

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Analyses and descriptions of geochemical samples,
Anna Ruby Roadless Area, White County, Georgia

by

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This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

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STUDIES RELATED TO WILDERNESS

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey (USGS) and the U.S. Bureau of Mines to survey certain areas on Federal lands in order to determine the mineral values, if any, that may be present. Results must be made available to the public and be submitted to the President and the Congress. This report presents the analytical results of a geochemical survey of the Anna Ruby Roadless Area (08-225) in the Chattahoochee National Forest, White County, Ga. The area was classified as nonwilderness during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January, 1979.

Abstract

Semiquantitative spectrographic analyses for 31 elements on 19 stream-sediment, 14 panned-concentrate, 42 soil, and 44 rock samples from the Anna Ruby Roadless Area, White County, Ga., are reported here in detail. Atomic-absorption analyses for zinc in most samples are also reported. Brief descriptions are given of rock samples analyzed, which include metamorphic and igneous rocks.

INTRODUCTION

The analyses presented in this report (Table 1) are of 19 stream-sediment, 14 panned-concentrates, 42 soil, and 44 rock samples from the Anna Ruby Roadless Area, Ga. (Fig. 1). These were collected by F. G. Lesure, J. P. D'Agostino, J. D. Peper and J. A. Goss in March 1985. Stream sediment samples were collected from most of the small drainage basins in the study area.

These represent several handfuls, randomly collected, of the finest sediment available at the sample site in the stream. A heavy mineral sample from coarser sediment was taken at 14 sites by panning one or more panfuls of gravel using a 14 in. standard gold pan. After air drying at room temperature, the remaining light minerals, mostly quartz and feldspar, were removed from the panned concentrate using bromoform (specific gravity 2.8). Magnetite was removed using a hand-held magnet and discarded. The remaining concentrate was analyzed without further preparation. Rock samples analyzed are described briefly in a separate section of this report. All are chip samples taken across bedding or layering over a measured thickness of representative material from outcrops or road cuts. The samples are representative of the major rock types exposed in the area. Some of the rock is partly weathered, but generally the freshest material available was sampled. The soil samples are grab samples from the A₂ or upper B soil zone, just below the dark, organic-rich surface soil (A₁ zone). Soils were dried, sieved to minus 80-mesh (0.007 in. or 0.177 mm), and then pulverized to minus 140-mesh (0.004 in. or 0.105 mm). Maps showing sample localities and discussion of the results of the analytical work are given by Lesure and others (in press).

ANALYTICAL TECHNIQUES

Each sample was analyzed semiquantitatively for 31 elements by means of a six-step, D.C. (direct-current) arc, optical-emission spectrographic method (Grimes and Marranzino, 1968) by R. T. Hopkins and M. S. Erickson in the USGS laboratories, Denver, Colo. In addition, most of the samples were analyzed for zinc by an atomic-absorption technique (Ward and others, 1969, p. 20) by M. A. Pokorny, USGS laboratories, Denver, Colo. Five of the panned-concentrate samples were analyzed for gold by atomic absorption methods by T. A. Roemer (Thompson and others, 1968). The semiquantitative spectrographic values are reported as six steps per order of magnitude (1, 0.7, 0.5, 0.3, 0.2, 0.15 or multiples of ten of these numbers) and are approximate midpoints of geometric brackets whose boundaries are 1.2, 0.83, 0.56, 0.38, 0.26, 0.18, 0.12, etc. The expected precision is within one adjoining reporting interval on each side of the reported value 83 percent of the time and within two adjoining intervals 96 percent of the time (Motooka and Grimes, 1976).

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

For those given in percent:

Calcium	0.05	Magnesium	0.02
Iron	0.05	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		

Rock sample descriptions

GB03- 104 R	1 m chip sample, quartz-biotite gneiss, light-to-medium-grey, layered, weathered,
106 R	Composite samples of three boulders, quartz vein, white, >1 m thick, 20 m long (?)
107 R	1 m chip sample, quartz-feldspar-biotite-garnet gneiss, light-gray, fine-grained, layers 2-15 cm thick.
112 R	Composite sample of five boulders, hornblende-feldspar gneiss, weathered, fine-grained.
114 R	Composite sample of six boulders, granite, feldspar-quartz biotite, coarse-grained.
121 R	2 m chip sample, granite.
216 R	1 m chip sample, biotite schist, weathered, iron-stained.
301 R	2 m chip sample, biotite gneiss, dark-gray, fine-grained.
302 R	2 m chip sample, migmatitic biotite gneiss.
303 R	2 m chip sample, biotite gneiss.
304 R	2 m chip sample, biotite gneiss, thin-layered, schistose.
305 R	2 m chip sample, biotite gneiss.
306 R	2 m chip sample, biotite gneiss.
307 R	1 m chip sample, quartz vein, minor plagioclase and biotite.
308 R	2 m chip sample, biotite gneiss, light-gray, medium-grained.
309 R	2 m chip sample, biotite gneiss, schistose, light-gray.
310 R	2 m chip sample, biotite gneiss, coarse-grained.
312 R	2 m chip sample, biotite gneiss, medium- to coarse-grained.

313 R 2 m chip sample, biotite gneiss, some migmatitic layers.

314 R 5 m chip sample, biotite gneiss, medium-grained.

315 R 5 m chip sample, biotite gneiss, medium-grained, blocky.

316 R 3 m chip sample, granitic pegmatite.

317 R 2 m chip sample, biotite gneiss, pin-striped.

318 R 2 m chip sample, biotite gneiss, even-layered, coarse-grained.

319 R 2 m chips sample, biotite gneiss, even-layered.

320 R 2 m chip sample, biotite gneiss, sugary texture.

326 R 3 m chip sample, biotite granulite.

327 R 5 m chip sample, biotite gneiss, schistose.

328 R 2 m chip sample, granitic pegmatite.

329 R 2 m chip sample, biotite gneiss, coarse-grained, migmatitic.

330 R 2 m chip sample, biotite granitic pegmatite, 1-1.3 m thick.

331 R 2 m chip sample, biotite gneiss saprolite, light-medium-gray, minor pegmatite stringers.

332 R 2 m chip sample, biotite gneiss, weathered.

333 R 2 m chip sample, biotite gneiss, schistose, weathered.

334 R Composite sample of flat, biotite-quartz granulite, meta-sandstone.

335 R 2 m chip sample, biotite-muscovite gneiss, weathered.

336 R 2 m chip sample, quartz vein.

GC03-
101 R 1 m chip sample, interlayered biotite gneiss and schist.

321 R 2 m chip sample, biotite granite and pegmatite.

322 R 2 m chip sample, biotite gneiss.

323 R 2 m chip sample, biotite gneiss.

324 R 2 m chip sample, biotite gneiss, schistose.

325 R 2 m chip sample, interlayered amphibolite and biotite gneiss.

EXPLANATION OF TABLE 1

Table 1 lists the results of analyses of all sample media. The letters following the sample numbers designate the type of sample: "C" designates panned concentrates, "D" designates soils, "R" designates rocks, and "S" designates stream sediments.

Iron, magnesium, calcium, and titanium, concentrations are reported in percent (pct); all others are in parts per million (ppm). Letters below chemical symbols indicate the method of analysis: s, six-step semiquantitative spectrographic method; aa, atomic absorption. Other symbols on the table are: N, not detected; --, not determined; <, amount detected is below the lower limit of determination, which is number shown; >, amount detected is above the upper limit of determination, which is number shown.

Elements looked for spectrographically but not found, except as noted, are listed below. The lower limits of determination for these elements are in parentheses, the first number is for rock, and stream sediment; the second number is for panned-concentrate samples.

Ag (0.5; 1), As (200; 500), Au (20; 20), Bi (10; 20), Cd (20; 50), Mo (5; 10), Sb (100; 200), Sn (10; 20), Th (100; 200), W (50; 100), and Zn (200; 500). Exceptions: Zn was detected but below limit of determination (200 ppm) in the following samples: stream sediments, 213; soils, 103, 203, and 205; rocks, 216, 305, and 323.

REFERENCES CITED

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- Motooka, J. M., and Grimes, D. J., 1976, Analytical precision of one-sixth order semiquantitative spectrographic analysis: U.S. Geological Survey Circular 738, 25 p.
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- Ward, F. N., Nakagawa, H. M., Harms, T. F., and Van Sickle, G. H., 1969, Atomic-absorption methods of analysis useful in geochemical exploration: U.S. Geological Survey Bulletin 1289, 45 p.

[N, not detected; <, detected but below the limit of determination shown; >, determined to be greater than the value shown.]

Sample	Latitude	Longitude	Fe-ppt. S	Mg-ppt. S	Ca-ppt. S	Ti-pct. S	Mn-ppt. S	B-ppt. S	Ba-ppt. S	Be-ppt. S	Co-ppt. S	Cr-ppt. S	Cu-ppt. S
GC03001S	34 44 43	83 43 13	2.00	.20	.07	.500	300	<10	300	1.5	10	50	20
GC03003S	34 44 55	83 43 3	2.00	.30	.15	.300	200	<10	300	1.5	10	70	20
GB03003S	34 47 45	83 41 25	3.00	.70	.30	.500	700	N	500	2.0	10	50	20
GB03005S	34 47 43	83 41 27	2.00	.50	.15	.500	500	N	500	2.0	10	70	30
GB03007S	34 47 41	83 41 24	3.00	.70	.30	.500	700	N	700	2.0	10	50	20
GB03009S	34 47 39	83 41 22	3.00	.70	.50	.500	1,000	<10	500	2.0	10	70	20
GB03011S	34 47 23	83 41 29	3.00	.70	.30	.500	700	N	500	2.0	10	50	20
GB03013S	34 47 12	83 41 25	3.00	.50	.30	.500	1,000	<10	500	2.0	10	70	20
GB03015S	34 47 14	83 41 28	3.00	.70	.30	.500	700	<10	500	2.0	10	70	30
GB03017S	34 46 25	83 41 27	3.00	.70	.30	.500	1,000	15	500	2.0	15	70	30
GB03018S	34 46 18	83 41 42	1.50	.50	.20	.300	500	N	300	2.0	10	50	20
GB03019S	34 46 7	83 41 54	2.00	.30	.30	.300	700	N	300	3.0	10	70	30
GB03020S	34 45 53	83 42 9	2.00	.50	.30	.300	500	N	500	3.0	10	50	20
GB03010S	34 45 55	83 42 38	2.00	.50	.30	.300	700	10	500	2.0	10	70	20
GB03209S	34 46 41	83 42 24	2.00	.30	.10	.300	500	N	500	2.0	10	50	20
GB03211S	34 46 41	83 42 27	2.00	.30	.15	.300	300	<10	500	1.5	10	50	20
GB03213S	34 46 0	83 42 47	3.00	.50	.05	.500	300	N	500	2.0	15	70	30
GB03215S	34 45 59	83 42 45	2.00	.50	.15	.300	300	<10	500	1.5	10	70	20
GB03202S	34 45 53	83 42 41	3.00	.70	.50	.300	1,000	10	500	2.0	10	70	20
GB03001D	34 47 53	83 41 26	1.50	.20	.10	.300	1,000	10	200	3.0	<5	50	30
GB03002D	34 47 47	83 41 26	1.50	.30	.07	.300	1,000	10	300	3.0	7	50	30
GB03021D	34 47 55	83 41 30	2.00	.30	.10	.300	1,000	<10	300	2.0	7	50	30
GB03022D	34 47 36	83 42 1	2.00	.30	.05	.300	300	15	300	1.5	7	70	20
GB03023D	34 47 26	83 42 38	2.00	.30	.05	.500	1,000	15	300	2.0	10	50	30
GB03024D	34 47 14	83 42 50	3.00	.30	.15	.500	700	<10	300	2.0	10	70	30
GB03025D	34 46 52	83 43 10	3.00	.50	.15	.500	500	15	500	2.0	7	70	30
GB03026D	34 46 30	83 43 32	2.00	1.50	.05	.500	150	<10	300	1.0	<5	50	30
GB03027D	34 46 18	83 43 27	2.00	.20	.05	.500	300	10	300	1.5	<5	50	30
GB03028D	34 46 0	83 43 26	2.00	.20	.05	.500	150	<10	300	2.0	<5	50	30
GB03029D	34 45 44	83 43 18	2.00	.02	.05	.300	100	<10	50	1.0	N	50	30
GB03030D	34 45 25	83 43 29	1.50	.10	.05	.500	200	20	300	<1.0	N	30	15
GB03031D	34 45 15	83 43 27	2.00	.07	.05	.500	150	15	300	<1.0	N	50	100
GB03102D	34 45 51	83 42 12	2.00	.30	.05	.300	300	N	300	2.0	10	50	20
GB03103D	34 45 54	83 41 56	3.00	.70	.07	.500	300	20	200	3.0	20	150	70
GB03105D	34 47 22	83 41 43	2.00	.30	.07	.500	150	15	300	2.0	7	70	30
GB03108D	34 47 7	83 41 42	3.00	.30	.05	.500	300	15	300	2.0	10	50	30
GB03109D	34 46 59	83 41 44	3.00	.30	.05	.300	300	10	300	2.0	7	70	30
GB03110D	34 46 48	83 41 49	3.00	.30	.05	.500	300	15	300	1.5	10	70	30
GB03111D	34 46 39	83 41 54	3.00	.30	.05	.500	200	15	300	2.0	15	70	30
GB03113D	34 46 20	83 41 59	3.00	.70	.70	.300	700	10	150	3.0	20	100	30
GB03115D	34 46 5	83 42 5	2.00	.07	.05	.300	70	20	150	1.0	N	50	20
GB03116D	34 46 12	83 42 19	2.00	.07	.05	.300	150	15	30	2.0	N	50	20
GB03117D	34 46 4	83 42 25	2.00	.10	.05	.500	150	30	200	1.5	N	50	30
GB03118D	34 45 58	83 42 55	3.00	.10	.05	.500	150	20	150	<1.0	N	70	30
GB03119D	34 45 50	83 42 55	2.00	.05	.05	1,000	150	20	20	<1.0	<5	70	30
GB03120D	34 45 32	83 42 56	2.00	.05	.05	.300	70	20	70	<1.0	N	50	20
GB03203D	34 45 45	83 42 31	1.50	.15	.05	.500	150	N	150	1.5	N	50	20
GB03204D	34 45 49	83 42 18	3.00	.30	.05	.500	200	<10	300	3.0	10	70	30
GB03205D	34 45 52	83 41 58	2.00	.30	.05	.500	200	N	200	3.0	N	50	50
GB03206D	34 47 36	83 41 53	3.00	.30	.05	.300	500	10	300	3.0	7	50	30

Sample	La-ppm S	Nb-ppm S	Ni-ppm S	Pb-ppm S	Sc-ppm S	Sr-ppm S	V-ppm S	Y-ppm S	Zr-ppm S	Zn-ppm aa
GC030015	20	<20	15	20	5	N	30	20	700	45
GC03003S	20	<20	15	30	5	N	50	30	500	45
GB03003S	100	<20	7	30	15	<100	50	70	1,000	50
GB03005S	70	<20	20	30	7	N	50	30	500	90
GB03007S	200	<20	20	30	7	N	50	70	700	65
GB03009S	100	<20	20	50	10	<100	70	70	700	85
GB03011S	70	<20	20	50	7	N	70	50	700	70
GB03013S	150	<20	15	50	7	<100	50	70	700	35
GB03015S	50	<20	20	30	7	100	70	50	500	95
GB03017S	100	<20	20	50	10	<100	70	100	700	80
GB03018S	300	N	15	30	7	N	50	150	700	65
GB03019S	150	<20	20	30	7	N	50	50	500	85
GB03020S	150	<20	10	50	7	N	50	70	700	60
GB03101S	150	<20	10	50	10	N	70	100	700	75
GB03209S	70	N	10	30	7	N	50	30	700	45
GB03211S	20	<20	10	30	7	N	50	20	700	45
GB03213S	70	<20	30	30	10	N	70	100	500	110
GB03215S	100	<20	10	30	7	N	70	50	700	55
GB03202S	100	<20	15	30	15	N	70	70	1,000	55
GB03001D	50	<20	15	30	7	N	70	70	150	85
GB03002D	70	<20	20	20	7	N	70	70	150	70
GB03021D	70	<20	30	30	7	N	70	70	200	95
GB03022D	30	<20	20	30	7	N	70	50	500	70
GB03023D	70	<20	30	30	7	N	70	70	300	80
GB03024D	50	<20	30	30	7	N	70	70	500	110
GB03025D	50	<20	30	30	7	N	70	30	300	95
GB03026D	70	<20	15	30	7	N	70	70	500	85
GB03027D	70	<20	20	30	7	N	70	70	500	80
GB03028D	70	<20	20	30	7	N	100	50	200	65
GB03029D	70	<20	10	20	7	N	100	30	300	25
GB03030D	70	<20	10	30	7	N	70	30	1,000	35
GB03031D	70	<20	10	30	7	N	700	70	700	45
GB03102D	30	<20	20	20	10	N	70	150	700	70
GB03103D	150	<20	50	30	10	N	100	150	700	115
GB03105D	30	N	15	30	7	N	70	50	700	75
GB03108D	150	<20	30	30	7	N	70	50	700	55
GB03109D	70	<20	30	30	7	N	70	50	500	90
GB03110D	70	<20	30	30	7	N	70	200	700	80
GB03111D	100	<20	30	30	7	N	70	70	200	85
GB03113D	50	N	20	15	20	N	150	50	30	70
GB03115D	30	<20	7	30	10	N	70	70	700	10
GB03116D	20	N	20	30	7	N	70	20	150	20
GB03117D	150	<20	7	30	7	N	70	100	150	20
GB03118D	100	<20	15	30	7	N	70	70	1,000	35
GB03119D	30	<20	7	30	7	N	70	50	1,000	30
GB03120D	30	N	<5	30	7	N	100	70	700	10
GB03203D	20	N	7	30	7	N	70	50	500	15
GB03204D	30	N	30	30	10	N	100	50	200	125
GB03205D	30	N	10	50	7	N	100	50	300	70
GB03206D	70	N	20	30	7	N	70	70	500	170

Anna Ruby, Georgia--Continued

Sample	Latitude	Longitude	Fe-pct. S	Mg-pct. S	Ca-pct. S	Ti-pct. S	Mn-ppt. S	B-ppt. S	Ba-ppt. S	Be-ppt. S	Co-ppt. S	Cr-ppt. S	Cu-ppt. S
GB03207D	34 47 29	83 42 14	3.00	.50	.10	.300	1,000	<10	300	3.0	10	50	30
GB03217	34 45 33	83 43 6	2.00	.10	<.05	.300	70	15	200	1.0	N	50	20
GB03218D	34 45 22	83 43 3	2.00	.03	<.05	.300	100	10	70	1.0	N	50	30
GB03219D	34 45 27	83 43 13	2.00	.07	<.05	.500	150	30	150	1.0	N	50	20
GB03220D	34 45 17	83 43 18	1.50	.07	<.05	.500	150	30	100	1.0	N	50	20
GB03221D	34 45 12	83 43 25	2.00	.05	<.05	.300	200	15	100	<1.0	N	30	20
GB03222D	34 45 3	83 43 41	1.50	.07	<.05	.300	100	20	150	<1.0	N	50	20
GC03102D	34 44 51	83 43 26	2.00	.10	<.05	.300	150	N	100	1.5	7	100	30
GC03103D	34 44 42	83 43 29	2.00	.15	<.05	.300	70	10	200	3.0	5	50	30
GC03104D	34 44 27	83 43 32	3.00	.30	<.05	.300	150	10	200	1.5	7	70	30
GC03105D	34 44 19	83 43 28	2.00	.02	<.05	.300	100	N	70	1.5	N	50	30
GC03004C	34 44 55	83 43 3	.20	.10	>2.000	.500	50	20	100	<2.0	N	50	<10
GB03004C	34 47 45	83 41 25	.50	.20	.30	.500	100	20	300	3.0	N	50	<10
GB03006C	34 47 43	83 41 27	.50	.20	.30	.300	100	20	300	2.0	N	50	<10
GB03012C	34 47 23	83 41 29	.70	.20	.30	.700	100	20	200	2.0	N	50	<10
GB03014C	34 47 12	83 41 25	2.00	.20	.20	2.000	150	20	200	<2.0	N	50	<10
GB03016C	34 47 14	83 41 28	.20	.20	.20	.500	150	20	300	<2.0	N	50	<10
GB03032C	34 45 29	83 42 33	.50	.30	.50	.500	150	20	500	2.0	N	50	<10
GB03201C	34 45 57	83 42 40	.20	.10	.30	>2.000	100	20	200	<2.0	N	30	<10
GB03208C	34 46 41	83 42 24	.30	.15	.50	.700	100	30	300	2.0	N	50	<10
GB03210C	34 46 41	83 42 27	1.00	.20	.20	>2.000	150	100	300	3.0	N	100	<10
GB03212C	34 46 0	83 42 47	1.00	.20	.30	>2.000	100	30	700	<2.0	N	100	10
GB03214C	34 45 59	83 42 45	1.00	.10	.10	2.000	100	20	150	<2.0	N	50	<10
GB03104R	34 47 58	83 35 2	3.00	.70	.50	.500	500	N	300	1.0	10	50	20
GB03106R	34 47 20	83 41 42	.15	<.02	<.05	.007	50	<10	N	N	15	15	7
GB03107R	34 47 14	83 41 41	2.00	.50	.50	.300	200	N	500	1.5	7	30	20
GB03112R	34 46 24	83 41 57	5.00	5.00	5.00	.500	1,000	N	150	<1.0	50	200	20
GB03114R	34 46 12	83 42 9	1.50	.50	.70	.100	200	N	200	5.0	50	30	N
GB03121R	34 45 0	83 43 26	1.50	.30	1.00	.150	300	N	300	2.0	N	15	20
GB03216R	34 45 57	83 42 47	3.00	1.00	.20	.500	1,000	N	300	2.0	30	70	50
GB03301R	34 45 54	83 42 37	3.00	.70	.50	.500	300	N	500	1.5	10	50	30
GB03302R	34 45 40	83 42 46	.70	.10	.15	.050	200	N	150	3.0	N	10	<5
GB03303R	34 45 40	83 42 46	3.00	.70	.50	.500	500	<10	700	<1.0	10	50	20
GB03304R	34 49 32	83 41 25	3.00	.70	.50	.300	300	N	700	1.5	10	50	30
GB03305R	34 47 53	83 41 14	5.00	.70	.30	.500	500	N	500	1.5	15	70	50
GB03306R	34 47 47	83 41 6	3.00	.70	1.00	.500	500	N	300	2.0	15	50	20
GB03307R	34 47 30	83 42 59	1.50	.30	.20	.200	100	N	150	2.0	7	20	10
GB03308R	34 47 23	83 41 11	3.00	.70	.07	.500	500	N	200	2.0	10	50	20
GB03309R	34 47 14	83 41 9	3.00	.70	.30	.500	500	N	300	1.5	15	70	30
GB03310R	34 47 4	83 41 8	2.00	.70	.30	.300	500	N	300	<1.0	7	30	20
GB03311R	34 46 49	83 41 13	3.00	1.00	.15	.500	500	<10	500	1.0	10	50	20
GB03312R	34 46 32	83 41 21	2.00	.50	.07	.300	200	N	300	1.0	10	50	30
GB03313R	34 46 22	83 41 18	3.00	.70	.50	.500	700	N	300	1.0	10	50	30
GB03314R	34 46 4	83 41 31	1.50	.50	.15	.300	200	N	200	1.0	N	20	20
GB03315R	34 45 57	83 41 27	1.00	.30	.50	.100	200	N	500	2.0	N	<10	10
GB03316R	34 45 50	83 41 22	2.00	.50	.70	.500	300	N	500	1.5	7	30	7
GB03317R	34 45 28	83 41 45	2.00	.50	.20	.500	700	<10	300	1.5	10	30	30
GB03318R	34 45 19	83 41 35	3.00	.70	.15	.500	500	<10	500	1.0	10	30	10
GB03319R	34 45 7	83 41 50	2.00	.50	<.05	.500	300	10	500	1.0	10	30	15

Anna Ruby, Georgia--Continued

Sample	La-ppm S	Nb-ppm S	Wl-ppm S	Pb-ppm S	Sc-ppm S	Si-ppm S	Y-ppm S	Y-ppm S	Zr-ppm S	Zn-ppm aa
GB03207D	50	<20	20	30	7	N	70	70	200	80
GB03217	<20	<20	7	30	7	N	100	30	300	10
GB03218D	150	<20	15	30	7	N	70	70	300	15
GB03219D	70	<20	7	30	5	N	70	100	700	15
GB03220D	30	<20	<5	30	7	N	70	50	700	35
GB03221D	30	<20	7	30	5	N	70	30	700	30
GB03222D	30	<20	<5	20	7	N	73	50	700	20
GC03102D	30	N	30	30	15	N	100	50	100	50
GC03103D	30	<20	10	30	7	N	70	50	200	60
GC03104D	50	<20	20	30	7	N	100	50	200	50
GC03105D	20	<20	10	20	7	N	70	15	100	15
GC03004C	100	<50	20	<20	<10	<200	70	500	>2,000	--
GB03006C	200	N	20	<20	N	<200	100	500	>2,000	--
GB03012C	300	N	<10	<20	N	200	100	500	>2,000	--
GB03014C	200	<50	<10	<20	N	200	150	200	>2,000	--
GB03016C	150	N	<10	<20	N	300	100	500	>2,000	--
GB03032C	200	N	<10	<20	N	200	150	500	>2,000	--
GB03201C	300	<50	<10	<20	N	200	100	700	>2,000	--
GB03208C	<50	N	<10	<20	N	200	150	500	>2,000	--
GB03210C	500	N	<10	<20	N	200	150	500	>2,000	--
GB03212C	150	<50	<10	<20	N	200	200	500	>2,000	--
GB03214C	<50	N	<10	<20	N	200	100	500	>2,000	--
GB03104R	30	N	30	30	7	100	50	300	40	40
GB03106R	<20	N	5	N	N	<10	N	N	N	<5
GB03107R	30	N	15	30	5	150	50	20	150	30
GB03112R	20	N	20	10	50	200	20	20	30	10
GB03114R	<20	N	20	30	<5	500	15	N	70	45
GB03121R	<20	N	<5	30	<5	300	20	N	100	35
GB03216R	150	<20	50	30	15	N	70	70	150	100
GB03301R	50	<20	50	50	10	<100	70	50	200	40
GB03302R	N	N	5	50	N	N	<10	15	50	30
GB03303R	N	<20	15	20	7	<100	100	30	300	40
GB03304R	30	N	20	30	10	150	70	30	150	85
GB03305R	50	<20	30	30	10	N	100	50	200	125
GB03306R	<20	<20	30	20	7	150	100	30	300	60
GB03307R	20	N	15	10	<5	N	30	10	150	30
GB03308R	20	N	20	30	7	100	70	30	150	50
GB03309R	30	<20	20	30	10	N	100	50	300	45
GB03310R	50	<20	15	20	7	<100	70	20	200	50
GB03311R	20	N	10	70	5	N	70	20	70	70
GB03312R	30	N	20	30	7	N	70	50	300	45
GB03313R	30	N	15	10	5	N	70	15	150	30
GB03314R	<20	<20	20	20	7	<100	70	50	200	65
GB03315R	50	N	5	50	<5	N	50	<10	100	65
GB03317R	20	N	15	30	N	100	15	15	20	5
GB03318R	30	<20	15	30	5	150	50	30	150	35
GB03319R	<20	N	20	20	7	N	70	15	200	50
GB03320R	20	N	20	20	7	N	50	20	150	45

Anna Ruby, Georgia--Continued

Sample	Latitude	Longitude	Fe-pct. S	Mn-pct. S	Ca-pct. S	Tl-pct. S	Mn-ppm S	B-ppm S	Ba-ppm S	Be-ppm S	Co-ppm S	Cr-ppm S	Cu-ppm S
GB03326R	34 47 38	83 42 2	3.00	.70	1.50	.500	300	N	500	1.5	15	50	30
GB03327R	34 47 24	83 42 41	3.00	.70	.30	.500	200	N	300	2.0	15	30	50
GB03328R	34 47 14	83 42 50	1.50	.30	.50	.200	150	N	500	2.0	5	10	10
GB03329R	34 30 40	83 42 43	3.00	.70	.15	.500	700	N	700	<1.0	15	50	50
GB03330R	34 46 29	83 43 30	.30	.07	.07	.050	20	N	300	2.0	N	10	7
GB03331R	34 47 48	80 46 23	2.00	.50	<.05	.500	300	<10	300	2.0	15	50	15
GB03332R	34 47 39	80 46 19	3.00	.70	<.05	.500	700	N	300	2.0	15	70	30
GB03333R	34 47 30	80 46 18	3.00	.70	<.05	.500	500	N	200	1.5	15	70	50
GB03334R	34 45 33	83 43 23	3.00	.50	.30	.700	500	N	300	2.0	10	70	7
GB03335R	34 45 18	83 43 28	2.00	.30	<.05	.300	300	N	200	1.0	15	50	100
GB03336R	34 47 5	80 42 38	.15	.02	<.05	.050	15	<10	70	<1.0	N	10	<5
GC03101R	34 44 41	83 43 13	3.00	.70	.50	.500	700	N	500	2.0	10	50	15
GC0321R	34 44 55	83 42 6	.70	.20	<.05	.100	150	N	150	3.0	<5	10	5
GC03322R	34 44 48	83 42 13	3.00	1.00	.30	.500	500	N	500	1.5	10	50	30
GC03323R	34 44 41	83 42 11	2.00	.70	.20	.500	300	N	200	1.5	10	50	15
GC03324R	34 45 28	83 42 30	3.00	1.00	.50	.500	700	N	300	2.0	10	50	30
GC03325R	34 44 8	83 42 35	5.00	2.00	5.00	.700	1,000	N	N	<1.0	50	200	20

Anna Ruby, Georgia--Continued

Sample	La-ppm S	Nb-ppm S	Ni-ppm S	Pb-ppm S	Sc-ppm S	Sr-ppm S	V-ppm S	Y-ppm S	Zr-ppm S	Zn-ppm aa
GB03326R	50	<20	30	30	7	150	70	30	200	50
GB03327R	20	<20	20	30	7	<100	70	20	200	75
GB03328R	<20	N	10	30	<5	200	30	15	50	20
GB03329R	20	<20	30	50	10	N	70	50	150	125
GB03330R	20	N	10	30	<5	N	<10	<10	15	10
GB03331R	20	<20	20	15	7	N	50	50	200	70
GB03332R	30	<20	50	20	7	N	70	50	300	75
GB03333R	70	<20	50	30	10	N	70	50	200	55
GB03334R	30	<20	20	20	7	<100	70	30	150	35
GB03335R	30	<20	15	150	10	N	70	30	500	80
GB03336R	<20	N	7	<10	N	N	<10	N	<10	N
GC03101R	20	N	30	30	7	150	70	30	150	45
GC03321R	<20	N	5	30	<5	N	10	N	15	30
GC03322R	20	N	20	30	7	150	70	50	150	40
GC03323R	<20	N	20	20	7	N	70	15	200	80
GC03324R	20	N	30	30	7	200	70	30	150	85
GC03325R	N	N	70	15	30	100	150	20	50	5