GEOLOGICAL SURVEY OF WYOMING

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MINERAL REPORT #MR83-19

GEOCHEMISTRY OF THE EXCHANGE GOLD VEIN, SOUTH PASS GREENSTONE BELT, FREMONT COUNTY, WYOMING

by
W. Dan Hausel
1983

During a raging blizzard in May, 1983, the Exchange gold vein located immediately west of the Duncan gold mine was sampled to test for hydrothermal genesis of veins within the South Pass District (Figure 1).

The vein and adjacent host rock trend N63°E and were sampled on a ~~N63E~~ trend perpendicular to the vein (Figure 2). Each of these chip samples were analyzed by emission spec. and the silica variation was plotted (Figure 3). The graph of silica percent compared to distance from the vein suggests that the silica generated from the fissure and flooded rocks immediately adjacent to the fissure vein. This is typical of hydrothermal genesis rather than metamorphic genesis. In the case of metamorphism, the silica content would be expect to decline towards the vein (see Boyle, 1955).

REFERENCE CITED

Boyle, R.W., 1955, The geochemistry and origin of the gold-bearing quartz veins and lenses of the Yellowknife greenstone belt: Economic Geology, vol. 50, p. 51-66.

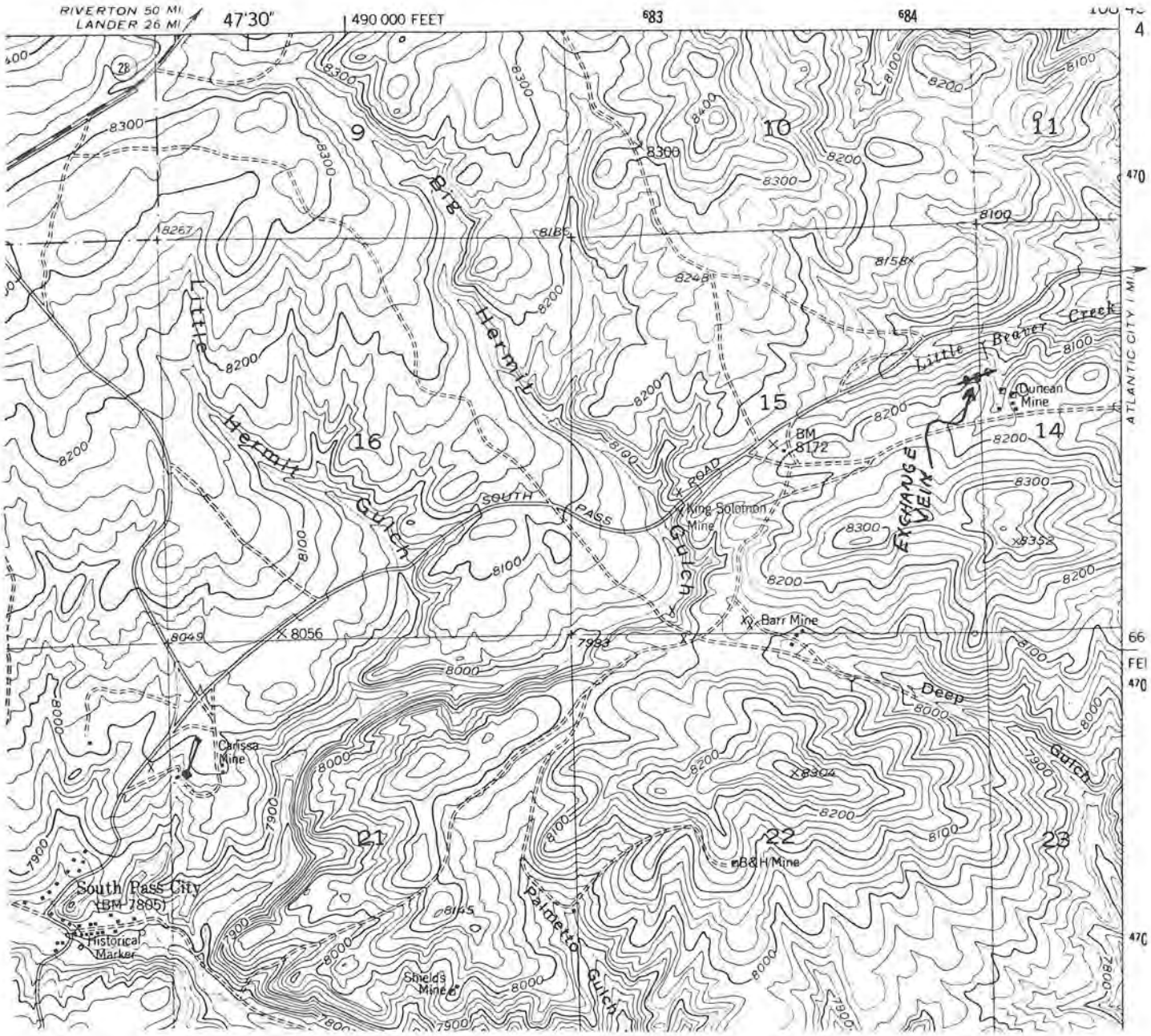

Figure 1. Location map of the Exchange vein (base map U.S. Geological Survey South Pass City 7½-minute quadrangle).

EXCHANGE VEIN - N 63°E trending vein adjacent to Duncan Mine. The vein varied from about ½ ft wide (at EXV-0-83) to 4 to 5 ft wide.

EXV-0-83 - Quartz vein

EXV-1-83 - Approx 1½ ft south of vein - silicified gabbro (?)

EXV-2-83 ~ 1 ft from #1

EXV-3-83 ~ 1 ft from #2 - chlorite red gabbro (shear?)

EXV-4-83 ~ 1 ft from #3 - Hard, slightly chloritized gabbro.

EXV-5-83 ~ 1 ft from #4 - Hard massive gabbro - slightly chloritized.

EXV-6-83 ~ 1 ft from #5 - chloritized massive gabbro.

EX-7-83 ~ 1 ft from #6 - massive gabbro slight diabasic texture

EX-8-83 - ~ 2 ft from #7 - Very hard gabbro.

EXV-9-83 ~ 1 ft from #8 Qtz vein material as float - nearby.

EXV-10-83 ~ 2 ft from #9

EXV-11-83 ~ 5 ft from #10

EXV-ALT-83 Altered rock adjacent to vein (# EXV-0-83)

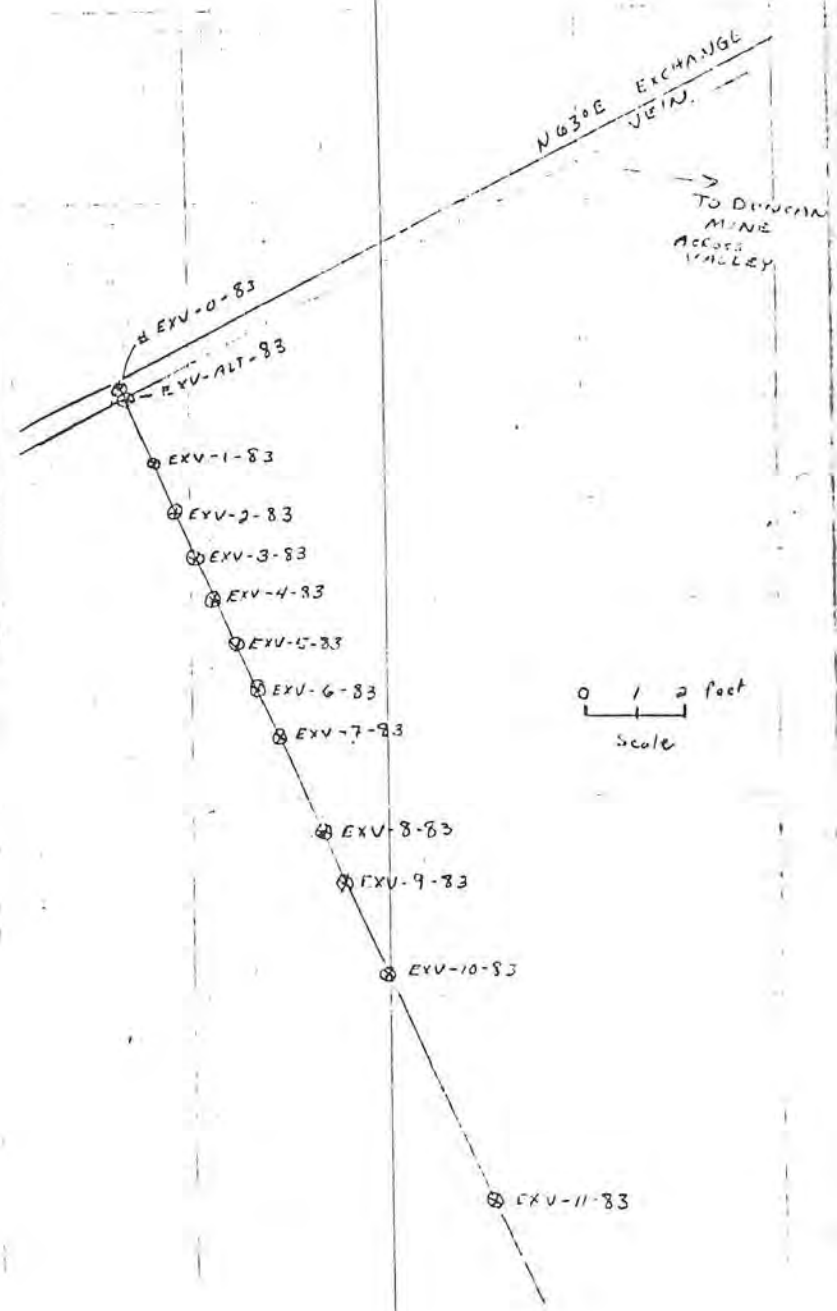

Figure 2. Sample location map and description of Exchange vein.

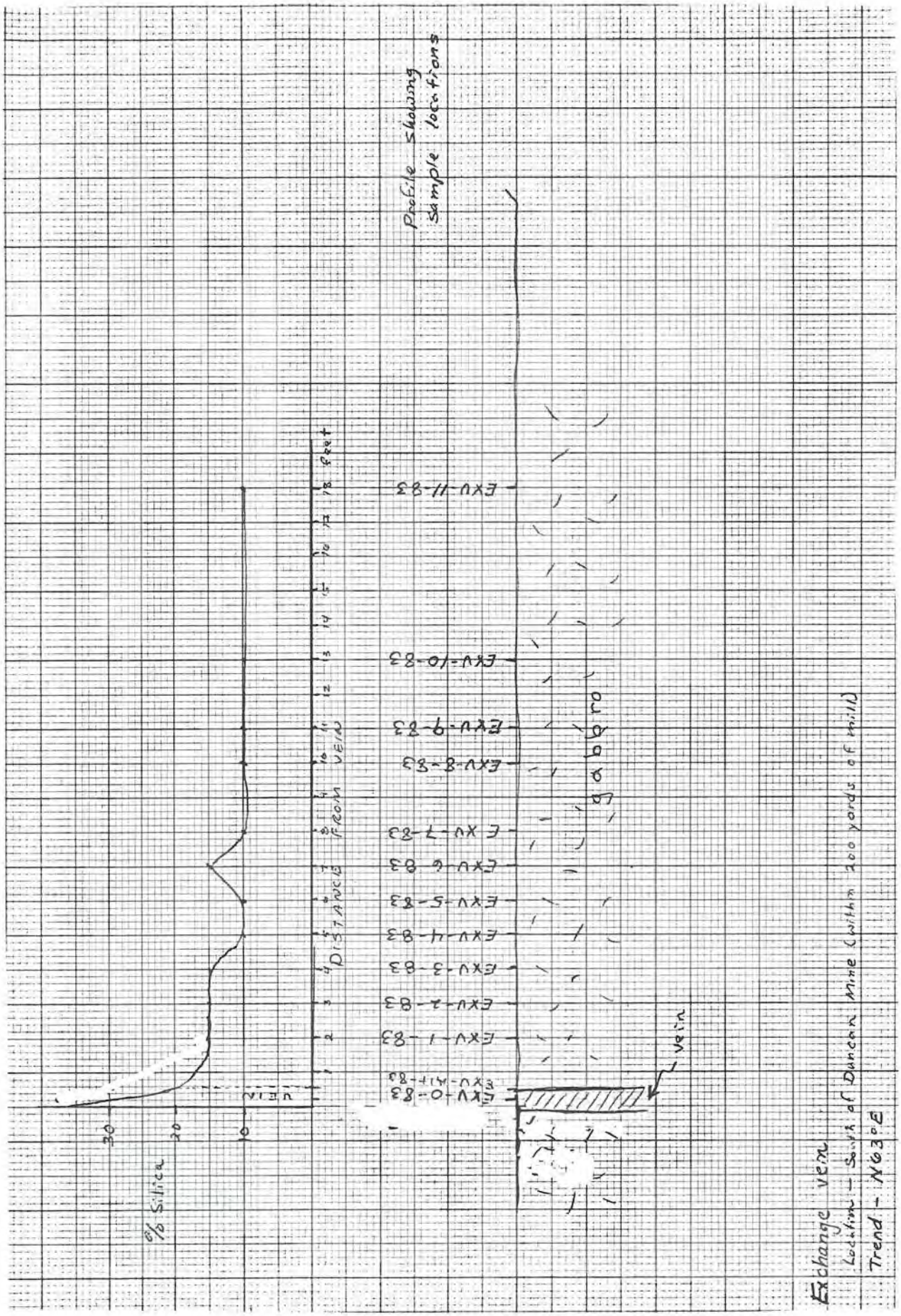

Figure 3. Plot of silica vs. sample distance and sample location map.

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Request No.: 1591-063
Date: May 23, 1983

34 ELEMENT EMISSION SCAN

Customer ID		South pass Exchange vein #Exv-Alt-83 Wholerock	South pass Exchange vein #Exv-0-83 Wholerock	South pass Exchang Vein #Exv-1-83 Wholerock
Lab No.		A0958	A0959	A0960
Iron(Fe)	%	10	3	10
Calcium(Ca)	%	2	0.7	0.7
Magnesium(Mg)	%	2	0.2	1.5
Silver(Ag)	ppm	<0.5	<0.5	<0.5
Arsenic(As)	ppm	<200	<200	<200
Boron(B)	ppm	20	10	50
Barium(Ba)	ppm	200	50	500
Beryllium(Be)	ppm	1	<1	1
Bismuth(Bi)	ppm	<10	<10	<10
Cadmium(Cd)	ppm	<20	<20	<20
Cobalt(Co)	ppm	30	10	20
Chromium(Cr)	ppm	200	100	150
Copper(Cu)	ppm	300	100	200
Lanthanum(La)	ppm	20	<20	<20
Manganese(Mn)	ppm	1000	500	1000
Molybdenum(Mo)	ppm	70	30	50
Niobium(Nb)	ppm	<20	<20	<20

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34 ELEMENT EMISSION SCAN (CONTINUED)

Customer ID		South pass Exchange Vein #Exv-Alt-83 Wholerock	South pass Exchange Vein #Exv-0-83 Wholerock	South pass Exchange Vein #Exv-1-83 Wholerock
Lab No.		A0958	A0959	A0960
Nickel(Ni)	ppm	150	50	150
Lead(Pb)	ppm	50	30	20
Antimony(Sb)	ppm	<100	<100	<100
Scandium(Sc)	ppm	15	5	10
Tin(Sn)	ppm	20	<10	20
Strontium(Sr)	ppm	150	<100	150
Titanium(Ti)	%	0.5	0.1	0.3
Vanadium(V)	ppm	100	70	100
Tungsten(W)	ppm	<50	<50	<50
Yttrium(Y)	ppm	15	<10	20
Zinc(Zn)	ppm	<200	<200	300
Zirconium(Zr)	ppm	200	30	150
Gold(Au)	ppm	<10	<10	<10
Potassium(K)	%	3	2	3
Aluminum(Ai)	%	7	<1	7
Silicon(Si)	%	20	30	15
Sodium(Na)	%	2	0.5	3

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Customer ID		South pass Exchange Vein #Exv-2-83 Wholerock	South pass Exchange Vein #Exv-3-83 Wholerock	South pass Exchange Vein #Exv-4-83
Lab No.		A0961	A0962	A0963
Iron(Fe)	%	15	10	7
Calcium(Ca)	%	3	3	3
Magnesium(Mg)	%	3	3	3
Silver(Ag)	ppm	<0.5	<0.5	<0.5
Arsenic(As)	ppm	<200	<200	<200
Boron(B)	ppm	10	10	10
Barium(Ba)	ppm	700	500	200
Beryllium(Be)	ppm	<1	<1	<1
Bismuth(Bi)	ppm	<10	<10	<10
Cadmium(Cd)	ppm	<20	<20	<20
Cobalt(Co)	ppm	70	70	50
Chromium(Cr)	ppm	100	100	100
Copper(Cu)	ppm	200	150	150
Lanthanum(La)	ppm	<20	<20	<20
Manganese(Mn)	ppm	1500	1500	1500
Molybdenum(Mo)	ppm	30	20	15
Niobium(Nb)	ppm	<20	<20	<20

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34 ELEMENT EMISSION SCAN (CONTINUED)

Customer ID		South pass Exchange Vein #Exv-2-83 Wholerock	South pass Exchange Vein #Exv-3-83 Wholerock	South pass Exchange Vein #Exv-4-83 Wholerock
Lab No.		A0961	A0962	A0963
Nickel(Ni)	ppm	100	100	70
Lead(Pb)	ppm	20	30	20
Antimony(Sb)	ppm	<100	<100	<100
Scandium(Sc)	ppm	30	50	30
Tin(Sn)	ppm	<10	<10	<10
Strontium(Sr)	ppm	100	100	150
Titanium(Ti)	%	0.7	0.7	0.7
Vanadium(V)	ppm	200	200	200
Tungsten(W)	ppm	<50	<50	<50
Yttrium(Y)	ppm	30	30	30
Zinc(Zn)	ppm	<200	<200	<200
Zirconium(Zr)	ppm	100	70	70
Gold(Au)	ppm	<10	<10	<10
Potassium(K)	%	1.5	1.5	1
Aluminum(Ai)	%	7	7	7
Silicon(Si)	%	15	15	10
Sodium(Na)	%	1.5	2	2

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Customer ID		South pass Exchange Vein #Exv-5-83 Wholerock	South pass Exchange Vein #Exv-6-83 Wholerock	South pass Exchange Vein #Exv-7-83 Wholerock
Lab No.		A0964	A0965	A0966
Iron(Fe)	%	10	15	15
Calcium(Ca)	%	3	3	2
Magnesium(Mg)	%	3	3	3
Silver(Ag)	ppm	<0.5	<0.5	<0.5
Arsenic(As)	ppm	<200	<200	<200
Boron(B)	ppm	10	10	10
Barium(Ba)	ppm	300	150	150
Beryllium(Be)	ppm	<1	<1	<1
Bismuth(Bi)	ppm	<10	<10	<10
Cadmium(Cd)	ppm	<20	<20	<20
Cobalt(Co)	ppm	70	70	70
Chromium(Cr)	ppm	150	150	150
Copper(Cu)	ppm	150	200	100
Lanthanum(La)	ppm	<20	<20	<20
Manganese(Mn)	ppm	1500	1500	1500
Molybdenum(Mo)	ppm	10	30	15
Niobium(Nb)	ppm	<20	<20	<20

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34 ELEMENT EMISSION SCAN (CONTINUED)

Customer ID		South pass Exchange Vein #Exv-5-83 Wholerock	South pass Exchange Vein #Exv-6-83 Wholerock	South pass Exchange Vein #Exv-7-83 Wholerock
Lab No.		A0964	A0965	A0966
Nickel(Ni)	ppm	100	150	150
Lead(Pb)	ppm	20	20	20
Antimony(Sb)	ppm	<100	<100	<100
Scandium(Sc)	ppm	50	50	50
Tin(Sn)	ppm	<10	<10	<10
Strontium(Sr)	ppm	150	150	150
Titanium(Ti)	%	0.7	0.5	0.7
Vanadium(V)	ppm	200	200	200
Tungsten(W)	ppm	<50	<50	<50
Yttrium(Y)	ppm	30	30	30
Zinc(Zn)	ppm	<200	<200	<200
Zirconium(Zr)	ppm	70	70	70
Gold(Au)	ppm	<10	<10	<10
Potassium(K)	%	1	2	1.5
Aluminum(Ai)	%	7	7	7
Silicon(Si)	%	10	15	10
Sodium(Na)	%	2	2	2

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Customer ID	South pass Exchange Vein #Exv-11-83 Wholerock
Lab No.	A0970

Iron(Fe)	%	10
Calcium(Ca)	%	3
Magnesium(Mg)	%	3
Silver(Ag)	ppm	<0.5
Arsenic(As)	ppm	<200
Boron(B)	ppm	10
Barium(Ba)	ppm	50
Beryllium(Be)	ppm	<1
Bismuth(Bi)	ppm	<10
Cadmium(Cd)	ppm	<20
Cobalt(Co)	ppm	50
Chromium(Cr)	ppm	150
Copper(Cu)	ppm	100
Lanthanum(La)	ppm	<20
Manganese(Mn)	ppm	1500
Molybdenum(Mo)	ppm	20
Niobium(Nb)	ppm	<20

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34 ELEMENT EMISSION SCAN (CONTINUED)

Customer ID		South pass Exchange Vein #Exv-11-83 Wholerock
Lab No.		A0970
Nickel(Ni)	ppm	100
Lead(Pb)	ppm	20
Antimony(Sb)	ppm	<100
Scandium(Sc)	ppm	30
Tin(Sn)	ppm	<10
Strontium(Sr)	ppm	100
Titanium(Ti)	%	0.5
Vanadium(V)	ppm	200
Tungsten(W)	ppm	<50
Yttrium(Y)	ppm	20
Zinc(Zn)	ppm	<200
Zirconium(Zr)	ppm	70
Gold(Au)	ppm	<10
Potassium(K)	%	1.5
Aluminum(Ai)	%	5
Silicon(Si)	%	10
Sodium(Na)	%	1.5

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34 ELEMENT EMISSION SCAN

Customer ID		South pass Exchange Vein #Exv-8-83 Wholerock	South pass Exchange Vein #Exv-9-83 Wholerock	South pass Exchange Vein #Exv-10-83 Wholerock
Lab No.		A0967	A0968	A0969
Iron(Fe)	%	15	10	10
Calcium(Ca)	%	5	3	3
Magnesium(Mg)	%	3	3	3
Silver(Ag)	ppm	<0.5	<0.5	<0.5
Arsenic(As)	ppm	<200	<200	<200
Boron(B)	ppm	10	10	10
Barium(Ba)	ppm	100	150	70
Beryllium(Be)	ppm	<1	<1	<1
Bismuth(Bi)	ppm	<10	<10	<10
Cadmium(Cd)	ppm	<20	<20	<20
Cobalt(Co)	ppm	70	50	50
Chromium(Cr)	ppm	150	150	150
Copper(Cu)	ppm	100	150	100
Lanthanum(La)	ppm	<20	<20	<20
Manganese(Mn)	ppm	1500	1500	1500
Molybdenum(Mo)	ppm	15	15	20
Niobium(Nb)	ppm	<20	<20	<20

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