UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Analyses and description of geochemical samples CRAGGY MOUNTAIN WILDERNESS STUDY AREA

Buncombe County, North Carolina

by

J.M. Motooka, J.D. Sharkey and F.G. Lesure

OPEN-FILE REPORT
OF 78-856

1978

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

Analyses and description of geochemical samples, Craggy Mountain Wilderness Study area, Buncombe County, North Carolina

by

Jerry M. Motooka, John D. Sharkey, and Frank G. Lesure

ABSTRACT

Semiquantitative spectrographic analyses for 30 elements and atomic absorption analyses for gold and zinc on 24 bulk stream sediments, 22 panned concentrates, and 50 rock samples from the Craggy Mountain Wilderness Study area and vicinity, Buncombe County, North Carolina, are reported here in detail. Locations for all samples are given in Universal Transverse Mercator (UTM) coordinates. Brief descriptions of rock samples are also included. Rocks analyzed include mica-garnet-kyanite schist, mica-quartz gneiss, vein quartz, pegmatite, trondhjemite and amphibolite. The data contain no obviously anomalous values that might be related to mineralized rock.

INTRODUCTION

The analyses reported in this open-file report are on samples from the Craggy Mountain Wilderness Study area, Buncombe County, North Carolina, collected by F.G. Lesure and A.E. Grosz, in October, 1976, and April, 1977. Spectrographic analyses on 8 samples collected by B.B. Williams and G.C. Gazdik, U.S. Bureau of Mines, Pittsburgh, Pennsylvania, are also reported.

The samples are 24 bulk stream sediments from the study area and vicinity. A panned concentrate from 10 of the bulk stream sediment localities was split into magnetic (A) and non-magnetic (B) fractions which were analyzed separately. Two panned concentrates collected by the Bureau of Mines and not separated into magnetic-non-magnetific fractions are included with these.

The fifty rock samples analyzed include 6 collected by the Bureau of Mines. Rock samples are described briefly in a separate section. All but one are chip samples of representative material collected from outcrop or road cuts; the exception is a composite sample of chips from several boulders of float. Some of the rock is partly weathered, but the freshest material available was generally sampled. Sample locations and discussion of the results of the analytical work are given by Lesure, Grosz, Williams, and Gazdik (1978).

The X and Y coordinates are Universal Transverse Mercator (UTM) grid, zone 17. The X coordinate is the easting value; the Y is the northing.

ANALYTICAL TECHNIQUES

Rock samples were crushed to approximately 0.25 inch (6 mm) and pulverized to minus 140-mesh (0.105 mm) in a vertical grinder with ceramic plates. Stream sediments were dried and sieved to minus 80-mesh (0.177 mm) and then pulverized. The magnetite in the heavy mineral concentrates was removed with a hand magnet, and the remainder separated at a specific gravity of 2.86 with bromoform into a light fraction and a heavy fraction. The light fraction was discarded. The heavy-mineral fraction was separated electromagnetically by a Frantz[1/] isodynamic separator set at a forward and side angle of 20 degrees and an ampere setting of 0.2. The magnetic fraction at 0.2 amperes was discarded and the less-magnetic fraction further separated electromagnetically at a setting of 0.6 amperes. The latter two fractions were analyzed.

Each sample was analyzed semiquantitatively for thirty elements by a six-step, D.C. arc, optical emission spectrographic method (Grimes and Marranzino, 1968). In addition, each sample was analyzed by an atomic absorption technique for gold (Ward and others, 1969, p. 33) and zinc (Ward and others, 1969, p. 20). Equivalent uranium was also determined instrumentally by total gamma count on five rock samples by J.C. Negri.

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 10 of these numbers) 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 96 percent of the time (Motooka and Grimes, 1976).

Rock sample descriptions

Mica schist without sulfides

Sample No.	Description
NCC 002	1 m, chip sample, biotite-muscovite-garnet-kyanite schist. Kyanite partly altered to sillimanite.
NCC 007	1 m, chip sample, quartz-biotite-garnet-kyanite schist; minor graphite.
NCC 012	1 m, chip sample, quartz-feldspar-mica-garnet schist.
NCC 013	1 m, chip sample, biotite-muscovite-feldspar-quartz-sillimanite-garnet schist, medium to coarse grained.
NCC 017	1 m, chip sample, biotite-kyanite-garnet schist, coarse grained.
NCC 020	1 m, chip sample, biotite-muscovite-kyanite-garnet schist, coarse grained; minor graphite.
NCC 021	1 m, chip sample, biotite-quartz-feldspar-garnet schist.
NCC 028	1 m, chip sample, biotite-kyanite-muscovite-garnet-sillimanite schist.

[1/] Use of brand names in this report is for descriptive purposes only and does not constitute endorsement by the U.S. Geological Survey.

NCC 030	2 m, chip sample, biotite-garnet schist.
NCC 032	1 m, chip sample, mica-quartz-garnet-kyanite-sillimanite schist.
NCC 034	1 m, chip sample, biotite-muscovite-quartz-garnet schist, medium grained, weathered.
NCC 037	1.5 m, chip sample, biotite-muscovite-garnet-kyanite-quartz schist, fine grained, partly weathered.
NCC 047	1 m, chip sample, biotite-muscovite-garnet-quartz-kyanite schist, medium grained; trace of graphite.
NCC 054	1 m, chip sample, biotite-muscovite-garnet-kyanite schist, medium grained; trace of graphite.
NCC 303	5 m, chip sample, mica schist; collected by U.S. Bureau of Mines.
NCC 312	4 m, chip sample, mica schist; collected by U.S. Bureau of Mines.
NCC 317	3 m, chip sample, mica schist, collected by U.S. Bureau of Mines.

Mica schist with sulfides

NCC 001	1 m, chip sample, biotite-garnet-kyanite schist; minor iron sulfides.
NCC 005	1 m, chip sample, biotite-quartz-kyanite-garnet schist; minor iron sulfides.
NCC 008	1 m, chip sample, biotite-kyanite-garnet-quartz schist; minor pyrite, trace of graphite.
NCC 011	1.5 m, chip sample, muscovite-quartz-biotite-garnet schist; minor iron sulfides.
NCC 015	1 m, chip sample, garnet-kyanite-mica schist; about 1 percent pyrite and one percent graphite.
NCC 018	1 m, chip sample, mica-kyanite-garnet-quartz schist; trace iron-sulfides and graphite.
NCC 019	1 m, chip sample, mica-kyanite-garnet schist; trace of iron-sulfides.
NCC 027	1 m, chip sample, mica-quartz-garnet-kyanite schist; trace of iron sulfides (?).
NCC 038	1 m, chip sample, mica-kyanite-quartz-garnet schist; minor iron sulfides.
NCC 040	1 m, chip sample, mica-quartz-kyanite-garnet schist; minor pyrite, trace graphite.
NCC 041	3 m, chip sample, muscovite-biotite-garnet schist; one percent pyrite, 1.5 percent graphite.
NCC 042	2 m, chip sample, mica-garnet schist; minor pyrite and graphite.
NCC 052	1 m, chip sample, biotite-kyanite-garnet schist; one percent pyrite, 0.5 percent graphite.

Mica gneiss

NCC 006	3 m, chip sample, quartz-biotite-feldspar-garnet gneiss, fine grained.
NCC 014	3 m, chip sample, quartz-feldspar-biotite-garnet gneiss, fine grained.
NCC 016	1 m, chip sample, quartz-feldspar-mica garnet gneiss, fine grained.
NCC 022	1 m, chip sample, quartz-biotite-muscovite gneiss, fine grained.
NCC 029	1 m, chip sample, quartz-biotite-muscovite-feldspar gneiss, fine grained.
NCC 031	1 m, chip sample, quartz-biotite-muscovite gneiss, fine grained.
NCC 039	1 m, chip sample, quartz-biotite-garnet gneiss, medium grained.
NCC 043	2 m, chip sample, quartz-feldspar-biotite-garnet gneiss, fine grained.
NCC 044	1 m, chip sample, quartz-feldspar-biotite-muscovite-garnet gneiss, fine grained.
NCC 230	0.5 m, chip sample, quartz-feldspar-muscovite gneiss.

Other rock

NCC 003	0.3 m, chip sample, trondhjemite dike, quartz, feldspar, biotite, porphoritic.
NCC 004	0.6 m, chip sample, quartz-feldspar-mica-garnet pegmatite, very fine grained.
NCC 009	0.1 m, chip sample, composite of several garnet-rich layers in quartz-garnet-muscovite-biotite schist.
NCC 010	2 m, chip sample, feldspar-quartz-biotite-muscovite-garnet pegmatite dike, fine grained; dike 1 to 3 m, thick.
NCC 033	0.3, chip sample, quartz vein in mica-garnet schist. Vein 0.3 m thick and at least 3 m long. Minor iron stain and some mica inclusions.
NCC 035	0.15 m, chip sample, quartz vein, in quartz-mica-garnet schist. Sample includes some schist wall rock. Vein 0.15 m thick and greater than 1.5 m long.
NCC 053	3 m, chip sample, amphibolite, medium grained.
NCC 306	0.3 m, chip sample, vein quartz; collected by U.S. Bureau of Mines.
NCC 308	Composite sample, several quartz veins; collected by U.S. Bureau of Mines.
NCC 313	0.6 m, chip sample, vein quartz; collected by U.S. Bureau of Mines.

EXPLANATION OF TABLE

Iron, magnesium, calcium, and titanium values are reported in percent (%), all others are in parts per million. Letters preceeding chemical symbols indicate the method of analyses: S, six-step semiquantitative spectrographic method; AA, atomic absorption. Other symbols represented on the table are: N, not detected; --, not determined; < , amount detected is below the lowest limit of determination which is figure shown; > , amount detected is above the highest limit of determination, which is figure shown; P, partial digestion.

Elements looked for spectrographically but not found, except as noted, and the lower limits of determination are: for stream sediments and panned concentrates, Ag (0.5) except NCC 019 which is reported as <.05; As(200); Au(10); Bi(10); Cd(20); Mo(5); Sb(100); Sn(10) except two non-magnetic panned concentrates NCC 213B and 214B reported as <10; and W(5). For rock samples: As(200); Au(10), Bi(10), Cd(20); Mo(5); Sb(100); Sn(10); and W(50).

REFERENCES CITED

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.

Lesure, F.G., Grosz, A.E., Williams, B.B., and Gazdik, G.C., 1978, Mineral resources of the Craggy Mountain Wilderness Study area, Buncombe County, North Carolina: U.S. Geological Survey Open-File Report, OF 78-1091

Motooka, J.M. and Grimes, D.J., 1976, Analytical precision of one-sixth order semiquantative spectrographic analyses: U.S. Geological Survey Circular 738, 25 p.

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.

sample	X-COORD.	Y-COORD.	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU
NCC001	373,200	3,952,210	7.00	2.00	1.50	.700	1,500	N	<10	700	N	15	150	50
NCC002	375,740	3,954,500	5.00	1.50	.70	.500	1,500	N	<10	500	2.0	30	70	70
NCC003	375,880	3,954,480	1.00	.20	.70	.150	150	N	<10	300	1.5	N	<10	10
NCC004	375,880	3,954,480	1.00	.15	.70	.020	700	N	<10	700	2.0	N	<10	5
NCC005	375,980	3,954,420	5.00	1.00	1.00	.300	1,500	N	<10	300	3.0	15	70	50
NCC006	376,640	3,954,450	3.00	.70	.50	.500	700	N	<10	1,000	1.5	10	30	5
NCC007	376,980	3,956,000	5.00	1.50	.70	.300	1,500	N	<10	500	3.0	15	70	20
NCC008	377,520	3,956,200	10.00	2.00	.30	.700	2,000	<.5	<10	700	<1.0	30	100	70
NCC009	375,040	3,950,840	15.00	1.50	2.00	.070	>5,000	N	<10	300	N	50	20	20
NCC010	375,090	3,950,870	3.00	.50	2.00	.500	2,000	N	<10	150	<1.0	5	20	<5
NCC011	373,270	3,952,220	10.00	1.50	1.00	.700	1,500	<.5	<10	700	N	30	70	70
NCC012	373,340	3,952,960	5.00	1.50	1.00	.500	1,500	N	10	700	2.0	15	70	15
NCC013	372,900	3,954,150	7.00	1.50	.70	.500	1,500	N	<10	700	1.5	15	70	30
NCC014	373,800	3,952,350	3.00	.70	1.00	.300	1,000	N	<10	300	1.5	7	20	N
NCC015	373,090	3,951,410	15.00	2.00	1.50	.700	3,000	N	<10	500	N	50	100	150
NCC016	376,820	3,953,430	5.00	1.00	1.00	.500	700	N	<10	500	<1.0	15	50	20
NCC017	376,730	3,953,500	10.00	1.50	.50	.500	1,500	N	<10	700	1.5	20	70	30
NCC018	376,360	3,953,880	10.00	1.50	.20	.500	1,500	N	<10	1,000	1.0	20	70	15
NCC019	375,820	3,954,440	7.00	1.50	.50	.500	1,500	N	<10	700	1.5	20	70	20
NCC020	375,360	3,954,870	10.00	1.50	.70	.500	1,500	N	10	700	2.0	20	70	30
NCC021	375,150	3,955,270	7.00	1.50	.50	.500	1,500	N	<10	300	2.0	10	70	30
NCC022	374,770	3,955,560	2.00	.50	.30	.500	500	N	<10	700	<1.0	7	20	<5
NCC027	375,260	3,951,960	10.00	1.50	.70	.500	1,500	N	<10	1,000	1.0	15	100	30
NCC028	375,020	3,952,320	15.00	1.50	.30	.500	5,000	N	<10	1,000	<1.0	50	70	70
NCC029	374,830	3,952,640	3.00	.70	.50	.500	700	N	<10	700	1.0	10	30	20
NCC030	374,600	3,953,100	15.00	2.00	.20	.700	1,000	N	<10	1,000	N	20	150	70
NCC031	374,470	3,953,260	2.00	.50	.50	.500	500	N	<10	300	1.0	10	20	<5
NCC032	374,130	3,953,580	15.00	1.50	.30	.300	>5,000	N	<10	300	1.0	50	50	10
NCC033	373,960	3,954,100	.15	.02	.20	.015	50	N	<10	50	N	N	<10	N
NCC034	373,550	3,954,970	10.00	2.00	.20	.500	1,000	N	<10	1,000	1.0	20	70	70
NCC035	373,550	3,954,970	2.00	.30	.20	.300	200	N	<10	300	<1.0	N	15	10
NCC037	373,490	3,955,350	10.00	1.50	.30	.500	5,000	N	<10	1,000	<1.0	50	70	50
NCC038	375,350	3,951,440	10.00	2.00	.20	.700	1,500	N	<10	700	<1.0	15	100	50
NCC039	375,630	3,951,580	3.00	.70	.70	.500	700	N	<10	300	1.0	10	30	10
NCC040	375,630	3,951,580	7.00	1.50	.50	.500	5,000	N	<10	700	2.0	20	50	50
NCC041	376,080	3,952,140	10.00	1.50	.50	.700	1,500	<.5	10	1,000	1.5	20	100	50
NCC042	376,790	3,952,940	7.00	1.50	.10	.700	1,000	<.5	15	1,000	1.0	20	70	50
NCC043	377,160	3,953,340	7.00	1.00	.50	.700	1,000	N	<10	500	1.0	15	50	20
NCC044	376,920	3,953,160	7.00	1.00	.70	.700	700	N	<10	700	1.0	15	70	20
NCC047	375,700	3,953,680	5.00	2.00	.07	.500	2,000	N	20	300	1.5	15	50	30
NCC052	375,820	3,952,770	10.00	2.00	.07	.700	1,500	N	20	300	1.0	20	70	150
NCC053	375,820	3,952,770	10.00	7.00	5.00	.700	3,000	N	<10	150	1.5	50	300	N
NCC054	375,210	3,952,820	7.00	2.00	.20	.700	2,000	N	<10	300	1.0	7	50	5
NCC230	375,700	3,953,680	1.00	.70	1.00	.150	100	N	<10	150	3.0	5	<10	<5
NCC303	374,480	3,954,100	3.00	1.50	.70	.300	1,000	1.0	N	300	1.5	10	70	50

sample	S-LA	S-NB	S-NI	S-PB	S-SC	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	AA-ZN-P
NCC001	100	<20	20	<10	30	700	150	70	N	300	N	20
NCC002	100	<20	30	20	20	100	100	70	200	100	N	110
NCC003	N	N	5	10	<5	700	20	N	N	100	N	25
NCC004	N	N	<5	30	5	300	10	15	N	50	<.05	10
NCC005	50	<20	20	20	15	300	100	50	200	150	N	80
NCC006	<20	<20	15	<10	7	200	70	20	N	500	N	40
NCC007	150	<20	15	20	15	200	100	70	<200	100	N	85
NCC008	150	<20	50	<10	20	<100	200	70	300	150	N	110
NCC009	200	N	15	N	20	<100	50	150	N	50	<.05	50
NCC010	N	N	<5	<10	10	700	70	50	N	200	N	25
NCC011	100	N	30	<10	15	500	150	30	<200	150	N	10
NCC012	70	<20	30	15	15	500	100	70	200	300	<.05	100
NCC013	70	<20	30	20	15	200	150	70	<200	300	N	90
NCC014	N	<20	5	<10	7	300	70	20	N	300	N	50
NCC015	150	<20	70	<10	20	500	150	70	N	100	N	30
NCC016	50	<20	30	<10	15	300	100	50	N	300	N	70
NCC017	70	<20	30	20	15	150	150	70	200	200	N	120
NCC018	70	<20	20	20	20	N	150	70	300	150	N	130
NCC019	100	<20	20	20	15	150	150	70	200	150	N	80
NCC020	150	<20	20	30	30	200	150	70	<200	150	N	80
NCC021	100	<20	15	20	15	300	100	50	<200	150	N	85
NCC022	50	<20	10	<10	7	100	50	20	N	200	N	35
NCC027	150	20	15	15	20	200	150	70	<200	300	N	60
NCC028	150	<20	50	20	20	100	150	70	300	100	N	100
NCC029	30	<20	20	<10	10	100	70	50	N	300	N	40
NCC030	150	<20	30	20	30	150	200	100	<200	200	N	100
NCC031	<20	<20	15	N	7	100	70	15	N	200	N	40
NCC032	100	<20	30	10	20	N	70	100	200	100	N	90
NCC033	N	N	<5	N	N	100	10	N	N	10	N	5
NCC034	100	<20	30	30	20	N	150	70	<200	200	N	90
NCC035	50	N	5	N	7	N	30	30	N	50	N	20
NCC037	150	<20	50	<10	20	100	150	70	200	200	N	30
NCC038	100	20	20	<10	20	N	150	70	200	200	N	70
NCC039	30	<20	15	10	10	300	70	30	N	150	N	45
NCC040	70	<20	30	10	10	100	70	70	<200	150	N	100
NCC041	150	<20	50	20	15	100	150	70	200	150	N	100
NCC042	100	<20	30	30	20	150	200	70	300	150	N	60
NCC043	50	<20	30	10	15	100	100	50	N	300	N	80
NCC044	50	<20	50	15	15	200	150	50	N	300	N	80
NCC047	100	<20	10	<10	15	N	100	50	300	100	--	90
NCC052	100	<20	50	<10	15	N	150	50	300	150	--	100
NCC053	N	N	150	10	30	200	200	20	N	70	--	20
NCC054	50	<20	10	<10	15	100	150	50	200	150	--	120
NCC230	<20	N	5	30	5	300	30	<10	N	100	--	60
NCC303	70	<20	30	150	15	200	70	50	N	300	--	--

sample	X-COORD.	Y-COORD.	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-AG	S-B	S-BA	S-BE	S-CO	S-CR	S-CU
NCC306	374,580	3,953,190	1.00	.05	<.05	.010	100	<.5	N	150	<1.0	N	30	30
NCC308	375,110	3,953,180	1.50	.20	.50	.020	150	N	N	1,500	1.0	<5	20	30
NCC312	375,760	3,952,560	7.00	2.00	.70	.300	1,000	N	10	1,000	1.0	20	200	50
NCC313	376,450	3,952,660	1.00	.10	2.00	.007	500	.7	N	500	1.0	N	20	20
NCC317	375,460	3,953,800	10.00	3.00	1.50	.500	5,000	N	<10	300	2.0	30	300	70

sample	S-LA	S-NB	S-NI	S-PB	S-SC	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	AA-ZN-P
NCC306	N	N	30	30	<5	N	N	N	N	N	--	--
NCC308	N	N	20	200	<5	300	15	15	N	20	--	--
NCC312	100	<20	50	100	20	300	150	50	<200	150	--	--
NCC313	N	N	15	150	5	200	10	15	N	100	--	--
NCC317	70	N	50	50	50	150	200	70	300	150	--	--

Stream Sediments

sample	X-COORD.	Y-COORD.	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-B	S-BA	S-BE	S-CO	S-CR	S-CU	S-LA	S-NB
NCC023	374,780	3,955,100	5.0	.7	.7	.7	2,000	10	700	2.0	20	70	30	150	20
NCC024	374,720	3,954,350	5.0	.7	.7	1.0	1,500	10	700	1.0	20	50	20	100	20
NCC025	374,770	3,954,350	5.0	.7	.7	.5	1,500	10	500	2.0	20	50	20	70	<20
NCC026	374,720	3,955,200	3.0	.5	.5	.7	2,000	<10	300	1.5	15	30	15	150	20
NCC036	373,520	3,955,110	7.0	.5	.5	1.0	3,000	<10	500	1.5	20	50	15	200	30
NCC201	376,630	3,954,270	3.0	.5	.5	.5	1,000	<10	500	2.0	20	50	20	100	<20
NCC202	376,780	3,954,410	5.0	.7	.7	.7	1,500	10	500	1.5	20	70	20	50	<20
NCC203	373,380	3,951,890	7.0	1.0	1.0	.7	2,000	10	300	<1.0	50	70	30	70	<20
NCC204	373,750	3,952,180	7.0	.5	.7	>1.0	2,000	10	300	1.5	20	50	10	50	20
NCC205	373,910	3,952,380	7.0	1.0	.7	.7	2,000	15	500	2.0	30	70	30	150	<20
NCC206	373,810	3,952,960	5.0	.5	.7	.7	2,000	10	300	2.0	30	50	30	100	<20
NCC207	373,640	3,953,220	5.0	.5	.7	1.0	3,000	<10	300	1.5	20	50	15	100	20
NCC208	373,240	3,953,790	5.0	.3	.7	.7	1,500	10	300	1.5	10	30	5	70	20
NCC209	373,220	3,953,850	5.0	.5	.5	.7	1,500	15	500	2.0	15	50	15	150	<20
NCC210	372,980	3,954,060	3.0	.5	.3	.7	1,000	<10	500	1.5	10	50	15	70	<20
NCC211	374,790	3,955,540	5.0	.7	.7	.7	1,500	<10	700	1.5	15	70	20	100	<20
NCC212	374,700	3,955,470	7.0	.7	.5	.7	2,000	10	700	1.5	30	100	30	150	20
NCC213	374,790	3,954,620	3.0	.5	.7	.7	2,000	15	500	1.5	20	50	20	150	20
NCC214	374,840	3,954,630	5.0	.7	.5	.7	3,000	10	300	2.0	20	70	20	150	20
NCC215	374,070	3,955,660	5.0	.7	.5	.7	2,000	10	500	1.5	20	70	30	150	20
NCC216	375,470	3,953,750	7.0	.7	.5	.7	3,000	15	500	2.0	30	100	30	300	20
NCC217	375,390	3,953,700	5.0	.5	.5	.5	2,000	10	500	1.5	15	50	20	150	<20
NCC218	375,600	3,952,780	1.5	.2	.3	.3	1,000	10	300	1.5	10	20	15	50	N
NCC219	375,640	3,952,830	3.0	.5	.5	.7	1,500	15	500	3.0	30	30	50	150	<20

sample	S-NI	S-PB	S-SC	S-SR	S-V	S-Y	S-ZN	S-ZR	AA-AU-P	AA-ZN-P
NCC023	50	30	10	300	100	70	N	300	<.05	70
NCC024	30	20	15	300	100	50	N	500	<.05	60
NCC025	30	30	15	300	100	50	N	300	<.05	90
NCC026	15	30	10	200	50	50	N	300	N	60
NCC036	30	20	15	300	100	70	200	300	<.05	60
NCC201	20	30	15	150	70	50	N	200	N	100
NCC202	30	30	15	300	100	50	N	300	<.05	70
NCC203	30	20	15	500	100	50	<200	300	N	60
NCC204	20	20	15	500	100	50	N	1,000	<.05	80
NCC205	50	50	15	300	100	70	<200	300	N	100
NCC206	30	30	15	300	70	70	<200	300	N	70
NCC207	15	20	15	500	70	50	N	500	N	40
NCC208	10	15	15	300	70	50	N	700	N	40
NCC209	30	30	15	200	70	70	N	500	N	80
NCC210	20	20	10	100	70	50	N	500	N	100
NCC211	30	20	15	200	100	70	N	500	N	70
NCC212	50	30	15	200	150	70	N	500	N	70
NCC213	20	30	15	300	70	70	N	700	N	65
NCC214	30	30	15	200	70	70	N	300	N	90
NCC215	30	20	15	200	100	70	N	300	<.05	70
NCC216	50	50	15	150	100	70	<200	200	<.05	100
NCC217	20	30	15	200	100	70	N	500	N	70
NCC218	10	15	7	100	30	30	N	150	N	100
NCC219	20	50	15	200	100	70	N	300	N	50

Panned Concentrates: A = magnetic fraction, B = nonmagnetic fraction

sample	X-COORD.	Y-COORD.	S-FE%	S-MG%	S-CA%	S-TI%	S-MN	S-B	S-BA	S-BE	S-CO	S-CR	S-CU	S-LA	S-NB
NCC205A	373,910	3,952,380	20.0	1.5	1.00	.5	>5,000	<10	70	<1	30	100	10	50	20
NCC206A	373,810	3,952,960	15.0	1.5	1.00	>1.0	>5,000	<10	70	N	20	100	7	70	50
NCC211A	374,790	3,955,470	20.0	1.5	1.00	>1.0	>5,000	<10	70	N	30	150	7	70	30
NCC212A	374,700	3,955,470	20.0	1.5	1.00	1.0	>5,000	<10	70	<1	30	150	5	70	30
NCC213A	374,790	3,954,620	20.0	1.5	.70	1.0	>5,000	<10	50	<1	30	100	10	70	30
NCC214A	374,840	3,954,630	20.0	1.5	1.00	1.0	>5,000	<10	50	<1	20	100	<5	70	30
NCC215A	374,070	3,955,660	15.0	1.5	1.00	>1.0	>5,000	<10	70	<1	30	150	7	70	30
NCC216A	375,470	3,953,750	20.0	1.5	.70	>1.0	>5,000	<10	50	<1	30	150	10	N	100
NCC217A	375,390	3,953,700	20.0	1.5	.70	1.0	>5,000	<10	100	<1	50	150	10	20	30
NCC218A	375,600	3,952,780	15.0	1.5	1.00	.7	>5,000	<10	70	<1	50	150	15	N	20
NCC205B	373,910	3,952,380	2.0	.5	.07	>1.0	500	20	150	<1	10	200	5	200	70
NCC206B	373,810	3,952,960	2.0	.5	.07	>1.0	500	20	150	<1	7	200	<5	500	70
NCC211B	374,790	3,955,540	1.5	.5	.10	>1.0	300	10	100	<1	5	200	5	700	20
NCC212B	374,700	3,955,470	2.0	.5	.07	1.0	200	50	70	10	5	200	5	300	30
NCC213B	374,790	3,954,620	2.0	.5	.05	1.0	300	15	150	<1	10	200	7	500	20

Panned Concentrates: A = magnetic fraction, B = nonmagnetic fraction--continued

NCC214B	374,840	3,954,630	2.0	.5	.07	1.0	200	<10	100	<1	7	200	15	700	20
NCC215B	374,070	3,955,660	2.0	.5	.15	>1.0	300	15	100	<1	7	200	7	300	30
NCC216B	375,470	3,953,750	2.0	.5	.05	.7	500	30	100	<1	7	200	7	500	20
NCC217B	375,390	3,953,700	2.0	.7	.10	>1.0	300	20	200	<1	7	200	7	300	30
NCC218B	375,600	3,952,780	2.0	.7	.15	>1.0	300	30	150	<1	10	150	10	300	20
NCC301	374,730	3,955,470	15.0	1.5	.70	1.0	>5,000	<10	150	<1	20	200	50	150	30
NCC302	374,660	3,954,200	15.0	1.5	.70	>1.0	>5,000	<10	70	<1	30	150	70	500	20

sample	S-NI	S-PB	S-SC	S-V	S-Y	S-ZN	S-ZR
NCC205A	10	N	100	100	500	N	100
NCC206A	<5	N	100	100	300	N	70
NCC211A	10	N	100	100	500	N	150
NCC212A	10	N	100	100	500	N	100
NCC213A	7	N	70	100	300	N	100
NCC214A	7	N	100	100	300	N	100
NCC215A	20	N	100	100	300	N	100
NCC216A	15	N	100	100	300	N	100
NCC217A	20	N	100	150	300	N	100
NCC218A	15	N	100	100	300	N	100
NCC205B	10	<10	7	200	50	N	300
NCC206B	5	<10	5	300	50	500	700
NCC211B	<5	10	15	200	100	N	>1,000
NCC212B	7	<10	<5	200	30	N	300
NCC213B	7	<10	5	200	50	N	700
NCC214B	10	<10	<5	200	70	N	200
NCC215B	15	<10	<5	200	50	N	500
NCC216B	10	<10	<5	200	50	N	300
NCC217B	10	10	5	200	50	N	700
NCC218B	10	<10	5	200	50	N	700
NCC301	20	30	70	150	200	N	200
NCC302	15	20	70	100	200	500	1,000