UNITED STATES DEPARTMENT OF THE INTERIOR
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ANALYTICAL RESULTS AND SAMPLE LOCALITY MAP OF JASPEROID SAMPLES FROM MACKAY, IDAHO

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This report presents the results of a partial geochemical survey of a part of the Idaho Falls and Dubois 1 x 2 degree quadrangles, Idaho. Samples for geochemical analysis were collected as one of several multidisciplinary studies associated with a U.S. Geological Survey Conterminous United States Mineral Appraisal Program (CUSMAP) to evaluate the mineral resources of the Hailey 1 x 2 degree quadrangle and a part of the Idaho Falls 1 x 2 degree quadrangle, Idaho.

INTRODUCTION

In 1987, the U.S. Geological Survey (USGS) conducted a reconnaissance geochemical survey of jasperoid rocks near Mackay, Idaho. This report presents the results of the analyses of samples collected during this survey and includes a brief description of the physical properties of the samples. Interpretation of the data may be found in Wilson and others (1988). The area studied is near the town of Mackay in the northwest corner of the Idaho Falls 1 x 2 degree quadrangle, west of U.S. Highway 93 and north of the Pioneer Mountains (fig. 1).

Extensive areas of jasperoid occur in Paleozoic sedimentary rocks near Mackay. Outcrops in this area range from massive, gray-, brown-, or pink-colored, hard and dense jasperoid with original textures preserved to highly brecciated, quartz-healed, gossan-stained jasperoid showing no sign of its protolith. The Mackay jasperoids have geological and geochemical similarities to jasperoids associated with known sediment-hosted precious-metal deposits in the western United States; they should therefore be of considerable interest to the exploration industry. Jasperoid, as used in this paper, refers to "an epigenetic siliceous replacement of a previously lithified host rock" (Lovering, 1972, p. 3).

The geology of the Mackay area was previously mapped by Nelson and Ross (1968, 1969a, b). Part of the area is currently being mapped by Betty Skipp of the U.S. Geological Survey, and her unpublished mapping was used to locate jasperoid bodies near Grouse and Timbered Dome. Plate 1 is a generalized geologic map of the area and is based on a compilation by Worl and others (1988) of the work done by Nelson, Ross, and Skipp. The geology consists of a basement of Paleozoic rocks, mainly carbonates, intruded by Tertiary granitic stocks and hypabyssal (Ti) bodies and overlain by Challis volcanic (Te) rocks and minor Heise volcanic rocks (Th) (pl. 1). The area is cut by high-angle faults that trend north-northwest and northeast. Jasperoid bodies (shaded in gray on plate 1) are mainly in Paleozoic limestones; a few occur in sandstone, shale, siltstone, and volcanic rock. Paleozoic rocks that crop out south and west of Highway 93 are Ordovician to Permian in age and consist of: Carey Formation and three units that may be (1) all part of the Summerhouse Formation or (2) Saturday Mountain Formation equivalent, Kinnikinic Quartzite, and Summerhouse Formation (DOu); Milligen Formation (Dm); Copper Basin Formation (Mcu); White Knob Limestone (Mw); McGowan Creek Formation (Mmg); a carbonate bank sequence comprising Middle Canyon, Scott Peak, South Creek, and Surrett Canyon Formations (Mcb); Bluebird Mountain and Snaky Canyon Formation (PMcb); and Wood River Formation (P Pw). North and east of Highway 93, the rock units include the Wilbert Formation and associated quartzites (Ꞓq); Summerhouse Formation and Kinnikinic Quartzite (Oq); and the Saturday Mountain Formation, Fish Haven and Laketown Dolostones; Roberts Mountain, Jefferson and Three Forks Formations (DOc). In addition, small outcrops of the Arco Hills Formation are included with the Bluebird Mountain and Snaky

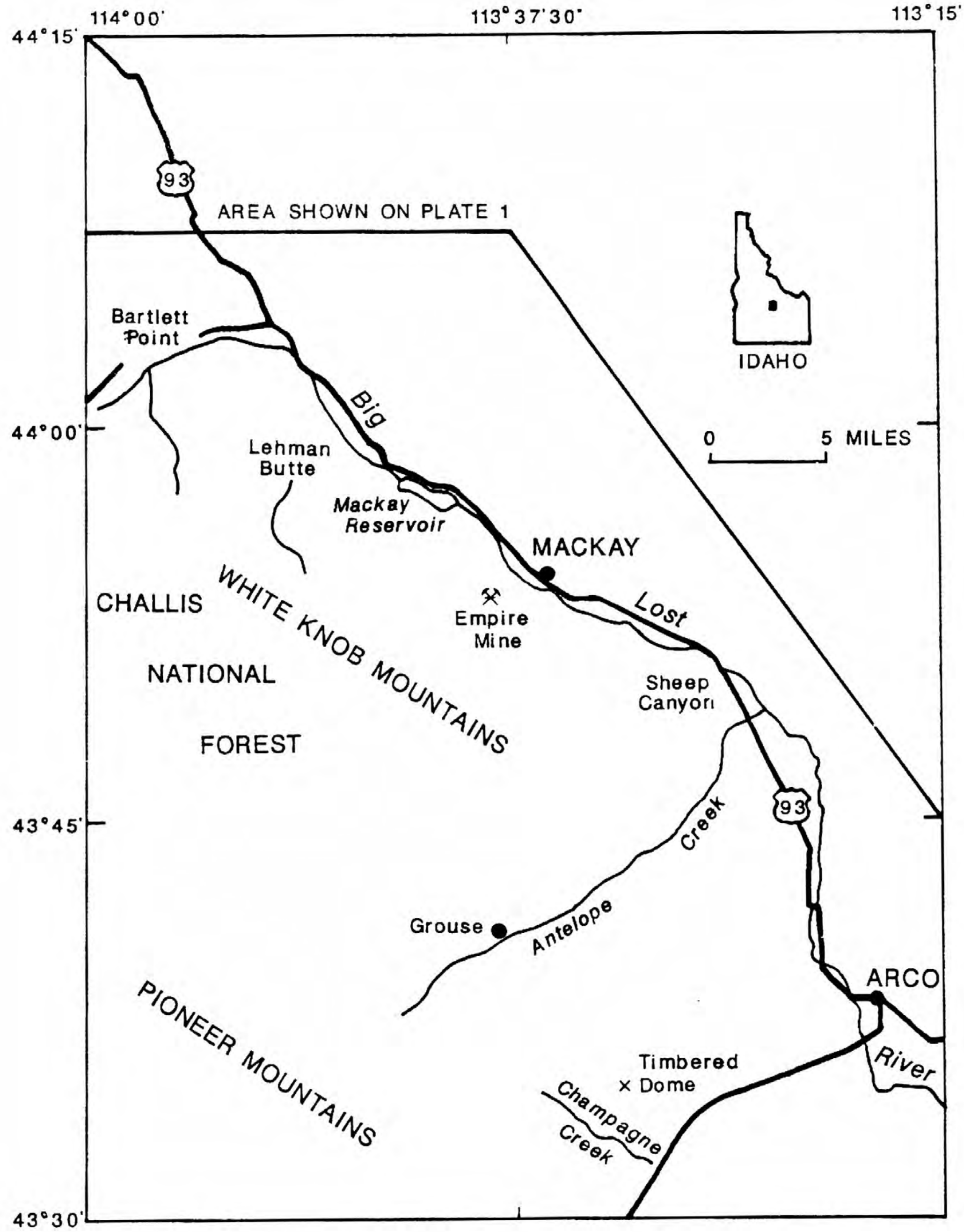

Figure 1. Location of area studied.

Canyon Formation (PMcb). For a more complete discussion of these strata and their structural relations, see Link and others (1988).

Acknowledgments--We thank S. René Evans, Ronald G. Worl, and Flint L. Hall for their help in collecting some of the chip samples from jasperoid outcrops. Funding for the geochemical analyses of most of the samples came from an Idaho State University project to study gold and silver mineralization in central Idaho. The project is directed by Falma J. Moye and supported by a grant from the Idaho State Board of Education. Funding for the analysis of 43 samples collected by Keith P. Rhea was provided by Ampro Resources, Missoula, Mont.

METHODS OF STUDY

Sample Collection, Preparation, and Analyses

One hundred and twenty rock chip samples were collected from jasperoid outcrops and from mine dumps near Mackay, Idaho, during the summer of 1987. Sample sites are shown on plate 1 and a description of each sample is found in table 1. At each site a 5 lb (pound) bag of rock chips and one or more hand samples were collected. Forty-three samples with the prefix ID were collected by K.P. Rhea of Ampro Resources; fifty-seven samples with the prefix 87M were collected by S.J. Soulliere, A.B. Wilson, S.R. Evans, and R.G. Worl. Twenty samples with the prefix 87 were collected by F.L. Hall and F.J. Moye. For descriptive purposes, samples were grouped according to location and local geographic features into eight areas: Bartlett Point, Lehman Butte, Sheep Canyon, Grouse, Timbered Dome, Champagne Creek, Empire, and Garden Creek.

In the laboratory, each rock chip sample was crushed and pulverized, then sieved to -100 mesh with U.S. Standard stainless steel sieves. One hundred and seven samples were then analyzed for 18 elements by Geochemical Services, Inc. (GSI), Sparks, Nev., using inductively coupled plasma emission spectrographic (ICP) and graphite furnace atomic absorption (AA) methods. Thirteen rock samples (ID-R-69 through ID-R-80) were submitted to Skyline Labs, Inc., Wheatridge, Colo., for analyses of Au, Ag, As, Sb, and Hg using a graphite furnace AA method. Details of the analytical procedures are considered proprietary information. Use of brand names in this report is only for descriptive purposes and does not constitute endorsement by the U.S. Geological Survey.

Before analysis by ICP, the samples were processed through a single acid digestion and through organic extraction chemistry. Extraction of the organic material in the sample eliminated undesired abundant elements, such as iron, thereby avoiding detection limit degradation caused by interferences. Three replicates of the samples were run to assure an instrument relative standard deviation of less than 1 percent. A detection limit for each element is computed (see table 2 for a list of elements and their detection limits). Before analysis by AA, the samples were processed through an acid leach extraction. Hg was analyzed by a flameless AA method. Analytical results for all samples are listed in table 3.

DESCRIPTION OF DATA TABLES

Table 1 lists the sample numbers and a brief description of each sample collected. Table 2 lists the elements analyzed by each geochemical laboratory and their limits of detection. The detection limits for samples analyzed by Geochemical Services, Inc. are computed for a standard size sample of nominal weight. If the actual weight of the submitted sample is greater than the nominal weight of the standard, then the limit of detection may be lower. If less sample is used, the limit of detection may be higher. Samples submitted to Skyline Labs, Inc. were analyzed for only five elements. All detection limits are in ppm (parts per million) unless noted otherwise. Table 3 lists the results of the analyses for all rock chip samples and is grouped according to geographic location. The data are arranged so that column 1 contains the USGS-assigned sample numbers. Successive columns include the element analyzed and the results of the analyses. An L indicates a value less than the detection limit, a G indicates a value greater than the detection limit, and a B indicates that the sample was not analyzed for this element.

All of the data were analyzed by correlation analysis using the USGS STATPAC (Van Trump and Miesch, 1976) statistical computer package to determine element associations. Tables 4 through 6 were originally presented in Wilson and others (1988) and are included here with corrected values. The main purpose was to determine element associations specific to five geographical areas (areas in which more than eight samples were collected). The data are too sparse and incomplete to allow valid groupings based on factor analysis. A summary of analytical results from the entire data set is given in table 4. Data for five individual geographic areas in which more than eight samples were collected are given in table 5. Element associations shown by correlation coefficients for these five areas are shown in table 6. These elements were selected because Ag, As, Au, Cu, Hg, Mo, Pb, Sb, and Zn were detected in more than 85 percent and Tl in nearly half the samples.

SUMMARY

Many jasperoid bodies in the Mackay area have geological and geochemical properties that are similar to jasperoids associated with known sediment-hosted precious-metal deposits in the western United States. Mackay jasperoids are replacements of limestone, shale, sandstone, carbonaceous limestone, and calcareous carbonaceous shales. Many jasperoid bodies show multiple generations of brecciation and silicification. Quartz and calcite veins are common, and minor barite, fluorite, and jarosite are present. The geochemistry of Mackay jasperoids is characterized by the presence of Ag, As, Au, Cu, Hg, Mo, Pb, Sb, Tl, and Zn. Only a few samples had detectable amounts of Bi, Cd, Pt, Se, Sn, and Te. Correlation analysis for all samples defines two strong associations: As-Hg-Sb-Tl and Ag-Pb. Of particular interest is the suite of elements As, Au, Hg, Sb, and Tl present in the majority of the samples. These elements are characteristic of the upper parts of geothermal systems (Silberman and Berger, 1985), hot-spring-type precious-metal deposits (Berger and Silberman, 1985), and sediment-hosted disseminated precious-metal deposits (Bagby and Berger, 1985).

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Table 1.--*Description of jasperoid samples*

BARTLETT POINT (34)	
ID-2-1	:Light-gray to dark orange-buff silicified breccia, orange to orange-brown limonite on fractures
ID-2-2	:Silicified breccia, Fe stained with dark maroon to yellow-orange limonite coating; calcite locally abundant
ID-2-3	:Light to medium gray jasperoid with yellow-orange limonite coating
ID-2-4	:Light to medium gray jasperoid breccia with limonite coating
ID-R-24	:Light buff to gray silicified breccia with limonite coatings in boxworks and on fractures
ID-R-25	:Light buff to gray silicified breccia with limonite coating
ID-R-44	:Gossany jasperoid breccia
ID-R-45	:Jasperoid, some limonite coating
ID-R-46	:Red, brown, and yellow ferruginous jasperoid
ID-R-47	:Jasperoid, similar to ID-R-44 but less gossany and less brecciated; open-space texture and incipient brecciation
ID-R-48	:Silicified breccia in latite porphyry
ID-R-106	:Varicolored jasperoid with Fe stain and a trace of barite in fractures
ID-R-107	:Varicolored gossany jasperoid with abundant barite as void coatings
87M-174	:Light gray silicified ls. (limestone) breccia; breccia fragments are light gray
87M-175	:Silicified ash flow, banded white to orange to pinkish-red and gray
87M-176	:Silicified ls. with crinoid stems
87M-177	:Red gossany jasperoid
87M-178A	:Silicified ls.
87M-179A	:Basal Challis Conglomerate (silicified)
87M-180B	:Dark gray silicified ls.
87M-181	:Silicified volcanic rock (tectonic breccia?)
87M-182	:Pink to light gray mottled jasperoid
87M-183	:Medium gray jasperoid, slightly brecciated
87M-194	:Gray and white silicified ls. with barite and calcite veins
87M-195	:Gray to pinkish-gray gossany jasperoid with jarosite crystals

87-1019	:Silicified ls. breccia
87-1026A	:Quartz arenite
87-1026B	:Micrite breccia
87-1026C	:Silicified ls.
87-1026D	:ls. breccia with red silicic matrix
87-1026E	:ls. breccia with red silicic matrix
87-1027	:Silicified ls., brecciated
87-1028	:Silicified ls.
87-1029	:Brecciated ls. with silicic matrix

LEHMAN BUTTE (15)

ID-R-95	:Light to medium gray to gray brown brecciated jasperoid with limonite stain on fractures
ID-R-96	:Same as ID-R-95
ID-R-101	:Light to dark gray silicified breccia and jasperoid
87M-172A	:Gossany jasperoid breccia
87M-173	:Light gray to tan or pink jasperoid breccia, Fe stained surface
87M-191	:Light to dark gray jasperoid breccia
87M-192	:Gossany jasperoid breccia, Fe stained surface
87M-193	:Light to dark gray to pink silicified ls.
87-1030A	:Fractured gray ls.; calcite in fractures
87-1030B	:Dark gray brecciated ls.
87-1030C	:Dark gray brecciated ls.
87-1030D	:Light gray silicified ls.
87-1030E	:Gray ls. with calcite
87-1031	:ls. breccia
87-1032	:Silicified ls. breccia

SHEEP CANYON (20)

ID-R-102	:Light to dark gray jasperoid, Fe stain in fractures
ID-R-108	:Varicolored ferruginous jasperoid breccia with abundant quartz veins
ID-R-109	:Light to dark gray jasperoid breccia, Fe stained surface
ID-R-110	:Dark gray jasperoid breccia, Fe stained in fractures
ID-R-111	:Ferruginous jasperoid
* ID-R-112	:Yellow-buff to light maroon jasperoid from mine dump, Fe stained surface
ID-R-113	:Black jasperoid breccia with calcite veins
ID-R-114	:Light to dark gray jasperoid breccia with Fe stained surface
ID-R-115	:Black jasperoid breccia with Fe stain on fractured surfaces
ID-R-116	:Varicolored jasperoid breccia, Fe stained surface

ID-R-117	:Medium to dark gray jasperoid breccia
ID-R-118	:Light to medium gray jasperoid breccia
ID-R-119	:Medium to dark gray jasperoid breccia with quartz veins
ID-R-120	:Medium to dark gray to brownish gray jasperoid breccia
* 87M-196	:Silicified ls. breccia from mine dump
87M-197	:Brown to black jasperoid breccia, Fe stained surface
87-1137	:Silicified ls.
87-1138	:Silicified ls. at fault contact
87-1139	:Silicified ls.
87-1140	:Silicified ls. breccia

GROUSE (32)

ID-R-66	:Light to dark gray jasperoid breccia, Fe stained surface
ID-R-67	:Light to dark gray jasperoid breccia
ID-R-68	:Dark gray jasperoid breccia with limonite coating
ID-R-69	:Light to dark gray jasperoid breccia
ID-R-70	:Light gray to orange-brown jasperoid breccia, Fe stained surface
ID-R-71	:Light greenish-gray, ferruginous jasperoid
ID-R-72	:Light to medium gray jasperoid
ID-R-73	:Light to medium gray jasperoid breccia, Fe stained on fractured surfaces
ID-R-74	:Dark maroon hematitic jasperoid breccia
ID-R-75	:Orange to yellow-orange jarositic(?) jasperoid
ID-R-76	:Medium gray to yellow-brown jasperoid with some Fe stain along fractures
ID-R-77	:Light gray gossany jasperoid breccia with white calcite veins, Fe stained surface
ID-R-80	:Orange-brown gossany jasperoid
87M-149	:Gray to pinkish-gray jasperoid (in McGowan Ck Formation), Fe stained surface
87M-150	:Maroon and yellowish-orange silicified ls.
87M-151	:Dark gray to black silicified ls. with crinoid stem
87M-152	:Gray to grayish-pink jasperoid
87M-153	:Jasperoid breccia
87M-154	:Jasperoid breccia
87M-155	:Dark gray jasperoid breccia

87M-156	:Dark gray to tan to pink jasperoid breccia, Fe stained surface
87M-157	:Light to dark gray jasperoid breccia, Fe stained surface
87M-158	:Dark gray silicified fossiliferous ls. breccia
87M-159	:Light to dark gray jasperoid breccia with Fe stained surface
87M-160	:Gray to white gossany silicified ls.
87M-161	:Jasperoid breccia in fault zone
87M-162	:Gray jasperoid breccia in fault zone
87M-163	:Gray silicified ls.
87M-164	:Light gray to brown-orange silicified ls.
87M-165	:Dark gray jasperoid, Fe stained surface
87M-166	:Dark gray silicified ls., Fe stained surface
87M-167	:Silicified ls. breccia

TIMBERED DOME (10)

87M-185	:Medium to dark gray to red silicified ls.
87M-186	:Tan-buff to gray silicified sandstone
87M-187	:Light to medium gray jasperoid with remnant calcite veining (silicified), Fe stained surface
87M-188	:Pink to light gray silicified breccia (sedimentary), Fe stained surface
*+ 87M-189	:High grade mine dump sample
87M-190	:Light to medium gray silicified ls.
87M-198	:Jasperoid breccia
87M-222	:Light to dark gray gossany jasperoid breccia
87M-223	:Medium to dark gray jasperoid breccia
87M-224	:Light tan to medium gray silicified ls.

CHAMPAGNE CK

*87M-136	:High grade dump sample of silicified volcanic rocks

EMPIRE AREA

* 87M-139	:Gray to red jasperoid at mine with high-grade ore
87M-142	:Red-pink jasperoid
* 87M-144A	:Gray jasperoid mine dump sample, Fe stained surface
87M-144B	:Gray to maroon gossany jasperoid breccia, Fe stained surface
87M-145	:Brown to reddish-orange gossany jasperoid
87M-146	:Light-gray gossany jasperoid

GARDEN CK

87M-184A	:Light to dark gray silicified ls.
87M-184B	:Medium to dark gray silicified ls. with brachiopod fossil

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* Mine dump sample

\+ Erroneously included with jasperoid; presented here because it was included in data set used by Wilson and others (1988).

Table 2.--*List of elements analyzed by each geochemical laboratory and their limits of detection*

[All values in ppm, parts per million, except for GSIs lower Au limit which is in ppb, parts per billion]

Element	Geochemical Services, Inc. Lower Limit	Geochemical Services, Inc. Upper Limit	Skyline Labs, Inc. Lower Limit
Ag	0.015	12,500	0.05
As	1.0	25,000	2
Au	0.5 ppb	6,250	<0.002
Bi	0.25	12,500	---
Cd	0.25	12,500	---
Cu	0.025	50,000	---
Ga	0.50	12,500	---
Hg	0.10	6,250	0.01
Mo	0.10	12,500	---
Pb	0.25	25,000	---
Pd	0.10	2,500	---
Pt	0.25	2,500	---
Sb	0.25	12,500	1
Se	1.0	100	---
Sn	0.5	12,500	---
Te	0.5	12,500	---
Tl	0.5	12,500	---
Zn	1.0	50,000	---

Table 3.--Results of geochemical analyses of rock samples from Mackay, Idaho

[All values in ppm (parts per million); L, indicates a value less than the detection limit; G, indicates a value greater than the detection limit; B, indicates that the sample was not analyzed for this element]

Sample	Ag	As	Au	Cu	Hg	Mo	Pb	Sb	Tl	Zn
BARTLETT POINT (34)										
ID-2-1	.103	236.	.002	8.58	1.08	12.4	8.22	16.6	.5 L	19.9
ID-2-2	.080	1306.	.002	11.8	6.72	35.1	5.30	135.	5.35	9.75
ID-2-3	.086	166.	.014	5.03	.5 L	25.2	5.21	17.5	1.43	9.14
ID-2-4	.215	511.	.033	17.0	2.51	9.39	6.15	24.8	.5 L	21.0
ID-R-24	.127	114.	.05 L	84.8	.5 L	7.47	5.23	13.6	1.43	9.76
ID-R-25	.214	318.	.05 L	127.	.79	13.9	6.60	34.8	1.97	59.1
ID-R-44	.071	286.0	.002	25.0	.5 L	6.15	6.17	16.9	.5 L	29.9
ID-R-45	.054	34.5	.001	35.4	.512	2.99	5.75	7.26	.5 L	5.76
ID-R-46	.073	580.0	.026	28.7	.5 L	7.74	4.48	13.7	1.0	33.4
ID-R-47	.206	102.0	.024	49.7	2.84	8.07	8.52	29.3	.5 L	68.4
ID-R-48	.046	2.17	.010	15.3	.5 L	.879	5.47	.25 L	.5 L	26.6
ID-R-106	.092	442.	.003	10.8	2.71	54.7	3.64	30.5	6.37	22.8
ID-R-107	.097	732.	.002	29.4	3.35	25.4	5.24	44.0	4.83	107.
87M-174	.088	102.	.008	4.14	1.04	3.37	3.50	8.72	1.15	2.54
87M-175	.055	4.22	.007	5.14	.317	1.49	4.14	.519	.485	32.2
87M-176	.191	59.8	.008	6.87	1.18	3.06	20.6	3.58	.775	9.39
87M-177	.119	135.	.008	6.69	1.60	4.25	4.49	4.75	.720	10.6
87M-178A	.127	50.1	.008	10.0	2.94	2.55	10.4	5.60	.743	2.45
87M-179A	.154	10.5	.008	10.5	.405	9.90	7.55	.799	.499L	19.3
87M-180B	.139	130.	.008	10.3	2.68	5.01	3.19	3.03	.515	4.97
87M-181	.132	182.	.009	14.6	3.92	3.46	9.71	3.61	.646	12.0
87M-182	.816	229.	.161	10.7	2.13	7.80	6.38	25.5	.633	14.1
87M-183	.369	71.2	.037	6.03	1.01	4.16	5.25	7.32	.489L	10.3
87M-194	16.5	32.7	.033	6.32	1.21	6.96	3.38	2.50	.475L	7.63
87M-195	.298	486.	.07	6.15	4.11	80.3	5.09	31.7	.986	5.38
87-1019	.316	119.	.038	5.84	1.26	6.35	2.97	14.7	.484L	3.72
87-1026A	.227	111.	.021	3.79	.136	4.11	.616	6.77	.468L	3.64
87-1026B	.066	22.0	.004	3.58	.311	2.01	1.55	4.05	.476L	27.7
87-1026C	.015L	44.0	.005	5.66	.1 L	6.17	1.34	2.98	.498L	1.22
87-1026D	.017	26.1	.003	4.48	.175	3.99	1.46	5.55	.483L	2.54
87-1026E	.014L	18.5	.005	4.98	.097L	6.52	1.63	5.01	.515L	1.59
87-1027	.076	193.	.004	2.79	3.70	8.01	1.79	22.4	1.45	5.26
87-1028	.028	29.4	.002	3.97	.716	7.68	1.35	6.28	.475L	.951L
87-1029	.036	302.	.01	8.80	.242	9.43	4.99	21.6	.481L	67.8

Table 3. Continued

Sample	Ag	As	Au	Cu	Hg	Mo	Pb	Sb	Tl	Zn
LEHMAN BUTTE (15)										
ID-R-95	.374	206.	.003	30.7	.088L	59.2	55.3	6.95	.442L	17.4
ID-R-96	6.17	177.	.03	62.0	4.59	21.7	30.8	17.0	.691	37.6
ID-R-101	.094	152.	.004	7.10	.671	39.6	3.01	11.9	1.31	29.7
87M-172A	.901	60.1	.028	6.29	.569	9.34	27.2	4.11	.878	5.93
87M-173	.389	46.8	.01	5.76	.302	2.70	8.21	2.34	.659	3.54
87M-191	.120	25.3	.003	4.79	.788	6.69	2.42	6.21	.471	3.52
87M-192	.148	181.	.003	6.46	2.57	15.3	3.47	26.2	2.95	12.2
87M-193	.257	48.7	.004	4.67	.503	6.63	1.75	5.34	.792	.927
87-1030A	.03	110.	.003	2.46	1.70	7.79	.77	12.5	2.19	.888L
87-1030B	.013L	9.21	.004	2.41	.089L	5.37	.831	1.27	.443L	.887L
87-1030C	.081	398.	.002	8.66	2.99	24.1	3.05	62.7	1.01	65.3
87-1030D	.018	29.7	.003	2.80	.095L	5.47	.966	4.55	.608	1.02
87-1030E	.013L	6.07	.004	1.24	.088L	.343	1.28	.316	.438L	12.6
87-1031	.014L	47.0	.005	4.27	.107	11.2	.913	1.54	.468L	7.00
87-1032	.147	25.9	.005	5.26	.098L	16.9	1.59	1.13	.599	10.9
SHEEP CANYON (20)										
ID-R-102	.106	40.0	.021	5.85	1.11	9.60	1.74	18.4	3.16	47.9
ID-R-108	.06	217.	.002	10.8	.095L	4.52	4.67	20.3	.508	100.
ID-R-109	.096	262.	.003	10.8	.955	3.41	2.03	6.44	2.61	78.3
ID-R-110	.067	185.	.001	5.58	1.22	18.2	3.00	12.5	4.20	25.3
ID-R-111	.084	130.	.001	7.96	3.28	121.	3.85	17.7	3.50	180.
ID-R-112	.048	208.	.001	6.06	.295	9.47	3.13	9.55	.902	130.
ID-R-113	.061	26.4	.002	6.45	.314	6.36	2.44	1.20	.49 L	41.1
ID-R-114	.07	27.3	.003	5.29	.115	3.74	2.21	8.13	.498L	28.1
ID-R-115	.05	19.1	.002	5.30	.227	4.75	1.77	8.45	.663	19.4
ID-R-116	.048	86.9	.001	4.82	.093L	3.53	2.28	42.7	.463L	49.0
ID-R-117	.036	133.	.002	10.2	.284	4.75	3.35	8.25	.579	49.4
ID-R-118	.041	24.6	.0005L	5.87	.781	3.88	2.61	6.33	.466	64.5
ID-R-119	.039	68.3	.005	5.58	.093L	4.10	2.29	13.1	.510	77.3
ID-R-120	.05	14.8	.002	7.86	.09	10.6	3.11	8.84	.448L	15.7
87M-196	.098	56.2	.004	8.88	.466	4.94	2.65	2.42	.466L	43.5
87M-197	.088	26.3	.004	6.84	.475	3.94	2.25	12.5	.466L	17.1
87-1137	1.92	39.7	.04	5.88	.547	3.66	9.93	8.45	.466L	43.4
87-1138	.142	110.	.004	8.13	2.25	2.27	31.3	40.7	.438L	40.8
87-1139	.570	162.	.004	13.0	1.15	5.84	152.	10.0	1.53	153.
87-1140	.102	84.7	.004	19.3	1.64	4.17	12.7	12.1	1.00	26.1

Table 3. Continued

Sample	Ag	As	Au	Cu	Hg	Mo	Pb	Sb	Tl	Zn
GROUSE (32)										
ID-R-66	.20	5.	.012	B	.05	B	B	2. L	B	B
ID-R-67	.15	65.	.030	B	.54	B	B	2.	B	B
ID-R-68	.40	90.	.010	B	.07	B	B	2.	B	B
ID-R-69	.50	150.	.002	B	.07	B	B	10.	B	B
ID-R-70	.30	245.	.002L	B	2.20	B	B	4.	B	B
ID-R-71	.40	135.	.002L	B	1.40	B	B	8.	B	B
ID-R-72	.25	200.	.002L	B	3.10	B	B	8.	B	B
ID-R-73	.15	250.	.002L	B	1.40	B	B	10.	B	B
ID-R-74	.10	50.	.002L	B	.08	B	B	4.	B	B
ID-R-75	.10	295.	.002L	B	.98	B	B	14.	B	B
ID-R-76	.20	36.	.002L	B	.49	B	B	4.	B	B
ID-R-77	.25	545.	.005	B	2.90	B	B	34.	B	B
ID-R-80	.75	630.	.002L	B	.04	B	B	8.	B	B
87M-149	.581	64.7	.004	4.20	.468	3.72	113.	4.01	1.19	6.44
87M-150	.438	515.	.004	8.05	2.35	7.73	104.	57.5	17.7	7.90
87M-151	2.15	31.7	.004	6.61	.563	4.77	452.	4.12	.693	6.30
87M-152	.181	13.0	.004	3.72	1.00	5.43	35.7	5.45	1.08	3.87
87M-153	.142	30.3	.004	5.60	1.08	6.12	43.5	2.22	1.24	4.49
87M-154	.307	10.2	.004	4.27	.693	4.10	29.0	1.09	.917	4.60
87M-155	.172	8.41	.004	6.49	.220	4.66	15.9	.933	.549	4.61
87M-156	.192	11.1	.004	4.35	2.58	8.65	35.2	1.04	.796	21.8
87M-157	.098	46.4	.004	3.82	1.54	2.77	7.27	3.06	1.82	2.88
87M-158	.075	5.24	.004	3.38	.347	3.97	7.27	.513L	.703	1.85
87M-159	.067	14.6	.004	3.05	.477	46.7	5.35	2.06	.959	.949L
87M-160	.097	76.4	.003	6.30	1.06	7.29	4.48	3.06	1.86	5.21
87M-161	.112	44.9	.003	6.20	1.44	7.55	5.86	7.94	2.24	5.76
87M-162	.219	107.	.004	8.83	1.74	79.6	11.5	5.84	1.38	15.7
87M-163	.085	27.4	.008	3.60	.627	3.23	5.55	2.53	.620	6.8
87M-164	.072	9.91	.009	3.83	.508	3.48	5.56	1.40	.480	7.93
87M-165	.312	167.	.007	7.23	3.78	11.9	4.67	16.1	3.29	12.2
87M-166	.08	24.9	.008	3.97	.487	7.14	2.85	2.91	.730	3.47
87M-167	.09	10.9	.019	4.19	.532	9.06	3.51	1.07	.660	2.35
TIMBERED DOME (10)										
87M-185	.076	3.37	.003	5.65	.333	3.73	2.05	.959L	.48 L	1.91
87M-186	.143	7.72	.004	6.24	.387	5.75	2.99	.504	.481L	3.08
87M-187	.161	12.3	.003	14.1	.602	2.19	4.12	.416L	.570L	16.8
87M-188	.124	13.1	.004	8.37	.321	3.58	3.57	.834	.467L	28.5
87M-189	.846	98.1	.009	77.1	4.11	5.70	10.2	7.78	.472L	586.
87M-190	.095	7.16	.003	8.02	.249	4.77	2.36	.372	.456L	6.34
87M-198	.073	52.8	.004	4.96	.384	13.6	1.81	1.82	.461L	4.26
87M-222	.156	263.	.004	16.7	2.09	10.9	7.14	9.10	.477L	34.7
87M-223	.08	57.0	.003	7.24	.551	9.23	4.51	2.37	.478L	13.0
87M-224	.218	50.1	.003	11.6	.795	4.80	4.57	3.33	.711	8.68

Table 3. Continued

Sample	Ag	As	Au	Cu	Hg	Mo	Pb	Sb	Tl	Zn
CHAMPAGNE CK--Hornsilver Mine										
87M-136	20.5	179.	.307	164.	4.95	25.2	2610.	26.1	2.02	38.2
EMPIRE AREA										
87M-139	1538.	1786.	.146	110.	2.54 L	10.0	25000.G	394.	6.59 L	1037.
87M-142	22.7	183.	.036	13.9	2.41	9.26	5708.	68.4	.574	37.8
87M-144A	.659	97.2	.005	25.3	2.62	2.63	139.	16.9	1.95	197.
87M-144B	.666	2064.	.007	16.6	20.6	2.02	118.	470.	11.7	182.
87M-145	1.67	167.	.01	10.0	3.29	15.5	178.	18.7	1.83	32.7
87M-146	.620	181.	.003	17.7	2.24	4.39	119.	23.8	4.28	582.
GARDEN CK										
87M-184A	.108	7.25	.004	6.19	.638	3.47	9.10	.467L	.473L	11.1
87M-184B	.124	8.31	.003	6.44	.478	7.59	3.54	.960	.471L	21.0

Table 3. Continued

Sample	Bi	Cd	Ga	Pd	Pt	Se	Sn	Te
BARTLETT POINT (34)								
ID-2-1	.5 L	.5 L	2.11	.25 L	.5 L	1.34	1.23	.5 L
ID-2-2	.5 L	.5 L	2.81	.25 L	.5 L	5.99	.77	.5 L
ID-2-3	.5 L	.5 L	.78	.25 L	.5 L	3.40	1.30	.5 L
ID-2-4	.5 L	.94	2.31	.25 L	.5 L	6.76	.5 L	.5 L
ID-R-24	.5 L	.5 L	.75	.25 L	.5 L	2.00 L	1.97	1.0
ID-R-25	.5 L	1.38	1.85	.25 L	.5 L	2.00 L	2.19	.9
ID-R-44	.5 L	.5 L	1.11	.25 L	.5 L	1.42	1.59	.5 L
ID-R-45	.5 L	.5 L	.5 L	.25 L	.5 L	1.0 L	2.43	.5 L
ID-R-46	.5 L	.5 L	1.7	.25 L	.5 L	2.6	1.4	.5 L
ID-R-47	.5 L	.932	.5 L	.25 L	.5 L	1.9	3.17	.5 L
ID-R-48	.5 L	.5 L	.5 L	.25 L	.5 L	1.0 L	1.18	.5 L
ID-R-106	1.02	.242	2.37	.094L	.235L	1.59	.47 L	.47 L
ID-R-107	.534	.381	3.52	.088	.233	1.88	.44 L	.44 L
87M-174	.228L	.228L	.455L	.091L	.228L	.911L	.455L	.455L
87M-175	.234L	.234L	1.72	.093L	.234L	.935L	.660	.467L
87M-176	.242L	.242L	1.17	.097L	.242L	.969L	.484L	.484L
87M-177	.239L	.561	1.30	.096L	.239L	.956L	.478L	.478L
87M-178A	.307	.224L	1.74	.09 L	.224L	.896L	.448L	.448L
87M-179A	.25 L	.25 L	.596	.1 L	.25 L	.998L	.499L	.499L
87M-180B	.24 L	.24 L	.598	.096L	.24 L	.962L	.481L	.481L
87M-181	.308	.249L	3.49	.099L	.249L	.994L	.497L	.497L
87M-182	.231L	.231L	1.63	.092L	.231L	4.88	.461L	.461L
87M-183	.245L	.245L	1.07	.098L	.245L	.978L	.489L	.489L
87M-194	.238L	.238L	.475L	.095L	.238L	3.46	.475L	.475L
87M-195	.229L	.229L	3.23	.091L	.229L	3.04	.457L	.457L
87-1019	.242L	.242L	.484L	.097L	.242L	4.74	.484L	.484L
87-1026A	.234L	.234L	.468L	.094L	.234L	2.74 L	.468L	.468L
87-1026B	.238L	.366	.913	.095L	.238L	4.32 L	.476L	.476L
87-1026C	.249L	.249L	.498L	.1 L	.249L	6.34	.498L	.498L
87-1026D	.241L	.241L	.483L	.097L	.241L	3.77 L	.483L	.483L
87-1026E	.241L	.241L	.483L	.097L	.241L	5.19 L	.483L	.483L
87-1027	.235L	.235L	.469L	.094L	.235L	4.05 L	.469L	.469L
87-1028	.238L	.238L	.475L	.095L	.238L	3.60 L	.492	.475L
87-1029	.24 L	.24 L	2.15	.096L	.24 L	3.22 L	.481L	.481L

Table 3. Continued

Sample	Bi	Cd	Ga	Pd	Pt	Se	Sn	Te
LEHMAN BUTTE (15)								
ID-R-95	3.06	.221L	.442L	.088L	.221L	2.13	.745	.442L
ID-R-96	.742	.247	.757	.088L	.219L	1.44	4.14	7.70
ID-R-101	.229L	.292	.459L	.092L	.229L	.917L	.459L	.459L
87M-172A	.667	.238L	1.40	.095L	.238L	.952L	.476L	.476L
87M-173	.243	.231L	1.41	.093L	.231L	.926L	.463L	.463L
87M-191	.234L	.234L	.467L	.093L	.234L	.935L	.467L	.467L
87M-192	.236L	.236L	.473L	.095L	.236L	.945L	.473L	.473L
87M-193	.231L	.231L	.461L	.092L	.231L	.923L	.461L	.461L
87-1030A	.222L	.222L	.444L	.089L	.222L	.888L	.444L	.444L
87-1030B	.222L	.222L	.443L	.089L	.222L	2.35	.443L	.443L
87-1030C	.243L	.829	.485L	.097L	.243L	2.36 L	.485L	.485L
87-1030D	.236L	.236L	.473	.095L	.236L	15.9 L	.473L	.473L
87-1030E	.219L	.288	.438L	.088L	.219L	2.85 L	.438L	.438L
87-1031	.234L	.234L	.468L	.094L	.234L	.936L	.468L	.468L
87-1032	.241L	.284	.482L	.096L	.241L	2.54 L	.482L	.482L
SHEEP CANYON (20)								
ID-R-102	.242L	.334	.484L	.097L	.242L	1.10	.484L	.484L
ID-R-108	.237L	.266	2.52	.095L	.327	.947L	.473L	.473L
ID-R-109	.234L	.291	.632	.094L	.234L	.936L	.468L	.468L
ID-R-110	.364	.505	1.32	.091L	.228L	.912L	.482	.456L
ID-R-111	2.10	1.99	.795	.095L	.371	.952L	.707	.476L
ID-R-112	.289	.538	.488L	.098L	.339	2.22	.488L	.488L
ID-R-113	.245L	.613	.49 L	.098L	.286	.98 L	.49 L	.49 L
ID-R-114	.249L	.391	.498L	.1 L	.249L	.996L	.498L	.498L
ID-R-115	.233	.228L	.456L	.091L	.268	.912L	.540	.456L
ID-R-116	.231L	.231L	1.14	.093L	.231L	1.97	.463L	.463L
ID-R-117	.24 L	.595	.931	.096L	.24 L	2.77	.481L	.481L
ID-R-118	.244	.223L	.446L	.089L	.223L	1.28	.547	.446L
ID-R-119	.232L	.232L	.774	.093L	.232L	.929L	.465L	.465L
ID-R-120	.329	.224L	.448L	.09 L	.224L	.896L	2.66	.448L
87M-196	.233L	.275	.466L	.093L	.233L	1.23	.466L	.466L
87M-197	.233L	.233L	.466L	.093L	.233L	.933L	.466L	.466L
87-1137	.233L	.572	.466L	.093L	.233L	4.15 L	.466L	.466L
87-1138	.219L	.388	.728	.088L	.219L	2.49 L	.655	.438L
87-1139	.235L	1.56	.471L	.094L	.235L	2.80 L	1.29	.471L
87-1140	.227L	.286	.454L	.091L	.227L	2.03 L	.454L	.454L

Table 3. Continued

Sample	Bi	Cd	Ga	Pd	Pt	Se	Sn	Te
GROUSE (32)								
ID-R-66	B	B	B	B	B	B	B	B
ID-R-67	B	B	B	B	B	B	B	B
ID-R-68	B	B	B	B	B	B	B	B
ID-R-69	B	B	B	B	B	B	B	B
ID-R-70	B	B	B	B	B	B	B	B
ID-R-71	B	B	B	B	B	B	B	B
ID-R-72	B	B	B	B	B	B	B	B
ID-R-73	B	B	B	B	B	B	B	B
ID-R-74	B	B	B	B	B	B	B	B
ID-R-75	B	B	B	B	B	B	B	B
ID-R-76	B	B	B	B	B	B	B	B
ID-R-77	B	B	B	B	B	B	B	B
ID-R-80	B	B	B	B	B	B	B	B
87M-149	.482	.242L	.484L	.097L	.242L	.969L	.484L	.484L
87M-150	.304	.243	.580	.097L	.243L	.971L	.485L	.485L
87M-151	1.35	.233L	.466L	.093L	.233L	.933L	.466L	.466L
87M-152	.235L	.235L	.47 L	.094L	.235L	.94 L	.47 L	.47 L
87M-153	.245L	.245L	.49 L	.098L	.245L	.98 L	.49 L	.49 L
87M-154	.245L	.245L	.489L	.098L	.245L	.978L	.489L	.489L
87M-155	.238L	.238L	.476L	.095L	.238L	.952L	.476L	.476L
87M-156	.234L	.234L	.468L	.094L	.234L	.936L	.468L	.468L
87M-157	.247L	.247L	.494L	.099L	.247L	.988L	.494L	.494L
87M-158	.233L	.233L	.466L	.093L	.233L	.931L	.466L	.466L
87M-159	.237L	.237L	.474L	.095L	.288	.949L	.474L	.474L
87M-160	.218L	.218L	.436L	.087L	.218L	.873L	.436L	.436L
87M-161	.23 L	.23 L	.567	.092L	.23 L	.919L	.46 L	.46 L
87M-162	.239L	.239L	.677	.096L	.384	1.44	.478L	.478L
87M-163	.238L	.238L	.725	.095L	.238L	.951L	.475L	.475L
87M-164	.223L	.223L	.787	.089L	.223L	.893L	.446L	.446L
87M-165	.219L	.219L	.532	.087L	.219L	.874L	.437L	.437L
87M-166	.234L	.234L	.468L	.094L	.234L	.936L	.468L	.468L
87M-167	.231L	.231L	.480	.092L	.231L	.924L	.462L	.462L
TIMBERED DOME (10)								
87M-185	.24 L	.24 L	.48 L	.096L	.24 L	.96 L	.48 L	.48 L
87M-186	.24 L	.24 L	.481L	.096L	.24 L	.962L	.481L	.481L
87M-187	.237L	.237L	.839	.095L	.237L	.949L	.474L	.474L
87M-188	.234L	.234L	.674	.093L	.234L	.935L	.467L	.467L
87M-189	.236L	.236L	.711	.094L	.236L	1.86	.472L	1.22
87M-190	.228L	.228L	.456L	.091L	.228L	.912L	.456L	.456L
87M-198	.231L	.231L	.461L	.092L	.231L	.923L	.461L	.461L
87M-222	.239L	.291	.477L	.095L	.239L	.954L	.477L	.477L
87M-223	.239L	.239L	.478L	.096L	.239L	.959L	.478L	.478L
87M-224	.242L	.242L	.658	.097L	.242L	.972	.484L	.484L

Table 3. Continued

Sample	Bi	Cd	Ga	Pd	Pt	Se	Sn	Te
CHAMPAGNE CK--Hornsilver Mine								
87M-136	9.18	.226L	10.6	.091L	.278	10.7	1.98	12.7
EMPIRE AREA								
87M-139	1263.	8.94	5. L	1. L	2.5 L	136.	17.2	40.0
87M-142	18.6	.246L	1.19	.098L	.326	.984L	.555	1.25
87M-144A	.680	.299	1.72	.093L	.232L	1.34	.465L	.602
87M-144B	.542	3.68	1.04	.098L	.246L	.982L	.491L	.491L
87M-145	.726	.307	1.12	.09 L	.226L	1.00	.452L	1.29
87M-146	.626	1.26	.479	.093L	.233L	.968	.466L	1.48
GARDEN CK								
87M-184A	.237L	.237L	.473L	.095L	.237L	.947L	.473L	.473L
87M-184B	.235L	.235L	.471L	.094L	.235L	.942L	.471L	.471L

43 samples with prefix ID- collected by Keith Rhea, Ampro Resources
57 samples with prefix 87M- collected by Rene Evans, Sandra Soulliere, Anna Wilson, or Ron Worl; USGS
20 samples with prefix 87- collected by Flint Hall or Falma Moye, Idaho State University

120 total samples collected

Table 4.--*Summary of analytical results*[1] *(in ppm) of 117 samples*[2] *from jasperoids of the Mackay, Idaho, area*

[Min. = minimum value detected; Max. = maximum value detected; V = number of samples with detectable values]

	Min.	Max.	Mean	Deviation	V
Ag	0.013	22.70	0.60	2.63	112
As	2.17	2064.	151.5	255.18	117
Au	<0.0005	0.16	0.01	0.02	106
Cu	1.24	127.00	11.36	16.38	104
Hg	0.04	20.60	1.33	2.17	102
Mo	0.34	121.00	11.46	17.74	104
Pb	0.62	5708.	74.47	560.38	104
Sb	<0.25	470.0	15.86	45.725	111
Tl	<0.44	17.70	1.355	2.22	64
Zn	<0.89	582.00	32.82	66.89	100
Bi	<0.22	18.60	0.54	1.825	22
Cd	<0.22	3.68	0.39	0.43	32
Ga	<0.44	3.52	0.86	0.69	49
Pd	<0.09	0.25	0.11	0.05	1
Pt	<0.22	0.50	0.27	0.08	9
Se	<0.87	15.90	1.86	1.91	28
Sn	<0.44	4.14	0.67	0.59	22
Te	<0.44	7.70	0.58	0.72	7

[1]Samples 87M-136, 87M-139, and 87M-189 are not included. The first two are from known high-grade mine dumps, the last is from a dump not associated with jasperoid.

[2]117 samples analyzed for Ag, As, Au, Hg, and Sb. 104 samples analyzed for Cu, Mo, Pb, Tl, Zn, Bi, Cd, Ga, Pd, Pt, Se, Sn, and Te.

Table 5.--*Minimum and maximum range in ppm (parts per million) of elements for each of five areas near Mackay, Idaho with more than eight samples analyzed*

[Min. = minimum value detected; max. = maximum value detected; V = number of samples with detectable values]

	Bartlett Point (34)			Lehman Butte (15)			Sheep Canyon (20)			Grouse (32)*			Timbered Dome (9)+		
	Min.	Max.	V	Min.	Max.	V	Min.	Max.	V	Min.	Max.	V	Min.	Max.	V
Ag	<0.02	16.50	32	0.01	6.17	12	0.036	1.92	20	0.067	2.15	32	0.07	0.22	9
As	2.17	1306.00	34	6.07	398.00	15	14.80	262.00	20	5.00	630.00	32	3.37	263.00	9
Au	0.001	0.16	32	0.002	0.03	15	<0.0005	0.04	19	<0.002	0.03	24	0.003	0.004	9
Cu	2.79	127.00	34	1.24	62.00	15	4.82	19.30	20	3.05	8.83	19	4.96	16.70	9
Hg	0.10	6.72	27	<0.09	4.59	10	0.09	3.28	17	0.04	3.78	32	0.25	2.09	9
Mo	0.88	80.30	34	0.34	59.20	15	2.27	121.00	20	2.77	79.60	19	2.19	13.60	9
Pb	0.62	20.60	34	0.77	55.30	15	1.74	152.00	20	2.85	452.00	19	1.81	7.14	9
Sb	<0.25	135.00	33	0.32	62.70	15	1.20	42.70	20	<0.51	57.50	30	0.37	9.10	7
Tl	<0.47	6.37	17	<0.44	2.95	11	<0.44	4.20	12	0.48	17.70	18	<0.46	0.71	1
Zn	0.95	107.00	33	0.89	65.30	13	15.70	180.00	20	<0.95	21.80	18	1.91	34.70	9
Bi	<0.23	1.02	4	<0.22	3.06	4	<0.22	2.10	6	<0.22	1.35	3	<0.23	0.24	0
Cd	<0.22	1.38	7	<0.22	0.83	5	<0.22	1.99	14	<0.22	<0.25	1	<0.23	0.29	1
Ga	<0.46	3.52	22	<0.44	1.41	4	<0.45	2.52	8	<0.44	0.79	7	<0.46	0.84	3
Pd	<0.09	<0.25	1	<0.09	<0.10	0	<0.09	<0.10	0	<0.09	<0.10	0	<0.09	<0.10	0
Pt	<0.22	<0.50	1	<0.22	<0.24	0	<0.22	0.37	5	<0.22	0.38	2	<0.23	<0.24	0
Se	<0.90	6.76	14	<0.89	<15.90	3	<0.90	<4.15	6	<0.87	1.44	1	<0.91	0.97	1
Sn	<0.44	3.17	12	<0.44	4.14	2	<0.46	2.66	7	<0.44	<0.49	0	<0.46	<0.48	0
Te	<0.44	1.00	2	<0.44	7.70	1	<0.44	<0.50	0	<0.44	<0.49	0	<0.46	<0.48	0

*13 of these samples were analyzed for Ag, As, Au, Hg, and Sb only.
+Sample 87M-189 is excluded from the statistics as it is a high-grade dump sample and no jasperoid is present in the immediate vicinity.
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Table 6.--*Correlation coefficients for each pair of selected elements for each jasperoid sample subset, Mackay area, Idaho*

117 samples[1] (117 samples for Ag, As, Au, Hg, and Sb, 104 samples for Cu, Mo, Pb, Tl and Zn)

Ag	1.00									
As	-0.00	1.00								
Au	0.22	0.07	1.00							
Cu	0.07	0.15	0.30	1.00						
Hg	0.08	0.81	0.07	0.12	1.00					
Mo	-0.01	0.16	0.08	0.05	0.16	1.00				
Pb	0.79	0.02	0.13	0.02	0.07	-0.02	1.00			
Sb	0.08	0.86	0.04	0.11	0.90	0.05	0.12	1.00		
Tl	-0.03	0.58	-0.06	0.06	0.56	0.16	-0.01	0.58	1.00	
Zn	0.01	0.23	-0.06	0.15	0.27	0.08	0.03	0.27	0.25	1.00
	Ag	As	Au	Cu	Hg	Mo	Pb	Sb	Tl	Zn

Bartlett Point 34 samples

Ag	1.00									
As	-0.12	1.00								
Au	0.12	0.05	1.00							
Cu	-0.07	0.12	0.22	1.00						
Hg	-0.03	0.69	0.08	-0.06	1.00					
Mo	-0.05	0.56	0.16	-0.01	0.51	1.00				
Pb	-0.08	0.03	0.05	0.16	0.19	-0.04	1.00			
Sb	-0.10	0.90	0.07	0.17	0.71	0.50	0.02	1.00		
Tl	-0.09	0.72	-0.13	0.14	0.55	0.59	-0.03	0.70	1.00	
Zn	-0.09	0.32	-0.03	0.42	0.06	0.08	0.14	0.23	0.31	1.00
	Ag	As	Au	Cu	Hg	Mo	Pb	Sb	Tl	Zn

Lehman Butte 15 samples[2]

Ag	1.00									
As	0.20	1.00								
Au	0.97	0.08	1.00							
Cu	0.92	0.38	0.85	1.00						
Hg	0.72	0.66	0.62	0.64	1.00					
Mo	0.13	0.59	0.02	0.47	0.12	1.00				
Pb	0.46	0.36	0.39	0.76	0.19	0.75	1.00			
Sb	0.09	0.91	-0.02	0.14	0.68	0.25	-0.01	1.00		
Tl	-0.10	0.34	-0.16	-0.13	0.43	0.02	-0.20	0.39	1.00	
Zn	0.36	0.87	0.27	0.43	0.64	0.48	0.23	0.83	0.04	1.00
	Ag	As	Au	Cu	Hg	Mo	Pb	Sb	Tl	Zn

Sheep Creek 20 samples

Ag	1.00									
As	-0.11	1.00								
Au	0.87	-0.25	1.00							
Cu	-0.03	0.34	-0.14	1.00						
Hg	0.01	0.22	-0.02	0.30	1.00					
Mo	-0.08	0.13	-0.12	-0.03	0.71	1.00				
Pb	0.25	0.21	0.00	0.38	0.20	-0.07	1.00			
Sb	-0.11	0.13	-0.05	-0.10	0.28	0.07	0.03	1.00		
Tl	-0.10	0.43	0.01	0.01	0.58	0.54	0.04	0.00	1.00	
Zn	0.03	0.56	-0.14	0.15	0.42	0.59	0.44	0.04	0.31	1.00
	Ag	As	Au	Cu	Hg	Mo	Pb	Sb	Tl	Zn

Grouse area 32 samples

*13 samples were analyzed for Ag, As, Au, Hg, and Sb only

Ag	1.00									
As	0.16	1.00								
Au	-0.14	-0.23	1.00							
Cu	0.13	-0.24	-0.07	1.00						
Hg	-0.08	0.36	-0.20	0.21	1.00					
Mo	-0.09	-0.13	-0.06	0.37	0.11	1.00				
Pb	0.90	-0.07	-0.09	0.25	-0.06	-0.14	1.00			
Sb	0.09	0.73	-0.16	0.13	0.49	-0.04	0.09	1.00		
Tl	0.05	0.35	-0.07	0.48	0.32	-0.04	0.10	0.79	1.00	
Zn	0.05	-0.20	-0.07	0.43	0.40	0.30	0.03	0.03	0.09	1.00
	Ag	As	Au	Cu	Hg	Mo	Pb	Sb	Tl	Zn

Timbered Dome 9 samples[3]

Ag	1.00									
As	0.24	1.00								
Au	-0.02	0.37	1.00							
Cu	0.69	0.66	-0.03	1.00						
Hg	0.44	0.97	0.27	0.80	1.00					
Mo	-0.33	0.59	0.48	-0.09	0.39	1.00				
Pb	0.57	0.81	0.11	0.86	0.89	0.17	1.00			
Sb	0.32	0.98	0.30	0.66	0.97	0.53	0.83	1.00		
Tl	0.81	-0.06	-0.43	0.41	0.13	-0.34	0.27	0.08	1.00	
Zn	0.31	0.67	0.37	0.72	0.68	-0.08	0.78	0.63	-0.08	1.00
	Ag	As	Au	Cu	Hg	Mo	Pb	Sb	Tl	Zn

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[1] Of the original 120 samples analyzed, samples 87M-136, 139, and 189 are not included due to high-grade bias.

[2] Does not include sample 87M-172A.

[3] Sample 87M-189 is not included.