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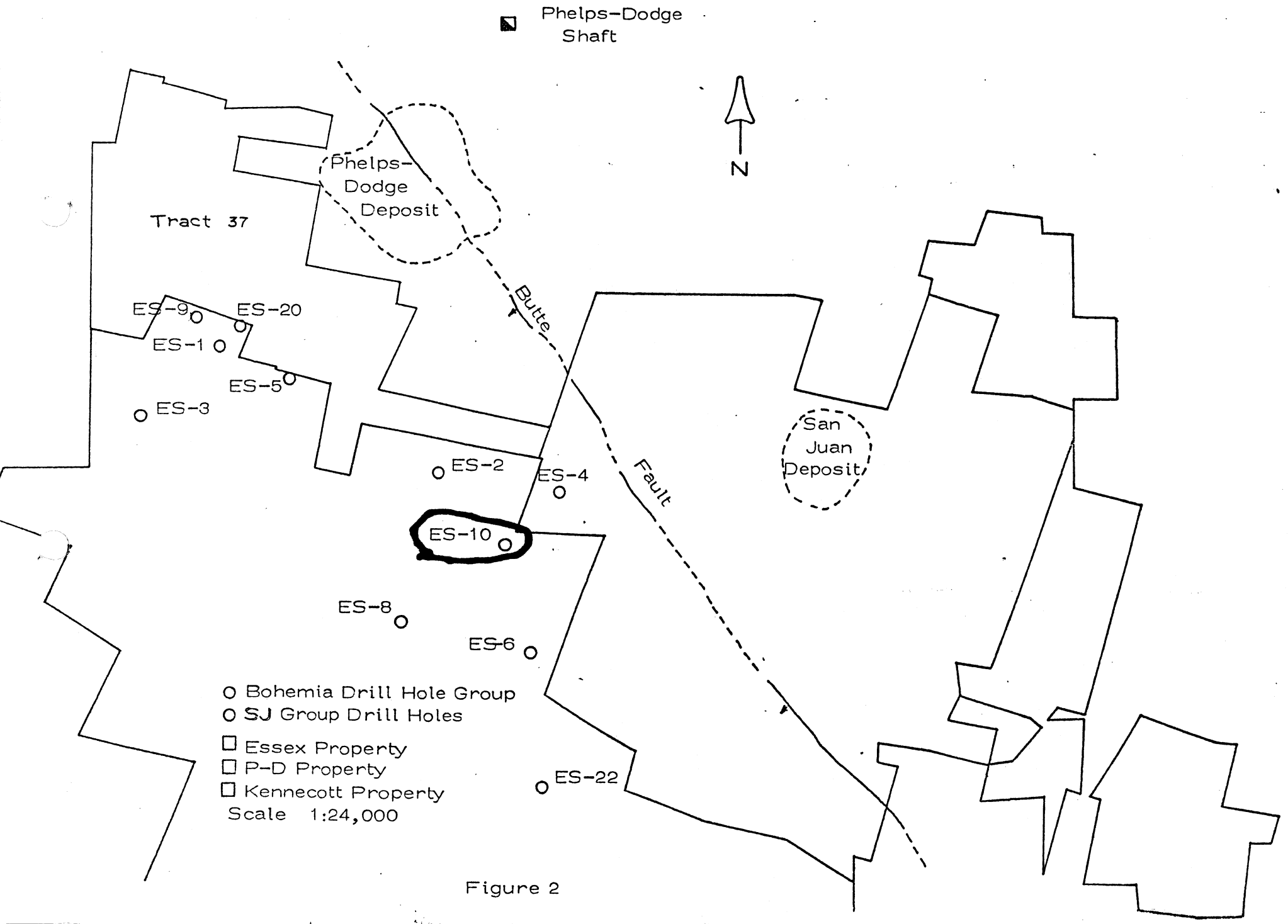
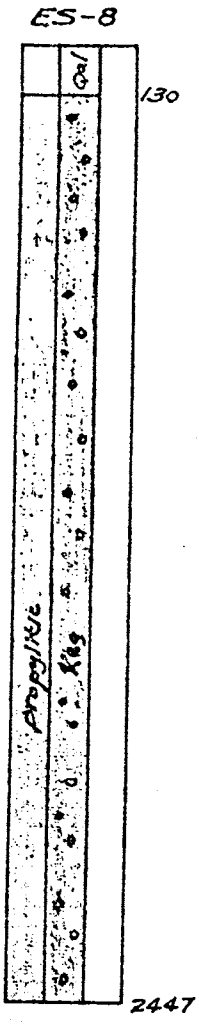

Phelps-Dodge
Shaft
N
Phelps-
Dodge
Deposit
Tract 37
Butte
Fault
San
Juan
Deposit
ES-9
ES-20
ES-1
ES-5
ES-3
ES-2
ES-4
ES-10
ES-8
ES-6
ES-22
Bohemia Drill Hole Group
SJ Group Drill Holes
Essex Property
P-D Property
Kennecott Property
Scale 1:24,000

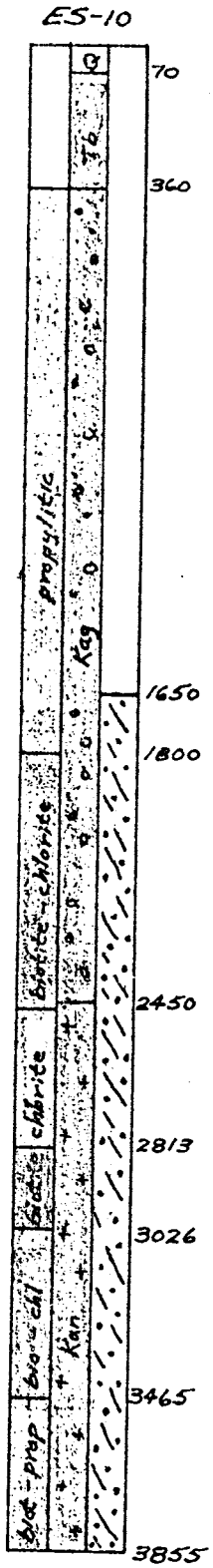
Figure 2

ES-10 COLLARED 11/6/72

ROTARY 0 - 1995

NUMBER OF SHIFTS	:	44
COST PER SHIFT	:	$395.72
AVG FOOTAGE PER SHIFT	:	45
COST PER FOOT	:	$8.72
TOTAL COST	:	$17,411.79


ES-8
Qal
propylitic
Kks
130
2447


ES-10
Q
Tc
propylitic
Kag
Brecciated chlorite
chlorite
Kan
70
360
1650
1800
2450
2813
3026
3465
3855

DRILL HOLE SAMPLES

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO. ES 10	CONTRACTOR	COLLAR COORD. N E	COLLAR ELEV.
BEARING	INCLINATION	DEPTH	STARTED STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.		ASSAYS							REMARKS
5122				0	10	10	.01								
5139					20	10	.2								
5128					30	10	.01								
5127					40	10	.02								
5124					50	0	.03	0-70	0.024						
5142					60	10	.03								
5143					70	10	.06								
5161					80	10	.03								
5115					90	10	.02								
5136					100	10	.02								
5126					110	10	.01								
5156					120	10	.01								
5137					130	10	.01				150'	.012			
5127					140	10	.01								
5112					150	10	.01		0	360	360'	0.01			
5145					160	10	.01				34				
[illegible]					170	10	.01								
[illegible]					180	10	.01								
[illegible]44					190	10	.01								
[illegible]47					200	10	.01								
[illegible]					220	20	.01								
[illegible]					230	10	.01								
[illegible]					240	10	.01								
[illegible]					250	10	.01								
5133					260	10	.01								
5130					270	10	.01								
5150					280	10	.01								
[illegible]				280	290	10	.01								
[illegible]					300										
[illegible]					310										
[illegible]				310	320	10	.01								
[illegible]04					330	10	.01								
5114					340	10	.01								
[illegible]					350	10	.01								
5140					360	10	.01								
5111				360	370	10	.16								
[illegible]					380										
[illegible]				380	390	10	.08								
[illegible]					400				360	430	70'	0.12			
[illegible]				400	410	10	.11				5				
[illegible]					420	10	.12								
[illegible]					430	10	.11								
5155					440	0	.34								
[illegible]					450	10	.27								
[illegible]					460	10	.32								
[illegible]03					470	10	.67								
5153					480	10	.31								
[illegible]					490	10	.30		430	530	100'	0.34			
5125					500	10	.31				2				
[illegible]				500	510	10	.32								
[illegible]					520										
[illegible]				520	530	10	.26								
[illegible]					540	10	.09								
[illegible]					550	10	.17								
5105					560	10	.15								
[illegible]					570	10	.15								
5142					580	10	.16								
[illegible]					590	0			530	700	170'	0.15			
5118				590	[illegible]	10	.16								
[illegible]					610										
5135				610	[illegible]	[illegible]	.15								
[illegible]					[illegible]	[illegible]	.15								
[illegible]					[illegible]	[illegible]									
[illegible]					[illegible]	[illegible]									
[illegible]				[illegible]	[illegible]		.12								

DRILL HOLE SAMPLES

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD. N E	COLLAR ELEV.
ES 10			

BEARING	INCLINATION	DEPTH	STARTED	STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS Cu	ASSAYS PPM Cu						REMARKS
5116				660	670	10	.14							
					680									
5106				680	690	10	.15							
5109					700	10	.16							
5164					710	10	.21							
5166					720	10	.21							
5172					730	10	.18		700	810	110'	0.24		
5171					740	10	.50							
5169					750	10	.24							
5162					760	10	.24							
5163					770	10	.24							
5167					780	10	.25							
5168					790	10	.22							
5165					800	10	.21							
5170				800	810	10	.17							
												430	810	380 0.22
5201				1000	1010	10		767						
5202				1010	1020	10		668		1000	1020	20'	717	
5203				1210	1220	10		576						
5204				1220	1230	10		803		1210	1240	30'	635	
5205				1230	1240	10		527						
5213				1320	1330	10		802						
5210					40	10		774						
5211					50	10		851		1320	1400	80'	938	
5209					60	10		881						
5206					70	10		964						
5212					80	10	.12							
5214					90	10	.12							
5207				1390	1400	10		831						
5208				1420	1430	10		716						
5215				1570	1580	10	.12							
5216				1620	1630	10		779						
5217				1660	1670	10		368						
5218				1820	1830	10		625						
5219					40	10		888		1820	1860	40'	732	
5220					50	10		570						
5221				1850	60	10		845						
5222				1980	1995	15		918						

DRILL HOLE SAMPLES

PAGE | OF

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO	CONTRACTOR	COLLAR COORD.	COLLAR ELEV.
ES-10		N E	

BEARING	INCLINATION	DEPTH	STARTED	STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT	ASSAYS CU							REMARKS
5234	NX	5	100	1994	1999	5	.04							
5240		4	80	2050	2055	"	.03							
5241		5	100	2104	2109	"	.05							
5242		"	"	2148	2153	"	.07							
5243		"	"	2195	2200	"	.17							
5244		"	"	2249	2254	"	.13							
5245		"	"	2296	2301	"	.08							
5246		"	"	2349	2354	"	.07							
5247		"	"	2398	2403	"	.18							
5248		"	"	2450	2455	"	.10							
5249		"	"	2500	2505	"	.09							
5250		"	"	2551	2556	"	.05							
5251		"	"	2602	2607	"	.16							
5252		4	80	2650	2655	"	.08							
5253		5	100	2700	2705	"	.07							
5254		5	"	2751	2756	"	.07							
5255		4	80	2803	2808	"	.12							
5256		5	100	2853	2858	"	.08							
5257		4	80	2896	2901	"	.19							
5258		4	"	2949	2954	"	.02							
5259		4	"	2994	2999	"	.06							
5260		5	100	3050	3055	"	.02							
5261		5	"	3105	3110	"	.03							
5262		4	80	3150	3155	"	.07							
5263		5	100	3202	3207	"	.18							
5264		4	80	3251	3256	"	.03							
5265		5	100	3298	3303	"	.03							
5266		4	80	3345	3350	"	.02							
5267		5	100	3395	3400	"	.01							
5268		5	"	3450	3455	"	.01							
5354		10	"	3523	3533	10								
5355		7	"	3533	3540	7								
5356		10	"	3540	3550	10								
5514		5		3599	3604	5	.03							
5515		"		3653	3658	"	.02							
5516		"		3695	3700	"	.02							
5517		5		3750	3755	"	.05							
5518		"		3800	3805	"	<.01							
5519		7		3843	3850	7	<.01							

Sample No. ES-10 1997

Texture: Mostly fine-grained, porphyritic.

Mineralogy

Plagioclase
Quartz
Biotite
Chlorite
Sericite
Pyrite
Magnetite
Hematite

Plagioclase occurs as phenocrysts up to 2mm across. It is mostly fairly fresh with only minor sericitic alteration. The groundmass is all crystalline and consists mostly of plagioclase and quartz with fine grained biotite present in variable amounts. Biotite is aparse in some areas but is present throughout the section. It forms clusters in a few areas. Some sericite is present in the groundmass. The section did not stain; apparently no orthoclase is present. Pyrite is fairly abundant and is associated with fairly coarse grained chlorite. Much of the magnetite is oxidized to hematite. Sericite appears to be more abundant adjacent to iron-oxide stained fractures. (See hand sample.)

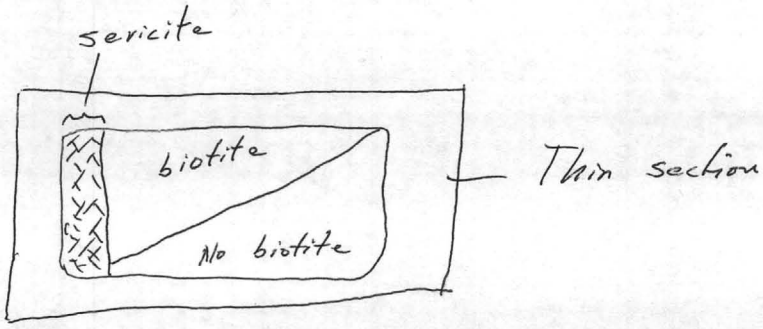
Sample No. ES-10 2150

Texture: Fine grained porphyritic

Mineralogy

Plagioclase
Chlorite
Quartz
Biotite
Sericite
Sphene
Pyrite
Hematite
Epidote

The thin section is somewhat heterogeneous. Irregular plagioclase crystals have a maximum size of 2mm, but are mostly less than this. In the part of the thin section containing biotite they are relatively fresh with minor epidote and sericite replacement. In other areas they are very cloudy and show some sericite, chlorite and possibly some clay mineral replacement. Chlorite is fairly abundant in areas not containing biotite as ~1mm irregular masses. Very fine grained is abundant in the groundmass of about 1/3 of the thin section but is absent in other areas. A thin 0 zone of sericite about 2mm wide is present at the edge of the thin section and some orthoclase may be present in the hand specimen adjacent to the sericite zone (orthoclase vein?). The contact between the biotite rock and the rock without biotite is sharp and appears to be a contact rather than alteration zoning. Quartz is mostly in small veinlets that cut both the biotite rock and the areas where biotite is absent.



Sample No. ES-10 3155

Texture: Mostly fine grained porphyritic.

Mineralogy

Plagioclase
Epidote
Quartz
Chlorite
Calcite
Magnetite
Pyrite

Plagioclase occurs both as phenocrysts and in the groundmass. Some of the phenocrysts are almost completely replaced by masses of epidote. Alteration to chlorite and calcite are present in some areas. Phenocrysts make up less than $\frac{1}{2}$ of the rock. Epidote occurs as alteration product of plagioclase and as large clusters whose origins are not clear. Quartz is present in the groundmass and in small veinlets with pyrite. Chlorite is not at all abundant but some is present. Pyrite and magnetite are disseminated throughout the rock and in small veinlets. The groundmass is variable in texture. In some areas it is composed of granular quartz and plagioclase and in others appears to be almost all fine grained laths of plagioclase. Apparently no orthoclase is present.

Sample No. ES-10-1900-1910

Hand sample: Rotary cuttings, several small fragments 1-5mm in size.

The fragments appear similar but textures are slightly different. All contain plagioclase crystals in a finer grained groundmass. The groundmass contains quartz and possibly orthoclase in most fragments. Fine grained biotite is present in all fragments. One fragment appears to contain more plagioclase and biotite than the others. This one is most probably andesite while the others may be more felsic rocks such as latites of maybe quartz latites.

Sample No. ES-10-2055

Hand Sample: Dark grey, fine grained rock. Some small feldspar phenocrysts Several veinlets with pyrite. Rock is bleached adjacent to veinlets.

Thin section texture: Porphyritic, fine grained groundmass.

Mineral

plagioclase
biotite
sericite
apatite
chlorite
magnetite
pyrite
hematite or limonite
quartz
glass (?)

Plagioclase phenocrysts are similar to those in other rocks of this group. Most are altered, sericite and fine grained biotite being the most abundant alteration products. Some crystals are very cloudy and clay minerals may be present. A few smaller quartz phenocrysts are present. Fine grained brown biotite is scattered throughout the groundmass and occurs in larger clusters that apparently represent replaced mafic minerals. Some of the shapes are suggestive of hornblende but most clusters are irregular in outline. Much of the groundmass is very fine grained and some glass may be present. Chlorite is present as irregular patches, but is not very abundant ($<5\%$).

Several veinlets cut the thin section. These contain small amounts of quartz and chlorite. Fairly coarse sericite is abundant in the veinlets and finer grained sericite is very abundant adjacent to the veinlets causing the lighter color in the core. The center of larger veinlets is mostly pyrite. A thin shell of red iron oxide coats the pyrite. Along with the pyrite is a pale brown material with very low birefringence. Under high power this seems to be an extremely fine grained material. It is also coated with red iron oxide and looks milky white in reflected light. It may be some form of amorphous or cryptocrystalline silica with iron oxide staining causing the brownish color.

Rock name: Andesite.

Sample No. ES-10-2468

Hand Sample: Medium grey, mostly fine grained porphyritic. Pyrite along fractures and disseminated. Much of the disseminated pyrite is in the center of light colored phenocrysts (plagioclase).

Thinssection texture: Porphyritic, mostly fine grained.

Mineral

plagioclase
quartz
biotite
orthoclase
chlorite
carbonate
pyrite
sericite
clay minerals (?)

Plagioclase phenocrysts are irregular in shape and show weak to moderate alteration to sericite, biotite and possibly clay minerals. Irregular patches of orthoclase occur inside some plagioclase crystals. Irregularly shaped quartz phenocrysts are fairly abundant (8-10%). The larger ones are rounded and embayed. Very fine grained biotite is present in most areas of the groundmass and a few coarser grained patches are present. Much of the groundmass is extremely fine grained and some glass may be present. One small carbonate veinlet cuts the rock. A larger quartz vein cuts the thin section. Some coarse grained sericite is with the quartz and finer grained sericite is abundant on either side of the quartz. A very small amount of carbonate is also present.

Rock name: Probably andesite although quartz is more abundant than in most of the other samples. Phenocrysts appear to be broken. Maybe a pyroclastic rock (?).

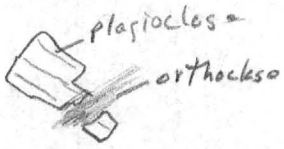
Sample No. ES-10-2528

Hand sample: Light gray porphyritic rock. White plagioclase phenocrysts. Fine grained disseminated pyrite.

Thin section texture: Porphyritic, fine grained groundmass.

Mineral	Est. %
plagioclase	35-40
orthoclase	30-35
quartz	10-15
sericite	5-10
chlorite	~5
leucoxene	tr
pyrite	1-2
magnetite	tr
hematite	tr
apatite	tr

Plagioclase occurs as subhedral phenocrysts up to 4mm in length. All crystals show moderate to strong sericitic alteration. Quartz occurs as small, sparse rounded and embayed phenocrysts and in the groundmass. Chlorite is present as fairly large masses that appears to be replacements of biotite. Leucoxene is usually present in these areas. Orthoclase is abundant in the groundmass where it is fine grained. It is even more abundant on either side of a fracture which cuts the thin section. This appears to be, at least in part, secondary. A plagioclase phenocryst is broken and the fracture filled with orthoclase.



Some farily coarse grained sericite is also present along the fracture. Throughout the thin section are several patches 2-4mm across that contain sericite and quartz with no orthoclase. Several plagioclase phenocrysts are cut by fractures smaller than the one mentioned above with strong sericitic alteration developed in the plagioclase along these fractures.

Rock name: Porphyritic quartz latite if most of the orthoclase is primary, which it appears to be. Some orthoclase along the fracture is secondary.

Sample No. ES-10-2567

Hand sample: Light gray porphyritic, white or pink feldspar phenocrysts. Small veinlets are present.

Thin section texture: Porphyritic, fine grained groundmass.

Mineral

plagioclase
orthoclase
quartz
sericite
chlorite
apatite
pyrite
hematite
leucoxene
clay minerals ??

Plagioclase, quartz and chlorite occur as phenocrysts. The plagioclase shows varying amounts of alteration from slight sericitization to complete replacement by sericite. Quartz phenocrysts are rounded and embayed. Chlorite usually occurs as elongated masses with fine grained leucoxene and probably represents replaced biotite. The groundmass, which makes up about one-half of the rock, is about 75% orthoclase. Some fine grained quartz also occurs in the groundmass. Fine grained sericite is sparsely scattered throughout the groundmass. Coarser grained sericite intergrown with fine grained quartz is abundant in large irregularly shaped patches throughout the rock and along a small veinlet. Plagioclase phenocrysts are more intensely altered in these areas and where cut by the veinlet. A small amount of orthoclase somewhat coarser grained than most of the groundmass orthoclase occurs with the quartz sericite patches. Pyrite is disseminated throughout the rock but is common in the sericite-quartz patches. Some clay minerals may be present but were not positively identified in thin section or by X-ray. Sericite makes up 20-25% of the rock.

Rock name: This is the same rock as ES-10-2528 which was called quartz latite. It may be closer to rhyolite as orthoclase and plagioclase are present in roughly similar amounts.

Sample NO. ES-10-2950

Hand sample: Dark grey, mostly fine grained porphyritic rock. Pyrite along fractures.

Thin section texture: Porphyritic, fine grained groundmass.

Mineral

plagioclase
biotite
quartz
apatite
chlorite
carbonate
epidote
magnetite
pyrite

Plagioclase phenocrysts are up to 2mm in length. Most are cloudy, some contain patches of fine grained biotite and very small amounts of epidote are present in a few plagioclase sites. Fine grained biotite is present throughout the groundmass. A few patches of slightly coarser grained biotite are present. A small amount of chlorite occurs as small patches. Fine grained quartz makes up less than 5% of the rock. A small veinlet carries sulfides with small amounts of carbonate, quartz and chlorite.

Rock name: Andesite.

Sample No. ES-10-3417

Hand Sample: Medium grey, mostly fine grained rock with cavities (vesicles? (vesicles?) of various sizes. Some of these are lined with a white material some of which appears to be carbonate (weak acid reaction). Green masses (epidote?) up to 2mm across are fairly abundant. Sulfides in veinlets.

Thin section texture: Fine grained rock with some phenocrysts. Some suggestion of flow orientation of plagioclase microlites.

Mineral

plagioclase
biotite
epidote
hornblende
magnetite
pyrite
carbonate
quartz
orthoclase

Plagioclase occurs as liths ranging in size from 0.1mm to 1mm. Most grains are cloudy, biotite occurs in some plagioclase sites. Some larger phenocrysts have irregular patches of orthoclase. Anhedral hornblende phenocrysts make up about 5% of the rock. Some of these are slightly altered to epidote and several fairly large patches of epidote are present in the thin section. Fine grained biotite is distributed throughout the groundmass. Several small veinlets are present. These contain sulfides, orthoclase and smaller amounts of carbonate and quartz.

Rock name: Andesite.

Sample No. ES-20-3807

Hand sample: Dark gray dense fine grained rock. Sulfides along fractures.

Thin section texture: Porphyritic, fine grained groundmass with abundant plagioclase laths.

Mineralogy

Plagioclase
hornblende
biotite
magnetite
sericite
quartz
anhydrite (?)

Plagioclase is the most abundant mineral ranging in size from small microlites to small phenocrysts 1mm in length. Most plagioclase is unaltered but some grains are altered to sericite and occasionally patches of biotite occur in plagioclase sites. Plagioclase makes up about 60% of the rock. Hornblende occurs as small (~1mm) phenocrysts and as more irregular grains in the groundmass. It is very fresh in appearance and makes up 10% or less of the rock. Biotite is very abundant in the groundmass (~30% of rock). It is greenish brown and fine grained. Biotite also occurs with quartz in a small veinlet and this veinlet biotite is slightly coarser grained than most of the groundmass biotite. Quartz was recognized only in the veinlet. A small amount of what appears to be anhydrite also occurs in the veinlet. Fine grained magnetite is very abundant in the groundmass of the rock ((3-5%).

Rock name: Andesite.

Sample No. ES-10-3814

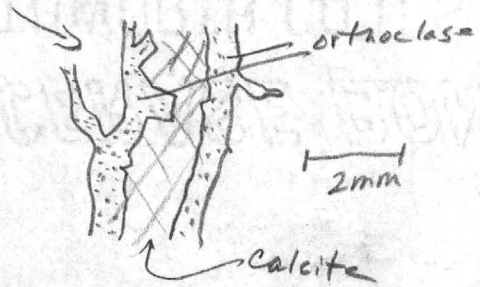
Hand sample: Medium gray mostly fine grained rock. Some lighter colored areas are present. Pyrite veinlets are present and the rock is bleached adjacent to these veinlets. Carbonate occurs along some fractures. Some lithic fragments up to 1cm in diameter are in the sample.

Thin section texture: Mostly fine grained porphyritic. Phenocrysts are irregular in shape and appear to be broken. Rock is probably pyroclastic or an agglomerate.

Mineral

plagioclase
quartz
orthoclase
biotite (?)
chlorite
glass
carbonate
pyrite
magnetite

This rock consists mostly of irregular, broken plagioclase crystals set in a groundmass of glass. A few (<5% of rock) quartz phenocrysts are present. Orthoclase phenocrysts are more abundant than quartz but are in part replacement. Plagioclase phenocrysts are very fresh appearing. Some fine grained biotite is present in the groundmass. A few irregular patches of chlorite are present. One fairly large veinlet cuts the thin section. It has a calcite center with orthoclase at the margins. Two smaller veinlets are almost all orthoclase.



Rock name: The rock is very heterogeneous fractured [redacted] and veined. It is probably close to andesite in composition. The broken plagioclase crystals suggest a possible pyroclastic origin. Secondary orthoclase is fairly abundant in veinlets.

Sample No. ES-20-4956

Hand Sample: Dark gray, mostly fine grained somewhat heterogeneous rock. Several irregular light colored patches are present. The rock is fractured and cut by light colored veinlets. Fine grained chalcopyrite and bornite are present in some areas.

Thin section texture: Porphyritic. Two slightly different textures are present in the thin section. In one area there is a well defined break in grain size between larger plagioclase crystals and groundmass. In the other area plagioclase is slightly more abundant and ranges in size from microlites to larger crystals. Groundmass biotite is slightly coarser grained in the former area.

<u>Mineral</u>

plagioclase
biotite
quartz
magnetite
carbonate
orthoclase
chlorite

Plagioclase is variable in grain size. Maximum size is about 2mm. Most crystals are cloudy and some fine grained biotite occurs in plagioclase sites. A few quartz phenocrysts are present and apparently some quartz is in the groundmass in the areas where plagioclase is less abundant. Biotite is abundant throughout the thin section but is coarser grained in the areas where plagioclase is less abundant, 1-2% magnetite is present. A few small irregular patches of carbonate are present. A veinlet cutting the thinsection is composed mostly of quartz and orthoclase with a small amount of carbonate. Chlorite occurs along the margins of the veinlet in some areas.

Rock name: Probably andesite. Impossible to say just how much quartz is present in the groundmass.

DIAMOND DRILL LOG

SCALE _____ STARTED 12-21-73 STOPPED 3-26-73 NOTES BY B. Helming

DEPTH 3855 BEARING _____ INCLINATION VERTICAL

HOLE No. ES-10 SHEET 1 OF 20

PROPERTY _____ COUNTY _____ STATE _____

COLLAR COORD. N. _____ E. _____

COLLAR ELEV. 3880

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
							ROTARY START 11-7-72 STOP 11-25-72 CORE START 12-21-72 STOP 3-26-73 SHIFT REPORTS SHOW HOLE WAS ROTARY DRILLED TO 1995 BUT CORE STARTS 1985 — 10 FT DISCREPANCY			
				1985						
			100				partial oxidation is evident	pyrite occurs in veins and disseminations;	moderate to strong pervasive biotite alteration locally ascending to some chlorite alteration	Kog andesite agglomerate upper part is porphyritic and lacks clastic structure
				1990			pyrite → reddish brown goethite	majority of pyrite is in veins, the principal set is subparallel the core axis with secondary sets at about	sericite weak, plagioclase are	clastic structure appears at about 2055 but is weak and best
			95							
	.04			1996			at about 2000 ft there are small amounts of yellow jarosite			
			65							
				1999						

DIAMOND DRILL LOG

SCALE ____ STARTED ____ STOPPED ____ NOTES BY ____ DEPTH ____ BEARING ____ INCLINATION ____

HOLE No. ES-10 SHEET 2 OF 20

PROPERTY ____ COUNTY ____ STATE ____ COLLAR COORD. N. ____ E. ____ COLLAR ELEV. ____

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			35	2010			which occasionally is shaded a pale green	45° ± to core axis; amount of dissem. pyrite varies widely from < 1% to 8%; total sulfide content probably averages 6-8%	cloudy and dull but generally pretty hard	seen when core is washed and allowed to dry; clasts are irregular in size + shape up to 3 inches; strong alteration has obscured original structure
			20	2020				a few of the pyrite-sericite type veinlets contain a metallic gray mineral finely disseminated as a border phase in the bleached halo or less frequently within the vein proper; this mineral is thought to be specular hematite since it breaks into tiny flakes when you attempt to scratch it	abundant veinlets all containing pyrite may be separated into two general types 1) thin pyrite seams with or without thin biotite halo, appear to have closely followed pervasive biotite alteration	rock fairly typical of that seen approaching the agglomerate (Kag) — fine-grained andesite (Kan) contact
			0	2025						
			100	2027						
			90	2028						
			8	2038						
			95	2040						
			100	2045						
			140	2046						
			80						2) pyrite + sericite ± quartz + weak chlorite (?) these far outnumber the first type of vein, occur in many stages as evidenced by frequent crosscutting; up to ½" wide with bleached sericite halo on each side commonly wider than vein; typically contain erratic core of soft blue-green clay which is some places has concentric banding indicating open-space filling, where these are abundant entire rock has bleached effect	
	.03			2055			zone of moderate to strong fracturing ends at approximately 2070 with degree of oxidation decreasing below			
			10	2062						
			100	2070						
			100	2080						
			100	2088						
			100	2091						
			95	2100						

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 3 OF 20

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____

DEPTH _____ BEARING _____ INCLINATION _____

PROPERTY _____ COUNTY _____ COLLAR COORD. N. _____ E. _____ COLLAR ELEV. _____ STATE _____

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			100					Same	Same	Same
				2104					at this depth chlorite is a strong component of many if not most veinlets occurring with pyrite in the center	
	.05									
			95							
				2114						
			100							
				2119						
			100							
				2128						
			100							
				2137						
			100							
				2145						
			100							
	.07									
				2153						
			95							
				2160						
			80							
				2164						
			100	2165						
			100							
				2172						
			100							
				2175						
			100							
				2185						
			100							
				2195				2195 first traces f.g. bronze colored sulfide (bornite?)		
	.17	6								

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 4 OF 20

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____

DEPTH _____ BEARING _____ INCLINATION _____

PROPERTY _____ COUNTY _____ STATE _____ COLLAR COORD. N. _____ E. _____ COLLAR ELEV. _____

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
		80						same	same
			2205						
		100							
			2215						
		100							
			2222						
		100				pyrite → bright brick red limonite			
			2232						
		100							
			2237						
		100							
			2247						
	.13	95							
			2257						
		100							
			2265						
		100							
			2275						
		100							
			2285				some diminution in size and frequency of sulfide veinlets total sulfide content about 3-5 %		
		100							
			2295						
	.08								

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 5 OF 20

SCALE ____ STARTED ____ STOPPED ____ NOTES BY ____

DEPTH ____ BEARING ____ INCLINATION ____

PROPERTY ____ COUNTY ____ STATE ____ COLLAR COORD. N. ____ E. ____ COLLAR ELEV. ____

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
		100						Same	Same
			2305						Some areas bleached to pale greenish gray
		100							
			2311						clastic structure very weak to nonexistant, still rock lacks homogeneity of flows
		100							
			2321						phenocrysts barely megascopic
		100							
			2331			2331 trace chalcopyrite on fx			
		100							
			2336						
		100							
			2346						
		90							
	.07		2355						
		100							
			2365						
		100							
			2374						
		100							
			2383						
		100				partial oxidation still occurs			
			2393						
		100							
			2398						

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 6 OF 20

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____

DEPTH _____ BEARING _____ INCLINATION _____

PROPERTY _____ COUNTY _____ COLLAR COORD. N. _____ E. _____ COLLAR ELEV. _____ STATE _____

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
	.18	100	2404				Same	Same	Same
		100	2414						poorly defined chaotic structure
		100	2421						
		100	2430					a rare vein will have pyrite-chlorite core w/ thin halo of biotite, these are cut by later quartz-chlor-sericite	
		100	2440					small amounts of calcite in a few veins	
		100	2450			2449 traces fg. bornite	several tens of feet in this area contain about 6% dissem pyrite plus the veins for a total ≈ 8%		2450 — Kan. start of section showing good megascopic porphyritic texture, percent phenocrysts varies from 5-50% average 10-15% up to 3 mm
	.10	100	2460					rock becoming more siliceous	essentially no clastic structure gray color as above
		100	2470				pyrite veinlets common but show essentially no halo alteration good dissem pyrite 4-5% total sulfide content 4-6% locally 8%	plagioclase totally altered to soft pale green clay or sericite; probably strong secondary silica;	
		100	2480					near top there is some biotite after mafics but this rapidly gives way to chlorite	at 2480 it is apparent this rock is a siliceous flow unit, dacite or perhaps rhyodacite
		100	2482				scattered occurrences of very fine brassy colored sulfide (bornite?) also traces irridescent red + blue covellite on bornite?	also clay (sericite) alteration of groundmass has destroyed whatever crystal texture may have existed	≈ 10% phenocrysts of plagioclase; quartz grains abundant but entire groundmass is very siliceous, how much is secondary is unknown; perhaps 1% original mafic phenocrysts locally up to 5%
		100	2490				small amounts of hypogene hematite		
		100	2500				pale green coloration of clay? on fxs and veins probably due to chlorite		

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 7 OF 20

SCALE ____ STARTED ____ STOPPED ____ NOTES BY ____

DEPTH ____ BEARING ____ INCLINATION ____

PROPERTY ____ COUNTY ____ STATE ____ COLLAR COORD. N. ____ E. ____ COLLAR ELEV. ____

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
	.09	100					Same	Same	no K-spars identified color is pale greenish gray
			2508						
		100							* gradational nature of both upper and lower contacts indicate the dacite is a normal flow unit in the lower andesite unit
			2518						
		100							
			2527						
		100							
			2535						
		75							
			2539						
		20							
			2545						
		100							
			2547						
		100				continued partial oxidation of pyrite to bright brick red limonite			
	.05		2555						
		100							
			2565						
		100							
			2574			about 10 ft of golden brown limonite			
		100							
			2580						
		100							
			2587			below ≈ 2585' limonite is dark purplish red			
		100				~2589 true bor-cpy			
			2595						
		130							

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 8 OF 20

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____

DEPTH _____ BEARING _____ INCLINATION _____

PROPERTY _____ COUNTY _____ STATE _____ COLLAR COORD. N. _____ E. _____ COLLAR ELEV. _____

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
							Same	Same	Same
	.16		2603						
		70							
			2610				6-8% dissem pyrite plus 1-2% vein pyrite		
		100							
			2617						
		100							
			2625				traces hypogene hematite - dissem		
		100							
			2633						
		100							
			2640						
		100							
			2647						
		100							
	.08		2655						
		100							
			2659						
		95							
			2665						
		100							
			2670						
		100							
			2677						
		100							
			2680			local moderate fracturing with accompanying heavier limonite dark purple red			
		95							
			2685						
		80							
			2690						
		100							
			2694						
		100							
			2697						

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 9 OF 20

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____ DEPTH _____ BEARING _____ INCLINATION _____ PROPERTY _____ COUNTY _____ STATE _____ COLLAR COORD. N. _____ E. _____ COLLAR ELEV. _____

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
	.07		100	2704				Same	Same	Same
			100	2707						
			100	2711						
			90	2719						
			100	2721						
			100	2728						
			100	2732						
			100	2735						
			90	2744				scattered traces bornite with possible chalcopyrite		
			100	2750			scattered limonite dark brown or dark red			
	.07		100	2760						
			100	2765				dissem pyrite 4-6% total pyrite ≈ 5-7%		
			100	2766						
			100	2775						
			100	2778						
			85	2784						
			100	2787						
			100	2791						2790 approx start contact zone - mixed intrusive - andesite in patches with irregular shapes + sizes
			100							

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 10 OF 20

SCALE ____ STARTED ____ STOPPED ____ NOTES BY ____

DEPTH ____ BEARING ____ INCLINATION ____

PROPERTY ____ COUNTY ____ STATE ____ COLLAR COORD. N. ____ E. ____ COLLAR ELEV. ____

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			2801				Same	Same	
		100					mod. pyrite veinlets usually with bleached halo several times thickness of vein; many contain green clay	biotite alteration strong; plagioclases have hazy outline, are cloudy and soft due to clay(?) alteration	2813 approx contact Kan – fine grained andesite porphyry, phenocrysts 1-2 mm; dark gray to nearly black; still there are short intervals and clasts of docite occurring for several tens of feet in a section that has a weakly developed clastic structure
	.12		2806						
		70				traces bor-cpy			
			2809						
		100					dissem pyrite weak to mod, ≤1-2%	scattered very minor calcite	
			2816						
			2818			trace bor-cpy			
		100							
			2821						
		100							
			2826						
		100							
			2835				scattered f.g. bornite w/ traces chalcopyrite is more frequent in veins + on fxs but still only minor amounts		
		100							
			2844				so far bornite observed nearly exclusively in clay? – chlorite veinlets		
		100							
			2849						
		100							
	.08		2855						
		100							
			2863						
		100							
			2871						
		100							
			2880						
		50							
			2881						
		50							
			2884						
		70							
			2886						
		100							
			2890						
		95					below approx 2890 dissem pyrite decreases to 1-2% but veins remain consistent		
			2892						
		85					rare bornite		
	.19								

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 11 OF 20

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____

DEPTH _____ BEARING _____ INCLINATION _____

PROPERTY _____ COUNTY _____ STATE _____ COLLAR COORD. N. _____ E. _____ COLLAR ELEV. _____

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
							same	same	same
			2906					biotite with argillic, heavy white to green waxy material on fys and veins	
		100					low sulfides ≈ 2% b, no copper		2912-2916 black aphanitic tuff bed, below this point green porphyritic dacitic intervals and clasts very rare, rock more typical fine grained andesite
			2916						
		100					most of the sulfides in veins		
			2925						
		100							
			2933						
		100							
			2940						
		95							
			2947					plagioclase phenocrysts stronger clearer and harder	
		100							
	.02		2951						
		50							
			2953						
		100							
			2957						
		100							
			2961						
		100							
			2965						
		90					dissem pyrite erratic and directly related to veins		
			2973						
		90					dissem magnetite present but tough to see	scattered local areas of strong epidote in spots + clumps	
			2981						
		100							
			2991						
	.06	100							
			3000						

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 12 OF 20

SCALE ____ STARTED ____ STOPPED ____ NOTES BY ____

DEPTH ____ BEARING ____ INCLINATION ____

PROPERTY ____ COUNTY ____ STATE ____ COLLAR COORD. N. ____ E. ____ COLLAR ELEV. ____

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
								Same	Same	Same
			100				badly broken core	rare veins just thin stringer pyrite; most veins thin 1/16 to 1/8 inch w/ weak to moderate bleached halo, core varies from pyrite-quartz, pyrite-weak chlorite, pyrite-biotite	epidote fairly common after plagioclase	Kan fine-grained porphyritic andesite; medium to dark gray
				3010						
			95							
				3020						
			85							
				3026						
			100						biotite very weak to very patchy moderate, chlorite appears in place of biotite	
				3034						
			100						heavy waxy material on fxs diminished greatly to relatively thin white coatings w/ occasional calcite	
				3044						
			100							
	.02			3053						
			100							
				3062						
			90							
				3070						
			100							
				3075				biotite very rare in veins		
			100							
				3080						
			100				3 inch gouge w/ bx			
				3086						
				3096						

DIAMOND DRILL LOG

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____

DEPTH _____ BEARING _____ INCLINATION _____

HOLE No. ES-10 SHEET 13 OF 20

PROPERTY _____ COUNTY _____ STATE _____ COLLAR COORD. N. _____ E. _____ COLLAR ELEV. _____

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
		100					Same total sulfides varies widely from <1% to 5% fairly consistent 1-2% in veins but dissem pyrite varies from nil to 4% no visible copper fine disseminated magnetite 2-3%	Same	Same Kan medium gray fine-grained porphyritic andesite
	.03		3105						
		100							
			3115						
		100							
			3125						
		70							
			3139			3141-3159 grayish green interval alteration is chlorite-epidote dissem sulfides 3-4% traces chalcopyrite 2-3% dissem magnetite			
		100							
			3150						
	.07	100							
			3159						
		100							
			3165			approximate start of badly broken and brecciated core		biotite alteration improves to generally moderate, epidote + calcite still present	
		100							
			3175						
		100							
			3185						
		100							
			3194						

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 14 OF 20

SCALE
STARTED
STOPPED
NOTES BY
DEPTH
BEARING
INCLINATION
PROPERTY
COUNTY
STATE
COLLAR COORD. N.
E.
COLLAR ELEV.

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
		70					same	same	same
	.18								andesite porphyry but only weakly porphyritic; 20-30% phenocrysts average ≈ 1 mm rarely over 2 mm
			3207					approaching bx zone alteration becomes chlorite-qtz-sericite rock slightly bleached to light gray	
		100					pyrite veins minor mostly dissem, 3-4% total		
			3215						
		100							
			3234						
		100							
			3240						
		75							
		100	3248						
		100	3250						
			3251						
	.03	90							
			3259						
		90					2-3% dissem pyrite	weak chlorite, silicification continues below fx zone	
			3266						
		100							
			3271						
			3280						
		NO BLOCKS	3290				weak dissem magnetite		
							sulfide content diminishing, traces dissem, sparse veins + fx coatings		
			3300						

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 15 OF 20

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____

DEPTH _____ BEARING _____ INCLINATION _____

PROPERTY _____ COUNTY _____ STATE _____ COLLAR COORD. N. _____ E. _____ COLLAR ELEV. _____

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
	.03							very small amounts pyrite	low matic content weak chlorite, some biotite appearing	same
				3313						
			100							
				3323						
			90							
				3331						
			100					sulfides improving in veins and dissem.	chlorite on fxs + veins biotite mod to strong in groundmass plagioclase hard + cloudy	
				3341						
			100							
				3345						
	.02								at 3345 sharp increase to moderate epidote and weak chlorite after plagioclase	
			65							
				3357					calcite in sparse veinlets + occasional open space fillings	
			100							
				3367						
		NO BLOCKS	95							
								2% pyrite dissem + veins		
									3392 - 3 inch long 1/4 inch wide streak pale salmon colored mineral, H-6, no fizz w/ HCl, feldspar(?); calcite on margins	
	3393									
				3395						
	.01									

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 16 OF 20

SCALE
STARTED
STOPPED
NOTES BY
DEPTH
BEARING
INCLINATION
PROPERTY
COUNTY
STATE
COLLAR COORD. N.
E.
COLLAR ELEV.

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			100					Same	Same	Same
				3405					chlorite - epidote after plagioclase;	Kan andesite
								< 1% pyrite thin coatings rare veins	calcite varies moderate to strong;	greenish gray porphyry
			100						locally in veins partially or completely filling irregular cavities	
				3415				weak 1-2% magnetite		somewhat blotchy appearance due to small ¼" irregular lighter colored patches
T-SECTION 3417										
			100						weak somewhat erratic biotite	
				3425					epidote dots up to 1 inch	
			100						weak to moderate clay on fxs	
									weakly siliceous	
				3436						
			95							
				3445						
			100							
	.01									
				3455						
			100						stronger biotite nearly all plagioclase gone to epidote	
				3465				3466 good pyrite zone 8-10% dissem and irregular patches	chlorite alteration	3466 start of clastic section irregular poorly defined fragments up to 2 inches
			90							
			80	3475 3476				6% dissem pyrite		3474 dacite? flow - medium green, 30% plag. phenocrysts up to ¼" conformable contacts
			100							3479 clastic andesite?
										3481 approx dacite
			70	3483 3484						3483 gray to green gray andesite; texture varies between two distinct types 1) totally aphanitic 2) porphyry with 30-40% phenocrysts
		NO BLOCKS	100							two types are intermixed in intervals a few inches to 1-2 feet; distinctly clastic

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 17 OF 20

SCALE

STARTED
STOPPED
NOTES BY

DEPTH
BEARING
INCLINATION

PROPERTY
COUNTY
STATE
COLLAR COORD. N.
E.
COLLAR ELEV.

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			3503				weak to moderate pyrite in veins and locally 1-2% dissem; total averages 3-4% traces fine dissem cpy	propylitic alteration; good epidote after plagioclase phenocrysts in clumps and sometimes in veins; chlorite in groundmass & some traces in feldspar; calcite common in veins + fractures	locally; occasional rounded clasts of porphyry in the aphanitic type!
		100							
			3513				1-2% dissem magnetite		
		100							
			3523						
	.03	100				weak dissem. chalcopyrite			
			3533						
	.04	100							
			3540						
	.01	100							3541 rock turns to very predominant aphanitic type with scattered clasts of porphyry
			3550						
		100							
			3560			weak crackled zone			
		100							
			3570						
		15							
			3580						
		95							
			3590						
		100							
			3599						

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 18 OF 20

SCALE ___ STARTED ___ STOPPED ___ NOTES BY ___

DEPTH ___ BEARING ___ INCLINATION ___

PROPERTY ___ COUNTY ___ STATE ___ COLLAR COORD. N. ___ E. ___ COLLAR ELEV. ___

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
	.03							Same	Same	Same Kan
			100					weak veining, usually bleached halo of clay? alteration	weak epidote in aphanitic rock but may be strong after plagioclase in the porphyry	roughly 75% aphanitic green gray or gray very sparse plagioclase phenocrysts weakly developed scattered remnants hbld phenocrysts rare qtz eye locally short intervals clastic structure containing rounded fragments of andesite porphyry, 50% phenocrysts
				3609						
			100					traces fine dissem cpy in aphanitic rock	hornblende altered to chlorite,	
				3619						
			100					except for local hot spots, pyrite total 2-3%	possibly weak silicification but not persistent	
				3629						
			100							
				3635						
			100							
				3645						
			100							
				3649						
			100							
	.02									ratio of aphanitic green gray andesite to gray andesite porph decreased to 3/2
				3658				zone 3660 ≈ 3710 2-4% increase in both veins and dissem. traces chalcopyrite dissem; rare covellite? tarnish		
			100							
				3666						apparent structure is clasts 1-3 inches of aphanitic andesite cemented by andesite porphyry; contacts gradational
			95							
				3675						
			100							
				3684						
			100							
				3690						
			100							
				3695						
	.02									

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 19 OF 20

SCALE ____ STARTED ____ STOPPED ____ NOTES BY ____

DEPTH ____ BEARING ____ INCLINATION ____

PROPERTY ____ COUNTY ____ STATE ____ COLLAR COORD. N. ____ E. ____ COLLAR ELEV. ____

ASSAYS % MO	ASSAYS % CU	ASSAYS	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			100					same	same	Some Kan
				3705					andesite porphyry areas commonly show weak biotite alteration	
			100							
				3707						
			100					continued 1-3% dissem magnetite	also weak biotite developed in alteration halo along some veins	gray to gray green; very locally porphyry may be dark gray
				3717				traces dissem cpy + pyrite total < 1%	the other andesite, i.e. with weak phenocrysts, rarely shows secondary biotite rather chlorite flecks + small clumps; epidote grains + spots common but not abundant	
			100					pyrite common in veins w/ calcite ± chlorite and bleached halo		
				3727				total pyrite 1-2%		
			100							
				3735						
			100							
				3745					locally strong biotite	
			100							
	.05									
				3755						
			95							≈ 3758 change in rock type to exclusively aphanitic - obviously a tuff, very finely fragmental
				3760					chlorite weak, large clots of epidote; mod-strong calcite on fx + veins with moderate clay	
			100							
				3770						
			100							
				3780						≈ 3779 end aphanitic
				3780						mixed aphanitic weakly porphyry, some tuffaceous, in part fragmental w/ clasts up to 2-3 inches generally gray in color
			100							
				3790						

DIAMOND DRILL LOG

HOLE No. ES-10 SHEET 20 OF 20

SCALE 1" = STARTED STOPPED NOTES BY

DEPTH BEARING INCLINATION

PROPERTY COUNTY COLLAR COORD. N. E. COLLAR ELEV. STATE

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
	<.01	NO BLOCKS	95					Same	mixed bag of chlorite-biotite w/ very minor epidote below 3779	Same Kan
				3810					fragments of good andesite porphyry tend to show moderate to intense biotite	
			90							
				3819					bleaching along some of the veins due to clay or sericite	
			100							
				3825						
			90							
				3833						
			100							
				3842						
	<.01		80							moderately broken rock from 3755 to bottom caused circulation problems
				3855			END OF HOLE			

KEN

XM
MAY 7 - 1973
RECEIVED

ES-10
DRILL HOLE SUMMARY

0 - 70 Qal; recent gravel

70 - 360 Tb; post-ore Tertiary volcanics

360 - 2450 Kag; andesite agglomerate, green to gray depending upon type of alteration; fissure vein intervals marked by quartz - sericite - limonite are common in rotary cuttings above 1740

2450 - 3855 Kan; andesite porphyry; interval 2450 - 2813 appears to be a flow(?) unit but of a type previously unidentified in Essex drill holes, contacts are rubbly and gradational, rock is a porphyry with plagioclase phenocrysts up to 4 mm, quartz eyes are common making the composition at least that of dacite; remainder of section is typical with porphyry, fragmental and tuffaceous intervals

ALTERATION

360 - 790 chloritic(?) alteration, original alteration obscured by bleaching associated with later quartz-sericite alteration related to fissure veins

790 - 2450 pervasive biotite alteration, very locally strong chlorite

2450 - 2813 chlorite - clay - sericite (?); plagioclase altered to soft pale green clay, matics altered to chlorite, pervasive chlorite-clay alteration of groundmass

2813 - 3026 biotite - clay; pervasive biotite in groundmass; heavy white to green waxy clay on fractures and veins diminishes with depth, plagioclase phenocrysts cloudy and soft at top become hard and shiny with depth

3026 - 3345 chlorite - biotite alteration; the two minerals show an inverse relationship; epidote is weak and this is the only apparent difference between this zone and the one below where epidote is abundant after plagioclase

3345 - 3855 predominantly chlorite - epidote (propyllitic zone) but with scattered intervals of biotite of intensity varying from weak to strong; the biotite alteration has a marked affinity for

intervals of good andesite porphyry

MINERALIZATION

360 – 1650 oxidized zone; scattered traces chrysocolla as coatings and feldspar staining but not enough to account for the assays which run up to .67% Cu for ten foot interval of rotary cuttings; the obvious conclusion is that a lot of the red limonite is cuprite

1650 – 2420 pyrite principally in veins but also as disseminations; total sulfides varies from 3-6%, ~~dissem~~ locally up to 8%, disseminated sulfide varies widely from <1% to 8%; rare copper sulfide

2420 – 2890 predominantly disseminated pyrite from 4-8%, vein pyrite 1-2%; traces chalcopyrite, bornite

2890 – 3855' total sulfides average 2-3% mostly in veins, disseminated sulfides erratic and directly related to veins; very rare copper sulfides

SUMMARY LOG ES-10

ROTARY DRILLING 0 - 1995

0 - 70 Qal, recent gravels

70 - 360 Tb, post-ore basalt, etc.; includes 50 ft (310-360) basal volcanic sandstone

360 - 430 Kag, andesite agglomerate,
360-390 greenish tan, chlorite, red and tan limonite, weak quartz-sericite
390 - 430 similar but much finer chips, generally whitish except for green chlorite, some chips show strong gold limonite

430 - 1995 Logically this interval should be andesite agglomerate but the cuttings and core immediately below strongly resemble altered andesite porphyry. The structural manipulations necessary to fault the andesite porphyry into this position seem to preclude the possibility. Therefore, the andesite agglomerate - andesite porphyry contact is tentatively placed lower at 2450 and will be discussed later in the summary of the core section.

430 - 540 gray to green gray porphyry; good quartz-sericite-chlorite, chrysocolla staining plagioclase varies trace to moderate; possibly weak biotite starting at 510.

540 - 890 medium - dark gray porphyry chips with color due to hematite and or biotite, 50% of chips are quartz-sericite-gold limonite-hematite with red hematite much stronger than limonite; visible copper varies from nil to weak

890 - 1300 similar to above interval except sample is 60-80% is fissure vein material

with strong quartz-sericite-hematite; traces copper stain

1300-1995 gray porphyry, weak to moderate chlorite alteration, moderate to intense finely disseminated hematite; 50% of chips are quartz-sericite-gold or red limonite; scattered traces chrysocolla in feldspar; disseminated pyrite starting at 1650 varies from 1-4%.

CORE DRILLING 1995-3855

1995-2450 Kag (?) andesite agglomerate; texture is that of porphyry although in many places plagioclase phenocrysts are very small; clastic structure weakly developed with irregular shaped clasts up to 3 inches; alteration moderate to strong biotite locally asceding to chlorite, sericite weak, abundant veinlets of two general types 1) most numerous pyrite + sericite halo ± quartz + weak chlorite ± hematite, frequently crosscut each other, 2) pyrite ± thin biotite halo; total pyrite content averages 6-8%, most of the pyrite occurs in veins but locally is disseminated up to 8%; at about 2280 total sulfides decreases slightly to about 3-5% but then increases again to 8% at approximately 2430; very rare traces of chalcopyrite and bornite(?) were observed.

2450-2813 the andesite agglomerate-andesite porphyry contact as defined in many drill holes cannot be conclusively located in this hole

but is tentatively placed at 2450. The unit described here was not seen in any other drill hole. Contacts appear to be normal flow contacts.

Rock is gray green dacite(?) porphyry. Plagioclase phenocrysts up to 3 mm vary from 5-50% but average only 10-15%. Quartz grains abundant, probably +10%. Perhaps 1% original mafic phenocrysts, locally up to 5%, are totally altered to chlorite. Plagioclase totally altered to pale green clay (sericite?). Clay and silicification(?) have destroyed groundmass texture. Pyrite veinlets common but show essentially no halo alteration. Total sulfide content 4-6% and of that 3-5% is disseminated. Scattered traces of covellite, bornite (?), chalcopyrite and hypogene hematite occur in the veins.

2813 – 3483 Approximate contact Kan, andesite porphyry; short intervals and clasts of green dacite (?) occur sporadically down to 2912. Andesite porphyry is dark gray with plagioclase phenocrysts 1-2 mm which tend to be cloudy and soft due to clay(?) alteration. General alteration is strong biotite. Moderate pyrite veining usually with green clay and a bleached halo several times thickness of veins. There is 1-2% disseminated pyrite plus veins for a total of about 2-4%. Traces of bornite and chalcopyrite occur in veins. There is persistent decrease in alteration and mineralization with depth. Biotite decreases until at the started of the breccia zone 3215-3250 only chlorite is present. Plagioclase turns hard then develops epidote and weak calcite as alteration products. Sulfides decrease to about 2% total and mostly confined to veins. Disseminated magnetite varies from weak to 2-3%.

3250 - 3483 Alteration is generally chloritic with weak silicification (?). Epidote after plagioclase varies from weak to strong and near bottom of interval ~~clumps~~ epidote may occur in clumps up to 1 inch. Calcite also varies from moderate to strong, generally in veinlets but also filling irregular open cavities. Hydrothermal biotite varies widely from nil to locally strong at about 3340 and 3450. Magnetite is relatively weak, about 1% or less. Pyrite of less than 1% up to 2% is essentially restricted to veins but a good zone of 6-10% disseminated occurs from 3466 - 3483. The good pyrite is coincident with two short intervals of dacite (?) porphyry from 3474 - 3479 and 3481 - 3483.

3483 - 3855 Rock type change to gray to green gray andesite which is distinctly clastic. ~~Tex~~ Texture varies between two types 1) aphanitic (tuffs) 2) porphyry containing 30-40% plagioclase phenocrysts which are generally intermixed in intervals of a few inches to 1-2 feet. The ratio of aphanitic to porphyry varies from 3:1 to 2:1. Clasts of porphyry in aphanitic matrix are common but the reverse relationship is seldom observed. Alteration at start of interval is propylitic. Chlorite is present in the groundmass with traces in feldspar. Good epidote is present after plagioclase, also in clumps and sometimes in veins. Calcite is common in veins and fractures. Sporadic biotite alteration begins at approximately 3700 and varies from nil to strong. Biotite shows a marked preference for porphyry rock. Weak to moderate pyrite occurs in veins. Locally

to 1-2% disseminated pyrite. Total pyrite averages 3-4% at top of interval but decreases fairly steadily to 1-2% at bottom. Traces finely disseminated chalcopyrite (?) seen throughout interval. Veins typical are sulfide + calcite ± chlorite with a bleached halo. Persistent magnetite varies from 1-3% disseminated.

DRILL HOLE SAMPLES

PAGE | OF

PROPERTY: SAFFORD | DISTRICT | COUNTY | STATE | COUNTRY

HOLE NO.: ES-10 | CONTRACTOR | COLLAR COORD. N E | COLLAR ELEV.

BEARING | INCLINATION | DEPTH | STARTED | STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS Cu							REMARKS
5239	NX	5	100	1994	1999	5	.04							
5240		4	80	2050	2055	"	.03							
5241		5	100	2104	2109	"	.05							
5242		5	"	2148	2153	"	.07							
5243		5	"	2195	2200	"	.17							
5244		5	"	2249	2254	"	.13							
5245		5	"	2296	2301	"	.08							
5246		5	"	2354	2359	"	.07							
5247		5	"	2398	2403	"	.18							
5248		5	"	2450	2455	"	.10							
5249		5	"	2500	2505	"	.09							
5250		5	"	2551	2556	"	.05							
5251		5	"	2602	2607	"	.16							
5252		4	80	2650	2655	"	.08							
5253		5	100	2700	2705	"	.07							
5254		5	100	2751	2756	"	.07							
5255		4	80	2803	2808	"	.12							
5256		5	100	2853	2858	"	.08							
5257		4	80	2896	2901	"	.19							
5258		4	80	2949	2954	"	.02							
5259		4	80	2994	2999	"	.06							
5260		5	100	3050	3055	"	.02							
5261		5	100	3106	3110	"	.03							
5262		4	80	3150	3155	"	.07							
5263		5	100	3202	3207	"	.18							
5264		4	80	3251	3256	"	.03							
5265		5	100	3298	3303	"								

DRILL HOLE SAMPLES

PAGE 1 OF 2

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD. N E	COLLAR ELEV.
ES 10			

BEARING	INCLINATION	DEPTH	STARTED	STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS							REMARKS
5122				0	10	10	.01							
5132					20	10	.02							
5123					30	10	.01							
5133					40	10	.02							
5124					50	10	.03							
5142					60	10	.03							
5129					70	10	.06							
5161					80	10	.13							
5115					90	10	.02							
5136					100	10	.03							
5126					110	10	.01							
5156					120	10	.01							
5137					130	10	.01							
5157					140	10	.01							
5112					150	10	.01		2	360	160	0.01		
5145					160	10	.01				4			
5113					170	10	.01							
5134					180	10	.01							
5142					190	10	.01							
5147					200	10	.01							
5127					220	20	.01							
5121					230	10	.01							
5128					240	10	.01							
5131					250	10	.01							
5133					260	10	.01							
5130					270	10	.01							
5150					280	10	.01							
5142				290	290	10	.01							
					300									
					310									
5122				320	320	10	.01							
5104					330	10	.01							
5114					340	10	.01							
5127					350	10	.01							
5140					360	10	.01							
5111				360	370	10	.16							
					380									
5117				380	390	10	.08							
					400				360	430	70'	0.12		
5113				400	410	10	.11				2			
5138					420	10	.12							
5119					430	10	.11							
5155					440	10	.34							
5144					450	10	.27							
5109					460	10	.32							
5103					470	10	.67							
5153					480	10	.31							
5107					490	10	.30		430	530	100'	.34		
5125					500	10	.31				2			
5151				500	510	10	.32							
					520									
5120				520	530	10	.26							
5110					540	10	.02							
5159					550	10	.17							
5105					560	10	.15							
5160					570	10	.15							
5140					580	10	.10							
					590	10			530	700	170'	0.15		
5119					[illegible]	10	.16				2			
					610									
5132				620	620	10	.15							
5110					630	10	.15							
					640	10								
					650	10								
					660	10								
5118					[illegible]	10	.12							

DRILL HOLE SAMPLES

PAGE	OF

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD. N E	COLLAR ELEV.

BEARING	INCLINATION	DEPTH	STARTED	STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS							REMARKS
5110				[illegible]	[illegible]	10	.14							
[illegible]					[illegible]									
5105					620	10	.15							
5102					[illegible]	10	[illegible]	—						
5164					710	[illegible]	[illegible]							
5166					[illegible]	[illegible]	.51							
5171					730	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]		
5171					740	10	[illegible]							
5162					750	[illegible]	[illegible]							
5162					[illegible]	[illegible]	.24							
5163					770	[illegible]	[illegible]							
5161					780	[illegible]	[illegible]							
5165					[illegible]	[illegible]	[illegible]							
5165					[illegible]	[illegible]	[illegible]							
5180				[illegible]	[illegible]	[illegible]	.17							
5201				[illegible]	1010	10		765						
5202				[illegible]	1020	10		669						
5203				1210	1220	10		776						
5204				1220	1230	10		[illegible]						
5205				1230	1240	10		521						
5213				1320	1330	10		[illegible]						
5210					40	10		774						
5211					50	10		[illegible]						
5209					60	10		221						
5206					70	10		964						
5212					[illegible]	[illegible]	.12							
5214					90	10	.12							
5207				1390	1400	10		831						
5208				1420	1430	10		116						
5215				1570	1580	10	.12							
5216				1620	1630	10		772						
5217				1660	1670	10		785						
5218				[illegible]	1730	10		625						
5219					40	10		[illegible]						
5220					50	10		570						
5221				1750	60	10		345						
5222				1820	1835	15		218						

DRILL HOLE SAMPLES

PAGE | OF

PROPERTY | DISTRICT | COUNTY | STATE | COUNTRY

HOLE NO. ES-10 | CONTRACTOR | COLLAR COORD. N E | COLLAR ELEV.

BEARING | INCLINATION | DEPTH | STARTED | STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS CU							REMARKS
5239	NX	5	100	1994	1999	5	.04							
5240		4	80	2050	2055	"	.03							
5241		5	100	2104	2109	"	.05							
5242		"	"	2148	2153	"	.07							
5243		"	"	2195	2200	"	.17							
5244		"	"	2249	2254	"	.13							
5245		"	"	2296	2301	"	.08							
5246		"	"	2354	2359	"	.07							
5247		"	"	2398	2403	"	.18							
5248		"	"	2450	2455	"	.10							
5249		"	"	2500	2505	"	.09							
5250		"	"	2551	2556	"	.05							
5251		"	"	2602	2607	"	.16							
5252		4	80	2650	2655	"	.08							
5253		5	100	2700	2705	"	.07							
5254		5	"	2751	2756	"	.07							
5255		4	80	2803	2808	"	.12							
5256		5	100	2853	2858	"	.08							
5257		4	80	2896	2901	"	.19							
5258		4	"	2949	2954	"	.02							
5259		4	"	2994	2999	"	.06							
5260		5	100	3050	3055	"	.02							
5261		5	"	3105	3110	"	.03							
5262		4	80	3150	3155	"	.07							
5263		5	100	3202	3207	"	.18							
5264		4	80	3251	3256	"	.03							

DRILL HOLE SAMPLES

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY
Safford		Graham	Arizona	

HOLE NO.	CONTRACTOR	COLLAR COORD. N	E	COLLAR ELEV.
ES-10	Boyles Bros.			3880

BEARING	INCLINATION	DEPTH	STARTED	STOPPED
	vertical	1995	11-7-72	11-25-72

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS	REMARKS
				0	10			
				10	20			
				20	30		alluvium	
				30	40			
				40	50			
				50	60			
				60	70			
				70	80		light brown to gray v.f.g. latite(?), spotted with	
				80	90	Tb	rusty hematite, post-ore volcanics	
				90	100			
				100	110			
				110	120			
				120	130			
				130	140			
				140	150			
				150	160			
				160	170			
				170	180			
				180	190			
				190	200			
				200	210			
				210	220			
				220	230			
				230	240			
				240	250		dark purplish red iron stained basalt at base of Tb	
				250	260		portions are vesicular	
				260	270		" " " "	
				270	280		" " " "	
				280	290		" " " "	
				290	300		" " " "	
				300	310		base of post ore volcanics	
				310	320		red Tb mixed with andesite agglomerate which has	
				320	330		quartz-sericite alteration and abundant golden orange	
				330	340		to reddish orange limonite	
				340	350		very strong rusty limonite, good quartz, weak sericite	
				350	360		" " " " "	
				360	370		moderate gold limonite, intense qtz-sericite	
				370	380		some but much chlorite, much smaller chips,	
				380	390	Kag andesite agglomerate	" " " " v.l. magnetite	
				390	400			
				400	410			
				410	420			
				420	430			
				430	440		gray to green gray Kag, good qtz-ser-chl traces Cu stain in	
				440	450		10% qtz-ser chips; good chrys-malla staining plagioclase on rest of Kag feldspars	
				450	460		<10% " good Cu stained plagioclase	
				460	470		traces lim-qtz-ser; good chrysocolla coatings, mal stain, (big chips)	
				470	480		" weaker copper	
				480	490		" weak copper	
				490	500		" " " "	
				500	510		very weak Cu, groundmass very dark, possibly some biotite but washed	
				510	520		out by strong quartz alteration	
				520	530		20% qtz-ser-lim (gold) chips, very small chips OVER	
				530	540		" " " trace copper	
				540	550		50% qtz-ser-lim " "	
				550	560		" " no copper apparent	
				560	570		Kag chips ~ strong qtz-ser and abundant gold limonite	
				570	580		" " " ~ brick red hematite	
				580	590		" " "	
				590	600		" " "	
				600	610		" " trace copper "	
				610	620		" " no copper "	
				620	630		" " "	
				630	640		" " "	
				640	650		" " "	

DRILL HOLE SAMPLES

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD. N E	COLLAR ELEV.
ES-10			

BEARING	INCLINATION	DEPTH	STARTED	STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS	REMARKS
				650	660		predominantly qtz-ser-lim-hem chgs with bright purple	
				660	670		red hematite much stronger than gold limonite	
				670	680		" " "	
				680	690		" " "	
				690	700		" " "	
				700	710		" " strong spec hematite	
				710	720		50% Kag 7 qtz-ser- [redacted]	Tb contamination
				720	730		" " traces chrysocolla	"
				730	740		" " several chgs chrysocolla	"
				740	750		" " [redacted], weak chrysocolla	"
				750	760		" " "	"
				760	770		" " " trace chrysocolla	"
				770	780		" " " "	"
				780	790		" " "	" (red streak)
				790	800		agglomerate chgs dark gray from intense stg hematite or beautate	
				800	810		" " "	
				810	820		" " "	
				820	830		" " "	no Tb basalt
				830	840		" " "	no copper
				840	850		" " "	"
				850	860		" " "	"
				860	870		" " "	"
				870	880			
				880	890			
				890	900		80% bright red fissure vein material,	no apparent Cu
				900	910		" "	"
				910	920		60% fissure vein material, rest agglomerate as above	
				920	930		" " "	"
				930	940		" " "	"
				940	950		" " "	"
				950	960		" " "	"
				960	970		" " "	"
				970	980		" " "	"
				980	990		" " "	"
				990	1000		" " "	"
				1000	1010		" " "	trace Cu stain
				1010	1020		" " "	no Cu
				1020	1030		" " "	
				1030	1040		" " abundant red oxidized Kag	
				1040	1050		" " "	
				1050	1060		" " "	
				1060	1070		" " "	
				1070	1080		" " "	
				1080	1090		" " "	
				1090	1100		" " "	
				1100	1110		Kag - gray due to magnetite and/or pyrite, qtz-ser, strong brick red	
				1110	1120		Fe oxide material; 60% fissure vein material	
				1120	1130		" " "	
				1130	1140		" " "	
				1140	1150		" " "	
				1150	1160		" " "	
				1160	1170		" " "	
				1170	1180		" " "	
				1180	1190		" " "	
				1190	1200		" " "	
				1200	1210			
				1210	1220			
				1220	1230			trace Cu
				1230	1240			
				1240	1250			
				1250	1260			
				1260	1270			
				1270	1280			
				1280	1290			
				1290	1300			

DRILL HOLE SAMPLES

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD. N E	COLLAR ELEV.
ES-10			

BEARING	INCLINATION	DEPTH	STARTED	STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS	REMARKS
				1300	1310		Kay; fissure vein zone, most chips bleached	7 strong limonite
				1310	1320		gold to red, qtz, sericite; less altered	dark chips show
				1320	1330	[redacted]	chlorite 7 strong hematite moderate to intense	and frequently
				1330	1340	tr Cu	oxidized to red hematite	
				1340	1350	"	" " "	
				1350	1360	"	trace chrysocolla " "	
				1360	1370	—	bad samples)	
				1370	1380	—	bad sample)	
				1380	1390	tr Cu	" "	"
				1390	1400	"	" " "	"
				1400	1410	no Cu	" "	"
				1410	1420	tr Cu	" "	"
				1420	1430	no Cu	" "	"
				1430	1440		" "	"
				1440	1450		" "	"
				1450	1460		" "	"
				1460	1470		" "	"
				1470	1480		" "	"
				1480	1490		" "	"
				1490	1500		" "	"
				1500	1510		" "	"
				1510	1520		" "	"
				1520	1530		" "	"
				1530	1540		"	more chlorite alteration
				1540	1550		"	
				1550	1560		"	
				1560	1570		"	
			x	1570	1580		"	tr Cu chrysocolla
				1580	1590		"	no Cu
				1590	1600			"
				1600	1610			"
				1610	1620			"
			x	1620	1630			tr chrysocolla in plagioclase
				1630	1640			no Cu
				1640	1650			
			x	1650	1670		50% are bleached ± qtz weak sericite	mod dissem pyrite in unoxid-
				1670	1680		with strong hematite; 50% unoxidized	ized chips 2-4%
				1680	1690		agglom. colorless or light green due	less pyrite
				1690	1700		to chlorite; 20% of agglom. is gray	weak pyrite ½%
				1700	1710		or black due to finely dissem	2% pyrite in
				1710	1720		hematite	unoxidized agglom.
				1720	1730		60-70% Fe stained chips, 20% gold limonite	
				1730	1740			weak pyrite
				1740	1750		more black hematite chips,	weak pyrite
				1750	1760		" "	
				1760	1770		" " pyrite ≈ 4%	few chips chrysocolla
				1770	1780		" " pyrite 2%	
				1780	1790		" " weak pyrite	
				1790	1800		50% hematite stained, rare limonite	tr 1% pyr. in fresh chips
				1800	1810		fresh chips either gray to black or green,	mostly gray in this sample
				1810	1820		" "	"
			x	1820	1830		" "	" trace Cu oxide stain
			x	1830	1840		" "	" trace Cu stain
			x	1840	1850			"
			x	1850	1860			" trace Cu oxide stain
				1860	1870			"
				1870	1880			"
				1880	1890			"
				1890	1900			"
				1900	1910		≈60% hematite stained	"
				1910	1920		40% " "	7% pyrite
				1920	1930		% of black chips markedly less ≈ 20%	"
				1930	1940		" " "	
				1940	1950			2-3% pyrite
				~~1950~~			(OVER)	

ES-10

DRILL HOLE SUMMARY

0 - 70 Qal; recent gravel

70 - 360 Tb; post-ore Tertiary volcanics

360 - 2450 Kag; andesite agglomerate, green to gray depending upon type of alteration; fissure vein intervals marked by quartz-sericite-limonite are common in rotary cuttings above 1740

2450 - 3855 Kan; andesite porphyry; interval 2450 - 2813 appears to be a flow(?) unit but of a type previously unidentified in Essex drill holes, contacts are rubbly and gradational, rock is a porphyry with plagioclase phenocrysts up to 4 mm, quartz eyes are common making the composition at least that of dacite; remainder of section is typical with porphyry, fragmental and tuffaceous intervals

ALTERATION

360 - 790 chloritic(?) alteration, original alteration obscured by bleaching associated with later quartz-sericite alteration related to fissure veins

790 - 2450 pervasive biotite alteration, very locally strong chlorite

2450 - 2813 chlorite - clay - sericite (?); plagioclase altered to soft pale green clay, matrix altered to chlorite, pervasive chlorite-clay alteration of groundmass

2813 - 3026 biotite - clay; pervasive biotite in groundmass; heavy white to green waxy clay on fractures and veins diminishes with depth, plagioclase phenocrysts cloudy and soft at top become hard and shiny with depth

3026 - 3345 chlorite - biotite alteration; the two minerals show an inverse relationship; epidote is weak and this is the only apparent difference between this zone and the one below where epidote is abundant after plagioclase

3345 - 3855 predominantly chlorite - epidote (propylitic zone) but with scattered intervals of biotite of intensity varying from weak to strong; the biotite alteration has a marked affinity for

intervals of good andesite porphyry

MINERALIZATION

360 - 1650 oxidized zone; scattered traces chrysocolla as coatings and feldspar staining but not enough to account for the assays which run up to .67% Cu for ten foot interval of rotary cuttings; the obvious conclusion is that a lot of the red limonite is cuprite

1650 - 2420 pyrite principally in veins but also as disseminations; total sulfides varies from 3-6%, ~~dissem~~ locally up to 8%, disseminated sulfide varies widely from <1% to 8%; rare copper sulfide

2420 - 2890 predominantly disseminated pyrite from 4-8%, vein pyrite 1-2%; traces chalcopyrite, bornite

2890 - 3855' total sulfides average 2-3% mostly in veins, disseminated sulfides erratic and directly related to veins; very rare copper sulfides

DRILL HOLE SAMPLES — Tecote 2 claim — PAGE 1 OF 3

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY
Safford	Lone Star	Graham	Ariz.	

HOLE NO.	CONTRACTOR	COLLAR COORD.	COLLAR ELEV.
ES-10	Boyles Bros	N E	3880

BEARING	INCLINATION	DEPTH	STARTED	STOPPED
	vertical	1995'	11-7-72	11-25-72

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY Cu%	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS	REMARKS
			.01	0	10			
			.01	10	20			
			.01	20	30		Qal - alluvium	
			.02	30	40			
			.03	40	50			
			.03	50	60			
			.06	60	70			
			.03	70	80		light brown to gray basalt (?) spotted	
			.02	80	90		with rusty hematite; post-ore volcanics	
			.02	90	100		"	
			.01	100	110	Tb	"	
			.01	110	120		"	
			.01	120	130		"	
			.01	130	140		"	
			.01	140	150		"	
			.01	150	160		"	
			.01	160	170		"	
			.01	170	180		"	
			.01	180	190		"	
			.01	190	200		"	
			.01	200	210		"	
			.01	210	220		"	
			.01	220	230		"	
			.01	230	240		"	
			.01	240	250		dark purplish red Fe stained basalt,	
			.01	250	260		in places vesicular	
			.01	260	270		"	
			.01	270	280	Tb	"	
			.01	280	290		"	
			.01	290	300		"	
			.01	300	310		"	
			.01	310	320		red + tan sandstone at base of	
			.01	320	330		post-ore volcanics	
			.01	330	340	Tb	"	
			.01	340	350		"	
			.01	350	360		"	
			.16	360	370		greenish tan andesite agglomerate, chlorite, red +	
				370	380	Kag	tan limonite, some quartz weak sericite	
			.08	380	390		"	
				390	400		some rock but much finer chips, matrix generally	
			.11	400	410		white w/ chlorite except for chips w/ strong gold	
			.12	410	420		limonite; some bleaching	
			.11	420	430		"	
			.34	430	440		gray to green gray porphyry; good qtz-ser-chl; trace Cu in feldspar	
			.27	440	450		" 10% qtz-ser chips; good chrysocolla staining plagioclase	
			.32	450	460	Kan?	" <10% " " "	
			.67	460	470		traces lim-qtz-ser; good chrysocolla coatings; mod stain	
			.31	470	480		" weaker copper	
			.30	480	490		" "	
			.31	490	500		" "	
			.32	500	510		very weak Cu, possibly weak biotite but washed out	
				510	520		out by strong quartz alteration ~~OVER~~	
			.25	520	530		20% qtz-ser-gold lim; small chips	
			.09	530	540		" " " trace copper	
			.17	540	550		50% qtz-ser-lim "	
			.15	550	560		" " no apparent copper	
			.15	560	570		strong qtz-ser, abundant gold limonite w/ brick red hematite	
			.16	570	580		" " "	
				580	590		" " "	
			.16	590	600		" " "	
				600	610		" " " trace copper	
			.15	610	620		" " "	
			.15	620	630		" " "	
				630	640		" " "	
				640	650		" " "	

DRILL HOLE SAMPLES

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD. N E	COLLAR ELEV.
ES-10			
BEARING	**INCLINATION**	**DEPTH**	**STARTED STOPPED**

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %Cu	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS	REMARKS
			.12	650	660		predominantly qtz-ser-limon-hem chips with bright purple	
			.14	660	670		red hematite much stronger than gold limonite	
				670	680		" " "	
			.15	680	690		" " "	
			.16	690	700		" " "	
			.21	700	710		" " strong spec hematite	
			.21	710	720		50% Kag 7 qtz-ser- [redacted]	Pb contamination
			.18	720	730		" " traces chrysocolla	"
			.50	730	740		" " several chips chrysocolla	"
			.24	740	750		" " [redacted], weak chrysocolla	"
			.24	750	760		" " " "	
			.24	760	770		" " " trace chrysocolla	"
			.25	770	780		" " " "	"
			.22	780	790		" " "	" (red streak)
			.21	790	800		agglomerate chips dark gray from intense stg hematite or biotite	
			.17	800	810		" " "	
				810	820		" " "	
				820	830		" " "	no Pb basalt
				830	840		" " "	no copper
				840	850		" " "	"
				850	860		" " "	"
				860	870		" " "	"
				870	880		" " "	"
				880	890		" " "	"
				890	900		80% bright red fissure vein material, no apparent Cu	
				900	910		" " "	"
				910	920		60% fissure vein material, rest agglomerate as above	
				920	930		" " "	"
				930	940		" " "	"
				940	950		" " "	"
				950	960		" " "	"
				960	970		" " "	"
				970	980		" " "	"
			Cu	980	990		" " "	"
			ppm	990	1000		" " "	"
			767	1000	1010		" " "	trace Cu stain
			668	1010	1020		" " "	no Cu
				1020	1030		" " "	
				1030	1040		" " abundant red oxidized Kag	
				1040	1050		" " "	
				1050	1060		" " "	
				1060	1070		" " "	
				1070	1080		" " "	
				1080	1090		" " "	
				1090	1100		" " "	
				1100	1110		Kag - gray due to magnetite and/or biotite, qtz-ser, strong brick red	
				1110	1120		Fe oxide material; 60% fissure vein material	
				1120	1130		" " "	
				1130	1140		" " "	
				1140	1150		" " "	
				1150	1160		" " "	
				1160	1170		" " "	
				1170	1180		" " "	
				1180	1190		" " "	
				1190	1200		" " "	
				1200	1210		" " "	
			576	1210	1220		" " "	
			803	1220	1230		" " "	trace Cu
			527	1230	1240		" " "	
				1240	1250		" " "	
				1250	1260		" " "	
				1260	1270		" " "	
				1270	1280		" " "	
				1280	1290		" " "	
				1290	1300		" " "	

DRILL HOLE SAMPLES

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD. N E	COLLAR ELEV.
ES-10			

BEARING	INCLINATION	DEPTH	STARTED	STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS	REMARKS
		% Cu	Cu ppm	1300	1310		Key; fissure vein zone, most chips bleached w/ strong limonite	
				1310	1320		gold to red, qtz, sericite; less altered dark chips show	
			802	1320	1330	[redacted]	chlorite w/ strong hematite moderate to intense and frequently	
			774	1330	1340	tr Cu	oxidized to red hematite	
			851	1340	1350	"	" "	
			881	1350	1360	"	trace chrysocolla " "	
			964	1360	1370	—	bad samples)	
		.12		1370	1380	—	bad sample)	
		.12		1380	1390	tr Cu	" "	
			831	1390	1400	"	" " "	
				1400	1410	no Cu	" "	
				1410	1420	tr Cu	" "	
				1420	1430	no Cu	" "	
			716	1430	1440		" "	
				1440	1450		" "	
				1450	1460		" "	
				1460	1470		" "	
				1470	1480		" "	
				1480	1490		" "	
				1490	1500		" "	
				1500	1510		" "	
				1510	1520		" "	
				1520	1530		" "	
				1530	1540		" "	more chlorite alteration
				1540	1550		"	
				1550	1560		" "	
				1560	1570		" "	
		.12	x	1570	1580		" "	tr Cu chrysocolla
				1580	1590		" "	no Cu
				1590	1600		" "	"
				1600	1610		" "	"
				1610	1620		" "	"
			779x	1620	1630		" "	tr chrysocolla in plagioclase
				1630	1640		" "	no Cu
				1640	1650		" "	
			368x	1650	1670		50% are bleached ± qtz weak sericite	mod dissem pyrite in unoxid
				1670	1680		with strong hematite; 50% unoxidized	ized chips 2-4%
				1680	1690		agglom. colorless or light green due	less pyrite
				1690	1700		to chlorite; 20% of agglom. is gray	weak pyrite ½%
				1700	1710		or black due to finely dissem	2% pyrite in
				1710	1720		hematite	unoxidized agglom.
				1720	1730		60-70% Fe stained chips, 20% gold limonite	
				1730	1740			weak pyrite
				1740	1750		more black hematite chips,	weak pyrite
				1750	1760		" "	
				1760	1770		" "	pyrite 2-4% few chips chrysocolla
				1770	1780		" "	pyrite 2%
				1780	1790		" "	weak pyrite
				1790	1800		50% hematite stained, rare limonite	≈ 1% pyr. in fresh chips
				1800	1810		fresh chips either gray to black or green,	mostly gray in this sample
				1810	1820		" "	"
			625x	1820	1830		" "	" trace Cu oxide stain
			888x	1830	1840		" "	" trace Cu stain
			570x	1840	1850			"
			845x	1850	1860			" trace Cu oxide stain
				1860	1870			"
				1870	1880			"
				1880	1890			"
				1890	1900			"
				1900	1910		≈60% hematite stained	"
				1910	1920		40% " "	1% pyrite
				1920	1930		% of black chips markedly less ≈ 20%	"
				1930	1940		" "	"
				1940	1956			2-3% pyrite
				~~1950~~			(OVER)	

DRILL HOLE SAMPLES

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD.	COLLAR ELEV.
ES 10		N E	

BEARING	INCLINATION	DEPTH	STARTED	STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS							REMARKS
5122				0	10	10	.01							
5139					20	10	.01							
5128					30	10	.01							
5123					40	10	.02							
5124					50	10	.03							
5142					60	10	.03							
5129					70	10	.06							
5161					80	10	.03							
5115					90	10	.02							
5136					100	10	.02							
5126					110	10	.01							
5156					120	10	.01							
5137					130	10	.01							
5157					140	10	.01							
5112					150	10	.01		0	360	360'	0.01		
5145					160	10	.01				34			
5148					170	10	.01							
5134					180	10	.01							
5144					190	10	.01							
5147					200	10	.01							
5141					220	20	.01							
5121					230	10	.01							
5138					240	10	.01							
5131					250	10	.01							
5133					260	10	.01							
5130					270	10	.01							
5150					280	10	.01							
5143				280	290	10	.01							
					300									
					310									
5132				310	320	10	.01							
5104					330	10	.01							
5114					340	10	.01							
5127					350	10	.01							
5140					360	10	.01							
5111				360	370	10	.16							
					380									
5117				380	390	10	.08							
					400				360	430	70'	0.12		
5113				400	410	10	.11				5			
5158					420	10	.12							
5119					430	10	.11							
5155					440	10	.34							
5154					450	10	.27							
5108					460	10	.32							
5103					470	10	.67							
5153					480	10	.31							
5107					490	10	.30		430	530	100'	0.34		
5125					500	10	.31				9			
5151				500	510	10	.32							
					520									
5120				520	530	10	.26							
5110					540	10	.09							
5159					550	10	.17							
5105					560	10	.15							
5160					570	10	.15							
5149					580	10	.16							
					590	10			530	700	170'	0.15		
5118				590	600	10	.16				12			
					610									
5135				610	620	10	.15							
5146					630	10	.15							
					640	10								
					650	10								
5152				650	660	10	.12							

DRILL HOLE SAMPLES

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD. N E	COLLAR ELEV.
ES 10			

BEARING	INCLINATION	DEPTH	STARTED	STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS Cu	ASSAYS PPM Cu						REMARKS
5116				660	670	10	.14							
					680									
5106				680	690	10	.15							
5109					700	10	.16							
5164					710	10	.21							
5166					720	10	.21							
5172					730	10	.18		700	810	110'	0.24		
5171					740	10	.50				"			
5169					750	10	.24							
5162					760	10	.24							
5163					770	10	.24							
5167					780	10	.25							
5168					790	10	.22							
5165					800	10	.21							
5170				800	810	10	.17							
												430	810	380 0.22
5201				1000	1010	10		767						
5202				1010	1020	10		668		1000	1020	20'	717	
5203				1210	1220	10		576						
5204				1220	1230	10		803		1210	1240	30'	635	
5205				1230	1240	10		527						
5213				1320	1330	10		802						
5210					40	10		774						
5211					50	10		851		1320	1400	80'	938	
5209					60	10		881						
5206					70	10		964						
5212					80	10	.12							
5214					90	10	.12							
5207				1390	1400	10		831						
5208				1420	1430	10		716						
5215				1570	1580	10	.12							
5216				1620	1630	10		779						
5217				1660	1670	10		368						
5218				1820	1830	10		625						
5219					40	10		888		1820	1860	40'	732	
5220					50	10		570						
5221				1850	60	10		845						
5222				1980	1995	15		918						

DRILL HOLE SAMPLES

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PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD.	COLLAR ELEV.
ES-10		N E	
BEARING	**INCLINATION**	**DEPTH**	**STARTED STOPPED**

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS CU							REMARKS
5239	NX	5	100	1994	1999	5	.04							
5240		4	80	2050	2055	"	.03							
5241		5	100	2104	2109	"	.05							
5242		"	"	2148	2153	"	.07							
5243		"	"	2195	2200	"	.17							
5244		"	"	2249	2254	"	.13							
5245		"	"	2296	2301	"	.08							
5246		"	"	2354	2359	"	.07							
5247		"	"	2398	2403	"	.18							
5248		"	"	2450	2455	"	.10							
5249		"	"	2500	2505	"	.09							
5250		"	"	2551	2556	"	.05							
5251		"	"	2602	2607	"	.16							
5252		4	80	2650	2655	"	.08							
5253		5	100	2700	2705	"	.07							
5254		5	"	2751	2756	"	.07							
5255		4	80	2803	2808	"	.12							
5256		5	100	2853	2858	"	.08							
5257		4	80	2896	2901	"	.19							
5258		4	"	2949	2954	"	.02							
5259		4	"	2994	2999	"	.06							
5260		5	100	3050	3055	"	.02							
5261		5	"	3105	3110	"	.03							
5262		4	80	3150	3155	"	.07							
5263		5	100	3202	3207	"	.18							
5264		4	80	3251	3256	"	.03							
5265		5	100	3298	3303	"	.03							
5266		4	80	3345	3350	"	.02							
5267		5	100	3395	3400	"	.01							
5268		5	"	3450	3455	"	.01							
5354		10	"	3523	3533	10	.03							
5355		7	"	3533	3540	7	.04							
5356		10	"	3540	3550	10	.01							
5514		5		3599	3604	5	.03							
5515		"		3653	3658	"	.02							
5516		"		3695	3700	"	.02							
5517		5		3750	3755	"	.05							
5518		"		3800	3805	"	<.01							
5519		7		3843	3850	7	<.01							

DRILL HOLE SAMPLES — WORK SHEET

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PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD.	COLLAR ELEV.
ES-10		N E	

BEARING	INCLINATION	DEPTH	STARTED	STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS	REMARKS
1-30-73 5239	NX	5	100	1994	1999	5		
5240		4	80	2050	2055	5		
5241		5	100	2104	2109	5		
5242		5	"	2148	2153	5		
5243		5	"	2195	2200	5		
5244		5	"	2249	2254	5		
5245		5	"	2296	2301	5		
5246		5	"	2354	2359	5		
5247		5	"	2398	2403	5		
5248		5	"	2450	2455	5		
5249		5	"	2500	2505	5		
5250		5	"	2551	2556	5		
5251		5	"	2602	2607	5		
5252		4	80	2650	2655	5		
5253		5	100	2700	2705	5		
5254		5	100	2751	2756	5		
5255		4	80	2803	2808	5		
5256		5	100	2853	2858	5		
5257		4	80	2896	2901	5		
5258		4	80	2949	2954	5		
5259		4	80	2994	2999	5		
5260		5	100	3050	3055	5		
5261		5	100	3105	3110	5		
5262		4	80	3150	3155	5		
5263		5	100	3202	3207	5		
5264		4	80	3251	3256	5		
ES-9 ~~5265~~	2/7/73			~~30~~				
5265		5	100	3298	3303	5		
5266		4	80	3345	3350	5		
5267		5	100	3395	3400	5		
5268		5	100	3450	3455	5		
ES-10 5269		4	80	2800	2805	5		
5270		5	100	2849	2854	5		
5271		5	100	2899	2904	5		
5272		5	100	2949	2954	5		
5273		5	100	3000	3005	5		
5274		5	100	3050	3055	5		
5275		5	100	3100	3105	5		
5276		5	100	3151	3156	5		
5277		10	100	3360	3370	10		
5278		10	100	3370	3380	10		
5279		10	100	3380	3390	10	EST 2% Cu	
5280		9	10	3390	3399	9		
5281		10	100	3399	3409	10		
5282		10	100	3409	3419	10		
5283		10	100	3419	3429	10		
5284		10	100	3429	3439	10		
5285		8	100	3439	3447	8		
5286		6	100	3447	3453	6		
5287		8	100	3453	3461	8		
5288		10	100	3461	3471	10		
5289		9	100	3471	3480	9		
5290		10	100	3480	3490	10		assay for
5291		10	100	3490	3500	10		Cu, Mo
5292		10	100	3500	3510	10		
5293		10	100	3510	3520	10		3510 - 3550
5294		10	100	3520	3530	10		
5295		10	100	3530	3540	10		
5296		10	100	3540	3550	10		
5297		10	100	3550	3560	10		
5298		10	100	3560	3570	10		
5299		10	100	3570	3580	10		
5300		13	100	3580	3593	13		

DRILL HOLE SAMPLES

WORK SHEET

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PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD.	COLLAR ELEV.
ES-10		N E	

BEARING	INCLINATION	DEPTH	STARTED	STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS							REMARKS
5354		10	100	3523	3533	10								
5355		7	100	3533	3540	7								
5356		10	100	3540	3550	10								
5514		5	100	3599	3504	5								
~~5515~~				~~3504~~	~~35~~									
5515		5	100	3653	3658	5								
5516		5	100	3695	3700	5								
5517		5	100	3750	3755	5								
5518		5	100	3800	3805	5								
~~5519~~		~~5~~	~~100~~	~~3849~~	~~3854~~	~~5~~								
5519		5	71	3843	3850	7								