DEPARTMENT OF INTERIOR

GEOLOGICAL SURVEY

PRELIMINARY INVESTIGATION OF GOLD MINERALIZATION IN THE PEDRO DOME - CLEARY SUMMIT AREA, FAIRBANKS DISTRICT, ALASKA

U. S. GEOLOGICAL SURVEY RESEARCH CONTRACT 14-08-0001-10910

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PRELIMINARY INVESTIGATION OF GOLD MINERALIZATION IN THE PEDRO DOME - CLEARY SUMMIT AREA FAIRBANKS DISTRICT, ALASKA

By

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Abstract

Anomalous gold values in mineralized veins and hydrothermally altered quartz-mica schist in the Pedro Dome - Cleary Summit area of the Fairbanks District suggest the presence of numerous small low- to high-grade lodes. Anomalous concentrations of gold were found to exist in the wall rocks adjacent to mineralized veins. In general, the gold concentration gradients in these wall rocks are much too steep to increase appreciably the mineable width of the veins. Anomalous gold values were also detected in bedrock samples taken by means of a power auger on the Murphy Dome Road along the southwest extension of the Pedro Dome - Cleary Summit mineralized belt.

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INTRODUCTION

This preliminary report covers the previously unpublished gold anomalies detected in serial, channel and grab samples of mineralized veins and adjacent wall rocks throughout the Pedro Dome - Cleary Summit area, Fairbanks District, Alaska. The description, location and gold content of other samples collected from mineralized veins, altered wall rocks and unaltered bedrock during the 1967 and 1968 field seasons are also included.

The lode-gold deposits occur mainly in metamorphic rocks which have been mapped as Birch Creek Schist (Plate I). Some gold lodes occur in quartz diorite-granodiorite plutons and in quartz monzonite-granite plutons (Forbes and others, 1968). Most of the lode gold deposits are found along the crest of an anticlinal structure in the northern part of the map area (Plate I). A few lodes (Chapman and Foster, 1967) are associated with an anticlinal structure in the southern part of the map area.

Analytical Techniques

The gold assays given in this report were determined both by atomic absorption spectrometry and by fire assay. The former method was employed using an aqua-regia digestion procedure at the University of Alaska and by the U. S. Geological Survey using a hydrobromic acid-bromine digestion procedure. Fire assay of a number of samples was carried out by the Juneau laboratory of the U. S. Bureau of Mines. The particular technique used is indicated in the tables showing the analytical results.

Spectrographic analysis for elements other than gold was performed by the U. S. Bureau of Mines laboratory at Juneau.

Gold Anomalies

Approximately 1000 grab samples of mineralized veins, altered wall rocks and unaltered bedrock were collected throughout the Pedro Dome-Cleary Summit area. The location and gold content of all samples having anomalous concentrations of gold are shown in Plate I. The description, location and gold content of these samples are listed in Table 7. A value of 0.10 ppm or more gold probably represents an anomalous concentration of gold in the rocks of this district. For clarity of presentation, only samples containing 0.50 ppm or more gold were plotted in the Pedro Dome - Cleary Summit region of Plate I. This was necessary because of the large number of samples taken from this area.

Acknowledgements

The investigations described in this report are based upon cooperative research done by the University of Alaska and the U. S. Geological Survey as part of the U. S. Geological Survey's Heavy Metals Program (Contract 14-08-0001-10919). Much of the data contained in this report could not have been obtained without the consent and cooperation of mine owners and claim holders in the district. The permission of the U. S. Bureau of Mines to use and to publish data obtained from their drilling project on the Keystone property is gratefully acknowledged.

WALL ROCK GOLD GRADIENTS

Serial grab and channel samples of mineralized veins and adjacent wall rocks in the Pedro Dome - Cleary Summit area have established the presence of gold gradients in both altered and apparently unaltered wall rocks. The previously unpublished data from five localities shown on Plate I are discussed below.

Antimony Ridge Mine, Murphy Dome Road

The Antimony Ridge Mine, locality A, represents the western-most known occurrence of mineralized veins in the Pedro Dome-Cleary Summit area of the Fairbanks District. The vein trends N.47^{o}E. and dips 60^{o}SE. A major shear with many subsidiary shears has been mineralized. Stibnite occurs as lenses or nodules surrounded by sheared material suggesting pre-, syn-, and post-ore movement along the shear zone. Gold assays of channel samples across the vein range from 3.40 to 69.00 ppm, and average 16.1 ppm for the width of the vein. Figure 2 shows the gold values obtained from the vein and the schist of the hanging wall.

Divide Between Too Much Gold Creek and Goose Creek

Channel samples were taken from two veins exposed in prospect trenches in the divide area between Too Much Gold Creek and Goose Creek, designated locality B on Plate I. Table 2 shows the assays across a vein which strikes N.45^{o}W. and dips 74^{o}SW. The vein is narrow, less than one foot; however, significant gold values occur in the silicified schists of the footwall as shown in Figure 3. The second vein trends N.75^{o}W. and dips 70^{o}S. and where sampled does not carry abundant gold as shown in Table 3 and Figure 4.

Cleary Summit

A recent prospect trench northeast of Cleary Summit, locality C, has exposed a seven-foot wide shear zone with minor vein quartz. Channel samples were collected across the N.75^{o}W. zone to determine whether a gold gradient might exist. Table 4 shows the assays, and only samples ECC 5-4-67

Table 1. Gold content of vein at Antimony Ridge mine, Murphy Dome Road.

Sample No.	Description	Location	Type	Au in ppm aqua-regia method (1)	*(2)
ECM 1-5-67	Sulfide nodule	Footwall	Channel	3.40	
1-6-67	Gouge/footwall side of #5	0.0-0.5 ft.	Channel	22.50	
1-7-67	Gouge/hanging wall side of #5	0.0-0.5 ft.	Channel	24.00	
1-8-67	Gouge & vein quartz breccia	0.5-1.0 ft.	Channel	69.00	
1-9-67	Sheared & oxidized schist	1.0-1.5 ft.	Channel	18.00	
1-10-67	Sulfide nodule	1.5-1.8 ft.	Channel	11.60	
1-11-67	Sheared quartz & oxides	1.8-2.1 ft.	Channel	15.00	
1-12-67	Sulfide nodule	2.1-3.1 ft.	Channel	6.30	
1-13-67	Sheared quartz & wall rock	3.1-3.5 ft.	Channel	9.75	
1-14-67	Sheared quartz and sulfide	3.5-4.0 ft.	Channel	14.30	
1-15-67	Vein quartz and sulfide	4.0-4.2 ft.	Channel	10.80	
1-16-67	Gouge zone	4.2-4.3 ft.	Channel	20.30	
1-17-67	Sheared quartz & schist	4.3-4.8 ft.	Channel	18.00	
1-18-67	Sheared quartz & schist	4.8-5.3 ft.	Channel	18.00	22.50
1-19-67	Hanging wall of vein	5.3-6.0 ft.	Channel	0.35	
1-20-67	Schist of hanging wall	6.0-6.5 ft.	Channel	0.19	
1-21-67	Schist of hanging wall	6.5-7.0 ft.	Channel	0.16	0.02
1-22-67	Schist of hanging wall	7.0-7.5 ft.	Channel	0.59	
1-23-67	Schist of hanging wall	7.5-8.0 ft.	Channel	0.15	
1-24-67	Schist of hanging wall	8.0-8.5 ft.	Channel	0.14	0.02
1-25-67	Schist of hanging wall	8.5-9.0 ft.	Channel	0.02	

* repeat analyses

Figure 2. Gold content of channel samples Antimony Ridge Mine, Murphy Dome Road.

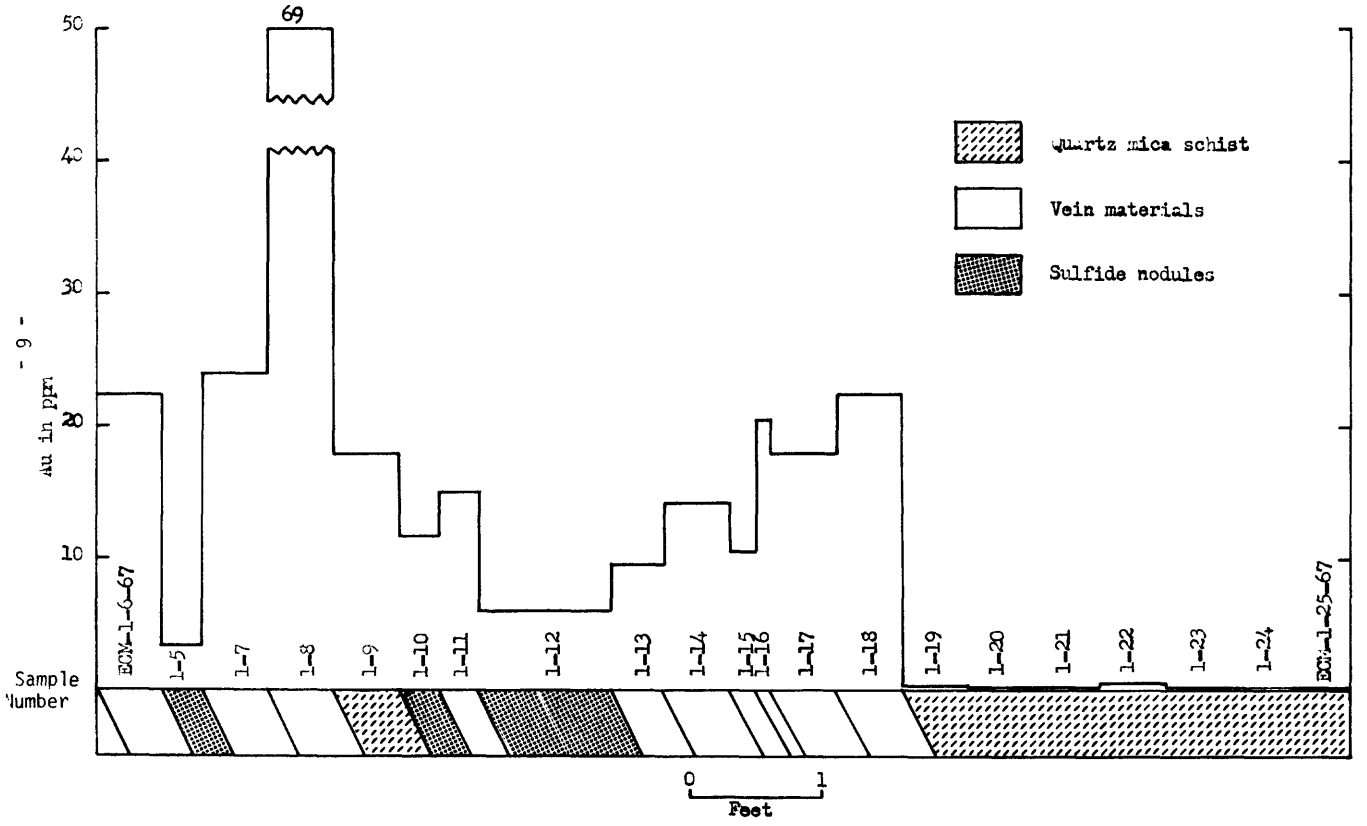


Table 2. Gold content of vein in divide area between Too Much Gold Creek and Goose Creek, Cleary Summit area.

Sample No.	Description	Location	Type	Au in ppm aqua-regia method
ECV 9-60-67	Vein quartz & sheared schist	0.0-0.3 ft.	Channel	3.96
9-61-67	Vein quartz	0.3-0.7 ft.	Channel	1.75
9-62-67	Silicified schist footwall	0.7-1.2 ft.	Channel	1.25
9-63-67	Silicified schist footwall	1.2-1.7 ft.	Channel	0.63
9-64-67	Silicified schist footwall	1.7-2.4 ft.	Channel	0.95

Table 3. Gold content of vein in divide area between Too Much Gold Creek and Goose Creek, Cleary Summit area.

Sample No.	Description	Location	Type	Au in ppm aqua-regia method
ECV 9-65-67	Altered schist footwall	0.0-1.0 ft.	Channel	0.37
9-66-67	Vein quartz	1.0-1.5 ft.	Channel	0.65
9-67-67	Sheared schist and vein quartz	1.5-2.5 ft.	Channel	0.65
9-68-67	Sheared schist hanging wall	2.5-3.0 ft.	Channel	0.13
9-69-67	Sheared schist hanging wall	3.0-4.0 ft.	Channel	0.13
9-70-67	Quartz mica schist hanging wall	4.0-5.0 ft.	Channel	0.13
9-71-67	Quartz mica schist hanging wall	5.0-6.0 ft.	Channel	0.13

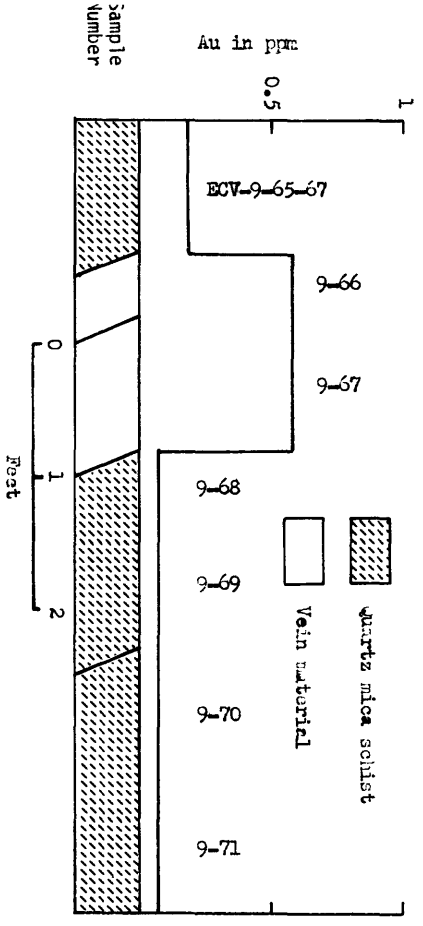


Figure 4. Gold content of vein in the divide area between Too Much Gold Creek and Goose Creek, Cleary Summit area.

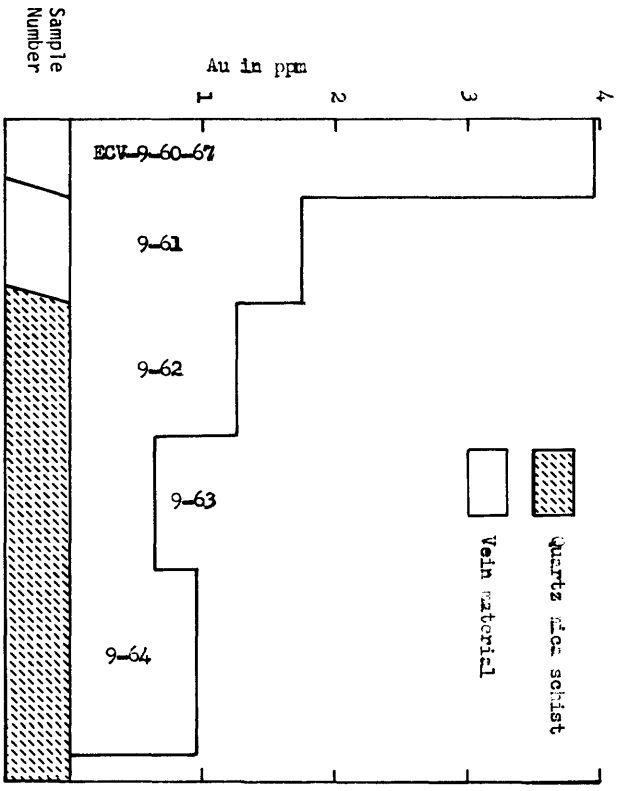


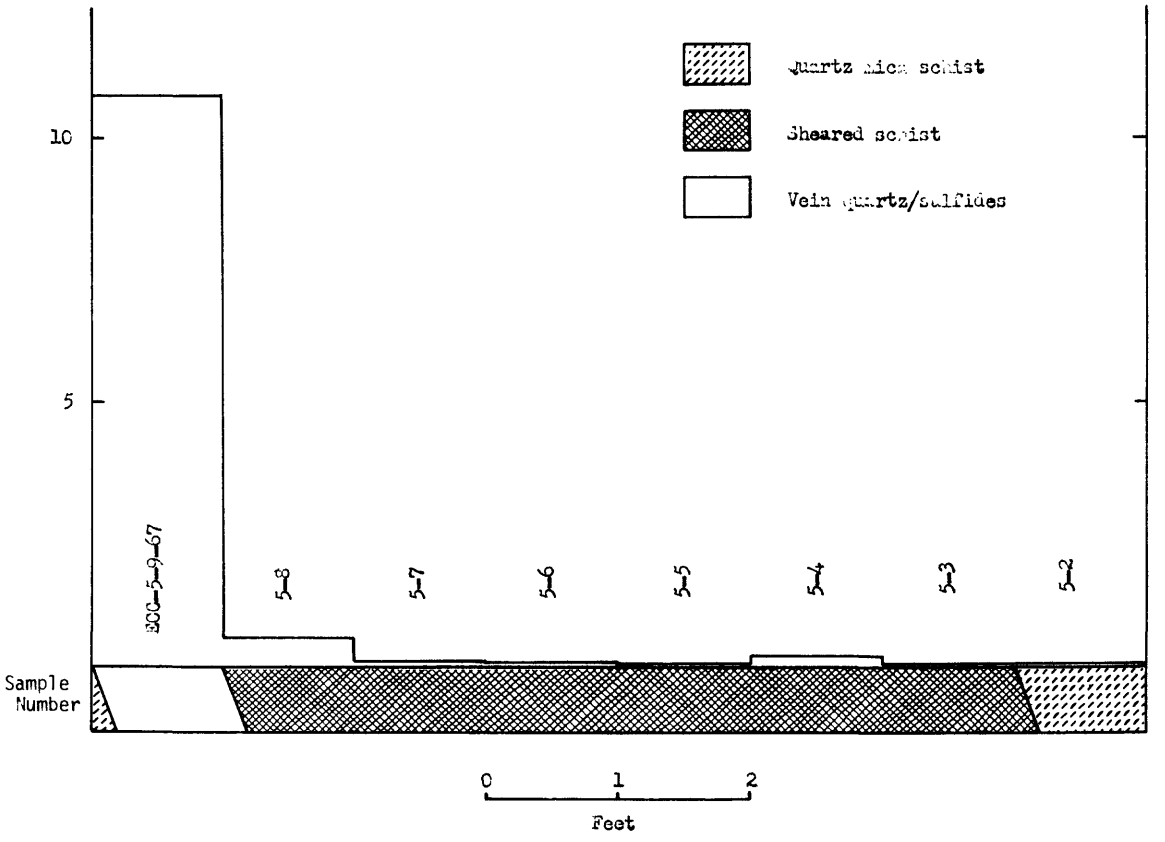
Figure 3. Gold content of vein in the divide area between Too Much Gold Creek and Goose Creek, Cleary Summit area.

Table 4. Gold content of vein northeast of Cleary Summit.

Sample No.	Description	Location	Type	Au in ppm aqua-regia method (1)	*(2)
ECC 5-2-67	Quartz mica schist hanging wall	0.0-1.0 ft.	Channel	0.03	
5-3-67	Sheared schist	1.0-2.0 ft.	Channel	0.03	
5-4-67	Sheared schist	2.0-3.0 ft.	Channel	0.11	
5-5-67	Sheared schist	3.0-4.0 ft.	Channel	0.03	
5-6-67	Sheared schist	4.0-5.0 ft.	Channel	0.04	
5-7-67	Sheared schist	5.0-6.0 ft.	Channel	0.05	
5-8-67	Sheared schist	6.0-7.0 ft.	Channel	0.58	
5-9-67	Vein quartz/sulfide	7.0-8.0 ft.	Channel	10.80	8.10

* repeat analysis

Figure 5. Gold content of vein northeast of Cleary Summit.



and ECC 5-8-67 can be regarded as anomalous. The vein quartz contains stibnite, and euhedral quartz crystals appear to be replacing the sulfide. Figure 5 depicts the location of the samples within the shear zone.

Divide Between Fairbanks and Wolf Creeks

Serial grab samples were taken from two veins exposed in old prospect trenches in the divide area between Fairbanks Creek and Wolf Creek. The first vein strikes N.70°W. and dips 55°S., locality D on the road to the old Nordale mine. The assay results and sample distribution are shown in Table 5 and Figure 6, respectively.

The second vein trends N.65°E. and dips 70°S. and is designated as locality E on Plate I. The altered schist sample taken one foot into the footwall carries significant gold (ECV 9-40-67), while the unaltered schist from the same distance into the hanging wall is only slightly anomalous (ECV 9-45-67), as shown in Table 6 and Figure 7.

AUGER SAMPLES

The mineralized belt in the Pedro Dome-Cleary Summit area trends in a west-southwesterly direction. The trend of this belt, as projected to the southwest beyond the Elliott Highway would be approximately coincident with the Murphy Dome Road. Because the outcrops are scarce and small along the projected trend, a truck-mounted auger unit from the U. S. Geological Survey Equipment Development and Services Unit was used to obtain bedrock samples at 400-foot intervals along the Murphy-Dome Road.

Table 8 shows the gold assay values for those samples containing anomalous quantities of gold. These data are also plotted on Plate I.

Table 5. Gold content of vein in the divide area between Fairbanks and Wolf Creeks, Cleary Summit area

Sample No.	Description	Location	Type	Au in ppm aqua-regia method (1)	*(2)
ECV 9-3-67	Vein quartz (footwall)	Footwall of vein	Grab	0.63	0.41
9-4-67	Vein quartz	Hanging wall of vein	Grab	2.40	2.30
9-5-67	Vein quartz	2 ft. into footwall	Grab	0.38	0.48
9-6-67	Quartz mica schist	5 ft. into footwall	Grab	0.13	0.06
9-7-67	Stibnite & galena	Footwall of vein	Grab	0.25	0.11
9-8-67	Micaceous quartzite	3 ft. into hanging wall	Grab	0.13	0.27
9-9-67	Quartz mica schist	2.1 ft. into footwall	Grab	0.13	0.11

Table 6. Gold content of vein in the divide area between Fairbanks and Wolf Creeks, Cleary Summit area

Sample No.	Description	Location	Type	Au in ppm aqua-regia method (1)	*(2)
ECV 9-40-67	Altered schist	1 ft. into footwall	Grab	2.87	
9-41-67	Vein quartz	Footwall of vein	Grab	0.90	
9-42-67	Vein quartz/sulfides	Footwall of vein	Grab	1.05	
9-43-67	Vein quartz	Hanging wall of vein	Grab	1.76	
9-45-67	Quartz mica schist	1 ft. into hanging wall	Grab	0.18	
9-46-67	Quartz mica schist	2 ft. into hanging wall	Grab	0.05	
9-47-67	Quartz mica schist	5 ft. into hanging wall	Grab	0.05	
9-48-67	Quartz mica schist	7 ft. into hanging wall	Grab	0.05	

* repeat analyses

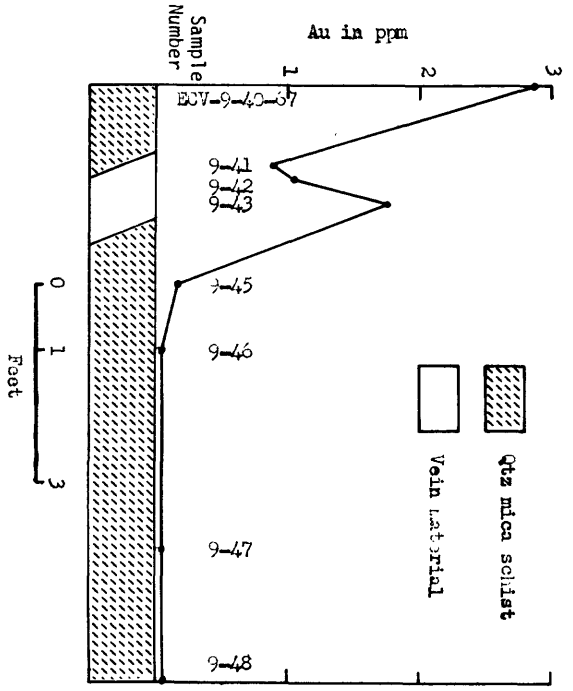


Figure 7. Gold content of vein in the divide area between Fairbanks and Wolf Creeks, Cleary Summit area.

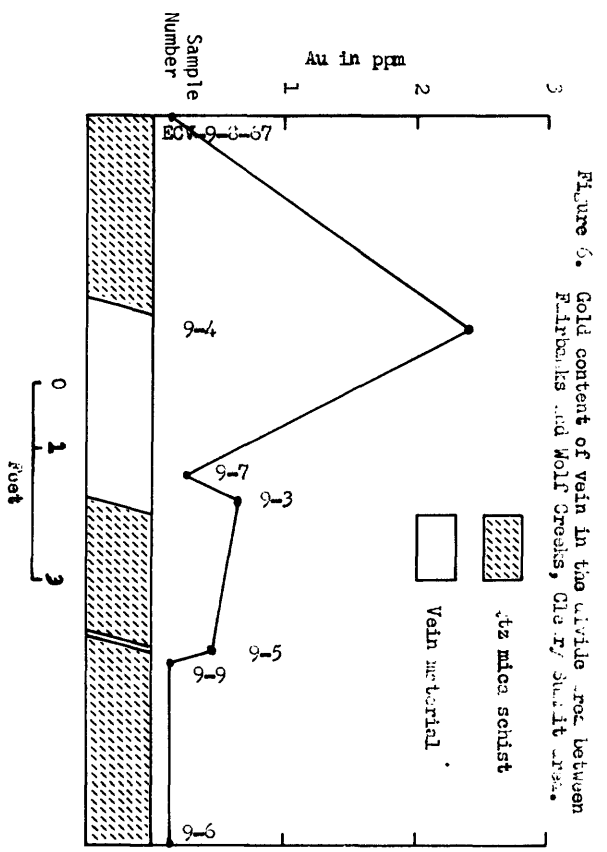


Figure 6. Gold content of vein in the divide area between Fairbanks and Wolf Creeks, Cleary Summit area.

Table 7. Gold content of grab samples from the Murphy Dome Road, Pedro Dome, and Cleary Summit area.

Sample No.	Description	Location	Au in ppm aqua-regia method (1)	*(2)	Mean Value**
ECM 4-64b-67	Schist/black material	Murphy Dome Road	0.68		
4-106-67	Fe stained fracture fill	Murphy Dome Road	1.16		
ECV 4-1a-67	Vein quartz	Christina Claim, Cleary Summit	170.00		136.50
4-1b-67	Vein quartz	Christina Claim, Cleary Summit	103.00		
ECV 9-2a-67	Vein quartz	Divide area Fbks† & Wolf Creeks	2.30	3.00	
9-2b-67	Gouge	Divide area Fbks & Wolf Creeks	3.20	0.93	2.26
9-2c-67	Vein quartz	Divide area Fbks & Wolf Creeks	1.80	2.30	
9-10-67	Vein quartz	Divide area Fbks & Wolf Creeks	0.76		
9-13-67	Vein quartz	Divide area Fbks & Wolf Creeks	0.76		0.76
9-14-67	Vein quartz breccia	Divide area Fbks & Wolf Creeks	1.00		
9-15-67	Vein quartz	Divide area Fbks & Wolf Creeks	0.50		
9-19-67	Vein quartz	Divide area Fbks & Wolf Creeks	0.64		
9-20-67	Vein quartz	Divide area Fbks & Wolf Creeks	1.26		
9-26-67	Vein quartz	Divide area Fbks & Wolf Creeks	1.51		
9-29-67	Vein quartz	Divide area Fbks & Wolf Creeks	4.52		
9-30-67	Altered schist	Divide area Fbks & Wolf Creeks	1.76		2.60
9-31-67	Altered schist	Divide area Fbks & Wolf Creeks	1.51		
9-34-67	Vein quartz	Divide area Fbks & Wolf Creeks	0.90		
9-50-67	Fe stained qtz mica schist	Divide area Fbks & Wolf Creeks	0.60		
9-55-67	Vein quartz	Divide area Fbks & Wolf Creeks	1.36		
9-72-67	Vein quartz	Divide area Fbks & Wolf Creeks	3.38		

Table 7. (Continued)

Sample No.	Description	Location	Au in ppm aqua-regia method (1)	*(2)	Mean Value**
ECV 9-76-67	Vein quartz	Divide area Fbks & Wolf Creeks	1.75		3.37
9-77-67	Vein quartz	Divide area Fbks & Wolf Creeks	5.00		
9-87-67	Vein quartz	Divide area Fbks & Wolf Creeks	7.00		
9-89-67	Vein quartz	Divide area Fbks & Wolf Creeks	1.25		
ECV 10-1-67	Vein quartz	Hi-Yu Mine	0.55		
10-2-67	Vein quartz	Road NW from Hi-Yu Mine	2.13		
10-3-67	Vein quartz	Road NW from Hi-Yu Mine	20.00		
10-10-67	Quartz mica schist	Road NW from Hi-Yu Mine	1.25		
ECC 1-60-67	Vein quartz	Steese Hwy, Cleary Summit N	1.38		
1-62-67	Vein quartz	Steese Hwy, Cleary Summit N	2.83		
1-70-67	Amphibolite	Steese Hwy, Cleary Summit N	0.54		
1-121-67	Altered qtz prophyry dike	Steese Hwy, Cleary Summit N	0.50		
1-122-67	Altered qtz porphyry breccia	Steese Hwy, Cleary Summit N	0.50		
1-123-67	Altered qtz porphyry breccia	Steese Hwy, Cleary Summit N	1.25		1.31
1-124-67	Altered qtz porphyry breccia	Steese Hwy, Cleary Summit N	2.20		
1-129-67	Vein quartz	Steese Hwy, Cleary Summit N	1.88		
ECC 2-48-67	Sheared quartz diorite	Steese Hwy, Cleary Summit S	1.10	1.25	1.17
2-91-67	Sheared qtz mica schist	Steese Hwy, Cleary Summit S	0.75		

Table 7. (Continued)

Sample No.	Description	Location	Au in ppm aqua-regia method (1)	*(2)	Mean Value**
ECC 2-95-67	Sheared qtz mica schist	Steese Hwy, Cleary Summit S	1.80		4.27
2-96-67	Sheared qtz mica schist	Steese Hwy, Cleary Summit S	8.60		
2-97-67	Sheared qtz mica schist	Steese Hwy, Cleary Summit S	2.40		
2-102-67	Altered qtz mica schist	Steese Hwy, Cleary Summit S	2.10		
2-108-67	Altered qtz mica schist	Steese Hwy, Cleary Summit S	0.50		
2-127-67	Vein quartz	Easy Money Mine	23.20		
ECC 4-13-67	Vein quartz	Pedro Dome Road	138.00	143.00	140.00
ECC 5-12-67	Vein quartz	Cleary Summit-Ski Land	6.50	6.40	6.45
5-14-67	Sheared schist	Cleary Summit-Ski Land	2.00	1.90	1.95
5-17-67	Vein quartz	Cleary Summit-Ski Land	8.00	8.40	8.20
5-18-67	Vein quartz	Cleary Summit-Ski Land	7.50	6.70	7.10
5-19-67	Vein quartz	Cleary Summit-Ski Land	0.70		
5-20-67	Vein quartz	Cleary Summit-Ski Land	0.95		
5-22-67	Vein quartz	Cleary Summit-Ski Land	9.10	9.10	9.10
ECC 7-3-67	Vein quartz	Ridge between Twin & Deadwood Crks	4.08		
7-7-67	Vein quartz	Ridge between Twin & Deadwood Crks	5.50	16.80	11.15
ECP 5-64-68	Clayey gouge in qtz diorite	Fox Creek headwaters	17.40		
5-65-68	Vein quartz	Fox Creek headwaters	6.70	15.00	9.50
5-66-68	Galena/quartz	Fox Creek headwaters	4.60	5.50	5.15

Table 7. (Continued)

Sample No.	Description	Location	Au in ppm aqua-regia method (1)	*(2)	Mean Value**
ECDC 1-1 (F)	Pyrite bearing quartz vein	Dawson Cut, Engineer Creek	0.02		
1-2 (F)	Altered qtz-mica schist	Dawson Cut, Engineer Creek	0.02		
1-3 (F)	Vein qtz w/altered schist	Dawson Cut, Engineer Creek	0.02		
1-4 (F)	Vein qtz w/altered schist	Dawson Cut, Engineer Creek	0.02		
1-5 (F)	Vein qtz w/pyrite	Dawson Cut, Engineer Creek	0.02		
1-6 (F)	Pyrite bearing granitic dike rock	Dawson Cut, Engineer Creek	0.15		
ECFCh 1-1-68	Vein qtz	First Chance Creek	>15.00		
1-2-68	Bluish-grey quartzite	First Chance Creek	<0.02		
1-3-68	Bluish-grey quartzite	First Chance Creek	<0.02		
2-1-68	Qtz-mica schist	First Chance Creek	<0.02		
2-2-68	Brown stained qtz-mica schists	First Chance Creek	0.03		
2-3-68	Qtz-mica schist	First Chance Creek	<0.02		
2-4-68	Qtz-mica schist	First Chance Creek	<0.02		
3-1-68	Silicified breccia	First Chance Creek	0.27		
3-2-68	Ochre gouge	First Chance Creek	<0.02		
3-3-68	Altered qtz-mica schist	First Chance Creek	<0.02		
ECFCk 1-1-68	Quartzose gouge	Lower Fox Creek	<0.02		
1-2-68	Altered qtz-mica schist	Lower Fox Creek	<0.02		
1-3-68	Granitic dike rock	Lower Fox Creek	<0.02		
1-4-68	Segregation (?) quartz	Lower Fox Creek	<0.02		
1-5-68	Vein qtz	Lower Fox Creek	<0.02		

Table 7. (Continued)

Sample No.	Description	Location	Au in ppm aqua-regia method (1)	*(2)	Mean Value**
ECF 4-10-68	Gouge & vein material	Prospect SW McCarty Mine	0.68		
ECF 8-3-68	Micaceous quartzite	Coffee Dome area	1.27		
8-4-68	Vein quartz	Coffee Dome area	43.50		36.70
8-5-68	Vein quartz	Coffee Dome area	30.00		
8-6-68	Vein quartz	Coffee Dome area	33.00		
8-7-68	Vein quartz	Coffee Dome area	1.95		
8-10-68	Vein quartz	Coffee Dome area west	2.48		
8-13-68	Vein quartz	Coffee Dome area west	150.00		
ECG 1-26-68	Calc-magnesian rock	Gilmore Dome	1.05		
1-28-68	Segregation quartz (?)	Gilmore Dome	3.53		
ECG 4-3-68	Vein quartz	Gilmore Dome	1.28		
4-5-68	Vein breccia	Gilmore Dome	1.35		
ECGT 1-7-68	Altered qtz mica schist	Gilmore Trail Road	0.53		
ECEC 1-6-68	Vein material	Engineer Creek tailings	3.75		
1-8-68	Vein material	Engineer Creek tailings	1.27		
1-12-68	Altered qtz porphyry	Engineer Creek tailings	0.98		
1-26-68	Altered qtz porphyry	Engineer Creek tailings	0.56		
1-28-68	Altered qtz porphyry	Engineer Creek tailings	0.63		
1-30-68	Vein material	Engineer Creek tailings	2.30		
1-32-68	Vein material	Engineer Creek tailings	0.70		

* repeat analyses
** value plotted on map
† Fbks - Fairbanks

Table 8. Gold content of auger samples along Murphy Dome Road
(Analysts: M. S. Rickard, R. L. Miller, J. G. Viets, U. S. Geological Survey.)

Sample No.	Description	Location		Type	Au in ppm $HBr-Br_2$ Field Method
		Hole No.	Depth (ft.)		
67ACh-127	Fe stained qtz-mica schist	30	6.0	Auger	0.1
67ACh-132	Mica schist	32	6.0	Auger	1.0
67AWrZ-2	Fe stained qtz-mica schist	39	11.5	Auger	0.6
67ACh-147	Fe stained silicified schist	46	11.5	Auger	0.1
67ACh-152	Altered schist	50	6.5	Auger	0.2
67ACh-165	Fe stained schist	56	6.0	Auger	0.4
67ACh-170	Fe stained qtz-mica schist	59	4.0	Auger	0.1
67ACh-215	Altered schist	84	16.5	Auger	0.2

Table 9. Gold content of grab samples from Dome Creek and Little Eldorado Creek, northwest of Pedro Dome

Sample No.	Description	Location	Au in ppm aqua-regia method
RCS-1	Vein quartz rubble	Mine below Pedro Dome*	>150.00
2	Vein quartz rubble	Mine below Pedro Dome*	>150.00
3	Quartz gouge	Ditch, Marshall Gulch	0.42
4	Vein quartz	Bulldozer cut, NW-SE road above Marshall Gulch	0.45
5	Vein quartz	Prospect west of the above road	0.30
6	Quartz gouge	Prospect east of road above Cleary col	<0.02
7	Vein quartz	Prospect west of road above Cleary col	0.15
8	Altered schist	Prospect west of road above Cleary col	
9	Quartz veinlet	Prospect west of road above Cleary col	0.03
10	Vein quartz	Vein on bench at lake, Dome Creek	4.65
11	Vein quartz	Vein on bench at lake, Dome Creek	4.35
12	Mica schist	Vein on bench at lake, Dome Creek	<0.02
13	Vein quartz	Vein on bench at lake, Dome Creek	2.70
14	Weathered schist	Vein on bench at lake, Dome Creek	2.25
15	Mica quartzite	300 yd. NW of dredge, N side Dome Creek	2.70
16	Mica quartzite	300 yd. NW of dredge, N side Dome Creek	<0.02
17	Altered schist	Mine dump NE of dredge, Dome Creek**	1.65
18	Quartzite	Mine dump NE of dredge, Dome Creek**	<0.02
19	Mica schist	Mine dump NE of dredge, Dome Creek**	0.09
20	Vein quartz & Gouge	300 yd. NW of dredge, N side Dome Creek	0.08
21	Quartz vein	"Main" vein, Little Last Chance Creek	<0.02
22	Gouge	"Main" vein, Little Last Chance Creek	<0.02
23	Quartz vein	"Main" vein, Little Last Chance Creek	<0.02
24	Gouge	"Main" vein, Little Last Chance Creek	0.21
25	Vein quartz	Vein in Louise Creek	<0.02
26	Clay gouge	N of fold, Little Last Chance Creek	<0.02
27	Clay gouge	S of fold, Little Last Chance Creek	<0.02
28	Micaceous quartzite	S of fold, Little Last Chance Creek	<0.02

Table 9. (Continued)

Sample No.	Description	Location	Au in ppm aqua-regia method
RCS-29	Gouge	Leached zone N of fault, Little Last Chance Creek	0.56
30	Vein quartz	Head of Little Last Chance Creek	<0.02
31	Quartz	Chomco #1 prospect	3.00
32	Schist	Chomco #1 prospect	0.19
33	Quartz	Chomco #2 prospect	2.10
34	Quartz	Chomco #2 prospect	4.80
35	Stibnite breccia	Prospect W of road above spruce Creek***	4.20
36	Vein quartz & gouge	Prospect W of road above Spruce Creek***	28.50
37	Limonitic Quartz breccia	Prospect W of road above Spruce Creek***	12.40

* Probably Dome View (Rock Run, Wackwitz Bros., Last Chance) Prospect, worked by Charles Wackwitz, ref. #61 Chapman, R. N. & Foster, R. L., 1967, Open File Report, Fig. 1. prospect number 61.

** Probably Spaulding Mine (Soo Mine & associated prospects), Champman, R. M. & Foster, R. L., 1967, Mine number 65.

*** Probably Ohio Claim Prospect (Markovitch Mine, Hindenburg Claim), Chapman, R. M. & Foster, R. L., 1967, Mine number 96.

† Lower plate of thrust.

Table 10. Gold, arsenic, silver, antimony and lead assays of core from Keystone #1 drill hole, Cleary Summit Area.

Sample No.	Depth in Ft.	Description	Au in ppm; atomic absorption	Au in ppm; fire assay	As in ppm; spectrograph	Sb in ppm; spectrograph	Ag in ppm; spectrograph	Pb in ppm; spectrograph
67-1494	126.7-135.5	Qtz mica schist	--	--	--	--	--	--
1495	135.5-142.9	Qtz mica schist/alteration lower 0.3'	0.05	--	--	--	--	--
1496	142.9-146.1	Fe stained schist	--	--	--	--	--	--
67-1502	183.9-190.5	Qtz mica schist/Fe stain	0.50	0.310	--	--	--	--
1503	190.5-193.7	Qtz mica schist/Sb oxide stain	0.13	0.217	--	--	1.2	
1504	193.7-197.9	Qtz mica schist/Sb oxide stain	<0.13	--	--	--	0.6	--
1505	197.9-201.7	Qtz mica schist/ qtz vein	<0.13	--	--	--	--	--
1506	201.7-206.7	Qtz mica schist/disseminated sulfides	<0.13	--	--	--	2.5	--
1507	206.7-211.6	Qtz mica schist/disseminated sulfides	<0.13	0.156	--	--	0.3	
1508	211.6-215.6	Qtz mica schist/disseminated sulfides	<0.13	--	--	--	--	--
1509	215.6-217.9	Qtz mica schist	<0.13	--	--	--	--	--
1510	217.9-223.9	Silicified schist	0.82	0.620	1,000	--	--	--
1511	223.9-229.0	Silicified schist	<0.13	0.930	500	--	--	--
1512	229.0-233.5	Qtz mica schist	<0.13	--	--	--	--	--
67-1515	245.7-251.5	Qtz mica schist	0.63	0.310	--	--	--	--
1516	251.5-254.0	Qtz vein/altered schist	<0.13	0.465	380	--	0.6	--
1517	254.0-260.0	Qtz mica schist/shears	<0.13	0.620	260	--	1.2	--
1518	260.0-267.7	Qtz mica schist/shears	0.38	0.217	--	--	1.9	--
1519	267.7-272.9	Sheared schist/sulfides	0.44	0.310	--	--	Tr	--
1520	273.9-280.0	Sheared schist/sulfides	0.19	--	--	--	0.6	--
1521	280.0-285.5	Gray green schist	0.50	0.248	--	--	--	--
1522	285.5-291.7	Gray green schist/pyrite	<0.13	Tr	--	--	--	--
1523	291.7-300.8	Gray green schist/pyrite	<0.13	Tr	--	--	Tr	--

Table 10. (Continued)

Sample No.	Depth in Ft.	Description	Au in ppm; Atomic Absorption	Au in ppm; fire assay	As in ppm; spectrograph	Sb in ppm; spectrograph	Ag in ppm; spectrograph	Pb in ppm; spectrograph
67-1530	343.5-344.5	Silicified schist	--	0.156	--	--	--	--
1531	344.5-351.1	Silicified schist	--	0.156	--	--	--	--
1532	355.1-356.1	Silicified schist	0.08	--	--	--	Tr	--
1533	356.1-361.1	Silicified schist	0.04	--	--	--	--	--
1534	361.1-365.3	Qtz mica schist	0.04	--	--	--	--	--
1535	365.3-369.5	Qtz mica schist/Segregation qtz	0.08	0.620	--	--	--	--
1536	369.5-375.1	Qtz mica schist/vein quartz	0.04	0.248	--	--	0.6	--
1537	375.1-377.4	Qtz mica schist/qtz vein	--	--	--	--	4.0	--
1538	377.4-383.2	Qtz mica schist/graphitic bands	--	--	--	--	1.9	--
1539	383.2-388.1	Green qtz mica schist/sulfides	--	--	--	--	--	--
1540	388.1-390.5	Green qtz mica schist/sulfides	--	--	--	--	--	--
1541	390.5-393.5	Qtz mica schist/segregation qtz	--	--	--	--	3.1	--
1542	393.5-400.7	Qtz mica schist/segregation qtz	--	0.248	--	--	1.2	--
67-1571	574.0-576.8	Altered qtz mica schist	--	--	--	--	--	--
1572	576.8-578.9	Altered qtz mica schist	--	--	--	--	2.5	--
1573	578.9-580.8	Vein/gouge	0.07	1.244	5,200	17,600	55.2	38,700
1574	580.8-583.5	Vein/gouge	0.09	0.622	10,800	5,500	34.1	13,100
1575	583.5-584.5	Qtz vein	0.09	1.560	5,400	18,500	62.0	38,000
1576	584.5-587.3	Vein & silicified schist	0.02	--	--	--	5.9	--
1577	587.3-591.0	Vein & silicified schist	0.02	0.340	--	--	Tr	--
1578	591.0-592.7	Qtz mica schist	1.18	2.480	11,000	--	--	--
1579	592.7-595.3	Qtz mica schist	0.07	1.560	12,000	--	--	--
1580	595.3-598.4	Qtz mica schist	--	0.460	--	--	--	--
1581	598.4-603.0	Qtz mica schist	--	--	--	--	1.9	--
1582	603.0-604.0	Qtz mica schist	1.30	3.670	32,000	12,500	3.7	--

Atomic absorption analyses - University of Alaska, College, Alaska

Fire assay and spectrographic results - U. S. Bureau of Mines, Juneau, Alaska

Table 11. Au, As, Ag, Sb, Pb and Zn assays of core from Keystone #2 drill hole, Cleary Summit area.

Sample No.	Depth in Ft.	Description	Au in ppm; Atomic Absorption	Au in ppm; fire assay	As in ppm; spectrograph	Sb in ppm; spectrograph	Ag in ppm; spectrograph	Pb in ppm; spectrograph	Zn in ppm; spectrograph
67-1356	73.9-76.0	Mica qtzite vein at 74.5	0.069	0.156	--	--	3.1	--	--
1357	76.0-79.5	Vein quartz	0.023	--	--	--	1.9	--	--
1358	79.5-85.2	Mica qtzite	0.023	--	260	--	3.1	--	--
1359	85.2-91.3	Mica qtzite	--	0.093	--	--	2.5	--	--
67-1362	107.2-111.9	Quartz mica schist	0.092	0.622	7,000	--	5.0	--	--
1363	111.9-117.5	Altered qtz mica schist	--	Tr	--	--	2.5	--	--
1364	117.5-120.5	Altered schist/green spots	--	--	--	--	3.7	--	--
1365	120.5-124.6	Silicified schist	--	0.156	--	--	2.8	--	--
1366	124.6-129.0	Quartz mica schist	--	--	--	--	2.5	--	--
1367	129.0-131.4	Qtz mica schist/disseminated pyrite	--	0.093	--	--	2.8	--	--
67-1370	150.0-153.3	Quartz mica Schist	0.110	--	--	--	2.8	--	--
1371	153.3-163.3	Quartz mica schist	0.026	0.311	--	--	4.3	--	--
1372	163.3-165.0	Quartz mica schist	--	0.622	200	--	3.7	--	--
1373	165.0-170.5	Quartz mica schist	--	--	--	--	2.8	--	--
1374	170.5-175.0	Qtz mica schist/vein at 174.0	--	0.156	--	--	5.0	--	--
1375	175.0-177.6	Altered qtz mica schist	--	--	--	--	3.4	--	--
1376	177.6-182.2	Mica qtzite/sulfides	--	0.311	--	--	3.7	--	--
1377	182.2-185.0	Mica qtzite/sulfides	--	0.933	8,000	--	3.7	--	--
1378	185.0-186.0	Gouge	0.080	4.354	20,000	--	18.9	--	--
1379	186.0-188.9	Mica qtzite/sulfides	--	--	--	--	5.0	--	--
1380	188.9-190.5	Vein qtz & altered schist	0.023	0.622	3,000	--	3.7	--	--
1381	190.5-193.4	Qtz mica schist/vein at 191.6	0.230	1.399	2,000	--	5.3	--	--
1382	193.4-196.7	Qtz mica schist/vein at 193.4	--	0.311	--	--	5.0	--	--
1383	196.7-203.9	Quartz mica schist	--	0.248	--	--	3.7	--	--

Table 11. (Continued)

Sample No.	Depth in Ft.	Description	Au in ppm; Atomic Absorption	Au in ppm; fire assay	As in ppm; spectrograph	Sb in ppm; spectrograph	Ag in ppm; spectrograph	Pb in ppm; spectrograph	Zn in ppm; spectrograph
67-1387	232.9-237.9	Qtz mica schist/phyllite bands	0.070	0.933	2,700	--	0.6	--	--
1388	237.9-242.7	Qtz mica schist/phyllite bands	--	0.093	--	--	1.2	--	--
1389	242.7-247.5	Qtz mica schist/phyllite bands vein at 247.1	--	0.156	--	--	5.0	--	--
1390	247.5-252.5	Qtz mica schist/disseminated sulfides	--	0.311	--	300	4.7	--	200
1391	252.5-255.5	Vein material in qtz mica schist	--	0.311	--	300	4.0	--	400
1392	255.5-257.8	Vein material in qtz mica schist	0.046	0.466	--	15,800	52.4	19,300	8,400
1393	257.8-262.6	Vein material in qtz mica schist	--	0.156	--	2,300	49.0	3,500	8,600
1394	262.6-265.6	Qtz mica schist/disseminated pyrite	0.069	--	--	--	8.7	--	--
1395	265.6-266.3	Quartz vein	--	Tr	--	--	11.5	--	--
1396	266.3-270.1	Chlorite schist	--	--	--	--	3.7	--	--
1397	270.1-275.0	Chloritic qtz mica schist	0.023	--	--	300	9.3	--	2,800
1399	275.0-280.0	Chloritic qtz mica schist/ sulfides	--	0.311	--	700	5.0	--	1,800
1400	280.0-284.5	Chloritic qtz mica schist/ sulfides	--	Tr	--	--	4.3	--	--
1401	284.5-287.9	Chloritic qtz mica schist/ sulfides	--	Tr	--	--	5.3	--	--
1402	287.9-292.3	Chloritic qtz mica schist/ sulfides	--	0.156	--	--	8.4	--	--
1403	292.3-294.4	Chloritic qtz mica schist/ sulfides	0.023	--	--	--	21.1	--	--
1404	294.4-299.4	Chloritic qtz mica schist/ sulfides	0.023	0.156	--	2,800	8.7	5,600	2,400
1405	299.4-303.7	Chloritic qtz mica schist	--	--	--	--	1.6	--	--

Table 11. (Continued)

Sample No.	Depth in Ft.	Description	Au in ppm; Atomic Absorption	Au in ppm; fire assay	As in ppm; spectrograph	Sb in ppm; spectrograph	Ag in ppm; spectrograph	Pb in ppm; spectrograph	Zn in ppm; spectrograph
67-1413	366.0-371.6	Silicified schist/sulfides	<0.130	0.156	--	300	4.0	--	300
1414	371.6-376.6	Quartz mica schist	<0.130	0.048	--	500	5.0	Tr	500
1415	376.5-381.0	Quartz mica schist	<0.130	0.048	--	600	11.2	Tr	1,500
1416	381.0-385.2	Qtz mica schist/sulfides	0.250	0.156	--	--	3.7	--	--
1428	385.2-392.0	Qtz mica schist/sulfides	0.500	0.465	--	--	2.2	--	800
67-1432	410.2-411.3	Quartz mica schist	<0.130	--	--	--	6.2	--	--
1433	411.3-415.7	Quartz mica schist/veins	1.130	1.007	11,600	--	5.6	--	--
1434	415.7-420.2	Quartz mica schist	0.380	0.310	--	--	2.0	--	--
67-1445	495.0-499.5	Quartz mica schist	<0.130	--	--	--	4.0	--	--
1446	499.5-504.1	Quartz mica schist	<0.130	0.156	--	--	2.0	--	--
1447	504.1-508.7	Qtz mica schist/sulfides at 506.2	0.250	0.156	--	--	5.6	--	--
1448	508.7-518.7	Quartz mica schist	0.130	0.156	--	--	3.7	--	--
67-1452	543.7-553.7	Calc-mag schist	<0.130	--	--	--	2.5	--	--
1453	553.7-559.0	Calc-mag schist	<0.130	--	--	--	2.5	--	--
1454	559.0-561.6	Qtz mica schist/veins	0.380	0.248	--	400	4.0	--	4,200
1455	561.6-563.5	Qtz mica schist/veins	6.000	4.433	16,000	800	0.6	1,700	900
1456	563.5-565.9	Qtz mica schist/veins	0.130	0.156	--	1,300	29.5	2,900	13,300
1457	565.9-569.5	Qtz mica schist/veins	3.300	2.543	5,000	400	4.7	--	600
1458	569.5-572.5	Calc-mag schist	0.630	0.610	2,400	--	2.0	--	--
1459	572.5-581.8	Calc-mag schist	<0.130	--	--	--	2.2	--	--
67-1464	610.5-617.3	Altered calc-mag schist	<0.130	--	--	--	0.3	--	--
1465	617.3-620.0	Altered calc-mag schist	<0.130	0.186	--	--	2.5	--	--
1466	620.0-623.8	Sheared altered/sulfides	<0.130	0.156	--	600	--	--	12,000
1467	623.8-628.0	Quartz mica schist	0.390	0.310	--	300	0.6	--	300
1468	628.0-632.1	Qtz mica schist/gouge	0.910	0.744	3,000	--	1.2	--	--

Atomic Absorption analyses - University of Alaska, College, Alaska

Fire Assay and Spectrographic results - U. S. Bureau of Mines, Juneau, Alaska

GRAB SAMPLES FROM THE DOME CREEK-LITTLE ELDORADO CREEK AREA

Recent work indicates that the Pedro Dome-Cleary Summit anticlinorium may be confined to rocks composing the upper plate of a thrust which overrides an older basement complex of higher-grade and more complexly deformed rocks (Forbes and others, 1968).

In light of this new interpretation, both old and new openings and trenches northwest of Pedro Dome were sampled, to determine whether the mineralization was possibly confined to rocks of the upper plate. The results of gold analyses of samples from mineralized zones within the two plates are shown in Table 9. These data are also plotted in Plate I.

Gold mineralization has been found in both plates, therefore mineralization is obviously not limited to the host rocks of the upper plate.

U. S. BUREAU OF MINES DRILLING PROJECT

The U. S. Bureau of Mines diamond-drilled two holes on the Keystone Mines. Inc. property in 1967 to test the continuation of the Kawalita and Jamesonite veins (locality F, Plate I) at depth. The core was logged as a cooperative project project with the University of Alaska. The drill logs are included as Appendix I. Gold, arsenic, silver, antimony, lead and zinc assays of samples from selected intervals are given in Tables 10 and 11. Anomalous concentrations of gold were found at depth. The relationship, if any, between the gold anomalies and the Kawalita and Jamesonite veins was not established.

SUMMARY

Studies of the gold content of mineralized veins in the Pedro Dome-Cleary Summit area of the Fairbanks District, Alaska, suggest the presence of numerous small low- to high-grade lodes. Anomalous concentrations of gold exist in the wall rocks in close proximity to many of the veins.

In general, the gold concentration gradients are much too steep to increase the mineable width of the veins.

In addition, gold analysis of auger samples has shown that low-grade gold anomalies also exist along the southwest extension of the Pedro Dome-Cleary Summit mineralized belt.

REFERENCES

Chapman, R. M. and R. L. Foster, 1967, Locations and descriptions of lode mines and prospects in the Fairbanks District, Alaska; U. S. Geological Survey Open File Report.

Forbes, R. B., H. D. Pilkington and D. B. Hawkins, 1968, Gold gradients and anomalies in the Pedro Dome-Cleary Summit area, Fairbanks District, Alaska; U. S. Geological Survey Open File Report.

APPENDIX I

DRILL LOG

DDH Keystone #1 Lat 65° 04' Long 147° 22'

Location Keystone Mines Inc., near Cleary Summit, Fairbanks District, Alaska

Depth	Core	Core Recovery	Description
000.0-003.0	0.0	00.00	No Samples
003.0-009.0	5.2	86.6	Quartz mica schist which contains incipient garnet. Folia-inclined 30° crenulated in plane of foliation
009.0-010.8	0.9	50.0	Upper 0.4 ft is segregation qtz, lower part is banded light and dark gray quartz mica schist
010.8-012.9	1.8	85.7	Same with small recumbent fold in a quartz rich layer. The lower part of run is spotted schist
012.9-017.5	4.0	87.0	Same with some segregation qtz
017.5-019.2	5.8	96.8	Same with considerable iron stain along fractures. Thin gray phyllitic bands
025.2-027.4	2.0	91.0	Same
027.4-030.0	2.0	76.9	Light gray quartz mica schist foliation inclined 15°
030.0-031.8	1.8	100.0	Same
031.8-038.3	4.2	64.7	Light gray-green quartz mica schist, considerable iron stain along fractures
038.3-045.3	3.9	56.5	Same
045.3-055.5	7.2	70.6	Dark gray quartz mica schist, much more biotite and/or chlorite. Same dark phyllitic layers
055.5-059.0	3.5	100.0	Same with strong iron staining
059.0-062.0	3.0	100.0	Same
062.0-064.5	2.5	100.0	Same with minor segregation qtz and feldspar in the lower 0.5 ft
064.5-069.9	5.4	100.0	Upper 0.8 ft the same. The rest is light gray quartz mica schist
069.9-072.4	2.5	100.0	Same with horizontal foliation
072.4-075.4	1.0	50.0	Same
075.4-080.5	5.1	100.0	Same to 78.3 ft where becomes a banded light and dark gray schist with foliation inclined 30°
080.5-085.4	4.9	100.0	Same with minor segregation qtz
085.4-087.7	1.9	79.3	Same
087.7-095.0	7.3	100.0	Same to 92.4 ft but the foliation more gentle, 10°, and iron stained fractures. Lower part is light gray quartz mica schist
095.0-099.2	4.2	100.0	Same
099.2-100.0	0.8	100.0	Same
100.0-101.4	1.4	100.0	Same
101.4-102.7	1.3	100.0	Same
102.7-103.4	0.5	71.5	Same with some dark phyllitic bands
103.4-103.7	0.3	100.0	Same
103.7-109.9	6.0	96.8	Same
109.9-115.7	6.8	100.0	Same
115.7-123.6	7.9	100.0	Same
123.6-126.7	3.1	100.0	Banded light and dark gray qtz mica schist. Dark bands contain porphyroblasts of chlorite or biotite
126.7-135.5	8.8	100.0	Same with minor segregation quartz
135.5-142.9	1.6	21.6	Same for upper part. The lower 0.3 ft consists of bleached, silicified, iron stained quartz mica schist typical of that found adjacent to veins in the district
142.9-144.8	0.9	47.4	Lower part soft altered, iron stained schist

144.8-146.1	1.3	100.0	Strongly fractured, iron stained quartz mica schist
146.1-150.2	3.2	78.0	Banded light and dark gray qtz mica schist with horizontal foliation
150.2-154.4	3.8	90.5	Same
154.4-158.5	1.7	41.5	Same
158.5-160.5	0.3	15.0	Silvery gray, altered quartz mica schist
160.5-161.9	0.5	35.6	Same with iron staining
161.9-163.9	1.5	75.0	Soft clayey altered quartz mica schist
163.9-165.9	1.6	80.0	Same with minor Sb oxide along foliation
165.9-167.9	0.1	5.0	Light gray quartz mica schist
167.9-169.5	0.1	6.3	Same
169.5-171.4	0.8	42.0	Same
171.4-175.5	2.9	69.1	Same
175.6-178.5	3.0	100.0	Same with iron staining and minor As oxide at 178.3
178.5-180.3	1.5	83.4	Same
180.3-181.3	1.0	100.0	Same
181.3-183.9	2.6	100.0	Same
183.9-189.3	5.4	100.0	Same
189.3-190.5	1.2	100.0	Same with abundant fractures and strong iron staining
190.5-197.9	7.4	100.0	Same with minor amounts of Sb oxide
197.9-200.5	2.4	92.2	Same to 200.1 where have 0.1 ft of vein quartz with 0.4 ft of sheared and brecciated schist in the footwall
200.5-201.2	0.5	71.5	Light gray silicified quartz mica schist which contains about 5% disseminated sulfides, mostly pyrite
201.2-211.6	8.2	78.8	Same to 201.7 ft. The rest is a medium gray schist/less than 5% sulfide

211.6-212.7	1.1	100.0	Same with less than 1% sulfide
212.7-213.2	0.5	100.0	Silicified quartz mica schist with 1-2% disseminated sulfides, both pyrite and arsenopyrite
213.2-215.6	2.4	100.0	Same
215.6-217.9	1.9	82.7	Same
217.9-223.9	6.0	100.0	Gray quartz mica schist with very minor disseminated sulfide
223.9-225.7	1.4	77.8	Same
225.7-229.0	3.3	100.0	Intercalated schist and quartzite layers with 1-2% sulfides
229.0-230.8	1.7	94.5	Same
230.8-233.5	2.7	100.0	Light gray quartz mica schist, no visible sulfides
233.5-237.5	4.0	100.0	Same
237.5-240.4	2.8	96.5	Dark gray schist with minor disseminated sulfide
240.4-245.7	5.3	100.0	Same
245.7-252.1	6.4	100.0	Same to 251.5 where encountered quartz vein with pyrite and arsenopyrite
252.1-254.0	1.5	79.0	Altered and silicified schist
254.0-260.0	5.9	98.4	Gray quartz mica schist with shear zones at 257.3 and 259.0 ft which contain minor sulfides
260.0-267.7	2.0	26.0	Core badly broken, the lower portion is silicified and has 1-2% disseminated sulfides
267.7-269.2	1.5	100.0	Sheared and silicified material from within a vein containing 1-2% pyrite and arsenopyrite
269.2-271.1	0.5	26.3	Vein breccia with sulfides and a red mineral which might be cinnabar
271.1-272.9	1.8	100.0	Sheared and silicified zone/some sulfides, becomes very clayey in lower part

272.9-273.9	0.0	0.0	No core or sludge
273.9-274.5	0.4	80.0	Same sheared and silicified rock with about 1% sulfide
274.5-280.0	2.5	45.5	Gray green quartz mica schist with very minor sulfides along the foliation
280.0-281.5	1.0	65.7	Same
281.5-283.8	2.3	100.0	Same
283.8-285.5	1.7	100.0	Same
285.7-291.7	6.2	100.0	Same with considerable pyrite at 288.1 and 288.8 ft
291.7-300.8	8.3	100.0	Same with increasing mica in thin bands
300.8-304.1	3.3	100.0	Same
304.1-307.7	3.6	100.0	Silvery gray phyllitic schist
307.7-309.2	0.7	46.6	Same
309.2-310.7	0.7	50.0	Alternating bands of light and dark gray quartz mica schist
310.7-311.6	0.0	0.0	No core
311.6-312.7	1.1	100.0	Light gray quartz mica schist
312.7-314.0	0.4	30.8	Iron stained, soft, clayey, altered schist
314.0-315.2	0.7	58.3	Same
315.2-319.7	4.5	100.0	Same
319.7-320.9	1.2	100.0	Light gray quartz mica schist
320.9-324.5	2.8	78.0	Same with very fine-grained micro crystals of stibnite in open spaces
324.5-330.1	5.4	96.5	Same with foliation inclined about 10°. Small vein filled with calcite and a gray sulfide at 328.0
330.1-334.5	2.3	52.3	Silvery gray micaceous layers intercalted with quartzite
334.5-335.2	0.4	57.3	Same
335.2-337.0	0.4	22.2	Same

337.0-339.4	1.9	79.2	Gray quartz mica schist
339.4-343.5	2.6	63.4	Same
343.5-348.4	4.9	100.0	Silicified quartz mica schist with disseminated sulfides in the upper 1.0 ft
348.4-351.1	3.7	100.0	Same with minor disseminated sulfides throughout
351.1-361.1	5.8	58.0	Same
361.1-363.3	1.8	100.0	Light gray quartz mica schist with no observed sulfide
363.3-369.5	6.2	100.0	Same to 365.3 ft, the lower part consists of schist with segregation masses of quartz with sulfides concentrated along the selvages, up to 1%
369.5-375.1	5.6	100.0	Same with minor quartz vein cutting the flat lying foliation
375.1-377.4	1.2	92.4	Same
377.4-381.5	3.9	100.0	Silvery gray phyllitic schist foliation inclined at 20°
381.5-383.2	0.4	23.5	Black "graphitic" schist with disseminated sulfides
383.2-388.1	4.9	100.0	Gray green micaceous quartzite with minor disseminated sulfides
388.1-390.5	0.3	12.5	Same
390.5-393.5	2.4	80.0	Light gray quartz mica schist with one mass of segregation qtz and pyrite along its selvages
393.5-400.7	0.6	8.3	Same
400.7-403.6	1.3	44.8	Same with foliation inclined at 20° and containing some disseminated pyrite
403.6-406.5	2.3	79.4	Same but no sulfide
406.5-410.6	2.5	61.0	Gray silicified schist with 1-2% disseminated sulfides
410.6-413.3	1.7	62.9	Sheared and altered schist with minor sulfides

413.3-415.5	1.2	54.4	Same
415.5-417.4	0.1	19.0	Same but more silicified and about 3% sulfides
417.4-420.0	0.0	0.0	No core
420.0-421.6	0.3	18.7	Gray quartz mica schist with small vein of quartz pyrite
421.6-423.8	1.0	45.5	Same
423.8-425.7	1.3	68.5	Same
425.7-428.3	1.9	73.1	Same with considerable pyrite and some stibnite, foliation of the rock nearly horizontal
428.3-429.8	1.2	80.0	Gray quartz mica schist with very minor sulfides
429.8-431.1	0.5	38.5	Same
431.1-431.9	0.2	25.0	Same
431.9-433.0	0.1	21.0	Same
433.0-434.1	0.2	18.2	Same
434.1-435.3	0.4	50.0	Same
435.3-436.3	1.0	100.0	Same
436.3-440.7	4.3	100.0	Same
440.7-441.1	0.4	100.0	Same
441.1-444.0	0.7	24.1	Same
444.0-446.2	2.2	100.0	Gray quartz mica schist with no observable sulfides
446.2-451.4	1.0	19.2	Same
451.4-455.0	1.6	44.5	Same
455.0-457.2	2.2	100.0	Same with minor sulfides at 456'
457.2-460.3	3.1	100.0	Same with vein quartz at 458.2 ft
460.3-464.6	4.3	100.0	Same
464.6-469.3	4.6	97.9	Silvery gray to black altered schist with disseminated pyrite

469.3-474.0	4.3	91.5	Gray quartz mica schist with minor segregation quartz
474.0-474.1	0.1	100.0	Segregation quartz
474.1-480.0	1.0	17.0	Gray quartz mica schist with minor segregation quartz
480.0-480.4	0.2	50.0	Same
480.4-483.6	0.6	21.4	Same
483.6-489.3	1.8	31.6	Same
489.3-493.0	3.7	100.0	Same
493.0-495.5	1.4	93.4	Gray quartz mica schist with minor disseminated sulfides
495.5-499.3	3.8	100.0	Same
499.3-500.4	0.5	45.4	Same
500.4-504.3	1.7	43.6	Same
504.3-511.3	7.0	100.0	Greenish gray calc-magnesian schist with minor disseminated sulfides
511.3-515.5	4.2	100.0	Same
515.5-518.4	2.9	100.0	Same with minor quartz-pyrite veins
518.4-520.0	1.2	75.0	Same
520.0-525.4	5.4	100.0	Same
525.4-530.6	4.9	100.0	Same
530.6-537.6	7.0	100.0	Same with more and larger quartz veins
537.6-542.9	5.3	100.0	Same to 539.6. The lower part a gray quartz mica schist with 1-3% disseminated sulfide
542.9-544.1	1.2	100.0	Silvery gray, altered quartz mica schist with disseminated sulfide
544.1-547.7	3.6	100.0	Same
547.7-550.9	3.2	100.0	Gray green calc-magnesian rock
550.9-553.3	2.4	100.0	Same

553.3-556.8	3.5	100.0	Same with foliation inclined 60°
556.8-558.5	1.7	100.0	Same
558.5-562.8	2.4	55.8	Same to 559.5 then becomes gray clayey altered mass
562.8-565.9	3.1	100.0	Altered gray quartz mica schist
565.9-567.7	1.8	100.0	Same
567.7-570.4	2.7	100.0	Same
570.4-574.0	3.6	100.0	Same
574.0-576.8	1.4	50.0	Same
576.8-577.8	1.0	100.0	Silicified schist with minor pyrite
577.8-580.8	3.0	100.0	Same to 579.1 feet. The next 1.1 ft contains sphalerite and pyrite along the foliation and the lower part is clayey
580.8-583.5	2.7	100.0	Same to 582.0 The lower 1.5 ft is vein quartz with pyrite, arsenopyrite
583.5-587.3	3.8	100.0	Vein material continues to 584.3 ft. The lower part is gray green silicified schist
587.3-591.0	1.4	29.8	Upper 1.2 feet the same. The bottom of the run is vein quartz with pyrite, sphalerite, and galena
591.0-592.7	0.9	52.8	Gray quartz mica schist
592.7-593.2	0.4	80.0	Same
593.2-595.3	0.6	28.6	Same with disseminated pyrite
595.3-598.4	2.9	93.5	Altered gray clayey quartz mica schist
598.4-601.4	2.0	66.6	Same
601.4-603.0	1.6	61.5	Same
603.0-608.5	2.5	45.5	Gray quartz mica schist with incipient garnet
608.5-612.7	3.5	83.4	Same

612.7-616.5	1.0	26.3	Same
616.5-618.0	1.5	100.0	Gray micaceous quartzite with disseminated pyrite
618.0-622.9	4.9	100.0	Same
622.9-628.2	1.8	34.0	Same with a 0.2 foot quartz vein at bottom of run. Vein contain minor sulfides
628.2-630.8	0.4	15.4	Gray green spotted calc-magnesia schist
630.8-634.3	3.0	85.8	Same
634.3-635.1	0.6	75.0	Gray quartz mica schist
635.1-637.6	0.5	20.0	Same
637.6-640.0	0.6	25.0	Same
640.0-643.9	1.0	25.6	Same
643.9-649.6	0.7	12.3	Silvery gray altered quartz mica schist with minor disseminated pyrite
649.6-653.4	0.9	23.6	Gray quartz mica schist
653.4-657.3	3.9	100.0	Same with minor disseminated pyrite
657.3-661.7	0.5	11.7	Same
661.7-667.1	5.4	100.0	Same but somewhat spotted with what appear to be chlorite porphyroblast
667.1-675.0	4.5	57.0	Same
675.0-677.8	1.9	67.8	Same
677.8-682.6	0.9	18.7	Gray green altered zone, some silicification and minor disseminated sulfides
682.6-688.5	0.0	0.0	No core
688.5-692.5	0.0	0.0	No core
692.5-694.4	1.2	63.2	Soft gray clayey gouge zone with minor disseminated sulfides
694.4-698.5	2.1	51.2	Same
698.5-699.5	0.0	0.0	No core
699.5-705.0	2.8	51.0	Gray quartz mica schist

705.0-708.2	3.1	96.8	Same with foliation inclined at 60°
708.2-713.0	4.5	93.7	Same with foliation horizontal
713.0-715.0	1.5	75.0	Same
715.0-716.6	1.6	100.0	Same

DRILL LOG

DDH Keystone #2 Lat 65° 04.1' Long 147° 22.3'

Location Keystone Mines Inc. Cleary Summit Area, Alaska

Depth	Core	Core Recovery	Description
000.0-008.0	2.9	36.2	Iron stained, weathered quartz mica schist with horizontal foliation
008.0-015.5	2.1	28.0	Same
015.5-020.2	1.3	27.8	Same
020.2-024.1	1.8	43.9	Same
024.1-027.8	3.7	100.0	Same but foliation inclined about 10°
027.8-032.9	4.6	95.8	Same
032.9-035.6	2.7	100.0	Same
035.6-036.1	0.4	80.0	Same
036.1-037.9	1.8	100.0	Same with segregation quartz at 39.4 and foliation inclined about 5°
037.9-043.0	5.1	100.0	Same
043.0-048.0	5.0	100.0	Gray quartz mica schist with foliation contorted near segregation masses of quartz @ 44.6 ft and 46.1 ft. Strong slip folds occur in the contorted foliation
048.0-050.5	2.1	84.0	Silvery gray micaceous quartzite
050.5-055.5	4.6	92.1	Same with minor manganese stain along some fractures
055.5-059.2	3.7	100.0	Same

059.2-064.5	1.0	18.8	Same
064.5-071.5	5.9	84.4	Iron stained gray quartz mica schist with minor segregation quartz masses
071.5-073.9	2.4	100.0	Same
073.9-076.0	1.2	60.0	Micaceous quartzite with considerable iron staining, small vein of quartz @ 74.5 ft
076.0-077.9	1.9	100.0	Vein quartz, 0.1 ft, at 76.0 ft with minor sulfides and some as oxide
077.9-080.5	2.6	100.0	The same to 79.5 ft. The lower part is gray quartz mica schist
080.5-085.2	4.6	88.5	Same with intercalated quartzite layers
085.2-091.3	4.9	83.1	Same
091.3-093.6	2.3	100.0	Same with moderate iron stain
093.6-094.1	0.5	100.0	Same
094.1-094.7	0.6	100.0	Same
094.7-100.2	5.5	100.0	Same to 99.7 ft. The lower part is altered silvery gray quartz mica schist
100.2-103.7	3.5	100.0	Same to 101.8 where rock is olive green altered and has foliation inclined 30°. The lower part is gray quartz mica schist with minor cross-cutting quartz veins
103.7-107.2	3.2	91.5	Same
107.2-111.9	4.7	100.0	Same
111.9-115.1	3.9	92.8	Same with minor sulfide along minute veins and along the foliation
115.1-117.5	2.4	100.0	Same with stronger hydrothermal alteration
117.5-120.5	3.0	100.0	Same with minor green spots of chlorite

120.5-124.6	4.1	100.0	Silicified and mineralized quartz mica schist to 121.7 ft. The lower part is quartz mica schist
124.6-129.0	4.4	100.0	Gray quartz mica schist
129.0-131.4	2.4	100.0	Same with some disseminated pyrite
131.4-140.0	8.6	100.0	Gray quartz mica schist
140.0-150.0	10.0	100.0	Gray quartz mica schist with thin intercalated bands of dark phyllitic material. Foliation nearly horizontal
150.0-153.3	3.3	100.0	Same with minor segregation qtz
153.3-163.3	3.9	39.0	Same
163.3-165.0	0.8	47.0	Same
165.0-170.5	5.5	100.0	Same
170.5-175.0	4.5	100.0	Same to 174.0 ft where there is a small fault filled by vein quartz and pyrite. The footwall is altered and silicified with minor disseminated pyrite
175.0-177.6	2.6	100.0	Same for the upper 0.5 feet. The lower part is gray quartz mica schist
177.6-182.2	2.0	43.5	Gray micaceous quartzite with 1-2% disseminated sulfides
182.2-185.0	0.6	21.4	Same
185.0-188.9	2.7	69.4	The upper 1.0 feet consists of dark gray clayey gouge with 3-5% sulfide
188.9-190.5	0.9	81.8	The upper 0.4 ft consists of vein quartz with pyrite and arsenopyrite, the lower part is sheared altered quartz mica schist
190.5-191.6	1.1	100.0	Gray quartz mica schist with minor segregation quartz
191.6-193.2	1.6	100.0	The upper 0.9 consists of vein quartz with pyrite and sphalerite the lower part is gray quartz mica schist
193.2-195.0	1.8	100.0	The upper 0.2 feet consists of vein quartz with pyrite and arsenopyrite. The lower part is gray quartz mica schist

195.0-196.7	1.1	64.8	Same
196.7-198.1	1.4	100.0	Same
198.1-198.9	0.7	87.6	Same with the foliation inclined about 45°
198.9-203.9	5.0	100.0	Same with minor segregation quartz
203.9-209.0	5.1	100.0	Same with a small quartz vein at 204.8 ft
209.0-214.0	5.0	100.0	Gray quartz mica schist
214.0-218.7	4.7	100.0	Same with small quartz-pyrite vein at 217.0 ft
218.7-223.2	4.5	100.0	Same with a band of segregation quartz at 220.6 ft which has a minor amount of pyrite concentrated along the selvages
223.2-228.0	4.8	100.0	Gray quartz mica schist
228.0-232.9	4.9	100.0	Same
232.9-237.9	5.0	100.0	Same with bands of more micaceous schist which have a dark gray color
237.9-242.7	4.8	100.0	Same with what appears to be incipient garnets
242.7-247.5	4.8	100.0	Same but the foliation is inclined 10-15° and highly contorted. The middle portion contains 5-10% pyrite along the foliation. At 247.1 feet a thin quartz-pyrite vein
247.5-252.5	5.0	100.0	Same with 3-5% sulfides
252.5-257.5	5.0	100.0	Same with a vein of pyrite at 253.3, a 0.2 ft vein of pyrite, stibnite, sphalerite @ 255.5, 0.2 ft vein of sulfides @ 257.3 feet, disseminated sulfides throughout the interval
257.5-262.6	5.1	100.0	The upper 0.2 feet is a vein of quartz, pyrite, sphalerite with minute needles of stibnite in open spaces. Pyrite occurs as disseminations throughout the interval
262.6-265.6	4.0	100.0	Same with less sulfide

265.6-270.1	4.5	100.0	The upper 0.7 feet consists of vein quartz with pyrite, arsenopyrite, sphalerite, and chalcopyrite. The lower part is a gray green chlorite schist
270.1-275.0	4.9	100.0	Gray green quartz mica schist with scattered stringers of quartz-pyrite and some disseminated pyrite
275.0-280.0	5.0	100.0	Same with concentrations of sulfides along the foliation at 275.1, 276.2, and 278.0 feet
280.0-284.5	4.5	100.0	Same but sulfides show less concentration into descrete layers
284.5-289.4	4.9	100.0	Same with stibnite @ 287.1 and pyrite @ 288.1
289.4-294.4	5.0	100.0	Same with sulfides along the foliation throughout the interval
294.4-299.2	4.8	100.0	Same with a quartz-sulfide vein at 294.7 feet and sulfides concentrations along the foliation at intervals throughout
299.2-303.7	4.5	100.0	Same but less sulfide concentration along the foliation
303.7-307.7	4.0	100.0	Gray micaceous quartzite with 1-2% dissemination sulfides
307.7-312.7	5.0	100.0	Same with less than 1% sulfide
312.7-316.5	3.7	97.4	Same
316.5-321.3	4.8	100.0	Same
321.3-326.2	4.7	96.0	Same
326.2-330.9	1.3	27.6	Same
330.9-335.7	4.8	100.0	Same
335.7-340.7	4.8	96.0	Same
340.7-345.0	4.3	100.0	Gray micaceous quartzite with a mass of segregation quartz at 344.7
345.0-349.4	4.4	100.0	Same with segregation quartz @ 345.7 and 347.6 ft

349.4-354.3	4.9	100.0	Gray micaceous quartzite with minor sulfides at 350.7 feet
354.3-359.1	4.8	100.0	Same
359.1-362.8	3.3	89.3	Same
362.8-366.8	4.0	100.0	Same to 366.0 feet. The lower part is silicified and contains a quartz pyrite vein as well as disseminated sulfides
366.8-371.6	4.8	100.0	Vein material for the upper 0.2 feet then soft clayey alteration and the lower 0.1 feet in vein material again. The vein is quartz-pyrite with some arseno-pyrite
371.6-376.5	4.9	100.0	Gray quartz mica schist with minor sulfides parallel to the foliation
376.5-381.0	4.5	100.0	Same
381.0-385.2	4.2	100.0	Same but with very minor sulfide
385.2-386.9	1.7	100.0	Same
386.9-388.0	1.1	100.0	Same
388.0-392.6	4.5	97.8	Same to 392.0 feet where a shear zone with disseminated sulfides occurs
392.6-396.0	3.4	100.0	Sheared clayey quartz mica schist with no observable sulfides
396.0-401.0	5.0	100.0	Banded light and dark gray quartz mica schist
401.0-405.8	4.8	100.0	Same
405.8-410.2	4.4	100.0	Same to 409.7 ft. The lower part is silvery gray altered schist
410.2-415.4	4.4	84.8	Same to 411.3 feet where have small quartz vein. The next 2.0 ft is silicified schist and the bottom 0.8 feet is sulfide vein with 5-10% sulfide
415.4-420.2	4.8	100.0	The upper 0.3 feet the same. The lower part is banded light and dark gray quartz mica schist
420.2-425.2	5.0	100.0	Same

425.2-430.0	4.8	100.0	Same
430.0-435.0	5.0	100.0	Same
435.0-440.0	1.4	28.0	Same
440.0-445.0	5.0	100.0	Same to 441.4 ft. At 443.4 have quartz-pyrite vein 0.8 feet
445.0-451.0	6.0	100.0	Gray quartz mica schist
451.0-455.0	4.0	100.0	Same with considerable carbonate at 453.2 feet
455.0-459.5	4.5	100.0	Same
459.5-465.5	5.5	91.5	Same
465.5-475.2	9.7	100.0	Banded light and dark gray quartz mica schist
475.2-479.8	4.6	100.0	Same with nearly horizontal foliation
479.8-489.8	10.0	100.0	Same
489.8-499.5	9.7	100.0	Same
499.5-508.7	9.2	100.0	Same with small concentrations of stibnite and minor pyrite in a small vein @ 506.2 ft
508.7-518.7	10.0	100.0	Same
518.7-524.0	4.3	81.3	Same to 520.3 feet. The lower part is a gray green calc-magnesian schist. The two rocks are separated by a shear zone
524.0-534.0	10.0	100.0	Gray green calc-magnesian schist
534.0-543.7	9.7	100.0	Same
543.7-553.7	10.0	100.0	Same
553.7-563.5	9.8	100.0	Same to 559.0 feet. Rock then becomes gray quartz mica schist with cross-cutting quartz pyrite veins and sulfides disseminated along the foliation
563.5-572.5	9.0	100.0	Same to 569.5 but with decreasing sulfides. Below 569.5 the rock is a green calc-magnesian schist
572.5-581.8	9.3	100.0	Same
581.8-585.4	3.6	100.0	Same

585.4-595.4	10.0	100.0	Same
595.4-603.5	7.9	100.0	Same
603.5-610.5	4.8	68.7	Upper part the same. The lower part is altered with quartz-pyrite and minor stibnite
610.5-617.3	6.4	94.0	Altered calc-magnesian schist with considerable segregation quartz
617.3-620.0	2.7	100.0	Same
620.0-623.8	3.8	100.0	Sheared and altered rock with 5-10% sulfide, then 0.2 feet of gray quartz mica schist with quartz-pyrite veins, and the bottom 0.3 feet is soft clayey gouge
623.8-632.1	7.4	89.2	Gray quartz mica schist. The lower 0.3 feet is soft clayey altered rock
632.1-637.8	5.3	93.0	Gray quartz mica schist with minor disseminated sulfides
637.8-642.7	2.3	47.0	Same
642.7-648.0	4.5	71.4	Same with some porphyroblasts of chlorite
648.0-653.1	2.0	39.2	Dense gray silicified quartz mica schist with disseminated pyrite. The bottom 0.4 feet of core is soft clayey gouge
653.1-656.5	3.3	97.0	Same schistose rock with shear zone in the lower 0.2 feet with disseminated sulfides
656.5-660.5	4.0	100.0	Gray quartz mica schist
660.5-665.5	5.0	100.0	Same
665.5-670.5	5.0	100.0	Same
670.5-675.1	4.6	100.0	Gray green calc-magnesian schist
675.1-680.1	5.0	100.0	Same
680.1-685.0	4.9	100.0	Same to 681.6 feet then becomes gray quartz mica schist
685.0-690.0	3.0	60.0	Same