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Semiquantitative spectrographic analysis of  
drill core from Sunbeam mine, Custer County, Idaho

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

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Semiquantitative spectrographic analysis of  
drill core from Sunbeam mine, Custer County, Idaho

Geologists for Azcon Corporation, Salt Lake City, Utah undertook an exploratory drilling program at Sunbeam mine, Custer County, Idaho (figure 1) in the summer of 1976. Core from three drill holes (table 1) was made available to the U.S. Geological Survey by Sunbeam Mining Corporation in 1981 and was analyzed by semiquantitative spectrographic methods in 1982. This report presents the results of those analyses.

Sunbeam mine exploits a vein and disseminated gold-silver deposit hosted in rhyolite and pyroclastic rocks of Eocene age. The rhyolite intrudes volcaniclastic rocks of the Custer graben, one of several northeast-trending volcanotectonic features that form the trans-Challis fault system (Kiilsgaard and others, 1986). Brecciation and intense silicification followed intrusion of the rhyolite and affected both the rhyolite and the host rocks. Both the rhyolite and the adjacent pyroclastic rocks are altered to clay minerals and quartz. Zircon from altered rhyolite yielded a fission-track age of  $45.8 \pm 2.3$  Ma (Johnson and McIntyre, 1983); this is thought to be the age of alteration and mineralization. The geologic relations (McIntyre and Johnson, 1983) indicate that a closely contemporaneous interplay between intrusion, continued fracturing, and prolonged fracture-controlled circulation of hydrothermal fluids produced the observed patterns of alteration and mineralization.

Sunbeam mine was first staked in 1879 but had little production until a mill was erected in 1903. Litigation closed the mine in 1911 and it remained closed until modern exploration began in 1967. U.S. Bureau of Mines records indicate that total production was more than 18,000 oz gold and more than 23,000 oz silver (Johnson and Fisher, 1987). Early production was from fracture-controlled chimney-like veins in both rhyolite and pyroclastic rocks. Recent exploration has focused on disseminated metals around those veins.

Table 2 shows the results of semiquantitative spectrographic analysis of samples taken at approximately ten-foot intervals down the three 500-foot cores. Sample numbers show both the hole number and the number of feet from the surface. SB32056 is from hole number 32 at a depth of 56 ft.

Spectrographic analysis was done by techniques described by Grimes and Marranzino (1968). Results were obtained by visual comparison of spectra derived from the sample against spectra obtained from standards made from pure oxides and carbonates. The values are reported by giving the nearest midpoint on a six-step scale using 1, 1.5, 2, 3, 5, 7, 10 .... as the midpoints of the intervals. Motooka and Grimes (1976) report that the precision of this method is approximately plus or minus one reporting interval at the 83 percent confidence level and plus or minus two intervals at the 95 percent confidence level.

#### REFERENCES CITED

- Grimes, D. J., and Marranzino, A. P., 1968, Direct-current arc and alternating-current spark emission spectrographic field methods for the semiquantitative analysis of geologic materials: U.S. Geological Survey Circular 591, 6 p.
- Johnson, K. M., and Fisher, F. S., 1987, High-level rhyolite-hosted precious-metal deposits, in Fisher, F. S., and Johnson, K. M., eds., Preliminary manuscript for "Mineral-resource potential and geology of the Challis 1°x2° quadrangle, Idaho": U.S. Geological Survey Open-File Report 87-480, p. 163-166.
- Johnson, K. M., and McIntyre, D. H., 1983, Disseminated gold-silver deposit in a rhyolite dome at the Sunbeam mine, Custer County, Idaho [abs.]: Geological Society of America Abstracts with Programs, v. 15, no. 5, p. 324-325.
- Kiilsgaard, T. H., Fisher, F. S., and Bennett, E. H., 1986, The trans-Challis fault system and associated precious-metal deposits: Economic Geology, v. 81, p. 721-724.
- McIntyre, D. H., and Johnson, K. M., 1983, Geologic map of part of the Sunbeam mine area, Custer County, Idaho: U.S. Geological Survey Open-File Report 83-329, 1 sheet, scale 1:2,400.
- Motooka, J. M., and Grimes, D. J., 1976, Analytical precision of one-sixth order semiquantitative spectrographic analysis: U.S. Geological Survey Circular 738, 25 p.

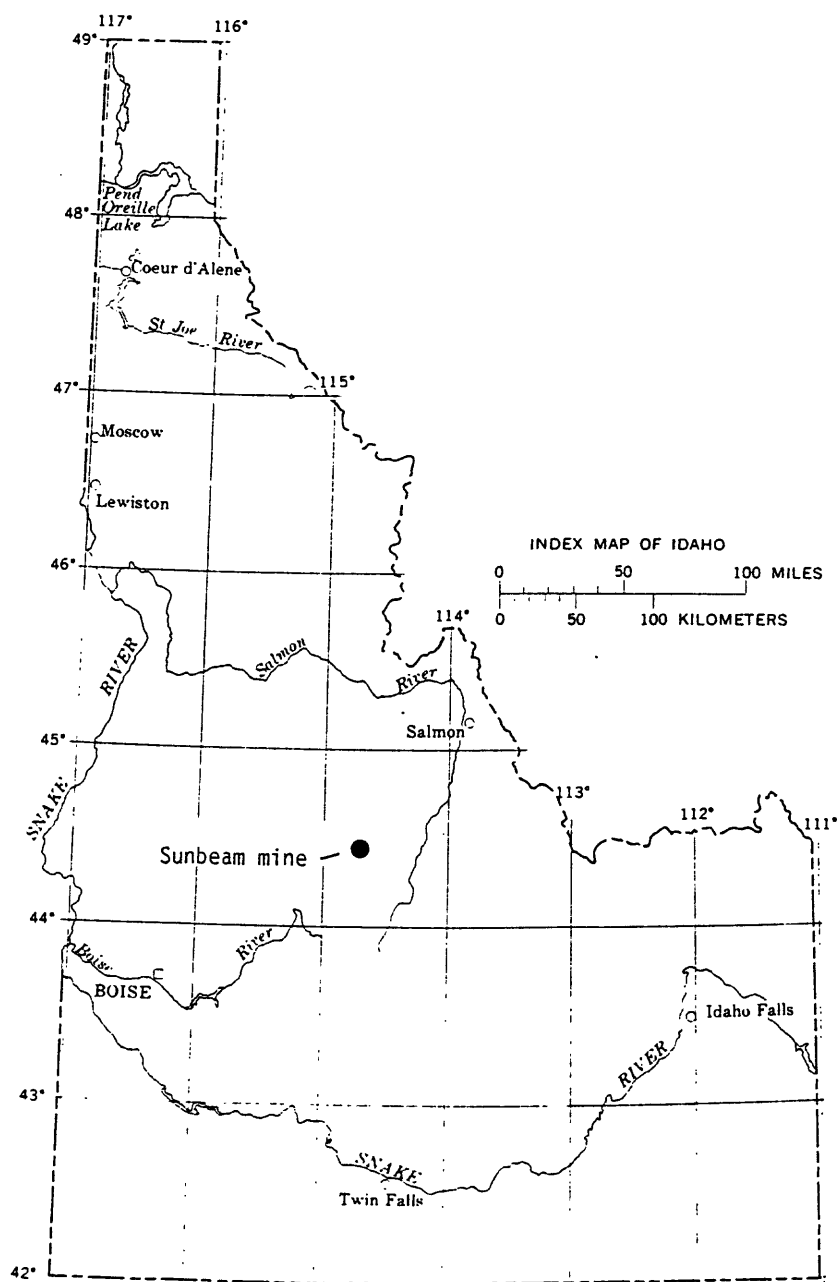


Figure 1. Index map for Sunbeam mine area, Custer County, Idaho.

Table 1.--Location, orientation, and depth data for drill holes, Sunbeam mine

Hole Number	Collar Elev.	Latitude	Longitude	Bearing	Plunge	Total Depth
32	7500'	44°26'06"	114°44'03.5"	N33°W	60°	500'
33	7755'	44°26'08"	114°43'58.5"	N36°W	45°	500'
34	7998'	44°26'07"	114°44'10"	N32°W	45°	500'

Table 2.--Geochemical data from drill holes, Sunbeam mine, Idaho.  
Analyses by semiquantitative spectrographic methods. Values in parts per million unless otherwise noted. N = not detected at limit of detection. Analyses for the following elements yielded no values above the detection limits shown: Au (10), Bi (10), Cd (20), Sn (10), Th (100). Analyst: E.F. Cooley

Sunbeam Drill Core Data--Spec

Sample	Fe%	Mg%	Ca%	Ti%	Mn	Ag	As	B	Ba	Be	Co	Cr	Cu	La
SB32010	1.00	.20	<0	.10	50	10.0	<0	10	300	3	<0	N	5	30
SB32015	.50	.20	<0	.10	20	1.5	N	10	200	2	<0	N	<0	30
SB32026	1.00	.20	<0	.10	20	7.0	<0	10	300	2	<0	N	<0	30
SB32037	.70	.20	<0	.07	50	7.0	N	10	200	2	<0	N	5	70
SB32040	1.00	.20	<0	.10	50	5.0	<0	10	300	2	<0	N	<0	70
SB32056	1.00	.20	<0	.10	20	10.0	<0	10	200	5	<0	N	<0	50
SB32065	1.00	.20	<0	.15	50	10.0	<0	10	300	5	<0	N	<0	50
SB32079	.50	.20	<0	.15	50	5.0	<0	10	300	3	<0	N	<0	70
SB32085	1.50	.20	<0	.20	30	5.0	<0	10	300	3	<0	N	5	70
SB32091	2.00	.05	<0	.05	30	20.0	300	20	200	3	<0	N	5	50
SB32102	.50	.15	<0	.10	50	7.0	1,000	10	300	5	<0	N	<0	70
SB32110	.50	.10	<0	.10	20	5.0	300	10	200	5	<0	N	<0	50
SB32120	.20	.20	<0	.10	30	3.0	<0	10	300	3	<0	N	<0	70
SB32128	1.50	.20	<0	.10	30	10.0	500	10	300	2	<0	N	5	70
SB32137	.20	.20	<0	.10	30	10.0	500	10	300	3	<0	N	<0	70
SB32145	.50	.20	<0	.10	30	20.0	1,000	10	300	3	<0	N	<0	70
SB32155	.50	.10	<0	.10	30	7.0	<0	10	200	3	<0	N	5	70
SB32168	.10	.10	<0	.10	20	3.0	N	10	200	3	<0	N	5	70
SB32175	.20	.15	<0	.10	30	5.0	<0	10	200	3	<0	N	5	70
SB32184	.20	.20	<0	.07	30	2.0	N	10	300	3	<0	N	<0	70
SB32197	.30	.15	<0	.10	20	10.0	500	10	200	3	<0	N	<0	70
SB32207	1.00	.20	<0	.10	30	2.0	<0	10	200	3	<0	N	20	70
SB32213	1.50	.20	<0	.10	30	20.0	3,000	10	200	3	<0	N	15	70
SB32224	2.00	.30	<0	.10	50	10.0	3,000	20	700	3	<0	N	10	70
SB32230	.50	.50	.05	.20	50	15.0	3,000	20	700	3	<0	N	20	70
SB32239	1.50	.20	.05	.15	50	5.0	N	20	500	3	<0	N	7	70
SB32250	1.00	.30	<0	.15	20	20.0	2,000	15	700	2	<0	N	<0	50
SB32259	1.00	.20	.05	.15	50	7.0	200	20	500	3	<0	N	10	100
SB32267	.20	.50	.05	.20	50	2.0	<0	20	700	3	<0	N	<0	100
SB32276	1.50	.20	.10	.15	50	7.0	700	20	500	3	<0	N	30	70
SB32286	.15	.15	<0	.07	30	7.0	<0	20	300	3	<0	N	<0	50
SB32297	.20	.30	.05	.10	50	15.0	N	20	500	3	<0	N	<0	70
SB32307	2.00	.50	<0	.20	50	20.0	N	20	700	3	<0	N	20	100
SB32313	2.00	.20	<0	.20	30	10.0	700	20	700	3	<0	N	50	100
SB32323	2.00	.50	<0	.20	50	5.0	500	20	1,000	3	<0	N	<0	100
SB32340	3.00	.50	<0	.30	200	3.0	1,000	20	1,000	3	<0	N	7	150
SB32352	3.00	.50	<0	.20	300	3.0	2,000	20	1,000	3	<0	N	10	70
SB32361	3.00	.50	<0	.20	100	3.0	1,000	20	700	3	<0	N	10	100
SB32372	3.00	.50	<0	.30	150	5.0	N	20	1,000	3	<0	N	30	100
SB32381	2.00	.50	<0	.20	100	3.0	<0	20	1,000	3	<0	N	5	100
SB32388	2.00	.50	<0	.20	100	2.0	1,000	20	1,000	5	<0	N	5	100
SB32400	2.00	.50	.07	.20	70	7.0	N	20	500	3	<0	N	5	100
SB32410	1.00	.20	.05	.15	50	5.0	N	20	500	3	<0	N	5	70
SB32415	1.00	.20	.05	.10	50	10.0	N	20	500	3	<0	N	5	70
SB32425	1.00	.20	.07	.10	70	5.0	N	20	500	5	<0	N	5	70

Sunbeam Drill Core Data--Spec

Sample	Mo	Nb	Ni	Pb	Sb	Sc	Sr	V	W	Y	Zn	Zr
SB32010	N	<0	<0	50	N	<0	N	10	N	<0	N	100
SB32015	N	<0	<0	10	N	<0	N	10	N	<0	N	150
SB32026	N	<0	<0	20	N	<0	N	10	N	<0	N	100
SB32037	N	<0	<0	30	N	<0	N	10	N	<0	N	150
SB32040	N	<0	<0	30	N	<0	N	10	N	<0	N	150
SB32056	N	<0	<0	50	N	<0	N	10	N	<0	N	50
SB32065	N	<0	<0	50	N	<0	N	10	N	<0	N	70
SB32079	N	<0	<0	20	N	<0	N	10	N	<0	N	100
SB32085	N	<0	<0	70	N	<0	N	10	N	<0	N	300
SB32091	N	<0	<0	50	N	<0	N	10	N	<0	N	100
SB32102	N	<0	<0	50	N	<0	N	10	N	<0	N	150
SB32110	N	<0	<0	20	N	<0	N	10	N	<0	N	100
SB32120	N	<0	<0	20	N	<0	N	10	N	<0	N	150
SB32128	N	<0	<0	50	N	<0	N	10	N	<0	N	150
SB32137	N	<0	<0	50	N	<0	N	10	N	<0	N	100
SB32145	N	<0	<0	50	N	<0	N	10	N	<0	N	200
SB32155	N	<0	<0	20	N	<0	N	10	N	<0	N	200
SB32168	N	<0	<0	20	N	<0	N	10	N	<0	N	100
SB32175	N	<0	<0	30	N	<0	N	10	N	<0	N	200
SB32184	N	<0	<0	10	N	<0	N	10	N	<0	N	100
SB32197	N	<0	<0	20	N	<0	N	10	N	<0	N	100
SB32207	N	<0	<0	20	N	<0	N	10	N	<0	N	200
SB32213	20	<0	<0	20	100	<0	N	10	N	<0	N	100
SB32224	10	<0	<0	20	100	<0	N	15	N	10	N	200
SB32230	7	<0	<0	70	<0	<0	N	15	N	10	N	200
SB32239	N	<0	<0	50	N	<0	N	15	N	10	N	200
SB32250	N	<0	<0	20	<0	<0	N	10	N	<0	N	200
SB32259	N	<0	<0	20	N	<0	N	15	N	10	N	200
SB32267	N	<0	<0	10	<0	<0	N	15	N	10	N	200
SB32276	N	<0	<0	50	<0	<0	N	15	N	10	N	200
SB32286	N	<0	<0	10	N	<0	N	20	N	<0	N	200
SB32297	N	<0	<0	20	N	<0	N	15	N	<0	N	100
SB32307	10	20	<0	50	N	<0	N	15	N	10	N	300
SB32313	5	<0	<0	50	<0	<0	N	15	N	10	N	200
SB32323	5	<0	<0	100	<0	<0	N	15	N	10	N	300
SB32340	20	20	<0	50	<0	20	N	15	N	50	N	700
SB32352	N	20	<0	50	N	10	N	15	N	20	N	700
SB32361	<0	20	<0	30	N	10	N	15	N	20	N	500
SB32372	N	20	<0	50	N	15	N	20	N	20	N	700
SB32381	<0	<0	<0	50	N	<0	N	15	N	10	N	200
SB32388	<0	<0	<0	50	N	<0	N	15	N	10	N	150
SB32400	N	<0	<0	50	N	<0	N	15	N	10	N	300
SB32410	N	<0	<0	30	N	<0	N	15	N	10	N	200
SB32415	N	<0	<0	20	N	<0	N	15	N	10	N	200
SB32425	N	<0	<0	20	N	<0	N	15	N	10	N	200



Sunbeam Drill Core Data--Spec

Sample	Mo	Nb	Ni	Pb	Sb	Sc	Sr	V	W	Y	Zn	Zr
SB32010	N	<0	<0	50	N	<0	N	10	N	<0	N	100
SB32015	N	<0	<0	10	N	<0	N	10	N	<0	N	150
SB32026	N	<0	<0	20	N	<0	N	10	N	<0	N	100
SB32037	N	<0	<0	30	N	<0	N	10	N	<0	N	150
SB32040	N	<0	<0	30	N	<0	N	10	N	<0	N	150
SB32056	N	<0	<0	50	N	<0	N	10	N	<0	N	50
SB32065	N	<0	<0	50	N	<0	N	10	N	<0	N	70
SB32079	N	<0	<0	20	N	<0	N	10	N	<0	N	100
SB32085	N	<0	<0	70	N	<0	N	10	N	<0	N	300
SB32091	N	<0	<0	50	N	<0	N	10	N	<0	N	100
SB32102	N	<0	<0	50	N	<0	N	10	N	<0	N	150
SB32110	N	<0	<0	20	N	<0	N	10	N	<0	N	100
SB32120	N	<0	<0	20	N	<0	N	10	N	<0	N	150
SB32128	N	<0	<0	50	N	<0	N	10	N	<0	N	150
SB32137	N	<0	<0	50	N	<0	N	10	N	<0	N	100
SB32145	N	<0	<0	50	N	<0	N	10	N	<0	N	200
SB32155	N	<0	<0	20	N	<0	N	10	N	<0	N	200
SB32168	N	<0	<0	20	N	<0	N	10	N	<0	N	100
SB32175	N	<0	<0	30	N	<0	N	10	N	<0	N	200
SB32184	N	<0	<0	10	N	<0	N	10	N	<0	N	100
SB32197	N	<0	<0	20	N	<0	N	10	N	<0	N	100
SB32207	N	<0	<0	20	N	<0	N	10	N	<0	N	200
SB32213	20	<0	<0	20	100	<0	N	10	N	<0	N	100
SB32224	10	<0	<0	20	100	<0	N	15	N	10	N	200
SB32230	7	<0	<0	70	<0	<0	N	15	N	10	N	200
SB32239	N	<0	<0	50	N	<0	N	15	N	10	N	200
SB32250	N	<0	<0	20	<0	<0	N	10	N	<0	N	200
SB32259	N	<0	<0	20	N	<0	N	15	N	10	N	200
SB32267	N	<0	<0	10	<0	<0	N	15	N	10	N	200
SB32276	N	<0	<0	50	<0	<0	N	15	N	10	N	200
SB32286	N	<0	<0	10	N	<0	N	20	N	<0	N	200
SB32297	N	<0	<0	20	N	<0	N	15	N	<0	N	100
SB32307	10	20	<0	50	N	<0	N	15	N	10	N	300
SB32313	5	<0	<0	50	<0	<0	N	15	N	10	N	200
SB32323	5	<0	<0	100	<0	<0	N	15	N	10	N	300
SB32340	20	20	<0	50	<0	20	N	15	N	50	N	700
SB32352	N	20	<0	50	<0	10	N	15	N	20	N	700
SB32361	<0	20	<0	30	N	10	N	15	N	20	N	500
SB32372	N	20	<0	50	N	15	N	20	N	20	N	700
SB32381	<0	<0	<0	50	N	<0	N	15	N	10	N	200
SB32388	<0	<0	<0	50	N	<0	N	15	N	10	N	150
SB32400	N	<0	<0	50	N	<0	N	15	N	10	N	300
SB32410	N	<0	<0	30	N	<0	N	15	N	10	N	200
SB32415	N	<0	<0	20	N	<0	N	15	N	10	N	200
SB32425	N	<0	<0	20	N	<0	N	15	N	10	N	200

Sunbeam Drill Core Data--Spec--continued

Sample	Fe%	Mg%	Ca%	Ti%	Mn	Ag	As	B	Ba	Be	Co	Cr	Cu	La
SB32435	1.50	.30	.05	.15	70	5.0	<0	20	500	3	<0	N	5	70
SB32445	10.00	.30	.05	.10	70	3.0	N	20	500	3	<0	N	<0	100
SB32455	10.00	.50	.05	.10	150	2.0	1,000	20	500	5	<0	N	<0	100
SB32462	2.00	.50	.05	.10	100	3.0	200	20	500	3	<0	N	5	70
SB32482	.50	.50	.05	.10	100	1.0	N	20	500	3	<0	N	<0	100
SB32490	.70	.20	<0	.10	70	1.5	N	20	300	3	<0	N	<0	100
SB32497	.30	.50	.05	.10	100	1.0	N	20	500	3	<0	N	<0	100
SB33015	.15	.50	<0	.10	50	5.0	N	20	300	2	<0	N	<0	100
SB33023	1.00	.50	<0	.10	50	5.0	<0	20	300	2	<0	N	<0	100
SB33035	1.00	.50	<0	.15	70	5.0	N	20	300	3	<0	N	5	100
SB33041	1.50	.50	<0	.10	50	2.0	N	20	300	3	<0	N	5	100
SB33050	1.50	.50	<0	.15	50	3.0	N	20	300	3	<0	N	7	100
SB33060	.50	.50	<0	.10	30	1.5	N	20	300	3	<0	N	15	100
SB33070	1.50	.50	<0	.15	50	2.0	N	20	300	3	<0	N	5	100
SB33080	1.00	.70	<0	.10	70	3.0	N	20	300	3	<0	N	<0	100
SB33087	1.00	.50	<0	.10	50	20.0	N	20	300	3	<0	N	50	100
SB33095	1.00	.50	<0	.10	50	3.0	N	20	300	3	<0	N	15	100
SB33105	1.50	.30	<0	.10	30	5.0	N	20	300	2	<0	N	<0	100
SB33115	1.00	.30	<0	.10	30	5.0	N	20	300	2	<0	N	<0	70
SB33120	.50	.20	<0	.15	30	3.0	N	20	300	2	<0	N	5	100
SB33135	1.00	.30	<0	.10	30	5.0	N	20	300	2	<0	N	20	70
SB33140	.50	.30	<0	.10	30	2.0	N	20	500	2	<0	N	20	70
SB33150	1.00	.50	<0	.10	30	5.0	N	20	500	2	<0	N	5	70
SB33160	1.50	.20	<0	.07	30	30.0	N	20	500	3	<0	N	10	70
SB33170	1.00	.15	<0	.10	20	20.0	N	20	500	2	<0	N	7	70
SB33174	.50	.10	<0	.05	20	20.0	N	20	300	2	<0	N	<0	50
SB33185	1.00	.20	<0	.07	50	3.0	N	20	700	2	<0	N	<0	70
SB33195	.50	.15	<0	.07	30	2.0	N	20	500	2	<0	N	50	70
SB33203	1.00	.15	<0	.05	20	10.0	<0	20	500	2	<0	N	10	50
SB33211	1.00	.20	<0	.07	70	2.0	<0	20	500	2	<0	N	<0	70
SB33221	.70	.15	<0	.07	20	3.0	N	20	500	2	<0	N	<0	70
SB33232	1.00	.20	<0	.05	50	2.0	N	20	500	2	<0	N	<0	70
SB33240	1.00	.15	<0	.10	50	5.0	N	20	500	2	<0	N	10	70
SB33248	2.00	.50	<0	.10	50	3.0	N	20	700	2	<0	N	30	70
SB33256	1.50	.30	<0	.10	50	3.0	N	20	700	2	<0	N	10	70
SB33266	1.50	.30	<0	.30	50	7.0	N	20	700	2	<0	N	30	100
SB33276	2.00	.20	<0	.10	50	7.0	<0	20	700	3	<0	N	30	70
SB33285	1.00	.30	<0	.10	30	20.0	N	20	700	3	<0	N	30	100
SB33292	2.00	.30	<0	.10	50	20.0	<0	20	700	3	<0	N	50	70
SB33303	2.00	.30	<0	.15	50	20.0	N	20	700	3	<0	N	50	100
SB33311	2.00	.20	<0	.15	50	5.0	N	20	500	3	<0	N	5	100
SB33320	2.00	.15	<0	.15	20	5.0	N	20	500	3	<0	N	<0	100
SB33327	1.50	.20	<0	.15	20	5.0	N	20	700	3	<0	N	<0	100
SB33335	3.00	.20	<0	.15	20	5.0	N	20	500	3	<0	N	5	100
SB33345	1.00	.20	<0	.15	20	15.0	N	20	700	3	<0	N	5	100

Sunbeam Drill Core Data--Spec--continued

Sample	Mo	Nb	Ni	Pb	Sb	Sc	Sr	V	W	Y	Zn	Zr
SB32435	N	<0	<0	70	N	<0	N	15	N	10	N	200
SB32445	<0	<0	<0	50	N	<0	<0	10	N	10	N	200
SB32455	10	20	<0	50	N	5	N	15	N	20	N	200
SB32462	10	20	<0	30	N	5	N	10	N	15	N	150
SB32482	N	<0	<0	50	N	<0	N	15	N	15	N	200
SB32490	N	<0	<0	50	N	<0	N	15	N	10	N	200
SB32497	N	<0	<0	30	N	5	N	10	N	10	N	200
SB33015	N	<0	<0	50	N	<0	N	15	N	10	N	200
SB33023	N	<0	<0	70	N	5	N	10	N	10	N	200
SB33035	N	<0	<0	70	N	5	N	10	N	10	N	300
SB33041	N	<0	<0	50	N	<0	N	10	N	10	N	200
SB33050	N	20	<0	50	N	<0	N	10	N	10	N	200
SB33060	N	<0	<0	30	N	<0	N	10	N	10	N	150
SB33070	N	<0	<0	50	N	5	N	10	N	10	N	200
SB33080	N	<0	<0	50	N	5	N	10	N	10	N	300
SB33087	10	<0	<0	70	N	<0	N	10	N	10	N	100
SB33095	N	<0	<0	20	N	<0	N	10	N	10	N	200
SB33105	<0	<0	<0	50	N	<0	N	10	N	10	N	300
SB33115	N	<0	<0	15	N	<0	N	10	N	10	N	200
SB33120	N	<0	<0	15	N	<0	N	10	N	10	N	200
SB33135	N	<0	<0	30	N	<0	N	10	N	10	N	200
SB33140	N	<0	<0	10	N	<0	N	10	N	10	N	200
SB33150	N	<0	<0	30	N	<0	N	10	N	10	N	150
SB33160	N	<0	<0	20	N	<0	N	10	N	10	N	150
SB33170	N	<0	<0	20	N	<0	N	10	N	10	N	50
SB33174	N	<0	<0	7	N	<0	N	10	N	10	N	30
SB33185	N	<0	<0	20	N	<0	N	10	N	10	N	50
SB33195	N	<0	<0	10	N	<0	N	10	N	10	N	50
SB33203	N	<0	<0	20	N	<0	N	10	N	10	N	100
SB33211	N	<0	<0	30	N	<0	N	10	N	10	N	70
SB33221	N	<0	<0	30	N	<0	N	10	N	10	N	70
SB33232	N	<0	<0	20	N	<0	N	10	N	10	N	100
SB33240	N	<0	<0	20	N	<0	N	10	N	10	N	50
SB33248	N	<0	<0	20	N	<0	N	10	N	10	N	100
SB33256	N	<0	<0	20	N	<0	N	10	N	10	N	150
SB33266	15	<0	<0	50	N	<0	N	10	N	10	N	150
SB33276	5	<0	<0	30	N	10	N	30	N	20	N	300
SB33285	10	<0	<0	20	N	<0	N	20	N	10	500	70
SB33292	15	<0	<0	50	N	<0	N	15	N	10	1,000	100
SB33303	15	<0	<0	50	N	<0	N	15	N	15	1,000	200
SB33311	<0	<0	<0	20	N	<0	N	15	N	10	N	200
SB33320	<0	<0	<0	20	N	<0	N	15	N	10	N	300
SB33327	<0	<0	<0	20	N	<0	N	15	N	10	N	200
SB33335	<0	<0	<0	50	N	<0	N	15	N	10	N	200
SB33345	<0	<0	15	20	N	<0	N	15	N	10	N	200

Sunbeam Drill Core Data--Spec--continued

Sample	Fe%	Mg%	Ca%	Ti%	Mn	Ag	As	B	Ba	Be	Co	Cr	Cu	La
SB33355	1.50	.20	<0	.20	50	3.0	N	20	500	2	<0	N	5	70
SB33364	1.50	.20	<0	.20	20	2.0	N	20	500	2	<0	N	5	70
SB33373	2.00	.20	.05	.20	100	3.0	N	20	500	3	<0	N	5	70
SB33382	1.50	.20	.05	.15	20	10.0	N	20	500	3	<0	N	5	50
SB33390	.50	.20	<0	.10	30	3.0	N	20	500	3	<0	N	<0	100
SB33401	1.00	.20	<0	.15	30	2.0	N	20	500	3	<0	N	<0	70
SB33409	1.50	.20	<0	.15	30	5.0	N	20	500	3	<0	N	5	100
SB33417	2.00	.20	.05	.20	20	5.0	N	20	500	3	<0	N	5	7
SB33425	1.50	.20	<0	.15	30	5.0	N	20	500	3	<0	N	5	100
SB33437	1.50	.20	.10	.10	30	3.0	N	20	500	5	<0	N	5	100
SB33445	1.50	.30	.15	.20	70	2.0	N	20	500	5	<0	N	20	150
SB33455	2.00	.15	.05	.15	50	20.0	N	20	500	5	<0	N	5	100
SB33463	2.00	.20	.05	.15	30	2.0	N	20	500	3	<0	N	5	100
SB33473	1.00	.50	.07	.20	200	2.0	N	20	500	5	<0	10	<0	100
SB33480	1.00	.50	.05	.15	200	1.0	N	20	700	5	<0	N	<0	50
SB33490	5.00	.50	.50	.15	5,000	N	N	20	700	7	<0	<0	5	100
SB33500	7.00	.50	.30	.20	5,000	N	N	20	1,000	7	<0	<0	<0	70
SB34006	1.50	.20	<0	.15	200	2.0	N	20	1,000	5	<0	N	5	70
SB34018	5.00	.30	<0	.10	150	2.0	N	20	1,000	5	<0	N	15	70
SB34025	3.00	.20	<0	.10	100	5.0	500	20	300	5	<0	N	20	70
SB34033	2.00	.20	<0	.10	70	1.5	N	20	300	5	<0	N	10	100
SB34043	2.00	.30	<0	.10	100	2.0	N	20	300	5	<0	N	15	200
SB34052	2.00	.30	<0	.10	70	3.0	N	20	700	5	<0	N	10	50
SB34063	2.00	.20	.05	.10	200	10.0	500	20	1,000	5	<0	N	20	50
SB34072	3.00	.20	<0	.20	200	5.0	500	20	700	5	<0	N	10	50
SB34083	7.00	.20	<0	.20	150	3.0	<0	20	500	5	<0	10	20	100
SB34090	3.00	.30	<0	.30	150	2.0	N	20	2,000	3	<0	N	10	50
SB34100	1.50	.20	<0	.30	100	2.0	N	20	2,000	3	<0	N	5	50
SB34110	10.00	.50	<0	.30	150	2.0	N	20	3,000	2	<0	<0	20	200
SB34117	2.00	.20	<0	.30	100	2.0	N	20	3,000	3	<0	N	10	200
SB34126	5.00	.20	<0	.30	100	2.0	N	20	2,000	5	<0	<0	5	100
SB34134	2.00	.50	<0	.30	100	5.0	N	20	5,000	5	<0	N	15	200
SB34145	5.00	.70	.05	.50	200	15.0	N	20	1,000	5	<0	N	50	200
SB34153	1.50	.30	.05	.10	50	50.0	N	20	500	5	<0	N	5	70
SB34159	1.00	.20	<0	.10	50	100.0	<0	20	300	5	<0	N	5	70
SB34167	.70	.50	<0	.15	50	100.0	500	20	500	5	<0	N	5	70
SB34180	.20	.50	<0	.10	50	50.0	<0	20	500	2	<0	N	5	70
SB34186	.70	.70	.05	.50	50	10.0	N	20	300	2	<0	200	5	200
SB34194	.30	.20	<0	.10	50	70.0	N	20	300	5	<0	N	5	70
SB34206	.70	.15	.05	.10	30	70.0	200	20	300	3	<0	<0	7	70
SB34214	1.00	.20	.05	.10	50	30.0	200	20	300	3	<0	<0	50	70
SB34223	1.50	.30	.05	.10	50	10.0	1,000	20	300	3	<0	<0	10	70
SB34233	2.00	.50	<0	.20	50	70.0	1,000	20	300	2	<0	<0	700	100
SB34242	3.00	.30	<0	.15	50	15.0	700	20	500	2	<0	<0	20	100
SB34248	1.50	.15	<0	.15	50	20.0	700	20	500	2	<0	<0	70	100

Sunbeam Drill Core Data--Spec--continued

Sample	Mo	Nb	Ni	Pb	Sb	Sc	Sc	Sr	V	W	Y	Zn	Zr
SB33355	<0	<0	<0	20	N	<0	<0	N	15	N	10	N	200
SB33364	N	<0	<0	20	N	<0	<0	N	10	N	10	N	300
SB33373	<0	<0	<0	70	N	<0	<0	N	15	N	10	N	150
SB33382	N	<0	<0	15	N	<0	<0	N	10	N	10	N	200
SB33390	<0	<0	<0	20	N	<0	<0	N	15	N	10	N	200
SB33401	<0	<0	<0	10	N	<0	<0	N	10	N	10	N	300
SB33409	<0	<0	<0	100	N	<0	<0	N	15	N	10	N	200
SB33417	N	<0	<0	20	N	<0	<0	N	10	N	10	N	300
SB33425	<0	20	<0	30	N	<0	<0	N	15	N	10	N	200
SB33437	5	<0	<0	20	N	<0	<0	N	15	N	10	N	300
SB33445	N	20	<0	20	N	<0	<0	N	15	N	20	N	300
SB33455	<0	20	<0	15	N	<0	<0	N	15	N	10	N	100
SB33463	<0	20	<0	30	N	<0	<0	N	15	N	10	N	200
SB33473	N	20	<0	20	N	<0	<0	<0	15	N	20	N	300
SB33480	N	20	<0	30	N	<0	<0	N	15	N	10	N	200
SB33490	N	20	<0	50	N	<0	<0	100	15	N	20	200	300
SB33500	N	20	<0	70	N	<0	<0	100	15	N	15	300	200
SB34006	5	100	<0	30	N	<0	<0	N	15	N	70	N	500
SB34018	N	150	<0	20	N	<0	<0	N	15	N	70	N	700
SB34025	N	100	<0	700	N	<0	<0	N	10	N	70	N	700
SB34033	N	100	<0	50	N	<0	<0	N	10	N	70	N	700
SB34043	5	100	<0	100	N	<0	<0	N	10	N	100	N	700
SB34052	5	100	<0	100	N	<0	<0	N	10	N	100	N	700
SB34063	5	100	<0	150	N	<0	<0	N	10	N	70	N	500
SB34072	15	100	<0	200	N	<0	<0	N	10	N	70	N	500
SB34083	10	100	<0	100	N	5	5	N	20	N	70	N	700
SB34090	<0	50	<0	50	N	10	10	N	15	N	50	N	700
SB34100	5	50	<0	50	N	10	10	N	15	N	50	N	700
SB34110	5	70	<0	70	N	15	15	N	15	N	70	N	700
SB34117	5	50	<0	70	N	15	15	<0	10	N	70	N	1,000
SB34126	5	70	<0	70	N	10	10	N	10	N	70	N	1,000
SB34134	5	50	<0	70	N	10	10	<0	10	N	70	N	700
SB34145	5	50	<0	70	N	15	15	<0	100	N	100	N	1,000
SB34153	5	20	<0	10	N	<0	<0	N	20	N	10	N	150
SB34159	5	20	<0	10	N	<0	<0	N	15	N	10	N	150
SB34167	5	20	<0	20	N	<0	<0	N	15	N	10	N	200
SB34180	10	20	<0	70	N	<0	<0	N	15	N	10	N	200
SB34186	10	20	<0	70	N	10	10	N	200	50	10	N	500
SB34194	<0	20	<0	20	N	<0	<0	N	10	N	10	N	300
SB34206	<0	20	<0	10	N	<0	<0	N	15	N	10	N	200
SB34214	<0	20	<0	10	N	<0	<0	N	15	N	10	N	100
SB34223	5	20	<0	70	N	<0	<0	N	15	N	10	N	200
SB34233	5	20	<0	30	N	<0	<0	N	15	N	10	N	200
SB34242	5	20	<0	50	N	<0	<0	N	15	N	10	N	200
SB34248	5	20	<0	10	N	<0	<0	N	15	N	10	N	300

Sunbeam Drill Core Data--Spec--continued

Sample	Fe%	Mg%	Ca%	Ti%	Mn	Ag	As	B	Ba	Be	Co	Cr	Cu	La
SB34260	.50	.50	<0	.15	50	3.0	<0	20	500	2	<0	<0	10	100
SB34270	.50	.20	<0	.10	50	20.0	N	20	300	3	<0	<0	10	50
SB34277	1.00	.30	<0	.10	50	20.0	N	20	500	3	<0	<0	10	50
SB34285	.50	.30	<0	.10	70	20.0	N	20	500	3	<0	<0	5	70
SB34297	2.00	.20	<0	.10	50	15.0	N	20	500	2	<0	10	5	70
SB34305	3.00	.30	<0	.15	70	15.0	N	20	500	2	<0	15	7	100
SB34316	3.00	.30	<0	.30	70	50.0	<0	20	500	2	<0	50	<0	50
SB34328	1.00	.30	.05	.15	50	30.0	N	20	500	2	<0	50	<0	50
SB34340	3.00	.30	<0	.15	50	10.0	500	20	500	2	<0	50	5	50
SB34350	1.50	.30	<0	.30	70	2.0	N	20	500	2	<0	50	<0	50
SB34357	1.50	.30	<0	.15	50	3.0	N	20	300	2	<0	20	30	50
SB34367	1.00	.30	<0	.30	100	15.0	1,000	20	500	2	<0	30	<0	50
SB34375	.50	.30	<0	.15	50	30.0	300	20	700	2	<0	15	<0	50
SB34385	3.00	.50	<0	.30	150	5.0	N	20	1,000	3	<0	10	10	100
SB34395	7.00	.70	.10	.30	3,000	3.0	N	20	1,000	3	<0	10	20	200
SB34403	5.00	.30	.10	.30	300	3.0	500	20	1,000	3	<0	10	15	50
SB34413	5.00	.20	<0	.30	100	5.0	1,000	20	1,000	3	<0	10	10	100
SB34423	3.00	.30	<0	.30	70	3.0	200	20	1,000	3	<0	10	10	100
SB34430	3.00	.20	<0	.30	70	5.0	200	20	1,000	3	<0	10	50	100
SB34441	2.00	.20	<0	.30	100	10.0	200	20	700	2	<0	10	10	100
SB34450	5.00	.30	<0	.30	100	50.0	2,000	20	700	2	<0	10	15	100
SB34460	5.00	.30	<0	.30	100	7.0	300	20	700	2	<0	10	15	100
SB34470	5.00	.30	<0	.50	150	2.0	N	20	1,000	2	<0	10	10	100
SB34475	3.00	.30	<0	.50	150	2.0	N	20	1,000	2	<0	10	10	100
SB34485	10.00	.15	.10	.30	300	10.0	3,000	30	700	3	15	10	20	70
SB34493	7.00	.70	.20	.50	10,000	N	N	20	700	2	10	<0	10	70
SB34499	7.00	.70	.15	.50	5,000	1.0	N	20	700	2	<0	<0	15	70

Sunbeam Drill Core Data--Spec--continued

Sample	Mo	Nb	Ni	Pb	Sb	Sc	Sr	V	W	Y	Zn	Zr
SB34260	<0	20	<0	30	N	<0	N	15	N	10	N	300
SB34270	20	<0	<0	10	N	N	N	15	N	10	N	100
SB34277	N	<0	<0	10	N	N	N	15	N	10	N	300
SB34285	N	20	<0	50	N	N	N	15	N	10	N	500
SB34297	15	20	<0	20	N	5	N	15	N	20	N	300
SB34305	5	20	<0	50	N	7	N	15	N	20	N	300
SB34316	15	20	<0	50	N	7	N	70	N	20	N	300
SB34328	<0	20	<0	20	N	5	N	50	N	10	N	200
SB34340	<0	20	<0	70	N	5	N	50	N	15	N	200
SB34350	<0	20	<0	30	N	5	N	70	N	15	N	300
SB34357	<0	20	<0	30	N	5	N	20	N	15	N	200
SB34367	N	20	<0	20	N	5	N	30	N	15	N	300
SB34375	N	20	<0	20	N	5	N	50	N	10	N	200
SB34385	10	20	<0	30	N	15	N	20	N	30	N	700
SB34395	N	20	<0	50	N	10	N	20	N	50	N	700
SB34403	N	20	<0	30	N	15	N	20	N	50	N	700
SB34413	5	20	<0	50	N	10	N	20	N	50	N	700
SB34423	<0	20	<0	20	N	10	N	15	N	30	N	500
SB34430	20	20	<0	50	N	10	N	30	N	30	N	700
SB34441	N	20	<0	30	N	10	N	20	N	20	N	700
SB34450	N	20	<0	20	N	15	N	30	N	50	N	700
SB34460	N	20	<0	30	N	15	N	30	N	50	N	700
SB34470	N	20	<0	20	N	20	N	30	N	50	N	700
SB34475	N	20	<0	30	N	20	N	50	N	50	N	700
SB34485	N	20	<0	50	N	10	N	70	<0	50	N	300
SB34493	N	20	<0	30	N	20	N	70	<0	70	N	500
SB34499	N	20	<0	30	N	20	N	70	<0	50	N	500