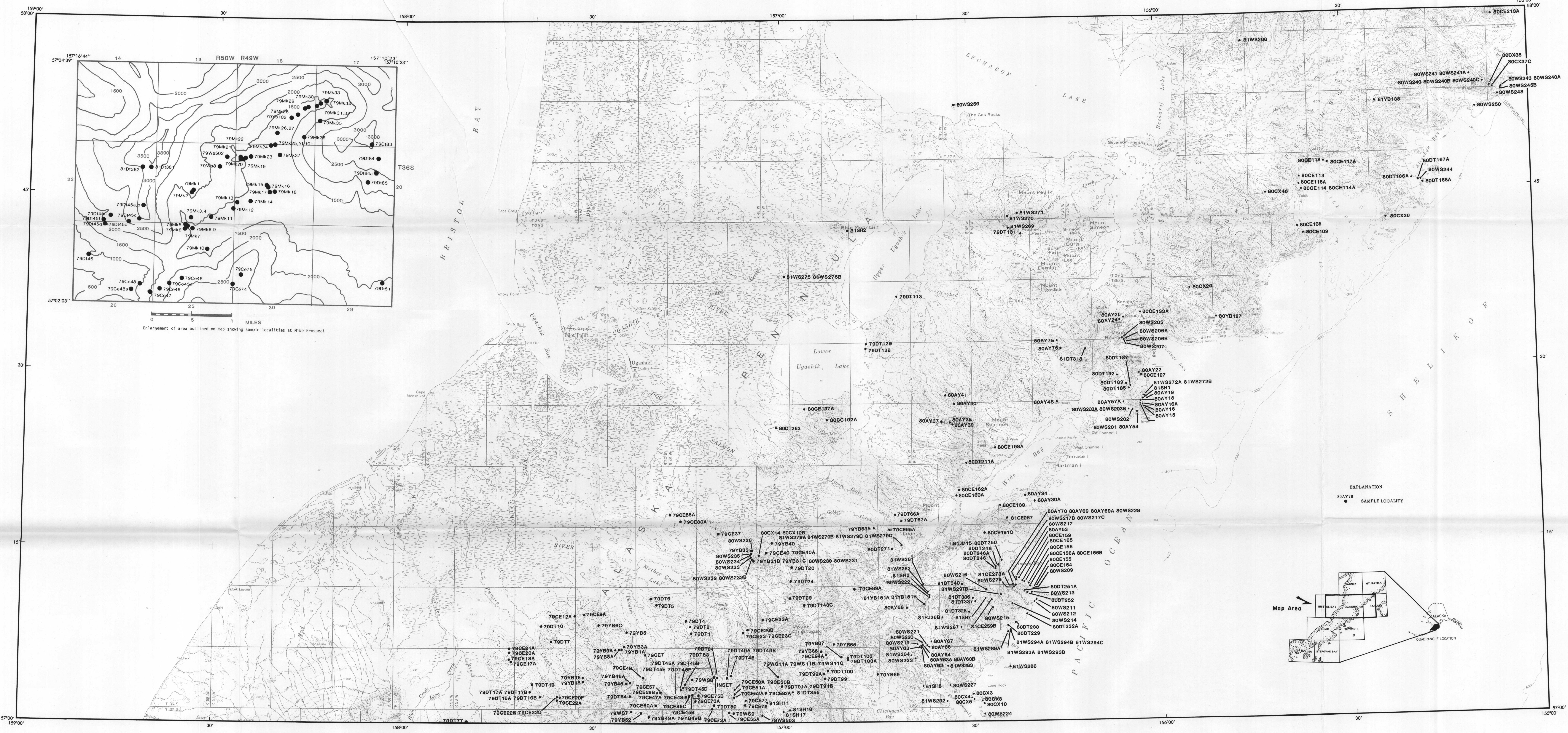
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY



Enlargement of area outlined on map showing sample localities at Mike Prospect

Base from U.S. Geological Survey,
Ugashik, Bristol Bay, and Karluk, 1963

SCALE 1:250 000

5 0 5 10 15 20 MILES

5 0 5 10 15 20 25 30 KILOMETERS

CONTOUR INTERVAL 200 FEET
DOTTED LINES REPRESENT 100-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

SAMPLE LOCALITIES

INTRODUCTION

The accompanying maps and tables show analytical data and data analyses from rock samples collected in conjunction with geologic mapping in the Ugashik, Bristol Bay, and western Karluk quadrangles from 1979 through 1981. This work was conducted under the auspices of the Alaska Mineral Resource Assessment Program (AMRAP). A total of 337 samples were collected for analysis, primarily in areas of surface alteration. The sample locations are shown on sheet 1; they are concentrated along the Pacific Ocean side of the area because the Bristol Bay lowlands part of the map area is predominantly unconsolidated Quaternary deposits. Sample collection was by the following people, with their respective two letter identifying code shown in parentheses: W.H. Allaway (AY), J.E. Case (CE), D.P. Cox (CX), R.L. Detterman, (DT), T.G. Theodore (MK), F.H. Wilson (WS), and M.E. Yount (YB).

ANALYTICAL METHODOLOGY

Analyses were made with a DC-arc emission spectrograph (ES) using a six-step, semiquantitative method described by Grimes and Maranzino (1968). In addition, atomic absorption spectrophotometry (AA) was used to determine copper, lead, zinc, gold, and silver. Instrumental mercury and specific ion fluorine analyses were also performed.

The semiquantitative ES analyses are reported in values of six steps per order of magnitude. These steps are the approximate geometric midpoints of the class intervals:

Reported value	Class interval
1.0	0.83 --- 1.2
1.5	1.2 --- 1.8
2.0	1.8 --- 2.6
3.0	2.6 --- 3.8
5.0	3.8 --- 5.6
7.0	5.6 --- 8.3

Matooka and Grimes (1976) evaluated the precision of the semiquantitative method; repeatibility of a determination within plus or minus 1 and 2 reported values is approximately 83 and 96 percent, respectively. Analyses done by AA are not reported on the six-step scale; these quantitative values reflect both the higher precision and the lower determination limits of the method. Table 1 shows the lower limit of determination for each element for both ES and AA.

SAMPLE CATEGORIZATION

The data set was divided on the basis of coding provided by the submitter into subsets of mineralized and nonmineralized (background) rocks and subsets of volcanic, intrusive, sedimentary, and all other rocks that were further divided into mineralized and nonmineralized (background) rock groupings. All other rocks tended to be either altered rocks not easily classifiable into the first three categories or rocks that could not be fully coded. Approximately 70 percent of the samples collected were classified as background even though most were collected in areas near surface alteration. Figure 1 is a list of sample coding criteria used in the field. Analytical results and coding of the samples is shown in table 2.

STATISTICAL ANALYSIS

Arithmetic and geometric means (table 3) were calculated for the entire data set (table 2) and for subsets distinguished by rock type. Correlation coefficients (table 4) were calculated for each element pair; however, very few of the pairs of elements in the data subsets showed strong correlations. Most of the stronger correlations between element pairs were in the sedimentary rock subset.

Table 5 shows the value selected as anomalous for each element analyzed and the number of samples that showed measurable concentrations for that element. These anomalous values were selected by using the geometric means and standard deviations shown in table 3 and by taking into account results from the Chignik and Sutwik Island quadrangles to the south (Yount and others, 1978, Pickthorn and others, 1979). For gold, arsenic, boron, and ES-zinc, any measured value was considered anomalous because few samples had measurable concentrations of these elements.

RESULTS

Samples that are anomalous in gold (Au), silver (Ag), arsenic (As), and barium (Ba) are located on sheet 2. Each element is plotted in a specific quadrant of a circle, and the radius of that quadrant is dependent on the amount of the element present. For gold and silver, the AA results were given dominance in consideration of anomalous values and AA results were not, the ES value is plotted. Similarly, samples that are anomalous in copper (Cu), lead (Pb), zinc (Zn), and molybdenum (Mo) are located on sheet 3. As on sheet 2, AA results for copper, lead, and zinc were treated preferentially.

EXPLANATION OF RESULTS

A number of different field personnel collected samples, and as a result, coding of samples was not always consistent. For example, fine-grained igneous rocks may have been coded as either intrusive or volcanic depending on the interpretation of the field environment by the submitter. Volcaniclastic rocks may have been coded as either volcanic or sedimentary. The distinction made between mineralized and nonmineralized rocks was variable; some workers coded as mineralized only rocks with visible sulfide mineralization, whereas other workers included all rocks associated with alteration or mineralization. The result of this variability in coding is that the distinction between the various categories is not as great as would be expected, and a number of aberrations, possibly related to coding, are apparent in the data. For example, the geometric and arithmetic mean zinc values, are higher in nonmineralized rocks than in mineralized rocks. This is true for ES and AA results.

A number of areas are shown on sheets 2 and 3 that have clusters of sample sites anomalous in more than one element. Many of these are on the periphery of the Agripina Bay batholith and are hydrothermally altered country rock or pluton. Potassium-argon dating of some of the altered zones spatially associated with the batholith has indicated a wide range of apparent ages in contrast to a narrow range for the batholith (Wilson and others, written commun., 1985). Oligocene ages determined on altered rocks from Kilokak Creek, east of the batholith, and other Oligocene ages peripheral to the batholith suggest the area was also an Oligocene igneous center with associated hydrothermal alteration and possibly mineralization.

Samples at localities around the periphery of the Pliocene plutons at Mt. Becharof and Cape Igvak also are anomalous.

Cape Kubugakli, in the extreme northeast of the area mapped, is characterized by small intrusions and dike swarms intruding altered Jurassic sedimentary rocks; a number of anomalous samples came from locations around it. An abandoned cabin and sluice box were found while sampling this area, suggesting an attempt was made to produce gold in the past.

Two prospects were drilled by Bear Creek Mining Company in 1977. Rex, in the mountains between Volcano and Wandering Creeks, was a gold and copper prospect. Mike, in the area east of the head of Painter Creek, was a molybdenum prospect. Our samples from both prospects are especially anomalous. Mike was carefully sampled by T. G. Theodore and is represented by some 35 samples in our data set.

REFERENCES CITED

Grimes, D. J., and Maranzino, 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.

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

Pickthorn, W. J., Yount, M. E., Cooley, E. F., O'Leary, R. M., Detra, D. E., and Ito, Gail, 1979, Sample location and analytical data for rock samples collected in 1978, Chignik and Sutwik Island quadrangle, Alaska: U.S. Geological Survey Open-File Report 79-1506, 1 sheet, scale 1:250,000.

Yount, M. E., Cooley, E. F., and O'Leary, R. M., 1978, Sample location map, analytical data, and statistical summary of analyses of rock samples, Chignik and Sutwik Island quadrangles, Alaska: U.S. Geological Survey Open-File Report 78-557, 1 sheet, scale 1:250,000.

Table 1.--Lower limit of determination for respective elements

[All analyses are semiquantitative emission spectrophotometry unless otherwise noted: AA, atomic absorption spectrophotometry; I, instrumental analysis; SI, specific ion analysis. Fe, Mg, Ca, Ti in percent, all other analyses in parts per million]

Element	Limit	Element	Limit
Fe	0.1	Ni	5
Mg	.02	Pb	10
Ca	.05	Sb	200
Ti	.005	Sc	5
Mn	10	Sn	10
Ag	.5	Sr	100
As	200	Th	200
Au	20	V	10
B	10	W	50
Ba	30	Y	10
Be	1	Zn	200
Bi	10	Zr	20
Cd	50	AA-Ag	.05
Co	5	AA-Au	.05
Cr	10	AA-Cu	5
Cu	5	AA-Pb	5
La	20	AA-Zn	5
Mo	5	I-HG	.2
Nb	20	SI-F	100

EXPLANATION FOR ROCK-SAMPLE CODING, TABLE 2

Material Class
- 11 Rock
- 12 Stream sediment
- 13 Organic sample
- 14 Soil
- 15 Water

Sample type
- 11 Single (grab)
- 12 Composite
- 13 Channel
- 14 Pan concentrate
- 15 Other

Sample source
- 11 Outcrop
- 12 Rubble
- 13 Mine
- 14 Dump/prospect
- 15 Float
- 16 Other

Rock type
- 12 Sedimentary
- 13 Metamorphic
- 14 Igneous
- 15 Unconsolidated
- 25 Other

FC1--1:63, 360-scale quadrangle letter designation
- 11 A
- 12 B
- 13 C
- 14 D

1-6 FC2--1:63,360-scale quadrangle number designation

FC3--Type of collection
- 11 Primary
- 12 Resample
- 13 Replicate
- 14 Reanalysis
- 15 Other

FC4
- 11 Background - major
- 12 Background - lesser
- 13 Atypical - very minor
- 14 Atypical - mineralized

FC5--Form
- 11 Bed
- 12 Mass
- 13 Foliated
- 14 Pluton
- 15 Dike or sill
- 16 Extrusive
- 17 Vein
- 18 Fault
- 37 Not coded

FC6--Rock name
- 11 Feldspathic sandstone
- 12 Lithic sandstone
- 13 Sandstone
- 14 Shale
- 15 Siltstone
- 16 Conglomerate
- 17 Chert
- 18 Argillite
- 19 Limestone
- 20 Basalt
- 21 Volcanic breccia
- 22 Andesite
- 23 Tuff
- 24 Quartz diorite
- 25 Granodiorite
- 26 Quartz monzonite
- 27 Diorite
- 36 Other
- 37 Not coded

Table 2.--Analytical results and coding for rock samples from Ugashik and the western part of Karluk quadrangles, Alaska

[All analyses are semiquantitative emission spectrography unless otherwise noted: AA, atomic absorption, I, instrumental analysis, SI, specific ion analysis. Fe, Mg, Ca, and Ti in percent, all others in parts per million. N, not detected. Explanation of rock-sample coding at end of table. Analysts were: R.M. O'Leary, D. Risoli, A. Grunsky, J. Hurrell, D.M. Hopkins, G.W. Day, and Stephen Sutley]

Sample No.	Latitude (N.)	Longitude (W.)	Fe	Mg	Ca	Ti	Mn	Ag	As	Au	B	Ba	Be	Bi	Cd	Co	Cr	Cu	La	Mo	Nb	Ni	Pb
79CE040	57 14 23	157 2 35	2.0	1.00	0.05	0.200	1,500	1.5	N	N	20	500	<1.0	N	N	5	20	50	N	N	N	10	70
79CE045B	57 2 18	157 14 34	10.0	2.00	1.50	.500	1,000	<.5	N	N	50	1,000	1.0	N	N	20	150	150	30	7	N	100	<10
79CE045C	57 2 15	157 14 48	5.0	1.50	1.00	.300	700	N	N	N	30	700	<1.0	N	N	10	50	30	<20	N	N	50	15
79CE047A	57 2 9	157 15 11	3.0	1.00	.07	.200	700	N	N	N	70	500	1.0	N	N	7	30	10	N	N	N	30	N
79CE048	57 2 12	157 15 26	7.0	3.00	1.50	.500	1,000	N	N	N	50	1,000	1.0	N	N	20	100	100	<20	N	<20	100	10
79CE050A	57 2 37	157 7 4	3.0	3.00	1.00	.500	500	N	N	N	15	700	1.0	N	N	15	50	20	<20	N	<20	30	10
79CE050B	57 2 37	157 7 4	2.0	.15	1.50	.300	300	N	N	N	50	150	1.0	N	N	10	20	15	<20	N	N	30	<10
79CE052A	57 2 3	157 7 41	3.0	.30	1.00	.500	500	N	N	N	100	200	1.5	N	N	10	50	30	<20	N	N	70	<10
79CE055A	57 0 46	157 8 42	5.0	1.50	2.00	.300	700	N	N	N	30	1,000	1.0	N	N	10	70	5	<20	N	N	70	10
79CE057	57 2 33	157 19 11	1.0	.15	.05	.300	30	N	N	N	50	70	1.0	N	N	5	70	15	N	N	<20	30	10
79CE059B	57 2 34	157 19 37	.5	.10	.15	.070	500	N	N	N	100	300	2.0	N	N	N	<10	N	N	N	<20	5	<10
79CE060A	57 1 30	157 19 52	5.0	1.50	1.00	.700	700	N	N	N	10	1,000	1.0	N	N	15	70	30	<20	N	N	30	15
79YB045	57 3 18	157 24 28	3.0	.70	1.00	1.000	1,000	<.5	N	N	50	1,000	1.5	N	N	N	50	30	N	N	N	5	30
79YB046A	57 3 23	157 24 15	10.0	2.00	2.00	.700	1,000	N	N	N	20	200	1.0	N	N	20	30	7	30	N	<20	30	15
79YB049A	57 0 29	157 21 17	2.0	.70	5.00	.200	2,000	N	N	N	30	500	<1.0	N	N	7	70	20	N	N	N	50	<10
79YB049B	57 0 29	157 21 17	5.0	1.50	.20	.500	700	<.5	N	N	50	1,000	1.5	N	N	20	150	150	20	N	N	100	20
79YB052	57 0 48	157 22 19	5.0	2.00	1.00	.500	1,000	N	N	N	20	1,000	1.0	N	N	20	100	50	<20	N	N	70	10
79DT045A	57 3 7	157 15 24	5.0	1.00	.50	.300	1,500	.5	N	N	10	500	1.0	N	N	10	50	100	N	N	N	30	10
79DT045B	57 3 7	157 15 24	15.0	.70	3.00	.200	3,000	1.0	N	N	15	200	<1.0	N	N	10	70	300	N	N	N	20	30
79DT045D	57 2 56	157 15 30	10.0	5.00	5.00	1.000	1,000	N	N	N	10	300	1.0	N	N	70	300	100	<20	N	N	300	<10
79DT045E	57 3 0	157 16 5	1.5	.07	.15	.050	700	<.5	N	N	30	1,500	1.5	N	N	N	<10	10	<20	N	<20	5	30
79DT048	57 4 0	157 8 20	5.0	3.00	2.00	.700	1,000	N	N	N	70	700	<1.0	N	N	50	200	100	<20	N	N	150	N
79DT049A	57 3 45	157 8 45	3.0	2.00	1.00	.700	500	.5	N	N	70	700	1.0	N	N	15	100	100	N	N	N	100	15
79DT050	57 1 38	157 5 58	5.0	2.00	2.00	.500	700	N	N	N	20	500	<1.0	N	N	15	20	30	N	<5	N	20	10
79DT054	57 2 15	157 24 15	10.0	3.00	3.00	1.000	2,000	N	N	N	10	300	<1.0	N	N	20	50	<5	N	N	N	20	<10
79DT049B	57 3 45	157 8 45	3.0	1.00	1.50	.500	300	N	N	N	50	1,000	1.0	N	N	5	10	15	N	N	<20	10	<10
79DT045F	57 3 0	157 16 5	1.5	.15	.70	.070	2,000	N	N	N	50	700	2.0	N	N	N	200	30	N	5	<20	10	20
79CE051A	57 2 20	157 7 37	5.0	1.50	1.50	.500	1,000	N	N	N	70	500	1.0	N	N	30	70	30	N	N	N	50	N
79DT066A	57 17 40	156 42 12	5.0	1.00	1.50	.700	700	N	N	N	20	500	1.0	N	N	15	50	30	N	N	N	30	<10
79DT067A	57 17 8	156 41 29	5.0	2.00	5.00	.700	1,000	N	N	N	20	500	1.0	N	N	20	20	100	N	<5	N	20	<10
79MK1	57 3 17	157 14 23	15.0	5.00	1.50	1.000	500	<.5	N	N	N	150	<1.0	N	N	15	100	500	N	N	N	70	<10
79MK2	57 3 15	157 14 24	20.0	2.00	.15	.500	300	.7	N	N	<10	300	<1.0	N	N	150	70	3,000	N	5	N	300	N
79MK3	57 2 59	157 14 25	10.0	.07	<.05	.100	10	N	N	N	N	150	N	N	N	N	15	20	N	10	N	7	N
79MK4	57 2 59	157 14 25	10.0	.15	<.05	.300	<10	.5	N	N	N	300	N	N	N	N	20	10	N	20	N	5	N
79MK5	57 2 54	157 14 31	15.0	3.00	2.00	1.000	500	N	N	N	N	500	<1.0	N	N	10	100	100	N	15	N	70	<10
79MK6	57 2 51	157 14 31	.5	.20	.50	.100	10	N	N	N	N	200	<1.0	N	N	N	<10	<5	20	30	N	5	N
79MK7	57 2 53	157 14 29	10.0	3.00	.50	.700	500	N	N	N	N	300	<1.0	N	N	10	70	150	N	100	N	50	N
79MK8	57 2 51	157 14 23	10.0	.03	<.05	.700	<10	N	N	N	30	N	<1.0	N	N	150	50	5	N	150	N	30	N
79MK9	57 2 51	157 14 23	15.0	.05	<.05	.500	<10	N	N	N	20	70	<1.0	N	N	10	30	15	N	1,500	N	20	15
79MK10	57 2 38	157 14 5	10.0	2.00	.70	.500	300	N	N	N	50	300	<1.0	N	N	5	50	70	N	<5	N	20	N
79MK11	57 2 59	157 14 0	1.5	.15	.07	.070	<10	N	N	N	N	1,000	<1.0	N	N	N	<10	10	N	200	<20	5	N
79MK12	57 3 5	157 13 33	1.5	.15	.05	.070	<10	N	N	N	N	1,000	<1.0	N	N	<5	<10	15	<20	1,000	<20	5	20
79MK13	57 3 9	157 13 30	2.0	.20	<.05	.070	<10	N	N	N	N	700	1.0	N	N	<5	<10	7	<20	5	N	<5	N
79MK14	57 3 10	157 13 14	2.0	.15	<.05	.100	<10	N	N	N	N	300	<1.0	N	N	N	<10	20	N	N	<20	5	N
79MK15	57 3 21	157 12 55	1.0	.20	.10	.100	<10	N	N	N	N	1,000	<1.0	N	N	N	<10	15	<20	N	N	5	15
80AY39	57 25 18	156 32 54	1.5	1.00	0.70	0.100	500	<0.5	N	N	20	700	<1.0	N	N	15	100	30	N	N	N	50	<10
80AY40	57 27 7	156 32 48	1.5	.70	1.50	.150	500	N	N	N	15	700	<1.0	N	N	7	10	20	N	N	N	7	<10
80AY41	57 27 50	156 34 14	2.0	1.00	2.00	.200	700	N	N	N	15	700	<1.0	N	N	20	30	15	<20	N	<20	15	10
80DT211A	57 22 24	156 32 40	3.0	2.00	5.00	.300	1,500	N	N	N	30	500	<1.0	N	N	30	150	70	<20	N	N	50	20
80AY4S	57 27 12	156 16 15	7.0	2.00	.70	.500	1,000	N	N	N	20	300	<1.0	N	N	30	100	70	N	N	N	30	10
80CE154	57 11 20	156 20 11	3.0	1.50	1.50	.300	1,000	N	N	N	15	300	<1.0	N	N	15	20	20	<20	N	N	7	150
80CE155	57 11 20	156 20 29	5.0	1.50	1.00	.700	700	<.5	N	N	30	700	<1.0	N	N	30	100	30	30	N	N	20	50
80CE156A	57 11 27	156 21 9	3.0	1.50	10.00	.150	5,000	N	N	N	70	1,500	1.0	N	N	20	200	30	50	N	N	50	30
80CE156B	57 11 27	156 21 9	7.0	3.00	3.00	.300	1,000	N	N	N	20	700	<1.0	N	N	50	50	50	N	N	N	30	70
80AY15	57 26 33	156 02 26	5.0	2.00	3.00	.300	1,500	N	N	N	15	200	<1.0	N	N	30	50	70	N	N	N	20	10
80CE133A	57 34 42	156 02 55	5.0	2.00	2.00	.500	1,000	N	N	N	20	500	<1.0	N	N	30	200	100	20	N	N	50	20
80CE158	57 11 42	156 21 22	7.0	.70	3.00	.500	700	.5	N	N	30	1,000	1.0	N	N	30	70	20	20	N	N	30	30
80CE159	57 11 54	156 22 18	5.0	1.50	.70	.700	300	<.5	N	N	70	700	1.0	N	N	20	200	50	20	N	N	50	15
80AY53	57 12 38	156 23 7	5.0	2.00	3.00	.500	700	<.5	N	N	15	1,500	<1.0	N	N	30	300	15	50	N	N	50	20
80WS201	57 26 14	156 3 42	7.0	3.00	5.00	.500	700	N	N	N	10	200	N	N	N	20	150	30	N	N	N	30	10
80WS202	57 26 26	156 4 22	3.0	1.00	1.50	.300	500	<.5	N	N	10	500	<1.0	N	N	10	20	30	<20	N	N	10	<10
80WS203A	57 26 27	156 4 50	5.0	1.00	1.50	.500	500	<.5	N	N	10	1,000	N	N	N	15	50	70	N	N	N	15	10
80WS203B	57 26 27	156 4 50	7.0	.50	2.00	.700	700	.7	N	N	15	300	N	N	N	30	70	700	<20	N	N	30	15
80AY54	57 26 13	156 3 42	>20.0	1.50	<.05	.300	1,000	.7	1,000	N	<10	100	N	N	N	70	70	100	<20	<5	N	20	15
80AY57A	57 26 2	156 5 53	7.0	2.00	2.00	.700	1,000	<.5	N	N	20	500	N	N	N	30	200	150	<20	N	N	50	20
80CE160A	57 19 17	156 32 34	7.0	3.00	1.00	.700	1,000	N	N	N	20	300	N	N	N	30	70	50	<20	N	N	30	15
80CE162A	57 19 44	156 32 10	10.0	.70	.20	1.000	300	N	N	N	30	70	<1.0	N	N	50	150	200	20	N	N	70	15
80WS205	57 32 32	156 5 40	5.0	1.50	2.00	.500	500	N	N	N	10	300	N	N	N	7	10	20	N	N	N	7	<10
80WS206A	57 32 25	156 5 35	5.0	1.50	2.00	.500	700	N	N	N	15	500	N	N	N	20	10	20	N	N	N	10	10
80WS206B	57 32 20	156 5 31	>20.0	.50	1.00	.300	200	N	N	N	10	200	N	N	N	70	150	300	20	<5	N	50	10
80WS207	57 32 16	156 5 26	7.0	2.00	3.00	.700	1,500	N	N	N	<10	300	N	N	N	15	30	50	N	N	N	15	10
80DT229	57 8 9	156 24 40	5.0	1.50	3.00	.500	1,000	N	N	N	10	700	<1.0	N	N	20	50	70	30	7	N	20	15
80DT230	57 9 3	156 21 40	3.0	.70	1.00	.500	1,000	N	N	N	15	700	<1.0	N	N	10	N	30	N	5	N	5	<10
80DT232A	57 9 3	156 21 40	7.0	2.00	1.50	.500	700	N	N	N	15	200	N	N	N	30	30	50	N	N	N	15	<10
80CE165	57 12 53	156 22 15	15.0	1.50	1.00	.200	700	.5	1,000	N	10	200	N	N	N	20	50	70	30	<5	N	20	50
80CE139	57 18 28	156 25 43	10.0	3.00	5.00	.700	1,000	N	N	N	<10	150	N	N	N	50	500	100	N	N	N	70	N
80WS209	57 11 20	156 20 2	5.0	1.50	2.00	.500	1,500	<.5	N	N	30	700	1.0	N	N	7	<10	7	N	N	N	7	<10
80WS211	57 10 22	156 20 10	5.0	2.00	2.00	.500	1,000	N	N	N	10	500	<1.0	N	N	20	50	20	N	N	N	15	10
80WS212	57 10 10	156 20 35	7.0	2.00	3.00	.500	1,500	N	N	N	<10	200	N	N	N	30	50	50	N	5	N	15	<10
80WS213	57 10 58	156 20 50	3.0	1.50	3.00	.300	700	<.5	N	N	10	500	<1.0	N	N	10	50	50	<20	N	N	10	10
80WS214	57 10 8	156 23 44	2.0	1.50	1.50	.200	500	N	N	N	15	700	1.0	N	N	20	30	70	50	5	N	15	10
80WS215	57 9 40	156 27 1	5.0	.30	.07	.700	700	<.5	N	N	50	300	1.0	N	N	30	70	50	30	N	<20	50	<10
80WS216	57 10 56	156 27 54	2.0	1.50	2.00	.200	300	N	N	N	50	1,000	<1.0	N	N	7	15	15	20	N	N	5	<10
80WS217B	57 11 55	156 23 30	5.0	3.00	3.00	.300	700	N	N	N	30	1,500	<1.0	N	N	30	500	70	70	N	N	70	15
80WS217C	57 11 55	156 23 30	3.0	1.00	.07	.500	300	.7	N	N	70	700	<1.0	N	N	20	150	50	50	N	<20	50	30
80DT246	57 13 1	156 26 30	3.0	2.00	2.00	.500	700	<.5	N	N	30	700	<1.0	N	N	30	300	100	20	N	N	50	15
80DT248	57 13 18	156 26 19	3.0	2.00	1.00	.300	200	N	N	N	50	300	<1.0	N	N	30	200	100	N	N	N	70	15
80DT250	57 13 46	156 25 30	7.0	3.00	5.00	.500	1,000	<.5	N	N	15	200	<1.0	N	N	50	70	100	<20	N	N	30	10
80DT251A	57 11 19	156 21 50	3.0	2.00	2.00	.300	1,000	N	N	N	15	300	<1.0	N	N	30	100	70	20	N	N	30	10
80DT252	57 5 58	156 21 35	7.0	3.00	3.00	.500	1,500	N	N	N	10	300	<1.0	N	N	15	200	70	N	N	N	30	50

Table 2.--Continued

Sample No.	Sb	Sc	Sn	Sr	V	W	Y	Zn	Zr	Th	AA-Au	I-Hg	AA-Cu	AA-Pb	AA-Zn	AA-Ag	SI-F	Material class	Sample type	Sample source	Rock type	FC1	FC2	FC3	FC4	FC5	FC6
79CE040	N	15	N	N	150	N	10	200	70	N	N	--	65	140	190	--	--	11	11	11	14	11	4	11	14	15	36
79CE045B	N	50	N	500	500	N	70	N	100	N	N	--	50	20	45	--	--	11	11	11	12	11	4	11	11	11	14
79CE045C	N	30	N	200	300	N	20	<200	100	N	N	--	30	35	85	--	--	11	11	11	12	11	4	11	11	11	13
79CE047A	N	15	N	<100	100	N	15	<200	70	N	N	--	10	10	50	--	--	11	11	11	12	11	4	11	11	11	13
79CE048	N	50	N	1,000	300	N	30	<200	100	N	N	--	55	20	85	--	--	11	11	11	12	11	4	11	11	11	15
79CE050A	N	30	N	1,000	200	N	20	N	150	N	N	--	20	15	50	--	--	11	11	11	14	11	4	11	12	14	36
79CE050B	N	20	N	200	150	N	20	<200	150	N	N	--	25	15	45	--	--	11	11	11	14	11	4	11	13	14	36
79CE052A	N	20	N	300	200	N	20	<200	100	N	N	--	35	15	60	--	--	11	11	11	14	11	4	11	13	14	22
79CE055A	N	20	N	700	300	N	20	<200	100	N	N	--	10	20	60	--	--	11	11	11	14	11	4	11	12	15	22
79CE057	N	20	N	N	100	N	<10	<200	70	N	N	--	55	15	95	--	--	11	11	11	12	11	4	11	11	11	14
79CE059B	N	5	N	100	15	N	20	<200	50	N	N	--	<5	15	10	--	--	11	11	11	14	11	4	11	12	15	36
79CE060A	N	50	N	500	300	N	50	<200	100	N	N	--	30	25	100	--	--	11	11	11	12	11	4	11	11	11	14
79YB045	N	50	N	700	300	N	20	<200	150	N	N	--	25	35	20	--	--	11	11	11	13	11	5	11	14	37	37
79YB046A	N	50	N	150	300	N	50	<200	150	N	N	--	10	30	40	--	--	11	11	11	14	11	5	11	14	15	37
79YB049A	N	20	N	300	200	N	30	<200	70	N	N	--	25	25	40	--	--	11	11	11	12	11	5	11	11	11	13
79YB049B	N	30	N	200	500	N	20	<200	150	N	N	--	100	35	110	--	--	11	11	11	12	11	5	11	11	11	14
79YB052	N	30	N	500	300	N	30	N	150	N	N	--	40	20	55	--	--	11	11	11	12	11	5	11	11	11	13
79DT045A	N	20	N	150	150	N	10	200	70	N	N	--	45	20	150	--	--	11	11	11	14	11	4	11	12	12	37
79DT045B	N	15	<10	100	100	N	10	500	50	N	N	--	160	55	180	--	--	11	11	11	12	11	4	11	11	11	37
79DT045D	N	50	N	700	500	N	50	700	150	N	N	--	50	30	400	--	--	11	11	11	14	11	4	11	12	15	37
79DT045E	N	5	N	<100	N	N	15	1,000	50	N	N	--	15	35	700	--	--	11	11	11	14	11	4	11	12	15	37
79DT048	N	50	N	1,500	300	N	30	N	100	N	N	--	45	20	60	--	--	11	11	11	14	11	4	11	12	15	22
79DT049A	N	30	N	300	300	N	30	<200	70	N	N	--	65	25	120	--	--	11	11	11	12	11	4	11	12	12	37
79DT050	N	30	N	500	300	N	20	<200	100	N	N	--	10	10	5	--	--	11	11	11	14	11	4	11	11	16	37
79DT054	N	70	N	200	700	N	70	200	150	N	N	--	5	15	95	--	--	11	11	11	14	11	5	11	12	15	37
79DT049B	N	20	N	200	200	N	30	N	100	N	N	--	10	10	10	--	--	11	11	11	12	11	4	11	12	11	37
79DT045F	N	5	N	100	<10	N	20	2,000	50	N	N	--	30	30	1,200	--	--	11	11	11	14	11	4	11	12	15	37
79CE051A	N	20	N	1,500	300	N	20	N	150	N	N	--	30	15	35	--	--	11	11	11	14	11	4	11	11	14	22
79DT066A	N	20	N	500	300	N	20	<200	50	N	N	--	25	15	60	--	--	11	11	11	12	12	3	11	11	11	13
79DT067A	N	50	N	300	500	N	50	N	100	N	N	--	45	15	15	--	--	11	11	11	14	12	3	11	12	15	37
79MK1	N	20	N	300	500	N	30	N	50	N	N	<.02	180	10	25	--	--	11	37	37	37	37	37	37	37	37	37
79MK2	N	15	N	<100	200	N	20	N	50	N	N	.70	2,600	10	20	--	--	11	37	37	37	37	37	37	37	37	37
79MK3	N	5	N	N	150	N	N	N	<10	N	N	.28	5	<5	<5	--	<100	11	37	37	37	37	37	37	37	37	37
79MK4	N	7	<10	N	150	N	N	N	20	N	N	.10	15	<5	<5	--	100	11	37	37	37	37	37	37	37	37	37
79MK5	N	15	N	700	500	N	20	N	50	N	N	<.02	40	5	40	--	300	11	37	37	37	37	37	37	37	37	37
79MK6	N	N	N	200	20	N	20	N	50	N	N	<.02	<5	<5	5	--	200	11	37	37	37	37	37	37	37	37	37
79MK7	N	15	15	150	300	N	20	N	70	N	N	.02	95	5	35	--	600	11	37	37	37	37	37	37	37	37	37
79MK8	N	N	N	N	50	N	N	N	50	N	N	.50	5	<5	5	--	400	11	37	37	37	37	37	37	37	37	37
79MK9	N	<5	N	<100	70	<50	N	N	50	N	N	.55	10	10	5	--	<100	11	37	37	37	37	37	37	37	37	37
79MK10	N	15	20	100	200	<50	20	N	70	N	N	.02	40	5	30	--	--	11	37	37	37	37	37	37	37	37	37
79MK11	N	N	<10	100	20	N	20	N	30	N	N	.12	10	<5	<5	--	100	11	37	37	37	37	37	37	37	37	37
79MK12	N	N	N	150	30	N	15	N	30	N	N	.14	20	10	10	--	<100	11	37	37	37	37	37	37	37	37	37
79MK13	N	N	<10	N	<10	N	15	N	20	N	N	.06	5	<5	<5	--	--	11	37	37	37	37	37	37	37	37	37
79MK14	N	N	15	N	50	N	10	N	50	N	N	<.02	25	<5	<5	--	--	11	37	37	37	37	37	37	37	37	37
79MK15	N	N	N	<100	15	N	30	N	30	N	N	.02	15	10	5	--	--	11	37	37	37	37	37	37	37	37	37
80AY39	N	20	N	300	150	N	<10	N	70	N	--	--	30	10	35	--	--	11	11	11	12	12	2	11	11	11	11
80AY40	N	15	N	1,000	150	N	10	N	70	N	--	--	15	10	25	--	--	11	11	11	12	12	2	11	11	11	11
80AY41	N	15	N	700	150	N	10	<200	70	N	--	--	15	10	55	--	--	11	11	11	14	12	2	11	11	11	25
80DT211A	N	50	N	300	200	N	30	<200	70	N	--	--	85	20	70	--	--	11	12	11	12	12	2	11	11	11	15
80AY4S	N	50	N	300	300	N	30	<200	100	N	--	--	50	20	75	--	--	11	11	11	12	12	1	11	11	11	12
80CE154	N	50	30	500	200	N	50	N	100	N	--	--	15	190	90	--	--	11	11	11	14	11	2	11	11	14	22
80CE155	N	50	N	500	300	N	30	<200	150	N	--	--	30	30	80	--	--	11	11	11	12	11	2	11	11	11	11
80CE156A	N	30	N	700	200	N	50	N	70	N	--	--	30	30	90	--	--	11	11	11	12	11	2	11	11	11	36
80CE156B	N	70	N	700	500	N	30	500	50	N	--	--	50	75	380	--	--	11	11	11	14	11	2	11	14	15	36
80AY15	N	50	N	500	300	N	30	<200	70	N	--	--	100	10	85	--	--	--	--	--	--	--	--	--	--	--	--
80CE133A	N	50	N	300	200	N	30	N	10	N	--	--	65	15	60	--	--	--	--	--	--	--	--	--	--	--	--
80CE158	N	30	N	700	150	N	20	N	100	N	--	--	5	40	35	--	--	11	11	11	35	11	2	11	13	15	37
80CE159	N	50	N	300	200	N	30	<200	100	N	--	--	50	20	140	--	--	11	11	11	12	11	2	11	14	13	37
80AY53	N	30	N	2,000	200	N	15	N	100	N	--	--	10	20	40	--	--	11	11	11	14	11	2	11	12	15	37
80WS201	N	50	N	500	300	N	20	N	50	N	--	--	20	10	30	--	--	11	11	11	14	12	1	11	14	17	2
80WS202	N	20	N	200	150	N	30	N	150	N	--	--	35	10	25	--	--	11	11	11	14	12	1	11	12	14	2
80WS203A	N	20	N	700	200	N	N	N	100	N	--	--	55	15	45	--	--	11	11	11	12	12	1	11	11	11	11
80WS203B	N	20	N	700	150	N	20	N	100	N	--	--	490	15	40	--	--	11	11	11	12	12	1	11	14	11	11
80AY54	N	50	N	N	300	50	N	<200	70	N	N	--	50	30	70	--	--	11	11	11	14	12	1	11	14	15	37
80AY57A	N	50	N	300	300	N	30	<200	100	N	--	--	110	25	95	--	--	11	11	11	12	12	1	11	11	11	15
80CE160A	N	50	N	500	300	N	50	N	100	N	--	--	30	20	80	--	--	11	11	11	12	12	2	11	11	11	13
80CE162A	N	70	N	200	300	N	30	<200	150	N	--	--	110	20	100	--	--	11	11	11	12	12	2	11	14	11	15
80WS205	N	30	N	300	150	N	50	N	150	N	--	--	25	15	30	--	--	11	11	11	14	13	1	11	11	14	24
80WS206A	N	30	N	300	150	N	30	N	150	N	--	--	20	15	45	--	--	11	11	11	12	13	1	11	12	11	22
80WS206B	N	50	N	300	200	N	50	N	30	N	--	--	330	25	15	--	--	11	11	11	12	13	1	11	14	11	15
80WS207	N	70	N	500	200	N	30	N	50	N	--	--	20	10	20	--	--	11	11	11	14	13	1	11	11	14	36
80DT229	N	30	N	500	150	N	30	N	150	N	--	--	75	15	40	--	--	11	11	11	14	11	2	11	11	14	24
80DT230	N	20	N	500	100	N	30	N	100	N	--	--	10	5	30	--	--	11	11	11	14	11	2	11	11	14	27
80DT232A	N	50	N	700	200	N	30	<200	150	N	--	--	40	20	95	--	--	11	11	11	14	11	2	11	11	14	27
80CE165	N	30	N	100	100	N	50	200	50	N	.35	--	25	60	60	--	--	11	11	11	35	11	2	11	14	17	36
80CE139	N	70	N	300	300	N	50	<200	70	N	--	--	65	20	80	--	--	11	11	11	14	12	2	11	12	15	20
80WS209	N	50	N	500	100	N	50	N	100	N	--	--	5	15	60	--	--	11	11	11	14	11	2	11	11	15	22
80WS211	N	50	N	700	200	N	30	N	150	N	--	--	25	15	60	--	--	11	11	11	14	11	2	11	12	14	22
80WS212	N	50	N	500	200	N	20	N	50	N	--	--	30	15	60	--	--	11	11	11	14	11	2	11	14	15	25
80WS213	N	50	N	500	300	N	30	N	100	N	--	--	40	15	40	--	--	11	12	11	12	11	2	11	12	11	12
80WS214	N	30	N	300	200	N	50	<200	200	N	--	--	90	10	55	--	--	11	11	11	14	11	2	11	12	14	25
80WS215	N	50	N	N	200	N	50	N	200	N	--	--	30	20	60	--	--	11	11	11	12	11	2	11	12	11	16
80WS216	N	30	N	500	200	N	50	N	200	N	--	--	5	10	10	--	--	11	11	11	14	11	2	11	12	14	25
80WS217B	N	50	N	1,500	300	N	20	N	100	N	--	--	65	20	50	--	--	11	11	11	14	11	2	11	12	15	22
80WS217C	N	30	N	<100	200	N	50	<200	150	N	--	--	30	25	85	--	--	11	11	11	12	11	2	11	11	11	14
80DT246	N	50	N	500	300	N	30	<200	100	N	--	--	65	10	60	--	--	11	11	11	14	11	2	11	12	15	37
80DT248	N	30	N	500	300	N	20	N	100	N	--	--	70	15	40	--	--	11	11	11	13	11	2	11	11	11	15
80DT250	N	70	N	700	500	N	30	N	100	N	--	--	65	20	60	--	--	11	11	11	12	11	2	11	11	11	13
80DT251A	N	50	N	500	300	N	30	<200	100	N	--	--	80	25	45	--	--	11	11	11	14	11	2	11	12	14	27
80DT252	N	70	N	700	500	N	30	N	70	N	--	--	40	35	160	--	--	11	11	11	14	11	2	11	11	14	27

MAPS AND TABLES SHOWING DATA AND ANALYSES OF SEMIQUANTITATIVE EMISSION SPECTROMETRY AND ATOMIC-ABSORPTION SPECTROPHOTOMETRY OF ROCK SAMPLES, UGASHIK, BRISTOL BAY, AND PART OF KARLUK QUADRANGLES, ALASKA

By

F.H. Wilson and R.M. O'Leary

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