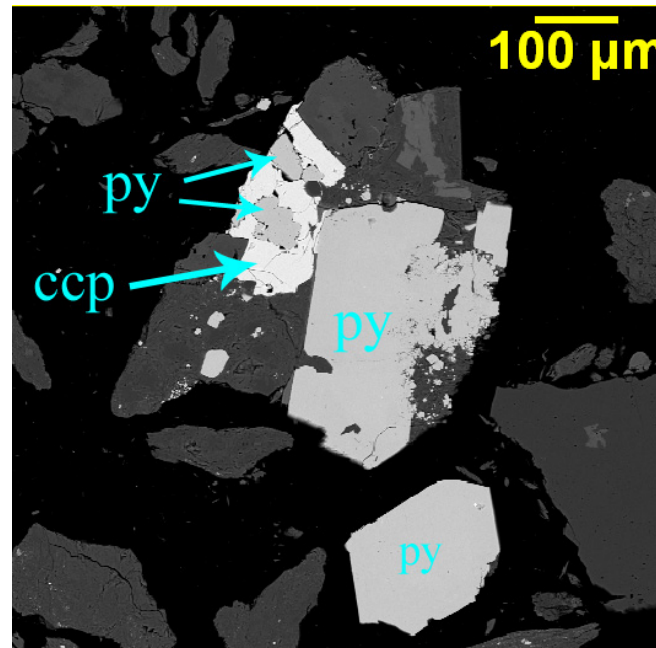


04PMD272, 105-110m (HC-39) - Predominately composed of quartz, muscovite/sericite, ankerite, and paragonite. Lesser amounts of chlorite and rutile were also detected. MLA detected exaggerated amounts of muscovite/sericite (40.81%) compared to XRD (20%) due to difficulties segmenting similar gray level phases, which is most likely the reason for lower MLA quantities of quartz, ankerite, and paragonite compared to XRD values; K values (~1.8%) from chemical analyses suggests XRD quantities for muscovite/sericite are more accurate. MLA measured minor amounts of pyrite (1.09%) and trace amounts of chalcopyrite (0.02%), <0.01% gersdorffite, and <0.001% pyrrhotite and sphalerite. Pyrite was mainly associated with muscovite (59%), but this value is most likely skewed due to exaggerated muscovite/sericite quantities detected by MLA; 17% of pyrite had a free surface. Seven percent of pyrite was encapsulated, 15% was liberated, and 77% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 72µm and 202µm respectively. Pyrite's crystal morphology, displayed in image below, is subhedral to euhedral, with mostly coarse grained particles with slight sieve texture. Chalcopyrite (also displayed in image below) was mainly associated with pyrite (33%) and ankerite (19%); 17% of chalcopyrite had a free surface. Thirteen percent of chalcopyrite was encapsulated, <1% was liberated, and 87% had intermediate exposure.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Muscovite	40.81	20
Quartz	30.45	41
Ankerite	13.18	19
Paragonite	11.85	16
Chlorite	1.27	2
Pyrite	1.09	1
Apatite	0.56	
Albite	0.27	
Tourmaline	0.22	
Monazite	0.07	
Rutile	0.06	1
Amphibole	0.05	
Ilmenite	0.04	
Kspar	0.03	
Calcite	0.02	
Chalcopyrite	0.02	
Epidote	<0.01	
FeClay	<0.01	
Gersdorffite	<0.01	
Siderite	<0.01	
Zircon	<0.01	
Anhydrite	<0.001	
Biotite	<0.001	
Chromite	<0.001	
Gold	<0.001	
Iron	<0.001	
Magnetite	<0.001	
Pyrophyllite	<0.001	
Pyrrhotite	<0.001	
Sphalerite	<0.001	
Sphene	<0.001	
Xenotime	<0.001	



BSE image of bright chalcopyrite (ccp) and light gray subhedral/euhedral pyrite (py).

Sulfide Mineral Associations

MINERAL	Ankerite	Chlorite	Muscovite	Paragonite	Pyrite	Quartz	Tourmaline	Free Surface	OTHER
Chalcopyrite	18.85	5.43	12.38	9.66	33.05	3.22	0.00	17.16	0.27
Gersdorffite	6.12	3.01	61.39	2.74	8.83	16.13	0.00	0.96	0.82
Pyrite	2.75	3.18	58.73	7.67	0.00	8.43	0.38	17.42	1.45
Pyrrhotite	0.00	0.61	56.43	0.00	37.31	0.00	3.97	1.67	0.00
Sphalerite	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	12.79	86.75	0.46
Gersdorffite	95.25	4.75	0.00
Pyrite	7.06	77.48	15.45
Pyrrhotite	93.04	6.96	0.00
Sphalerite	100.00	0.00	0.00

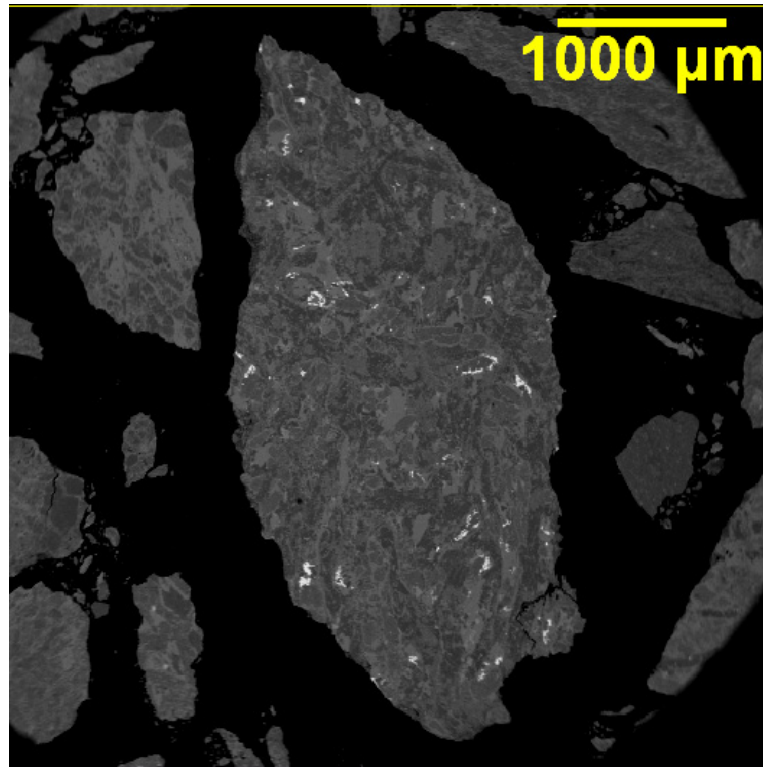
Pyrite Particle Size by Percent Passing

P-value	µm
P50	72.21
P80	202.24

05PMD310, 6-31m (HC-40) - Predominately composed of chlorite (~50%). Lesser amounts albite, muscovite/sericite, quartz, amphibole, and ankerite were also detected. MLA measured trace amounts of pyrite (0.26%), chalcopyrite (0.02%), and <0.001% cobaltite and pyrrhotite. Pyrite was mainly associated with amphibole (40%) and chlorite (29%); 9% of pyrite had a free surface. Fourteen percent of pyrite was encapsulated, 3% was liberated, and 83% had intermediate exposure. Pyrite had a P_{50} and P_{80} of 40 μ m and 77 μ m respectively. Pyrite's crystal morphology, displayed in image below, is anhedral and mostly found in one particle composed of amphibole, albite, and chlorite. Chalcopyrite was mainly associated with chlorite (34%) and quartz (16%); 7% of chalcopyrite had a free surface. Forty-four percent of chalcopyrite was encapsulated, <1% was liberated, and 56% had intermediate exposure.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Chlorite	50.56	51
Albite	10.69	10
Muscovite	10.14	11
Quartz	7.79	10
Amphibole	6.04	9
Ankerite	5.80	8
Kspar	4.16	
Biotite	2.57	
Epidote	0.47	
Rutile	0.38	
Sphene	0.31	
Tourmaline	0.31	
Pyrite	0.26	
Ilmenite	0.17	
Paragonite	0.16	
Calcite	0.06	
Siderite	0.06	
Apatite	0.03	
Chalcopyrite	0.02	
Chromite	<0.01	
Iron	<0.01	
Magnetite	<0.01	
Monazite	<0.01	
Cobaltite	<0.001	
FeClay	<0.001	
Pyrrhotite	<0.001	
Xenotime	<0.001	



BSE image of bright anhedral pyrite in mixed gangue composed of chlorite, amphibole, and albite.

Sulfide Mineral Associations

MINERAL	Albite	Amphibole	Ankerite	Chlorite	Epidote	Kspar	Muscovite	Pyrite	Quartz	Sphene	Free Surface	OTHER
Chalcopyrite	11.14	15.97	0.00	34.14	0.00	2.20	4.90	3.28	16.46	3.31	7.05	1.55
Cobaltite	0.00	0.00	0.00	68.43	0.00	0.00	31.57	0.00	0.00	0.00	0.00	0.00
Pyrite	6.19	39.45	1.44	29.07	1.31	1.27	5.27	0.00	4.87	0.09	9.43	1.60
Pyrrhotite	32.01	0.00	0.00	67.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	43.69	56.01	0.30
Cobaltite	100.00	0.00	0.00
Pyrite	14.07	83.27	2.67
Pyrrhotite	100.00	0.00	0.00

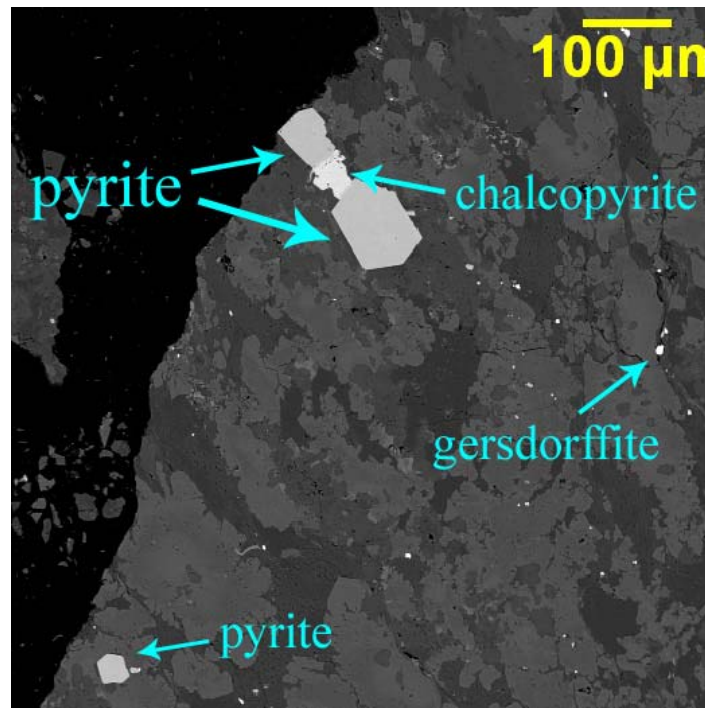
Pyrite Particle Size by Percent Passing

P-value	μm
P50	39.65
P80	76.54

05PMD293, 8.89-34m (HC-41) - Predominately composed of ankerite, quartz, and muscovite/sericite. Lesser amounts chlorite, albite, siderite, and rutile were also detected. MLA measured trace amounts of pyrite (0.40%), gersdorffite (0.03%), chalcopyrite (0.02%), <0.01% tetrahedrite, and <0.001% cobaltite. Pyrite was mainly associated with quartz (18%), ankerite (17%), and muscovite/sericite (16%); 33% of pyrite had a free surface. Twenty-two percent of pyrite was encapsulated, 18% was liberated, and 60% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 56µm and 97µm respectively. Pyrite's crystal morphology, displayed in image below, is subhedral to euhedral, with coarse to fine-grained particles. Gersdorffite was mainly associated with muscovite/sericite (30%) and had 15% free surface. Sixty-five percent of gersdorffite was encapsulated, 8% was liberated, and 27% had intermediate exposure. Chalcopyrite was mainly associated with quartz (24%) and ankerite (21%); 17% of chalcopyrite had a free surface. Seventy percent of chalcopyrite was encapsulated, 10% was liberated, and 20% had intermediate exposure.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Ankerite	33.49	35
Quartz	24.18	25
Muscovite	21.20	21
Chlorite	7.81	8
Albite	7.63	7
Siderite	2.97	3
Kspar	1.20	
Pyrite	0.40	
Biotite	0.31	
Ilmenite	0.21	
Amphibole	0.15	
Tourmaline	0.15	
Rutile	0.10	<1
Apatite	0.06	
Paragonite	0.05	
Gersdorffite	0.03	
Chalcopyrite	0.02	
Chromite	0.01	
Calcite	<0.01	
Epidote	<0.01	
FeClay	<0.01	
Iron	<0.01	
Magnetite	<0.01	
Monazite	<0.01	
Sphene	<0.01	
Tetrahedrite	<0.01	
Anhydrite	<0.001	
Barite	<0.001	
Cobaltite	<0.001	
Gold	<0.001	
Pyrophyllite	<0.001	
Scheelite	<0.001	
Xenotime	<0.001	



BSE image of white gersdorffite inclusions along with bright chalcopyrite associated with light gray euhedral pyrite. Mixed gangue is composed of chlorite (medium gray), ankerite (med-dark gray), and albite (dark gray).

Sulfide Mineral Associations

MINERAL	Albite	Ankerite	Chalcopyrite	Chlorite	Kspar	Muscovite	Pyrite	Quartz	Siderite	Free Surface	OTHER
Chalcopyrite	5.39	20.88	0.00	7.55	0.40	12.84	6.79	24.12	2.63	17.40	1.99
Cobaltite	19.79	31.28	7.63	1.23	0.00	9.47	0.00	13.60	0.00	17.01	0.00
Gersdorffite	4.20	12.45	0.00	12.80	1.17	29.60	1.26	16.10	6.05	15.07	1.30
Pyrite	5.45	17.25	0.51	6.88	1.00	15.54	0.00	17.61	1.05	33.23	1.49
Tetrahedrite	0.00	23.39	0.00	0.00	0.00	2.13	0.00	7.45	0.00	67.04	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	70.25	19.81	9.94
Cobaltite	68.97	25.12	5.91
Gersdorffite	64.71	26.67	8.63
Pyrite	22.33	60.01	17.67
Tetrahedrite	0.00	28.88	71.12

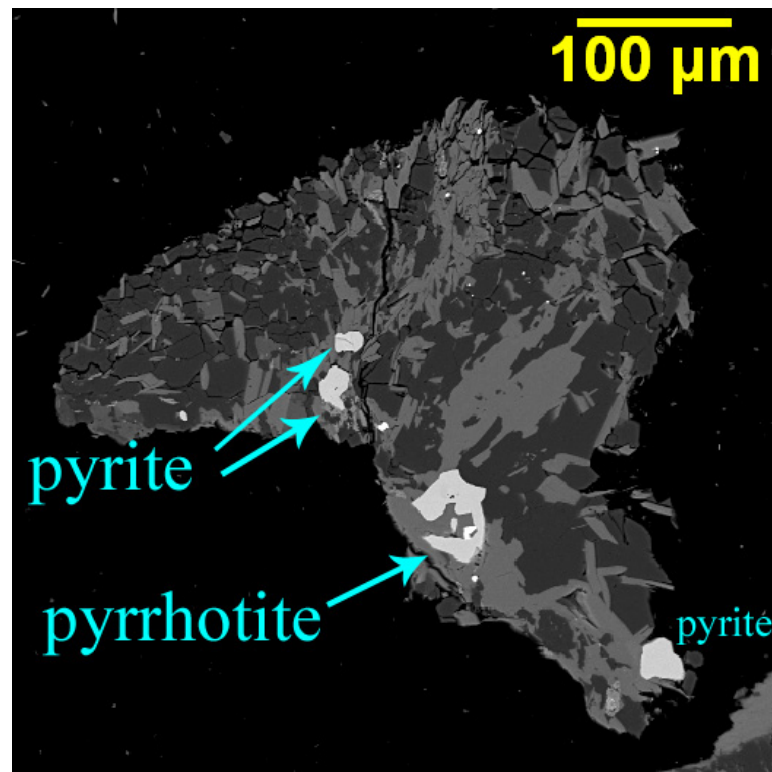
Pyrite Particle Size by Percent Passing

P-value	μm
P50	56.46
P80	97.04

02TDD506, 39-64m (HC-42) - Predominately composed of chlorite, quartz, calcite, and albite. Lesser amounts of muscovite/sericite, ankerite, and rutile were also detected. MLA measured trace amounts of pyrite (0.24%) and <0.01% chalcopryite and pyrrhotite. Pyrite was mainly associated with quartz (28%) and chlorite (27%); 12% of pyrite had a free surface. Twenty-one percent of pyrite was encapsulated, 3% was liberated, and 76% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 110µm and 225µm respectively. Pyrite's crystal morphology, displayed in image below, is subhedral to euhedral, with coarse grained particles.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Chlorite	36.65	49
Quartz	36.54	23
Calcite	8.50	12
Albite	7.52	11
Ankerite	5.02	1
Muscovite	2.14	3
Amphibole	1.00	
Kspar	0.74	
Ilmenite	0.42	
Epidote	0.34	
Rutile	0.27	<1
Pyrite	0.24	
Siderite	0.21	
Apatite	0.16	
Biotite	0.11	
Tourmaline	0.05	
Paragonite	0.03	
Sphene	0.02	
Chalcopryite	<0.01	
Monazite	<0.01	
Pyrrhotite	<0.01	
Barite	<0.001	
Enstatite	<0.001	
FeClay	<0.001	
Gold	<0.001	
Iron	<0.001	
Magnetite	<0.001	
Pyrophyllite	<0.001	
Xenotime	<0.001	



BSE image of bright subhedral/euhedral pyrite and pyrrhotite grains encapsulated in chlorite (light gray) and quartz (dark grey).

Sulfide Mineral Associations

MINERAL	Albite	Ankerite	Calcite	Chlorite	Ilmenite	Kspar	Muscovite	Pyrite	Quartz	Xenotime	Free Surface	OTHER
Chalcopyrite	2.43	9.56	14.33	15.02	0.00	0.00	0.00	12.99	22.33	0.00	22.23	1.11
Pyrite	10.78	5.96	3.15	26.91	1.77	2.53	5.40	0.00	28.33	0.00	11.60	3.56
Pyrrhotite	0.88	0.00	0.00	54.85	0.00	0.00	0.00	13.13	26.15	4.03	0.96	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	31.73	67.55	0.72
Pyrite	21.01	75.92	3.06
Pyrrhotite	99.70	0.30	0.00

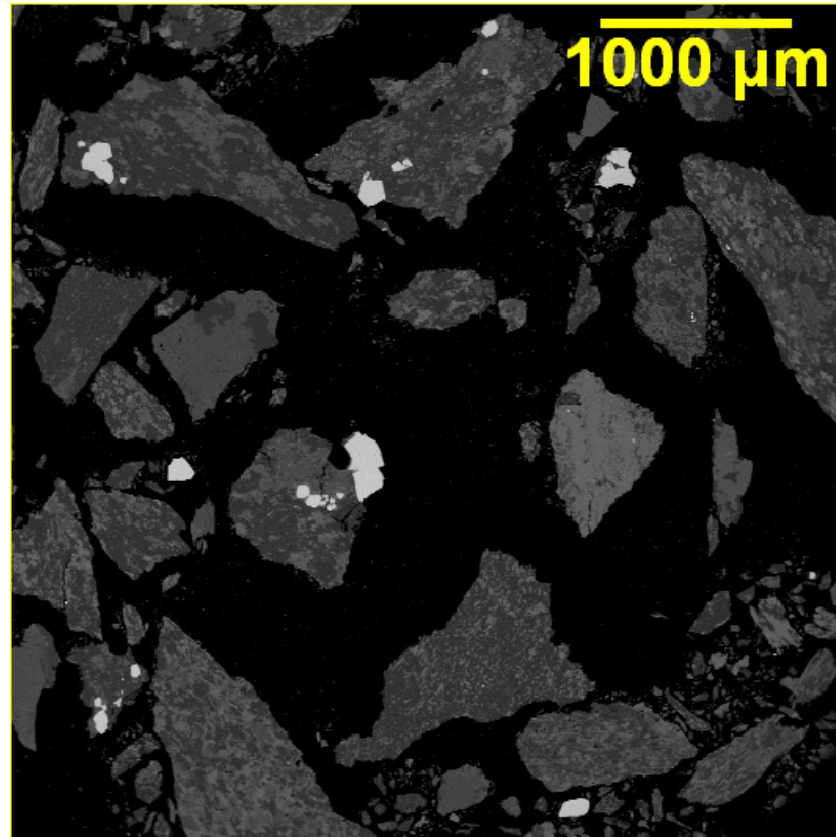
Pyrite Particle Size by Percent Passing

P-value	μm
P50	109.94
P80	224.57

02TDD545, 6.36-32m (HC-43) - Predominately composed of quartz, chlorite, ankerite, and muscovite/sericite. Lesser amounts albite, paragonite, siderite, calcite, and rutile were also detected. MLA measured minor amounts of pyrite (1.12%) along with trace amounts of chalcopryite (<0.01%), and <0.001% pyrrhotite. Pyrite was mainly associated with muscovite/sericite (18%) and chlorite (14%); 40% of pyrite had a free surface. Five percent of pyrite was encapsulated, 27% was liberated, and 68% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 125µm and 194µm respectively. Pyrite's crystal morphology, displayed in image below, is subhedral to euhedral, with coarse grained particles.

Mineral Weight %

	MLA	XRD
Mineral	Wt%	Wt%
Quartz	29.79	28
Chlorite	25.28	26
Ankerite	17.39	20
Muscovite	12.25	12
Albite	5.63	10
Siderite	1.61	<1
Paragonite	1.60	2
Kspar	1.37	
Calcite	1.28	<1
Pyrite	1.12	<1
Ilmenite	0.62	
Amphibole	0.38	
Apatite	0.38	
Rutile	0.38	1
Tourmaline	0.38	
Biotite	0.26	
Magnetite	0.14	
Epidote	0.10	
Monazite	0.01	
Chalcopryite	<0.01	
FeClay	<0.01	
Iron	<0.01	
Sphene	<0.01	
Xenotime	<0.01	
Barite	<0.001	
Gold	<0.001	
Pyrophyllite	<0.001	
Pyrrhotite	<0.001	



Low magnification BSE image of bright subhedral/euhedral pyrite associated with chlorite (light gray) and muscovite/sericite (dark grey),

Sulfide Mineral Associations

MINERAL	Albite	Ankerite	Chlorite	Ilmenite	Kspar	Muscovite	Paragonite	Pyrite	Quartz	Rutile	Siderite	Free Surface	OTHER
Chalcopyrite	11.06	41.52	11.35	0.00	0.00	0.00	0.00	0.00	7.91	0.00	12.17	16.00	0.00
Pyrite	3.52	4.75	13.97	2.10	1.77	18.08	1.16	0.00	11.14	1.32	0.49	39.86	1.84
Pyrrhotite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.08	0.00	0.00	26.63	39.29	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	79.62	4.76	15.62
Pyrite	5.47	67.95	26.58
Pyrrhotite	31.11	4.44	64.44

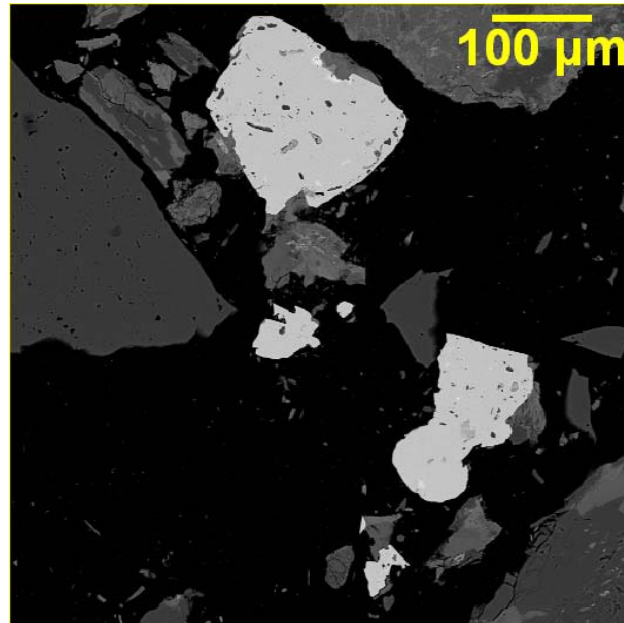
Pyrite Particle Size by Percent Passing

P-value	µm
P50	125.06
P80	194.31

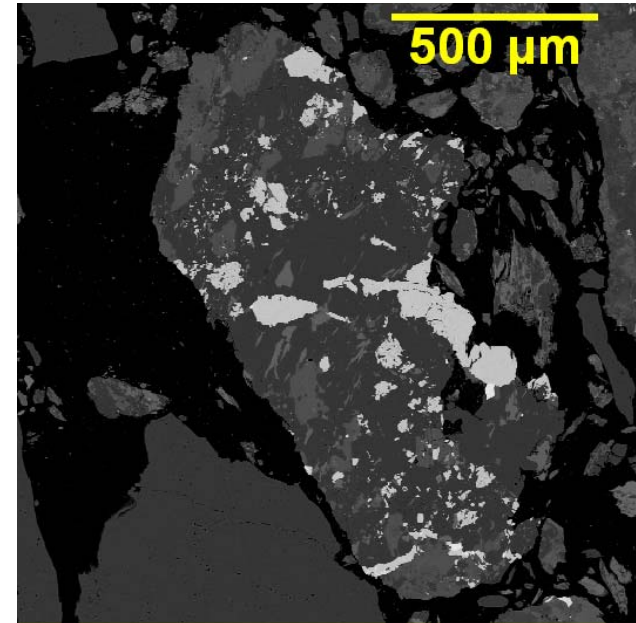
02TDD545, 82-100.73m (HC-44) - Predominately composed of quartz, chlorite, and muscovite/sericite. Lesser amounts of ankerite, calcite, albite, paragonite, and rutile were also detected. MLA measured trace amounts of pyrite (0.95%), chalcopyrite (0.03%), pyrrhotite (0.01%), <0.01% cobaltite and sphalerite, and <0.001% gersdorffite. Pyrite was mainly associated with quartz (30%); 28% of pyrite had a free surface. Seven percent of pyrite was encapsulated, 6% was liberated, and 87% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 155µm and 284µm respectively. Pyrite's crystal morphology, displayed in images below, is anhedral to subhedral, with coarse to fine-grained particles with sieve texture. Chalcopyrite was mainly associated with quartz (24%), chlorite (18%), and ankerite (17%); 10% of chalcopyrite had a free surface. Eighty-four percent of chalcopyrite was encapsulated, 5% was liberated, and 11% had intermediate exposure. Pyrrhotite was mainly associated with calcite (24%) and had 34% free surface. Sixteen percent of pyrrhotite was encapsulated, 21% was liberated, and 63% had intermediate exposure.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Quartz	34.88	26
Chlorite	20.55	35
Ankerite	14.03	7
Calcite	9.74	8
Albite	7.21	5
Muscovite	6.29	14
Paragonite	2.53	5
Epidote	1.12	
Pyrite	0.95	
Tourmaline	0.94	
Amphibole	0.90	
Ilmenite	0.21	
Rutile	0.15	<1
Apatite	0.14	
Kspar	0.11	
Siderite	0.10	
Biotite	0.07	
Chalcopyrite	0.03	
Pyrrhotite	0.01	
Sphene	0.01	
Cobaltite	<0.01	
FeClay	<0.01	
Iron	<0.01	
Monazite	<0.01	
Sphalerite	<0.01	
Gersdorffite	<0.001	
Gold	<0.001	
Magnetite	<0.001	
Pyrophyllite	<0.001	
Xenotime	<0.001	



BSE image of bright anhedral and subhedral pyrite with sieve texture.



BSE image of coarse and fine-grained pyrite in ankerite (light gray) and quartz (dark gray). Very bright chalcopyrite inclusions are also encapsulated in the gangue.

Sulfide Mineral Associations

MINERAL	Albite	Ankerite	Calcite	Chalcopyrite	Chlorite	Cobaltite	Gersdorffite	Muscovite	Paragonite	Pyrite	Quartz	Siderite	Tourmaline	Free Surface	OTHER
Chalcopyrite	4.38	16.93	6.45	0.00	17.68	0.00	1.21	3.11	0.82	11.14	23.28	3.81	0.52	10.44	0.24
Cobaltite	21.59	8.87	1.75	0.00	10.64	0.00	1.49	1.73	8.58	0.00	29.14	6.04	0.00	10.18	0.00
Gersdorffite	0.00	0.00	18.00	33.44	20.80	2.76	0.00	22.94	0.00	0.00	0.00	2.06	0.00	0.00	0.00
Pyrite	1.29	9.41	12.31	0.80	11.36	0.00	0.00	3.91	0.55	0.00	30.19	0.03	0.37	27.51	2.28
Pyrrhotite	0.44	6.54	23.71	0.00	11.11	0.00	0.00	0.00	0.00	10.09	13.76	0.27	0.00	33.52	0.57
Sphalerite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.27	0.00	10.31	83.42	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	84.45	10.61	4.94
Cobaltite	88.89	11.11	0.00
Gersdorffite	100.00	0.00	0.00
Pyrite	6.84	87.18	5.97
Pyrrhotite	15.84	62.97	21.18
Sphalerite	0.00	98.00	2.00

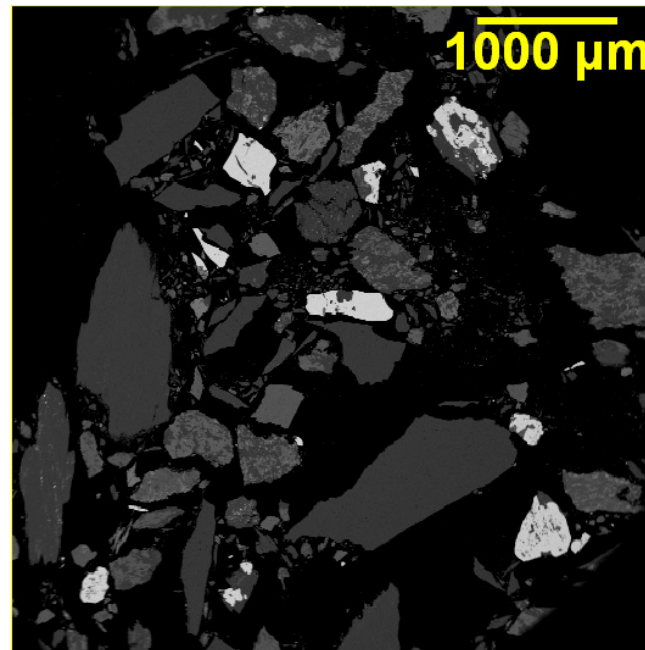
Pyrite Particle Size by Percent Passing

P-value	µm
P50	155.30
P80	284.15

TDD380, 245-254.5m (HC-45) - Predominately composed of quartz, ankerite, paragonite, and muscovite/sericite. Lesser amounts of chlorite, albite, siderite, and rutile were also detected. MLA detected exaggerated amounts of paragonite (15.53%) compared to XRD (5%) due to difficulties segmenting similar gray level phases, which is most likely the reason for lower MLA quantities of quartz and muscovite/sericite compared to XRD values. MLA measured relatively high amounts of pyrite (4.66%) which is in agreement with total sulfur (2.35%) from chemical analyses. MLA also detected trace amounts of pyrrhotite (0.02%), chalcopyrite (0.01%), <0.01% cobaltite, sphalerite, and gersdorffite. Pyrite was mainly associated with quartz (11%) and had a significant amount of free surface (51%). One percent of pyrite was encapsulated, 21% was liberated, and 78% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 215µm and 383µm respectively. Pyrite's crystal morphology, displayed in image below, is subhedral to euhedral, and coarse grained with sieve texture. Pyrrhotite and chalcopyrite were mainly associated with pyrite (42-56%); 15-16% of pyrrhotite and chalcopyrite had a free surface. Twenty-five percent of pyrrhotite was encapsulated, 4% was liberated, and 70% had intermediate exposure. Thirty-five percent of chalcopyrite was encapsulated, 9% was liberated, and 56% had intermediate exposure.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Quartz	32.14	44
Ankerite	20.74	22
Paragonite	15.53	5
Muscovite	12.83	18
Chlorite	5.69	2
Pyrite	4.66	2
Albite	3.32	4
Siderite	1.21	1
Tourmaline	1.12	
Apatite	0.62	
Epidote	0.62	
Ilmenite	0.40	
Rutile	0.38	1
Magnetite	0.25	
Amphibole	0.20	
Calcite	0.19	
Pyrrhotite	0.02	
Chalcopyrite	0.01	
Pyrophyllite	0.01	
Cobaltite	<0.01	
FeClay	<0.01	
Gersdorffite	<0.01	
Iron	<0.01	
Kspar	<0.01	
Monazite	<0.01	
Sphalerite	<0.01	
Xenotime	<0.01	
Anhydrite	<0.001	
Barite	<0.001	
Biotite	<0.001	
Gold	<0.001	
Sphene	<0.001	



Low magnification BSE image shows liberated and locked light gray subhedral/euhedral pyrite. A significant amount of pyrite from this sample was either liberated or partially exposed.

Sulfide Mineral Associations

MINERAL	Albite	Ankerite	Chalcopyrite	Chlorite	Cobaltite	Magnetite	Muscovite	Paragonite	Pyrite	Quartz	Siderite	Free Surface	OTHER
Chalcopyrite	0.30	4.97	0.00	4.12	0.28	0.14	1.67	3.42	55.93	11.10	1.70	15.47	0.90
Cobaltite	4.58	8.65	3.15	1.04	0.00	0.00	0.64	15.68	17.60	10.02	26.34	10.88	1.42
Gersdorffite	0.00	1.93	0.89	0.00	1.04	0.00	33.89	12.21	2.09	25.07	0.00	22.87	0.00
Pyrite	1.86	8.85	1.24	6.07	0.03	0.16	8.42	4.82	0.00	10.82	4.79	50.61	2.31
Pyrrhotite	0.00	2.16	0.00	2.86	0.00	1.44	2.46	5.61	41.95	8.00	19.31	15.73	0.49
Sphalerite	1.94	0.00	0.00	0.00	0.00	0.00	1.21	0.00	5.06	23.23	0.00	68.55	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	34.70	56.20	9.10
Cobaltite	69.89	27.84	2.27
Gersdorffite	8.89	91.11	0.00
Pyrite	1.39	78.05	20.56
Pyrrhotite	25.41	70.42	4.17
Sphalerite	0.64	54.97	44.39

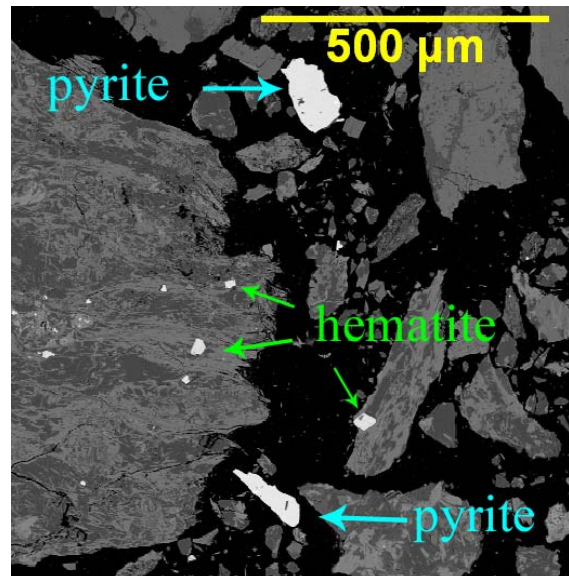
Pyrite Particle Size by Percent Passing

P-value	µm
P50	215.25
P80	382.98

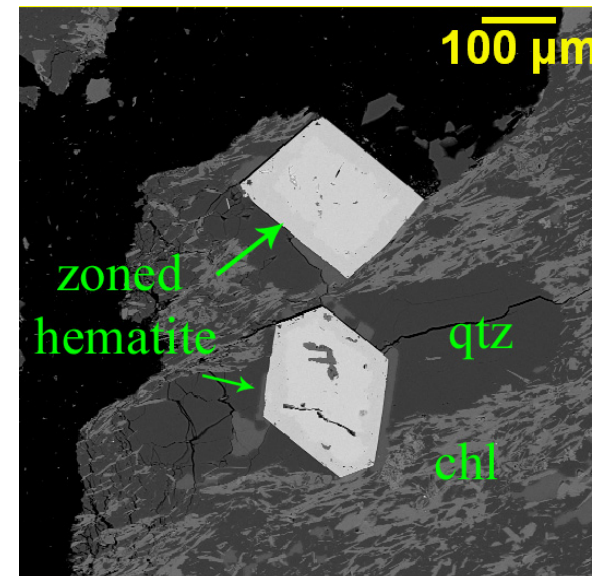
TDD380, 272-294m (HC-46) - Predominately composed of chlorite, quartz, and albite. Lesser amounts of ankerite, calcite, muscovite/sericite, paragonite, and rutile were also detected. MLA detected trace amounts of pyrite (0.24%), <0.01% chalcopyrite, and <0.001% pyrrhotite and sphalerite. Pyrite was mainly associated with quartz (15%) and had a significant amount of free surface (48%). Five percent of pyrite was encapsulated, 24% was liberated, and 71% had intermediate exposure. Pyrite had a P_{50} and P_{80} of 91 μ m and 127 μ m respectively. Pyrite's crystal morphology, displayed in left image below, is subhedral and coarse-grained with slight sieve texture. Hematite (1.49%), a product of oxidized pyrite, was also detected and is shown in right image below with cubic crystal shape.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Chlorite	29.56	44
Quartz	27.25	23
Albite	16.57	18
Ankerite	13.51	8
Calcite	3.38	3
Muscovite	2.35	2
Hematite	1.49	
Epidote	1.26	
Amphibole	1.19	
Sphene	0.69	
Siderite	0.61	
Paragonite	0.60	1
Rutile	0.35	<1
Diopside	0.27	
Pyrite	0.24	
Ilmenite	0.23	
Apatite	0.17	
Kspar	0.15	
Tourmaline	0.07	
Magnetite	0.04	
Biotite	0.01	
Chalcopyrite	<0.01	
Iron	<0.01	
Monazite	<0.01	
Xenotime	<0.01	
FeClay	<0.001	
Gold	<0.001	
Pyrophyllite	<0.001	
Pyrrhotite	<0.001	
Sphalerite	<0.001	
Zircon	<0.001	



BSE image of bright subhedral pyrite that is liberated. Hematite was encapsulated in chlorite and quartz



BSE image of bright euhedral zoned hematite (product of oxidized pyrite). Mixed gangue is light gray chlorite (chl) and dark gray quartz (qtz).

Sulfide Mineral Associations

MINERAL	Albite	Amphibole	Ankerite	Chlorite	Hematite	Ilmenite	Muscovite	Paragonite	Pyrite	Quartz	Rutile	Siderite	Free Surface	OTHER
Chalcopyrite	7.16	1.41	38.15	4.58	5.49	0.00	0.00	0.00	18.88	24.34	0.00	0.00	0.00	0.00
Pyrite	5.00	0.52	2.94	13.10	1.13	1.08	5.86	1.42	0.00	15.10	1.41	1.84	47.94	2.68
Pyrrhotite	0.00	0.00	0.00	0.00	85.18	0.00	0.00	0.00	10.49	0.00	0.00	0.00	4.33	0.00
Sphalerite	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	100.00	0.00	0.00
Pyrite	5.03	70.58	24.39
Pyrrhotite	0.00	100.00	0.00
Sphalerite	100.00	0.00	0.00

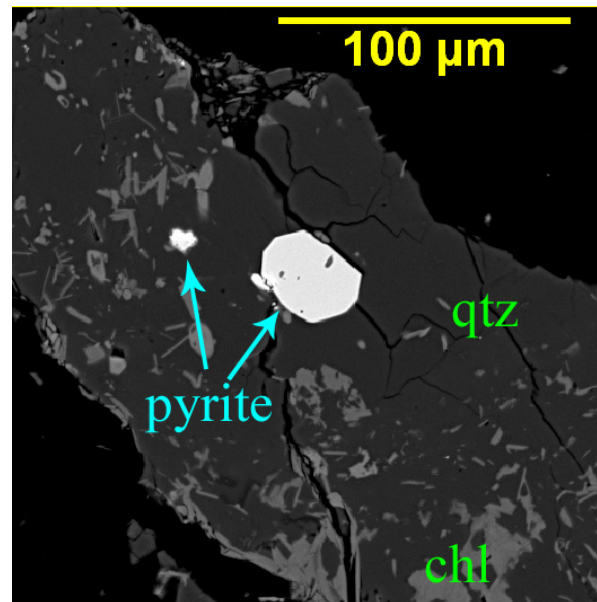
Pyrite Particle Size by Percent Passing

P-value	µm
P50	90.78
P80	126.80

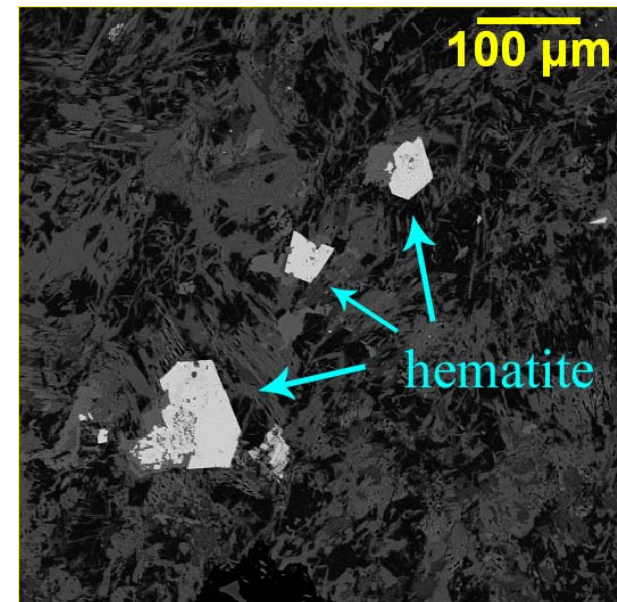
TDD374, 61-67.6m (HC-47) - Predominately composed of chlorite and albite. Lesser amounts of amphibole, quartz, epidote, sphene, calcite, and rutile were also detected. MLA detected trace amounts of pyrite (0.03%), chalcopyrite (0.02%), and <0.01% pyrrhotite. Pyrite was mainly associated with chlorite (18%) and quartz (14%); 40% of pyrite had a free surface. Thirty-seven percent of pyrite was encapsulated, 32% was liberated, and 31% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 33µm and 50µm respectively. Pyrite's crystal morphology, displayed in left image below, is subhedral with slight sieve texture. Chalcopyrite was also mainly associated with quartz (27%) and chlorite (22%); 7% of chalcopyrite had a free surface. Forty-six percent of chalcopyrite was encapsulated, <1% was liberated, and 53% had intermediate exposure. Iron oxide, hematite (1.17%) was also detected and is shown in right image below.

Mineral Weight %		
	MLA	XRD
Mineral	Wt%	Wt%
Chlorite	38.40	48
Albite	27.25	21
Amphibole	12.86	9
Quartz	12.20	9
Epidote	3.47	8
Sphene	2.63	2
Hematite	1.17	
Calcite	0.78	1
Ankerite	0.48	
Diopside	0.41	
Siderite	0.11	
Apatite	0.05	
Biotite	0.03	
Muscovite	0.03	
Paragonite	0.03	
Pyrite	0.03	
Chalcopyrite	0.02	
Kspar	0.02	
Tourmaline	0.02	
Ilmenite	<0.01	
Pyrrhotite	<0.01	
Rutile	<0.01	<1
Enstatite	<0.001	
Monazite	<0.001	
Zircon	<0.001	
Sepiolite*	-	2

*Sepiolite was not included in MLA standards list



BSE image of bright subhedral/euhedral pyrite that are encapsulated in chlorite (chl) and quartz (qtz)



BSE image of bright subhedral/euhedral hematite (product of oxidized pyrite) that are encapsulated in light gray chlorite and dark gray quartz.

Sulfide Mineral Associations

MINERAL	Albite	Amphibole	Chalcopyrite	Chlorite	Epidote	Hematite	Pyrite	Quartz	Sphene	Free Surface	OTHER
Chalcopyrite	6.91	12.90	0.00	22.11	0.13	15.71	5.17	26.75	1.87	6.97	1.48
Pyrite	9.52	5.64	4.59	18.05	1.04	5.10	0.00	13.72	0.00	40.11	2.23
Pyrrhotite	4.03	3.63	0.00	31.69	6.07	14.22	6.85	15.00	7.39	11.12	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	46.41	53.00	0.60
Pyrite	37.24	30.91	31.85
Pyrrhotite	92.13	0.00	7.87

Pyrite Particle Size by Percent Passing

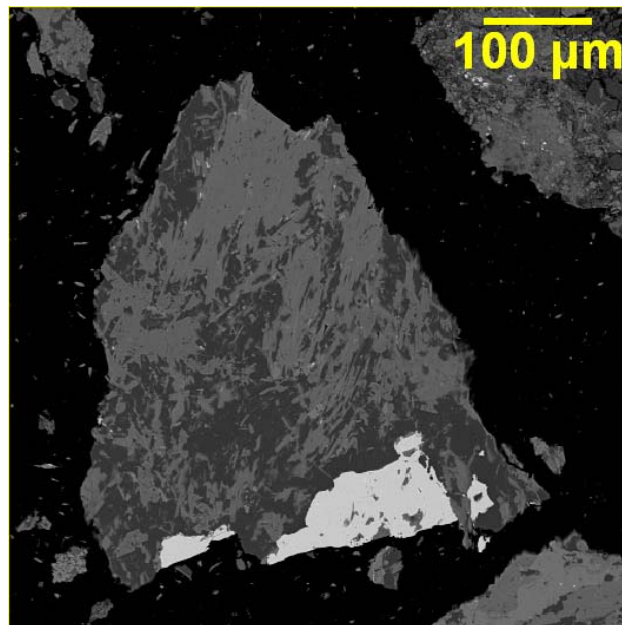
P-value	µm
P50	32.90
P80	50.37

TDD374, 11.63-36m (HC-48) - Predominately composed of albite, amphibole, and chlorite. Lesser amounts of quartz, epidote, sphene, and rutile were also detected. MLA detected exaggerated amounts of amphibole (28.66%) compared to XRD (19%) due to difficulties segmenting similar gray level phases. MLA measured trace amounts of pyrite (0.08%), chalcopyrite (0.01%), <0.01% gersdorffite and pyrrhotite, and <0.001% sphalerite and tetrahedrite. Pyrite was mainly associated with quartz (16%), amphibole (12%), and chlorite (11%); 42% of pyrite had a free surface. Seven percent of pyrite was encapsulated, 18% was liberated, and 75% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 56µm and 73µm respectively. Pyrite's crystal morphology, displayed in left image below, is anhedral to subhedral, and coarse grained with slight sieve texture. Chalcopyrite was mainly associated with amphibole (37%) and albite (15%); 14% of chalcopyrite had a free surface. Eighty percent of chalcopyrite was encapsulated, 5% was liberated, and 15% had intermediate exposure. Iron oxide, hematite (0.76%) was also detected and is shown in right image below.

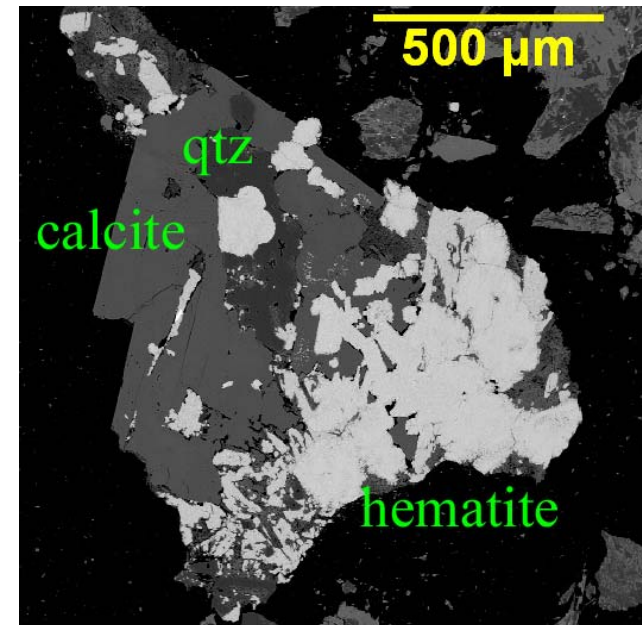
Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Amphibole	28.66	19
Albite	28.58	23
Chlorite	21.71	31
Quartz	10.07	11
Epidote	4.72	13
Sphene	2.21	2
Ankerite	1.43	
Calcite	1.03	<1
Hematite	0.76	
Biotite	0.30	
Muscovite	0.13	
Siderite	0.12	
Pyrite	0.08	
Kspar	0.06	
Ilmenite	0.05	
Paragonite	0.03	
Apatite	0.02	
Chalcopyrite	0.01	
Tourmaline	<0.01%	
Gersdorffite	<0.01%	
Magnetite	<0.01%	
Pyrrhotite	<0.01%	
Rutile	<0.01%	<1
FeClay	<0.001%	
Gold	<0.001%	
Iron	<0.001%	
Monazite	<0.001%	
Pyrophyllite	<0.001%	
Sphalerite	<0.001%	
Tetrahedrite	<0.001%	
Zircon	<0.001%	
Sepiolite*	-	1

*Sepiolite was not included in MLA standards list



BSE image of bright subhedral pyrite with some sieve texture. Light gray gangue is chlorite and quartz is dark gray.



BSE image of light gray hematite associated with medium gray calcite and dark gray quartz.

Sulfide Mineral Associations

MINERAL	Albite	Amphibole	Ankerite	Calcite	Chlorite	Epidote	Kspar	Pyrite	Quartz	Siderite	Sphene	Hematite	Free Surface	OTHER
Chalcopyrite	15.29	37.42	0.00	2.89	10.88	1.28	1.35	2.02	10.43	0.00	1.28	2.74	14.11	0.30
Gersdorffite	1.33	0.00	35.23	0.00	60.82	0.00	0.00	0.00	0.00	1.83	0.00	0.00	0.79	0.00
Pyrite	9.47	12.12	3.88	0.00	11.27	1.97	0.48	0.00	15.58	0.00	0.10	0.47	41.74	2.91
Pyrrhotite	0.00	24.12	6.05	5.77	0.00	0.00	0.00	17.09	0.00	0.00	0.00	2.83	44.14	0.00
Sphalerite	0.00	0.00	0.00	0.00	12.79	0.00	0.00	0.00	33.31	0.00	0.00	0.00	53.91	0.00
Tetrahedrite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	80.37	14.79	4.84
Gersdorffite	99.32	0.68	0.00
Pyrite	7.49	74.66	17.85
Pyrrhotite	10.53	70.66	18.81
Sphalerite	13.04	86.96	0.00
Tetrahedrite	0.00	0.00	100.00

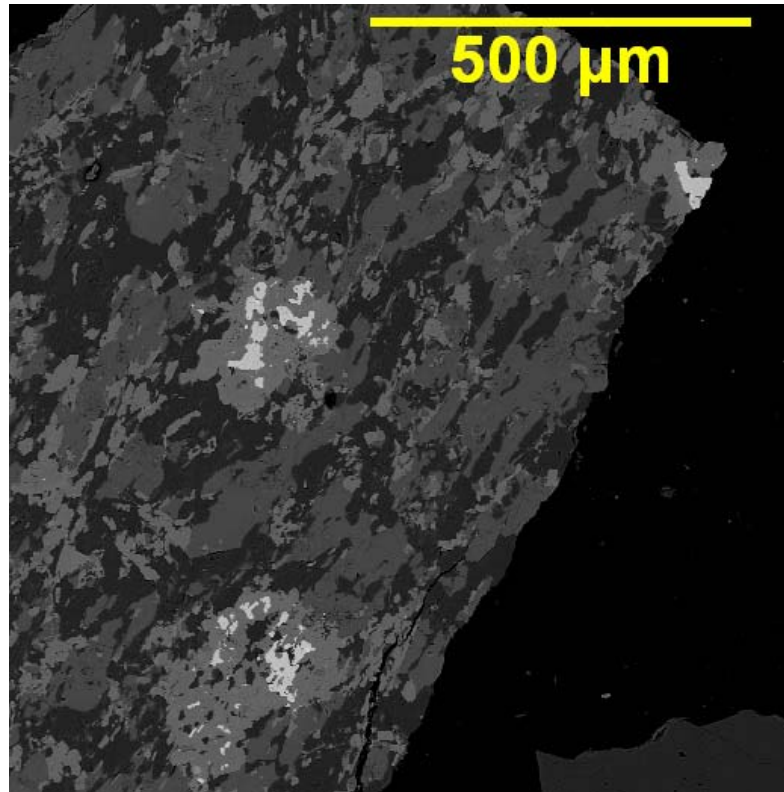
Pyrite Particle Size by Percent Passing

P-value	µm
P50	55.90
P80	73.01

TDD370, 253.21-255.12m (HC-49) - Predominately composed of quartz, ankerite, paragonite, and muscovite/sericite. Lesser amounts of chlorite, albite, siderite, and rutile were also detected. MLA detected albite (7.42%) and lower amounts of paragonite (4.97%) compared to XRD (21%) due to difficulties segmenting similar gray level phases. MLA detected trace amounts of pyrite (0.07%), <0.01% chalcopryite and pyrrhotite, and <0.001% cobaltite and sphalerite. Pyrite was mainly associated with siderite (44%) and had 7% free surface. Twenty-five percent of pyrite was encapsulated, 5% was liberated, and 70% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 24µm and 44µm respectively. Pyrite's crystal morphology, displayed in image below, is anhedral and fine-grained.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Quartz	38.01	33
Ankerite	21.99	23
Chlorite	10.12	5
Muscovite	7.98	10
Albite	7.42	
Siderite	5.20	7
Paragonite	4.97	21
Magnetite	1.68	
Amphibole	0.74	
Tourmaline	0.61	
Rutile	0.39	1
Ilmenite	0.34	
Epidote	0.22	
Apatite	0.19	
Pyrite	0.07	
Calcite	0.04	
Chalcopryite	<0.01	
FeClay	<0.01	
Iron	<0.01	
Kspar	<0.01	
Monazite	<0.01	
Pyrophyllite	<0.01	
Pyrrhotite	<0.01	
Xenotime	<0.01	
Biotite	<0.001	
Cobaltite	<0.001	
Sphalerite	<0.001	
Sphene	<0.001	



BSE image of bright, fine-grained, anhedral pyrite in mixed gangue composed of siderite (light gray), ankerite (medium gray), and quartz (dark gray).

Sulfide Mineral Associations

MINERAL	Albite	Ankerite	Apatite	Chlorite	Magnetite	Muscovite	Paragonite	Pyrite	Pyrrhotite	Quartz	Siderite	Free Surface	OTHER
Chalcopyrite	0.00	32.86	1.91	5.12	1.83	0.19	1.16	8.22	2.53	14.07	29.88	2.22	0.00
Cobaltite	0.00	34.47	0.00	22.50	0.00	0.00	0.00	0.00	0.00	43.03	0.00	0.00	0.00
Pyrite	6.48	7.02	0.19	6.00	9.30	6.91	3.24	0.00	0.88	7.36	43.95	7.23	1.44
Pyrrhotite	0.00	1.49	0.00	2.43	11.46	0.45	3.69	6.12	0.00	4.50	67.85	0.93	1.08
Sphalerite	0.00	53.33	0.00	0.00	26.84	0.00	0.00	0.00	0.00	19.83	0.00	0.00	0.00

Sulfide Exposure

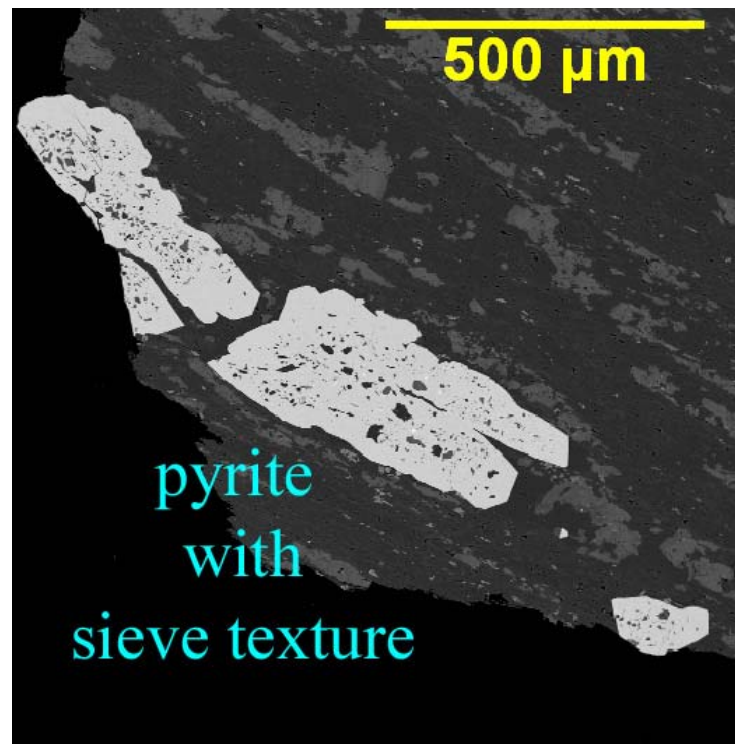
Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	62.03	37.97	0.00
Cobaltite	100.00	0.00	0.00
Pyrite	25.43	69.78	4.79
Pyrrhotite	89.85	10.15	0.00
Sphalerite	100.00	0.00	0.00

Pyrite Particle Size by Percent Passing

P-value	µm
P50	24.43
P80	43.81

TDD387, 151.2-153.5m (HC-50) - Predominately composed of ankerite, quartz, muscovite/sericite, and paragonite. Lesser amounts of siderite and rutile were also detected. MLA detected exaggerated amounts of muscovite/sericite (29.02%) compared to XRD (14%) due to difficulties segmenting similar gray level phases; K values (1.5%) from chemical analyses are in agreement with XRD's muscovite/sericite value. MLA measured minor amounts of pyrite (1.91%) along with trace amounts of chalcopyrite (<0.01%), pyrrhotite (<0.01%), and <0.001% cobaltite, galena, and sphalerite. Pyrite was mainly associated with muscovite/sericite (24%) and ankerite (14%); 25% of pyrite had a free surface. Eight percent of pyrite was encapsulated, 10% was liberated, and 82% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 209µm and 393µm respectively. Pyrite's crystal morphology, displayed in image below, is subhedral to euhedral, and coarse grained with sieve texture.

Mineral Weight %		
Mineral	MLA Wt%	XRD Wt%
Muscovite	29.02	14
Ankerite	28.48	31
Quartz	27.35	36
Albite	4.85	
Siderite	2.57	4
Pyrite	1.91	3
Paragonite	1.71	10
Chlorite	1.11	
Ilmenite	1.05	
Rutile	0.56	1
Magnetite	0.53	
Apatite	0.34	
Amphibole	0.17	
Epidote	0.11	
Tourmaline	0.09	
Calcite	0.08	
Monazite	0.01	
Biotite	<0.01	
Xenotime	<0.01	
Chalcopyrite	<0.01	
FeClay	<0.01	
Kspar	<0.01	
Pyrophyllite	<0.01	
Pyrrhotite	<0.01	
Chromite	<0.001	
Cobaltite	<0.001	
Enstatite	<0.001	
Galena	<0.001	
Iron	<0.001	
Sphalerite	<0.001	
Sphene	<0.001	



BSE image of bright subhedral pyrite with sieve texture in mixed gangue composed of light gray ankerite and dark gray quartz.

Sulfide Mineral Associations

MINERAL	Albite	Ankerite	Ilmenite	Magnetite	Muscovite	Paragonite	Pyrite	Quartz	Rutile	Siderite	Free Surface	OTHER
Chalcopyrite	0.00	22.65	0.00	0.00	0.00	0.00	61.47	1.87	0.00	6.16	7.85	0.00
Cobaltite	13.03	0.00	4.17	0.00	30.32	0.00	18.39	0.81	0.00	4.83	28.45	0.00
Galena	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00
Pyrite	3.79	14.62	2.91	0.26	23.62	1.72	0.00	21.13	1.29	2.59	25.28	2.80
Pyrrhotite	0.00	0.00	0.00	11.40	10.20	0.00	40.14	7.97	0.00	10.18	20.12	0.00
Sphalerite	0.00	0.00	0.00	0.00	0.00	0.00	74.07	0.00	0.00	25.93	0.00	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	75.19	18.30	6.52
Cobaltite	68.00	0.00	32.00
Galena	100.00	0.00	0.00
Pyrite	7.94	81.83	10.23
Pyrrhotite	30.40	39.65	29.96
Sphalerite	100.00	0.00	0.00

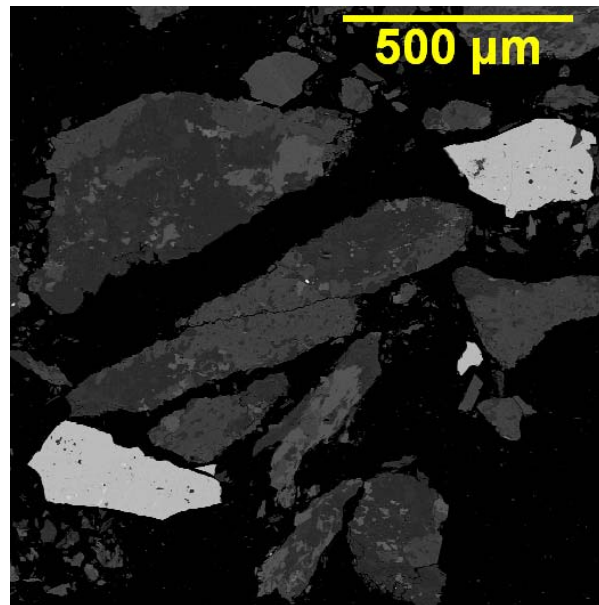
Pyrite Particle Size by Percent Passing

P-value	μm
P50	208.68
P80	393.19

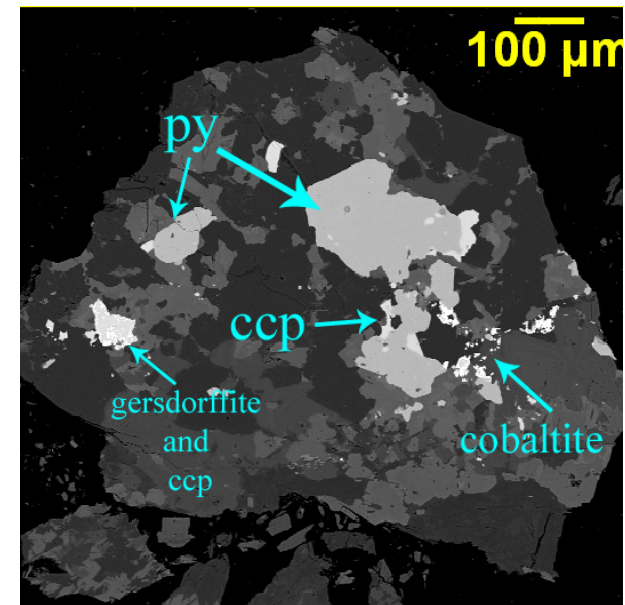
97TDD131, 169.13-171.61m (HC-51) - Predominately composed of ankerite, quartz, muscovite/sericite, chlorite, and paragonite. Lesser amounts of siderite and rutile were also detected. MLA detected exaggerated amounts of muscovite/sericite (29.02%) compared to XRD (14%) in the expense of paragonite due to difficulties segmenting similar gray level phases; K values (1.6%) from chemical analyses are in agreement with XRD's muscovite/sericite value. MLA measured minor amounts of pyrite (1.74%) along with trace amounts of chalcopyrite (0.03%), <0.01% cobaltite and gersdorffite, and <0.001% galena, pyrrhotite, sphalerite, and tetrahedrite. Pyrite was associated with muscovite/sericite (8%), quartz (8%), and ankerite (7%); a significant amount (63%) of pyrite had a free surface. Less than 1% of pyrite was encapsulated, 17% was liberated, and 82% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 202µm and 328µm respectively. Pyrite's crystal morphology, displayed in images below, is anhedral to euhedral, and coarse grained with sieve texture. Chalcopyrite was mainly associated with muscovite/sericite (20%) and pyrite (20%); 7% of chalcopyrite had a free surface. Seventy-two percent of chalcopyrite was encapsulated, 2% was liberated, and 26% had intermediate exposure.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Ankerite	36.96	34
Muscovite	23.69	13
Quartz	22.07	21
Chlorite	9.40	14
Paragonite	2.49	14
Pyrite	1.74	1
Siderite	1.53	2
Albite	0.61	
Rutile	0.47	1
Calcite	0.30	
Tourmaline	0.17	
Amphibole	0.15	
Apatite	0.14	
Ilmenite	0.14	
Epidote	0.04	
Kspar	0.04	
Chalcopyrite	0.03	
Biotite	<0.01	
Cobaltite	<0.01	
Gersdorffite	<0.01	
Magnetite	<0.01	
Monazite	<0.01	
Sphene	<0.01	
Xenotime	<0.01	
Enstatite	<0.001	
FeClay	<0.001	
Galena	<0.001	
Gold	<0.001	
Iron	<0.001	
Pyrophyllite	<0.001	
Pyrrhotite	<0.001	
Sphalerite	<0.001	
Tetrahedrite	<0.001	
Zircon	<0.001	



BSE image of liberated light gray subhedral/euhedral pyrite with sieve texture.



BSE image of very bright cobaltite and gersdorffite grains, very light gray chalcopyrite (ccp) grains, and light gray pyrite (py), encapsulated in siderite (light-med gray), ankerite (medium gray), and quartz (dark gray).

Sulfide Mineral Associations

MINERAL	Albite	Ankerite	Chalcopyrite	Chlorite	Cobaltite	Gersdorffite	Muscovite	Paragonite	Pyrite	Quartz	Rutile	Siderite	Free Surface	OTHER
Chalcopyrite	0.78	10.49	0.00	5.97	1.65	3.47	19.54	0.55	19.62	15.60	0.24	14.90	6.61	0.56
Cobaltite	0.00	14.01	5.31	13.76	0.00	1.14	13.21	3.13	4.91	28.23	1.36	11.54	2.42	0.98
Galena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00
Gersdorffite	0.00	17.26	33.65	0.00	3.44	0.00	6.19	0.00	1.71	12.24	0.00	19.61	5.90	0.00
Pyrite	0.21	7.15	2.02	4.09	0.16	0.02	8.22	0.78	0.00	7.71	0.39	4.50	63.41	1.34
Pyrrhotite	0.00	0.00	6.65	7.36	0.00	0.00	0.00	0.00	40.43	0.00	0.00	18.61	26.95	0.00
Sphalerite	13.77	0.00	0.00	14.90	0.00	0.00	37.69	0.00	6.43	17.94	0.00	0.00	9.26	0.00
Tetrahedrite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00

Sulfide Exposure

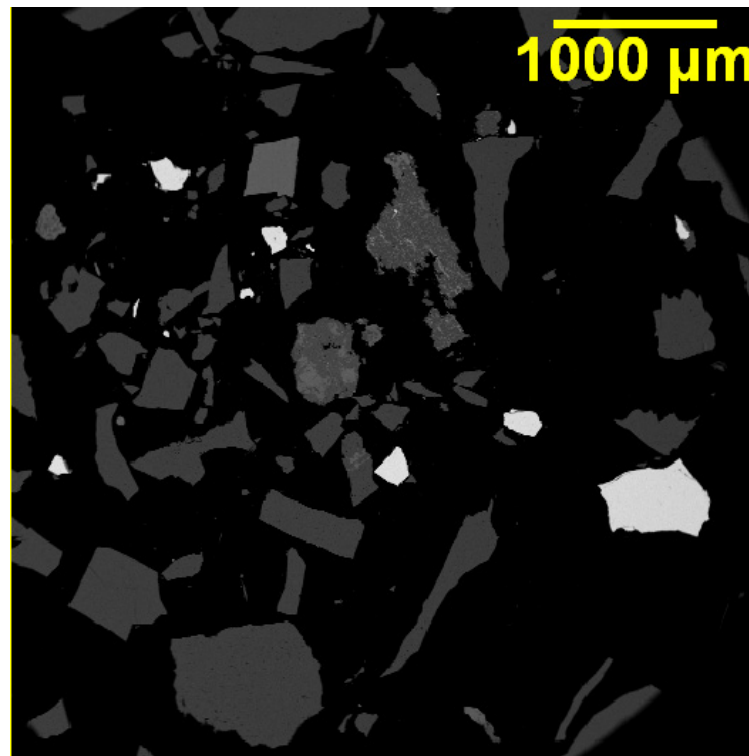
Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	72.08	25.99	1.94
Cobaltite	91.45	8.55	0.00
Galena	100.00	0.00	0.00
Gersdorffite	84.92	15.08	0.00
Pyrite	0.63	81.96	17.41
Pyrrhotite	48.30	19.32	32.39
Sphalerite	95.94	0.00	4.06
Tetrahedrite	0.00	0.00	100.00

Pyrite Particle Size by Percent Passing

P-value	µm
P50	201.50
P80	327.94

TDD392, 214.58-216.68m (HC-52) - Predominately composed of quartz (~80%). Lesser amounts muscovite/sericite, paragonite, ankerite, and rutile were also detected. MLA measured relatively elevated amounts of pyrite (3.94%), which is in agreement with the total sulfur value (2.01%) from chemical analyses. MLA also detected minor amounts of pyrrhotite and sphalerite (<0.01%), and <0.001% chalcopyrite, cobaltite, galena, and tetrahedrite. Pyrite was associated with ankerite (18%) and muscovite/sericite (8%); a significant amount (63%) of pyrite had a free surface. Less than 1% of pyrite was encapsulated, 27% was liberated, and 73% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 247µm and 506µm respectively. Pyrite's crystal morphology, displayed in image below, is subhedral to euhedral, and coarse grained with slight sieve texture.

Mineral Weight %		
Mineral	MLA	XRD
	Wt%	Wt%
Quartz	85.56	81
Ankerite	5.35	8
Pyrite	3.97	3
Muscovite	3.47	5
Paragonite	0.79	2
Tourmaline	0.25	
Chlorite	0.21	
Siderite	0.16	
Rutile	0.05	1
Ilmenite	0.04	
Albite	0.03	
Calcite	0.03	
Epidote	0.03	
Apatite	0.02	
Magnetite	0.02	
Amphibole	<0.01	
Biotite	<0.01	
Iron	<0.01	
Kspar	<0.01	
Monazite	<0.01	
Pyrrhotite	<0.01	
Sphalerite	<0.01	
Xenotime	<0.01	
Anhydrite	<0.001	
Chalcopyrite	<0.001	
Chromite	<0.001	
Cobaltite	<0.001	
FeClay	<0.001	
Galena	<0.001	
Gold	<0.001	
Sphene	<0.001	
Tetrahedrite	<0.001	



BSE image shows liberated light gray subhedral/euhedral pyrite. A significant amount of pyrite from this sample was either liberated or partially exposed.

Sulfide Mineral Associations

MINERAL	Albite	Ankerite	Iron	Muscovite	Paragonite	Pyrite	Quartz	Siderite	Tourmaline	Free Surface	OTHER
Chalcopyrite	0.00	4.75	0.00	0.00	0.00	88.53	0.00	0.00	0.00	6.72	0.00
Cobaltite	0.00	54.20	0.00	45.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Galena	0.00	0.00	0.00	6.89	0.00	41.36	0.00	0.00	0.00	51.74	0.00
Pyrite	1.02	18.41	0.00	8.43	1.45	0.00	2.44	0.94	2.10	63.36	1.84
Pyrrhotite	0.00	0.81	1.98	1.18	0.00	35.89	0.00	2.68	0.00	57.13	0.32
Sphalerite	0.00	0.00	0.00	0.00	0.00	0.00	74.56	0.00	0.00	25.44	0.00
Tetrahedrite	0.00	0.00	0.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	94.51	0.00	5.49
Cobaltite	100.00	0.00	0.00
Galena	47.37	5.26	47.37
Pyrite	0.08	72.73	27.19
Pyrrhotite	9.48	50.63	39.89
Sphalerite	0.00	96.63	3.37
Tetrahedrite	100.00	0.00	0.00

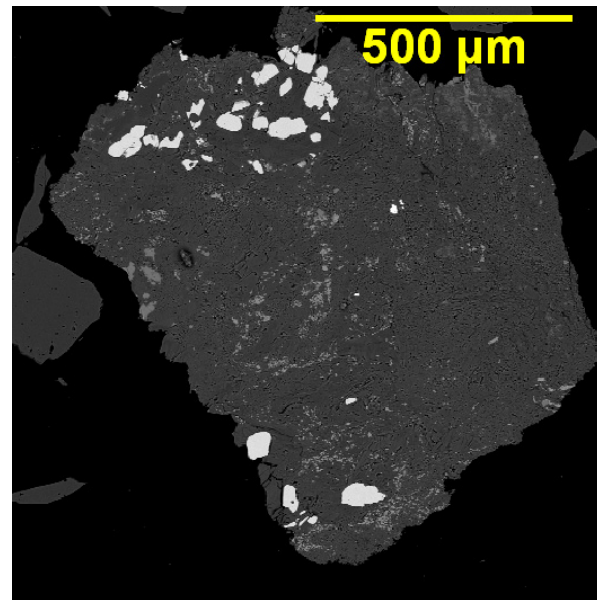
Pyrite Particle Size by Percent Passing

P-value	µm
P50	247.20
P80	505.76

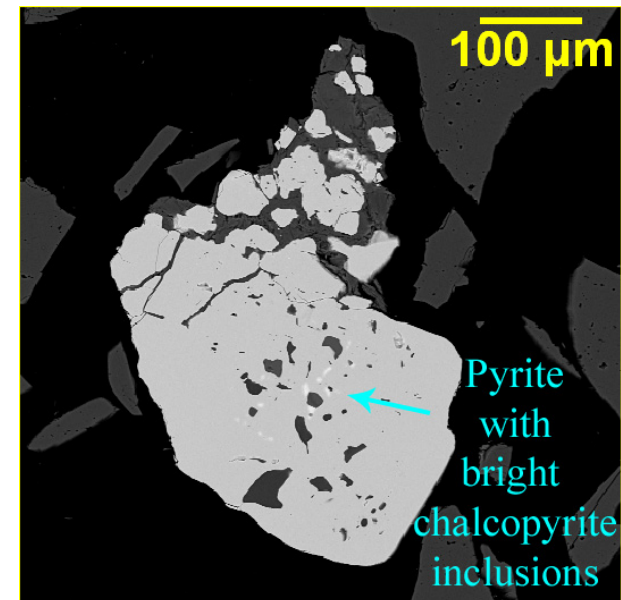
TDD368, 175-178m (HC-53) - Almost entirely composed of quartz (~97%). MLA detected <1% tourmaline, muscovite/sericite, and ankerite (also detected by XRD). MLA measured trace amounts of pyrite (0.28%), <0.01% pyrrhotite, and <0.001% chalcopyrite. Pyrite was mainly associated with tourmaline (39%) and 36% of pyrite had a free surface. One percent of pyrite was encapsulated, 2% was liberated, and 97% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 374µm and 405µm respectively. Pyrite's crystal morphology, displayed in images below, is subhedral coarse grained particles with sieve texture.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Quartz	97.12	99
Muscovite	0.92	
Tourmaline	0.80	
Ankerite	0.65	1
Pyrite	0.28	<1
Paragonite	0.12	
Chlorite	0.03	
Ilmenite	0.02	
Albite	0.01	
Rutile	0.01	
Amphibole	<0.01	
Apatite	<0.01	
Biotite	<0.01	
Calcite	<0.01	
Iron	<0.01	
Kspar	<0.01	
Platinum	<0.01	
Pyrrhotite	<0.01	
Siderite	<0.01	
Xenotime	<0.01	
Barite	<0.001	
Chalcopyrite	<0.001	
Chromite	<0.001	
Enstatite	<0.001	
Epidote	<0.001	
FeClay	<0.001	
Gold	<0.001	
Magnetite	<0.001	
Monazite	<0.001	
Pyrophyllite	<0.001	
Zircon	<0.001	



BSE image of light gray subhedral pyrite in dark gray tourmaline.



BSE image of light gray subhedral pyrite with sieve texture. Inclusions of bright chalcopyrite grains are pointed out in the image.

Sulfide Mineral Associations

MINERAL	Ankerite	Chalcopyrite	Muscovite	Paragonite	Pyrite	Quartz	Tourmaline	Free Surface	OTHER
Chalcopyrite	7.40	0.00	0.00	0.00	79.61	0.00	0.00	12.99	0.00
Pyrite	2.13	1.64	13.83	2.41	0.00	3.80	39.48	36.33	0.38
Pyrrhotite	0.00	0.00	0.88	0.00	1.84	0.00	0.00	97.28	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	78.57	0.00	21.43
Pyrite	1.15	96.55	2.31
Pyrrhotite	0.17	0.85	98.98

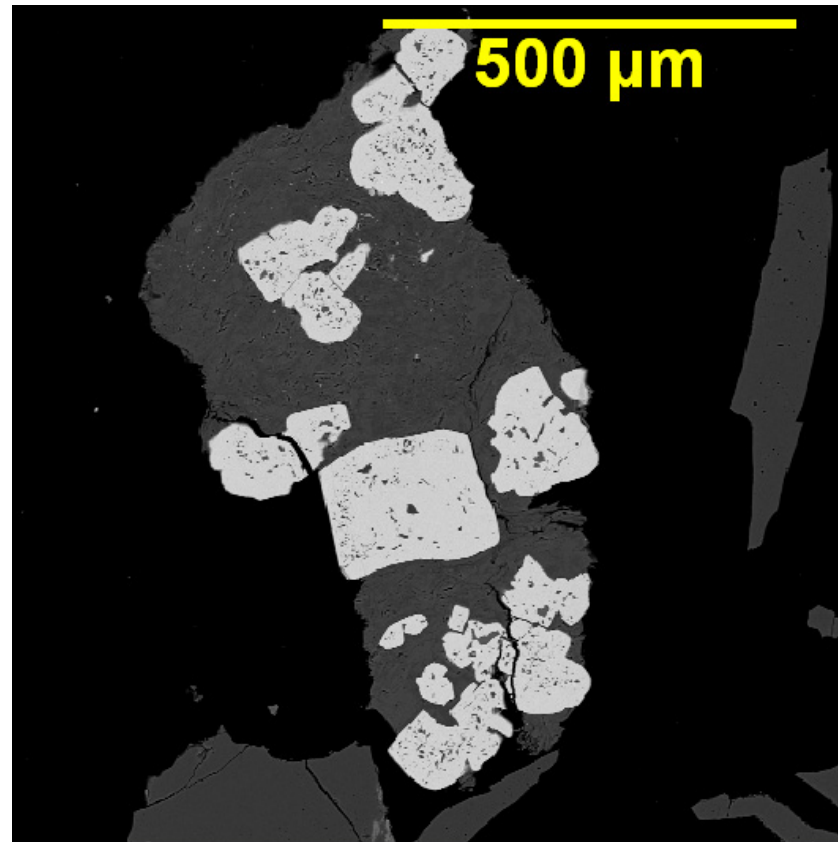
Pyrite Particle Size by Percent Passing

P-value	µm
P50	373.87
P80	404.55

TDD363, 153.85-155.96m (HC-54) - Almost entirely composed of quartz (~92%). Lesser amounts of ankerite and muscovite/sericite were also detected. MLA measured minor amounts of pyrite (1.94%) along with trace amounts of pyrrhotite and chalcopyrite (<0.01%). Pyrite was mainly associated with muscovite/sericite (27%) and had a significant amount (60%) of free surface. Less than 1% of pyrite was encapsulated, 11% was liberated, and 89% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 431µm and 775µm respectively. Pyrite's crystal morphology, displayed in image below, is subhedral to euhedral, and coarse grained with sieve texture.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Quartz	91.77	92
Ankerite	4.12	3
Pyrite	1.94	1
Muscovite	1.73	4
Paragonite	0.21	
Chlorite	0.09	
Albite	0.08	
Rutile	0.02	
Ilmenite	0.01	
Tourmaline	<0.01	
Calcite	<0.01	
Chalcopyrite	<0.01	
Magnetite	<0.01	
Monazite	<0.01	
Pyrrhotite	<0.01	
Siderite	<0.01	
Amphibole	<0.001	
Apatite	<0.001	
Biotite	<0.001	
Chromite	<0.001	
Epidote	<0.001	
FeClay	<0.001	
Gold	<0.001	
Kspar	<0.001	
Pyrophyllite	<0.001	
Xenotime	<0.001	



BSE image of light gray subhedral/euhedral pyrite with sieve texture in dark gray muscovite/sericite.

Sulfide Mineral Associations

MINERAL	Ankerite	Chlorite	Muscovite	Paragonite	Pyrite	Pyrrhotite	Quartz	Free Surface	OTHER
Chalcopyrite	33.23	16.15	0.00	0.00	13.53	0.00	32.01	5.09	0.00
Pyrite	3.48	0.28	27.60	2.02	0.00	1.69	4.11	59.84	0.98
Pyrrhotite	0.00	0.00	0.00	0.00	90.85	0.00	1.17	7.98	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	96.55	0.00	3.45
Pyrite	0.01	89.33	10.66
Pyrrhotite	66.19	33.81	0.00

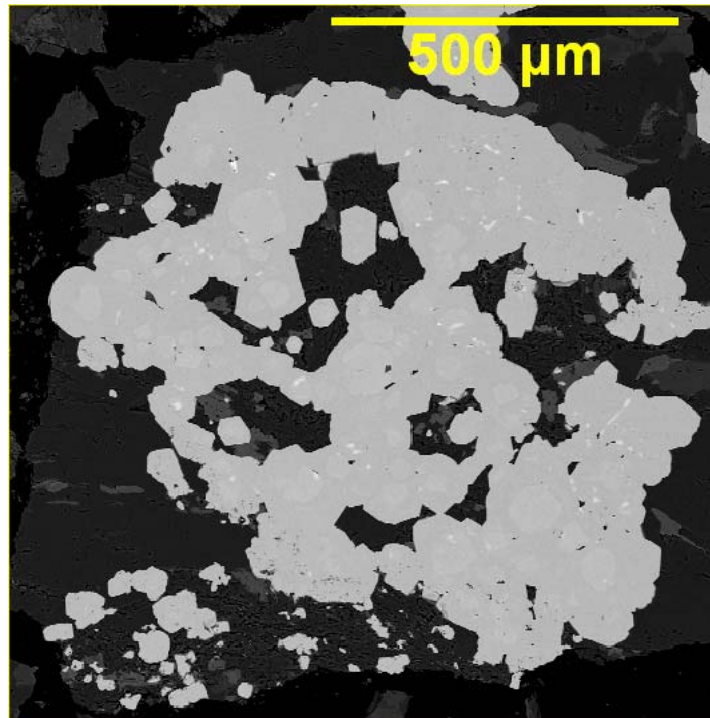
Pyrite Particle Size by Percent Passing

P-value	μm
P50	431.09
P80	775.41

94NOD128, 20.7-30m (HC-55) - Predominately composed of ankerite, quartz, and chlorite. Lesser amounts of muscovite/sericite, paragonite, and rutile were also detected. MLA measured trace amounts of pyrite (0.75%), chalcopyrite (0.02%), gersdorffite (0.01%), <0.01% cobaltite, and <0.001% pyrrhotite and sphalerite. Pyrite was mainly associated with ankerite (18%), and quartz (17%); 34% of pyrite had a free surface. Four percent of pyrite was encapsulated, 16% was liberated, and 80% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 223µm and 448µm respectively. Pyrite's crystal morphology, displayed in image below, is subhedral to euhedral, and coarse grained with slight sieve texture. Chalcopyrite was mainly associated with ankerite (18%), quartz (17%), chlorite (14%), and pyrite (14%); 20% of chalcopyrite had a free surface. Sixty-one percent of chalcopyrite was encapsulated, 8% was liberated, and 31% had intermediate exposure. Gersdorffite was mainly associated with ankerite (23%) and quartz (17%); 30% of gersdorffite had a free surface. Fifty-two percent of gersdorffite was encapsulated, 34% was liberated, and 14% had intermediate exposure.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Ankerite	42.40	34
Quartz	25.62	32
Chlorite	12.28	18
Paragonite	6.86	8
Albite	5.78	
Muscovite	3.83	7
Tourmaline	1.19	
Pyrite	0.75	
Siderite	0.53	
Epidote	0.35	
Amphibole	0.09	
Rutile	0.08	<1
Calcite	0.07	
Ilmenite	0.05	
Apatite	0.04	
Chalcopyrite	0.02	
Chromite	0.02	
Gersdorffite	0.01	
Kspar	0.01	
Biotite	<0.01	
Cobaltite	<0.01	
Pyrophyllite	<0.01	
Scheelite	<0.01	
Sphene	<0.01	
Xenotime	<0.01	
Barite	<0.001	
FeClay	<0.001	
Iron	<0.001	
Magnetite	<0.001	
Monazite	<0.001	
Pyrrhotite	<0.001	
Sphalerite	<0.001	



BSE image of light gray subhedral/euhedral pyrite in dark gray quartz. Pyrite in this image has bright chalcopyrite inclusions

Sulfide Mineral Associations

MINERAL	Albite	Ankerite	Chalcopyrite	Chlorite	Gersdorffite	Muscovite	Paragonite	Pyrite	Quartz	Tourmaline	Free Surface	OTHER
Chalcopyrite	5.32	17.59	0.00	14.21	0.16	3.39	7.91	13.90	16.70	1.01	19.50	0.31
Cobaltite	3.74	25.82	0.90	20.51	1.40	2.73	17.28	1.75	10.78	9.50	5.59	0.00
Gersdorffite	2.86	23.15	0.25	11.16	0.00	5.66	6.26	2.73	15.90	0.79	30.07	1.16
Pyrite	9.06	17.74	1.44	6.63	0.18	5.15	6.39	0.00	16.68	1.75	33.71	1.28
Pyrrhotite	0.00	0.00	0.00	0.00	0.00	0.00	10.53	1.81	0.00	0.00	87.67	0.00
Sphalerite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	84.34	0.00	0.00	15.66	0.00

Sulfide Exposure

Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Chalcopyrite	60.50	31.14	8.36
Cobaltite	66.85	33.15	0.00
Gersdorffite	51.94	14.21	33.85
Pyrite	4.11	80.04	15.85
Pyrrhotite	0.00	53.85	46.15
Sphalerite	92.50	0.00	7.50

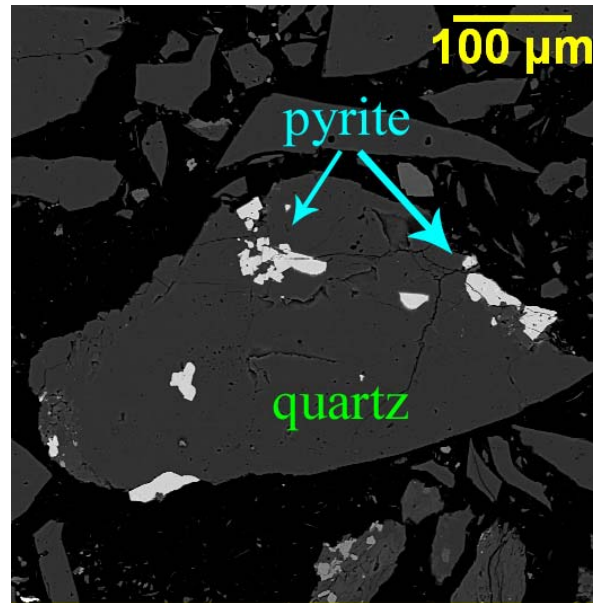
Pyrite Particle Size by Percent Passing

P-value	μm
P50	222.61
P80	448.29

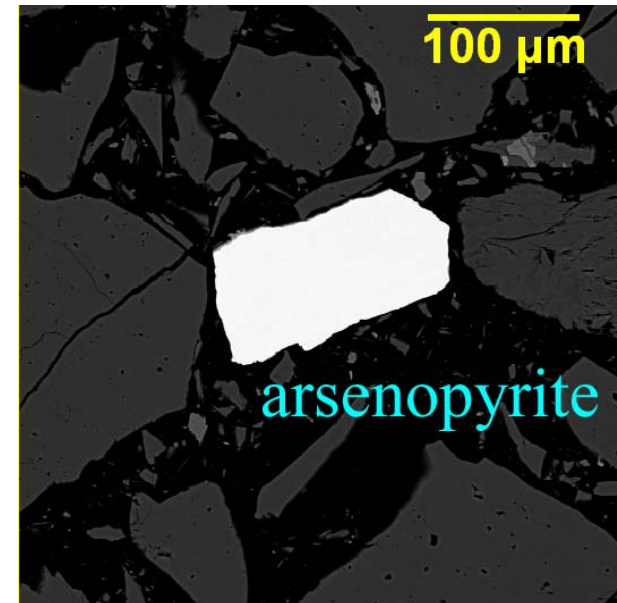
HB DCO G Float Tails Master Comp (HC-57) - Predominately composed of quartz (~80%). Lesser amounts of muscovite/sericite, ankerite, paragonite, siderite, and rutile were also detected. MLA measured trace amounts of pyrite (0.08%), arsenopyrite (0.01%), <0.01% chalcopyrite and pyrrhotite, and <0.001% sphalerite. Pyrite was mainly associated with quartz (31%) and siderite (22%); 21% of pyrite had a free surface. Fourteen percent of pyrite was encapsulated, 3% was liberated, and 83% had intermediate exposure. Pyrite had a P₅₀ and P₈₀ of 43µm and 75µm respectively. Pyrite's crystal morphology, displayed in the left image below, is anhedral to subhedral, and coarse to fine-grained with sieve texture. Arsenopyrite, displayed in the right image below, was associated with quartz (13%) but mostly had free surface (85%). One hundred percent of arsenopyrite had intermediate exposure.

Mineral Weight %

Mineral	MLA	XRD
	Wt%	Wt%
Quartz	81.72	75
Ankerite	9.14	9
Muscovite	3.69	7
Paragonite	2.29	7
Siderite	1.03	1
Tourmaline	0.69	
Chlorite	0.40	
Magnetite	0.22	
Albite	0.16	
Apatite	0.15	
Rutile	0.12	1
Ilmenite	0.11	
Pyrite	0.08	
Calcite	0.07	
Amphibole	0.06	
Iron	0.03	
Arsenopyrite	0.01	
Biotite	<0.01	
Chalcopyrite	<0.01	
Epidote	<0.01	
Kspar	<0.01	
Monazite	<0.01	
Pyrrhotite	<0.01	
Xenotime	<0.01	
FeClay	<0.001	
Gold	<0.001	
Pyrophyllite	<0.001	
Sphalerite	<0.001	
Sphene	<0.001	
Zircon	<0.001	



BSE image of bright anhedral/subhedral pyrite encapsulated and locked in dark gray quartz.



BSE image of a bright liberated arsenopyrite grain surrounded by dark gray quartz.

Sulfide Mineral Associations

MINERAL	Albite	Amphibole	Ankerite	Apatite	Chalcopyrite	Magnetite	Muscovite	Paragonite	Pyrite	Quartz	Siderite	Tourmaline	Free Surface	OTHER
Arsenopyrite	0.00	0.00	1.73	0.00	0.00	0.00	0.00	0.00	0.00	12.95	0.00	0.00	85.32	0.00
Chalcopyrite	0.00	0.00	10.60	26.97	0.00	2.49	0.00	5.91	8.64	17.60	14.34	0.00	12.85	0.60
Pyrite	1.43	2.36	9.43	0.21	0.25	2.33	5.83	1.40	0.00	31.02	21.93	1.53	20.77	1.50
Pyrrhotite	3.05	6.62	2.02	0.00	0.00	2.70	0.85	0.27	8.26	16.10	57.92	0.00	2.24	0.00
Sphalerite	0.00	0.00	2.62	0.00	4.15	0.00	0.00	0.00	0.00	59.98	0.00	0.00	33.26	0.00

Sulfide Exposure

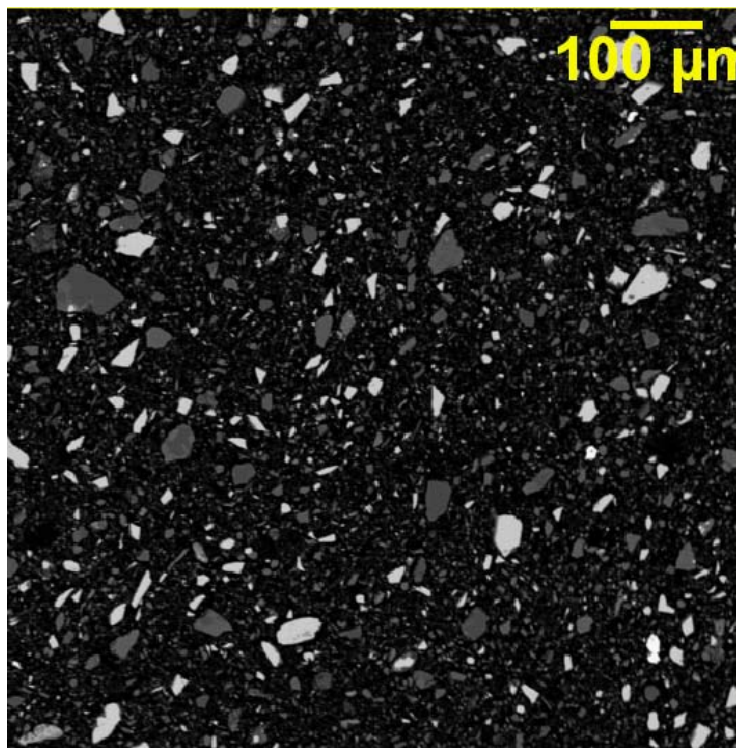
Free Surface of Particle (%)	0% (not exposed)	0% < x < 100%	100% (liberated)
Arsenopyrite	0.00	100.00	0.00
Chalcopyrite	75.13	22.92	1.95
Pyrite	13.69	83.48	2.84
Pyrrhotite	81.28	18.72	0.00
Sphalerite	0.76	99.24	0.00

Pyrite Particle Size by Percent Passing

P-value	µm
P50	42.93
P80	75.36

NW CNDT SS 20100602 (HC-58) - Predominately composed of pyrite (~40%) and ankerite (~27%) with lesser amounts of quartz, chlorite, muscovite/sericite, albite, and rutile. Pyrite wt% by MLA (41.93%) was greater than XRD's value (30%); according to total sulfur value (18.66%) from chemical analyses pyrite's wt% is more likely ~35%. MLA also detected trace amounts of chalcopyrite (0.27%), gersdorffite (0.26%), pyrrhotite (0.08%), millerite (0.03%), <0.01% arsenopyrite, cobaltite, galena, and tetrahedrite, and <0.001% tetradymite. Sulfide mineral associations and exposure were not included for this sample because most particles have been liberated due to pulverization. The image below shows pulverized sample with liberated grains of gangue and sulfides.

Mineral Weight %		
	MLA	XRD
Mineral	Wt%	Wt%
Pyrite	41.93	30
Ankerite	26.79	27
Quartz	8.53	10
Chlorite	7.55	16
Muscovite	5.91	9
Albite	4.73	5
Amphibole	1.17	
Kspar	0.69	
Ilmenite	0.47	
Rutile	0.33	2
Siderite	0.31	
Chalcopyrite	0.27	<1
Gersdorffite	0.26	
Calcite	0.22	
Apatite	0.17	
Tourmaline	0.16	
Paragonite	0.13	
Biotite	0.12	
Pyrrhotite	0.08	
Epidote	0.04	
Monazite	0.04	
Millerite	0.03	
Chromite	0.02	
Iron	0.02	
Arsenopyrite	<0.01	
Cobaltite	<0.01	
Galena	<0.01	
Magnetite	<0.01	
Sphalerite	<0.01	
Sphene	<0.01	
Tetrahedrite	<0.01	
FeClay	<0.001	
Olivine	<0.001	
Pyrophyllite	<0.001	
Tetradymite	<0.001	
Xenotime	<0.001	

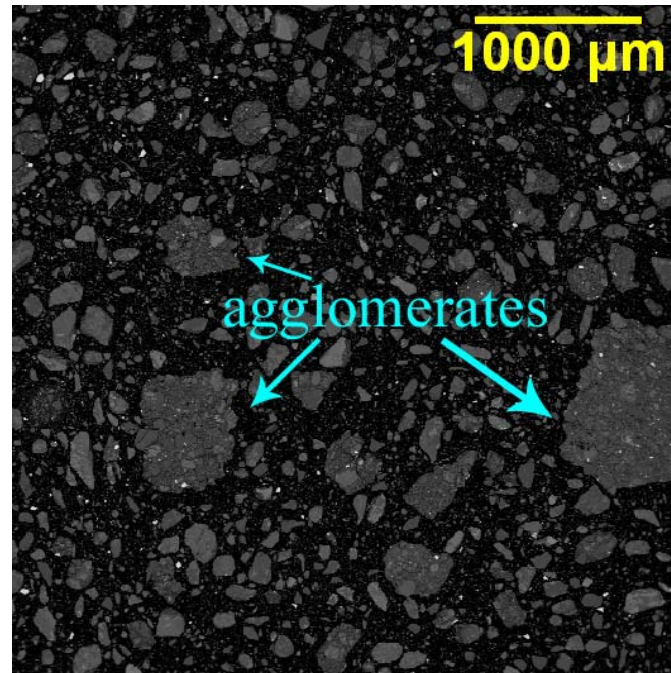


BSE image of pulverized sample. Bright gray particles are sulfides and darker gray particles are gangue.

NW MT SS 0 20100609 (HC-59) - Predominately composed of ankerite and quartz with lesser amounts of muscovite/sericite, chlorite, albite, calcite, siderite, and rutile. MLA detected minor amounts of pyrite (1.93%) and trace amounts of chalcopyrite (0.02%), gersdorffite (0.02%), pyrrhotite (0.02%), <0.01% cobaltite, and <0.001% millerite, arsenopyrite, and sphalerite. Sulfide mineral associations and exposure were not included for this sample because most particles have been liberated due to pulverization. The image below shows pulverized sample with liberated grains of gangue and sulfides.

Mineral Weight %

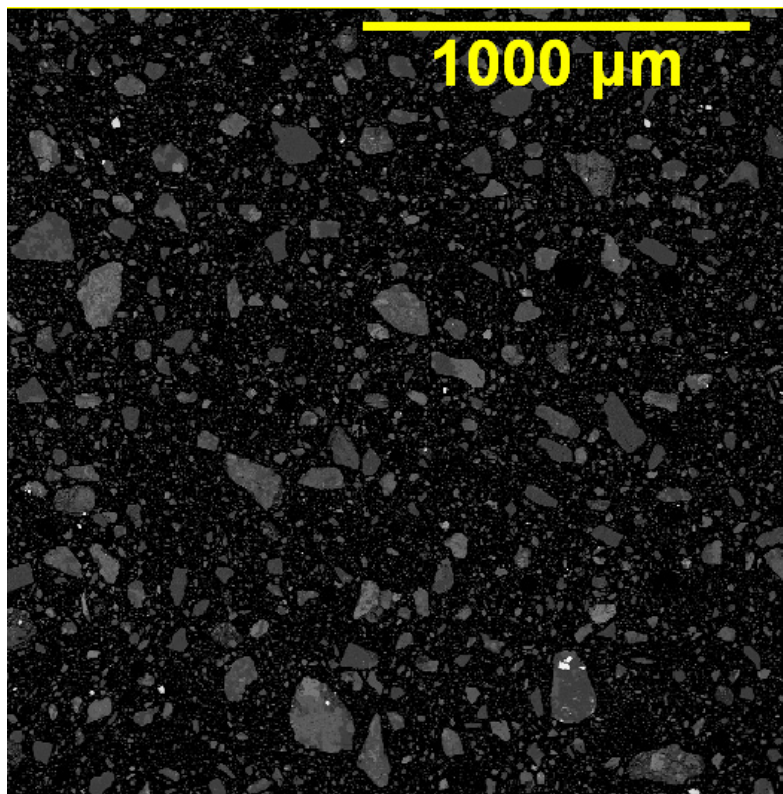
Mineral	MLA	XRD
	Wt%	Wt%
Ankerite	31.86	33
Quartz	25.02	28
Albite	18.24	8
Muscovite	8.09	13
Chlorite	7.83	13
Pyrite	1.93	1
Siderite	1.53	1
Amphibole	0.94	
Epidote	0.92	
Calcite	0.78	2
Biotite	0.56	
Paragonite	0.53	
Kspar	0.50	
Ilmenite	0.37	
Rutile	0.24	1
Apatite	0.18	
Chromite	0.06	
Chalcopyrite	0.02	
Gersdorffite	0.02	
Pyrrhotite	0.02	
Sphene	0.02	
Iron	0.01	
Magnetite	0.01	
Cobaltite	<0.01	
FeClay	<0.01	
Monazite	<0.01	
Olivine	<0.01	
Zircon	<0.01	
Arsenopyrite	<0.001	
Millerite	<0.001	
Pyrophyllite	<0.001	
Scheelite	<0.001	
Sphalerite	<0.001	
Xenotime	<0.001	



BSE image of pulverized sample. Bright gray particles are sulfides and darker gray particles are gangue. Agglomerates (pointed out) form due to preparation of fine-grained sample.

NW BFT Solids (HC-56) - Predominately composed of ankerite, quartz, and muscovite/sericite. Lesser amounts of chlorite, calcite, siderite, albite, and rutile were also detected. MLA detected trace amounts of pyrite (0.35%), <0.01% pyrrhotite, and <0.001% cobaltite and millerite. Sulfide mineral associations and exposure were not included for this sample because most particles have been liberated due to pulverization. The image below shows pulverized sample with liberated grains of gangue and sulfides.

Mineral Weight %		
	MLA	XRD
Mineral	Wt%	Wt%
Ankerite	35.58	38
Quartz	25.09	26
Muscovite	14.49	13
Chlorite	10.08	9
Albite	7.32	9
Siderite	1.24	2
Biotite	1.05	
Calcite	1.03	2
Paragonite	0.61	
Kspar	0.56	
Epidote	0.54	
Amphibole	0.45	
Ilmenite	0.45	
Pyrite	0.35	
Apatite	0.30	
Rutile	0.27	1
Tourmaline	0.23	
Chromite	0.11	
Titanomagnetite	0.09	
Hematite	0.07	
Iron	0.02	
Sphene	0.02	
Gersdorffite	0.01	
FeClay	<0.01	
Monazite	<0.01	
Olivine	<0.01	
Pyrophyllite	<0.01	
Pyrrhotite	<0.01	
Zircon	<0.01	
Cobaltite	<0.001	
Millerite	<0.001	
Scheelite	<0.001	
Xenotime	<0.001	



Low magnification BSE image of pulverized sample. Bright gray particles are sulfides and darker gray particles are gangue.

TABLE I
Semiquantitative XRD Data (Wt.%) of Forty-three Ore and Waste Composites from Hope Bay

SAMPLE ID	AMP	ANK	CAL	CCP	CHL	EPI	KSPAR	MAG	MUSC/SER	PG	PLAG	PY	PYRO	PYROX	QTZ	RUT	SEP	SID	TIT	TL
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
08PMD650, 33-36.4m		23	6		41				6						22	1				
07PMD552, 134-144.5m		5	6		27	6			18		21				15				2	
08PSD142, 245.5-254.5m	2		7		24	17			6		24				18				2	
06PMD470, 217.03-218.7m		45			<1				2		11	4			38	<1				
07PMD542, 104.15-		20			3				24		27	5			20	1				
06PMD470, 371.05-		1			8			2			45			40	3					
07PMD542, 73.28-77m		4			8			5			63			18	2					
06PMD484, 224.5-226.5m		45			12				9		15	3			15	1				
07PMD552, 58.5-72m		31			11				16	11	10				19	1				
07PMD522, 27-38m		35			9						23	7			24	2				
07PMD522, 126-136.5m		30	2		17					24		<1			26					
06PMD470, 85-88m		35			13				11		25	3			13	<1				
08PMD657A, 101.5-111.5m		39			5				9		15				27	2		2		
08PMD657A, 90.5-91m		37	1		29				6		2				23	1				
07SBD374, 53.4-64.5m		35			9				4	14					32	2		3		
08SBD380, 7.2-14m		33			21				2	9		1			30	1				3
08SBD380, 23-33.5m		43	<1		18				3	9		1			25	1				
08SBD382, 7.43-12.82m		20			1				6	4		2	13		53	1				
08SBD382, 267.5-276.52m		12			6				20	3	18				39	1				
08TDD631, 33.5-37.3m		18							10	3		9			58	2				
94NOD124, 259-263.5m		34			2				6	13	7	1			28	2				7
94NOD124, 277.5-280m		28			1				2	13	5	4			41	2		2		3
04PMD272, 105-110m		19			2				20	16		1			41	1				
05PMD310, 6-31m	9	8			51				11		10				10					
05PMD293, 8.89-34m		35			8				21		7				25	<1		3		
02TDD506, 39-64m		1	12		49				3		11				23	<1				
02TDD545, 6.36-32m		20	<1		26				12	2	10	<1			28	1		<1		
02TDD545, 82-100.73m		7	8		35				14	5	5				26	<1				
TDD380, 245-254.5m		22			2				18	5	4	2			44	1		1		
TDD380, 272-294m		8	3		44				2	1	18				23	<1				
TDD374, 61-67.6m	9		1		48	8					21				9	<1	2		2	

TABLE I, XRD Wt% cont'd

SAMPLE ID	AMP	ANK	CAL	CCP	CHL	EPI	KSPAR	MAG	MUSC/SER	PG	PLAG	PY	PYRO	PYROX	QTZ	RUT	SEP	SID	TIT	TL
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TDD374, 11.63-36m	19		<1		31	13					23				11	<1	1		2	
TDD370, 253.21-255.12m		23			5				10	21					33	1		7		
TDD387, 151.2-153.5m		31							14	10		3			36	1		4		
97TDD131, 169.13-171.61m		34			14				13	14		1			21	1		2		
TDD392, 214.58-216.68m		8							5	2		3			81	1				
TDD368, 175-178m		1										<1			99					
TDD363, 153.85-155.96		3							4			1			92					
94NOD128, 20.7-30m		34			18				7	8					32	<1				
HB DCO G Float Tails M.C		9							7	7					75	1		1		
NW CNDT SS 20100602		27		<1	16				9		5	30			10	2				
NW MT SS 0 20100609		33	2		13				13		8	1			28	1		1		
NW Bm Solids HC-56		38	2		9				13		9				26	1		2		

Mineral phases and abbreviations are detailed in the Mineral Key shown in Table V.

TABLE II
Measured Chemical Analyses of Forty-three Ore and Waste Composites from Hope Bay

SAMPLE ID	pH-Initial	ANPA_CO2	As	Sb	Se	CAP650	SAP650	CAP550	SAP550	C_TOTAL	S_TOTAL	AuFAA	CAI	Hg	AGP	ANP
	-	%	ppm	ppm	ppm	%	%	%	%	%	%	ppm	%	ppm	-	-
08PMD650, 33-36.4m	8.93	13.08	62	<1	<1	2.09	0.25	3.24	0.26	3.57	0.46	0.013	0.12	0.006	-0.274	12.662
07PMD552, 134-144.5m	9.34	7.36	56	<1	<1	0.15	0.20	1.35	0.16	1.50	0.13	<0.010	<0.01	0.004	0.000	5.468
08PSD142, 245.5-254.5m	9.45	5.85	34	<1	<1	0.11	0.20	0.97	0.19	1.11	0.19	<0.010	<0.01	0.009	0.000	4.037
06PMD470, 217.03-218.7m	9.52	18.25	1329	<1	<1	3.30	0.87	5.08	1.09	5.85	3.23	8.101	0.01	0.010	-2.932	21.433
07PMD542, 104.15-105.29m	9.25	7.99	72	<1	<1	0.94	0.76	1.93	1.06	3.19	3.54	0.135	0.80	0.003	-3.398	8.771
06PMD470, 371.05-376.28m	9.84	4.26	31	<1	<1	<0.01	0.11	0.05	0.10	0.15	0.07	0.014	<0.01	0.002	0.000	0.514
07PMD542, 73.28-77m	9.78	3.62	31	<1	<1	<0.01	0.09	0.07	0.10	0.15	0.07	0.018	<0.01	0.008	0.000	0.514
06PMD484, 224.5-226.5m	9.36	16.33	803	<1	<1	2.70	0.57	4.53	0.75	4.97	2.54	2.900	0.03	0.022	-2.452	18.130
07PMD552, 58.5-72m	9.55	11.54	167	<1	<1	2.24	0.20	3.42	0.19	3.72	0.44	0.064	<0.01	0.004	-0.343	13.616
07PMD522, 27-38m	9.60	14.92	713	<1	<1	2.42	0.81	4.16	0.87	4.56	4.07	5.198	0.07	0.007	-4.384	16.478
07PMD522, 126-136.5m	9.62	12.24	172	<1	<1	1.97	0.20	3.61	0.14	3.81	0.17	0.027	<0.01	0.007	-0.041	13.946
06PMD470, 85-88m	9.43	12.90	550	<1	<1	2.40	0.45	3.79	0.45	4.26	1.44	10.651	<0.01	0.010	-1.356	15.598
08PMD657A, 101.5-111.5m	9.59	15.14	105	<1	<1	3.18	0.14	4.81	0.13	5.25	0.13	0.016	<0.01	0.004	0.000	19.231
08PMD657A, 90.5-91m	9.37	16.35	41	<1	<1	3.64	0.33	4.99	0.29	5.36	0.57	<0.010	<0.01	0.006	-0.384	19.635
07SBD374, 53.4-64.5m	9.56	11.92	112	<1	<1	2.61	0.13	3.90	0.12	4.52	0.12	0.066	0.06	0.008	0.000	16.368
08SBD380, 7.2-14m	9.41	16.56	324	<1	<1	1.99	0.33	4.02	0.27	4.46	0.49	0.641	<0.01	0.016	-0.301	16.332
08SBD380, 23-33.5m	9.31	16.19	419	<1	<1	3.20	0.30	4.87	0.22	5.71	0.36	0.023	<0.01	0.004	-0.192	20.919
08SBD382, 7.43-12.82m	8.86	7.04	105	<1	<1	0.62	0.23	1.84	0.21	2.63	1.05	0.123	0.61	0.026	-1.151	7.413
08SBD382, 267.5-276.52m	9.40	5.04	66	<1	<1	0.42	0.11	1.26	0.11	1.55	0.29	0.017	<0.01	0.004	-0.247	5.652
08TDD631, 33.5-37.3m	9.30	5.61	93	<1	<1	1.10	0.72	1.37	0.89	1.92	4.37	6.329	<0.01	0.005	-4.768	7.010
94NOD124, 259-263.5m	9.40	13.11	611	<1	<1	2.83	0.42	4.10	0.45	4.63	1.33	0.509	0.08	0.006	-1.206	16.699
94NOD124, 277.5-280m	9.23	10.99	220	<1	<1	1.97	0.80	3.21	1.12	4.19	2.59	1.579	0.07	0.004	-2.014	15.120
04PMD272, 105-110m	9.51	9.36	81	<1	<1	1.42	0.19	2.61	0.23	2.79	0.51	0.216	<0.01	0.004	-0.384	10.203
05PMD310, 6-31m	9.44	8.41	63	<1	<1	0.34	0.16	1.23	0.16	1.41	0.12	<0.010	<0.01	0.013	0.000	5.138
05PMD293, 8.89-34m	9.55	15.80	316	<1	<1	3.13	0.18	4.37	0.21	5.37	0.25	0.108	0.18	0.009	-0.055	19.047
02TDD506, 39-64m	9.05	8.74	58	<1	<1	1.20	0.17	1.97	0.24	2.13	0.09	<0.010	<0.01	0.003	0.000	7.780
02TDD545, 6.36-32m	9.16	9.25	67	<1	<1	1.10	0.47	2.42	0.47	3.00	0.56	0.014	<0.01	0.005	-0.123	10.973
02TDD545, 82-100.73m	9.03	10.22	57	<1	<1	1.33	0.35	2.26	0.45	2.59	0.36	0.558	<0.01	0.004	0.000	9.469
TDD380, 245-254.5m	9.19	8.25	81	<1	<1	1.73	0.50	2.58	0.55	2.84	2.35	2.616	<0.01	0.005	-2.466	10.386
TDD380, 272-294m	9.11	6.10	61	<1	<1	0.79	0.15	1.56	0.15	1.72	0.25	0.019	<0.01	0.004	-0.137	6.276
TDD374, 61-67.6m	9.62	3.42	59	<1	<1	0.03	0.10	0.16	0.10	0.22	0.10	<0.010	<0.01	0.004	0.000	0.771
TDD374, 11.63-36m	9.42	3.58	49	<1	<1	<0.01	0.12	0.07	0.11	0.13	0.13	<0.010	<0.01	0.007	-0.027	0.440
TDD370, 253.21-255.12m	9.78	8.75	24	<1	<1	0.95	0.25	2.61	0.28	4.09	0.16	<0.010	0.01	0.002	0.000	14.974
TDD387, 151.2-153.5m	9.17	10.91	89	<1	<1	1.55	0.86	3.13	1.11	4.03	2.25	0.083	<0.01	0.004	-1.562	14.753
97TDD131, 169.13-171.61m	9.29	14.25	84	<1	<1	2.75	0.56	4.08	0.56	4.96	1.03	0.066	<0.01	0.002	-0.644	18.167
TDD392, 214.58-216.68m	9.20	3.09	57	<1	<1	0.39	0.44	0.73	0.49	0.93	2.01	6.241	<0.01	0.003	-2.082	3.376
TDD368, 175-178m	8.86	0.83	<1	<1	<1	<0.01	0.06	<0.01	0.05	0.07	0.11	0.941	<0.01	0.002	-0.082	0.220
TDD363, 153.85-155.96m	8.61	1.39	15	<1	3	0.05	0.26	0.28	0.25	0.48	0.92	2.396	0.03	0.011	-0.918	1.652
94NOD128, 20.7-30m	9.14	16.65	163	<1	<1	3.26	0.28	4.39	0.30	5.03	0.36	0.232	0.02	0.008	-0.082	18.387
HB DCO G Float Tails M.C.	9.13	3.91	8	<1	<1	0.23	0.11	1.02	0.16	1.33	0.03	0.622	0.03	0.005	0.000	4.771
NW CNDT SS 20100602	7.95	12.41	3736	<1	<1	1.45	2.93	2.38	2.87	4.32	18.75	4.082	0.90	0.121	-21.756	12.551
NW MT SS 0 20100609	8.88	16.23	573	<1	<1	2.86	0.38	4.14	0.40	4.84	0.98	0.281	0.08	0.013	-0.795	17.469
NW BFT Solids HC-56	9.19	9.1935	342	-	-	3.55	0.09	4.43	0.06	4.99	0.01	0.083	0.12	-	-	-

TABLE II, Chemical Analyses cont'd

SAMPLE ID	AGP	ANP	NCV	PAG pH	SCIS	SHCL	SHNO3	Al	Ba	Fe	K	Mg	Mn	Na	P	S	Si	Ti
	-	-	-	-	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
08PMD650, 33-36.4m	-0.274	12.662	12.388	10.01	0.36	0.35	0.11	74558	<100	52413	7696	28222	1229	19116	174	770	211519	4211
07PMD552, 134-144.5m	0.000	5.468	5.468	10.64	0.03	0.09	0.08	70973	<100	48987	7161	26912	1145	18153	331	562	201589	3932
08PSD142, 245.5-254.5m	0.000	4.037	4.037	10.48	0.13	0.11	0.10	72220	<100	53895	3097	20129	1475	15570	213	961	211100	3944
06PMD470, 217.03-218.7m	-2.932	21.433	18.501	9.11	2.80	2.38	0.18	13533	<100	55469	2456	38293	1327	7780	178	27046	186627	4451
07PMD542, 104.15-105.29m	-3.398	8.771	5.373	8.85	2.93	3.14	0.15	60488	491	48845	19691	14133	803	21723	881	27191	210159	3665
06PMD470, 371.05-376.28m	0.000	0.514	0.514	9.38	0.04	0.04	0.05	59138	<100	93647	6848	32587	1746	14638	620	<100	212091	10605
07PMD542, 73.28-77m	0.000	0.514	0.514	9.24	0.04	0.17	0.05	55139	<100	87887	2735	33502	1418	12669	532	<100	201389	10020
06PMD484, 224.5-226.5m	-2.452	18.130	15.678	8.95	2.16	1.71	0.13	42163	<100	66548	13224	40446	1596	11389	231	20833	156746	5496
07PMD552, 58.5-72m	-0.343	13.616	13.273	10.39	0.32	0.36	0.07	68544	<100	45115	9734	23001	1139	17527	243	3001	189432	3898
07PMD522, 27-38m	-4.384	16.478	12.094	8.82	3.43	3.43	0.21	27821	<100	56388	3738	32090	1233	17025	463	30050	171144	7433
07PMD522, 126-136.5m	-0.041	13.946	13.905	10.83	0.06	0.16	0.05	69622	<100	47649	3899	22301	1177	14512	330	1325	204183	4044
06PMD470, 85-88m	-1.356	15.598	14.242	9.29	1.08	1.11	0.12	57669	<100	68571	9370	26895	1602	21498	461	12302	181548	3651
08PMD657A, 101.5-111.5m	0.000	19.231	19.231	10.09	<0.01	0.13	0.05	47966	<100	50635	7264	30317	1116	7401	644	639	185516	2917
08PMD657A, 90.5-91m	-0.384	19.635	19.251	9.01	0.47	0.47	0.18	33148	<100	90238	4364	39583	1937	2749	603	5432	161867	10030
07SBD374, 53.4-64.5m	0.000	16.368	16.368	9.82	<0.01	0.11	0.04	56050	<100	50896	5280	23970	1053	10637	278	237	173134	2935
08SBD380, 7.2-14m	-0.301	16.332	16.031	9.46	0.38	0.43	0.07	49106	<100	68669	3494	32900	1405	5967	342	4359	199603	3237
08SBD380, 23-33.5m	-0.192	20.919	20.727	8.72	0.19	0.27	0.07	52380	<100	91960	3210	37870	2589	7448	134	2940	179000	3460
08SBD382, 7.43-12.82m	-1.151	7.413	6.262	9.30	0.81	0.93	0.08	56194	104	32418	7051	14386	619	6365	733	8611	306693	2028
08SBD382, 267.5-276.52m	-0.247	5.652	5.405	9.91	0.21	0.21	0.05	67582	412	29980	16997	10198	506	16541	556	1556	301288	2775
08TDD631, 33.5-37.3m	-4.768	7.010	2.242	8.59	3.56	3.65	0.57	28328	<100	66239	6226	9537	1311	4779	486	38109	336318	3821
94NOD124, 259-263.5m	-1.206	16.699	15.493	9.27	1.16	1.03	0.18	66412	137	68449	10716	26451	1827	10905	167	11431	198807	4324
94NOD124, 277.5-280m	-2.014	15.120	13.106	8.64	2.25	2.34	0.34	46852	<100	93277	4835	19682	2055	9814	404	23635	220457	6832
04PMD272, 105-110m	-0.384	10.203	9.819	9.83	0.39	0.36	0.07	63260	341	29571	16271	22114	966	6678	639	4237	275174	2861
05PMD310, 6-31m	0.000	5.138	5.138	9.86	0.05	0.12	0.03	72512	<100	92433	12522	55104	1582	12999	477	523	193644	5243
05PMD293, 8.89-34m	-0.055	19.047	18.992	9.77	0.19	0.23	0.05	43247	150	63257	17331	45458	1360	5727	<100	2321	173307	3028
02TDD506, 39-64m	0.000	7.780	7.780	10.14	0.03	0.10	0.03	55847	125	99333	7828	19651	2592	11992	828	4522	217131	7390
02TDD545, 6.36-32m	-0.123	10.973	10.850	8.89	0.48	0.48	0.06	56266	125	98818	8071	19821	2508	12105	992	4538	216485	7418
02TDD545, 82-100.73m	0.000	9.469	9.469	9.12	0.24	0.25	0.05	56056	101	82478	6129	20565	2084	9603	827	3102	237859	5580
TDD380, 245-254.5m	-2.466	10.386	7.920	8.90	2.10	1.95	0.34	56218	114	92246	8445	17226	2090	9655	851	24950	299401	6417
TDD380, 272-294m	-0.137	6.276	6.139	9.26	0.22	0.20	0.05	75035	<100	144797	3872	21635	2547	20238	1136	2864	285431	10605
TDD374, 61-67.6m	0.000	0.771	0.771	9.39	0.06	0.07	0.02	76111	<100	137698	1365	35675	2213	23879	772	560	249008	9415
TDD374, 11.63-36m	-0.027	0.440	0.413	9.30	0.08	0.11	0.02	73619	<100	136889	1912	33170	2114	21456	580	997	248255	9960
TDD370, 253.21-255.12m	0.000	14.974	14.974	8.82	0.11	0.23	0.02	57156	174	103667	6938	14995	2249	11080	870	1288	222993	7443
TDD387, 151.2-153.5m	-1.562	14.753	13.191	8.65	1.98	1.83	0.13	53591	147	97133	15020	17371	2629	6205	831	19742	235119	7163
97TDD131, 169.13-171.61m	-0.644	18.167	17.523	8.87	0.84	0.86	0.10	56370	<100	80970	13770	30700	2055	5914	393	8460	162000	4880
TDD392, 214.58-216.68m	-2.082	3.376	1.294	8.71	1.72	1.34	0.06	16440	<100	38550	2922	5824	544	2170	217	19900	445000	1620
TDD368, 175-178m	-0.082	0.220	0.138	6.15	0.07	0.11	0.03	1523	<100	4992	235	597	<100	<100	<100	781	521479	110
TDD363, 153.85-155.96m	-0.918	1.652	0.734	7.79	0.72	0.30	0.13	4959	<100	14602	966	1807	307	156	<100	6978	487078	571
94NOD128, 20.7-30m	-0.082	18.387	18.305	8.54	0.31	0.67	0.19	39950	<100	55837	1560	36581	1243	2006	<100	2953	209118	2517
HB DCO G Float Tails M.C.	0.000	4.771	4.771	8.49	0.03	0.05	0.02	22273	<100	25354	2467	6273	742	1119	695	<100	551346	2602
NW CNDT SS 20100602	-21.756	12.551	-9.205	7.78	18.66	17.96	0.79	30668	125	212064	4623	28365	1425	1752	429	182453	133599	7747
NW MT SS 0 20100609	-0.795	17.469	16.674	10.36	0.85	0.79	0.06	45333	190	78328	5378	38209	1676	2427	669	10149	275622	6209
NW BFT Solids HC-56	-	-	-	11.06	<0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-

TABLE II, Chemical Analyses cont'd

SAMPLE ID	Ag ppm	Al ppm	Be ppm	Ca ppm	Cd ppm	Co ppm	Cr ppm	Cu ppm	Fe ppm	K ppm	Mg ppm	Mn ppm	Mo ppm	Na ppm	Ni ppm	Pb ppm	Sb ppm	Se ppm	Sn ppm	Sr ppm	Ti ppm	Tl ppm	V ppm	Zn ppm
08PMD650, 33-36.4m	<2.0	54813	<2	77407	4	86	212	220	122790	4912	46385	2259	<2	576	234	240	54	<10	<2	45	6680	<20	365	104
07PMD552, 134-144.5m	<2.0	94355	<2	64153	3	69	227	151	71654	11192	33439	1457	3	22700	201	<10	62	25	<2	101	4422	<20	316	50
08PSD142, 245.5-254.5m	<2.0	88700	<2	84552	3	72	202	162	72699	4465	23588	1776	<2	19064	192	<10	62	29	<2	135	4781	24	300	90
06PMD470, 217.03-218.7m	<2.0	16535	<2	97080	4	78	337	42	72612	3157	42936	1582	<2	8938	773	<10	29	12	<2	345	588	<20	122	24
07PMD542, 104.15-105.29m	<2.0	76194	<2	44019	<2	52	54	191	61390	29807	16818	936	<2	26056	53	<10	53	23	<2	127	2033	<20	139	49
06PMD470, 371.05-376.28m	<2.0	72600	<2	72200	3	83	94	336	122000	9500	36860	1980	<2	17440	84	<10	66	<10	<2	292	12800	28	520	85
07PMD542, 73.28-77m	<2.0	77400	<2	78600	4	93	101	382	134200	4480	44620	1880	<2	18280	135	<10	77	19	<2	177	12340	25	504	99
06PMD484, 224.5-226.5m	<2.0	52295	<2	86826	3	74	401	199	90020	20559	46766	1924	<2	14192	345	<10	53	14	<2	109	1729	<20	226	26
07PMD552, 58.5-72m	<2.0	86811	<2	67323	2	68	240	151	63386	15453	27894	1358	<2	22047	186	<10	58	21	<2	93	1620	<20	287	29
07PMD522, 27-38m	<2.0	34777	<2	74722	3	83	304	105	75517	4809	37897	1494	<2	20668	453	<10	31	11	<2	175	2246	<20	142	53
07PMD522, 126-136.5m	<2.0	81633	<2	73587	2	61	140	141	56515	5259	24529	1254	<2	17563	185	<10	55	28	<2	105	1982	<20	269	51
06PMD470, 85-88m	<2.0	71257	<2	77445	4	62	126	106	85230	13992	31597	1892	<2	26747	179	<10	57	23	<2	117	922	<20	224	63
08PMD657A, 101.5-111.5m	<2.0	58952	<2	88329	3	42	184	88	67289	10877	34915	1310	<2	9627	134	<10	48	23	<2	181	1129	<20	162	33
08PMD657A, 90.5-91m	<2.0	36266	<2	83631	3	88	59	1918	102259	5153	39814	2021	<2	3191	325	<10	43	17	<2	138	5747	21	317	100
07SBD374, 53.4-64.5m	<2.0	71911	<2	66945	<2	44	144	138	71712	6933	29062	1265	3	14501	82	<10	56	13	<2	119	1067	<20	222	41
08SBD380, 7.2-14m	<2.0	53302	<2	79952	3	67	340	107	87112	4057	36098	1563	<2	7399	278	<10	52	25	<2	123	410	<20	205	96
08SBD380, 23-33.5m	<2.0	53208	<2	94460	3	66	418	92	99641	3448	36528	2571	<2	8569	279	<10	63	25	<2	157	357	<20	201	78
08SBD382, 7.43-12.82m	<2.0	59707	<2	37960	<2	22	38	115	35587	7592	14808	540	5	7651	38	<10	47	11	<2	187	1348	<20	62	42
08SBD382, 267.5-276.52m	<2.0	77627	<2	25677	<2	23	61	47	37420	21099	11186	514	5	20104	50	<10	54	<10	<2	265	1455	<20	92	67
08TDD631, 33.5-37.3m	<2.0	29049	<2	31039	<2	27	103	31	69837	6725	8934	1142	6	4815	4	16	34	11	<2	63	696	<20	52	<2
94NOD124, 259-263.5m	<2.0	66427	<2	82033	3	65	634	136	76831	12165	25930	1769	<2	10924	246	<10	58	23	<2	112	618	<20	240	45
94NOD124, 277.5-280m	<2.0	44720	<2	62057	2	45	74	139	93972	4886	18105	1881	<2	9279	43	<10	36	15	<2	98	1152	<20	229	69
04PMD272, 105-110m	<2.0	59780	<2	44492	<2	18	30	49	28224	18189	19424	739	6	6566	31	<10	47	18	<2	155	1448	<20	93	<2
05PMD310, 6-31m	<2.0	75527	<2	33958	2	64	125	110	101874	15652	53669	1509	<2	13447	137	<10	68	29	<2	54	4176	<20	277	74
05PMD293, 8.89-34m	<2.0	46794	<2	75269	<2	60	354	76	66507	21904	45719	1344	<2	6372	221	<10	47	23	<2	145	1059	<20	189	45
02TDD506, 39-64m	<2.0	61208	<2	67965	3	44	4	29	116653	5763	15143	1848	<2	12858	6	<10	56	18	<2	77	3339	<20	109	145
02TDD545, 6.36-32m	<2.0	58199	<2	55053	2	39	9	33	101258	9516	20448	2340	8	12190	5	<10	49	13	<2	72	1518	<20	90	85
02TDD545, 82-100.73m	<2.0	59552	<2	75540	3	46	46	81	87530	7294	21982	1875	<2	10072	43	<10	51	18	<2	78	2638	<20	132	242
TDD380, 245-254.5m	<2.0	50407	<2	51764	3	38	74	84	80070	8414	15258	1642	4	8550	24	<10	38	10	<2	90	485	<20	100	69
TDD380, 272-294m	<2.0	60279	<2	44112	3	45	4	39	105589	3553	16946	1717	<2	15848	5	<10	51	12	<2	81	2834	<20	111	125
TDD374, 61-67.6m	<2.0	66852	<2	38798	3	70	18	77	114007	1470	30840	1634	<2	20096	39	<10	58	18	<2	97	7561	<20	290	100
TDD374, 11.63-36m	<2.0	68651	<2	50595	4	73	12	92	122222	2063	30754	1714	<2	19325	33	<10	59	27	<2	126	8651	<20	367	89
TDD370, 253.21-255.12m	2.2	56442	<2	52653	<2	37	9	33	98923	7878	14579	1855	<2	10989	5	<10	43	20	<2	150	858	<20	85	98
TDD387, 151.2-153.5m	<2.0	48843	<2	64143	3	34	38	28	84151	15594	15791	2138	2	5787	6	<10	33	<10	<2	100	690	<20	78	26
97TDD131, 169.13-171.61m	<2.0	58413	<2	77352	2	46	87	90	80742	15949	31898	1902	<2	6240	69	<10	49	18	<2	105	433	<20	227	47
TDD392, 214.58-216.68m	<2.0	12265	<2	15239	<2	17	122	18	31690	2465	4538	407	10	1995	16	<10	<10	<10	<2	27	184	<20	40	<2
TDD368, 175-178m	<2.0	1401	<2	1118	<2	<2	91	3	4079	310	460	53	9	408	5	<10	<10	<10	<2	3	42	<20	12	<2
TDD363, 153.85-155.96m	<2.0	5308	<2	6010	<2	5	182	5	15685	1286	1829	208	<2	845	7	<10	<10	<10	<2	10	101	<20	17	7
94NOD128, 20.7-30m	<2.0	5957	<2	7027	<2	5	212	6	18195	1422	2100	236	<2	903	9	<10	13	<10	<2	11	101	<20	19	7
HB DCO G Float Tails M.C.	<2.0	19339	<2	20336	<2	6	67	<2	23661	4028	5749	679	6	3226	30	<10	<10	<10	<2	37	225	<20	35	28
NW CNDT SS 20100602	<2.0	31634	<2	67510	11	521	496	1792	235409	8230	30156	1290	<2	5856	2160	15	94	39	<2	115	652	<20	167	131
NW MT SS 0 20100609	<2.0	39286	<2	80556	6	65	474	107	78373	10694	35913	1546	<2	7679	387	<10	43	<10	<2	157	1050	<20	188	73
NW BFT Solids HC-56	<2.0	43324	<2	85073	3	46	311	56	71288	11914	40173	1595	3	8094	299	<10	52	<10	<2	170	1599	<20	205	71

TABLE II, Chemical Analyses cont'd

SAMPLE ID	B ppm	Ba ppm	Be ppm	Bi ppm	Cd ppm	Co ppm	Cr ppm	Cu ppm	Eu ppm	Ga ppm	Hf ppm	Ho ppm	La ppm	Li ppm	Mn ppm	Nb ppm	Ni ppm
08PMD650, 33-36.4m	94.24	214.57	0.50	0.56	<0.01	27.64	93.67	87.38	1.47	31.46	2.07	0.67	13.26	68.52	961.40	5.45	92.75
07PMD552, 134-144.5m	13.70	70.16	<0.01	0.75	<0.01	16.08	69.64	38.24	0.57	29.38	0.56	0.42	1.80	63.28	410.41	1.36	52.66
08PSD142, 245.5-254.5m	12.90	69.86	0.10	0.42	0.28	20.50	78.79	52.64	0.61	22.83	0.57	0.53	2.14	52.51	625.43	1.76	62.35
06PMD470, 217.03-218.7m	307.91	31.28	<0.01	0.54	<0.01	40.37	186.01	23.48	0.53	7.75	0.84	0.19	4.38	16.58	874.39	0.58	396.73
07PMD542, 104.15-105.29m	76.92	639.89	0.77	0.57	0.09	25.91	35.53	104.92	1.47	51.99	2.40	0.46	17.65	11.81	527.53	2.07	27.95
06PMD470, 371.05-376.28m	31.13	76.93	0.39	0.31	0.01	16.99	33.79	98.52	1.34	32.21	2.92	1.01	5.51	42.57	643.22	4.60	24.74
07PMD542, 73.28-77m	46.23	56.79	0.38	0.36	0.02	18.53	34.92	102.60	1.31	27.60	2.45	0.98	5.56	26.98	567.60	2.98	36.63
06PMD484, 224.5-226.5m	263.36	97.03	0.50	0.47	<0.01	29.72	178.80	82.66	0.80	19.61	0.86	0.32	5.92	42.27	873.45	1.10	150.24
07PMD552, 58.5-72m	29.37	94.05	0.35	0.24	0.04	20.76	84.85	49.88	0.39	22.22	0.67	0.14	1.79	53.87	466.18	0.38	60.30
07PMD522, 27-38m	193.10	22.17	<0.01	3.38	0.01	33.88	139.39	44.85	0.90	14.29	1.25	0.31	8.61	15.93	685.05	1.83	189.43
07PMD522, 126-136.5m	66.05	65.62	<0.01	3.01	0.07	18.02	51.40	46.84	0.47	21.43	0.55	0.20	1.90	42.48	425.71	0.51	60.01
06PMD470, 85-88m	69.92	134.87	0.49	3.19	<0.01	21.94	56.99	42.80	0.45	20.80	0.43	0.17	3.25	34.88	779.21	0.26	68.81
08PMD657A, 101.5-111.5m	223.71	142.85	0.30	0.37	<0.01	15.70	89.38	38.42	0.55	24.16	0.80	0.18	6.17	19.22	602.11	0.51	58.11
08PMD657A, 90.5-91m	240.49	40.10	0.19	0.42	0.06	25.28	23.69	580.93	1.11	20.52	0.91	0.33	7.32	49.18	682.30	4.24	103.84
07SBD374, 53.4-64.5m	212.51	202.64	0.12	0.26	<0.01	14.38	59.12	50.62	0.32	25.27	0.40	0.11	0.88	49.50	495.05	0.34	29.27
08SBD380, 7.2-14m	174.32	104.57	0.30	6.12	0.02	23.53	133.16	38.74	0.30	17.52	0.45	0.12	1.22	41.85	600.93	0.13	99.51
08SBD380, 23-33.5m	258.65	147.50	0.37	4.80	0.05	24.33	173.93	36.06	0.34	19.56	0.33	0.10	1.01	41.05	1070.99	0.11	107.67
08SBD382, 7.43-12.82m	77.99	194.40	0.42	3.61	0.08	13.36	35.57	87.27	1.04	25.57	2.36	0.33	23.39	46.51	419.90	2.53	27.65
08SBD382, 267.5-276.52m	28.16	437.83	0.66	6.48	0.08	10.15	38.71	27.80	0.98	49.15	2.83	0.27	22.84	30.68	285.16	2.23	25.75
08TDD631, 33.5-37.3m	367.80	95.29	<0.01	0.55	<0.01	13.96	69.17	22.56	0.41	17.34	0.65	0.12	2.19	16.74	716.01	0.32	2.37
94NOD124, 259-263.5m	176.43	130.33	0.25	0.25	0.06	21.02	211.57	44.02	0.37	25.35	0.89	0.13	1.32	27.77	611.03	0.15	81.47
94NOD124, 277.5-280m	183.99	95.95	0.39	0.59	0.11	17.21	36.60	59.58	0.54	25.72	1.46	0.17	4.71	29.10	851.17	0.67	17.95
04PMD272, 105-110m	96.39	331.33	0.63	0.51	<0.01	8.67	22.97	32.56	1.04	40.37	2.18	0.34	18.66	24.64	482.21	2.01	20.07
05PMD310, 6-31m	40.93	93.94	0.08	1.12	<0.01	17.53	47.44	36.91	0.63	26.21	0.95	0.57	4.41	88.88	534.60	1.78	43.27
05PMD293, 8.89-34m	152.60	172.34	0.20	1.98	0.01	22.01	141.99	28.73	0.40	22.43	0.42	0.19	1.61	31.22	539.39	0.34	83.29
02TDD506, 39-64m	39.18	111.84	0.12	2.54	<0.01	11.53	6.51	12.17	0.98	32.32	1.32	0.51	6.03	31.70	705.99	1.12	1.87
02TDD545, 6.36-32m	2.60	131.36	0.11	1.52	<0.01	13.10	7.99	12.17	0.90	30.21	1.02	0.40	5.51	38.33	1012.58	1.49	1.57
02TDD545, 82-100.73m	162.08	112.27	0.23	1.07	0.31	14.51	33.87	33.08	0.86	25.40	0.74	0.59	5.50	48.60	828.66	1.25	16.66
TDD380, 245-254.5m	185.71	93.43	0.21	2.27	0.13	14.65	39.07	35.59	0.63	23.76	0.85	0.20	3.71	26.61	740.78	0.43	9.38
TDD380, 272-294m	49.28	49.30	0.24	1.16	0.02	14.70	7.27	17.13	1.06	29.17	1.33	0.69	6.26	51.81	764.08	2.04	1.41
TDD374, 61-67.6m	60.23	12.63	0.28	0.98	<0.01	20.28	13.59	31.46	1.02	25.74	1.14	1.00	4.80	30.73	701.83	2.50	14.53
TDD374, 11.63-36m	3.03	18.17	0.07	2.39	<0.01	16.90	8.65	31.89	1.01	25.45	0.82	0.94	4.56	19.41	628.66	2.86	9.94
TDD370, 253.21-255.12m	263.49	148.42	0.23	1.19	0.05	11.40	8.77	12.84	0.86	35.18	0.99	0.22	6.67	29.75	800.92	0.49	1.16
TDD387, 151.2-153.5m	162.26	151.91	0.06	2.47	0.10	13.39	27.70	14.64	0.79	29.50	1.28	0.27	4.18	17.55	1115.89	0.69	2.45
97TDD131, 169.13-171.61m	191.75	76.23	0.10	1.21	0.10	15.11	37.19	34.67	0.52	23.45	0.42	0.17	1.98	34.15	789.53	0.32	25.61
TDD392, 214.58-216.68m	327.88	24.68	<0.01	1.26	0.02	9.69	82.36	12.15	0.16	8.77	0.24	0.06	0.86	9.05	258.75	0.08	9.50
TDD368, 175-178m	415.96	4.20	<0.01	0.45	0.21	1.02	85.72	4.43	<0.01	1.48	0.05	<0.01	0.11	5.79	43.99	<0.01	3.83
TDD363, 153.85-155.96m	146.84	25.55	1.72	0.15	0.31	4.58	174.00	-	0.11	4.21	0.14	0.05	0.64	6.89	206.64	0.13	6.47
94NOD128, 20.7-30m	61.70	94.38	1.96	0.08	0.39	17.57	123.44	-	0.35	13.69	0.20	0.12	1.43	56.41	485.94	0.15	86.01
HB DCO G Float Tails M.C.	7.20	9.78	0.96	1.41	0.36	1.55	65.36	11.99	0.23	0.89	0.05	0.06	1.60	1.24	428.79	0.03	19.00
NW CNDT SS 20100602	48.06	148.84	0.28	0.70	0.22	396.74	437.71	1488.98	0.66	13.21	1.54	0.24	8.43	<0.01	1028.07	0.52	1672.91
NW MT SS 0 20100609	51.73	158.12	0.33	0.24	0.26	41.86	304.70	79.92	0.61	16.95	0.88	0.23	5.24	9.97	997.58	0.84	265.16
NW BFT Solids HC-56	156.27	189.95	0.79	0.07	0.10	28.57	240.05	40.58	0.71	18.53	1.07	0.24	5.77	18.38	1229.21	0.77	224.16

TABLE II, Chemical Analyses cont'd

SAMPLE ID	Pb ppm	Sb ppm	Sc ppm	Sr ppm	Ta ppm	Te ppm	Th ppm	Ti ppm	Tl ppm	U ppm	V ppm	Y ppm	Yb ppm	Zn ppm	Zr ppm
08PMD650, 33-36.4m	1.25	0.84	32.15	35.01	0.43	0.06	1.29	2687.54	<0.01	0.30	184.73	16.88	1.49	80.16	69.74
07PMD552, 134-144.5m	<0.01	0.37	46.36	62.79	0.19	0.05	0.19	1180.22	<0.01	0.05	122.62	11.18	1.19	33.59	13.05
08PSD142, 245.5-254.5m	1.45	0.71	45.09	132.61	0.22	0.04	0.18	1647.84	<0.01	0.04	142.91	14.26	1.42	56.79	10.07
06PMD470, 217.03-218.7m	2.40	2.00	16.36	305.53	0.12	0.52	0.45	282.93	<0.01	0.14	119.14	4.71	0.44	45.67	28.40
07PMD542, 104.15-105.29m	7.09	1.46	16.65	103.52	0.21	0.02	2.15	1065.62	0.99	0.56	132.81	12.44	1.34	58.73	90.27
06PMD470, 371.05-376.28m	0.40	0.36	48.29	214.61	0.46	0.05	0.71	4100.78	<0.01	0.16	199.90	26.72	2.55	72.74	90.50
07PMD542, 73.28-77m	<0.01	0.19	45.77	123.12	0.34	0.06	0.68	4242.70	<0.01	0.15	199.45	26.03	2.47	74.95	73.83
06PMD484, 224.5-226.5m	3.00	1.22	28.74	104.04	0.13	0.17	0.46	735.12	<0.01	0.11	149.23	8.52	0.83	36.86	28.06
07PMD552, 58.5-72m	0.24	2.65	43.02	93.93	0.10	0.06	0.17	487.76	<0.01	0.06	129.31	3.40	0.51	26.68	20.38
07PMD522, 27-38m	2.51	0.72	21.64	113.70	0.13	0.64	0.76	946.18	<0.01	0.17	105.77	7.41	0.72	50.81	44.47
07PMD522, 126-136.5m	<0.01	0.67	41.32	81.30	0.10	0.03	0.17	660.28	<0.01	0.04	122.37	4.55	0.61	36.00	16.74
06PMD470, 85-88m	0.68	0.94	32.22	115.76	0.10	0.04	0.23	361.29	<0.01	0.04	136.41	4.11	0.58	43.58	12.53
08PMD657A, 101.5-111.5m	0.47	0.65	23.13	148.52	0.11	<0.01	0.62	431.52	<0.01	0.19	130.20	4.80	0.47	34.23	24.62
08PMD657A, 90.5-91m	<0.01	0.92	43.74	101.13	0.28	0.03	0.82	1902.79	<0.01	0.18	141.04	7.65	0.71	60.48	33.69
07SBD374, 53.4-64.5m	1.84	0.65	40.06	124.21	0.13	<0.01	0.16	388.99	<0.01	0.02	129.43	2.77	0.30	27.80	12.19
08SBD380, 7.2-14m	0.59	0.64	34.05	118.07	0.11	<0.01	0.15	142.59	<0.01	0.04	120.36	3.00	0.37	45.73	13.00
08SBD380, 23-33.5m	1.29	1.03	33.15	157.27	0.10	<0.01	0.14	121.10	<0.01	0.02	128.69	2.57	0.30	43.17	9.76
08SBD382, 7.43-12.82m	14.23	4.49	9.04	173.83	0.25	<0.01	4.77	966.19	<0.01	1.21	135.55	9.17	0.80	61.17	85.80
08SBD382, 267.5-276.52m	35.68	1.87	12.44	198.52	0.25	<0.01	6.76	746.06	<0.01	2.09	105.81	7.54	0.81	56.61	97.28
08TDD631, 33.5-37.3m	2.34	0.84	16.19	60.09	0.11	0.20	0.33	384.64	<0.01	0.07	99.81	3.03	0.43	20.12	21.08
94NOD124, 259-263.5m	2.12	2.53	42.23	91.58	0.10	0.08	0.19	173.49	0.15	0.15	121.94	3.42	0.48	26.03	25.67
94NOD124, 277.5-280m	1.24	1.18	31.26	93.52	0.12	0.04	0.70	479.16	<0.01	0.18	152.78	4.34	0.76	42.64	48.13
04PMD272, 105-110m	1.21	0.70	14.87	148.36	0.18	<0.01	3.48	852.47	<0.01	0.86	125.19	9.67	0.88	21.52	79.24
05PMD310, 6-31m	<0.01	0.29	50.33	47.30	0.18	<0.01	0.35	1409.97	<0.01	0.08	131.04	15.30	1.84	45.00	27.18
05PMD293, 8.89-34m	<0.01	0.56	35.32	127.51	0.10	<0.01	0.15	378.17	<0.01	0.03	115.04	4.82	0.53	31.49	13.57
02TDD506, 39-64m	<0.01	0.21	32.98	58.10	0.14	<0.01	0.70	1242.14	<0.01	0.12	88.91	13.03	1.70	70.10	40.89
02TDD545, 6.36-32m	1.68	0.29	31.60	56.25	0.18	0.07	0.64	1042.01	<0.01	0.12	82.84	10.50	1.28	56.80	33.72
02TDD545, 82-100.73m	1.24	1.23	30.58	68.56	0.21	<0.01	0.69	1247.87	<0.01	0.13	97.00	16.14	1.53	126.63	21.76
TDD380, 245-254.5m	1.92	0.67	26.47	80.30	0.14	0.09	0.47	442.16	<0.01	0.08	94.13	5.04	0.67	47.56	26.03
TDD380, 272-294m	<0.01	0.47	37.21	70.89	0.25	<0.01	0.78	1511.38	<0.01	0.16	94.01	18.35	1.94	69.95	37.74
TDD374, 61-67.6m	<0.01	0.80	41.94	105.26	0.28	0.02	0.61	3314.76	<0.01	0.15	166.09	27.52	2.59	83.48	25.05
TDD374, 11.63-36m	0.21	0.27	43.93	92.01	0.31	0.02	0.58	3100.93	<0.01	0.14	170.15	25.76	2.39	69.07	16.66
TDD370, 253.21-255.12m	0.11	0.25	31.14	116.98	0.11	<0.01	0.83	424.55	<0.01	0.13	88.31	5.55	0.75	49.64	31.99
TDD387, 151.2-153.5m	8.64	0.65	29.45	102.38	0.12	0.03	0.59	628.88	<0.01	0.12	99.47	6.95	1.00	35.31	40.90
97TDD131, 169.13-171.61m	2.39	0.45	41.00	103.92	0.11	0.54	0.20	335.60	<0.01	0.03	139.14	4.21	0.47	33.25	13.14
TDD392, 214.58-216.68m	0.84	0.24	8.35	19.78	0.09	0.18	0.18	134.07	<0.01	0.03	96.01	1.58	0.19	14.36	7.20
TDD368, 175-178m	0.70	3.32	0.95	2.17	0.08	0.26	0.04	30.04	<0.01	<0.01	104.91	0.23	<0.01	19.89	0.93
TDD363, 153.85-155.96m	1.61	0.81	3.34	11.33	0.11	0.17	0.13	47.13	<0.01	0.05	86.34	1.20	0.14	9.33	3.39
94NOD128, 20.7-30m	2.53	1.12	26.88	136.53	0.11	<0.01	0.13	40.43	<0.01	0.05	89.72	2.75	0.34	24.16	5.36
HB DCO G Float Tails M.C.	3.86	0.49	3.22	14.56	0.05	0.26	0.15	6.38	<0.01	0.02	10.38	1.17	0.13	12.53	1.06
NW CNDT SS 20100602	25.79	2.76	4.53	110.80	0.03	1.78	1.17	422.88	0.18	0.28	224.57	6.23	0.71	197.95	49.96
NW MT SS 0 20100609	4.20	1.01	16.96	139.94	<0.10	<0.10	0.60	873.63	0.16	0.12	182.98	5.08	0.61	81.46	27.99
NW BFT Solids HC-56	1.80	0.69	23.23	167.20	0.23	<0.01	0.71	-	<0.01	0.15	221.29	5.99	0.69	55.74	31.68

SAMPLE KEY for Tables III and IV

1	08PMD650, 33-36.4m		23	04PMD272, 105-110m
2	07PMD552, 134-144.5m		24	05PMD310, 6-31m
3	08PSD142, 245.5-254.5m		25	05PMD293, 8.89-34m
4	06PMD470, 217.03-218.7m		26	02TDD506, 39-64m
5	07PMD542, 104.15-105.29m		27	02TDD545, 6.36-32m
6	06PMD470, 371.05-376.28m		28	02TDD545, 82-100.73m
7	07PMD542, 73.28-77m		29	TDD380, 245-254.5m
8	06PMD484, 224.5-226.5m		30	TDD380, 272-294m
9	07PMD552, 58.5-72m		31	TDD374, 61-67.6m
10	07PMD522, 27-38m		32	TDD374, 11.63-36m
11	07PMD522, 126-136.5m		33	TDD370, 253.21-255.12m
12	06PMD470, 85-88m		34	TDD387, 151.2-153.5m
13	08PMD657A, 101.5-111.5m		35	97TDD131, 169.13-171.61m
14	08PMD657A, 90.5-91m		36	TDD392, 214.58-216.68m
15	07SBD374, 53.4-64.5m		37	TDD368, 175-178m
16	08SBD380, 7.2-14m		38	TDD363, 153.85-155.96m
17	08SBD380, 23-33.5m		39	94NOD128, 20.7-30m
18	08SBD382, 7.43-12.82m		40	HB DCO G Float Tails Master Comp
19	08SBD382, 267.5-276.52m		41	NW CNDT SS 20100602
20	08TDD631, 33.5-37.3m		42	NW MT SS 0 20100609
21	94NOD124, 259-263.5m		43	NW Bm Solids HC-56
22	94NOD124, 277.5-280m			

TABLE III
MLA Mineral Weight Percent for Forty-three Ore and Waste Composites from Hope Bay

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Mineral	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%
Albite	0.96	34.16	38.42	8.26	22.26	25.92	24.30	11.52	19.31	22.19	13.48	22.61	1.19	7.63	3.47	1.18	4.99	4.42	10.35	2.90	3.53	2.73
Andesine	0.00	0.00	0.00	0.00	0.00	12.64	13.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Alstonite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Amphibole	3.78	0.03	0.64	0.23	0.07	0.64	0.00	0.39	0.13	0.02	0.44	0.10	0.06	0.97	0.07	0.11	0.39	0.22	0.04	0.27	0.10	0.11
Anhydrite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ankerite	25.36	11.55	1.15	43.57	14.20	0.86	0.64	41.14	24.18	35.86	24.25	31.45	32.62	52.45	27.19	29.06	45.51	11.90	9.47	11.95	29.54	25.50
Apatite	0.05	0.01	0.01	0.06	0.52	0.08	0.09	0.05	0.04	0.20	0.06	0.08	0.22	0.13	0.08	0.04	0.04	0.22	0.26	0.52	0.04	0.12
Arsenopyrite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Barite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Biotite	0.01	0.56	0.07	0.04	0.02	0.55	0.62	0.16	0.02	0.01	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.33	0.00	0.00	0.00	0.00
Calcite	3.05	3.06	6.44	0.01	0.05	0.89	0.47	0.08	0.08	0.00	2.42	0.04	0.01	0.32	0.05	0.01	0.02	0.00	0.01	0.06	0.09	0.10
Chalcopyrite	0.03	0.05	0.04	0.01	0.02	0.06	0.06	0.03	0.03	0.01	0.03	0.01	0.01	0.79	0.04	0.01	0.02	0.03	0.01	0.00	0.01	0.06
Chlorite	37.95	24.55	16.18	1.97	1.89	4.69	9.78	10.62	6.31	7.79	7.17	10.52	4.76	14.72	5.70	13.04	9.53	0.71	3.32	0.12	2.16	2.99
Chromite	0.00	0.00	0.00	0.08	0.00	0.00	0.02	0.03	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.00	0.00	0.00	0.02	0.00
Cobaltite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Diopside	0.00	0.00	0.00	0.00	0.00	40.18	38.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Enstatite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Epidote	0.33	4.64	20.33	0.01	0.16	3.51	3.14	0.22	0.53	0.00	0.57	0.15	0.01	0.01	0.05	0.01	0.06	0.04	0.01	0.01	0.07	0.26
FeClay	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Galena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gersdorffite	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.03	0.01	0.02	0.01	0.02	0.01	0.00	0.00	0.03	0.01	0.00	0.01	0.00	0.07	0.00
Gold	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hematite	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hessite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ilmenite	0.47	0.03	0.01	0.19	0.34	0.29	0.28	0.26	0.05	0.33	0.03	0.12	0.10	0.06	0.23	0.15	0.07	0.18	0.11	0.30	0.25	0.42
Iron	0.03	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kspar	0.12	0.99	0.48	0.09	0.75	0.86	0.02	2.53	1.47	0.11	0.00	0.07	0.00	0.10	0.00	0.00	0.00	0.87	0.04	0.00	0.00	0.00
Magnetite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.00	0.00	0.07	0.00	0.24
Millerite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Monazite	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.01	0.02	0.00	0.00	0.01
Muscovite	5.19	9.11	3.36	0.40	26.35	0.00	0.00	16.68	21.26	0.56	4.27	17.79	16.56	1.44	12.30	3.79	4.05	13.66	24.53	11.79	12.48	12.96
Olivine	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paragonite	0.03	1.58	0.19	0.03	0.65	0.04	0.00	0.10	11.52	0.01	23.27	2.27	15.22	0.50	21.35	10.72	6.38	13.24	1.07	3.66	20.83	11.66
Petzite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Platinum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pyrite	2.13	0.13	0.58	6.05	9.35	0.02	0.00	3.69	0.97	6.61	0.14	3.63	0.13	0.72	0.14	0.96	0.57	1.93	0.90	6.17	2.14	5.66
Pyrophyllite	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.19	0.00	0.00	0.00	0.00
Pyrrhotite	0.00	0.00	0.18	0.00	0.04	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.01	0.00	0.00	0.00
Quartz	19.69	7.65	10.43	38.49	22.93	3.03	3.29	12.06	13.72	25.91	20.93	10.56	27.57	19.02	23.81	35.77	24.26	45.26	48.75	61.23	26.63	33.35
Rutile	0.49	0.02	0.01	0.36	0.23	0.00	0.00	0.38	0.07	0.28	0.06	0.10	0.12	1.01	0.26	0.18	0.08	0.06	0.15	0.18	0.25	0.43
Scheelite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Siderite	0.02	0.01	0.00	0.04	0.00	0.01	0.05	0.00	0.00	0.02	0.00	0.00	1.06	0.01	3.73	0.01	1.07	0.82	0.75	0.72	0.01	2.11
Sphalerite	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Sphene	0.30	0.11	0.24	0.01	0.00	0.32	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Stibnite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetradymite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrahedrite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Titanomagnetite	0.00	0.00	0.00	0.00	0.00	5.34	5.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tourmaline	0.02	1.75	1.22	0.00	0.08	0.03	0.03	0.02	0.28	0.01	2.83	0.44	0.33	0.05	1.50	4.89	2.87	2.74	0.15	0.03	1.76	1.26
Xenotime	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Zircon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00

TABLE III, MLA Wt% cont'd

	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Mineral	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%
Albite	0.27	10.69	7.63	7.52	5.63	7.21	3.32	16.57	27.25	28.58	7.42	4.85	0.61	0.03	0.01	0.08	5.78	0.16	4.73	18.24	7.32
Andesine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Alstonite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Amphibole	0.05	6.04	0.15	1.00	0.38	0.90	0.20	1.19	12.86	28.66	0.74	0.17	0.15	0.01	0.00	0.00	0.09	0.06	1.17	0.94	0.45
Anhydrite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ankerite	13.18	5.80	33.49	5.02	17.39	14.03	20.74	13.51	0.48	1.43	21.99	28.48	36.96	5.35	0.65	4.12	42.40	9.14	26.79	31.86	35.58
Apatite	0.56	0.03	0.06	0.16	0.38	0.14	0.62	0.17	0.05	0.02	0.19	0.34	0.14	0.02	0.00	0.00	0.04	0.15	0.17	0.18	0.30
Arsenopyrite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Barite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Biotite	0.00	2.57	0.31	0.11	0.26	0.07	0.00	0.01	0.03	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.56	1.05
Calcite	0.02	0.06	0.00	8.50	1.28	9.74	0.19	3.38	0.78	1.03	0.04	0.08	0.30	0.03	0.00	0.01	0.07	0.07	0.22	0.78	1.03
Chalcopyrite	0.02	0.02	0.02	0.01	0.00	0.03	0.01	0.00	0.02	0.01	0.00	0.00	0.03	0.00	0.00	0.00	0.02	0.00	0.27	0.02	0.00
Chlorite	1.27	50.56	7.81	36.65	25.28	20.55	5.69	29.56	38.40	21.71	10.12	1.11	9.40	0.21	0.03	0.09	12.28	0.40	7.55	7.83	10.08
Chromite	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.06	0.11
Cobaltite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Diopside	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electrum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Enstatite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Epidote	0.00	0.47	0.00	0.34	0.10	1.12	0.62	1.26	3.47	4.72	0.22	0.11	0.04	0.03	0.00	0.00	0.35	0.01	0.04	0.92	0.54
FeClay	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Galena	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gersdorffite	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.26	0.02	0.01
Gold	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hematite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.49	1.17	0.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
Hessite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ilmenite	0.04	0.17	0.21	0.42	0.62	0.21	0.40	0.23	0.00	0.05	0.34	1.05	0.14	0.04	0.02	0.01	0.05	0.11	0.47	0.37	0.45
Iron	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.01	0.02
Kspar	0.03	4.16	1.20	0.74	1.37	0.11	0.00	0.15	0.02	0.06	0.00	0.01	0.04	0.01	0.01	0.00	0.01	0.00	0.69	0.50	0.56
Magnetite	0.00	0.01	0.00	0.00	0.14	0.00	0.25	0.04	0.00	0.00	1.68	0.53	0.01	0.02	0.00	0.00	0.00	0.22	0.01	0.01	0.00
Millerite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Monazite	0.07	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.01
Muscovite	40.81	10.14	21.20	2.14	12.25	6.29	12.83	2.35	0.03	0.13	7.98	29.02	23.69	3.47	0.92	1.73	3.83	3.69	5.91	8.09	14.49
Olivine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Paragonite	11.85	0.16	0.05	0.03	1.60	2.53	15.53	0.60	0.03	0.03	4.97	1.71	2.49	0.79	0.12	0.21	6.86	2.29	0.13	0.53	0.61
Petzite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Platinum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pyrite	1.09	0.26	0.40	0.24	1.12	0.95	4.66	0.24	0.03	0.08	0.07	1.91	1.74	3.97	0.28	1.94	0.75	0.08	41.93	1.93	0.35
Pyrophyllite	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pyrrhotite	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.02	0.01
Quartz	30.45	7.79	24.18	36.54	29.79	34.88	32.14	27.25	12.20	10.07	38.01	27.35	22.07	85.56	97.12	91.75	25.62	81.72	8.53	25.02	25.09
Rutile	0.06	0.38	0.10	0.27	0.38	0.15	0.38	0.35	0.00	0.00	0.39	0.56	0.47	0.05	0.01	0.02	0.08	0.12	0.33	0.24	0.27
Scheelite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Siderite	0.00	0.06	2.97	0.21	1.61	0.10	1.21	0.61	0.11	0.12	5.20	2.57	1.53	0.16	0.01	0.01	0.53	1.03	0.31	1.53	1.24
Sphalerite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Sphene	0.00	0.31	0.00	0.02	0.00	0.01	0.00	0.69	2.63	2.21	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02
Stibnite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetradymite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tetrahedrite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
Titanomagnetite	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
Tourmaline	0.22	0.31	0.15	0.05	0.38	0.94	1.12	0.07	0.02	0.01	0.61	0.09	0.17	0.25	0.80	0.00	1.19	0.69	0.16	0.29	0.23
Xenotime	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Zircon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01

TABLE IV
Calculated Assay from MLA Mineral Wt % for Forty-three Ore and Waste Composites from Hope Bay

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Element	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%
Ag	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Al	4.64	8.80	9.14	1.12	7.98	5.47	5.66	5.78	9.49	3.06	8.26	7.37	7.14	2.51	8.06	4.95	3.91	7.03	6.53	3.47	7.72	5.83
As	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.02	0.01	0.00	0.01	0.00	0.03	0.00
Au	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B	0.00	0.06	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.09	0.01	0.01	0.00	0.05	0.16	0.09	0.09	0.00	0.00	0.06	0.04
Ba	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C	3.46	1.78	0.91	5.32	1.74	0.21	0.14	5.03	2.96	4.38	3.25	3.84	4.10	6.43	3.77	3.55	5.68	1.55	1.25	1.55	3.61	3.37
Ca	6.14	5.09	7.45	7.86	3.40	9.90	9.16	7.61	4.93	6.97	5.80	6.23	5.80	9.60	4.92	5.21	8.17	2.37	2.07	2.42	5.34	4.67
Ce	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
Co	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cr	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00
Cu	0.01	0.02	0.01	0.00	0.01	0.02	0.02	0.01	0.01	0.00	0.01	0.00	0.00	0.28	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.02
F	0.00	0.07	0.05	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.11	0.02	0.02	0.01	0.06	0.18	0.11	0.11	0.02	0.02	0.07	0.05
Fe	11.88	6.90	5.55	8.71	6.91	7.59	8.57	9.16	4.95	9.14	4.80	7.85	5.52	9.97	5.90	7.04	8.37	3.32	2.73	4.88	5.44	7.59
H	0.53	0.39	0.28	0.03	0.16	0.07	0.14	0.22	0.25	0.10	0.24	0.24	0.22	0.20	0.25	0.25	0.18	0.17	0.17	0.08	0.20	0.17
K	0.45	0.94	0.35	0.05	2.28	0.17	0.06	1.74	1.96	0.06	0.35	1.48	1.36	0.14	1.01	0.31	0.33	1.28	2.03	0.97	1.03	1.07
La	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mg	6.70	3.87	1.97	4.33	1.55	3.61	3.96	5.05	2.98	4.22	3.25	4.13	3.73	6.58	3.72	4.44	5.63	1.49	1.35	1.23	3.12	3.03
Mn	0.00	0.00	0.00	0.00	0.00	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Na	0.25	2.62	2.75	0.59	1.97	2.46	2.36	1.06	2.35	1.55	2.44	1.97	1.25	0.61	1.72	0.84	0.83	1.34	1.15	0.60	1.70	1.10
Ni	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00
O	47.37	47.78	46.91	47.31	44.61	44.58	44.63	46.81	48.44	46.28	49.44	46.86	49.76	48.35	49.58	49.47	49.19	49.71	50.06	48.27	48.80	47.15
P	0.01	0.00	0.00	0.01	0.10	0.01	0.02	0.01	0.01	0.04	0.01	0.02	0.04	0.02	0.02	0.01	0.01	0.04	0.05	0.10	0.01	0.02
Pb	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	1.14	0.09	0.40	3.26	5.00	0.04	0.02	1.99	0.53	3.53	0.09	1.95	0.07	0.66	0.09	0.52	0.32	1.10	0.49	3.30	1.17	3.05
Sb	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Si	16.93	21.55	24.12	21.07	24.00	24.89	24.30	15.21	21.04	20.37	21.81	17.93	20.84	14.08	20.62	22.89	17.07	30.30	31.94	32.90	21.45	22.47
Te	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ti	0.48	0.05	0.06	0.25	0.23	0.81	0.83	0.28	0.05	0.26	0.04	0.09	0.09	0.55	0.21	0.14	0.07	0.09	0.11	0.19	0.21	0.36
W	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Y	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Zn	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Zr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00

TABLE IV, Calculated Assays cont'd

	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Element	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%	Wt%
Ag	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Al	10.90	8.44	5.89	4.56	5.81	4.65	6.95	5.53	7.67	6.44	4.43	6.83	6.21	0.93	0.32	0.41	4.10	1.37	2.51	4.56	5.16
As	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01	0.12	0.01	0.01
Au	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
B	0.01	0.01	0.00	0.00	0.01	0.03	0.04	0.00	0.00	0.00	0.02	0.00	0.01	0.01	0.03	0.00	0.04	0.02	0.01	0.01	0.01
Ba	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C	1.61	0.72	4.44	1.66	2.46	2.89	2.69	2.12	0.17	0.31	3.28	3.78	4.72	0.68	0.08	0.50	5.24	1.24	3.38	4.16	4.61
Ca	2.53	2.09	6.08	4.73	3.92	6.90	4.17	5.10	4.12	5.49	4.29	5.31	6.63	0.96	0.13	0.72	7.67	1.71	5.07	6.71	7.24
Ce	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Co	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
Cr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.02	0.03
Cu	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.00	0.09	0.01	0.00
F	0.03	0.01	0.01	0.01	0.03	0.04	0.07	0.01	0.00	0.00	0.03	0.02	0.01	0.01	0.03	0.00	0.05	0.03	0.01	0.02	0.02
Fe	2.81	11.47	7.01	8.08	8.54	6.52	6.81	8.98	9.43	7.28	7.98	6.58	7.92	2.68	0.31	1.46	8.28	1.91	24.78	7.26	7.52
H	0.28	0.74	0.21	0.49	0.40	0.32	0.22	0.41	0.54	0.36	0.20	0.17	0.25	0.02	0.01	0.01	0.22	0.04	0.13	0.15	0.21
K	3.37	1.66	1.94	0.29	1.23	0.54	1.06	0.22	0.01	0.05	0.66	2.39	1.96	0.29	0.08	0.14	0.32	0.30	0.60	0.79	1.37
La	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
Mg	1.39	6.52	4.39	4.51	4.58	3.66	2.77	4.62	4.97	4.16	3.63	3.00	4.69	0.56	0.11	0.40	5.45	1.04	3.45	4.13	4.68
Mn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Na	1.34	1.07	0.85	0.58	0.68	0.78	1.37	1.06	1.95	2.76	0.96	0.88	0.55	0.10	0.03	0.04	0.88	0.21	0.46	1.44	0.67
Ni	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.01	0.00
O	49.20	47.15	49.06	49.15	48.53	49.04	47.52	48.45	47.10	46.94	49.48	48.26	48.35	50.65	52.99	51.94	49.17	52.24	28.06	48.30	48.95
P	0.11	0.01	0.01	0.03	0.07	0.03	0.12	0.03	0.01	0.00	0.04	0.06	0.03	0.00	0.00	0.00	0.01	0.03	0.04	0.03	0.06
Pb	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.59	0.15	0.23	0.13	0.60	0.53	2.50	0.13	0.02	0.05	0.04	1.02	0.94	2.12	0.15	1.04	0.41	0.05	22.47	1.04	0.19
Sb	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Si	25.73	19.64	19.72	25.49	22.74	23.90	23.36	22.92	23.36	25.60	24.62	21.04	17.41	40.95	45.72	43.30	18.09	39.69	8.38	21.09	18.96
Te	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ti	0.04	0.33	0.12	0.28	0.39	0.15	0.33	0.43	0.64	0.56	0.31	0.63	0.29	0.04	0.01	0.01	0.06	0.10	0.33	0.25	0.30
W	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Y	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Zn	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Zr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE V
Mineral Key

MINERAL	FORMULA
Albite, Andesine (PLAG)	$\text{NaAlSi}_3\text{O}_8/(\text{Ca}, \text{Na})(\text{Al}, \text{Si})_4\text{O}_8$
Alstonite	$\text{BaCa}(\text{CO}_3)_2$
Amphibole (AMP)	$\text{Ca}_2(\text{Mg}, \text{Fe}, \text{Al})_5(\text{Al}, \text{Si})_8\text{O}_{22}(\text{OH})_2$
Anhydrite	CaSO_4
Ankerite (ANK)	$\text{Ca}(\text{Fe}, \text{Mg})(\text{CO}_3)_2$
Apatite	$\text{Ca}_5(\text{PO}_4)_3(\text{OH})$
Arsenopyrite	FeAsS
Barite	BaSO_4
Biotite	$\text{K}(\text{Mg}, \text{Fe})_3(\text{Si}_3\text{Al})\text{O}_{10}(\text{OH})_2$
Calcite (CAL)	CaCO_3
Chalcopyrite (CCP)	CuFeS_2
Chlorite (CHL)	$(\text{Mg}, \text{Fe}, \text{Al})_6(\text{Al}, \text{Si})_4\text{O}_{10}(\text{OH})_8$
Chromite	$(\text{FeZn})\text{Cr}_2\text{O}_4$
Cobaltite	CoAsS
Diopside (PYROX)	$(\text{Ca}, \text{Na})(\text{Mg}, \text{Fe}, \text{Al}, \text{Ti})(\text{Si}, \text{Al})_2\text{O}_6$
Electrum	Au_2Ag
Enstatite	MgSiO_3
Epidote (EPI)	$\text{Ca}_2(\text{Fe}^{3+}, \text{Al})\text{Al}_2(\text{Si}_2\text{O}_7)(\text{SiO}_4)(\text{O}, \text{OH})_2$
FeClay	$\text{Na}_{0.3}\text{Fe}_2(\text{Si}, \text{Al})_4\text{O}_{10}(\text{OH})_2 \cdot \text{N}(\text{H}_2\text{O})$
Galena	PbS
Gersdorffite	$(\text{Fe}, \text{Co}, \text{Ni})\text{AsS}$
Gold	Au
Hematite	$\text{Fe}^{3+}_2\text{O}_3$
Hessite	Ag_2Te
Ilmenite	FeTiO_3
Iron	Fe
K-feldspar (KSPAR)	KAlSi_3O_8
Magnetite (MAG)	Fe_3O_4
Millerite	NiS
Monazite	$(\text{La}, \text{Ce})\text{PO}_4$
Muscovite/Sericite (MUSC/SER)	$\text{KAl}_2(\text{AlSi}_3\text{O}_{10})(\text{OH})_2$
Olivine	$(\text{Mg}, \text{Fe})_2\text{SiO}_4$
Paragonite (PG)	$\text{NaAl}_2(\text{Si}_3\text{Al})\text{O}_{10}(\text{OH})_2$
Petzite	Ag_3AuTe_2
Platinum	Pt
Pyrite (PY)	FeS_2
Pyrophyllite (PYRO)	$\text{AlSi}_2\text{O}_5(\text{OH})$
Pyrrhotite	$\text{Fe}_{(1-x)}\text{S}$
Quartz (QTZ)	SiO_2
Rutile (RUT)	TiO_2
Scheelite	CaWO_4
Sepiolite (SEP)	$\text{Mg}_4\text{Si}_6\text{O}_{15}(\text{OH})_2 \cdot 6(\text{H}_2\text{O})$
Siderite (SID)	FeCO_3
Sphalerite	ZnS
Sphene (TIT)	CaTiSiO_5
Stibnite	Sb_2S_3
Tetradymite	$\text{Bi}_2\text{Te}_2\text{S}$
Tetrahedrite	Cu_3SbS_3
Titanomagnetite	$\text{Fe}_{3-x}\text{Ti}_x\text{O}_4$
Tourmaline (TL)	$(\text{Ca}, \text{Na})(\text{Mg}, \text{Fe}^{2+})_3\text{Al}_5\text{Mg}(\text{BO}_3)_3\text{Si}_6\text{O}_{18}(\text{OH}, \text{F})_4$
Xenotime	YPO_4
Zircon	ZrSiO_4

Mineral abbreviations are from XRD Table I.