CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
3550 N. Central Ave, 2nd floor
Phoenix, AZ, 85012
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

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Horseshoe

DIAMOND DRILL LOG

HOLE No. HS-1 SHEET 1 OF 2

SCALE _____ STARTED 10-8-74 STOPPED _____ NOTES BY BHH.

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
						core split			0-15 basalt, dark gray, weakly vesicular
								15-23. strong vein system, silicified w/ stringers of strong limonite 50Y 50G smaller amounts of dark red to purple hematite	15-29 Kag andesite agglomer.
						badly broken 25-56		weak fem limonite on surfaces	29-64 Kag clay and propylitic alter.
							mod-str ; amorphic limonite	propylitic, clay w/ bleaching	64-87 Kag
							77-79 strong diss. cuprite		
							mod brown goethite in veinlets and on fxs ; 96-99 coatings & dissem. hematite, small amounts green clay - montronite ?	weak clay alteration of plagioclase	87-107 andesite porphyry dik ? or flow, abundant well defined phenocrysts to 1/16 - 1/8 inch
							mod-str magnetite dissem and in veins		
							strong vein zone gold to brown limonite w/ lesser hematite in veins and coatings, also dissem hematite	probably propylitic but destroyed by intense m/zn silicification	107 - 133 Kag
						138-170 badly broken		qtz-sericite gold limonite zone	133-149 Kag
								Similar alteration but much weaker limonite	149-170 Kag
								propylitic w/ bleaching & silicification calcite stringers and cavity filling;	170-177 Kag

DIAMOND DRILL LOG

Horseshoe

HOLE No. HS-1 SHEET 2 OF 2

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
									fault zone gouge + gravel limonite stained	177-198 Kag
							badly broken		silicified + moderate limonite	198-210 Kag
										EOH

DIAMOND DRILL LOG

Horseshoe

HOLE No. HS-7 SHEET 1 OF 1

SCALE ____ STARTED 10-8-74 STOPPED ____ NOTES BY BHH

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 TYBE
							fault zone gouge + gravel	strong purple red hematite mixed w/ jarositic limonite		0-17 quartz diorite
							badly broken		weak chlorite w/ clay after plag. but masked by hematite + limonite	17-36 quartz diorite
								weak gold limonite	weak chlorite; feldspars milky and some are soft	36-44 qtz drt
							badly broken and gougey in places	intense brick red to purple red hematite flooding		44-65 qtz drt
								strong veinlets + coatings of brown gothite	bleaching weak silicification	65-83 qtz-drt
								traces Cu ox coatings + veinlets of magnetite	chlorite, weak clay	83-86.5 qtz-drt
								v.f. dissem brick red specular hematite after magnetite?	chlorite after mafics, no epidote plagioclase milky and frequently soft	86.5-220 qtz-drt
										220 EOH very dry intrusive

DIAMOND DRILL LOG

HORSESHOE

HOLE No. HS-3 SHEET 1 OF 2

SCALE _____ STARTED 10-8-74 STOPPED _____ NOTES BY BHA

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
		0-10 NC					pervasive silicification w/ strong chrysocolla reddish brown limonite		0-10 qtz-diorite fine grained
		10-638 NX				rounded gravel	scattered chrysocolla	bleached, some silicified	10-29 qtz-drt
							qtz vein + massive silicification		20-28 qtz drt
						26-28 gravel	fn dissem brick red hematite, strong chrysocolla, traces malachite		
							weak jarosite	bleached, clay alteration weak silicification	28-35 qtz-drt?
							f.g. dissem red spec. hematite after magnetite? 35-41 moderate chrysocolla coatings	plagioclase cloudy mostly soft-clay, otherwise no alter.	35-54 light gray qtz-drt
						breccia 107-109 and 118-191 gouge	intense vein zone maroon to brick red hematite in veins, coatings and pervasive, frequently mixed w/ gold limonite principal veining parallel or subparallel core axis	silicification clay	54-146 intensely mixed qtz drt
									≈130-141 more coarsed porphyry, phenocrysts 1/16 to 1/4 inch probably still qtz drt
									146-161 same material but green color
									161-171 red
									171-191 green
									191-200 badly broken more porphyritic
									200-205 light green f.g. intrusive

DIAMOND DRILL LOG

HOLE No. HS-2 SHEET 2 OF 2

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
						225-228 gouge, rest is badly broken	221≈229 mod-str limonite-hematite	clay, locally some chlorite but masked by limonites in many places	205-365 coarser grained porphyry, phenocrysts up to 1/4 inch qtz-diorite
							generally weak brown + gold limonite coatings	plagioclase milky and soft hematite from mafics	
							294-300 mod-lim + hematite	clay alteration decreasing w/ depth plagioclase getting hard + shiny	
						322-336 bx and gouge	320-322 strong hematite		
						336-365 badly broken	356-362 strong hematite and gold limonite		365-420 rock type uncertain appears to be finer grained qtz dot porphyry
						365-393 bx and gouge	390-395 strong hematite	chloritic alteration	
								chlorite and clay	420-430 abundant phenocrysts up to 1/4-3/8
						all badly broken	dark red to purple hematite w gold limonite, pervasive and coatings		430-638 intense mlzd vein zone in rock types described above
							473-483 mostly goethite		
						546-548 gouge	483-487 dark purple hematite		
						557-587 gouge + breccia	alternating zones of predominant goethite or hematite		
									EOH 638

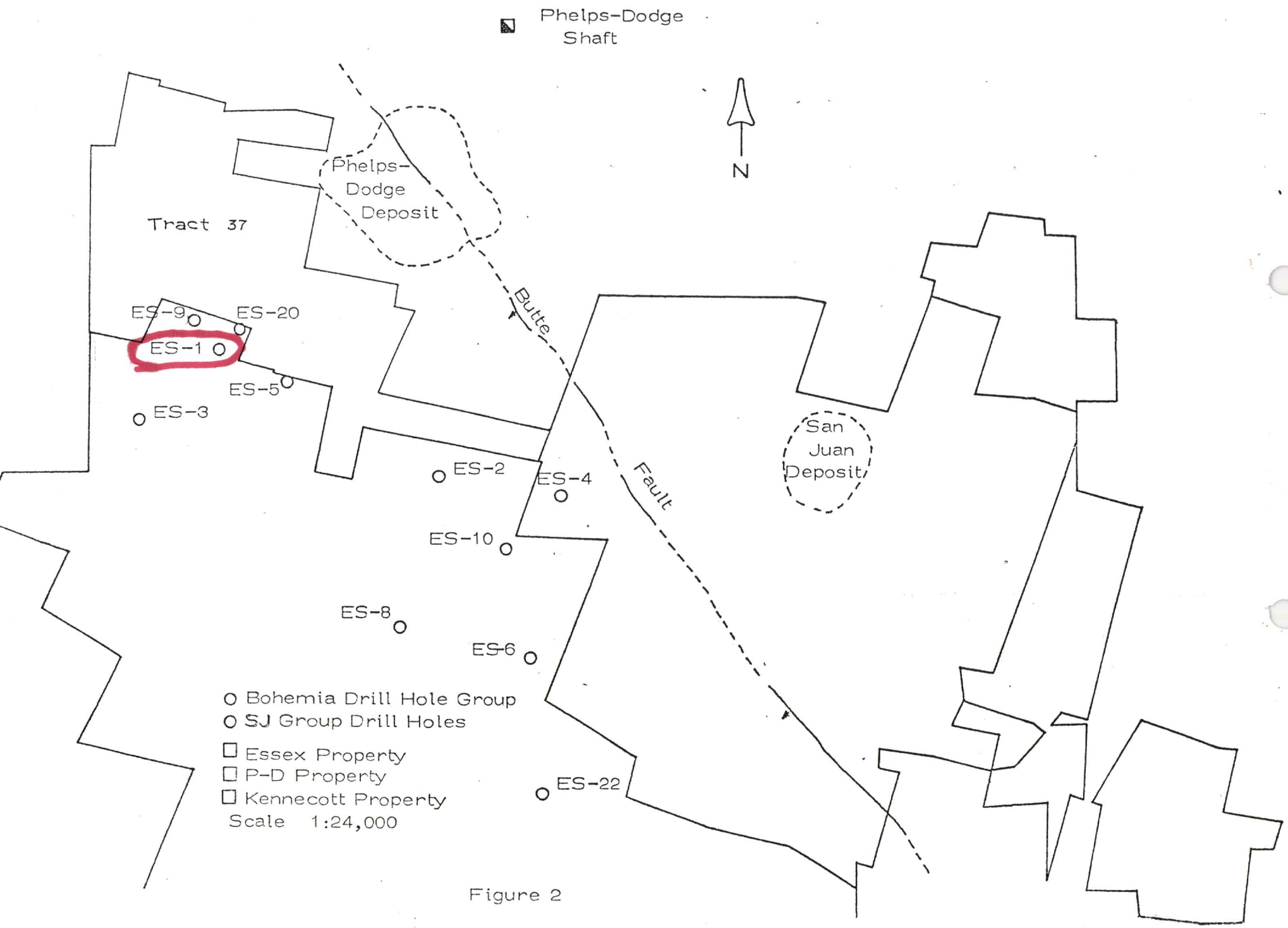

Phelps-Dodge Shaft
N
Phelps-Dodge Deposit
Tract 37
Butte
ES-9
ES-20
ES-1
ES-5
ES-3
ES-2
ES-4
Fault
San Juan Deposit
ES-10
ES-8
ES-6
ES-22
Bohemia Drill Hole Group
SJ Group Drill Holes
Essex Property
P-D Property
Kennecott Property
Scale 1:24,000

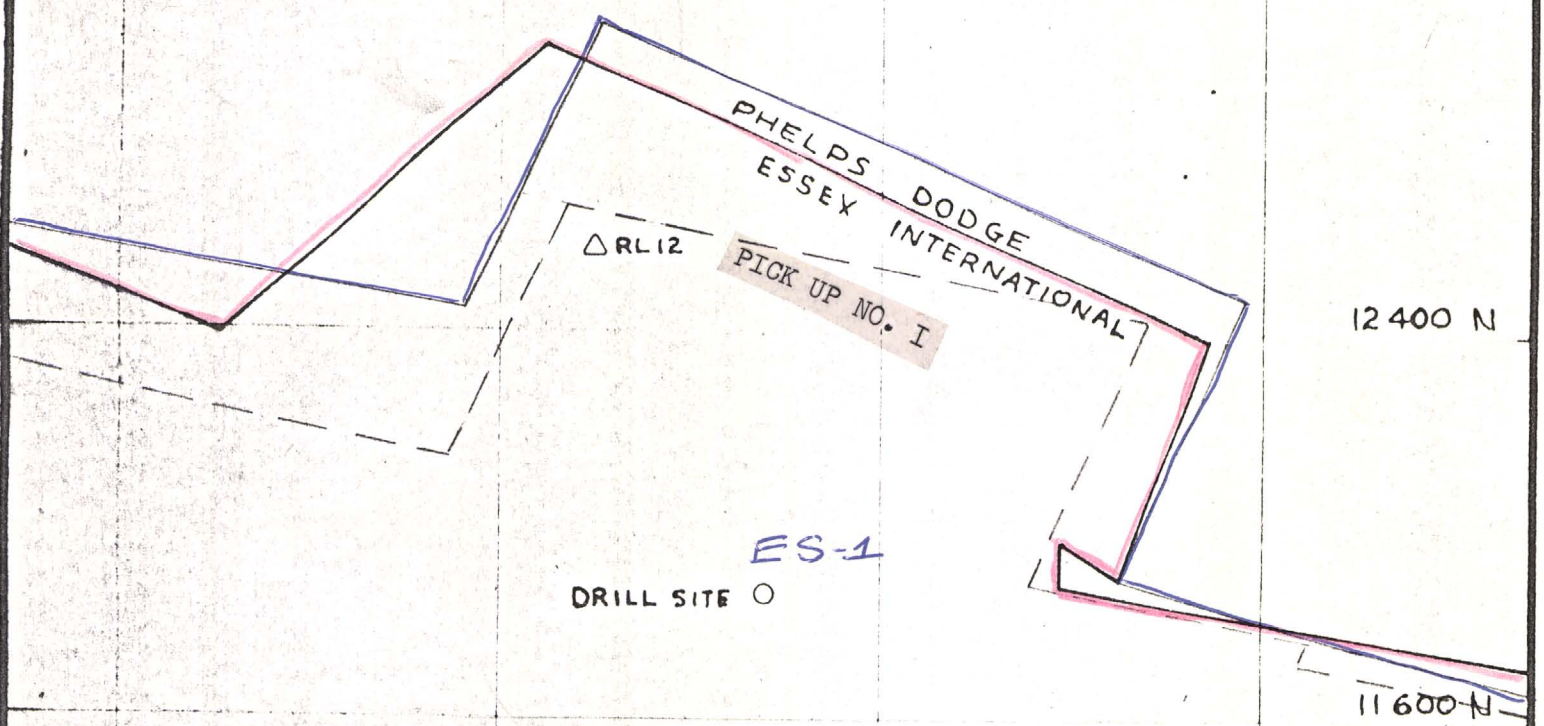
Figure 2

NOTE: Claim outlines were pantographed up from map scaled at 1" = 1000'

Solid printed line represents Phelps Dodge Corp's concept of Essex International Inc.'s claim boundary line.

Solid pencil line represents Essex claim boundary line based on mineral survey.

Dashed pencil line represents P.D. overlap.



	N	E	EL
RL 12	12 574.01	16 993.12	
S 19	13 298.46	18 604.64	4000.66

16000 E 16800 E 17600 E 18400 E

PHELPS DODGE CORP
SAFFORD PROJECT

TRIANGULATION STATIONS
RL 12 & S 19 LOCATION & COORDINATES

SCALE 1" = 400' 9-1-71

DILLE LSPs-1a

ES-1

Thinsections of seven different samples have been examined. Samples from 747', 1011', 1620', 2071' and 2136' are somewhat similar. All are a greenish-grey porphyritic rock, probably andesite. Fragments of various size are included in all the samples although they become less obvious with depth and in general the deeper samples appear more dense and homogeneous. Samples from 1103' and 2037' are "bleached" and iron stained and appear to be more intensely altered samples of the same or similar rock types as the above samples.

(747') - Plagioclase phenocrysts 80-90% replaced by Sericite, epidote and Calcite. Sericite is rather coarse and is more abundant than the other two minerals. Chlorite is abundant as fairly large masses. Large "fragments" of almost pure epidote are present and intergrowths of epidote and calcite are fairly common.

(1011') - Replacement of plagioclase phenocrysts not as complete as in 747'; Probably 70-90% replacement. Sericite is most abundant alteration product with calcite and epidote being less abundant. Masses of pure epidote common but not as large as in 747'. Irregular masses of chlorite are similar to those in 747'

(1620') - Plagioclase 60-80% replaced by alteration products. Sericite slightly more abundant than calcite & epidote an alteration product of plagioclase. Chlorite is similar in amount and occurrence to above two samples. Epidote seems less abundant than in 1011'; no mass are present in the thin section. Plagioclase phenocrysts are slightly more abundant than in the above two samples.

HAWLEY & HAWLEY
ASSAYERS AND CHEMISTS, INC.
1700 W. GRANT RD. • BOX 50106 • 622-4836
TUCSON, ARIZONA 85703

BRANCHES: DOUGLAS, ARIZONA; HAYDEN, ARIZONA; EL PASO, TEXAS; ST. LOUIS, MO.

IDENTIFICATION	GOLD oz/T	SILVER oz/T	LEAD %	COPPER %	ZINC %	MO. %	IRON %
	ppm	ppm		ppm		ppm	
E 860	< 0.01	1.3		77		< 2	

SXM
OCT 4 1971
RECEIVED

REGISTERED ASSAYER CERTIFICATE NO. 6784 ARIZONA U.S.A.

CC: Essex International, Inc
ADD: 1704 West Grant Road
CITY: Tucson, Arizona 85705
DD:
CITY:

REMARKS: Trace analysis

ANALYSIS CERT. BY: R. E. Hawley

PREPARATION $ 1.25
ANALYSIS $ 7.75

HH3A ACC: ESSEX INTERNATIONAL, INC.

DATE SPL. RECEIVED 9/29/71 | DATE COMPL. 10/2/71 | TUC 345658 | $ 9.00

DRILL HOLE SAMPLE

PAGE 1 OF

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY
Safford Project	Cone Star	Graham,	Ariz	U S A

HOLE NO.	CONTRACTOR	COLLAR COORD N E	COLLAR ELEV.
E.S.-1	Joy		

BEARING	INCLINATION	DEPTH	STARTED	STOPPED
	VERTICAL			

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT	ASSAYS % CU							REMARKS
1351				2130	2135	5.0	0.03							
1354				2411	2412	1.0								
1356				2412	2413.5	1.5	.04							
1357				2413.5	2419	5.5	.10							
1358				2419	2421.5	2.5	.18							
1359				24215	24245	3.0	.15							
1360				24245	2426.5	2.0	.14							
1361				24265	24315	5.0	.19							
1352				2452	2457	5.0								
1362				2503	2508	5.0	.03							
1363				2508	2513	5.0	.06							
1364				2513	2519	6.0	.04							
1365				2519	2523	4.0	.05							
1366				2523	2527	4.0	.05							
1355				2527	2528	1.0	.08							
1367				2527	2532	5.0	.02							
1368				2557	2561	4.0	.20							
1369				2561	2566	5.0	.13							
1370				2566	2570	4.0	.16							
1371				2570	2574	4.0	.02							
1372				2640	2645	5.0	.04							
1373				2645	2650	5.0	.01							
1374				2650	2655	5.0	.01							
1375				2655	2660	5.0	.02							
1376				2660	2665	5.0	.03							
1377				2665	2670	5.0	.02							
1378				2670	2675	5.0	.03							
1379				2675	2680	5.0	.03							
1380				2680	2685	5.0	.02							
1381				2685	2690	5.0	.02							
1382				2690	2695	5.0	.04							
1383				2695	2700	5.0	.04							
1384				2700	2705	5.0	.02							
1385				2705	2710	5.0	.03							
1386				2710	2715	5.0	.06							
1387				2715	2820	5.0	.03							
1388				2720	2725	5.0	.02							
1389				2725	2730	5.0	.04							
1390				2730	2735	5.0	0.12							
1391				2735	2740	5.0	.03							
1392				2740	2745	5.0	.01							
1393				2745	2750	5.0	.03							
1394				2750	2755	5.0	.02							
1395				2755	2760	5.0	.02							
1396				2760	2765	5.0	.06							
1397				2765	2770	5.0	.03							
1398				2770	2775	5.0	.05							
1399				2775	2780	5.0	.02							
1400				2780	2785	5.0	.02							
1251				2785	2790	5.0	.02							
1252				2790	2795	5.0	.05							
1253				2795	2800	5.0	0.07							
1254				2800	2805	5.0	0.07							
1255				2805	2810	5.0	0.05							
1256				2810	2815	5.0	0.02							
1257				2815	2820	5.0	0.01							
1258				2820	2825	5.0	0.02							
1259				2825	2830	5.0	0.06							
1260				2830	2835	5.0	0.04							

DRILL HOLE SAMPLE

PAGE 2 OF

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY
Safford Project	Lone Star	Graham	Ariz	USA

HOLE NO	CONTRACTOR	COLLAR COORD N	COLLAR COORD E	COLLAR ELEV
ES-1	JOY			

BEARING	INCLINATION	DEPTH	STARTED	STOPPED
	VERTICAL			

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT	ASSAYS % Cu	REMARKS
1261				2835	2840	5.0	0.01	
1262				2840	2845	5.0	0.06	
1263				2845	2850	5.0	0.04	
1264				2850	2855	5.0	0.08	
1265				2855	2860	5.0	0.03	
1266				2860	2865	5.0	0.02	
1267				2865	2870	5.0	0.01	
1268				2870	2875	5.0	0.03	
1269				2875	2880	5.0	0.09	
1270				2880	2885	5.0	0.05	
1271				2885	2890	5.0	0.06	
1272				2890	2895	5.0	0.01	
1273				2895	2900	5.0	0.02	
1274				2900	2905	5.0	0.01	
1275				2905	2910	5.0	0.06	
1276				2910	2915	5.0	0.03	
1277				2915	2920	5.0	0.03	
1278				2920	2925	5.0	0.01	
1279		1.0	100	2925	2930	5.0	0.04	
1280		1.5	30	2926	2931	5.0	0.03	
1281		1.0	100	2931	2932	1.0	0.02	
1282		3.5	88	2932	2936	4.0	0.02	
1283		5.0	100	2936	2941	5.0	0.04	
1284		3.5	100	2941	2944.5	3.5	0.08	
1285		4.5	100	2944.5	2949	4.5	0.04	
1286		4.0	88	2949	2953.5	4.5	0.02	
1287		2.0	80	2953.5	2956	2.5	0.10	
1288		2.0	100	2956	2958	2.0	0.11	
1289		3.0	100	2958	2961	3.0	0.06	
1290		2.0	66	2961	2964	3.0	0.01	
1291		4.0	100	2964	2968	4.0	0.20	
1292		2.5	62	2968	2972	4.0	0.07	
1293		5.0	100	2972	2977	5.0	0.03	
1294		4.5	90	2977	2982	5.0	0.02	
1295		0.5	50	2982	2983	1.0	0.04	
1296		2.0	66	2983	2986	3.0	0.14	
1297		2.5	86	2986	2989	3.0	0.12	
1298		1.5	50	2989	2991	3.0	0.11	
1299		5.0	100	2991	2996	5.0	0.05	
1300		3.0	100	2996	2999	3.0	0.03	
1301		4.5	90	2999	3004	5.0	0.03	
1302		3.5	88	3004	3008	4.0	0.02	
1303		0.5	50	3008	3009	1.0	0.01	
1304		2.5	63	3009	3013	4.0	0.03	
1305		1.0	25	3013	3017	4.0	0.06	
1306		1.0	100	3017	3018	1.0	0.10	
1307		3.0	100	3018	3021	3.0	0.21	
1308		3.0	100	3021	3024	3.0	0.14	
1309		3.0	100	3024	3027	3.0	0.15	
1310		5.0	100	3027	3032	5.0	0.07	
1311		2.0	100	3032	3034	2.0	0.02	
1312		5.0	100	3034	3039	5.0	0.11	
1313		4.0	80	3039	3044	5.0	0.49	
1314		4.5	90	3044	3049	5.0	0.04	
1315		2.0	100	3049	3054	5.0	0.09	
1316		2.5	50	3054	3059	5.0	0.06	
1317		3.0	100	3059	3062	3.0	0.13	
1318		2.0	100	3062	3064	2.0	0.01	
1319		5.0	100	3064	3069	4.0	0.07	
1320		2.5	100	3069	3071.5	2.5	0.01	
1321		5.0	100	3072.5	3077.5	5.0	0.02	
1322		4.5	82	3077.5	3083	5.5	0.01	
1323		4.5	90	3083	3088	5.0	0.07	
1324		3.5	88	3088	3092	4.0	0.07	
1325		4.5	100	3092	3096.5	4.5	0.02	

DRILL HOLE SAMPLE

PAGE 3 OF

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY
SAFFORD PROJECT	Lone Star	Graham	Ariz	U.S.A

HOLE NO.	CONTRACTOR	COLLAR COORD N E	COLLAR ELEV
ES-1	JOY		

BEARING	INCLINATION	DEPTH	STARTED	STOPPED
	VERTICAL			

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT	ASSAYS %CU							REMARKS
1326		3.0	86	3096.5	3100	3.5	0.05							
1327		3.0	100	3100	3103	3.0	0.06							
1328		3.0	75	3103	3107	4.0	0.02							
1329		2.0	100	3107	3109	2.0	0.55							
1330		4.5	90	3109	3114	5.0	0.08							
1331		2.0	100	3114	3116	2.0	0.13							
1332		4.0	100	3116	3120	4.0	0.35							
1333		5.0	100	3120	3125	5.0	0.30							[illegible]
1334		5.0	100	3125	3130	5.0	0.14							[illegible]
1335		5.0	100	3130	3135	5.0	0.08							
1336		3.0	100	3135	3138	3.0	0.16							
1337		5.0	91	3138	3143.5	5.5	0.21							
1338		5.0	100	3143.5	3148.5	5.0	0.65							
1339		5.0	100	3148.5	3153.5	5.0	0.14							
1340		5.5	100	3153.5	3159	5.5	0.24							
1341		5.0	100	3159	3164	5.0								
1342		4.5	90	3164	3169	5.0								
1343		5.0	100	3169	3174	5.0	0.05							
1344		5.0	100	3174	3179	5.0	0.10							
1345		5.0	100	3179	3184	5.0	0.10							
1346		5.0	83	3184	3190	6.0	0.04							
1347		2.1	84	3190	3192.5	2.5	0.02							
1348		4.4	89	3192.5	3197.5	5.0	0.08							
1349		4.5	100	3197.5	3202	4.5	0.08							
1350		3.0	100	3202	3205	3.0	0.03							
1401		5.0	100	3205	3210	5.0	0.10							
1402		4.8	96	3210	3215	5.0	0.14							
1403		5.0	100	3215	3220	5.0	0.27							
1404		5.0	100	3220	3225	5.0	0.06							
1405		4.5	90	3225	3230	5.0	0.19							
1406		5.0	100	3230	3235	5.0	0.03							
1407		4.5	90	3235	3240	5.0	0.04							
1408		5.0	100	3240	3245	5.0	0.03							
1409		5.0	100	3245	3250	5.0	0.04							
1410		5.0	100	3250	3255	5.0	0.04							
1411		5.0	100	3255	3260	5.0	0.07							
1412		3.0	100	3260	3263	3.0	0.04							
1413		5.0	100	3263	3268	5.0	0.21							
1414		5.0	100	3268	3273	5.0	0.03							
1415		5.0	100	3273	3278	5.0	0.11							
1416		2.8	97	3278	3281	3.0	0.41							

GEOLOGIC DESCRIPTION

DDH ES-1 SAFFORD PROJECT

Notes by J.K. Jones
9-28-71, 9-30-71,
10-8-71

ROTARY CUTTINGS

FROM	TO	DESCRIPTION
0 feet	20 feet	Heterogeneous assortment of rock chips representing coarse, unsorted, recent gravel deposits.
20 feet	120 feet	Mostly gray, fine grained basalt but with scattered chips of a fresh, brown volcanic and rare fragments of epidotized rock. Probably represents a Tertiary basalt flow with some contamination from material caving in from higher in hole, but could be alluvium.
120 feet	190 feet	Almost entirely fine grained, dark gray basalt, a few brown volcanic chips. Tertiary basalt flow.
190 feet	208 feet	About 50% basalt, 50% brown, unaltered latite (?) which contains a few small fragments of epidote. Probably represents Tertiary flows and sedimentary material which occur beneath basalt and unconformably overlie Cretaceous volcanics.
208 feet	210 feet	No cuttings recovered.
210 feet	240 feet	Brown, unaltered latite (?) which contains fragments of epidote.
240 feet	330 feet	No cuttings recovered.
330 feet	335 feet	Basalt and latite fragments may be cave from higher in hole.
335 feet	340 feet	No cuttings recovered.
340 feet	390 feet	Mostly fine grained, white, altered material with much epidote. Chips are much smaller than higher in hole. Probably represents Cretaceous andesite agglomerate.

ROTARY CUTTINGS FROM	TO	DESCRIPTION
390 feet	400 feet	Similar to interval above, but epidote increased and chips are finer.
400 feet	420 feet	No cuttings recovered.
420 feet	470 feet	Cretaceous altered volcanic similar to above, but with some dark gray basalt and brown latite probably caving from higher in hole.
470 feet	500 feet	No cuttings recovered.
500 feet	580 feet	Altered Cretaceous volcanic similar to above.
580 feet	640 feet	No cuttings recovered.
640 feet	650 feet	Altered Cretaceous volcanic similar to 420 to 470 feet, much epidote, some contamination by basalt.
650 feet	660 feet	No cuttings recovered.
660 feet	670 feet	Similar to 640 to 650 feet.
670 feet	735 feet	No cuttings recovered.
735 feet	745 feet	Cretaceous volcanic similar to 640 to 650 feet but much contamination.

Hole cased to 745 feet, NX coring started at 745 feet.

745 feet	850 feet ±	Fragmental andesite. Fine, fuzzy textured matrix, possibly an altered andesite containing scattered feldspar phenocrysts, blebs of epidote, chloritized femics. Many fragments are medium grained, dark green andesite porphyry characterized by numerous soft white feldspar phenocrysts and abundant chlorite. ALTERATION: Feldspar locally bright but soft, probably sericitized, estimated 10% epidote present, ferromagnesian minerals altered to chlorite. MINERALIZATION: Widely spaced calcite veinlets, 0 to ½% disseminated grains limonite some after cubic pyrite, local goethite but common hematite. 837 to 879 estimated 5% limonite cubes after FES_2 up to 0.1 inch, estimated to be 60% hematite 40% goethite.

~~ROTARY CUTTINGS~~ CORE FROM	TO	DESCRIPTION
850' ±	940' ±	Similar to interval above but chlorite seems to be increased.
940' ±	1020'(?)	Andesite agglomerate similar to above. ALTERATION: Chlorite appears stronger, epidote may be decreased, sericite appears stronger. Matrix and feldspars very soft and exhibit a sheen that resembles sericite. 951-953, 978-988±, 997-1006± are broken, bleached, limonite stained, and appear to be a fine grained aggregate of quartz and sericite.
1020'(?)	1120'(?)	Generally similar to above but does not appear as strongly altered. Light colored rock, under high power (30X) matrix appears to be largely composed of white, moderately soft feldspar and very fine quartz(?). Much of feldspar appears to be sericitized, but some areas are pink and hard. 1034-1036 broken, strong limonite. 1039-1045 broken. 1065 several inches strong limonite. 1065-1116 broken, strong limonite to 1108.
1120'(?)	1199' ±	Appears similar to 940-1020, texture fuzzy, fairly strongly altered andesite agglomerate, pale green in color.
1199' ±	1303'	Groundmass and overall rock color becoming light brown to pink, otherwise similar to above. 1229' to 1235' moderate amount disseminated, coarse grained limonite after pyrite.
1303'	1361'	Pale green, fuzzy textured rock, similar to 1120'-1199'. Alteration appears to be strong sericite, moderate chlorite, weak epidote.
1361'	1710	Andesite agglomerate, pale pink matrix of relatively fine grained andesite porphyry containing numerous various sized fragments often coarser grained than matrix. ALTERATION: Variable, feldspar in part bright but usually soft white. Femic minerals at least in part altered to chlorite but in places black. Fairly numerous blebs epidote.

CORE
~~ROTARY CUTTINGS~~

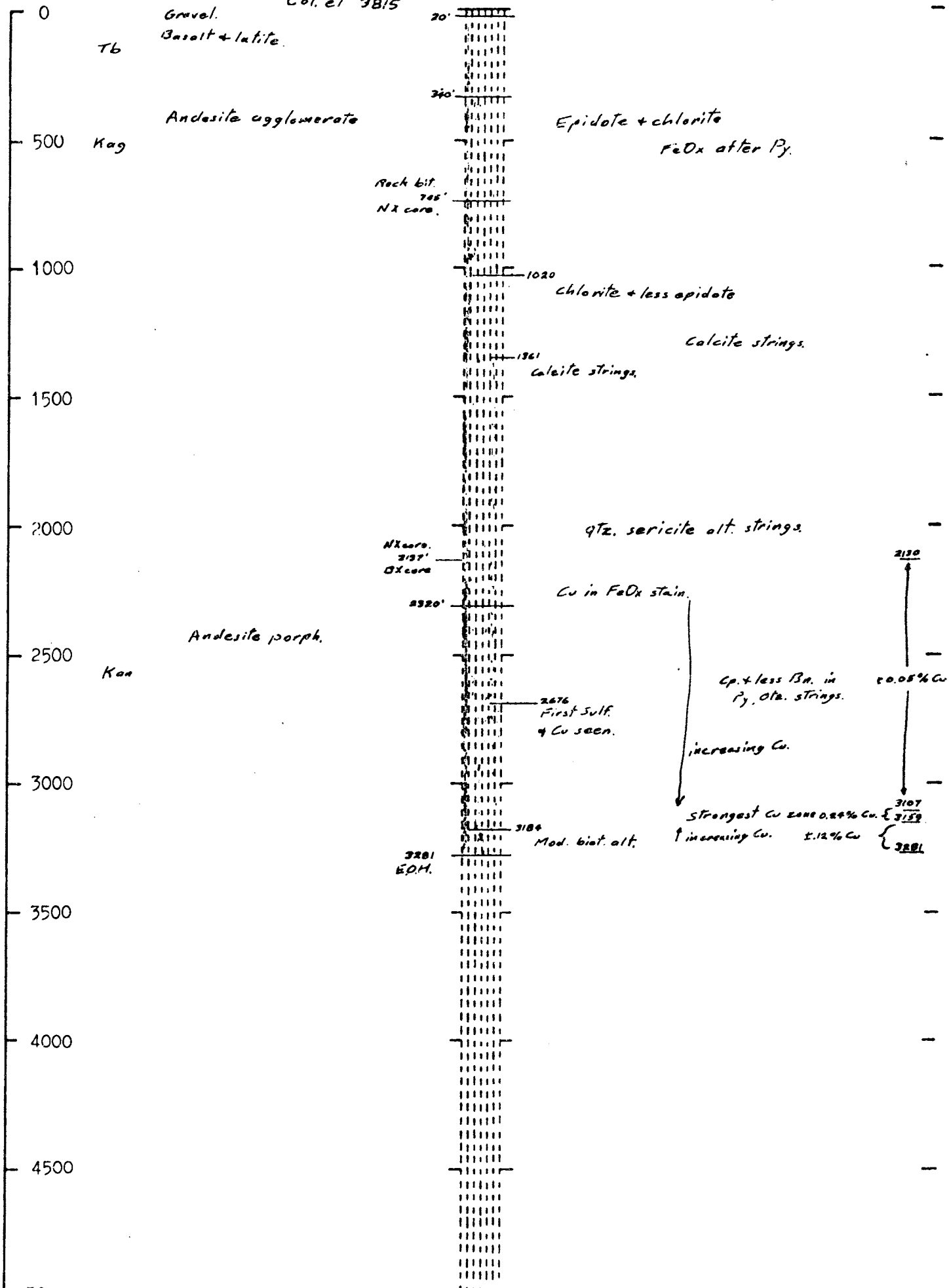
FROM	TO	DESCRIPTION
1361' - continued		MINERALIZATION: A few flecks disseminated hematite, widely spaced very thin seams calcite. 1341' to 1412' broken, scattered veinlets calcite with some white clay, possible gypsum. 1444' to 1460' broken.
1710'	1790'	Similar to above but denser, gray color, firm but greasy-looking, easily scratched gray to gray-pink matrix, much fine femic altered to chlorite, scattered spots epidote. At 1759', 1.5 feet strong limonite in soft altered material.
1790'	1874'	Very similar to above but matrix a little pinker, possibly harder.
1874'	1971'	Same as above except locally broken, more numerous calcite seams, many with films and specks hematite.
1971'		Darker colored andesite agglomerate possibly due to increased fine grained biotite. Broken, fairly numerous steeply dipping calcite and sericitized stringers, weak to fair limonite. Last core observed 1992 feet, October 8, 1971.

ES 1

Essex

Oct. 25 1971 - Nov. 26, 1971

SCALE: 1" = 500'



36-E - from near San Juan Mine

Plagioclase phenocrysts fairly fresh; alteration products are epidote and sericite. Yellow brown biotite is abundant in patches and as fine-grained material in the groundmass. In some areas a little chlorite is associated with ~~[illegible]~~ and is being replaced by biotite.

2136' ES-1

Plagioclase alteration is very similar to 36-E. A pale-green chlorite takes the place of biotite in 36-E. This chlorite differs from the biotite in 36-E in color (green as opposed to yellow brown) and shows the deep blue interference color typical of pennine. No biotite was recognized in 2136'. It appears that 36-E has been subjected to the addition of K resulting in the replacement of chlorite by biotite and that this has not occured in 2136'. opaque iron oxides are much more abundant than in 36-E.

ES-1 Sample 1103' contains biotite similar to that in 36-E. Sample 2037' is somewhat similar to 36-E but iron staining makes it difficult to determine if the fine-grained material contains biotite or is just stained sericite.

The 3 core samples from other holes all show biotitic alteration. They may be slightly different rock types as more quartz is present.

NOTES ON ALTERATION MINERALOGY FROM THIN SECTION DESCRIPTIONS

ES-1

Depth (ft)	Epidote	Calcite	Chlorite	Biotite	Sericite	
747	mod	mod	strong	—	strong	
1011	mod	mod	mod-str	—	~~strong~~ mod	
1103	wk-mod	—	—	strong	strong	
1620	mod	mod	mod	—	mod-str	
2037	—	—	~~wk~~ mod	—	str	
2071	—	—	mod	—	str	
2136	mod	—	mod-str	—	mod	
2469	wk	—	str	wk-mod	wk	
2493	~~mod~~ wk	wk	str	—	—	
2527	wk	—	—	mod	str	good quartz; altered dike material
2565	—	—	mod	mod-str	mod	
2731	str	wk	wk	—	str	dike? some K-spar
2746	wk	—	mod	wk	mod	K-spar minor
2880	mod	—	—	str	wk	minor K-spar, weak quartz

ES-1

Thinsections of seven different samples have been examined: Samples from 747', 1011', 1620', 2071' and 2136' are somewhat similar. All are a greenish grey porphyritic rock, probably andesite. Fragments of various size are included in all the samples although they become less obvious with depth and in general the deeper samples appear more dense and homogeneous. Samples from 1108' and 2037' are "bleached" and iron stained and appear to be more intensely altered samples of the same or similar rock types as the above samples.

(747') - Plagioclase phenocrysts 80-90% replaced by Sericite, epidote and Calcite. Sericite is rather coarse and is more abundant than the other two minerals. Chlorite is abundant as fairly large masses. Large "fragments" of clear pure epidote are present and intergrowths of epidote and calcite are fairly common.

(1011') - Replacement of plagioclase phenocrysts not as complete as in 747'; Probably 70-90% replacement. Sericite is most abundant alteration product with calcite and epidote being less abundant. Masses of pure epidote common but not as large as in 747'. Irregular masses of chlorite are similar to those in 747'.

(1620') - Plagioclase 60-80% replaced by alteration products. Sericite slightly more abundant than Calcite & epidote as alteration product of plagioclase. Chlorite is similar in amount and occurrence to above two samples. Epidote seems less abundant than in 1011'; no mass are present in the thin section. Plagioclase phenocrysts are slightly more abundant than in the above two samples.

(2071') - Plagioclase phenocrysts altered to sericite. Appear to be a finer-grained sericite than in previous samples. 70 - 90% of plagioclase replaced. Appears to be some secondary quartz in the plagioclase sites. Carbonates and epidote very ~~rare~~ rare if present. Chlorite occurs in the groundmass and as relatively large masses. Talc (?) is present along fractures. Sericite appears to be slightly more abundant in groundmass than in other samples.

(2136') - Plagioclase phenocrysts appear less altered. ~30-50% replaced. Sericite alteration less pronounced. Epidote alteration of plagioclase more abundant ~~than~~ than sericite or the two are about equal. Some small quartz veinlets. Chlorite common as masses and in groundmass. Opaques (magnetite & hematite) very abundant in areas rich in chlorite. Minor calcite in a veinlet.

(1103') "Bleached" sample highly fractured & iron stained. Plagioclase phenocrysts 50-70 % replaced by sericite & epidote. Sericite more abundant than epidote. Biotite is fairly abundant and texturally appears similar to the chlorite in the other samples. Some biotite is spacially associated with plagioclase. Hematite surrounded by iron-staining is fairly common.

(2037')- Altered & iron-stained. Plagioclase phenocrysts in distinct. ~~the~~ Dark brown masses appear to be iron stained masses of sericite, Possibly some biotite. Chlorite is fairly common, mostly in small masses. Sericite also occurs in groundmass. Fe-oxide minerals surrounded by brown staining are common.

36-E - from near San Juan Mine

Plagioclase phenocrysts fairly fresh; alteration products are epidote and sericite. Yellow brown biotite is abundant in patches and as fine-grained material in the groundmass. In some areas a little chlorite is associated with [redacted] and is being replaced by biotite.

2136' ES-1

Plagioclase alteration is very similar to 36-E. A pale-green chlorite takes the place of biotite in 36-E. This chlorite differs from the biotite in 36-E in color (green as opposed to yellow brown) and shows the deep blue interference color typical of pennine. No biotite was recognized in 2136'. It appears that 36-E has been subjected to the addition of K resulting in the replacement of chlorite by biotite and that this has not occured in 2136'. opaque iron oxides are much more abundant than in 36-E.

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The 3 core samples from other holes all show biotitic alteration. They may be slightly different rock types as more gneiss is present.

(2037')- Altered & iron-stained. Plagioclase phenocrysts indistinct. ~~the~~ Dark brown masses appear to be iron stained masses of sericite, possibly some biotite. Chlorite is fairly common, mostly in small masses. Sericite also occurs in groundmass. Fe-oxide minerals surrounded by brown staining are common.

PETROGRAPHIC ANALYSIS

Date 10-13-71

Analyst JAF

Sample No. 101 (747') Hole ES-1 747 feet

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Light gray, fine-grained rock w/ rounded fragments of a darker green rock (mostly chlorite?) and some fragments that appear to be mostly epidote.

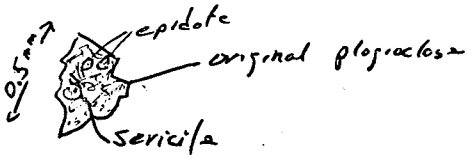
Thin Section Texture: Porphyritic, fine-grained groundmass with medium-grained phenocrysts. [redacted] non homogeneous.

THIN SECTION MINERALOGY

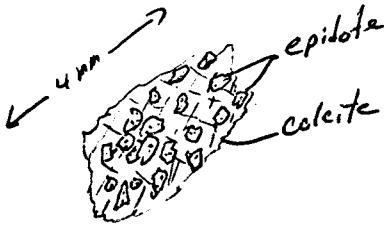
Mineral	Chemical Composition
plagioclase	
Calcite	
epidote	
Chlorite	
quartz	
hematite	

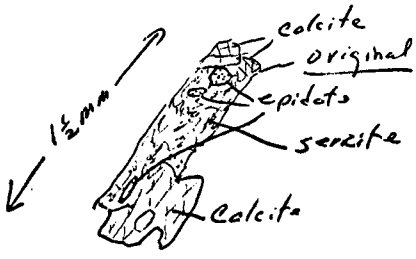
MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase occurs as subhedral phenocrysts up to 2 mm in length. Alteration is very intense so that in most cases all that is seen is the outline of the original plagioclase grain. Sericite is the most abundant alteration product of plagioclase. Calcite and epidote are much less common. Epidote is very abundant in the rock occurring as fine-grained mass with a more or less rounded shape (as the larger masses are obvious in the hand specimen. In other areas intergrowths of calcite and epidote occur. It is not obvious what these masses are replacing. A small amount of quartz is present and appears to be a primary mineral. In some areas the groundmass does not appear to be extensively altered. Because of fine-grained size the mineralogy cannot be determined. Low birefringence suggests feldspar may possibly some quartz in these areas.



CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)





Normally Not this much calcite

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Original mineral	alteration
Plagioclase	sericite, epidote, calcite
hornblende ?	epidote ± chlorite
biotite	chlorite

Alteration appears to be propylitic. Plagioclase seems to be more extensively altered to sericite than in sample # 113.

PETROGRAPHIC ANALYSIS

Date 9-20-71

Analyst JAF

Sample No. ES-1 (1011')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Greenish-gray heterogeneous, fine-grained groundmass with larger "phenocrysts" of altered plagioclase and bright green epidote.

Texture - mostly fine - to medium grained porphyritic. Euhedral plagioclase & mafic minerals in a fine-grained groundmass. Fragmental (?) in part. Proportions of phenocrysts & groundmass change from area to area

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase (too badly altered to determine composition)	
Epidote	
chlorite	
sericite	
Carbonate	
Opaques (magnetite?)	
quartz ? (very fine-gd. in groundmass)	
Sphene	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase phenocrysts - too badly altered to determine composition. Some euhedral others anhedral. Size varies; largest grains ≈ 2mm. Alteration products are sericite, epidote and Calcite. Sericite appears to be slightly more abundant than the other two and is rather coarse. It occurs as irregular masses throughout the plagioclase. Calcite is slightly more abundant than epidote and commonly occurs as a fairly large (up to ½mm) mass. Epidote is slightly less abundant as an alteration product of plagioclase and is usually present as fairly small grains scattered through the plagioclase.

Sericite, Carbonate and epidote also occur in the fine-grained groundmass. Bec[illegible] the grain size their exact relationship is not clear (even)

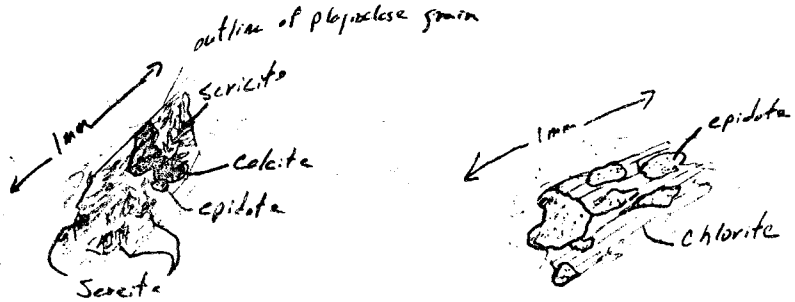
but they appear to be forming from finer-grained plagioclase present in the groundmass. ~~From~~

Fairly coarse grained epidote occurs in patches sometimes associated w/ Chlorite. Apparently these masses represent completely altered mafic minerals perhaps hornblende or biotite. Several smaller shreds of chlorite are present independent of epidote. Texturally these suggest replacement of biotite, but no biotite remains. A few small grains of sphene are present in the larger patches of chlorite & epidote.

A few small opaque grains are present. These are black in reflected light and are probably magnetite. Some are ~~slight~~ reddish around the edges suggesting partial oxidation to hematite. No sulfides were identified.

The fine grained groundmass has a low birefringence and appears to be mostly feldspar. Under high power it appears that a little quartz may be present but quartz could not be definitely identified. If present it appears to be a primary mineral and no secondary quartz was recognized. Chlorite is fairly abundant in the groundmass and may represent altered biotite.

~~CHEMICAL COMPOSITION OF ROCK~~ ~~(Estimated from mineralogy and approximate mineral abundances)~~



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Texturally the rock appears to be pyroclastic, at least in part, thus the term agglomerate or tuff is probably correct. The composition is probably close to that of andesite. Alteration appears to be rather strong (pervasive) & seems to be propylitic in nature.

Original mineralogy	Alteration
Plagioclase	Sericite, calcite, epidote
hornblende (?)	epidote, chlorite
biotite	chlorite

No orthoclase was recognized, but a small amount might be present in groundmass. quartz, if present, is in groundmass.

PETROGRAPHIC ANALYSIS

Date 9-20-71

Analyst JAF

Sample No. ES-1 (1011')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Greenish-gray heterogeneous, fine-grained groundmass with larger "phenocrysts" of altered plagioclase and bright green epidote.

Texture - Mostly fine- to medium grained porphyritic. Euhedral plagioclase & mafic minerals in a fine-grained groundmass. Fragmental? in part. Proportions of phenocrysts & groundmass change from area to area

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase (too badly altered to determine composition)	
Epidote	
chlorite	
sericite	
Carbonate	
Opaques (magnetite?)	
quartz? (very fine-gd. in groundmass)	
Sphene	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase phenocrysts - too badly altered to determine composition. Some euhedral others anhedral. Size varies, largest grains ≈ 2mm. Alteration products are sericite, epidote and Calcite. Sericite appears to be slightly more abundant than the other two and is rather coarse. It occurs as irregular masses throughout the plagioclase. Calcite is slightly more abundant than epidote and commonly occurs as a fairly large (up to 1mm) mass. Epidote is slightly less abundant as an alteration product of plagioclase and is usually present as fairly small grains scattered through the plagioclase.

Sericite, Carbonate and epidote also occur in the fine-grained groundmass. Because of the grain size their exact relationship is not clear (over)

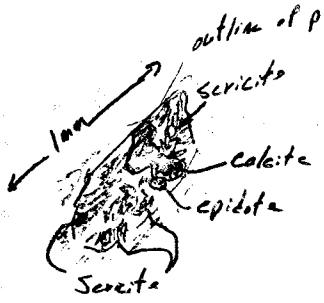
but they appear to be forming from fine-grained plagioclase present in the groundmass.

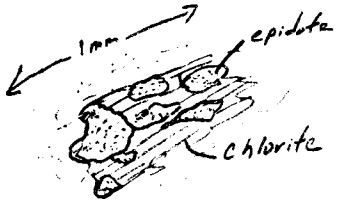
Fairly coarse-grained epidote occurs in patches sometimes associated with chlorite. Apparently these masses represent completely altered mafic minerals perhaps hornblende or biotite. Several smaller shreds of chlorite are present independent of epidote. Texturally these suggest replacement of biotite, but no biotite remains. A few small grains of sphene are present in the larger patches of chlorite & epidote.

A few small opaque grains are present. These are black in reflected light and are probably magnetite. Some are reddish around the edges suggesting partial oxidation to hematite. No sulfides were identified.

The fine-grained groundmass has a low birefringence and appears to be mostly feldspar. Under high power it appears that a little quartz may be present but quartz could not be definitely identified. If present it appears to be a primary mineral and no secondary quartz was recognized. Chlorite is fairly abundant in the groundmass and may represent altered biotite.

~~CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)~~





PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Texturally the rock appears to be pyroclastic, at least in part, thus the term agglomerate or tuff is probably correct. The composition is probably close to that of andesite. Alteration appears to be rather strong (pervasive) & seems to be propylitic in nature.

Original mineralogy	Alteration
Plagioclase	Sericite, calcite, epidote
hornblende(?)	epidote, calcite
biotite	chlorite

No orthoclase was recognized, but a small amount might be present in groundmass. quartz, if present, is in groundmass.

PETROGRAPHIC ANALYSIS

Date 10-1-71

Analyst JAF

Sample No. 55-1 1103'

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Mostly fine-grained somewhat friable rock. Light-gray with Fe_2O_3 stain. Iron oxide is mostly in small circular areas giving a spotted appearance to the rock. The rock is foliated.

Thin Section Texture - Fine-grained hypidiomorphic porphyritic. Phenocrysts are approx. 1mm or smaller in size.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
Plagioclase	
Quartz	
Sericite	
epidote	
biotite	
hematite	
sphene?	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase - altered euhedral plagioclase phenocrysts make up approximately 40% of the rock. The largest dimension averages about 1mm in length. Within a given area a rough preferred orientation of the laths seems present but the direction varies throughout the section. All of the plagioclase phenocrysts are altered with Sericite being by far the most common alteration product. Epidote and a pale yellow biotite are much less abundant alteration products.

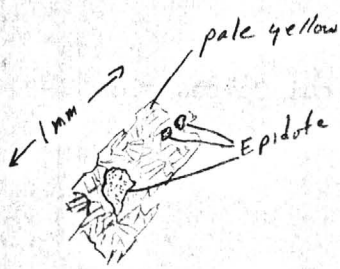
Biotite - Probably the second most abundant mineral in the slide is a pale-yellow biotite. It occurs mostly as fairly large patches throughout the rock. These patches consist of masses of fairly fine-grained biotite. The overall shape of these larger patches suggests that they may have been large biotite flakes that have recrystallized

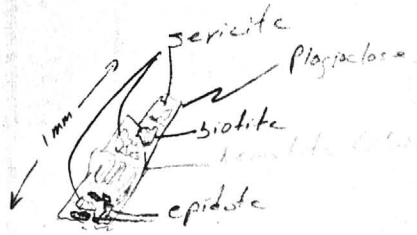
A small amount of epidote occurs in some of the patches of biotite. A small amount of this biotite occurs within plagioclase phenocrysts and appears to be forming from the plagioclase.

Hematite - hematite occurs as grains up to .8mm in diameter and as much finer grained "disseminations". The larger grains are often surrounded by a red iron oxide stain.

Quartz - a few small grains of quartz were identified in the groundmass and appear to be primary minerals in the rock.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)





PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Primary minerals	Alteration
Plagioclase	sericite, epidote, biotite
mafics (Amphibole? biotite?)	biotite, epidote
magnetite?	hematite

The sample differs from 1011' in having a much greater hematite content, the presence of biotite and the absence of calcite and chlorite.

A small spherical body slightly greater than 1mm in diameter is composed of an unidentified translucent material. Under reflected light a few small grains of what appears to be pyrite were observed. No other sulfides are present.

HAWLEY & HAWLEY
ASSAYERS AND CHEMISTS, INC.
1700 W. GRANT RD. • BOX 50106 • 622-4836
TUCSON, ARIZONA 85703

BRANCHES: DOUGLAS, ARIZONA
HAYDEN, ARIZONA
EL PASO, TEXAS
ST. LOUIS, MO.

IDENTIFICATION	GOLD oz/T	SILVER oz/T	LEAD %	COPPER %	ZINC %	MO. %	IRON %		
	ppm	ppm		ppm		ppm			
E 860	< 0.01	1.3		77		< 2			

CC: Essex International, Inc
ADD: 1704 West Grant Road
CITY: Tucson, Arizona 85705
DD:
CITY:

REMARKS: Trace analysis

ANALYSIS CERT. BY W E Richard

PREPARATION $ 1.25
ANALYSIS $ 7.75

HH3A ACC: ESSEX INTERNATIONAL, INC. | DATE SPL. RECEIVED 9/29/71 | DATE COMPL 10/2/71 | TUC 345658 | $ 9.00

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PETROGRAPHIC ANALYSIS

Date 10-1-71

Analyst JAF

Sample No. ES-1 1103'

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Mostly fine-grained somewhat friable rock. Light-gray with Fe_2O_3 stain. Iron oxide is mostly in small "circular" areas giving a spotted appearance to the rock. The rock is fractured.

Thin section Texture - fine-grained hypidiomorphic porphyritic. Phenocrysts are approx 1mm or smaller in size.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
Plagioclase	
Quartz	
Sericite	
epidote	
biotite	
hematite	
sphene?	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase - altered euhedral plagioclase phenocrysts make up approximately 40% of the rock. The longest dimension averages about 1mm in length. Within a given area a rough preferred orientation of the laths seems present but the direction varies throughout the section. All of the plagioclase phenocrysts are altered with Sericite being by far the most common alteration product. Epidote and a pale yellow biotite are much less abundant alteration products.

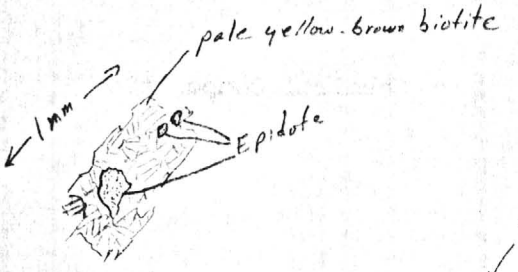
Biotite - Probably the second most abundant mineral in the slide is a pale-yellow biotite. It occurs mostly as fairly large patches throughout the rock. These patches ~~[illegible]~~ consist of masses of fairly fine-grained biotite. The overall shape of these larger patches suggests that they may have been larger biotite flakes that have recrystallized

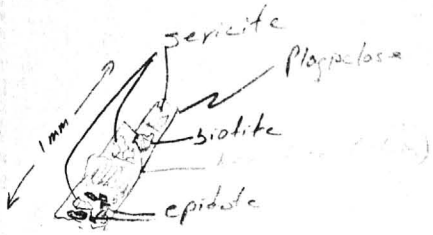
A small amount of epidote occurs in some of the patches of biotite. A small amount of this biotite occurs within plagioclase phenocrysts and appears to be forming from the ~~last~~ plagioclase.

Hematite - hematite occurs as grains up to .8mm in diameter and as much finer grained "disseminations". The larger grains are often surrounded by a red iron oxide stain.

Quartz - a few small grains of quartz were identified in the groundmass and appear to be primary minerals in the rock.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)





PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Primary minerals	Alteration
Plagioclase	sericite, epidote, biotite
mafics (Amphibole? biotite?)	biotite, epidote
magnetite?	hematite

The Sample differs from 1011' in having a much greater hematite content, the presence of biotite and the absence of Calcite and Chlorite

A small spherical body slightly greater than 1mm in diameter is composed of an unidentified translucent material. under reflected light a few small grains of ~~that~~ what appears to be pyrite were observed. No other sulfides are present

PETROGRAPHIC ANALYSIS

Date 10 - 12 - 71

Analyst JAF

Sample No. 113 (1620') Drill Hole ES-1 1620 feet.

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray, Porphyritic. Several rather large darker areas also w/ phenocrysts Groundmass is fine-grained. Appears to be agglomerate or similar rock. Seems to be denser w/ more hazy outlines of fragments than shallower samples

Thin section Texture - fine-grained groundmass w/ phenocrysts up to 2.5 mm. Large fragments of a similar rock type also w/ phenocrysts. Phenocrysts in inclusions have a subparallel ~~orientation~~ orientation in some cases. Phenocrysts are plagioclase.

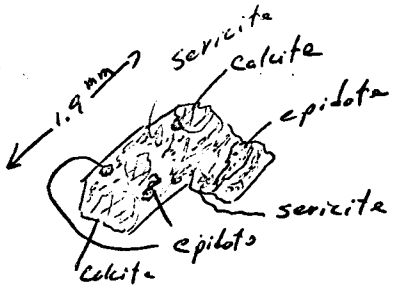
THIN SECTION MINERALOGY

Mineral	Chemical Composition
Plagioclase	
Chlorite	
epidote	
Calcite	
magnetite	
Sphene (?)	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase occurs as euhedral phenocrysts up to 2.5 mm in length. Phenocrysts are very abundant, making up at least 50% of rock. All are altered. The most common alteration product of plagioclase is sericite. Epidote and calcite are abundant as alteration products of plagioclase. Fairly large masses of chlorite appear to have replaced biotite. Very fine-grained chlorite is abundant in the groundmass in the darker areas of the rock. Magnetite is fairly abundant and is slightly altered to hematite or limonite. No quartz or K-feldspar was identified although small amounts may be present in the fine-grained groundmass. The alteration seems to be propylitic and seems about the same as in the sample from 1011'.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Original Mineral	Alteration Products
Plagioclase	sericite, epidote, calcite
biotite	chlorite

PETROGRAPHIC ANALYSIS

Date Oct 18, 1971

Analyst JAF

Sample No. ES-1 2037

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Light gray, mostly fine-grained rock w/ inclusions. Sample grades from a bleached light gray color to a darker green. Abundant iron oxide stain. Numerous fractures.

Thin section texture: Difficult to determine because of pervasive alteration & Fe staining. Appears to be porphyritic.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
Chlorite	
sericite	
Quartz	
hematite	
magnetite	
Altered plagioclase	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Strongly altered. Sericite abundant throughout rock. Fe staining makes exact identification difficult but plagioclase phenocrysts seem to be completely altered to sericite & stained a red-brown by iron oxides. Quartz is present in the groundmass. Chlorite occurs as scattered irregular aggregates. No sulfides were observed; small opaque grains are black in reflected light and apparently magnetite. Areas around these grains are the most heavily stained. The groundmass appears to be mostly sericite and quartz.

PETROGRAPHIC ANALYSIS

Date 10-18-71

Analyst JAF

Sample No. FS-1 2071

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray fine- to medium-grained rock. Some small fragments of a darker green-gray rock. Several fractures.

Thin section texture: Mostly fine-grained porphyritic. Euhedral plagioclase phenocrysts.

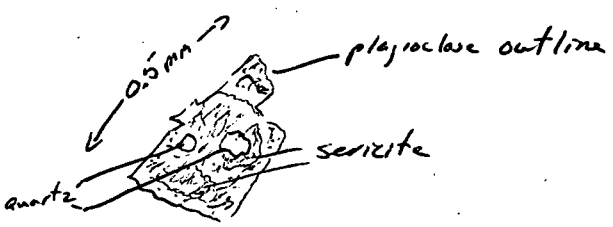
THIN SECTION MINERALOGY

Mineral	Chemical Composition
Plagioclase	
Chlorite	
Sericite	
Epidote	
quartz	
hematite	
talc (?)	
Sphene	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase phenocrysts altered to sericite w/ some secondary quartz. There may be some clay alteration but if so it is not as abundant as sericite. Epidote is very minor. A fine-grained mineral w/ high birefringence occurs along fractures and is probably talc or serpentine. Chlorite occurs as irregular aggregates up to 0.5 mm in diameter and as fine-grained material in some areas. Alteration is pervasive.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

PETROGRAPHIC ANALYSIS

Date 10-21-71

Analyst JAF

Sample No. ES-1 2136'

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Fine-grained reddish brown rock w/ some included fragments of a greenish rock.

Thin section texture: fine- to medium-grained porphyry. Euhedral plagioclase phenocrysts set in a fine-grained matrix.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase	
Quartz	
Chlorite	
epidote	
Magnetite	
hematite	
sericite	
Carbonate	
sphene?	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, texture, relationships with adjacent minerals)

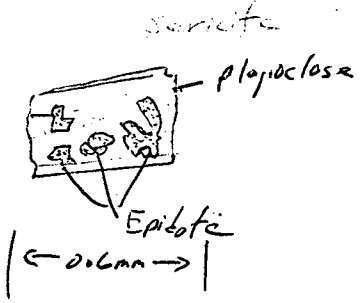
Is this actually introduced biotite?

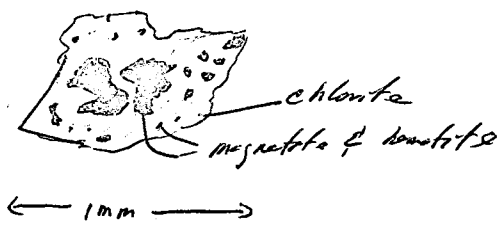
Intensity of plagioclase alteration varies. Some grains are not badly altered while others are quite altered. Epidote is the most common alteration mineral. Sericite is fairly abundant also. Calcite is a rare alteration product of plagioclase. Some plagioclase grains have a "cloudy" appearance.

Coarse masses of chlorite up to 3 mm across occur throughout the rock. Finer-grained chlorite is common in the groundmass. Magnetite is very abundant in areas rich in chlorite. It occurs as very fine-grained occasionally euhedral crystals and as aggregates of very fine-grained material. In reflected light the opaque grains are red-brown around the edges indicating hematite or limonite.

A small (<1mm) quartz veinlet cuts the rock. Sericite seems to be slightly more abundant along the margins of this vein.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)



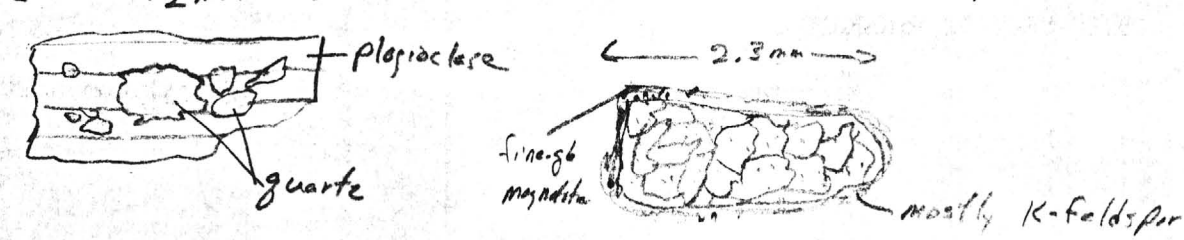


PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

In general the plagioclase appears fresher than in sections of similar rock from above. Epidote is present in similar amounts but sericite is less abundant as an alteration product of plagioclase, chlorite appears to be more abundant than in some previous samples as well as magnetite. No sulfides were recognized.

chlorite often forms narrow rims around pyrite grains, but a few larger grains are present. Quartz occurs as fine-grained material in the groundmass, in plagioclase grains and along veinlets w/ sericite & chlorite. sericite is mostly restricted to small veinlets where it is fairly coarse-grained. Pyrite is disseminated and occurs in veinlets. magnetite is fine-grained and occurs in the groundmass.

~~CHEMICAL COMPOSITION OF ROCK~~ (Estimated from mineralogy and approximate mineral abundances)



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

The fine-grained biotite in this rock resembles that in the core from Kennecott & P-D holes.

PETROGRAPHIC ANALYSIS

Date 11-23-71

Analyst JAF

Sample No. 2880' ES-1

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray porphyritic fine- to medium-grained rock. Disseminated pyrite.

Thin section texture: fine-grained groundmass, medium-grained phenocrysts.

THIN SECTION MINERALOGY

Mineral		Chemical Composition
Plagioclase		
Epidote		
biotite		(good brown biotite!)
Chlorite	Pyrite	
K-feldspar	magnetite	
Sericite	Calcite	
Quartz		

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase occurs as phenocrysts 1-2 mm in length. Most crystals are fairly fresh with only flecks of sericite. A few appear to be partially replaced by quartz (sketch). Fine-grained biotite is very abundant in the groundmass. Epidote occurs as fairly large clusters of fine-grained crystals probably representing replaced mafic minerals. Some of these clusters are surrounded by a narrow rim of K-feldspar. K-feldspar is a very minor constituent occurring as mentioned above and as very fine grains in plagioclase or around the edge of plagioclase phenocrysts.

PETROGRAPHIC ANALYSIS

Date 11-10-71

Analyst JAF

Sample No. ES-1 (2469')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray fine-grained porphyritic rock. Reddish stain along fractures. A white fiberous substance coats some fractures.

Thinsection Texture: Fine- to medium-grained porphyritic; subparallel arrangement of phenocrysts (flow structure).

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase	
opaques (magnetite, hematite)	
chlorite	
Quartz	
epidote	
sphene(?)	
biotite	
sericite	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase phenocrysts are mostly fresh. Some are cloudy & a small amount of sericite occurs along fractures. Many plagioclase crystals are zonned. Chlorite is abundant in the groundmass. Some masses of chlorite have a dark green central area ~~which~~ with higher birefringence which appears to be a variety of biotite. Texturally, the chlorite seems to be replacing the biotite in some areas. Biotite appears to be aggregates of extremely fine-grained material. A few patches of epidote are present. Quartz is minor and occurs in the groundmass. Fine-grained magnetite is abundant and is ~~assoc~~ associated with chlorite and biotite in the groundmass.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Phenocrysts are very abundant and show some parallel orientation suggesting a flow rock.

PETROGRAPHIC ANALYSIS

Date 11-10-71

Analyst JAF

Sample No. ES-1 (2493')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray, fine-grained porphyritic rock. Some areas are reddish.

Thin section Texture: fine- to medium-grained, porphyritic. Some alignment of small plag. rodlets suggesting flow.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase	
epidote	
chlorite	
calcite	
magnetite	
hematite	
sphene (?)	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

plagioclase phenocrysts are fairly abundant most are ~~fresh~~ fresh although some contain a few grains of epidote, and some are cloudy. chlorite is slightly less abundant than in (2465') but is still fairly abundant as rather large aggregates. Biotite seems to be absent. A few patches of calcite are present. Epidote is fairly abundant, usually intergrown with chlorite. Usually occurs in the groundmass. Fine-grained opaque minerals are mostly magnetite with some hematite around the edges.

PETROGRAPHIC ANALYSIS

Date 11-10-71

Analyst JAF

Sample No. FS-1 (2527')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Red-brown fine-grained rock. Highly fractured ~~with~~ with "spots" of deep red-brown hematite

Thin section Texture: fine-grained, porphyritic.

THIN SECTION MINERALOGY

Mineral	Estimated %	Chemical Composition
plagioclase	50	
quartz	30	
sericite	10	
biotite	5⁻	
epidote	5⁻	
sphene		
magnetite		
hematite		

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Sericite is pervasive although it is more abundant in the groundmass than in the plagioclase phenocrysts. Phenocrysts are not too abundant and show ~~them~~ some sericite alteration and are cloudy. Quartz is abundant occurring mostly as ~~the~~ "patches"; some may be ~~secondary~~ secondary. Biotite ~~one~~ is fine-grained and occurs as irregular patches scattered throughout the thin section. Small grains of magnetite are present. Some has a red border apparently alteration to hematite. Red hematite stains parts of the section. Epidote is not too abundant. It occurs as roughly spherical aggregates up to 1mm across.

PETROGRAPHIC ANALYSIS

Date 11-10-71

Analyst JAF

Sample No. ES-1 (2565.3')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Red-brown fine-grained rock, A thin (1mm) "vein" of hematite cuts one side of the core, Hematite & possibly limonite make up or stain the rock for a distance of approx 2 cm away from the vein. The outer part of the core is a dark gray fine-grained rock. (see sketch)

Thin section Texture: mostly fine-grained. slightly porphyritic.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
Biotite	
Chlorite	
Plagioclase	
sericite	
quartz.	
magnetite	
hematite	
calcite	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase phenocrysts are not very abundant. When present they are very cloudy & show sericite alteration. Both chlorite & biotite are present. They occur as fine-grained material in the groundmass (mostly biotite) and as larger patches (chlorite centers w/ biotite rims commonly). Biotite is replacing the chlorite and is more abundant than chlorite. Near the hematite "vein" biotite ~~&~~ & chlorite become less abundant and their place is taken by a translucent or transparent mass of hematite. Some sericite is present in the fresh rock and as the hematite vein is approached sericite becomes more abundant and coarser. Quartz is very fine-grained. Magnetite occurs as rather small black grains usually surrounded by red brown translucent hematite. Hematite & iron oxide staining increase rapidly toward the hematite vein.

Small veinlets of calcite parallel the hematite vein and only occur near it.

~~CHEMICAL COMPOSITION OF ROCK~~ (Estimated from mineralogy and approximate mineral abundances)

{biotite not obvious; hematite abundant; sericite abundant}

{biotite & chlorite abundant; biotite replacing chlorite; some sericite & a few plagioclase phenocrysts}

Sketch of core fragment

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Rock is strongly altered. Hematite appears to be in a strongly sheared area.

PETROGRAPHIC ANALYSIS

Date 11-22-71

Analyst JAF

Sample No. ES-1 2731'

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Pinkish grey, porphyritic rock. Mostly fine-grained. Chalcopyrite & fe-oxides along fractures.

Thinsection texture: fine-to medium-grained, porphyritic. Poorly defined flow structure.

THIN SECTION MINERALOGY

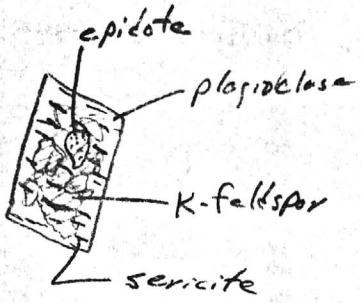
Mineral	Chemical Composition
Plagioclase	
K-feldspar	
Quartz	
opagues	
Epidote	Calcite
Sericite	
Chlorite	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase occurs as two distinct grain sizes. Fairly large plagioclase phenocrysts are fairly abundant and much smaller plagioclase laths make up approx 50% of the groundmass. The phenocrysts contain patches of K-feldspar, usually near the central portions of the crystals with plagioclase rims. A few phenocrysts apparently contain little or no K-feldspar as they would not take a Na-Cobaltinitrate stain. Sericite & epidote are abundant as alteration products of plagioclase.

Fine-grained K-feldspar occurs in the groundmass with plagioclase and minor quartz. Chlorite occurs as small patches in the groundmass. Calcite is rare occuring as patches. Opaque minerals are black in reflected light, suggesting magnetite or ilmenite.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

This rock is texturally similar to most of the previous samples but appears to contain much more K-feldspar. Phenocrysts are less abundant than in most of the previous samples.

PETROGRAPHIC ANALYSIS

Date 11-23-71

Analyst JAF

Sample No. 2746' ES-1

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Light gray, fine-grained porphyritic rock. Some areas are darker gray w/ fewer phenocrysts. Pyrite along fractures.

Thin section texture: mostly fine-grained, porphyritic.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase	
magnetite	
K-feldspar	
chlorite	
biotite (?)	
sericite	epidote
hematite	
sulfide	

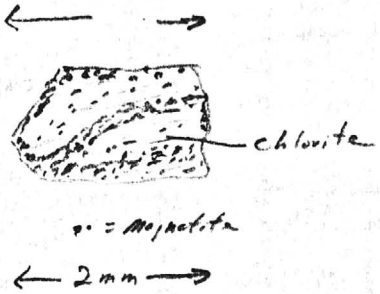
MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase is very abundant. most grains are cloudy and contain some fine-grained sericite. Magnetite is fairly abundant as small irregular grains, some are reddish around the edges in reflected light indicating some alteration to hematite. Apparently the small black specks seen in hand specimen are magnetite. K-feldspar is present in minor amounts as fine-grained material. Some fine-grained quartz is also present.

In the darker colored parts of the core a green mineral is abundant some of this is chlorite and some is a very fine-grained material w/ higher birefringence and is probably a fine-grained biotite that seems to be forming from chlorite. Magnetite &

These areas. Epidote is a very minor constituent. One large area of chlorite & magnetite is sketched below.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Probably an altered andesite

THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

COLLEGE OF MINES
DEPARTMENT OF GEOLOGY
TEL. (602) 884-1819

Comparison of samples ES-1 (3275) and ES-2 (2773)

ES-2 (2773) is a fairly homogeneous fine-grained porphyritic andesite. ES-1 (3275) ~~is~~ is porphyritic in part but about one half of the sample is fine-grained with few or no phenocrysts. Biotite in the ES-1 sample is a darker brown and is largely independent of chlorite while the biotite in ES-2 is paler brown and is usually interbrown with chlorite but the replacement relationships are not clear. The ES-2 sample contains much more epidote and pyrite and some more chlorite while the ES-1 sample contains more orthoclase, anhydrite and quartz. ES-1 (3275) resembles the samples from Kennecott and P D core much more than does ES-2 (2773).

PETROGRAPHIC ANALYSIS

Date 9-21-72

Analyst JF

Sample No. ES-1 3275'

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray, heterogeneous, fine-grained. one half of specimen is coarser-grained than other part. Contact between two rock types or a fragment in an agglomerate or breccia.

This section Texture: part of this section is porphyritic w/ numerous plagioclase phenocrysts. other part is very fine-grd. w/ almost no phenocrysts. Both parts contain irregular areas of very fine-grd. biotite but these are larger in the part without plagioclase phenocrysts.

THIN SECTION MINERALOGY

Approx. %	Mineral	Chemical Composition
45	plagioclase	
40	Biotite	
	Anhydrite	
5	Black opaque (magnetite?); sulfide ??	
	Chlorite	
	Apatite	orthoclase
5	Quartz	Calcite, epidote

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase - euhedral phenocrysts (0.5-1mm) very abundant in part of slide. Most crystals are zoned, with most zones being very fresh while a few interior zones in some crystals are altered. Alteration products are mostly a very fine-grained biotite, with a pale green chlorite and anhydrite being much less abundant. One plagioclase crystal is partially replaced by anhydrite & calcite these being surrounded by a narrow rim of orthoclase. [redacted] Very thin irregular areas of orthoclase occur in other plagioclase crystals, especially where anhydrite is present. Much of the anhydrite is rimmed or otherwise associated w/ orthoclase but the total orthoclase content of the rock is < 1 % and

- it all appears to be secondary

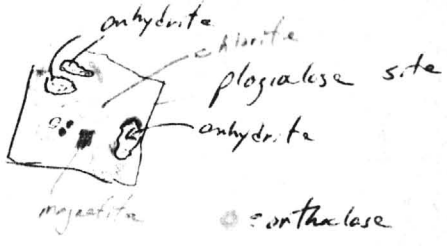
Biotite – biotite is very abundant. It is greenish brown and very fine-grained usually occuring as fairly large patches. Magnetite is very abundant in some areas where biotite is abundant.

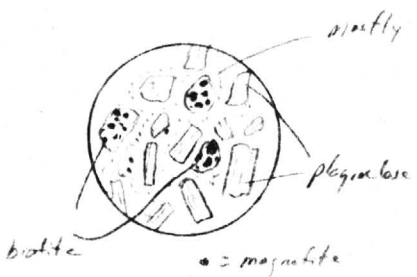
Quartz - a few phenocrysts of quartz are present in the porphyritic part of the slide. In the other part of the slide very fine-grain quartz make up much of the slide in some areas.

Anhydrite – fine-grained anhydrite is scattered throughout the slide but is more abundant in the non porphyritic part of the slide

only one grain of epidote was recognized.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)





Not typical of whole slide but is like the area the contact between the porphyritic & non porphyritic zones

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

PETROGRAPHIC ANALYSIS

Date 2-21-72

Analyst JAF

Sample No. ES-2, 2773

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Light gray, fine-grained porphyritic. Pyrite along fractures with some very fine-grained disseminations

Thin section texture: Fine-grained, porphyritic

THIN SECTION MINERALOGY

Mineral	Chemical Composition
Plagioclase	
biotite	
chlorite	
epidote	
magnetite	
Pyrite	
apatite	
quartz	
orthoclase	
calcite	
	Sericite

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Texturally similar to ES-1 3275'

Plagioclase - Some grains are cloudy. Sericite is a very minor alteration product occuring along cleavages is a few cases. Epidote is slightly more common as an alteration product.

Biotite - Generally paler brown (more greenish) than in ES-1 3275' associated w/ minor chlorite in the large patches.

Magnetite & Pyrite - disseminated throughout ground mass.

Orthoclase - very, very minor amounts,

Epidote - minor alteration product of plagioclase and occassionally as fairly large masses of almost pure epidote.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

GEOLOGIC DESCRIPTION

DDH ES-1 SAFFORD PROJECT

Notes by J.K. Jones
9-28-71, 9-30-71,
10-8-71

ROTARY CUTTINGS

FROM	TO	DESCRIPTION
0 feet	20 feet	Heterogeneous assortment of rock chips representing coarse, unsorted, recent gravel deposits.
20 feet	120 feet	Mostly gray, fine grained basalt but with scattered chips of a fresh, brown volcanic and rare fragments of epidotized rock. Probably represents a Tertiary basalt flow with some contamination from material caving in from higher in hole, but could be alluvium.
120 feet	190 feet	Almost entirely fine grained, dark gray basalt, a few brown volcanic chips. Tertiary basalt flow.
190 feet	208 feet	About 50% basalt, 50% brown, unaltered latite (?) which contains a few small fragments of epidote. Probably represents Tertiary flows and sedimentary material which occur beneath basalt and unconformably overlie Cretaceous volcanics.
208 feet	210 feet	No cuttings recovered.
210 feet	240 feet	Brown, unaltered latite (?) which contains fragments of epidote.
240 feet	330 feet	No cuttings recovered.
330 feet	335 feet	Basalt and latite fragments may be cave from higher in hole.
335 feet	340 feet	No cuttings recovered.
340 feet	390 feet	Mostly fine grained, white, altered material with much epidote. Chips are much smaller than higher in hole. Probably represents Cretaceous andesite agglomerate.

ROTARY CUTTINGS FROM	TO	DESCRIPTION
390 feet	400 feet	Similar to interval above, but epidote increased and chips are finer.
400 feet	420 feet	No cuttings recovered.
420 feet	470 feet	Cretaceous altered volcanic similar to above, but with some dark gray basalt and brown latite probably caving from higher in hole.
470 feet	500 feet	No cuttings recovered.
500 feet	580 feet	Altered Cretaceous volcanic similar to above.
580 feet	640 feet	No cuttings recovered.
640 feet	650 feet	Altered Cretaceous volcanic similar to 420 to 470 feet, much epidote, some contamination by basalt.
650 feet	660 feet	No cuttings recovered.
660 feet	670 feet	Similar to 640 to 650 feet.
670 feet	735 feet	No cuttings recovered.
735 feet	745 feet	Cretaceous volcanic similar to 640 to 650 feet but much contamination.

Hole cased to 745 feet, NX coring started at 745 feet.

745 feet	850 feet ±	Fragmental andesite. Fine, fuzzy textured matrix, possibly an altered andesite containing scattered feldspar phenocrysts, blebs of epidote, chloritized femics. Many fragments are medium grained, dark green andesite porphyry characterized by numerous soft white feldspar phenocrysts and abundant chlorite. ALTERATION: Feldspar locally bright but soft, probably sericitized, estimated 10% epidote present, ferromagnesian minerals altered to chlorite. MINERALIZATION: Widely spaced calcite veinlets, 0 to ½% disseminated grains limonite some after cubic pyrite, local goethite but common hematite. 837 to 879 estimated 5% limonite cubes after FES_2 up to 0.1 inch, estimated to be 60% hematite 40% goethite.

CORE ~~ROTARY CUTTINGS~~ FROM	TO	DESCRIPTION
850' ±	940' ±	Similar to interval above but chlorite seems to be increased.
940' ±	1020'(?)	Andesite agglomerate similar to above. ALTERATION: Chlorite appears stronger, epidote may be decreased, sericite appears stronger. Matrix and feldspars very soft and exhibit a sheen that resembles sericite. 951–953, 978–988±, 997–1006± are broken, bleached, limonite stained, and appear to be a fine grained aggregate of quartz and sericite.
1020'(?)	1120'(?)	Generally similar to above but does not appear as strongly altered. Light colored rock, under high power (30X) matrix appears to be largely composed of white, moderately soft feldspar and very fine quartz(?). Much of feldspar appears to be sericitized, but some areas are pink and hard. 1034–1036 broken, strong limonite. 1039–1045 broken. 1065 several inches strong limonite. 1065–1116 broken, strong limonite to 1108.
1120'(?)	1199' ±	Appears similar to 940–1020, texture fuzzy, fairly strongly altered andesite agglomerate, pale green in color.
1199' ±	1303'	Groundmass and overall rock color becoming light brown to pink, otherwise similar to above. 1229' to 1235' moderate amount disseminated, coarse grained limonite after pyrite.
1303'	1361'	Pale green, fuzzy textured rock, similar to 1120'–1199'. Alteration appears to be strong sericite, moderate chlorite, weak epidote.
1361'	1710	Andesite agglomerate, pale pink matrix of relatively fine grained andesite porphyry containing numerous various sized fragments often coarser grained than matrix. ALTERATION: Variable, feldspar in part bright but usually soft white. Femic minerals at least in part altered to chlorite but in places black. Fairly numerous blebs epidote.

CORE
~~ROTARY CUTTINGS~~

FROM	TO	DESCRIPTION
1361' - continued		MINERALIZATION: A few flecks disseminated hematite, widely spaced very thin seams calcite. 1341' to 1412' broken, scattered veinlets calcite with some white clay, possible gypsum. 1444' to 1460' broken.
1710'	1790'	Similar to above but denser, gray color, firm but greasy-looking, easily scratched gray to gray-pink matrix, much fine femic altered to chlorite, scattered spots epidote. At 1759', 1.5 feet strong limonite in soft altered material.
1790'	1874'	Very similar to above but matrix a little pinker, possibly harder.
1874'	1971'	Same as above except locally broken, more numerous calcite seams, many with films and specks hematite.
1971'	slight biot-chlor	Darker colored andesite agglomerate possibly due to increased fine grained biotite. Broken, fairly numerous steeply dipping calcite and sericitized stringers, weak to fair limonite. Last core observed 1992 feet, October 8, 1971.

2080 – 2320(?)	andesite agglomerate; alteration propylitic with common blebs of epidote, also to secondary biotite and weak sericite; greenish or reddish gray depending upon amount of hematite hematite variable but usually mod-strong on fractures and disseminated; sericite (?) and calcite on fractures; rock has wavy appearance due to sericite; hematite locally massive
2320 – 2508	andesite, andesite porphyry; green gray to reddish gray; hematite similar to above; lesser epidote; plagioclase alteration varies from weak sericite to sericite, calcite and epidote; femics alter to chlorite and probably v.f.g. biotite; rock locally fragmental;
2508 – 2527	dike; dull red chalky looking leached and bleached rock; weak silicification mod-strong sericite; disseminated limonite & hematite 1-2%, femics alter to chlorite, sericite, biotite(?)

2527 - 2658 rock similar to ~~that~~ above dike; interval 2613 - 2658 ~~may be~~ somewhat clastic,

2658 - 2731 andesite like above, weakly porphyritic, commonly fragmental, ~~first sulfide 2676~~

2731 - 2733 possible dike, feldspathized andesite; pink color

2733 - 2850 ~~similar to~~ same as above dike, andesite ~~w~~ biotite + chlorite + calcite - sericite alteration; veinlets with qtz - pyrite and traces chalcopyrite + bornite; trace biotite veinlets, first sulfide 2676'

2850 - 3071 andesite porphyry; dark gray strongly porphyritic, dense; plagioclase alteration varies from clear + shiny to cloudy + sericitized ~~w~~ calcite and epidote epidote more common than rocks above moderate to strong chlorite with ~~slight~~ definite decrease in biotite alteration pyrite most common in veinlets with chalcopyrite + bornite, locally disseminated pyrite ~~up~~ to 7%; chalcopyrite much more apparent in veinlets from 3018 on but veinlets widely ~~spaced~~; traces of chalcocite; ~~trace~~ minor

is veinlets starts to become common at about 3030; better sulfide zone 3018-3040

3071 - 3148

this section shows quartz; dacite?

lighter colored, weakly porphyritic rock of similar alteration; disseminated magnetite up to ~~2-3%~~ 6%; good disseminated sulfides to 8% from 3106-3143; veinlets show thin alteration margins;

dissem sulfides

vein sulfides

3148 - 3184 ~~3213~~

back to dark gray, andesite porphyry similar alteration; sulfides essentially restricted to veinlets of quartz ± sericite ± chlorite ± calcite; ± epidote

3181 biotite zone

3184 - 3213

black aphanitic dacite (?) dike(?) or flow some ~~nil~~ quartz visible; widely spaced sulfide veinlets with very little attendant alteration; weak-mod biotite, ~~mod~~ weak chlorite weak sericite

~~3213~~ - ~~3273~~

3213 - 3273

andesite porphyry agglomerate with marked decrease in sulfide mineralizat

3273 - 3281

andesite porphyry with alteration and mineralization same as noted above

SAMPLE #	% Cu	Sulfide % S	Pyrite / Chalcopyrite
1253 - 1262	.04	.33	.29/.04 = 7/1
1263 - 1271	.09	2.05	1.96/.09 = 22/1
1272 - 1278	.02	1.15	1.13/.02 = 56/1
1291 - 1312	.07	1.38	1.31/.07 = 19/1
133 - 1320	.05	.34	.29/.05 = 6/1
1321 - 1328	.03	.23	.20/.03 = 7/1
1329 - 1340 + 1343 - 1345	.19	1.57	1.38/.19 = 7/1
1346 - 1350 + 1401 - 1416	.10	.54	.44/.10 4.5/1
1251, 1252 1394 - 1400	0.03	0.51	.48/.03 = 16/1

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 1 OF 26

SCALE 1" = 10' STARTED AUG. 25, 1971 STOPPED NOTES BY CRS

DEPTH BEARING INCLINATION VERTICAL

PROPERTY SAFFORD COUNTY GRAHAM STATE ARIZ.

COLLAR COORD. N. E. COLLAR ELEV. ~3800

ASSAYS % MO	ASSAYS % CU	ASSAYS	% RECOV.	DEPTH 745'	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			100	5.0			748.5 45°-60° Hairline fracture with some calcite and hematite	Sparse local dissem. limonite after pyrite. These are best dev. within & adjacent to strongly fractured zones. - Local orthoclasation adjacent to clay filled fractures	strong pervasive chlorite(?) & epidote alteration. Sparse pyrite oxidized to limonite (Cluster & dissem)	Probably upper K volcanic agglomerate pervasively altered to chlorite(?), epidote
				750						Compact fragmental lt. grn. andesite(?) with abundant dark green, grey-green, and cream colored angular fragments (to 3 inches) of volcanic rock
			100	5.0						
				755			758-761 steeply inclined hairline fracture healed with white calcite. Calcite also rims some fragments in agglomerate		Local seams of K-feldspar alteration	
			100	5.0						
				760					plagioclase soft white	
			100	5.0	A		762-765 Brecciated zone Brn, Friable, pyritic (oxidized)		mafics generally altered to chlorite, epidote & locally limonite.	
				765	A A A		766.8 - 771.5 like (762-765)			Most fragments exhibit reaction rims; epidote rims or replaces many fragments; locally calcite rims fragments & fills steeply dipping hairline fractures.
			100	6.0				771.1 5% Pyrite (oxid.) 766.5 - 772 OXID. PYRITE DISSEM. ½-1 mm.	Epidote tends to replace all mafic minerals in the agglomerate but locally completely replaces mafic rock fragments.	
				771			771.5 45° Hairline fracture with MnO_2 dendrites			
					A A A		772-778 Brecciated			
			100	5.0			775-781	-773 - 791.5 (OXID.) PYRITE DISSEM.		
				776	A A		781-782.5 Rock indurated and bleached to lt. grn.		781-782.5 Indurated;	
			100	2.0	A A					
			100	2.0	A A		782.5-783.5 Fault breccia (90°) Brn (oxid) stained clay rich.		782 K-feldspar alt. along clay filled clay seam (¾").	
			70	780	A					
				781	A					
			100	4.0			784-787 steeply incl. hairline fractures			
				785						
			100	5.0						
				790						
			100	4.0						
				794						
			100	5.0			798-800 steep hairline fractures with calcite			
				799						
			100	5.0						
				804				806-806.5 - Qtz Veinlet and pyrite (oxid.)	806-806.5 silicification & sericite(?)	
			100	5.0			808-811 Hairline fracs.			
				809						
			100	5.0				808-821 Local clusters dissem pyrite (oxid.)		
				814						
			100	5.0						
				819						
			100	5.0			823 30° Hairline fracture			
				824			825 & 826 Hairline fractures with calcite			
			100	5.0			828 Hairline fracs with calcite			
				829						
			100	5.0						
				834						
			100	5.0						
				839						
			100	5.0			840 & 841 Steep hair line fractures Calcite & hematite (trace)			
				844			845 45° hairline fracture			

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 2 OF 26

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
										volcanic agglomerate - same as above
			100	5.0						
				849						
			100	5.0						
				854			854-856 Broken by several steeply dipping hairline fracs			
			100	5.0			855-857 Lt. brn to gray partially oxidized			
				859			860, 862-876 Steep hairline fractures some with calcite			
			100	4.0						
				863			864 Hairline fracture (vertical)			
			100	5.0			866-889 Abundant steeply inclined hairline fracs some with calcite & others MnO_2 dendrites	865-866 OXID PYRITE DISSEM. ½-1mm.	867 Secondary biotite & silicification	
				868				867-880 OXID PYRITE DISSEM & 874-876 PYRITE TO 5%		
			100	5.0				869 & 875 MnO_2 Dendrites along fracs.	873-878 silicification, pyritization, sericitization (?)	
				873				880-904 Local spots of dissem. pyrite (oxid) ½ mm.		
			100	5.0					878-879 2nd Biotite	
				879						
			100	5.0						
				884						
			100	5.0						
				889						
			100	5.0						
				894			896-897 Hairline frac. frozen walls calcite (70°).	894 & 898 Tr pyrite (oxid)		
			100	5.0						
				899						
			100	5.0				902 Tr pyrite (oxid)		
				904					904 2nd Biotite	
			100	5.0						
				909						
			100	5.0						
				914						
			100	5.0			917-919 Steep hairline fracture			
				919			921-922 Steep hairline fractures w/ clay			
			90	3.5						
				922.5						
			100	5.0						
				927.5			926 & 928 45° fracture			
			100	5.0			931-932.5 & 934 Abundant steep fractures with clay			
				932.5						
			100	5.0						
				937.5			937-941 Steeply inclined hairline fractures			
			100	5.5						
				943			944-949 Steep fractures			

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 3 OF 26

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	5.0						
			948			948-949 steep hairline fracture			
		80	5.0			951-953 Abundant steep fractures with clay & limonite (oxid, pyrite).	950-953 Tr. - 1% pyrite (oxid).		
			953						
		100	5.0						
			958						
		100	5.0						
			963						
		90	8.0			964.5-966.5 45° hairline fractures with some calcite & iron oxide stn.			
			971			970-978 steeply inclined hairline fractures with calcite			
		30	5.0						
			976				977 Trace dissem. pyrite (oxid) 1/2 mm.		
		80	4.0			978.5-981.5 Broken by numerous open hairline fractures	978.5-981.5 Lim. after pyrite 2-3% (1/2-2mm)	978.5-981.5 Limonite after pyrite, quartz sericite. Mafics still show some chlorite	978.5-981.5 The andesite agglom. altered to brn limonite after pyrite sericite quartz.
			980						
		90	8.0			981.5-991 closely fractured Low & high angle closely spaced breaks	981.5-991 Limonite after pyrite less than 1% 981.5-983 but reaches 2-3% (983-991) Dissem & seams.	981.5-991 Locally altered to white clay, silica & patches secondary biotite(?)	981.5-991 Rock is strongly broken by high & low angle breaks. Limonite after pyrite seams & dissem. Alt. tends to permeate rock but silica is spotty.
			988						
		100	10.0			996 steep hairline fracture 999-1001 strongly fractured	997-1001 Lim. after py. 1-5% (1/2-4mm aggregates)	997-1008 Like 981.5-991	997-1008 similar to 981.5-991 except epidote more prominent
			998			1002-1003 Large epidote body		1002-1003 Large mass of epidote	
		100	10.0	E			1005-1008 1-3% lim. after pyrite dissem & frac. surfaces. Preference shown granitic xenoliths		
			1008			1008-1014 OCCASIONAL steep hairline fracture			
Thin Section 1011		100	8.5			1014-1016 abundant steep hairline fractures	1014-1023 lim. after pyrite dissem (1/2 mm) less than 1%	1014-1023 Soft white feldspars & mafics to chlorite	1014-1023 Andesite porphyry with fewer xenoliths. Chlorite abundant & sparse lim. after py. Some qtz phenocrysts
			1016.5			1019-1020 Low & high ange hairline fractures			
		100	10.5			1021-1025 steep hairline fractures coated by calcite			
			1027			1025-1027 Abundant steep hairline fractures coated by calcite			
						1032-1034 Close spaced low angle fractures			
		80	10.0			1034-1036 Soft Red clay-rich breccia. Lim. chematite(?) after pyrite & mafic alt.	Limonite after pyrite	Hematite & clay from break down of mafics & plagioclase in sheared andesite	1034-1036 strongly sheared andesite breccia stained red by hem. & lim. after mafics & pyrite destruction. Soft clay rich breccia
			1037			1036-1044.6 Entire core broken by high & low angle fractures best developed at 1040-1044.6	very sparse lim. after pyrite	1036-1044.6 Partially altered to clay & lim. along strongly broken sections	1036-1044.6 - Gry to Lt. brn sheared andesite agglom. above breccia zone 1034-1036. Rock is partially bleached & oxid. clay rich.
		100	5.0						
			1041						
		100	3.6						
			1044.6						

DIAMOND DRILL LOG

HOLE No. FS-1 SHEET 4 OF 26

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	4.4			1044.6 – 1073 Moderately broken by low & high angle fractures. Very little mineralization on fracture			1044.6 – 1095 This section usual andesite agglomerate, is tektitic & indurated & some local porosity developed adjacent to sheared zones
				1049						
			90	5.0						
				1054						
			100	6.0						
				1060			1060 – 1073 local porosity near shears			
			100	3.0						
				1063			1063-1064 SHEARED ZONE	1063-1064 Lim after pyrite veinlets along lims of broken zone		
			100	4.0				1066 Lim after pyrite above		
				1067						
			100	6.0			1071-1072 SHEARED ZONE	1071-1072 Lim. after Py. dissem, outward from fracture (½-1mm) locally to 3%.		
				1073						
			100	10.0						
				1083						
							1085 CALCITE & MnO_2 on steep fracture			
			100	8.0						
				1091						
			100	5.5			1095 – 1097 Strong dev. vertical & low angle hairline fractures coated by lim. after Py.	1095-1097 Lim. after Py. from diss. & veinlets on fractures (½ %)		1099 – 1109 Fe stained fault breccia zone impregnated with lim. & hem. after pyrite.
				1096.5						
SAMPLE ASSAY 1102-1103 Thin Section			100	5.5	A	A	1099 – 1109 Red lime, hem. stained breccia.	1100 – 1109 Lim & hem. after pyrite from dissem & veinlets along fractures (1-5%) ½ – 3mm.	1102 – 1104 qtz, sericite, pyrite alteration	
				1102	A	A				
			100	5.0	A	A			1106 – 1108 qtz, sericite pyrite alteration	
			100	1107 2.0	A	A				
				1109	A					
			100	4.0			1109 – 1122 Fractured zone between brecciated fault zones. Steep hairline fractures with calcite & sparse lim after Py.	1109 – 1122 Sparse lim. after py. along fractures		
				1113						
			100	3.0						
				1116						
			100	6.0				1122-1125 Lim & Hem. after pyrite in dissem & fractures 2% 1124 (½ – 1mm) Gypsum on fractures.		1122 – 1125 Fe stained (Lim & hem after Py.) fault breccia
				1122	A	A	1122 – 1125 BRECCIA ZONE			
			100	3.0	A	A			1125 – 1129 Feldspars alt. to clay adjacent to shear planes.	1125 – 1129 shear zone between breccias where feldspars partially alt. to clay
				1125	A	A	1125 – 1129 SHEARED ZONE between breccias Fractures contain calcite	1125 – 1129 Sparse lim. after pyrite		
			100	10.0	A	A	1129 – 1132 BRECCIA ZONE with Gypsum, clay, calcite, & pyrite (lim) on fractures	1129 – 1132 1% limonite after pyrite as seams & dissem.	1129 – 1132 matrix to limonite & feldspars to clay!	1129 – 1132 Clay rich iron stained breccia with gypsum & calcite
				1135	A	A	1132 – 1135 Many steep fractures with Calcite & Gypsum,			1132 – 1135 broken zone below brecciated zone
			100	5.0			1135 – 1139 Few steep hairline fracs With calcite & gypsum			
				1140						
			100	3.0			1139 – 1140 Many hairline fracs with lim after Py. & Gyp – Calcite	1139 – 1140 Lim after Py on fractures		
				1143						

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 5 OF 26

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	5.0			1142-1152 Many close spaced hairline fractures filled by gyp, Calcite & Sp. lim. after py. Most broken 1142-1143 & 1147-1148	1142-1152 Sparse lim after py. along fracs. & as dissem outwards. py. dissem occur on centers of mafic minerals		1142-1152 SAME Host rock but more fractured with trace lim. after py. near on in fractures
				1148						
			100	3.0						
				1151			1152-1168 Occasional steep hairline fracture with some calcite limonite.			
			100	10.0						
				1161						
			100	8.0						
				1169						1168-1170 Dk green Andesite porphyry with few inclusions & fractures PROBABLY is large xenolith
							1170-1212 Occasional steep angle hairline fracture, with calcite gyp. & limonite.		Dike?	
			100	10.0						
				1179						1170-1229 SAME HOST Rock (And. agglom.) but few fracs & spots lim. after py in broken zones
							1181-1182 Closely sheared zone.	1181-1182 Lim after pyrite (5%) as dissem & seams in broken zone		
			100	10.0						
				1189						
			100	10.0						
				1199						
			100	10.0						
				1209						
			100	10.0						
				1219						
			100	10.0						
				1229			1230 strong shear zone	1229-1234 Iron preg & seams Lim & hem after py/pyrite 2% (1-2 mm)	1230 Heavy iron stained clay, Lim & hem after py & clay after feldspar in sheared zone	1229-1234 Iron stained sheared zone impreg with Lim. after Pf.
			100	8.0			1234-1259 occasional low angle or steeply inclined hairline fracture with th calcite gyp, limonite.			
				1237	E				1237 - Sericite(?) along contact of epidote mass along fracture with quartz at 1239	
			100	10.0			1238, 1245, 1250, & 1256 Lots xenoliths Now complete epidote.	1244-45 Tr. Lim. after py		

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 6 OF 26

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
			1247	E			1245-1247 Lim after py. 1% dissem. (1-2mm)		At 1249 there is a increase in number & % of fragments of dark green andesite porphyry.
		100	10.0	E		1251 5" frag. dk grn. andesite porphyry			
			1257	E		1257-59 Steep hairline fracture with tr calcite & hem.			1269-1287 Rock lt brn to pink fragmental andesite porphyry agglomerate or flow breccia. Texture resemble lt grn. andesite porphyry. Epidote partially replaces feldspars. This may be a flow unit with flow breccia above & below (1280-1285 main flow mass).
		100	8.0			1261-63 FRAGMENTS of ANDESITE PORPHYRY			
			1265			1264-1268 Few steeply inclined hairline fractures with MnO_2 & calcite. 1268 Epidote			
		100	10.0	E		1268.5 Fine gr. banded pink graded bedded ash (water lain)			
			1275	E		1275 Large epidote mass 1277-1287 Few steeply incl. hairline fracs with hem., lim. MnO_2			
		100	5.0			1280 & 1282 2"-3" epidote			
			1280	E					
		100	7.0	E		BELOW 1285 EPIDOTE DECREASES IN ABUND.			
			1287			1287 - Brn banded sandy (water lain) volcanics			
		100	10.0						1303-1340 Rock still lt grn andesite agglom. but has some water laid units & is well indurated with few fractures.
			1297			1296-1306 MANY steep hairline fractures with MnO_2 calcite			
		100	5.0						
			1302			1302 ANDESITE PORPHYRY FRAGMENT			
		100	9.0						
			1311						
		100	8.0						
			1319			1321 BROKEN ZONE			
		100	10.0						
			1329	Tuff		1328-29 Lt green fine xall tuff			
		100	10.0			1333-34 Graded & banded water lain tuff			
			1339			1336-1340 steep hairline fractures with calcite lim. after py. & gypsum.	1339-42 Tr. lim. after py. dissem (<1/2 mm)		1340-42 Shear Zone Breccia
		100	5.0			1340-42 Lt grn rotten broken clay-rich zone with abundant gypsum & tr lim. after py.			
			1344			1342-47 Next page			

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 1 OF 26

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 (sheared)
						1340-54 many steep hairline fracs. with calcite & gyp.	1340-54 Tiny dissem lim after pyrite (<1mm.) (½%)	1340-1412 ANDESITE AGGLOMERATE EXTENSIVELY shattered to brecciated shear zones; locally clay rich. Tiny xals of lim. after py. & hem. after magnetite dissem. throughout section (¼ to 1% ⅛-½mm) CALCITE & locally gyp & lim. coat fractures. Rock still largely exhibits chlorite alteration	1340-1354 Dk. grn compact andesite agglom. impregnated with veinlets of pink qtz-feldspar porphyry. Abundant tiny xals of lim. after py.
			10.0			1350-51 Steep calcite-gyp veinlet to ½" thick			
			1354			1354-1360 Shattered zone with calcite, gyp, & lim after py. in fractures	1354-1360 Trace lim after pyrite		1354-1360 Lt grey-brn lithic tuff(?) shattered
		100	4.0						
			1358						
			1360						1360-64 like 1340-54 (see 1361) Veinlets of Rock Flour?
		100	6.0						
			1364						
		100	6.0						
			1370						
		100	2.0						
			1372						
		100	2.0						
			1374			1374-1381 BRECCIATED CLAY			
		100	2.0						
			1376						
		100	2.0						
			1378						
		100	2.0						
			1379						
		100	1380						
(1382-1383)						1381-1383 BANDS OF GRADED BEDDING IN TUFF	1382-83 Local bands to 2" wide of heavily pyritized rock (Lim, hem. after py) To 10% (½-2mm) AT. 1397 Lim. after pyrite dissem on mafics To 2%.		
		100	5.0			1381-1389 ZONE LESS Broken - steep hairline fracs. with calcite & gyp.			
			1385						
		100	5.0						
			1390			1389-1394 BRECCIA			
		80	2.0						
			1392						
		80	5.0			1394-1400 Broken by Numerous hairline fracs of low & high angles Calcite & Sparse lim. coat fracs.			
			1397						
		90	2.0						
			1399			1400-1412 BRECCIA			
		90	3.0						
			1402			1402 EPIDOTE			
		15	3.8						
			1405						
		80	2.0						
			1407						
		50	1408						
		95	2.0						1412-1444 - WELL INDURATED - Relatively UNFRACTURED MOTTLED GRN-BRN ANDESITE AGGLOM. with prominent dk grn andesite frags set in pink groundmass Tr. Lim after py, dissem Hem after magnetite. (This rock may be a welded tuff sequence) Dissem. tiny magnetite (⅛-½ mm) Original rock constituent (¼%) Magnetite xals tend to be smaller than py.
			1410						
		90	1411			1412-1431 FEW HAIRLINE FRACTURES			
		90	5.0						
			1416			1417 BRECCIA WITH Lim. AFTER PYRITE	1417 3" Lim after py in breccia Approx 3% (½-1mm)		
		100	5.0						
			1421						
		100	5.0						
			1426						
		100	5.0						
			1431						
		90	5.0						
(1437)			1436			1436-1437 CLOSE SPACED STEEP FRACS WITH CALCITE 1437 BRECCIA WITH Lim. AFTER PYRITE	1437 Lim & Hem after PYRITE To 5% IN breccia Zone 2" Thick.		
		90	5.0						
			1441						
		100	3.0						
			1444			1444-1451.5 EXTENSIVELY BROKEN SHEAR ZONE WITH SELENITE & CLAY			

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 8 OF 26

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
			50	3.5			1445 Selenite Xals on fracs with minor calcite			
			40	1447.5						
			90	1449						
			100	1450			1451-	1450-1451 Dissem. Lim. AFTER PYRITE (NON MAGNETIC) AND HEM. AFTER MAGNETITE (MAGNETIC)		1451-1498 SAME ROCK BUT INDURATED & RELATIVELY FEW HAIRLINE FRACTURES WITH CALCITE & SPORADIC LIM. AFTER PYRITE DISSEM ALONG SOME NARROW BRECCIA ZONES
			90	5.0			1454.5-1459 CLOSE SPACED STEEP HAIRLINE FRACS. WITH GYP SOME CALCITE & LIM. AFTER PYRITE	1451.5 - QUARTZ LIM. AFTER PYRITE VEINLET FROZEN ON WALLS ALONG STEEPLY INCLINED FRACTURE WITH SELENITE XALS & MnO2		
				1456						
			45	5.0						
				1461		E	1462 4" EPIDOTE			
			95	3.0			1461-1478 LOCAL ORANGE-RED WAXY-EARTHY STAINS ON FRACTURES & AS HALOS ON FELDSPAR & MAFIC MINERALS			
				1464						
			100	2.0						
				1466						
			100	2.0						
				1468			1470 - PYRITE XAL. WITH OCHEROUS center & hematite Rim SOME GRADING OUT TO GYP & RED ORANGE WAXY CLAY			
			100	5.0						
				1473						
			100	5.0						
				1478						
			100	5.0						
				1483						
			95	5.0						
				1488			1489 & 1491 Heavy Impreg. Lim. after py. (½-2mm) (TO 5%) Along steeply inclined fractures			
			100	5.0						
				1493						
			95	5.0				1497 / 1499 — Lim. AFTER PYRITE (HEAVY) / 1501		
				1498		A	1497-1499 Impreg. Lim. AFTER PY. ON BROKEN ZONE (HEAVY)			1497-1505 SHEAR ZONE WITH CLOSE SPACED LOW ANGLE FRACTURES
			85	5.0						1505-1511 - LESS BROKEN
				1503			1501 & 1503 Impreg. Lim. AFTER PY ON BROKEN ZONES (HEAVY)	1503 Limonite moving out along fractures		1511-1530 STRONG SHEAR ZONE IMPREG NATE BY Lim. AFTER PY (HEAVY) ALONG BRECCIATED(?) ZONES
			100	4.0						
				1507			1507 - BROKEN ZONE WITH	1507 - Sprise Cubes lim. AFTER PYRITE		
			100	5.0			1509-1511 Close Spaced 45° FRACTURES WITH CALCITE			
				1512		A	1511-1530 SHEAR ZONE (1512 - EPIDOTE) WITH Lim AFTER PYRITE & GYP & CALCITE IN FRACTURES	1511-1530 LOCALLY HEAVY IMPREGNATION LIM. AFTER PYRITE. BLACK Rim OUT FROM PY. AREA MnO2(?) PYRITE HEAVIEST 1511-1512.5; 1514, 1515; 1516; 1518-1519, 1522, 1524-1525; 1528-1530 (½-1mm 2-5%) But Lim. after pyrite dissem & in fractures between breccia(?) zones	MAFICS & Magnetite ALTERED TO HEMATITE FELDSPARS TO CLAY	
			100	5.0		A				
1511-1512				1517		A				
			100	5.0		A				
				1522		A				
			100	5.0		A				
				1527		A	1529 SLICKENSIDES ON HEM.			1530-1537 SAME ROCK BUT FEW FRACTURES
			100	3.5		A				
				1530.5		A				
			100	5.0						
				1535.5			1535.5 2" BROKEN ZONE			
			80	3.5			1537-1544 ABUNDANT CLOSELY SPACED STEEP FRACTURES WITH LOCAL Epidote COATINGS. 1541 Epidote 4-5"	1537-1544 Thicker Lim. after PYRITE ON FRACTURES MOST Lim. TRANSPORTED		1537-1544 Rock similar to 1530-1537 but more Broken SOME Lim after PY & MORE EPIDOTE.
				1539						
			100	4.0		E				
				1543						

DIAMOND DRILL LOG

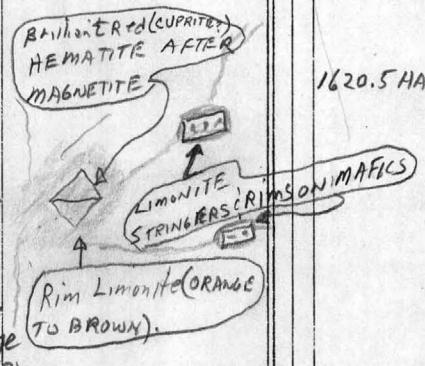
HOLE No. ES-1 SHEET 9 OF 26

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	5.0			1544-			1544-1573 FRAGMENTAL WELDED TUFF OCC. FLOW BANDING, WELL INDURATED & Very FEW FRACTURES (SAME ROCK UNIT) STILL HAS ABUNDAND FRAGS. DRK. GRN. ANDESITE PORPHYRY LESS Epidote & Lim. after PYRITE. Hem. AFTER MAGNETITE (<1/2 mm - 1/2 %) MAGNETITE ORIGINAL CONSTITUENT & DISSEMINATED. IN GENERAL OXIDATION PERVASIVE THRU OUT ROCK & Fe Sn (Orange) Common as rims on mafics & magnetite & into fractures. In general matrix is shades of brn to gry-brn & frags gry-grn or brn.
				1548						
			100	5.0						
				1553			1552.8-1553.3 SCATTERED ORANGE (OXID.) SPOTS TO 1/4" across			
			100	5.0						
				1558	WT		1559 FRAG. BANDED WELDED TUFF			
			100	5.0			1560-1563 SCATTERED OXID. SPOTS LIKE ABOVE			
				1563	WT		1564 FRAG WELDED TUFF			
			100	5.0			1565-1573 SEVERAL STEEPLY INCLINED HAIR-LINE FRACS WITH CALCITE & Fe-stn. clay			
				1568						
			100	5.0						
				1573						
				1575						
							1577-1580 FLOW BANDING			
				1580	E		1580 - Epidote mostly confined to replaced frags.			
			90	3.0						1583 Hand Sp. (Jones)
				1583						
			50	2.0			1584 FLOW BANDING			
				1585						
			80	5.0						
				1590						
			90	5.0						
				1595			1595-1596 MORTAR & FRAGMENT TEXTURE			
			100	5.0						
				1600						
			100	5.0			1602-1610 Few steep fracs. with calcite			
				1605						
			100	5.0						
				1610						
			80	2.5						
				1612.5						
			80	5.0			1615-1617 Few steep fracs with calcite & Fe stn. clay.			
				1617.5						
			100	4.5						1620.5 HANDSP. (JONES)
				1622			1621-1623 INC. in % of silty brn tuff & fewer fragments			
		NATIVE CU ? (CUPRITE)	100	6.0				1626 Tr. Native Cu? on magnetite CUPRITE?		
1627				1628	AA		1627-1628.5 BROKEN ZONE	1627 NATIVE COPPER DISSEM. ON older mafics some small plates on frags <.1% (1/8-1/2 mm). these are spatially assoc. w/red orange Fe OX. stn. from magnetite(?) CUPRITE(?)		
			100	1629						
			100	10.0						
							1639- MATRIX & BRECCIA TEXTURE RIM Epidote Frag.			
				1639	E		1639 Epidote FRAG 1639-1666 Epidote Frags MORE COMMON			



DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 10 OF 26

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	10.0			1646-1650 FEW STEEP FRACS,			
			1649			1651 Large Porous Epidote Frag. Porosity well dev. 1650-1652			
		100	9.0			1653-1655 Steep fracs			
			1658						
		100	10.0						
			1668			1668-1678 Few steep fracs with calcite			
		100	10.0						
			1678				1678 – LOCAL STRINGERS & cluster tiny Lim after pyrite cubes 1/8-1/2 mm (1%)		
		100	10.0						
			1688			1688 FEW CLOSE SPACED ≈ 45° fractures with calcite 1690-1200 BROKEN ZONE STEEP FRACS. WITH CALCITE - 1698 1/4" calcite vein from to fracture well			
		100	7.0						
			1695						
		100	7.0						
			1702						
		100	3.0			1703-1706 – SOME CLOSE SPACED 60-70 HAIRLINE FRACS. BROKEN 1704-1706			
			1705						
		100	2.0						
			1707			1708-1711 close hairline Steep fracs			
		100	3.0						
			1710			1711-1727 Close spaced 60°-80° hairline fracs with calcite			
		100	5.0			BROKEN ZONES 1722-1723			
			1715			1725-1727			
							1717 1/2 SPOTS Red-orange Hematite		
		100	4.0			1710-1750 SMALL EPIDOTE FRAGS MORE Common			
			1719						
		100	4.0						
			1723						
		100	3.0						
			1726						
		100	8.0						
			1734			1735-1740 Few steep Frac with Calcite			
		100	5.0						
			1739						
		100	6.0			1742-1744 Close spaced 45-60° Fracs.			
			1745			1744-1745 BROKEN ZONE	1744-45 STREAKS Lim CUBES		

FRACTURE SYSTEM TEND TO CHANGE AS FOLLOWS

1. STEEP HAIRLINE WITH CALCITE
2. CLOSE SPACED 45-70° HAIRLINE SOME WITH CALCITE
3. BROKEN ZONE SOME WITH Lim. AFTER PYRITE
4. CLOSE SPACED 45-70° HAIRLINE FRACS
5. STEEP hairline fracs with calcite

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 11 OF 26

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____

DEPTH _____ BEARING _____ INCLINATION _____

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

ASSAYS % MO	% CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			100	1.5			1745-1746 Close 45-60° FRACS.			
				1746.5			1746-1751 FEW Steep Hairline FRACS WITH CALCITE			
			80	2.5						
				1749			1751 - Close 60° FRACS			
			80	4.5						
				1753.5			1753-1755 Steep fracs with CALCITE			
							1756-1759 Inc Gry To BRN (oxid.) steep fracs & BRECCIA 1658-1659.		1759-1760 — Lim, after py & Sericite	1759-1760.5 SOFT BRN (OCHRE) SERCITIZED LIMONITIC AFTER PYRITE ALL MAFICS TO Lim & Clay ALL Feldspar To clay & Sericite. POROUS.
			60	5.5						
				1759			1759-1760.5 BRN OCHRE CLAY ABUNDANT - UNIDEN. SOFT white to clear mineral (gyp?)	1759-1760 Heavy Limonite (ochre brn) after pyrite		
			50	1.5						
				1760.5			1760.5 - 1770 MOD. Number steep fracs with calcite			
		NATIVE CU?	100	4.5						
		CUPRITE?		1765				1765 Tr. NATIVE CU? assoc. WITH ALTIMAGNETITE & MAFICS (?) - CUPRITE (?)		
			100	5.0			1770-1785 Very few steep hairline fracs with calcite			
				1770						
			100	9.0						
				1779						
			100	10.0	AMA		1785 7" BRN OXID FRAG ANDESITE POR.			
					CAL		1787 1/4" CALCITE VEIN FROZEN WALL 60° FRACTURE			
				1789						
			100	10.0						
				1799			1800 Close spaced open fractures filled with Vugg calcite veinlets To 1/2" wide Assoc with BRECCIA CHLORITE & FeOX.			
			100	10.0			1805 CLOSE FRACS with CALCITE			
				1809						
			100	7.0			1813-1814 CLOSE STEEP FRACS WITH CALCITE			
				1816						
							1818 FLOW BANDING 1819 FRAC WITH CALCITE			
			100	10.0			1823-1827 Few FRACS 60° WITH CALCITE			
				1826						
			75	6.0			1829-1834 CORE BROKEN Irregular dipping hairline fractures			
				1832						
				4.0						
				1836			1836-1844 Few steep hairline fracs with calcite.			
			100	10.0						

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 12 OF 26

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
			30	1846 1847			1846-1853.5 CORE IN FRAGS DUE TO NUMEROUS HAIRLINE FRACS OF 45-80° dip			
			90	4.0						
				1851						
			80	2.5			1853.5 - 1862 - Some 60°-80° hairline fracs with calcite			
				1853.5						
			100	9.5						
							1862-1863 CORE BROKEN BY MANY CLOSE HAIRLINE FRACS WITH CALCITE			
				1863						
			100	6.0			1863-1892 - Few steep vertical fractures, some with veins of calcite (trace Limonite) frozen to walls to ½" wide & altered vein walls to ½" either side vein see (1877)-(1882-1886)			
				1869						
			100	10.0						
				1879						
			100	10.0						
				1889						
			80	5.0			1892-1894 - Core broken by many close spaced hairline fractures			
				1894			1894-1900 - Several steep hairline fracs with calcite			
			100	6.0			1900-1908 - Very few hairline fracs with calcite			
				1900						
			80	9.0			1904 Epidote	1904 Tr. dissem Lim. → pyrite		
							1908-1911 CORE BROKEN BY Numerous high, moderately steep hairline fracs w/calcite	1906 Tr. Dissem. Lim. → Py.		
				1909			1911-1917 - Steep calcite veins to ⅛" thick in fracs.			
			100	7.0						
				1916			1917-1932 Few steep to mod. fracs. with calcite. Esp. well dev. (1913-1915) and (1927-1929)	1915-1918 Tr. dissem. Lim. → pyrite		
			100	10.0						
				1926						
								1928 Tr. dissem. Lim. → Py.		1932-1953 Med to dk. grey fractured andesite with trace dissem. Lim. → pyrite & soft light brn clay filling fractures (some calcite) Few fragments (inclusions) Matrix → chlorite Phenocrysts → epidote? Some K-feldspar(?) Rock may be flow but not much alignment of xtals
			100	10.0				1930-1931 Tr. dissem. Lim. → pyrite		
				1936			1932 change Lithology (1934-1945) Many 45-70° hairline to wider fracs with clay or calcite			
			80	3.0				1935-1959 Tr Lim → Py. dissem. with tendency to form on alt. mafics (To ½% & To ½ mm) Trace cuprite(?)		
				1939			1939-1941 Dk grn-grey Compact sheared andesite with clay on seams			
			90	4.0					DIKE?	
				1943						
			100	3.0						

DIAMOND DRILL LOG

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

HOLE No. _____ SHEET 13 OF 26

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

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			1946			1945-1949 Some steep fracs with Lim after py. 1947 - Epidote fragment.	TRACE Dissem. & veinlets of Lim → pyrite along frac. 1952 & 1956. Tr. cuprite(?)	Thin seams of chlorite cut rock along steep fracture	1932 - 1953 PROBABLY FLOW WITH FLOW BRECCIA AT BASE (Below 1950) Andesite porphyry (DRK GRN) at center & to P(1932 - 1939) altered or weathered to lt. gry. color.
		100	7.0			(1949-1955) Many close spaced hairline fracs with Lim → pyrite & calcite & clay(?)			
			1953			(1955-1980) Few steep fractures with calcite & Lim after py. Epidote frags. abundant (1957-1961).			
		100	10.0			1980-1986 Numerous close spaced vertical fracs & abundant brn clay in resulting breccia	(1953-2050) NUMEROUS CALCITE, CLAY, qtz(?), Lim → py veinlets with alt. vein wall, e.g. (1990-2034) Gen. Dissem Lim. → py. (To several %)	(1953 - 2070+) ALT TO chlorite & serpentinite	(1953-1980) Med to DRK grn. fragmental andesitic agglomerate similar to rock above 1932 but more dark fragments & inc. andesite ground mass. Usually contains dissem & fracture fillings lim. → py. (clay)
			1963						
		100	9.0					Locally feldspars alt. to clay & orange brn ochre coats area (1986) Also some hematite & cuprite(?) (1973)	STEEP vertical fractures have calcite - qtz? - py veins to 1/4 wide with wall rock alteration most rock alt. → chlorite & serpentinite?
			1972						
		80	3.0						
			1975						
		100	8.0				PROMINENT VERTICAL VEINLETS with banded areas of rock alteration 1979, 1983, 1985, (1990-1993), 2000, (2002-2020), (2035-2046)	Hematite less abundant than above 1932.	Rocks (1932-2080+) more reactive to mineralizing fluids as evidenced by uniform lim → py dissem & wall rock alt. along veinlets
			1983			1985 Jarosite with calcite - qtz. veinlet			
		70	10.0			1986-1990 Few hairline fracs with calcite			
			1993			1990 - 2002 Brn clay & limonite stained breccia created by alteration of numerous qtz(?) CALCITE, (Lim → py) veinlets		1990 - 2000 ALT. & bleached to a lighter colored & more porous rock along numerous vertical veinlets MnO_2 dendrites common	
		40	6.0						
			1999						
		70	3.0						
			2002			2002 - 2022 Rock less broken and alt. It is drk grn. except where cut by calcite, Lim → py veinlets along vertical fractures & local breccia zones.			
		80	8.0						
			2010						
		85	10.0			2022 - 2050 Heavy Lim → py stained & fractured clay rich extensively brecciated			
			2020						
		80	5.0						
			2025						
		50	2.0						
			2027						
		80	3.0						
			2030						
		75	4.0						
			2034						
		70	7.0			2037 - 2038 Leisegang banding parallel to veinlets			
			2041						
		50	2.0						
			2043						
		30	2.0						
			2045						

DIAMOND DRILL LOG

SCALE 1" = 10'
STARTED 8-25-71
STOPPED
NOTES BY

DEPTH
BEARING
INCLINATION VERTICAL

HOLE No. ES-1
SHEET 14 OF 26
PROPERTY SAFFORD
COUNTY GRAHAM
STATE ARIZ
COLLAR COORD. N.
E.
COLLAR ELEV. 3800

ASSAYS % MO	% CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
		80	4.0			2050-2060 Drk brn relatively unfractured except last two feet. Frac. filled by calcite & satin like white clay(?).	2046-2051 Veinlet & Dissem. Lim. → pyrite to 2% (1/8-1mm). Heavy Lim. → py at 2050.	2046-2051 Rock alt to sericite & limonite after pyrite	
		100	2049 3.0			2052-2053 & 2055 Rock locally hematitic	2052-2053 & 2055 Lim & Hematite → dissem. py (1/8 mm & To 1%) Dissem out from hairline fractures.		
		100	2052 7.5			2055 Alternating brn & gry-green bands of fine clastics (ash).			
		80	2059.5 4.5		(HEMATITE)	2059- SHEAR ZONE 2060.5-2066 Heavy hematite breccia	2060.5-2066 Heavy Hem. → py (To 5+%) (XAL 1/2 mm)		
		50	2064 5.0			2069-2071 several qtz veinlets	2069 Qtz Lim → py veinlets		
		50	2069 2.0			(2070) 3" massive Voggy qtz vein with Lim → py	2070 Lim → py		
			2071 4.0			2071-(2080) Drk. brn. Fragmental Andesite with many closely spaced hairline fractures coated by Lim., clay, some gyp(?)	2071-(2080) Dissem. Lim. → pyrite as halos around local clusters of tiny alt. py. cubes. Py. shows no preference for any type rock fragment. (<1/8-1/2 mm) (To 2%).	2071-(2080) Rock altered to chlorite, serpentinite(?) clay (Limonite & epidote).	
		80	2075			2079-2080 white alt. (tripoli?) lim suture around qtz xals in rock fabric	2079-2080 Possibly spots of dissem. Cuprite(?) or hematite coating some xals.		
			2080						
		100	2080			2080-2082 massive porph. andesite agglom. w/ streaks of tuffaceous material; gray to purple gray		propylitic alter throughout; strong diss. epidote; rock has slight look of clay or sericite alteration dissem hematite w/ rare goethite; fractures contain abundant clay, some calcite + iron oxide usually 40J 60G	
		60	2082			2082-2095 same rock very badly broken a few fragments of rhydite(?) in andesite			
		85	2095					at 2091.3 thick black mineral on fx	
		95	2100					hhbld altered to chlorite	
		95	2105					white mineral-alunite? abundant on fx	
		80	2110					red to maroon hematite common around margins of clasts and in fx, lesser amounts dissem.	
		100	2115					2121 small vug w/ trace qtz and hematite after pyrite cubes	
		100	2120						
			2125						
			2130						

DIAMOND DRILL LOG

SCALE 1"=10' STARTED 8-25-71 STOPPED NOTES BY

DEPTH BEARING INCLINATION VERTICAL

HOLE No. ES-1 SHEET 15 OF 26

PROPERTY SAFFORD COUNTY GRAHAM STATE ARIZ

COLLAR COORD. N. E.

COLLAR ELEV. 3800

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Grapin	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
							hematite unusually strong 2112 & 2125 as finely dissem specks and thin coatings	hem-qtz veinlet at 2133	
<.001	.03	95	2135						
			2136						
		BX					2135-2150 strong disseminated hematite - brick red - very fine, no relict pyrite forms positively identified; hematite also occurs on fx w/ clay and traces calcite some areas nearly devoid of hematite	epidote less abundant in diss. form but still occurs as large clots all hbld altered to chlorite plagioclase varies from nearly fresh in f.g. rock to moderately altered to clay + epidote	fragmental - andesitic agglomerate, greenish or reddish gray dependant upon relative amounts of hematite + epidote fragments up to 1 1/2"
		95	7						
		100	2137 2 2139			2138 fx with thin coatings of clay w/ lesser calcite + hematite also much weaker set of fx w/ higher angle			
		100	5 2144						
		37	4 2148						
		75	2 2150				150		2150 fragmental nature less well defined perhaps due to more tuffaceous material; medium greenish-gray andesitic
		100	9 2159			2157 long fx w/ clay (sericite?) + calcite coating very little hematite	mineralization same as above	all the rock has waxy or greasy appearance due to clay or sericitic? alteration	
		90	4 2163						
		65	3 2166			small fx zone at 2165 w/ stronger hematite on fx surfaces			
		100	2168						
		85	2171						
		33	2174						
		12	2176						
		40	2177						
		50	2178						
		50	2181			2171-2199.5 strong fracture zone with 15" fairly solid core at 2187-2188 strong clay + hematite on fx surfaces	some of the disseminated hematite is definitely pseudomorphic after pyrite		
		35	4 2184						
		75	5 2189						
		95	2190.5						
		85	4.5 2195						
		75	5.5						
		30	2200.5						
		65	2201 2202						
		95	2206						
		50	2208						
		50							
		90	3 2211				2213-2215 hematite flooding	2213 small fx with limonite (50G 50J) after pyrite	
		100	5 2216						
		100	5						

DIAMOND DRILL LOG

SCALE 1"=10' STARTED 8.25.71 STOPPED NOTES BY

DEPTH BEARING INCLINATION VERTICAL

HOLE No. ES-1 SHEET 16 OF 26

PROPERTY SAFFORD COUNTY GRAHAM STATE ARIZ

COLLAR COORD. N. E.

COLLAR ELEV. 3800

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
		15	2221 2222			3 sets of fx throughout 1) 45° to core axis 2) 60° " " " 3) nearly parallel to core axis in order of dominance	2222 – 2225 strong hematite dissem + on fx	epidote tapering off slightly but still common in plagioclase and scattered clumps	
		70	3 2225						
		100	2 2227						
		90	2 2229						
		100	5 2234						
		100	5 2239					2243 biotite veinlet	2240 ± rock more tuffaceous than agglomerate and increasingly so with depth
		100	3 2242			fx still have strong hematite + clay? coatings, commonly slickensided		JKJ has identified good biotite alteration in clots and disseminated; small amounts of biotite were evident as far back as 1800'	
		100	3 2245						
		100	5 2250						
		100	5 2255					weak to moderate propylitic alteration still evident	
		95	5 2260					2260 strong hematite on fx but general lack of waxy clay?	
		85	2262.5				hematitic limonite disseminated and on fx but may vary widely locally		color tends to medium gray and purple gray instead of greenish gray
		85	4.5 2267			strong green biotite? on fx 2264 fx zone 2265-2267 with strong hematite		plagioclase white + soft often with epidote grains and less commonly chlorite flakes	
		100	2 2269						
		100	3 2272					large clots of chlorite and/or biotite may have been mafic minerals; biotite also disseminated throughout groundmass	
		100	5 2277						
		95	3 2280						
		100	5 2285			2283-2287 very strong hematite			
		80	5 2290			2287-2297 rock obliterated by hematite, purple-red, very badly fractured			
		0	5 2295			2297-2302 fractured but annealed by hematite + clay?	2297- hematite more purple than red, at		color + tuffaceous character suggests proximity to base of clastic section
		75	2 2297						
		90	5 2302					2302 clay? reappears on fx	
		100	5 2307						
		100	4.5 2311.5						
		90	3.5 2315					2311 small vein? ≈1" shows strong biotite + chlorite	
		50	2 2317						

DIAMOND DRILL LOG

SCALE 1" = 10' STARTED 8-25-71 STOPPED NOTES BY

DEPTH BEARING INCLINATION VERTICAL

HOLE No. ES-1 SHEET 17 OF 26

PROPERTY SAFFORD COUNTY GRAHAM STATE ARIZ

COLLAR COORD. N. E.

COLLAR ELEV. 3800

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			100	5 2322						
			100	4 2326					plagioclase slightly cloudy to cloudy, soft, altered to clay?, + epidote but much less common than higher in hole;	fragmentmental nature observed locally but rock is mostly texture less; agglomerate no longer present, andesitic tuffs
			100	5 2331			2326-2327.5 massive hematite →			
			90	5 2336			locally good fracturing at 45° with others at 60° and subparallel to core axis, commonly weakly annealed with clay + hematite	hematite on fx with clay and traces calcite; abundant as small irregular disseminations		
			80	5 2341					clay? alteration may be slightly less, its occurrence on fx although still common is more irregular with intervals of several feet showing very little clay on fx	
			100	5 2346						
			100	5 2351						
			90	5 2356				2353.5-2356 massive hematite purple red		
			100	5 2361				2360-2361.5 massive hematite	biotite common in clumps probably as product of mafic alteration also in finely disseminated form	
			100	5 2366			2364-2379 badly broken			
			100	4 2370					amount of chlorite present is uncertain, may occur with biotite	
			80	4.5 2374.5						
			100	4 2378.5				2376-2377 strong hematite	epidote as alteration product of plagioclase large clots are very rare now, individual grains still common	
			100	2 2380.5						
			75	4 2384.5						
			60	2385						
			100	2 2387						
			100	2388						
			100	5 2393						
			100	4 2397						
			80	3 2400			2400-2405 well fractured			
			75	5 2405						
			75	4 2409						
								2411-2412 massive hematite		
	0.14		100	4 2413			2411-2415 strongly fractured	2415-2434.5 calcite vein 1/8 to 3/4" thick with hematite, parallel core axis.		
	.04						2415-2432 abundant thin fx, cemented, most subparallel core axis or at 30° from axis			
	0.10		75	4 2417						

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 18 OF 26

SCALE 1"=10' STARTED 8-25-71 STOPPED NOTES BY

DEPTH BEARING INCLINATION VERTICAL

PROPERTY SAFFORD COUNTY GRAHAM STATE ARIZ

COLLAR COORD. N. E. COLLAR ELEV. 3800

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
	0.18	100	45 2421.5				hematite finely dissem after pyrite, also in small local streaks + patches as well as on fx	as noted by Foutz and K.J. plagioclase alteration varies, some reflect light and are still pretty hard but in most alteration is partial to complete to clay, sericite? and some epidote	gray andesite tuff? locally plagioclase laths abound and comprise ± 50% of rock with matrix of biotite, hematite + ?
	0.15	100	5 2426.5						
	0.14								
	0.19	100	5 2431.5						
		100	2436.5			2436 & 2457 broken core good fracturing at 45°		biotite + chlorite? finely disseminated	
		100	3.5 2440				2439 2 small calcite veinlets at 30° to core axis ± trace Goethite		
		100	5 2445						sequence 2450-2465 flow rock? pretty fresh, vitreous looking, porphyry with plagioclase phenocrysts shiny and hard; chloritic alteration of mafics (hornblende) finely disseminated biotite pretty strong; some or more than rocks above; incipient alteration of feldspars; a few quartz phenocrysts noted
		80	2446 3						
		80	2449 3					rare chlorite on fx's	
		80	2452 3						
	.02	80	2457 5						
		100	2461 4						
		100	2465 4					2465-2499	
		75	2466.5			2465-2466.5 gravel, badly broken	hematite on fractures locally pervasive in rock abundant in finely disseminated form up to 2-3% color usually red or bright orange, sub-metallic lustre; locally appears to be goethitic (24695) amount of dissem H may be in direct proportion to amount and alteration of plagioclase	andesite porphyry has jagged and more abundant plag. phenocrysts which are well altered to clay, sericite? and epidote; hornblende altered to chlorite with weak to moderate biotite in matrix when plag. phenocrysts smaller and less abundant they are less altered with more abundant very fine biotite in matrix clay on fx's	2465-2499 rocks same as usually seen above 2450 tuffs? or flows? varies between andesite porphyry and porphyritic andesite color gray
		100	2.5 2469						
		100	3 2472			all core with very few exceptions is well fractured usually at 45° to core axis; microfractures locally abundant; a 3" piece with no fractures is uncommon			
		100	2 2474						
		100	3.5 2477.5						
		30	2.5 2480						
		100	3 2483						
		100	3 2486						
		100	5 2491						
		50	2492						
		100	4 2496					2493-2495 more homogeneous rock with weak argillic alteration and some silicification	
		50	2498						2499 rock fragmental with texture obscure in many places; composition of matrix same as fragments; color varies from reddish to dark greenish gray depending on amount of hematite and chlorite present; red color predominate
		100	1 2503						
	0.03	80	2508						
		80	2510			2509-2510 badly broken			
	0.06	95	2515						
	0.04	70	2519						
		50	2520						

DIAMOND DRILL LOG

SCALE 1"-10' STARTED 8-25-71 STOPPED NOTES BY

DEPTH BEARING INCLINATION Vertical

HOLE No. E5-1 SHEET 19 OF 26

PROPERTY SAFFORD COUNTY GRAHAM STATE ARIZ

COLLAR COORD. N. [illegible] E.

COLLAR ELEV. 3600

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
	0.05		60	5 2525			2520-2523 badly broken, poor core recovery	2508-2527 unusually strong H in rock but whole rock is leached and bleached, rock is dull red rather chalky looking disseminated H 1-2% clumps of goethite abundant 5-7%	2508-2536? weak silicification, mod-strong sericite; hornblende altered to chlorite, biotite?, and sericite traces jarosite on fractures and in clots with goethite none or traces of biotite in matrix good quartz; dike?	pyrite → goethite hbld → chlorite, sericite biotite? 2508-2527 groundmass or matrix is pinkish, fairly hard but will scratch, aphanitic, holocrystalline; Some of rock is andesite porphyry w/ plagioclase → epidote + clay; mod-strong biotite in matrix hematite in small streaks with biotite apparently not after pyrite matic fragments may be small xenoliths in siliceous replacement dike?
	0.05		100	5 2530			2523-2533 good core locally abundant micro-fractures			
	.08									
	0.02		80	5 2535			2533-2535 angular fragments, poor recovery			
			75	4 2539			2535- well broken + fractured to locally strongly fractured, microfractures common locally			
			100	5 2544						
			100	3 2547				2527-2561 hematite dissem 2-3% brick red color, also on fx with clay + sericite; goethite 60-40% also common on H	plagioclase cloudy altered to epidote and clay; hbld → chlorite and biotite?; weak to mod. dissem biotite, decreasing from above	2527-2561 rock same as before 2508 ie. andesite porphyry, gray
			90	5 2552						
			100	3 2555						
			80	5 2560						
	0.20							2561-2570 zone of very strong limonite dissem hematite very fine 3-4% (locally up to 7% or more) irregular pervasive iron stain	weak dissem biotite	"
	0.13		100	5 2565						
	0.16		100	5 2570			2570 small shear, core is nearly sand	2264-2265 massive dark red earthy H 2565-2566 1/8-1/4" vein of hematite see other side similar fxs 2568-2570		2570 ≈ 2613 andesite porphyry, dark green gray sometimes reddish due to hematite; abundant plagioclase phenocrysts with no direction, smaller + few relict hornblende phenocrysts in aphanitic matrix
	0.02		90	4 2574			2574 6" shear			
			60	5 2579			2578-2579 shear zone w/ strong hematite			
			80	4 2583			2581-2583 strong fractures			
			50	3 2586					plagioclase white, cloudy, waxy commonly altered to epidote which is becoming more abundant; strong clots of epidote up to 1/4 inch 2575-2576; probably weak to mod. sericitic alteration with argillic alteration; hornblende alters to chlorite with minor sericite + biotite; disseminated biotite very weak, chlorite instead	
			100	2587						
			20	2588						
			100	2 2590			2588-2590.5 badly fractured, strong Hematite	hematite disseminated ranges from 2-5%, also on fractures with clay, sericite, and occasionally calcite; tends to be massive in the small shear zones, color is dark purple red		
			50	3 2593			2590.5-2596 well fractured			
			50	2 2595						
			100	5 2600						
			100	5 2605						
			80	3 2608			2605-2610 badly fractured			
			50	2 2610						
			100	4 2614			2610-2613 fault gouge + breccia			
			80	4 2618						

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 20 OF 26

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
			95	5 2623			2613-2623 badly broken & fractured	numerous quartz-calcite veinlets w/or without streaks & blebs of hematite after sulfides	plagioclase varies from slightly cloudy and soft to cloudy and partly or totally altered to epidote and traces calcite	2613-2658 clastic rock probably mostly tuff but small subrounded fragments common many of these are quite felsic; plagioclase phenocrysts absent but fabric is directionless "andesite"
			95	5 2628			2623-2638 good shearing not always broken; 45° to core axis			
		5-7°	100	5 2633			much less shearing to 2654 but well fractured		hornblende strongly altered to chlorite, sericite and biotite	
		disseminated hematite	100	5 2638				chalcocite(?) smear on ft at 2628; possibly some small black flecks in rock are also chalcocite	sericite increasing in intensity	
			90	3 2641				trace chalcopyrite on ft 2649		
	.04		20	2642						
			65	6 2648						
	.01							* white mineral on most fractures is probably gypsum		
			65	2652						
	.01						2654-2658 strong shearing			
			95	5 2657						rock change 2658 clastic character only very locally suggested; rock dark gray, more dense, finer-grained; much less porphyritic
	.02						2658-2672 fairly good solid core	2658		
			100	5 2662				locally very strong hematite (goethite?) after sulfides	many plag. phenocrysts quite fresh although clay alteration + epidote still common; pink color of some plagioclase suggests K-spar alteration	
	.03		90	2 2664						
			100	5 2669				quartz-calcite-hematite-goethite on fractures	biotite alteration more distinguishable although still best in hbld, sericite good, possibly local silicification	
	.02									
			100	4 2673			2672-2675 strong shear			rock fragmental in very large pieces approximately 2669- on down
	.03		10	2 2675				2676 silicification w/ goethite + hematite after sulfides, also good chalcopyrite; fx shows good goethite; trace of pyrite in 6" silicified zone		
			100	4 2679						
	.02		100	4 2683						
			100	5 2688				2677 pyrite, chalcopyrite, bornite and chalcocite? on fracture w/ qtz + calcite		
	.02									
			100	4 2692						
	.04		90	4 2696				2690.5-2691.5 zone of silicification with pyrite and lesser chalcopyrite in veinlets and disseminations; pyrite → reddish goethite also traces chalcocite?		
	.04		100	5 2701				a strong patch of qtz-sericite + 40 & 60 J possibly 8-10% sulfides		
	.02		100	5 2706						
								2694 traces very fine		
	.03		100	4 2710			2707 small shear 6"	dissem. chalcocite, how much?		
								2708 traces dissem sulfides		
	.06		100	5 2715						
								2714 1" calcite-goethite vein		
			50	2.5 2717.5			2715-2718 badly broken	2714.5 pyrite + chalcopyrite on ft, trace chalcocite		
	.03		85	2720				good sulfide zone, mostly pyrite up to 2720, chalcocite?		

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 21 OF 26

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
	.02	5% diss. H	85	3 2723			much better core; locally weak to mod. fracturing	disseminated hematite; chalcocite? no copper reaction from pink or red hematite on fx	weakly altered, clay? or sericite?, plagioclase hornblende well altered to chlorite + sericite; good biotite in groundmass local weak silicification	fragmental? appearance less + less distinguishable; weak to mod alinement of plagioclase porphyritic andesite flows w/ locally fragments and xenoliths of similar rocks med-dark gray abundance of phenocrysts varies
	.04		100	2.5 2726						
	.12	1-2%	100	2.5 2728.5				good pyrite on some fx's; pyrite in veinlets w/ qtz and calcite and occasionally chlorite, weak dissem pyrite + limonite-hematite, traces chalcocite + bornite	2731-2733 rock pink strongly feldspathized 1-2% dissem pyrite + hematite + goethite DIKE?	
	.03		90	5.5 2739						
	.01		90	4 2743				weak disseminated sulfides; good pyrite w/ bornite and chalcocite on fx at 2735.5, 2736.5		rock same as above locally fragmental
	.03		90	2 2745						
	.02		100	5 2750				2738 marked increase in dissem pyrite 6-7% up to 2740 ±	less in hornblende; alteration strong or mod chlorite, (strong) mod biotite, plagioclase → argillic	
	.02		100	4 2754			2752-2754 small shear zone w/ fracturing	disseminated hematite actually rare, in its place? is a very fine black material; chalcocite?	unknown finely dissem. black mineral 4-5% biotite?	
	.02		100	5 2759				some magnetite also present - dissem.	occasional epidote from plagioclase and rarely as dots	
	.06		100	5 2764				most pyrite w/ chlorite - qtz - calcite in veinlets also ± bornite ± chalcopyrite; dissem. pyrite seems to be related to veinlets up to 3-4%		
	.03		90	5 2769						
	.05		100	5 2774						
	.02		95	5 2779				2776 good bornite-chalcopyrite -pyrite w/ calcite veinlet	2776-2780 several biotite veinlets @ 45° to core axis cut by later pyrite - calcite veinlets subparallel to core axis pyrite → orange-red goethite	
	.02		100	5 2784						
	.02		100	5 2789					pink calcite on fx's	
	.05		100	5 2794						
	0.07		100	5 2799						
	0.07		90	5 2804				2800 small veinlet w/ bornite - chalcopyrite		
	0.05		50	3 2807			small zones of bx at 2811, 2812-13, 2816, 2818			
	0.02		90	4 2811						
	0.01		80	3 2814						
			100	2 2816						

DIAMOND DRILL LOG

SCALE 1" = 10' | STARTED 8-25-71 | STOPPED | NOTES BY

DEPTH | BEARING | INCLINATION VERTICAL

HOLE No. ES-1 | SHEET 22 OF 26 | PROPERTY SAFFORD | COUNTY | STATE | COLLAR COORD. N. | E. | COLLAR ELEV. 3500

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			90	2822				sulfides common in veinlets with quartz ± calcite ± chlorite	biotite mod-strong in groundmass, brown biotite showing wp;	dark gray weakly porphyritic andesite
	0.02		75	4 2826				pyrite most common in veinlets ± bornite, chalcopyrite rare;	mod chloritic alteration;	
	0.06		90	2827.5				pyrite also as irregularly distributed disseminations locally up to 2-3%;	plagioclase mod-strong altered to sericite?, clay,	
			50	2.5 2830				very rare dissem. chalcopyrite	epidote very rare	
	0.04		100	5 2835				also finely disseminated magnetite	quartz ± calcite ± chlorite veinlets common ± sulfides; commonly	
	0.01		100	5 2840				occasionally some of the goethite has a gray metallic coating, what is it? magnetite?	qtz-sulfide veinlets show thin chloritic zone adjacent to veinlet	
	0.06		80	5 2845			2844-2850 strong fracturing + shearing	2877-2850 disseminated pyrite rare		2850 rock change fault? contact strongly porphyritic andesite; gray to green gray
	0.04		75	2 2847				2847 good veinlet ± chalcopyrite, pyrite, bornite and chalcocite		
			75	4 2851				good dissem pyrite 3-7%, average ≈ 5%	/Similar to above, weak to moderate alteration of plag.;	zone 2855-2874 rock more dense more felsic, silicified fewer mafics
	0.08		100	2 2853				pyrite ± qtz-calcite-sericite chlorite on veinlets, locally massive up to 1/4"	mod to strong chlorite, very weak to weak sericite	
			90	3 2856				only traces chalcopyrite + bornite	biotite varies from weak to moderate;	below 2874 rock is darker again
	0.53		80	3 2859				may be slight correlation between pyrite clots and plagioclase phenocrysts	marked decrease in biotite below 2855	
			100	3 2862				OVER	marked increase in epidote after plag. epidote varies from	
	0.02		100	3 2865				2877 1½" vein of qtz-sericite border on 1/4" pyrite ± trace chalcopyrite + chalcocite, chlorite	mod-to strong; ; also locally strong in veinlets	
	0.01		80	4.5 2869.5				2880 strong bornite fx		
	0.03		100	3.5 2873				disseminated magnetite weak		
			100	2.5 2875.5				below 2885 very little dissem. sulfides; good pyrite only in veinlets ± qtz-sericite-chlorite calcite;		
	0.09		100	3 2878.5				only traces Cu sulfides		
	0.05		100	5 2883.5				2907 bornite in veinlet		
	0.06		100	5 2888.5						
			100	5 2891						
	0.01		95	6 2897						
	0.02		100	5 2902						
	0.01		100	5 2907						
	0.06		75	3 2910			2908-2910 badly fractured vein zone		mod to strong alteration of plag; less epidote, mod-strong biotite + chlorite	
	0.03		100	5 2915						
	0.03		100	5 2920						

DIAMOND DRILL LOG

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____

DEPTH _____ BEARING _____ INCLINATION _____

HOLE No. _____ PROPERTY _____ COUNTY _____ COLLAR COORD. N. _____ E. _____ COLLAR ELEV. _____

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
		100	4 2924					2920–2922.5 zone of bleaching, silicification and sericitization	
	0.01						2925 5x % pyrite + some chalcopyrite; also orange mineral in small radiating clusters		same as above
	0.04	100	2926						
	0.03	15	5 2931						
		50	2932						
	0.02	100	4 2936						
	0.04	100	5 2941						
	0.08	100	3.5 2944.5				2943 strong 1/4" pyrite veins % orthoclase?; traces chlorite, bornite, calcite		
	0.04	100	4.5 2949						
	0.02	80	4.5 2953				2952 – 6" long veinlet with good chalcopyrite very little pyrite		
	0.10	60	2.5 2956						
	0.11	100	2 2958				2959 chalcopyrite	2959–2974 mod epidote from plagioclase, few clots, common in veinlets	
	0.06	100	3 2961				2959–2974 zone of bleaching, weak silicification, mod–strong sericitization; color varies from light gray to med gray green depending upon intensity of alteration, biotite disappears leaving only chlorite, sericite, clay?;		
	0.01	50	3 2964						
	0.20	100	4 2968						
	0.07	75	4 2972				veinlets contain % bornite + lesser chalcopyrite, traces chalcocite + goethite; strong Cu vein zone 2964–2966 but also good bornite on smaller veinlets from 2966 to 2975 at start of fracture zone; weak to mod disseminated sulfides directly related to size and abundance of veinlets		
	0.03	80	5 2977			2974–2978 mod fracture 2978–2982 very strong fracturing			
	0.02	80	5 2982						
	0.04	20	2983				copper stain (brochantite?) at a couple spots, 2964, with goethite		
	0.14	60	5 2986				2984 traces ccp, born. + ccc % pyrite in veinlets		
	0.11	95	3 2989						
		70	2 2991				2993 bornite on 5x		
	0.05	95	5 2996						
	0.03	70	3 2999						
	0.03	90	5 3004						
	0.02	75	4 3008						
	0.01	50	3009						
	0.03	55	4 3013						
	0.06	25	4 3017						
	0.10	70	3018				3018 good chalcopyr. veinlet		
	0.21		3				3020 ccy, ccc, pyr veinlet		

DIAMOND DRILL LOG

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

HOLE No. ES-1 SHEET 24 OF 26

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

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
		100	3021						
	0.16	100	3 3024			good Cu zone to 3030 good Cu to Fe ratio	3022 pyr-born-ccy, ccc + 3023 3024 ccc + ccy all veinlets show Cu sulfides, primary + secondary		
	0.15	100	3 3027						
	0.07	100	5 3032					sericitized biotite weak to mod.	
	0.02	75	2 3034			Fe/Cu higher below 3030	3034 strong ccc w/ccy	chlor mod. secondary anhydrite (?) (orange?) becoming common in veinlets	
	0.11	100	5 3039				3036 trace ccy in veinlet 3039 ccy		≈3058 approximate start of change in rock type [illegible] gray porphyritic andesite;
	0.09	100	5 3044						
	0.04	100	5 3049						
	0.09	100	5 3054						
	0.06	60	5 3059						3058 approximate start of change in rock type + alteration; light to medium gray andesite porphyry
	0.13	100	3 3062				magnetite finely disseminated 2-3% noticeable decrease in amount of pyrite in veinlets and on fractures; veinlets contain calcite-chlorite-sericite-quartz-pyr and anhydrite(?)	plagioclase weak to mod altered to sericite moderate pervasive sericitization; very weak biotite as tiny disseminated flakes hornblende rare and only slightly altered only traces chlorite	
	0.01	75	2 3064						
	0.07	100	5 3069						
	0.01	100	3.5 3072.5						≈3071 very light colored porphyritic w/ very few plag phenocrysts; to 3078; several short intervals of similar rock occur sporadically i.e. 3083-3084, 3086.5-3089, 3090-3093, 3102≈3109 3109-3148 rock is medium gray but turns dark and strongly porphyritic at 3148
	.02	100	5 3077.5				traces magnetite fractures have calcite-sericite-anhydrite? only sulfide @ 3075 w/ strong chalcopyrite	plag → mod to strong sericite chlorite as small clumps after hbld (?) weak sericitization; otherwise rock is very clean	
	.01	100	5.5 3083						
	.07	100	5 3088					alteration mod-strong sericite, mod chlorite quartz?	
	.07	90	4 3092				4-6% dissem. magnetite pyrite limited to fx and veinlets except for strong zone dissem pyrite noted from 3106	only very small amounts of dark minerals, mostly chlorite w/ magnetite commonly good sericite on fx's	
	.02	100	4.5 3096.5						
	.05	85	3.5 3100						
	.06	100	3 3103				3106 - 5-8% diss. pyrite, no apparent Cu 3108 1/2" ccp + born vein		
	.02	80	4 3107						
	.55	100	2 3109						
	.08	100	5 3114						
	.13	100	2 3116				3116 chalcopyrite vein + 3117		
	.35	100	4 3120						

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 25 OF 26

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
	.30		100	5' 3125'				3123-3124.5 ccp veinlet w/ bornite disseminated pyrite, decreasing		
	.14		100	5 3130'						
	.08		100	5 3135'						
	.16		100	3 3138'				good chalcopyrite zone 3146-3149		
	.21		100	5.5 3143.5'						
	.65		100	5				sulfides predominantly in veinlets and margins with trace amounts disseminated most veinlets contain some ccp and also trace disseminated pyrite	weak to mod sericite alteration plag shiny to slightly soft + cloudy w/ calcite hbld-chl but not abundant good biotite in groundmass veinlets of qtz-chl-sericite usually very thin and not very abundant but nearly all contain some chalcopyrite with pyrite calcite in veinlets alteration due to veinlets is very restricted to practically none	3148 rock changes back to dark gray porphyritic andesite
	.14		100	5 3153.5'						
	.24		100	5.5 3159'						
			100	5' 3164'						
			100	5' 3169'						
	.05		100	5' 3174'						
	.10		100	5 3179'						
			100	5' 3184'				pyrite-chalcopyrite veinlets 3180-3182 and throughout	biotite moderate or less mod sericite weak chlorite sericite in groundmass many plagioclase phenocrysts shiny + hard qtz-sericite in veinlets w/ epidote, chlorite + clay; very little alteration adjacent to veinlets	3181 black aphanitic dacite (?) dike; fair amount of quartz
	.04		100	6 3190'						
	.02		100	2.5 3192.5'						
	.08		100	5' 3197.5'						
	.08		100	4.5 3202'						
	.03		100	3 3205'						
	.10		100	5' 3210'						
	.14		100	5' 3215'				sharp contact		3213 volcanic agglomerate
	.27		100	5 3220'						

DIAMOND DRILL LOG

HOLE No. E5[illegible] SHEET 26 OF 26

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
	.06		100	5 3225				pyrite veinlets and strong dissem up to a 3229 weak scattered ccp in veinlets a few veinlets carry good ccp	general chlorite-biotite; calcite-qtz-sericite chlorite-sulfides-K-spar? in veinlets	porphyritic andesite? matrix, most fragments are dark, aphanitic like rock in section above
	.19		100	5 3230						
	.03		100	5 3235						
	.04		100	5 3240						
	.03		100	5 3245						
	.04		100	5 3250						
	.04		100	5 3255						
	.07		100	5 3260						
	.04		100	3 3263						
	.21		100	5 3268						
	.03		100	5 3273						-3273 end of agglomerate — green-gray porphyritic andesite with alteration and mineralization same as that previously noted
	.11		100	5 3278						
	.41		94	3 3281						

DRILL HOLE SAMPLES

PAGE 1 OF

PROPERTY: SAFFORD PROJECT | DISTRICT: COVE STAR | COUNTY: GRAHAM | STATE: ARIZ | COUNTRY: U.S.A.

HOLE NO.: E.S.-1 | CONTRACTOR: JOY | COLLAR COORD. N E | COLLAR ELEV.

BEARING | INCLINATION: VERTICAL | DEPTH | STARTED STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS % CU	REMARKS
1351				2130	2135	5.0	0.03	
1354				2411	2412	1.0		
1356				2412	2413.5	1.5	.04	
1357				2413.5	2419	5.5	.10	
1358				2419	2421.5	2.5	.18	
1359				2421.5	2424.5	3.0	.15	
1360				2424.5	2426.5	2.0	.14	
1361				2426.5	2431.5	5.0	.19	
1352				2452	2457	5.0		
1362				2503	2508	5.0	.03	
1363				2508	2513	5.0	.06	
1364				2513	2519	6.0	.04	
1365				2519	2523	4.0	.05	
1366				2523	2527	4.0	.05	
1355				2527	2528	1.0	.08	
1367				2527	2532	5.0	.02	
1368				2557	2561	4.0	.20	
1369				2561	2566	5.0	.13	
1370				2566	2570	4.0	.16	
1371				2570	2574	4.0	.02	
1372				2640	2645	5.0	.04	
1373				2645	2650	5.0	.01	
1374				2650	2655	5.0	.01	
1375				2655	2660	5.0	.02	
1376				2660	2665	5.0	.03	
1377				2665	2670	5.0	.02	
1378				2670	2675	5.0	.03	
1379				2675	2680	5.0	.03	
1380				2680	2685	5.0	.02	
1381				2685	2690	5.0	.02	
1382				2690	2695	5.0	.04	
1383				2695	2700	5.0	.04	
1384				2700	2705	5.0	.02	
1385				2705	2710	5.0	.03	
1386				2710	2715	5.0	.06	
1387				2715	2720	5.0	.03	
1388				2720	2725	5.0	.02	
1389				2725	2730	5.0	.04	
1390				2730	2735	5.0	.012	
1391				2735	2740	5.0	.03	
1392				2740	2745	5.0	.01	
1393				2745	2750	5.0	.03	
1394				2750	2755	5.0	.02	
1395				2755	2760	5.0	.02	
1396				2760	2765	5.0	.06	
1397				2765	2770	5.0	.03	
1398				2770	2775	5.0	.05	
1399				2775	2780	5.0	.02	
1400				2780	2785	5.0	.02	
1251				2785	2790	5.0	.02	
1252				2790	2795	5.0	.05	
1253				2795	2800	5.0	0.07	
1254				2800	2805	5.0	0.07	
1255				2805	2810	5.0	0.05	
1256				2810	2815	5.0	0.02	
1257				2815	2820	5.0	0.01	
1258				2820	2825	5.0	0.02	
1259				2825	2830	5.0	0.06	
1260				2830	2835	5.0	0.04	

COMP ASSAY
% Cu = 0.03
% Sulfide S = 0.51

COMP ASSAY
1253-1262
TC .04 % Cu
SS .33 % S

DRILL HOLE SAMPLES

PAGE 2 OF

PROPERTY: SAFFORD PROJECT | DISTRICT: COVE STAR | COUNTY: GRAHAM | STATE: ARIZ | COUNTRY: USA

HOLE NO.: ES-1 | CONTRACTOR: JOY | COLLAR COORD. N E | COLLAR ELEV.

BEARING | INCLINATION: VERTICAL | DEPTH | STARTED STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS % Cu	REMARKS
1261				2835	2840	5.0	0.01	
1262				2840	2845	5.0	0.06	
1263				2845	2850	5.0	0.04	COMP. ASSAY 1263-1271 TC .09 %Cu SS 2.05 %S
1264				2850	2855	5.0	0.08	
1265				2855	2860	5.0	0.53	
1266				2860	2865	5.0	0.02	
1267				2865	2870	5.0	0.01	
1268				2870	2875	5.0	0.03	
1269				2875	2880	5.0	0.09	
1270				2880	2885	5.0	0.05	
1271				2885	2890	5.0	0.06	
1272				2890	2895	5.0	0.01	COMP ASSAY 1272-1278 TC .02 %Cu SS 1.15 %S
1273				2895	2900	5.0	0.02	
1274				2900	2905	5.0	0.01	
1275				2905	2910	5.0	0.06	
1276				2910	2915	5.0	0.03	
1277				2915	2920	5.0	0.03	
1278				2920	2925	5.0	0.01	
1279		1.0	100	2925	2926	1.0	0.04	
1280		1.5	30	2926	2931	5.0	0.03	
1281		1.0	100	2931	2932	1.0	0.02	
1282		3.5	88	2932	2936	4.0	0.02	
1283		5.0	100	2936	2941	5.0	0.04	
1284		3.5	100	2941	2944.5	3.5	0.08	
1285		4.5	100	2944.5	2949	4.5	0.04	
1286		4.0	88	2949	2953.5	4.5	0.02	
1287		2.0	80	2953.5	2956	2.5	0.10	
1288		2.0	100	2956	2958	2.0	0.11	
1289		3.0	100	2958	2961	3.0	0.06	
1290		2.0	66	2961	2964	3.0	0.01	
1291		4.0	100	2964	2968	4.0	0.20	
1292		2.5	62	2968	2972	4.0	0.07	
1293		5.0	100	2972	2977	5.0	0.03	
1294		4.5	90	2977	2982	5.0	0.02	
1295		0.5	50	2982	2983	1.0	0.04	
1296		2.0	66	2983	2986	3.0	0.14	
1297		2.5	86	2986	2989	3.0	0.12	
1298		1.5	50	2989	2991	3.0	0.11	
1299		5.0	100	2991	2996	5.0	0.05	
1300		3.0	100	2996	2999	3.0	0.03	
1301		4.5	90	2999	3004	5.0	0.03	
1302		3.5	88	3004	3008	4.0	0.02	
1303		0.5	50	3008	3009	1.0	0.01	
1304		2.5	63	3009	3013	4.0	0.03	
1305		1.0	25	3013	3017	4.0	0.06	
1306		1.0	100	3017	3018	1.0	0.10	
1307		3.0	100	3018	3021	3.0	0.21	
1308		3.0	100	3021	3024	3.0	0.16	
1309		3.0	100	3024	3027	3.0	0.15	
1310		5.0	100	3027	3032	5.0	0.07	
1311		2.0	100	3032	3034	2.0	0.02	
1312		5.0	100	3034	3039	5.0	0.11	Composite Assay 1291-1312 %Cu = .07 Sulfide S% = 1.38
1313		4.0	80	3039	3044	5.0	0.09	
1314		4.5	90	3044	3049	5.0	0.04	
1315		5.0	100	3049	3054	5.0	0.09	
1316		2.5	50	3054	3059	5.0	0.06	
1317		3.0	100	3059	3062	3.0	0.13	
1318		2.0	100	3062	3064	2.0	0.01	
1319		5.0	100	3064	3069	4.0	0.07	
1320		2.5	100	3069	3072.5	2.5	0.01	
1321		5.0	100	3072.5	3077.5	5.0	0.02	%Cu = .05 %S = .34 (Sulfide)
1322		4.5	82	3077.5	3083	5.5	0.01	
1323		4.5	90	3083	3088	5.0	0.07	
1324		3.5	88	3088	3092	4.0	0.07	
1325		4.5	100	3092	3096.5	4.5	0.02	COMP ASSAY 1321-1328 TC .039%Cu SS .23 %S

DRILL HOLE SAMPLES

PAGE 3 OF

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY
SAFFORD PROJECT	CONE STAR,	GRAHAM,	ARIZ	U.S.A

HOLE NO.	CONTRACTOR	COLLAR COORD.	COLLAR ELEV.
ES-1	JOY	N E	

BEARING	INCLINATION	DEPTH	STARTED STOPPED
	VERTICAL		

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS %Cu	REMARKS
1326		3.0	86	3096.5	3100	3.5	0.05	
1327		3.0	100	3100	3103	3.0	0.06	
1328		3.0	75	3103	3107	4.0	0.02	
1329		2.0	100	3107	3109	2.0	0.55	
1330		4.5	90	3109	3114	5.0	0.08	
1331		2.0	100	3114	3116	2.0	0.13	
1332		4.0	100	3116	3120	4.0	0.35	
1333		5.0	100	3120	3125	5.0	0.30	
1334		5.0	100	3125	3130	5.0	0.14	AVG ASSAY 3107 - 3159' 52' 0.24% Cu
1335		5.0	100	3130	3135	5.0	0.08	
1336		3.0	100	3135	3138	3.0	0.16	
1337		5.0	91	3138	31435	5.5	0.21	
1338		5.0	100	31435	31485	5.0	0.65	
1339		5.0	100	3148.5	31535	5.0	0.14	
1340		5.5	100	31535	3159	5.5	0.24	
1341		5.0	100	3159	3164	5.0		
1342		4.5	90	3164	3169	5.0		
1343		5.0	100	3169	3174	5.0	0.05	COMP ASSAY 1343 - 1345 TC .19 % Cu SS 1.57 % S
1344		5.0	100	3174	3179	5.0	0.10	
1345		5.0	100	3179	3184	5.0	0.10	
1346		5.0	83	3184	3190	6.0	0.04	
1347		2.1	84	3190	31925	2.5	0.02	
1348		4.4	89	31925	31975	5.0	0.08	
1349		4.5	100	31975	3202	4.5	0.08	
1350		3.0	100	3202	3205	3.0	0.03	
1401		5.0	100	3205	3210	5.0	0.10	
1402		4.8	96	3210	3215	5.0	0.14	
1403		5.0	100	3215	3220	5.0	0.27	% Cu = .10
1404		5.0	100	3220	3225	5.0	0.06	
1405		4.5	90	3225	3230	5.0	0.19	Sulfide S% = .54
1406		5.0	100	3230	3235	5.0	0.03	
1407		4.5	90	3235	3240	5.0	0.04	
1408		5.0	100	3240	3245	5.0	0.03	
1409		5.0	100	3245	3250	5.0	0.04	
1410		5.0	100	3250	3255	5.0	0.04	
1411		5.0	100	3255	3260	5.0	0.07	
1412		3.0	100	3260	3263	3.0	0.04	
1413		5.0	100	3263	3268	5.0	0.21	
1414		5.0	100	3268	3273	5.0	0.03	
1415		5.0	100	3273	3278	5.0	0.11	
1416		2.8	97	3278	3281	3.0	0.41	

GEOLOGIC DESCRIPTION

DDH ES-1 SAFFORD PROJECT

Notes by J.K. Jones
9-28-71, 9-30-71,
10-8-71

ROTARY CUTTINGS

FROM	TO	DESCRIPTION
0 feet	20 feet	Heterogeneous assortment of rock chips representing coarse, unsorted, recent gravel deposits.
20 feet	120 feet	Mostly gray, fine grained basalt but with scattered chips of a fresh, brown volcanic and rare fragments of epidotized rock. Probably represents a Tertiary basalt flow with some contamination from material caving in from higher in hole, but could be alluvium.
120 feet	190 feet	Almost entirely fine grained, dark gray basalt, a few brown volcanic chips. Tertiary basalt flow.
190 feet	208 feet	About 50% basalt, 50% brown, unaltered latite (?) which contains a few small fragments of epidote. Probably represents Tertiary flows and sedimentary material which occur beneath basalt and unconformably overlie Cretaceous volcanics.
208 feet	210 feet	No cuttings recovered.
210 feet	240 feet	Brown, unaltered latite (?) which contains fragments of epidote.
240 feet	330 feet	No cuttings recovered.
330 feet	335 feet	Basalt and latite fragments may be cave from higher in hole.
335 feet	340 feet	No cuttings recovered.
340 feet	390 feet	Mostly fine grained, white, altered material with much epidote. Chips are much smaller than higher in hole. Probably represents Cretaceous andesite agglomerate.

ROTARY CUTTINGS FROM	TO	DESCRIPTION
390 feet	400 feet	Similar to interval above, but epidote increased and chips are finer.
400 feet	420 feet	No cuttings recovered.
420 feet	470 feet	Cretaceous altered volcanic similar to above, but with some dark gray basalt and brown latite probably caving from higher in hole.
470 feet	500 feet	No cuttings recovered.
500 feet	580 feet	Altered Cretaceous volcanic similar to above.
580 feet	640 feet	No cuttings recovered.
640 feet	650 feet	Altered Cretaceous volcanic similar to 420 to 470 feet, much epidote, some contamination by basalt.
650 feet	660 feet	No cuttings recovered.
660 feet	670 feet	Similar to 640 to 650 feet.
670 feet	735 feet	No cuttings recovered.
735 feet	745 feet	Cretaceous volcanic similar to 640 to 650 feet but much contamination.

Hole cased to 745 feet, NX coring started at 745 feet.

745 feet 850 feet ± Fragmental andesite. Fine, fuzzy textured matrix, possibly an altered andesite containing scattered feldspar phenocrysts, blebs of epidote, chloritized femics. Many fragments are medium grained, dark green andesite porphyry characterized by numerous soft white feldspar phenocrysts and abundant chlorite. ALTERATION: Feldspar locally bright but soft, probably sericitized, estimated 10% epidote present, ferromagnesian minerals altered to chlorite. MINERALIZATION: Widely spaced calcite veinlets, 0 to ½% disseminated grains limonite some after cubic pyrite, local goethite but common hematite. 837 to 879 estimated 5% limonite cubes after FES_2 up to 0.1 inch, estimated to be 60% hematite 40% goethite.

~~ROTARY CUTTINGS~~ CORE

FROM	TO	DESCRIPTION
850' ±	940' ±	Similar to interval above but chlorite seems to be increased.
940' ±	1020'(?)	Andesite agglomerate similar to above. ALTERATION: Chlorite appears stronger, epidote may be decreased, sericite appears stronger. Matrix and feldspars very soft and exhibit a sheen that resembles sericite. 951–953, 978–998±, 997–1006± are broken, bleached, limonite stained, and appear to be a fine grained aggregate of quartz and sericite.
1020'(?)	1120'(?)	Generally similar to above but does not appear as strongly altered. Light colored rock, under high power (30X) matrix appears to be largely composed of white, moderately soft feldspar and very fine quartz(?). Much of feldspar appears to be sericitized, but some areas are pink and hard. 1034–1036 broken, strong limonite. 1039–1045 broken. 1065 several inches strong limonite. 1065–1116 broken, strong limonite to 1108.
1120'(?)	1199' ±	Appears similar to 940–1020, texture fuzzy, fairly strongly altered andesite agglomerate, pale green in color.
1199' ±	1303'	Groundmass and overall rock color becoming light brown to pink, otherwise similar to above. 1229' to 1235' moderate amount disseminated, coarse grained limonite after pyrite.
1303'	1361'	Pale green, fuzzy textured rock, similar to 1120'–1199'. Alteration appears to be strong sericite, moderate chlorite, weak epidote.
1361'	1710	Andesite agglomerate, pale pink matrix of relatively fine grained andesite porphyry containing numerous various sized fragments often coarser grained than matrix. ALTERATION: Variable, feldspar in part bright but usually soft white. Femic minerals at least in part altered to chlorite but in places black. Fairly numerous blebs epidote.

CORE
~~ROTARY CUTTINGS~~

FROM	TO	DESCRIPTION
1361' - continued		MINERALIZATION: A few flecks disseminated hematite, widely spaced very thin seams calcite. 1341' to 1412' broken, scattered veinlets calcite with some white clay, possible gypsum. 1444' to 1460' broken.
1710'	1790'	Similar to above but denser, gray color, firm but greasy-looking, easily scratched gray to gray-pink matrix, much fine femic altered to chlorite, scattered spots epidote. At 1759', 1.5 feet strong limonite in soft altered material.
1790'	1874'	Very similar to above but matrix a little pinker, possibly harder.
1874'	1971'	Same as above except locally broken, more numerous calcite seams, many with films and specks hematite.
1971'		Darker colored andesite agglomerate possibly due to increased fine grained biotite. Broken, fairly numerous steeply dipping calcite and sericitized stringers, weak to fair limonite. Last core observed 1992 feet, October 8, 1971.

2080 – 2320(?) andesite agglomerate; alteration propylitic with common blebs of epidote, also ~~to~~ secondary biotite and weak sericite; greenish or reddish gray depending upon amount of hematite; hematite variable but usually mod-strong on fractures and disseminated; sericite (?) and calcite on fractures; rock has waxy appearance due to sericite; hematite locally massive

2320 – 2508 andesite, andesite porphyry; green gray to reddish gray; hematite similar to above; lesser epidote; plagioclase alteration varies from weak sericite to sericite, calcite and epidote; ferrics alter to chlorite and probably v.f.g. biotite; rock locally fragmental;

2508 – 2527 dike; dull red chalky looking leached and bleached rock; weak silicification, mod-strong sericite; disseminated limonite + ~~f~~ hematite 1-2%, ferrics alter to chlorite, sericite, biotite(?)

2527 - 2658 rock similar to ~~that~~ above dike; interval 2613 - 2658 ~~may be~~ somewhat clastic,

2658 - 2731 andesite like above, weakly porphyritic, commonly fragmental, ~~first sulfide~~ 2676

2731 - 2733 possible dike, feldspathized andesite; pink color

2733 - 2850 ~~similar to~~ same as above dike, andesite w/ biotite + chlorite + calcite - sericite alteration; veinlets with qtz - pyrite and traces chalcopyrite + bornite; traces biotite veinlets, first sulfide 2676'

2850 - 3071 andesite porphyry; dark gray strongly porphyritic, dense; plagioclase alteration varies from clear + shiny to cloudy + sericitized w/ calcite and epidote; epidote more common than rocks above; moderate to strong chlorite with ~~slight~~ definite decrease in biotite alteration; pyrite most common in veinlets with chalcopyrite + bornite, locally disseminated pyrite up to 7%; chalcopyrite much more apparent in veinlets from 3018 on but veinlets widely spaced; traces of dolcocite; orange mineral

is veinlets ~~starts~~ to become common at about 3030; better sulfide zone ~~3018~~ - 3040

3071 - 3143

this section shows quartz; dacite?

lighter colored, weakly porphyritic rock of similar alteration; disseminated magnetite up to ~~2-3%~~ 6%; good disseminated sulfides to 8% from 3106 - 3143; veinlets show thin alteration margins;

3148 - ~~3213~~ 3184

back to dark gray, andesite porphyry; similar alteration; sulfides essentially restricted to veinlets of quartz ± sericite ± chlorite ± calcite; ± epidote

3184 - 3213

black aphanitic dacite (?) dike(?) or flow; ~~some~~ ~~rare~~ quartz visible; widely spaced sulfide veinlets with very little attendant alteration; weak-mod biotite, ~~mod~~ weak chlorite, weak sericite

~~3213 - 3273~~

3213 - 3273

andesite porphyry agglomerate with marked decrease in sulfide mineralization

3273 - 3281

andesite porphyry with alteration and mineralization same as noted above

Sample #	% Cu	Sulfide % S	Pyrite/Chalcopyrite
1253 - 1262	.04	.33	.29/.04 = 7/1
1263 - 1271	.09	2.05	1.96/.09 = 22/1
1272 - 1278	.02	1.15	1.13/.02 = 56/1
1291 - 1312	.07	1.38	1.31/.07 = 19/1
133 - 1320	.05	.34	.29/.05 = 6/1
1321 - 1328	.03	.23	.20/.03 = 7/1
1329 - 1340 + 1343 - 1345	.19	1.57	1.38/.19 = 7/1
1346 - 1350 + 1401 - 1416	.10	.54	.44/.10 4.5/1
1251, 1252 1394 - 1400	0.03	0.51	.48/.03 = 16/1

GEOLOGIC DESCRIPTION DDH ES-1 SAFFORD PROJECT

Notes by J. K. Jones 9-28-71, ~~and~~ 9-30-71, 10-8-71

For what they are worth here are my notes on the hole to a depth of 1992 feet. I now think that biotite alteration probably starts at 1971 feet.

ROTARY CUTTINGS

FROM	TO	DESCRIPTION
0 FEET	20 FEET	Heterogeneous assortment of rock chips representing coarse, unsorted, recent gravel deposits
20 "	120 "	Mostly gray, ~~basalt~~ fine grained basalt but with scattered chips of a fresh, brown volcanic and rare fragments of epidotized rock. Probably represents a Tertiary basalt flow with some contamination from material caving in from higher in hole but could be alluvium
120 "	190 "	Almost entirely fine grained, dark gray basalt, a few brown volcanic chips. Tertiary basalt flow.
190	208	About 50% basalt, 50% brown, unaltered latite(?) which contains a few small fragments of epidote. Probably represents Tertiary flows and sedimentary material which occur beneath basalt and unconformably overlie Cretaceous volcanics.
208	210	No ~~recovery~~ cuttings recovered
210	240	Brown, unaltered latite(?) which contains fragments of epidote.
240	330	No cuttings recovered

FROM	TO	DESCRIPTION
330 FEET	335 FEET	Basalt and latite fragments. May be cave from higher in hole.
335	340	No cuttings recovered
340	390	Mostly fine grained, white, altered material with much epidote. Chips are much smaller than higher in hole. Probably represents Cretaceous andesite agglomerate
390	400	Similar to interval above, but epidote increased and chips are finer.
400	420	No cuttings recovered
420	470	Cretaceous altered volcanic similar to above, but with some dark gray basalt and brown latite probably caving from higher in hole.
470	500	No cuttings recovered
500	530	altered Cretaceous volcanic similar to above
530	640	No cuttings recovered
640	650	altered Cretaceous volcanic similar to 420 to 470 feet, much epidote, some contamination by basalt
650	660	NO CUTTINGS RECOVERED
660	670	Similar to 640 to 650
670	735	NO CUTTINGS RECOVERED
735	745	Cretaceous volcanic similar to 640 to 650 but much contamination.

HOLE CASED TO 745 FEET, NX CORING STARTED AT 745 FEET.

DRILL HOLE ES-1 CORE

FROM	TO	DESCRIPTION
745	850 ±	Fragmental andesite. Fine, fuzzy textured matrix, possibly an altered andesite containing scattered feldspar phenocrysts, blebs of epidote, chloritized ferrics. Many fragments are medium grained, dark green andesite porphyry characterized by numerous soft white feldspar phenocrysts and abundant chlorite. ALTERATION: Feldspar locally bright but soft, probably sericitized, estimated 10% epidote present, ferromagnesian minerals altered to chlorite. MINERALIZATION: Widely spaced calcite veinlets, 0 to ½% disseminated grains limonite some after cubic pyrite, local goethite but common hematite. 873 to 879 estimated 5% limonite cubes after FeS$_2$ up to 0.1 inch, estimated to be 60% hematite 40% goethite.
850±	940±	Similar to interval above but chlorite seems to be increased.
940±	1020?	Andesite agglomerate similar to above. ALTERATION: Chlorite appears stronger, epidote may be decreased, sericite appears stronger. Matrix and feldspars very soft and exhibit a sheen that resembles sericite. 951-953, 978-988±, 997-1006± are broken, bleached, limonite stained, and appear to be a fine grained aggregate of quartz & sericite.

FROM	TO	
1020?	1120?	Generally similar to above but does not appear as strongly altered. Light colored rock, under high power (30X) matrix appears to be largely composed of white, moderately soft feldspar and very fine quartz (?). Much of feldspar appears to be sericitized, but some areas are pink & hard. 1034 - 1036 broken, strong limonite 1039 - 1041 broken 1061 several inches strong limonite 1099 - ~~1103~~ 1116 broken, strong limonite to 1108.
1120?	~~1199~~ 1199±	Appears similar to 940 - 1020; ~~tex~~ texture fuzzy, fairly strongly altered andesite agglomerate, pale green in color.
1199±	1303	Groundmass and overall rock color becoming light brown to pink, otherwise similar to above. 1229 to 1231 feet moderate amount disseminated, coarse grained limonite after pyrite.
1303	1361	Pale green, fuzzy textured rock, similar to 1120 - 1199 feet. Alteration appears to be strong sericite, moderate chlorite, weak epidote.
1361		Andesite agglomerate, ~~chiefly~~ pale pink matrix of relatively fine grained andesite porphyry containing numerous various sized fragments often coarser grained than matrix. ALTERATION: Variable, feldspar in part bright but usually soft white. Ferric minerals at least in part altered to chlorite but in place black. Fairly numerous black epidote. MINERALIZATION: ~~Unoxidized limonite~~, a few flecks disseminated hematite, widely spaced very thin seams calcite.

FROM	TO	
		1341 to 1412 broken, scattered veinlets calcite with some white clay, possible gypsum.
		1444 to 1460 broken
1710	1790	Similar to above but denser, gray color, firm but greasy-looking, easily scratched gray to gray-pink matrix, much fine femic altered to chlorite, scattered spots epidote.
		at 1757 ~~feet~~ 1.5 feet strong limonite in soft altered material.
1790	1874	Very similar to above but matrix a little pinker, possibly harder
1874	1971	Same as above except locally broken, more numerous calcite seams many with films and specks hematite.
1971		Darker colored andesite agglomerate possibly due to increased fine grained biotite. Broken, fairly numerous steeply dipping calcite and sericitized stringers, weak to fair limonite.
		Last core observed 1992 feet, October 8, 1971

DIAMOND DRILL LOG

HOLE No. _____ SHEET _____ OF _____

SCALE 1" = 10' STARTED AUG. 25, 1941 DEPTH _____ PROPERTY _____

STOPPED _____ BEARING _____ COUNTY _____ STATE _____

NOTES BY _____ INCLINATION _____ COLLAR COORD. N. _____ E. _____

COLLAR ELEV. _____

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
		100	5.0			743.5 45°-60° Hairline fract. w/ some calcite and hematite	Sparse local disseminated aggregates of pyrite. These are best dev. within & adjacent to strongly fractured zones! - Local orientation of aggregates appears to control fracture pattern		
		100	5.0			759-761 steeply inclined hairline fractures filled with white calcite. Calcite also in small fractures in adjacent rock			
		100	5.0			762-765 Brecciated zone Btn. friable, pyrite (oxidized). 766.8 - 771.5 like (762-765)			
		100	5.0			771.5 45° Hairline fracture with MnO_2 dendrites 771-778 Brecciated	771.1 5% pyrite (oxid.)		
		100	5.0			775-781 781-782.5 Rock indurated and bleached to tan.			MANY EPIDOTE VEINS EXHIBIT REACTION RIMS
		100	2.0			782.5-783.5 Fault breccia (90°) Btn (oxid) stained clay tuff.		781-782.5 Indurated?	
		100	4.0			784-787 Steeply incl. hairline fractures			
		100	5.0			798-800 Steep hairline fractures with calcite			
		100	5.0				806-806.5 - Qtz. veinlets and pyrite (oxid)	806-806.5 Chalcopyrite in Sericite (?)	
		100	5.0			808-821 Hairline fract.			
		100	5.0				818-821 Local clusters disseminated pyrite (oxid)		
		100	5.0			823 30° Hairline fracture 825-826 Hairline fractures with calcite			
		100	5.0			828 Hairline fract. with calcite			
		100	5.0			840-841 Steep hairline fract. with calcite & hematite (trace)			
		100	5.0			845 45° hairline fracture			

DIAMOND DRILL LOG

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____

DEPTH _____ BEARING _____ INCLINATION _____

HOLE No. _____ SHEET 2 OF _____

PROPERTY _____ COUNTY _____ STATE _____

COLLAR COORD. N. _____ E. _____ COLLAR ELEV. _____

ASSAYS % MO	ASSAYS % CU	% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
		100	5.0						
			847						
		100	5.0						
			852			850-852 Basalt flow? Strong stockwork fracturing, partly oxidized			
		100	5.0			855-859 Light brn to grey partially oxidized			
			859			863; 872-876 Steep hairline fractures some with calcite			
		100	4.0						
			863			904 Hairline fracture			
		100	5.0			880-89? Abundant steep hairline fractures some with calcite	865-866 Qtz veinlet 1/2-1mm		
			868				867-880 pervasive fracture controlled	867 Secondary biotite? Silicification	
		100	5.0					873-879 Silicification, pyrite in pervasive?	
			873						
		100	5.0				880-904 Local pyrite disseminated (1%) 1/2 mm	879-891 2nd biotite	
			879						
		100	5.0						
			884						
		100	5.0						
			889						
		100	5.0						
			894			896-897 Hairline fracs. fresh walls calcite (70°).	894 & 898 ? pyrite		
		100	5.0						
			899						
		100	5.0				902 ? pyrite		
			904					904 2nd biotite	
		100	5.0						
			909						
		100	5.0						
			914						
		100	5.0			917-919 Steep hairline fractures			
			919						
		90	3.5			921-922 Steep hairline fractures w/clay			
			922.5						
		100	5.0						
			927.5			926-927.5 45° fractures			
		100	5.0			931-932.5 & 934 Abundant steep fractures with clay			
			932.5						
		100	5.0						
			937.5			937-941 Steeply inclined hairline fractures			
		100	5.5						
			943			941-949 Steep fractures			

DIAMOND DRILL LOG

HOLE No. E5[illegible] SHEET 3 OF ____

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	5.0						
				948			948-949 steep hairline fracture			
			80	5.0			951-953 Abundant steep fractures with clay & limonite coating/plate	950-953 Tr. - 1% pyrite banding		
				953						
			100	5.0						
				958						
			100	5.0						
				963						
							964.5-966.5 45° hairline fractures with some calcite, manganese stn.			
			90	8.0						
							970-978 steeply inclined hairline fissures with calcite			
				971						
			30	5.0						
				976						
			80	4.0			978.5-981.5 Broken by numerous open hairline fractures	977 (1305 disseminated pyrite (2%)) ½ mm 978.5-981.5 Limonite after pyrite 2-5% (½-2 mm)	978.5-981.5 Limonite after pyrite, quartz, sericite, weak chl. show some calcite	978.5-981.5 Fine dacite ash stone, altered to fine limonite after pyrite, sericite, quartz
				980						
			90	8.0			981.5-991 Close/fractured Lower high angle closely spaced breaks	981.5-991 Limonite after pyrite (more than 1%, 981.5-983 dot breaches 2-3% (983-991) Disseminated	981.5-991 Locally altered to white clay, silver patches secondary quartz	981.5-991 Rock is strongly broken by high & low angle breaks. Limonite after pyrite causes dusky stn. Alt. produces patchy white clay effect in spots
				988						
			100	10.0			996 steep hairline fracture 999-1001 strong fractured 1002-1003 Large epidote body	999-1001 Limonite after Py. 1-5% (½-4 mm aggregates) 1002-1003 Large mass of epidote	999-1008 Like 981-991 1002-1003 Large mass of epidote	999-1002 similar to 981.5-991 except epidote replacement
				998						
			100	10.0	E			1005-1008 1-3% limonite after pyrite disseminated fine surfaces. Fractures shown granite & epidote		
				1008			1008-1014 OCCASIONAL steep hairline fracture			
			100	8.5						
							1014-1016 2 hundred steep hairline fractures	1014-1023 Limonite after pyrite disseminated (1-3% less than 1%)	1014-1023 Soft white to light pink to chocolate	1014-1023 Andesite porphyry with fewer Hornblende, Biotite & abundant sparse limonite after pyr. Some gt + feldspars
				1016.5						
							1019-1020 Local high angle hairline fractures			
			100	10.5			1024-1025 steep hairline fractures coated by calcite			
							1025-1027 Abundant steep hairline fractures coated by calcite			
				1027						
							1032-1034 Close spaced low angle fractures			
			80	10.0			1034-1036 Soft Red clay-like material Lim. chem. (clay) after pyrite & magnetite	Limonite after pyrite	Hematite & clay from 1034 to 1036 ft. Massive & have gt. grains & phenocrysts in chloritic base	1034-1036 Strongly chloritic andesite breccia. Strongly altered by hematite after pyrite. Soft clay at bottom
		KAA FA								
				1037			1036-1044.6 Extreme core broken by high & low angle fractures best developed at 1040-1044.6	Very sparse limonite after pyrite	1036-1044.6 Partially altered to chl. clay, strong chloritic sections	1036-1044.6 - 6½ ft. of fine sparse andesite ash tuff. Some breccia. Core 1034-1036 clay altered chl. tuff.
			100	5.0						
				1041						
			100	5.6						

DIAMOND DRILL LOG

HOLE No. ES SHEET 4 OF

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	44			1044.6 - 1073 Moderately broken by low high angle fracture - S. Very little mineralization on fractures			1044.6 - 1075 This section usual dark grey diabase — 15° to core axis indicated by some local porosity development adjacent to sheared zones
		90	1049 5.0						
			1054						
		100	6.0						
			1060			1060 - 1073 local occasional sheared zones			
		100	3.0						
			1063			1063 - 1064 SHEARED ZONE	1063 - 1064 Pyrite, chalcopyrite stringers & blebs		
		100	4.0				1066 Lim after pyrite above		
			1067						
		100	6.0			1071 - 1072 SHEARED ZONE	1071 - 1072 Lim after Py, & sem, cubic to irregular fine (½ - 1mm) locally to 3%		
			1073						
		100	10.0						
			1083						
						1085 calcite filled on steep fracture			
		100	8.0						
			1091						
		100	5.5			1095 - 1097 strong dev. vert. to 10° to 15° to the axis fractures coated by lim. after Py.	1095 - 1097 Lim after Py. & from diss. pyrite on fractures (½ %)		1099 - 1109 Fe stained fault breccia zone impregnated with lim & chrom. after Pyrite.
			1096.5						
Sample & Assay 1102 - 1103		100	5.5		A B	1099 - 1109 Red hem. stained breccia.	1100 - 1109 Lim & hem after pyrite from disseminated veinlets steep fractures (1 - 5%) ½ - 3mm	1101 - 1104 Qtz, sericite pyrite alteration	
			1102		A B				
		100	5.0		A B			1106 - 1108 Qtz, sericite pyrite alteration	
			1107		A B				
		100	2.0		A B				
			1109		A	1109 - 1122 Fracture zone between brecciated fault zones. Steep hairline fractures with calcite & sparse lim after Py.	1109 - 1122 Sparse lim after py along fractures		
		100	4.0						
			1113						
		100	3.0						
			1116						
		100	6.0				1122 - 1125 Lim & hem after pyrite in disseminated fractures (½ - 1mm) & fracture fillings		1122 - 1125 Fe stained fault breccia zone. Py) fracture controlled
			1122		A	1122 - 1125 BRECCIA ZONE			
		100	3.0		A				
			1125			1124 - 1124 SHEARED zone with fractures controlled calcite	1125 - 1129 Sparse lim. after pyrite	1125 - 1129 Fault zone with clay, sericite & pyrite	1124 - 1125 shear zone, fracture controlled to steep fractures parallel to core axis
		100	10.0		A	1129 - 1132 BRECCIA ZONE with gypsum, clay, calcite & pyrite (½ - 1%) on fractures	1129 - 1132 - 1% lim. & hem after pyrite as seams & disseminations	1129 - 1132 Argillic & transitional feldspars to clay.	1129 - 1132 Clay - Hem fault breccia zone with gypsum, calcite & Py.
			1132		A	1132 - 1135 Many steep fractures with calcite & gypsum.			1132 - 1135 brecciated zone below breccia zone
			1135						
		100	5.0			1135 - 1139 Few steep hairline fractures with calcite & gypsum			
			1140						
		100	3.0			1139 - 1140 Many hairline fractures with lim after Py.	1139 - 1143 Lim after Py on fractures		
			1143						

DIAMOND DRILL LOG

SCALE _____ STARTED _____ STOPPED _____ NOTES BY _____

DEPTH _____ BEARING _____ INCLINATION _____

HOLE No. ES- _____ SHEET 5 OF _____

PROPERTY _____ COUNTY _____ STATE _____

COLLAR COORD. N. _____ E. _____

COLLAR ELEV. _____

ASSAYS % MO	ASSAYS % CU	% RECOV	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
		80	5.0			1142-1152 Many close spaced quartz fractures filled by pyrite, calcite & pyrrhotite, often at right angles to core axis. Most broken 1142-1143 & 1149-1147 1152-1168 occasional steep hairline fractures with some calcite & limonite.	1142-1152 Some pyrite & pyrrhotite as disseminations & fracture fillings. Mineralization occurs on centers of most fractures.		1142-1152 Grey fine grained dacite porphyry cut by many fractures with thin veinlets of pyrite & calcite. Fractures at right angles to core axis.
		100	3.0						
			1151						
		100	10.0						
			1161						
		100	8.0						
			1169			1170-1182 Occasional steep angle hairline fractures with calcite & pyrite & limonite.			1168-1170 Dike(?) Andesite porphyry with few inclusions & fractures probably a large xenolith
		100	10.0						
			1179			1181-1182 Closely sheared zone.	1181-1182 2in. of pyrite (5%) as disseminations & seams in broken zone		1170-1229 Strong host rock (dacite porphyry) but few fractures & spots limonite stained by shear zone.
		100	10.0						
			1189						
		100	10.0						
			1199						
		100	10.0						
			1209						
		100	10.0						
			1219						
		100	10.0						
			1229			1230 strong shear zone	1229-1234 Increasing veinlets 2in. apart to 1/16 to 2% (1-2 mm)	1230 Heavy iron staining, clay, limonite & some pyrite in closely spaced shear zone	1229-1234 Iron stained sheared zone in porphyry with dacite fragments.
		100	8.0			1234-1239 Occasional low angle or steeply inclined hairline fractures with calcite & pyrite limonite.			
			1239		E			1239 - Sericite 3 ft. long contact of pyrite mass cutting fracture with quartz at 1239	
		100	10.0			1238, 1245, 1250 & 1256 large xenoliths Now sampled			

DIAMOND DRILL LOG

HOLE No. ES-1 SHEET 6 OF

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
			1247				1245-1247 py. 1% dissem (1-2mm)		At 1249 there is a increase in number of % of fragments of drk. green andesite porphyry.
		100	10.0			1251 5" frag. dk gren andesite porphyry			
			1257			1257-59 Steep hairline fracture with tr calcite & hem.			1269-1287 Rock lt brn to pink fragmental andesite porphyry agglomerate or flow breccia. Texture resembles lt grn. andesite porphyry. Epidote partially replaces feldspars. This may be a flow unit with flow breccia above below (1280-1285 main flow mass).
		100	8.0			1261-63 FRAGMENTS of ANDESITE PORPHYRY			
			1265			1264-1268 Few steeply inclined hairline fractures with MnO_2 & calcite. 1268 Epidote			
		100	10.0			1268.5 Fine gr. banded pink graded bedded ash (water lain)			
			1275			1275 Large epidote mass 1277-1287 Few steeply incl. hairline fracs with hem., lim. MnO_2			
		100	5.0			1280 & 1282 2-3" epidote			
			1280						
		100	7.0			B FLOW 1285 EPIDOTE DECREASES IN ABUND.			
			1287			1287 - Brn banded sandy (water lain) volcanics			
		100	10.0						1303-1340 Rock still lt grn andesite agglom. but has some water laid units & is well indurated with few fractures
			1297			1296-1306 MANY steep hairline fractures with MnO_2 calcite			
		100	5.0						
			1302			1302 ANDESITE PORPHYRY FRAGMENT			
		100	9.0						
			1311						
		100	8.0						
			1319			1321 BROKEN ZONE			
		100	10.0						
			1329			1328-29 Lt green fine xall tuff			
		100	10.0			1333-34 Graded & banded water lain tuff			
			1339			1336-1340 steep hairline fractures with calcite lim. after py. & gypsum.	1339-42 Tr. lim. after py. dissem (<1/2 mm)		1340-42 Shear Zone Breccia
		100	5.0			1340-42 Lt grn rotten broken clay-rich zone with abundant gypsum & tr lim. after py.			
			1344			1342-47 very [illegible]			

DIAMOND DRILL LOG

HOLE No. FS-1 SHEET 7 OF

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
			10.0			1340-54 Many steep hairline fracs. with Calcite & ¼ pt. 1350-51 Steep calcite -pyr Veinlet to ½" thick	1340-54 Tiny dissem 1 in often pyrite (< 1mm.) (½%)	1340-1412 ANDESITE AGGLOMERATE EXTENSIVELY Silicified to dense Sheared zones locally clayitic. Tiny xals of lim. often py. hem. often magnetic dissem. (¼ to 1%, ½ to 1%) on fractures & in CALCITE & local ¼ to ½ lim. Sort fractures Rock still largely exhibits chloritic alteration	1340-1354 Dk grn Compact andesite agglom. impregnated with Veinlets of pink pt. feldspar. Phenocrysts Abundant lin. xals of lim. often py.
			1354			1354-1360 Shattered zone with Calcite ¼ & ¼ lin often py in fractures	1354-1360 Trace 1 in often pyrite		1354-1360 Lt grey-buff lithic (tuff?) shattered
100			4.0						
			1358						1360-64 like 1340-54 (See 1361) Veinlets of Rock Flour?
100			6.0						
			1364						
100			6.0						
			1370						
100			2.0						
			1372						
100			2.0						
			1374			1374-1381 BRECCIA/CLAY			
100			2.0						
			1376						
100			2.0						
			1378						
100			2.0						
			1379						
100			1380						
			1381			1381-1383 BANDS OF GRADED BEDDING/TUFF	1382-83 Local bands to 2" wide of heavily Pyritized rock (Lim. hem. often Py) To 10% (½-2mm.) AT 1381 Lim. often pyrite dissem on mafics To 2%.		
100			5.0			1381-1389 ZONE LESS BROKEN - Steep hairline fr. to 50. with calcite ¼ Py.			
			1386						
100			5.0			1389-1394 BRECCIA >			
			1390						
80			2.0						
			1392						
80			5.0			1394-1400 Broken by Numerous hairline fracs at low-high angles Calcite & Sparse lim. coat fracs.			
			1397						
90			2.0						
			1399			1400-1412 BRECCIA			
95			3.0						
			1402			1402 ERROR			
15			3.8						
			1405						
80			2.0						
50			1407						
95			1408						
			2.0						
90			1410						
			1411			1412-1431 FEW HAIRLINE FRACTURES			1412-1441 - WELL INDURATED - Relatively UNFRACTURED MOTTLED
90			5.0						SEM-BRN ANDESITE AGGLOM. with fragments ½-8 cm andesite frags — ¼ cm. Pink granular ¼ cm. Lim often py. dissem Hem often magnetic. (This stack may be a welded tuff sequence) Dissem. tiny magnetite (¼ ½ mm) Original rock constituent (½ mm) Magnetite xals tend to be associated with PX
			1416						
100			5.0						
			1421						
100			5.0						
			1426						
100			5.0						
			1431						
95			5.0						
			1436			1426-1439 CLOSE SPACED STEEP FRACS WITH CALCITE			
90			5.0			1439 BRECCIA WITH lim. AFTER PYRITE	1439 Lim. Hem. after pyrite To 5% in breccia zone 2" thick		
			1441						
100			3.0			1444-1451.5 EXTENSIVELY BROKEN/SHEAR ZONE			
			1444						

DIAMOND DRILL LOG

HOLE No. ES- SHEET 8 OF

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
		50	3.5			1445 Selenite Veins on fracs with minor Calcite			
		40	1447.5						
		90	1449						
		100	1450				1450-1451 Dissem. Lim. After Pyrite (Non Magnetic) and Hem. After Magnetite (Magnetic)		
			1451			1451-			1451- 1498 Same as above but Interbanded Laminations of Fine Grained Pyrite Bands with Calcite Fractures (1m Calcite) Sporadic Lim After Pyrite Disseminations along Some Narrow Brecciated Zones
		90	5.0			1454.5 - 1459 Close Spaced Steep Hairline Fracs. with Grey Some Calcite & Lim. After Pyrite	1451.5 - Quartz Lim. After Pyrite Blebs Frosty on Walls Along Steeply Inclined Fractures with Selenite Walls		
			1456						
		95	5.0						
			1461						
		95	3.0			1462 4" Epidote			
			1464			1461-1478 Local Orange-Red Waxy Earthy Stains on Fracture Faces and Halos on Felsic & Mafic Minerals			
		100	2.0						
			1466						
		100	2.0						
			1468			1470 - Pyrite Vein with Ochreous Centre & Hematite Rim Some Grading Outs Gyp & Sporadic Waxy Clay			
		100	5.0						
			1473						
		100	5.0						
			1478						
		100	5.0						
			1483						
		95	5.0						
			1488			1489 & 1491 Heavy Impregs. Lim. After Py (½-2mm) (To 5%) Along steeply inclined fractures			
		100	5.0						
			1493						
		95	5.0						
			1498			1497 - 1499 Impregs. Lim After Py. Along Broken Zone (Heavy)	1497 - Lim. After Py (Heavy) 1499 -		1497 - 1505 Shear Zone with Close Spaced Low Angle Fractures
		85	5.0				1501		
			1503			1501 & 1503 Impregs. Lim After Py. on Broken Zone (Heavy)	1503 Limonite staining out along fractures		1505 - 1511 - Less Broken
		100	4.0						1511 - 1580 Strong Shear Zone Impregs. Mod. Py. Lim After Py (Heavy) Along Brecciated Zones
			1507			1507 - Broken Zone	1507 - Spongy Cubes Lim After Pyrite		
		100	5.0			1509-1511 Close Spaced 45° Fractures with Calcite			
			1511			1511 - 1530 Shear Zone (1512 - Epidote) with Lim After Pyrite & Calcite in Fractures	1511 - 1580 Locally Heavy Impregnations Lim. After Pyrite. Black Rim Outfrom Py. Areas Mn O2? Pyrite Heaviest 1511-1512.5; 1514, 1515; 1518, 1519 - 1522, 1524 - 1525; 1528' - 1530 (½ - 1mm 2 - 5%) But Lim after Pyrite Throughout Below	Marked Magnetic Decrease Altered Intermediate Feldspars to Clay	
		100	5.0						
			1517						
		100	5.0						
			1522						
		100	5.0						
			1527			1529 Slickensides on Hem.			1530 - 1537 Same Rock But Few Fractures
		100	3.5						
			1530.5						
		100	6.0						
			1535.5			1535.5 2" Broken Zone			
		80	3.5			1537 - 1544 Abundant Close-Spaced Steep Fractures, with Local Epidote Coating 1541 Pyrite 4" s	1537 - 1544 Tiny Lim. after Pyrite on Fractures Most Lim. Transported		1537 - 1544 Rock Similar 1530 - 1537 but More Broken Some Lim. after Py & Minor Pyrite.
			1539						
		100	4.0						
			1543						

DIAMOND DRILL LOG

HOLE No. ES[illegible] SHEET 9 OF

SCALE

STARTED
STOPPED
NOTES BY

DEPTH
BEARING
INCLINATION

PROPERTY
COUNTY
COLLAR COORD. N.
COLLAR ELEV.

STATE
E.

ASSAYS % MO	ASSAYS % CU		% RECOV.	DEPTH	Graph	COL.	DETAIL	MINERALIZATION	ALTERATION	ROCK TYPE
			100	5.0			1544 -			1544-1573 FRAGMENT WELDED TUFF WELL INDURATED + V[illegible] FEW FRACTURES (SAME ROCK UNIT) STILL HAS ABUNDANT FRAGS. DRAGON ANDESITE [illegible] - VERY. Little Epidote or plan [illegible]
				1548						
			100	5.0						
				1553			1552.8-1553.3 SCATTERED ORANGE (OXID.) SPOTS TO 1/4" ACROSS			
			100	5.0						
				1558			1559 FRAG. BANDED WELDED TUFF			
			100	5.0			1560-1563 SCATTERED OXID SPOTS LIKE ABOVE			
				1563			1564 FRAG WELDED TUFF			
			100	5.0			1565 STEEP FRAG. WITH CALCITE			
				1568						
			100	5.0						
				1573						

HAWLEY & HAWLEY
ASSAYERS AND CHEMISTS, INC.
1700 W. GRANT RD. • BOX 50106 • 622-4836
TUCSON, ARIZONA 85703

BRANCHES: DOUGLAS, ARIZONA; HAYDEN, ARIZONA; EL PASO, TEXAS; ST. LOUIS, MO.

IDENTIFICATION	GOLD OPT	SILVER OPT	LEAD %	COPPER %	ZINC %	MO. %	IRON %	Sulphide Sulphur %
Composite # 1 1291 thru 1312				0.07				1.38
Composite # 2 1313 thru 1320				0.05				0.34
Composite # 3 1346 thru 1350, 1401 thru 1416				0.10				0.54

REGISTERED ASSAYER CERTIFICATE NO. 6784 H. E. RICHARD State of Arizona U. S. A.

CC: Essex International, Inc.
ADD: Attn: Mr. Ken Jones
CITY: 1704 West Grant Road
DD: Tucson, Arizona 85705
CITY:

SXM

DEC 15 1971

RECEIVED

REMARKS: Verified determination

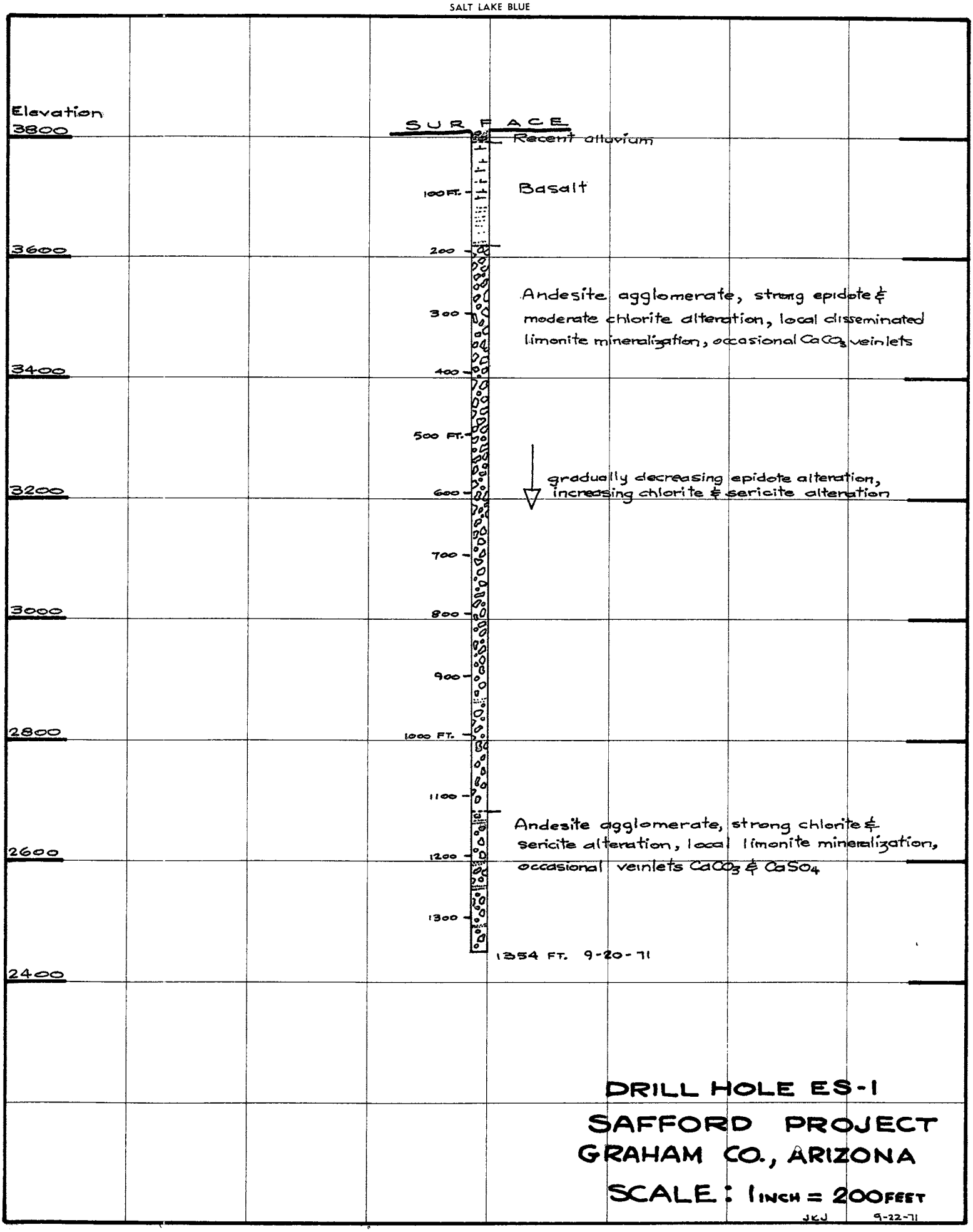
ANALYSIS CERT. BY H. E. Richard

Compositing PREPARATION $ 12.75
ANALYSIS $ 48.00
$ 60.75

HH3A ACC: ESSEX INTERNATIONAL, INC.

DATE SPL. RECEIVED 12/4/71 | DATE COMPL 12/15/71 | TUC 34582~~3~~

SALT LAKE BLUE



DRILL HOLE ES-1
SAFFORD PROJECT
GRAHAM CO., ARIZONA
SCALE: 1 INCH = 200 FEET

JEJ 9-22-71

FORM 1006

DRILL HOLE SAMPLES — Bohemia 9 Claim — PAGE 1 OF 1

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY
SAFFORD	LONE STAR	GRAHAM	ARIZONA	USA

HOLE NO.	CONTRACTOR	COLLAR COORD. N / E	COLLAR ELEV.
ES-1	JOY		

BEARING	INCLINATION	DEPTH	STARTED / STOPPED
	VERTICAL	0-20 RB 6¼; 20-745 RB 4½; 745- NXE	Aug. 25, 1971

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS	GRAPHIC LOG	REMARKS
	6¼			0	10	10			ALLUVIAL MATERIAL
	"			10	20	10			" "
	4½			20	30	10			EROSIONAL CONTACT — BASALT
	"			30	40	10			"
	"			40	50	10			VESICULAR BASALT (TR)
	"			50	56	6			BASALT AN ASH
	"			56	60	4			" " "
	"			60	70	10			" " "
	"			70	80	10			VESICULAR BASALT (TR)
	"			80	90	10			BASALT WITH SOME OXID FRAGS.
	"			90	100	10			" "
	"			100	110	10			" "
	"			110	120	10			FINE XAL BASALT
	"			120	130	10			" "
	"			130	140	10			" "
	"			140	150	10			" "
	"			150	160	10			" "
	"			160	170	10			" "
	"			170	180	10			"
	"			180	190	10			EROSIONAL CONTACT
	"			190	200	10			BRN BAKED ZONE AT
	"	NO RETURN		200	203	3			BASE OF BASALT
	"			203	208	5			SEQUENCE IN CONTACT
	"			208	220	12			WITH OLD EROSIONAL
	"			220	230	10			SURFACE(?) OF BRN (OXID.)
	"			230	240	10			EPIDOTIZED ANDESITE
	"	NO RETURN		240	330	90			WITH ABUNDANT FRAGMENTS
	"			330	335	5			OF ASSORTED ROCK TYPES
	"	NO RETURN		335	340	5			
	"			340	350	10			
	"			350	360	10			
	"			360	370	10			
	"			370	380	10			
	"			380	390	10			LIMONITE after PYRITE IN H.M.
	"			390	400	10			
	"	NO RETURN		400	420	20			
	"			420	430	10			
	"			430	440	10			
	"			440	450	10			TR. DISSEM. PYRITE (OXID.) AND CALCITE
	"	NO RETURN		450	454	4			
	"			454	460	6			
	"			460	465	5			TR. DISSEM. PYRITE (OXID.) AND CALCITE
	"	NO RETURN		465	500	35			
	"			500	510	10			TR. DISSEM. PYRITE (OXID.) AND CALCITE (500-540).
	"			510	520	10			
	"			520	530	10			LIMONITE after PYRITE IN H.M.
	"			530	536	6			
	"			536	540	4			
	"			540	550	10			INC. EPIDOTE (540-580)
	"			550	560	10			LIMONITE AFTER PYRITE IN H.M.
	"			560	570	10			" " " " "
	"			570	580	10			
	"	NO RETURN		580	640	60			
	"			639					CLAY SEAM
	"			640	650	10			LIMONITE after PYRITE IN H.M.
	"	NO RETURN		650	660	10			
	"			660	670	10			
	"	NO RETURN		670	735	65			
	"			735	745	10			TR. PYRITE (OXID.) AND CALCITE

SET CASING AND BEGAN CORING NXE (WIRE LINE)

DRILL HOLE SAMPLES

PAGE 1 OF

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY
SAFFORD	LONE STAR	GRAHAM	ARIZONA	U.S.A

HOLE NO.	CONTRACTOR	COLLAR COORD. N E	COLLAR ELEV.
ES-1	JOY		

BEARING	INCLINATION	DEPTH	STARTED STOPPED
	VERTICAL		AUG. 25, 1971

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS	REMARKS
	6 1/4"			0	10	10		8-25-71
	"			10	20	10		"
	4 1/2"			20	30	10		"
	"			30	40	10		"
	"			40	50	10		"
	"			50	56	6		"
	"			56	60	4		8-26-71 1
	"			60	70	10		" 1/4
	"			70	80	10		" 1/4
	"			80	90	10	washed hole - abund. cuttings	" 1/8
	"			90	100	10		" 1/8
	"			100	110	10		"
	"			110	120	10	hard	"
	"			120	130	10	"	"
	"			130	140	10	"	"
	"			140	141	10	one sample "	"
	"			141	150		hole clean, open	8-27-71 1/4
	"			150	160		soft & hard	"
	"			160	170			"
	"			170	180			"
	"			180	190			"
	"			190	200		Lost all circulation 197' ±, cemented	"
	"			200	203		No recovery	8-28-71
	"			203	208		Minor recovery, mostly cement	
				208	220	12'		8-30-71
				220	230	10'		
				230	240	10'		
				240	250		lost circulation 240' - 330'	
				250	260		added mud, additives, rice hulls & H.S	8-31-71
				260	270			
				270	280			
				280	290			
				290	300			
				300	310			
				310	320			
				320	330			9-1-71
				330	335	5		
				335	340		lost circulation 335'	9-2-71
				340	350	10		
				350	360	10		
				360	370	10		
				370	380	10		
				380	390	10		
				390	400	10		
				400	410		lost circulation	
				410	420			9-3-71
				420	430	10		
				430	440			
				440	450			
				450	454		lost circulation	
				454	460	6		
				460	465	5		
				465	470		lost circulation	
				470	480			
				480	490			
				490	500			
				500	510	10		9-3-71
				510	520	10		
				520	530	10		
				530	536	6		

3226 East 46th Street

Phone 624-0049

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85713

SAMPLE SUBMITTED BY Essex International, Inc.

DATE December 27, 1971

SAMPLE MARKED	GOLD OZ / TON	SILVER OZ./TON	PER CENT COPPER	PERCENT LEAD	PERCENT ZINC	PERCENT MOLYBDENUM	PERCENT IRON	Sulfide S
1251, 1252+ 1394-1400			0.03					0.51

Invoice # 7153

CHARGES $ 5.00

ASSAYER - CHEMIST

SAFFORD HOLE ES-1 COMPOSITE SAMPLES to be assayed for sulphide sulphur and copper

American Analytical Lab 624-0049

Given to Assayer 12-3-71

Sample numbers 1251 and 1252, 1394 Thru 1400
Combine all of These into one sample and run Au Cu and sulphide sulphur
Composite #1

Southwestern Assayers & Chemists 294-5811

Given to Will Weight 12-3-71

Composite #1	Sample numbers	1253 through 1262	
Composite #2		1263 Through 1271	
Composite #3		1272 ✓	1278
Composite #4		1321 ✓	1328
Composite #5		1329 ✓	1345 (1341 & 1342 missing)

Hawley & Hawley 622-4836

Given to Assayer 12-3-71

Composite #1		1291 through 1312	
✓	#2	1313 ✓	1320
✓	#3	1346 Thru 1350 and 1401 Thru 1416	

TOTAL SULFUR

FOOTAGE	SAMPLE # INCLUSIVE	
2750 - 2845 low	1394 - 1400	American Analytical Lab ?
	1251 - 1252 ✓	?
	1253 - 1262	(Southwestern)
2845 - 2890 high	1263 - 1271	(Southwestern)
2890 - 2964 low	1272 - 1278	(Southwestern)
	1279 - 1290	(Hawley)
2964 - 3039 mod.	1291 - 1312	Hawley
3039 - 3107 low	1313 - 1320	Hawley
	1321 - 1328	? Southwestern
3107 - 3143 high	1329 - 1337	?
3143 - 3281 low	1338 - 1350	?
	1401 - 1416	?

DRILL HOLE SAMPLES

PAGE 1 OF

PROPERTY: SAFFOLD PROJECT | DISTRICT: LONE STAR | COUNTY: GRAHAM | STATE: ARIZ. | COUNTRY: U.S.A.

HOLE NO.: ES-1 | CONTRACTOR: JOY | COLLAR COORD. N E | COLLAR ELEV.

BEARING: — | INCLINATION: VERTICAL | DEPTH | STARTED STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS % Cu	REMARKS
1351				2130	2135	5.0		Assayed by Hawley
1354				2411	2412	1.0		
1356				2412	2413.5	1.5	.04	
1357				2413.5	2419	5.5	.10	
1358				2419	2421.5	2.5	.18	
1359				2421.5	2424.5	3.0	.15	2413.5 - 2431.5 18' .14% Cu
1360				2424.5	2426.5	2.0	.14	
1361				2426.5	2431.5	5.0	.19	
1352				2452	2457	5.0		
1362				2503	2508	5.0	.03	
1363				2508	2513	5.0	.06	
1364				2513	2519	6.0	.04	
1365				2519	2523	4.0	.05	
1366				2523	2527	4.0	.05	
1355				2527	2528	1.0	.08	
1367				2527	2532	5.0	.02	
1368				2557	2561	4.0	.20	
1369				2561	2566	5.0	.13	2557 - 2570 13' 0.16% Cu
1370				2566	2570	4.0	.16	
1371				2570	2574	4.0	.02	
1372				2640	2645	5.0	.04	Sampled 11-8-71 delivered to Amer. Analyt. Lab. 11-10-71
1373				2645	2650	5.0	.01	
1374				2650	2655	5.0	.01	
1375				2655	2660	5.0	.02	
1376				2660	2665	5.0	.03	
1377				2665	2670	5.0	.02	
1378				2670	2675	5.0	.03	
1379				2675	2680	5.0	.03	
1380				2680	2685	5.0	.02	
1381				2685	2690	5.0	.02	
1382				2690	2695	5.0	.04	
1383				2695	2700	5.0	.04	
1384				2700	2705	5.0	.02	
1385				2705	2710	5.0	.03	
1386				2710	2715	5.0	.06	
1387				2715	2720	5.0	.03	
1388				2720	2725	5.0	.02	
1389				2725	2730			Delivered to Assayer 11-12-71
1390				2730	2735			
1391				2785	2740			
1392				2740	2745			
1393				2745	2750			
1394				2750	2755			
1395				2755	2760			
1396				2760	2765			
1397				2765	2770			
1398				2770	2775			
1399				2775	2780			
1400				2780	2795			
1257				2785	2790			
1252				2790	2795			

DRILL HOLE SAMPLES — Work Sheet — PAGE 1 OF

PROPERTY	DISTRICT	COUNTY	STATE	COUNTRY

HOLE NO.	CONTRACTOR	COLLAR COORD. N E	COLLAR ELEV.
ES-1			

BEARING	INCLINATION	DEPTH	STARTED STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS	REMARKS
1321		5.0	100	3072.5	3077.5	5.0		
1322		4.5	82	3077.5	3083	5.5		
1323		4.5	90	3083	3088	5.0		% Cu = .03
1324		3.5	88	3088	3092	4.0		Sulfide S% = .23
1325		4.5	100	3092	3096.5	4.5		
1326		3.0	86	3096.5	3100	3.5		
1327		3.0	100	3100	3103	3.0		
1328		3.0	75	3103	3107	4.0		
1329		2.0	100	3107	3109	2.0		
1330		4.5	90	3109	3114	5.0		
1331		2.0	100	3114	3116	2.0		
1332		4.0	100	3116	3120	4.0		
1333		5.0	100	3120	3125	5.0		
1334		5.0	100	3125	3130	5.0		
1335		5.0	100	3130	3135	5.0		% Cu = .19
1336		3.0	100	3135	3138	3.0		
1337		5.0	91	3138	3143.5	5.5		% Sulfide S = 1.57
1338		5.0	100	3143.5	3148.5	5.0		
1339		5.0	100	3148.5	3153.5	5.0		
1340		5.5	100	3153.5	3159	5.5		
1341		5.0	100	3159	3164	5.0		
1342		4.5	90	3164	3169	5.0		
1343		5.0	100	3169	3174	5.0		
1344		5.0	100	3174	3179	5.0		
1345		5.0	100	3179	3184	5.0		
1346		5.0	83	3184	3190	6.0		
1347		2.1	84	3190	3192.5	2.5		
1348		4.4	89	3192.5	3197.5	5.0		
1349		4.5	100	3197.5	3202	4.5		
1350		3.0	100	3202	3205	3.0		
1401		5.0	100	3205	3210	5.0		
1402		4.8	96	3210	3215	5.0		% Cu = .10
1403		5.0	100	3215	3220	5.0		
1404		5.0	100	3220	3225	5.0		% S = .54
1405		4.5	90	3225	3230	5.0		
1406		5.0	100	3230	3235	5.0		
1407		4.5	90	3235	3240	5.0		
1408		5.0	100	3240	3245	5.0		
1409		5.0	100	3245	3250	5.0		
1410		5.0	100	3250	3255	5.0		
1411		5.0	100	3255	3260	5.0		
1412		3.0	100	3260	3263	3.0		
1413		5.0	100	3263	3268	5.0		
1414		5.0	100	3268	3273	5.0		
1415		5.0	100	3273	3278	5.0		
1416		2.8	97	3278	3281	3.0		
ES-2								
1417		5.0	100	1101	1106	5.0		
1420		5.0	100	1347	1352	5.0		
1418		5.0	100	1312.5	1317.5	5.0		
1419		5.0	100	1317.5	1322.5	5.0		
1421		5.0	100	1322.5	1327	5.0		
1422		5.0	100	1327	1332	5.0		
1423		5.0	100	1332	1337	5.0		
1424		5.0	100	1337	1342	5.0		
1425		5.0	100	1342	1347	5.0		
1426		5.0	100	1352	1357	5.0		
1427		5.0	100	1357	1362	5.0		
1428		5.0	100	1362	1367	5.0		
1429		5.0	100	1367	1372	5.0		
1430		5.0	100	1372	1377	5.0		
1431		5.0	100	1377	1382	5.0		
1432		5.0	100	1382	1387	5.0		
1433		4.0	80	1387	1391	5.0		

ASSAYS

Sample	interval
1346	3184 - 3190
1347	92 5
1348	97 5
1349	3202
1350	3205
1401	10
1402	15
1403	20
1404	25
1405	30
1406	35
1407	40
1408	45
1409	50
14010	55
14-11	60
14-12	63
14-13	68
14-14	73
14-15	78
14-16	3281

Sample #	Interval
E 1253	2795 - 2800
1254	2800 - 2805
1255	2805 - 2810
1256	2810 - 2815
1257	2815 - 2820
1258	2820 - 2825
1259	2825 - 2830
1260	2830 - 2835
1261	2835 - 2840
1262	2840 - 2845
1263	2845 - 2850
1264	2850 - 2855
1265	2855 - 2860
1266	2860 - 2865
1267	2865 - 2870
1268	2870 - 2875
1269	2875 - 2880
1270	2880 - 2885
1271	2885 - 2890
1272	2890 - 2895
1273	2895 - 2900
1274	2900 - 2905
1275	2905 - 2910
1276	2910 - 2915
1277	2915 - 2920
1278	2920 - 2925

SAMPLE NUMBER	RECOVERY FEET	%	DRILL RUN FROM	TO	INTERVAL
1321	5.0	100	3072.5	3077.5	5.0
1322	4.5	82	3077.5	3083	5.5
1323	4.5	90	3083	3088	5.0
1324	3.5	88	3088	3092	4.0
1325	4.5	100	3092	3096.5	4.5
1326	3.0	86	3096.5	3100	3.5
1327	3.0	100	3100	3103	3.0
1328	3.0	75	3103	3107	4.0
1329	2.0	100	3107	3109	2.0
1330	4.5	90	3109	3114	5.0
1331	2.0	100	3114	3116	2.0
1332	4.0	100	3116	3120	4.0
1333	5.0	100	3120	3125	5.0
1334	5.0	100	3125	3130	5.0
1335	5.0	100	3130	3135	5.0
1336	3.0	100	3135	3138	3.0
1337	5.0	91	3138	3143.5	5.5
1338	5.0	100	3143.5	3148.5	5.0
1339	5.0	100	3148.5	3153	5.0
1340	5.5	100	3153	3159	5.5
1341	5.0	100	3159	3164	5.0
1342	4.5	90	3164	3169	5.0
1343	5.0	100	3169	3174	5.0
1344	5.0	100	3174	3179	5.0
1345	5.0	100	3179	3184	5.0

DRILL HOLE SAMPLES — WORK SHEET — PAGE — OF

PROPERTY — DISTRICT — COUNTY — STATE — COUNTRY

HOLE NO. ES-1 — 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
1279	BX	1.0	100	2925	2926	1.0		
1280		1.5	30	2926	2931	5.0		
1281		1.0	100	2931	2932	1.0		
1282		3.6	88	2932	2936	4.0		
1283		5.0	100	2936	2941	5.0		
1284		3.5	100	2941	29445	3.5		
1285		4.5	100	29445	2949	4.5		
1286		4.0	88	2949	29535	4.5		
1287		2.0	80	29535	2956	2.5		
1288		2.0	100	2956	2958	2.0		
1289		3.0	100	2958	2961	3.0		
1290		2.0	66	2961	2964	3.0		
1291		4.0	100	2964	2968	4.0		
1292		2.5	62	2968	2972	4.0		
1293		5.0	100	2972	2977	5.0		
1294		4.5	90	2977	2982	5.0		
1295		0.5	50	2982	2983	1.0		
1296		2.0	66	2983	2986	3.0		
1297		2.5	86	2986	2989	3.0		
1298		1.5	50	2989	2991	3.0		
1299		5.0	100	2991	2996	5.0		
1300		3.0	100	2996	2999	3.0		
1301		4.5	90	2999	3004	5.0		
1302		3.5	88	3004	3008	4.0		
1303		0.5	50	3008	3009	1.0		
1304		2.5	63	3009	3013	4.0		
1305		1.0	25	3013	3017	4.0		
1306		1.0	100	3017	3018	1.0		
1307		3.0	100	3018	3021	3.0		
1308		3.0	100	3021	3024	3.0		
1309		3.0	100	3024	3027	3.0		
1310		5.0	100	3027	3032	5.0		
1311		2.0	100	3032	3034	2.0		
1312		5.0	100	3034	3039	5.0		
1313		4.0	80	3039	3044	5.0		
1314		4.5	90	3044	3049	5.0		
1315		5.0	100	3049	3054	5.0		
1316		2.5	50	3054	3059	5.0		
1317		3.0	100	3059	3062	3.0		
1318		2.0	100	3062	3064	2.0		
1319		5.0	100	3064	3069	4.0		
1320		2.5	100	3069	30725	2.5		

DRILL HOLE SAMPLES

PAGE 1 OF

PROPERTY: SAFFORD PROJECT | DISTRICT: LONE STAR | COUNTY: GRAHAM | STATE: ARIZ. | COUNTRY: U.S.A

HOLE NO.: ES-1 | CONTRACTOR: JOY | COLLAR COORD. N E | COLLAR ELEV.

BEARING: — | INCLINATION: VERTICAL | DEPTH | STARTED STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS % Cu	REMARKS
1351				2130	2135	5.0		Assayed by Hawley
1354				2411	2412	1.0		
1356				2412	2413.5	1.5	.04	
1357				2413.5	2419	5.5	.10	
1358				2419	2421.5	2.5	.19	
1359				2421.5	2424.5	3.0	.15	2415.5 - 2431.5 18' .14% Cu
1360				2424.5	2426.5	2.0	.14	
1361				2426.5	2431.5	5.0	.19	
1352				2452	2457	5.0		
1362				2503	2505	5.0	.03	
1363				2505	2511	5.0	.06	
1364				2513	2519	6.0	.04	
1365				2519	2523	4.0	.05	
1366				2523	2527	4.0	.05	
1555				2527	2528	1.0	.08	
1367				2527	2532	5.0	.02	
1368				2557	2561	4.0	.20	
1369				2561	2566	5.0	.13	2557 - 2570 13' 0.16% Cu
1370				2566	2570	4.0	.16	
1371				2570	2574	4.0	.02	
1372				2640	2645	5.0	.04	Sampled 11-9-71 Inspiration Lab.
1373				2645	2650	5.0	.01	
1374				2650	2655	5.0	.01	Amer. Analyt. Lab. 11-10-71
1375				2655	2660	5.0	.02	
1376				2660	2665	5.0	.03	
1377				2665	2670	5.0	.02	
1378				2670	2675	5.0	.03	
1379				2675	2680	5.0	.03	
1380				2680	2685	5.0	.02	
1381				2685	2690	5.0	.02	
1382				2690	2695	5.0	.04	
1383				2695	2700	5.0	.04	
1384				2700	2705	5.0	.02	
1385				2705	2710	5.0	.03	
1386				2710	2715	5.0	.06	
1387				2715	2720	5.0	.03	
1388				2720	2725	5.0	.02	
1389				2725	2730			D.O. sent to Inspiration 11-12-71
1390				2730	2735			
1391				2735	2740			
1392				2740	2745			
1393				2745	2750			
1394				2750	2755			
1395				2755	2760			
1396				2760	2765			
1397				2765	2770			
1398				2770	2775			
1399				2775	2780			
1400				2780	2795			
1251				2795	2790			
1252				2790	2795			

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Essex International, Inc.
1704 W. Grant Road
Tucson, Arizona 85705

JOB# 010504
RECEIVED 12-3-71
REPORTED 12-10-71

SAMPLE NUMBER	TOTAL COPPER %	ACID SOLUBLE COPPER %	TOTAL IRON %	SULFIDE SULFUR %	ACID CONSUMED LB H_2SO_4/TON	MOLYBDENUM %
Comp:						
1253-1262	.04			.33		
1263-1271	.09			2.05		
1272-1278	.02			1.15		
1321-1328	.03			.23		
1329-1340+						
1343-1345	.19			1.57		

REGISTERED ASSAYER
CERTIFICATE
5
D
WRIGHT
Date Signed 12/14/71
Arizona U. S. A.

$ 35.00--Assay
5.00--Comp.

CHARGE $ 40.00

INVOICE

9-23-71 Report by phone from Chuck Sewell

DOH ES-1

1345'-1405' bottom Broken sheared, numerous tiny veinlets or dikelets quartz & feldspar porphyry, much of rock appears to intrusive, tiny pin-point cubes limonite, strong red color when scratched.

FROM CRS LOG.

-190'

0-20 Alluvium

20-190 Basalt

190-745 Agglomerate

745- Agglomerate, common to abundant epidote, probably decreasing at depth. Chlorite fairly common & getting much stronger at depth. All femics chloritized, much fine chlorite in matrix. Scattered $CaCO_3$ veinlets, $CaSO_4$ on fracture below 1124 ft. At depth ~~al~~ nearly all feldspar soft (clay or seric?) Occas ~~fra~~ short zones impreg w. limonite

1341-1350 bkn, much clay, gyp., gray but not biotite? Some limonite

	NX	BX
0-500	6.40	6.20
~~NX~~		
500-1000	6.80	6.60
	7.40	7.20
	8.30	8.10
	9.50	9.30
2500-3000	11.00	10.70

3000
1354
1646

DIAMOND DRILLING

745-1000 255' @ $6.80 = $1734.00

1000-1350 350 @ 7.40 = 2590.00

mud 108 sacks @ 2.60 = 280.80

water truck mileage = 96.00

" " rental 100.00 ±

other additives 50.00

4850.80
16.00 H_2O
4866.80

32 loads H_2O for 1354'

mud. 108 sacks @ $2.60

1 soda ash
1 celex
1 flo seal
1 quick-seal

5200
4900
10,100

± $7.50/ft for 1350 ft.

64 IN PROGRESS REPORT

63 DRILL HOLE ES-1

SAFFORD EXPLORATION PROJECT

Drill hole ES-1, collared on August 25, 1971, had advanced to a depth of 1354 feet on September 20. Average advance per working day has been 61½ feet, but with increasing depth this rate may diminish. The hole is situated 7100 feet southwest of the Phelps-Dodge shaft and approximately 4000 feet southwest of the presumed location of the Phelps-Dodge orebody. Because hole ES-1 is located in a fault block that is known to be down-dropped relative to the ~~block~~ fault block containing the Phelps-Dodge orebody, the favorable locus for copper mineralization is expected to lie at a depth of 2000 feet or more. Therefore, the hole is tentatively scheduled ~~to~~ be drilled to a depth of 3000 feet.

Rock types encountered in the hole to date are similar to those seen at surface in the vicinity. The initial 20 feet of advance was in unconsolidated alluvium which covers much of the surface. From 20 to 190 feet is basalt and associated post-mineral volcanic rocks comparable to flat-lying flows exposed in canyon bottoms near the drill hole and as a capping ~~on~~ on hills elsewhere in the district. At a depth of 190 feet the hole entered andesite agglomerate, a rock type known to occur ~~stratigraphically~~ stratigraphically above copper ore deposits in the district. Hydrothermal alteration of a type that would be expected adjacent to but

possibly some distance from copper mineralization appears to be increasing in intensity at depth. No evidence of copper minerals had been encountered, but ~~the~~ short intervals contain moderate to strong ~~limonite~~ iron oxides which appear to result from the oxidation of pyrite.

Drilling results to the present depth are about as expected. ~~Direct evidence of copper minerals has not been found, but~~ Alteration appears to be increasing and ~~the hole should be continued to the target depth of 3000 ft.~~ could represent the type of material that would occur reasonably close to copper mineralization. ~~The hole should be continued. The hole should be continued. It is recommended that the drill hole be continued~~

J. K. Jones

Sept. 22, 1971

DOT ES-1 estimated costs

0-745 feet Rotary drilling

0 - 500 500' @ $4.40/ft.	$ 2200.00
500-745 245' @ 4.80 ???	1176.00
21 hours cement time @ $16.00/hour.	336.00
35 loads water @ 50¢ ea.	17.50
" " " @ 20 miles ea @ 15¢/mile	105.00
water truck rental, Aug. 24 - Sept. 10 (0.6 mo. x $300)	180.00
6 hours setting casing	
Other additives 56 qp fibertex, 2 hi-seal, 2 soda ash, 1 flo-seal, 1 CG-16, 1 casting plaster, 2 quik-seal 1 cal seal, 4 portland cement	± 200.00
253 sacks bentonite @ 2.60	657.80
	4877.30
~~SUB TOTAL~~	~~4214.50~~
($6.54 per foot)	
Mobilization	$ 500.00
	~~$ 4714.50~~
	$ 5372.30

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745 - 1000 @ 255' 6.80	1734.00
1000-1354 314' @ 7.40	2619.60
108 sacks bentonite @ 2.60	280.80
32 loads water @ 50¢	16.00
" " " @ 20 miles @ 15¢	96.00
water truck rental Sept 11 - 20	100.00
Other additives: 1 soda ash, 1 celex, 1 flo seal 1 quick seal.	± 50.00
	$ 4896.40
($7.18/ft to date)	$ 10,268.70

As of 9-20-71

DRILL HOLE ES-1 COSTS

1.	536 feet 4½" rock bit @ $4.40/ft.	2358.40
2.	18 hours cement time @ $16.00/hr.	288.00
3.	168 Sacks bentonite @ $2.60/sack	436.80
4.	1 sack Flo-seal, 1 soda-ash, 1 CC-16, 2 Quick-seal, 1 cal-seal, 4 portland cement, 1 hydro seal, 1 fiber-tex	EST. 100.00
5.	Water truck, Aug. 25 - Sept 7. @ $300.00/Month	150.00
	19 loads water @ 20 miles ea. = 380 miles @ 15¢	57.00
6.	Water Cost, 19 loads @ $0.50 ea. ??	9.50
	SUB TOTAL FOR 536 FEET.	$ 3399.70
	COST/FT. FOR 536 FT. = $6.34	
7.	Mobilization	$ 500.00
→	TOTAL	$ 3899.70

8. PLUS 536 to 740 = 204 FT. @ EST. 6.34/FT. $1293.36

→ ESTIMATED TOTAL COST THRU SEPT. 9, 1971

$ 5193.06

13 DAYS, 740 FT. ADVANCE

= 57 FT./DAY

DOIT ES-1

notes taken over phone from C. R. Sewell by JKJ

Coring started at 745'

745 – 754 Green agglomerate, fragments to 4", epidote throughout, 45° hairline fractures with thin veinlets $CaCO_3$

754 – 755 Fe-stained, clay-rich

755 – 758 light green agglomerate, much epidote

758 – 762 dark green, chlorite-rich agglomerate, fewer large fragments, some $CaCO_3$ on fractures.

762 – 766 4 foot Fe-stained, clay-rich agglomerate, at least some of the limonite is after FeS_2.

766 – 767 green compact volcanic

767 – 771 brown to green, clay-rich, epidotized agglomerate, pink bands (K-spar??) adjacent to limonite stained fractures

771 – 786 Broken, soft, clay-rich, green agglomerate, possible K-Spar (IS THIS ACTUALLY JUST ORIGINAL PINK BANDING IN VOLCANIC?), limonite on fractures

786 – 802 Compact, medium green agglomerate, $CaCO_3$ on fractures, common epidote, spotty limonite after FeS_2.

HAWLEY & HAWLEY
ASSAYERS AND CHEMISTS, INC.
1700 W. GRANT RD. • BOX 50106 • 622-4836
TUCSON, ARIZONA 85703

BRANCHES
DOUGLAS, ARIZONA
HAYDEN, ARIZONA
EL PASO, TEXAS
ST. LOUIS, MO.

IDENTIFICATION	GOLD OPT	SILVER OPT	LEAD %	COPPER %	ZINC %	MO. %	IRON %		
E 1351 ES - 1 51				0.03		< 0.001			

REGISTERED ASSAYER
CERTIFICATE NO.
6784
H. E.
RICHARD
Date Signed
Arizona U. S. A.

CC: Essex International, Inc.
ADD: Attn; Mr. Paul Eimon
CITY: 1704 West Grant Road, Tucson, Arizona 85705
DD:
CITY:

REMARKS: Single determination

ANALYSIS CERT. BY: H. E. Richard

PREPARATION $ 1.25
ANALYSIS $ 5.25

HH3A ACC: ESSEX INTERNATIONAL, INC | DATE SPL. RECEIVED 10/18/71 | DATE COMPL. 10/20/71 | TUC 345707 | $ 6.50

HAWLEY & HAWLEY
ASSAYERS AND CHEMISTS, INC.
1700 W. GRANT RD. • BOX 50106 • 622-4836
TUCSON, ARIZONA 85703

BRANCHES
DOUGLAS, ARIZONA
HAYDEN, ARIZONA
EL PASO, TEXAS
ST. LOUIS, MO.

IDENTIFICATION	GOLD OPT	SILVER OPT	LEAD %	COPPER %	ZINC %	MO. %	IRON %	Sulphide Sulphur %
Composite # 1 1291 thru 1312				0.07				1.38
Composite # 2 1313 thru 1320				0.05				0.34
Composite # 3 1346 thru 1350, 1401 thru 1416				0.10				0.54

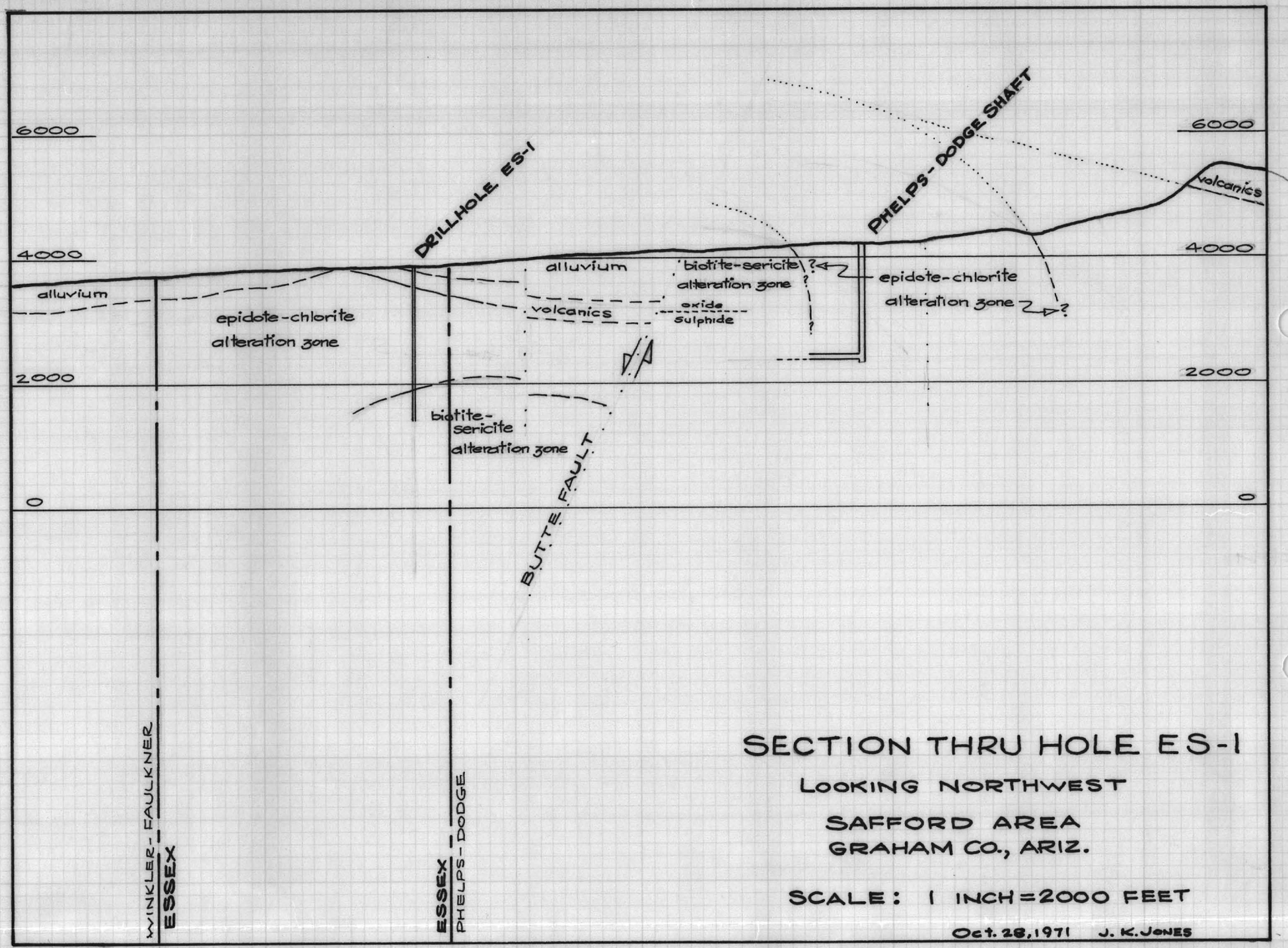
CC: Essex International, Inc.
ADD: Attn: Mr. Ken Jones
CITY: 1704 West Grant Road, Tucson, Arizona 85705
DD:
CITY:

REMARKS: Verified determination

ANALYSIS CERT. BY: H. E. Richard

Compositing 12.75
PREPARATION $
ANALYSIS $ 48.00

HH3A ACC: ESSEX INTERNATIONAL, INC. | DATE SPL. RECEIVED 12/4/71 | DATE COMPL. 12/15/71 | TUC 345823 | $ 60.75



SECTION THRU HOLE ES-1

LOOKING NORTHWEST

SAFFORD AREA
GRAHAM CO., ARIZ.

SCALE: 1 INCH = 2000 FEET

Oct. 28, 1971 J. K. JONES

HAWLEY & HAWLEY

ASSAYERS AND CHEMISTS, INC.
BOX 50106 1700 W. GRANT RD.,
TUCSON, ARIZONA 85703 (602) 622-4836

Registered Assayers
OVER 50 YEARS

BRANCHES
Douglas
Hayden
Morenci
Inspiration
El Paso
St. Louis

IDENTIFICATION	Gold OPT	Silver OPT	Lead %	Copper %	Zinc %	Mo. %			
E 1355				0.08		< 0.001			
E 1356				0.04		< 0.001			
E 1357				0.10		< 0.001			
E 1358				0.18		< 0.001			
E 1359				0.15		< 0.001			
E 1360				0.14		< 0.001			
E 1361				0.19		< 0.001			
E 1362				0.03		< 0.001			
E 1363				0.06		< 0.001			
E 1364				0.04		< 0.001			
E 1365				0.05		< 0.001			
E 1366				0.05		< 0.001			
E 1367				0.02		< 0.001			
E 1368				0.20		< 0.001			
E 1369				0.13		< 0.001			
E 1370				0.16		< 0.001			
E 1371				0.02		< 0.001			

CC: Essex International, Inc.
ADD: Attn: Mr. Clem Chase
CITY: 1704 West Grant Road
ADD: Tucson, Arizona 85705
CITY:

REMARKS: Single determination

Analysis Cert. By Helen D.

Preparation $ 15.30
Analysis $ 89.25

ACC:	Date Spl. Received	Date Compl.		$
ESSEX INTERNATIONAL, INC.	11/5/71	11/8/71	TUC 345748	104.55

HH3

GROVER HEINRICHS

99 69 05 03 02 209

18443

Essex International Corporation
1704 West Grant Road
Tucson, Arizona 85705

RECEIVED NOV 1 9 1971

96699

10-7-71

Safford, Arizona

Michigan City, Indiana

To 1,573' core drilling at Safford, Arizona for period ending September 25, 1971 as per agreement.

PROSPECT NO.		FROM	TO	TOTAL FEET	COST UNIT	TOTAL COST
ES-1	4¾" R.B.	0.	500.	500.	4.40	$2,200.00
	4½" R.B.	500.	745.	245.	4.80	1,176.00
	NX	745.	1000.	255.	6.80	1,734.00
	NX	1000.	1500.	500.	7.40	3,700.00
	NX	1500.	1573.	73.	8.30	605.90
						$9,415.90

CEMENTING

ES-1	Aug. 26	1 hour	
	Aug. 27	5 hours	
	Aug. 28	12 hours	
	Aug. 30	1 hour	
		19 hours @ $16.00/hr.	304.00

CDN

MUD USED UP

443	50-lb. bags drilling mud @ $2.60/bag	1,151.80
2	50-lb. bags Flosal @ $12.66/bag	25.32
5	100-lb. bags Soda Ash @ $9.16/bag	45.80
1	50-lb. bag CC-16	12.66
1	50-lb. bag Cellex	64.71
5	40-lb. bag Fibertex @ $5.63/bag	28.15

Essex International Corporation

96699

MUD USED UP (CONT'D.)

4	50-lb. bags Hyseal @ $7.55/bag	$ 30.20
3	40-lb. bags Kwikseal @ $13.19/bag	39.57

WATER TRUCK RENTAL

Aug. 25 through Sept. 25, 1971	
One (1) truck @ $300.00/mo.	310.00
1,862 miles @ 15¢/mi.	279.30
Use of Well Pump for loading water through 9-25-71	46.00

MOBILIZATION

One (1) drill unit @ $500.00	500.00
	$12,253.41

CDW

HAWLEY & HAWLEY
ASSAYERS AND CHEMISTS, INC.
BOX 50106 1700 W. GRANT RD.,
TUCSON, ARIZONA 85703 (602) 622-4836

Registered Assayers
OVER 50 YEARS

BRANCHES
Douglas
Hayden
Morenci
Inspiration
El Paso
St. Louis

SXM
DEC 6 1971
RECEIVED

IDENTIFICATION	Gold OPT	Silver OPT	Lead %	Copper %	Zinc %	Mo. %			
1346				0.04					
1347				0.02					
1348				0.08					
1349				0.08					
1350				0.03					
1401				0.10					
1402				0.14					
1403				0.27					
1404				0.06					
1405				0.19					
1406				0.03					
1407				0.04					
1408				0.03					
1409				0.04					
1410				0.04					
1411				0.07					
1412				0.04					
1413				0.21					
1414				0.03					
1415				0.11					
1416				0.41					

REGISTERED ASSAYER
CERTIFICATE NO.
6784
H. E. RICHARD
Date Signed .....
Arizona U. S. A.

CC:
ADD:
CITY:
ADD:
CITY:

Essex International, Inc
Attn: Mr. Ken Jones
1704 West Grant Road
Tucson, Arizona 85705

REMARKS:

Single determination

Analysis Cert. By

Preparation $ 18.90
Analysis $ 42.00

ACC:	Date Spl. Received	Date Compl.		$
ESSEX INTERNATIONAL, INC	12/2/71	12/7/71	TUC 345821	60.90

HH3

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Essex International, Inc.
1784 W. Grant Road
Tucson, Arizona 85705

JOB# 010480
RECEIVED 11-30-71
REPORTED 12-2-71

SAMPLE NUMBER	TOTAL COPPER %	ACID SOLUBLE COPPER %	TOTAL IRON %	SULFIDE SULFUR %	ACID CONSUMED LB H_2SO_4/TON	MOLYBDENUM %
1321	.02					
1322	.01					
1323	.07					
1324	.07					
1325	.02					
1326	.05					
1327	.06					
1328	.02					
1329	.55					
1330	.00					
1331	.13					
1332	.35					
1333	.30					
1334	.14					
1335	.08					
1336	.16					
1337	.21					
1338	.65					
1339	.14					
1340	.24					
1341	Not Received					
1342	Not Received					
1343	.05					
1344	.06					
1345	.10					

CHARGE ~~$ 46.00~~

INVOICE

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Essex International, Inc.
1704 W. Grant Road
Tucson, Arizona 85705

JOB# 010482
RECEIVED 11-30-71
REPORTED 12-2-71

SAMPLE NUMBER	TOTAL COPPER %	ACID SOLUBLE COPPER %	TOTAL IRON %	SULFIDE SULFUR %	ACID CONSUMED LB H_2SO_4/TON	MOLYBDENUM %
Pulp - 861	1.65			.78		

CHARGE $ 7.00

INVOICE

3226 East 46th Street

Phone 624-0049

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85713

SAMPLE SUBMITTED BY Essex International

DATE November 18, 1971

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PER CENT COPPER	PERCENT LEAD	PERCENT ZINC	PERCENT MOLYBDENUM	PERCENT IRON
E-1389			0.04				
E-1390			0.12				
E-1391			0.03				
E-1392			0.01				
E-1393			0.03				
E-1394			0.02				
E-1395			0.02				
E-1396			0.06				
E-1397			0.03				
E-1398			0.05				
E-1399			0.02				
E-1400			0.02				
E-1251			0.02				
E-1252			0.05				

Invoice # 6707

CHARGES $ 28.00

11/18/1971

ASSAYER-CHEMIST

3226 East 46th Street

Phone 624-0049

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85713

SAMPLE SUBMITTED BY Essex International

DATE Nov. 15, 1971

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PER CENT COPPER	PERCENT LEAD	PERCENT ZINC	PERCENT MOLYBDENUM	PERCENT IRON	
1372			0.04					
1373			0.01					
1374			0.01					
1375			0.02					
1376			0.03					
1377			0.02					
1378			0.03					
1379			0.03					
1380			0.02					
1381			0.02					
1382			0.04					
1383			0.04					
1384			0.02					
1385			0.03					
1386			0.06					
1387			0.03					
1388			0.02					

REGISTERED ASSAYER
CERTIFICATE NO. 3552
PETE S. FLORES
Date Signed 11/15/71
Arizona U. S. A.

Invoice # 6992

CHARGES $ 34.00

ASSAYER - CHEMIST

Registered Assayers
OVER 50 YEARS

HAWLEY & HAWLEY

ASSAYERS AND CHEMISTS, INC.
BOX 50106 1700 W. GRANT RD.,
TUCSON, ARIZONA 85703 (602) 622-4836

RECEIVED

BRANCHES
Douglas
Hayden
Morenci
Inspiration
El Paso
St. Louis

IDENTIFICATION	Gold OPT	Silver OPT	Lead %	Copper %	Zinc %	Mo. %
E 1355				0.08		< 0.001
E 1356				0.04		< 0.001
E 1357				0.10		< 0.001
E 1358				0.18		< 0.001
E 1359				0.15		< 0.001
E 1360				0.14		< 0.001
E 1361				0.19		< 0.001
E 1362				0.03		< 0.001
E 1363				0.06		< 0.001
E 1364				0.04		< 0.001
E 1365				0.05		< 0.001
E 1366				0.05		< 0.001
E 1367				0.02		< 0.001
E 1368				0.20		< 0.001
E 1369				0.13		< 0.001
E 1370				0.16		< 0.001
E 1371				0.02		< 0.001

REGISTERED ASSAYER CERTIFICATE NO. 6784 U.S.A.

CC: Essex International, Inc.
ADD: Attn: Mr. Clem Chase
CITY: 1704 West Grant Road
ADD: Tucson, Arizona 85705
CITY:

REMARKS:
Single determination

Analysis Cert. By H. E. Hawley

Preparation $ 15.30
Analysis $ 89.25

ACC:	Date Spl. Received	Date Compl.		$
ESSEX INTERNATIONAL, INC.	11/5/71	11/8/71	TUC 345748	104.55

HH3

Registered Assayers
OVER 50 YEARS

HAWLEY & HAWLEY

ASSAYERS AND CHEMISTS, INC.
BOX 50106 1700 W. GRANT RD.,
TUCSON, ARIZONA 85703 (602) 622-4836

BRANCHES
Douglas
Hayden
Morenci
Inspiration
El Paso
St. Louis

IDENTIFICATION	Gold OPT	Silver OPT	Lead %	Copper %	Zinc %	Mo. %			
1279				0.04					
1280				0.03					
1281				0.02					
1282				0.02					
1283				0.04					
1284				0.08					
1285				0.04					
1286				0.02					
1287				0.10					
1288				0.11					
1289				0.06					
1290				< 0.01					
1291				0.20					
1292				0.07					
1293				0.03					
1294				0.02					
1295				0.04					
1296				0.14					
1297				0.12					
1298				0.11					
1299				0.05					
1300				0.03					
1301				0.03					
1302				0.02					
1303				< 0.01					
1304				0.03					

CC: Essex International, Inc.
ADD: 1704 West Grant Road
CITY: Tucson, Arizona 85705
ADD:
CITY:

REMARKS:
Single determination

Analysis Cert. By

Preparation $
Analysis $

ACC:	Date Spl. Received	Date Compl.		$
ESSEX INTERNATIONAL, INC.	11/29/71	11/29/71	TUC 345804	

HH3

Registered Assayers
OVER 50 YEARS

HAWLEY & HAWLEY

ASSAYERS AND CHEMISTS, INC.
BOX 50106 1700 W. GRANT RD.,
TUCSON, ARIZONA 85703 (602) 622-4836

BRANCHES
Douglas
Hayden
Morenci
Inspiration
El Paso
St. Louis

IDENTIFICATION	Gold OPT	Silver OPT	Lead %	Copper %	Zinc %	Mo. %			
1305				0.06					
1306				0.10					
1307				0.21					
1308				0.16					
1309				0.15					
1310				0.07					
1311				0.02					
1312				0.11					
1313				0.09					
1314				0.04					
1315				0.09					
1316				0.06					
1317				0.13					
1318				< 0.01					
1319				0.07					
1320				< 0.01					

REGISTERED ASSAYER CERTIFICATE NO. 6781 H. E. RICHARD

CC: Essex International, Inc.
ADD: 1704 West Grant Road
CITY: Tucson, Arizona 85705
ADD:
CITY:

REMARKS:
Single determination

Analysis Cert. By: H. E. Richard

$84.00 less 3.5% discount

Preparation $ 37.80
Analysis $ 81.06

ACC:	Date Spl. Received	Date Compl.		$
ESSEX INTERNATIONAL, INC.	11/29/71	11/29/71	TUC 345804	118.86

HH3

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Essex International, Inc.
1704 W. Grant Road
Tucson, Arizona 85705

JOB# 010420
RECEIVED 11-18-71
REPORTED 11-20-71

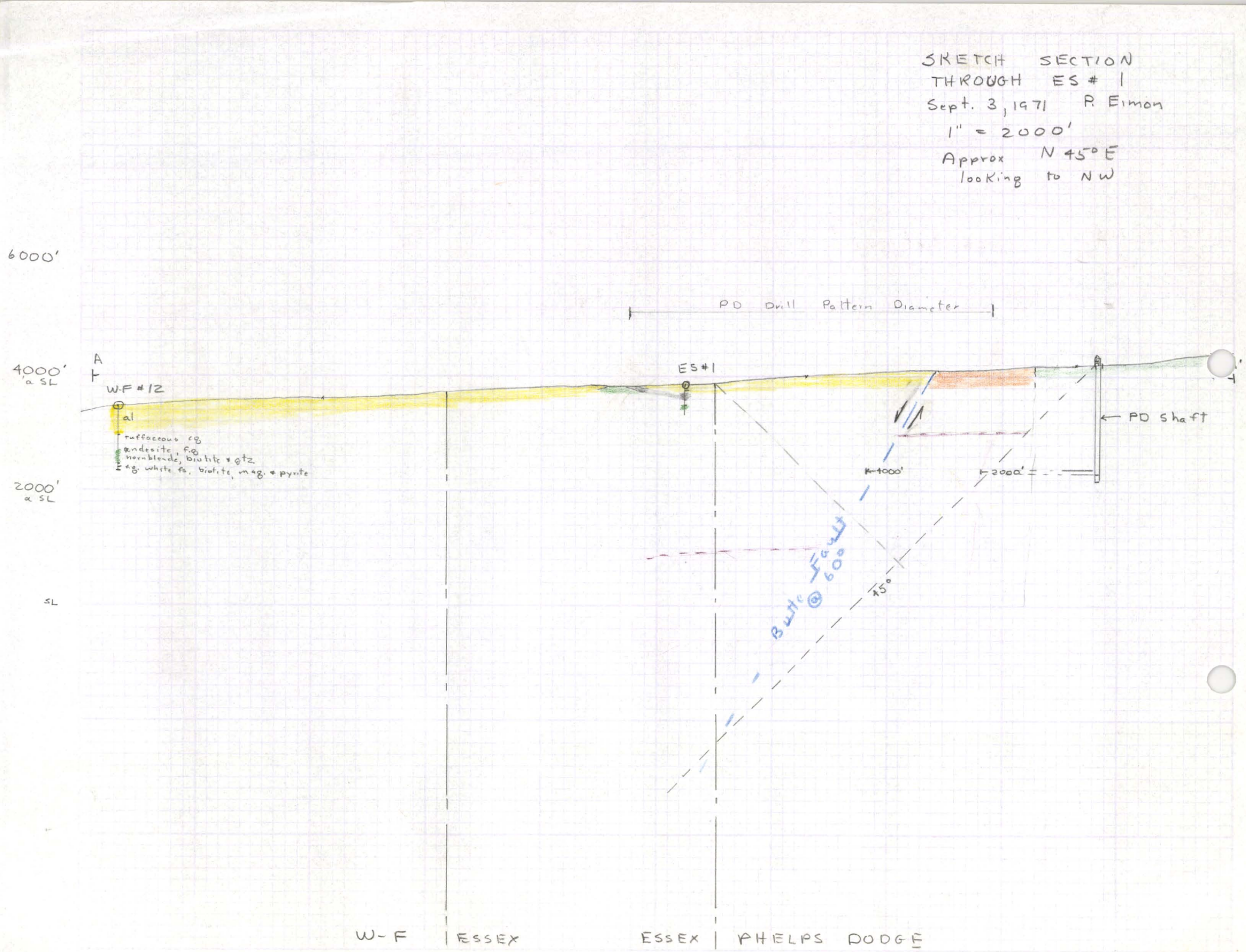
SAMPLE NUMBER	TOTAL COPPER %	ACID SOLUBLE COPPER %	TOTAL IRON %	SULFIDE SULFUR %	ACID CONSUMED LB H_2SO_4/TON	MOLYBDENUM %
1253	.07					
1254	.07					
1255	.05					
1256	.02					
1257	.01					
1258	.02					
1259	.06					
1260	.04					
1261	.01					
1262	.06					
1263	.04					
1264	.08					
1265	.53					
1266	.02					
1267	.01					
1268	.03					
1269	.09					
1270	.05					
1271	.06					
1272	.01					
1273	.02					
1274	.01					
1275	.06					
1276	.03					
1277	.03					
1278	.01					

REGISTERED ASSAYER
WILBUR K. WRIGHT
Date Signed 11/20/71
Arizona U. S. A.

CHARGE $ 52.00

INVOICE

SKETCH SECTION
THROUGH ES # 1
Sept. 3, 1971 R. Eimon
1" = 2000'
Approx N 45° E
looking to NW



11-10-71 JKd

Safford Drill Hole ES-1

Review of logs and some core from 2322

2322 - 2676. Mostly andesite porphyry, probably moderate biotite alteration, spotty but generally fair amounts hematite, local strong hematite zones contain 0.1 to 0.2% Cu and are characterized by bright red hematite

2676 - 2798 Similar rock to above, spotty weak sulphides accompanied by some hematite. Mostly FeS_2, but local seams $CuFeS_2$, bornite.

2731 - 2733 monzonite porphyry dike

2798 - 2848 Black hornblende andesite, scattered plagioclase phenocrysts, 1 to 3% FeS_2 as seams & disseminated grains, traces $CuFeS_2$, occasional calcite veinlets

2848 - 2850 Approx. 2 foot zone sheared, altered

2850 - 2888 Gray green, distinctly porphyritic andesite. Feldspar phenocrysts more obvious than above. 3 to 5% FeS_2. Note seam of $CuFeS_2$ & ~~$CuFeS_2$~~ Cu_2S ?? at 2856.4' Plagioclase bright, appears quite fresh.

2888 - Similar to above except FeS_2 diminished to 1 or 2% mostly on fractures. Very rare $CuFeS_2$.

2925' LAST CORE AVAILABLE 11-17-71

SAFFORD HOLE ES-1 COMPOSITE SAMPLES to be assayed for sulphide sulphur and copper

American Analytical Lab 624-0049

Given to Assayer 12-3-71

Sample numbers 1251 and 1252, 1394 Thru 1400

Combine all of These into one sample and run for Cu and sulphide sulphur

Composite #1

Southwestern Assayers & Chemists 294-5811

Given to Will Weight 12-3-71

Composite #1	Sample numbers 1253	Through 1262
Composite #2	1263	Through 1271
Composite #3	1272 ✓	1276
Composite #4	1321 ✓	1328
Composite #5	1329 ✓	1345 (1341 & 1342 missing)
	1338 ✓	1345

Given to Assayer 12-3-71

Hawley & Hawley 622-4836

Composite #1		1291 Through 1312
✓	#2	1313 ✓ 1320
✓	#3	1346 Thru 1350 and 1401 Thru 1416

TOTAL SULFUR

FOOTAGE	SAMPLE # INCLUSIVE	
~~2675~~ 2750 - 2845 low	1394 - 1400	American Analytical Lab ?
	1251 - 1252 ✓	?
	1253 - 1262	(Southwestern)
2845 - 2890 high	1263 - 1271	(Southwestern)
2890 - ~~2964~~ low	1272 - 1278	(Southwestern)
	1279 - 1290	(Hawley)
2964 - 3039 mod.	1291 - 1312	Hawley
3039 - 3107 low	1313 - 1320	Hawley
	1321 - 1328	? Southwestern
3107 - 3143 high	1329 - 1337	?
3143 - 3281 low	1338 - 1350	?
	1401 - 1416	?

DRILL HOLE SAMPLES — PAGE 1 OF

PROPERTY: SAFFORD PROJECT | DISTRICT: LONE STAR | COUNTY: GRAHAM | STATE: ARIZ | COUNTRY: U.S.A.

HOLE NO.: E.S.-1 | CONTRACTOR: JOY | COLLAR COORD. N E | COLLAR ELEV.

BEARING | INCLINATION: VERTICAL | DEPTH | STARTED STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS % CU							REMARKS
1351				2130	2135	5.0	0.03							
1354				2411	2412	1.0								
1356				2412	2413.5	1.5	.04							
1357				2413.5	2419	5.5	.10							
1358				2419	2421.5	2.5	.18							
1359				2421.5	2424.5	3.0	.15		2413	2431.5	18'	.14		
1360				2424.5	2426.5	2.0	.14							
1361				2426.5	2431.5	5.0	.19							
1352				2452	2457	5.0								
1362				2503	2508	5.0	.03							
1363				2508	2513	5.0	.06							
1364				2513	2519	6.0	.04		2503	2528	25'	.05		
1365				2519	2523	4.0	.05							
1366				2523	2527	4.0	05							
1355				2527	2528	1.0	08							
1367				2527	2532	5.0	.02							
1368				2537	2561	4.0	.20							
1369				2561	2566	5.0	.13		2557	2574	17'	.13		
1370				2566	2570	4.0	.16							
1371				2570	2574	4.0	.02							
1372				2690	2695	5.0	.04							
1373				2695	2650	5.0	.01							
1374				2650	2655	5.0	.01							
1375				2655	2660	5.0	.02							
1376				2660	2665	5.0	.03							
1377				2665	2670	5.0	.02							
1378				2670	2675	5.0	.03							
1379				2675	2680	5.0	.03							
1380				2680	2685	5.0	.02							
1381				2685	2690	5.0	.02							
1382				2690	2695	5.0	.04							
1383				2695	2700	5.0	.04							
1384				2700	2705	5.0	.02							
1385				2705	2710	5.0	.03							
1386				2710	2715	5.0	.06							
1387				2715	2720	5.0	.03							
1388				2720	2725	5.0	.02							
1389				2725	2730	5.0	.04		2640 — 2855					
1390				2730	2735	5.0	0.12							
1391				2735	2740	5.0	.03							
1392				2740	2745	5.0	.01							
1393				2745	2750	5.0	.03							
1394				2750	2755	5.0	02							
1395				2755	2760	5.0	02							
1396				2760	2765	5.0	.06							COMP ASSAY % Cu 0.03 % S = 0.51
1397				2765	2770	5.0	.03							
1398				2770	2775	5.0	.05							
1399				2775	2780	5.0	.02							
1400				2780	2785	5.0	.02							
1251				2785	2790	5.0	.02							
1252				2790	2795	5.0	.05							
1253				2795	2800	5.0	0.07							
1254				2800	2805	5.0	0.07							
1255				2805	2810	5.0	0.05							
1256				2810	2815	5.0	0.02							.04 % Cu
1257				2815	2820	5.0	c 01							.38 % S
1258				2820	2825	5.0	0.02							
1259				2825	2830	5.0	c 04							
1260				2830	2835	5.0	0.04							

DRILL HOLE SAMPLES

PAGE 2 OF

PROPERTY: SAFFORD PROJECT | DISTRICT: COVE STAR | COUNTY: GRAHAM | STATE: ARIZ. | COUNTRY: USA

HOLE NO.: ES-1 | CONTRACTOR: JOY | COLLAR COORD. N E | COLLAR ELEV.

BEARING | INCLINATION: VERTICAL | DEPTH | STARTED STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS % Cu	REMARKS
1261				2835	2840	5.0	0.01	
1262				2840	2845	5.0	0.06	
1263				2845	2850	5.0	0.04	
1264				2850	2855	5.0	0.08	1263-1271
1265				2855	2860	5.0	0.53	.09 %Cu
1266				2860	2865	5.0	0.02	2.05 %S
1267				2865	2870	5.0	0.01	
1268				2870	2875	5.0	0.03	
1269				2875	2880	5.0	0.09	
1270				2880	2885	5.0	0.05	
1271				2885	2890	5.0	0.06	
1272				2890	2895	5.0	0.01	
1273				2895	2900	5.0	0.02	1272-1278
1274				2900	2905	5.0	0.01	.02 %Cu
1275				2905	2910	5.0	0.06	1.15 %S
1276				2910	2915	5.0	0.03	
1277				2915	2920	5.0	0.03	
1278				2920	2925	5.0	0.01	
1279		1.0	100	2925	2926	1.0	0.04	
1280		1.5	30	2926	2931	5.0	0.03	
1281		1.0	100	2931	2932	1.0	0.02	
1282		3.5	88	2932	2936	4.0	0.02	2860 – 3013
1283		5.0	100	2936	2941	5.0	0.04	
1284		3.5	100	2941	2944.5	3.5	0.08	
1285		4.5	100	2944.5	2949	4.5	0.04	
1286		4.0	88	2949	2953.5	4.5	0.02	
1287		2.0	80	2953.5	2956	2.5	0.10	
1288		2.0	100	2956	2958	2.0	0.11	
1289		3.0	100	2958	2961	3.0	0.06	
1290		2.0	66	2961	2964	3.0	0.01	
1291		4.0	100	2964	2968	4.0	0.20	
1292		2.5	62	2968	2972	4.0	0.07	
1293		5.0	100	2972	2977	5.0	0.03	
1294		4.5	90	2977	2982	5.0	0.02	
1295		0.5	50	2982	2983	1.0	0.04	
1296		2.0	66	2983	2986	3.0	0.14	
1297		2.5	86	2986	2989	3.0	0.12	
1298		1.5	50	2989	2991	3.0	0.11	
1299		5.0	100	2991	2996	5.0	0.05	1291-1312
1300		3.0	100	2996	2999	3.0	0.03	%Cu .07
1301		4.5	90	2999	3004	5.0	0.03	
1302		3.5	88	3004	3008	4.0	0.02	S =1.38
1303		0.5	50	3008	3009	1.0	0.01	
1304		2.5	63	3009	3013	4.0	0.03	
1305		1.0	25	3013	3017	4.0	0.06	
1306		1.0	100	3017	3018	1.0	0.10	
1307		3.0	100	3018	3021	3.0	0.21	
1308		3.0	100	3021	3024	3.0	0.16	
1309		3.0	100	3024	3027	3.0	0.15	
1310		5.0	100	3027	3032	5.0	0.07	3013 3062 49 .094
1311		2.0	100	3032	3034	2.0	0.02	
1312		5.0	100	3034	3039	5.0	0.11	
1313		4.0	80	3039	3044	5.0	0.09	
1314		4.5	90	3044	3049	5.0	0.04	
1315		2.0	100	3049	3054	5.0	0.09	%Cu = .05
1316		2.5	50	3054	3059	5.0	0.06	%S = .34
1317		3.0	100	3059	3062	3.0	0.13	
1318		2.0	100	3062	3064	2.0	0.01	
1319		5.0	100	3064	3069	4.0	0.07	
1320		2.5	100	3069	3072.5	2.5	0.01	3062 3107 44' .038
1321		5.0	100	3072.5	3077.5	5.0	0.02	
1322		4.5	82	3077.5	3083	5.5	0.01	1321-1328
1323		4.5	90	3083	3088	5.0	0.07	.038 %Cu
1324		3.5	88	3088	3092	4.0	0.07	.28 %S
1325		4.5	100	3092	3096.5	4.5	0.02	

DRILL HOLE SAMPLES

PAGE 3 OF

PROPERTY: SAFFORD PROJECT | DISTRICT: COUNTY: STATE: COUNTRY: CONE STAR, GRAHAM, ARIZ. U.S.A

HOLE NO.: ES-1 | CONTRACTOR: JOY | COLLAR COORD. N E: | COLLAR ELEV.:

BEARING: | INCLINATION: VERTICAL | DEPTH: | STARTED: STOPPED:

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS % CU	REMARKS
1326		3.0	86	3096.5	3100	3.5	0.05	
1327		3.0	100	3100	3103	3.0	0.06	
1328		3.0	75	3103	3107	4.0	0.02	
1329		2.0	100	3107	3109	2.0	0.55	
1330		4.5	90	3109	3114	5.0	0.08	
1331		2.0	100	3114	3116	2.0	0.13	
1332		4.0	100	3116	3120	4.0	0.35	
1333		5.0	100	3120	3125	5.0	0.30	
1334		5.0	100	3125	3130	5.0	0.14	3107 - 3119' 12' 0.24% Cu
1335		5.0	100	3130	3135	5.0	0.08	
1336		3.0	100	3135	3138	3.0	0.16	
1337		5.0	91	3138	3143.5	5.5	0.21	
1338		5.0	100	3143.5	3148.5	5.0	0.65	
1339		5.0	100	3148.5	3153.5	5.0	0.14	
1340		5.5	100	3153.5	3159	5.5	0.24	
1341		5.0	100	3159	3164	5.0		
1342		4.5	90	3164	3169	5.0		
1343		5.0	100	3169	3174	5.0	0.05	
1344		5.0	100	3174	3179	5.0	0.10	.19 % Cu
1345		5.0	100	3179	3184	5.0	0.10	1.57 % S
1346		5.0	83	3184	3190	6.0	0.04	
1347		2.1	84	3190	3192.5	2.5	0.02	
1348		4.4	89	3192.5	3197.5	5.0	0.08	
1349		4.5	100	3197.5	3202	4.5	0.08	
1350		3.0	100	3202	3205	3.0	0.03	
1401		5.0	100	3205	3210	5.0	0.60	3169 - 3281 112 .094
1402		4.8	96	3210	3215	5.0	0.14	
1403		5.0	100	3215	3220	5.0	0.27	
1404		5.0	100	3220	3225	5.0	0.06	% Cu = .10
1405		4.5	90	3225	3230	5.0	0.19	
1406		5.0	100	3230	3235	5.0	0.03	S % = .54
1407		4.5	90	3235	3240	5.0	0.04	
1408		5.0	100	3240	3245	5.0	0.02	
1409		5.0	100	3245	3250	5.0	0.04	
1410		5.0	100	3250	3255	5.0	0.04	
1411		5.0	100	3255	3260	5.0	0.07	
1412		3.0	100	3260	3263	3.0	0.04	
1413		5.0	100	3263	3268	5.0	0.21	
1414		5.0	100	3268	3273	5.0	0.03	
1415		5.0	100	3273	3278	5.0	0.11	
1416		2.8	97	3278	3281	3.0	0.41	

SAFFORD HOLE ES-1 COMPOSITE SAMPLES to be assayed for sulphide sulphur and Copper

American Analytical Lab 624-0049

Given to Assayer 12-3-71

Sample numbers 1251 and 1252, 1394 Thru 1400
Combine all of These into one sample and run for Cu and sulphide sulphur
Composite #1

Southwestern Assayers & Chemists 294-5811

Given to Wilwright 12-3-71

Composite #1	Sample numbers 1253	Through 1262
Composite #2	1263	Through 1271
Composite #3	1272 ✓	1276
Composite #4	1321 ✓	1328
Composite #5	1329 ✓	1345 (1341 & 1342 missing)

Given to Assayer 12-3-71

Hawley & Hawley 622-4836

Composite #1		1291 Through 1312
✓	#2	1313 ✓ 1320
✓	#3	1346 Thru 1350 and 1401 Thru 1416

SAFFORD HOLE ES-1 COMPOSITE SAMPLES to be assayed for sulphide sulphur and Copper

American Analytical Lab 624-0049

GIVEN TO ASSAYER 12-3-71

Sample numbers 1251 and 1252, 1394 Thru 1400

Combine all of These into one sample and run for Cu and sulphide sulphur

Composite #1

Southwestern Assayers & Chemists 294-5811

GIVEN TO WILLWEIGHT 12-3-71

Composite #1	Sample numbers 1253	Through 1262
Composite #2	1263	Through 1271
Composite #3	1272 ✓	1278
Composite #4	1321 ✓	1328
Composite #5	1329 ✓	1345 (1341 & 1342 missing)

GIVEN TO ASSAYER 12-3-71

Hawley & Hawley 622-4836

Composite #1	1291	Through 1312
✓ #2	1313 ✓	1320
✓ #3	1346 Thru 1390 and 1401	Thru 1416

Copy to K. Jones ✓
Copy to B. Helming

SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO
WIL WRIGHT
ARIZONA REG. NO. 5875

P. O. BOX 7517
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.
PHONE 602-294-5811

Essex International, Inc.
1704 W. Grant Road
Tucson, Arizona 85705

JOB# 010420
RECEIVED 11-18-71
REPORTED 11-20-71

SAMPLE NUMBER	TOTAL COPPER %	ACID SOLUBLE COPPER %	TOTAL IRON %	SULFIDE SULFUR %	ACID CONSUMED LB H_2SO_4/TON	MOLYBDENUM %
1253	.07					
1254	.07					
1255	.05					
1256	.02					
1257	.01					
1258	.02					
1259	.06					
1260	.04					
1261	.01					
1262	.06					
1263	.04					
1264	.08					
1265	.53					
1266	.02					
1267	.01					
1268	.03					
1269	.09					
1270	.05					
1271	.06					
1272	.01					
1273	.02					
1274	.01					
1275	.06					
1276	.03					
1277	.03					
1278	.01					

CHARGE $ 52.00

INVOICE

3226 East 46th Street

Phone 624-0049

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85713

SAMPLE SUBMITTED BY Essex International

DATE Nov. 15, 1971

SAMPLE MARKED	GOLD OZ / TON	SILVER OZ./TON	PER CENT COPPER	PERCENT LEAD	PERCENT ZINC	PERCENT MOLYBDENUM	PERCENT IRON
1372			0.04				
1373			0.01				
1374			0.01				
1375			0.02				
1376			0.03				
1377			0.02				
1378			0.03				
1379			0.03				
1380			0.02				
1381			0.02				
1382			0.04				
1383			0.04				
1384			0.02				
1385			0.03				
1386			0.06				
1387			0.03				
1388			0.02				

Invoice # 6992

CHARGES $ 34.00

11/15/71

Registered Assayer Arizona U.S.A.

ASSAYER - CHEMIST

GEOLOGIC DESCRIPTION

DDH ES-1 SAFFORD PROJECT

Notes by J.K. Jones
9-28-71, 9-30-71,
10-8-71

ROTARY CUTTINGS

FROM	TO	DESCRIPTION
0 feet	20 feet	Heterogeneous assortment of rock chips representing coarse, unsorted, recent gravel deposits.
20 feet	120 feet	Mostly gray, fine grained basalt but with scattered chips of a fresh, brown volcanic and rare fragments of epidotized rock. Probably represents a Tertiary basalt flow with some contamination from material caving in from higher in hole, but could be alluvium.
120 feet	190 feet	Almost entirely fine grained, dark gray basalt, a few brown volcanic chips. Tertiary basalt flow.
190 feet	208 feet	About 50% basalt, 50% brown, unaltered latite (?) which contains a few small fragments of epidote. Probably represents Tertiary flows and sedimentary material which occur beneath basalt and unconformably overlie Cretaceous volcanics.
208 feet	210 feet	No cuttings recovered.
210 feet	240 feet	Brown, unaltered latite (?) which contains fragments of epidote.
240 feet	330 feet	No cuttings recovered.
330 feet	335 feet	Basalt and latite fragments may be cave from higher in hole.
335 feet	340 feet	No cuttings recovered.
340 feet	390 feet	Mostly fine grained, white, altered material with much epidote. Chips are much smaller than higher in hole. Probably represents Cretaceous andesite agglomerate.

ROTARY CUTTINGS FROM	TO	DESCRIPTION
390 feet	400 feet	Similar to interval above, but epidote increased and chips are finer.
400 feet	420 feet	No cuttings recovered.
420 feet	470 feet	Cretaceous altered volcanic similar to above, but with some dark gray basalt and brown latite probably caving from higher in hole.
470 feet	500 feet	No cuttings recovered.
500 feet	580 feet	Altered Cretaceous volcanic similar to above.
580 feet	640 feet	No cuttings recovered.
640 feet	650 feet	Altered Cretaceous volcanic similar to 420 to 470 feet, much epidote, some contamination by basalt.
650 feet	660 feet	No cuttings recovered.
660 feet	670 feet	Similar to 640 to 650 feet.
670 feet	735 feet	No cuttings recovered.
735 feet	745 feet	Cretaceous volcanic similar to 640 to 650 feet but much contamination.
		Hole cased to 745 feet, NX coring started at 745 feet.
745 feet	850 feet ±	Fragmental andesite. Fine, fuzzy textured matrix, possibly an altered andesite containing scattered feldspar phenocrysts, blebs of epidote, chloritized femics. Many fragments are medium grained, dark green andesite porphyry characterized by numerous soft white feldspar phenocrysts and abundant chlorite. ALTERATION: Feldspar locally bright but soft, probably sericitized, estimated 10% epidote present, ferromagnesian minerals altered to chlorite. MINERALIZATION: Widely spaced calcite veinlets, 0 to ½% disseminated grains limonite some after cubic pyrite, local goethite but common hematite. 837 to 879 estimated 5% limonite cubes after FES_2 up to 0.1 inch, estimated to be 60% hematite 40% goethite.

GEOLOGIC DESCRIPTION
DDH ES-1 SAFFORD PROJECT - continued

~~ROTARY CUTTINGS~~ CORE FROM	TO	DESCRIPTION
850' ±	940' ±	Similar to interval above but chlorite seems to be increased.
940' ±	1020'(?)	Andesite agglomerate similar to above. ALTERATION: Chlorite appears stronger, epidote may be decreased, sericite appears stronger. Matrix and feldspars very soft and exhibit a sheen that resembles sericite. 951-953, 978-988±, 997-1006± are broken, bleached, limonite stained, and appear to be a fine grained aggregate of quartz and sericite.
1020'(?)	1120'(?)	Generally similar to above but does not appear as strongly altered. Light colored rock, under high power (30X) matrix appears to be largely composed of white, moderately soft feldspar and very fine quartz(?). Much of feldspar appears to be sericitized, but some areas are pink and hard. 1034-1036 broken, strong limonite. 1039-1045 broken. 1065 several inches strong limonite. 1065-1116 broken, strong limonite to 1108.
1120'(?)	1199' ±	Appears similar to 940-1020, texture fuzzy, fairly strongly altered andesite agglomerate, pale green in color.
1199' ±	1303'	Groundmass and overall rock color becoming light brown to pink, otherwise similar to above. 1229' to 1235' moderate amount disseminated, coarse grained limonite after pyrite.
1303'	1361'	Pale green, fuzzy textured rock, similar to 1120'-1199'. Alteration appears to be strong sericite, moderate chlorite, weak epidote.
1361'	1710	Andesite agglomerate, pale pink matrix of relatively fine grained andesite porphyry containing numerous various sized fragments often coarser grained than matrix. ALTERATION: Variable, feldspar in part bright but usually soft white. Femic minerals at least in part altered to chlorite but in places black. Fairly numerous blebs epidote.

CORE
~~ROTARY CUTTINGS~~

FROM	TO	DESCRIPTION
1361' - continued		MINERALIZATION: A few flecks disseminated hematite, widely spaced very thin seams calcite. 1341' to 1412' broken, scattered veinlets calcite with some white clay, possible gypsum. 1444' to 1460' broken.
1710'	1790'	Similar to above but denser, gray color, firm but greasy-looking, easily scratched gray to gray-pink matrix, much fine femic altered to chlorite, scattered spots epidote. At 1759', 1.5 feet strong limonite in soft altered material.
1790'	1874'	Very similar to above but matrix a little pinker, possibly harder.
1874'	1971'	Same as above except locally broken, more numerous calcite seams, many with films and specks hematite.
1971'		Darker colored andesite agglomerate possibly due to increased fine grained biotite. Broken, fairly numerous steeply dipping calcite and sericitized stringers, weak to fair limonite. Last core observed 1992 feet, October 8, 1971.

2080 – 2320(?) andesite agglomerate; alteration propylitic with common blebs of epidote, also ~~to~~ secondary biotite and weak sericite; greenish or reddish gray depending upon amount of hematite; hematite variable but usually mod-strong on fractures and disseminated; sericite (?) and calcite on fractures; rock has waxy appearance due to sericite; hematite locally massive

2320 – 2508 andesite, andesite porphyry; green gray to reddish gray; hematite similar to above; lesser epidote; plagioclase alteration varies from weak sericite to sericite, calcite and epidote; ferrics alter to chlorite and probably v.f.g. biotite; rock locally fragmental;

2508 – 2527 dike; dull red chalky looking leached and bleached rock; weak silicification, mod-strong sericite; disseminated limonite + hematite 1-2%, ferrics alter to chlorite, sericite, biotite(?)

2527 - 2658 rock similar ~~to that~~ above like; interval 2613 - 2658 ~~may be~~ somewhat clastic,

2658 - 2731 andesite like above, weakly porphyritic, commonly fragmental, ~~first sulfide 2674~~

2731 - 2733 possible dike, feldspathized andesite; pink color

2733 - 2850 ~~similar to~~ same as above dike, andesite w/ biotite + chlorite + calcite - sericite alteration; veinlets with qtz - pyrite and traces chalcopyrite + bornite; traces biotite veinlets, first sulfide 2676'

2850 - 3071 andesite porphyry; dark gray strongly porphyritic, dense; plagioclase alteration varies from clear + shiny to cloudy + sericitized w/ calcite and epidote; epidote more common than rocks above; moderate to strong chlorite with ~~slight~~ definite decrease in biotite alteration; pyrite most common in veinlets with chalcopyrite + bornite, locally disseminated pyrite up to 7%; chalcopyrite much more apparent in veinlets from 3018 on but veinlets widely spaced; traces of chalcocite; orange mineral

is veinlets ~~starts~~ to become common at about 3030; better sulfide zone 3018-3040

3071 - 3148

this section shows quartz; dacite ?

lighter colored, weakly porphyritic rock of similar alteration; disseminated magnetite up to ~~2-3%~~ 6%; good disseminated sulfides to 8% from 3106-3143; veinlets show thin alteration margins;

3148 - ~~3213~~ 3184

back to dark gray, andesite porphyry; similar alteration; sulfides essentially restricted to veinlets of quartz ± sericite ± chlorite ± calcite; ± epidote

3184 - 3213

black aphanitic dacite (?) dike(?) or flow; some ~~mic~~ quartz visible; widely spaced sulfide veinlets with very little attendant alteration; weak-mod kistite, ~~mod~~ weak chlorite, weak sericite

~~3213 - 3273~~

3213 - 3273

andesite porphyry agglomerate with marked decrease in sulfide mineralization

3273 - 3281

andesite porphyry with alteration and mineralization some as noted above

Sample #	% Cu	Sulfide % S	Pyrite / Chalcopyrite
1253 - 1262	.04	.33	.29/.04 = 7/1
1263 - 1271	.09	2.05	1.96/.09 = 22/1
1272 - 1278	.02	1.15	1.13/.02 = 56/1
1291 - 1312	.07	1.38	1.31/.07 = 19/1
133 - 1320	.05	.34	.29/.05 = 6/1
1321 - 1328	.03	.23	.20/.03 = 7/1
1329 - 1340 + 1343 - 1345	.19	1.57	1.38/.19 = 7/1
1346 - 1350 + 1401 - 1416	.10	.54	.44/.10 4.5/1
1251, 1252 1394 - 1400	0.03	0.51	.48/.03 = 16/1

DRILL HOLE SAMPLES

PAGE 1 OF

PROPERTY: SAFFORD PROJECT | DISTRICT: LONESTAR | COUNTY: GRAHAM | STATE: ARIZ. | COUNTRY: U.S.A

HOLE NO.: ES-1 | CONTRACTOR: JOY | COLLAR COORD. N E | COLLAR ELEV.

BEARING: — | INCLINATION: VERTICAL | DEPTH | STARTED STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS % Cu	REMARKS
1351				2130	2135	5.0	.03	Assayed by Hawley & Hawley
1354				2411	2412	1.0	.14	
1356				2412	2413.5	1.5	.04	
1357				2413.5	2419	5.5	.10	
1358				2419	2421.5	2.5	.18	
1359				2421.5	2424.5	3.0	.15	2413.5 – 2431.5 : 18' .14% Cu
1360				2424.5	2426.5	2.0	.14	
1361				2426.5	2431.5	5.0	.19	
1352				2452	2457	5.0	.02	
1362				2503	2508	5.0	.03	
1363				2508	2513	5.0	.06	
1364				2513	2519	6.0	.04	
1365				2519	2523	4.0	.05	
1366				2523	2527	4.0	.05	
1355				2527	2528	1.0	.08	
1367				2527	2532	5.0	.02	
1368				2557	2561	4.0	.20	
1369				2561	2566	5.0	.13	
1370				2566	2570	4.0	.16	2557 – 2570 : 13' 0.16% Cu
1371				2570	2574	4.0	.02	
1372				2640	2645	5.0	.04	Sampled 11-8-71 delivered to Amer. Analyt. Lab. 11-10-71 624-0049 phone
1373				2645	2650	5.0	.01	
1374				2650	2655	5.0	.01	
1375				2655	2660	5.0	.02	
1376				2660	2665	5.0	.03	
1377				2665	2670	5.0	.02	
1378				2670	2675	5.0	.03	
1379				2675	2680	5.0	.03	2676' first sulphide
1380				2680	2685	5.0	.02	
1381				2685	2690	5.0	.02	
1382				2690	2695	5.0	.04	
1383				2695	2700	5.0	.04	
1384				2700	2705	5.0	.02	
1385				2705	2710	5.0	.03	
1386				2710	2715	5.0	.06	
1387				2715	2720	5.0	.03	
1388				2720	2725	5.0	.02	
1389				2725	2730	5.0	.04	
1390				2730	2735	5.0	.12	Delivered to assayer 11-12-71 American Analytical Lab.
1391				2735	2740	5.0	.03	
1392				2740	2745	5.0	.01	
1393				2745	2750	5.0	.03	2750' oxidation ceases
1394				2750	2755	5.0	.02	
1395				2755	2760	5.0	.02	
1396				2760	2765	5.0	.06	
1397				2765	2770	5.0	.03	
1398				2770	2775	5.0	.05	
1399				2775	2780	5.0	.02	
1400				2780	2785	5.0	.02	
1257				2785	2790	5.0	.02	
1252				2790	2795	5.0	.05	
~~253~~								

DRILL HOLE SAMPLES

PROPERTY: SAFFORD PROJECT | DISTRICT | COUNTY | STATE | COUNTRY

HOLE NO. ES-1 | 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
1253				2795	2800		.07	Southwestern Assayers & Chemists
1254				2800	2805		.07	
1255				2805	2810		.05	
1256				2810	2815		.02	
1257				2815	2820		.01	
1258				2820	2825		.02	
1259				2825	2830		.06	
1260				2830	2835		.04	
1261				2835	2840		.01	
1262				2840	2845		.06	
1263				2845	2850		.04	
1264				2850	2855		.08	
1265				2855	2860		.53	
1266				2860	2865		.02	
1267				2865	2870		.01	
1268				2870	2875		.03	
1269				2875	2880		.09	
1270				2880	2885		.05	
1271				2885	2890		.06	
1272				2890	2895		.01	
1273				2895	2900		.02	
1274				2900	2905		.01	
1275				2905	2910		.06	
1276				2910	2915		.03	
1277				2915	2920		.03	
1278				2920	2925		.01	

DRILL HOLE SAMPLES — Work Sheet — PAGE 3 OF

PROPERTY | DISTRICT | COUNTY | STATE | COUNTRY

HOLE NO. ES-1 | 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
1279	BX	1.0	100	2925	2926	1.0	.04	Hawley & Hawley
1280		1.5	30	2926	2931	5.0	.03	
1281		1.0	100	2931	2932	1.0	.02	
1282		3.5	88	2932	2936	4.0	.02	
1283		5.0	100	2936	2941	5.0	.04	
1284		3.5	100	2941	2944.5	3.5	.08	
1285		4.5	100	2944.5	2949	4.5	.04	
1286		4.0	88	2949	2953.5	4.5	.02	
1287		2.0	80	2953.5	2956	2.5	.10	
1288		2.0	100	2956	2958	2.0	.11	
1289		3.0	100	2958	2961	3.0	.06	
1290		2.0	66	2961	2964	3.0	<.01	
1291		4.0	100	2964	2968	4.0	.20	
1292		2.5	62	2968	2972	4.0	.07	
1293		5.0	100	2972	2977	5.0	.03	
1294		4.5	90	2977	2982	5.0	.02	
1295		0.5	50	2982	2983	1.0	.04	
1296		2.0	66	2983	2986	3.0	.14	
1297		2.5	86	2986	2989	3.0	.12	
1298		1.5	50	2989	2991	3.0	.11	
1299		5.0	100	2991	2996	5.0	.05	
1300		3.0	100	2996	2999	3.0	.03	
1301		4.5	90	2999	3004	5.0	.03	
1302		3.5	88	3004	3008	4.0	.02	
1303		0.5	50	3008	3009	1.0	<.01	
1304		2.5	63	3009	3013	4.0	.03	
1305		1.0	25	3013	3017	4.0	.06	
1306		1.0	100	3017	3018	1.0	.10	
1307		3.0	100	3018	3021	3.0	.21	
1308		3.0	100	3021	3024	3.0	.16	
1309		3.0	100	3024	3027	3.0	.15	
1310		5.0	100	3027	3032	5.0	.07	
1311		2.0	100	3032	3034	2.0	.02	
1312		5.0	100	3034	3039	5.0	.11	
1313		4.0	80	3039	3044	5.0	.09	
1314		4.5	90	3044	3049	5.0	.04	
1315		5.0	100	3049	3054	5.0	.09	
1316		2.5	50	3054	3059	5.0	.06	
1317		3.0	100	3059	3062	3.0	.13	
1318		2.0	100	3062	3064	2.0	<.01	
1319		5.0	100	3064	3069	4.0	.07	
1320		2.5	100	3069	3072.5	2.5	<.01	

Above Samples delivered to
HAWLEY & HAWLEY

DRILL HOLE SAMPLES

PAGE 4 OF

PROPERTY SAFFORD | DISTRICT | COUNTY | STATE | COUNTRY

HOLE NO. ES-1 | CONTRACTOR JOY | 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
1321				3072.5	3077.5	5.0	.02	
1322				3077.5	3083	5.5	.01	
3				3083	3088		.07	
4				3088	3092		.07	
5				3092	3096.5		.02	
6				3096.5	3100		.05	
7				3100	3103		.06	
8				3103	3107		.02	
9				3107	3109	2.0	.55	
1330				3109	3114	5.0	.08	
1				3114	3116	2.0	.13	
2				3116	3120	4.0	.35	57' .24% Cu
3				3120	3125	5.0	.30	
4				3125	3130	5.0	.14	
5				3130	3135	5.0	.08	
6				3135	3138	3.0	.16	
7				3138	3143.5	5.5	.21	
8				3143.5	3148.5	5.0	.65	
9				3148.5	3153	4.5	.14	
1340				3153	3159	6.0	.24	
1				3159	3164			Sample missing
2				3164	3169			
3				3169	3174		.05	
4				3174	3179		.06	
5				3179	3184		.10	
6				3184	3190		.04	
7				3190	3192.5		.02	
8				3192.5	3197.5		.08	
9				3197.5	3202		.08	
1350				3202	3205		.03	
1401				3205	3210		.10	
2				3210	3215		.14	
3				3215	3220		.27	
4				3220	3225		.06	
5				3225	3230		.19	
6				3230	3235		.03	
7				3235	3240		.04	
8				3240	3245		.03	
9				3245	3250		.04	
1410				3250	3255		.04	
1				3255	3260		.07	
2				3260	3263		.04	
3				3263	3268		.21	
4				3268	3273		.03	
5				3273	3278		.11	
1416				3278	3281		.41	
		BOTTOM OF HOLE						

11-30-71 SOUTHWESTERN ASSAYERS.

12-2-71 HAWLEY & HAWLEY

GEOLOGIC DESCRIPTION

DDH ES-1 SAFFORD PROJECT

Notes by J.K. Jones
9-28-71, 9-30-71,
10-8-71

ROTARY CUTTINGS

FROM	TO	DESCRIPTION
0 feet	20 feet	Heterogeneous assortment of rock chips representing coarse, unsorted, recent gravel deposits.
20 feet	120 feet	Mostly gray, fine grained basalt but with scattered chips of a fresh, brown volcanic and rare fragments of epidotized rock. Probably represents a Tertiary basalt flow with some contamination from material caving in from higher in hole, but could be alluvium.
120 feet	190 feet	Almost entirely fine grained, dark gray basalt, a few brown volcanic chips. Tertiary basalt flow.
190 feet	208 feet	About 50% basalt, 50% brown, unaltered latite (?) which contains a few small fragments of epidote. Probably represents Tertiary flows and sedimentary material which occur beneath basalt and unconformably overlie Cretaceous volcanics.
208 feet	210 feet	No cuttings recovered.
210 feet	240 feet	Brown, unaltered latite (?) which contains fragments of epidote.
240 feet	330 feet	No cuttings recovered.
330 feet	335 feet	Basalt and latite fragments may be cave from higher in hole.
335 feet	340 feet	No cuttings recovered.
340 feet	390 feet	Mostly fine grained, white, altered material with much epidote. Chips are much smaller than higher in hole. Probably represents Cretaceous andesite agglomerate.

ROTARY CUTTINGS FROM	TO	DESCRIPTION
390 feet	400 feet	Similar to interval above, but epidote increased and chips are finer.
400 feet	420 feet	No cuttings recovered.
420 feet	470 feet	Cretaceous altered volcanic similar to above, but with some dark gray basalt and brown latite probably caving from higher in hole.
470 feet	500 feet	No cuttings recovered.
500 feet	580 feet	Altered Cretaceous volcanic similar to above.
580 feet	640 feet	No cuttings recovered.
640 feet	650 feet	Altered Cretaceous volcanic similar to 420 to 470 feet, much epidote, some contamination by basalt.
650 feet	660 feet	No cuttings recovered.
660 feet	670 feet	Similar to 640 to 650 feet.
670 feet	735 feet	No cuttings recovered.
735 feet	745 feet	Cretaceous volcanic similar to 640 to 650 feet but much contamination.
		Hole cased to 745 feet, NX coring started at 745 feet.
745 feet	850 feet ±	Fragmental andesite. Fine, fuzzy textured matrix, possibly an altered andesite containing scattered feldspar phenocrysts, blebs of epidote, chloritized femics. Many fragments are medium grained, dark green andesite porphyry characterized by numerous soft white feldspar phenocrysts and abundant chlorite. ALTERATION: Feldspar locally bright but soft, probably sericitized, estimated 10% epidote present, ferromagnesian minerals altered to chlorite. MINERALIZATION: Widely spaced calcite veinlets, 0 to ½% disseminated grains limonite some after cubic pyrite, local goethite but common hematite. 837 to 879 estimated 5% limonite cubes after FES_2 up to 0.1 inch, estimated to be 60% hematite 40% goethite.

ROTARY CUTTINGS

FROM	TO	DESCRIPTION
850' ±	940' ±	Similar to interval above but chlorite seems to be increased.
940' ±	1020'(?)	Andesite agglomerate similar to above. ALTERATION: Chlorite appears stronger, epidote may be decreased, sericite appears stronger. Matrix and feldspars very soft and exhibit a sheen that resembles sericite. 951-953, 978-988±, 997-1006± are broken, bleached, limonite stained, and appear to be a fine grained aggregate of quartz and sericite.
1020'(?)	1120'(?)	Generally similar to above but does not appear as strongly altered. Light colored rock, under high power (30X) matrix appears to be largely composed of white, moderately soft feldspar and very fine quartz(?). Much of feldspar appears to be sericitized, but some areas are pink and hard. 1034-1036 broken, strong limonite. 1039-1045 broken. 1065 several inches strong limonite. 1065-1116 broken, strong limonite to 1108.
1120'(?)	1199' ±	Appears similar to 940-1020, texture fuzzy, fairly strongly altered andesite agglomerate, pale green in color.
1199' ±	1303'	Groundmass and overall rock color becoming light brown to pink, otherwise similar to above. 1229' to 1235' moderate amount disseminated, coarse grained limonite after pyrite.
1303'	1361'	Pale green, fuzzy textured rock, similar to 1120'-1199'. Alteration appears to be strong sericite, moderate chlorite, weak epidote.
1361'	1710	Andesite agglomerate, pale pink matrix of relatively fine grained andesite porphyry containing numerous various sized fragments often coarser grained than matrix. ALTERATION: Variable, feldspar in part bright but usually soft white. Femic minerals at least in part altered to chlorite but in places black. Fairly numerous blebs epidote.

ROTARY CUTTINGS

FROM	TO	DESCRIPTION
1361' - continued		MINERALIZATION: A few flecks disseminated hematite, widely spaced very thin seams calcite. 1341' to 1412' broken, scattered veinlets calcite with some white clay, possible gypsum. 1444' to 1460' broken.
1710'	1790'	Similar to above but denser, gray color, firm but greasy-looking, easily scratched gray to gray-pink matrix, much fine femic altered to chlorite, scattered spots epidote. At 1759', 1.5 feet strong limonite in soft altered material.
1790'	1874'	Very similar to above but matrix a little pinker, possibly harder.
1874'	1971'	Same as above except locally broken, more numerous calcite seams, many with films and specks hematite.
1971'		Darker colored andesite agglomerate possibly due to increased fine grained biotite. Broken, fairly numerous steeply dipping calcite and sericitized stringers, weak to fair limonite. Last core observed 1992 feet, October 8, 1971.

SAFFORD PROJECT
DRILL HOLE ES-1
LIST OF SPECIMENS IN TUCSON OFFICE

SPECIMEN NO.	DEPTH	
101	747 feet	Thin section cut
102	822	
103	890	
104	874	
105	948	
	1011	Thin section cut
106	1021	
107	1079	
	1103	Thin section cut
108	1163	
109	1276	
	1318	
110	1378	
111	1423	
112	1536	
113	1620	Thin section cut
114	1583	
115	1702	
116	1775	
117	1728	
118	1822	
119	1972	
	2037	Thin section cut
	2071	Thin section cut
	2136	Thin section cut
	2170	
	2232	
	2243	

J.K. Jones
10/26/71

DRILL HOLE SAMPLES

PAGE 1 OF

PROPERTY: SAFFORD PROJECT | DISTRICT: COME STAR | COUNTY: GRAHAM, | STATE: ARIZ. | COUNTRY: U.S.A.

HOLE NO.: E.S.-1 | CONTRACTOR: JOY | COLLAR COORD. N E | COLLAR ELEV.

BEARING | INCLINATION: VERTICAL | DEPTH | STARTED STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS % CU	REMARKS
1351				2130	2135	5.0	0.03	
1354				2411	2412	1.0		
1356				2412	2413.5	1.5	.04	
1357				2413.5	2419	5.5	.10	
1358				2419	2421.5	2.5	.18	
1359				2421.5	2424.5	3.0	.15	
1360				2424.5	2426.5	2.0	.14	
1361				2426.5	2431.5	5.0	.19	
1352				2452	2457	5.0		
1362				2503	2508	5.0	.03	
1363				2508	2513	5.0	.06	
1364				2513	2519	6.0	.04	
1365				2519	2523	4.0	.05	
1366				2523	2527	4.0	05	
1355				2527	2528	1.0	.08	
1367				2527	2532	5.0	.02	
1368				2537	2561	4.0	.20	
1369				2561	2566	5.0	.13	
1370				2566	2570	4.0	.16	
1371				2570	2574	4.0	.02	
1372				2690	2695	5.0	.04	
1373				2695	2650	5.0	.01	
1374				2650	2655	5.0	.01	
1375				2655	2660	5.0	.02	
1376				2660	2665	5.0	.03	
1377				2665	2670	5.0	.02	
1378				2670	2675	5.0	.03	
1379				2675	2680	5.0	.03	
1380				2680	2685	5.0	.02	
1381				2685	2690	5.0	.02	
1382				2690	2695	5.0	.04	
1383				2695	2700	5.0	.04	
1384				2700	2705	5.0	.02	
1385				2705	2710	5.0	.03	
1386				2710	2715	5.0	.06	
1387				2715	2820	5.0	.03	
1388				2720	2725	5.0	.02	
1389				2725	2730	5.0	.04	
1390				2730	2735	5.0	0.12	
1391				2735	2740	5.0	.03	
1392				2740	2745	5.0	.01	
1393				2745	2750	5.0	.03	
1394				2750	2755	5.0	02	
1395				2755	2760	5.0	.02	
1396				2760	2765	5.0	.06	COMP ASSAY % Cu 0.03
1397				2765	2770	5.0	.03	% S = 0.51
1398				2770	2775	5.0	.05	
1399				2775	2780	5.0	.02	
1400				2780	2785	5.0	.02	
1251				2785	2790	5.0	.02	
1252				2790	2795	5.0	.05	
1253				2795	2800	5.0	0.07	
1254				2800	2805	5.0	0.07	
1255				2805	2810	5.0	0.05	
1256				2810	2815	5.0	0.02	.04 % Cu
1257				2815	2820	5.0	0.01	.33 % S
1258				2820	2825	5.0	0.02	
1259				2825	2830	5.0	0.06	
1260				2830	2835	5.0	0.04	

DRILL HOLE SAMPLES

PAGE 2 OF

PROPERTY: SAFFORD PROJECT | DISTRICT: COVE STAR | COUNTY: GRAHAM | STATE: ARIZ. | COUNTRY: USA

HOLE NO.: ES-1 | CONTRACTOR: JOY | COLLAR COORD. N E | COLLAR ELEV.

BEARING | INCLINATION: VERTICAL | DEPTH | STARTED STOPPED

SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS %Cu	REMARKS
1261				2835	2840	5.0	0.01	
1262				2840	2845	5.0	0.06	
1263				2845	2850	5.0	0.04	COMP ASSAY
1264				2850	2855	5.0	0.08	1263-1271
1265				2855	2860	5.0	0.53	.09 %Cu
1266				2860	2865	5.0	0.02	2.05 %S
1267				2865	2870	5.0	0.01	
1268				2870	2875	5.0	0.03	
1269				2875	2880	5.0	0.09	
1270				2880	2885	5.0	0.05	
1271				2885	2890	5.0	0.06	
1272				2890	2895	5.0	0.01	COMP ASSAY
1273				2895	2900	5.0	0.02	1272-1278
1274				2900	2905	5.0	0.01	.02 %Cu
1275				2905	2910	5.0	0.06	1.15 %S
1276				2910	2915	5.0	0.03	
1277				2915	2920	5.0	0.03	
1278				2920	2925	5.0	0.01	
1279		1.0	100	2925	2926	1.0	0.04	
1280		1.5	30	2926	2931	5.0	0.03	
1281		1.0	100	2931	2932	1.0	0.02	
1282		3.5	88	2932	2936	4.0	0.02	
1283		5.0	100	2936	2941	5.0	0.04	
1284		3.5	100	2941	2944.5	3.5	0.08	
1285		4.5	100	2944.5	2949	4.5	0.04	
1286		4.0	88	2949	2953.5	4.5	0.02	
1287		2.0	80	2953.5	2956	2.5	0.10	
1288		2.0	100	2956	2958	2.0	0.11	
1289		3.0	100	2958	2961	3.0	0.06	
1290		2.0	66	2961	2964	3.0	0.01	
1291		4.0	100	2964	2968	4.0	0.20	
1292		2.5	62	2968	2972	4.0	0.07	
1293		5.0	100	2972	2977	5.0	0.03	
1294		4.5	90	2977	2982	5.0	0.02	
1295		0.5	50	2982	2983	1.0	0.04	
1296		2.0	66	2983	2986	3.0	0.14	
1297		2.5	86	2986	2989	3.0	0.12	
1298		1.5	50	2989	2991	3.0	0.11	COMP ASSAY
1299		5.0	100	2991	2996	5.0	0.05	1291-1312
1300		3.0	100	2996	2999	3.0	0.03	%Cu .07
1301		4.5	90	2999	3004	5.0	0.03	
1302		3.5	88	3004	3008	4.0	0.02	S =1.38
1303		0.5	50	3008	3009	1.0	0.01	
1304		2.5	63	3009	3013	4.0	0.03	
1305		1.0	25	3013	3017	4.0	0.06	
1306		1.0	100	3017	3018	1.0	0.10	
1307		3.0	100	3018	3021	3.0	0.21	
1308		3.0	100	3021	3024	3.0	0.16	
1309		3.0	100	3024	3027	3.0	0.15	
1310		5.0	100	3027	3032	5.0	0.07	
1311		2.0	100	3032	3034	2.0	0.02	
1312		5.0	100	3034	3039	5.0	0.11	
1313		4.0	80	3039	3044	5.0	0.09	
1314		4.5	90	3044	3049	5.0	0.04	
1315		5.0	100	3049	3054	5.0	0.09	%Cu = .05
1316		2.5	50	3054	3059	5.0	0.06	%S = .34
1317		3.0	100	3059	3062	3.0	0.13	
1318		2.0	100	3062	3064	2.0	0.01	
1319		5.0	100	3064	3069	4.0	0.07	
1320		2.5	100	3069	3072.5	2.5	0.01	
1321		5.0	100	3072.5	3077.5	5.0	0.02	COMP ASSAY
1322		4.5	82	3077.5	3083	5.5	0.01	1321-1320
1323		4.5	90	3083	3088	5.0	0.07	.036Cu
1324		3.5	88	3088	3092	4.0	0.07	.23 %S
1325		4.5	100	3092	3096.5	4.5	0.02	

DRILL HOLE SAMPLES

PAGE 3 OF

PROPERTY: SAFFORD PROJECT | DISTRICT: CONE STAR | COUNTY: GRAHAM | STATE: ARIZ | COUNTRY: U.S.A

HOLE NO.: ES-1 | CONTRACTOR: JOY | COLLAR COORD. N E | COLLAR ELEV.

BEARING | INCLINATION: VERTICAL | DEPTH | STARTED STOPPED

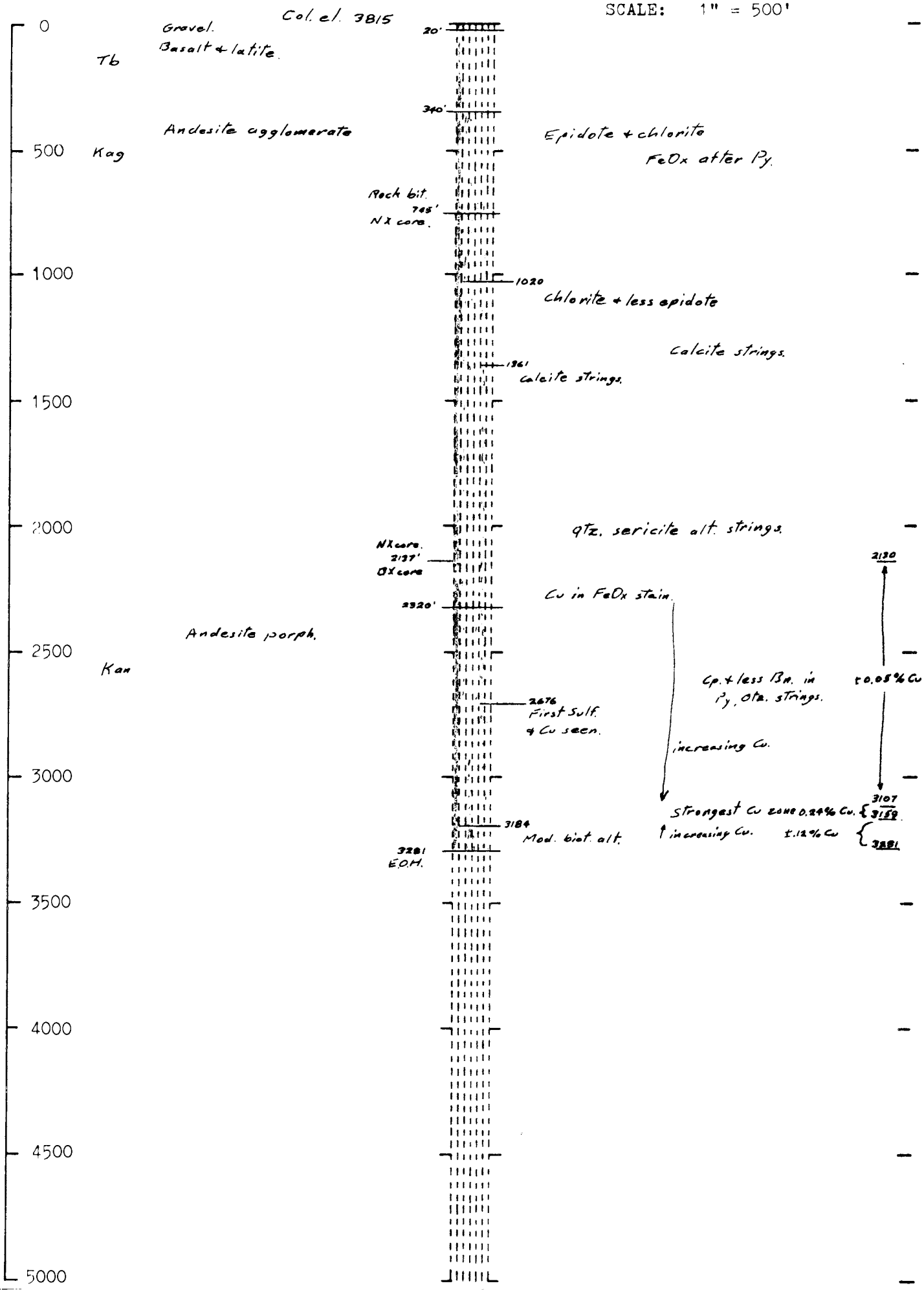
SAMPLE NUMBER	BIT SIZE	RECOVERY FEET	RECOVERY %	DRILL RUN FROM	DRILL RUN TO	INT.	ASSAYS % Cu	REMARKS
1326		3.0	86	3096.5	3100	3.5	0.05	
1327		3.0	100	3100	3103	3.0	0.06	
1328		3.0	75	3103	3107	4.0	0.02	
1329		2.0	100	3107	3109	2.0	0.55	
1330		4.5	90	3109	3114	5.0	0.08	
1331		2.0	100	3114	3116	2.0	0.13	
1332		4.0	100	3116	3120	4.0	0.35	
1333		5.0	100	3120	3125	5.0	0.30	
1334		5.0	100	3125	3130	5.0	0.14	3107 - 3159' 52' 0.24% Cu
1335		5.0	100	3130	3135	5.0	0.08	
1336		3.0	100	3135	3138	3.0	0.16	
1337		5.0	91	3138	31435	5.5	0.21	
1338		5.0	100	31435	31485	5.0	0.65	
1339		5.0	100	31485	31535	5.0	0.14	
1340		5.5	100	31535	3159	5.5	0.24	
1341		5.0	100	3159	3164	5.0		
1342		4.5	90	3164	3169	5.0		
1343		5.0	100	3169	3174	5.0	0.05	
1344		5.0	100	3174	3179	5.0	0.10	.19 % Cu
1345		5.0	100	3179	3184	5.0	0.10	1.57 % S
1346		5.0	83	3184	3190	6.0	0.04	
1347		2.1	84	3190	31925	2.5	0.02	
1348		4.4	89	31925	31975	5.0	0.08	
1349		4.5	100	31975	3202	4.5	0.08	
1350		3.0	100	3202	3205	3.0	0.03	
1401		5.0	100	3205	3210	5.0	0.00	
1402		4.8	96	3210	3215	5.0	0.14	
1403		5.0	100	3215	3220	5.0	0.27	% Cu = .10
1404		5.0	100	3220	3225	5.0	0.06	
1405		4.5	90	3225	3230	5.0	0.19	S % = .54
1406		5.0	100	3230	3235	5.0	0.03	
1407		4.5	90	3235	3240	5.0	0.04	
1408		5.0	100	3240	3245	5.0	0.02	
1409		5.0	100	3245	3250	5.0	0.04	
1410		5.0	100	3250	3255	5.0	0.04	
1411		5.0	100	3255	3260	5.0	0.07	
1412		2.0	100	3260	3263	3.0	0.04	
1413		5.0	100	3263	3268	5.0	0.21	
1414		5.0	100	3268	3273	5.0	0.03	
1415		5.0	100	3273	3278	5.0	0.11	
1416		2.8	97	3278	3281	3.0	0.41	

ES 1

Essex

Aug. 25, 1971 – Nov. 26, 1971

SCALE: 1" = 500'



PETROGRAPHIC ANALYSIS

Date 10-1-71

Analyst JAF

Sample No. ES-1 1103'

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Mostly fine-grained somewhat friable rock. Light-gray with Fe_2O_3 stain. Iron oxide is mostly in small "circular" areas giving a spotted appearance to the rock. The rock is fractured.

Thin section Texture - fine-grained hypautomorphic porphyritic. Phenocrysts are approx 1mm or ~~smaller~~ in size.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
Plagioclase	
Quartz	
Sericite	
epidote	
biotite	
hematite	
Sphene?	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase - altered euhedral plagioclase phenocrysts make up approximately 40% of the rock. The longest dimension averages about 1mm in length. Within a given area a rough preferred orientation of the laths seems present but the direction varies throughout the section. All of the plagioclase phenocrysts are altered with Sericite being by far the most common alteration product. Epidote and a pale yellow biotite are much less abundant alteration products.

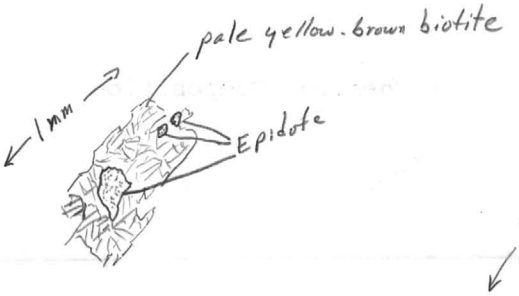
Biotite - Probably the second most abundant mineral in the slide is a pale-yellow biotite. It occurs mostly as fairly large patches throughout the rock. These patches ~~are~~ consist of masses of fairly fine-grained biotite. The overall shape of these larger patches suggests that they may have been larger biotite flakes that have recrystallized.

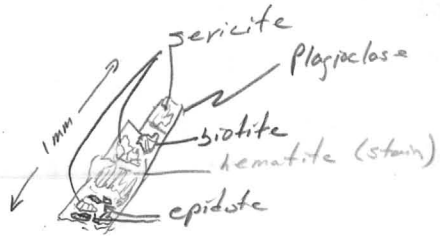
A small amount of epidote occurs in some of the patches of biotite. A small amount of this biotite occurs within plagioclase phenocrysts and appears to be forming from the ~~host~~ plagioclase.

Hematite - hematite occurs as grains up to .8mm in diameter and as much finer grained "disseminations". The larger grains are often surrounded by a red iron oxide stain.

Quartz - a few small grains of quartz were identified in the groundmass and appear to be primary minerals in the rock.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)





PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Primary minerals	Alteration
Plagioclase	sericite, epidote, biotite
mafics (Amphibole? biotite?)	biotite, epidote
magnetite?	hematite

The sample differs from 1011' in having a much greater hematite content, the presence of biotite and the absence of calcite and chlorite

A small spherical body slightly greater than 1mm in diameter is composed of an unidentified translucent material. under reflected light a few small grains of ~~that~~ what appears to be pyrite were observed. No other sulfides are present

PETROGRAPHIC ANALYSIS

Date 11-23-71

Analyst JAF

Sample No. 2746' ES-1

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Light gray, fine-grained porphyritic rock. Some areas are darker gray w/ fewer phenocrysts. Pyrite along fractures.

Thin section texture: mostly fine-grained, porphyritic.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase	
magnetite	
K-feldspar	
chlorite	
biotite (?)	
sericite	epidote
hematite	
sulfide	

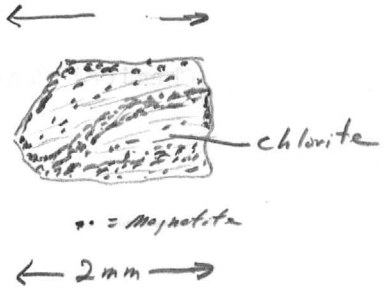
MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase is very abundant. Most grains are cloudy and contain some fine-grained sericite. Magnetite is fairly abundant as small irregular grains, some are reddish around the edges in reflected light indicating some alteration to hematite. Apparently the small black specks seen in hand specimen are magnetite. K-feldspar is present in minor amounts as fine-grained material. Some fine-grained quartz is also present.

In the darker colored parts of the core a green mineral is abundant. Some of this is chlorite and some is a very fine-grained material w/ higher birefringence and is probably a fine-grained biotite that seems to be forming from chlorite. Magnetite & sulfides are more abundant in

These areas. Epidote is a very minor constituent. One large ore of chlorite & magnetite is sketched below.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Probably an altered andesite

PETROGRAPHIC ANALYSIS

Date 11-22-71

Analyst JAF

Sample No. FS-1 2731'

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Pinkish gray, porphyritic rock. Mostly fine-grained. Chalcopyrite & Fe-oxides along fractures.

Thinsection texture: fine- to medium-grained, porphyritic. Poorly defined flow structure.

THIN SECTION MINERALOGY

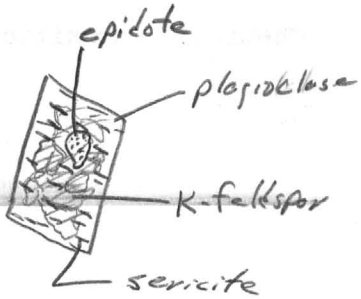
Mineral	Chemical Composition
Plagioclase	
K-feldspar	
Quartz	
opaques	
Epidote	Calcite
Sericite	
Chlorite	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase occurs as two distinct grain sizes. Fairly large plagioclase phenocrysts are fairly abundant and much smaller plagioclase laths make up approx 50% of the groundmass. The phenocrysts contain patches of K-feldspar, usually near the central portions of the crystals with plagioclase rims. A few phenocrysts apparently contain little or no K-feldspar as they would not take a Na-Cobaltinitrate stain. Sericite & epidote are abundant as alteration products of plagioclase.

Fine-grained K-feldspar occurs in the groundmass with plagioclase and minor quartz. Chlorite occurs as small patches in the groundmass. Calcite is rare occuring as patches. Opaque minerals are black in reflected light, suggesting magnetite or ilmenite.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

This rock is texturally similar to most of the previous samples but appears to contain much more K-feldspar. Phenocrysts are less abundant than in most of the previous samples.

PETROGRAPHIC ANALYSIS

Date 11-23-71

Analyst JAF

Sample No. 2880' ES-1

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray porphyritic fine- to medium-grained rock. Disseminated pyrite.

Thin section texture: fine-grained groundmass, medium-grained phenocrysts.

THIN SECTION MINERALOGY

Mineral		Chemical Composition
plagioclase		
Epidote		
biotite		
chlorite	Pyrite	
K-feldspar	magnetite	
Sericite	Calcite	
Quartz		

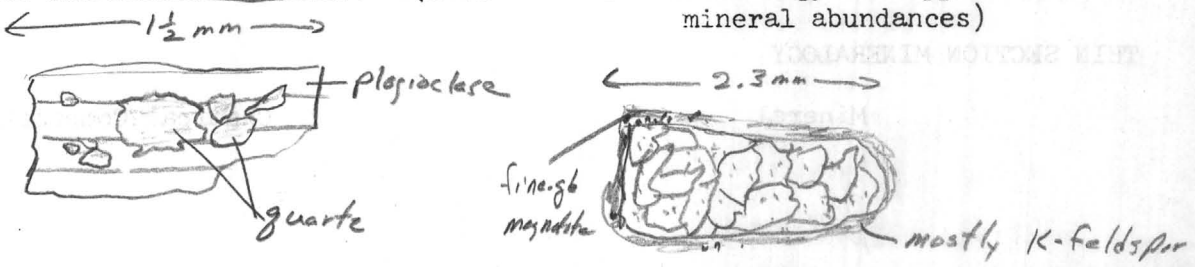
Good brown biotite!

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase occurs as phenocrysts 1-2 mm in length. Most crystals are fairly fresh with only flecks of sericite. A few appear to be partially replaced by quartz (sketch). Fine-grained biotite is very abundant in the groundmass. Epidote occurs as fairly large clusters of fine-grained crystals probably representing replaced mafic minerals. Some of these clusters are surrounded by a narrow rim of K-feldspar. K-feldspar is a very minor constituent occuring as mentioned above and as very fine grains in plagioclase or around the edge of plagioclase phenocrysts.

chlorite often forms narrow rims around pyrite grains, but a few larger grains are present. Quartz occurs as fine-grained material in the groundmass, in plagioclase grains and along veinlets w/ sericite & chlorite. sericite is mostly restricted to small veinlets where it is fairly coarse-grained. Pyrite is disseminated and occurs in veinlets. magnetite is fine-grained and occurs in the groundmass.

~~CHEMICAL COMPOSITION OF ROCK~~ (Estimated from mineralogy and approximate mineral abundances)



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

The fine-grained biotite in this rock resembles that in the core from Kennecott & P-D holes.

PETROGRAPHIC ANALYSIS

Date 11-10-71

Analyst JAF

Sample No. ES-1 (2565.3')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Red-brown fine-grained rock. A thin (1mm) "vein" of hematite cuts one side of the core. Hematite & possibly limonite make up or stain the rock for a distance of approx 2 cm away from the vein. The outer part of the core is a dark gray fine-grained rock. (see sketch)

Thin section Texture: mostly fine-grained. slightly porphyritic.

THIN SECTION MINERALOGY

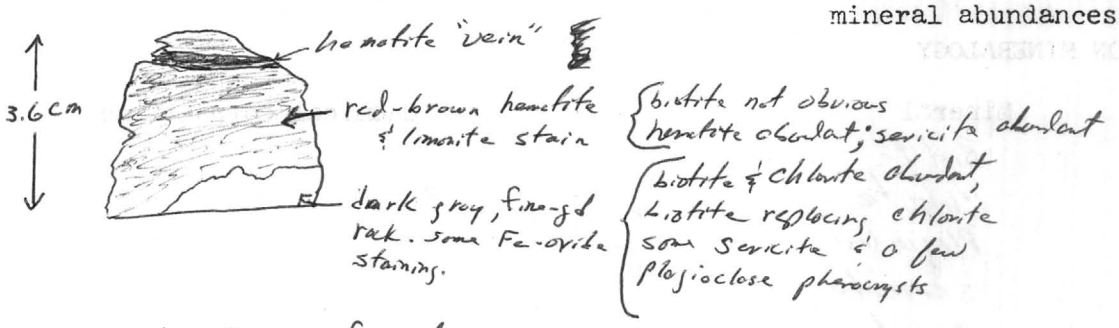
Mineral	Chemical Composition
Biotite	
Chlorite	
Plagioclase	
sericite	
quartz.	
magnetite	
hematite	
Calcite	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase phenocrysts are not very abundant. When present they are very cloudy & show sericite alteration. Both chlorite & biotite are present. They occur as fine-grained material in the groundmass (mostly biotite) and as larger patches (chlorite centers w/ biotite rims commonly). Biotite is replacing the chlorite and is more abundant than chlorite. Near the hematite "vein" biotite ~~[illegible]~~ & chlorite become less abundant and their place is taken by a translucent or transparent mass of hematite. Some sericite is present in the fresh rock and as the hematite vein is approached sericite becomes more abundant and coarser. Quartz is very fine-grained. Magnetite occurs as rather small black grains usually surrounded by red brown translucent hematite. Hematite & iron oxide staining increase rapidly toward the hematite vein.

Small veinlets of calcite parallel the hematite vein and only occur near it.

~~CHEMICAL COMPOSITION OF ROCK~~ (Estimated from mineralogy and approximate mineral abundances)



Sketch of core fragment

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Rock is strongly altered, Hematite appears to be in a strongly sheared area.

PETROGRAPHIC ANALYSIS

Date 11-10-71

Analyst JAF

Sample No. ES-1 (2527')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Red-brown fine-grained rock. Highly fractured ~~with~~ with "spots" of deep red-brown hematite

Thin section Texture: fine-grained, porphyritic.

THIN SECTION MINERALOGY

Mineral	Estimated %	Chemical Composition
plagioclase	50	
quartz	30	
sericite	10	
biotite	5	
epidote	5	
sphene		
magnetite		
hematite		

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Sericite is pervasive although it is more abundant in the groundmass than in the plagioclase phenocrysts. Phenocrysts are not too abundant and show ~~show~~ some sericite alteration and are cloudy. Quartz is abundant occurring mostly as ~~(illegible)~~ "patches"; some may be ~~secondary~~ secondary. Biotite ~~are~~ is fine-grained and occurs as irregular patches scattered throughout the thin section. Small grains of magnetite are present. Some have a red border suggesting alteration to hematite. Red hematite stains parts of the section. Epidote is not too abundant. It occurs as roughly spherical aggregates up to 1mm across.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

PETROGRAPHIC ANALYSIS

Date 11-10-71

Analyst JAF

Sample No. ES-1 (2469')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray fine-grained porphyritic rock. Reddish stain along fractures. A white fiberous substance coats some fractures.

Thinsection Texture: Fine- to medium-grained porphyritic; subparallel arrangement of phenocrysts (flow structure).

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase	
opaques (magnetite, hematite)	
chlorite	
Quartz	
epidote	
sphene(?)	
biotite	
sericite	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase phenocrysts are mostly fresh. Some are cloudy & a small amount of sericite occurs along fractures. Many plagioclase crystals are zoned. Chlorite is abundant in the groundmass. Some masses of chlorite have a dark green central area ~~which~~ with higher birefringence which appears to be a variety of biotite. Texturally, the chlorite seems to be replacing the biotite in some areas. Biotite appears to be aggregates of extremely fine-grained material. A few patches of epidote are present. Quartz is minor and occurs in the groundmass. Fine-grained magnetite is abundant and is ~~also~~ associated with chlorite and biotite in the groundmass.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Phenocrysts are very abundant and show some parallel orientation suggesting a flow rock.

PETROGRAPHIC ANALYSIS

Date 11-10-71

Analyst JAF

Sample No. ES-1 (2493')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray, fine-grained porphyritic rock. Some areas are reddish.

Thin section Texture: fine- to medium-grained, porphyritic. Some alignment of small plag. needles suggesting flow.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase	
epidote	
chlorite	
calcite	
magnetite	
hematite	
sphene (?)	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

plagioclase phenocrysts are fairly abundant, most are ~~fast~~ fresh although some contain a few grains of epidote, and some are cloudy. chlorite is slightly less abundant than in (2465') but is still fairly abundant as rather large aggregates. Biotite seems to be absent. A few patches of calcite are present. Epidote is fairly abundant, usually intergrown with chlorite. Quartz occurs in the groundmass. Fine-grained opaque minerals are mostly magnetite with some hematite around the edges.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

PETROGRAPHIC ANALYSIS

Date 9-20-71

Analyst JAF

Sample No. ES-1 (1011')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Greenish-gray heterogeneous, fine-grained groundmass with larger "phenocrysts" of altered plagioclase and bright green epidote.

Texture - mostly fine- to medium grained porphyritic. Euhedral plagioclase & mafic minerals in a fine-grained groundmass. Fragmental(?) in part. Proportions of phenocrysts & groundmass change from area to area

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase (too badly altered to determine composition)	
Epidote	
chlorite	
sericite	
Carbonate	
opaques (magnetite?)	
quartz ? (very fine-gd. in groundmass)	
Sphene	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase phenocrysts - too badly altered to determine composition. Some euhedral others anhedral. Size varies, largest grains ≈ 2mm. Alteration products are sericite, epidote and Calcite. Sericite appears to be slightly more abundant than the other two and is rather coarse. It occurs as irregular masses throughout the plagioclase. Calcite is slightly more abundant than epidote and commonly occurs as a fairly large (up to ½mm) mass. Epidote is slightly less abundant as an alteration product of plagioclase and is usually present as fairly small grains scattered through the plagioclase.

Sericite, Carbonate and epidote also occur in the fine-grained groundmass. Because of the grain size their exact relationship is not clear (over)

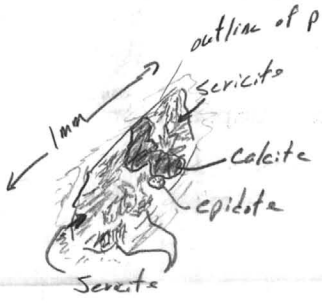
but they appear to be forming from finer-grained plagioclase present in the groundmass. ~~Fair~~

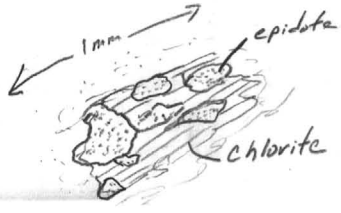
Fairly coarse-grained epidote occurs in patches sometimes associated w/ chlorite. Apparently these masses represent completely altered mafic minerals perhaps hornblende or biotite. Several smaller shreds of chlorite are present independent of epidote. Texturally these suggest replacement of biotite, but no biotite remains. A few small grains of sphene are present in the larger patches of chlorite & epidote.

A few small opaque grains are present. These are black in reflected light and are probably magnetite. Some are ~~slight~~ reddish around the edges suggesting partial oxidation to hematite. No sulfides were identified.

The fine-grained groundmass has a low birefringence and appears to be mostly feldspar. Under high power it appears that a little quartz may be present but quartz could not be definitely identified. If present it appears to be a primary mineral and no secondary quartz was recognized. Chlorite is fairly abundant in the groundmass and may represent altered biotite.

~~CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)~~





PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Texturally the rock appears to be pyroclastic, at least in part, thus the term agglomerate or tuff is probably correct. The composition is probably close to that of andesite. Alteration appears to be rather strong (pervasive) & seems to be propylitic in nature.

Original mineralogy	Alteration
Plagioclase	Sericite, Calcite, epidote
hornblende (?)	epidote, chlorite
biotite	chlorite

No orthoclase was recognized, but a small amount might be present in groundmass. quartz, if present, is in groundmass.

PETROGRAPHIC ANALYSIS

Date oct 18, 1971

Analyst JAF

Sample No. ES-1 2037

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Light gray, mostly fine-grained rock w/ inclusions. Sample grades from a bleached light gray color to a darker green. Abundant iron oxide stain. Numerous fractures.

Thin section texture: Difficult to determine because of pervasive alteration & Fe staining. Appears to be porphyritic.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
Chlorite	
sericite	
Quartz	
hematite	
magnetite	
Altered plagioclase	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Strongly altered. Sericite abundant throughout rock. Fe staining makes exact identification difficult but plagioclase phenocrysts seem to be completely altered to sericite & stained a red-brown by iron oxides. Quartz is present in the groundmass. Chlorite occurs as scattered irregular aggregates. No sulfides were observed; small opaque grains are black in reflected light and apparently magnetite. Areas around these grains are the most heavily stained. The groundmass appears to be mostly sericite and quartz.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

PETROGRAPHIC ANALYSIS

Date 10-18-71

Analyst JAF

Sample No. FS-1 2071

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray fine- to medium-grained rock. Some small fragments of a darker green-gray rock. Several fractures.

Thin section texture: Mostly fine-grained porphyritic. Euhedral plagioclase phenocrysts.

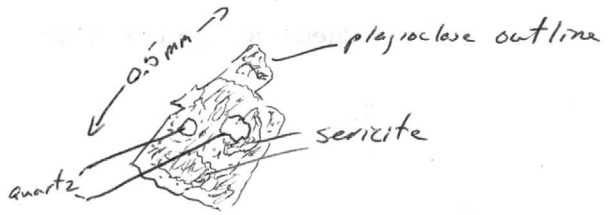
THIN SECTION MINERALOGY

Mineral	Chemical Composition
Plagioclase	
Chlorite	
Sericite	
Epidote	
Quartz	
hematite	
talc (?)	
Sphene	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase phenocrysts altered to sericite w/ some secondary quartz. There may be some clay alteration but if so it is not as abundant as sericite. Epidote is very minor. A fine-grained mineral w/ high birefringence occurs along fractures and is probably talc or serpentine. Chlorite occurs as irregular aggregates up to 0.5 mm in diameter and as fine-grained material in some areas. Alteration is pervasive.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

PETROGRAPHIC ANALYSIS

Date 10-13-71

Analyst JAF

Sample No. 101

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Light gray, fine-grained rock w/ rounded fragments of a darker green rock (mostly chlorite?) and some fragments that appear to be mostly epidote.

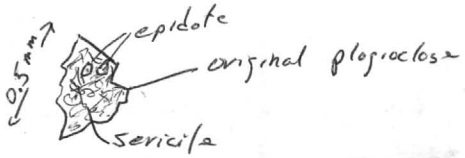
Thin section Texture: Porphyritic, fine-grained groundmass with medium-grained phenocrysts, [redacted] non homogeneous.

THIN SECTION MINERALOGY

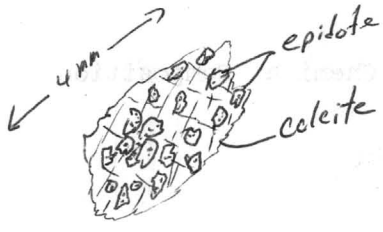
Mineral	Chemical Composition
plagioclase	
calcite	
epidote	
chlorite	
quartz	
hematite	

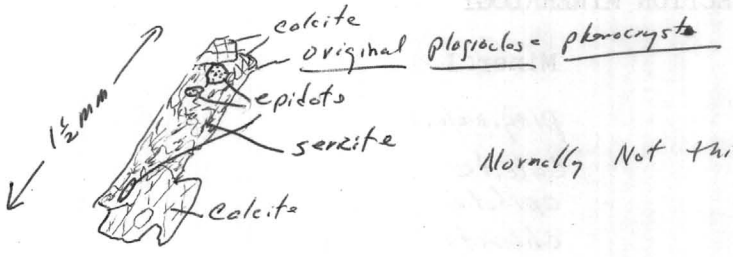
MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase occurs as subhedral phenocrysts up to 2.mm in length. Alteration is very intense so that in most cases all that is seen is the outline of the original plagioclase grain. Sericite is the most abundant alteration product of plagioclase. calcite and epidote are much less common. Epidote is very abundant in the rock occuring as fine-grained mass with a more or less rounded shape (the larger masses are obvious in the hand specimen. In other areas intergrowths of calcite and epidote occur. It is not obvious what these masses are replacing. A small amount of quartz is present and appears to be a primary mineral. In some areas the groundmass does not appear to be extensively altered. Because of fine-grain size the mineralogy cannot be determined. Low birefringence suggests feldspar w/ possibly some quartz in these areas.



CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)





Normally Not this much calcite

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

original mineral	alteration
Plagioclase	sericite, epidote, calcite
hornblende ?	epidote ± chlorite
biotite	chlorite

Alteration appears to be propylitic. Plagioclase seems to be more extensively altered to sericite than in sample #113.

PETROGRAPHIC ANALYSIS

Date 10 - 12 - 71

Analyst JAF

Sample No. 113

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray, Porphyritic. Several rather large darker areas also w/ phenocrysts Groundmass is fine-grained. Appears to be agglomerate or similar rock. Seams to be denser w/ more hazy outlines of fragments than shallower samples

Thin section Texture - fine-grained groundmass w/ phenocrysts up to 2.5 mm. Large fragments of a similar rock type also w/ phenocrysts. Phenocrysts in inclusions have a subparallel ~~orientation~~ orientation in some cases. Phenocrysts are plagioclase.

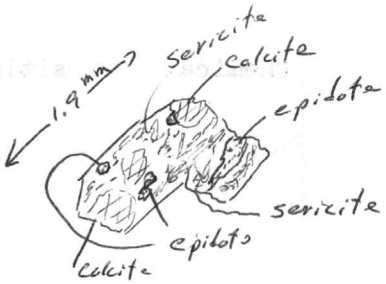
THIN SECTION MINERALOGY

Mineral	Chemical Composition
Plagioclase	
chlorite	
epidote	
Calcite	
magnetite	
Sphene (?)	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase occurs as euhedral phenocrysts up to 2.5 mm in length. Phenocrysts are very abundant, making up at least 50% of rock. All are altered. The most common alteration product of plagioclase is sericite. Epidote and calcite are abundant as alteration products of plagioclase. Fairly large masses of chlorite appear to have replaced biotite. Very fine-grained chlorite is abundant in the groundmass in the darker areas of the rock. Magnetite is fairly abundant and is slightly altered to hematite or limonite. No quartz or K-feldspar was identified although small amounts may be present in the fine-grained groundmass. The alteration seems to be propylitic and seems about the same as in the sample from 1011'.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Original Mineral	Alteration Products
Plagioclase	sericite, epidote, calcite
biotite	chlorite

PETROGRAPHIC ANALYSIS

Date 10-21-71

Analyst JHF

Sample No. ES-1 2136'

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Fine-grained reddish brown rock w/ some included fragments of a greenish rock.

Thin section texture: fine- to medium-grained porphyry. Euhedral plagioclase phenocrysts set in a fine-grained matrix.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase	
Quartz	
Chlorite	
epidote	
Magnetite	
hematite	
sericite	
Carbonate	
sphene ?	

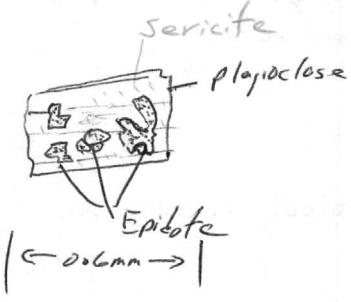
MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, texture, relationships with adjacent minerals)

Intensity of plagioclase alteration varies. (Some grains are not badly altered while others are quite altered. Epidote is the most common alteration mineral. Sericite is fairly abundant also. Calcite is a rare alteration product of plagioclase. Some plagioclase grains have a "cloudy" appearance.

Coarse masses of chlorite up to 3 mm across occur throughout the rock. Finer-grained chlorite is common in the groundmass. Magnetite is very abundant in areas rich in chlorite. It occurs as very fine-grained occassionally euhedral crystals and as aggregates of very fine-grained material. In reflected light the opaque grains are red-brown around the edges indicating hematite or limonite.

A small (<1mm) quartz veinlet cuts the rock. Sericite seems to be slightly more abundant along the margins of this vein.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)



PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

In general the plagioclase appears fresher than in sections of similar rock from above. Epidote is present in similar amounts but sericite is less abundant as an alteration product of plagioclase. Chlorite appears to be more abundant than in some previous samples as well as magnetite. No sulfides were recognized.

PETROGRAPHIC ANALYSIS

Date 11-21-72

Analyst JAF

Sample No. ES-1 3275

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray, heterogeneous, fine-grained. One half of specimen is coarser-grd. than other part. Contact between two rock types or a fragment in an agglomerate or breccia.

Thin section Texture: part of this section is porphyritic w/ numerous plagioclase phenocrysts. other part is very fine-grd. w/ almost no phenocrysts. Both parts contain irregular areas of very fine-grd. biotite but these are larger in the part without plagioclase phenocrysts.

THIN SECTION MINERALOGY

Approx. %	Mineral	Chemical Composition
45	plagioclase	
40	Biotite	
	Anhydrite	
5	Black opaque (magnetite?); sulfide??	
	Chlorite	
	Apatite	orthoclase
5	Quartz	Calcite
		epidote

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase - euhedral phenocrysts (0.5-1mm) very abundant in part of slide. Most crystals are zoned, with most zones being very fresh while a few interior zones in some crystals are altered. Alteration products are mostly a very fine-grained biotite, with a pale green chlorite and anhydrite being much less abundant. One plagioclase crystal is partially replaced by anhydrite & calcite, these being surrounded by a narrow rim of orthoclase. ~~This is the only occurrence in the slide~~ Very thin irregular areas of orthoclase occur in other plagioclase crystals, especially where anhydrite is present. ~~Some~~ much of the anhydrite is ~~rimmed~~ rimmed or otherwise associated w/ orthoclase but the total orthoclase content of the rock is < 1 % and

it all appears to be secondary

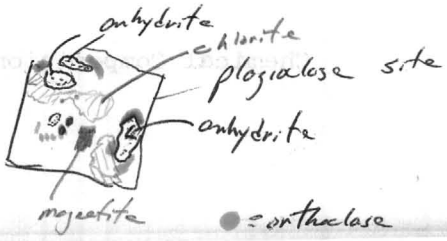
Biotite – biotite is very abundant. It is greenish brown and very fine-grained usually occuring as fairly large patches. Magnetite is very abundant in some areas where biotite is abundant.

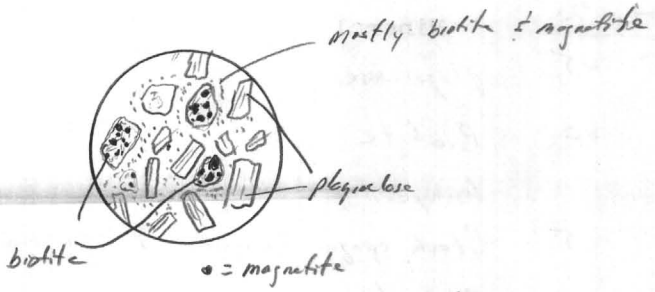
Quartz – a few phenocrysts of quartz are present in the porphyritic part of the slide. In the other part of the slide very fine-grain quartz make up much of the slide in some areas.

Anhydrite – fine-grained anhydrite is scattered throughout the slide but is more abundant in the non porphyritic part of the slide

only one grain of epidote was recognized.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)





Not typical of whole slide

but is like this near the contact between the porphyritic & non porphyritic zone

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

PETROGRAPHIC ANALYSIS

Date 12-5-71

Analyst JAF

Sample No. ES-1 (3077')

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Light gray, dense, f.m-gd rock w/ some dark specks up to 3mm. Groundmass looks very dense

Thin section Texture: Mostly fine-grained, hypautomorphic porphyritic -

THIN SECTION MINERALOGY

Mineral	Chemical Composition
Plagioclase (phenocrysts)	
Chlorite	
Biotite	
Sericite	
Quartz	
Magnetite	
Calcite	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Plagioclase - Phenocrysts up to 2 mm in length, subhedral. Most grains are zoned. Many grains are fractured. Sericite alteration is strong but is confined to fractures and certain zones in zoned xtals. Other parts of the xtals are unaltered.

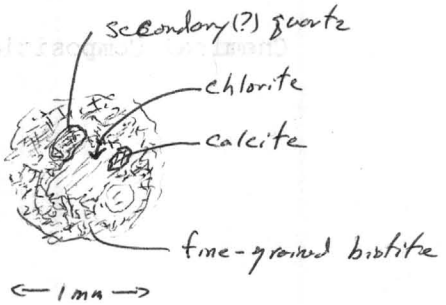
Chlorite & Biotite - Chlorite & biotite occur together as roughly spherical masses up to 1.5 mm in diameter. Biotite appears to be replacing chlorite and usually occurs near the edges of the masses w/ the chlorite forming the central part. Some masses are almost all biotite (fine-grained). Minor Calcite is present in some masses. (See sketch). Probably altered mafic minerals originally present.

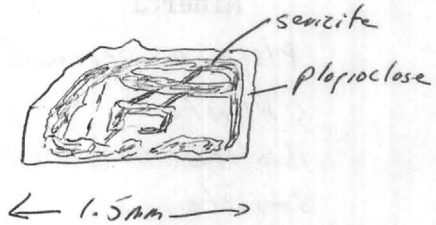
magnetite – fine-grained w/ irregular shape. Not very abundant.

Quartz – fine-grained, irregular grains <0.5mm. most appears to be primary but some is probably secondary.

Groundmass – Extremely fine-grained. Contains sericite in some areas. Too fine-grained to identify but apparently contains no K-feldspar as attempts to stain w/ Na-cobaltinitrite were unsuccessful.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)





PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Doesn't seem to be the andesite.

PETROGRAPHIC ANALYSIS

Date 12-5-71

Analyst JAF

Sample No. ES-1 3189'

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Very fine-grained dense rock. Dark gray, almost black.
Cut by small veinlets containing pyrite & silicate minerals

Thinsection Texture: Mostly very fine-grained, porphyritic (on microscopic scale)

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase	
Biotite	
Quartz	
Anhydrite	
Pyrite	
magnetite	
Apatite	
Sericite	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

plagioclase - Small (~½ mm) phenocrysts. Subhedral. Minor sericite alteration, mostly fresh. Some grains slightly cloudy.

quartz - Irregular shaped phenocrysts. Small (½ mm). Also some secondary quartz in veinlets.

Biotite - Biotite is fairly common in the groundmass and in fairly large masses. All is fine-grained and a yellow green color.

Chlorite - Some chlorite is present in the groundmass but much occurs within small veinlets as quartz & anhydrite. Some chlorite in the groundmass is partially replaced by biotite while that in the veinlets doesn't show any replacement.

Anhydrite - occurs in veinlets. f.-grained

Pyrite - in veinlets

Magnetite - in groundmass

Calcite - in veinlets.

Apatite - in veinlets

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

The original rock seems to have been composed of plagioclase, quartz & some mafic mineral. The mafic mineral has been replaced by chlorite which is in turn partly replaced by biotite. Secondary quartz, calcite, anhydrite & chlorite & pyrite occur in small veinlets. K-feldspar is absent.

PETROGRAPHIC ANALYSIS

Date 12-6-71

Analyst JAF

Sample No. 3229' ES-1

HAND SAMPLE DESCRIPTION (textures, structures, mineralogy, field name)

Dark gray heterogeneous rock. Rounded fragments in a lighter gray groundmass. A pink veinlet 1.5cm in diameter cuts the rock.

Thin section Texture: fragmental, fine-grained, porphyritic in some areas. Plag. phenocrysts in the darker areas show flow orientation.

THIN SECTION MINERALOGY

Mineral	Chemical Composition
plagioclase	
Quartz	
Biotite	
Chlorite	
Magnetite	
Calcite	
Apatite(?)	

MINERAL DESCRIPTIONS (Habit, Size, Zoning, Inclusions, Alteration, Texture, Relationships with adjacent minerals)

Biotite - rather large masses ~~of~~ of greenish fine-grained material. Some is replacing plagioclase

Veinlets contain ~~gun~~ quartz, calcite & chlorite

Fine-grained magnetite is abundant in parts of the slide

Plagioclase is of different sizes. In the darker areas of the rock the plagioclase laths show a preferred orientation suggesting flow.

CHEMICAL COMPOSITION OF ROCK (Estimated from mineralogy and approximate mineral abundances)

PETROLOGIC INTERPRETATIONS (Gross chemical changes, paragenesis, origin)

Vein Minerals:

Some Calcite near center

Other mineral: Biaxial (−)

$2V \approx 50°$ or less Closer to 40°

$n < 1.537$

$n_\beta \cong 1.505$

Stilbite

NOTES ON DDH S-1

3002 – 3017½ – Fine grained gray andesite porphyry. Feldspar appears nearly fresh, but probably much fine-grained biotite in groundmass. Estimated 3 to 5% FeS_2 both disseminated & on seams

3017½ – 3064± Rock type and alteration similar to above, 3 to 5% FeS_2, an occasional ~~see~~ very Thin seam $CuFeS_2$, some with covellite tarnish, also accompanied by small amounts unidentified gray mineral (very soft like MoS_2, but doesn't look right).

3064± – 3082 Very dense groundmass andesite porphyry, gray to light gray in color, Not sure of alteration but may not be as much biotite. Sulphides distinctly decreased (RH says 3058, I would pick 3067'). Minor FeS_2. Rock may contain sanidine phenocrysts, in part may be strongly sericitized.

3082 – 3103 Gradual rock type change – a little more grainy appearing groundmass probably because of fine biotite. Sparse seams FeS_2, more $CuFeS_2$.

3103 – 3143 Slightly coarser grained, light colored andesite porphyry, appears moderately to strongly sericitized, 3 to 5% disseminated FeS_2. 3121 – 3124 Thin seam $CuFeS_2$ with spots covellite tarnish parallels core. Below 3120 alteration weak.

3143 – 3180½ Similar to above – quite coarse for a volcanic rock – and becoming darker colored Than above. 3162' film $CuFeS_2$ – also @ 3176 & 3178

3180½ – Abrupt change to very fine grained black rock, probably strong biotite alteration. Estimated 1 to 2% FeS_2

mostly on seams, films $CuFeS_2$ @ 3183, 3197, 3199, 3201-2
3205-6, 3208, 3212 on

3213 — 3227 Biotite-altered agglomerate, fragments are mostly fine grained, black, matrix is coarser, porphyritic.
Estimated 3% ~~sulphide~~ FeS_2, more persistent $CuFeS_2$ than seen elsewhere in hole, much is on seams but locally some is disseminated in matrix of agglomerate

3227 - 3277 Darker colored, biotite-altered agglomerate, sulphides & especially $CuFeS_2$ appears decreased, 1-2% FeS_2, thin films $CuFeS_2$. Occasional veinlets pale salmon pink mineral

3277 - 3281 BOTTOM. Only local fragments as in agglomerate above, mostly andesite porphyry, strongly biotite altered. Estimated 2% FeS_2, $CuFeS_2$ on seams & disseminated increasing. See specimen 3 inches above bottom, 3280½'.

JKJ. 12-1-71

62
FEET LEFT
63
FEET LEFT
ES-1
2469'
Cu/Ni
14°
1.5184 - chlorite(?)
1.7744 - chlorite?
1.8207 - quartz
1.8344
100
90
80
70
60
50
40
30
20
10
0
22
20
18
16
14
60
58
56
54
52
50
48
46
44
42
40
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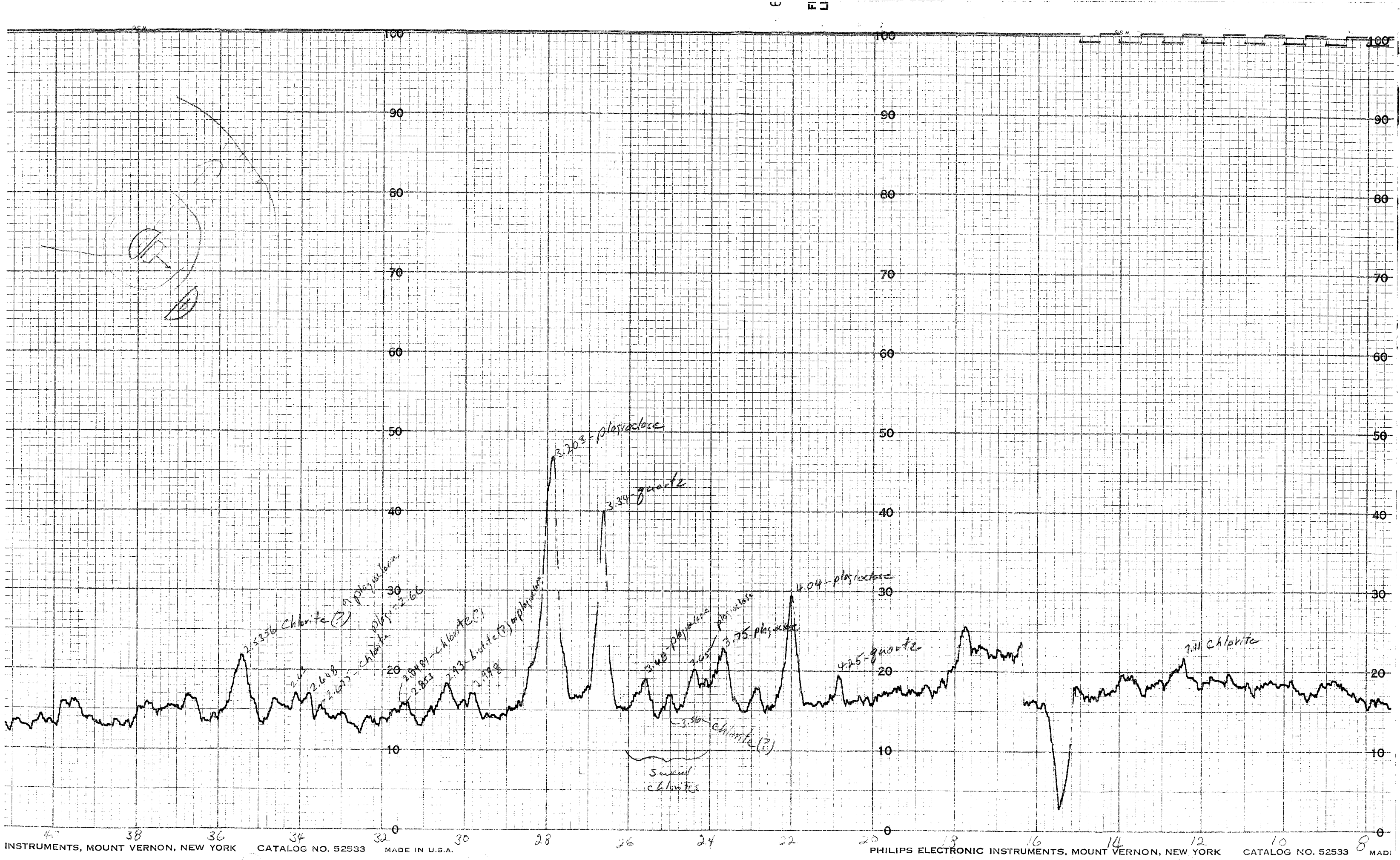

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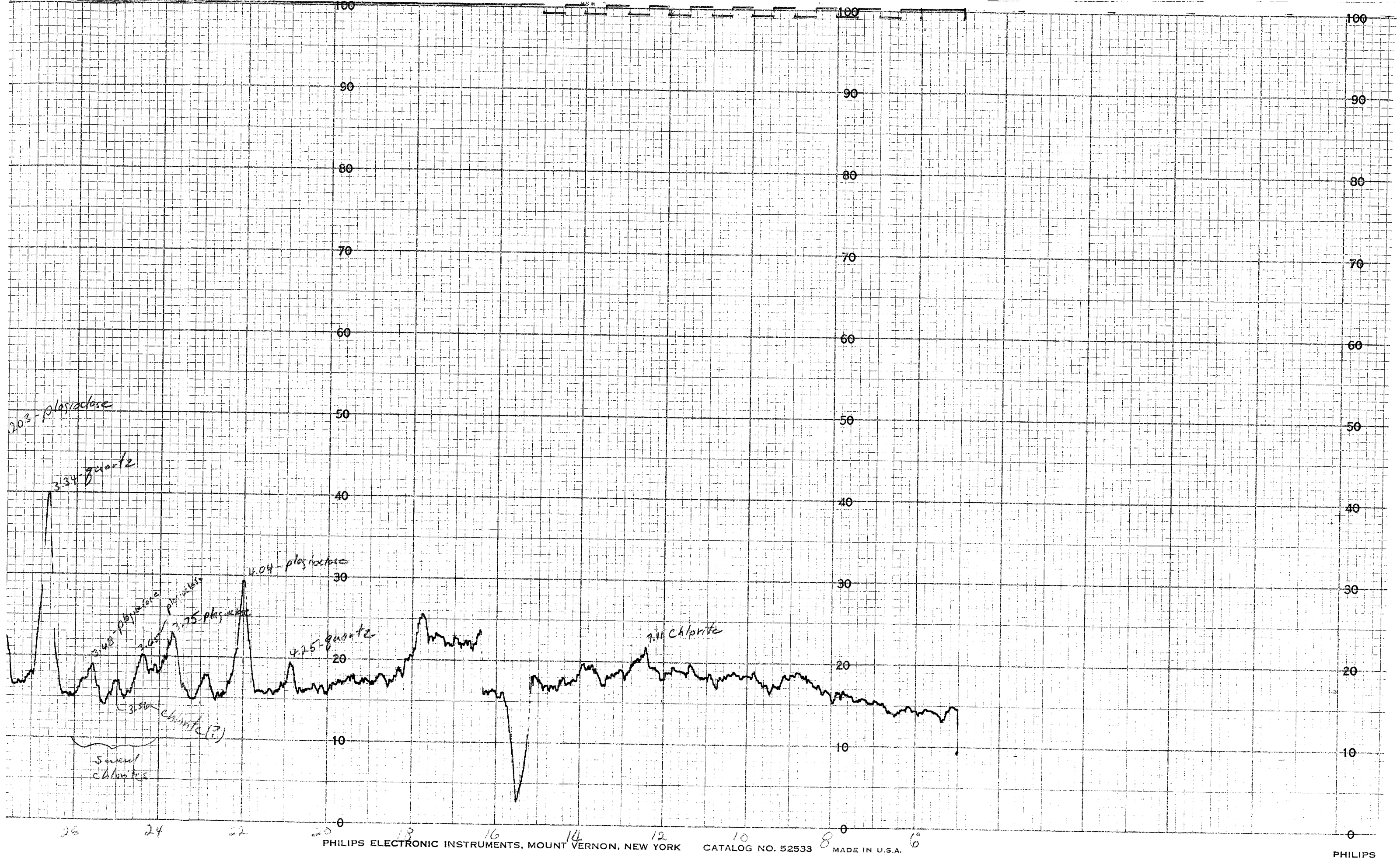

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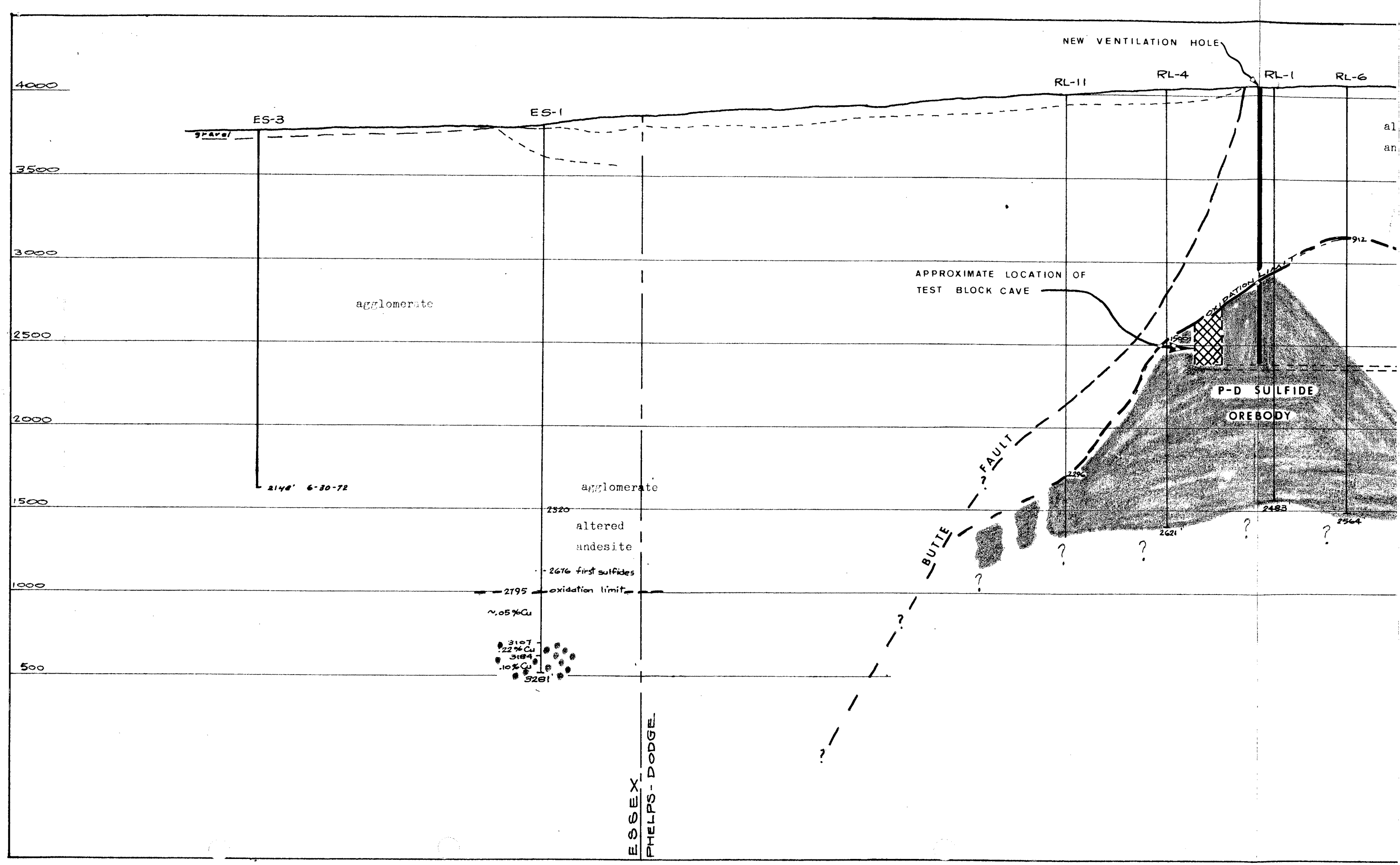
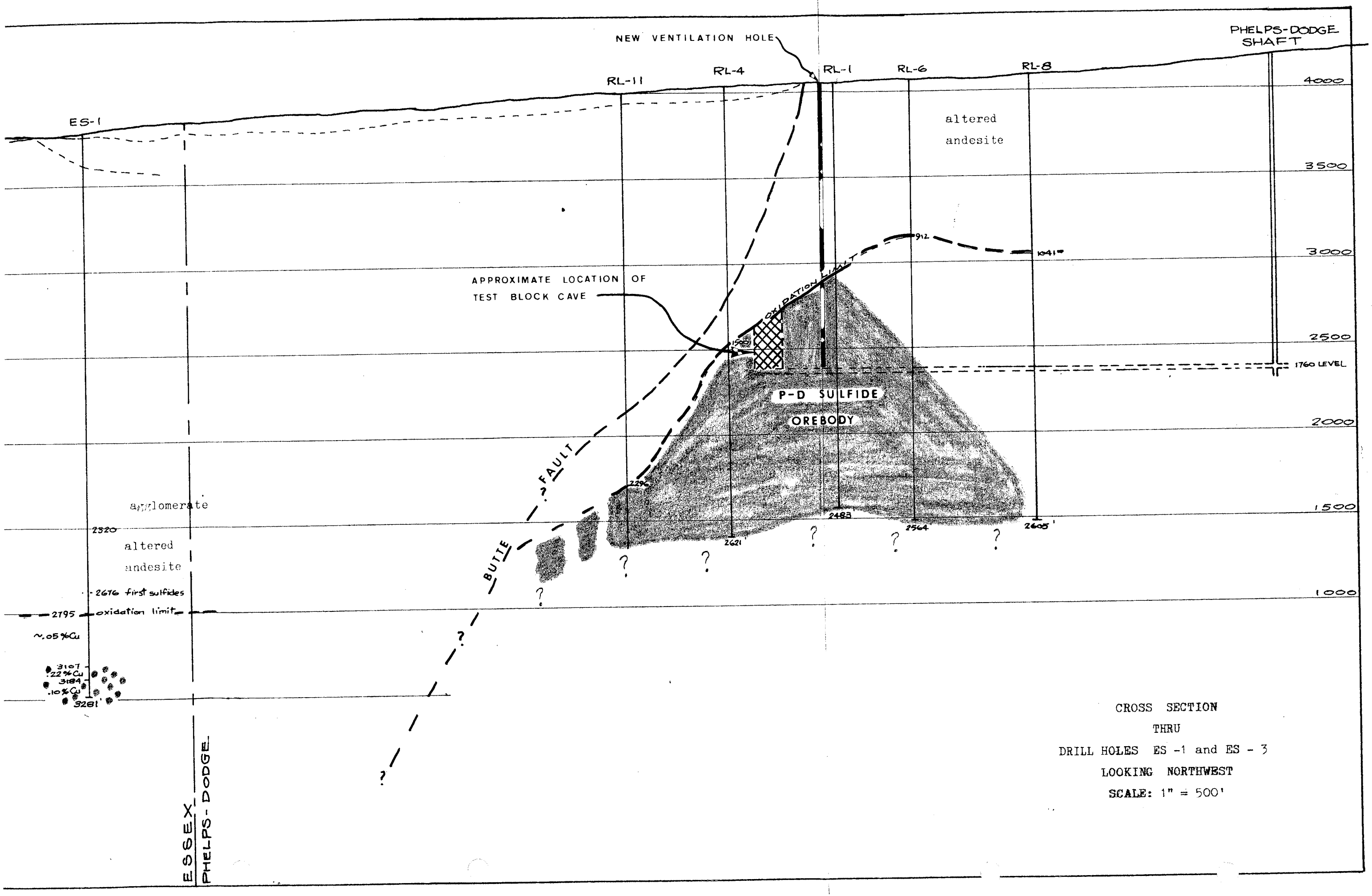
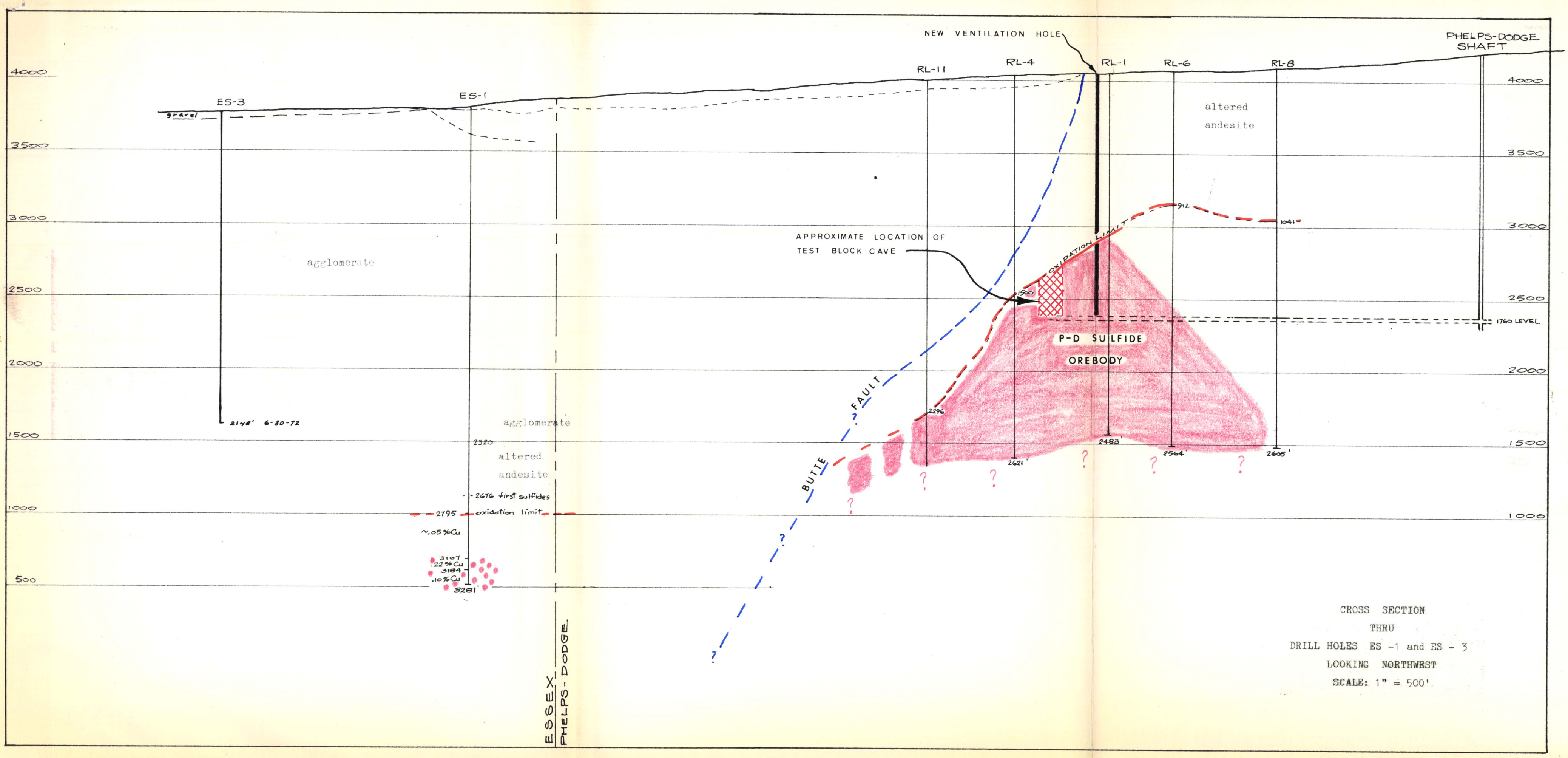


NEW VENTILATION HOLE
RL-11
RL-4
RL-1
RL-6
ES-3
ES-1
gravel
4000
3500
3000
2500
2000
1500
1000
500
agglomerate
2148' 6-30-72
agglomerate
2320
altered
andesite
2676 first sulfides
2795
oxidation limit
~.05%Cu
3107
.22%Cu
3184
.10%Cu
3281
APPROXIMATE LOCATION OF
TEST BLOCK CAVE
OXIDATION LIMIT
912
P-D SULFIDE
OREBODY
BUTTE FAULT
2296
2621
2483
2564
ESSEX
PHELPS-DODGE



CROSS SECTION
THRU
DRILL HOLES ES -1 and ES - 3
LOOKING NORTHWEST
SCALE: 1" = 500'



CROSS SECTION
THRU
DRILL HOLES ES -1 and ES - 3
LOOKING NORTHWEST
SCALE: 1" = 500'

ES-1
2469'
Cu/Ni
X-RAY
ES-1
2469'
14°
1.5789 - chlorite (?)
1.7744 - chlorite ?
1.8207 - quartz
1.8344
2.5356 Chlorite (?) or plagioclase
2.63
2.648
2.675 - chlorite
plag = 2.66
2.8489 - chlorite (?)
2.853
2.93 - biotite (?) or plagioclase
2.998
3.203 - plagioclase
3.34 - quartz
3.34 - quartz
3.48 - plagioclase
3.65
plagioclase
3.75 - plagioclase
3.56 - chlorite (?)
Several chlorites
4.04 - plagioclase
4.25 - quartz
7.11 Chlorite
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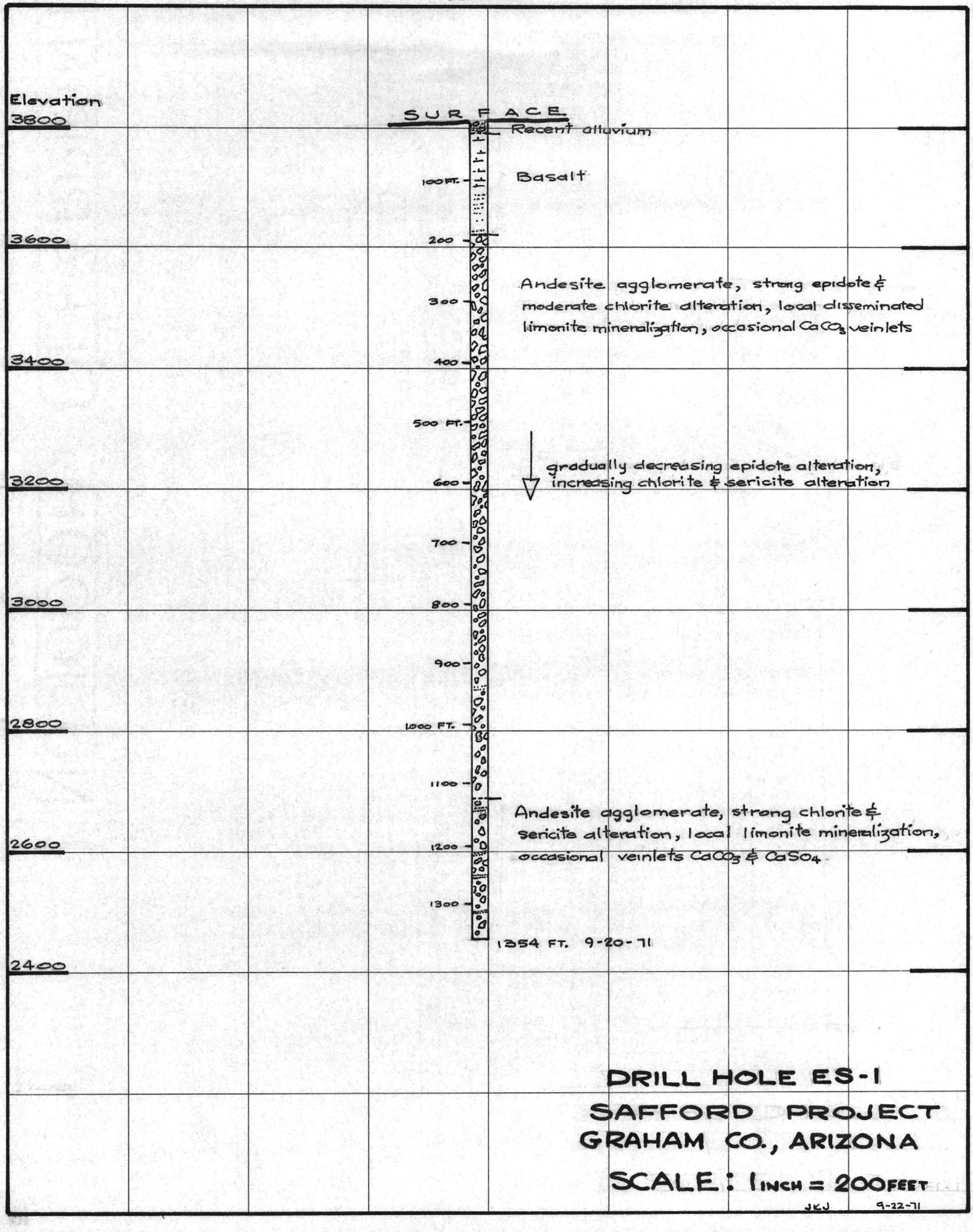
SALT LAKE BLUE

FORM 1006



DRILL HOLE ES-1

SAFFORD PROJECT

GRAHAM CO., ARIZONA

SCALE: 1 INCH = 200 FEET

JKJ 9-22-71

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ASSAYERS AND CHEMISTS, INC.
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TUCSON, ARIZONA 85703

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EL PASO, TEXAS
ST. LOUIS, MO.

IDENTIFICATION	GOLD oz/T	SILVER oz/T	LEAD %	COPPER %	ZINC %	MO. %	IRON %		
	ppm	ppm		ppm		ppm			
E 860	< 0.01	1.3		77		< 2			

SXM
OCT 4 1971
RECEIVED

REGISTERED ASSAYER
CERTIFICATE NO. 6784
M. E. RICHARD
Date Signed
Arizona U.S.A.

CC: Essex International, Inc
ADD: 1704 West Grant Road
CITY: Tucson, Arizona 85705
DD:
CITY:

REMARKS:
Trace analysis

ANALYSIS CERT. BY M. E. Richard

PREPARATION $ 1.25
ANALYSIS $ 7.75

HH3A ACC: ESSEX INTERNATIONAL, INC.

DATE SPL. RECEIVED 9/29/71 | DATE COMPL. 10/2/71 | TUC 345658 | $ 9.00

HAWLEY & HAWLEY
ASSAYERS AND CHEMISTS, INC.
1700 W. GRANT RD. • BOX 50106 • 622-4836
TUCSON, ARIZONA 85703

BRANCHES
DOUGLAS, ARIZONA
HAYDEN, ARIZONA
EL PASO, TEXAS
ST. LOUIS, MO.

IDENTIFICATION	GOLD OPT	SILVER OPT	LEAD %	COPPER %	ZINC %	MO. %	IRON %	Sulphide Sulphur %
Composite # 1 1291 thru 1312				0.07				1.38
Composite # 2 1313 thru 1320				0.05				0.34
Composite # 3 1346 thru 1350, 1401 thru 1416				0.10				0.54

REGISTERED ASSAYER
CERTIFICATE NO.
6784
H. E.
RICHARD
Arizona U. S. A.

SXM

DEC 15 1971

RECEIVED

CC: Essex International, Inc.
ADD: Attn: Mr. Ken Jones
CITY: 1704 West Grant Road
DD: Tucson, Arizona 85705
CITY:

REMARKS: Verified determination

ANALYSIS CERT. BY H. E. Richard

Compositing	12.75
PREPARATION $	
ANALYSIS $	48.00
$	60.75

HH3A ACC: ESSEX INTERNATIONAL, INC.

DATE SPL. RECEIVED 12/4/71 | DATE COMPL 12/15/71 | TUC 345823

HAWLEY & HAWLEY
ASSAYERS AND CHEMISTS, INC.
1700 W. GRANT RD. • BOX 50106 • 622-4836
TUCSON, ARIZONA 85703

BRANCHES
DOUGLAS, ARIZONA
HAYDEN, ARIZONA
EL PASO, TEXAS
ST. LOUIS, MO.

IDENTIFICATION	GOLD OPT	SILVER OPT	LEAD %	COPPER %	ZINC %	MO. %	IRON %		
E 1351 ES - 1 51				0.03		< 0.001			

REGISTERED ASSAYER
CERTIFICATE NO.
6784
H. E.
RICHARD
Date Signed
Arizona U. S. A.

CC: Essex International, Inc.
ADD: Attn; Mr. Paul Eimon
CITY: 1704 West Grant Road Tucson, Arizona 85705
DD:
CITY:

REMARKS:
Single determination

ANALYSIS CERT. BY

PREPARATION $ 1.25
ANALYSIS $ 5.25

HH3A ACC: ESSEX INTERNATIONAL, INC

DATE SPL. RECEIVED 10/18/71 | DATE COMPL. 10/20/71 | TUC 345707 | $ 6.50

HAWLEY & HAWLEY

ASSAYERS AND CHEMISTS, INC.
1700 W. GRANT RD. • BOX 50106 • 622-4836
TUCSON, ARIZONA 85703

BRANCHES
DOUGLAS, ARIZONA
HAYDEN, ARIZONA
EL PASO, TEXAS
ST. LOUIS, MO.

IDENTIFICATION	GOLD OPT	SILVER OPT	LEAD %	COPPER %	ZINC %	MO. %	IRON %	Sulphide Sulphur %	
Composite # 1 1291 thru 1312				0.07				1.38	
Composite # 2 1313 thru 1320				0.05				0.34	
Composite # 3 1346 thru 1350, 1401 thru 1416				0.10				0.54	

CC:
ADD: Essex International, Inc.
Attn: Mr. Ken Jones
CITY: 1704 West Grant Road
DD: Tucson, Arizona 85705
CITY:

REMARKS: Verified determination

ANALYSIS CERT. BY W. E. Hawley

Compositing	12.75
PREPARATION $	
ANALYSIS $	48.00
$	60.75

ACC: ESSEX INTERNATIONAL, INC.
DATE SPL. RECEIVED 12/4/71
DATE COMPL 12/15/71
TUC 345823

HH3A

HAWLEY & HAWLEY
ASSAYERS AND CHEMISTS, INC.
1700 W. GRANT RD. • BOX 50106 • 622-4836
TUCSON, ARIZONA 85703

BRANCHES
DOUGLAS, ARIZONA
HAYDEN, ARIZONA
EL PASO, TEXAS
ST. LOUIS, MO.

IDENTIFICATION	GOLD OPT	SILVER OPT	LEAD %	COPPER %	ZINC %	MO. %	IRON %		
	ppm	ppm		ppm		ppm			
E 860	< 0.01	1.3		77		< 2			

CC: Essex International, Inc
ADD: 1704 West Grant Road
CITY: Tucson, Arizona 85705
DD:
CITY:

REMARKS:

Trace analysis

ANALYSIS CERT. BY H E Richard

PREPARATION $ 1.25
ANALYSIS $ 7.75

ACC: ESSEX INTERNATIONAL, INC.

DATE SPL. RECEIVED 9/29/71

DATE COMPL 10/2/71

TUC 345658

$ 9.00

HH3A

HAWLEY & HAWLEY

ASSAYERS AND CHEMISTS, INC.

1700 W. GRANT RD. • BOX 50106 • 622-4836

TUCSON, ARIZONA 85703

BRANCHES
DOUGLAS, ARIZONA
HAYDEN, ARIZONA
EL PASO, TEXAS
ST. LOUIS, MO.

IDENTIFICATION	GOLD OPT	SILVER OPT	LEAD %	COPPER %	ZINC %	MO. %	IRON %		
	ppm	ppm		ppm		ppm			
E 860	< 0.01	1.3		77		< 2			

CC: Essex International, Inc
ADD: 1704 West Grant Road
CITY: Tucson, Arizona 85705
DD:
CITY:

REMARKS:

Trace analysis

ANALYSIS CERT. BY H E Nisbet

PREPARATION $ 1.25
ANALYSIS $ 7.75

HH3A

ACC: ESSEX INTERNATIONAL, INC.

DATE SPL. RECEIVED 9/29/71

DATE COMPL 10/2/71

TUC 345658

$ 9.00