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Geochemical Characteristics of the Metalliferous Salmon River Sequence, Central Idaho

By

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INTRODUCTION

Geological mapping by Hobbs and others (1975) north of the Salmon River in central Idaho (fig. 1) and by Wayne E. Hall (unpublished data) south of the Salmon River demonstrated that the Mississippian Salmon River sequence is a thick accumulation of turbidite deposits composed of argillite, siltstone, calcareous siltstone, quartzite, sandstone, and carbonate beds that are part of a series of allochthonous Mississippian sedimentary rocks that were thrust eastward during the Sevier orogeny and are now exposed along the eastern edge of the Idaho Batholith (fig. 2). These turbidite rocks, especially the carboniferous and calcareous units, are known to contain numerous epigenetic type metalliferous ore deposits (Skipp and others, 1979), including lead, silver, molybdenum, copper, zinc, barite, gold, tungsten, and tin. During the mineral appraisal of the Challis $1^{o}x2^{o}$ quadrangle (in 1981 and 1982) that part of the Salmon River sequence exposed west of Clayton, Idaho (figs. 1 and 2) was identified as a potential host for syngenetic type metallic ore deposits. To test this hypothesis 257 samples were collected for geochemical analyses and additional geological and mineralogical data were gathered at the sample sites.

GEOLOGICAL SETTING

The westernmost units of the Salmon River sequence north of the Salmon River are composed mainly of light-colored, fine-grained quartzite and siltite with some interbedded gray argillite. Flute and groove casts, cross-laminations, and graded bedding are common. Tops of beds determined from these features indicate general younging of the unit to the east. The Idaho Batholith has intruded these rocks (fig. 2) and contact effects include silicification, the development of scattered pyrrhotite grains, and the formation of unidentified, incipient porphyroblasts in argillic and calcareous rocks. Some hornfels is also present.

Further east the percentage of quartzitic units decreases and the rocks are composed mainly of black, thin to massively bedded argillite, gray to black, impure limestone, and gray calcareous siltstone beds. These units are generally about 1 to 2 m thick but range up to 10 m. Often they are carbonaceous and locally are cut by networks of thin (less than 1 mm) quartz veinlets. These rocks have been highly deformed and isoclinal folds are common.

The eastern parts of the Salmon River sequence are mostly fine-grained, light- to dark-gray, thin-bedded, laminated siltite and argillite. Some thin quartzite and dark-gray limestone beds are also present. A few of these units are highly carbonaceous.

All outcrops of the Salmon River sequence within the study area are allochthonous, and the base of the unit, where exposed, is a thrust fault. The fault ranges from nearly flat to nearly vertical and has been folded itself. Most of the beds are folded, many isoclinally. Some of the folding is probably due to downslope slumping during deposition of the sediments, whereas other folds developed during the later thrusting and deformation of the sequence. Several high angle faults have brecciated rocks of the sequence in local areas (F. S. Fisher and G. D. May, unpublished mapping) and have contributed to the repetition of beds. Because of the complexity of the

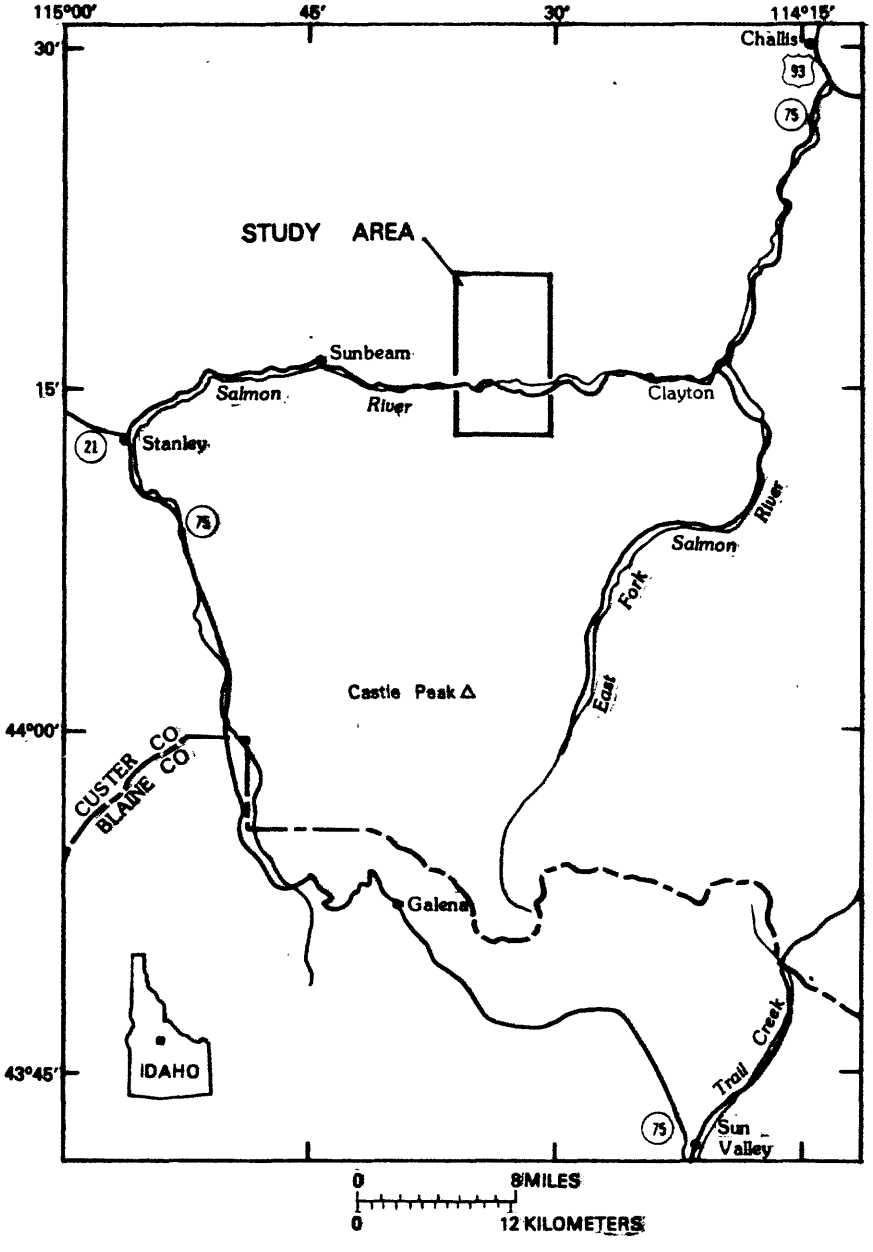

Figure 1.--Index map of the Salmon River sequence study area, Custer County, Idaho.

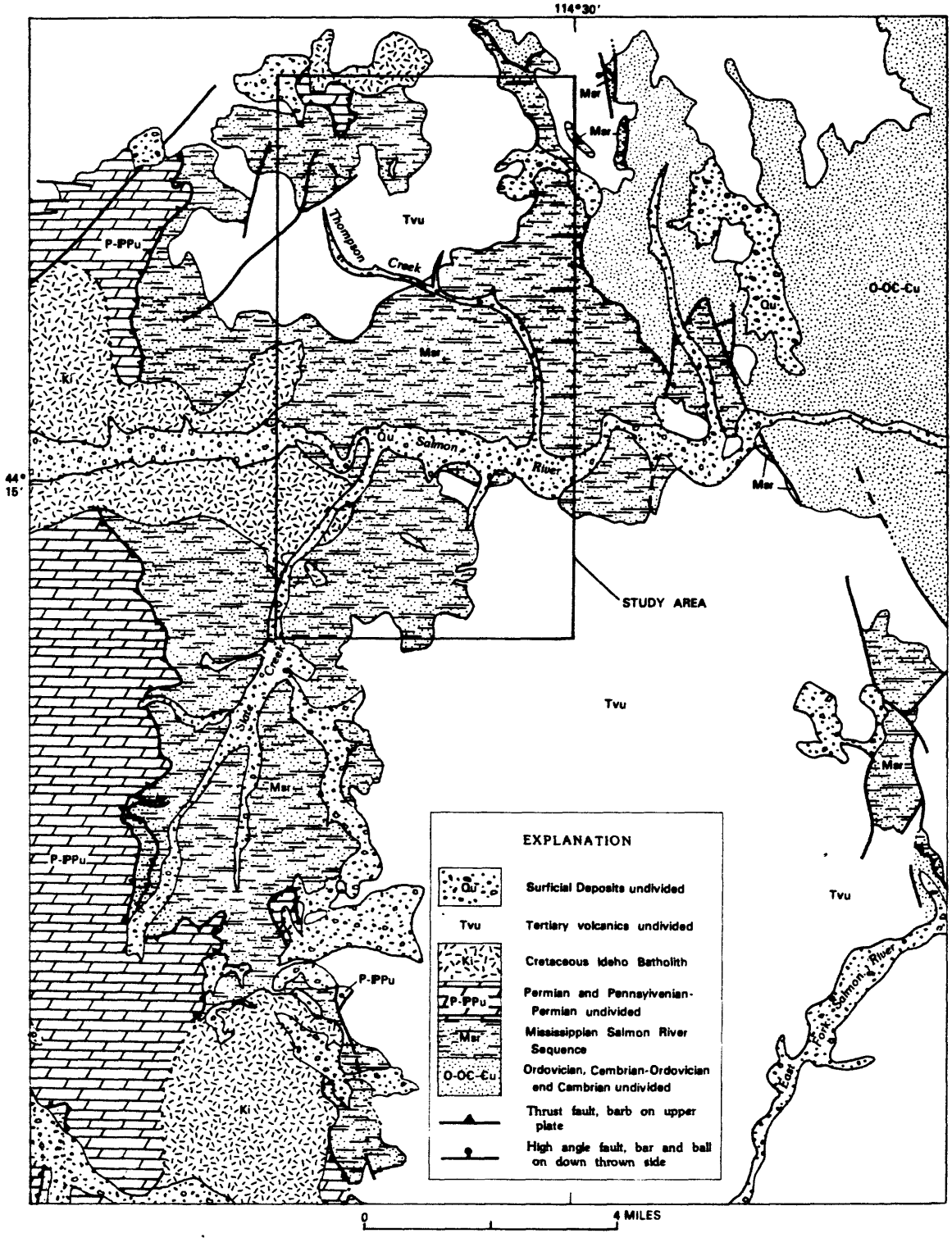

Figure 2.--Generalized geologic map of the Salmon River sequence study area and vicinity, Custer County, Idaho (from Hobbs, S. W., and Hall, W. E., unpublished mapping).

DESCRIPTION OF MAP UNITS

Qu SURFICIAL DEPOSITS UNDIVIDED--Pleistocene and Holocene deposits

Tvu TERTIARY VOLCANICS UNDIVIDED--This includes the younger silicic pyroclastic rocks informally named the Tuff of Red Ridge and the Tuff of Pennal Gulch and older intermediate lavas, pyroclastic rocks, and associated intrusives (D. H. McIntyre, written commun., 1983)

Ki CRETACEOUS INTRUSIVE--Granodiorite, quartz monzonite, and associated porphyries observed in the Idaho Batholith

P-IPPu PERMIAN AND PENNSYLVANIAN-PERMIAN UNDIVIDED--Includes the impure carbonates of the younger Pole Creek Formation and the Pennsylvanian-Permian impure carbonates of the Unit 6 Wood River Formation (W. E. Hall, written commun., 1982)

Msr MISSISSIPPIAN SALMON RIVER SEQUENCE--Thinly laminated siltite and quartzite contains discrete beds of argillite, carbonate, and quartzite (Nilsen, 1977)

O-OC-Cu ORDOVICIAN, ORDOVICIAN-CAMBRIAN, AND CAMBRIAN UNDIVIDED--Includes the youngest impure carbonates of the Saturday Mountain Formation, Kinnikinic Quartzite, and Ella Dolomite. Ordovician-Cambrian rocks include the Clayton Mine Quartzite, interbedded siltstone, quartzite, and dolomite, and Ramshorn Slate. The oldest rocks are Cambrian quartzites (Hobbs and others, 1975)

folding and thrusting and other faulting, the exact thickness of the sequence cannot be determined; however, it is estimated to be in excess of 2,000 m. Determination of the tops of beds suggests that the eastern sequence of rocks may be overturned and folded into a broad, northward(?) plunging syncline, but before this can be demonstrated with any certainty, much more structural data must be gathered.

GEOCHEMISTRY

During 1981 a series of rock chip samples were taken from outcrops in roadcuts along U.S. Highway 93. At each site (A, B, C, etc. on figure 3) continuous chips were taken for the entire length of exposure of the outcrop. Chips taken from every 6 m interval were combined and represent one sample. For example, at site A (plate 1) sample number GM222 represents the first 6 m of outcrop, sample GM223 the second 6 m, etc. A total of 139 individual samples were taken from eight sites (A-H). Each individual sample weighed approximately 4 kg.

In 1982 random grab samples (numbers F82-xx and GM82-xx) were taken from a diversity of outcrops and rock types as shown on plate 1. The 1982 samples were also rock chips with each sample aggregating approximately 2 kg. Both sets of samples were analyzed by U.S. Geological Survey laboratories by semiquantitative spectrographic and atomic absorption methods. Samples collected in 1981 were analyzed for 33 elements and the 1982 samples for 38 elements. These data are presented in table 1.

Several elements within rocks of the Salmon River sequence occur in anomalous amounts as compared to values given by Vine and Tourtelot (1970) and by Desborough and Poole (1983) for metal concentrations in black shales and argillic rocks elsewhere in the United States. Those elements most consistently enriched in the Salmon River sequence include Ag, Ba, Cu, Mo, V, and Zn. Zinc occurs in anomalous concentrations ($\geq$200 ppm) in 28 percent of the samples collected, vanadium ($\geq$1,000 ppm) in 26 percent, copper ($\geq$100 ppm) in 25 percent, molybdenum ($\geq$50 ppm) in 11 percent, barium ($\geq$3,000 ppm) in 9 percent, and silver ($\geq$5 ppm) in 7 percent. Several other elements occur in anomalous concentrations throughout the sequence; sample GM251 is enriched in lead (1,000 ppm), antimony (200 ppm), and tin (200 ppm); sample GM247 contains 2,000 ppm boron, and sample GM307 contains 0.1 ppm gold. Three samples (GM323, GM333, GM82-056A) contain cadmium in concentrations greater than or equal to 100 ppm and four samples (GM82-070, GM82-009, GM82-002, GM235) contain arsenic in concentrations greater than or equal to 50 ppm.

Of the samples enriched in molybdenum, 77 percent are also enriched in zinc and 88 percent in vanadium. Seventy-two percent of the samples containing anomalous silver also contain anomalous concentrations of vanadium. No other consistent relationships are apparent between various elements or between individual anomalous elements and carbon content and lithology. The apparent wide dispersal of anomalous metal concentrations may be due to several factors including: (1) the distribution of the various metals at different sites within the turbidite sequence may represent some type of initial metal zonation due to differing depositional environments; (2) some of the metals undoubtedly have been remobilized due to supergene weathering and oxidation and (or) also to heating and hydrothermal effects related to intrusive activity in the Cretaceous and Tertiary; and (3) the sampling of the rock units may have been non-representative.

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Table 1.--Geochemical data from the Salmon River sequence study area, Custer County, Idaho. Analyses by semiquantitative spectrographic and atomic absorption (AA) methods. Values in parts per million (ppm) unless otherwise noted. G = greater than value shown; N = not detected at limit of detection or at value shown; L = detected but below limit of determination or below value shown; -- = no analysis performed. Results of the semiquantitative spectrographic analyses are reported to the nearest number in the series 1, 1.5, 2, 3, 5, 7, 10, which represent approximate class midpoints in a geometric series. Analyses for Th and W yielded no values above the detection limits of 100 and 50 ppm respectively.

Numbering systems used on Plate 1 and in Table 1 are as follows:

Plate 1 usage		Table 1 usage
F 82 - 1	=	F82001
82 - 1	=	GM82001
GM235	=	GM235

Table 1.--Geochemical data from the Salmon River sequence study area, Custer County, Idaho

Sample	Fe%	Mg%	Ca%	Ti%	Mn	Ag	As	B	Ba	Be	Cd	Co
						Argillite						
F82012	7.00	2.00	.15	1.000	300	N	N	200	1,500	2.0	N	20
F82024	3.00	2.00	15.00	.300	500	1.0	N	200	1,500	2.0	N	5
F82025	5.00	2.00	.50	.500	100	2.0	N	300	2,000	2.0	N	5
F82026	5.00	2.00	.15	.500	70	1.0	N	300	1,500	2.0	N	5
F82027	3.00	1.50	15.00	.300	500	.5	N	200	1,500	2.0	N	5
GM257	2.00	2.00	2.00	.300	100	3.0	N	300	2,000	<1.0	N	5
GM258	2.00	2.00	1.50	.300	100	2.0	N	500	2,000	<1.0	N	5
GM260	2.00	2.00	3.00	.300	150	2.0	N	500	2,000	<1.0	50	5
GM261	2.00	2.00	1.50	.300	200	2.0	N	200	1,500	2.0	N	5
GM262	1.50	1.00	1.50	.300	100	2.0	N	200	1,500	2.0	N	5
GM263	2.00	2.00	2.00	.300	100	2.0	N	100	1,500	2.0	N	5
GM264	2.00	1.00	5.00	.200	100	1.5	N	300	1,500	2.0	N	5
GM265	2.00	1.50	2.00	.300	100	2.0	N	300	1,500	2.0	N	5
GM266	2.00	1.50	2.00	.300	150	1.5	N	200	1,500	2.0	50	5
GM267	2.00	1.50	5.00	.300	150	2.0	N	150	1,500	1.5	50	5
GM268	15.00	.50	2.00	.100	100	1.0	N	200	1,000	1.5	300	10
GM269	2.00	2.00	2.00	.300	100	3.0	N	200	1,500	1.5	20	5
GM270	2.00	.50	1.00	.100	150	3.0	N	100	300	1.5	N	5
GM271	2.00	.70	1.50	.050	200	2.0	N	20	200	1.0	N	5
GM272	2.00	.50	1.00	.100	200	7.0	N	20	300	1.0	20	5
GM273	3.00	2.00	1.50	.300	150	3.0	N	200	700	2.0	20	10
GM274	3.00	3.00	5.00	.300	500	1.0	N	100	1,000	2.0	N	15
GM275	.70	.20	.15	.070	50	2.0	N	70	500	<1.0	N	<5
GM276	.50	.20	.15	.050	30	2.0	N	70	200	<1.0	N	<5
GM277	3.00	1.50	1.00	.300	70	2.0	N	200	1,500	2.0	N	10
GM278	2.00	.70	1.50	.200	150	3.0	N	200	1,500	1.0	20	20
GM279	2.00	1.00	1.50	.200	150	3.0	N	200	1,000	1.0	20	5
GM280	2.00	1.00	.70	.200	100	1.0	N	200	1,500	2.0	N	10
GM281	3.00	2.00	5.00	.200	500	1.0	N	200	700	2.0	N	15
GM282	2.00	3.00	5.00	.300	500	1.0	N	200	1,500	2.0	N	10
GM283	3.00	3.00	10.00	.200	1,500	N	N	200	500	2.0	N	10
GM284	5.00	2.00	15.00	.300	1,500	1.5	N	200	500	2.0	N	10
GM301	1.00	.70	1.50	.100	500	N	N	100	500	<1.0	N	5
GM302	3.00	1.00	2.00	.100	1,500	2.0	N	150	500	2.0	N	15
GM303	1.00	.50	.20	.150	70	.5	N	150	700	2.0	N	<5
GM304	1.00	.70	1.50	.200	300	N	N	200	500	2.0	N	<5
GM305	2.00	2.00	10.00	.200	1,000	<.5	N	200	500	2.0	N	10
GM306	2.00	1.50	5.00	.200	1,000	N	N	200	700	2.0	N	7
GM307	1.00	.30	.50	.100	100	N	N	100	300	1.5	N	<5

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Cr	Cu	La	Mo	Nb	Ni	Pb	Sb	Sc	Sn	Sr	V
F82012	200	100	100	N	30	70	20	N	20	N	<100	200
F82024	100	50	50	N	20	15	50	N	10	N	700	100
F82025	150	100	50	10	20	20	100	N	20	N	N	500
F82026	150	100	50	5	20	20	50	N	20	N	N	700
F82027	50	50	50	N	20	20	50	N	10	N	1,000	200
GM257	150	70	50	70	<20	150	10	N	10	N	100	2,000
GM258	150	50	50	70	<20	150	10	N	10	N	150	2,000
GM260	150	100	50	70	<20	150	10	N	10	N	200	2,000
GM261	100	70	50	100	<20	150	20	N	10	N	100	1,500
GM262	100	50	50	20	<20	150	10	N	10	N	100	1,000
GM263	150	70	50	30	<20	150	10	N	10	N	200	500
GM264	150	50	70	20	<20	100	10	N	10	N	200	700
GM265	150	70	50	20	<20	150	10	N	10	N	150	700
GM266	100	70	70	30	<20	150	10	N	10	N	200	1,000
GM267	150	50	50	50	<20	150	20	N	10	N	100	1,000
GM268	70	150	50	70	<20	200	10	N	7	N	100	2,000
GM269	70	50	50	50	<20	150	20	N	10	N	100	1,000
GM270	70	100	50	<5	<20	100	10	N	7	N	N	500
GM271	50	150	50	<5	<20	70	<10	N	5	N	N	300
GM272	150	200	50	100	<20	200	10	N	7	N	N	1,500
GM273	150	150	50	20	<20	150	20	N	10	N	100	1,000
GM274	100	50	70	N	<20	50	30	N	15	N	100	100
GM275	30	50	30	<5	<20	30	10	N	5	N	N	500
GM276	20	50	20	10	<20	30	10	N	5	N	N	1,000
GM277	150	70	50	20	<20	100	20	N	10	N	100	1,000
GM278	150	200	50	10	<20	100	20	N	10	N	N	1,500
GM279	100	100	50	30	<20	100	20	N	7	N	N	1,500
GM280	100	70	50	5	<20	50	10	N	7	N	N	300
GM281	100	70	50	10	<20	150	10	N	7	N	<100	300
GM282	70	30	50	<5	<20	30	50	N	10	N	100	100
GM283	30	30	50	N	<20	30	20	N	5	N	100	100
GM284	50	100	50	15	<20	50	15	N	15	N	100	200
GM301	50	20	30	10	<20	50	<10	N	5	N	N	700
GM302	50	70	50	10	<20	100	300	N	7	N	100	500
GM303	50	10	30	10	<20	10	<10	N	7	N	N	500
GM304	50	30	30	<5	<20	20	<10	N	5	N	N	500
GM305	50	50	50	20	<20	100	30	N	7	N	100	500
GM306	70	30	50	10	<20	70	10	N	7	N	<100	500

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Y	Zn	Zr	Zn(AA)	Cd(AA)	Bi(AA)	Sb(AA)	As(AA)	Ag(AA)	Au(AA)
F82012	50	<200	200	115	.1	N	N	N	--	--
F82024	30	<200	200	65	.1	N	<1	N	--	N
F82025	50	<200	300	90	.3	N	N	5	--	.05
F82026	50	<200	300	65	.2	N	N	<10	--	N
F82027	50	<200	300	80	.3	N	N	N	--	--
GM257	70	2,000	300	--	--	--	--	N	.95	N
GM258	50	1,000	200	--	--	--	--	N	.80	N
GM260	50	2,000	300	--	--	--	--	<10	1.05	N
GM261	50	700	300	--	--	--	--	N	.95	N
GM262	50	700	200	--	--	--	--	N	.65	N
GM263	30	500	200	--	--	--	--	<10	.70	N
GM264	70	500	200	--	--	--	--	N	.45	N
GM265	50	500	200	--	--	--	--	N	.65	N
GM266	50	1,000	200	--	--	--	--	<10	.80	N
GM267	50	1,000	200	--	--	--	--	N	1.05	N
GM268	30	5,000	50	--	--	--	--	10	.65	N
GM269	20	1,500	200	--	--	--	--	10	1.20	N
GM270	20	700	100	--	--	--	--	N	1.75	N
GM271	30	700	50	--	--	--	--	N	1.65	N
GM272	50	2,000	100	--	--	--	--	<10	3.25	N
GM273	50	1,500	200	--	--	--	--	N	1.40	N
GM274	50	<200	300	--	--	--	--	N	.35	N
GM275	10	<200	70	--	--	--	--	10	1.65	N
GM276	10	200	50	--	--	--	--	N	2.85	N
GM277	50	500	300	--	--	--	--	10	1.10	N
GM278	50	1,000	100	--	--	--	--	<10	1.35	N
GM279	50	1,000	200	--	--	--	--	40	1.65	N
GM280	20	<200	200	--	--	--	--	<10	.75	N
GM281	50	1,000	300	--	--	--	--	<10	.60	N
GM282	50	N	300	--	--	--	--	<10	.50	N
GM283	50	N	300	--	--	--	--	N	.20	N
GM284	70	<200	300	--	--	--	--	<10	.30	N
GM301	20	<200	100	--	--	--	--	N	.25	N
GM302	20	1,000	100	--	--	--	--	<10	.85	N
GM303	10	N	70	--	--	--	--	<10	.25	N
GM304	10	N	150	--	--	--	--	<10	.20	N
GM305	15	200	150	--	--	--	--	<10	.35	N
GM306	20	<200	100	--	--	--	--	20	.20	N
GM307	15	N	70	--	--	--	--	<10	.20	.10

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Fe%	Mg%	Ca%	Ti%	Mn	Ag	As	B	Ba	Be	Cd	Co
GM309	2.00	2.00	20.00	.070	1,500	N	N	100	300	<1.0	N	<5
GM310	1.00	.70	1.00	.150	200	N	N	50	500	1.5	N	<5
GM311	2.00	.20	.50	.150	100	N	N	70	500	1.5	N	<5
GM312	1.00	.20	.20	.100	100	N	N	50	300	1.5	N	<5
GM313	2.00	.30	.20	.150	150	.5	N	100	500	1.5	N	<5
GM314	1.50	.20	1.50	.050	200	.5	N	30	300	<1.0	N	<5
GM315A	3.00	1.50	10.00	.300	1,500	.5	N	150	1,000	1.0	N	10
GM315B	.50	.05	7.00	.015	100	N	N	<10	100	<1.0	N	<5
GM316	2.00	2.00	5.00	.300	1,000	.5	N	200	700	1.0	N	10
GM317	2.00	2.00	10.00	.300	1,500	.5	N	200	700	2.0	N	10
GM318	1.50	2.00	2.00	.300	300	1.0	N	200	700	1.0	N	10
GM319	1.50	.70	2.00	.300	300	.5	N	200	700	2.0	N	<5
GM320	1.50	.50	.50	.200	100	1.0	N	100	500	1.5	N	5
GM321	1.50	.50	.50	.200	70	1.5	N	100	500	1.0	N	5
GM322	1.50	.50	2.00	.100	200	2.0	N	70	300	N	200	5
GM323	2.00	5.00	15.00	.150	1,000	1.0	N	200	300	<1.0	N	5
GM324	2.00	5.00	15.00	.100	700	1.0	N	200	500	1.0	N	10
GM325	.50	5.00	10.00	.050	500	.5	N	100	200	N	N	N
GM326	1.50	1.50	2.00	.200	300	3.0	N	200	700	1.0	N	5
GM327	1.50	.50	2.00	.200	150	2.0	N	100	700	1.0	N	5
GM328	2.00	2.00	2.00	.200	300	3.0	N	200	1,000	2.0	N	5
GM329	2.00	.50	1.00	.300	50	3.0	N	200	1,000	2.0	N	5
GM330	1.50	.50	1.00	.300	70	2.0	N	200	1,000	2.0	20	5
GM331	2.00	.50	.20	.300	50	3.0	N	200	1,000	2.0	N	5
GM332	1.50	5.00	10.00	.200	300	3.0	N	200	1,000	1.0	N	5
GM333	2.00	1.50	7.00	.200	200	3.0	N	200	1,000	1.0	100	10
GM334	2.00	2.00	5.00	.150	300	2.0	N	200	1,000	2.0	50	10
GM335	1.00	.50	2.00	.150	100	1.5	N	200	1,000	2.0	20	5
GM336	1.00	1.50	2.00	.200	200	2.0	N	200	1,000	1.0	20	10
GM337	1.00	3.00	1.50	.200	300	3.0	N	200	1,000	1.0	<20	5
GM338	3.00	1.00	2.00	.300	200	5.0	N	500	1,500	2.0	<20	10
GM339	3.00	.70	1.00	.300	100	3.0	N	500	1,500	2.0	N	5
GM340	2.00	.70	2.00	.150	100	2.0	N	200	700	2.0	<20	<5
GM341	2.00	5.00	10.00	.200	200	2.0	N	200	1,000	1.0	N	5
GM342	3.00	5.00	10.00	.200	200	2.0	N	200	1,000	1.0	N	5
GM343	2.00	3.00	5.00	.200	300	2.0	N	300	1,000	1.5	N	10
GM344	1.00	.20	.15	.050	50	2.0	N	30	300	<1.0	N	N
GM345	2.00	.50	.20	.300	70	10.0	N	200	1,000	1.5	N	N
GM346	1.00	.30	.20	.100	20	3.0	N	50	500	1.0	N	<5
GM347	1.00	.30	.10	.200	20	3.0	N	150	700	1.0	N	<5
GM348	1.50	1.00	.70	.200	300	2.0	N	200	1,000	2.0	N	20
GM349	2.00	1.00	.20	.500	200	2.0	N	300	1,500	2.0	N	10
GM350	1.50	.70	.05	.300	70	2.0	N	150	700	2.0	N	N

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Cr	Cu	La	Mo	Nb	Ni	Pb	Sb	Sc	Sn	Sr	V
GM309	50	30	30	10	<20	50	20	N	5	N	500	200
GM310	50	20	30	<5	<20	10	10	N	5	N	N	300
GM311	50	20	30	<5	<20	5	30	N	5	N	N	150
GM312	50	10	30	N	<20	5	10	N	5	N	N	200
GM313	50	20	50	N	<20	10	30	N	7	N	N	200
GM314	10	20	30	N	<20	10	20	N	5	N	N	70
GM315A	100	50	50	20	<20	50	50	N	10	N	150	300
GM315B	10	10	30	N	<20	<5	70	N	N	N	<100	20
GM316	150	50	50	N	<20	50	30	N	10	N	100	200
GM317	150	50	50	N	<20	70	30	N	10	N	100	200
GM318	100	50	50	10	<20	70	50	N	5	N	<100	500
GM319	70	10	50	<5	<20	50	20	N	5	N	<100	300
GM320	50	50	50	N	N	50	10	N	7	N	N	200
GM321	50	100	50	30	N	50	10	N	7	N	N	1,000
GM322	100	200	50	70	N	150	10	N	5	N	N	3,000
GM323	100	50	50	5	N	50	20	N	10	N	200	300
GM324	50	30	50	N	N	50	20	N	10	N	200	200
GM325	10	15	50	N	N	10	10	N	5	N	100	20
GM326	70	70	50	15	N	70	20	N	7	N	<100	500
GM327	70	200	50	50	N	100	10	N	7	N	N	1,000
GM328	100	100	50	15	N	70	30	N	10	N	200	700
GM329	150	100	50	30	N	100	20	N	10	N	N	1,000
GM330	100	100	50	30	N	150	20	N	10	N	N	1,500
GM331	100	200	50	50	N	100	20	N	10	N	N	1,500
GM332	150	70	50	50	N	100	20	N	10	N	200	1,500
GM333	100	100	50	70	N	150	20	N	10	N	200	1,500
GM334	100	150	50	50	N	100	20	N	10	N	300	1,000
GM335	70	100	50	30	N	100	10	N	7	N	<100	1,500
GM336	70	100	50	30	N	100	15	N	7	N	200	1,000
GM337	100	50	50	10	N	70	10	N	7	N	300	500
GM338	150	150	50	30	N	100	20	N	10	N	200	1,000
GM339	150	150	50	50	N	150	20	N	10	N	<100	1,500
GM340	100	100	50	50	N	100	10	N	5	N	<100	1,000
GM341	150	100	50	50	N	100	20	N	10	N	200	700
GM342	150	100	50	50	N	100	20	N	10	N	200	700
GM343	70	50	30	20	<20	150	20	N	10	N	150	500
GM344	20	10	30	N	<20	<5	<10	N	7	N	N	200
GM345	200	70	30	20	<20	20	20	N	20	N	N	1,000
GM346	150	50	30	10	<20	20	<10	N	7	N	N	700
GM347	100	50	30	5	<20	30	10	N	7	N	N	300
GM348	150	100	50	N	<20	70	N	N	10	N	N	200
GM349	100	70	50	N	<20	70	N	N	20	N	N	200
GM350	50	50	50	N	<20	50	<10	N	15	N	N	100

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Y	Zn	Zr	Zn(AA)	Cd(AA)	Bi(AA)	Sb(AA)	As(AA)	Ag(AA)	Au(AA)
GM309	30	N	100	--	--	--	--	N	.30	N
GM310	20	N	50	--	--	--	--	N	.20	N
GM311	10	N	50	--	--	--	--	10	.40	N
GM312	10	N	30	--	--	--	--	10	.35	N
GM313	20	N	50	--	--	--	--	20	.40	N
GM314	<10	N	20	--	--	--	--	<10	.25	N
GM315A	50	N	300	--	--	--	--	<10	.25	N
GM315B	<10	N	N	--	--	--	--	<10	.10	N
GM316	20	N	300	--	--	--	--	10	.20	N
GM317	30	N	300	--	--	--	--	<10	.35	N
GM318	15	N	300	--	--	--	--	20	.65	N
GM319	20	N	200	--	--	--	--	<10	.40	N
GM320	10	200	150	--	--	--	--	10	.70	N
GM321	30	<200	100	--	--	--	--	60	1.00	N
GM322	70	2,000	50	--	--	--	--	20	1.55	N
GM323	100	<200	200	--	--	--	--	N	.35	N
GM324	30	N	100	--	--	--	--	<10	.70	N
GM325	20	N	100	--	--	--	--	N	.20	N
GM326	20	200	150	--	--	--	--	10	1.35	N
GM327	50	1,500	150	--	--	--	--	<10	1.65	N
GM328	20	300	200	--	--	--	--	10	1.80	N
GM329	50	3	200	--	--	--	--	<10	1.60	N
GM330	20	1,500	200	--	--	--	--	<10	1.70	N
GM331	70	1,000	200	--	--	--	--	<10	2.05	N
GM332	20	700	200	--	--	--	--	10	1.95	N
GM333	150	1,500	200	--	--	--	--	20	1.70	N
GM334	100	1,000	100	--	--	--	--	10	1.70	N
GM335	50	1,000	100	--	--	--	--	<10	1.65	N
GM336	50	700	150	--	--	--	--	20	1.35	N
GM337	30	500	100	--	--	--	--	<10	1.30	N
GM338	100	700	200	--	--	--	--	20	2.20	N
GM339	100	700	300	--	--	--	--	20	1.95	N
GM340	20	1,000	100	--	--	--	--	20	1.90	N
GM341	30	500	200	--	--	--	--	20	1.30	N
GM342	30	500	200	--	--	--	--	10	1.55	N
GM343	20	500	200	--	--	--	--	<10	1.20	N
GM344	<10	<200	50	--	--	--	--	10	1.50	N
GM345	50	<200	200	--	--	--	--	20	3.25	N
GM346	50	N	100	--	--	--	--	20	2.65	N
GM347	10	<200	100	--	--	--	--	N	1.95	N
GM348	20	<200	150	--	--	--	--	<10	1.30	N
GM349	70	<200	200	--	--	--	--	<10	.65	N
GM350	20	N	200	--	--	--	--	10	.90	N
GM351	<10	N	150	--	--	--	--	<10	1.35	N

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Fe%	Mg%	Ca%	Ti%	Mn	Ag	As	B	Ba	Be	Cd	Co
GM353	1.50	.15	.05	.070	<10	2.0	N	100	300	1.0	N	N
GM354	.50	.15	.05	.050	<10	2.0	N	50	200	<1.0	N	N
GM355	.70	.15	.30	.100	<10	5.0	N	50	300	<1.0	N	N
GM356	1.00	.20	.20	.100	50	7.0	N	70	700	<1.0	N	N
GM357	.70	.20	.20	.100	20	5.0	N	100	500	<1.0	N	N
GM358	1.00	.20	.50	.100	50	10.0	N	100	500	<1.0	N	N
GM359	1.00	.20	.05	.150	20	10.0	N	100	1,000	<1.0	N	N
GM360	1.00	.20	.20	.150	10	10.0	N	100	1,000	<1.0	N	N
GM82010	.20	.50	.05	.200	30	1.0	N	200	2,000	N	N	N
GM82012	20.00	.30	.10	.070	70	5.0	N	20	1,000	1.5	<20	7
GM82018	.30	.20	.15	.150	20	3.0	N	30	1,500	N	N	N
GM82020	.70	1.00	5.00	.150	50	3.0	N	70	2,000	N	<20	N
GM82021	1.00	2.00	1.00	.300	70	1.5	N	300	3,000	<1.0	N	N
GM82024	.20	.15	.30	.300	20	1.0	N	N	3,000	N	N	<5
GM82025	.50	.50	.70	.300	70	2.0	N	200	3,000	<1.0	N	<5
GM82026	.50	1.00	1.00	.200	100	2.0	N	N	3,000	1.5	N	<5
GM82027	1.00	.30	.05	.500	10	N	N	200	2,000	N	N	<5
GM82033	.30	.30	.50	.150	50	1.0	N	50	2,000	N	N	<5
GM82034A	.30	.50	.50	.300	70	1.5	N	150	3,000	N	N	<5
GM82034B	.50	1.00	.50	.300	100	.5	N	100	2,000	<1.0	N	N
GM82036	2.00	2.00	.70	.300	150	1.0	N	300	2,000	<1.0	N	<5
GM82037	.20	1.00	.20	.150	100	3.0	N	70	2,000	N	N	N
GM82038	1.50	2.00	5.00	.300	150	.5	N	200	2,000	1.5	N	<5
GM82039	3.00	1.00	5.00	.500	300	N	N	N	2,000	1.5	N	5
GM82056B	1.50	1.50	.50	.300	100	N	N	100	1,500	1.0	N	7
GM82057	.50	.50	.10	.100	150	N	N	50	200	<1.0	N	N
GM82058	.15	.50	1.50	.150	20	5.0	N	100	1,000	N	N	N
GM82059	.50	.50	.70	.100	50	5.0	N	50	700	N	N	N
GM82060	.30	.20	.07	.050	50	5.0	N	<10	500	N	N	N
GM82064	1.00	.70	<.05	.200	15	3.0	N	150	2,000	<1.0	N	N
GM82066	3.00	1.00	.10	.300	100	<.5	N	200	1,500	2.0	N	10
GM82067	.20	.30	<.05	.150	150	1.5	N	30	100	N	N	<5
GM82074	.30	.50	1.50	.300	200	3.0	N	70	5,000	N	N	<5
GM82077	1.50	.50	.20	.200	70	<.5	N	N	500	N	N	N
GM82079	1.50	1.00	.15	.300	100	2.0	N	500	1,500	1.0	N	N
GM82080	1.50	.70	.50	.300	150	N	N	10	1,500	<1.0	N	<5
GM82082	.30	1.00	.20	.200	70	.7	N	300	>5,000	<1.0	N	N
GM82084	.30	.70	.70	.200	100	2.0	N	300	2,000	<1.0	N	N
GM82085	1.50	.30	.50	.150	50	.5	N	100	3,000	N	N	N
GM82136	.70	5.00	10.00	.070	200	N	N	70	100	N	N	<5
GM82137	1.50	3.00	.20	.200	100	<.5	N	100	200	1.0	N	<5
GM82138	.30	1.50	20.00	.070	1,500	N	N	20	100	N	N	N
GM82139	1.50	1.00	.07	.300	20	1.5	N	300	1,000	2.0	N	<5
GM82140	1.50	2.00	2.00	.200	150	1.0	N	200	1,000	1.5	50	7

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Cr	Cu	La	Mo	Nb	Ni	Pb	Sb	Sc	Sn	Sr	V
GM353	70	30	50	10	<20	20	<10	N	5	N	N	500
GM354	20	30	50	N	<20	20	<10	N	5	N	N	100
GM355	70	30	50	10	<20	20	<10	N	5	N	N	300
GM356	100	70	50	30	<20	30	<10	N	7	N	N	2,000
GM357	100	50	50	50	<20	30	<10	N	5	N	N	5,000
GM358	150	100	50	50	<20	50	<10	N	5	N	N	5,000
GM359	100	700	50	100	<20	50	30	N	5	N	N	5,000
GM360	150	70	50	100	<20	50	<10	N	5	N	<100	5,000
GM82010	50	15	30	N	N	15	20	N	5	N	N	2,000
GM82012	10	7,000	20	10	N	200	15	N	5	N	N	500
GM82018	50	20	30	30	N	20	20	N	<5	N	N	5,000
GM82020	200	30	30	50	N	20	20	N	<5	N	<100	10,000
GM82021	70	30	30	30	<20	50	20	N	7	N	<100	1,500
GM82024	70	15	50	5	N	15	30	N	5	N	100	2,000
GM82025	30	50	30	<5	N	20	20	N	7	N	<100	500
GM82026	30	50	30	20	N	70	15	N	5	N	N	2,000
GM82027	70	15	30	<5	N	<5	10	N	7	N	N	500
GM82033	30	30	30	7	N	20	<10	N	5	N	N	2,000
GM82034A	30	50	30	15	N	30	15	N	7	N	<100	2,000
GM82034B	50	20	20	5	N	5	15	N	7	N	N	1,500
GM82036	30	30	30	15	N	50	20	N	7	N	N	2,000
GM82037	150	50	20	20	N	15	30	N	5	N	N	10,000
GM82038	20	30	30	15	N	50	20	N	7	N	N	1,000
GM82039	<10	7	50	N	<20	N	30	N	5	N	700	70
GM82056B	20	30	30	N	N	20	20	N	5	N	N	70
GM82057	30	15	20	N	N	10	<10	N	5	N	N	70
GM82058	50	150	30	7	N	20	20	N	<5	N	N	7,000
GM82059	30	50	30	15	N	10	20	N	5	N	N	1,500
GM82060	10	20	30	10	N	5	10	N	5	N	N	200
GM82064	20	20	30	10	N	7	20	N	7	N	N	1,500
GM82066	15	30	30	N	<20	70	<10	N	7	N	N	150
GM82067	<10	10	20	20	N	7	50	N	<5	N	N	2,000
GM82074	200	50	70	7	<20	30	30	N	7	N	<100	2,000
GM82077	20	30	30	50	<20	30	10	N	5	N	N	2,000
GM82079	20	100	30	N	<20	7	20	N	7	N	N	150
GM82080	70	50	30	7	<20	30	<10	N	7	N	N	1,500
GM82082	20	20	30	7	N	10	20	N	7	N	100	300
GM82084	100	50	30	<5	N	20	20	N	5	N	100	500
GM82085	20	30	30	15	N	5	20	N	<5	N	100	300
GM82136	10	7	20	7	N	20	20	N	<5	N	<100	100
GM82137	30	15	30	N	N	50	30	N	5	N	N	300
GM82138	10	5	20	N	N	20	15	N	<5	N	<100	70
GM82139	50	20	30	7	<20	20	20	N	10	N	N	200
GM82140	20	50	20	20	N	70	30	N	5	N	150	300

Table 1.-- Geochemical data from the Salmon River study area --Continued

Sample	Y	Zn	Zr	Zn(AA)	Cd(AA)	Bi(AA)	Sb(AA)	As(AA)	Ag(AA)	Au(AA)
GM353	15	N	50	--	--	--	--	10	2.70	N
GM354	<10	N	30	--	--	--	--	<10	1.65	N
GM355	10	N	100	--	--	--	--	<10	2.50	N
GM356	20	N	100	--	--	--	--	N	2.45	N
GM357	70	N	100	--	--	--	--	20	2.95	N
GM358	50	N	100	--	--	--	--	20	4.30	N
GM359	50	N	150	--	--	--	--	40	3.55	N
GM360	50	N	150	--	--	--	--	10	4.00	N
GM82010	10	N	100	45	.1	N	9	<10	--	--
GM82012	50	3,000	70	1,500	25.0	N	N	20	--	--
GM82013	20	<200	50	120	1.7	N	8	5	--	--
GM82020	50	N	100	350	20.0	N	15	20	--	--
GM82021	20	200	150	200	3.3	N	2	N	--	--
GM82024	30	N	150	75	.2	N	3	N	--	--
GM82025	50	N	150	85	2.0	N	7	5	--	--
GM82026	20	700	150	320	3.2	N	7	<10	--	--
GM82027	15	N	150	10	N	N	18	N	--	--
GM82033	15	<200	100	200	1.8	N	2	N	--	--
GM82034A	15	<200	100	190	2.1	N	9	N	--	--
GM82034B	30	N	200	170	N	N	4	N	--	--
GM82036	20	200	150	110	.6	N	4	N	--	--
GM82037	10	N	100	65	.5	N	5	10	--	--
GM82038	20	<200	100	180	1.4	N	6	<10	--	--
GM82039	20	N	150	80	N	N	N	<10	--	--
GM520568	10	200	100	150	.8	N	3	N	--	--
GM82057	<10	N	50	75	N	N	6	5	--	--
GM82058	30	N	70	70	2.7	N	8	5	--	--
GM82059	10	N	50	15	N	N	7	10	--	--
GM82060	<10	N	50	5	N	N	5	10	--	--
GM82064	20	N	100	10	.2	N	8	10	--	--
GM82066	20	200	200	220	.2	N	8	5	--	--
GM82067	15	N	20	10	N	N	10	5	--	--
GM82074	30	200	150	240	2.0	N	3	N	--	<.05
GM82077	20	300	50	250	<.1	N	3	N	--	N
GM82079	10	N	100	40	N	N	3	N	--	N
GM82080	20	300	150	320	1.0	N	3	N	--	N
GM82082	15	N	50	30	N	<2	1	N	--	N
GM82084	20	N	100	35	.1	N	3	N	--	N
GM82085	20	N	50	15	N	N	10	10	--	<.05
GM82136	10	<200	10	130	.4	N	2	15	--	--
GM82137	20	300	50	220	1.7	N	1	10	--	--
GM82138	10	N	10	55	2.1	N	1	<10	--	--
GM82139	10	300	100	220	1.0	N	3	5	--	N
GM82140	20	1,000	150	450	17.0	N	3	5	--	<.05

Table 1.--Geochemical data from the Salmon River study area --Continued

Sample	Fe%	Mg%	Ca%	Ti%	Mn	Ag	As	B	Ba	Be	Cd	Co
GM82142	.20	1.00	1.00	.100	50	5.0	N	15	500	N	30	N
Brecciated argillite												
GM82086	.50	1.00	2.00	.200	300	.7	N	200	3,000	N	N	15
Limestone												
F82022	2.00	.70	20.00	.300	1,000	N	N	100	500	1.0	N	10
GM285	1.50	2.00	20.00	.070	1,500	N	N	100	700	1.0	N	5
GM286	2.00	7.00	10.00	.100	1,000	1.0	N	70	700	1.0	N	5
GM287	3.00	10.00	15.00	.200	1,500	1.0	N	200	1,000	1.0	N	10
GM288	1.50	2.00	10.00	.150	1,500	5.0	N	200	1,000	2.0	20	5
GM289	2.00	3.00	15.00	.100	2,000	2.0	N	200	500	2.0	20	20
GM290	2.00	2.00	5.00	.100	700	1.5	N	100	1,000	2.0	N	5
GM291	1.00	1.00	5.00	.100	700	1.0	N	100	700	1.0	N	5
GM292	1.50	.50	1.50	.100	200	1.0	N	100	700	<1.0	N	<5
GM293	1.50	.70	10.00	.100	1,000	1.0	N	70	700	<1.0	N	<5
GM294	2.00	2.00	5.00	.200	1,000	.5	N	200	700	1.0	N	5
GM295	2.00	3.00	10.00	.300	300	N	N	300	1,500	2.0	N	5
GM296	2.00	2.00	10.00	.200	300	N	N	200	700	1.0	N	5
GM297	1.50	2.00	15.00	.150	500	N	N	100	500	1.0	N	5
GM298	2.00	2.00	10.00	.150	300	N	N	200	500	1.0	N	10
GM82031	2.00	5.00	10.00	.300	700	N	N	20	3,000	<1.0	N	<5
GM82032	2.00	5.00	10.00	.300	500	<.5	N	30	2,000	1.0	N	5
GM82045	2.00	5.00	10.00	.300	1,000	.7	N	<10	3,000	2.0	N	7
GM82056A	2.00	5.00	7.00	.300	1,000	5.0	N	150	700	2.0	>500	10
GM82078	2.00	1.50	20.00	.100	500	N	N	N	700	N	N	<5
Brecciated limestone												
GM82002	10.00	.07	.05	.050	50	5.0	N	15	500	1.5	N	5
Phyllite												
GM82013	.50	.70	.10	.200	30	.7	N	70	1,500	<1.0	N	N
GM82014	1.00	.50	.15	.300	30	.7	N	100	2,000	1.0	N	5
GM82015	1.00	.50	.10	.200	15	.5	N	100	3,000	1.0	N	<5
GM82016	.50	.50	.07	.200	15	.7	N	150	3,000	1.0	N	<5
GM82063	.15	.30	<.05	.100	20	1.5	N	50	1,000	<1.0	N	<5
GM82071	.50	1.00	<.05	.300	<10	1.0	N	200	1,500	1.5	N	N
Quartzite												
GM299	1.50	2.00	5.00	.200	300	N	N	100	700	1.0	N	10
GM300	1.50	2.00	5.00	.200	300	N	N	100	500	1.0	N	5
GM82005	2.00	.10	<.05	.070	500	.7	N	30	500	N	N	7
GM82006	.30	.20	<.05	.100	30	N	N	70	700	N	N	N

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Cr	Cu	La	Mo	Nb	Ni	Pb	Sb	Sc	Sn	Sr	V
GM82142	50	70	30	50	N	30	30	N	5	N	N	5,000
					Brecciated argillite--continued							
GM82086	50	30	30	<5	<20	30	15	N	5	N	<100	500
					Limestone--continued							
F82022	150	50	50	N	<20	20	20	N	10	N	500	50
GM285	20	20	30	N	<20	20	N	N	5	N	200	50
GM286	20	70	30	N	<20	30	10	N	5	N	100	50
GM287	50	70	50	5	<20	50	20	N	10	N	100	150
GM288	50	30	50	10	<20	70	100	N	10	N	100	200
GM289	50	100	30	10	<20	150	100	N	10	N	<100	200
GM290	50	50	30	5	<20	50	30	N	7	N	100	200
GM291	30	20	30	5	<20	50	20	N	5	N	100	300
GM292	20	20	30	15	<20	15	30	N	5	N	N	200
GM293	20	20	30	10	<20	20	30	N	5	N	200	200
GM294	30	30	30	10	<20	50	20	N	5	N	<100	150
GM295	150	30	50	<5	<20	30	10	N	15	N	N	300
GM296	30	30	50	N	<20	20	10	N	7	N	100	100
GM297	30	30	50	N	<20	20	<10	N	5	N	100	70
GM298	50	30	50	N	<20	30	10	N	7	N	50	100
GM82031	10	15	30	N	<20	7	15	N	5	N	200	50
GM82032	15	15	30	N	<20	15	10	N	5	N	100	50
GM82045	15	20	30	N	N	20	30	N	7	N	100	100
GM82056A	30	3,000	30	N	N	30	200	N	7	N	<100	300
GM82078	10	15	20	N	N	5	10	N	5	N	700	30
					Brecciated limestone--continued							
GM82002	30	200	20	20	N	30	70	<100	<5	N	N	1,000
					Phyllite--continued							
GM82013	30	20	20	N	N	10	30	N	7	N	N	500
GM82014	50	50	30	<5	N	20	20	N	<5	N	N	150
GM82015	50	20	30	<5	N	10	20	N	7	N	N	200
GM82016	30	15	30	N	N	5	20	N	5	N	N	300
GM82063	15	15	20	N	N	10	10	N	<5	N	N	1,500
GM82071	20	15	30	70	N	20	20	N	7	N	N	700
					Quartzite--continued							
GM299	20	30	50	N	<20	30	<10	N	7	N	N	70
GM300	15	10	30	N	<20	10	<10	N	5	N	<100	50
GM82005	<10	30	20	5	N	30	300	N	<5	N	N	150
GM82006	10	5	30	N	N	<5	15	N	<5	N	N	200

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Y	Zn	Zr	Zn(AA)	Cd(AA)	Bi(AA)	Sb(AA)	As(AA)	Ag(AA)	Au(AA)
GM82142	20	700	50	500	6.3	N	6	20	--	N
				Brecciated argillite--continued						
GM82086	30	300	150	200	.6	N	6	10	--	<.05
				Limestone--continued						
F82022	50	<200	200	35	.1	N	N	N	--	--
GM285	30	<200	200	--	--	--	--	<10	.20	N
GM286	20	<200	200	--	--	--	--	<10	.20	N
GM287	30	<200	200	--	--	--	--	N	.25	N
GM288	50	200	300	--	--	--	--	N	1.45	N
GM289	70	700	150	--	--	--	--	<10	.45	N
GM290	20	300	150	--	--	--	--	<10	.80	N
GM291	20	<200	100	--	--	--	--	<10	.45	N
GM292	20	N	70	--	--	--	--	10	.60	N
GM293	30	N	50	--	--	--	--	10	.35	N
GM294	20	N	300	--	--	--	--	<10	.20	N
GM295	20	N	300	--	--	--	--	N	.20	N
GM296	20	N	300	--	--	--	--	N	.15	N
GM297	20	N	200	--	--	--	--	N	.10	N
GM298	10	N	200	--	--	--	--	N	.20	N
GM82031	20	N	300	20	N	N	6	N	--	--
GM82032	20	N	200	15	N	N	6	N	--	--
GM82045	30	N	300	45	.3	N	4	N	--	--
GM82056A	20	>10,000	150	45,000	1,600.0	N	7	45	--	--
GM82078	20	N	100	30	N	N	3	N	--	N
				Limestone--continued						
GM82002	10	200	10	260	1.1	2	40	90	--	--
				Phyllite--continued						
GM82013	10	N	100	35	N	N	3	N	--	--
GM82014	20	N	100	95	.6	N	2	<10	--	--
GM82015	15	N	100	50	N	N	4	N	--	--
GM82016	10	N	100	35	N	N	3	<10	--	--
GM82063	<10	N	50	10	N	N	5	5	--	--
GM82071	20	N	100	10	N	N	11	10	--	--
				Quartzite--continued						
GM299	15	N	300	--	--	--	--	N	.15	N
GM300	10	N	300	--	--	--	--	N	.10	N
GM82005	<10	500	30	200	N	N	12	25	--	--
GM82006	<10	N	30	5	N	N	6	N	--	--

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Fe%	Mg%	Ca%	Ti%	Mn	Ag	As	B	Ba	Be	Cd	Co
GM82028	.20	.07	<.05	.020	20	N	N	N	100	N	N	N
Brecciated quartzite												
GM82007	.30	.30	.05	.150	20	<.5	N	70	1,000	1.0	N	N
Siltite												
F82007	5.00	2.00	15.00	.700	700	N	N	150	1,500	2.0	N	15
F82014	5.00	2.00	2.00	.700	700	N	N	200	1,500	2.0	N	20
F82020	3.00	2.00	20.00	.300	1,000	N	N	100	1,500	2.0	N	<5
F82021	7.00	2.00	1.00	1.000	300	N	N	200	2,000	2.0	N	20
F82023	7.00	2.00	2.00	1.000	1,000	N	N	200	2,000	2.0	N	15
F82031	.20	.10	.20	.050	70	1.5	N	20	200	<1.0	N	5
F82032	5.00	3.00	2.00	.500	500	N	N	200	1,000	2.0	N	5
F82033	.50	.15	.05	.070	50	3.0	N	20	300	<1.0	N	5
F82034	5.00	2.00	.50	.500	300	N	N	200	1,500	2.0	N	15
GM82008	5.00	.30	.10	.200	300	1.5	N	50	1,000	<1.0	N	10
GM82019	1.50	2.00	3.00	.300	200	1.5	N	200	3,000	<1.0	N	<5
GM82022	2.00	2.00	3.00	.300	200	N	N	200	3,000	1.5	N	7
GM82062	.20	.20	<.05	.050	10	2.0	N	20	500	N	N	N
GM82073	3.00	3.00	7.00	.300	700	.7	N	50	>5,000	1.0	N	10
GM82083	.70	2.00	3.00	.200	200	.5	N	15	>5,000	1.0	N	5
Thinly laminated argillite, siltite, and quartzite												
F82001	7.00	2.00	.70	1.000	300	N	N	150	2,000	2.0	N	20
F82002	7.00	2.00	1.50	1.000	300	N	N	150	2,000	2.0	N	10
F82003	7.00	2.00	.50	1.000	300	N	N	150	2,000	2.0	N	15
F82004	3.00	1.00	20.00	.300	700	N	N	200	1,500	1.5	N	5
F82005	5.00	2.00	1.00	1.000	300	N	N	100	1,500	2.0	N	10
F82006	5.00	2.00	.50	1.000	200	N	N	100	1,500	2.0	N	10
F82008	5.00	2.00	5.00	1.000	700	N	N	150	1,500	2.0	N	15
F82009	10.00	2.00	.20	1.000	700	N	N	200	1,500	2.0	N	30
F82010	10.00	2.00	.50	1.000	500	N	N	200	1,500	2.0	N	20
F82011	7.00	2.00	.30	1.000	500	N	N	200	1,500	2.0	N	30
F82013	10.00	2.00	.50	1.000	500	N	N	200	1,500	2.0	N	20
F82015	10.00	2.00	.20	1.000	500	N	N	200	1,500	2.0	N	20
F82016	5.00	2.00	5.00	.700	1,000	N	N	200	1,500	2.0	N	7
F82017	10.00	2.00	.20	1.000	300	N	N	200	1,500	2.0	N	20
F82018	10.00	2.00	.20	1.000	300	N	N	200	1,500	2.0	N	20
F82019	10.00	2.00	2.00	1.000	500	N	N	200	2,000	2.0	N	20
F82026	5.00	2.00	5.00	1.000	200	.5	N	200	3,000	2.0	N	5
F82029	10.00	.50	.50	.500	200	3.0	N	200	2,000	2.0	N	20
F82029B	5.00	2.00	.50	.500	200	2.0	N	300	1,500	2.0	N	15

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Cr	Cu	La	Mo	Nb	Ni	Pb	Sb	Sc	Sn	Sr	V
GM82028	<10	15	30	N	N	5	<10	N	N	N	N	20
					Brecciated quartzite--continued							
GM82007	15	100	30	N	N	7	<10	N	5	N	N	200
					Siltite--continued							
F82007	150	100	70	N	30	50	50	N	20	N	500	200
F82014	150	70	100	5	30	70	30	N	20	N	300	200
F82020	70	30	50	N	<20	10	100	N	10	N	500	70
F82021	200	100	100	N	50	100	20	N	30	N	100	200
F82023	200	100	100	N	20	30	30	N	20	N	150	300
F82031	50	70	<20	20	<20	20	20	N	N	N	N	2,000
F82032	150	70	70	N	<20	50	20	N	20	N	100	200
F82033	30	30	50	N	<20	5	<10	N	5	N	N	200
F82034	150	100	50	N	20	50	<10	N	20	N	N	150
GM82008	30	150	20	<5	<20	50	50	N	5	N	100	150
GM82019	70	30	30	50	N	70	20	N	7	N	200	1,500
GM82022	30	20	30	N	N	20	20	N	7	N	N	150
GM82062	<10	20	20	N	N	5	10	N	<5	N	N	150
GM82073	70	30	50	10	N	30	15	N	10	N	200	100
GM82083	20	20	30	15	N	30	15	N	5	N	100	300
					Thinly laminated argillite, siltite, and quartzite--continued							
F82001	200	100	100	N	50	70	20	N	20	N	100	200
F82002	200	100	100	N	50	70	20	N	20	N	200	200
F82003	200	100	50	N	50	70	20	N	20	N	<100	200
F82004	100	20	70	N	<20	20	50	N	10	N	1,000	100
F82005	200	100	70	5	100	20	30	N	20	N	150	300
F82006	150	100	50	10	50	20	30	N	20	N	150	200
F82008	200	100	100	N	50	70	20	N	20	N	200	300
F82009	200	100	70	N	30	70	20	N	20	N	100	200
F82010	200	100	100	N	50	70	20	N	20	N	100	200
F82011	200	50	100	N	30	100	20	N	20	N	<100	200
F82013	200	100	100	N	50	70	30	N	20	N	100	200
F82015	200	70	100	N	30	100	20	N	20	N	<100	200
F82016	150	70	70	N	20	30	50	N	20	N	700	200
F82017	200	70	100	N	50	70	50	N	20	N	N	200
F82018	200	70	100	N	30	70	20	N	20	N	N	200
F82019	200	100	100	N	50	100	50	N	20	N	200	300
F82028	150	100	100	<5	100	15	30	N	20	N	200	500
F82029	150	200	100	20	20	100	100	N	20	N	N	1,000
SR82029	150	200	50	15	20	100	50	N	20	N	<100	500

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Y	Zn	Zr	Zn(AA)	Cd(AA)	Bi(AA)	Sb(AA)	As(AA)	Ag(AA)	Au(AA)
GM82028	N	N	30	5	N	N	7	N	--	--
				Brecciated quartzite--continued						
GM82007	15	N	70	15	<.1	N	17	15	--	--
				Siltite--continued						
F82007	50	<200	300	80	.3	N	N	N	--	--
F82014	50	<200	300	100	.1	N	N	5	--	--
F82020	50	<200	150	70	.3	N	N	<10	--	--
F82021	70	<200	500	85	.1	N	N	<10	--	--
F82023	50	<200	300	95	.1	N	N	N	--	--
F82031	20	<200	20	125	1.2	N	5	10	--	N
F82032	30	<200	500	35	N	N	N	N	--	--
F82033	10	<200	50	5	N	N	2	N	--	<.05
F82034	50	<200	500	50	N	N	2	N	--	--
GM82008	30	500	100	150	.9	N	17	20	--	--
GM82019	30	500	150	210	2.8	<2	8	N	--	--
GM82022	20	N	150	50	N	N	N	N	--	--
GM82062	<10	N	15	10	N	N	6	10	--	--
GM82073	30	N	150	10	N	N	2	N	--	<.05
GM82083	20	300	200	220	3.6	N	3	N	--	N
				Thinly laminated argillite, siltite, and quartzite--continued						
F82001	50	<200	300	110	N	N	1	5	--	--
F82002	50	<200	300	75	N	N	N	<10	--	--
F82003	50	<200	300	90	N	N	N	N	--	--
F82004	50	<200	200	55	.3	N	N	5	--	--
F82005	50	<200	300	70	N	N	N	<10	--	--
F82006	50	<200	300	55	N	N	N	<10	--	--
F82008	50	<200	300	60	.1	N	N	N	--	--
F82009	50	<200	300	50	N	N	N	10	--	--
F82010	50	<200	300	85	N	N	N	5	--	--
F82011	50	<200	200	85	2.3	N	N	10	--	--
F82013	70	<200	300	100	.2	N	N	5	--	--
F82015	50	<200	300	95	N	N	N	N	--	--
F82016	50	<200	300	70	.1	N	N	N	--	--
F82017	50	<200	300	80	N	N	N	<10	--	--
F82018	70	<200	300	85	1.4	N	N	5	--	--
F82019	50	<200	500	100	.3	N	N	N	--	--
F82028	50	<200	700	55	.2	N	N	<10	--	--
F82029	70	<200	500	40	N	N	3	40	--	.05
F82030	50	<200	500	130	<.1	N	2	N	--	N

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Fe%	Mg%	Ca%	Ti%	Mn	Ag	As	B	Ba	Be	Cd	Co
GM222	2.00	5.00	5.00	.300	500	N	N	100	1,000	1.0	N	5
GM223	2.00	2.00	2.00	.200	300	1.0	N	100	700	2.0	N	5
GM224	2.00	5.00	7.00	.200	500	1.0	N	150	500	2.0	N	5
GM225	3.00	5.00	7.00	.150	700	.5	N	100	500	2.0	N	5
GM226	2.00	5.00	5.00	.100	700	.5	N	100	700	2.0	N	5
GM227	1.50	2.00	2.00	.300	300	N	N	500	1,000	2.0	N	5
GM228	2.00	2.00	3.00	.300	500	N	N	100	1,000	1.5	N	5
GM229	2.00	3.00	3.00	.300	300	2.0	N	150	700	1.5	N	5
GM230	1.50	2.00	2.00	.300	500	<.5	N	100	700	1.5	N	10
GM231	1.50	2.00	2.00	.300	300	N	N	200	1,000	2.0	N	10
GM232	3.00	2.00	2.00	.300	300	1.5	N	100	700	1.0	N	15
GM233	2.00	1.00	1.00	.300	300	N	N	200	500	1.0	N	10
GM234	1.50	1.00	1.50	.300	300	N	N	200	700	2.0	N	5
GM235	1.50	2.00	2.00	.300	300	N	N	500	1,000	1.5	N	5
GM236	2.00	5.00	5.00	.300	700	N	N	200	1,000	1.5	N	5
GM237	3.00	7.00	5.00	.300	500	N	N	200	700	1.5	N	5
GM238	3.00	5.00	5.00	.300	500	.7	N	150	500	1.0	N	5
GM239	2.00	5.00	5.00	.300	500	N	N	200	700	1.0	N	10
GM240	5.00	10.00	10.00	.300	1,000	N	N	150	1,000	1.0	N	10
GM241	3.00	7.00	10.00	.300	500	N	N	150	700	1.0	N	10
GM242	2.00	7.00	7.00	.300	300	N	N	200	1,000	1.0	N	10
GM243	3.00	7.00	10.00	.300	1,000	N	N	50	700	1.0	N	10
GM244	3.00	7.00	10.00	.300	300	1.5	N	300	700	1.0	N	10
GM245	1.50	5.00	5.00	.300	300	N	N	50	500	1.0	N	5
GM246	5.00	10.00	10.00	.300	1,000	N	N	50	1,000	1.0	N	10
GM247	2.00	7.00	10.00	.700	1,000	.5	N	2,000	1,500	2.0	N	10
GM248	2.00	5.00	7.00	.200	700	N	N	50	700	1.0	N	5
GM249	2.00	5.00	5.00	.500	700	N	N	300	1,500	2.0	N	5
GM250	2.00	5.00	2.00	.300	500	N	N	300	1,500	2.0	N	10
GM251	3.00	7.00	7.00	.500	2,000	N	N	300	2,000	2.0	N	10
GM252	2.00	5.00	5.00	.500	1,000	N	N	150	1,000	2.0	N	10
GM253	5.00	3.00	5.00	.300	500	N	N	100	1,500	1.0	N	10
GM254	5.00	7.00	5.00	.500	700	N	N	300	1,500	1.0	N	10
GM255	3.00	5.00	5.00	.300	1,000	N	N	500	1,500	1.0	N	10
GM256	3.00	7.00	7.00	.500	1,000	N	N	200	2,000	1.0	N	10
GM82001	1.00	.30	<.05	.500	10	.5	N	500	1,500	N	N	N
GM82004	5.00	.20	<.05	.100	<10	1.0	N	30	1,500	N	N	N
GM82017	.70	.70	.15	.300	50	.5	N	150	3,000	1.5	N	<5
GM82023	.10	.20	<.05	.150	20	.5	N	150	3,000	N	N	N
GM82029	1.50	.70	<.05	.300	30	.7	N	200	1,500	1.5	N	<5
GM82030	.30	.50	<.05	.200	15	N	N	100	2,000	1.0	N	N
GM82035	3.00	1.50	15.00	.300	700	N	N	N	700	N	N	7
GM82051	1.50	1.50	.10	.300	30	<.5	N	200	5,000	1.0	N	N
GM82053	2.00	1.00	.15	.700	30	<.5	N	300	5,000	3.0	N	N

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Cr	Cu	La	Mo	Nb	Ni	Pb	Sb	Sc	Sn	Sr	V
GM222	50	20	50	N	<20	20	30	N	7	N	100	70
GM223	50	30	50	N	<20	30	20	N	7	N	100	200
GM224	50	20	50	<5	<20	50	20	N	7	N	100	200
GM225	30	50	50	N	<20	50	15	N	5	N	200	200
GM226	50	20	50	N	<20	70	20	N	10	N	150	200
GM227	30	20	50	N	<20	15	20	N	5	N	100	100
GM228	50	20	50	N	<20	20	20	N	5	N	100	70
GM229	100	20	50	N	<20	30	100	N	10	N	100	100
GM230	70	20	50	N	<20	20	20	N	10	N	<100	70
GM231	100	50	50	N	<20	20	20	N	10	N	150	70
GM232	50	100	50	N	<20	50	20	N	10	N	<100	50
GM233	70	50	50	N	<20	50	30	N	10	N	<100	70
GM234	50	20	50	N	<20	20	30	N	10	N	<100	70
GM235	100	50	50	N	<20	50	20	N	10	N	100	100
GM236	50	20	50	N	<20	10	10	N	10	N	<100	100
GM237	70	50	50	N	<20	50	20	N	10	N	100	150
GM238	50	200	50	N	<20	30	10	N	7	N	100	100
GM239	50	50	50	N	<20	50	10	N	7	N	100	100
GM240	100	50	50	N	<20	50	20	N	10	N	200	200
GM241	100	50	50	N	<20	50	10	N	10	N	100	200
GM242	100	70	50	N	<20	70	10	N	10	N	100	200
GM243	70	20	50	N	<20	50	10	N	7	N	100	200
GM244	100	70	50	N	<20	70	100	N	7	N	100	200
GM245	50	20	50	N	<20	20	10	N	5	N	N	100
GM246	50	50	50	N	<20	50	10	N	10	N	<100	200
GM247	100	50	70	N	<20	20	15	N	20	N	200	200
GM248	20	20	50	N	<20	20	10	N	5	N	<100	70
GM249	100	30	50	N	<20	20	20	N	15	N	100	300
GM250	100	30	50	N	<20	50	10	N	10	N	100	300
GM251	150	100	50	N	<20	50	1,000	200	20	200	100	500
GM252	100	150	50	N	<20	50	10	N	10	N	100	300
GM253	100	100	50	5	<20	50	20	N	10	N	N	200
GM254	100	70	50	N	<20	30	20	N	10	N	100	200
GM255	150	70	50	7	<20	30	30	N	10	N	150	200
GM256	150	70	70	N	<20	50	30	N	10	N	200	300
GM82001	100	20	50	7	N	<5	30	N	7	N	N	700
GM82004	15	<5	30	<5	N	5	<10	N	<5	N	N	1,000
GM82017	20	20	30	5	N	20	20	N	5	N	N	200
GM82023	30	<5	30	7	N	5	<10	N	5	N	N	2,000
GM82029	30	20	30	20	N	15	20	N	7	N	N	500
GM82030	10	10	30	N	N	5	10	N	5	N	N	500
GM82035	70	20	20	N	N	100	10	N	7	N	500	5,000
GM82051	20	70	30	<5	<20	20	20	N	7	N	N	500
GM82053	15	7	50	N	30	<5	20	N	10	N	N	100

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Y	Zn	Zr	Zn(AA)	Cd(AA)	Bi(AA)	Sb(AA)	As(AA)	Ag(AA)	Au(AA)
GM222	30	N	500	--	--	--	--	<10	.25	N
GM223	20	<200	300	--	--	--	--	<10	.55	N
GM224	20	<200	300	--	--	--	--	N	.40	N
GM225	30	500	200	--	--	--	--	N	.50	N
GM226	30	N	300	--	--	--	--	N	.25	N
GM227	20	N	300	--	--	--	--	<10	.35	N
GM228	20	N	300	--	--	--	--	N	.30	N
GM229	30	N	300	--	--	--	--	N	1.55	N
GM230	50	N	300	--	--	--	--	10	.35	N
GM231	50	N	300	--	--	--	--	N	.20	N
GM232	50	N	500	--	--	--	--	<10	.35	N
GM233	20	<200	300	--	--	--	--	<10	.15	N
GM234	20	500	300	--	--	--	--	N	.20	N
GM235	20	N	300	--	--	--	--	80	.20	N
GM236	20	N	1,000	--	--	--	--	<10	.15	N
GM237	50	N	300	--	--	--	--	10	.20	N
GM238	20	<200	300	--	--	--	--	<10	.35	N
GM239	20	N	500	--	--	--	--	<10	.20	N
GM240	50	N	300	--	--	--	--	<10	.15	N
GM241	30	N	300	--	--	--	--	<10	.15	N
GM242	20	N	200	--	--	--	--	N	.10	N
GM243	30	N	300	--	--	--	--	N	.05	N
GM244	20	N	300	--	--	--	--	<10	.15	N
GM245	15	N	300	--	--	--	--	N	.10	N
GM246	20	N	700	--	--	--	--	N	.15	N
GM247	50	200	500	--	--	--	--	N	.10	N
GM248	20	N	300	--	--	--	--	N	.10	N
GM249	50	N	500	--	--	--	--	N	.05	N
GM250	30	N	500	--	--	--	--	N	.15	N
GM251	50	N	500	--	--	--	--	N	.15	N
GM252	30	N	500	--	--	--	--	N	.05	N
GM253	20	N	300	--	--	--	--	<10	.20	N
GM254	50	N	500	--	--	--	--	N	.15	N
GM255	30	N	500	--	--	--	--	N	.20	N
GM256	50	N	500	--	--	--	--	N	.20	N
GM82001	15	N	150	10	N	N	7	10	--	--
GM82004	<10	N	50	<5	N	N	7	<10	--	--
GM82017	10	<200	100	130	1.5	N	8	5	--	--
GM82023	15	N	70	N	N	N	5	N	--	--
GM82029	15	N	100	40	N	N	7	10	--	--
GM82030	<10	N	70	10	N	N	10	N	--	--
GM82035	50	200	100	220	2.4	N	3	N	--	--
GM82051	15	N	200	55	N	N	3	20	--	--
GM82053	20	N	500	40	N	N	2	N	--	--

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Fe%	Mg%	Ca%	Ti%	Mn	Ag	As	B	Ba	Be	Cd	Co
GM82061	.30	.30	<.05	.100	<10	3.0	N	50	1,000	N	N	N
GM82065	2.00	2.00	1.00	.300	100	N	N	100	1,000	1.5	N	7
GM82068	3.00	2.00	.15	1.000	70	.5	N	100	1,000	2.0	N	5
GM32069	20.00	.30	<.05	.500	150	N	N	N	700	2.0	N	20
GM82070	1.50	1.00	.15	.300	20	.5	N	100	1,000	2.0	N	5
GM82072	1.00	2.00	2.00	.500	200	.5	N	300	>5,000	1.0	N	5
GM82076	5.00	3.00	7.00	1.000	1,500	.5	N	50	5,000	2.0	N	10
GM82081	.30	.10	<.05	.100	15	<.5	N	20	2,000	<1.0	N	N
				Brecciated thinly laminated argillite, siltite, and quartzite								
GM82003	3.00	.10	<.05	.100	<10	15.0	N	150	1,000	<1.0	N	<5
GM82009	3.00	.30	.10	.200	50	.7	<200	150	1,500	1.0	N	<5

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Cr	Cu	La	Mo	Nb	Ni	Pb	Sb	Sc	Sn	Sr	V
GM82061	20	20	20	20	N	7	15	N	5	N	N	>10,000
GM82065	15	20	30	N	<20	30	10	N	7	N	N	100
GM82068	30	50	30	15	<20	20	15	N	10	N	<100	1,000
GM82069	10	70	20	<5	<20	100	30	N	7	N	N	100
GM82070	15	50	30	N	N	30	15	N	7	N	N	300
GM82072	70	15	70	<5	<20	10	30	N	7	N	150	100
GM82076	30	100	50	5	20	30	30	N	10	N	150	100
GM82081	<10	15	20	N	N	<5	10	N	<5	N	N	100
Brecciated thinly laminated argillite, siltite, and quartzite--continued												
GM82003	50	20	20	<5	N	5	100	N	5	N	N	1,000
GM82009	20	150	20	7	N	15	30	<100	5	N	<100	150

Table 1.--Geochemical data from the Salmon River study area--Continued

Sample	Y	Zn	Zr	Zn(AA)	Cd(AA)	Bi(AA)	Sb(AA)	As(AA)	Ag(AA)	Au(AA)
GM82061	20	N	70	10	N	N	11	15	--	--
GM82065	20	N	150	50	N	N	2	5	--	--
GM82068	15	N	150	65	N	N	5	15	--	--
GM82069	20	500	200	310	.8	<2	4	65	--	--
GM82070	15	N	100	65	.4	N	5	5	--	--
GM82072	20	N	300	45	N	N	3	<10	--	<.05
GM82076	30	300	200	80	N	N	4	N	--	<.05
GM82081	N	N	20	5	N	N	3	N	--	<.05
		Brecciated thinly laminated argillite, siltite, and quartzite--continued								
GM82003	20	N	70	10	.7	N	15	5	--	--
GM82009	20	N	100	65	.9	N	50	150	--	--