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R290
no. 78-402



✓ UNITED STATES (DEPARTMENT OF THE INTERIOR)

GEOLOGICAL SURVEY

[Reports-Open
file series]

SPECTROGRAPHIC AND CHEMICAL ANALYSES
OF DRILL CORE FROM PRECAMBRIAN IGNEOUS ROCKS
OF THE ST. FRANCOIS IGNEOUS PROVINCE
IN SOUTHEAST MISSOURI

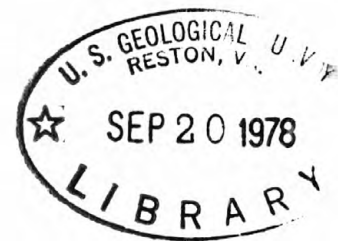
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Open-File Report 78-402
1978



Prepared in cooperation with the
Missouri Department of Natural Resources,
Division of Geology and Land Survey

Title page corrected
6/6/78

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CONTENTS

	Page
Introduction-----	1
Preparation and Analysis of Samples-----	2
Explanation of Data-----	3
References-----	4

TABLE

Table 1.--Spectrographic and Chemical Analyses of Drill Core from Precambrian Igneous Rocks of the St. Francois Igneous Province in Southeast Missouri-----	5
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INTRODUCTION

Seventy-nine samples of igneous rock from drill holes in and near the Rolla, Missouri, 2° quadrangle were collected and catalogued by the Division of Geology and Land Survey of the Missouri Department of Natural Resources. Spectrographic and chemical analyses were performed to characterize some of the major, minor, and trace element contents of these subsurface samples. The analytical results for these samples are given in this report.

PREPARATION AND ANALYSIS OF SAMPLES

The rock samples were initially crushed to approximately 1-cm chips with a conventional jaw crusher. The rock chips were split with a manual splitter to obtain approximately 80 g of homogenized sample. The 80-g portion was pulverized to a minus-100 mesh (0.140-mm) using a vertical pulverizer equipped with ceramic plates.

Thirty elements were determined by a six-step, DC-arc semiquantitative emission-spectrographic method described by Grimes and Marranzino (1968). The approximate visual lower limits of determination for the 30 elements are bracketed above the appropriate elements in Table 1.

Although several of the elements determined by chemical methods were also determined spectrographically, the detection limits were generally lower using the various chemical techniques. This second method served as a cross-check between methods. Silver, bismuth, copper, cadmium, lead, and zinc were determined by atomic absorption spectroscopy utilizing a partial digestion which dissolved non-silicate-bound metals only. Potassium, calcium, magnesium, sodium, and lithium were also determined by atomic absorption, but a total digestion was used.

Tungsten was determined spectrographically after a chemical digestion and organic extraction described by Leinz and Grimes (1978). Tin was determined using an atomic absorption method described by Welsch and Chao (1976). Fluorine was determined by specific-ion electrode as described by Hopkins (1977). The chemical lower limits of determination are bracketed above the appropriate elements in Table 1.

EXPLANATION OF DATA

The data listed in Table 1 include the analytical results for the 79 subsurface Precambrian igneous rocks. The columns have heading titles of sample, latitude, longitude, and the elements. Columns in which the element is preceded by a S contain the emission-spectrographic data. Elements preceded by AA, SI, and SC indicate atomic absorption, specific ion, and spectrochemical determination respectively. Elements followed by a P indicate only a partial digestion. An N indicates that the element was not detected, while < means the element was detected but was below the bracketed lower limit. All elements are reported in ppm except those elements followed by % in Table 1.

The first alphanumeric portion of the sample identifier is the county abbreviation and site number, and the last portion is the depth below surface.

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. Geol. Survey Circ. 591, 6 p.
- Hopkins, D. M., 1977, An improved ion-selective electrode method for the rapid determination of fluorine in rocks and soils: U.S. Geol. Survey Jour. Research, v. 5, no. 5, p. 589-593.
- Leinz, R. W., and Grimes, D. J., 1978, Spectrochemical determination of submicrogram amounts of tungsten in geologic materials: U.S. Geol. Survey Jour. Research, v. 6, no. 2, p. 259-262.
- Welsch, E. P., and Chao, T. T., 1976, Determination of trace amounts of tin in geological materials by atomic absorption spectrometry: Anal. Chim. Acta, v. 82, p. 337-342.

Table 1. Spectrographic and Chemical Analyses of Drillcore from Precambrian Igneous Rocks of the St. Francois Igneous Province in Southeast Missouri

sample	LATITUDE		LONGITUDE		(.05) S-FE%	(.02) S-MG%	(.05) S-CA%	(.002) S-Ti%	(10) S-MN	(.5) S-AG	(200) S-AS	(10) S-AU	(10) S-B	(20) S-BA	(1) S-BE	(10) S-BI	(20) S-CD
CT4-1359	37	0 29	91	2 48	1.00	.10	.05	.070	100	N	N	N	N	300	1.5	N	N
CT5-1744	37	2 39	91	1 24	1.00	.10	.20	.050	150	N	N	N	<10	150	5.0	N	N
CT7-1580	37	1 10	91	13 2	3.00	.30	.20	.300	150	N	N	N	10	500	1.5	N	N
CT8-1859	36	59 52	91	11 4	1.50	.50	.50	.300	200	N	N	N	N	<20	N	N	N
CW1-1648	37	52 56	91	7 53	5.00	2.00	5.00	.500	1,000	N	N	N	20	150	N	N	N
CW1-1654	37	52 56	91	7 53	7.00	3.00	3.00	.300	1,000	N	N	N	10	200	N	N	N
CW2-857	38	5 36	91	8 29	3.00	.70	.30	.300	100	N	N	N	10	500	1.0	N	N
CW3-1162	0	0 0	0	0 0	1.50	.02	.05	.050	20	N	N	N	N	150	7.0	N	N
CW4-880	37	44 47	91	7 45	5.00	2.00	1.00	.700	700	N	N	N	20	300	2.0	N	N
CW4-885	37	44 47	91	7 45	1.00	.15	.10	.100	300	N	N	N	N	300	1.0	N	N
CW5-1584	37	55 1	91	10 47	1.00	.15	.07	.150	50	N	N	N	20	500	1.5	N	N
CW7-1692	37	54 21	91	9 11	2.00	.50	.50	.300	100	N	N	N	15	700	1.5	N	N
CW8-1220	37	49 58	91	9 15	1.00	.20	.05	.100	150	N	N	N	N	500	N	N	N
CW9-1232	37	47 16	91	9 44	1.00	.10	.15	.150	70	N	N	N	15	700	1.5	N	N
CW19-595	37	45 33	91	9 57	.20	.15	.10	.070	50	N	N	N	10	50	1.0	N	N
CW20-387	37	44 56	91	10 23	.70	.05	.10	.050	100	N	N	N	N	300	1.5	N	N
I1-1437	37	38 34	91	7 10	1.50	.50	<.05	.100	300	N	N	N	50	700	2.0	N	N
I1-1499	37	38 34	91	7 10	2.00	.30	<.05	.150	300	N	N	N	20	300	1.5	N	N
I1-1511	37	38 34	91	7 10	3.00	.70	.10	.300	300	N	N	N	50	300	2.0	N	N
I1-1517	37	38 34	91	7 10	3.00	.70	.05	.200	200	N	N	N	50	1,000	3.0	N	N
I1-1529	37	38 34	91	7 10	1.00	.20	.10	.070	150	N	N	N	<10	3,000	N	N	N
I1-1537	37	38 34	91	7 10	3.00	.30	1.00	.300	200	N	N	N	<10	100	1.5	N	N
I1-1541	37	38 34	91	7 10	5.00	2.00	.70	.700	200	N	N	N	100	200	5.0	N	N
I1-1545	37	38 34	91	7 10	5.00	2.00	1.00	.700	700	N	N	N	10	150	1.0	N	N
I2-524	37	43 41	91	5 5	1.00	.02	.05	.070	100	N	N	N	<10	300	1.5	N	N
I6-608	37	43 49	91	4 37	1.00	.02	.05	.070	100	N	N	N	N	500	2.0	N	N
I8-668	37	43 13	91	4 32	.70	.05	.05	.070	70	N	N	N	<10	500	2.0	N	N
I28-391	37	39 48	90	50 9	.70	.05	.10	.100	50	N	N	N	10	300	3.0	N	N
JE1-873	38	3 34	90	36 42	7.00	2.00	3.00	.700	1,000	N	N	N	10	200	1.0	N	N
JE1-877	38	3 34	90	36 42	10.00	1.00	.50	.700	500	N	N	N	100	200	2.0	N	N
JE2-1720	38	5 32	90	31 56	5.00	1.00	.50	.700	500	N	N	N	10	700	1.5	N	N
MA1-600	37	28 10	90	13 44	.70	.03	.07	.050	200	N	N	N	N	300	2.0	N	N
MA2-461	37	23 41	90	16 27	3.00	.70	2.00	.300	700	N	N	N	<10	300	1.5	N	N
MA3-797	37	22 41	90	12 34	3.00	.70	1.00	.300	500	N	N	N	<10	300	1.5	N	N
MA4-82	37	32 2	90	24 6	1.50	.20	.20	.200	150	N	N	N	15	500	1.5	N	N
MA4-105	31	32 2	90	24 6	7.00	1.50	5.00	1.000	500	N	N	N	N	300	1.0	N	N
MA5-812	37	21 43	90	14 3	1.50	.10	.15	.150	70	N	N	N	N	20	N	N	N
MA6-686	37	23 9	90	15 24	3.00	.70	.50	.300	700	N	N	N	10	500	1.5	N	N
MA7-1056	37	26 17	90	11 30	1.50	.20	.10	.150	70	N	N	N	10	500	1.5	N	N
MA8-1286	37	24 29	90	13 1	3.00	.70	.70	.300	500	N	N	N	15	300	1.5	N	N
MA9-756	37	24 42	90	14 26	1.50	.07	.05	.150	200	N	N	N	<10	500	1.5	N	N
MA10-772	37	21 39	90	26 41	1.50	.20	.07	.200	200	N	N	N	<10	500	1.5	N	N
MA14-318	37	36 6	90	16 27	2.00	.20	.30	.200	150	N	N	N	<10	500	1.5	N	N
MA17-786	37	37 8	90	12 53	3.00	.70	.70	.200	300	N	N	N	15	150	1.0	N	N
PUI-1468	37	52 54	92	4 23	2.00	.50	.50	.200	300	N	N	N	15	300	2.0	N	N

Table 1. Spectrographic and Chemical Analyses of Drillcore from Precambrian Igneous Rocks of the St. Francois Igneous Province in Southeast Missouri (continued)

sample	(5) S-CO	(10) S-CR	(5) S-CU	(20) S-LA	(5) S-MO	(20) S-NB	(5) S-NI	(10) S-PB	(100) S-SB	(5) S-SC	(10) S-SN	(100) S-SR	(10) S-V	(50) S-W	(10) S-Y	(200) S-ZN	(10) S-ZR
CT4-1359	N	N	<5	50	N	N	N	N	N	N	N	N	N	N	30	N	150
CT5-1744	N	N	5	50	N	N	N	10	N	N	N	N	N	N	50	N	100
CT7-1580	7	20	10	30	N	N	5	N	N	10	N	N	70	N	30	N	200
CT8-1859	5	15	N	20	N	N	5	50	N	7	N	N	50	N	20	N	150
CW1-1648	50	20	70	N	N	N	20	N	N	15	N	300	200	N	20	N	30
CW1-1654	70	500	20	N	N	N	100	N	N	20	N	150	300	N	20	N	30
CW2-857	100	20	30	20	N	N	10	N	N	10	N	N	150	N	20	N	70
CW3-1162	N	N	N	100	10	<20	N	N	N	N	N	N	N	N	70	N	200
CW4-880	70	30	50	N	N	N	70	N	N	20	N	200	300	N	20	N	50
CW4-885	N	15	5	50	10	N	5	N	N	5	N	N	10	N	30	N	100
CW5-1584	N	N	<5	30	N	N	<5	N	N	N	N	N	20	N	15	N	100
CW7-1692	15	30	<5	50	N	N	15	N	N	10	N	150	100	N	30	N	150
CW8-1220	30	N	N	20	N	N	<5	N	N	N	N	N	15	N	15	N	70
CW9-1232	N	N	<5	30	N	N	<5	N	N	5	N	100	20	N	20	N	150
CW19-595	N	N	N	70	N	<20	<5	N	N	N	N	N	<10	N	20	N	100
CW20-387	N	N	N	20	N	N	N	N	N	5	N	N	<10	N	20	N	70
I1-1437	N	N	N	50	N	N	<5	N	N	7	N	200	30	N	20	N	100
I1-1499	5	10	N	30	N	N	5	N	N	7	N	200	30	N	20	N	150
I1-1511	20	N	<5	30	N	N	7	N	N	15	N	N	30	N	30	N	100
I1-1517	15	30	<5	50	N	N	15	10	N	10	N	200	50	N	50	N	150
I1-1529	<5	N	N	N	N	N	<5	10	N	5	N	200	15	N	20	N	100
I1-1537	30	100	<5	N	N	N	20	N	N	10	N	300	150	N	10	N	50
I1-1541	50	200	<5	N	N	N	70	N	N	20	N	N	200	N	20	N	70
I1-1545	30	150	5	30	N	N	70	N	N	20	N	200	200	N	30	N	70
I2-524	N	N	N	20	N	N	N	N	N	5	N	N	10	N	30	N	70
I6-608	N	N	<5	70	30	N	N	N	N	5	N	N	<10	N	50	N	200
I8-668	N	N	N	50	N	N	N	N	N	5	N	N	<10	N	50	N	100
I28-391	N	N	N	150	N	N	N	N	N	N	N	N	<10	N	30	N	100
JE1-873	50	50	70	N	N	N	70	N	N	30	N	300	300	N	30	<200	70
JE1-877	50	50	50	N	N	N	70	N	N	30	N	N	200	N	30	N	70
JE2-1720	20	50	<5	50	N	N	30	30	N	15	N	200	150	N	50	300	300
MA1-600	N	N	N	30	N	N	N	N	N	N	N	N	N	N	30	N	100
MA2-461	10	N	5	30	N	N	<5	15	N	15	N	300	100	N	30	<200	150
MA3-797	10	N	5	20	N	N	<5	10	N	15	N	300	70	N	30	N	100
MA4-82	7	N	<5	N	N	N	5	N	N	5	N	100	50	N	20	N	150
MA4-105	100	100	100	N	N	N	200	10	N	20	N	500	300	N	30	N	70
MA5-812	N	N	5	N	N	N	<5	N	N	5	N	N	15	N	20	N	150
MA6-686	20	N	7	20	N	N	<5	20	N	15	N	200	70	N	30	300	100
MA7-1056	N	N	<5	N	N	N	10	N	N	5	N	100	15	N	15	N	100
MA8-1286	15	N	<5	20	N	N	<5	N	N	15	N	300	70	N	30	N	100
MA9-756	N	N	<5	30	N	N	<5	10	N	10	N	100	<10	N	30	N	150
MA10-772	N	N	N	20	N	N	<5	N	N	10	N	150	10	N	30	N	200
MA14-318	N	N	N	20	N	N	<5	N	N	10	N	100	15	N	30	N	150
MA17-786	10	20	<5	30	N	N	10	N	N	10	N	150	100	N	20	N	100
PU1-1468	7	15	5	50	N	N	10	10	N	10	N	100	50	N	30	N	100

Table 1. Spectrographic and Chemical Analyses of Drillcore from Precambrian Igneous Rocks of the St. Francois Igneous Province in Southeast Missouri (continued)

sample	(.01) AA-MG%	(1) AA-CU-P	(1) AA-PB-P	(1) AA-ZN-P	(.05) AA-AG-P	(.05) AA-CD-P	(.5) AA-BI-P	(1) AA-LI	(.1) AA-CA%	(.1) AA-NA%	(.1) AA-K%	(100) SI-F	(2) AA-SN-T
CT4-1359	.11	<1	1	11	<.05	<.05	N	N	.3	4.3	3.4	1,500	<2
CT5-1744	.12	4	7	45	N	<.05	N	60	.7	3.4	4.3	3,600	10
CT7-1580	.52	15	2	21	N	<.05	N	9	.6	3.5	4.6	900	4
CT8-1859	.81	4	75	43	.05	.15	N	4	1.0	7.0	.4	500	4
CW1-1648	2.40	78	1	7	N	<.05	N	16	6.3	2.2	1.1	700	<2
CW1-1654	4.90	23	1	9	N	<.05	N	22	6.0	2.0	1.3	800	<2
CW2-857	1.40	77	4	16	<.05	<.05	N	32	1.7	3.6	4.6	1,300	4
CW3-1162	.11	1	2	4	N	N	N	N	.3	3.8	3.2	200	4
CW4-880	3.50	58	2	29	<.05	<.05	N	66	4.3	2.6	2.7	1,400	<2
CW4-885	.27	4	1	17	N	<.05	<.5	2	.5	3.8	3.7	1,200	6
CW5-1584	.26	1	<1	7	N	<.05	N	4	.4	3.3	4.4	400	<2
CW7-1692	.73	4	<1	5	<.05	N	N	12	1.7	2.6	3.1	700	4
CW8-1220	.29	1	2	15	<.05	<.05	<.5	7	.4	4.0	5.6	400	4
CW9-1232	.13	3	1	7	N	.05	N	7	.6	3.3	5.5	600	4
CW19-595	.21	<1	1	4	<.05	<.05	<.5	4	.5	5.3	.6	600	4
CW20-387	.09	<1	5	16	<.05	<.05	N	2	.5	4.1	4.5	1,400	<2
I1-1437	.65	<1	<1	2	N	<.05	N	37	.2	.6	5.2	1,300	<2
I1-1499	.51	<1	<1	4	N	<.05	N	28	.2	.4	3.5	800	<2
I1-1511	1.10	<1	<1	4	N	N	N	27	.6	.5	4.1	1,600	<2
I1-1517	.94	<1	1	2	N	N	N	22	.3	.6	5.2	1,300	<2
I1-1529	.33	<1	1	5	<.05	<.05	N	6	.5	1.5	8.4	300	<2
I1-1537	.45	<1	1	9	N	<.05	N	20	4.1	5.4	.8	500	4
I1-1541	3.10	7	2	18	.05	.05	N	99	1.8	.5	4.5	2,800	<2
I1-1545	2.10	<1	3	17	<.05	<.05	N	28	2.6	3.6	.2	1,200	2
I2-524	.07	1	3	7	<.05	<.05	N	N	.2	3.5	3.6	1,100	2
I6-608	.07	1	2	5	N	N	N	N	.3	3.2	3.3	400	5
I8-568	.08	3	2	3	N	<.05	N	N	.3	2.9	2.8	400	3
I28-391	.10	2	7	33	.05	<.05	N	3	.4	2.7	3.3	300	4
JE1-873	2.40	73	1	65	<.05	<.05	N	16	5.5	2.9	.5	400	N
JE1-877	1.50	21	2	55	N	<.05	N	8	1.2	.6	5.4	600	2
JE2-1720	1.20	2	6	120	N	.05	N	50	1.0	4.0	2.9	900	3
MA1-600	.07	1	5	32	<.05	.10	N	2	.2	2.5	5.0	100	3
MA2-461	.88	7	15	95	.10	.15	N	23	3.2	3.3	1.9	700	2
MA3-797	1.10	3	6	60	<.05	.05	N	11	2.2	3.8	2.2	1,100	2
MA4-82	.40	6	4	17	<.05	<.05	N	16	.5	2.5	4.9	600	2
MA4-105	1.40	110	4	15	.10	<.05	N	9	8.8	2.9	.6	800	2
MA5-812	.10	1	1	5	N	<.05	N	N	.4	6.3	.1	100	<2
MA6-686	.89	5	15	130	.20	.30	<.5	20	1.4	3.7	3.0	1,000	2
MA7-1056	.20	16	2	9	<.05	.10	N	N	.4	2.4	5.9	400	4
MA8-1286	.96	3	5	50	<.05	.10	N	13	2.3	4.0	2.6	1,000	2
MA9-756	.13	1	6	50	<.05	.10	N	1	.4	2.3	2.5	300	2
MA10-772	.25	1	1	28	N	<.05	N	14	.2	3.3	3.9	500	2
MA14-318	.31	1	1	10	.15	.05	N	N	1.0	2.6	2.0	900	<2
MA17-786	1.00	2	1	13	N	.05	N	9	2.5	3.1	.4	900	2
PU1-1468	.66	8	2	45	.05	<.05	N	25	1.5	2.0	2.5	800	<2

Table 1. Spectrographic and Chemical Analyses of Drillcore from Precambrian Igneous Rocks of the St. Francois Igneous Province in Southeast Missouri (continued)

sample	(.2) SC-W
CT4-1359	.7
CT5-1744	1.0
CT7-1580	1.0
CT8-1859	1.0
CW1-1648	.5
CW1-1654	<.2
CW2-857	.2
CW3-1162	<.2
CW4-880	<.2
CW4-885	.2
CW5-1584	.5
CW7-1692	<.2
CW8-1220	<.2
CW9-1232	.2
CW19-595	.3
CW20-387	<.2
I1-1437	<.2
I1-1499	<.2
I1-1511	2.0
I1-1517	<.2
I1-1529	<.2
I1-1537	<.2
I1-1541	<.2
I1-1545	<.2
I2-524	N
I6-608	.5
I8-668	.3
I28-391	.2
JE1-873	<.2
JE1-877	<.2
JE2-1720	.3
MA1-600	<.2
MA2-461	.2
MA3-797	.2
MA4-82	<.2
MA4-105	<.2
MA5-812	<.2
MA6-686	.2
MA7-1056	<.2
MA8-1286	<.2
MA9-756	<.2
MA10-772	.2
MA14-318	<.2
MA17-786	.2
PU1-1468	<.2

Table 1: Spectrographic and Chemical Analyses of Drillcore from Precambrian Igneous Rocks of the St. Francois Igneous Province in Southeast Missouri--continued

sample	LATITUDE	LONGITUD	(.05) S-FEX	(.02) S-MG%	(.05) S-CA%	(.002) S-TI%	(10) S-MN	(.5) S-AG	(200) S-AS	(10) S-AU	(10) S-B	(20) S-BA	(1) S-BE	(10) S-BI	(20) S-CD
RE5-1079	37 20 47	91 7 28	1.00	.07	.10	.100	150	N	N	N	<10	300	1.5	N	N
RE34-1485	37 19 8	90 52 4	1.50	.15	.07	.200	100	N	N	N	20	500	2.0	10	N
RE40-1235	37 12 11	91 0 6	.15	.10	.05	.070	30	N	N	N	10	N	1.5	N	N
RE45-1417	37 8 31	90 58 9	.70	.10	.05	.070	70	N	N	N	<10	300	1.5	N	N
RE47-1253	37 7 51	90 51 37	.50	.03	.05	.070	20	N	N	N	<10	N	<1.0	N	N
RE48-1907	37 5 34	90 48 16	1.50	.15	.20	.150	100	N	N	N	<10	200	5.0	N	N
RE49-1272	37 27 51	91 6 56	1.50	.20	.15	.150	300	N	N	N	<10	500	1.0	N	N
RE50-954	37 20 27	90 55 17	1.00	.20	.15	.150	70	N	N	N	30	500	N	N	N
RE52-1377	37 10 23	90 54 12	.20	.07	.05	.150	10	N	N	N	<10	N	1.5	N	N
SH1-2129	37 9 16	91 34 27	1.50	.15	.05	.150	100	N	N	N	<10	500	1.5	N	N
SH2-1457	37 15 37	91 25 32	1.50	.20	.30	.150	150	N	N	N	10	300	1.5	N	N
SH4-1380	37 5 52	91 4 17	.70	<.02	.05	.015	100	N	N	N	<10	N	5.0	N	N
SH8-1168	37 24 41	91 17 3	.50	.02	.50	.007	200	N	N	N	<10	N	2.0	N	N
SH15-1535	37 10 13	91 6 48	2.00	.20	.07	.200	50	N	N	N	10	300	1.0	N	N
SH23-1493	37 5 16	91 22 23	.70	.15	.05	.150	70	N	N	N	10	500	<1.0	N	N
SH37-1478	37 1 29	91 18 20	1.50	.30	.10	.150	200	N	N	N	10	500	2.0	N	N
WA2-1447	37 51 11	91 5 32	.20	.05	<.05	.150	15	N	N	N	20	20	2.0	N	N
WA2-1452	37 51 11	91 5 32	.20	.20	.07	.100	15	N	N	N	30	300	1.0	N	N
WA11-1233	38 2 21	90 52 47	7.00	1.00	2.00	.700	1,500	N	N	N	15	500	N	N	N
WA11-1290	38 2 21	90 52 47	7.00	2.00	2.00	.700	1,500	N	N	N	<10	200	1.5	N	N
WA14-1485	37 53 7	90 51 12	7.00	.70	2.00	.500	2,000	N	N	N	20	300	1.5	N	N
WA15-1460	37 52 45	90 51 51	10.00	1.00	2.00	.700	2,000	N	N	N	20	500	1.0	N	N
WA17-1280	37 52 59	90 51 17	5.00	.50	1.50	.300	700	N	N	N	30	700	<1.0	N	N
WA32-1058	37 53 2	91 2 53	5.00	1.00	.20	.300	1,000	N	N	N	N	150	<1.0	N	N
WA32-1062	37 53 2	91 2 53	5.00	.70	.07	.150	1,000	N	N	N	<10	20	1.5	N	N
WA32-1064	37 53 2	91 2 53	1.00	.07	.30	.050	150	N	N	N	<10	30	3.0	N	N
WA46-968	37 51 53	91 1 59	.30	.05	.05	.050	15	N	N	N	15	150	1.5	N	N
WA46-969	37 51 53	91 1 59	1.00	.05	.07	.070	30	N	N	N	10	200	2.0	N	N
WA66-1171	37 45 44	91 1 15	.70	.07	<.05	.070	70	N	N	N	<10	300	1.5	N	N
WA84-922	0 0 0	0 0 0	3.00	.70	.70	.300	500	N	N	N	10	300	2.0	N	N
WY2-1271	36 58 50	90 41 31	.70	.03	.07	.070	70	N	N	N	N	300	1.0	N	N
WY6-1990	37 2 9	90 25 54	1.00	.02	.15	.050	100	N	N	N	N	30	3.0	N	N
WY8-1322	37 18 29	90 16 10	.70	.02	<.05	.050	30	N	N	N	N	200	N	N	N
WY9-1611	37 2 16	90 43 49	2.00	.50	.07	.070	300	N	N	N	N	700	1.5	N	N

Table 1. Spectrographic and Chemical Analyses of Drillcore from Precambrian Igneous Rocks of the St. Francois Igneous Province in Southeast Missouri--continued

sample	(5) S-CO	(10) S-CR	(5) S-CU	(20) S-LA	(5) S-MO	(20) S-NB	(5) S-NI	(10) S-PB	(100) S-SB	(5) S-SC	(10) S-SN	(100) S-SR	(10) S-V	(50) S-W	(10) S-Y	(200) S-ZN	(10) S-ZR
RE5-1079	N	N	N	30	N	N	<5	N	N	5	N	N	<10	N	50	N	200
RE34-1485	5	<10	<5	N	N	N	7	10	N	7	N	N	20	N	30	N	200
RE40-1235	N	N	N	20	N	N	N	N	N	<5	N	N	N	N	20	N	70
RE45-1417	N	N	N	50	N	N	N	N	N	<5	N	N	N	N	30	N	100
RE47-1253	N	N	N	N	N	N	N	N	N	<5	N	N	N	N	15	N	70
RE48-1907	N	N	<5	150	N	<20	N	10	N	5	10	N	10	N	70	N	150
RE49-1272	5	10	7	30	N	N	<5	10	N	7	N	N	20	N	30	N	100
RE50-954	<5	N	N	50	N	N	N	N	N	10	N	N	20	N	30	N	100
RE52-1377	N	N	<5	20	N	N	N	N	N	5	15	N	<10	N	30	N	150
SH1-2129	5	N	N	30	N	N	<5	10	N	7	N	N	20	N	30	N	150
SH2-1457	5	10	<5	30	N	N	<5	N	N	7	N	100	50	N	30	N	100
SH4-1380	N	N	N	30	N	20	N	20	N	N	150	N	N	N	70	N	70
SH8-1168	20	N	30	N	N	<20	7	N	N	N	50	N	N	N	30	N	20
SH15-1535	10	15	7	20	N	N	5	N	N	7	N	N	70	N	20	N	100
SH23-1493	5	10	<5	N	N	N	7	15	N	5	N	N	30	N	30	N	70
SH37-1478	7	10	5	30	N	N	5	20	N	7	N	N	50	N	30	200	100
WA2-1447	7	N	<5	100	N	<20	7	N	N	5	N	300	20	N	50	N	150
WA2-1452	N	N	N	20	N	N	<5	N	N	<5	N	N	<10	N	20	N	70
WA11-1233	70	20	300	N	N	N	15	N	N	20	N	150	300	N	30	N	50
WA11-1290	70	200	30	N	N	N	30	N	N	15	N	150	200	N	30	N	50
WA14-1485	70	10	7	N	N	N	10	N	N	15	N	200	200	N	30	N	50
WA15-1460	100	10	15	N	N	N	15	N	N	30	N	300	200	N	30	N	70
WA17-1280	50	<10	<5	N	N	N	7	N	N	15	N	150	150	N	20	N	50
WA32-1058	50	200	<5	70	N	N	70	10	N	20	N	N	150	N	70	200	30
WA32-1062	30	100	5	20	N	N	70	N	N	15	N	N	100	N	30	200	70
WA32-1064	N	N	<5	100	N	N	N	N	N	10	N	150	N	N	30	N	100
WA46-968	5	N	N	50	N	N	5	N	N	10	N	N	N	N	20	N	100
WA46-969	N	N	N	50	N	N	N	N	N	10	N	N	N	N	30	N	150
WA66-1171	N	N	N	30	7	N	N	N	N	N	N	N	N	N	30	N	100
WA84-922	30	10	5	30	N	N	7	N	N	15	N	100	150	N	30	N	100
WY2-1271	N	N	N	50	15	N	N	N	N	<5	N	N	<10	N	20	N	70
WY6-1990	N	N	N	50	N	20	N	30	N	N	20	N	<10	N	100	N	100
WY8-1322	N	N	N	N	7	N	N	N	N	N	N	N	10	N	15	N	100
WY9-1611	N	N	10	20	7	N	N	50	N	7	N	N	20	N	30	200	100

Table 1. Spectrographic and Chemical Analyses of Drillcore from Precambrian Igneous Rocks of the St. Francois Igneous Province in Southeast Missouri --continued

sample	(.01) S AA-MG%	(1) AA-CU-P	(1) AA-Pb-P	(1) AA-ZN-P	(.05) AA-AG-P	(.05) AA-CD-P	(.5) AA-BI-P	(1) AA-LI	(.1) AA-CA%	(.1) AA-NA%	(.1) AA-K%	(100) SI-F	(2) AA-SN-T
RE5-1079	.11	<1	2	20	<.05	.05	N	N	.4	3.0	4.0	1,400	5
RE34-1485	.24	<1	2	40	<.05	.05	9.5	26	.4	.9	6.2	700	5
RE40-1235	.11	1	1	10	<.05	<.05	N	N	.2	5.1	.3	200	2
RE45-1417	.09	<1	2	14	<.05	<.05	N	N	.2	3.7	2.7	300	4
RE47-1253	.02	<1	1	3	N	<.05	N	N	.1	5.1	<.1	200	3
RE48-1907	.27	1	6	8	N	<.05	N	15	.5	2.7	3.1	3,600	9
RE49-1272	.46	8	7	56	.25	<.05	N	26	.6	1.7	5.2	500	5
RE50-954	.26	2	1	10	<.05	<.05	N	5	.6	.4	9.1	800	2
RE52-1377	.07	1	1	5	N	<.05	N	N	.1	4.5	<.1	700	N
SH1-2129	.31	2	10	32	N	<.05	N	4	.3	2.5	4.6	400	4
SH2-1457	.60	8	10	35	<.05	.05	N	12	1.5	3.0	4.1	1,000	3
SH4-1380	.03	<1	5	12	<.05	<.05	N	309	.2	3.4	3.7	4,800	30
SH8-1168	.05	50	4	11	.05	.10	5.5	418	1.7	2.6	3.8	4,900	30
SH15-1535	.46	13	3	22	<.05	.05	N	12	.4	2.8	3.7	500	4
SH23-1493	.18	5	3	5	<.05	.05	N	15	.4	.8	7.2	700	<2
SH37-1478	.58	4	18	130	.05	.15	N	19	.5	2.2	5.6	500	3
WA2-1447	.09	10	2	60	N	.05	N	92	.1	.2	.2	300	3
WA2-1452	.16	<1	1	9	N	.05	N	3	.4	.3	8.0	400	2
WA11-1233	2.00	300	1	39	.05	.05	N	15	4.2	3.1	3.0	500	N
WA11-1290	3.60	24	3	40	<.05	<.05	N	31	4.9	1.8	1.4	500	<2
WA14-1485	1.40	9	2	12	N	.10	N	16	5.7	2.1	.8	700	<2
WA15-1460	2.00	18	2	27	N	<.05	N	22	4.3	2.8	1.1	800	N
WA17-1280	1.20	5	1	15	N	<.05	N	20	3.7	3.3	3.6	800	<2
WA32-1058	2.80	2	4	180	<.05	<.05	N	84	.9	2.2	2.8	1,000	<2
WA32-1062	1.60	7	4	170	.05	<.05	N	68	.4	1.9	.3	400	2
WA32-1064	.15	9	6	25	<.05	.05	N	8	1.0	4.3	.5	200	4
WA46-968	.12	<1	5	3	.05	<.05	<.5	12	.2	.8	5.5	400	4
WA46-969	.08	<1	2	4	N	<.05	N	4	.3	1.9	4.8	300	4
WA66-1171	.15	1	2	13	<.05	.05	N	1	.3	2.2	4.1	600	4
WA84-922	1.20	6	5	50	.05	.10	N	26	2.0	2.4	3.3	800	2
WY2-1271	.07	2	6	18	<.05	.15	N	1	.4	3.0	4.0	600	3
WY6-1990	.04	<1	14	30	<.05	.05	N	23	.5	2.7	4.0	6,000	20
WY8-1322	.04	4	1	6	<.05	.10	N	N	.2	4.8	1.5	100	2
WY9-1611	.73	18	32	150	.20	.35	N	175	.4	2.8	5.6	4,000	6

Table 1. Spectrographic and Chemical Analyses of Drillcore from Precambrian Igneous Rocks of the St. Francois Igneous Province in Southeast Missouri --continued

sample	(.2) SC-W
RE5-1079	<.2
RE34-1485	1.0
RE40-1235	N
RE45-1417	.2
RE47-1253	<.2
RE48-1907	3.0
RE49-1272	<.2
RE50-954	.2
RE52-1377	<.2
SH1-2129	<.2
SH2-1457	.5
SH4-1380	1.0
SH8-1168	1.0
SH15-1535	.7
SH23-1493	2.0
SH37-1478	.2
WA2-1447	N
WA2-1452	N
WA11-1233	N
WA11-1290	<.2
WA14-1485	<.2
WA15-1460	<.2
WA17-1280	.2
WA32-1058	<.2
WA32-1062	.3
WA32-1064	<.2
WA46-968	.2
WA46-969	.3
WA66-1171	.7
WA84-922	.5
WY2-1271	.5
WY6-1990	.5
WY8-1322	.5
WY9-1611	.3



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