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Geochemical Data for 85 Heavy-mineral Concentrates from Selected Areas in Greenville and Laurens Counties, South Carolina, by Semi-quantitative Emission Spectrography

by

John C. Jackson[1], Betty M. Adrian[2], and Roy T. Hopkins[2]

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[1]U.S. Geological Survey, Reston, Virginia 22092
[2]U.S. Geological Survey, Denver, Colorado 80225

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Introduction

Geochemical analyses of 85 heavy-mineral concentrate samples taken from streams in three selected areas in Greenville and Laurens Counties, S.C., are given in this report. The northernmost of the three areas is located near Greenville, S.C. (41 samples), the next study area to the south is near Simpsonville, S.C. (39 samples), and the southernmost study area is near Hickory Tavern, S.C. (7 samples) (figs. 1 and 2). The three areas were selected for sampling on the basis of a previous reconnaissance study, which reported anomalously high amounts of tin in those areas (Jackson and Moore, 1992). Detailed sample location maps, drainage basin maps, statistical evaluations, and discussions concerning the data are found in Jackson (1992). These data supplement an assessment of the Greenville 1° x 2° quadrangle prepared under the Conterminous United States Mineral Resource Assessment Program (CUSMAP) of the U.S. Geological Survey (Lesure and others, in prep.).

The samples analyzed in this study represent the heavy resistate minerals derived from a variety of rock types of the Inner Piedmont thrust stack of South Carolina. Within the Paris Mountain study area, rocks of the Paris Mountain thrust sheet predominate, consisting of a biotite-muscovite-sillimanite schist, and lenses of fine- to medium-grained biotite granite gneiss. The biotite granite gneiss within the Paris Mountain study area contains extensive zones of pegmatitic and leucogranitic phases. Gneissic biotitic granites of the Six Mile thrust sheet occur in the northwestern part of the Paris Mountain study area. In the northwestern part of the Simpsonville study area, within the Paris Mountain thrust sheet, the rocks are mostly a biotite-muscovite-sillimanite schist containing lenses of biotite granite gneiss. In the southeastern part of the Simpsonville study area, within the Laurens thrust sheet, occur various interlayered biotite gneisses and biotite granite gneisses, and minor amphibolite. The Hickory Tavern study area contains interlayered biotite gneiss, granite gneiss and amphibolite of the Laurens thrust sheet. The geology as described here generally follows that of Nelson and others (1987, 1989).

Sample collection and preparation

The concentrates analyzed in this study were collected by John C. Jackson and William J. Moore of the U.S. Geological Survey in March 1987. Samples were obtained by panning two

brimful 16-inch gold pans of sand and gravel collected from the riffles of active streams. The panned materials were further concentrated in the laboratory by standard means of heavy-liquid separation using bromoform (specific gravity 2.85) and by magnetic separation using a Frantz Isodynamic separator. This process resulted in a high-density, non-magnetic, heavy-mineral concentrate for spectrographic analysis.

Analytical method

The high-density, non-magnetic fractions of the concentrates were analyzed for 31 elements using a six-step, semi-quantitative, emission spectrographic method (Grimes and Marranzino, 1968). This spectrographic method reports values, in percent or parts per million (ppm), as one of six steps per order of magnitude (1, 0.7, 0.5, 0.3, 0.2, 0.15, and multiples of 10 of these numbers), and these values are the approximate geometric midpoints of the concentration ranges whose boundaries are 1.2, 0.83, 0.56, 0.38, 0.26, 0.18, 0.12, etc. The analytical uncertainty of the method is ±1 reporting interval 83 percent of the time and ±2 reporting intervals 96 percent of the time (Matooka and Grimes, 1976).

The lower limits of detection, or first reporting interval, for elements reported in percent are as follows: Fe(0.1), Mg(0.05), Ca(0.1), and Ti(0.005). The lower limits of detection, or first reporting interval, for elements reported in parts per million are as follows: Ag(1), As(500), Au(20), B(20), Ba(50), Be(2), Bi(20), Cd(50), Co(10), Cr(20), Cu(10), La(50), Mn(20), Mo(10), Nb(50), Ni(10), Pb(20), Sb(200), Sc(10), Sn(20), Sr(200), Th(200), V(20), W(100), Y(20), Zn(500), and Zr(20).

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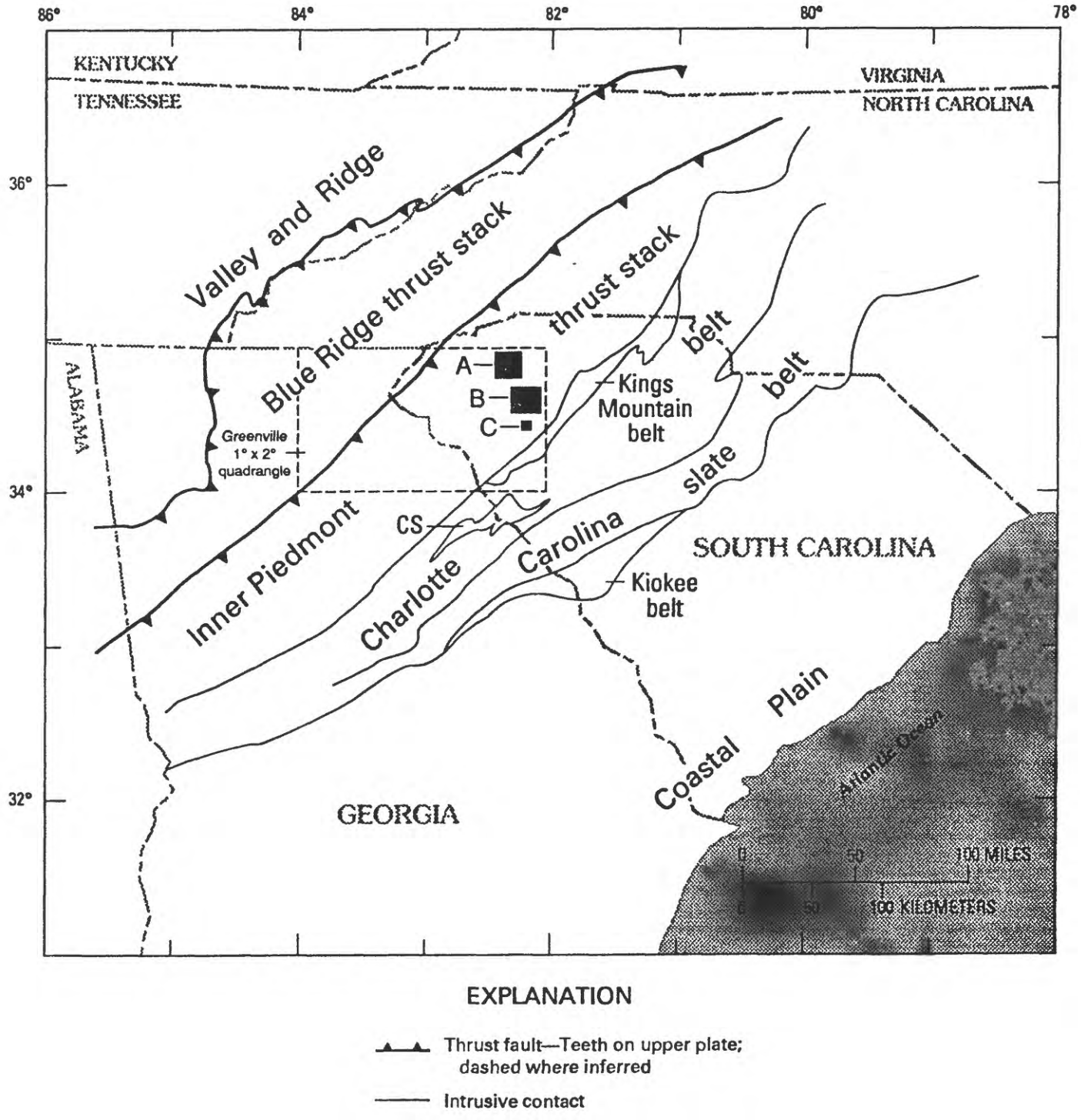

Figure 1. Index map showing location and geologic setting of three areas (shaded black, depicted A, B, or C) studied in this report, and outline of the Greenville 1^{o} x 2^{o} quadrangle. [Symbols: A, Paris Mountain study area; B, Simpsonville study area; C, Hickory Tavern study area; CS, Carolina slate belt]. The Inner Piedmont thrust stack includes the Chauga-Walhalla thrust complex and the Six Mile, Laurens, and Paris Mountain thrust sheets. Belts are modified from King (1955), Overstreet and Bell (1965a, 1965b), and Hatcher (1972).

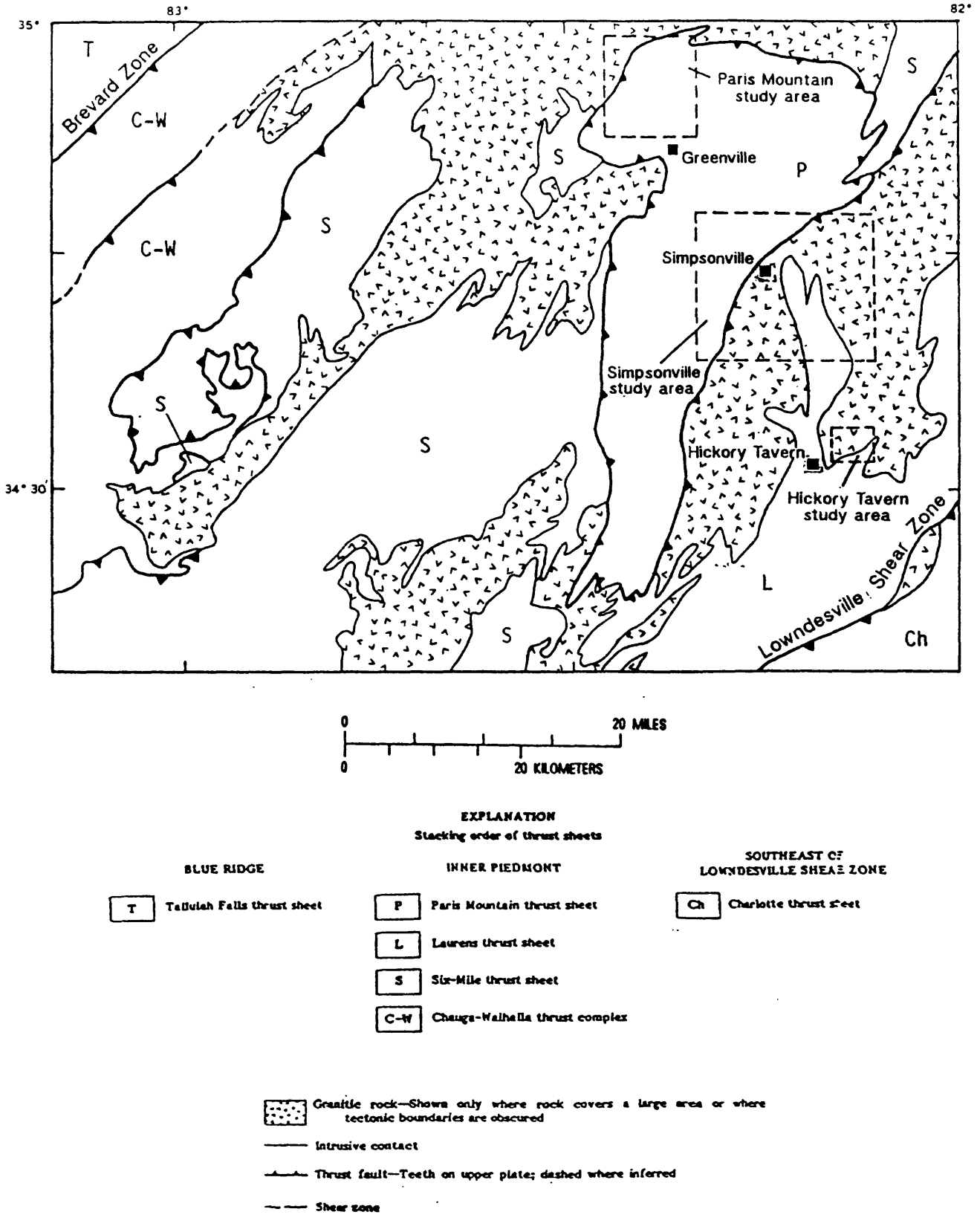

Figure 2. Generalized tectonic map of the northeastern part of the Greenville 1^{o} x 2^{o} quadrangle, and boundaries of the three study areas described in this report. Modified from Nelson and others (1987).

Table 1. Sample numbers, locations, and major and trace elements by semiquantitative emission spectrography; "map number" indicates number used on figures in Jackson (1992) ; N, not detected; L, detected but less than the value for the first reporting interval; G, greater than the value shown in parenthesis; all values in parts per million, except where noted.

FIELD NUMBER	MAP NUMBER	7.5' QUAD.	LATITUDE	LONGITUDE	Fe(%)	Mg(%)	Ca(%)	Ti(%)	Mn	Ag	As	Au	B
GA13001C	1	PARIS MOUNTAIN	345641	822310	0.1	L	0.3	G2	20	N	N	N	L
GA13002C	2	PARIS MOUNTAIN	345613	822333	0.015	L	0.5	0.7	30	7	N	N	30
GA13003C	3	PARIS MOUNTAIN	345607	822330	0.2	L	L	2	30	N	N	N	70
GA13004C	4	PARIS MOUNTAIN	345536	822312	0.1	L	N	G2	L	N	N	N	100
GA13005C	5	PARIS MOUNTAIN	345527	822312	0.15	L	0.1	G2	L	N	N	N	100
GA13006C	6	PARIS MOUNTAIN	345552	822253	0.1	L	0.2	1	L	N	N	N	50
GA13007C	7	PARIS MOUNTAIN	345530	822242	0.15	N	N	1.5	20	N	N	N	100
GA13008C	8	PARIS MOUNTAIN	345612	822245	0.2	L	0.3	2	20	N	N	N	100
GA13009C	9	PARIS MOUNTAIN	345815	822232	L	L	L	2	N	N	N	N	L
GA13010C	10	PARIS MOUNTAIN	345721	822259	0.1	L	0.3	G2	20	N	N	20	50
GA13011C	11	PARIS MOUNTAIN	345752	822406	0.1	N	0.1	2	L	N	N	70	30
GA13012C	12	PARIS MOUNTAIN	345746	822458	0.2	N	0.1	1.5	L	N	N	N	70
GA13013C	13	PARIS MOUNTAIN	345706	822600	L	L	L	1.5	L	N	N	N	L
GA13014C	14	PARIS MOUNTAIN	345544	822521	0.01	L	1.5	1	20	N	N	N	20
GA13015C	15	PARIS MOUNTAIN	345451	822514	0.1	L	L	G2	N	N	N	N	20
GA13016C	16	PARIS MOUNTAIN	345437	822459	L	L	N	1.5	N	N	N	N	30
GA13017C	17	PARIS MOUNTAIN	345433	822421	0.2		L	2	N	N	N	N	50
GA13018C	18	PARIS MOUNTAIN	345406	822405	0.1	L	L	1.5	L	N	N	N	50
GA13019C	19	PARIS MOUNTAIN	345350	822358	0.1	L	0.7	0.5	20	N	N	N	50
GA13024C	20	PARIS MOUNTAIN	345441	822301	0.2	N	0.3	1	L	N	N	N	100
GA13026C	21	PARIS MOUNTAIN	345524	822240	0.15	L	L	0.7	L	N	N	N	100
GA13028C	22	PARIS MOUNTAIN	345330	822243	0.2	L	0.1	1	20	N	N	N	100
GA13030C	23	PARIS MOUNTAIN	345352	822343	0.2	L	1	1	50	N	N	N	100
GA13031C	24	PARIS MOUNTAIN	345358	822341	0.2	L	0.1	0.7	20	N	N	N	100
GA14001C	25	TAYLORS	345542	822204	N	N	N	0.2	L	N	N	N	20
GA14002C	26	TAYLORS	345560	822223	0.1	N	N	0.15	30	N	N	N	100
GA14003C	27	TAYLORS	345634	822218	L	L	L	G2	L	N	N	N	20
GA14004C	28	TAYLORS	345644	822121	L	L	L	G2	20	N	N	N	30
GA14005C	29	TAYLORS	345735	822059	L	L	L	G2	L	N	N	N	70
GA14006C	30	TAYLORS	345656	822017	L	L	L	G2	L	N	N	N	100
GA14007C	31	TAYLORS	345546	822043	0.15	L	L	G2	L	N	N	N	100
GA14012C	32	TAYLORS	345756	822102	0.15	L	L	2	L	N	N	N	50
GA14013C	33	TAYLORS	345527	822114	0.2	L	0.1	2	20	N	N	N	100
GA14014C	34	TAYLORS	345531	822114	L	L	N	G2	L	N	N	N	70
GA14015C	35	TAYLORS	345508	822040	0.2	L	L	1	L	N	N	N	100
GA14016C	36	TAYLORS	345511	822106	0.3	L	0.1	1.5	20	N	N	N	100
GA14017C	37	TAYLORS	345416	822220	0.15	N	L	2	L	N	N	N	100
GA14018C	38	TAYLORS	345429	822107	0.15	N	0.1	2	L	N	N	N	70
GA14019C	39	TAYLORS	345520	822005	L	L	L	G2	L	N	N	N	100
GA14021C	40	TAYLORS	345514	822206	0.15	N	0.15	2	20	N	N	N	100
GA14022C	41	TAYLORS	345540	822042	L	L	L	G2	L	N	N	N	100
GB14001C	42	MAULDIN	344547	821647	0.1	L	L	2	L	N	N	N	50
GB14002C	43	MAULDIN	344620	821606	L	L	0.5	G2	30	N	N	N	70

Table 1 (Continued).

FIELD NUMBER	MAP NUMBER	Ba	Be	Bi	Cd	Co	Cr	Cu	La	Mo	Nb	Ni	Pb	Sb	Sc	Sn
GA13001C	1	N	10	N	N	N	50	N	L	N	N	N	20	N	30	300
GA13002C	2	L	7	N	N	N	100	N	N	N	N	N	N	N	L	20
GA13003C	3	N	7	N	N	N	150	N	L	N	N	N	N	N	L	30
GA13004C	4	N	200	N	N	N	150	N	L	N	70	N	N	N	L	2000
GA13005C	5	N	20	N	N	N	150	N	L	N	70	N	N	N	10	150
GA13006C	6	N	300	N	N	N	30	N	L	N	N	N	L	N	L	G2000
GA13007C	7	N	200	N	N	N	70	N	50	N	L	N	20	N	L	G2000
GA13008C	8	N	1500	N	N	N	100	N	N	N	70	N	N	N	10	G2000
GA13009C	9	N	15	N	N	N	70	N	L	N	50	N	N	N	30	200
GA13010C	10	N	15	N	N	N	150	N	50	N	L	N	L	N	50	G2000
GA13011C	11	N	5	N	N	N	70	N	N	N	50	N	L	N	70	G2000
GA13012C	12	N	15	N	N	N	100	N	50	N	L	N	L	N	L	2000
GA13013C	13	N	L	N	N	N	30	N	N	N	N	N	L	N	50	500
GA13014C	14	N	2	N	N	N	30	N	70	N	N	N	N	N	30	200
GA13015C	15	N	N	N	N	N	70	L	L	N	L	N	N	N	30	200
GA13016C	16	N	3	N	N	N	100	N	N	N	N	N	L	N	20	300
GA13017C	17	N	3	N	N	N	70	N	L	N	N	N	L	N	30	200
GA13018C	18	N	70	N	N	N	70	N	L	N	N	N	L	N	50	1000
GA13019C	19	N	150	N	N	N	100	N	50	N	N	N	L	N	70	1500
GA13024C	20	N	100	N	N	N	50	N	L	N	N	N	L	N	30	1000
GA13026C	21	N	30	N	N	N	100	N	L	N	N	N	L	N	50	200
GA13028C	22	N	100	N	N	N	70	N	N	N	N	N	N	N	15	30
GA13030C	23	N	70	N	N	N	50	N	150	N	N	N	N	N	15	70
GA13031C	24	N	30	N	N	N	50	N	L	N	N	N	N	N	10	N
GA14001C	25	N	1000	N	N	N	N	N	N	N	N	N	N	N	L	L
GA14002C	26	N	2000	N	N	N	20	N	N	N	L	N	N	N	L	G2000
GA14003C	27	L	100	N	N	N	100	N	L	N	150	N	L	N	10	G2000
GA14004C	28	L	100	N	N	N	150	N	50	N	200	N	L	N	10	2000
GA14005C	29	L	50	N	N	N	150	N	100	N	150	N	L	N	30	2000
GA14006C	30	L	70	N	N	N	150	N	500	N	200	N	N	N	20	1500
GA14007C	31	N	50	N	N	N	200	N	300	N	200	N	N	N	L	200
GA14012C	32	N	2	N	N	N	150	N	70	N	50	N	N	N	10	N
GA14013C	33	N	70	20	N	N	100	N	70	N	70	N	30	N	50	G2000
GA14014C	34	N	150	N	N	N	150	N	70	N	200	N	L	N	20	2000
GA14015C	35	N	100	L	N	N	70	N	N	N	L	N	20	N	30	200
GA14016C	36	N	150	50	N	N	70	N	N	N	50	N	70	N	150	G2000
GA14017C	37	N	100	L	N	N	70	N	200	N	50	N	L	N	30	500
GA14018C	38	N	70	20	N	N	70	N	N	N	L	N	20	N	70	200
GA14019C	39	N	150	L	N	N	100	N	L	N	100	N	L	N	30	300
GA14021C	40	N	70	20	N	N	100	N	N	N	L	N	30	N	50	1000
GA14022C	41	N	150	N	N	N	200	N	70	N	150	N	L	N	30	1000
GB14001C	42	N	5	N	N	N	150	N	50	N	L	N	N	N	20	300
GB14002C	43	N	5	N	N	N	100	N	70	N	50	N	L	N	20	150

Table 1 (Continued).

FIELD NUMBER	MAP NUMBER	Sr	V	W	Y	Zn	Zr	Th
GA13001C	1	N	70	N	700	N	G2000	N
GA13002C	2	N	70	N	200	N	G2000	N
GA13003C	3	N	200	N	200	N	G2000	N
GA13004C	4	N	200	N	200	N	G2000	N
GA13005C	5	N	150	300	50	N	G2000	N
GA13006C	6	N	70	N	500	N	G2000	N
GA13007C	7	N	100	N	200	N	G2000	N
GA13008C	8	N	70	N	70	N	G2000	N
GA13009C	9	N	100	N	200	N	G2000	N
GA13010C	10	N	150	L	300	N	G2000	N
GA13011C	11	N	150	N	500	N	G2000	N
GA13012C	12	N	150	N	200	N	G2000	N
GA13013C	13	N	70	N	700	N	G2000	N
GA13014C	14	N	70	N	500	N	G2000	N
GA13015C	15	N	150	N	500	N	G2000	N
GA13016C	16	N	100	N	500	N	G2000	N
GA13017C	17	N	150	N	500	N	G2000	N
GA13018C	18	N	100	N	500	N	G2000	N
GA13019C	19	N	70	N	500	N	G2000	N
GA13024C	20	N	100	N	500	N	G2000	N
GA13026C	21	N	100	N	200	N	G2000	N
GA13028C	22	N	100	N	200	N	G2000	N
GA13030C	23	N	100	N	500	N	G2000	N
GA13031C	24	N	70	N	500	N	G2000	N
GA14001C	25	N	L	N	L	N	700	N
GA14002C	26	N	30	N	200	N	G2000	N
GA14003C	27	N	200	N	200	N	G2000	N
GA14004C	28	N	150	N	200	N	G2000	N
GA14005C	29	N	200	N	500	N	G2000	N
GA14006C	30	N	200	N	200	N	G2000	N
GA14007C	31	N	150	N	100	N	G2000	N
GA14012C	32	N	150	N	150	N	G2000	N
GA14013C	33	N	150	N	500	N	G2000	N
GA14014C	34	N	200	N	200	N	G2000	N
GA14015C	35	N	100	N	200	N	G2000	N
GA14016C	36	N	150	N	500	N	G2000	N
GA14017C	37	N	100	N	500	N	G2000	N
GA14018C	38	N	70	N	500	N	G2000	N
GA14019C	39	N	150	N	300	N	G2000	N
GA14021C	40	N	100	N	500	N	G2000	N
GA14022C	41	N	150	L	300	N	G2000	N
GB14001C	42	N	150	N	300	N	G2000	N
GB14002C	43	N	150	N	300	N	G2000	N

Table 1 (Continued).

FIELD NUMBER	MAP NUMBER	7.5' QUAD.	LATITUDE	LONGITUDE	Fe(%)	Mg(%)	Ca(%)	Ti(%)	Mn	Ag	As	Au	B
GB15001C	44	PELHAM	344541	821331	N	N	L	G2	L	N	N	N	50
GB15002C	45	PELHAM	344532	821246	0.1	N	N	2	20	N	N	N	50
GC15002C	46	FOUNTAIN INN	344259	821018	0.5	L	0.15	G2	70	N	N	N	150
GC15003C	47	FOUNTAIN INN	343952	820801	0.2	L	0.3	G2	70	N	N	N	100
GC15004C	48	FOUNTAIN INN	343854	820832	0.2	L	L	G2	70	N	N	N	50
GC15005C	49	FOUNTAIN INN	344401	821247	0.7	0.1	0.2	G2	200	N	N	N	70
GC15006C	50	FOUNTAIN INN	344358	821200	0.5	0.05	0.1	G2	100	N	N	N	200
GC15008C	51	FOUNTAIN INN	344343	821214	0.3	L	L	G2	150	N	N	N	20
GC15009C	52	FOUNTAIN INN	344311	821158	0.5	0.07	0.1	G2	150	N	N	N	20
GC15010C	53	FOUNTAIN INN	344344	821151	0.7	L	L	G2	500	N	N	N	20
GC15011C	54	FOUNTAIN INN	343815	821028	0.5	L	0.3	G2	300	N	N	N	20
GC15012C	55	FOUNTAIN INN	343816	821035	0.3	L	0.1	G2	200	N	N	N	20
GC15016C	56	FOUNTAIN INN	343820	821048	N	N	L	G2	L	N	N	N	L
GC15017C	57	FOUNTAIN INN	344339	821325	L	N	0.15	G2	L	N	N	N	N
GC15018C	58	FOUNTAIN INN	344334	821321	L	N	L	G2	L	N	N	N	N
GC15020C	59	FOUNTAIN INN	344356	821253	L	N	L	G2	20	N	N	N	L
GC15021C	60	FOUNTAIN INN	344428	821237	0.1	N	N	G2	L	N	N	N	20
GC15022C	61	FOUNTAIN INN	344429	821246	0.15	L	L	G2	20	N	N	N	50
GC15023C	62	FOUNTAIN INN	344441	821160	0.15	N	L	G2	20	N	N	N	20
GC15024C	63	FOUNTAIN INN	344325	821110	0.2	N	0.5	2	L	N	N	N	50
GC15025C	64	FOUNTAIN INN	344402	821021	L	N	L	2	20	N	N	N	L
GC14011C	65	SIMPSONVILLE	344305	821646	N	N	0.7	2	20	N	N	N	N
GC14002C	66	SIMPSONVILLE	344309	821655	0.3	L	0.7	G2	100	N	N	N	30
GC14003C	67	SIMPSONVILLE	344423	821638	L	N	L	G2	L	N	N	N	50
GC14004C	68	SIMPSONVILLE	344418	821643	L	L	0.2	2	L	N	N	N	100
GC14005C	69	SIMPSONVILLE	344445	821757	L	N	N	G2	N	N	N	N	70
GC14006C	70	SIMPSONVILLE	344351	821815	L	L	0.1	G2	L	N	N	N	100
GC14007C	71	SIMPSONVILLE	344344	821723	L	L	L	2	L	N	N	N	70
GC14008C	72	SIMPSONVILLE	344350	821719	L	L	N	G2	L	N	N	N	70
GC14009C	73	SIMPSONVILLE	344323	821707	L	N	N	G2	L	N	N	N	100
GC14010C	74	SIMPSONVILLE	344311	821649	L	N	0.1	G2	L	N	N	N	50
GC14012C	75	SIMPSONVILLE	344317	821622	L	N	0.3	G2	L	N	N	N	N
GC14013C	76	SIMPSONVILLE	344341	821606	0.15	L	0.7	G2	150	N	N	N	20
GC14014C	77	SIMPSONVILLE	344353	821610	L	N	L	G2	L	N	N	N	L
GC14015C	78	SIMPSONVILLE	344354	821617	L	N	0.1	G2	L	N	N	N	50
GD15001C	79	HICKORY TAVERN	343305	820817	0.2	0.05	0.2	G2	70	N	N	N	100
GD15002C	80	HICKORY TAVERN	343308	820817	0.2	0.05	0.1	G2	50	N	N	N	20
GD15004C	81	HICKORY TAVERN	343303	820831	0.7	1.5	1	G2	500	N	N	N	200
GD15005C	82	HICKORY TAVERN	343251	820828	0.5	0.05	1	G2	500	N	N	N	L
GD15006C	83	HICKORY TAVERN	343303	820755	0.7	0.7	2	G2	500	N	N	N	70
GD15007C	84	HICKORY TAVERN	343225	820852	0.15	0.05	L	G2	50	N	N	N	50
GD15008C	85	HICKORY TAVERN	343232	820853	0.15	0.05	L	G2	100	N	N	N	L

Table 1 (Continued).

FIELD NUMBER	MAP NUMBER	Ba	Be	Bi	Cd	Co	Cr	Cu	La	Mo	Nb	Ni	Pb	Sb	Sc	Sn
GB15001C	44	N	L	N	N	N	150	N	N	N	150	N	N	N	L	150
GB15002C	45	N	50	100	N	N	70	N	L	N	L	N	70	N	150	2000
GC15002C	46	100	70	N	N	N	70	50	1000	N	300	15	20	N	70	200
GC15003C	47	100	2	N	N	N	70	N	700	N	150	15	L	N	150	70
GC15004C	48	N	N	N	N	N	100	N	2000	N	100	15	30	N	100	50
GC15005C	49	G10000	200	700	N	N	50	10	1000	N	70	L	100	N	200	G2000
GC15006C	50	10000	200	30	N	N	100	N	2000	N	200	L	50	N	200	2000
GC15008C	51	2000	50	N	N	N	50	N	300	N	150	10	20	N	100	200
GC15009C	52	3000	20	N	N	N	50	N	500	N	100	L	20	N	70	300
GC15010C	53	3000	10	N	N	N	20	N	1500	N	100	L	50	N	200	200
GC15011C	54	2000	7	N	N	N	100	N	700	N	70	10	L	N	100	150
GC15012C	55	1500	5	N	N	N	70	N	150	N	150	L	1000	N	150	200
GC15016C	56	N	10	N	N	N	100	N	70	N	L	N	20	N	70	30
GC15017C	57	N	N	N	N	N	30	N	N	N	70	N	20	N	70	2000
GC15018C	58	N	N	N	N	N	20	N	N	N	300	N	N	N	L	700
GC15020C	59	N	15	N	N	N	100	N	L	N	100	N	L	N	100	300
GC15021C	60	N	150	100	N	N	30	N	N	N	70	N	50	N	70	G2000
GC15022C	61	N	70	500	N	N	70	N	N	N	70	N	500	N	100	G2000
GC15023C	62	N	100	30	N	N	50	20	300	N	70	N	70	N	50	G2000
GC15024C	63	N	L	N	N	N	L	N	N	N	N	N	30	N	100	300
GC15025C	64	N	10	N	N	N	N	N	N	N	L	N	30	N	150	1500
GC14011C	65	200	15	150	N	N	20	N	N	N	L	N	20	N	50	1500
GC14002C	66	500	150	N	N	N	50	N	500	N	70	15	70	N	200	200
GC14003C	67	N	15	N	N	N	100	N	N	N	100	N	30	N	50	G2000
GC14004C	68	N	20	N	N	N	150	N	100	N	50	N	50	N	L	300
GC14005C	69	N	5	N	N	N	150	N	50	N	50	N	N	N	15	G2000
GC14006C	70	N	10	N	N	N	150	N	200	N	100	N	N	N	10	1000
GC14007C	71	N	10	N	N	N	150	N	50	N	50	N	N	N	15	150
GC14008C	72	N	3	N	N	N	200	L	50	N	100	N	N	N	15	150
GC14009C	73	N	5	N	N	N	150	N	50	N	100	N	N	N	20	100
GC14010C	74	N	15	1000	N	N	200	N	N	N	150	N	20	N	50	2000
GC14012C	75	200	50	L	N	N	20	N	100	N	50	N	150	N	50	150
GC14013C	76	L	L	N	N	N	100	N	300	N	70	N	N	N	30	G2000
GC14014C	77	N	15	N	N	N	100	N	N	N	100	N	150	N	15	1500
GC14015C	78	N	3	N	N	N	150	N	L	N	100	N	N	N	50	2000
GD15001C	79	N	N	N	N	N	70	10	G2000	N	100	20	200	N	150	150
GD15002C	80	50	L	N	N	N	50	L	G2000	N	100	15	100	N	200	70
GD15004C	81	50	L	N	N	N	100	L	G2000	N	100	20	100	N	150	70
GD15005C	82	L	50	N	N	N	L	L	G2000	10	50	15	200	N	150	700
GD15006C	83	50	L	N	N	N	70	N	1500	N	100	20	10	N	30	50
GD15007C	84	50	30	N	N	N	L	L	G2000	N	70	L	200	N	150	300
GD15008C	85	70	N	N	N	N	N	10	G2000	N	100	L	100	N	150	30

Table 1 (Continued).

FIELD NUMBER	MAP NUMBER	Sr	V	W	Y	Zn	Zr	Th
GB15001C	44	N	150	N	200	N	G2000	N
GB15002C	45	N	100	N	700	N	G2000	N
GC15002C	46	N	150	N	300	N	G2000	200
GC15003C	47	N	150	N	300	N	G2000	N
GC15004C	48	N	100	N	500	N	G2000	300
GC15005C	49	700	300	N	1500	N	G2000	N
GC15006C	50	L	300	N	500	N	G2000	N
GC15008C	51	N	150	N	300	N	G2000	N
GC15009C	52	N	200	N	300	N	G2000	N
GC15010C	53	L	150	N	1000	N	G2000	L
GC15011C	54	N	200	N	500	N	G2000	N
GC15012C	55	N	150	N	300	N	G2000	N
GC15016C	56	N	70	N	500	N	G2000	N
GC15017C	57	N	100	N	500	N	G2000	N
GC15018C	58	N	100	N	150	N	G2000	N
GC15020C	59	N	150	N	500	N	G2000	N
GC15021C	60	N	70	N	700	N	G2000	N
GC15022C	61	N	100	N	500	N	G2000	N
GC15023C	62	N	100	N	500	N	G2000	N
GC15024C	63	N	50	N	1000	N	G2000	N
GC15025C	64	N	50	N	1000	N	G2000	N
GC14011C	65	N	70	N	700	N	G2000	N
GC14002C	66	L	200	N	500	N	G2000	200
GC14003C	67	N	150	N	700	N	G2000	N
GC14004C	68	N	150	N	200	N	G2000	N
GC14005C	69	N	150	N	300	N	G2000	N
GC14006C	70	N	200	N	300	N	G2000	N
GC14007C	71	N	200	N	200	N	G2000	N
GC14008C	72	N	200	N	200	N	G2000	N
GC14009C	73	N	150	N	300	N	G2000	N
GC14010C	74	N	200	N	300	N	G2000	N
GC14012C	75	N	70	N	700	N	G2000	N
GC14013C	76	N	150	N	700	N	G2000	N
GC14014C	77	N	150	N	500	N	G2000	N
GC14015C	78	N	150	N	300	N	G2000	N
GD15001C	79	N	70	L	1500	N	G2000	G5000
GD15002C	80	N	70	N	1000	N	G2000	2000
GD15004C	81	N	100	N	1000	N	G2000	2000
GD15005C	82	N	70	100	1000	N	G2000	1500
GD15006C	83	L	100	L	300	N	G2000	500
GD15007C	84	N	70	N	1000	N	G2000	2000
GD15008C	85	N	70	N	1000	N	G2000	3000