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Core Log
Valles Caldera #2A,
New Mexico

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MASTER

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CORE LOG

VALLES CALDERA #2A, NEW MEXICO

by

Virginia L. Starquist

ABSTRACT

Scientific core hole VC-2A was drilled into the western ring-fracture zone at Sulphur Springs in the Valles caldera, New Mexico. VC-2A, the second scientific core hole in the caldera, was cored through a faulted and brecciated sequence of intracauldron tuffs and volcaniclastic rocks to a depth of 528 m. As of November 1, 1986, the unequilibrated bottom-hole temperature was 212°C. The rocks penetrated are intensely altered and host sub-ore grade stockwork molybdenite mineralization between 25 and 125 m. This report contains a detailed core log to aid researchers in their studies of the Valles caldera magma hydrothermal system.

I. INTRODUCTION

Valles caldera #2A (VC-2A) is the second scientific core hole drilled into the Valles caldera as a part of the Continental Scientific Drilling Program (Fig. 1). The primary objective of VC-2A was to penetrate the vapor zone beneath the acid-sulfate hot spring system of Sulphur Springs on the western edge of the resurgent dome inside the caldera (Goff and Nielson 1986). Secondary objectives were to core through the interface between the vapor zone and the hot water-dominated zone, to obtain structural and stratigraphic data

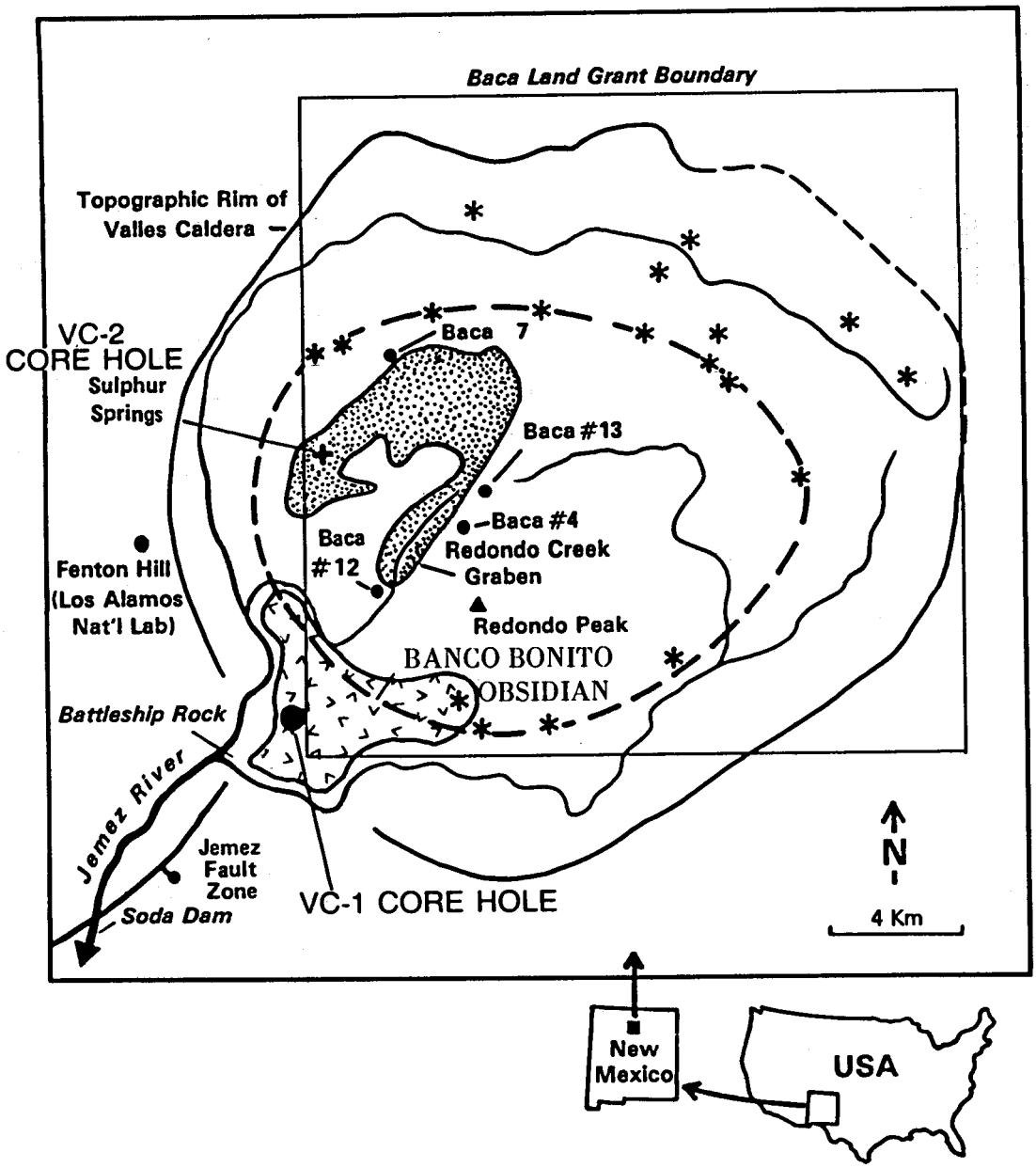


Fig. 1.
Schematic map of Valles caldera region showing location of VC-2A.

on the caldera fill rocks along the ring-fracture resurgent-dome boundary, and to determine possible mechanisms of ore deposition in an active caldera hydrothermal system.

Over 98% of HQ core (62-mm diameter) throughout the entire length of the bore was successfully recovered. The core hole was spudded on September 5, 1986, and completed in 24 days. Total depth is 527.7 m (1731 ft) and the unequilibrated bottom-hole temperature (BHT) was 212°C (410°F) as of November 1, 1986. The core from 366 core runs averaging 5 ft in length is stored in 224 boxes.

A core log in the Appendix provides detailed information on rock types, coherency, mineralization, alteration, and rock structures observed in the core. It is intended to be used by researchers who wish to work on research projects associated with the Valles caldera scientific drilling program or other research problems. All core was cleaned, labeled, and boxed according to the sampling procedures of S. Goff (1986). Those who wish to obtain core should contact Fraser Goff or Jamie Gardner, ESS-1, D462, Los Alamos National Laboratory, Los Alamos, NM 87545 or Dennis Nielson or Jeff Hulen, University of Utah Research Institute, 391 Chipeta Way, Suite C, Salt Lake City, UT 84108. After the summer of 1987, all core will be stored at the US Department of Energy Core Repository in Grand Junction, Colorado. The curator of this repository is Richard Dayvault.

II. DISCUSSION

For description of the core in VC-2A, a two-facing-page log was utilized (see Appendix). The first page contains a heading with general information, drilling dates, depth, and number of boxes and runs. Lithology was graphically logged at a scale of 3/4 in. = 5 ft, there being 50 ft (15.25 m) per page. A coherency profile shows the competency of the rock, and separate columns show specific mineralization. The second page of the set has similar headings and a number of columns for noting core recovery (in feet per run), the run number, and descriptions of structures including sketches of fractures and broken zones, the angle of dip of fractures and infillings, fracture frequency (number of fractures per run), and relative porosity. Sections of core were waxed at selected intervals and are indicated with a special symbol ( ) and a sample number with the corresponding depth, i.e., W#19-1, 61-61.9'.

A summary section of VC-2A is shown in Fig. 2. At the top of the core hole, the first rocks encountered were landslide debris and volcaniclastic sediments. The greater portion, however, consists of various ash-flow tuffs, with lesser intervals of air-fall tuffs and tuff breccias. Also encountered were thin intervals of sandstone and cataclastic rocks.

Most of the rocks are hydrothermally altered. In much of the tuff sequence the lithic fragments and fiamme are altered to pale green clay. From 435 m (1428 ft) to total depth, the matrix is also composed of green clay giving a distinctive green turquoise color to the rock. These clays have been analyzed by x-ray diffraction and consist of sericite-montmorillonite-illite with or without chlorite. In many instances the plagioclase in the rock is altered to soft clay, and the rock consequently appears to be pitted. In the upper part of the hole there are intervals of "splotchy" appearance that are due to a hydrothermal alteration overprint on devitrified welded tuff.

A number of interesting structures were observed in the tuffs. Most conspicuous are a number of breccias; small vein breccias, fault breccias, and coarse-grained tuff breccias. At 487 m (1596 ft) there is a possible intrusion breccia displaying angular lithic fragments in a matrix of calcite and green clay. This zone has a flaring cylindrical shape, 65-70° from core vertical, but is only a few centimeters in length. At 477 m (1565 ft) there appear to be welded pumice trains in very fine grained tuff. Mylonites are observed at several locations in the vicinity of 479 m (1570 ft). A spectacular section of bedded, fall-out tuffs occurs from 373 to 380 m (1225 to 1248 ft).

Alteration minerals were observed with the binocular microscope. Pyrite is always present, from 1 to 10%, and usually noticed as striated cubes, 1-2 mm in size. The next most common mineral is calcite, seldom disseminated, but rather in slender veins, these often with chloritic selvages. Molybdenite occurs as black coatings, not with the usual coarsely crystalline blue aspect, and is associated with Mn, Zn, Pb, and Cu. It is fairly common along fractures in the region of the hole between 25 and 125 m (Hulen et al. 1987). Amorphous hematite appears rarely as small patches of red stain. There is one notable occurrence of green fluorite in 2-cm octahedrons in a vein breccia at 165 m (540 ft). Very small crystals of rutile occur at 516 m (1694 ft). The rutile is associated with a druse of calcite crystals, and a zinc sulphide, probably sphalerite. Rhodochrosite was logged at 167 m (550 ft).

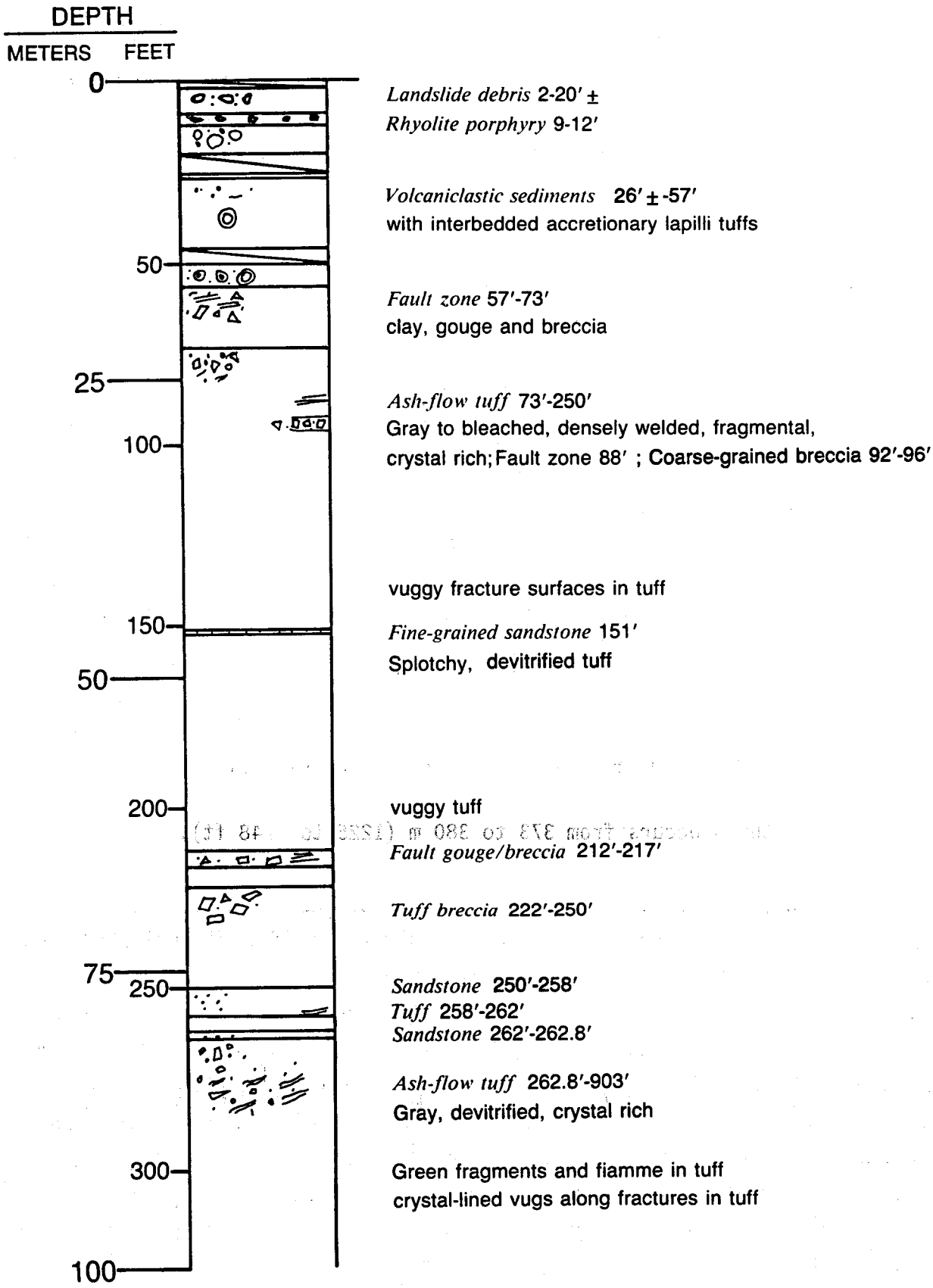


Fig. 2.
Summary section of VC-2A.

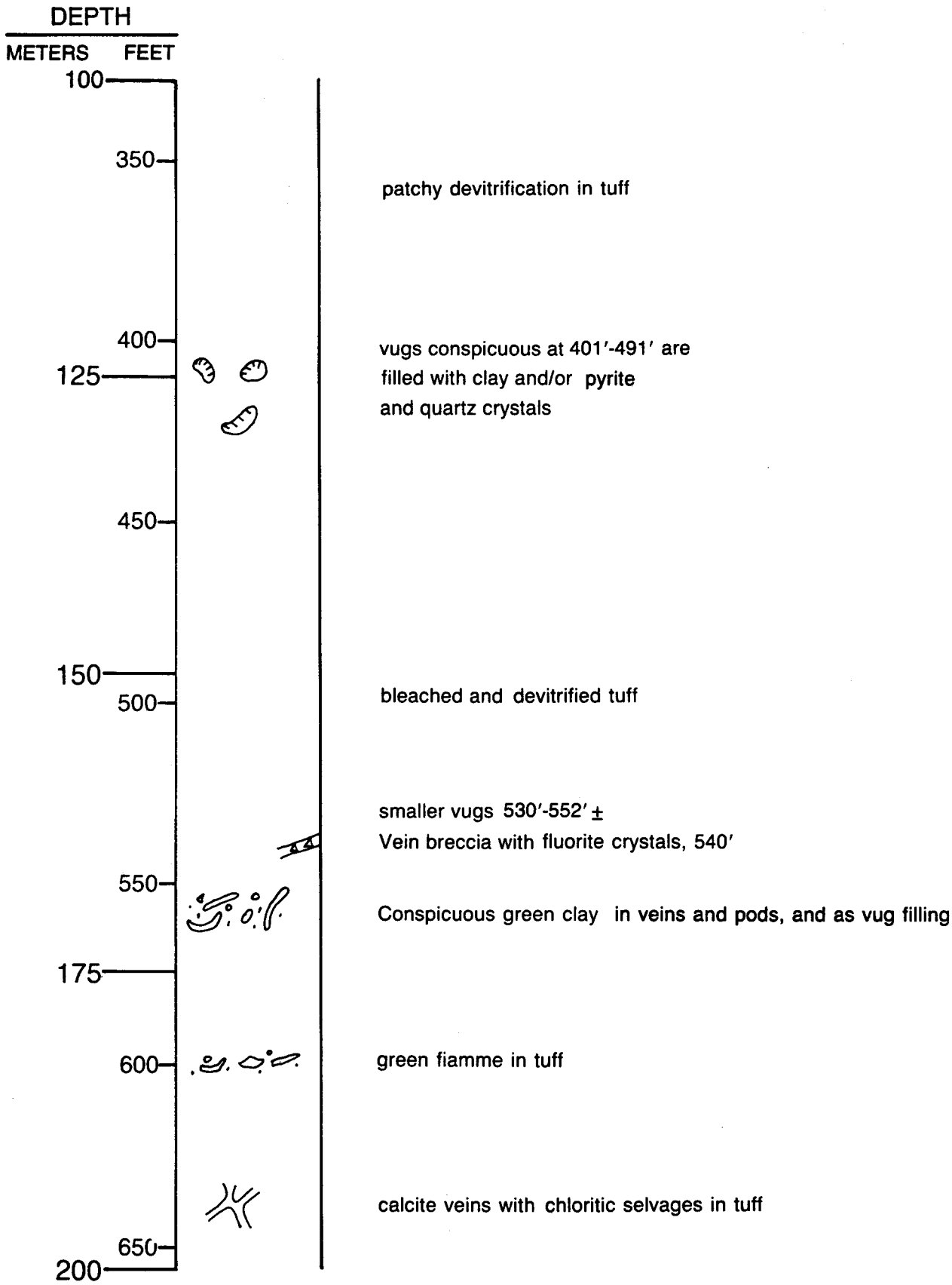

DEPTH
METERS FEET
100
350
400
125
450
150
500
550
175
600
650
200
patchy devitrification in tuff
vugs conspicuous at 401′-491′ are
filled with clay and/or pyrite
and quartz crystals
bleached and devitrified tuff
smaller vugs 530′-552′ ±
Vein breccia with fluorite crystals, 540′
Conspicuous green clay in veins and pods, and as vug filling
green fiamme in tuff
calcite veins with chloritic selvages in tuff

Fig. 2. (cont)

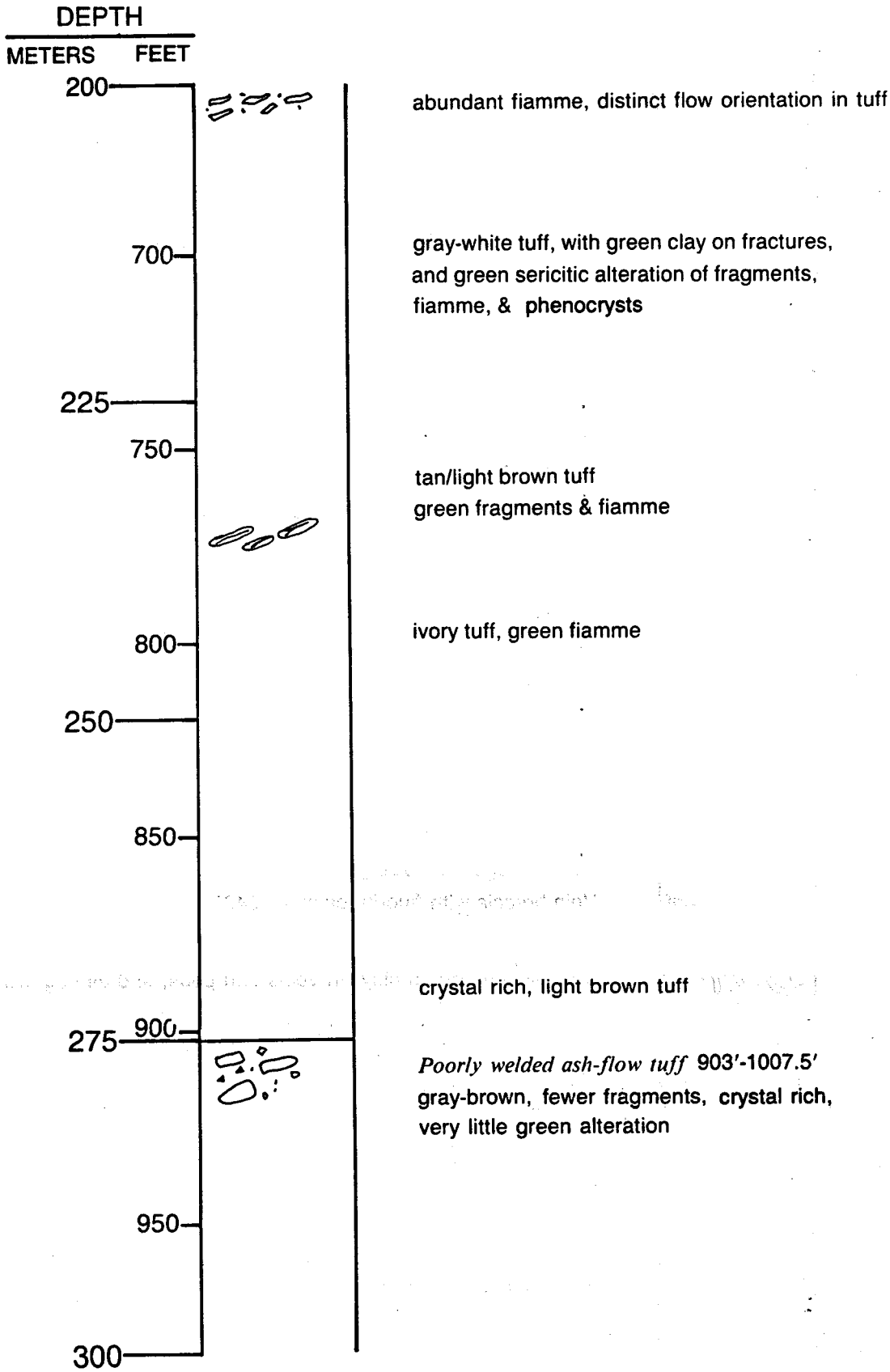
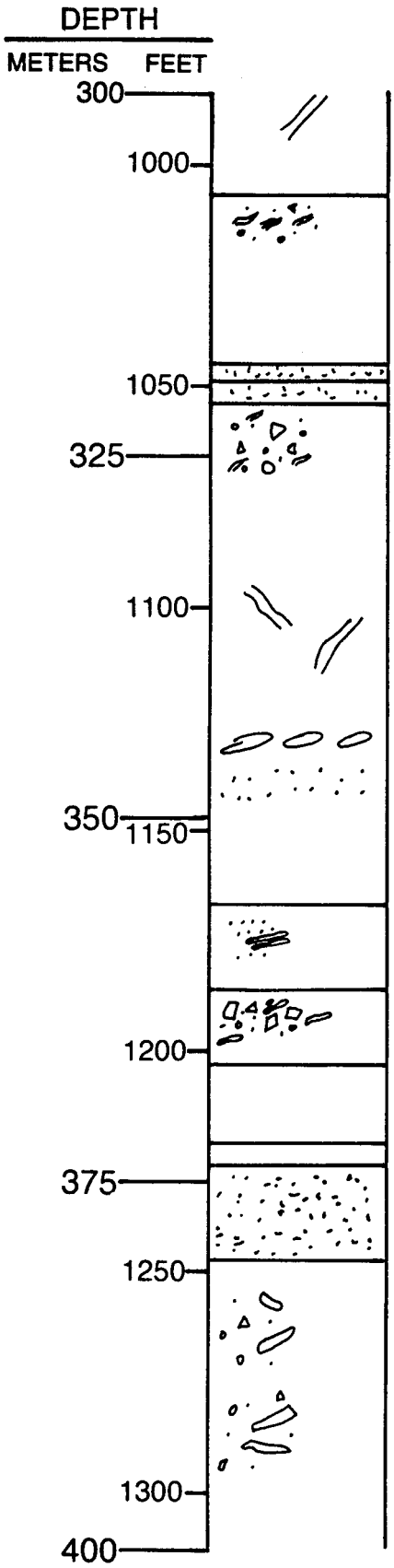

DEPTH
METERS FEET
200
700
225
750
800
250
850
900
275
950
300
abundant fiamme, distinct flow orientation in tuff
gray-white tuff, with green clay on fractures, and green sericitic alteration of fragments, fiamme, & phenocrysts
tan/light brown tuff
green fragments & fiamme
ivory tuff, green fiamme
crystal rich, light brown tuff
Poorly welded ash-flow tuff 903'-1007.5'
gray-brown, fewer fragments, crystal rich, very little green alteration

Fig. 2. (cont)



calcite veins with chloritic selvages

Densely welded tuff 1007.5′-1046′ ±
dark gray, fragmental, swirly fabric
very little green alteration

Air-fall tuff 1049.2′-1054′ ±

Fragmental tuff 1054′ ±-1167.5′
gray, crystal rich; fiamme

conspicuous calcite veins with chloritic
selvages 1095′-1152′

green fiamme & fragments in tuff
pitted tuff

Sandy tuff/tuffaceous sandstone 1167.5′ ±-1186.3′
with bedding

Fragmental tuff 1186.3′-1203′ ±
densely welded, lt.tan with green fiamme

Partially welded tuff 1203′ ±-1221′
pitted, bleached, fragmental; inconspicous. fiamme

Densely welded tuff (?) 1221′-1225.5′

Fall-out tuffs 1225.5′-1248′

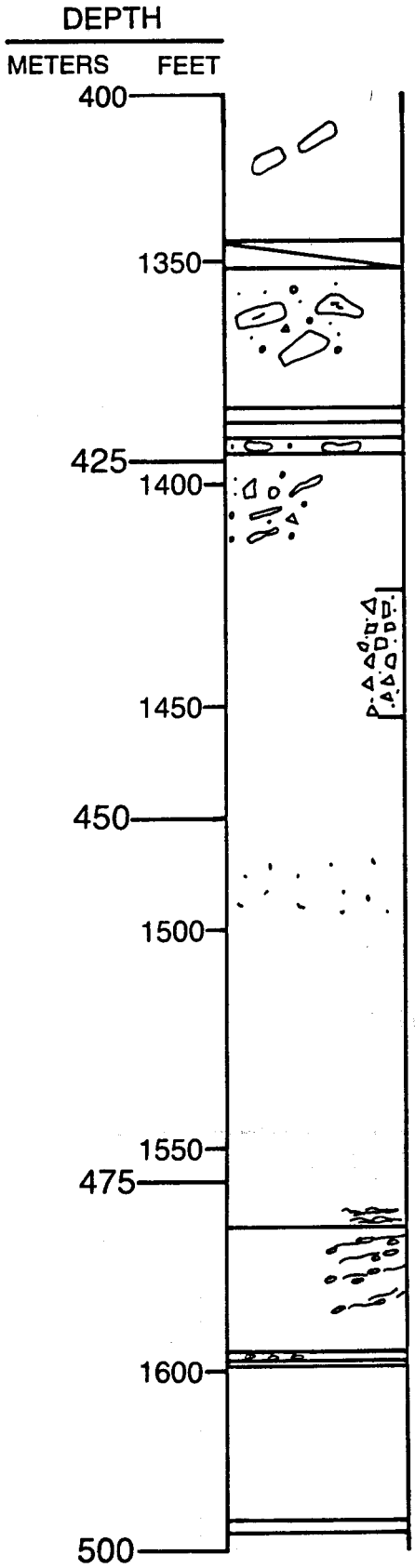
Moderately welded tuffs 1248′-1382.5′
to nonwelded tuffs

grey, pitted tuff

random fragments in tuff

inconspicuous pumice in tuff

Fig. 2. (cont)



pits and vugs in tuff
poorly welded, crystal rich tuff

increase in lithic fragments in tuff
large, noncompressed pumice fragments in tuff

Densely welded tuff 1382.5′-1386′; "feathered" pumice
Moderately welded tuff 1386′-1390′
Nonwelded tuff 1390′-1393′

Densely welded tuff 1393-1568′
crystal rich, fragmental tuff

? Tuff breccia 1423′-1452′
(Lag Breccia?) "TERRAZZO" aspect

green altered matrix 1428′-1731′ T.D.

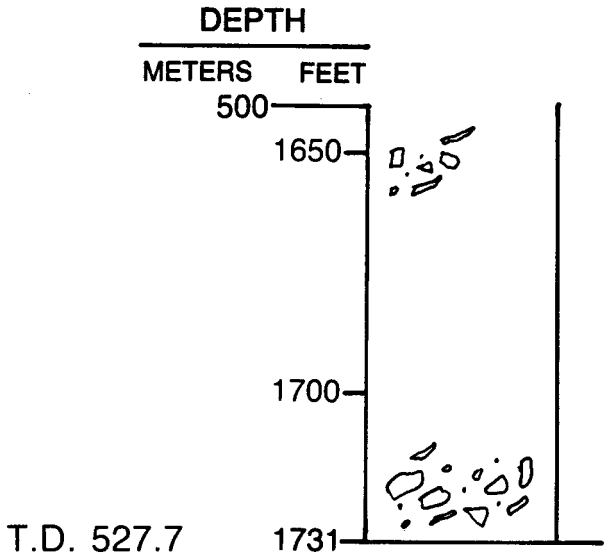
pitted tuff

?welded pumice trains 1565.5′,1567.5′

Nonwelded tuff 1568′-1596′
No quartz
Mylonites 1570′-1585′

? Cataclastic tuff/intrusion breccia? 1596′-1596.4′
Welded tuff 1597.7′-1633′
Quartz to 1610′ ±
No quartz 1610′ ±-1636′ ±
Mylonite 1630′
Nonwelded tuff 1633′-1636′; no quartz

Fig. 2. (cont)



Moderately to densely welded tuff 1636′-1731′
conspicuously fragmental tuff
quartz 5-10%

quartz 8% 1715′-1731′
numerous lithic fragments in tuff 1719′-1731′

Fig. 2. (cont)

Mineralization on fractures consists mainly of potassium clays and calcite, sericite clays with or without chlorite, pyrite and pyrite mud, and ore minerals such as the molybdenite. A general observation can be made that low-angle fractures (0-30°) tend to exhibit clean surfaces, whereas the higher-angle fractures are the ones with the vein infillings mentioned above.

ACKNOWLEDGMENTS

The author wishes to thank Greg Bayhurst of INC Division for x-ray diffraction analyses and Robert Baran of ESS Division for field and laboratory assistance.

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Goff, F., and D. L. Nielson, "Caldera Processes and Magma-Hydrothermal Systems: Continental Scientific Drilling Program--Thermal Regimes, Valles Caldera Research, Scientific and Management Plan," Los Alamos National Laboratory report LA-10737-OBES (May 1986).

Goff, S. "Curatorial Policy Guidelines and Procedures for the Continental Scientific Drilling Progam," Los Alamos National Laboratory report LA-10542-OBES (January 1986).

Hulen, J. B., F. Goff, D. L. Nielson, J. N. Gardner, and R. W. Charles, 1987. "Molybdenum Mineralization in an Active Geothermal System, Valles Caldera, New Mexico," Geology (in press).

APPENDIX

VC-2A CORE LOG

Lithologic Log

Page 1 of 36

DRILL HOLE VC-2A ATTITUDE -90° AZIMUTH _____ C. ELEVATION _____ TD 1731

LAT. _____ LONG. _____

DATE: START 9/5/86 COMPL. 9/26/86

LOGGED BY VLS DATE 9/10-10/29/86

BOX(ES) 1-5 RUN(S) 2-15

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER	Arsenite
Landslide debris 2-20'± (bott. indef.)						?					
Tuffaceous rhyolite fragments	5										
Rhyolite, ? Tuffisite XL rich tuff, and various unrecognizables hydrothermally altered	10										?
9-12' gray-brown, clayey rhyolite p. Conspicuous anhed. clayey plag.											blue
clayey bx	15										
clay gouge											
lg tuff	20										
	25										
Volcaniclastic sediments 26-57 (top indef.)											
In + out bedding, lenses	30										
Random fragments Accretionary lapilli altered									?		
Py cubes 1-5%	35										
	40										
	45								?		
	50										

PICTURE

MINERALIZATION AND ALT. PRODUCTS

HOLE NO. VC-2A
LATITUDE -90°
LONGITUDE
ELEVATION
INCLINATION -90°
TOTAL DEPTH 1731'
CORE SIZE Hq

PROJECT CSDP
LOCATION SULPHUR SPRINGS

PAGE 1 OF 36
LOGGED BY VLS
DATE 9/10 - 10/29/86

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

WATER FIRST MET

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters, Gases
		0.0									
	5	1.0'	2	comp. w softer zones	X			7	lo		
	10	4.0'	3	clayey	X / X	50° 30° 80-30-10°	clay brown clay	20	med→hi		
	15	5.0'	4	but core shape comp. hard clay + crumbles	/ /	70, 10 50 50 30	" " brown med	8 10+	"		
MXED #5.7, 18.4-18.9	20	4.0'	5	soft, core shape clay, crumbles	/	60 45 50	clean clay "	7 10	hi		
	25	0.0	6								
	30	3.0' 4.0'	7 8	sand, clay, crumbles soft	X X X X	10 30 30-50 60	clay to med clay clay	10+ 10+	low med.		
	35	5.0'	9	med. hard	X /	60→70 20 10	clay brown clay pdd to clay	11			
	40	0.0 2.0'	10 11		X			10+			
W #12-1, 41-41.7	45	LOST 3.0 0.7 2.4	12 LOST 0.9 13	softer	X /	40 0 50 30, 40	to clay clay " "	10+ 8	low		
	50	1.8 LOST 0.9 0	14 15	mod. soft, core shape				2	to med.		

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 5-12 RUN(S) 15-28

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER ? specularite
Sediments continue vic. 51' conspicuous, distinctive accretionary lapilli	55			?					?	
Patches of phyllic alteration: Si/ser/py										
57-73 fault zone: clay + crumbles, clay gouge, bt tuff matrix, K-stained fragments.	60									
Cg conglomerate/agglomerate? Sil. frags. to 3", L lav + sub-L lav. Heavily pyritic	65									
? rhyolite fragments	70									
72'± - (Top indet) ? Bandelier Tuff	75								tr	
L lav → sub L lav lithic frags. Bleached Biot., cube py, py after biot., ? py after fragments	80									
Bleached white clayey matrix @ 82' little more competent, vuggy No flow	85									
Qtz, biot., + lithic pebbles 1mm → 1½" Cavities @ 88' fault qz., broken w clay on fractures	90									
92-96 cg bt: one 8" frag. pyritized frags. Bleached tuff matrix py to 10%	95									•
Tuff hardet, silic, py 2-5% Densely welded Distinctive fract. coatings of py/py mud/ser/? specularite	100									•

PICTURE

MINERALIZATION AND ALT. PRODUCTS

#1 NOTE: all "specularite" in this log has been determined to be MoS_2 w Cu + Pb

Fracture coating @ sample #1 = quartz + potassium clay + molybdenite + pyrite

HOLE NO. VC-2A
ATITUDE
NGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
LOCATION

PAGE 2 OF 36
LOGGED BY VLS
DATE 9/10-

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

WATER FIRST MET

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/ Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
		4.0	16	soft, whole broken, clayey		70, 30, 10	clay	10+	hi med.		
	55	2.5	17	whole mod. hard.	X	30 60	clean lt. clay	5			
		lost 2.5						10+			
	60	5	18	med. soft to broken + clayey		80 60, 20	clay "		lo med		
W #19-1, 61-61.9'	65	E=+1' 0.9	19	all secured is waxed		70	"				
		lost 4.1' 2.0 E=1'	20	bf w clay matrix		20	"	10+	lo		
	70	0	21								
	75	5.3	22	clay, crumbly bf		30 10	" "	10+	lo, med + hi (bf) lo		
W #24-3, 79.5-79.9'	80	0.6 lost 4.4' 5.3	23 24	med. soft/ whole soft → crumbles		50, 80	"	2 10+	hi		
	85	5.3	25	med hard w zones of clay + crumbles	X X	70	lt py mud	10+	med → lo hi (vuggy)		
	90	lost 0.3 5.3	26	"		70° sealed 30 50, 80	clay, py mud w sericite clay lt clay	10+	med hi		
	95	lost 0.1 5.3	27	"	X X	30 80, 60, 70 20	lt py m. clean	10+	med lo		
W #28-5, 97-97.8'	100	lost 0.3 5.3	28	hard/ broken	X X	50 → 80 70, 89	py mud + ? speculaite ser. clay w py + ? spec.	10+	med hi + lo		

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 12-18 RUN(S) 28-38

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER specularite?
fragmental welded tuff	105									
	110									
py and/or specularite to 5%	115									
subhed. qtz + broken XLS XL lined vugs along fracts Hairline fracts approaching honeycomb	120									
modest flow structure around qtz grains small scale ovr bk	125									
sericite in matrix #2 - Qtz, Ca, K clay. Some Ca w/ Mn numerous sealed fractures	130									
vein bk	135									
vugs vic. 139' sealed bk w/ lg frags. (2-3")	140									
Qtz XLS line fract. (ruggy surface) vug along fract.	145									
py 3%	150									

HOLE NO. VC-2A
PROJECT
PAGE 3 OF 36
ATITUDE
LOCATION
LOGGED BY
NGITUDE
DATE
ELEVATION
INCLINATION
TOTAL DEPTH
WATER FIRST MET
CORE SIZE 4

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/ Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
		5.3 lost 0.1'	28	broken		85 50	py/spec/ ser mud.		lo		
		5.3	29	comp.		50, 80 80,90,60	sacy tex here. "	10	rare vugs		
	110	5.0	30	comp.		25 70-90 50-60	"	12	lo		
	115	4.0	31	comp.		80, 30 15-20-30	" same, in lesser amts.	13	"		
	120	5.0	32	comp.		80 10 20 5 30	white ser, clay w py + spec. py/spec. minor ser, clay dusty qtz	7	"		
W #32-11, 120-120.5' ±	125	5.0	33	comp.		40 10-20 10,60	XLS in vugs + fracts. " dusty qtz blotched	11	lo → v. lo		
	130	5.0	34	"		10 20,10 60 30,40 40,10	py/spec. spec/py/qtz ?gyp/Ca	8	v. lo		
	135	5.0	35	"		60 10,50 30 30 → 10	" various as above	5	"		
W #36-5, 139.6' - 140.1	140	5.0	36	"		30 65 20 30	py/spec/ ?gyp	7	"		
	145	5.0	37	"		30 50 50 20 50	"	13	"		
	150	5.0	38	"		80-90 10-20 60	dusty qtz/ spec.	13	"		

#2 NOTE: No gyp. OR ANHYDRITE. DETERM. TO BE QTZ, + Calcite + K clay; Ca w hi Mn

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 18-25 RUN(S) 39-47

DESCRIPTION	DEPTH	ROCK TYPE	PICTURE: COHERENCY PROFILE	MINERALIZATION AND ALT. PRODUCTS: PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER	? Agac.
contin. welded tuff w fragments si/ser/py alteration Med. gray	155										
anhed. → subhed felds. 157o lg scale splotchy - possible	160										
devitrification? (159-61') Lt + dark gray OVERLAP											
	146.6										
welded tuff as above rather sparse fragments	150										
fg ss. - no phenos, no frags. grains of? specularite in qtz sand	155										
	160										
splotchy as noted above	165										
freq. sealed fracts. qtz XLS on fract. surfaces	170										
	175										
rare qtz phenos + broken XLS	180										

HOLE NO. VC-2A
PROJECT
PAGE 4 OF 36
LATITUDE
LOCATION
LOGGED BY
LONGITUDE
DATE
ELEVATION
INCLINATION
WATER FIRST MET
TOTAL DEPTH
CORE SIZE Hq

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/ Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
	155	5.0	39	comp.		10 15 10	py ? tr gyp	6	v. lo		
W#40-5, 158-159'	160	5.0	40	comp.		65 70-20 80, 30 50, 20	sealed vuggy surf spec/ qtz XLS	5	"		
OVERLAP	146.6 150	4.4	41	comp.	X	20 70-80 10, 60	clay qtz XLS spec. ? gyp	7	v. lo		
	155	5.0	42	comp.	XXXX	20-40 70 70, 80, 90	sealed surf, spec, py " sealed	9	"		
frequent sealed fracture	160	5.0	43	"	X	90, 30 5 50 60-70 10	py, clay clay spec, " drusy qtz clay	8	"		
	165	5.0	44	"		10 70 30	? gyp spec py, tr clay	4	"		
	170	6.0	45	"		20, 30 0-10 40-90	" py vug/qtz XLS py/qtz/ spec.	5	"		
vuggy on fract surfaces	175	5.0	46	"		25 70 40, 60	py/spec. vuggy as above	9	"		
	180	5.0	47	"		45 50 20 15 20	" qtz XLS py/spec/ clay "	5	"		

Lithologic Log

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BOX(ES) 25-32 RUN(S) 48-51

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER	FLUORITE	? PINK MIX	? Spec.
continued welded tuff as above med. gray, densely welded	185												
fault bt	190.												
increase in sealed fractures - dark because of py + specularite lighter gray	195										?	✓	
darker tuff, "basier"	200												
suggestion of flow structure most felds. phenos, qtz to 15% generally smaller fragments Biotite	205												
patches green sericite - altered feldspar?	210												
Qtz XLS abound in honeycomb vuggy structure 212*-217* clay gouge + bt fault zone	215												
@214.5 bleached ss. frag.? ? Tuff bt ? vein bt	220												
222-250 in + out clay gouge larger frags → bt, sub ∠ lar to rounded. Some w auroles	225												
? Tuff breccia Bleached	230												

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ATITUDE
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DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	RUN	Weathering Alteration	Faults/ Shatter Zones	DIP	Infilling	Fracture Frequency	Porosity	Drillers Comments Mud Tank	Waters. Gases
	185	5.0 ↑ 5.0	47 ↑ 48	Comp. broken		40 40-50 20 70-80 20, 50 20	py/clay " + spec. sealed, vuggy spec., qtz	6	v. lo		
	190	2.5	49	Comp		50 60 10-30 20 70-90	py, spec. sealed py mud ? gyp	6			
	195	? 5.0	50	"		40-70-30 30 60-80 40 30	py/spec/ ?gyp " " + qtz vn bt sealed	10			
W #51-6, 198.4-199	200	5.2	51	"		20-30 50 25 30-40 20	vuggy; vein bt py/spec/ clay " + drusy qtz	4			
	205	5.3	52	"		20 20	clay tr clay	5			
	210	5.3	53	"		70-90 70-80 50, 70	all of above drusy qtz lt. clay spec.	11			
	215	5.0	54	increasingly vuggy/ soft clayey		10+70 60-80 60-90	" vuggy all of above clay	12+	hi honeycomb hi	vuggy	
W #55-4A 218-18.8±	220	5.2	55	clay & crumbles med. hard		70° 50 20 30	clay "	12+	med. lo		
	225	5.3	56	clayey		30 60 10 80-90 50 20, 40	clay, py " " "	7	alternat. med. + hi		
	230	5.3	57	med. hard comp.		20 10 30	" " " "	10	"		

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BOX(ES) 32-38 RUN(S) 57-68

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE (PICTURE)	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
Tuff bx continues Matrix gray, clayey Increase in no. + size of frags	235									
some frags. bleached, clayey " " hard vic 238 not brecciated then immed. a coarse bx	240.									
	245									
rounded clasts - ? conglom.	250									
250-258 sandstone uniformly fg, bleached, ivory random 2 mm qtz grains 8% tr py + ? hem/mag	255									
no bedding observed after 256' pale peach, approaching lithographic. Few ? tuff frags. @258 gouge w py mud. 40° contact	260									
Tuff again, not brecciated lt gray SS again, as above. cont. 70° lt gray, competent tuff - bleached Pale green sericite ? fiamme	265									
Incr. in phenos + frags. After 266.5 can see flow - 30°. Incr. in green sericite xenos XL sich. Obsidian ~ — fiamme	270									
lighter gray ash flow tuff continues decrease in green ser. patches	275									
end of conspic. flow struct.	280									

MINERALIZATION AND ALT. PRODUCTS

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TOTAL DEPTH
CORE SIZE Hq

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DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	RUN	Weathering Alteration	Faults/ Shatter Zones	DIP	Infilling	Fracture Frequency	Porosity	Drillers Comments Mud Tank	Waters. Gases
		5.3 ↑	57 ↑								
		5.2	58	mod. hard w softer z.		30° 30 " 40-70-20 20	gray clay " clay py	12+	vugs altered hi+lo		
	235					10	"; clay				
		1.8	59	comp.		60, 40 85	py, p. mud	2	lo		
W#60-2A, 238.5±-39±	240	3.0	60			70, 85	" " " +? gyp	8	med. lo		
		5.0	61	softer hard frags. in mod. hard matrix		20 20 0 50, 60	clay 3/4" clay clay "	10+	lo		
	245										
		3.0	62	mod. soft		60 50, 70 10 50	" " clay, py	4	med.		
	250										
		5.0	63	mod. hard to hard		0 15, 70, 10 40	clean lt. p. mud	8	mod. → hi		
	255										
		5.2	64	broken mod. soft		5 65 10 60	clean " py mud	12+	hi		
	260										
W#65.1, 261.3-62±				harder		70 20	clay "				
		5.4	65	comp.		30 20 50 70-90	py clay gouge py	8	lo v. lo		
	265										
		5.0	66	"		30 40, 30 30 20 40	clean py lt clay sealed	5	v. lo vuggy		
	270										
rather frequent sealed fracts. w py and/or qtz XLS		5.2	67	"		50 30 40 20, 30 15-30	py " py	5	v. lo		
	275										
W#68-4, 279.4-9±		5.2	68	"		70 50 10-30 60 30	py/?gyp clay qtz XLS py "	5	"		
	280										

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BOX(ES) 38-44 RUN(S) 68-78

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER	? Apac.
tuff continues as above lt + med gray Occasional vugs, usually	285										
along fractures subhed feldr. 15%, 3-10mm med. soft → clay	290										
qtz phenos + broken XLS 5-10% faint flow struct. around phenos. Random, rare fragments	295										
	300										
	305										
occ. hairline qtz vns	310										
small amts. ? obsidian	315										
	320										
	325										
Extra Si in matrix ? lt. gray splotchy phenos less distinct.	330										

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CORE SIZE Hq

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters, Gases
	285	5.2 ↑	68 ↑	comp		40 65 50	py lt clay		v. lo		
		4.8	69			35 70 60-70 30	py py/spec qtz XLS py	6			
	290	4.0	70	slightly bleached comp		70 40 10-20 70 20-60 70 15	py/spec py, qtz qtz qtz XLS qtz, spec	7	"		
	295	5.0	71	"		35 45 50 10 80 5	1/4" qtz on lo spec. margins py, spec py	4	"		
W#72-7, 299-99.9	300	5.1	72	"		15 30 60,30 30	sealed/vuggy lt clay py	5	"		
vugs + XLS along fractures	305	5.0	73	"		20-40 25 50 15	clay, py py	3	"		
	310	5.0	74	"		20 35 30 70 20 70	clay, py	4	"		
	315	5.0	75	"		50 90 40 80 70 50 qtz	py clay sealed py mud	8	"		
	320	5.0	76	"		20 70 10-15 70	qtz clay, py sec, spec. qtz XLS clay, py	8	"		
	325	5.0	77	"		75 15 20 10-20	" " py	2	"		
W# 76-6A, 325-25.7	330	5.0	78	"		50-70-80 88,15 70,80 10	clay py py, sec clay py	12	"		

Lithologic Log

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BOX(ES) 44-50 RUN(S) 78-88

DESCRIPTION	DEPTH	ROCK TYPE	PICTURE: COHERENCY PROFILE	MINERALIZATION AND ALT. PRODUCTS: PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
Tuff as above, welded splotchy, w vugs vugs → back to tuff previously noted	335									
small mafics (?)	340.									
splotchy again for 2'±	345									
	350									
vug →	355									
splotchy	360									
lt + dark areas - could this be patchy phyllic alteration? OR devitrification?	365									
no regular pattern - dark splotches in lt matrix (bleached)	370									
end splotchy interval vugs →	375									
splotchy again T.S. 2 vugs →	380									

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CORE SIZE Hq

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

WATER FIRST MET

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
	335	5.0	79	Comp. minor breaks Comp.	XX	15 70-85-90 70 40	lt. clay lt clay + vugs v. lt clay "	12+	v. lo except in vuggy areas		
W # 80-4, 337.1-38'	340	5.0	80	"	X	70, 10 70, 20 30, 10 20, 80, 90	" ? gyp " clay, py	9	"		
	345	5.0	81	"		20-25-30 45 60 40 20 30	? spec. qtz XLS clay, py ? gyp	12	"		
	350	5.0	82	broken Comp.	X	80-90 40, 20 60, 70 45 10, 20	clay, qtz py, qtz py	12+	"		
	355	5.0	83	"		15 30 60, 10	py, qtz " "	14	"		
W # 84-3, 357.5-58.4	360	5.0	84	broken	X	80, 20 30 20 60, 70	lt. clay sealed, vuggy clean	12	"		
	365	5.0	85	Comp "		80-90 20 90 60	? gyp sealed, vuggy sa. clay "	12	"		
	370	5.0	86	"		90 25 70 90 80-90	? gyp py, clay sealed ? gyp	9	"		
	375	5.0	87	broken Comp.	X	20-30 10 70-50 20 10-15	? clay lt clay	9	"		
	380	5.0	88	"		30 30 20 30 10	vug vugs ? gyp	12	"		

Lithologic Log

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BOX(ES) 50-57 RUN(S) 88-99

DESCRIPTION	DEPTH	ROCK TYPE	PICTURE: COHERENCY PROFILE	MINERALIZATION AND ALT PRODUCTS: PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER	? spec.
welded tuff as above sugg. of flow increasingly splotchy	385										
"hydrothermal alteration overprint on devitrified welded tuff" – F. Goff	390										
alternating normal + splotchy	395										
	400										
@ 401 + beyond conspic lg vuggs (2"+) filled w dense white clay and/or py + qtz XLS seldom splotchy	405										
? obsidian	410										
flow around phenos	415										
obsidian ? cpy	420										
T.S.1	425										
py mud/spec./gouge + vuggs qtz XLS euhed., to ½"	430										

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INCLINATION
TOTAL DEPTH
CORE SIZE Hq

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DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters Gases
W# 89-9, 383.4-84	385	5.2	89	Comp.		10 40 15 15 40	?gyp py, ?spec	12	U. lo dis-counting vugs		
@389' py mud w slicks	390	E= 0.2' 5.0	90			0° 20 10 70 40, 20 20	py py, sw, ?spec. ?gyp	12+	"		
	395	3.6 lost 0.4	91	coarsely broken		80, 90 0, 10, 30 70-90 10-20	" py py, ?spec, lt. lar.	12+	"		
	400	2.3 E= 0.1' 3.2	92 93			"	" "	12+ 12+	"		
W #94-3, 401.6-402'	405	lost 0.6' 4.6	94	comp broken		20 90, 40 20 80 80-90	" ?gyp py, ?spec, clay "	12+	"		
	410	3.9 E= 0.4'	95	Comp. w zones coarsely broken		" 20 30 70 60, 80, 20	tr qtz XLS py "	12+	"		
	415	5.0	96			30 30, 60 20 70-90	" ?gyp py, ?spec. ?gyp	9	"		
	420	5.4	97			20 60 50 20 5 20	?gyp, qtz py py, ?spec. ?gyp	14	"		
W#98-4 423-23.9±	425	5.1	98			60 90, 30 70, 80 40 20	py qtz XLS " ; py	13	"		
	430	5.0	99	med. hard comp		70, 30 15 60, 40 50, 40, 20 70	qtz py vuggy, qtz	8	med. lo		

Lithologic Log

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BOX(ES) 57-64 RUN(S) 100-110

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER ? Apy.
Continues as above lighter gray, w lg (3"±) bleached lascat, some contain vugs lg vugs persist	435									
vugs filled w dense white clay, and/or py + qtz XLS	440									
honeycomb vugs	445									
#4 + 8 - SERICITE, ILLITE, + MONTMORILLONITE	450									
	455									
	460									
	465									
	470									
	475									
	480									

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TOTAL DEPTH
CORE SIZE Hq

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DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/ Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
	435	5.0	100	comp		70, 20 5 40 45, 60 50, 60	py qtz XLS " "	12	lo "		
	440	5.0	101	broken softer		80, 90 40 80, 40, 30 30 70, 90, 30	" " w py py, ?gyp qtz XLS py, ?gyp	12+	mod.		
W#102-2, 440.7-41.5±	445	4.5 lost 0.5'	102	crumbly v. rough		70 80-90 40-20 "	py, spec. mkd +py, clay "	12+	med. hi "		
	450	4.5	103	mod. hard, coarsely broken comp, w		30 40, 85 85-90 20-30 40	" " py, qtz XLS "	12+	lo except in vugs		
deposit on fract. appears botryoidal (?), milky white	455	5.3	104	vugs + clay z.		10-30 10-20 30-60	clay, py clay gouge 2" ?gyp	8	"		
	460	5.2	105			70-80 10-30 50 20 80-30	", ?clay " clay "	12	"		
W# 106-2, 460.3-61.2±	465	5.0	106			60 30 20 60, 90 70-20	py ?clay "	14	"		
	470	5.0	107			20 30 30 20, 60 20	clay, py, qtz " "	9.	"		
	475	5.0	108			50 10, 20 30 80	?clay clay, py, qtz "	10+	"		
	480	2.5 3.0	109 110			70, 30 10, 20 70 20 30	?clay " " "	8 10	"		

Lithologic Log

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BOX(ES) 64-71 RUN(S) 110-120

DESCRIPTION	DEPTH	ROCK TYPE	PICTURE: COHERENCY PROFILE	MINERALIZATION AND ALT. PRODUCTS: PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER	? Spec.
welded tuff continues devitrified + bleached Qtz + felds. phenos abound. Tr biotite	485			•							
lg bleached patches XL sich - phenos + broken XLS, 20% ±	490			•							
@491 last of the big vugs, filled w dense white clay, qtz XLS, + pink clay (?) bleached (rhodochrosite color)	495			•							
rare fragments bleached + devitrified valet of clay	500			•							
some flow around phenos	505			•							
bleached tuff, no vns, no vugs	510			•							
bleached / devitrif. lg bleached patches (4-5"), irreg. in outline	515			•							
	520			•							
	525			•							
1 smaller vug	530			•							•

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DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	RUN	Weathering Alteration	Faults/ Shatter Zones	DIP	Infilling	Fracture Frequency	Porosity	Drillers Comments Mud Tank	Waters. Gases
W# 111-6, 482.6-83.2±	485	5.0	111	comp.		40-50 40-60, 20 40, 30 50	py ? clay ? gyp "	8	lo		
freq. "? clay" on fractures is wavy, pale green	490	lost 0.2' 4.4 E = 0.4'	112	vuggy		70-80 20 10 50, 20 60 20	py, clay " py ? clay, ? gyp " vuggy	14	vug/hi		
Have sampled for proper determination	495	5.0±	113	comp. vug broken comp.		60 60 70-80 30	? clay ? gyp ", + py vugs clay ? py	12+	lo vug/hi lo		
W# 114-8B, 498.8-500.1	500	5.0	114	broken comp.		60 80 80 30 80-90 + 30	" • "	13			
	505	5.3	115	broken		10 30 70-90	" " complex. py veinlets	14			
avocado green sericite clay on fracts. Remnant chlorite here, ∴ chlorite → sericite	510	5.3	116	comp.		10 60 70 70 30 50	py greenish " (pale gn) clay white clay	15			
	515	5.3	117			20 40 50→80 80→90 70	+ py " " " " + pink clay wh. clay, py	8			
@ 519', 1" clayg./py mud, 70°	520	5.3	118			60-70-50 75 70-90 70	" wavy white clay " + py py	12+	med. lo		
W# 118-9A, 520-21	525	5.5	119	broken comp.		60 60, 40 60, 30	white clay + py " "	13			
	530	5.3	120	broken		50 20 70-90 50 85-90, 60	" " • • •	13			

Lithologic Log

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BOX(ES) 71-77 RUN(S) 120-130

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
welded tuff lg bleached patches	535									
Vn bt: white clay, gray clay lg green fluorite, KLS splotchy octahedrons (3/4")	540									
white clay zone	545									
conspic. white clay vugs + zone pink clay #5 - SERICITE, MONTMORILLONITE, + ILLITE	550									
green + pink cl. #6 RHODOCROSITE #7 - CLAYS AS ABOVE, + CHLORITE	555									
white clay w pink clay pebbles green clay pale green clay green clay	560									
green clay green	565									
pale gr. clay good flow around phenos contin. green clay	570									
probably sericite clay derived from chlorite feldspars going to clay	575									
some w green (? chlorite) centers	580									

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DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters Gases
		5.3	120	Crassely broken comp		20, 75 30	wavy clay py, spec		med. lo		
	535	5.3	121	vug		60 70-90	py, spec. " "	10			
W#122-4, 538.5-39.3±	540		122	vug Comp broken		75, 40 60, 70 70-90 60, 30 70	wavy clay " " " " " " " "	14+			
	545	5.3 5.3	123	clayey crumbles comp.		70 40 10 70-80 70 40	clay q, 2" clay, py py clay py clay	12	hi med hi lo		
	550	5.3	124	vugs + clay		50 60 35 10 50 20	white clay w pink wh. clay py wh. clay "		lo except for vuggy areas		
OVERLAP IN MARKED INTERVALS ?	551 or 553.3			Comp. vugs clay in comp. core		40 60 60-70 60 85, 40	" pale green clay " wavy green sub clay + spec.	16			
W#126-7, 158-58.7'	555 560	5.0 6.0	125 126	clay Comp		60, 20 70-90 20 30 10 60	gr. clay " " wh clay wh + gr sov clay gr clay	7			
	565	5.0	127	Crassely broken comp		50, 10 10 10 70-90 45 30	" " py gr clay gr. clay	7			
@ 566 green chlorite on fract. w slickensides	570	5.0	128			60-40 80-90 40 20 85-90 30	" " " " gr + wh clay lt clay	9	v. lo		
	575	4.5 lost .5	129			30 10-20 50 20-30-80 60	wh clay lt " gr + wh cl. wh + gr cl wh cl., py	7			
W#130-8, 579.6 - 80.3	580	5.3	130			20 40 40	lt clay white clay	7			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C ELEVATION _____ TD _____

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BOX(ES) 77-84 RUN(S) 130-140

DESCRIPTION	DEPTH	ROCK TYPE	PICTURE: COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
welded tuff XL rich pale green clay some green pumice/fiamme	585			•						
lt + dk green clay vns + pods	590.			•						
splotchy, bleached, devit. slender green clay vnlets green clay patches XL rich. Flow around phenos	595			•						
not as bleached, not splotchy Felds. w grains of chlor. Conspicuous green coating on fractures. Chlor → lev.	600									
dissem, chlorite (1mm*), sparse py chlorite fiamme chlorite coats qtz phenos	605			•						
	610									
occ. hairline qtz vnlets	615			•						
	620						•			
	625									
	630			•						

HOLE NO. YC-2A
TITUDE
NGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
LOCATION
PAGE 13 OF 36
LOGGED BY
DATE
WATER FIRST MET

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/ Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
	585	5.0	131	comp.		20 60-80 " " 20 30-80	white clay green " " " white clay clean	8	v. lo		
	590	5.0	132			10-20 40 25 15	gr. clay " " " " " "	4			
	595	5.0	133	coarsely broken Comp coarse lt. comp.		80-90 40 30-90 5, 70 50	dk gr cl lt gr clay dk gr. " " " lt. " "	11			
W# 134-7, 598-99.2	600	5.0	134			80 50 10-30-40 25 70-90 80-90	" " " dk " " lt " " " " " " Ca	9	lo		
	605	5.0	135	coarsely broken comp.		20 70 75-90 20 70-90	clean green clay + Ca lt. clay dk green	12+			
	610	5.0	136	broken comp.		10 70 60-70-90	clean + Ca dk green gr white clay + ? Spec.	13			
	615	5.0	137	broken comp.		10-15 20 70 40	clean tr clay whe gr cl ½-1" gr clay gouge	13			
W# 138-1, 616-16.8	620	4.5	138			35 85 30 10 60	? Spec. Ca gr cl/Spec gr clay clean gr clay	12			
	625	lost 0.5 5.0	139	broken		70-90 5 70 80, 10 70	" " clean clay/spec ? spec. clay/ "	12+			
	630	5.0	140	comp.		30-40-90 45 25 20 85-90	lt clay, py lt clay " "	12+			

Lithologic Log

DRILL HOLE YC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

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BOX(ES) 84-92 RUN(S) 140-151

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
welded tuff as above				•						
calcite + green clay						•				
	635									
bleached, devit.										
good flow around phenos	640									
essentially no pyrite										
Ca vn (3/4") w green cl. boxdare	645					•				
ca vn						•				
end bleaching										
tuff w flow 20°	Ca 650					•				
crowded w phenos										
dark swirly matrix, abund. fiamme				•						
	655									
	660									
frags.	665									
	670							•		
	675									
	680									

HOLE NO. VC-2A
ATITUDE
NGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
LOCATION

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DATE
WATER FIRST MET

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/ Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
	635	5.0	141	broken		80-90 20 10 80-90 20	lt clay Ca clean lt clay	12 ++	v. lo		
dark green ? clay on surface is prob. chloritic Small amts. calcite w chlorite on surfs.	640	3.0 1.0	142 143	comp		80-90 20 20 75	dk green clay/spec. clean lt clay	12 ++ 2			
W# 144-6, 641.6-42.3'	645	4.6	144	broken		70 45 40 80 30	clean lt clay " " dk gr. cl. + spec. lt. clay Ca	7			
	650	5.0	145	comp.		75 30 50 5	? grip lt. clay white " sealed/ clay clean	12 +			
	655	6.3	146	coarsely broken comp.		20-30 60, 80 30 25	sealed/ clay green clay white " wh gr. " Ca	15			
	660	5.0	147	broken		20 75 15 30	gr. clay " " clean lt. clay Ca	9	lo		
W# 148-2, 660.4-661.3 definite chlorite on surf	665	5.0	148	comp.		50 10 40 30 75	clay/spec. lt. clay chlor/spec. py, Ca lt clay	11			
lower 2 fractures often clean	670	5.0	149	coarsely broken		30 50, 60 10-15 70 70	chlorite chl., clay, ? spec clean chlor/spec chl./clay	15			
	675	5.1	150	comp.		25 15 80-90 50 20 80-85	chl/spec. Ca chlor/clay lt. clay chl./clay	13	v. lo		
	680	5.0	151			50 75 70, 15 60-80-90 80-90	clean lt gr clay chl/spec/ py, Ca lt. clay clay gouge	10 +			

Lithologic Log

DRILL HOLE YC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 92-97 RUN(S) 152-161

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER	?Spec.
welded tuff as above flow distinct, 30°	685										
frag. frag.	690			•							
white clay xenos 2-5mm some w chlor. within - some may have been pumice bleached	695			•							
	700			•							
vugs w green clay many pale green xenos	705										
green fiamme XL rich tuff, bleached, somewhat argill. matrix. Cavn	710			•		•					•
green sec xeno w red hem. rim few small dark fragments Not a green tuff but persistent chlor/sec clay	715										
on fractures, and pale green sec. alter. of frags/xenos/fiamme the rule - make up 35% of rk	720								•		
incr. in no. of frags. frag. w green rim	725										
	730								•		

HOLE NO. VC-2A
TITUDE
NGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
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PAGE 15 OF 36
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WATER FIRST MET

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters, Gases
W# 152-1, 680-80.8'	685	5.3	152	Comp		70 30 40 15 25	lt gr. clay clean lt. clay chlor/hem/calcite py/chlor	14	v. lo		
	690	5.3	153			70 40 35 20 70, 30 80 80, 50	hem/chlor " calcite chlor, spec. calcite " lt gr. clay	12+	lo		
	695	5.3	154			55 50 70, 30 85 40	chlor, ca " . " + spec. chl., ca " gr clay	11	med		
	700	5.3	155	broken comp.		70 80 30, 90 30	clay " " "	12+			
W# 156-5, 702.4-703.2	705	5.3	156			30 70 60 30 40	lt clay clean lt chlor " chlor/py/calcite	11	hi (vuggy) med. lo		
	710	5.0	157	broken		70 50 30 60 80	lt chlor. ¼" calcite clean chl/ser mud "	15			
	715	5.0	158	comp.		20 15 40 10-40	chl/ser clean chl/ser clean	3			
	720	5.0	159			30-40 0-5	clean clean	3			
W# 160-1, 721-22	725	5.0	160			10-30-40 20 10-20-40 25	" chl/ser. clean chl/hem/ser.	5			
	730	5.0	161			40 20-30 20 85-90	lt clay clean clean chl/ser w/slicks	7			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

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LOGGED BY _____ DATE _____

BOX(ES) 97-105 RUN(S) 161-171

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
bleached tuff continues sparsely. Green zones + fractures the most striking features	735								•	
ca on	740					•			•	
ca on	745			•		•			•	
matrix still argill., now ivory colored				•					•	
more green fiamme	750								•	
flow structure less bleached - now a tan color ? to biotite dissem. in grass ?	755								•	
	760								•	
	765									
green alteration of frags + fiamme, not feldspar grass less argill, deeper tan or lt. brown color	770								•	
	775			•					•	
	780					•				

PICTURE

MINERALIZATION AND ALT. PRODUCTS

HOLE NO. VC-2A
PROJECT
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LOCATION
LOGGED BY
'TITUDE
JGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq
DATE
WATER FIRST MET

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	RUN	Weathering Alteration	Faults/ Shatter Zones	DIP	Infilling	Fracture Frequency	Porosity	Drillers Comments Mud Tank	Waters. Gases
	735	4.0 ?lost 1'	162	Comp.		80-90 10-20 50 10 40 10 40-50	chl/ser. clean chl/ser lt. clay " clean chl/ser	5	med		
	740	5.3 lost 9" (?)	163	softer comp.		70 80-90 50 30 20	clean chl/ser " lt. clay "	7	hi med		
W #164-2, 740.9-41.6'	745	5.0	164			70, 30 30 70 25 20-30	chl/ser clean " chl/ser tr. ham chl/ser clean	9			
	750	5.3	165			70 70 40 40-50 20 70 40	caving gr. clay chl/ca chl. clay " " lt. clay chl/ca ltgr. clay	12			
	755	4.7	166			0-10 40	clean chl/clay	3	med lo		
	760	lost .3 5.0	167			20 70-80-90	clean sealed chl/ca	2			
W #168-3, 763-63.9	765	5.0	168			70 10 (clean) 15-20-90	sealed chl/ca clean gr. clay	4			
	770	5.0	169			15 70 20	clean " "	3			
	775	5.3	170			70 10-20	" "	3			
	780	4.7	171			10-30	.	1			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

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BOX(ES) 105-111 RUN(S) 171-181

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PICTURE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
lt. brown tuff as above conspic. small white feldsp. green fragments + fiamme I think I see anhed. smudgy biotite. Flow around phenos	785										
becoming bleached - gray/tan no more distinct flow	790										
	795										
more green fiamme ivory groms	800				•					•	
still lighter colored/bleached mod. argill. matrix, white	805										
no mafics	810										
pale green aspect - green xenos to 50% of rk	815				•						
bleached decrease in green xenocrysts noted above (apparent decrease, perhaps just very bleached)	820				•					•	
to mafics, qtz less conspic, white somewhat argill. matrix more conspic green fiamme + frags -	825				•						
again to 50% of rk flow 20-30° py cubes	830				• •					•	

HOLE NO. YC-2A
PROJECT
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'TITUDE
.NGITUDE
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INCLINATION
TOTAL DEPTH
CORE SIZE Hq
DATE
WATER FIRST MET

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
	785	5.0	172	Comp.		5-20 80 30	clean " "	3	med.		
W#172-3B, 784.6-85.2	790	5.0	173			45	chl/sw	1	lo		
	795	5.0	174			5	clean	1			
	800	5.0	175			20	clean	0			
W#176-1, 801-02'	805	5.0	176			40 60 40	chl & white clay ?gyp chl. clay	3			
	810	5.0	177			20	pale green clay	1	v. lo		
	815	5.0	178			50 5-30	clean "	2			
	820	5.0	179			5-30 5-20 30	clean " lt. clay	3	med.		
W#180-2, 822.7-23.2	825	5.0	180					0			
	830	5.0	181			5-15 40	clean	2			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

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BOX(ES) 111-118 RUN(S) 181-191

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
welded tuff as above, w conspic. green fenos flow minor quartz	835									
more qtz - or maybe just more visible	840									
felds phenos w. indistinct	845									
	850									
	855									
	860									
	865									
bleached, but apparently same as above XL rich	870									
	875									
larger green patches in addit. to fiamme	880									

PICTURE

MINERALIZATION AND ALT. PRODUCTS

HOLE NO. VC-2A
PROJECT
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TOTAL DEPTH
CORE SIZE Hq
WATER FIRST MET

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/ Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters Gases
	835	5.0	182	Comp.	/	50°	clean	1	med.		
	840	5.0	183		/	45	lt. clay	6			
					—	5-10	clean				
					—	0-5	"				
					/	30-40	lt clay				
	845	5.0	184		—	0-20	clean	2			
					—	0-5	"				
					—	0-10	"				
					—	0-5	"				
W#184-4C, 845-46'	850	5.0	185					0			
	855	5.0	186		—	0-5	clean	2			
					—	0-5	"				
	860	5.0	187		~	30	"	5			
					?	15	"				
					—	10	"				
	865	5.0	188		—	0	"	1			
					~	30-50	lt. clay				
W#189-1B, 868-69'	870	5.0	189		~	15	clean	1			
					~	20-30	lt. clay				
	875	5.0	190					0			
	880	4'4" lost 8"	191		—	10	clean	1			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

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BOX(ES) 118-124 RUN(S) 191-201

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
exactly as above generally bleached, w green tend white, mod. argill. matrix	885			•					•	
	890			•					•	
	895			•						
less bleached, no longer argill. tan → lt brown matrix good flow 30°	900								•	
regular pattern of fiamme, (slender) fewer frags/patches can see felds. phenos; biotite must be dissem. in gmass	905			•						
larger pumice - not densely welded as above and of green alteration	910								•	
(< 5% now) (occ. on fracts.) no more green "aspect" to core now gray-brown very "busy" felds. phenos; qtz	915			•						
swirly flow around phenos tiny chlorite + biot	920			•					•	
	925			•					•	
	930			•					•	

HOLE NO. VC-2A | PROJECT | PAGE 19 OF 36
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INCLINATION | WATER FIRST MET
TOTAL DEPTH
CORE SIZE Hq

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters, Gases
	885	5'4"	192	comp.		70-80 5-20	clean "	3	med.		
W#192-3B, 885.1-886'	890	5.0	193			10-30 40	" lt green clay	2			
	895	5.0	194			5 80-90	clean green clay	2			
	900	5.0	195			20	clean	1			
W#196-4, 904.-04.9 ±	905	5.0	196			15 30	clean gr. clay	1	med. lo		
	910	5.0	197			25, 70 80	gr. clay gr. clay + clay + ? hem	4			
	915	5.0	198			0-20 60-90 15 30	lt. white cl. clean lt. white cl. clean	4			
	920	5.0	199			60 60 0-50 60 60	gr. clay " " " " + py " " " " " + ? hem	7			
W#200-1B, 921.5-26'	925	5.0	200			30 " 70 75 80 70	clean " green clay " " " " " " + py	8			
	930	4.9	201			90 50	clean lt. clay	2			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

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BOX(ES) 124-130 RUN(S) 201-211

DESCRIPTION	DEPTH	ROCK TYPE	PICTURE: COHERENCY PROFILE	MINERALIZATION AND ALT. PRODUCTS: PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
non-welded tuff, gray-brown XL rich, feldspar anhedral smudgy biotite lg pale green pumice	935									
	940									
	945									
	950									
seems siliceous in groms, Si/sev	955									
	960									
	965									
	970									
	975									
	980									

HOLE NO. YC-2A
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TOTAL DEPTH
CORE SIZE Hq

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

WATER FIRST MET

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/ Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters, Gases
	935	lost 0.1 5.0	202	comp		15 70 70 10-20 0-5	clean green clay " " + py clean "	5	lo		
	940	4.9	203			60-0 75 0-10 10-20	" green clay + py clean "	4			
W#204-4, 944.4-944.9'	945	lost 0.1 5.0	204			60 10 80 50	" " green clay "	4			
	950	5.0	205			80 10 0 0-20	" clean " "	9			
	955	5.0	206			60-70 70 50-60 10, 70 80	clean gr. clay, py " " clean, sev clay gr clay, py	9			
	960	5.3	207			5 70 5 0-20	clay " " clean	1			
	965	4.7	208					1			
W#208-2, 965.2-65.7	970	5.0	209			0-50 15 70 30 70-90 70	clean clean chlor/py gr. cl. / py chl / py " "	9			
	975	5.3	210			5 40, 80 15 " 60	clean py, chl clean " lt clay, py	5			
	980	5.0	211			15 60 20 10	clean chl/ca clean "	4			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

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BOX(ES) 131-137 RUN(S) 211-222

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
gray non welded tuff continues pale green pumice to 2"x1" XL rich anhed. feldr.	985									
(F.G. calls all this welded.)	990									
	995									
frag. inconspic., sare	1000									
calcite vn w chlorite selvages	1005									
vic. 1007.5 abrupt end to lg green pumice. Now welded Fragmental some small green fiamme	1010									
chlorite vns. dark gray hard sk black fiamme - obsidian hair-line calcite vns	1015									
flow around phenos fresh rock an obsidian pumice tuff matrix charcoal gray	1020									
subhed. feldr 25%	1025									
	1030									

HOLE NO. VC-2A
ATITUDE
NGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
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DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/ Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
W#212-6A, 983.3-84	985	5.0	212	Comp.		10 70 10, 50 60, 70	clean chlor clay clean chlor, py, ser.	7	lo		
	990	5.0	213			5, 10 0-10 0-5	clean " "	2	med.		
	995	4.7	214			70 60 20, 30 0-30 10	chlor, py, ser " clean "	6	lo		
	1000	4.9	215			55 70 50-60 15	chlor, ser. + py " " clean	5	med.		
W#217-1B, 1004.5-05.5	1005	lost a1 2.8	216			0-10 5 90 20 70-90 70	" " chl, py, ser chlor chl, py, ser "	4			
(note: waped piece is in box 134 at 1007.5', within seen 217	1010	loof 2.2 4.8 E 2.3	217			80 80 65 15 10 70, 20	" " ", slicks clean " chl, py, ox, + ser	5			
	1015	5.25	218			60 30 60, 90 10 40	" clean chl, ox, py, ser. chlor, py py, hem, ? chlor	10			
	1020	5.25	219.			70 20 70 10 75	", w " clean py " py, hem, chlor	5	med. to lo		
W#220-1D, 1023-24	1025	5.25	220			10 60	clean py, chlor	4			
	1030	5.1	221			70 80 20 70 10-20	py " clean py chl. clean	12			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 137-143 RUN(S) 222-232

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
same densely welded tuff as above flow 40°	1035									
dacr. in conspic. fiamme	1040									
lighter gray matrix, slightly argill.	1045									
becoming bleached, felds indistinct fabric swirly, ambiguous. No more obsidian gmass silic. contact @ 1049.2, 55° ? structural contact	1050		lt. weight							
aspect of a lithographic ss, w/ conchoidal fracture. Some lithic fragm. sparse. An air-fall tuff - depos. in water? Ivory, feldspar appearing	1056		lt. frag. devitrified matrix not a ss to chlorite							
tuff as @ 1047± - swirly texture fiamme appear. g, lg & small a distinct fragmental tuff	1060									
med. gray, XL rich	1065									
	1070									
lighter gray, felds. phenos a little less distinct	1075									
	1080									

HOLE NO. VC-2A
ATITUDE
NGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
LOCATION

LOGGED BY
DATE
WATER FIRST MET

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
	1035	5.1	222	Comp.		70 30 70, 30 85 80	py, chlor. slicks " " "	10	med. to lo		
	1040	5.0	223			5, 10 80 65, 20 60 5	clean py, chlor ", ", +ca clean	10			
W#224-1C, 1041-41.9'	1045	4.25	224			70 10 60 60, 30 0-5	chl, py, ca clean chl, py, ca, ? hem chl, py, ca, clay clean	4	med.		
	1050	5.1	225			80, 60 30, 85, 90 70, 10, 50 60, 10	chl, py, clay, ca " " clean "	12	hi		
	1055	5.3	226			10-20 20, 60 60 70 10 50	" " " chl, ca clean chl, clay	12+			
	1060	5.1	227	broken comp.		80 30 70-90 10, 70 70	chl, ca clean chl, ca clean chl, py, ca	12+	med.		
	1065	5.3	228			15 5 10	clean " "	4			
W#229-2, 1064.7-66	1070	5.3	229	broken		10 45 5-10 70	" sm, dk, min. clean chl, ca, py	6			
	1075	5.3	230	comp		90 40 75 45 10-20 70	" "(less) chl, py, ca, sh. " clean chl/py	13			
	1080	5.0	231			70 70-80-90 60	clean chl, py, ca chl, py, ca, dk. thin	6			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 143-149 RUN(S) 232-243

DESCRIPTION	DEPTH	ROCK TYPE	PICTURE: COHERENCY PROFILE	MINERALIZATION AND ALT. PRODUCTS: PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
welded tuff continues as above	1085									
	1090									
calcite w chlorite selvages	1095									
	1100									
	1105									
	1110									
	1115									
	1120									
darker matrix - gray/brown, w many felds phenos visible	1125									
	1130									

HOLE NO. VC-2A
LATITUDE
LONGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
LOCATION
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DATE
WATER FIRST MET

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters, Gases
W# 232-4, 1083.2-84	1085	5.1	232	comp.		60 20 70	calcite clear chl, ca	3	mod. to mod. hi		
	1090	4.0	233			80-90 10 90	ca, chl clear ca	8			
	1095	4.0	234	split 90°±		80-90 80-90 70	ca, chlor " " " "	6 11			
	1100	5.0 3.0	235 236	comp.		20 80	clear chl, ca	1			
	1105	5.0	237	split 90°± comp.		10 60 30 85-90 10	lt clay chl, ca clear chl, py, dark min clear	8			
W# ? , 1107.5-08.3	1110	5.0	238			60 70-90 50 10-30 75	chl, py ca w chl sels. clear " chl, py	7			
	1115	5.0	239	coarsely split comp		70-80 65, 80 80 50	" ", ca " " " " " " " " "	7			
	1120	4.6	240			5 70 60 10 60, 80	" " " sealed ca + chl. chl/py/ca clear chl, py, ca	5			
	1125	4.6	241	broken comp.		5-20 70-80-90 60 70	clear chl, ca, py ca/chl sels. chl/py/ca	8			
W# 242-5, 1125.4-26.4±	1130	4.0 3'	242 243			0-20 50 10 50-60	clear chl/py/ca clear chl/py/ca	5 8			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 150-155 RUN(S) 243-254

DESCRIPTION	DEPTH	ROCK TYPE	PICTURE: COHERENCY PROFILE	MINERALIZATION AND ALT. PRODUCTS: PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
welded tuff as above, med. gray rather frequent calcite vns w chlorite selvages	1135									
	1140									
darker 1144'-beg. of green altered fiamme in lighter tuff (lt gray/ivory mat.)	1145									
all fiamme + frags. green (chlorite) felds phenos indistinct flow 40°	1150									
1152-change in aspect frags + lg fiamme green (lt) smaller fiamme brown-black + incompic	1155									
sk lt gray felds distinct chlorite → pale gn sericite clay 1158- again, change. Bleached, w nearly pervasive green	1160		vnlets of py							
sericite alteration. Matrix white lithic frags. persist, dark pale green fiamme, felds indistinct outside of core vuggy, weathered, "moth-eaten", pitted	1165		mud or chlor.							
fabric essentially destroyed, except for 35% qtz XLS se-entrants @ contact w ?ss, 20° sandy tuff or tuffaceous ss?	1170									
Tq grains in hard ivory matrix uniformly fg larger (2-5 mm) green clay xlenos random vugs, outside of core	1175		? bedding 60°							
some calcite vug fillings	1180									

#8- same clays as above

HOLE NO. VC - 2A
PROJECT
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NGITUDE
DATE
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TOTAL DEPTH
WATER FIRST MET
CORE SIZE Hq

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	RUN	Weathering Alteration	Faults/ Shatter Zones	DIP	Infilling	Fracture Frequency	Porosity	Drillers Comments Mud Tank	Waters. Gases
				comp.		10	clean		med. to med. hi		
						60	chl/py/ca				
						0-20	chl/py				
		5.0	244			55	ca/chl	9			
	1135			broken		75	pelin chl/py/ca				
				comp.		50	" " "				
						80	" " "				
						60	" " "				
		5.0	245			5	clean	11			
						60	ca/chl sslv.				
	1140			broken		40	chl/py/ca				
				comp.		0-20	clean				
						" "	"		med.		
						15	"				
		5.0	246			"	"	6			
	1145					50-70	chl/py/ca				
						10	clean				
W# 247-3, 1147-47.7						0-5	"				
		5.0	247			20	"	9			
	1150					10	"				
						0	"				
						5.	"				
						10.	"		med. hi		
		5.0	248			15	"	4			
	1155										
						5	"				
		5.0	249			20	sax clay	2			
	1160					0-10	" "				
						30-0	" "		hi		
						30	" "				
		3.9	250			0-30	" "	5			
	1165					5	" "				
				broken "moth-eaten"		0	" "				
						25	clean				
						10	"				
		4.0	251			30	"	12+			
						80-90	"				
really 169	1170			comp.		0-20	"				
						0	"				
						70-90	"				
		5.0	252			60	"	7			
						0-15	"				
	1175					10	"				
		2.6	253					0			
W# ?, 1179.1 - 1179											
really 1176.6 @1179	1180										

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 155-162 RUN(S) 254-264

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
				MINERALIZATION AND ALT. PRODUCTS						
ss. continues as above	1185									
1186.3 contact w tuff, 60°. Chlor. on fract. altered, green, fragmental tuff green fiamme, + green in gmass bleached, white matrix, infill.	1190		cavn							
felds. phenos blushed @1191 change - tan matrix, green fiamme + frags, conspic. felds. phenos. Matrix hard, somewhat silic.	1195		? onlets							
good flow 40°, densely welded	1200									
1203-04 vague contact w less densely welded tuff. Flow	1205									
continues, fiamme pale aqua, fatter (¼") ca vns w chlorite selvages	1210									
bleached, pitted, fragmental, no green alter., or only bleached green fiamme inconspic. tan gmass, tr biot	1215									
continues partially welded green fiamme, felds phenos tan matrix	1220									
bleached pale green/white, same tuff but little fabric remains prob. more densely welded	1225									
end of green alter. brown aspect - gmass sil, tan. crowded w felds phenos - to 50% Qtz 15-20%, biot. Cut see pumice (ossan) 4"±, then next variety	1230		contact 30-40° black (30°) fiamme "gneissic aspect							

(see p. 26 A, detail descr.)

HOLE NO. VC-2A
TITUDE
NGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
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DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
1181 really 1180		2.0	254	comp		70-80	clean	1	hi		
	1185	5.0	255					0			
1186 really 1184						60	carwchl salt				
		5.0	256			0-30 0-5	clean "	5			
	1190					20	lt. clay				
						20	" "				
		5.0	257			0-10	" "	2			
	1195					0-10	clean				
W# ? , 1195-95.7											
		5.0	258					0			
	1200										
						20	clean				
		6.0	259			10	"	3			
	1205					0-15	clean				
						60	sealed/ Ca				
		5.0	260			70	Ca/sealed/ clay	2			
	1210					20-30	clean				
						60	carwchl. salt				
		5.0	261			50	lt. clay	2			
	1215					75-80	calcite				
		5.0	262			50	carwchl salt, sealed	0			
	1220										
W# ? , 1220.2-1221'											
		5.0	263			40	clean	3			
	1225					70	lt. green clay				
						30	clean (contact)				
		5.0	264			45	clean (contact)	2			
	1230										

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

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BOX(ES) 162-168 RUN(S) 264-274

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	MINERALIZATION AND ALT. PRODUCTS: PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAGHEM	OTHER
See p. 26 A for detailed description	1235									
	1240									
	1245									
1248 ± end of "sedimentary" section	1250									
These follow a long section of bleached, lt. gray tuff moderately welded, incomplete pumice random fragments matrix white - felds. phenos	1255									
v. numerous + ? coalesced no mafics, or v. rare	1260									
	1265									
characteristically pitted (felds.)	1270									
little darker gray, "busier" felds. phenos → white clay	1275									
	1280									

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TOTAL DEPTH
CORE SIZE Hq

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	RUN	Weathering Alteration	Faults/ Shatter Zones	DIP	Infilling	Fracture Frequency	Porosity	Drillers Comments Mud Tank	Waters, Gases
	1235	5.0	265	comp.		30 40 50 30 50	clean " dk gray clay " (pf m.)	5	hi med hi		
	1240	4.8	266			0-10	clean	1	hi		
	1245	5.0	267			30	lt clay	1			
√#267-2, 1245-46'	1250	6.0	268	xx broken along bedding plane		30 50 40 30-50	pf, p. mud slicks clean pf, p. mud, slicks pf, dev. clay	7			
	1255	5.0	269	comp.		20 60 35 50-70-80	clean green sm. clay " "	4			
	1260	5.0	270	comp, w tiny		0-20	clean	1			
	1265	5.0	271	pitting, ? folds				0			
W#271-3, 1264.7-66.3	1270	5.0	272			20 70 60 80	clean tr clay clean gr clay	4			
	1275	5.0	273			10-20 20 60 50-70	clean " gr clay clean	6			
	1280	5.0	274	pitting more pronounced		0-10-20 10-20	" "	1			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 161 - 164 RUN(S) 263 - 268

Interesting interval blown up for more detailed description 1225 - 1248'

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
	1225									
contact 30-40°										
black fiamme, "gneissic" aspect										
bleached matrix → gray	1230									
fiamme dk gray, wavy, attenuated (30 to 1±)										
feldspheno, frag. XL rich feldl. argill.										
fiamme indistinct crowded w feldsp. phenos lt gray - green matrix										
1234.5 wavy contact (~40°)	1235		frags. alt pale green, pale pink (some)							
w dense, fragmental tuff agglomerate ϕ ½ to sub ½ frags. 1mm → ½". Pumice sase to hom. Matrix black → charcoal gray ? glass			dk gray clasfelt.							
? clast of densely welded tuff										
Repeat ½ lav frag. tuff as above, but frags. farther apart in gray tuffaceous matrix										
? sandy section, random frags. sase fiamme										
lg frags again - pink, green, black	1240									
lt green matrix										
gray, bedded, 20°, 1mm white ? frags										
smaller fragments med. gray										
sugg. of bedding, 20°	1245									
pale green; appears to be tuff, not sed. v. fg sk ? green pumice 20°										
20° contact w tuff to follow										
1248± end of "sedimentary" section - apparently fall-out tuffs	1250									

Lithologic Log

DRILL HOLE YC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

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BOX(ES) 168-174 RUN(S) 274-284

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	MINERALIZATION AND ALT. PRODUCTS: PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
tuff exactly as above bleached gray-white, pitted random lg frags. inter py	1285									
matrix white argill. (but sk competent) XL sich pumice lg, deep gray, mod. compressed	1290									
frags. sparse	1295									
matrix white sericitic clay pervasive phyllic alter. abund. py cubes + pyritohedrons 1-3 mm, 5%	1300					•				
tr altered chlor. Conspic. pitting	1305									
only mod. welded less pitting	1310									
	1315									
med. gray, incr. pits + vugs feldsp. + pumice weathering out chlor flecks on poor welding, lg clay pumice	1320									
white argill. gmass, qtz bipyramids, py tr mafic above	1325									
	1330									

HOLE NO. VC-2A
PROJECT
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TOTAL DEPTH
CORE SIZE Hq

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	RUN	Weathering Alteration	Faults/ Shatter Zones	DIP	Infilling	Fracture Frequency	Porosity	Drillers Comments Mud Tank	Waters. Gases
	1285	5.0	275	comp., w pte above		40 20-30	py, lt. clay clean	2	hi		
W # 275-5, 1284.3-86.7'	1290	5.0	276			70	py, py mud	1			
	1295	5.0	277			20-25 80 40, 50	" clean chl. mud, slicks	8	med hi		
	1300	5.0	278			60° 10 20 30	sealed w calcite & chl clay clean " "	3	hi		
	1305	5.0	279	fract. pitting broken "moth-eaten"		10 70 60 50 85-90	" py, lt clay chl mud clean lt clay	12+			
slicks	1310	5.0	280	comp		70 70 50 40-60	py mud " clean "	3			
W # 280-4, 1309.5-10.5'	1315	5.0	281	broken comp.		70 5-30 60 20 70	py, ca clean py clean py	10	med hi		
	1320	5.0	282	comp. but vuggy/pitted		0-20 30 15 10 50 10-15 70	clean " " " chl. mud clean chl mud fra	4			
	1325	5.0	283			40 50 "	lt. clay " " " "	4			
	1330	5.0	284			5-20 60, 70 60 60 55	clean lt. clay " " " " py, py mud	7			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

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BOX(ES) 174-180 RUN(S) 284-293

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
vuggy gray tuff as above lithic frags. ? pumice	1335									
more bleached	1340									
matrix white less clay but core still competent	1345									
1346-51 missing	1350									
pitted tuff as above fragments increasingly conspic. v. lg pumice, such as 1 x 3", not compressed fold lglypits	1355									
vugs replaced qtz XLS striated py cubes	1360									
	1365									
pitting decr to nearly 0	1370									
rather colorful frags + pumice in off-white matrix	1375									
	1380									

MINERALIZATION AND ALT. PRODUCTS

HOLE NO. VC-2A
TITUDE
NGITUDE
ELEVATION
NCLINATION
OTAL DEPTH
CORE SIZE Hq

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DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
W#285-2, 1332.5-33.4'	1335	5.0	285			50 10-30 50 60-80 70	clean lt. clay py/sand mud lt clay " " + py	3	med. hi		
	1340	5.0	286	bar vuggy		75 20-30 20-35	py/sand mud py, clean " "	3			
	1345	5.0	287	vuggy agate		0-5 40-70 40 70	" " vuggy/ca " " py/lt clay	5	hi		
hole - 1346 crossed out & labelled 1351. ∴ lost 5' here?	1350					0-20	" " "				
W#288-1, 1351-51.8	1355	5.0	288	comp./pitted		50	clean	1			
	1360	5.0	289			80-90 75 30 0-15	clean lt clay " " clean	4			
	1365	5.0	290			30 0-20	lt clay clean	2			
	1370	5.0	291	comp.		10 20	lt clay "	2	med. hi		
W#292-2A, 1371.2-72.2'	1375	5.0	292			20	"	1			
	1380	5.0	293			70-90	clean	1			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 180-186 RUN(S) 293-302

MINERALIZATION AND ALT. PRODUCTS

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
vic 1382.5 change in aspect pumice more conspic, welded, w frayed ends, pale green but bed more are gray-black, rhyolitic. To 1386' ±.	1385		Detail of pumice (flattened)							
lt gray matrix, w. little green alter. no longer argill rhyolite frags - charcoal gray green fiamme feldspars re-appearing, clayey	1390									
lg uncompressed pumice attenuated green fiamme	1395									
	1400									
occasional lg uncompressed pumice in densely welded tuff	1405									
lt gray sh w green fiamme by cubes rhyolite frags., altered	1410									
RENUMBERED	1405									
fresh. rhyo. frags. matrix pale green sericitic, soft so much so that sh has green aspect	1410									
green fiamme in lt gray sh continues XL sich	1415									
	1420									

HOLE NO. VC-2A
LATITUDE
ONGITUDE
LEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

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DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters, Gases
	1385	5.0	294	Comp.	/	60	lt. clay	1	mod. hi		
	1390	5.0	295		~	20-30	lt clay/ clean	1	hi		
W#296-2,	1395	5.0	296		~ ~	20 0-15	" "	3			
	1400	5.0	297		~ /	10 40	" "	2			
	1405	5.0	298		~ | |	30 80 70-80-90	lt. clay lt. clay/ py "	2			
	1410	5.0	299	broken comp. XX	X XXX /	25 30-40 50-70	lt. clay " " " "	11			
"CORE FOOTAGE RENUMBERED TO MATCH DRILLERS"	→ 1405				~	30	" "				
.: RUN 300 - 1406-1411	1410	5.0	300		| ~ |	60-70 15 20-0 70-80	lt. clay/ py lt. clay py clean, py	5			
W 301-1A, 1411-12'	1415	5.0	301	X	~ F ~	20 10 65 10 10	clean, py " " "	5			
	1420	5.0	302		~	20-60	lt. clay	2			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 186-192 RUN(S) 302-312

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	MINERALIZATION AND ALT. PRODUCTS: PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
welded tuff, slender green fiamme, compic lithic fragments, XL sich becoming a tuff by ? pale green clay in matrix feldspar infill.	1425									
incr. no. of frags - ? rhyo, ? andesite, green, brown, white ? pe L lav to sch & lav can be identified when core is split	1430									
frags to 5", all sizes make up 50-60% of sh. "terrazzo" aspect	1435									
v. lg frags. predom. 1436-38.5 constitute 75-80% of sh fiamme small + indistinct	1440									
matrix green, frags often have green sinter @1438 banded rhyolite frag.	1445									
frags 40-60% chlor/hem/py sh green aspect, green matrix like green turquoise!	1450									
1452± now a fragmental tuff, frags 10-20% green fiamme small, abundant	1455									
cavities (absent qtz XLS) some qtz remaining ? poss. Abo ss. frag.	1460									
frags smaller, 10%± green fiamme in green matrix prob. pumice lt. brown	1465									
	1470									

HOLE NO. VC-2A
LATITUDE
LONGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
LOCATION

LOGGED BY
DATE
WATER FIRST MET

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters, Gases
W #303-1A, 1421-21.5'	1425	5.0	303	Comp.		30-40 15-35 20 30 10-40	lt. clay " " " " " " " "	6	mod. hi hi		
	1430	5.0	304			20 0-40 0-30-40	" " " " " "	3			
fractures jagged, go around lg fragments	1435	5.0	305			20 30 70	py, clean lt clay " "	3			
	1440	5.0	306			30 10-20-45 10-20 25	" " " " " " " "	4			
W #307-1A, 1441-42.5'	1445	5.0	307			10-15 10-40 60-90-10	" " " " py. "	3			
	1450	5.0	308			40 25	py py, slicks	1			
	1455	5.0	309					0	med. to hi (consequence of frag.)		
	1460	5.0	310			0	lt clay	1			
W #311-1A, 1461-62	1465	5.0	311			0-20 0-5	lt. clay " "	3			
	1470	5.0	312			20 15-30	" " clean	4			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 192-197 RUN(S) 312-324

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
green welded tuff w random frags. + slender green fiamme flow 30-40	1475									
deeper green + pitted, 1475.9 + after - to 1487. felds. + some frags. "weathered" out Qtz cavities also	1480									
@1485 vug of Ca + qtz, w XLS lining vugs chlor lanting, ? MoS_2	1485									
no. of frags. increasing, poss to 25%, varied as above	1490									
qtz XLS indistinct, but there	1495									
green fiamme, green matrix	1500									
qtz bipy 7% ±, few cavities	1505									
fragments more numerous, + larger	1510									
	1515									
anhed. chlorite XL rich	1520									

HOLE NO. VC-2A
LATITUDE
ONGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
LOCATION
PAGE 31 OF 36
LOGGED BY
DATE
WATER FIRST MET

DOWN HOLE SURVEY		
DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK RUN	ROCK Weathering Alteration	STRUCTURE Faults/Shatter Zones	STRUCTURE DIP	STRUCTURE Infilling	STRUCTURE Fracture Frequency	STRUCTURE Porosity	HYDROLOGY Drillers Comments Mud Tank	HYDROLOGY Waters. Gases
	1475	5.0	313	comp.		25 70 5-10 0-20	lt. clay clean lt. clay clean	2	hi		
end run 313 @ 1476 no 314 no 315 Run 316 - 1476-80	1480	4.0	316			0-15	clean	1	med. hi hi		
Run 317, 1480-86 W# 316 B, 1484-85	1485	6.0	317			10 60	lt. clay	10			
	1490	5.0	318	broken comp.		20	" "	0			
W# 319-C, 1494-94.10"	1495	5.0	319					1			
	1500	5.0	320			0-5	clean	1			
	1505	5.0	321			50-10 80-90	clean "	1			
	1510	5.0	322					0			
	1515	5.0	323			20 10	clean "	5			
	1520	5.0	324			70, 10 10 20, 60 10 50-60	lt. clay clean " " lt. clay	6			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 198-204 RUN(S) 324-334

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
welded tuff, fragmental green fiamme, green matrix random frags - 10-20% XL rich, some qtz cavities matrix somewhat argill.	1525									
	1530									
	1535									
some fiamme not as densely welded	1540									
	1545									
incr. in lithics L lat, sub L lat, rounded	1550									
abund. qtz XLS + shards + grains matrix argill. but core competent	1555									
lighter green	1560									
decr. lithic frags., 10% or less fiamme indistinct 1564-6445 brown frags. compie, 15% v. fg tuff	1565									
peculiar "bedding" @ 1565.5 ? welded pumice train again @1567.5 30° few grn fiamme ? mylonite	1570		gray fragm. tuff - matrix v. fg, sil., w 10% pf cuboid f. ghosts. No qtz. 1pc frag. - ? dolosite. No fiamme but few lg pumice							

HOLE NO. VC-2A
LATITUDE
LONGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
LOCATION
PAGE 32 OF 36
LOGGED BY
DATE
WATER FIRST MET

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
W# 325-B, 1521.7-22.3±	1525	5.0	325	comp.		10 0-20 0-10 20	clean " " "	5	hi		
	1530	5.0	326	comp. but broken every		0-20 5 20 15 5-20 15	lt. clay clean ", lt. clay clean " lt. clay	8			
	1535	5.0	327	5-8"±		10-15 0-25 30 10 15	clean " " " "	5			
	1540	5.0	328			10 15 20 10-15 10	" " " " "	7			
	1545	5.0	329			0-25 10 5-30 60 5 60	" " " lt. clay, slicks clean clay, Ca	10			
	1550	5.0	330			10-25 0-20 5-15 " 20	clean " " " lt. clay	12			
	1555	5.0	331			10 15 70-80 10 40 5-20	clean " " lt. clay " " " tr calcite clean	14			
	1560	5.0	332			15 40-50 10 20 " 10	lt. clay clean lt. clay clean " "	10			
	1565	5.0	333			20 10-20 " " 70 20	lt. clay clean " " " "	12	med.-hi		
~1566.5, ? bogue clay, 3." pale green	1570	5.0	334			0-20 0-5 40 40-50 0-30 0-20	" lt. clay clay, slicks by mud, slicks clean "	9			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 204-210 RUN(S) 334-344

MINERALIZATION AND ALT. PRODUCTS

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE		PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
many frags green (pale), rounded abund. chlorite, ser, py ? mylonite No qtz	1575		shyo. frag.								
rare lithics oval "augen" sk or. green, w green fiamme	1580										
matrix green, hard, grainy, silic. No qtz phenos, ghosty felds. tr bit ? @1585 mylonite ? 5" + not welded	1585										
somewhat ash fill, no qtz 1587 begin non-welded tuff lithics rare, but numerous lt. green slightly compressed pumices fiamme or small, inconspic	1590		tr ? bit.								
no qtz @1594 bleached; green matrix w lg pale green pumice, flattened, crowded 1 qtz XL	1595										
sdst frags. 1596-96.4, ? Intrusion by. Llas lithic frags in green clay + calcite ? cataclastic sf/sh 1597-97.7, green-brown green fragmental welded tuff green fiamme in gr. matrix, qtz	1600		65-70° contact Scale steep cont. 35°	ca vn across pumice <1% qtz							
or fault gouge material/shear ? 0-1% qtz	1605										
occ. larger less-compressed pumice qtz + cavities 3-5% inconspic.	1610										
some lg pumice escaped welding no qtz, but some Si in matrix tr qtz, no bipy's	1615										
	1620										

per JG + FG

VS

HOLE NO. VC-2A
LATITUDE
ONGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
LOCATION

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LOGGED BY
DATE
WATER FIRST MET

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
	1575	5.0	335	Comp.		20 40 10-30 0-15	clean chlorite, lt Ca clean "	3	hi		
mislabel?? ↓	1580	5.0	336			15-20 40-70 20	" chlor, Ca, py clean	3			
W #334 D, 1570' ↗? ↖?	1585	5.0	337	broken Comp. but freq. fr.		60 70 40-50 50 25	chlor, py, py mud slicks lt Ca, clay ca ca clean	12+			
	1590	5.0	338			15 5 50 55 80 70 10	" " chlor, py, sw slicks clean chlor, py, sw, lt Ca clean	4			
	1595	5.0	339	broken		80 10 50-90 70	clay, ca, slicks clean chlor, clay chlor, sw	12+			
	1600	5.0	340	Comp. but freq. fr.		50 " 40 50	chlor ca ca, chlor " "	10+			
W #340-F, 1600.5-1601'	1605	5.0	341	Comp.		15 10 5-20 5 70 10	clean " " " chlor clean	4			
	1610	5.0	342			50 40-50 10 5-20 0-5	chlor py, clay, ca clean " lt. clay	7			
	1615	5.0	343			10 0-15 0-20 5	clean clean " "	7	hi to med. hi		
W 343-J, "1609" incorrect; lies at 1615.4-.9±	1620	5.0	344	broken		0-10 30 70-90 60 60-70	" py mud slicks clean " lt. clay, Ca	12+			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 210-216 RUN(S) 344-354

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
				MINERALIZATION AND ALT. PRODUCTS						
green welded tuff, fine fiamme, few fragments consiic anked. chlorite no qtz	1625									
? mylonite	1630									
more frags. 1633* non-welded, green, sare frags. lt. green sh, v. lt green pumice no qtz, but Si in gmass	1635		qtz 5% contact 40°							
shear 1636 - mod. welded fragm. tuff frags. to 35%, red, brown, black, gray lt. green matrix	1640		40°							
Qtz to 5%, gmass somewhat argill. qtz to 10%	1645									
few fiamme, mod. → dense weld.	1650									
qtz-rich	1655									
py sparse	1660									
	1665									
	1670									

HOLE NO. YC-2A
LATITUDE
LONGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
LOCATION

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LOGGED BY
DATE
WATER FIRST MET

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
	1625	5.0	345	comp.		60 30 " 50-60 25 30,50	sat. clay, pf, pf mud pf mud " clay, Ca clean clay, Ca	11	hi		
	1630	5.0	346			60	gr. clay mud pf	0			
W # 347-1, 1631-31.5 (wrong footage on sh)	1635	5.0	347			5-10 0-40	clean gr. clay	6			
	1640	5.0	348	broken comp.		20 70 75 25 0-10	" " " +pf m. clean	1	med. hi		
	1645	5.0	349			0-15 35 0-15 60	clean clay, Ca clean slicks	5			
	1650	5.0	350			0-30	clean	0			
W # 351-1, 1651-52.2'	1655	5.0	351			40 10-15 70	clean " lt. clay	3			
	1660	5.0	352			0-20	lt. clay	2			
	1665	5.0	353			15 0-5	clean lt. clay	1			
	1670	5.0	354			80 10,40	sealed clean	2			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD _____

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY _____ DATE _____

BOX(ES) 216-222 RUN(S) 354-364

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	MINERALIZATION AND ALT. PRODUCTS: PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
conspicuously fragmental mod. → densely welded green, w qtz as above	1675									
	1680									
	1685									
	1690									
#10- RUTILE - TITANIUM OXIDE Calcite XLS/drusy, w tiny mafics over entire surface in clusters	1695									
also yellow min = #9 Zn SULFIDE, PROB. SPHALERITE; pumice welded, small. Occ. larger ones mod. welded; mem. frags, generally small, ∠lar + sub∠lar	1700									
pumice rarely attenuated; continues to contain qtz XLS + shards; anhed. chlorite; green slightly argill. matrix	1705									
	1710									
@1712.5, 3/4" m of Calcite XLS, 70°, in one portion a bt, w frags in Ca; 2tg bipy 8% ±	1715									
frags larger + more num. - to 30% megascopically	1720									

HOLE NO. VC-2A
LATITUDE
LONGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH
CORE SIZE Hq

PROJECT
LOCATION

LOGGED BY
DATE
WATER FIRST MET

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/ Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
W #355-1, 1671-71.6'	1675	5.0	355	comp.	—	0-10	clean	2	hi		
	1680	5.0	356		~	5-15	lt. clay	0			
	1685	5.0	357		~	5-20	clean	2			
	1690	5.0	358		~ —	20 15	clean clean	2			
W #359-1, 1691-92.2	1695	5.0	359		— — — — —	0-5 10 15 20 50 10	" clean " " gr. clay clean	7			
	1700	5.0	360		—	70-90 20	" "	1			
	1705	5.0	361		~ ~ — ~	0-10 5-20 35 25	clean " lt. clay & slick " "	3			
	1710	5.0	362		~	25	" "	2			
W #363-1, 1711-12'	1715	5.0	363		— ~ ~ —	0-15 15 70 10 70 15	" " clean lt. clay " " " " + slick lt. cl.	8			
	1720	5.0	364		~	25	clean	1			

Lithologic Log

DRILL HOLE VC-2A ATTITUDE _____ AZIMUTH _____ C. ELEVATION _____ TD 1731'

LAT. _____ LONG. _____

DATE: START _____ COMPL. _____

LOGGED BY VLS DATE 10/29/86

BOX(ES) 222-224 RUN(S) 364-366

DESCRIPTION	DEPTH	ROCK TYPE	COHERENCY PROFILE	PYRITE	QUARTZ	CALCITE	FLUORITE	GYPSUM	MAG/HEM	OTHER
				MINERALIZATION AND ALT. PRODUCTS						
green fragm. tuff as above all sizes frag. pumice present, not compic., small Qtz still present	1725			•					•	
@1730.2 ± lg frag. (2") of	1730			•						
? biot andesite. lt. brown w bleached auncle	1731' T.D.			•						

HOLE NO. VC-2A
LATITUDE
LONGITUDE
ELEVATION
INCLINATION
TOTAL DEPTH 1731'
CORE SIZE Hq

PROJECT
LOCATION

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LOGGED BY VLS
DATE 10/29/86

DOWN HOLE SURVEY

DEPTH	DECLINATION	AZIMUTH

WATER FIRST MET

COMMENTS	DEPTH	CORE RECOVERY	ROCK: RUN	ROCK: Weathering Alteration	STRUCTURE: Faults/ Shatter Zones	STRUCTURE: DIP	STRUCTURE: Infilling	STRUCTURE: Fracture Frequency	STRUCTURE: Porosity	HYDROLOGY: Drillers Comments Mud Tank	HYDROLOGY: Waters. Gases
				Comp'	—	5-15	lt. clay + slight		hi		
					—	10	clean				
		6.0	365		—	10	"	4			
	1725				—	5-10	"				
					—	5	"				
W #366-E, 1729.3 - 30.15	1730	4.0	366		—	5-10	"	1			
	1731 T.D.										