38	3.0	.7	<.05	.50	70	N	N	N
JBR1760	37 14 6	95 53 38	2.0	.5	<.05	.30	30	N	N	N
JBR1770	37 14 6	95 53 38	1.5	.2	<.05	.20	30	N	N	N
JBR1780	37 14 6	95 53 38	1.0	.2	<.05	.20	20	N	N	N
JBR1790	37 14 6	95 53 38	5.0	.5	<.05	.30	100	N	N	N
JBR1800	37 14 6	95 53 38	5.0	.5	<.05	.30	100	N	N	N
JBR1810	37 14 6	95 53 38	2.0	.5	<.05	.30	50	N	N	N
JBR1820	37 14 6	95 53 38	2.0	.5	<.05	.30	50	N	N	N
JBR1830	37 14 6	95 53 38	2.0	.5	.05	.30	50	N	N	N
JBR1840	37 14 6	95 53 38	2.0	.7	<.05	.30	30	N	N	N
JBR1850	37 14 6	95 53 38	7.0	.5	<.05	.30	200	N	N	N
JBR1860	37 14 6	95 53 38	3.0	.7	<.05	.30	50	N	N	N
JBR1870	37 14 6	95 53 38	5.0	.7	<.05	.30	70	N	N	N
JBR1880	37 14 6	95 53 38	5.0	.7	<.05	.50	100	N	N	N
JBR1890	37 14 6	95 53 38	3.0	.5	.05	.30	50	N	N	N
JBR1900	37 14 6	95 53 38	5.0	.5	<.05	.30	100	N	N	N
JBR1910	37 14 6	95 53 38	3.0	.5	<.05	.30	70	N	N	N
JBR1920	37 14 6	95 53 38	3.0	.5	<.05	.30	70	N	N	N
JBR1930	37 14 6	95 53 38	2.0	.7	<.05	.30	70	N	N	N
JBR1940	37 14 6	95 53 38	3.0	.5	<.05	.30	30	N	N	N
JBR1950	37 14 6	95 53 38	5.0	.7	.05	.50	70	N	N	N
JBR1960	37 14 6	95 53 38	2.0	.5	<.05	.30	50	N	N	N
JBR1970	37 14 6	95 53 38	5.0	.5	<.05	.30	70	N	N	N
JBR1980	37 14 6	95 53 38	5.0	.5	<.05	.30	70	N	N	N
JBR1990	37 14 6	95 53 38	3.0	.5	<.05	.30	50	N	N	N
JBR2000	37 14 6	95 53 38	2.0	.5	<.05	.30	50	N	N	N
JBR2010	37 14 6	95 53 38	2.0	.5	<.05	.20	30	N	N	N
JBR2020	37 14 6	95 53 38	1.5	.3	<.05	.20	20	N	N	N
JBR2030	37 14 6	95 53 38	2.0	.5	<.05	.30	30	N	N	N
JBR2040	37 14 6	95 53 38	1.5	.3	<.05	.30	30	N	N	N
JBR2050	37 14 6	95 53 38	1.5	.3	<.05	.30	20	N	N	N



TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 8, JOPLIN 1 x 2 QUADRANGLE,  
MISSOURI AND KANSAS.--Continued

Sample	B-ppm S	Ba-ppm S	Be-ppm S	Ri-ppm S	Cd-ppm S	Co-ppm S	Cr-ppm S	Cu-ppm S	La-ppm S	Mo-ppm S	Nb-ppm S	Ni-ppm S
J8R1610	70	150	1.0	N	N	10	30	20	20	N	N	30
J8R1620	70	200	1.0	N	N	15	50	30	20	5	N	50
J8R1630	70	200	1.0	N	N	15	50	50	N	5	N	50
J8R1640	50	200	<1.0	N	N	15	30	50	30	30	N	70
J8R1650	70	200	<1.0	N	N	10	50	50	N	20	N	50
J8R1660	70	200	1.0	N	N	15	50	50	N	50	N	50
J8R1670	50	200	1.0	N	N	15	50	70	N	50	N	50
J8R1680	70	200	1.0	N	N	15	50	50	N	50	N	50
J8R1690	70	150	<1.0	N	N	10	50	50	N	20	N	50
J8P1700	70	150	<1.0	N	N	10	50	30	30	15	N	50
J8K1710	70	200	<1.0	N	N	10	50	50	20	20	N	50
J8R1720	30	100	<1.0	N	N	10	30	30	N	10	N	50
J8R1730	70	200	1.0	N	N	20	70	50	30	10	N	70
J8R1740	70	200	1.0	N	N	15	70	100	30	15	N	50
J8R1750	70	200	1.0	N	N	15	100	30	30	10	N	70
J8R1760	70	100	1.0	N	N	7	50	20	30	10	N	30
J8R1770	50	150	<1.0	N	N	15	30	20	N	10	N	30
J8R1780	50	150	N	N	N	5	30	10	N	20	N	20
J8R1790	70	200	1.0	N	N	10	70	30	20	7	N	50
J8R1800	70	150	1.0	N	N	15	50	70	20	5	N	70
J8P1810	70	150	1.0	N	N	10	50	20	30	7	N	50
J8R1820	70	200	1.0	N	N	70	70	50	30	20	N	50
J8R1830	70	150	1.0	N	N	15	70	30	30	15	N	50
J8R1840	70	200	1.0	N	N	10	50	30	30	15	N	50
J8R1850	70	150	1.0	N	N	15	50	50	20	15	N	70
J8R1860	70	200	1.0	N	N	15	70	50	30	20	N	50
J8R1870	50	150	1.0	N	N	20	50	50	N	30	N	70
J8R1880	100	150	1.5	N	N	15	70	50	30	10	N	70
J8R1890	50	70	<1.0	N	N	20	50	30	N	15	N	50
J8R1900	50	100	<1.0	N	N	10	50	20	N	7	N	50
J8R1910	50	100	<1.0	N	N	15	50	50	20	7	N	50
J8R1920	70	200	1.0	N	N	15	50	50	N	10	N	50
J8R1930	70	100	<1.0	N	N	15	50	30	20	7	N	50
J8R1940	50	200	<1.0	N	N	10	50	50	N	10	N	50
J8R1950	70	300	1.0	N	N	15	70	50	50	10	N	50
J8R1960	50	50	1.0	N	N	15	70	50	N	7	N	50
J8R1970	70	70	1.0	N	N	15	70	30	30	10	N	50
J8R1980	70	70	1.0	N	N	15	70	50	20	5	N	50
J8R1990	70	70	1.0	N	N	15	70	50	30	5	N	30
J8R2000	70	70	1.0	N	N	10	70	70	20	N	N	30
J8R2010	50	50	<1.0	N	N	15	50	30	20	N	N	30
J8R2020	50	50	<1.0	N	N	7	50	20	30	N	N	30
J8R2030	70	70	1.0	N	N	10	70	20	30	N	N	30
J8R2040	50	50	<1.0	N	N	5	50	20	30	N	N	30
J8R2050	50	50	<1.0	N	N	30	50	150	30	N	N	30

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 8, 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.#
J8R1610	20	N	10	N	N	100	N	15	N	150	N	40
J8R1620	30	N	10	N	N	150	N	15	N	150	N	40
J8R1630	20	N	10	N	N	200	N	15	N	150	N	40
J8R1640	20	N	10	N	N	500	N	20	N	150	N	40
J8R1650	30	N	10	N	N	300	N	15	N	150	N	40
J8R1660	30	N	10	N	N	300	N	15	N	150	N	79
J8R1670	30	N	10	N	N	200	N	15	N	100	N	79
J8R1680	50	N	10	N	N	200	N	10	N	100	N	79
J8R1690	20	N	10	N	N	200	N	15	N	100	N	79
J8R1700	20	N	10	N	N	150	N	15	N	100	N	79
J8R1710	30	N	10	N	N	200	N	10	N	100	N	79
J8R1720	20	N	7	N	N	150	N	10	N	100	N	79
J8R1730	30	N	10	N	N	200	N	15	N	150	N	79
J8R1740	30	N	10	N	N	200	N	20	N	150	N	79
J8R1750	50	N	15	N	100	200	N	20	N	150	N	79
J8R1760	10	N	10	N	N	150	N	15	N	100	N	79
J8R1770	15	N	5	N	N	100	N	10	N	100	N	79
J8R1780	10	N	5	N	N	100	N	<10	N	100	N	79
J8R1790	30	N	10	N	N	200	N	20	N	150	N	79
J8R1800	50	N	10	N	N	200	N	15	N	100	N	79
J8R1810	50	N	10	N	100	200	N	15	N	150	N	79
J8R1820	50	N	15	N	100	200	N	15	N	150	N	79
J8R1830	50	N	10	N	100	200	N	20	N	150	N	79
J8R1840	50	N	10	N	100	200	N	15	N	100	N	79
J8R1850	30	N	10	N	N	200	N	20	N	150	N	79
J8R1860	70	N	10	N	100	200	N	15	N	100	N	79
J8R1870	50	N	10	N	N	300	N	10	N	100	N	79
J8R1880	30	N	15	N	N	200	N	15	N	150	N	79
J8R1890	30	N	10	N	N	200	N	15	N	100	N	79
J8R1900	50	N	10	N	N	200	N	15	N	100	N	79
J8R1910	50	N	10	N	N	200	N	15	N	150	N	79
J8R1920	50	N	10	N	N	200	N	15	N	100	N	79
J8R1930	30	N	15	N	N	200	N	15	200	100	N	79
J8R1940	50	N	7	N	N	200	N	15	N	100	N	79
J8R1950	50	N	15	N	100	200	N	20	N	150	N	79
J8R1960	30	N	7	N	N	200	N	15	N	150	N	79
J8R1970	30	N	10	N	N	200	50	20	1,000	150	N	79
J8R1980	30	N	10	N	N	200	N	20	N	150	N	79
J8R1990	20	N	10	N	N	200	N	20	N	150	N	79
J8R2000	30	N	7	N	N	200	N	20	N	200	N	79
J8R2010	15	N	7	N	N	150	N	15	N	150	N	79
J8R2020	15	N	7	N	N	150	N	15	N	150	N	79
J8R2030	20	N	10	N	N	100	N	20	N	150	N	79
J8R2040	15	N	5	N	N	150	N	15	N	100	N	79
J8R2050	15	N	5	N	N	100	N	15	N	150	N	79

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 8, 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
J8R2060	37 14 6	95 53 38	2.0	.3	.05	.30	30	N	N	N
J8R2070	37 14 6	95 53 38	2.0	.5	.05	.30	20	N	N	N
J8R2080	37 14 6	95 53 38	3.0	.5	<.05	.30	30	N	N	N
J8P2090	37 14 6	95 53 38	3.0	.7	<.05	.30	50	N	N	N
J8R2100	37 14 6	95 53 38	2.0	.5	<.05	.30	30	N	N	N
J8R2110	37 14 6	95 53 38	2.0	.7	.07	.20	70	.7	N	N
J8R2120	37 14 6	95 53 38	2.0	.7	.10	.20	700	.7	N	N
J8R2130	37 14 6	95 53 38	2.0	.3	.10	.20	200	.5	N	N
J8R2132	37 14 6	95 53 38	2.0	.3	.07	.20	200	.5	N	N

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 8, JOPLIN 1 x 2 QUADRANGLE,  
MISSOURI AND KANSAS.--Continued

Sample	P-ppm S	Ra-ppm S	Re-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
JAR2060	50	70	1.0	N	N	7	50	20	30	N	N	30
JAR2070	50	70	1.0	N	N	15	70	30	30	N	N	50
JAR2080	70	70	1.0	N	N	10	70	100	30	N	N	30
JAR2090	50	70	<1.0	N	N	20	70	50	20	10	N	50
JAR2100	50	50	1.0	N	N	10	50	500	50	N	N	50
JAR2110	30	70	<1.0	N	N	10	20	100	20	N	N	30
JAR2120	20	300	1.0	N	N	5	N	30	20	N	<20	20
JAR2130	20	200	1.5	N	N	10	N	10	30	N	<20	15
JAR2132	20	200	1.0	N	N	5	N	15	30	N	<20	15

TABLE 2--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 8, JOPLIN 1 x 2 QUADRANGLE,  
MISSOURI AND KANSAS.--Continued

Sample	Pb-ppm S	Sh-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.#
JRR2060	15	N	7	N	N	100	N	15	N	100	N	79
JRR2070	20	N	10	N	N	100	N	20	N	150	N	79
JRP2080	15	N	10	N	N	200	N	20	N	150	N	79
JRR2090	20	N	10	N	N	150	N	20	N	150	N	79
JRF2100	10	N	10	N	N	200	N	15	<200	150	N	79
JEP2110	200	N	5	N	N	150	N	15	N	200	N	79
JRP2120	100	N	5	N	N	150	N	30	N	200	N	90
JRR2130	50	N	5	N	N	100	N	20	N	150	N	90
JRF2132	20	N	7	N	N	100	N	20	N	200	N	90

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 9, 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
J9R1990	37 46 13	96 1 13	.70	.15	.05	.100	20	N	N	N
J9R2000	37 46 13	96 1 13	.10	.07	.10	.020	10	N	N	N
J9R2010	37 46 13	96 1 13	.10	.05	.05	.020	<10	N	N	N
J9R2020	37 46 13	96 1 13	.15	.05	.05	.030	<10	N	N	N
J9R2030	37 46 13	96 1 13	3.00	.50	.05	.150	15	N	N	N
J9R2040	37 46 13	96 1 13	2.00	.20	.05	.070	10	N	N	N
J9R2050	37 46 13	96 1 13	.05	.05	<.05	.002	N	N	N	N
J9R2070	37 46 13	96 1 13	1.00	.30	.07	.100	N	N	N	N
J9R2090	37 46 13	96 1 13	.10	.05	<.05	.020	N	N	N	N
J9R2110	37 46 13	96 1 13	.30	.07	.07	.020	15	N	N	N
J9R2130	37 46 13	96 1 13	.30	.15	.05	.070	10	N	N	N
J9R2150	37 46 13	96 1 13	.10	.07	.07	.020	10	N	N	N
J9R2170	37 46 13	96 1 13	.15	.07	.07	.015	N	N	N	N
J9R2190	37 46 13	96 1 13	.10	.05	.05	.015	N	N	N	N
J9R2210	37 46 13	96 1 13	.30	.10	.07	.010	N	N	N	N
J9R2230	37 46 13	96 1 13	.15	.03	.05	.015	N	N	N	N
J9R2250	37 46 13	96 1 13	3.00	.20	.10	.050	70	N	N	N
J9R2270	37 46 13	96 1 13	1.00	.10	.05	.030	10	N	N	N
J9R2290	37 46 13	96 1 13	.20	.50	.30	.010	15	N	N	N
J9R2310	37 46 13	96 1 13	5.00	.15	.05	.070	300	N	N	N
J9R2330	37 46 13	96 1 13	1.00	.10	.50	.015	20	N	N	N
J9R2350	37 46 13	96 1 13	.20	.02	<.05	.005	100	N	N	N
J9R2370	37 46 13	96 1 13	.30	.02	<.05	.007	N	N	N	N
J9R2390	37 46 13	96 1 13	.10	.03	<.05	.003	<10	N	N	N
J9R2410	37 46 13	96 1 13	1.50	.07	<.05	.020	15	N	N	N
J9R2430	37 46 13	96 1 13	3.00	1.50	.15	.150	100	N	N	N
J9R2450	37 46 13	96 1 13	.20	.07	<.05	.015	10	N	N	N
J9R2470	37 46 13	96 1 13	.10	.03	<.05	.005	<10	N	N	N
J9R2490	37 46 13	96 1 13	.20	.05	<.05	.010	.20	N	N	N
J9R2510	37 46 13	96 1 13	5.00	1.50	1.00	.300	700	N	N	N
J9R2530	37 46 13	96 1 13	5.00	1.50	1.00	.300	500	N	N	N
J9R2533	37 46 13	96 1 13	5.00	2.00	1.00	.300	500	N	N	N
J9R2540	37 46 13	96 1 13	5.00	1.50	1.00	.300	1.500	N	N	N
J9R2550	37 46 13	96 1 13	7.00	1.50	1.50	.300	700	N	N	N
J9R2560	37 46 13	96 1 13	5.00	1.50	1.00	.300	500	N	N	N
J9R2570	37 46 13	96 1 13	7.00	2.00	1.00	.500	700	N	N	N
J9R2580	37 46 13	96 1 13	3.00	1.50	1.00	.300	500	N	N	N
J9R2590	37 46 13	96 1 13	7.00	2.00	1.00	.500	700	N	N	N
J9R2600	37 46 13	96 1 13	3.00	1.50	1.00	.300	500	N	N	N
J9R2610	37 46 13	96 1 13	5.00	1.50	1.00	.500	700	N	N	N
J9R2620	37 46 13	96 1 13	5.00	1.50	1.00	.300	500	N	N	N
J9R2630	37 46 13	96 1 13	.70	.30	.15	.050	70	N	N	N
J9R2637	37 46 13	96 1 13	1.50	.30	.20	.100	100	N	N	N

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 9, 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
J9R1990	20	30	N	N	N	N	15	50	N	N	N	7
J9R2000	15	50	N	N	N	N	15	700	N	5	N	5
J9R2010	15	20	N	N	N	N	N	<5	N	N	N	5
J9R2020	15	<20	N	N	N	N	N	<5	N	N	N	5
J9P2030	20	70	N	N	N	10	20	50	N	20	N	50
J9R2040	15	70	N	N	N	5	10	30	N	7	N	30
J9R2050	15	20	N	N	N	N	N	N	N	N	N	5
J9R2070	15	70	N	N	N	N	15	7	N	N	N	7
J9R2090	10	20	N	N	N	N	N	<5	N	N	N	5
J9P2110	10	20	N	N	N	N	N	<5	N	N	N	5
J9R2130	15	30	N	N	N	N	N	<5	N	N	N	5
J9R2150	10	20	N	N	N	N	N	<5	N	N	N	5
J9R2170	10	20	N	N	N	N	N	<5	N	N	N	5
J9R2190	10	20	N	N	N	N	N	<5	N	N	N	5
J9P2210	10	20	N	N	N	N	N	<5	N	N	N	5
J9R2230	10	20	N	N	N	N	N	<5	N	N	N	5
J9R2250	15	200	N	N	N	<5	N	30	N	10	N	20
J9P2270	10	20	N	N	N	N	N	15	N	N	N	10
J9R2290	10	30	N	N	N	N	N	5	N	N	N	5
J9P2310	15	50	N	N	N	7	10	20	N	20	N	10
J9P2330	10	50	N	N	N	N	N	5	N	15	N	5
J9R2350	10	<20	N	N	N	N	N	15	N	N	N	5
J9R2370	10	20	N	N	N	N	N	5	N	N	N	5
J9R2390	10	<20	N	N	N	N	N	10	N	N	N	5
J9R2410	15	20	N	N	N	N	N	7	N	5	N	5
J9R2430	50	70	2.0	N	N	10	50	20	N	10	N	20
J9R2450	15	<20	N	N	N	N	N	<5	N	N	N	5
J9R2470	10	30	N	N	N	N	N	15	N	N	N	5
J9R2490	10	70	N	N	N	N	N	7	N	N	N	5
J9P2510	10	100	N	N	N	30	20	50	N	N	N	7
J9R2530	10	200	1.0	N	N	30	30	50	N	N	N	15
J9R2533	10	150	N	N	N	50	30	50	N	N	N	15
J9R2540	10	200	1.0	N	N	70	30	150	N	N	N	30
J9R2550	10	200	N	N	N	50	50	100	N	N	N	20
J9R2560	10	200	N	N	N	30	30	50	N	N	N	10
J9R2570	10	200	1.0	N	N	30	50	50	N	N	N	15
J9R2580	10	700	N	N	N	20	20	50	N	N	N	7
J9R2590	10	300	N	N	N	200	50	70	N	N	N	100
J9R2600	10	150	N	N	N	20	30	70	N	N	N	10
J9R2610	10	100	N	N	N	30	30	50	N	N	N	10
J9R2620	10	100	N	N	N	30	20	50	N	N	N	10
J9R2630	10	500	1.5	N	N	N	N	10	N	N	N	<5
J9P2637	10	500	2.0	N	N	5	N	<5	70	N	N	5

TABLE 3--SPECTROGRAPHIC ANALYSES OF INSOLUBLE-RESIDUE SAMPLES FROM DRILL HOLE NO. 9, 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.#
J9R1990	N	N	N	N	N	70	N	N	N	20	N	78
J9R2000	N	N	N	N	N	N	N	N	500	15	N	78
J9R2010	N	N	N	N	N	N	N	N	N	10	N	78
J9P2020	N	N	N	N	N	N	N	N	N	10	N	78
J9R2030	50	N	N	N	N	150	N	N	N	30	N	78
J9R2040	30	N	N	N	N	30	N	N	N	30	N	78
J9R2050	N	N	N	N	200	N	N	N	N	N	N	78
J9R2070	10	N	N	N	N	100	N	N	N	30	N	78
J9R2090	N	N	N	N	N	10	N	N	N	10	N	78
J9P2110	N	N	N	N	N	10	N	N	N	15	N	78
J9P2130	N	N	N	N	N	50	N	N	N	30	N	78
J9R2150	N	N	N	N	N	N	<50	N	N	15	N	78
J9R2170	N	N	N	N	N	N	100	N	N	10	N	78
J9R2190	N	N	N	N	N	N	<50	N	N	N	N	78
J9R2210	N	N	N	N	N	N	N	N	N	N	N	78
J9P2230	N	N	N	N	N	N	N	N	N	N	N	78
J9R2250	20	N	N	N	N	50	N	N	N	30	N	78
J9R2270	10	N	N	N	N	15	N	N	N	20	N	78
J9P2290	N	N	N	N	N	10	N	N	N	N	N	78
J9R2310	30	N	N	N	100	70	N	N	N	70	N	78
J9P2330	N	N	N	N	N	10	N	N	N	20	N	78
J9R2350	N	N	N	N	N	N	N	N	N	15	N	78
J9R2370	N	N	N	N	N	N	N	N	N	N	N	78
J9R2390	N	N	N	N	N	N	N	N	N	N	N	78
J9R2410	N	N	N	N	N	15	N	N	N	15	N	78
J9R2430	50	N	5	N	N	200	N	10	N	50	N	78
J9R2450	N	N	N	N	N	10	N	N	N	N	N	78
J9R2470	N	N	N	N	1,000	<10	N	N	N	N	N	78
J9R2490	N	N	N	N	1,500	15	N	N	N	N	N	78
J9R2510	15	N	20	N	500	300	N	20	N	100	N	90
J9R2530	20	N	20	N	100	300	50	20	N	70	N	90
J9R2533	20	N	20	N	100	500	50	20	N	70	N	90
J9R2540	15	N	20	N	100	300	<50	20	N	100	N	90
J9R2550	15	N	20	N	200	500	N	30	N	100	N	90
J9R2560	20	N	20	N	100	500	N	20	N	100	N	90
J9R2570	30	N	30	N	100	500	N	20	N	100	N	90
J9P2580	15	N	20	N	<100	300	N	20	N	70	N	90
J9P2590	15	N	30	N	100	500	N	30	N	100	N	90
J9R2600	15	N	20	N	N	300	N	20	N	100	N	90
J9R2610	20	N	30	N	N	500	N	30	N	150	N	90
J9R2620	15	N	20	N	150	500	N	20	N	100	N	90
J9R2630	30	N	N	<10	N	30	N	<10	N	30	N	90
J9P2637	20	N	N	10	100	50	N	15	N	50	N	90