

D-DOMINANT C-COMMON m-MINOR tr-TRACE W-WEAK M-MODERATE S-STRONG

SAMPLE	VEIN PDAS	TEXTURE								*GROUNDMASS IF PORPHYRY	GRAIN SIZE (mm)		ACCESSORIES				TRACE MINERALS				ALTERATION				COMMENTS				
		POPHYRITIC	EQUIGRANULAR	SERiate	EUHEDRAL GRANULAR *	HYDROID MORPHIC GRANULAR *	ANEHEDRAL GRANULAR *	GRANOPHYRIC *	MICROGRAPHIC *		MYRMENITIC *	GROUNDMASS	PHENOCRYSTS	BIOTITE	ORTHOPYROXENE	CLINOPYROXENE	HORNBLende	APATITE	ZIRCON	SPHENE	ALLANITE	ACICULAR RUTILE	CHLORITE AFTER MAFICS	ACTINOLITE AFTER MAFICS		EPIDOTE AFTER PLAG (PL) OR MAFICS(M)	K-FELDSP AFTER PLAGIOCLASE	SERICITE AFTER PLAGIOCLASE	TOTALINE AFTER PLAG (PL) OR MAFICS(M)
GRC-21																													
3840-60'																													
3900-20'																													
3940-60'																													
4000-20'																													
4040-60'	88	12	✓			✓	✓	✓	✓	✓	0.06	70.6	tr						W			tr	S?	W/ML	W/ML				
4100-20'	90	10	✓			✓	✓	✓	✓	✓	AA																		
4140-60'	97	11	✓			✓	✓	✓	✓	✓	AA																		
4200-20'	96	10	✓			RA																					some laycom/spn after plag/locan.		
4240-60'	94	6	✓			RA														W/ML	ML	W/W	M?	W	W				
4300-20'	94	6	✓			RA																							
4340-60'	95	5	✓			RA	✓	✓	✓		0.001-0.07	70.8								W/ML									
4400-20'	91	9	✓			RA																					def KF + to/plag.		
4440-60'	91	9	✓			RA																							
4500-20'	91	9	✓			RA																							
4540-60'	92	8	✓			RA																							
4600-20'	96	7	✓			RA														W/ML	W	W/W	S?	tr	W				
4640-60'	97	3	✓			RA																	(M)						
4700-20'	92	4	✓			RA																							
4740-60'	97	3	✓			RA																							
4800-20'	92	8	✓			RA																							
4840-60'	95	5	✓			RA																							
4900-20'	93	7	✓			RA																							
4940-60'	88	12	✓			RA																							
5000-20'																													
5040-60'	90	10	✓			✓	✓		✓	✓	0.06	70.7	tr						✓			tr	tr	W	S?	tr	ML	F.I. super abundant	
5100-20'	97	3	✓			✓	✓	✓	✓	✓	AA								✓					AA					
5140-60'	97	3	✓												RA				✓					RA		W			
5200-20'	96	4	✓																do							do			
5240-60'	96	4	✓																RA										
5300-20'	92	8	✓																										
5340-60'	93	5	✓																								W/ML	do.	
5400-20'	94	6	✓																										
5440-60'	92	8	✓			RA																							

LEUCOCRATIC
GRANOPHYRIC
MICROGRAPHIC
APLITE PPV

Pheno: very irregular

composite KF
phens 71.5 mm

badly covered

tr. rudest purpurary

badly covered (est.)

-do-

-do-

badly covered (est.)

do

GR-21

MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE

(X) = recalc to elim. contam.

SAMPLE NO.	QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPAL	CPW	ACTINOLITE	EPIDOTE	PREHNITE	ALMELITE FOR MAGNETITE	SPINELLE FOR LEUCON.	PYRITE	TOURMALINE	FERROXYNITE	BIOTITE	ILLITE	CHLORITE	ANPH.	SERPENTINE	IRUST	STEEL	CAVED	TOTAL CONTAM.	
	3600-20	25	19	9	3	2	9	2	TR	3	1	0	1	4	7	12				2	-	2		
3640-60	21	19	7	3	3	10	1		3	3	1	5	1	5	7	14								2 TRM Tr 9g
3700-20	22	18	7	2	2	7	3		(2)	(2)	(TR)	12	1	11	4	8								
3740-60	22	18	8	3	3	7	3		2	3	(TR)	9	1	10	3	8								Tr cpy
3800-20	36	9	6	1/2	1/2	2	TR	1	2	3	(TR)	24	TR	5	7	6								
3840-60	48	3	28			TR	TR	-	TR	1	TR	5	-	TR	7	2								
3900-20	56	2	12			TR	TR	-	TR	1	-	10	-	TR	5	2								
3940-60	48	3	29			TR	TR	-	TR	1	-	10	-	TR	7	1								
4000-20	50	4	30			TR	TR	-	TR	1	(X)	58	TR	TR	TR	1								
4040-60						TR	TR	-	1	1	TR	TR	TR	TR	TR	TR			4	1	2		(7)	
4100-20						TR	TR	-	TR	1	(X)	TR	TR	TR	TR	TR			3	TR	3		(6)	
4140-60						TR	TR	-	TR	1	(X)	TR	TR	TR	(2)	TR			6	1	3		(10)	
4200-20						TR	TR	-	TR	1	(X)	7	TR	TR	TR	TR			5	3	3		(11)	
4240-60						1	TR	-	TR	1	(X)	46	TR	1	3	TR	TR		4	5	2		(11)	
4300-20						TR	TR	-	TR	1	(X)	5	TR	1	2	TR	TR		4	3	2		(9)	
4340-60						TR	TR	-	TR	1	(X)	4	(TR)	1	3	TR	TR		3	2	2		(7)	
4400-20						TR	TR	-	TR	1	(X)	4	3	1	TR	TR	TR		3	5	3		(11)	
4440-60						TR	(1)	TR	TR	1	(X)	3	TR	TR	TR	TR	TR		1	TR	2		(3)	nice "bow-tie"
4500-20						TR	TR	-	TR	1	(X)	5	TR	TR	TR	TR	TR		4	5	2		(15)	2 cement
4540-60						TR	TR	-	TR	1	(X)	7	TR	TR	TR	TR	TR		5	3	2		(18)	
4600-20						TR	TR	-	TR	1	(X)	2	(TR)	1	TR	TR	TR		5	TR	1		(7)	
4640-60						TR	TR	-	TR	1		2	1	TR	TR	TR	TR							
4700-20								-	TR	1	(X)	2	2	1	TR	TR	TR							
4740-60						TR	TR	-	TR	1		2	TR	TR	TR	TR	TR							

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS
UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

J. Hulén

2650

2600

GPC-21

MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE

SAMPLE NO.

QUARTZ
PLAGIOCL.
K-FELDSP.
CALCITE
OPX
ACTINOLITE
EPIDOTE
PREHNITE
ALMENE/MAGNETE FOR SPHENE
LEUCOM.
PYRITE
TOURMALINE
FERROXINITE
BIOTITE
ILLITE
CHLORITE
TALC
PYROPH.
SERPENTINE
hbl

units

6000-20' NS																					
6040-60'			2	tr	tr	tr	tr	tr		tr	tr										tr
6100-20'			1	tr	tr	1	tr	tr		1	tr										tr
6140-60'			tr	tr	2	tr	tr	2		5	33										tr
6200-20'			1	tr	1	1	1	1		5	4										1
6240-60'			1	tr	1	1	1	1		4	6										1
6300-20'			2	1	2	tr	tr	1		1	tr										1
6340-60'			1	1	1	2	tr	1		3	1										1
6400-20'			tr	1	1	2	tr	1		9	3	tr									T, T-F, FPR, EP, PR
6440-60'			tr	1	2	2	1	1		6	3										4
6500-20'			tr	1	1	1	tr	2		7	2										4
6540-60'			tr	1	1	3	1	1		5	1										4
6600-20'			1	2	3	3	1	1		3	1										B A-E, T-F, PR, E-F, PR
6640-60'			1	2	3	tr	1	1		4	1										tr. hbl.
6700-20'			tr	2	2	2	1	2		2	1										1 hbl.
6740-60'			tr	3	1	3	1	2		2	1										2 hbl
6800-20'			tr	3	1	1	2	2		2	1	TR									2 hbl
6840-60'			tr	2	1	1	1	2		2	1										1 hbl
6900-20'			1	2	3	2	1	2		3	1	TR									2(?) hbl.
6940-60'			tr	3	1	tr	1	2		1	tr	1									2 hbl.
7000-20'			tr	2	1	1	1	2		1	tr	2									2 hbl
7040-60'			tr	2	1	1	1	2		2	tr	1									2 hbl
7100-20'			1	tr	1	tr	1	1		tr	tr	2									2 hbl
7140-60'			1	tr	3	1	tr	1		1	1	3									2 hbl.

Prehnite
decreas.
sing

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UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

SAMPLE NO.	MINERALOGY, APPROX. WT.% <input checked="" type="checkbox"/> (or) RELATIVE ABUNDANCE <input type="checkbox"/>														rust	steel	concr.	cement								
	QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPX	CPX	ACTINOLITE	EPIDOTE	PREHNITE	Z-MENITE FOR MAGNETITE	SPHELE FOR LEUCONITE	PYRITE	TOURMALINE	FEROXINITE					BIOTITE	ILLITE	CHLORITE	TALC	PYROPH.	SERPENTINE	HBL	
4800-20'				-	Tr	1		Tr	1		⑤	1	Tr	Tr	Tr							3	6	4	21	③④
4840-60'				Tr	Tr	1		Tr	1		⑤	1	2	Tr	1											
4900-20'				-	Tr	1		Tr	1		5	1	1	-	Tr											
4940-60'				-	Tr	3	Tr	1	Tr	1	6	2	Tr	Tr	Tr											
5000-20'																										
5040-60'				-	Tr	1	Tr	Tr	1		④	1	Tr		Tr											
5100-20'	44	24	27	-	Tr	Tr	-	Tr	Tr		②	Tr	Tr		Tr											
5140-60'				-	Tr	Tr	Tr	Tr	Tr		2	Tr	Tr	①	Tr	①										
5200-20'				-	Tr	Tr	-	Tr	Tr		3	Tr	Tr		Tr											
5240-60'				-	Tr	1	Tr	Tr	Tr		3	①	Tr		Tr											
5300-20'	41	20	30	-	1	2	1	Tr	1		6	1	Tr		1											
5340-60'				-	Tr	1	Tr	Tr	1		4	1	Tr		Tr											
5400-20'				-	Tr	1	Tr	Tr	1		⑤	Tr	1	Tr	Tr											
5440-60'				-	Tr	1	Tr	Tr	1		⑤	1	Tr		Tr											
5500-20'	43	24	29	Tr	Tr	Tr		Tr	Tr		2	Tr	1		1					Tr						
5540-60'				Tr	Tr	Tr		Tr	Tr		④	6	-		Tr											
5600-20'				Tr	Tr	Tr	2	Tr	1		7	6	-		Tr					Tr						F-sph-(T) T-ep FT
5640-60'				2	Tr	2		1	1		6	7	Tr		Tr					2						
5700-20'				3	Tr	2		1	1		7	5	1		1					3						
5740-60'				3	1	1	Tr	1	1		5	2	1		1					3						
5800-20'	33	19	20	4	1	2	2	1	1		3	5	1		1					2						P-F, F, F-T
5840-60'				2	1	1		1	Tr		4	2	1		1					1						
5900-20'	44	30	20	1	Tr	Tr	-Tr	1	1		2	1	1		Tr					1						F, T, F-T
5940-60'				Tr	2	1	Tr		2	Tr	Tr	Tr	1		Tr					2						

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UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

GDC-21

MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE

SAMPLE NO.

SAMPLE NO.	QUARTZ		PLAGIOCL.		K-FELDSP.		CALCITE		OPX		ACTINOLITE		EPIDOTE		PREHNITE		ALMÉNITE / MAGNET / SPHÉNÈRE		PYRITE		TOURMALINE		FERROXINITE		BIOTITE		ILLITE		CHLORITE		TALC		PYROPH.		SERPENTINE	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
7200-20									1	1	tr		tr		1									1										tr. hbl.		
7240-60									2	tr	1		tr		1		tr						1			1								2 hbl		
7300-20									3	tr	1		tr		2								3			1								3 hbl		
7340-60									2	tr	2		tr		2		1						1			1								3 hbl.		
7400-20									2	1			tr																							
7440-60									1	1	2		tr		1	2					tr	2	1													
7500-20									2	1	2				2	2					1		5												4 hbl	
7540-60									2	1	2				2	2					Tr		3		tr		2								5 hbl.	
7600-20									2	1	2		Tr		Tr	2					Tr	Tr	4		tr		2								3 hbl.	
7640-60										2													4													
7700-20									2	1	1		tr		2	2					1		4				3									3 hbl.
7740-60									2	tr	1	2			2						Tr		3		tr		2									3 hbl.
7800-20									2	1	2				2						1		3		tr		3									4 hbl. // much more mafic
7840-60									tr	tr	tr				1						1	Tr	2		tr		tr									1 hbl.
7900-20									tr		tr	1		tr		1					tr		2		tr		tr									tr hbl.
7940-60									1		tr	tr			1						tr		2		tr		tr									tr hbl.
8000-20									1		tr	1			1						tr		2		tr		tr									tr hbl.
8040-60									1		tr	Tr			tr								1		tr		tr									1 hbl.
8100-20									1		1	1			1						tr		2		1		tr									tr. hbl.
8140-60									1		tr	1			1						tr	tr	2		tr		tr									
8200-20									1		tr	1			1	1					tr	1	2		tr		Tr									
8240-60									1		Tr	1			tr						1		1		Tr		Tr									
8300-20									2		TR	tr			tr	1					Tr		tr		Tr		Tr									
8340-60									1		TR	1			tr	1					1		1		Tr		Tr									

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UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

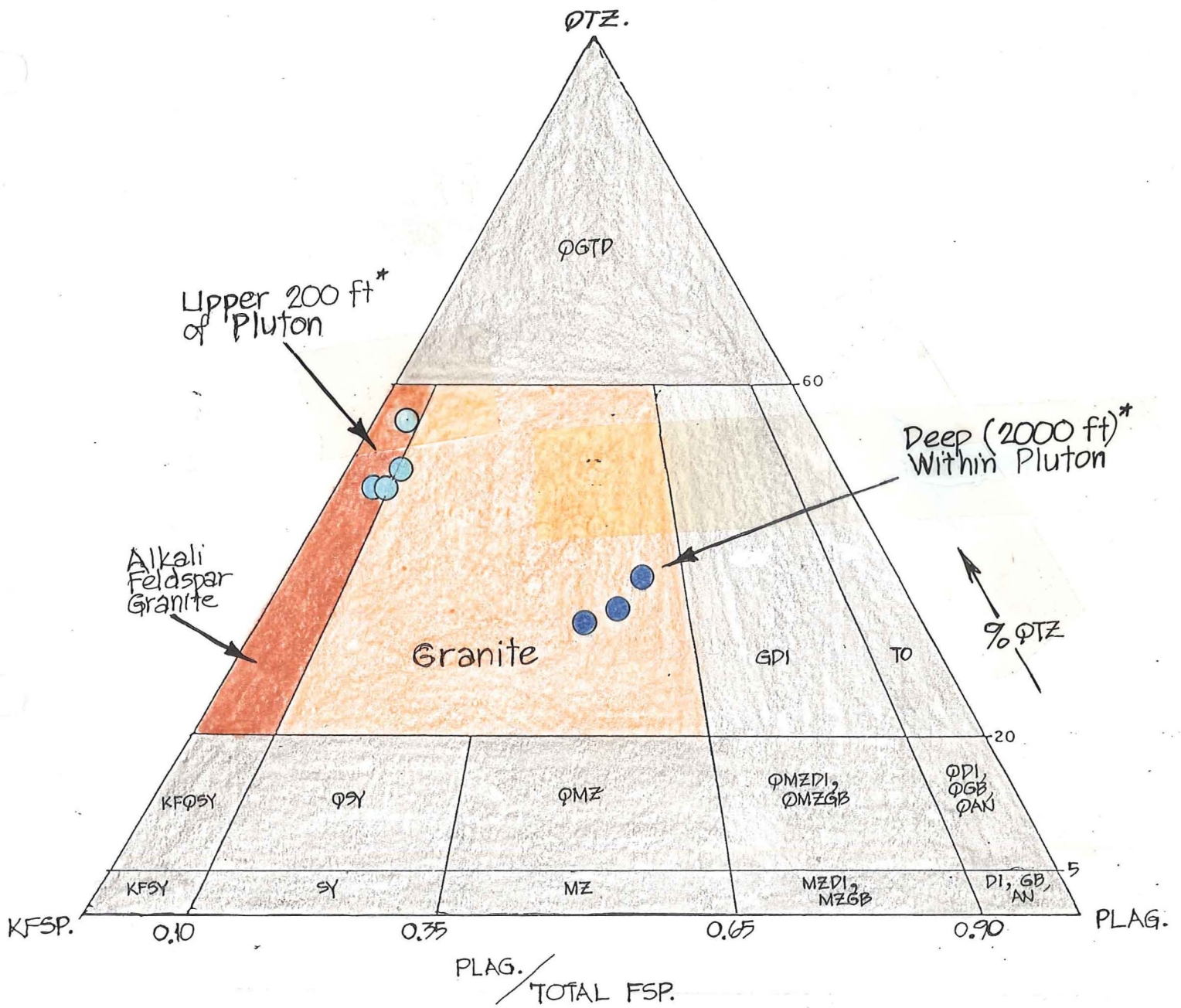
est
K/P
pl

GRC-21		MINERALOGY, APPROX. WT.% <input checked="" type="checkbox"/> (or) RELATIVE ABUNDANCE <input type="checkbox"/>																					
SAMPLE NO.		QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPX	ACTINOLITE	EPIDOTE	PREHNITE	ALMENEITE	MAGNETITE FOR SPHENE	LEUCOXEN.	PYRITE	TOURMALINE	FERROXYNITE	BIOTITE	ILLITE	CHLORITE	TALC	PYROPH.	SERPENTINE		
	8400-20				1/2	1	tr		1	tr				1	tr	tr							
	8440-60				tr/2	1	tr		1	tr				1	tr	tr							tr hbl 3
	8500-20				tr/4	tr	1		1	1				1	tr	tr							1 hbl (fibrous (2 est?))
no. 4	8540-60				tr/3	tr	tr		1	tr/1				tr	1	tr	tr						
	8600-20				1/2	1	tr		1	tr				1	tr	tr							1 hbl 1 blue green
no. 4	8640-60				tr/2	1	1		1	tr				2	tr	tr							tr hbl
	8700-20				1/2	1	tr		1	tr				1	tr	tr							1 green hbl.
no. 4	8740-60				2/1	tr	tr		1	tr				1	tr	tr							
	8800-20				1/4	tr	tr		1	tr			tr	1	tr	tr							
	8840-60				2/1	tr	tr		1	tr.			tr	tr	1	tr	tr						tr. all
no. 5	8900-8915				2/4	1	tr		1	tr.			1	1	1	tr	tr						tr. ap., tr. hbl.

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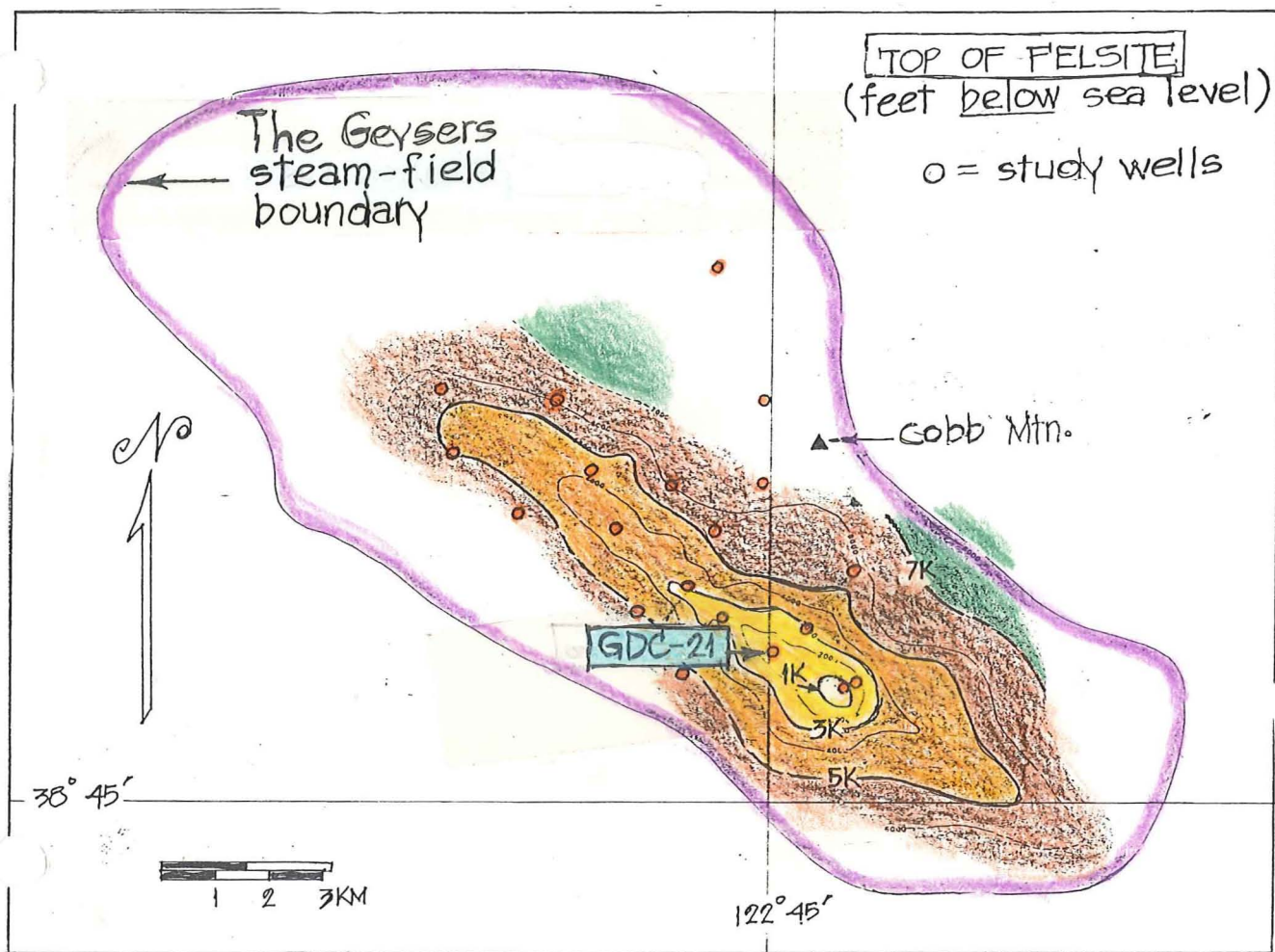
SUMMARY OF X-RAY DIFFRACTION ANALYSIS
 UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY



GDC-21: FELSITE COMPOSITIONS

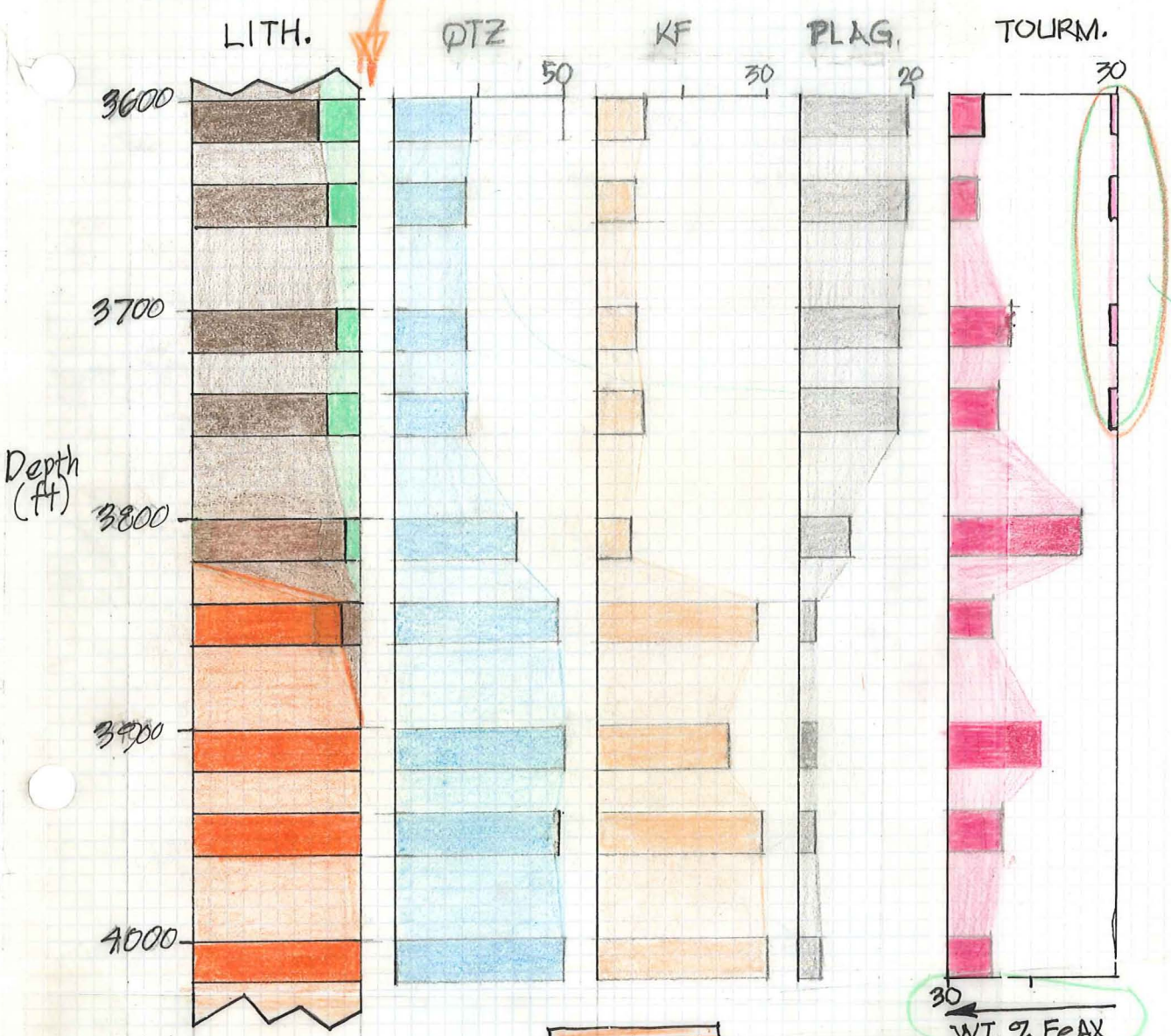
* measured depths

JBH/UURI/92



Please double the gap

APPROX. WT. %

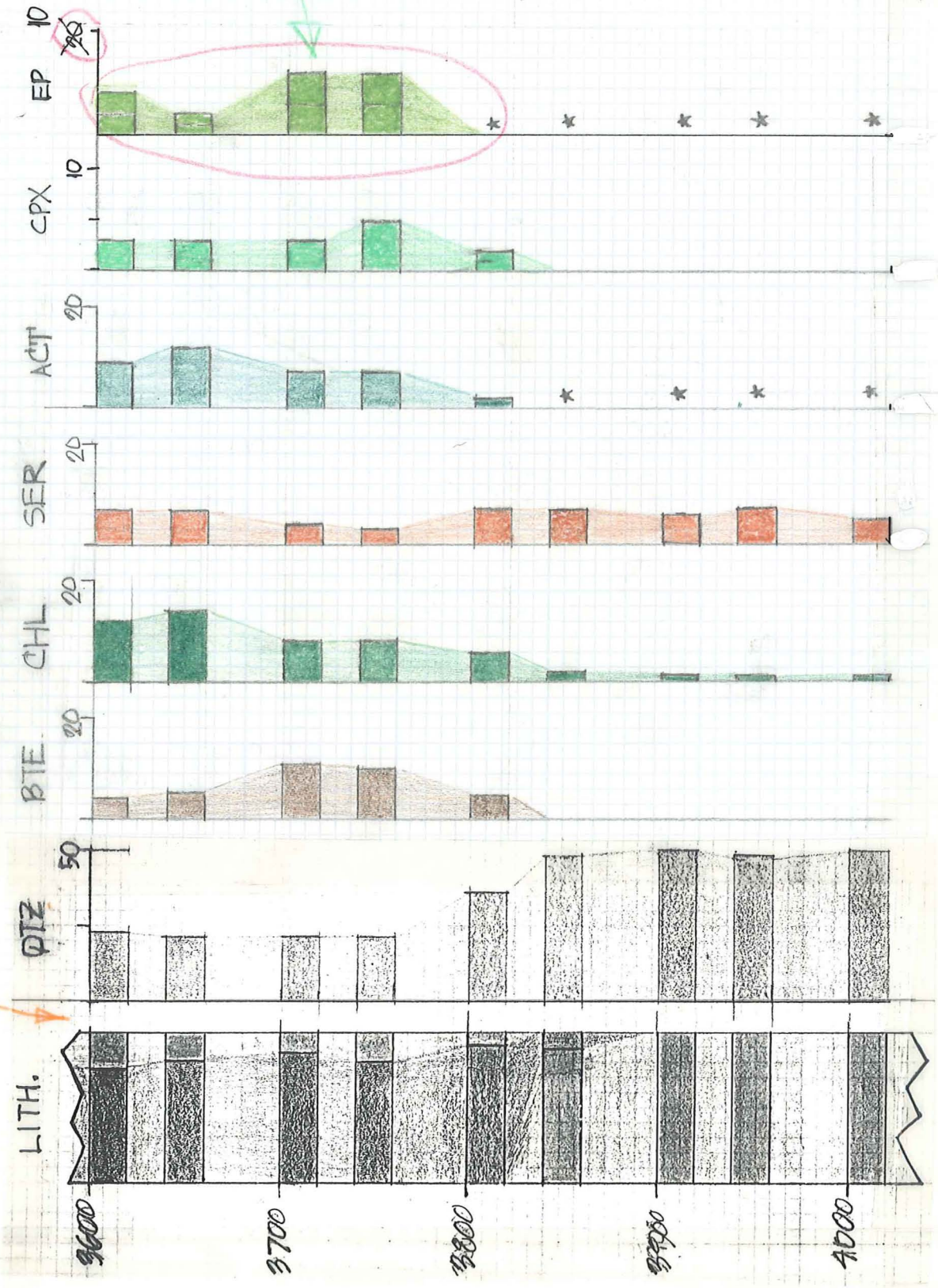


GDC-21

FELSITE CONTACT: MINERALOGY

Bob - corrections as of 04/10

Bob, please do the gap



GDC-21 FELSITE CONTACT: MINERALOGY

Leucocratic
OPXN - BTE - GRANITE, fine-grained, poss. seriate to porphyric, hypidiomorphic-granular; based on larger chips, rock appears to avg. ≈ 0.20 mm. in grain size, but some grains > 0.60 mm. dia.; 2% OPXN as pale transp. green (no obvious pleochroism) mostly fine grains up to at least 0.3 mm. dia. or length - typically strong subparallel wavy-appearing cleavages or partings - comm. incorporate traces of small anhedral rimmed grains - some X's partly alt. to bte - other X's pty-completely altered to fibrous bright green actinolite - local tr. phengite/cpxn (also leucoxene): 1% BTE shreddy, mostly fine X's, orange-brown pleochroic - locally pty alt. to green chl \neq tr. sphere - also pty repl. OPXN (see above); HBL (tr) - anh-subh. grains up to at least 0.3 mm. dia; pleochroic in shades of brownish or yellowish to bottle green - may be pty alt. to chlorite; plag. cloudy-appearing but rel. fresh (riddled w/ tiny fluid inclusions) anh-subh. blocky to stubby lath-like up to at least 0.15 mm length or diameter - locally partly alt to sparsely distr fibers/flokes of ser - also sparsely & locally to clzt or ep \neq chl; K-fsp similar to plag but less blocky - some X's. Tctn; 1% Qtz clear, locally w/ a few conspicuous uclite-bearing & vapor fluid inclusions.

OPXN texturally similar to OPXN - it locally seems to replace.

also spotty alt. K-fsp. ->
some upertilitic

epc-21
e.g. 7740'

CPX?

0.15% apatite needles - randomly arrayed
avg. $\approx 0.04 \times 0.001$ mm
DISTINGUISHING FEATURE

1% diss anh. ilmenite \rightarrow grains avg. ≈ 0.03 mm.

6740
7840

bte hbl

pxn-hbl-bte grd. (ppy)? fine-grained - subhedral-granular
distinctive in having conspicuous decussate-looking
texture defined by numerous plag. laths with
aspect ratios > 5

crystal
borders
commonly
irregularly
intergrown
w/ other
phases

OPXN as ^{anh-}subhedral, commonly lath-shaped xls
up to at least 0.2 mm in length 0.2 mm. wide
partly to compl. alt. to various combinations of
actinolite, chlorite, brotite (bte earliest) - also
probably hbl. locally - pale green, just
faintly pleochroic.

xl aggr.
up to
0.3 mm.
dia.

hbl - texturally similar to OPXN (poss. replaces it)
also locally as highly irregular aggregates
of randomly-oriented anh. xls interstitial to
plagioclase laths in a subdiabasic texture.
xls are pleochroic, pale-med grayish-green
w/ locally anom. low birefringence.

some
quite skeletal
looking

bte - mostly highly irregular, ragged-appearing aggregates, pleochroic
pale-deep orange-brown - xls making up
these aggregates dom. < 0.04 mm. dia
aggregates up to at least 0.15 mm. dia. -
have many re-entrants - some partly to
completely alt. to chlorite

think
these
are
CPXN
BOTH!

plag - typically forms decussate-arrayed laths
up to 0.3×0.1 mm. ϕ in size but commonly
w/ aspect ratios $\geq 4/1$ - borders of the
laths are euhedral but RAGGED looking -
turning is also irregular, stringy-appearing
not clear -

* ALSO OCCUR
AS subh., bleb-like
rounded elongate
xls $< 0.04 \times 0.015$ mm -
encased in
later-formed phases

much of the KSPK is interstitial to plagioclase.

PTZ

CPXN text. similar
to OPXN but
rare tend to
be somewhat
smaller xls.

masses avg. < 0.08 mm
up to at least 0.1
the larger masses
poikilolithically enclose
plag. & mafic minerals

btc

LEUCOCRATIC, granophyric, MICROGRANITE PORPHYRY
 est. 7-9% phenocrysts of ORTHOCLASE, PLAGIOCLASE, & QTZ
 embedded in a sugary-looking microxtn.
 groundmass. ——— GMASS is dominantly anhedral-
 granular w/ local zones of ~~qtz~~ ~~plag~~ ~~micro~~
 micrographic to granophyric qtz-kfsp intergrowths ———
 the anhedral-granular portion has an avg.
~~groundmass~~ grain size of 0.07 mm. $KSP > QTZ > Plag.$
 in this portn xls. have a rounded, equant shape. ———
 qtz. locally includes acicular rutile hairs; ———
 both plag. & kfsp. are cloudy - app. riddled with
 inclusions — some of the plag. is clearly
 partly altered to 2nd kfsp.

some porc. illite
 inclusions
 qtz. blebs

Plag. small as
 0.3 mm -
 of qtz. aggr.
 to these up
 to at
 least 1.1 mm

space
 illite
 diss
 fibers

PHENOCRYSTS are generally just fragments
 as cuttings, but from portions attached to matrix in
 these chips, & from rare whole phenos — it can
 be said they are anhedral to subhedral, with
 even the latter showing ragged borders. (resorbed,
 embayed; 3 types — qtz ~~is~~ rounded, irreg. embayed.
 oligoclase (?), twinned or not, rarely zoned, commonly
 partly replaced w/ 2nd K feldspar. ——— K-spa
 phenos are highly irregular, commonly microperthitic
 often merge outward into ~~granophyric~~ micrographic or
 granophyric halos. ——— All minerals locally
 contain xln acicular rutile hairs ——— these may
 project through several crystals.

[BIOTITE] accessory — quite rare up to at
 least 0.3 mm x 0.2 mm — prob. some much larger
 phenocr. lt orange brn to dk russet brown through-
 or dark greenish-brown ragged subh-arh

another section of composite KF phenos > 1.5 mm —
 (looks more like K-metasomitized plag.
 glomerocryst)

GRC-29
XRD only

24/13 1/12

PAGE NO.

PREPARED BY	
DATE	

	%P	%KF	%PL	φBTE %IL	%CH	
1 5400-20'	47	8	21	3	7	muck tour
2 5440-60'	41	8	19	4	1	do
3 5500-20'	44	8	19	4	7	
4 5600-20'	36	5	7	1	2	abund tour.
5 5640-60'	47	17	27	—	2	"
6 5700-20'	51	28	17	—	—	"

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GRL-29

MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE

SAMPLE NO.	QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPAL	SPIN	ACTINOLITE	EPIDOTE	PREHNITE	MELNITE	MAGNETITE	SPHENE	LEUCOS.	PYRITE	TOURMALINE	FERROXINITE	BIOTITE	ILLITE	CHLORITE	TALC	PYROPH.	SERPENTINE	rutile	apatite	Tr cont.	rust	steel	Carved	with prep
	6600-6620				Tr	1	Tr	-	1	1	Tr	(3)	(1)	(2)	Tr	(1)						✓	✓			21	9	6	6
6640-6660				Tr	1	1	-	1	1	Tr	(1)	Tr	2	Tr	1						✓	✓			17	7	5	5	2
6700-6720				Tr	Tr	Tr	-	1	1	Tr	(1)	Tr	2	Tr	Tr						✓	.			9	3	1	1	2
6740-6760				(1)	Tr	Tr	-	Tr	1	Tr	(2)	Tr	1	-	Tr						✓	.			8	4	2	2	2
6800-6820				2	3	Tr		1	1	Tr	(2)	Tr	2	-	(1)						✓	✓			4	2	1	1	3
6840-6860				3	2	(1)		1	1	Tr	(1)	Tr	3	Tr	2						.	✓			6	3	1	2	2
6900-6920				2	1	(1)		2	1	Tr	(2)	-	2	Tr	2							✓			7	4	1	2	3
6940-6960				1	1	Tr		1	1	Tr	(2)	-	2	-	2						✓	✓			15	5	4	6	3
7000-7020				1	1	Tr		1	1	Tr	(1)	Tr	2	-	2							✓			13	5	3	5	2
7040-7052						(1)		1	1	Tr	(2)	-	2	-	1						✓	✓			9	5	2	2	3

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS

UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

early tour
in matrix -
tour -
w/ magnetite

ugraphic - granophyric text. in
felsite



tour
"see
urchins"
in felsite

super-abund. vein fragments.

definitely K-felds
metasomatism



"globular-
ugraphic"

tourm. xls. have
zoned blue centers
"root-beer" rims

these in Kf
prob. a
variation
of ugraphic
text

SAMPLE NO.	MINERALOGY, APPROX. WT.% <input checked="" type="checkbox"/> (or) RELATIVE ABUNDANCE <input type="checkbox"/>														Total Contaminants			Notes						
	QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPX	ACTINOLITE	EPIDOTE	PREHNITE	ALMELITE	MAGNETITE FOR SPHENE	LEUCOXEN.	PYRITE	TOURMALINE	FERROXINITE					BIOTITE	ILLITE	CHLORITE	TRANGYTHOXA	PSYCHELITE	RUST
5400-5420	49	18	10	-	Tr	Tr	Tr	1	Tr	12	-	2	2	6						3	2	4	9	
5440-5460	44	19	9	13		Tr	Tr	1	-	15	-	3	3	5						3	2	2	7	Q-KF-to vnits.
5500-5520	42	17	7	-		Tr	Tr	1		21	1	3	2	6						5	3	3	11	tr. fluorite
5540-5560	38	8	6	-		Tr	Tr	1		41*	1	3	1	3						5	5	6	16	1 apatite
5600-5620 HHF			18	Tr		Tr	Tr	1		20	1	7	1	3						5	3	5	13	Tr. apatite.
5640-5660 FF	49	24	17	-		Tr	Tr	1	Tr	8	Tr	1	1	1	vw				13	5	4	22	1 rutile tr. Zirc.	
5700-5720	51	16	23	-	Tr	Tr	Tr	1	Tr	9	Tr	1	Tr	1	vw				11	4	5	20	tr. Zircon tr. rutile tr. ap.	
5740-5760				-		Tr	Tr	1	Tr	8	Tr	1	Tr	Tr	vw				10	3	3	16		
5800-5820				-		Tr	Tr	1	Tr	5	Tr	1	Tr	Tr	vw				12	4	5	19	APLITE PPY	
5840-5860				-		Tr	Tr	1	Tr	7	Tr	1	Tr	Tr	vw				12	4	6	22		
5900-5920				-		Tr	Tr	1	Tr	6	Tr	1	Tr	Tr	v				10	1	1	12	(dikes) of grd appear. ?	
5940-5960				-		Tr	Tr	Tr	Tr	8	Tr	Tr	Tr	Tr	v				7	2	3	12		
6000-6020				-		Tr	Tr	Tr	Tr	9	Tr	Tr	Tr	Tr	v				13	4	3	20	Tr HBL	
6040-6060				-																				NO SAMPLE
6100-6120					Tr	Tr	Tr	Tr	Tr	8	Tr	Tr	Tr	Tr	v				7	2	2	11	Tr. HBL.	
6140-6160																								NOTE: MOUNT. INCREASE IN NEW INTRUSIVE
6200-6220					Tr	Tr	Tr	Tr	Tr	17	Tr	Tr	Tr	Tr	v				6	1	2	9	HBL - new int.	
6240-60										9	Tr	Tr	Tr	Tr	v				6	3	3	12		
6300-20																								NS
6340-60					4	3	Tr	Tr	Tr	5	Tr	Tr	Tr	Tr	v				8	3	5	16		
6400-20					1	2	Tr	Tr	Tr	3	Tr	Tr	Tr	Tr	v				6	2	2	10		
6440-60					1	2	Tr	Tr	Tr	4	Tr	Tr	Tr	Tr	v				9	3	2	14	(GRD)	
6500-20					1	2	Tr	Tr	Tr	3	Tr	Tr	Tr	Tr	v				11	3	3	19		
6540-60					1	1	Tr	Tr	Tr	4	Tr	Tr	Tr	Tr	v				5	2	2	9		

in part
to plagg
feels
four

diff
retrograde
poss
like
L640

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS
UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

Jeffrey B. Hulen

GDF 15D-28

MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE

SAMPLE NO.

SAMPLE NO.	OPX / CPX		HBL	ILM / MAG	SPHENE / CLC.		PY	EPIDOTE	BIOGITE	ILLITE	CHLORITE	TOURMALINE	FERROXINITE	Apatite	RUT	VEGET. FRAGS.	rust	steel	caved	cement	total
	PCT																				
5240-60'	-	Tr	-	1	3		Tr	1	7	12	13	5	4	-	-	7	1	2	1	-	4
5300-5320'	-	Tr	-	1	3		-	Tr	5	12	13	3	-	-	-	5	1	2	Tr	-	3
5340-5360'	-	Tr		1	3		Tr	Tr	5	9	9	6	-	-	-	8	1	3	Tr	-	4
5400-5420'	-	-		1	3		Tr	Tr	9	10	11	13	-	-	-	16	3	4	10	Tr	17
5440-5460	Tr	Tr		1	2		Tr		8	6	7	6	-	-	-	8	1	1	2		4
5500-5520'				Tr	Tr		-	Tr	Tr	Tr	Tr	4	-	Tr	5	1	Tr	Tr		1	
5540-5560'				Tr	Tr		-	Tr	Tr	Tr	Tr	5	Tr	VV	6	1	Tr	Tr		1	
5600-5620				Tr	Tr		-	Tr	Tr	Tr	Tr	7	-	V	8	1	2	3		2	
5640-5660				Tr	Tr		-	Tr	Tr	Tr	Tr	10	Tr	VV	11	4	1	3		3	
5700-5720				Tr	Tr		-	Tr	Tr	Tr	Tr	3	Tr	VV	4	2	1	2		5	
5740-5760'				Tr	Tr		-	Tr	Tr	Tr	Tr	3	Tr	VV	4	2	1	7		10	
5800-5820'				Tr	Tr		-	Tr	Tr	Tr	Tr	1	Tr	VV	6	3	1	2		6	
5840-5860'			Tr	Tr	Tr		-	Tr	Tr	Tr	1	2	-	VV	4	2	Tr	2		4	
5900-5920				Tr	Tr		Tr	1	Tr	Tr	1	2	-	VV	3	1	Tr	1		2	
5940-5960				Tr	Tr	Tr		2	Tr	Tr	1	3	-	V	4	1	Tr	2		3	
6000-6020'				Tr	Tr	Tr		1	Tr	Tr	1	2	-	V	3	1	3			7	
6040-6060				Tr	Tr	Tr		Tr	Tr	Tr	Tr	1	-	V	3	3	1	2		6	
6100-6120				Tr	Tr	Tr	Tr	2	Tr	Tr	Tr	2	Tr	-	6	1	1	2?		4	
6140-60'				Tr	Tr	Tr		1	Tr	Tr	1	1	1	-	3	1	Tr	2?		3	
6200-20'				Tr	Tr	Tr		2	Tr	Tr	1	2	Tr	Tr	5?	Tr	Tr	1		1	
6240-60'				Tr	Tr	Tr		2	Tr	Tr	1	1	1	-	10	Tr	1	2?		3	
6300-20'				Tr	Tr	Tr	Tr	Tr	Tr	Tr	3	18	2	Tr	25	1	1	3		5	
6340-60'				Tr	Tr	Tr		1	Tr	Tr	2	4	Tr	Tr	6	1	1	2		4	
6400-20'				Tr	Tr	Tr		1	Tr	Tr	3	5	1		8	1	1	2		4	

GR of GR II
fresh II
N GR ppg
do fresh
N GR ppg
GR?
GR

tr. py
400 cuts
1395 cuts

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS
UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

GDF 15D-28
XRD

GDCF 157-28

MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE

SAMPLE NO.	QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPAL	ACTINOLITE	EPIDOTE	PREHNITE	ALMAGITE	MAGNETITE	SPHELE	LEUCOX.	PYRITE	TOURNALINE	FERROXYNITE	BIOTITE	ILLITE	CHLORITE	TALC	PYROPH.	SERPENTINE	HORNBL.	RUTILE	APATITE	ZIRCON	STEEL	RUST	CAVAP	CEMENT	TL CONV.	TAM
6440-60						2		TR	TR				7	TR	1	TR	2									1	4	2		7	
6500-20						2		1	1				9	1	1	TR	3									TR	3	3		6	
6540-60						1		TR	TR				7	1			3									TR	2	2		5	
6600-20						2		TR	TR				6	1			3									TR	2	1		3	
6640-60						3		1	1				7	1	TR		3									1	3	2		6	
6700-20						3		1	2	TR			8	2	2	TR	4									4	1	3		10	
6740-60						3		1	1				6	1	2	TR	4									3	1	1		5	
6800-20						2		TR	2				2	TR	1	TR	4									TR	1	1		2	
6840-60						1		1	1				2	TR	2	TR	2									1	1	1		3	
6900-20						1		1	1				3		2	TR	3									2	2	2	3	8	
6940-60						1		1	1				2	TR	2	TR	3									2	2	1		4	
7000-7020						1		1	1	TR			3	TR	2	TR	4									1	2	1		4	
7040-60						2		1	2				5	1	1	1	3									2	2	1		5	
7100-20						TR		TR	1				1	TR	2	TR	2									TR	1	1		2	
7140-60						1		1	1				2	TR	1	TR	2									1	1	1		3	
7200-20						TR		TR	1				TR		1	TR	1									TR	4	1		5	
7240-60						2		1	2				4	TR	1	1	3									1	3	2		6	
7300-20						1		2	1				2		2	TR	3									TR	5	3		8	
7340-60						1		2	1				2		2	TR	2									TR	6	2		8	
7400-20						1		1	1				1	TR	2	TR	2									TR	5	1		6	
7440-60						1		1	1				2		2	TR	2									TR	9?	3?		12	
7500-20						2		1	1				3		1	TR	2									TR	6	5		11	
7540-60						3		2	1				5	3	1	TR	3									TR	8?	2		10	
7600-20						1		1	2				3		2	TR	3									TR	7	5		12	

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MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS

UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

GDCF 15D-28

MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE

SAMPLE NO.	QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPX	CPX	ACTINOLITE	EPIDOTE	PREHNITE	ZIMMERMANNITE	MAGNETITE	SPHENE	LEUCOS.	PYRITE	TOURMALINE	FERROXINITE	BIOTITE	ILLITE	CHLORITE	TALC	PROPH.	SERPENTINE	HORNBL.	RTILE	APATITE	ZIRCON	R	S	Cl	(Tc)	VF
	7640-60				2	Tr	3	1	2	1	1	Tr	Tr	3	1	2	Tr	3									4	2	3	89	④
7700-20				1	Tr	2	1	Tr	2	1	-	2	Tr	1	Tr	2										3	Tr	2	5	③	
7740-60				1	Tr	1	1	1	1	1	Tr	2	1	2	Tr	2										5	Tr	2	7	③	
7800-20				2	Tr	2	1	1	1	1	-	2	1	2	Tr	2										5	Tr	2	7	③	
7840-60 N5																															
7900-20				3	3	2	2	2	2	1	-	Tr	Tr	2	Tr	3										5	3	4	12	③	
7740-60																															

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SUMMARY OF X-RAY DIFFRACTION ANALYSIS
 UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

89
98
187

0.49

48
47

GDCF 123-19

MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE

ab
TFSP

O-W
M
M
S
M

SAMPLE NO.

DTZ
FLAG
KFSP
CALCITE
ORP
CANU
PCT
EP
PREMIX
EPH
IIM/MAG
FELDSPH
PY.
BPE
LIDite
Chlorin
Talc/Pyrophyllite
TOURMALINE
FERROXINITE
RUTILE
APATITE

6000-6020'	42	15	11			TR	TR		TR	1	3	TR	2	12	1	2			0.06	0.02	much silic. no bte?
6040-6060'	41	8	13			TR	TR			TR	3	TR	TR	13	10	12	TR	-	-		poss. in felsite NO
6100-6120'	45	8	14			TR	TR			TR	2	2	1	8	5	TR			0.02	0.08	
6140-6160'	39	14	11			TR	TR			TR	1	2	TR	13	2	-					def. in felsite
6200-6220'	50	19	23			TR	TR			TR	TR	1	TR	2	TR	TR	(TR)				
6240-6260'	47	24	27			TR	TR			TR	TR	TR	-	TR	TR	-		(5)			tr. allanite.
6300-6320'	45	23	22				1							2	3	2					some silicd. nbx
6340-6360'	47	24	22				TR	1		TR	TR	TR	-	2	TR	4					
6400-6420'						2	TR	3	2	TR	3	1	3		1	2	TR?				much more mafic
6440-6460'						2	TR	3	2		1	1	1	1	TR	3	TR	TR	TR	TR	tr. allanite
6500-6520'						2	TR	2	1		1	1	1	1	TR	2	TR	TR	-	TR	
6540-6560'						1	TR	1	1		TR	TR	TR	-	2	TR	TR	-	TR	TR	
6600-6620'						TR	TR	1	2		TR	TR	TR	-	1	-	TR?	TR	TR	TR	
6640-6660'						TR	TR	1		TR	TR	TR	2		TR		TR	TR	TR	TR	
6700-6720'						1	TR	TR	TR		TR	TR	1		1		TR	TR	TR	TR	
6740-6760'						TR	TR	1		TR	TR	TR	1		TR		TR	TR	TR	TR	
6800-6820'						TR	TR	(3)		TR	TR	TR	1	5*	5*		(TR)	(TR)			tr. allanite
6840-60						TR	TR	(3)		TR	TR	TR	1	1*	1*		1	TR		(TR)	
6900-20						1	TR	(2)		TR	TR	TR	2	-	1		-	-	TR	TR	do
6940-60'						TR	TR	(1)	(3)		TR	TR	TR	1	-	1		(1)	(TR)	TR	do
7000-20'						TR	TR	1	1		TR	TR	2	TR	(2)		-	(1)	(1)		(0.1)
7040-60'						(2)	TR	1	2		TR	TR	(4)	TR	(2)		TR	(1)	(1)		(0.1)
7100-20'						(1)	TR	1	(4)		TR	TR	(3)	TR	(2)		(2)	TR			(0.1)
7140-60'						(2)	TR	(2)		1	TR	TR	(4)	TR	(2)		(TR)	(TR)	(1)		(0.2)

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION

rutile needles
68
3
2

GDCF 123-19
XRD



SUMMARY OF X-RAY DIFFRACTION ANALYSIS
UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

* poss. destroyed during drilling

** - scale?

* wholly or partially cemented.

incl. 2nd xrd bte

SAMPLE NO.	MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE																							
	QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPAL	ACTINOLITE	EPIDOTE	PREHNITE	MAGNETITE FOR SPHENE	LEUCON.	PYRITE	TOURMALINE	FERROXINITE	BIOTITE	ILLITE	CHLORITE	TALC	PROPH.	SERPENTINE	HORNBL.	RTILITE	APATITE	ZIRCON	
7200-20				2	3	3		1	Tr	Tr			4	Tr	3			1	*					0.3
7240-60				2	1	2		Tr	Tr			(2)	3	Tr	3			(2)						0.2
7300-20				2	4	2		Tr	Tr		*	Tr	3	Tr	2			(2)						0.1
7340-60				2	1	2		1	Tr		Tr		2	Tr	1			(2)						0.2
7400-20				1	1	2		1	Tr		**		2		1			(2)						0.1
7440-60				2	2	3		2	Tr	Tr	Tr	(1)	2		2			(1)						0.2
7500-20				2	3	2		2	Tr	(0.4)	Tr		3	Tr	2			(1)						0.3
7540-60				1	1	2		2	Tr	(0.1)	Tr	Tr	3	Tr	1			(1)						0.2
7600-20				1	1	2		2	Tr	Tr	Tr	Tr	3	Tr	1			(1)						0.2
7640-60				2	2	3		2	1	Tr	Tr	(1)	3	Tr	2			(1)						0.2
7700-20				2	2	2		2	1	Tr	Tr	Tr	2	Tr	2			Tr						0.2
7740-60				3	2	2		2	1	(1)	(1)	Tr	2	Tr	3			Tr						0.2
7800-20				3	2	2		2	1	(0.4)	(2)	Tr	?	Tr	3			Tr						0.2
7840-60				2	2	2		2	1	(0.7)	(2)	Tr	2	Tr	3			Tr						0.3
7900-20				2	2	2		2	1	(1)	(1)	Tr	3	Tr	3			Tr						0.2
7940-60																								NO SAMPLE
8000-20				2	2	2		2	1	(0.5)	(2)		3	Tr	2			Tr						0.1
8040-60				1	1	1		1	1	(0.7)	(2)	Tr	2		1			Tr						Tr CPY
8100-20				1	1	1		1	1	(0.0)	(1)		1	Tr	1			Tr						Tr allanite
8140-60				1	2	2		2	1	(1)	(1)	Tr	3	Tr	2			(1)						0.1
8200-20				1	1	1		1	Tr	Tr	Tr	Tr	1	Tr	1			Tr						AWFUL SMPL
8240-60				1	1	1		2	1	(0.3)	(2)	Tr	2	Tr	2			(1)						0.1
8300-20				1	1	1		1	Tr		(2)		2	Tr	2			Tr						
8340-60				1	Tr	1		Tr	Tr		(1)		(1)	Tr	(1)			Tr						

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS
 UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

* all or part covered

SAMPLE NO.	MINERALOGY, APPROX. WT.% <input type="checkbox"/> (or) RELATIVE ABUNDANCE <input type="checkbox"/>																							
	QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPX	CPX	ACTINOLITE	EPIDOTE	PREHNITE	Z-MELNITE MAGNETITE FOR SPINELLE	SPINELLE LEUCOSIT.	PYRITE	TOURMALINE	FERROXINITE	BIOTITE	ILLITE	CHLORITE	TALC	PROPH.	SERPENTINE	HORNBL.	RUTILE	APATITE	ZIRCON
8400-20				(M)	(M)	Tr	Tr	1	Tr	-	-	-	Tr	Tr	Tr					-	Tr	Tr		
8440-60				(M)	(M)	Tr	Tr	1	Tr	-	(Tr)	(Tr)	Tr	Tr	Tr					(Tr)				
8500-20				(M)	Tr	Tr	Tr	Tr	Tr		(Tr)	(Tr)	1	Tr	Tr						-			
8540-60				(M)	Tr	Tr	Tr	Tr	Tr		Tr	Tr	1	Tr	1					-				
8600-20				2	Tr	Tr	Tr	Tr	Tr		Tr	-	1	Tr	1					1				
8640-60				3	Tr	1	Tr	Tr	1		1	-	1	Tr	1					Tr				
8700-20				2	Tr	Tr	Tr	1	1		-	-	1	Tr	1					1				
8740-60				1	Tr	Tr	Tr	1	Tr		-	-	1	Tr	1					-				
8800-20																								

NS

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS
 UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

recalc (contam.^{2cc. for})

SAMPLE NO.	MINERALOGY, APPROX. WT.% <input type="checkbox"/> (or) RELATIVE ABUNDANCE <input type="checkbox"/>																											
	DTZ	FL	KF	CAL	OPH/CAN	ACT	EP	PR	ILM/MAG	SPH/LEUC.	PY	TOUR	FeAX	BTE	TLLITE	CHL	TAC/PYROPH	SERP	RUTILE	APATITE	RUST	STEEL	COVER	FIXED	CEMENTS	TOTAL	CONTAMI-	
6000-20																												
6040-60																												
6100-20																												
6140-60																												
6200-20							TR					TR	TR								1	TR	1?				2	
6240-60							TR					TR	TR								1	TR	5				6	
6300-20							1					3	2															
6340-60							1					1	5								4	6	10				20	
6400-20							2					1	2															
6440-60							2					1	-								6	2	10				18	
6500-20							1					TR	-								3	3	2				8	
6540-60							1					-	-								1	TR	-				1	
6600-20							2					-	-								1	TR	-				1	
6640-60							1					-	-								2	1	-				3	
6700-20							2					-	-								2	2	-				4	
6740-60							1					-	-								2	TR	-				2	
6800-20												-	-								5	6	18				29	
6840-60												-	-								6	7	5				18	
6900-20												-	-								3	1	3				7	
6940-60												-	-								4	2	2				8	
7000-20												-	-								3	1	-				4	
7040-60												-	-								10	3	-				13	
7100-20												-	-								10	4	-				14	
7140-60												-	-								7	1	-				8	

NS

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS
 UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

OPX - LS

Trem/Actm → LS
Andal. → LF
hbl. → LS

1.68 SILL - LS 11

7468
7469
7470
7471
7472
7473
7474
7475
7476
7477
7478
7479
7480
7481
7482
7483
7484
7485
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7494
7495
7496
7497
7498
7499
8000
8001
8002
8003
8004
8005
8006
8007
8008
8009
8010
8011
8012
8013
8014
8015
8016
8017
8018
8019
8020

DEPTH INTERVAL	VOL. PER CENT													NOTES; OTHER	
	ORTHOPIROXEN	CLINOPYROXEN	HORNBLLENDE	ACTINOLITE	EPIPOTE	PREHNITE	ANEBITE & FOR MAGNET.	SPHENE	TELLOVITE	PRITE	TOURMALINE	FERROXINITE	BIOTITE		ALLITE
7100-90	3	6	5	7	1	-	4	2	TR	2	TR	20	5	6	3 Trem - tr
7130-40 (P)	3	3	5	5	1	TR	3	2	1	TR	1	17	3	4	TR cpy - ls sill
7160-70	TR 1	4	4	1	1	3	3	TR	-	TR	13	4	6	TR cpy - tr	
7190-7200	2	2	3	3	1	-	TR	3	TR	-	-	13	3	5	- 3 sill
7220-30	1	TR	2	2	1	-	1	3	TR	⊕	-	13	3	5	- 3 sill
7250-60	3	4	3	3	2	TR	2	2	TR	2	TR	11	4	4	- 2 sill
7280-90	2	2	2	4	2	1	TR	4	TR	3	-	14	2	5	- 1 sill
7310-20	11	1	2	4	2	TR	TR	13	TR	2	TR	7	2	4	
7340-50 (P)	33	3	9	5	1	-	3	2	TR	-	-	4	1	3	
7370-80															
7400-10															
7430-40															
7460-70	11	3	13	⊙	1	-	3	2	TR	TR	-	6	1	3	Tr. silliman.
7490-7500	1	TR	TR	⊙	TR	-	2	1	-	TR	-	2	TR	TR	
7510-20	1	-	TR	TR	TR	-	1	TR	TR	-	3	2	TR	1	
7540-50 (P)	1	-	1	TR 1	1	-	1	TR	TR	-	-	2	TR		
7570-80	TR	TR	TR	1	TR	-	1	TR	TR	-	-	1	TR		
7600-10	TR	TR	1	TR	TR	-	1	TR	-	TR	-	1	1		
7630-40	1	-	1	TR	TR	-	2	TR	-	-	2	1	2		
7660-70	1	TR	TR	1	1	-	2	TR	TR	-	1	1	2		
7690-7700	TR	-	1	1	1	-	1	TR	TR	TR	-	1	1		
7720-30	TR	-	2	TR	1	-	1	1	TR	TR	-	1	2		
7750-60 (P)	1	-	TR	-	1	-	1	TR	-	-	-	1	2		
7780-90	TR	-	1	TR	TR	-	1	TR	-	-	TR	2	1		
7810-20	TR	TR	1	TR	TR	-	TR	1	-	-	-	1	2		
7840-50	TR	-	TR	TR	1	-	1	TR	TR	-	-	2	1		
7870-80	TR	1	-	TR	TR	-	1	TR	-	-	1	1	2		
7900-10	TR	TR	TR	TR	1	-	2	TR	-	TR	-	1	2		
7930-40	-	-	TR	TR	TR	-	1	TR	TR	-	-	1	1		
7960-70 (P)	TR	-	TR	TR	TR	-	1	TR	TR	TR	-	2	TR		
7990-8000	TR	-	TR	TR	1	-	1	TR	-	1	-	1	1		
8020-30	-	-	TR	TR	1	-	TR	TR	TR	1	-	1	1		
8050-60	-	-	TR	1	2	-	TR	TR	TR	TR	TR	1	2		
8080-90	TR	-	TR	1	2	-	TR	⊙	TR	3	-	1	2		
8110-20	TR	-	1	1	1	-	TR	1	-	2	-	1	2		
8140-50	-	-	TR	TR	1	-	TR	1	-	1	-	1	1		
8170-80	2	-	3	2	1	-	1	1	TR	TR	TR	3	3		✓
8200-10 (P)	1	-	3	2	1	-	1	1	TR	⊙	TR	2	TR		

GEYSERS H-A (NCPA) SELECTED MINERAL PERCENTAGES*

* CORRECTED FOR CONTAMINANTS

⊙ = POINT-COUNTED (300 PTS) ROUNDED TO NEAREST 1%

talc.
sill
SILL

CON SPIC

DEPTH INTERVAL	VOL. PER CENT													NOTES OTHER	
	ORTHOPYROX.	CLINOPYROX.	HORNBLENDE	ACTINOLITE	EPIPOTE	PREHNITE	ZIMENITE & CLMAGNET.	SPRIENE & LEUCOXEN.	PYRITE	TOURMALINE	FERROXINITE	BIOTITE	ALLITE		CHLORITE
8230-40'	2	-	1	1	TR	-	TR	1	-	1	-	1	H	1	
8260-70'	TR	-	2	TR	TR	-	TR	1	-	1	-	1	-	1	
8290-8300'	1	-	1	TR	TR	-	TR	1	-	-	-	1	-	1	
8320-30'	2	-	2	1	1	-	1	1	-	-	-	1	-	2	

GEYSERS

JM
(JCP)

SELECTED
MINERAL
PERCENTAGES*

* CORRECTED FOR CONTAMINANTS

(P) = POINT-COUNTED (300 PTS);
ROUNDED TO NEAREST 1%

DEPTH INTERVAL	ROCK TYPES, % *						CONTAMINANTS, %				
	HORNfelsic; ARG / GN	HORNfels	BIOTITE MICROGRANULITE	BIOT. ORAN GRANITE	BIOT. ORAN-HBL GRANODIORITE	VEN FRAGMENTS	RLIST	STEEL	CEMENT	LCM	OBVIOUS CAVED FRAGMENTS
7100-10'	84					11	1	1			1
7130-40' (P)	87					13	TR	2			1
7160-70'	95					5	TR	2			TR
7190-7200'	98					2	1	2			1
7220-30'	97					3	1	3			3
7250-60'	92					8	TR	3			2
7280-90'	93					7	TR	1			1
7310-20'	95					5	1	2			1
7340-50' (P)	82/12					6	1	3			1
7370-80'											
7400-10'											
7430-40'											
7460-70'	13	15?	70			2	1	3			2
7490-7500'	3?	25	77			1	2	2			2
7510-20'		15	81			4	2	2			3
7540-50' (P)	10*		79			1	2	1			2
7570-80' <i>ngyal</i>		20	79			1	1	3			4
7600-10'		20	80			TR	1	2			3
7630-40'		15	82			3	1	2			2
7660-70'		10	81			1	2	5			5
7690-7700'			98			2	1	3			6
7720-30'			99			1	2	5			4
7750-60' (P)			98			2	2	3			3
7780-90'			99			1	2	2			4
7810-20'			99			1	1	3			5
7840-50'			98			2	1	3			5
7870-80'			99			1	2	2			10
7900-10'			98			2	2	3			8
7930-40'			98			2	TR	2			5
7960-70' (P)			99			1	1	3			7
7990-8000'			97			3	2	2			4
8020-30'			98			2	2	2			5
8050-60'			98			2	1	2			9
8080-90'			96			8A	3	1			15
8110-20'			97			3	2	1			15
8140-50'			98			2	2	1			15
8170-80'			96			4	2	2			5
8200-10' (P)			97			3	2	3			5

*suspect
 10 gr is
 same
 as gmt*

*just
 finer
 grained*

*CALL IT
 ALL
 GRANITE*

*(not) caved frags.
 v. calc hornfels*

conspic rutile needles

abund. rutile

oxy. clearly blue

** poss.
 dom.
 caved*

*green
 hbl.*

OK

GEYSERS 14 (KIPA)

ROCK TYPES & CONTAMINANTS

* CORRECTED FOR CONTAMINANTS

(P) = POINT-COUNTED (200 PTS);
 ROUNDED TO NEAREST 1%

* wholly or partially carved. ✓ = trace

SAMPLE NO.	MINERALOGY, APPROX. WT.% <input type="checkbox"/> (or) RELATIVE ABUNDANCE <input type="checkbox"/>																										
	QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPX	ACTINOLITE	EPIDOTE	PREHNITE	ALMAGITE	MAGNETITE	SPHENE	LEUCOSITE	PYRITE	TOURMALINE	FERROXINITE	BIOTITE		ILLITE	CHLORITE	TALC	PHYOPH.	SERPENTINE	HORNBLNDE	ACIC. RUTILE	APATITE		
8800-20' (F)	40	26	23	2/1	TR	TR		1	1					3	1	2										tr allanite	
8840-60'	40	22	6	3/2	2	2	TR	1	2			2	TR	6	3	9											
8900-20'	36	20	5	2/1	2	3	1 cv	2	2	1	1			6	6	13											
8940-60'	35	21	7	3/1	3	2		1	2			1		7	5	12										TR sillimanite trem.	
9000-20'	36	22	6	3/TR	2	2		2	2	TR	TR	TR	TR	8	3	14										TR sillimanite trem.	
9040-60'	35	20	7	3/1	2	2		2	2	TR	2	1		7	5	13										TR rutile	
9100-20'	38	20	7	3/2	2	4/3		1	3				TR	6	5	12										tremulite	
9140-60'	32	21	6	1/2	3	4/4		1	2			2		8	4	12										//	
9200-20' (F)	40	31	22	1/2	TR	1		TR	TR			1		4/3*TR	2*											TR apatite	
9240-60'	31	22	19	5/2	1	2		1	2			1		5	2	6										1 sillimanite TR. apatite rutile	
9300-20' (F)	40	30	21	TR/2	TR	2		1	1			TR	TR	2	1	1											
9340-60'													TR														
9400-20'				TR/2*	1	1		1	1			TR	TR	5*	3*	5*											
9440-60'				TR/2*	1	2		1	1			TR	TR	4*	2*	3*					0.1						tr. allanite
9500-20'				TR/2	1	2		1	1			1	TR	3*	2*	3*					(0.1)	TR					sea urchins
9540-60'				TR/2	1	1		1	TR			1	TR	2*	2*	2*					TR	(0.1)	TR				tr. allanite
9600-20'																											cr - bad smpl.
9640-60'																											do
9700-20'				TR/2	1	1		TR	TR			TR	—	2*	2*	3*					TR	(0.1)	TR				
9740-60'				TR/2	2	1		1	TR			—	—	3*	2*	4*					(1)	TR	(0.1)				intr. is euh. - gran.
9800-20'				TR/2	1	2		1	1			TR	TR	4*	2*	4*					TR	TR	TR				n graph. shows up.
9840-60'				TR/2	TR	1		TR	TR			—	1	1	TR	2					TR	(0.1)	TR				
9900-12'				2	TR	1		TR	TR			—	1	1	TR	2					TR	TR	TR				

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION

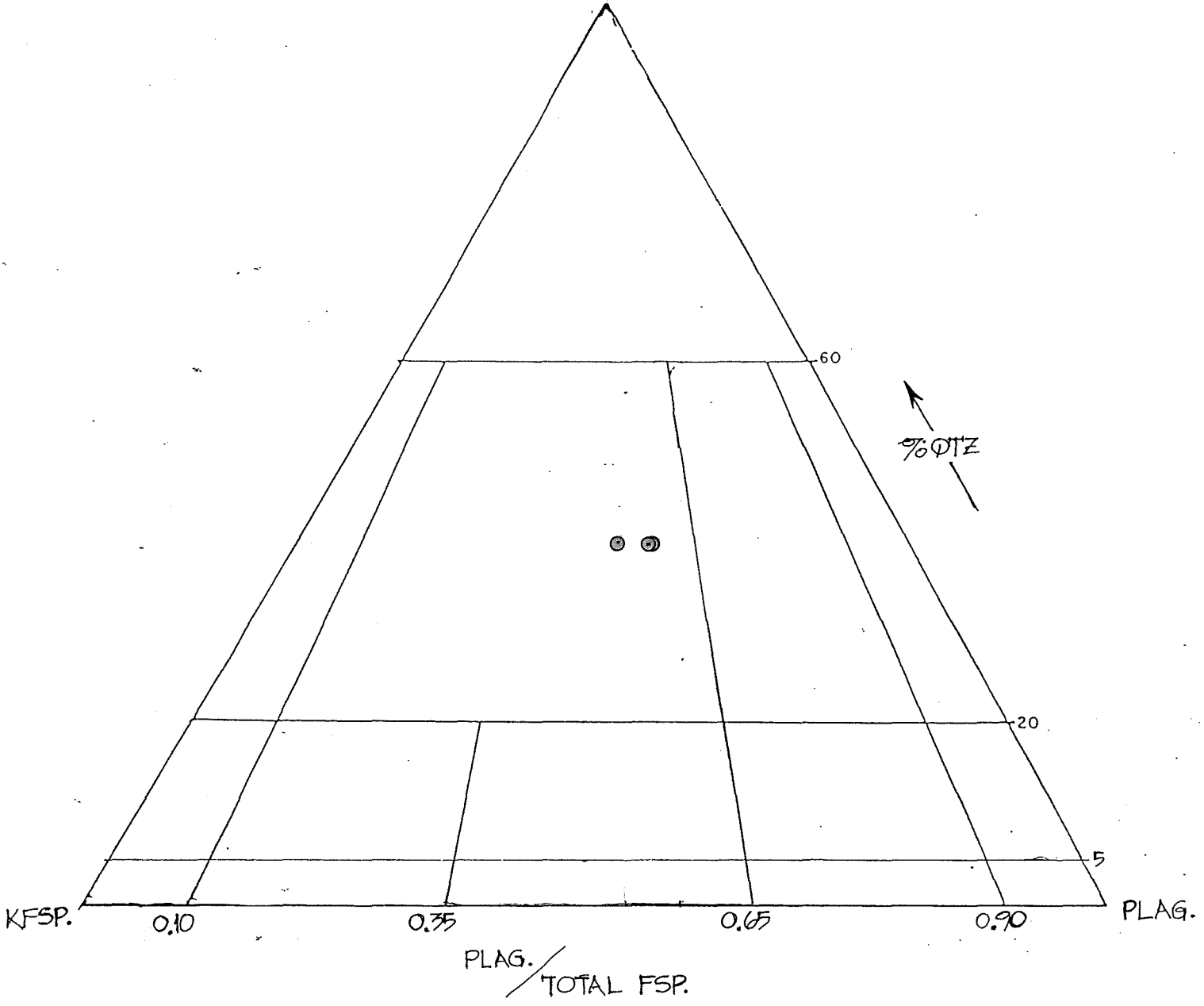


SUMMARY OF X-RAY DIFFRACTION ANALYSIS

UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

LF23-ST1.
FELSITE
COMPOSITIONS

QTZ.



96 97

bte opx granite or rhyolite ppg.
some ngraph. texture

@ 8840⁺ looker 2 feldsp
like different anh-gran.
intrusive
abund. apatite & magnet

LF40-ST3		MINERALOGY, APPROX. WT.% <input checked="" type="checkbox"/> (or) RELATIVE ABUNDANCE <input type="checkbox"/>																								
SAMPLE NO.	QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPX	SPAN	ACTINOLITE	EPIDOTE	PREHNITE	LIMONITE	MAGNETITE FOR SPHENE	LEUCOAN.	PYRITE	TOURMALINE	FERROXINITE	BIOTITE	ILLITE	CHLORITE	TALC	PYROPH.	SERPENTINE	Hbl	RUTILE	APATITE		
8400-8420	41	24	6		3	1	2	2	1	1	2	Tr	Tr	1	5	6	11									1 hbl
8440-8460	39	24	7		3	2	2	1	Tr	B2	2	1	Tr	Tr	7	3	11									
8500-8520	37	26	8		3	1	2	2	-	2	2	Tr	-	-	5	4	9									Tr. garnet
8540-8560	36	23	11		4	2	2	2	Tr	1	2	Tr	1	Tr	5	3	11									
8600-8620	45	25	7		3	1	1	4		1	2	Tr	-	-	5	3	10									
8640-8660	42	22	11		1	2	2	2	Tr	2	2	Tr	Tr	1	5	8										in intrusive
8700-8720	34	36	16		2	Tr	1	1	1	1	1	1	Tr	1	3	1	3									ratty smpl.
8740-8760	35	35	16		2	Tr	1	1	Tr	1	1	Tr	Tr	1	2	Tr	2									
8800-8820	36	34	18		1	Tr	1	1	1	1	1	Tr	Tr	1	2	Tr	2									Tr talc 1 hbl
8840-8860					1	Tr	1	1	1	2	1	Tr	Tr	1	Tr	Tr	2									3-4 hbl?
8900-8920					1	Tr	2	2	2	2	1	Tr	Tr	1	1	Tr	2									3-4 hbl. ✓
8940-8960					2	Tr	2	2	1	1	1	Tr	Tr	2	1	Tr	2									different intrusion
9000-9020					2	Tr	2	1	1	1	1	Tr	Tr	1	1	Tr	2									Tr. all same
9040-9060					2	Tr	1	1	1	1	1	Tr	Tr	2	2	Tr	2									same intr
9100-9120					3	Tr	2	1	1	1	1	Tr	Tr	1	2	Tr	2									

mixed no
det.
ab/TFP
W-M
W-M
W
OPX in intrusions
TFP

in intrusive
ratty smpl.
Tr talc 1 hbl
3-4 hbl?
3-4 hbl. ✓
different intrusion
Tr. all same
same intr

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS
UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

Jeffrey B. Hulen

* CAVED

SAMPLE NO.	MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE																							
	QUARTZ	PLAGIOCL.	K-FELDSP.	CALCITE	OPX	ACTINOLITE	EPIDOTE	PREHNITE	MAGNETITE FOR SPHENE	LEUCOXEN.	PYRITE	TOURNALINE	FERROXYNITE	BIOTITE	ILLITE	CHLORITE	TALC	PYROPH.	SERPENTINE	HORNBL.	RUTILE	APATITE	ZIRCON	
6040-60	36	24	15			Tr	1	2	2		6			5	5									
6100-20	40	20	29			Tr	1	1	Tr		3	Tr		3	2						Tr			
6140-60	36	24	16	1*	1	Tr	1	2	2		6	Tr		3	5*									
6200-20	37	21	31				1	1	1		4	Tr		2	2									
6240-60	41	20	30				1	1	1		X6			Tr	2						Tr			
6300-20	43	21	30				Tr	1	Tr		5	Tr		Tr	1						Tr			
6320-60	38	26	28			Tr	1	1	1		5			Tr	2						Tr			
6400-20	44	24	26			Tr	1	1	1		7(6)			Tr	1									
6440-60											4													
6500-20											3													
6540-60											Tr													
6600-20											3													
6640-60											3													
6700-20																								
6740-60																								
6800-20																								
6840-60																								
6900-20																								
6940-60																								
7000-20																								
7040-60																								
7100-20																								
7140-60																								
7200-20																								

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS
 UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

recalc to acct for contam.

rutile
very
sparse

LF-48

MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE

SAMPLE NO.

DTZ	PL	KF	CAL	OPAW/ CPAN	ACT	EP	PR	ILM/MAG	SPH/LEL.C.	PY	TOUR	FeX	BTE	ALLITE	CHL	TAC/ PYROPH	SERP	RUTILE	APATITE	RUST	STEEL	GLASS FRAGMENTS	CEMENT	TOTAL CONTAMI- NANTS
-----	----	----	-----	---------------	-----	----	----	---------	------------	----	------	-----	-----	--------	-----	----------------	------	--------	---------	------	-------	--------------------	--------	----------------------------

HF	6040-60					1			1	9	-									5	5	2		12
	6100-20					1			Tr	8	-									5	1	2		8
	6140-60					1			Tr	9	-							Tr	Tr	3	3	12		18
GR	6200-20					1			Tr	5	-							Tr	Tr	5	2	1		8
50% GD	6240-60					1			1	7	-									5	3	5		13
GR	6300-20					1			Tr	5	-							Tr		3	3	1		7
GR	6340-60					1			Tr?	5	-									3	5	4		12
!V GR	6400-20					1			-	7	Tr									4	7	5		16
GR	6440-60					1			-	5	Tr							No	W	4	4	4		12
GR app's	6500-20					2	Tr		-	5	Tr							W	W	4	6	6		16
	6540-60					1	-		-	1	Tr							W	W	1	2	2		5
	6600-20					2	Tr		-	4	Tr							W	W	1	2	2		5
GRD	6640-60					2				4								W	W	2	2	2		6
	6700-20																							
	6740-60																							
GRD	6800-20																							
	6840-60																							
	6900-20																							
	6940-60																							
	7000-20																							
	7040-60																							
	7100-20																							
	7140-60																							
	7200-20																							

dikes?

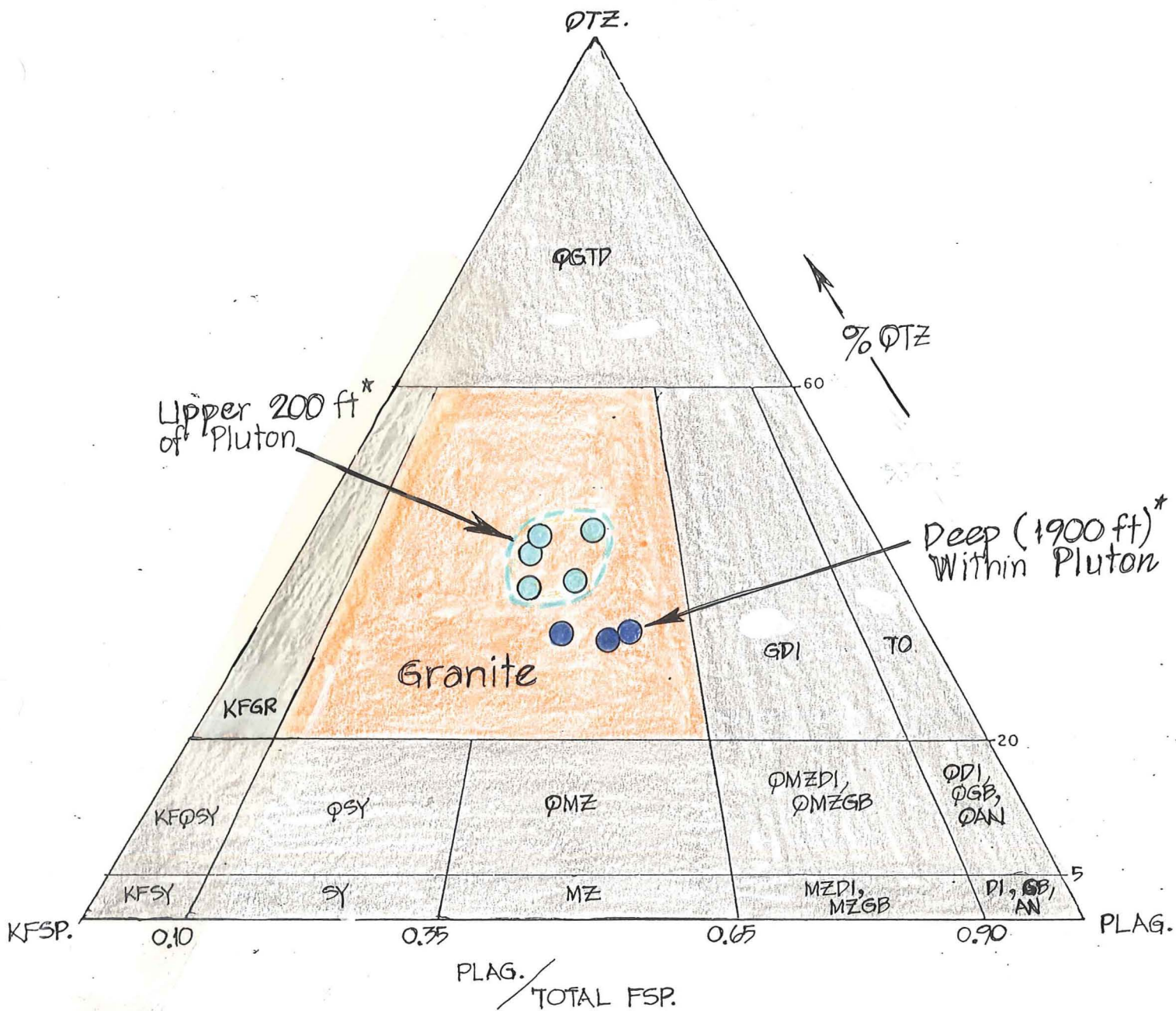
approx. 19-20%
GRD

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS

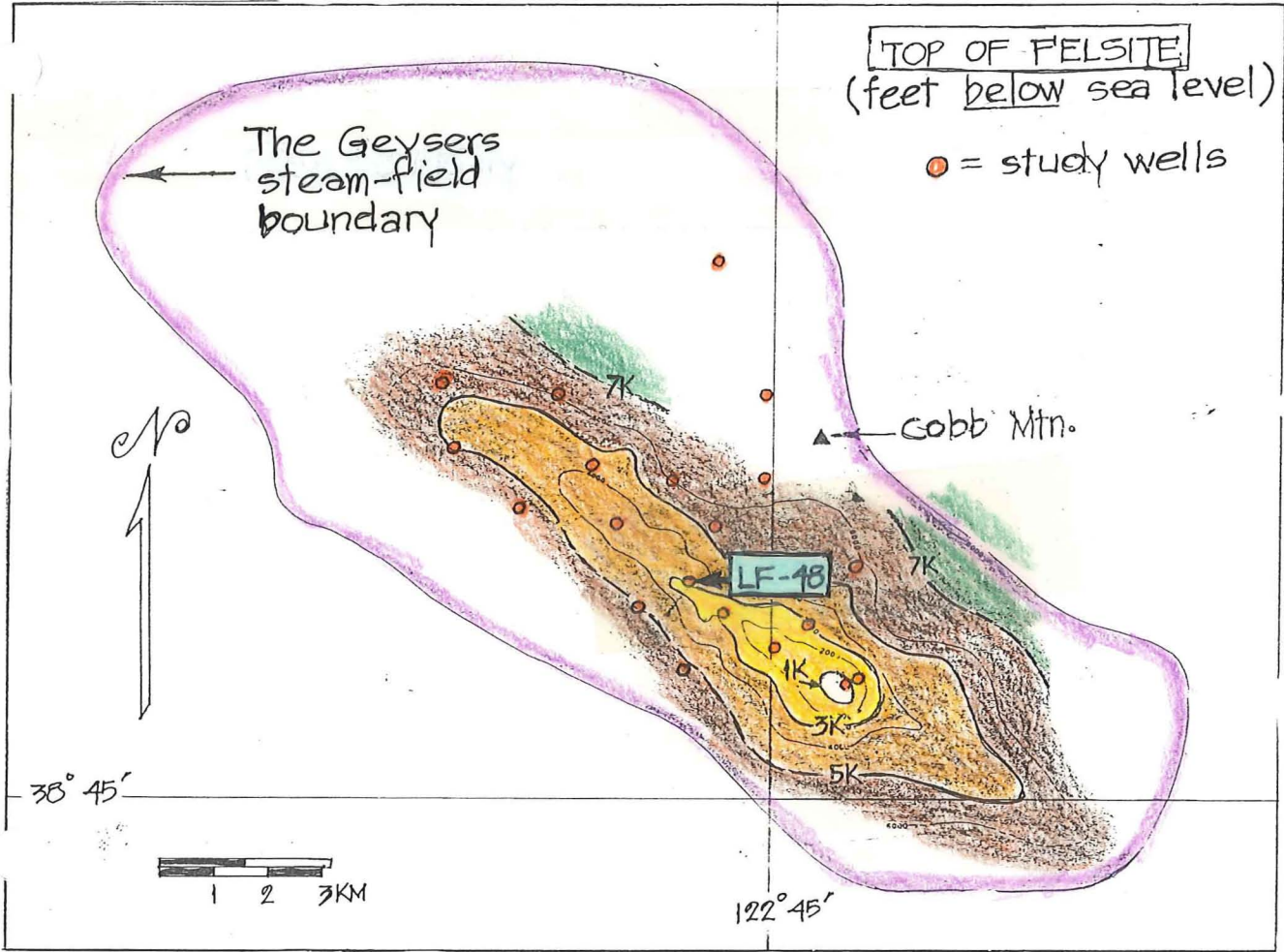
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LF-48: FELSITE COMPOSITIONS

* measured depths

JBH/ULRI/92



NEGLI-2, ST 1



12/25/92
fr. XRD alone

	%PLAG	%KFSP	%QTZ	%IL	%CH	%CAL	%AN
6100'	18	-	41	14	13	5	(94)
6140'	20	-	39	14	11	8	(95)
6200'	23	(10?)	28	7	16	5	(94)
6240'	22		40	14	12	4	(92)
6300'	11		29	29	23	2	(94)
6340'	14		33	26	24	4	(92)
7340-60'	19		41	14	13	6	(95)
7400-20'	17		39	19	13	5	(93)
7440-60'	21		39	17	13	3	(93)
7500-20'	23		42	14	13	3	(95)
7540-60'	19		40	17	13	4	(93)
7600-20'	18		38	20	14	3	(93)
7640-60'	22		40	15	12	4	(92)
7700-20'	19	10	35	14	13	2	(93)
7740-60'	19	7	33	17	15	3	(94)
7800-20'	22	10	35	14	12	3	(96)
7840-60'	20	5	41	14	10	2	1 (93)
7900-20'	25	3??	39	14	10	2	(93)
7940-60'	21		42	15	12	4	(94)
8000-20'	21		41	15	12	3	(93)
8040-60'	21		43	15	11	3	(94)

DEPTH INTERVAL	VOL. PER CENT											NOTES				
	ORTHOPYROX.	CLINOPYROX.	MONOCLINIC PILLENDE	ACTINOLITE	EPIDOTE	PREHNITE	ALBITE	CLIN. MAGNET.	LEUCOXENITE	PYRITE	TOURMALINE		FERROXENITE	BIOTITE	ILLITE	CHLORITE
6000-20																
6040-60																
6100-20																
6140-60																
6200-20																
6240-60																
6300-20																
6340-60																
6400-20																
6500-20																
6800-20					Tr	1	2	1				15 15	8 8	2 org.	2 cal.	1 kf
6840-60					Tr	1	2	1				15	13	1 org.	5 cal.	2 kf
6900-20					Tr	1	3	Tr				10	8	2 org.	2 cal.	1 kf
6940-60					Tr	1	2	Tr				10	8	1 org.	3 cal.	1 kf
7000-20					2	1	2	1				11	9	Tr org.	4 cal.	3 kf Tr pi
7040-60					1	1	3	Tr				10	10	1 "	3 cal.	3 kf Tr pi
7100-20					1	2	2	1				12	10	1 org.	4 cal.	3 kf Tr pi
7140-60					1	2	2	1				13	8	1 org.	4	3 kf
7200-20					Tr	2	2	2				14	8	1 org.	3	2 kf
7240-60					Tr	1	2	1				11	7	1 org.	3	3 kf
7300-20					1	1	2	2				11 11	7 7	1 org.	4	2 kf
7340-60					3	1	2	2				14 14	9 9	1 org.	4	2 "
7400-20					1	Tr	2	2	1			14	9	1 org.	6 cal.	2 kf
7440-60					1		2	2	1					1 org.	4 cal.	5 kf
7500-20							2	2	1					1 org.	4 cal.	4 kf
7540-60																
7600-20																
7640-60																
7700-20																
7740-60																
7800-20																
7840-60																
7900-20																
7940-60																
8000-20																
8040-60																

GEYSERS NEGL-2 ST1
(UNOCAL)

SELECTED
MINERAL
PERCENTAGES*

* CORRECTED FOR CONTAMINANTS

(P) = POINT-COUNTED (300 PLS)
ROUNDED TO NEAREST 1%

DEPTH INTERVAL	ROCK TYPES, % *						CONTAMINANTS, %					
	HORNBLASE TR	HORNBLASE TR	BIOTITE MICROGRANITE	BIOT-ORAN GRANITE	BIOT-ORAN-HBL GRANODIORITE	VEINS & ZEPHYR FRAGMENTS	RLIST	STEEL	CEMENT	LCM	OBVIOUS FRAGMENTS	
6000-20												
6040-60												
6100-20												
6140-60												
6200-20												
6240-60												
6300-20												
6340-60												
6400-20												
6500-20												
6800-20	85	12				3	1	TR	1		3	5
6840-60	11	87				2	2	1			2	5
6900-20	5	93				2	1	TR			3	4
6940-60	4	93				3	1	TR			2	6
7000-20	2	96				2	1	TR			-	1
7040-60	3	94				3	1	TR			-	1
7100-20	7	89				4	1	TR			5	6
7140-60	11	86				9	2	TR			4	6
7200-20	4	91				5	1	TR			3	4
7240-60	5	92				3	1	TR			3?	4?
7300-20	7	89				4	2	TR			2?	4?
7340-60	11	84				5	2	TR			2?	4?
7400-20	15	79				6	2	TR			-	2
7440-60	12	80				8	1	TR			4?	5?
7500-20							1	TR				
7540-60												
7600-20												
7640-60												
7700-20												
7740-60												
7800-20												
7840-60												
7900-20												
7940-60												
8000-20												
8040-60												

GEYSERS NEGU-2 ST1
(UNOCAL)

ROCK TYPES
& CONTAMINANTS

* CORRECTED FOR CONTAMINANTS

⓪ = POINT COUNTED (200 POINTS)
ROUNDED TO NEAREST 1%

DEPTH INTERVAL	VOL. PER CENT											NOTES OTHER		
	ORTHOPIROXEN	CLINOPYROXEN	HORNBLENDE	ACTINOLITE	EPIDOTE	PREHNITE	ZIMMERMANNITE & FOR MAGNET.	SPHENE LEUCOPHANE	PYRITE	TOURMALINE	FERROXINITE		BIOTITE	ILLITE
6000-20'														
6040-60'														
6100-20'														
6140-60'														
6200-20'														
6240-60'														
6300-20'														
6340-60'														
6400-20'														
6500-20'														
6800-20'														
6840-60'														
6900-20'														
6940-60'														
7000-20'														
7040-60'														
7100-20'														
7140-60'														
7200-20'														
7240-60'														
7300-20'														
7340-60'														
7400-20'														
7440-60'														
7500-20'														
7540-60'														
7600-20'														
7640-60'														
7700-20'														
7740-60'														
7800-20'														
7840-60'														
7900-20'														
7940-60'														
8000-20'														
8040-60'														

BEYSERS NEGL-2 ST1
(LINOXAL)

SELECTED
MINERAL
PERCENTAGES*

* CORRECTED FOR CONTAMINANTS

(P) = POINT-COUNTED (300 Pts)
ROUNDED TO NEAREST 1%

DEPTH INTERVAL	ROCK TYPES, % *					CONTAMINANTS, %				
	HORNfelsic: ARG / GN HORNfels	Biotite MICROSKALITE	Plagioclase GRANITE	Plagioclase HBL GRANODIORITE	VEN FRAGMENTS	RLIST	STEEL	CEMENT	LCM	OBVIOUS FRAGMENTS
6000-20'										
6040-60'										
6100-20'										
6140-60'										
6200-20'										
6240-60'										
6300-20'										
6340-60'										
6400-20'										
6500-20'										
6800-20'										
6840-60'										
6900-20'										
6940-60'										
7000-20'										
7040-60'										
7100-20'										
7140-60'										
7200-20'										
7240-60'										
7300-20'										
7340-60'										
7400-20'										
7440-60'										
7500-20'										
7540-60'										
7600-20'										
7640-60'										
7700-20'										
7740-60'										
7800-20'										
7840-60'										
7900-20'										
7940-60'										
8000-20'										
8040-60'										

GEYSERS 1 NEG-2 ST1
(UNOCAL)

ROCK TYPES
& CONTAMINANTS

* CORRECTED FOR CONTAMINANTS

⊙ = POINT COUNTED (300 POINTS)
ROUNDED TO NEAREST 1%

OF21C-12

MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE

AB/
PLAG

SAMPLE NO.

PTZ	PLAG	KFS	CALCITE	OPX	ACTINOLITE	PYRITE	MAGNETITE	SPHENE	LEUCOXENE	ILLITE	BIOTITE	CHLORITE	TALC	PYROPH.	EPIDOTE	PREHNITE	TOURMALINE	FERROXINITE	SERP.	HBL	OPHOLITE	rutile
-----	------	-----	---------	-----	------------	--------	-----------	--------	-----------	--------	---------	----------	------	---------	---------	----------	------------	-------------	-------	-----	----------	--------

cutting size (mm)
avg. max

S
S
S
S

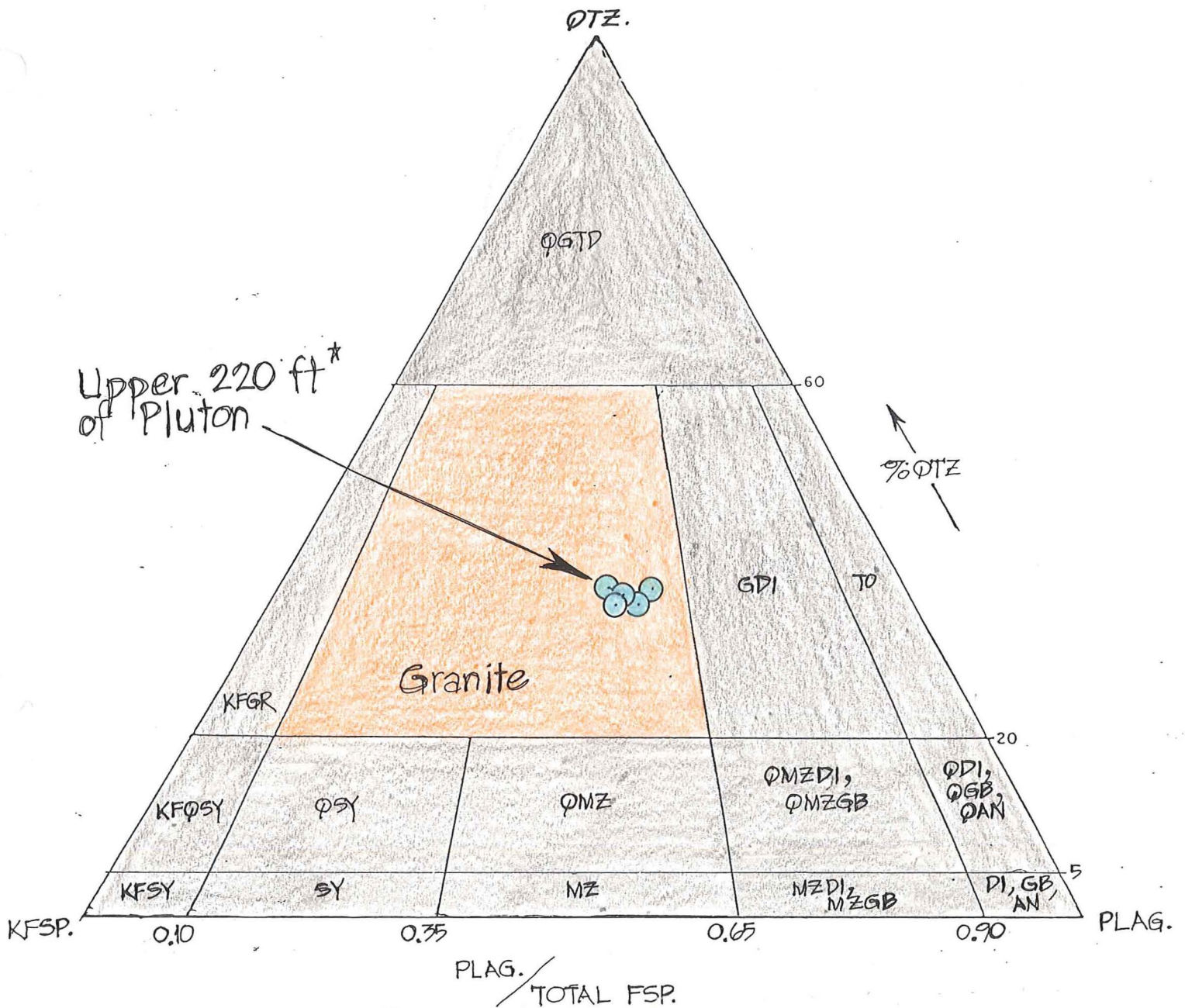
8600-20'	28	15	4		5/23		1	2	2	6				4	18	7							Tr magnetite siderite scale.
8640-60'	27	15	5		5/24		1	2	3	6	4			4	20	4							
8700-20'	32	18	7	1cv	4/14		1	3	5	6	6	Tr		3	8	3							
8740-60'	33	17	13		2	2		2	2	3	2			2	8	7							
8800-20'	35	22	23		Tr	Tr		1	Tr	Tr	1			2	8	11							
8840-60'	37	27	24		Tr	Tr		1	Tr	Tr	Tr			1	6	10							0.08 mm 0.28 mm
8900-20' *	38	24	15		Tr	Tr		1	Tr	Tr	1			2	9	17							0.10 mm 0.32 (0.74)
8940-60'	37	25	17					1	Tr	Tr	Tr			1	8	23							
9000-20'					Tr			1			2			2	9	20							to repl.
9040-60'					Tr	Tr		Tr	1	1	1			3	7	10							to repl. plaq.
9100-60'					Tr	Tr		Tr	1	1	1			1	10	9							Tr allanite
9140-60'					Tr	Tr		Tr	1	Tr	Tr			1	12	14							
9200-20'					Tr	Tr		Tr	1	1	Tr			2	5	2							
9240-60'					Tr	Tr		Tr	1	1	Tr			1	4	2							badly covered smpl.
9300-20'					Tr	Tr		Tr	1	1	Tr			Tr	5	2							

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS
UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

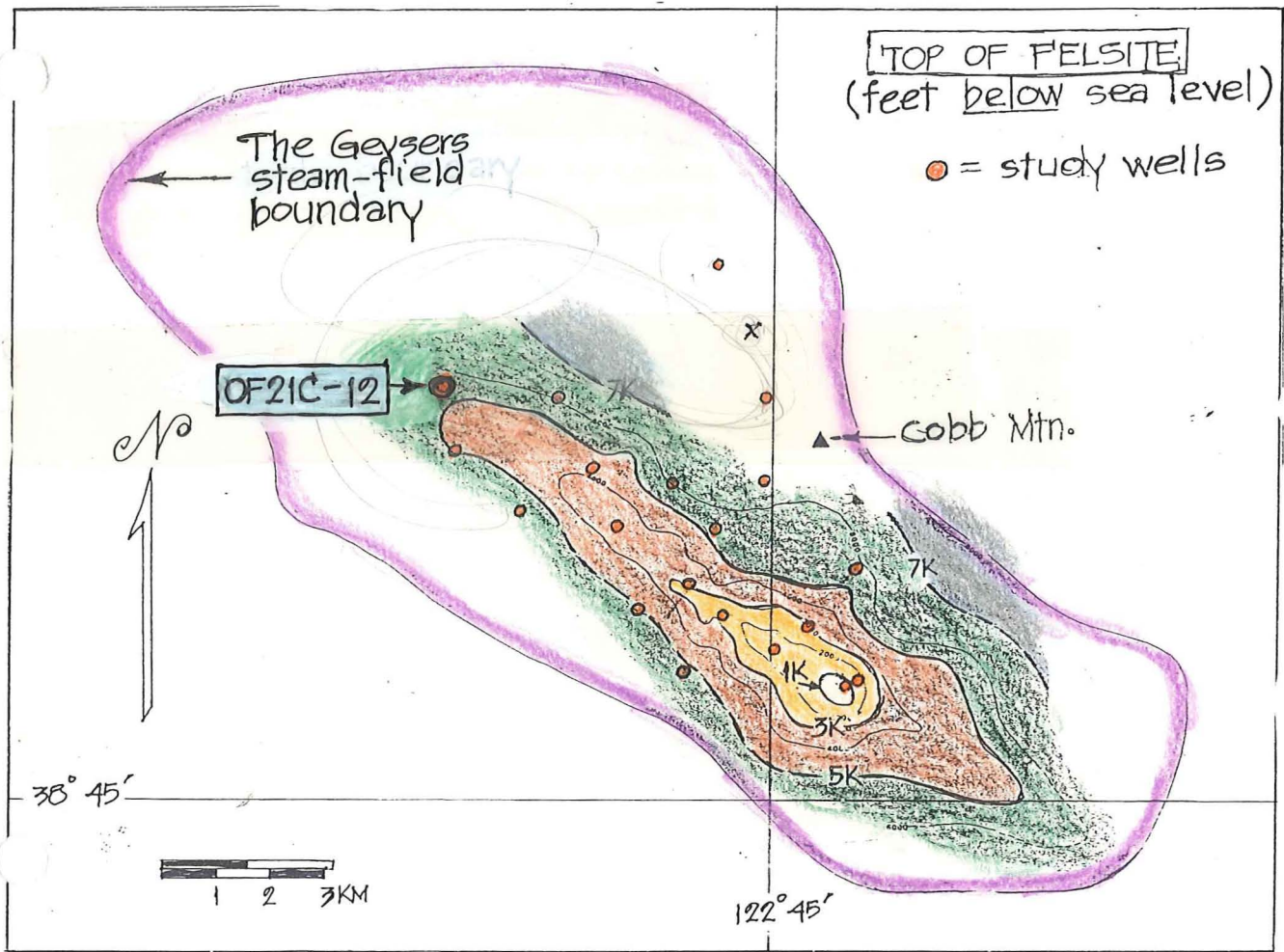
OF21C-12 XRD



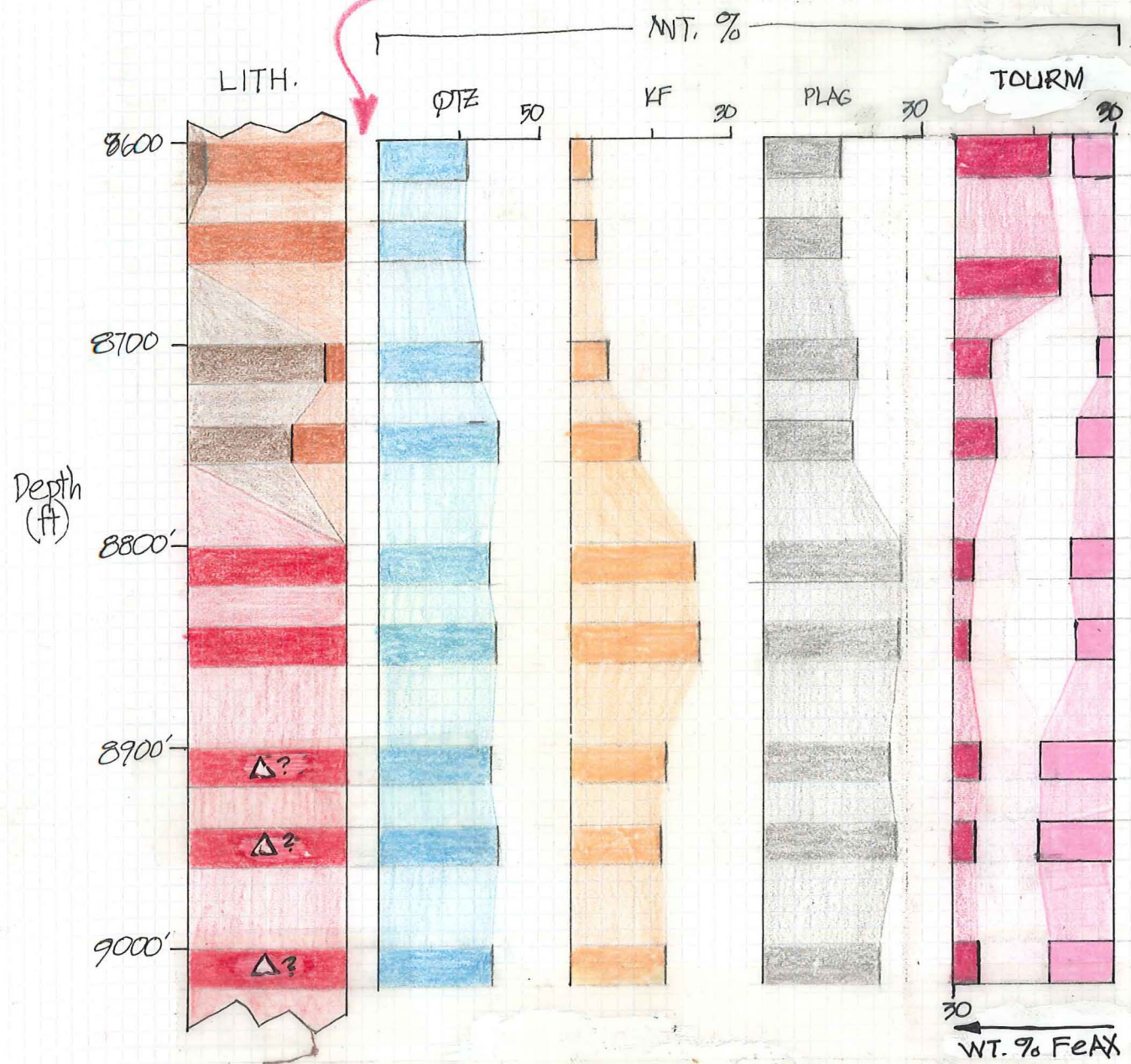
OF 21C-12: FELSITE COMPOSITIONS

* measured depths

JBH/LILIRI/92

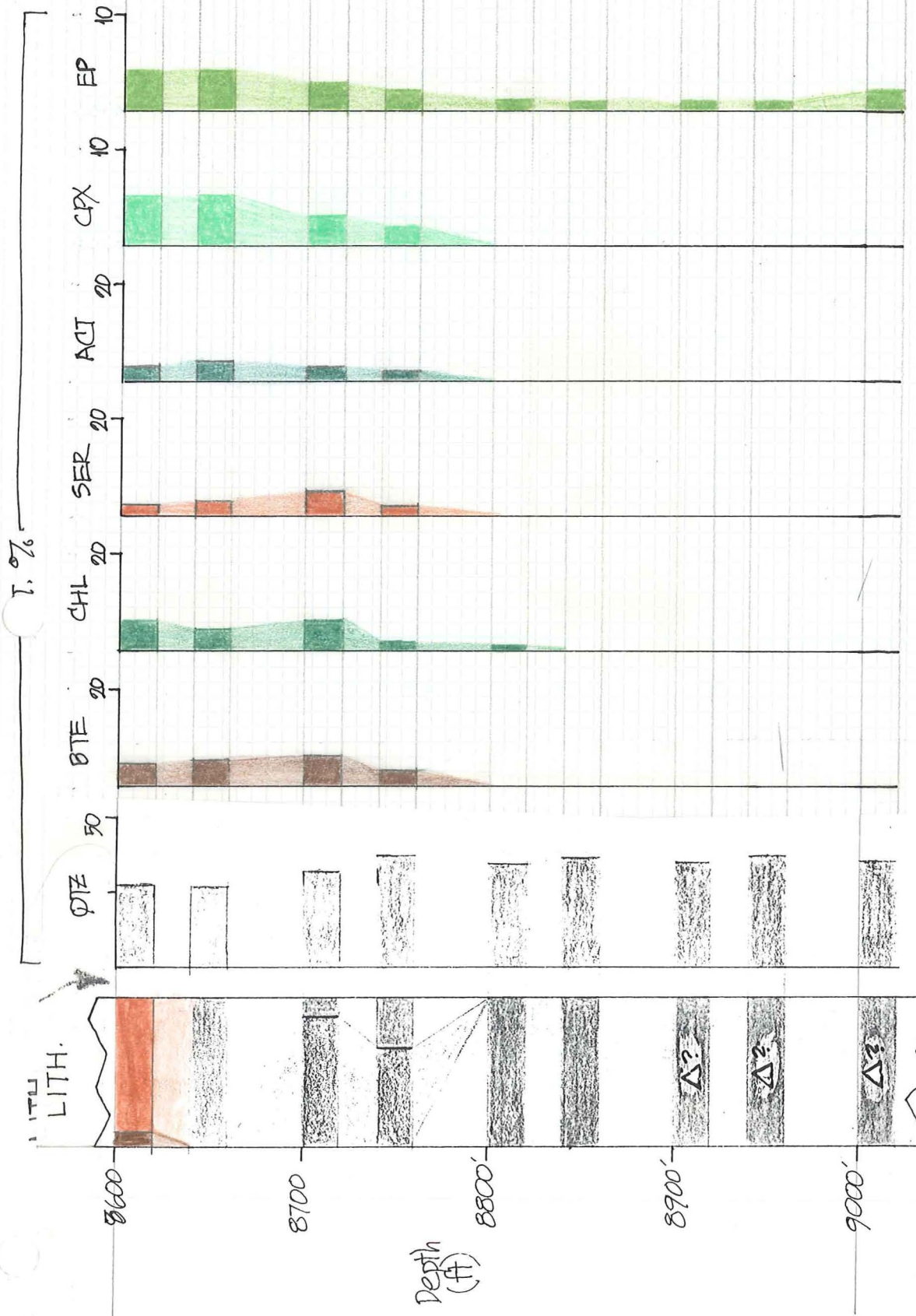


Bob, please double the gap



OF21C-12

FELSITE CONTACT: MINERALOGY



OF21C-12

FELSITE CONTACT: MINERALOGY

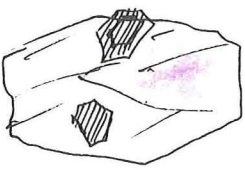
Petrographic Summary

Sample Identification OF 21C-12 8680 <u>Geysers</u>	Petrographer/Date of Examination JBH
Rock Type ϕ - bte - olig ± act., cpxn, tourmaline hornfels vnl't fragments. - 20% single-mineral frags.	tr. pyrite. 5% FeAx. 22 20 % tourmaline at the base 4 10 % cpxn 4 10 % epidote 8 15 % kfsp. 5% sericite (illite, phengite) 5% actinolite 5 10 % biotite 2% sphene/leucxn.
Mineralization none	
Alteration/Metamorphism much bte is alt. to <u>chl.</u> + <u>leucoxene</u> plag sparsely alt. to <u>epidote</u> , minor <u>sericite</u> chl. & ep. repl. cpxn	FeAx repl. tourm. sericite replaced some biotite chl. repl. actinolite ≠ leuc.
Fluid Inclusions	Porosity Summary
Interpreted Paragenesis of Vein- and Vug-Filling Minerals sericite vnl't. x-acts pale greenish phengite or biotite ep-to-g-kf-(ch) ep-to-g-kf-(ch) g-kf-ep	
Notes, Miscellaneous first phengite/bte. then ep-chl altn (rel. late)	

Petrographic Summary

Sample Identification 0F21C-12 8706' Geysers	Petrographer/Date of Examination 5 - tourmaline
Rock Type hornfelsic lithic MGW - 20. hornfelsic argillite ——— 33 (3) 0-PL - bte ≠ cpxn, act, tour. HNFLS - 7. Vnlt. fragments — 10 free xls. 30 much of the KF definitely granoblastic.	tr. siderite 1 - mag./ilm. 0 FeFx 1 - cpxn 5 KFSP 3 - act. 7 CHL 5? gtz + plag. 3 - Bte 10 - ser. 3 - leucxh 3 - epidote
Mineralization <p style="text-align: center;">none</p>	
Alteration/Metamorphism bte, ptly. to ser. matrix (mostly act. & cpxn) locally/ptly to chl ≠ leucxh. & mag. / ilmenite	
Fluid Inclusions	Porosity Summary
Interpreted Paragenesis of Vein- and Vug-Filling Minerals <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> <p>can't say for sure.</p> <p>==</p> </div> <div style="text-align: right;"> <p>0 - tourm. tourm - ep - gtz ep - KFSP. chl. tour.</p> </div> </div>	
Notes, Miscellaneous	

Petrographic Summary

Sample Identification OF 21C-12 8740 Grey sers	Petrographer/Date of Examination JBA
Rock Type 15. HNFLS $\left\{ \begin{array}{l} \text{bte-plag-act.} \\ \text{bte-blvd-cpxn-gtz} \\ \text{g-plag-cpxn} \end{array} \right\}$ 15 VULT. FRAGS. 15 hntsc. argillite 15 " M&W 40 free xls - single-phase fsp, bte	8 tour 5 FeAx 4 bte 6 ser 7 chl. 2 act. 2 cpxn to 6 Kfsp 2 epidote 2 sphere/leucocrn
Mineralization <p style="text-align: center;">none</p>	
Alteration/Metamorphism <p style="text-align: center;">chltzn., ltd. k-spar flooding.</p>	
Fluid Inclusions	Porosity Summary
Interpreted Paragenesis of Vein- and Vug-Filling Minerals	
 <p style="margin-left: 20px;">tour. prisms encapsulated in FeAxinite.</p>	FeAx - tour. epid - tour. tour - leucocrn. FeAx FeAx - kfsp D-cpxn - act. Kfsp. epidote - FeAx
Notes, Miscellaneous	
<p style="font-size: 1.2em;">piece of perthite probably penetrate a dike in here.</p>	<p style="font-size: 1.2em;">caved jadeite fragment.</p>

Petrographic Summary

Sample Identification OF 21C-12 8800 <i>Geysors</i>	Petrographer/Date of Examination <i>JBH</i>
Rock Type <i>disaggreg. felsic intrusive (greenodiiorite?) not much KFSP</i> <i>un. fragments — 20%</i> <i>GRD? — 5%</i> <i>Free to chips, single-phase KF+PLTQ</i>	11 - FeAx 7 - tour 15 - Kfsp. <i>64 qtz + plagioclase</i> 1 - epidote 1 - leucoxene 1 - chlorite Tr - biotite.
Mineralization <p style="text-align: center;"><i>none</i></p>	
Alteration/Metamorphism <i>at least some K metasomatism - extent unknown</i>	
Fluid Inclusions <i>① - 8μ > in qtz: 2ph. 4/1 L.V. pores</i>	Porosity Summary
Interpreted Paragenesis of Vein- and Vug-Filling Minerals <div style="text-align: right;"> FeAx - sphere tour. tour - FeAx qtz - tourm. tour - KFSP. ep - sph - KFSP (leuc) p - KFSP - ep. </div>	
Notes, Miscellaneous <p style="text-align: center;"><i>some of the plag. twin lamellae are <u>kinked</u></i></p>	

TOCHER 4

MINERALOGY, APPROX. WT.% (or) RELATIVE ABUNDANCE

SAMPLE NO.

QUARTZ
PLAGIOCL.
K-FELDSP.
CALCITE
OPAI / CPX
ACTINOLITE
EPIDOTE
PREHNITE
Z-MENITE
MAGNETITE / SP
LEUCITE
PYRITE
TOURMALINE
FERROXINITE
BIOTITE
ILLITE
CHLORITE
TALC
PYROPH.
SERPENTINE

9500-20'																			
9540-60'																			
9600-20'																			
9640-60'																			
9700-20'	41	21	8		2/2	3	1		2	2	TR		7	3	8				
9740-60'																			
9800-20'																			
9840-60'	38	21	8		4/4	2	2		1	2	TR	TR	11	7	8				
9942'																			

MM = PREDOMINANT M = MAJOR m = MINOR Tr = TRACE ? = TENTATIVE IDENTIFICATION



SUMMARY OF X-RAY DIFFRACTION ANALYSIS
UNIVERSITY OF UTAH RESEARCH INSTITUTE, EARTH SCIENCE LABORATORY

Jeffrey B. Hulen