

## SEDIMENT THIN SECTION DESCRIPTION

139-856A-8H-2 (49–54 cm)

GENERAL LITHOLOGY: Turbiditic silt.

MINERALS:	PERCENT	SIZE	MORPHOLOGY ( $\mu\text{m}$ )	TEXTURE AND COMMENTS
Quartz	40–50	50–100	Subhedral to anhedral.	Ragged detrital grains.
Plagioclase	10–20	50–100	Anhedral to subhedral.	Ragged, partly altered detrital grains. Alteration unknown.
Mica	2–5	100–150	Subhedral grains.	Clear to pale gray platy, highly birefringent, detrital grains.
Chlorite	2–5	100	Subhedral.	Pleochroic pale green grains with ragged margins.
Magnetite	1–2	50–100	Subhedral.	Ragged grains partly replaced by pyrite.
Pyrite	<0.5	50	Subhedral.	After magnetite; replaces silicate grains in places.
Clay	10–20	–	Anhedral.	Fine-grained anhedral masses in the matrix.

GENERAL COMMENTS: Hydrothermally altered silty clay; many of the magnetite grains are pyritized. Feldspars are ragged and partly altered, presumably to a clay mineral. A clay(?) mineral also partly fills the matrix.

## SEDIMENT THIN SECTION DESCRIPTION

139-856A-8H-3 (133–136 cm)

GENERAL LITHOLOGY: Hemipelagic silty clay.

MINERALS:	PERCENT	SIZE	MORPHOLOGY ( $\mu\text{m}$ )	TEXTURE AND COMMENTS
Quartz	10–20	30–50	Subhedral to anhedral.	Matrix-supported detrital grains with ragged margins.
Plagioclase	5	20–40	Anhedral grains.	Ragged detrital grains.
Amphibole	2–3	40–50	Subhedral grains.	Green detrital grains.
Mica	5–10	100–120	Subhedral.	Clear acicular grains, ragged margins, clear to pale green color.
Clay	60–70	--	--	Fine-grained aphanitic matrix; too fine-grained to identify.
Opaque minerals	0.5–1	50–100	Anhedral to subhedral.	Magnetite, in places replaced by pyrite.

GENERAL COMMENTS: Very poor section. Mineralogy similar to turbidites from Hole 855A except a higher percentage of clay minerals that form a matrix of detrital minerals.

139-856A-13X-CC (Piece 2A, 11–15 cm)

OBSERVER: STA

WHERE SAMPLED:

ROCK NAME: Plagioclase-olivine phyric diabase.

GRAIN SIZE: Medium-grained.

TEXTURE: Subophitic.

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PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Olivine	5	5	0.2–0.5		Equant.	
Plagioclase	3	3	0.1–0.6	An <sub>68-77</sub>	Columnar.	
Spinel	1	1	0.01–0.2		Euhedral.	
<b>GROUNDMASS</b>						
Plagioclase	46	46	0.01–0.1	An <sub>62</sub>	Lathlike.	Microlites.
Clinopyroxene	45	45	0.01–0.05		Anhedral.	Granular/microlitic.
<b>SECONDARY MINERALOGY</b>						
Talc	Trace.	REPLACING/ FILLING Olivine.				COMMENTS
<b>VESICLES/CAVITIES</b>						
Vesicles	1	LOCATION Evenly distributed.	SIZE (mm) 0.1–0.2	FILLING Void.	SHAPE Oblong.	

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COMMENTS: Round aggregates of finer minerals could be melt quench in vesicles.

139-856A-14X-01 (Piece 4, 56-61 cm)

OBSERVER: STA

WHERE SAMPLED:

ROCK NAME: Plagioclase-olivine phyric diabase.

GRAIN SIZE: Medium-grained.

TEXTURE: Holocrystalline.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Olivine	4	6	0.3-1.5		Oblong.	May be partially resorbed.
Plagioclase	7	8	0.3-0.8	An <sub>56</sub>	Columnar.	Concentric extinction.
Clinopyroxene	1	1	0.2-0.6		Oblong.	One poorly preserved crystal.
Spinel	2	2	0.1-0.4		Euhedral.	Small dark red diamond shapes.
<b>GROUNDMASS</b>						
Clinopyroxene	36	38	0.1-0.4		Spherulitic to granular.	
Plagioclase	43	44	0.1-0.3	An <sub>54</sub>	Tabular to lathlike.	
Magnetite	1	1	0.05-0.1	Ti-Mt	Granular.	
<b>SECONDARY MINERALOGY</b>						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clay	2	Veins, olivine.				Mixed with chlorite.
Clay	1	Clinopyroxene.				Rounded aggregates with second order colors.
Carbonates	Trace.	In veins.				With colorless phyllosilicates.
Chlorite	1	Plagioclase/veins.				Pale, anomalous blue interference color; may be mixed with smectite.
Talc	1	Olivine.				
Sulfide	1	Veins, grain boundaries.				Pyrrhotite(?) in cracks in plagioclase and mixed with chlorite; small grains (0.05 mm).
<b>VESICLES/CAVITIES</b>						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	
None						

COMMENTS: There are some finer grained areas with intersertal texture. There is no break in crystal size or composition between groundmass and phenocryst plagioclase. There are small smectite inclusions in the spinel which could be a replacement, possibly of original glass inclusions.

139-856A-14X-01 (Piece 5, 84–88 cm)

OBSERVER: STA

WHERE SAMPLED:

ROCK NAME: Plagioclase-olivine phyric diabase.

GRAIN SIZE: Medium-grained.

TEXTURE: Subophitic.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Olivine	0	8	0.1–1.0		Equant.	Replaced by talc/magnetite.
Plagioclase	8	10	0.2–0.8	An <sub>63</sub>	Columnar.	
Spinel	1	1	0.1–0.5		Euhedral.	Dark red to black.
<b>GROUNDMASS</b>						
Plagioclase	45	45	0.01–0.1	Unknown.	Lathlike.	
Clinopyroxene	30	33	0.02–0.1		Spindle.	
Mesostasis	2	3	N/A		Cryptocrystalline.	
<b>SECONDARY MINERALOGY</b>						
MINERALOGY	PERCENT	REPLACING/ FILLING				COMMENTS
Clay	1	Plagioclase.				In pseudomorphs with prehnite? Could also be a pale chlorite or mixture.
Clay	2	Olivine.				Dark brown.
Chlorite	2	Plagioclase.				With epidote; very pale.
Epidote	1	Plagioclase.				Pale; faint pleochroism.
Prehnite?	?	Plagioclase.				With smectite and opaques.
Sulfide	1	Cracks, interstitial.				Pyrrhotite and pyrite.
Magnetite	1	Olivine.				In pseudomorphs with talc.
Talc	6	Olivine.				
<b>VESICLES/ CAVITIES</b>						
Vesicles	PERCENT	LOCATION	SIZE (mm)		FILLING SHAPE	
Vesicles	0					

COMMENTS: Blocky smectite-magnetite pseudomorphs could possibly be after pyroxene rather than olivine. Secondary mineral associated with epidote has second order birefringence; relief is between plagioclase and epidote.

SITE 856

139-856A-14X-CC (Piece 1A, 0-3 cm)

OBSERVER: STA

WHERE SAMPLED:

ROCK NAME: Plagioclase-olivine phyric diabase.

GRAIN SIZE: Medium-grained.

TEXTURE: Holocrystalline.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Olivine	3	6	0.4-1.0		Equant.	Groundmass minerals occupy olivine grain boundaries.
Plagioclase	6	8	0.2-1.0	An <sub>45-52</sub>	Tabular.	Some radiating aggregates.
Spinel	1	1	0.05-0.2		Euhedral.	Dark red.
<b>GROUNDMASS</b>						
Plagioclase	44	50	0.1-0.2	An <sub>45</sub>	Lathlike.	
Clinopyroxene	28	30	0.2-0.1		Granular.	
Magnetite	5	5	0.01-0.03		Granular.	
<b>SECONDARY MINERALOGY</b>						
Chlorite	5	REPLACING/ FILLING Plagioclase/ clinopyroxene.				COMMENTS Pale, bluish gray with crossed polars.
Epidote	5	Plagioclase.				Clinzoisite, stubby grains, some with blue interference colors.
Talc	1	Olivine.				Relatively coarse-grained.
Pyrite	1	In cracks.				Disseminated in matrix.
<b>VESICLES/CAVITIES</b>						
Vesicles	0	LOCATION	SIZE (mm)		FILLING	SHAPE

COMMENTS: No break in composition or size in plagioclase population. Many plagioclase crystals have a mottled extinction and could be altered. This could not be determined with any accuracy. Texture of radiating plagioclase and clinopyroxene occupying grain interstices surrounding olivine suggests incipient resorption.

139-856B-8H-CC (Piece 2A, 10–12 cm)

OBSERVER: STA

WHERE SAMPLED:

ROCK NAME: Plagioclase-olivine phyric metabasalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Intersertal.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Olivine	1	4	0.3–0.5		Equant.	Replaced by clay.
Plagioclase	2	8	0.3–1		Columnar.	Replaced by smectite and chlorite.
Spinel	1	1	0.1		Euhedral.	Deep red.
<b>GROUNDMASS</b>						
Plagioclase	30	40	0.1–0.3		Microlites.	Replaced by albite? or a zeolite.
Glass	35	47	N/A	N/A		Replaced by smectite and chlorite.
<b>SECONDARY MINERALOGY</b>						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clay	5	In vein with sulfides.				Smectite with high birefringence.
Clay	3	Replacing olivine.				Pale in color.
Chlorite	1	Replacing plagioclase.				Mixed with smectite.
Quartz	10	Replaces relict margin; microcrystalline.				
Talc	1	Olivine and veins.				In vein with sulfides.
Pyrite	1	In veins.				Euhedral, distributed throughout section.
Palagonite	10	Glass.				Adjacent to silicified margin, preserves variolitic texture.

VESICLES/ CAVITIES	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE
None.					

SITE 856

139-856B-9X-01 (Piece 1, 4-8 cm)

OBSERVER: STA

WHERE SAMPLED:

ROCK NAME: Plagioclase-olivine metabasalt.

GRAIN SIZE: Fine-grained.

TEXTURE: Intersertal.

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Olivine	4	8	0.2-2		Euhedral.	Glomerocrysts?
Plagioclase	1	3	0.2-0.5	An <sub>70</sub>	Anhedral.	Replaced by clay.
Spinel	1	1	0.1-0.3		Euhedral.	Deep red.
<b>GROUNDMASS</b>						
Plagioclase	25	30	0.02-0.2	An <sub>60</sub>	Lathlike.	
Clinopyroxene	20	23	0.01-0.02		Granular to euhedral.	
Mesostasis	30	35	N/A	N/A		
<b>SECONDARY MINERALOGY</b>						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clay	5	Plagioclase/glass.				Pale color with high birefringence.
Clay	1	Olivine.				Brown smectite.
Chlorite	8	Plagioclase/glass.				Pale color with epidote.
Epidote	1	Plagioclase.				With clay in pseudomorphs.
Actinolite	Trace.	Plagioclase and pyroxene.				Green, acicular.
Talc	4	Olivine.				
Pyrite	Trace.	In veins.				Small grains in crack.
<b>VESICLES/CAVITIES</b>						
	PERCENT	LOCATION	SIZE (mm)		FILLING	SHAPE
Vesicles	0					



139-856B-16X-CC (Piece 1, 11-13 cm)

OBSERVER: STA

WHERE SAMPLED:

ROCK NAME: Plagioclase-olivine phyric metabasalt.

GRAIN SIZE: Fine-grained to cryptocrystalline.

TEXTURE: Variolitic (relict).

PRIMARY MINERALOGY	PERCENT PRESENT	PERCENT ORIGINAL	SIZE (mm)	COMPOSITION	MORPHOLOGY	COMMENTS
<b>PHENOCRYSTS</b>						
Olivine	0	3	0.2-0.7		Oblong.	Replaced by talc, magnetite, and chlorite.
Plagioclase	4	5	0.2-1.0	An <sub>42</sub>	Columnar.	
Spinel	1	1	0.05-0.1		Euhedral.	Deep red color.
<b>GROUNDMASS</b>						
Plagioclase	12	15	0.1-0.2	Sodic.	Lantern.	Skeletal.
Mesostasis	44	76	N/A	N/A		
<b>SECONDARY MINERALOGY</b>						
	PERCENT	REPLACING/ FILLING				COMMENTS
Clay	30	Glassy mesostasis.				Spherulitic bundles of smectite.
Clay	1	Olivine.				Pseudomorphs near margin.
Chlorite	6	Veins/olivine.				In sediment along contact, pseudomorphs of mafic minerals.
Talc	2	Olivine.				In pseudomorphs further from margin than chlorite and smectite pseudomorphs.
Sulfide	1	In sediment and olivine pseudomorphs.				Euhedral cubes.
<b>VESICLES/CAVITIES</b>						
	PERCENT	LOCATION	SIZE (mm)	FILLING	SHAPE	COMMENTS
Veins	10	Perpendicular to contact.	0.05	Chlorite.	N/A	Cut the sediment-basalt contact.

COMMENTS: Chlorite veins extend from sediment margin into basalt. The sediment-basalt contact has a cusped shape. Must be a baked contact of a sill. Compositional estimates for primary minerals is for basalt part only. The chlorite-pyrrhotite pseudomorphs after olivine may be an alteration of an original talc-magnetite pseudomorph.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856D-1H-1 (30-33 cm)

ROCK NAME: Sulfide sand.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	27	0.01-0.05	Idiomorphic.	Crystals growing around dissolved pyrrhotite crystals, many ragged crystals.
Sphalerite	10	0.01-0.04	Anhedral.	
Chalcopyrite	5	0.01-0.02	Anhedral.	
Magnetite	3	0.01-0.02	Subhedral.	
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Hydrosilicate	50	<0.1	Amorphous.	
Barite	5	0.1	Idiomorphic.	

COMMENTS: Polished concentrate.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856D-1H-1 (140-146 cm)

ROCK NAME: Sulfide sand.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	65	0.04-0.1	Euhedral.	Replaces pyrrhotite laths. Relict. In the centers of pyrite concentrations.
Pyrrhotite	4	0.5-1.0	Anhedral.	
Marcasite	2	0.02	Subhedral.	
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Hydrosilicate	20			
Barite	5	0.2	Rosettes.	
Carbonate	2	0.03		

COMMENTS: Network of pyrite replacing dissolved crystals of pyrrhotite. Chimney structure?

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856D-1H-2 (40-49 cm)

ROCK NAME: Sulfide sand.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	45	0.045-0.3	Anhedral-euhedral.	Crystals and concretions, some replacing pyrrhotite blades.
Chalcopyrite Sphalerite	2 tr.	0.03	Anhedral.	Small patches.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Quartz	35	0.02-0.2	Anhedral.	Spherulitic to anhedral quartz recrystallizing from chalcedony.
Clay plus silica Barite	13 5	0.02-1.0	Amorphous. Euhedral.	Rare tabular grains up to 2 mm.

COMMENTS: Polished concentrate.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856D-1H-7 (60-66 cm)

ROCK NAME: Sulfide sand.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	45	0.05-1.0	Idiomorphic.	As euhedral cubes, concretions and bladed crystals replacing pyrrhotite.
Sphalerite	10	0.2-1.0	Anhedral.	
Pyrrhotite	3	0.2-1.0	Anhedral.	Relict crystals in pyrite.
Chalcopyrite	2		Anhedral.	
Magnetite	1	0.2	Subhedral.	
Covellite	tr.	0.001	Anhedral.	Replacing chalcopyrite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Barite	3	0.5-0.8	Crystals form rosettes.	
Clay	20	<0.01	Aggregates.	
Silica	15		Amorphous.	

COMMENTS: Polished concentrate.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-3R-1 (Piece 2, 5–15 cm)

ROCK NAME: Massive colloform and vuggy pyrite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	50	0.05–0.3	Subhedral to euhedral.	Crystals and concretions with inclusions of pyrrhotite and chalcopyrite.
Isocubanite	5	up to 0.05	Anhedral.	Inclusions in sphalerite and blebs. Some grains have up to 5 percent chalcopyrite as exsolution-like lamellae.
Sphalerite	5	0.05–0.15	Anhedral.	Patches and grains, chalcopyrite inclusions common.
Pyrrhotite	1	0.01–0.02	Anhedral.	Remnants not completely transformed in pyrite and isolated grains.
Marcasite	tr.	0.1	Anhedral.	Intergrown in pyrite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Quartz	20	0.1	Collomorphic to subhedral crystals.	Growth-zoned quartz recrystallizing from chalcedony. Originally amorphous silica. Growth zoning defined by porous zones rich in inclusions. Some grains may have nucleated on carbonate crystal aggregates.
Amorphous silica	18	<2 (μm)	Felted aggregates.	

COMMENTS: Chimney textures, lacy networks of pyrite after pyrrhotite. Hexagonal shaped sphalerite with abundant chalcopyrite inclusions may be transformed wurtzite.

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## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-3R-1 (Piece 6, 35–47 cm)

ROCK NAME: Homogeneous, massive fine-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	48	0.01–0.1	Anhedral to subhedral.	Some collomorphic textures and some pyrite pseudomorphing pyrrhotite.
Hematite	8	0.01	Anhedral.	Collomorphic and spheroidal textures.
Magnetite	6	0.01	Anhedral.	
Isocubanite	6	0.01	Anhedral.	Up to 25% chalcopyrite as exsolution-like intergrowths.
Sphalerite	3	0.05–0.2	Anhedral.	
Pyrrhotite	1	0.01	Subhedral to anhedral.	Inclusions in pyrite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Smectite	15	<2 (µm)		Yellow-green moderate birefringence clay.
Amorphous silica	8	<2 (µm)	Amorphous.	In matrix and vugs, often stained by disseminated hematite.
Carbonate	5	0.01–0.1	Anhedral to subhedral.	Infills vugs and in matrix. Isocubanite and magnetite occur intergrown with carbonate.

COMMENTS: Some vugs have a zoned infill from a carbonate core to a hematite rim. Many spheroidal textures show a concentric pattern of hematite which has bright red internal reflections.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-3R-1 (Piece 9, 95–97 cm)

ROCK NAME: Homogeneous medium to coarse-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	55	0.01–0.4	Anhedral to euhedral.	Usually small ragged anhedral grains, a few euhedral cubes.
Magnetite	18	0.01–0.02	Anhedral to skeletal.	Some grains partly altered to hematite.
Chalcopyrite	3	0.01–0.04	Anhedral.	Mostly interstitial to pyrite, often with sphalerite.
Hematite	3	0.001–0.01	Acicular to anhedral.	Mostly occurs as an alteration of magnetite.
Sphalerite	2	0.02–0.04	Anhedral.	Generally corroded grains, often partly replaced by magnetite, some rimmed by chalcopyrite.
Pyrrhotite	1	0.01	Anhedral.	Inclusions in pyrite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Smectite	10		Polygonal aggregates.	Green to yellow-brown.
Carbonate	5	0.1–0.2	Subhedral.	Interstitial to the opaques.
Voids	3			

COMMENTS: Spheroidal magnetite-hematite structures within the carbonate. These have carbonate cores with radiating needles of pyrite (after pyrrhotite) within them.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-4R-2 (Piece 3, 18–20 cm)

ROCK NAME: Homogeneous, massive fine-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	50	0.04–0.1	Anhedral to subhedral.	Very porous, anhedral grains forming trellis reticulate network.
Magnetite	10	0.01–0.15	Anhedral to subhedral.	Occurs commonly as inclusions in pyrite which are usually concentrated in elongate strings in the centers of the reticulate network pyrite. Also as discrete crystals and veins.
Chalcopyrite	1	0.05–0.1	Anhedral.	As inclusions, predominantly in pyrite. Often as fiammé in both pyrite and magnetite.
Marcasite	1	0.4	Anhedral.	Intergrown in pyrite.
Hematite	0.5	0.1–0.4	Anhedral.	Replacing magnetite.
Pyrrhotite	tr.	0.01	Subhedral.	As inclusions in pyrite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Carbonate	5	<0.01	Anhedral.	
Silica	5		Amorphous.	
Chlorite	tr.	0.005	Anhedral.	
Voids	28			

COMMENTS: Vuggy sample with a reticulate texture defined by linear arrays of voids in the center of 2–4 mm linear pyrite aggregates that form a boxwork. Magnetite generally occurs in poorly defined linear arrays parallel to the voids that core the pyrite aggregates.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-5R-1 (Piece 5, 33–36 cm)

ROCK NAME: Homogeneous, massive fine-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	48	0.1–0.2	Subhedral.	Growth-zoned.
Magnetite	14	0.1	Anhedral to subhedral.	
Hematite	5	0.01	Anhedral.	Replaces magnetite and pyrite, some occur as spherical aggregates.
Chalcopyrite	3	0.15	Anhedral.	
Pyrrhotite	tr.			As inclusions in pyrite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Smectite	18		Aggregates.	Green and yellow.
Carbonate	10	0.05–0.1	Subhedral.	Growth-zoned, hourglass extinction.
Voids	2			

COMMENTS: None.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-5R-1 (Piece 14, 97–115 cm)

ROCK NAME: Massive colloform and vuggy pyrite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	70	0.07–0.3	Subhedral.	Interlocking crystals. Overgrowth textures of fairly clean pyrite around relict crystal outlines, some of which are platy and possibly relict pyrrhotite. These relict crystals are now infilled with iron hydroxides and crossed by pyrite veinlets. Local domains of reticulate boxwork dissolution textures.
Chalcopyrite	2	0.01	Anhedral.	Commonly rimming chalcopyrite.
Sphalerite	1		Anhedral.	
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Voids	25		Polygonal.	Some infilled with cloudy white amorphous silica.

COMMENTS: Well-developed dissolution and overgrowth textures.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-6R-1 (Piece 5, 24–25 cm)

ROCK NAME: Massive colloform and vuggy pyrite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	90	0.02–0.05	Subhedral.	Porous to compact botryoidal banded pyrite, locally overgrowing pyrite framboids.
Sphalerite	1	0.01–0.08	Anhedral.	As inclusions in pyrite.
Chalcopyrite	tr.	0.01–0.04	Anhedral.	As inclusions in pyrite.
Pyrrhotite	tr.	0.01–0.02	Anhedral.	As inclusions in pyrite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Voids	10			

COMMENTS: None.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-6R-2 (Piece 13, 80–84 cm)

ROCK NAME: Homogeneous medium- to coarse-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	45	0.02–0.5	Subhedral to anhedral.	Some poikilitic grains enclosing magnetite.
Magnetite	25	0.02–0.4	Anhedral to subhedral.	Grains are very porous.
Isocubanite	1	0.01–0.04	Anhedral.	Inclusions in pyrite and magnetite.
Pyrrhotite	1	0.01	Anhedral.	Inclusions in pyrite and magnetite.
Sphalerite	0.5	0.02	Anhedral.	Corroded remnants interstitial to pyrite.
Hematite	tr.	0.01	Acicular.	Inclusions in pyrite.

NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Smectite	18	<2 (μm)	Fibrous.	Brownish, high birefringence clay aggregates. Some areas with coarser fibers and lower birefringence appear to be interlayered smectite-illite. Intergrown with amorphous silica.
Chlorite	8	<2 (μm)	Fibrous.	Interstitial to sulfide. Colorless, low birefringent clay. Intergrown with amorphous silica.
Carbonate	tr.	0.02	Rhombohedral.	Appears to be residual from dissolved carbonate gangue.

COMMENTS: Two distinct grain/aggregate sizes in both pyrite and magnetite. Coarse grains are poikilitic, and the finer grained pyrite and magnetite occur as blebs in the gangue matrix.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-6R-3 (Piece 3, 13–16 cm)

ROCK NAME: Homogeneous medium- to coarse-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrrhotite	30	0.01–0.1	Anhedral to subhedral.	Mostly compact massive pyrrhotite, some bladed crystals visible.
Pyrite	35	0.05–0.2	Subhedral to anhedral.	Mostly subhedral crystals with pyrrhotite inclusions. Extensive areas of very fine scale vermicular intergrowths of pyrite partially replacing massive pyrrhotite.
Magnetite	5	0.01–0.05	Subhedral to anhedral.	
Hematite	2	0.01	Anhedral.	
Chalcopyrite	1	0.05	Anhedral.	

NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Smectite	18	<10 (μm)	Aggregates.	Yellow-green, high birefringence.
Carbonate	8	0.02	Anhedral.	Interstitial to the opaque minerals.
Chlorite	1	<10 (μm)	Aggregates.	

COMMENTS: It appears that a second generation of pyrrhotite has infilled open space between pyrite crystals that replaced an earlier generation of pyrrhotite. The second generation of pyrrhotite is also extensively replaced by pyrite.



## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-6R-3 (Piece 17, 129–131 cm)

ROCK NAME: Homogeneous medium- to coarse-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	45	0.5	Anhedral to subhedral.	Usually occurs as aggregates, but some euhedral faces visible. Partially replaced by magnetite. Also some euhedral equigranular granoblastic pyrite.
Magnetite	17	0.1–0.2	Subhedral-euhedral.	Sometimes as inclusions in pyrite.
Chalcopyrite	3	0.01	Anhedral.	As inclusions.
Pyrrhotite	2	0.01	Anhedral.	As inclusions in pyrite and magnetite.
Sphalerite	1	0.02	Anhedral.	Ragged grains, apparently remnant from incomplete sphalerite dissolution.
Hematite	tr.	0.01	Anhedral.	
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Carbonate	25	0.01–0.1	Subhedral.	Carbonate occurs interstitially to the opaque minerals.
Chlorite	2		Anhedral.	
Voids	5			

COMMENTS: Atoll textures of magnetite in pyrite euhedra. (See original visual core description for sketch.)

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-7R-1 (Piece 3, 21–23 cm)

ROCK NAME: Homogeneous medium- to coarse-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	30	0.2–1	Euhedral, corroded.	Often replacing pyrrhotite blades.
Chalcopyrite	2	0.02–0.1	Anhedral.	
Magnetite	2	0.2	Subhedral.	
Hematite	1	0.07	Anhedral to bladed.	Replacing pyrite, magnetite, and sphalerite; dusted through carbonate.
Pyrrhotite	0.5	0.02–0.04	Anhedral.	Inclusions in pyrite.
Sphalerite	tr.	0.1	Anhedral.	
Marcasite	tr.		Bladed.	In pyrite replacing pyrrhotite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Carbonate	45	0.2–0.5	Rounded rhombohedra	Interstitial to sulfides. Disseminated goethite and hematite in carbonate grains.
Clay	10	<2 (µm)	Amorphous.	Interstitial to sulfide and carbonate.
Voids	10			

COMMENTS: 1–5 (µm) two-phase fluid inclusions in carbonate with relatively small (10–15 vol%) vapor bubbles. Carbonate and rare rectangular transparent grains (Barite?) included in pyrite.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-7R-1 (Piece 6, 40–50 cm)

ROCK NAME: Massive colloform and vuggy pyrite/homogeneous, massive fine-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	65	0.02–0.2	Euhedral to anhedral.	Botryoidal banding framboids, concretions and pseudomorphs after pyrrhotite.
Chalcopyrite	4	0.02–0.05	Anhedral.	Patches in pyrite and gangue.
Sphalerite	3	0.02–0.06	Subhedral.	Inclusions in pyrite and gangue.
Pyrrhotite	2	0.03	Anhedral.	Small remnants in pyrite.
Marcasite	tr.	0.03	Euhedral.	Laths in the center of pyrite concretions.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Carbonates	10	0.1	Euhedral.	Vug filling.
Chlorite-amorphous silica	10	<2 (µm)	Amorphous.	Yellow interstitial areas of intergrown chlorite-amorphous silica. Replaces vug-filling carbonate and barite.
Voids	5			

COMMENTS: None.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-7R-1 (Piece 8, 63–65 cm)

ROCK NAME: Massive colloform and vuggy pyrite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	75	0.02–0.5	Subhedral to euhedral.	Collomorphic banded pyrite, abundant spherical pyrite concretions and coalesced and overgrown framboids.
Chalcopyrite	2	0.01–0.0	Anhedral.	As fine inclusions in pyrite and coarser grains interstitial to pyrite.
Sphalerite	tr.			
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Amorphous silica	7	<2 (µm)	Amorphous.	Interstitial, intergrown with chlorite.
Chlorite	3	<2 (µm)	Amorphous.	Low birefringence fibers in amorphous silica.
Carbonate	3	0.05	Euhedral.	
Chalcedony	tr.			Replacing carbonate.
Voids	10			

COMMENTS: None.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856G-7R-2 (Piece 6, 42–50 cm)

ROCK NAME: Massive colloform and vuggy pyrite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	65	0.2	Subhedral to anhedral.	
Chalcopyrite	2	0.1	Anhedral.	As ragged inclusions within the pyrite.
Pyrrhotite	tr.			Inclusions in pyrite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
White silica plus clay	10	<2 (μm)	Amorphous.	Infills vugs. Medium to high birefringence clay.
Dark silica(?) plus clay	15	<2 (μm)	Amorphous.	Cements the pyrite.
Voids	8			

COMMENTS: None.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-3R-1 (Piece 3B, 34–38 cm)

ROCK NAME: Heterogeneous and veined coarse-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	45	0.5–2	Subhedral to euhedral.	Large crystals overgrown by magnetite.
Magnetite	15	0.1–0.5	Subhedral to euhedral.	As inclusions in pyrite and growing in open space.
Sphalerite	10	0.05–2	Subhedral.	Between pyrite grains. Abundant chalcopyrite disease.
Pyrrhotite	3	0.1–0.3	Subhedral to anhedral.	Relict pyrrhotite in pyrite.
Chalcopyrite	2	0.001–0.4	Anhedral.	Mostly in pyrite and calcite and as disseminations in sphalerite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Carbonate	10	0.01–2	Euhedral.	Interstitial to the opaque minerals. Often growth zoned with cloudy, partially dissolved cores. Growth zones are defined by two-phase fluid inclusions up to 20 μm long with large vapor bubbles, approximately 20 volume percent. Rims are often more reflective than the cores suggesting a higher iron content.
Silica	10		Amorphous.	
Voids	5			

COMMENTS: None.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-3R-1 (Piece 9, 92-95 cm)

ROCK NAME: Heterogeneous and veined coarse-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	40	0.05-1	Subhedral to euhedral.	Late stage bladed pyrrhotite filling open space between pyrite aggregates.
Pyrrhotite	15	0.05-0.4	Bladed.	
Magnetite	10	0.02-0.2	Subhedral.	As inclusions, especially in sphalerite. Larger grains are mixtures of intergrown chalcopyrite-isocubanite with up to 40% isocubanite as exsolution-like lamellae.
Sphalerite	8	0.02-0.4	Anhedral.	
Chalcopyrite	4	0.05-0.1	Anhedral.	
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Carbonate	20	0.05-0.4	Anhedral.	Interstitial to the opaque minerals. Subhedral aggregates and trellis work needles of magnetite intergrown with carbonate. Infilling vugs.
Silica	4	<2 (µm)	Amorphous.	

COMMENTS: Sample has an overall globular appearance, with the pyrite forming the globules.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-3R-2 (Piece 1E, 73-77 cm)

ROCK NAME: Heterogeneous and veined coarse-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	37	0.1-2	Subhedral.	Replaces pyrrhotite.
Sphalerite	20	0.04-1.5	Anhedral.	Patches with chalcopyrite disease.
Pyrrhotite	10	0.05-1	Idiomorphic.	As small inclusions in pyrite and interpenetrating laths in the gangue matrix, variably replaced by pyrite and magnetite.
Magnetite	8	0.02-0.1	Subhedral to anhedral.	As crystals, aggregates and inclusions in pyrite. Abundant fine-grained magnetite in the carbonate, including some lattice work of magnetite needles.
Chalcopyrite	5	0.001-0.08	Anhedral.	Small patches with rectangular exsolutions of magnetite(?).
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Hydrosilicate	10			Yellow-green smectite(?) filling vugs.
Carbonate	5	0.05		Infilling vugs.
Voids	5			

COMMENTS: Paragenetic sequence: pyrrhotite to sphalerite to (pyrite+magnetite). Trace amount of filamentous bacteria replaced by magnetite at the edges of carbonate-filled cavities.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-4R-1 (Piece 9, 68–70 cm)

ROCK NAME: Sediment with sulfide veining.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Sphalerite	22	Up to 1.2	Anhedral to subhedral.	With chalcopyrite disease.
Pyrite	20	0.01–1	Euhedral to subhedral.	Aggregates replacing pyrrhotite and sphalerite, often occurs with magnetite.
Pyrrhotite	15	0.8–2	Euhedral.	Laths replaced by sphalerite, pyrite, magnetite, and chalcopyrite. Magnetite and pyrite veins cut pyrrhotite.
Magnetite	5	0.02–0.05	Euhedral to subhedral.	In crystals with rounded edges at the boundary between pyrrhotite and pyrite.
Chalcopyrite	4	0.01–0.05	Anhedral.	Inclusions in sphalerite and larger crystals with rectangular inclusions of magnetite(?).
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Smectite(?)	15	<2 (μm)	Amorphous.	Green felt filling voids.
Silica	10	<2 (μm)	Amorphous.	In voids.
Carbonate	5	0.1	Euhedral to subhedral.	Zoned crystals at the boundaries of voids and veinlets.
Voids	5			

COMMENTS: Possible paragenesis: pyrrhotite to (sphalerite+first stage chalcopyrite) to (pyrite+magnetite+second stage chalcopyrite)

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-4R-1 (Piece 15, 123–126 cm)

ROCK NAME: Heterogeneous and veined coarse-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrrhotite	40	0.2–2	Bladed to anhedral.	Coarse-grained pyrrhotite.
Pyrite	25	0.02–2	Euhedral.	Two generations of pyrite, the first replaces pyrrhotite, the second occurs as porous masses with wispy inclusions of clay minerals.
Sphalerite	10	0.02–0.08	Subhedral.	Small patches in pyrrhotite intergrown with chalcopyrite
Magnetite	5	0.05–0.1	Euhedral to subhedral.	In pyrite-rich areas.
Chalcopyrite	3	<0.01–0.02	Anhedral.	Included in sphalerite as chalcopyrite disease and as inclusions in pyrite.
Marcasite	tr.		Anhedral.	Intergrown with pyrite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Amorphous silica	15	<2 (μm)	Amorphous.	Structureless amorphous silica interstitial to sulfide.
Carbonate	2	0.06	Subhedral.	

COMMENTS: Patches of porous pyrite with thin silicate inclusions apparently formed when pyrite replaced void-filling amorphous silica-clay.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-4R-2 (Piece 3, 15–17 cm)

ROCK NAME: Heterogeneous and veined coarse-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	30	0.01–2	Anhedral to subhedral.	Compact pyrite often grading into plumose growth of porous pyrite with thin silicate inclusions. Possibly replacing amorphous silica-clay.
Sphalerite	15	0.05–1.5	Subhedral.	Generally associated with pyrite. Aggregates often rimmed by sphalerite, rectangular to triangular gray inclusions appear to be sphalerite.
Magnetite	7	0.1–0.4	Subhedral to euhedral.	
Chalcopyrite	5	0.1–0.8	Anhedral.	
Pyrrhotite	2	0.01–0.08	Anhedral.	Inclusions in pyrite.
Hematite	tr.			
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Silicate	25	0.01	Amorphous.	Interstitial to the opaque minerals.
Voids	15			

COMMENTS: None.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-4R-2 (Piece 15, 96–98 cm)

ROCK NAME: Homogeneous, massive, fine-grained pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrrhotite	75	0.1–2	Euhedral.	Network of lath-shaped crystals. Interstitial to pyrrhotite, abundant gray inclusions, possibly sphalerite or magnetite.
Chalcopyrite	5	0.1–0.8	Anhedral.	
Sphalerite	4	0.5–1	Anhedral.	Interstitial to pyrrhotite, abundant gray chalcopyrite inclusions.
Pyrite	2	0.05–0.1	Anhedral to euhedral.	Replacing pyrrhotite.
Magnetite	2	0.1–0.2	Euhedral to subhedral.	
Hematite	tr.			
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Hydrosilicate	7	<2 (µm)	Amorphous.	
Voids	5			

COMMENTS: Possible paragenesis: Pyrrhotite to magnetite to (first stage chalcopyrite + sphalerite) to (pyrite + magnetite + second stage chalcopyrite).

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-5R-1 (Piece 3, 12–17 cm)

ROCK NAME: Heterogeneous and veined coarse-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrrhotite	40	0.02–1.0	Subhedral to anhedral.	Bladed crystals and crystal aggregates partly replaced by pyrite.
Pyrite	13	0.05–1.0	Euhedral to subhedral.	Patches replacing pyrrhotite with inclusions of chalcopyrite, magnetite, and sphalerite.
Magnetite	10	0.05	Euhedral.	Crystals with rounded edges and silicate inclusions; inclusions in chalcopyrite.
Chalcopyrite	5	0.005–0.5	Anhedral to subhedral.	Interstitial to bladed pyrrhotite and as inclusions in pyrite and sphalerite.
Sphalerite	2	0.3	Anhedral.	Patches with inclusions of pyrrhotite and chalcopyrite, and as inclusions in pyrite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Carbonate	10	0.02–0.1	Euhedral.	Concentrations in the vein and less in the rest of thin section.
Silica and clay	15	<2 (μm)	Amorphous.	Fibrous aggregates.
Void	5			

COMMENTS: Large vein with Fe(?)–carbonate, silica and hydrosilicate.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-7R-1 (Piece 7, 35–43 cm)

ROCK NAME: Homogeneous, massive fine-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrrhotite	57	0.01–1.0	Subhedral.	Fine to coarse crystals. Some interlocking criss-cross textures in the coarser crystals.
Pyrite	20	0.02–0.1	Anhedral to euhedral.	Subhedral to euhedral grains interstitial to pyrrhotite and porous replacement of pyrrhotite.
Sphalerite	2	0.05	Anhedral.	
Chalcopyrite	2	0.03	Anhedral.	As inclusions in pyrrhotite.
Magnetite	1	0.02	Subhedral.	As inclusions in pyrrhotite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Amorphous silica and clay	10	<2 (μm)	Anhedral.	Interstitial to the sulfide.
Quartz	5	0.01–0.1	Anhedral.	Interstitial to the sulfide, some pseudomorphing carbonate. Intergrown with amorphous silica and clay.
Carbonate	1	0.05		
Voids	3			

COMMENTS: None.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-8R-1 (Piece 5, 26–33 cm)

ROCK NAME: Homogeneous, massive fine-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrrhotite	32	0.1–1	Anhedral to subhedral.	Massive to coarse bladed intergrowths with pyrite and gangue.
Pyrite	30	0.1–1	Anhedral to euhedral.	Small idiomorphic interstitial crystals and porous replacement of pyrrhotite.
Magnetite	8	0.1	Subhedral.	Intergrown in pyrite.
Sphalerite	4	0.01	Anhedral.	Interstitial.
Marcasite	3	0.02	Subhedral.	Intergrown in pyrite.
Chalcopyrite	2	0.01–0.05	Anhedral to subhedral.	Mainly inclusions in pyrite and pyrrhotite.
Hematite	tr.	0.005	Anhedral.	With magnetite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Silica	10	0.5	Amorphous.	Interstitial.
Silicate	5	0.1	Amorphous.	In thin veinlets.
Barite	tr.	0.05	Euhedral.	Prismatic grains in silicate.
Voids	5			

COMMENTS: None.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-8R-1 (Piece 11, 69–75 cm)

ROCK NAME: Massive colloform and vuggy pyrite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	65	0.1	Subhedral to euhedral.	Massive aggregates with voids.
Sphalerite	1	0.01	Subhedral.	Inclusions in pyrite.
Chalcopyrite	tr.	0.003	Anhedral.	Inclusions in pyrite and sphalerite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Silica	10		Amorphous.	Interstitial.
Barite	5	0.1	Euhedral.	Prismatic crystals in voids.
Calcite	5	0.05	Euhedral.	Isometric crystals precipitated in voids which were then filled with silica.
Voids	15			

COMMENTS: None.



## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-11R-1 (Piece 18, 110–112 cm)

ROCK NAME: Homogeneous massive fine-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	40	0.001–0.01 0.01–0.1	Anhedral. Cubic.	Very fine-grained lacy networks of pyrite overgrowing and replacing 1–4 mm pyrrhotite, sphalerite, and barite(?) grains. No original pyrrhotite left; only rare sphalerite remaining. Interior of grains are dusted with very fine-grained inclusions of pyrite.
Chalcopyrite	3	0.01–0.2	Anhedral to euhedral.	Most chalcopyrite occurs as remnant grains left behind during alteration. Some as euhedral crystals, including area of thin lamellae formerly included in pyrrhotite in areas of coarse replaced pyrrhotite crystals.
Sphalerite	1	0.1–0.4	Anhedral.	Remnant grains, partially dissolved.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Amorphous silica and clay	35	<2 (μm)	Amorphous.	Interstitial to sulfide.
Unknown	20	<2 (μm)	Amorphous.	Semi-opaque and birefringent material filling voids left by leaching of coarse-grained pyrrhotite and sphalerite. Mixed with 1–2 (μm) pyrite grains. Possibly native sulfur.

COMMENTS: None.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-13R-1 (Piece 6, 43–46 cm)

ROCK NAME: Homogeneous, massive fine-grained pyrite-pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrite	35	0.002–0.4	Anhedral.	Fine-grained lacy pyrite cut by later veins of medium to fine subhedral pyrite.
Magnetite	5	0.04–0.1	Anhedral to octahedral.	Disseminated fine-grained magnetite in pyrite groundmass, euhedral crystals in veins.
Chalcopyrite	3	0.05–0.2	Anhedral.	Disseminated inclusions in pyrite, coarser in veins.
Pyrrhotite	2	0.02–1	Anhedral.	Mostly as inclusions in pyrite, some in magnetite.
Sphalerite	tr.			
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Amorphous silica and clay	60	<2 (μm)	Amorphous.	Interstitial to sulfide.

COMMENTS: Magnetite occurs throughout the sample, independent of pyrite, and appears to be part of the primary mineral assemblage.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-14R-1 (Piece 3, 16–18 cm)

ROCK NAME: Homogeneous, massive, fine-grained pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrrhotite	75	0.02–0.04	Anhedral to bladed.	Network textured fine crystals and porous polycrystalline aggregates.
Chalcopyrite	6	0.02–0.8	Anhedral.	Fine disseminations and inclusions in pyrrhotite and as coarser-grained crystals.
Pyrite	5	0.2–2	Subhedral to anhedral.	Coarse porphyroblasts of poikilitic pyrite with inclusions of pyrrhotite, chalcopyrite, sphalerite and magnetite.
Magnetite	2	0.05–0.5	Ameboid to anhedral.	Disseminated throughout chalcopyrite.
Hematite	tr.	0.05	Blades.	In magnetite.
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Amorphous silica and clay	10	<2 (µm)	Amorphous.	Interstitial to sulfide.

COMMENTS: Magnetite occurs throughout the sample, independent of pyrite, and appears to be part of the primary mineral assemblage.

## SULFIDE "HARD ROCK" THIN/POLISHED SECTION DESCRIPTION FORM

139-856H-15R-1 (Piece 11, 73-76 cm)

ROCK NAME: Homogeneous, massive, fine-grained pyrrhotite.

OPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Pyrrhotite	65	0.02-0.5 up to 2	Bladed to anhedral. Subhedral to euhedral.	Fine-grained pyrrhotite groundmass. Coarser veins of subhedral pyrrhotite cutting through sample.
Pyrite	3	0.2-2	Pseudomorphic after pyrrhotite.	Pyrite partially to completely replaces pyrrhotite, especially in coarse veins, preserving the pyrrhotite grain shape. Also some 0.1 mm veinlets of pyrite with magnetite cutting the sample.
Magnetite	2	0.05-0.2	Octahedral to veinlets.	Magnetite occurs in pyrite-rich areas, and along veinlets with pyrite in coarse veins.
Sphalerite	8	0.05-1	Subhedral.	Disseminated in pyrrhotite-rich areas and as coarse crystals in veins. Extensive chalcopyrite disease and some rimming and replacement by both chalcopyrite and magnetite.
Chalcopyrite	5	0.02-0.8	Anhedral.	Fine-grained inclusions in groundmass and coarse grains in veins. Most coarse grains have 1-2 $\mu\text{m}$ rectangular gray inclusions (sphalerite-magnetite?).
NONOPAQUE MINERALOGY	PERCENT PRESENT	SIZE (mm)	MORPHOLOGY	COMMENTS
Amorphous silica and clay	15	<2 ( $\mu\text{m}$ )	Amorphous.	Structureless amorphous silica interstitial to sulfide with fibrous low birefringence clay, possibly chlorite.

COMMENTS: None.