Leg 193 Igneous Log - Hole 1189A

Identifiers									Phenocrysts												Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Ti-Mt						
Unit	Core	Sec	Pc#	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size	Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max		(%)	Comments
1	1R	1	1	0	5	4															microlitic glass	15	Vesicles: mainly elongate, 1mm x 2 mm to 7 mm, fresh glass for Refractive Index measurement. => 66 wt% SiO2.
1	1R	1	2	5	9	3															microlitic glass	15	Do.
1	1R	1	3	9	12	2															microlitic glass	10	Do. Vesicles with minor sulfate fills.
1	1R	1	4	12	17	4															vfg	15	Vesicles mainly round: 1 to 3 mm across.
2	1R	1	5	17	22	1															vfg	10	Small pieces of gravel, groundmass is pervasively sulfate-silica altered. Vesicles round to elongate: 1mm x 1 mm to 3 mm.
2	1R	1	6	22	25	2															vfg	10	Gray groundmass, bleached, vesicles round to elongate 1 to 2 mm x 1 to 5 mm.
2	1R	1	7	25	30	3															vfg	10	Do.
2	1R	1	8	30	34	3															vfg	10	Do.
2	2R	1	1	0	6	3																10	Gray groundmass. Vesicles round to elongate 1 to 5 mm x 2 to 15 mm with sulfate and sulfide lining.
2	2R	1	2	6	14	6																10	Do.
2	2R	1	3	14	21	2																10	Do.
2	2R	1	4	21	27	2																10	Do.
2	2R	1	5	27	33	5																10	Do.
2	2R	1	6	33	41	7																10	Do. Nice anhydrite linings in vesicles.
2	2R	1	7	41	48	4																10	Do. Note: one large elongate vesicle (5 mm x 25 mm).
2	2R	1	8	48	57	8																10	Light gray groundmass. Large elongate vesicles with vertical orientation indicating change in flow direction? (1 to 3 mm x 2 to 30 mm, with anhydrite fills).
2	2R	1	9	57	64	4																10	Do. As piece 8 with a particular 40 mm long vertically elongated vesicle.
2	2R	1	10	64	70	5																10	Gray groundmass. Vesicles round to elongate , 1 to 2 mm x 1 to 7 mm.
2	2R	1	11	70	77	4																10	Gray and white groundmass. Lensoidal to elongate vesicles, 1 to 2 mm s 1 to 10 mm.
2	2R	1	12	77	86	4																10	Do. White groundmass only.
2	2R	1	13	86	93	4																10	Do. White groundmass only.
3	2R	1	14	93	101	2																	Siliceous vein.
4	2R	1	15	101	117	6																	Hydrothermal breccia with 90% angular light green to blue green clasts (1 to 2 cm across) in white, gray anhydrite-rich matrix. Abundant jigsaw fit texture. Some perlitic clasts, some microvesicular clasts (vesicles 1 to 2 %, <1 mm to 1 mm across, filled by anhydrite and/or pyrite).
4	2R	1	16	117	126	9																	Do. Clast maximum diameter: 2.5 cm. Euherdral anhydrite in matrix voids.
4	2R	1	17	126	137	6																	Hydrothermal breccia as above. This piece consists mainly of one, large (5 cm across) clast with perlitic texture.
5	3R	1	1	0	6	5																10	Gray to light gray groundmass. Vesicles: mainly elongate (round cross sections in this piece) 1mm to 5 mm x 3 to 20 mm.
5	3R	1	2	6	14	6																10	Do. Two vesicles with spectacular pyrite lining.
5	3R	1	3	14	20	4																10	Do. One irregular shaped 10 mm x 20 mm cavity: coalesed vesicles?
5	3R	1	4	20	25	3																7	Do.
5	3R	1	5	25	30	4																5	Do.
5	3R	1	6	30	35	3																5	Do.

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Identifiers									Phenocrysts												Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Ti-Mt						
Unit	Core	Sec	Pc#	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size	Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max		(%)	Comments
5	3R	1	7	35	42	5																10	Do.
5	3R	1	8	42	50	8																10	Do.
5	3R	1	9	50	56	3																10	Do.
6	3R	1	10	56	63	6																	Volcanic breccia? Overprinted by two stages of alteration.
7	3R	1	11	63	69	3																3	Gray, bleached groundmass. Vesicles are 1 to 2 mm across, pyrite linings. Piece cut by anhydrite vein with silica-pyrite halo.
7	3R	1	12	69	76	5																3	Do.
7	3R	1	13	76	81	2																-	Gravel pieces of silica-anhydrite-pyrite vein.
7	3R	1	14	81	84	2																-	Gravel pieces of silica-anhydrite-pyrite vein.
7	3R	1	15	84	89	4																10	Gray, bleached groundmass. Vesicles: elongate 1mm x 2 to 5 mm, partially filled by pyrite.
7	3R	1	16	89	96	4																-	Crustiform, silica-anhydrite-pyrite vein.
8	4R	1	1	0	5	2																3	Intensely sulfate, silica-chlorite altered and silicified. Small, round to lenticular vesicles (<1 mm). Some lenticular. Range: <1mm to 2 mm x <1 mm x 20 mm. Typically filled by quartz.
8	4R	1	2	5	17	11																5	Do.
8	4R	1	3	17	24	5																5	Do.
9	5R	1	1	0	7	6																	Hydraulic jigsaw breccia with 95 % clasts (maximum diameters range: <1 cm to 6 cm). Clasts: white (sulfate-white clay-silica) locally with preserved flow banding texture. Overprinted by blue-green chlorite-smectite alteration. This alteration was followed by irrgular quartz-pyrite veining.
9	5R	1	2	7	14	2																	Do.
9	5R	1	3	14	23	7																	Do.
9	5R	1	4	23	30	5																	Do. folded flow lamination in one clast.
9	5R	1	5	30	34	2																	Do.
9	5R	1	6	34	41	5																	Do.
9	5R	1	7	41	51	9																	Do. Large (5 cm across) flow laminated clast fractured by green silica clay alteration.
9	5R	1	8	51	57	5																	Do. Large (6 cm across) white clast with fine, fibrous laminar texture (=> ?tube vesicles?).
9	5R	1	9	57	62	2																	Do.
9	6R	1	1	0	6	3																	Cm-scale clasts are flow-banded and completely altered.
9	6R	1	2	6	13	3																	Rubble.
9	6R	1	3	13	20	2																	Rubble.
9	6R	1	4	20	25	1																	Rubble.
9	6R	1	5	25	31	1																	Rubble.
9	6R	1	6	31	42	10																	Clastic “hydrothermal breccia” texture. Altered rock preserves flow banding. There is gradation from coherent rock to brecciated.
9	6R	1	7	42	48	5																	Deformed flow banding preserved.
9	6R	1	8	48	54	3																	Hydrothermal breccia.
9	6R	1	9	54	62	5																	Do.
9	6R	1	10	62	69	4																	Do.
10	7R	1	1	0	4	2																	
10	7R	1	2	4	12	7																5	Small (<1mm) to 5mm vesicles, commonly flattened and oriented.
10	7R	1	3	12	24	11																5	Do.
10	7R	1	4	24	28	2																	
10	7R	1	5	28	43	14																	Massive rock with no igneous features. Possibly originally a non-vesicular lava.

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Identifiers									Phenocrysts												Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Ti-Mt						
Unit	Core	Sec	Pc#	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size	Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max		(%)	Comments
10	7R	1	6	43	48	2																	Do.
10	7R	1	7	48	55	5																	Do.
10	7R	1	8	55	59	1																	Do. Rubble.
11	7R	1	9	59	67	8																	Breccia. Some clasts have relict flow banding.
11	7R	1	10	67	72	4																	Do. Some white clasts (bleached), some green + white clasts, mostly green clasts.
12	7R	1	11	72	76	2																2	Flattened vesicles.
12	7R	1	12	76	80	3																3	Do.
12	7R	1	13	80	88	7																2	Do.
12	7R	1	14	88	92	4																	
13	7R	1	15	92	96	2																	Breccia rubble.
13	7R	1	16	96	100	3																	Silicified breccia.
14	7R	1	17	100	103	3																	Silicified oxidized (jasper) breccia.
15	8R	1	1	0	3	2																	Rubble.
15	8R	1	2	3	10	7																	Possibly remnant perlitic texture. Silicified.
15	8R	1	3	10	14	3																	Do., only lightly silicified.
15	8R	1	4	14	23	8																	Jigsaw breccia with variable degrees of silicification. No definite igneous textures.
15	8R	1	5	23	32	7																	Do.
15	8R	1	6	32	45	12																	Do.
15	8R	1	7	45	51	4																	Do.
15	8R	1	8	51	59	6																	Do.
15	8R	1	9	59	65	4																	Do.
15	8R	1	10	65	72	5																	Do.
15	8R	1	11	72	77	3																	Do.
15	8R	1	12	77	80	2																	Do.
15	8R	1	13	80	85	3																	Do.
15	8R	1	14	85	93	7																	Do.
15	8R	1	15	98	97	3																	Do.
15	8R	1	16	97	102	4																	Do.
15	8R	1	17	102	107	3																	Do.
15	8R	1	18	107	113	5																	Do.
15	8R	1	19	113	124	8																	Do.
15	8R	1	20	124	129	4																	Do.
16	9R	1	1-12	0	85																		Jigsaw-type hydrothermal breccia. Clasts have abundant flow banding with kink and disharmonic folds in pcs. 1, 8, and 12.
17	9R	1	13	85	89	4																5	Bleached vesicular rubble.
17	10R	1	1-2	0	11																		Rubble, each piece different and probably out of place.
18	10R	1	3																				Mineralized little piece of breccia.
19	10R	1	4-14	11	148																		Completely altered veined/brecciated hydrothermal rock with medium-to-coarse-grained “clasts.” No obvious igneous texture.
20	11R	1	1-13	0	97																	5	Vesicles are mm-scale ovoid, sometimes elongate up to 2 cm. Sometimes steeply dipping in oriented pieces. Sugary texture, completely altered, with quartz+pyrite vesicle linings.
20	12R	1	1	0	6	5																	Do (and following pieces).
20	12R	1	2	6	14	5																5	Vesicles about 1-4 mm, ovoid.
20	12R	1	3	14	23	7																5	Vesicles 1-8 mm, ovoid.
20	12R	1	4	23	31	7																5	
20	12R	1	5	31	41	9																5	Vesicles 1 mm to cm-scale irregular voids (coalesced vesicles?).
20	12R	1	6	41	50	7																	
20	12R	1	7	50	61	10																5	Mm-scale ovoid vesicles.
20	12R	1	8	61	70	8																5	Mm-scale ovoid vesicles, oriented steeply.

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Identifiers									Phenocrysts												Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Ti-Mt						
Unit	Core	Sec	Pc #	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size	Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max		(%)	Comments
20	12R	1	9	70	79	8																	Rubble.
20	12R	1	10	79	87	8																5	Mm-scale, steeply-oriented ovoid vesicles.
20	12R	1	11	87	93	4																5	Vesicles and vugs.
20	12R	1	12	93	101	7																5	Elongate gracefully-curved vesicles.
20	12R	1	13	101	107	5																	Rubble.
20	12R	1	14	107	114	8																5	Elongate vesicles up to 2 mm across and 1 cm long.
20	12R	1	15	114	120	5																5	Rubble.
21	12R	1	16	120	128	7																	Breccia with clasts of altered rocks/shards and sulfide (with chalcopyrite) clasts in a fine-grained matrix.
22	12R	1	17	128	135	5																	Breccia with silicified matrix and soft sulfate-rich clasts.
22	12R	1	18	135	138	1																	Do.
23	13R	1	1	0	6	2																10	Completely altered (bleached) gray to light gray groundmass. Vesicles: large size range, many large elongte vesicles (2 to 3 mm x 3 to 20 mm). Pyrite in veins and vesicles.
23	13R	1	2	6	15	4																15	Do.
23	13R	1	3	15	23	3																10	Do.
23	13R	1	4	23	33	4																5	Pieces of gravel, mainly vesicular therefore assigned to unit 23.
23	13R	1	5	33	38	2																5	Pieces of gravel, some vesicular therefore assigned to unit 23.
23	13R	1	6	38	45	3																	Altered volcanic breccia (clasts <1 to 4 cm; multiphase alteration, similar to units 9 and 17). Green clasts: smectite/chlorite-rich clasts dotted with sulfate, white clay, silica alteration. Gray clasts: sulfate, silica, clay alteration. ?relict perlite? Matrix: dark gray silica +/- pyrite.
24	13R	1	7	45	51	5																	Large (>6 cm diameter) light gray sulfate, silica, clay altered clast with irregularly folded flow lamination (wrapped around green clast => ?xenolith in lavaflow), and green clast as above.
24	13R	1	8	51	57	4																	Green and gray clasts (max. diameter 1 cm). Some flow laminated, rotated clasts.
24	13R	1	9	57	62	2																	Gravel, some with green clasts.
24	13R	1	10	62	71	3																	Gravel, green and light gray clasts, quartz-pyrite vein (>1 cm thick).

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Identifiers									Phenocrysts														Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Clinopyroxene								
Unit	Core	Sec	Pc #	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size			Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max				(%)	Comments
1	1R	1	1	0	29	5																			Massive sulfide contains 2-3 mm volcnic fragments. They are altered and vesicular.
2	1R	1	2	29	29	4																		10	Bleached/completely altered volcanic rock, aphyric, vesiclular. Vesicles up to 5 mm long X 2 mm high. They are elongate, aligned by flow.
3	2R	1	1	0	10	4																			Blue-green volcanic flow-banded clasts, 5-cm-scale, subangular, rotated with respect to each other. Completely altered and have a lot of massive sulfide that has crosscut the clasts in little veins.
3	2R	1	2	10	20	5																			Ditto.
3	2R	1	3	20	30	5																			Rubble.
3	2R	1	4	30	40	4																		5	Rubble. Vesicular altered rock with disseminated pyrite.
3	2R	1	5	40	50	4																			Rubble.
3	3R	1	1	0	12	3																			Blue-gray, altered flow-banded or tube-pumiceous volcanic rock, with disseminated sulfide, in a pyrite-anhydrite cement. Fragments are cm-scale.
3	3R	1	2	12	23	2																			Ditto.
3	3R	1	3	23	34	2																		2	Two 1-cm chips of volcanic rock (completely altered) with pyrite crust. A few vesicles.
3	3R	1	4	34	46	3																			Ditto. Tiny pieces of altered rock clasts in pyrite-rich vein matrix.
3	3R	1	5	46	57	4																			Mm- to cm-scale altered rock clasts in pyrite-anhydrite cement.
3	3R	1	6	57	68	1																		1	Unusual sub-mm scale flow banding(?) in this 1-cm piece of blue-gray and blue-green rock. Disseminated pyrite. Few elongate vesicles.
3	3R	1	7	68	76	4																		5	1-mm spherical to ovoid vesicles in this completely altered gravel rubble.
3	3R	1	8	76	84	4																		5	Ditto. Gravel includes pieces of massive sulfide.
4	5R	1	1	0	12	2																			1- to 6-mm angular clasts of blue-gray altered volcanic rock (massive, micro-veined) set in a pyrite-quartz matrix.
4	5R	1	2	12	22	3																			1- to 8-mm angular clasts of blue-gray alteredvolcanic rock in a pyrite-quartz matrix. Rock has tiny thin green-clay microveins.
4	5R	1	3	22	33	2																			Sub-mm grains of blue-green altered volcanic rock (10%) in pyrite-quartz vein material.
4	5R	1	4	33	45	0.5																			Light green-blue, massive, altered rock with 3-mm concentric circular structures = PERLITE.
4	5R	1	5	45	55	2																			1- to 8-mm angular blue-green volcanic clasts (altered) in sulfide-quartz matrix.
5	6R	1	1	0	12	4																			0.5- to 3-cm clasts of altered volcanic rock in a matrix (only 10%) of pyrite-quartz-hematite (jasper). Rock is completely altered, light greenish, with lighter-colored rims and bands. Relict flow banding? No identifiable vesicles, yet extremely porous (>50% locally). The pores are subangular to subrounded (boxy), with septae of rock (clay) separating them. Primary vesicles or secondary porosity?

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Identifiers									Phenocrysts												Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Clinopyroxene						
Unit	Core	Sec	Pc #	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size	Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max		(%)	Comments
5	6R	1	2	12	24	4																	Ditto. The very porous clasts may either be very highly vesicular (if so, 50% vesicles) or they are perlitic and the central kernels have been dissolved. The jasper-like matrix does not invade the clasts, suggesting that they were not so porous at the time of jasper veining.
5	6R	1	3	24	34	6																	Ditto. Rubble.
5	6R	1	4	34	45	6																	Ditto. Some large clasts (several cm) have relict flow banding.
5	6R	1	5	45	56	3																	Ditto. Nice angular clasts.
6	6R	1	6	56	67	2																	Vuggy massive sulfide - pyrite with accessory quartz and anhydrite.
7	6R	1	7	67	78	3																	Completely altered volcanic rock, light gray-green. Vestiges of flow-banding. Irregular distribution of <1-mm quartz amygdales, spherical, about 20% abundance.
8	7R	1	1	0	11	5																	3- to 4-cm clasts of light gray altered volcanic rock in a pyrite-anhydrite-quartz matrix.
8	7R	1	2	11	22	2																	Ditto.
9	8R	1	1	0	3	2																2	Light gray-green, completely altered volcanic rock. Small vesicles/vugs, <1mm, partially to completely filled with pyrite quartz.
9	8R	1	2	3	6	2																5	Ditto. One vesicle reaches 3 mm, with drusy quartz + pyrite.
9	8R	1	3	6	9	2																Tr.	Ditto.
9	8R	1	4	9	14	3																	Rubble.
9	8R	1	5	14	24	2																7	Ditto. Pyrite + quartz in elongate oriented vesicles, <2 mm. A 1-cm vug lined by quartz + pyrite has euhedral anhydrite solitary crystals.
10	8R	1	6	24	27	2																	Clasts of completely altered rock in a quartz-pyrite matrix. Clasts are <1cm, light green-gray, and light tan. Angular. Possible vesicles.
10	8R	1	7	27	30	1																	Ditto.
10	8R	1	8	30	33	1																	Ditto.
11	8R	1	9	33	37	3																5	Volcanic rock, completely altered. The groundmass is light gray and very fine grained with uniformly-distributed round quartz spots, about 0.1-mm diameter, nearly close-packed. Vesicles are ovoid, up to 4 mm long, filled or lined by quartz + pyrite. There is a xenolith that is soft green clay, 1-cm diameter, and subrounded.
11	8R	1	10	37	47	6																8	Gray-green completely altered volcanic rock. Vesicles to 1 mm, and one or two 5 mm vugs. Vesicles/vugs lined or filled by quartz and pyrite. No phenocrysts to date in any of this.
11	8R	1	11	47	50	3																	Rubble.
11	8R	1	12	50	61	3																8	Same as Piece 10.
11	8R	1	13	61	64	2																1	Clasts of light green altered rock in a micro-stockwork of pyrite + quartz. Similar to Units 4 and 8.
11	8R	1	14	64	67	2																	Ditto.
11	8R	1	15	67	70	2																8	Same as Pcs. 10 and 12.
11	8R	1	16	70	73	2																	Ditto. Rubble. One piece has a turquoise-colored tint.
12	9R	1	1	0	3	2																	Less than 1-mm to 1-cm clasts of light blue-green volcanic rock in a pyrite-quartz matrix. Clasts are riddled with pyrite microveinlets.

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Identifiers									Phenocrysts												Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Clinopyroxene						
Unit	Core	Sec	Pc#	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size	Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max		(%)	Comments
12	9R	1	2	3	9	3																	Ditto. This is a larger piece that has clasts to 2 cm, with relict flow banding or tube-pumice structure.
13	10R	1	1	0	14	12																10	Pervasively silica-green clay altered. Amygdales (vesicles) range: 1 mm to 10 mm, mainly round, some lensoidal upto 6 mm x 10 mm. Generally filled by quartz, anhydrite, green clay (minor pyrite). Anhydrite-pyrite veins are locally connecting amygdales.
13	10R	1	2	14	23	4																5	As above.
13	10R	1	3	23	33	9																8	As above.
14	10R	1	4	33	37	2																None.	Breccia. Dark green volcanic fragments with vuggy silica-pyrite matrix/vein?
14	10R	1	5	37	49	7																None.	Rubble fragments. Dark green volcanic material, minor remnant perlite? Cross cut by fine rectangular quartz-anhydrite veinlets => pseudoclastic texture. Some pieces have a light gray perlititc? groundmass with silica-pyrite fine veinlets. Some pieces have white spots (up to 2 mm) => isolated and coalesced spherulites.
14	10R	1	6	49	56	5																None.	50 %, mainly <1 mm white (clay altered?) spherulites in dark green-black silica, chlorite groundmass. There are also white, wispy anhydrite domains. Spherulites often have a central vug filled with black silica-pyrite. Faint ?flow banding on piece margin.
14	10R	1	7	56	63	5																None.	Spectacular flow banding (about 1 mm scale) defined by spherulitic bands. Other domains contain isolated or coalesced spherulites (nodules with bulbous margins). Groundmass is dark gray (silica-pyrite) and dark green (chlorite-rich).
15	10R	1	8	63	77	8																20	Black massive rock. Extremely flattened tubular vesicles/amygdales generally <1 mm x 2 to 3 mm, maximum: 2 mm x 10 mm x 20 mm; filled/lined by whitish clay, minor anhydrite, trace pyrite. In some parts the black siliceous groundmass contains abundant (50 %) light gray quartz aggregates (<<1 mm) => Alteration feature?
16	11R	1	1	0	7	3																None.	Breccia. 60% green, clay-rich volcanic fragments, some are flow banded (up to 1 cm in diameter), mainly angular, in a drak gray siliceous matrix. Flowbanding at random orientations.
16	11R	1	2	7	14	5																<1	Apparent breccia with round, nodular (up to 1 cm) green, vesicular volcanic fragments embedded in a dark gray siliceous matrix with black/dark gray silica-magnetite dots (amygdales?) locally.
17	11R	1	3	14	17	2																None.	Jasperoidal breccia. 90 % red vuggy, FeOx (includingmagnetite, pyrite) with some green volcanic fragments (with faint remnant flow banding).
18	11R	1	4	17	22	3																None.	Polymict breccia. Green clay-rich volcanic clasts (40%, some banded). White clay altered clasts (5%), light gray siliceous clasts in a dark gray siliceous matrix with traces of pyrite.
18	11R	1	5	22	27	3																None.	Polymict breccia. As above. However, clasts (<0.5 cm) are more abundant (60%).

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				Identifiers					Phenocrysts												Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Clinopyroxene						
Unit	Core	Sec	Pc #	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size	Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max		(%)	Comments
18	11R	1	6	27	33	2																2	Dark green clay-rich, vesicular, volcanic clasts (<1 cm, 30 %) embedded in a dark gray siliceous groundmass with black, magnetite-rich dots (amygdales?). This is identical to Piece 2).
18	11R	1	7	33	40	2																None.	Polymict breccia. 70% clasts (mainly <1 cm). Light green, flow banded and light gray clay-rich clasts. Could be altered equivalents of green clasts).
18	11R	1	8	40	43	1																None.	One part of this small piece consists of of polymict breccia as above. Larger portion of consists predominately of dark silica hosting irregular, shard-shaped domains of light gray silica and green clay-bearing silica (<1 mm to 3 mm). Jig saw fit pattern dominates. 'Shards' are never in direct contact. This might well be an alteration texture.
19	11R	1	9	43	59	7																10	Black coherent, aphyric volcanic rock. Abundant, extremely streched, sub-mm amygdales, anhydrite filling or lining. One dark green clay-rich lensoidal patch (15 mm x 5 mm; xenoltih?).
19	11R	1	10	59	68	9																10	As above.
19	11R	2	1	0	15	7																10	Rubble. As above.
19	11R	2	2	15	30	15																5	As above.
19	11R	2	3	30	42	11																10	As above. Elongate, steeply dipping (subvertical) vesicles, lined or filled by dark green clay, concentrated in one half of the Piece (1 to 2 mm x 3 to 10 mm).
19	11R	2	4	42	49	8																8	As above.
19	11R	2	5	49	60	8																6	As above. Vertical orientation of vesicles and anhydrote and/or green clay-rich amygdales. Contains 1 cm wide dark gray fragment with light gray halo (=> xenolith?)
19	11R	2	6	60	76	8																8	Rubble. As above.
19	11R	2	7	76	81	4																6	As above.
19	11R	2	8	81	107	25																10	As above. Chlorite (+ anhydrite) filled/lined vesicles. Anhydrite crust (vein?) at one end of the Piece.
19	11R	2	9	107	114	4																5	Rubble. As above.
19	11R	2	10	114	135	20																20	As above.
19	11R	2	11	135	141	3																10	Rubble. As above.
19	12R	1	1 to 4	0	68	60																10	As above. Piece 2 and 3 have anhydrite crusts (veins) at their ends.
19	12R	1	5	68	82	14																10	As above. Subvertical vesicles maximum dimensions: 2 mm x 15 mm; lined by green clay and anhydrite. One exceptional vug: 3 cm x 4 cm x 3 mm with greenclay, pyrite and barite lining. One black xenolithic patch (1 cm) with anhydrite filled vesicles oriented normal to the subvertical alignment of vesicles in the surrounding groundmass.
19	12R	1	6	82	98	13																10	As above. Elongate vesicles are oriented subvrtically and gently folded on a 10 cm scale.
19	12R	1	7 to 11	98	141	35																10	As above. Vesicles (up to 1 mm x 10 mm) are vertical to subvertical. Lined or filled by dark green clay (+ anhydrite).
19	12R	2	1	0	18	17																8	As above. Vesicles (1 mm x 8 mm) are subvertical. Anhydrite vein on margin.
19	12R	2	2	18	29	10																8	As above.

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Identifiers									Phenocrysts														Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Clinopyroxene								
Unit	Core	Sec	Pc#	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size	Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max		(%)	Comments
19	12R	2	3	29	40	10																5	As above. Open vesicles are mainly <1mm.
19	12R	2	4	40	48	5																3	As above. Open fine vesicles.
19	12R	2	5	48	58	9																4	As above. Open vesicles anhydrite filling.
19	12R	2	6	58	62	3																7	As above.
19	12R	2	7	62	71	6																10	As above. Vesicles with green clay lining + anhydrite. Subvertical orientation.
19	12R	2	8	71	77	5																7	As above.
19	12R	2	9	77	93	16																3	As above with minor phenocrysts(??) and anhydrite-filled stretched vesicles.
19	12R	2	10-14	93	138																	3	Vesicles are mainly round up to 2 mm.
19	12R	3	0-10	0	73																	8-Mar	Dark to light gray aphyric volcanic rock. Trace plag(?) phenocrysts in Piece 9. Vesicles are round to irregular mainly unoriented. Maximum size 3 mm x 15 mm.
19	13R	1	1-3	0	20																	5	As above but vesicles are extremely flattened and generally anhydrite-filled.
20	13R	1	4-9	20	49																		Breccia. Light gray and light green, locally flow-banded clasts up to 2 cm. 50% clasts. Matrix is dark gray silica + pyrite. Some white clasts with remnant perlitic texture. Piece 5 is similar to Unit 21. Piece 9 is spherulitic.
21	13R	1	10	49	56	8																	Dark green completely altered volcanic rock. No igneous textures preserved. The rock appears. Therefore, to be aphyric and non-vesicular.
22	14R	1	1	0	10	3																2	Mineralized and silicified volcanic rock. Pyrite, quartz, anhydrite and some hematite.
23	14R	1	2	10	15	5																Tr.	Light green-gray, completely altered, slightly vesicular. Vesicles are flattened, lined or filled by quartz. Remnant flow banding.
23	14R	1	3	15	26	1																Tr.	1-cm fragment of rubble similar to Piece 1.
23	14R	1	4	26	30	3																	Clastic, light green-gray fragments in vuggy quartz + pyrite + anhydrite stockwork. Similar to Unit 20.
23	14R	1	5	30	33	3																	Light green-gray, completely altered, flow-banded volcanic rock with possible spherulitic texture.
23	14R	1	6	33	36	2																	Clastic or veined volcanic rock. Same light green-gray.
23	14R	1	7	36	42	3																	Altered rubble with clastic texture.
23	14R	1	8	42	52	6																	Ditto. Spherulitic amd flow-banded textures.
23	14R	1	9	52	55	2																	Ditto.
23	14R	1	10	55	65	10																	Light gray-green volcanic rock breccia. Flow-banded clasts. Matrix of light green clay, gray quartz, and clear bladed anhydrite. Cm-scale sub-angular to sub-rounded clasts. Grain-supported.
23	14R	1	11	65	75	10																	Light green-gray flow-banded volcanic rock with an intrusion into clastic material as in Piece 10. This is a flow that intruded its own clastic facies.
23	14R	1	12	75	85	10																	Clastic, with 1- to 5-cm clasts of flow-banded rock. Rotated clasts. Quartz matrix. Late stage anhydrite.
23	14R	1	13	85	95	9																	Ditto.
23	14R	1	14	95	107	12																	Ditto.
23	14R	1	15	107	118	12																	Light green flow-banded rock with a network of quartz-pyrite veins and late anhydrite. Also sphalerite.
23	14R	1	16	118	123	4																	Ditto, but no sulfides.

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Identifiers									Phenocrysts												Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Clinopyroxene						
Unit	Core	Sec	Pc #	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size	Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max		(%)	Comments
23	14R	1	17	123	130	4																	Rubble.
23	14R	2	1	0	3	3																	1-cm wide coarse anhydrite vein, quart-rich halo, and altered light-green rock.
23	14R	2	2	3	6	2																	Light green altered rock with quartz pyrite veins and late anhydrite.
23	14R	2	3	6	9	2																	Light green altered flow-banded rock.
23	14R	2	4	9	12	2																	Rounded cm-scale clasts of light green flow-banded rock in a quartz pyrite matrix.
23	14R	2	5	12	23	6																	Rubble of Unit 23 and one piece of Unit 24.
23	14R	2	6	23	29	4																	Light green flow-banded altered rock cut by a quartz-rich mm-scale breccia zone (altered rocks in a quartz matrix). The breccia zone grades to pure anhydrite with thin green clay veinlets.
24	14R	2	7	29	35	5																2	Gray aphanitic volcanic rock. Thin quartz + pyrite veins, irregular, with thin bleached halos. Completely altered. Vesicles up to 5 mm, elongate. Lined and filled by quartz pyrite.
24	15R	1	1	6	5	5																2	Ditto.
25	15R	1	2	6	18	11																	Light green flow-banded volcanic rock. Apparent clastic texture at base due to alteration. Actual clastic texture at top has rotated clasts, possibly due to autobrecciation. Light green bands: green clay-bearing; white bands: hard, silica-rich; generally 1 to 3 mm wide; sharp margins, straight to slightly bent bands.
25	15R	1	3	18	25	8																	Light green altered flow-banded volcanic rock with a quartz-rich cement/matrix.
25	15R	1	4	25	34	9																	Large flow banded, rotated clasts (3 to 5 cm) in direct contact with each other. One domain with abundant, up to 1 cm, blocky rotated, flow banded clasts.
25	15R	1	5	34	39	4																	Densely packed, flow banded clasts. Intraclast space (about 10 %) filled by dark gray silica.
25	15R	1	6	39	45	3																	Flow banding dissected by a fine, irregular to rectangular, white silica network.
25	15R	1	7	45	51	4																	As above.
25	15R	1	8	51	60	7																	Flow banding on mm-scale, some bands have a wispy to fibrous appearance => streched fine vesicles defining the flow banding? Some domains in the Piece consist of rotated clasts, no matrix => coherent and in-situ fragments facies. A nodular texture is overprinting the flow banding which is reminiscent of alteration kernels observed elsewhere on a cm-scale. This is alteration extending outwards from rectangular/irregular fracture network (this texture is prominent in Pieces 15, 16).
25	15R	1	9	60	71	10																	Brecciated flow banded volcanic rock. Jigsaw fit and rotated clasts. Large (3 to 6 cm) blocky vclasts are hosted in matrix of smaller flow banded or green, homogeneous clasts. Minor intraclasts space (10%) filled by dark gray silica. Flow banding on mm-scale is defined by straight to wavy, continuous light gray and light green bands which are locally intricately folded.

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Identifiers									Phenocrysts													Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Clinopyroxene							
Unit	Core	Sec	Pc#	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size		Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max			(%)	Comments
25	15R	1	10	71	79	6																		As above. Clasts maximum diameter is 2 cm. One clast has round white spots (1 mm diameter) amygdales?
25	15R	1	11	79	100	19																		As above. Maximum clast size is >5 cm. Prominent nodular texture in upper part of the Piece. Prominent flow banding and rotated clasts in central part.
25	15R	1	12	100	108	7																		Coherent flow banded volcanic rock with wavy folding of flow banding and in-situ brecciation (jig saw fit).
25	15R	1	13	108	117	8																		Altered flow banding. Prominent nodular texture is overprinting flow banding. Light gray bands appear as rectangular fragments due to alteration along microfractures. Flow banding is folded. Rotated clasts in lower part. Minor dark gray silica domains with prominent hematite crystals.
25	15R	1	14	117	130	11																		Brecciated. Abundant, rotated, blocky, angular, rotated clasts (maximum diameter is 4 cm) hosted by smaller clasts (flow banded or completely green clay altered). Minor intraclast space is filled by dark gray silica.
25	15R	1	15	130	135	4																		Coherent piece of flow banded volcanic rock. Flow banding wraps around black siliceous, irregular xenolith (3 cm maximum diameter, contains round, 5 mm diameter, cavitiy lined by silica). Prominent nodular alteration texture is overprinting flow banding.
25	15R	1	16	135	144	8																		Brecciated with prominent, rotated flow banded clasts (maximum diameter is 2 cm) in upper part (90 degrees). Similar to Piece 14.
25	15R	1	17	144	149	2																		Small piece of brecciated, flow banded volcanic rock. Silica-hematite intraclast fills.
25	15R	2	1	0	9	8																		Flow banding is intensely obscured by pervasive green clay alteration of coherent/in situ fragmented Piece. Minor silica-clay dots (<1 %, up to 1 mm) may be amygdales.
25	15R	2	2	9	18	7																		As above. Brecciated domain with 0.5 to 1 cm blocky flow banded clasts.
25	15R	2	3	18	22	3																		In situ brecciated faintly flow banded.
25	15R	2	4	22	31	8																		Intensely altered (green, hard) coherent, faint flow banding (<1 mm to 10 mm).
25	15R	2	5	31	37	5																		Intensely silicified (dark gray) and green clay bearing, mainly along fine microfracture network generating clastic appearance of light gray flow bands.
26	15R	2	6	37	42	3							?Tr			0.5							3	Dark gray-brown, massive rock with fine vesicles lined/filled by anhydrite, mainly <1 mm in diameter.
26	15R	2	7	42	45	2																	1	As above. With quartz-pyrite veinlets.
26	15R	2	8	45	53	7																	2	As above. With silicification along fine quartz-pyrite veinlets generating in-situ jigsaw fit pseudoclastic texture. Apparent clasts are up to 4 cm in diameter.
26	15R	2	9	53	59	4																	2	As above.
26	15R	2	10	59	68	8																	1	As above. Some vuggy cavities along veins and at vein intersections. There are two black xenoliths with 1 to 5 mm dark-green reaction rims (round fragments, 2 cm maximum diameter, round quartz amygdales up to 2 mm in diameter).

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Identifiers									Phenocrysts													Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Clinopyroxene							
Unit	Core	Sec	Pc #	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size		Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max			(%)	Comments
25	16R	1	1	0	7	6																	None.	FALLBACK. Folded and in-situ fragmented flow banding in light green, light gray piece of fallback from Unit 25.
26	16R	1	2	7	15	7																	1	Gray-brown with fine (<1 mm) vesicles and anhydrite amygdales. Fracture network of quartz-pyrite veins generating pseudoclastic texture. Piece is cut be a 2 to 3 cm wide vein structure with beige, bleached fragments. These may be exotic clasts or intensely altered equivalents of the surrounding material.
26	16R	1	3	15	26	10																	tr	Gray-brown. Intensely fractured by quartz-pyrite and or magnetite veinlets. Apparent clasts with jigsaw fit texture are angular, blocky to shard-shaped (<1 mm to 8 cm in diameter). Anhydrite amygdales are generally <1 mm except one (round, 5 mm) with cyclic alteration halo.
26	16R	1	4	26	31	4																	tr	As above. With vuggy quartz-pyrite network.
26	16R	1	5	31	36	3																	tr	As above.
26	16R	1	6	36	45	5																	2	As above. Vesicles (round, lensoidal, drop-shaped, maximum diameter: 2 mm) are lined or filled by anhydrite.
26	16R	1	7	45	53	8																	3	As above. Exceptionally large drop-shaped, streched vesicles lined by anhydrite or silica-pyrite.
26	16R	1	8	53	60	5																	3	As above.
26	16R	1	9	60	66	3																	3	As above.
26	16R	1	10	66	74	6																	3	As above.
27	16R	1	11 to 19	74	143								?Tr			0.1							3 to 10	Dark gray with white, fine shard-shaped spots. Round to lensoidal vesicles are lined or filled by quartz and/or anhydrite (1 mm to 5 mm x 15 mm in diameter). Peculiar hieroglyphic groundmass texture: interconnected network of dark gray silica which contains irregular, shard-shaped white, clay-anhydrite-rich domains (<1 mm to 3 mm in maximum diameter); 50 % in Pieces 11 and 12; 30% in Pieces 13 to 16. These white domains are never in direct contact and have a variety of angular shapes: irregluar, bubble wall, shard-like, graphic-hieroglyphic. Green, chloritic, round to lensoidal xenolithic aggregates (o.5 to 1 cm maximum diameter) occur in Pieces 13, 16 and 18.
27	16R	2	1 to 4	0	40																		5 to 15	As above. There are several large tubular vesicles (up to 5 mm x 10 mm x 20 mm).
28	17R	1	1	0	11	10																	7	Gray to light gray, silicified. Vesicles are round to lensoidal to irregular/angular (<1 mm to 7 mm in maximum diameter) Cut by quartz-pyrite vein with light gray halo of silicification. Vesicles are lined/filled by quartz +/- pyrite.
28	17R	1	2	11	22	10																	10	As above. Vesicles define a flow lamination (dipping about 50 degrees). Small (<0.5 cm) lensoidal patches of green, chloritic material => xenoliths?
28	17R	1	3	22	28	4																	1	As above. Fine (<1 mm) quartz amygdales.
29	17R	1	4	28	31	2																		Rubble. Light green flow-banded.
29	17R	1	5	31	35	2																		As above. Pseudoclastic, nodular texture due to alteration along rectangular fractures.

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Identifiers									Phenocrysts													Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Clinopyroxene							
Unit	Core	Sec	Pc#	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size	Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max		(%)	Comments
29	17R	1	6	35	43	7																		Prominent clasts (3-5 cm) with folded flow banding and clearly fractured margins. One large clast contains dark gray silica-hematite xenolith(?). Lower part is more brecciated with blocky angular clasts up to 1 cm.
30	17R	1	7	43	52	6							Tr.			0.5							Tr.	Gray very fine grained volcanic rock with sparse fresh plagioclase phenocrysts and quartz-lined and filled vugs.
30	17R	1	8	52	57	3																	Tr.	A 3-cm piece of light gray altered rock with <1-mm vesicles and a stretched and striated appearance. This is included as a clast or xenolith in a flow-banded, vesicular volcanic matrix.
30	17R	1	9	57	60	2																	2	Contorted flow-banded vesicular gray volcanic rock.
30	17R	1	10	60	64	2																	Tr.	Contorted flow-banded vesicular gray volcanic rock with xenoliths of similar material.
30	17R	1	11	64	67	2																	1	Contorted flow-banded vesicular gray volcanic rock, appears to have xenoliths. Groundmass has blue clay laminae and gray laminae. It is very porous at the micro-scale, which could be vesicles (then it would have 10-20% vesicularity) or secondary pores.
30	17R	1	12	67	70	2																	1	Flow-banded vesicular volcanic rock with a 1-cm rounded xenolith of dark gray rock with acicular spinifex-like texture in its core.
30	17R	1	13	70	73	2																	Tr.	Flow-banded gray volcanic rock.
30	17R	1	14	73	79	3																	1	Do.
30	17R	1	15	79	83	2																		Rubble of gray flow-banded rock with stretched tube pumice appearance, as if stretched or extruded.
30	17R	1	16	83	87	3																		Gray flow-banded rock.
30	17R	1	17	87	93	5																		Green porous (vesicular?) silicified rock.
30	17R	1	18	93	96	2																		Green flow-banded silicified rock.
31	17R	1	19	96	101	4																		Fine-grained volcaniclastic sandstone Grains of white clay, gray rock, pyrite, set in a light gray fine-grained matrix. Vugs to 1mm, quartz-lined. Many tiny pores. Clasts up to 3 mm, are concentrated in certain layers (graded).
31	17R	1	20	101	104	2																		Ditto.
32	17R	1	21	104	107	2																		Flow-banded clasts with silica veining.
32	17R	1	22	107	112	4																		Green flow-banded volcanic rock with quartz veins.
32	17R	1	23	112	117	3																		Ditto.
32	17R	1	24	117	122	2																		Ditto.
32	17R	1	25	122	129	3																		Ditto.
32	17R	1	26	129	133	2																		Ditto.
32	17R	1	27	133	137	4																		Ditto.
32	17R	1	28	137	145	6																		Ditto.
32	18R	1	1	0	4	3																		Clastic, flow-banded clasts with quartz-rich matrix.
32	18R	1	2	4	12	7																		Ditto.
33	18R	1	3	12	26	13							Tr.			1								Dark green fine-grained rock with silicification. Plagioclase is fresh.
33	18R	1	4	26	31	4							Tr.			1								Flow-banded, spherulitic texture. Fresh plagioclase.
33	18R	1	5	31	40	8							Tr.			1								Clastic or pseudoclastic, with quartz + minor pyrite stockwork. Green clasts are like Piece 3, and there are light-colored spotted clasts.

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Identifiers									Phenocrysts													Gms	Vesicles	
						meas.	Depth	Depth	Olivine				Plagioclase				Clinopyroxene							
Unit	Core	Sec	Pc#	Inter.		length	core	Piece	%	2nd	Size	Size	%	2nd	Size	Size	%	2nd	Size	Size		Type		
				top	bot	(cm)	top	Top		minl	min	max		minl	min	max		minl	min	max			(%)	Comments
33	18R	1	6	40	45	3							Tr.			1								Flow-banded and silicified, with some fresh plagioclase.
34	18R	1	7	45	50	4																		Clastic or pseudoclastic, spotted textures common (0.2 mm quartz spots).
34	18R	1	8	50	59	7																		Pseudoclastic with soft clay kernels and quartz veins.
34	18R	1	9	59	64	4																		Ditto.
34	18R	1	10	64	68	3																		Flow-banded volcanic rock with quartz veins.
34	18R	1	11	68	74	5																		Light green pseudoclastic breccia. Flow-banded.
34	18R	1	12	74	78	4																		Tan-green pseudoclastic breccia.
34	18R	1	13	78	83	4																		Light green pseudoclastic breccia or breccia. Some rotated clasts.
34	18R	1	14	83	89	5																		Pseudoclastic breccia through flow-banded rock.
34	18R	1	15	89	93	4																		Ditto, but not flow-banded.
34	18R	1	16	93	100	6																		Flow-banded pseudobreccia. Spotted texture is present locally.
34	18R	1	17	100	113	12																		Clastic, with rotated clasts of flow-banded and spotted volcanic rock.
34	18R	1	18	113	119	5																		Ditto.
34	18R	1	19	119	123	4																		Ditto.
34	18R	1	20	123	130	7																		Ditto.
34	18R	1	21	130	142	12																		Ditto.
34	18R	2	1	0	11	10																		Ditto. Flow banding and spotted texture.
34	18R	2	2	11	17	6																		Ditto.
34	18R	2	3	17	25	6																		Ditto.
34	18R	2	4	25	36	5																		Rubble.
35	18R	2	5	36	44	6																		Polymict breccia, clast-supported, with silica cement. Some flow banding, some spherulitic texture, and various amounts of silicification of the clasts.
35	18R	2	6	44	49	3																		Ditto.
35	18R	2	7	49	59	10																		Ditto.
35	18R	2	8	59	74	14																		Ditto.
36	18R	2	9	74	78	2																		Pseudoclastic monomict breccia.
36	18R	2	10	78	83	3																		Ditto.
36	18R	2	11	83	86	2																		Pseudoclastic and clastic (there is some clast rotation). Flow banded clasts.
36	18R	2	12	86	93	5																		Ditto.
36	18R	2	13	93	100	4																		Pseudoclastic breccia, tannish-gray-green.
36	18R	2	14	100	105	2																		Rubble.
36	18R	2	15	105	115	9							Tr.			1								Monomict clastic breccia. Some white clay clasts are flow banded and have fresh plagioclase phenocrysts.

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Identifiers								Color		Alteration											Sulfide Mineralization							
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Curated depth (mbrf)	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					Comments
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	
1	1R	1	1	0	5	4	0	Blk		Fr	Vn/ Vf	F	vfg	Sf	tr	FeOx	tr											Glassy dacite with traces of patchy film in vesicles and on fracture surfaces.
1	1R	1	2	5	9	3	0.05	Blk		Fr	Pa	Ox	vfg	FeOx	tr													Slight Fe oxide staining
1	1R	1	3	9	12	2	0.09	Blk		Fr	Pa	Ox	vfg	FeOx	tr													Slight Fe oxide staining
1	1R	1	4	12	17	4	0.12	Blk		Sl	Vf	F	vfg	Sf	1	Anhy	1				VF	vfg	Py	1				Sulfate (anhydrite) - pyrite vesicle fill
2	1R	1	5	17	22	1	0.17	DkGr	Blk	Md	Pv/Vf	Bl	vfg	Sf	7	Si	5				VF	vfg	Sp	tr	Py	tr		Si-Sf alteration in the body of the rock and anhydrite - tr pyrite vesicle fill
2	1R	1	6	22	25	2	0.22	Gr		Md	Pv/Vf	Bl	vfg	Sf	15	Si	5				VF	vfg	Py	tr	Sp	tr		Si-Sf alteration in the body of the rock and anhydrite - tr pyrite vesicle fill
2	1R	1	7	25	30	3	0.25	Gr		Md	Pv/Vf	Bl	vfg	Sf	20	Si	5				VF	vfg	Sp	tr	Py	tr		Si-Sf alteration in the body of the rock and anhydrite - tr pyrite vesicle fill. Py overgrowths on sp
2	1R	1	8	30	34	3	0.3	Gr		Md	Pv/Vf	Bl	vfg	Sf	20	Si	5				VF	vfg	Py	tr	Sp	tr		Si-Sf alteration in the body of the rock and anhydrite - tr pyrite vesicle fill
2	2R	1	1	0	6	3	9.7	Gr	Wht	Md	Pv/ Vn/ Vf	Bl	vfg	Sf	30	Si	5				VF	vfg	Py	tr				Mod sf-si altered rock. Anhy (tr py) vesicle fill. Two surfaces are more stongly bleached with py-anhy vesicle fill (=fluid pathways?)
2	2R	1	2	6	14	6	9.76	Gr	Wht	Md	Pv/ Vn/ Vf	Bl	vfg	Sf	30	Si	5				VF	vfg	Py	tr	Sp	tr		Similar to above with single bleached surface. Anhy (tr sp-py) in vesicles
2	2R	1	3	14	21	2	9.84	Gr	Wht	Md	Pv/Vf	Bl	vfg	Sf	30	Si	5				VF	vfg	Py	tr	Sp	tr		Anhy (tr sp-py) in vesicles
2	2R	1	4	21	27	2	9.91	Gr	Wht	Md	Pv/Vf	Bl	vfg	Sf	30	Si	5				VF	vfg	Py	tr	Sp	tr		Anhy (tr sp-py) in vesicles
2	2R	1	5	27	33	5	9.97	Gr	Wht	Hi	Pv/Vf	Bl	vfg	Sf	45	Si	10				VF	vfg	Py	tr				Anhy (tr py) vesicle fill
2	2R	1	6	33	41	7	10.03	Gr		Hi	Pv/Vf	Bl	vfg	Sf	50	Si	10				VF	vfg	Py	tr				Anhy (tr py) vesicle fill
2	2R	1	7	41	48	4	10.11	Gr		Hi	Pv/Vf	Bl	vfg	Sf	50	Si	10	FeOx	tr		VF	vfg	Py	tr				Anhy (tr py) vesicle fill; minor FeOx spotting
2	2R	1	8	48	57	8	10.18	LtGr	Wht	VH	Pv/Vf	Bl	vfg	Sf	60	Si	20				VF	vfg	Py	tr	Sp	tr		Anhy (tr py-sp) vesicle fill; vertical pipe vesicles
2	2R	1	9	57	64	4	10.27	Wht		Cm	Pv/Vf	Bl	vfg	Sf	75	Si	25				VF	vfg	Py	tr				Anhy (tr py) vesicle fill; pipe vesicle
2	2R	1	10	64	70	5	10.34	Gr		Hi	Pv/Vf	Bl	vfg	Sf	50	Si	15				VF	vfg	Py	tr				Anhy (tr py) vesicle fill
2	2R	1	11	70	77	4	10.4	Wht		Cm	Pv	Bl	vfg	Sf	75	Si	25				VF	vfg	Py	tr				Anhy (tr py) vesicle fill
2	2R	1	12	77	86	4	10.47	Wht		Cm	Pv	Bl	vfg	Sf	75	Si	25	FeOx	tr		VF	vfg	Py	tr				Anhy (tr py) vesicle fill
2	2R	1	13	86	93	4	10.56	Wht		Cm	Pv	Bl	vfg	Sf	75	Si	25				DS/ VF	vfg	Py	tr				Anhy (tr py) vesicle fill; also disseminated py in rock
3	2R	1	14	93	101	2	10.63	Gr	Gd	Cm	Vn	Sil	vfg	Qtz	65	Sf	15	Sm	5		VS	vfg	Py	15				Quartz-sulfate (=barite?)-smectite-py vein. C.g sulfate as vuggy cavity fill. Unit 2 and Unit 4 material included in this bay (contact zone), but not described.
4	2R	1	15	101	117	6	10.71	BlGn	Wht	Cm	Pv/ Sw	GSC	vfg/cg	Anhy	48	Sm	4	Si	10		VS/ VF	vfg	Py	2				Hydrofractured breccia. Vesicular volcanic with remnant perlitic texture has undergone pervasive alteration to smectite and has then been fractured and infilled by an anhy-si-py stockwork. Some of the smectitic fragments have undergone pervasive alteration to sf and all are cut by fine anastomosing networks of sf veinlets. Anhydrite occurs as vesicle fill. Py occurs in veins and as vesicle fill
4	2R	1	16	117	126	9	10.87	BlGn	Wht	Cm	Pv/ Sw	GSC	vfg/cg	Anhy	48	Sm	40	Si	10		VS/ VF	vfg	Py	2				As above.
4	2R	1	17	126	137	6	10.96	BlGn	Wht	Cm	Pv/ Sw	GSC	vfg/cg	Sm	80	Anhy	18	Si	2		VS/ VF	vfg	Py	tr				Similar to above - large perlitic fragment with incipient hydrofracture.

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Identifiers								Color		Alteration											Sulfide Mineralization							
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Curated depth (mbrf)	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					Comments
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	
5	3R	1	1	0	6	5	19.4	Wht		Cm	Pv	Bl	vfg/cg	Sf	74	Si	25	FeOx	tr		VS/ VF	vfg	Py	1				Py on fracture surfaces with cg drusy anhy and as vesicle fill with anhy
5	3R	1	2	6	14	6	19.46	LtGr	Wht	Cm	Pv	Bl	vfg	Sf	70	Si	24	Sm (5), FeOx (tr)			VS/ VF	vfg	Py	1				Py on fracture surfaces with cg drusy anhy and as vesicle fill with anhy
5	3R	1	3	14	20	4	19.54	LtGr	Wht	Cm	Pv	Bl	vfg	Sf	75	Si	23	Sm (2), FeOx (tr)			DS/ VF	vfg	Py	tr				Py disseminated throughout and as vesicle fill with anhy
5	3R	1	4	20	25	3	19.6	Wht		Cm	Pv	Bl	vfg	Sf	75	Si	25	FeOx	tr		DS/ VS/ VF	vfg	Py	tr				Py disseminated throughout, as vesicle fill with anhy and on fracture surface
5	3R	1	5	25	30	4	19.65	LtGr		Cm	Pv	Bl	vfg	Sf	75	Si	25	Sm	tr		DS/ VS/ VF	vfg	Py	tr				Py disseminated throughout, as vesicle fill with anhy and on fracture surface
5	3R	1	6	30	35	3	19.7	LtGr	Wht	Hi	Pv	Bl	vfg	Sf	5	Si	15				VF	vfg	Py	tr				Anhy - py vesicle fill
5	3R	1	7	35	42	5	19.75	LtGr	Wht	Cm	Pv	Bl	vfg	Sf	75	Si	25				VF	vfg	Py	tr				Anhy - py vesicle fill (some py slightly tarnished)
5	3R	1	8	42	50	8	19.82	LtGr	Wht	Cm	Pv	Bl	vfg	Sf	75	Si	25				VF	vfg	Py	tr				Anhy - py vesicle fill
5	3R	1	9	50	56	3	19.9	LtGr	Wht	Cm	Pv	Bl	vfg	Sf	70	Si	20	Sm	10		VF	vfg	Py	tr				Anhy - py vesicle fill
6	3R	1	10	56	63	6	19.96	BlGn	Wht	Cm	Pv/ Sw	GSC	vfg/ mg	Sf	45	Sm	45	Si (5), Qtz (1)			DS/ VS	vfg	Py	4				Volcaniclastic breccia. Sf altered (bleached) material cut by a stockwork of anhy-py veins with smectite halos. Py also disseminated throughout the bleached fragments. A single blue-green smectite altered rounded fragment contains anhy laths (or veinlets) that do not extend into the body of the rock, implying earlier alteration. A late irregular qtz-py vein cuts the anhy stockwork.
7	3R	1	11	63	69	3	20.03	LtGr	Wht	Cm	PV/ Vn	Bl	vfg/ mg	Sf	50	Si	39	Anhy	10		DS/ VS	vfg	Py	1				Silicified bleached vesicular volcanic. Mg anhy-qtz-py veins with si-py halos cut the rock. Py in vein halo (mostly), but also scattered throughout the rock. Cp in vein in working half.
7	3R	1	12	69	76	5	20.09	LtGr	Wht	Cm	PV/ Vn	Sil	vfg/ mg	Si	70	Sf	26	Anhy (2), Qtz (1)			VS/ DS	vfg	Py	1	Cp	tr		
7	3R	1	13	76	81	2	20.16	Gr	Wht	Cm	Vn	Sil	vfg	Qtz	50	Anhy	35				VS	vfg	Py	15				Qtz-anhy-py vein
7	3R	1	14	81	84	2	20.21	Gr	Wht	Cm	Vn	Sil	vfg	Qtz	50	Anhy	30				VS	vfg	Py	20				Qtz-anhy-py vein
7	3R	1	15	84	89	4	20.24	LtGr	GrGn	Cm	Pv	Bl/Sil	vfg	Sf	50	Si	47	Sm	3		DS/ VS	vfg	Py	tr				Py in vesicles and disseminated throughout the rock.
7	3R	1	16	89	96	4	20.29	LtGr	GrGn	Cm	Vn	Sv	mg/fg	Anhy	80	Qtz	15				VS	fg	Py	5				Banded, crustiform anhy-qtz-py vein.
8	4R	1	1	0	5	2	29.1	LtGrGn	Wht	Cm	Pv/ Vn	GSC/ Sil	vfg	Sf	50	Sil	40	Anhy (5), Cl-Chl (4), FeOx (tr)			VS	vfg	Py	1				Pv sf-si-chl(?) alteration, cut by irregular qtz-py veins. Si fills vesicles, implying silica flooding of the rock. Rock cut by late anhydrite vein. The unit smelt of H2S. The bay contains uphole contamination, which was not logged.
8	4R	1	2	5	17	11	29.15	LtGrGn	Gr	Cm	Pv/ Vn	GSC/ Sil	vfg	Sf	50	Sil	40	Cl-Chl	4		VS	vfg	Py	1				Same unit as above, no late anhy vein
8	4R	1	3	17	24	5	29.27	LtGrGn	Gr	Cm	Pv/ Vn	GSC/ Sil	vfg	Sf	50	Sil	45	Cl-Chl	4		VS	vfg	Py	1				Same unit as above, no late anhy vein

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Identifiers								Color		Alteration											Sulfide Mineralization							
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Curated depth (mbrf)	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					Comments
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	
9	5R	1	1	0	7	6	38.8	GnBl	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	50	Sm	25	Si	20		VS	vfg	Py	5				Pervasive multiphase alteration. Stage 1: Alteration of flow banded volcanic rocks to white clay-anhydrite-silica (locally preserving flow banding). Stage 2: Hydraulic brecciation forming anhydrite veins with smectite-chlorite alteration halos. Stage 3: Quartz-pyrite veining with associated patchily developed smectite-chlorite halos. Py veins, sm altered clasts with sf rims
9	5R	1	2	7	14	4	38.87	GnBl	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	55	Sm	23	Si	20		VS	vfg	Py	2				Py veins, sf altered clasts with sm rims
9	5R	1	3	14	23	7	38.94	GnBl	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	55	Sm	20	Si	20		VS	vfg	Py	5				Py veins, sf altered clasts with sm rims
9	5R	1	4	23	30	6	39.03	Wht	GnBl	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	60	Sm	15	Si	20		VS	vfg	Py	5				Py veins, sf altered clasts with sm rims
9	5R	1	5	30	34	3	39.1	Wht	GnBl	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	64	Sm	15	Si	20		VS	vfg	Py	1				
9	5R	1	6	34	41	5	39.14	GnBl	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	55	Sm	15	Si	20		VS	vfg	Py	1				Sf-si clasts, sf-si-sm clasts, si-py veins
9	5R	1	7	41	50	8	39.21	GnBl	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	55	Sm	24	Si	20		VS	vfg	Py	1				Sf-si clasts, sf-si-sm clasts, si-py veins
9	5R	1	8	50	57	5	39.3	Wht	GnBl	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	60	Sm	24	Si	20		VS	vfg	Py	1				Sf clasts, brittle fracture of si-py veins
9	5R	1	9	57	62	4	39.37	GnBl	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sm	40	Sf	30	Si	27		VS	vfg	Py	3				
9	6R	1	1	0	6	4	48.6	GnBl	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	30	Sm	40	Si	27		VS	vfg	Py	3				Pervasive multiphase alteration. Stage 1: Alteration of flow banded volcanic rocks to white clay-anhydrite-silica (locally preserving flow banding). Stage 2: Hydraulic brecciation forming anhydrite veins with smectite-chlorite alteration halos. Stage 3: Quartz-pyrite veining with associated patchily developed smectite-chlorite halos. Sf-si clasts, sf-si-sm clasts
9	6R	1	2	6	12	2	48.66	Gn	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	30	Cl+Chl	40	Si	27		VS	vfg	Py	3				Rubble
9	6R	1	3	12	20	3	48.72	Gn	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	30	Cl+Chl	40	Si	27		VS	vfg	Py	3				Rubble
9	6R	1	4	20	25	2	48.8	Gn	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	30	Cl+Chl	40	Si	27		VS	vfg	Py	3				Rubble
9	6R	1	5	25	31	3	48.85	Gn	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	30	Cl+Chl	40	Si	27		VS	vfg	Py	3				Rubble
9	6R	1	6	31	42	9	48.91	Gn	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Si	50	Sf	25	Cl+Chl	21		VS	vfg	Py	4				Well developed si-py veining
9	6R	1	7	42	48	4	49.02	Gn	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Si	50	Sf	25	Cl+Chl	24		VS	vfg	Py	1				
9	6R	1	8	48	54	3	49.08	Gn	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Sf	30	Cl+Chl	40	Si	27		VS	vfg	Py	3				Rubble
9	6R	1	9	54	62	5	49.14	Gn	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Si	50	Sf	25	Cl+Chl	24		VS	vfg	Py	1				
9	6R	1	10	62	69	4	49.22	Gn	Wht	Cm	Pv/ Sw	GSC/ Sil	vfg	Si	50	Sf	25	Cl+Chl	24		VS	vfg	Py	1				
10	7R	1	1	0	4	3	58.3	lt Gr	Wht	Cm	Pv	GSC/ Sil	fg	Anhy	70	Si	22	Cl	5		DS/ VN	fg	Py	3				

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Identifiers								Color		Alteration											Sulfide Mineralization							
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Curated depth (mbrf)	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	Comments
10	7R	1	2	4	12	6	58.34	lt Gr	Wht	Cm	Pv	GSC/ Sil	fg	Anhy	70	Si	22	Cl	5		DS/ VN	fg	Py	3				Silicification along qtz + pyr. Veins with some anhydrite in the center. Open tube like structures acted as fluid conduits (in pc. 3.)
10	7R	1	3	12	24	11	58.42	lt Gr	Wht	Cm	Pv	GSC/ Sil	fg	Anhy	70	Si	22	Cl	5		DS/ VN	fg	Py	3	Cp	tr		Silicification along qtz + pyr. Veins with some anhydrite in the center. Open tube like structures acted as fluid conduits (in pc. 3.)
10	7R	1	4	24	28	3	58.54	lt Gr	Wht	Cm	Pv	GSC/ Sil	fg	Anhy	70	Si	22	Cl	5		DS/ VN	fg	Py	3				
10	7R	1	5	28	43	13	58.58	lt Gr	Wht	Cm	Pv	GSC/ Sil	fg	Anhy	70	Si	22	Cl	5		DS/ VN	fg	Py	3	Cp	tr		
10	7R	1	6	43	46	2	58.73	lt Gr	Wht	Cm	Pv	GSC	vfg	Anhy	70	Si	10	Cl	10		DS/ VN	vfg	Py	1				Similar to pieces 1-5 but finer grained
10	7R	1	7	46	55	5	58.76	lt Gr	Wht	Cm	Pv	GSC	fg	Anhy	70	Si	10	Cl	10		DS/ VN	vfg	Py	1	Cp	tr		Similar to pieces 1-5 but finer grained
10	7R	1	8	55	59	3	58.85	lt Gr	Wht	Cm	Pv	GSC	fg	Anhy	70	Si	10	Cl	10		DS/ VN	vfg	Py	1				Similar to pieces 1-5 but finer grained
11	7R	1	9	59	67	7	58.89	Gr	Wht	Cm	Pv	GSC/ Sil	fg	Si	45	Anhy	40	Cl	14		DS/ VN	vfg	Py	1				Clasts of breccia are very similar to 1-8, some relict flow banding. Breccia cement is silica + quartz. Clasts show different styles of alteration, some show flow banding, all are cemented by silica
11	7R	1	10	67	72	4	58.97	Gr	Wht	Cm	Pv	GSC/ Sil	fg	Si	45	Anhy	40	Cl	14		DS/ VN	vfg	Py	1				Same as pc. 9.
12	7R	1	11	72	76	3	59.02	Gr	Wht	Cm	Pv	GSC/ Sil		Si	60	Anhy	25	Cl	22		DS/ VN		Py	3				
12	7R	1	12	76	79	2	59.06	Gr	Wht	Cm	Pv	GSC/ Sil		Si	60	Anhy	25	Cl	22		DS/ VN		Py	3	Cp	tr		
12	7R	1	13	79	88	8	59.09	Gr	Wht	Cm	Pv	GSC/ Sil		Si	60	Anhy	25	Cl	22		DS/ VN		Py	3	Cp	tr		Veins and vugs filled with beautiful euhedral pyrite x-tals and quartz
12	7R	1	14	88	92	4	59.18	Gr	Wht	Cm	Pv	GSC/ Sil		Si	60	Anhy	25	Cl	22		DS/ VN		Py	3				Silicification is most pronounced in center of piece where silicification is pervasive.
13	7R	1	15	92	96	3	59.22	LtGr	Gr	Cm	Pv	GSC/ Sil		Cl	35	Anhy	33	Si	30		DS/ VN		Py	2				Pseudoclastic rock
13	7R	1	16	96	99	3	59.26	LtGr	Gr	Cm	Pv	GSC/ Sil		Cl	35	Anhy	33	Si	30		DS/ VN		Py	2				Anhydrite/clay-rich clasts silica rich matrix
14	7R	1	17	99	102	2	59.29	Rd	Wht	Cm	Pv	Ox		Si	70	FeOx	20	Cl/Chl	5				Py	5				Breccia with soft whitish green unsilicified clasts embedded in jasper-like material dotted with sulfate and pyrite.
15	8R	1	1	0	3	2	68	Gr	lt Gr	Cm	Pa	Sil	vfg	Si	60	Plag	25	Cl	13		DS/ VN	vfg	Py	2				Relict perlitic texture. Rock is heavily silicified.
15	8R	1	2	3	10	5	68.03	Gr	lt Gr	Cm	Pa	Sil	vfg	Si	60	Plag	25	Cl	13		DS/ VN	vfg	Py	2				Relict perlitic texture. Rock is heavily silicified.
15	8R	1	3	10	14	3	68.1	LtGn	Gr	Cm	Pa	Sil	vfg	Plag	50	Plag	40	Si	8		DS/ VN	vfg	Py	2				Slightly silicified. Stringer of silica and pyrite (partly oxidized) near bottom of piece.
15	8R	1	4	14	23	6	68.14	LtBrGr	Gr	Cm	Pa	Sil	vfg	Plag	50	Si	35	Cl	12		DS/ VN	vfg	Py	2				Pseudoclastic texture. Moderately silicified along vein network. Cm sized silicified patch in pc. 4.
15	8R	1	5	23	31	6	68.23	LtBrGr	Gr	Cm	Pa	Sil	vfg	Plag	50	Si	35	Cl	12		DS/ VN	vfg	Py	2				Pseudoclastic texture. Moderately silicified along vein network.
15	8R	1	6	31	45	9	68.31	LtBrGr	lt Gn	Cm	Pa	Sil	vfg	Plag	50	Si	35	Cl	12		DS/ VN	vfg	Py	2				Pseudoclastic texture. Moderately silicified along vein network.
15	8R	1	7	45	51	4	68.45	LtBrGr	Gr	Cm	Pa	Sil	vfg	Si	50	Plag	40	Cl	8		DS/ VN	vfg	Py	2				Pseudoclastic texture. Moderately silicified along vein network.

Leg 193 Alteration/Mineralization Log - Hole 1189A

Identifiers								Color		Alteration												Sulfide Mineralization							
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Curated depth (mbrf)	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)								Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)						Dominant (%)		Secondary (%)		Others	Comments
15	8R	1	8	51	59	6	68.51	LtBrGr	Gr	Cm	Pa	Sil	vfg	Si	50	Plag	40	Cl	8			DS/ VN	vfg	Py	2				Silicification is pervasive to patchy.
15	8R	1	9	59	65	4	68.59	LtBrGr	Gr	Cm	Pa	Sil	vfg	Si	60	Plag	30	Cl; Ox	5; 3			DS/ VN	vfg	Py	2				Stringer of silica and oxide near bottom of piece.
15	8R	1	10	65	72	5	68.65	LtBrGr	Gr	Cm	Pa	Sil	vfg	Plag	50	Cl	40	Si	8			DS/ VN	vfg	Py	2				Slightly brecciated with silification along vein network. Vein fill is 50% quartz and 50% pyrite.
15	8R	1	11	72	77	3	68.72	LtBrGr	Gr	Cm	Pa	Sil	vfg	Plag	50	Cl	40	Si	8			DS/ VN	vfg	Py	2				Same as pc. 9.
15	8R	1	12	77	80	2	68.77	LtBrGr	Gr	Cm	Pa	Sil	vfg	Plag	50	Cl	40	Si	8			DS/ VN	vfg	Py	2				Same as pc. 9.
15	8R	1	13	80	85	3	68.8	LtBrGr	Gr	Cm	Pa	Sil	vfg	Plag	50	Cl	40	Si	8			DS/ VN	vfg	Py	2				Same as pc. 9.
15	8R	1	14	85	93	7	68.85	LtBrGr	Gr	Cm	Pa	Sil	vfg	Plag	50	Cl	40	Si	8			DS/ VN	vfg	Py	2				Same as pc. 9.
15	8R	1	15	93	97	3	68.93	LtBrGr	Gr	Cm	Pa	Sil	vfg	Si	60	Plag	25	Cl ; Mt	8;1			DS/ VN	vfg	Py	2				Intense silicification along vein network, some silicified clasts.
15	8R	1	16	97	102	4	68.97	LtBrGr	Gr	Cm	Pa	Sil	vfg	Si	60	Plag	25	Cl ; Mt	8;1			DS/ VN	vfg	Py	5				Same as 15.
15	8R	1	17	102	107	3	69.02	LtBrGr	Gr	Cm	Pa	Sil	vfg	Si	60	Plag	25	Cl ; Mt	8;1			DS/ VN	vfg	Py	2				Same as 15.
15	8R	1	18	107	113	5	69.07	LtBrGr	Gr	Cm	Pa	Sil	vfg	Si	60	Plag	25	Cl ; Mt	8;1			DS/ VN	vfg	Py	2				Same as 15.
15	8R	1	19	113	124	8	69.13	LtBrGr	Gr	Cm	Pa	Sil	vfg	Si	60	Plag	25	Cl ; Mt	8;1			DS/ VN	vfg	Py	2				Same as 15.
15	8R	1	20	124	128	4	69.24	Dk. Gr	Gr	Cm	Pa	Sil	vfg	Si	70	Plag	15	Cl; Mt	5; 5			DS/ VN	vfg	Py	5				Quartz/pyrite vein in dark, highly silicified piece that resembles the silicified clasts in pieces 4, 17, and 18.
16	9R	1	1	0	7	6	77.7	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	Anhy	40	Si	40	Cl	20			DS/ VN	vfg	Py	tr				Pc 1-8 flowbanding. Replacive stringers of silica+ sulfide/oxide. Slightly brecciated.
16	9R	1	2	7	12	4	77.77	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	Anhy	50	Si	30	Cl	20			DS/ VN	vfg	Py	tr				
16	9R	1	3	12	17	3	77.82	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	Anhy	50	Si	30	Cl	20			DS/ VN	vfg	Py	tr				
16	9R	1	4	17	28	9	77.87	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	Anhy	50	Si	30	Cl	20			DS/ VN	vfg	Py	tr				
16	9R	1	5	28	41	11	77.98	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	Anhy	55	Si	25	Cl	20			DS/ VN	vfg	Py	tr				
16	9R	1	6	41	44	2	78.11	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	Anhy	55	Si	25	Cl	20			DS/ VN	vfg	Py	tr				
16	9R	1	7	44	52	6	78.14	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	Anhy	50	Si	30	Cl	20			DS/ VN	vfg	Py	tr				
16	9R	1	8	52	59	6	78.22	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	Anhy	50	Si	30	Cl	20			DS/ VN	vfg	Py	tr				
16	9R	1	9	59	63	3	78.29	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	Anhy	50	Si	30	Cl	20			DS/ VN	vfg	Py	tr				
16	9R	1	10	63	71	7	78.33	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	Anhy	50	Si	30	Cl	20			DS/ VN	vfg	Py	tr				
16	9R	1	11	71	77	5	78.41	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	SI	50	Anhy	30	Cl	20			DS/ VN	vfg	Py	tr				
16	9R	1	12	77	86	7	78.47	Gn	Gr	Cm	Pv	GSC/ Sil	vfg	SI	50	Anhy	30	Cl	20			DS/ VN	vfg	Py	tr				Clasts of breccia are very similar to 1-8, some relict flow banding. Breccia cement is silica + quartz. Clasts show different styles of alteration, some show flow banding, all are cemented by silica.
17	9R	1	13	86	89	2	78.56	Gn	Gr	Cm	Pv	GSC	vfg	SI	50	Anhy	45	Cl	5			DS/ VN	vfg	Py	tr				

Leg 193 Alteration/Mineralization Log - Hole 1189A

Identifiers								Color		Alteration											Sulfide Mineralization							
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Curated depth (mbrf)	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	Comments
17	10R	1	1	0	4	2	87.3	lt Gn	Gr	Cm	Pv	GSC/ Sil	vfg	Anhy	50	Si	40	Cl	10	DS/ VN		Py	tr				
17	10R	1	2	4	7	2	87.34	Wht	Gr	Cm	Pv	Bl	vfg	Anhy	70	Cl	30	Cl	10	DS/ VN		Py	tr				Noticably bleached.
18	10R	1	3	7	11	2	87.37	Br	Wht	Cm	Pv	Min	vfg	Anhy	50	Ox/ Sulf	40	Si	10	DS/ VN		Py	tr				Mineralized with sulfides/oxides.
19	10R	1	4	11	25	10	87.41	Bl Gr	lt Gh	Cm	Pv	GSC/ Sil	vfg	Si	40	Cl	30	Anhy;Mt	6; 1	DS/ VN		Py	2	Cp	tr		Bluish domains are silicified. Greenish domains are soft (anhy and clay?). Quartz and pyrite veins often have anhydrite in center.
19	10R	1	5	25	38	10	87.55	Bl Gr	lt Gh	Cm	Pv	GSC/ Sil	vfg	Si	40	Cl	30	Anhy	30	DS/ VN		Py	2	Cp	tr		Same as 4
19	10R	1	6	38	51	10	87.68	Bl Gr	lt Gh	Cm	Pv	GSC/ Sil	vfg	Si	40	Cl	30	Anhy	30	DS/ VN		Py	tr	Cp	tr		Same as 4
19	10R	1	7	51	56	3	87.81	Bl Gr	lt Gh	Cm	Pv	GSC/ Sil	vfg	Si	40	Cl	30	Anhy	30	DS/ VN		Py	tr	Cp	tr		Same as 4
19	10R	1	8	56	66	9	87.86	Bl Gr	lt Gh	Cm	Pv	GSC/ Sil	vfg	Si	40	Cl	30	Anhy	30	DS/ VN		Py	tr	Cp	tr		Same as 4
19	10R	1	9	66	81	20	87.96	Bl Gr	lt Gh	Cm	Pv	GSC/ Sil	vfg	Si	40	Cl	30	Anhy	30	DS/ VN		Py	2	Cp	tr		Same as 4
19	10R	1	10	81	102	11	88.11	Gr	lt Gn	Cm	Pv	GSC/ Sil	vfg	Si	60	Cl	20	Anhy;Mt	11; 2	DS/ VN		Py	7				Veins are dominantly sulfide (partly oxidized) with minor anhydrite.
19	10R	1	11	102	115	11	88.32	Gr	lt Gn	Cm	Pv	GSC/ Sil	vfg	Si	75	Cl	13	Anhy;Mt	10; 2	DS/ VN		Py	1				
19	10R	1	12	115	125	8	88.45	Gr	lt Gn	Cm	Pv	GSC/ Sil	vfg	Si	60	Cl	20	Anhy;Mt	14; 1	DS/ VN		Py	4				
19	10R	1	13	125	133	6	88.55	Gr	lt Gn	Cm	Pv	GSC/ Sil	vfg	Si	60	Cl	20	Anhy;Mt	8; 2	DS/ VN		Py	10				
19	10R	1	14	133	142	7	88.63	Gr	lt Gn	Cm	Pv	GSC/ Sil	vfg	Anhy	50	Si	40	Cl	10	DS/ VN		Py	tr				
20	11R	1	1	0	6	4	96.9	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	20	Cl	12	VF	fg	Py	3				Entire core 11 and 12 are noticable coarser grained than previous section. Rocks have sugary appearance. Vugs/ vesicles are often lined with quartz and pyrite.
20	11R	1	2	6	13	4	96.96	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	20	Cl	12	VF	fg	Py	3				
20	11R	1	3	13	19	4	97.03	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	20	Cl	15	VF	fg	Py	tr				
20	11R	1	4	19	25	4	97.09	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	20	Cl	12	VF	fg	Py	3				Anhydrite in center of vug.
20	11R	1	5	25	30	3	97.15	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	25	Cl	10	VF	fg	Py	5				
20	11R	1	6	30	38	5	97.2	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	18	Cl	12	VF	fg	Py	5				
20	11R	1	7	38	55	6	97.28	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	20	Cl	12	DS/ CN	fg	Py	3				Pyrite veinlet.
20	11R	1	8	55	61	4	97.45	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	20	Cl	13	VF/ VN	fg	Py	2				Pyrite veinlet.
20	11R	1	9	61	64	2	97.51	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	20	Cl	13	DS/ VN	fg	Py	2				
20	11R	1	10	64	70	5	97.54	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	20	Cl	13	VF	fg	Py	2				
20	11R	1	11	70	80	7	97.6	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	20	Cl	13	VF	fg	Py	2				
20	11R	1	12	80	97	14	97.7	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	20	Cl	13	VF	fg	Py	2				
20	11R	1	13	97	117	14	97.87	Gr	Wht	Cm	Pv	Sil/ GSC	fg	Si	65	Anhy	20	Cl	13	VF	fg	Py	2				

Leg 193 Alteration/Mineralization Log - Hole 1189A

Identifiers								Color		Alteration											Sulfide Mineralization							
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Curated depth (mbrf)	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					Comments
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	
20	12R	1	1	0	6	5	106.5			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	20	Cl	15		VN	fg	Py	5				Sulfide veins with silicified halos.
20	12R	1	2	6	14	5	106.56			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	23	Cl	15		VF	fg	Py	2				Sulfide veins with silicified halos.
20	12R	1	3	14	23	5	106.64			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	24	Cl	15		VF	fg	Py	1				Sulfide veins with silicified halos.
20	12R	1	4	23	30	4	106.73			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	24	Cl	15		VF	fg	Py	1				Sulfide veins with silicified halos.
20	12R	1	5	30	41	8	106.8			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	24	Cl	15		VF	fg	Py	1				Sulfide veins with silicified halos.
20	12R	1	6	41	50	6	106.91			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	24	Cl	15		VN	fg	Py	1				Sulfide veins with bleached halos.
20	12R	1	7	50	61	8	107			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	24	Cl	15		VN	fg	Py	1				Sulfide veins with bleached halos.
20	12R	1	8	61	70	7	107.11			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	24	Cl	15		VF/ DS	fg	Py	1				
20	12R	1	9	70	78	7	107.2			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	24	Cl	15		DS	fg	Py	1				
20	12R	1	10	78	87	7	107.28			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	24	Cl	15		DS	fg	Py	1				
20	12R	1	11	87	93	4	107.37			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	21	Cl	15		VN	fg	Py	4	Cp	tr		
20	12R	1	12	93	101	6	107.43			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	21	Cl	15		VN	fg	Py	4				
20	12R	1	13	101	107	2	107.51			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	23	Cl	15		VN	fg	Py	2				
20	12R	1	14	107	114	5	107.57			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	23	Cl	15		VN	fg	Py	2				
20	12R	1	15	114	120	4	107.64			Cm	Pv	Sil/ GSC	fg	Si	60	Anhy	23	Cl	15		VN	fg	Py	2				
21	12R	1	16	120	128	6	107.7			Cm	Pv	Min	fg	Si	60	Anhy	5	Cl	5		VN	fg	Py	20	Cp	10		Sulfide-impregnated breccia.
22	12R	1	17	128	135	5	107.78			Cm	Pv	Sil/ GSC	fg	Si	90	Anhy	7	Cl	2		DS	fg	Py	1				Highly silicified.
22	12R	1	18	135	138	1	107.85			Cm	Pv	Sil/ GSC	fg	Si	90	Anhy	7	Cl	2		DS	fg	Py	1				Highly silicified.
23	13R	1	1	0	6	3	116.1			Cm	Pv	Sil/ GSC	vfg	Si	70	Cl	20	Anh	7		VN/ VF		Py	3				Very vesicular, quartz and pyrite lining vesicle walls
23	13R	1	2	6	15	5	116.16			Cm	Pv	Sil/ GSC	vfg	Si	70	Cl	20	Anh	7		VN/ VF		Py	3				Very vesicular, quartz and pyrite lining vesicle walls. Veins of pyrite and quartz.
23	13R	1	3	15	23	3	116.25			Cm	Pv	Sil/ GSC	vfg	Si	70	Cl	20	Anh	7		VN/ VF		Py	3				Very vesicular, quartz and pyrite lining vesicle walls. Veins of pyrite and quartz.
23	13R	1	4	23	33	10	116.33			Cm	Pv	Sil/ GSC	vfg	Si	70	Cl	20	Anh	7		VN/ VF		Py	3				Very vesicular, quartz and pyrite lining vesicle walls
23	13R	1	5	33	38	4	116.43			Cm	Pv	Sil/ GSC	vfg	Si	60	Cl	20	Anh	20		DS		Py	tr				
23	13R	1	6	38	45	4	116.48			Cm	Pv	Sil/ GSC	vfg	Si	60	Cl	20	Anh	20		DS		Py	tr				
24	13R	1	7	45	51	4	116.55			Cm	Pv	Sil/ GSC	vfg	Si	60	Cl	20	Anh	20		DS		Py	tr				
24	13R	1	8	51	59	5	116.61			Cm	Pv	Sil/ GSC	vfg	Si	60	Cl	20	Anh	20		DS		Py	tr				
24	13R	1	9	59	62	4	116.69			Cm	Pv	Sil/ GSC	vfg	Si	60	Cl	20	Anh	20		DS		Py	tr				
24	13R	1	10	62	72	5	116.72			Cm	Pv	Sil/ GSC	vfg	Si	80	Cl	10	Anh	8		VN/ VF		Py	2				Highly silicified breccia with some sulfide in veins.

Leg 193 Alteration/Mineralization Log - Hole 1189B

Identifiers								Color		Alteration											Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	
1	1R	1	1	0	29	5	31	Gd	DkGr	Cm	Pv	Min	vfg	Anhy	30	Gyp	10	Cl	5		SB/ MS	vfg	Py	45	Cp	10		Fragmental textured massive sulfide. Rare soft (GSC altered) vesicular volcanic fragments (2-3mm in size), white apparently anhy-replaced samples, cp fragments. All cemented in a fine grained py-anhy-(gypsum) matrix.
2	1R	1	2	29	39	4	31.29	LtGrGn		Cm	Pv	GSC/ Bl	vfg	Cl	60	Si	30	Anhy	10		VF	vfg	Py	tr				Greenish, soft GSC-altered moderately vesicular (10% vesicles)volcanic rock. Alligned stretched vesicles up to 4x2mm in size. Trace pyrite as vesicle lining.
3	2R	1	1	0	10	4	40.1	LtBlGn	Gd	Cm	Pv	GSC/ Min	vfg	Anhy	40	Cl	30	Si	10		SB/ VS	vfg	Py	20	Cp	tr		Soft, greenish-blue flow banded volcanic fragments cemented in and cut by py-anhy-(si) stockwork veinlets which show “ladder textures” that parallel and croGSCut flow banding. The fragments show evidence of rotation.
3	2R	1	2	10	20	5	40.2	LtBlGn	DkG	Cm	Pv	GSC/ Min	vfg	Anhy	65	Cl	20	Si	5		SB/ VS	vfg	Py	10	Cp	tr		Similar to above piece. Flow banding less pronounced, more anhy in the veins and less silica and pyrite.
3	2R	1	3	20	30	4	40.3	LtBlGn	Gd	Cm	Pv	GSC/ Min	vfg	Anhy	40	Cl	25	Si	15		SB/ VS	vfg	Py	20	Cp	tr		Rubble - small 1-3 cm pieces of stockwork material.
3	2R	1	4	30	40	4	40.4	LtBlGn		Cm	Pv	GSC	vfg	Cl	60	Anhy	20	Si	20		DS	vfg	Py	8				Rubble - small 1-3 cm pieces of moderately vesicular, altered volcanic rock. The fragments have no veins, but host fine grained disseminated pyrite. This probably means the fluids which have produced the stockwork in the flow banded unit passed through the more porous vesicular unit, without causing fracturing.
3	2R	1	5	40	50	4	40.5	LtBlGn	Gd	Cm	Pv	GSC/ Min	vfg	Anhy	50	Cl	40	Si	5		DS/ VS/ SB	vfg	Py	5				Mixed rubble (mostly <1 cm) of stockwork -flow banded and vesicular material.
3	3R	1	1	0	12	3	49.7	LtBlGn	DkG d	Cm	Pv	GSC/ Min	vfg	Cl	45	Anhy	25	Si	5		SW/ DS	vfg	Py	25				Completely altered, clayey, light blue green calsts with disseminated py, possibly with some amorphous silica) cemented by py+anhy±silica.
3	3R	1	2	12	23	2	49.82	Gd	Lt-BlGn	Cm	Pv	GSC/ Min	vfg	Cl	35	Anhy	5				SW/ DS	vfg	Py	60				Similar to Pc. 1, but only small fraction of rock is clasts.
3	3R	1	3	23	34	2	49.93	GnGr	DkG d	Cm	Pv	GSC/ Min	vfg	Si	45	Cl	30	Anhy	10		SW/ DS	vfg	Py	15				Greenish-gray GSC-altered rock with anhydrite selvages along py vein.
3	3R	1	4	34	46	3	50.04	DkGr	Lt-BlGn	Cm	Pv	GSC/ Min	vfg	Anhy	40	Cl	25	Si	10		SW/ DS	vfg	Py	25				Dark gray stockwork of anhy+py, enclosing completely GSC altered soft clasts.
3	3R	1	5	46	57	4	50.16	LtGn	Gr	Cm	Pv	GSC/ Min	vfg	Anhy	50	Cl	35	Si	5		SW/ DS	vfg	Py	10				Anhy-dominated stockwork with light green GSC-altered clasts.
3	3R	1	6	57	68	1	50.27	LtGn	Gr	Cm	Pv	GSC	vfg	Cl	50	Anhy	38	Si	10		DS	vfg	Py	2				Intercalating ireegular light green and greenish-gray bands.
3	3R	1	7	68	76	4	50.38	LtBlGn		Cm	Pv	GSC	vfg	Cl	80	Anhy	15	Si	5		DS	vfg	Py	2				Rubble. Similar to Pieces 1 and 2.
3	3R	1	8	76	84	4	50.46	BlGn	DkG d	Cm	Pv	GSC/ Min	vfg	Cl	56	Anhy	30	Si	10		SW/ DS	vfg	Py	4				Rubble. Mixture of pieces representing anhy+py stockwork and blue-green to light green clayey clasts. Some oxidation of sulfides.

Leg 193 Alteration/Mineralization Log - Hole 1189B

Identifiers								Color		Alteration												Sulfide Mineralization								Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)								Style	Grain Size	Mineralogy						
														Dominant (%)		Secondary (%)		Others (%)						Dominant (%)		Secondary (%)				
4	5R	1	1	0	12	2	69.3	Gd	Lt-GnBl	Cm	Pv	Min/GSC	vfg	Cl	18	Si	12					SW/DS	vfg	Py	70					Clay-altered light green--blue clasts in qtz-py stockwork. Quartz replaces anhydrite from core 3. Clasts are soft and clayey, but may contain some anhydrite.
4	5R	1	2	12	22	3	69.42	LtGrGn	Gd	Cm	Pv	GSC/Min	vfg	Cl	40	Si	18	Anhy	1			SW/DS	vfg	Py	40					Similar to Piece 1. Qtz crystals overgrown by very minor anhydrite lining vug walls.
4	5R	1	3	22	33	2	69.52	Gr	Gd	Cm	Pv	GSC/Min	vfg	Si	75	Cl	20					SW	vfg	Py	5					Small piece of qtz-py stockwork with minor white to greenish-gray clayey clasts.
4	5R	1	4	33	45	0.5	69.63	LtGnGr		Cm	Pv	GSC	vfg	Cl	80	Anhy	20					DS/VS	vfg	Py	Tr					Clayey, soft rock with relict perlitic texture(?)
4	5R	1	5	45	55	2	69.75	LtGrGn	Gd	Cm	Pv	GSC/Min	vfg	Cl	30	Si	20					SW/DS	vfg	Py	50					Very similar to Pieces 1 and 2. Beautiful euhedral qtz crystals lining vugs.
5	6R	1	1	0	12	4	79	Gr/LtGr	Rd	Cm	Pv	GSC/Min	vfg	Cl	75	Si	15	Hem (4), Anhy (10)				DS	vfg	Py	Tr					Light gray to green gray clayey rocks cut by qtz-hem stockwork. Py disseminated in clasts.
5	6R	1	2	12	24	4	79.12	GnGr	Rd	Cm	Pv	GSC/Min	vfg	Cl	50	Si	30	Hem (15), Anhy (10)				SW/DS	vfg	Py	Tr					Stockwork is qtz-hem±py in center of thick veins, but qtz-py±hem in narrow veins. Qtz veinlets cut through clayey clasts and form silicified “ridges” in visible with hand lense.
5	6R	1	3	24	34	6	79.24	GnGr	Rd	Cm	Pv	GSC/Min	vfg	Cl	50	Si	35	Hem (10), Anhy (10)				SW/DS	vfg	Py	Tr					Stockwork of red qtz-hem and minor gray qtz-py-hem veins. Rocks are mostly gray, very fine grained and soft, but few clasts are light-gray and slightly silicified.
5	6R	1	4	34	45	6	79.34	LtGnGr	Rd	Cm	Pv	GSC/Min	vfg	Cl	70	Si	25	Hem (5)				SW/DS	vfg	Py	Tr					GSC-altered, incipiently silicified (along of qtz veinlets) rock with weakly developed stockwork of qtz-hem-py. Again, hem is most abundant in the centers of thick veins.
5	6R	1	5	45	56	3	79.45	Rd	Lt-GnGr	Cm	Pv	GSC/Min	vfg	Si	53	Hem	30	Cl (10), Anhy (5)				SW/DS	vfg	Py	2					Anhy crystals overgrowing qtz.
6	6R	1	6	56	67	2	79.56	Gd	Gr	Cm	Pv	Min	vfg	Si	9	Anhy	1	Anhy	1			SW	vfg	Py	90	Cp	Tr	Sp (tr)		Massive sulfide.
7	6R	1	7	67	78	3	79.67	LtGnGr	DkGr	Cm	Pv	GSC/Min	vfg	Si	68	Si	30	Anhy	2			DS	vfg	Py	Tr					Clayey rock, soft, but spotty texture owing to dark gray quartz amygdales.
8	7R	1	1	0	11	5	88.7	LtGnGr	DkGd	Cm	Pv	Min/GSC	vfg	Cl	65	Anhy	15	Si	5			SW/DS	vfg	Py	15					Breccia. Soft, clay-rich clasts with 2% disseminated py surrounded by anhy-qtz-py cement. Anhy filles vugs and may also be present in the altered clasts along with clay.
8	7R	1	2	11	22	2	88.92	Gr	DkGd	Cm	Pv	Min/GSC	vfg	Cl	50	Anhy	45	Si	5			SW/DS	vfg	Py	10					Anhy-py stockwork with some qtz. Late anhy fills vugs. Clayey, soft clasts.
9	8R	1	1-5	0	24		98.4	LtGnGr	LtGr	Cm	Pv	GSC	vfg	Cl	50	Si	33	Anhy	5			DS/VS/VF	vfg	Py	2	Cp	Tr			Greenish-gray to gray clay-silica rocks. More silicified than previous rocks. Qtz-py veins in Piece 2 with anhydrite lining vug. Anhy fills vugs/vesicles, some vugs are lined with py-qtz±anhy. Piece 5 got 4% py and trace cp, lining vugs with silicified halos.
10	8R	1	6-8	24	33		98.64	LtGnGr	Gr	Cm	Pv	GSC/Min	vfg	Si	65	Cl	30	Anhy	2			SW/DS	vfg	Py	3	Cp	Tr			Contains greenish-gray very soft and light greenish-gray silicified clasts in a py-qtz stockwork.

Leg 193 Alteration/Mineralization Log - Hole 1189B

Identifiers								Color		Alteration										Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)						Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)				Dominant (%)		Secondary (%)		Others	
11	8R	1	9	33	37	3	98.73	GnGr	Lt-GnGr	Cm	Pv	GSC/ Sil	vfg	Si	65	Cl	30	Anhy	4	VF/ DS	vfg	Py	1				Moderately silicified rock with qtz-py-anhy amygdales. Vesicles are lined with vfg euhedarl qtz that is overgrown by pyrite.
11	8R	1	10	37	47	6	98.77	GnGr	DkGr	Cm	Pv	GSC/ Sil	vfg	Si	75	Cl	22	Anhy	1	SW/ DS	vfg	Py	2	Cp	Tr		Moderately silicified rock with highly silicfified dark gray halos along anhy-py veins. Small vesicles are filled with qtz and qtz-py-cp.
11	8R	1	11	47	50	3	98.87	LtGnGr	LtGr	Cm	Pv	GSC/ Sil	vfg	Si	65	Cl	30	Anhy	4	VF/ DS	vfg	Py	1				Rubble, similar to Piece 9
11	8R	1	12	50	61	3	98.9	GnGr	DkGr	Cm	Pv	GSC/ Sil	vfg	Si	75	Cl	22	Anhy	1	SW/ DS	vfg	Py	2				Rubble, similar to Piece 10
11	8R	1	13-16	61	73	8	99.01	LtGnGr	Gr	Cm	Pv	GSC/ Sil	vfg	Si	70	Cl	28	Anhy	2	SW/ DS	vfg	Py	1	Cp	Tr	Sp (Tr)	Silicified, GSC-altered rocks with py-qtz stockwork (Piece 13) and py/qtz (Piece 15). Silicification along veins imposes a dark gray colr to the rock. Rare examples of chalcopyrite filling vesicles.
12	9R	1	2-Jan	0	9	5	108.1	LtGnGr	DkGd	Cm	Pv	GSC/ Sil	vfg	Cl	70	Si	10	Anhy	10	SW/ DS	vfg	Py	10				Very soft, clayey rock, dissected by py-qtz stockwork. Py is also disseminated in matirx. Reminiscent of Unit 4. May have fallen down the hole.
13	10R	1	1	0	14	12	117.9	Gn		Cm	Pv	GSC	vfg	Si	50	Cl	40	Anhy	10	VF/ VS	vfg	Py	tr	Sp	tr	Cp (tr)	Green silicifed rock with vesicles up to 5mm in size, mostly filled with quartz. some are lined by anhy-py. Several hairline veins of qtz-anhy-py with 1-2mm datk gray siliceous halos. Coarser vein is filled with anhy, minor py. Traces of honey yellow sp around the edges of qtz amygdales. Trace cp in matrix.
13	10R	1	2	14	23	4	118.04	LtGn		Cm	Pv	GSC	vfg	Cl	49	Si	45	Anhy	5	VF/ VS	vfg	Py	1				Silicified rock with with anhy-py filled vesicles, qtz-py veinlets, hairline py veinlets.
13	10R	1	3	23	33	9	118.13	Gn		Cm	Pv	GSC	vfg	Cl	60	Si	35	Anhy	5	VF/ VS	vfg	Py	tr	Sp	tr	Cp (tr)	Similar to piece 1. mm - sized qtz-anhy vein with py-sp-cp.
14	10R	1	4	33	37	3	118.23	Gn	Gr	Cm	Pv	GSC	vfg	Si	60	Cl	15	Anhy (5), FeOx (tr)		VF/ DS	vfg	Py	20				Cherty, vuggy silica-pyrite vein (or is it replacing vesicular volcanic rock?) with green clayey volcanic pieces embedded in it. Vugs lined by crystalline anhy-py, often with a coating of blue-green clay. FeOx after py on one surface.
14	10R	1	5	37	49	7	118.27	Gn	Wht	Cm	Pv	GSC	vfg	Cl	70	Si	14	Anhy	15	VS	vfg	Py	1				Green, spherulitic volcanic toatlly replaced by green clay (chlorite) and anhydrite. Cut by fine irregular anhy-py veins.
14	10R	1	6	49	56	5	118.39	Gn	Wht	Cm	Pv	GSC	vfg	Qtz	55	Cl	30	Anhy	10	VF/ DS	vfg	Py	5				Spherulitc rock with flow banding at one end. Py occurs in vugs and with very fine grained silica in cores of spherulites.
14	10R	1	7	56	63	5	118.46	Gn	Wht	Cm	Pv	GSC	vfg	Qtz	55	Cl	30	Anhy	10	VF/ DS	vfg	Py	5				Similar to above piece, with distinct flow banding.
15	10R	1	8	63	77	8	118.53	DkGr	Lt-BlGn	Cm	Pv	Sil	vfg	Qtz	70	Cl	25	Anhy	5	VS/ DS	vfg	Py	tr				Stretched vesicles lined by anhy and/ or pale blue-green clay. Fine spotted texture defined by siliceous spots in a clayey matrix. Py in hairline fracture with anhy, very rarely in vesicles and in trace quantities in the groundmass.

Leg 193 Alteration/Mineralization Log - Hole 1189B

Identifiers								Color		Alteration											Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	
16	11R	1	1	0	7	4	127.6	DkGr	Gn	Cm	Pv	Sil/ GSC	vfg	Qtz	65	Cl	30	Anhy (5), Mt (tr)			DS	vfg	Py	tr				Vuggy dark gray silica (replacement?) with remnant green flow banded clay-replaced (chloritic) volcanic domains, some are slightly magnetic (tr of mt).
16	11R	1	2	7	14	5	127.67	DkGr	Gn	Cm	Pv	Sil/ GSC	vfg	Qtz	65	Cl	20	Anhy (13), Mt (1), FeOx (tr)			DS	vfg	Py	1				Blotchy textured rock composed of dark gray silica with remnant rounded green clay (chlorite) domains. Vuggy anhy and anhy in veins. Rare dark vfg si-mt ovoids (amygdales?)
17	11R	1	3	14	17	2	127.74	Rd	Gn	Cm	Pv	Sil/Ox	vfg	FeOx	30	Qtz	40	Cl (12), Anhy (10), Mt (3)			VF	vfg	Py	5				Porous (formerly vesicular?) jasperlitic silica - Fe-oxide with dark vfg disseminated Mt in patches. Drusy py and shaded anhy occur as vug fill. Remnant flow banded green domains.
18	11R	1	4	17	22	3	127.77	DkGr	Gn	Cm	Pv	Sil/ GSC	vfg	Qtz	50	Cl	42	Anhy (5), Mt (tr)			DS/ VS	vfg	Py	3				Polymict breccia. Variably altered green (chloritic) to gray clasts, some with flow banding. Dark siliceous matrix with minor pyrite. Traces of mt in clasts and in the matrix.
18	11R	1	5	22	27	3	127.82	DkGr	Gn	Cm	Pv	Sil/ GSC	vfg	Qtz	45	Cl	42	Anhy (5), Mt (3)			VS/ DS	vfg	Py	3	Cp	2		Similar to above. However, siliceous matrix contains 5-6% vfg dissem. mt. Cp occur as vug fill. Some dark mt-bearing siliceous clasts are present.
18	11R	1	6	27	33	3	127.87	DkGr	Gn	Cm	Pv	Sil/ GSC	vfg	Qtz	65	Cl	32	Anhy (3), Mt (tr)			DS	vfg	Py	tr				Very similar in appearance to Piece 2. Dark siliceous groundmass contains tr of Mt. Fine (< 1mm) white spots appear to be a mix of rounded anhy-filled vesicles and more angular fragments. Bladed anhy as void fill.
18	11R	1	7	33	40	3	127.93	DkGr	Gn	Cm	Pv	Sil/ GSC	vfg	Qtz	50	Cl	40	Anhy (10), Mt (tr)			DS	vfg	Py	tr				Similar to Piece 4. Flow banded fragments. Small patches of qtz. Tr Mt-vug; one vug is lined by dark mt impregnated qtz. Py is disseminated in siliceous matrix.
18	11R	1	8	40	43	1	128	DkGn	Gr	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy (tr)			DS	vfg	Py	tr				Devitrification textured fragment. Cuspate domains outlined by clay and silica. Vesicles filled by hard opaline silica. Rare green flow banded fragments at one edge. Traces of disseminated py in silica.
19	11R	1	9	43	59	11	128.03	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	58	Cl	40	Anhy (2), Mt (tr)										Fine spotted textured rock with abundant stretched vesicles, some lined by anhy. Spots of greenish clay in a siliceous matrix. Siliceous material contains tr of vfg Mt (magnetic).
19	11R	1	10	59	68	8	128.19	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	58	Cl	40	Anhy (2), Mt (tr)										Same as above
19	11R	2	1	0	15	8	128.28	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	58	Cl	40	Anhy (2), Mt (tr)										Rubble - same as above
19	11R	2	2	15	30	15	128.43	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	58	Cl	40	Anhy (2), Mt (tr)										Same as above
19	11R	2	3	30	41	11	128.58	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	58	Cl	40	Anhy (2), Mt (tr)										Same as above
19	11R	2	4	41	49	9	128.69	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	57	Cl	38	Anhy (5), Mt (tr)			VS	vfg	Py	tr				Anhy vein with tr mt and py and chl selvage. Same as above otherwise.
19	11R	2	5	49	60	9	128.77	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	57	Cl	38	Anhy (5), Mt (tr)			VS	vfg	Py	tr				Drusy anhy an fracture in working half with trace of mt and py. 1 cm rounded xenolith (?).

Leg 193 Alteration/Mineralization Log - Hole 1189B

Identifiers								Color		Alteration										Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)						Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)				Dominant (%)		Secondary (%)		Others	
19	11R	2	6	60	76	12	128.88	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	58	Cl	40	Anhy (2), Mt (tr)		DS	vfg	Py	tr				Patch of anhy on a fracture surface.
19	11R	2	7	76	80	4	129.04	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	59	Cl	40	Anhy (1), Mt (tr)		DS	vfg	Py	tr				Anhy +- green clays lines vesicles.
19	11R	2	8	80	107	25	129.08	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	59	Cl	40	Anhy (1), Mt (tr)									Anhy +- green clays lines vesicles. Anhy vein with trace of mt and chlorite selvage.
19	11R	2	9	107	114	4	129.35	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	59	Cl	40	Anhy (1), Mt (tr)									Anhy vein with chlorite selvage.
19	11R	2	10	114	134	20	129.42	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	59	Cl	40	Anhy (1), Mt (tr)									Anhy in vesicles. Anhy vein with chl selvage.
19	11R	2	11	134	140	3	129.62	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	59	Cl	40	Anhy (1), Mt (tr)									Small anhy patch on fracture surface. Anhy vesicle fill.
19	11R	3	1	0	29	29	129.68	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	59	Cl	40	Anhy (1), Mt (tr)									Mt in vuggy anhy vein. Anhy vesicle fill, green clay lined vesicles.
19	12R	1	1	0	7	6	137.3	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	39	Anhy (tr), Mt (tr)									Green clay vesicle lining. Anhy on fractures.
19	12R	1	2	7	25	16	137.37	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	39	Anhy (1), Mt (tr)									Same as above. Anhy vein at the base with incorporated rock fragments.
19	12R	1	3	25	43	17	137.55	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	39	Anhy (1), Mt (tr), Ba (tr)		VS	vfg	Py	tr				Green clay +- trace of pyrite and barite lined vesicles. Hairline anhy-py veinlet with 1 mm bleached halo. Anhy-chl veins at the top and base of piece.
19	12R	1	4	43	68	22	137.73	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	39	Anhy (1), Mt (tr), Ba (tr)									Scattered radiating bleached anhy (2-5 mm) aggregates flattened on a chloritic fracture. Green clay lined vesicles, some with fine drusy Ba crystals.
19	12R	1	5	68	82	22	137.98	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	39	Anhy (1), Mt (tr), Ba (tr)		VF	vfg	Py	tr	cp	tr		Py in large vugs with barite crystals. Other vugs green clay lined. 1 cm dark xenolith has anhy-filled vesicles, one with cpy.
19	12R	1	6	82	98	15	138.12	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	38	Anhy (2), Mt (tr)		VF	vfg	Py	tr				Irregular bleached zone adjacent to anhy vein, but not necessarely related . Drusy py in large vug with anhy.
19	12R	1	7	98	102	3	138.28	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	39	Anhy (1), Mt (tr), Ba (tr)		VF	vfg	Py	tr				Drusy py in vug with barite. Green clay lined vesicles.
19	12R	1	8	102	114	12	138.32	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	39	Anhy (1), Mt (tr)		VS/ DS	vfg	Py	tr				Bleached has disseminated py. Trace of py and mt in a anhy vein. Bleaching adjacent to vein but unrelated.
19	12R	1	9	114	118	2	138.44	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (1), Mt (tr)		DS	vfg	Py	tr				Anhy lined vesicles.
19	12R	1	10	118	132	12	138.48	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	39	Anhy (1), Mt (tr)		VS	vfg	Py	tr				Radiating 2-4 mm aggregates of bleached anhy in chlorite-coated fracture with trace of py.
19	12R	1	11	132	141	8	138.62	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (tr), Mt (tr)									Anhy and green clay vesicle fill. Mt in anhy vein and disseminated throughout the rock.
19	12R	2	1	0	18	17	138.71	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	39	Anhy (1), Mt (tr)		VS	vfg	Sp	tr				Extremely fine sphalerite dusting an anhydrite vein. Green clay-anhy vesicle linings.
19	12R	2	2	18	29	9	138.89	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	65	Cl	34	Anhy (1), Mt (tr)		VF	vfg	Sp	tr				Orange-red sphalerite in one vesicle with anhy. Other vesicles are lined by green clay and anhy. Rare qtz filled irregular voids.
19	12R	2	3	29	40	10	139	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (1), Mt (tr)									Green clay-anhy lined vesicles.

Leg 193 Alteration/Mineralization Log - Hole 1189B

Identifiers								Color		Alteration												Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)								Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)						Dominant (%)		Secondary (%)		Others	
19	12R	2	4	40	48	8	139.11	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	75	Cl	15	Anhy (10), Mt (tr)											Dark gray silicified rock with anhy amygdales.
19	12R	2	5	48	58	9	139.19	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	75	Cl	15	Anhy (10), Mt (tr)											Same as above.
19	12R	2	6	58	62	3	139.29	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	50	Cl	40	Anhy (10), Mt (tr)											Slightly blotchy appearance. Anhy in groundmass. Green clay and anhydrite vesicle lining.
19	12R	2	7	62	70	8	139.33	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (tr), Mt (tr), Ba (tr)											Ba-qtz lined vesicles + one py crystal.
19	12R	2	8	70	77	5	139.41	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (1), Mt (tr)											Green clay +- anhy lined vesicles.
19	12R	2	9	77	92	15	139.48	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	57	Cl	38	Anhy (5), Mt (tr)											Non vesicular rock. Possible plagioclase phenocrysts?
19	12R	2	10	92	99	6	139.63	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	57	Cl	38	Anhy (5), Mt (tr)											Vfg py and sphalerite dusting.One anhy vein is present.
19	12R	2	11	99	113	13	139.7	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (1), Mt (tr)											Trace of pyrite in bleached zone around.
19	12R	2	12	113	118	5	139.84	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (1), Mt (tr)											
19	12R	2	13	118	126	8	139.89	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (1), Mt (tr)											Anhy-green clay vesicle lining.
19	12R	2	14	126	138	8	139.97	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (1), Mt (tr)											Anhy-green clay vesicle lining.
19	12R	3	1	0	5	5	140.09	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (tr), Mt (tr)											Anhy-green clay lined vesicles.
19	12R	3	2	5	11	4	140.14	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (tr), Mt (tr)		DS	vfg	Py	tr					Disseminated py associated with pale gray-green clayey zone.
19	12R	3	3	11	17	4	140.2	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (tr), Mt (tr)											Anhy-green clay lined vesicles.
19	12R	3	4	17	22	4	140.26	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (tr), Mt (tr)											Py in vesicles to paler zone. Other vesicles are anhy-green clay lined.
19	12R	3	5	22	34	7	140.31	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (tr), Mt (tr)		VF	vfg	Py	tr					Anhy-green clay lined vesicles.
19	12R	3	6	34	42	7	140.43	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (tr), Mt (tr)											Anhy-green clay lined vesicles.
19	12R	3	7	42	51	8	140.51	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (tr), Mt (tr)											Anhy-green clay lined vesicles.
19	12R	3	8	51	56	3	140.6	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (tr), Mt (tr)											Anhy-green clay lined vesicles.
19	12R	3	9	56	64	7	140.65	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	65	Cl	35	Anhy (tr), Mt (tr)											Trace plagioclase, possibly not completely replaced.
19	12R	3	10	64	73	6	140.73	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	40	Anhy (tr), Mt (tr)											2-4 mm bleached anhy vein. Chlorite coated a fracture.
19	13R	1	1	0	7	2	147	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	65	Cl	35	Anhy (tr), Mt (tr)		VF	vfg	Py	tr					Anhy lined and occasionally filled vesicles. Traces of py in vesicles.
19	13R	1	2	7	14	3	147.07	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	65	Cl	35	Anhy (tr), Mt (tr)		VF	vfg	Py	tr					Same as above. Two plagioclase phenocrysts.
19	13R	1	3	14	20	4	147.14	DkGn	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	65	Cl	35	Anhy (tr), Mt (tr)		VF	vfg	Py	tr					Same as above.
20	13R	1	4	20	26	4	147.2	Gn	Wht	Cm	Pv	GSC	vfg	Qtz	45	Cl	33	Anhy (5), Il (5)		VS	vfg	Py	2					Polymict breccia with abundant flow banded white clay altered clasts and rarer dark gray silicified clasts. Silicified clasts contain 15% opaques in qtz veinlet and 2/3 hard, black, submetallic, non-magnetic mineral (ilmenite?). Remainder py. Matrix of the rocks is anhy-qtz with minor py.

Leg 193 Alteration/Mineralization Log - Hole 1189B

Identifiers								Color		Alteration											Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	
20	13R	1	5	26	31	2	147.26	Gn		Cm	Pv	GSC	vfg	Qtz	40	Cl	30	Anhy	28		VS	vfg	Py	2				Green spotty-textured rock with suggestion of a radiating structure around a central qtz-py filled void. Same as piece 10, which is a separate unit (Unit 21).
20	13R	1	6	31	35	2	147.31	LtBlGn	Gr	Cm	Pv	GSC	vfg	Qtz	40	Cl	30	Anhy	25		VS	vfg	Py	5	sp	tr	tn (tr)	Perlitic, blue clay-anhy altered volcanic fragments in a matrix of qtz-anhy-py with trace spalerite and tennantite.
20	13R	1	7	35	39	3	147.35	LtBlGn	Gr	Cm	Pv	GSC	vfg	Qtz	40	Cl	30	Anhy	23		VS	vfg	Py	7				Similar to above. Beautifully preserved perlitic fractures in fragments.
20	13R	1	8	39	45	3	147.39	LtBlGn	Gr	Cm	Pv	GSC	vfg	Qtz	45	Cl	30	Anhy	21		VS	vfg	Py	4				Rubble of above material.
20	13R	1	9	45	48	1	147.45	Gr	Wht	Cm	Pv	GSC	vfg	Qtz	60	Anhy	20	Cl	19		DS/ VF	vfg	Py	1				Anhy-py filled vesicles and possible sperulites in a silicified matrix.
21	13R	1	10	48	56	8	147.48	Gn		Cm	Pv	GSC	vfg	Qtz	40	Cl	30	Anhy	28		VS	vfg	Py	2				Fine network of silica-pyrite veinlets cut a pervasively GSC-altered rock.
22	14R	1	1	0	10	4	156.5	DkGr	Gd	Cm	Pv	Sil/ Min	vfg	Qtz	70	Anhy	13	Cl (5), Hem (5)			VS/ DS	vfg	Py	7				Highly silicified and mineralized. Alternating irregular hematite-bearing and hematite-free bands created layered structure that mimics flow banding. Pyrite abundance varies between different bands. Py veins cut banding. Anhydrite vein on one surface of piece.
23	14R	1	2	10	15	4	156.6	LtGnGr	LtGr	Cm	Pv	GSC	vfg	Cl	60	Anhy	30	Qtz	10		DS	vfg	Py	tr				Flow banding is well preserved in clay-anhy rich layers intercalating with rare gray qtz-rich layers. Anhy vein along one side of piece. Narrow py-anhy veinlet.
23	14R	1	3	15	26	1	156.65	DkGnGr	Wht	Cm	Pv	Sil/ Min	vfg	Qtz	75	Anhy	17	Cl	5		DS	vfg	Py	3				Small piece of silicified rock with py disseminated in gm and filling vugs together with anhydrite.
23	14R	1	4	26	30	2	156.76	LtGnGr	DkGr	Cm	Pv	GSC	vfg	Cl	60	Anhy	20	Qtz	20		VS/ DS/ VF	vfg	Py	tr				Breccia. Soft, incipiently silicified clasts float in a qtz-py matrix. Late anhy fills vugs.
23	14R	1	5	30	33	3	156.8	LtGnGr	LtGr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	30	Anhy	10		DS	vfg	Py	Tr				Flow-banded. Light greenish-gray clay-anhy rich bands alternate with dark gray silicified bands. Py-qtz veinlets.
23	14R	1	6	33	36	2	156.83	LtGnGr	LtGr	Cm	Pv	GSC/ Sil	vfg	Qtz	65	Cl	25	Anhy	10		DS	vfg	Py	Tr	Sp	Tr		Similar to Piece 5, but more silicified matrix. Anhy-py vein on one edge of piece. Trace spalerite in breccia cement.
23	14R	1	7	36	42	4	156.86	LtGnGr	DkG nGr	Cm	Pv	GSC/ Sil	vfg	Cl	50	Qtz	30	Anhy	19		VS/ DS/ VF	vfg	Py	1				Similar to piece 5, but more clay and anhydrite.
23	14R	1	8	42	51	5	156.92	LtGnGr	LtGr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	30	Anhy	10		DS	vfg	Py	Tr				Similar to Piece 5. Anhy-py vein on edge of piece.
23	14R	1	9	51	54	2	157.01	LtGnGr	LtGr	Cm	Pv	GSC/ Sil	vfg	Qtz	65	Cl	25	Anhy (1), Mt (Tr)			VS/ DS	vfg	Py	Tr				Trace magnetite in silicic bands.
23	14R	1	10	54	65	9	157.04	LtGnGr	Gr	Cm	Pv	GSC/ Sil	vfg	Qtz	44	Cl	44	Anhy	12		DS	vfg	Py	Tr				Breccia. Flow-banded, GSC-altered, soft, white to light greenish-gray, incipiently silicified clasts (clay>anhy>qtz) set in a qtz-rich, gray cement (qtz>clay>anhy)l Large anhydrite crystals in clasts and matrix, probably late vug fill.

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Identifiers								Color		Alteration										Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)						Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)				Dominant (%)		Secondary (%)		Others	
23	14R	1	11	65	75	10	157.15	LtGnGr	LtGr	Cm	Pv	GSC/ Sil	vfg	Qtz	50	Cl	40	Anhy	10	DS	vfg	Py	Tr				Flow-banded unit protruding into breccia that is dominated by qtz-rich, gray cement and contains soft, light greenish-gray clasts and anhydrite filled vugs. Flow-banded rocks are completely GSC-altered and show only weak silicification manifested in 0.1 mm qtz blebs and minor silicified screens. Qtz blebs are most abundant in the halo of a 2-3 mm wide anhy vein. Trace magnetite in breccia cement.
23	14R	1	12	75	85	9	157.25	LtGnGr	LtGr	Cm	Pv	GSC/ Sil	vfg	Qtz	65	Cl	30	Anhy	5	DS	vfg	Py	Tr				Similar to Piece 10. Clasts show light gray halos with gray, qtz-rich spots. Anhydrite filling vugs in matrix.
23	14R	1	13	85	95	8	157.35	LtGnGr	LtGr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	34	Anhy	6	DS	vfg	Py	Tr				In this piece and, to a lesser extent, in Piece 12, a second type of clast ist present. These clasts can be distinguished from the flow-banded ones by their greater softness, their gray color, and the virtual lack of flow-banding structures. It is unclear if these clasts represent a different rock type or differences in style of alteration.
23	14R	1	14	95	106	10	157.45	LtGnGr	LtGr	Cm	Pv	GSC/ Sil	vfg	Qtz	55	Cl	38	Anhy	7	DS	vfg	Py	Tr				Similar to Piece 10 and 11. Qtz-py veinlets cutting flow-banded clasts. Abundant anhydrite as vug fill.
23	14R	1	15	106	118	12	157.56	LtGnGr	LtGr	Cm	Pv	GSC/ Sil	vfg	Cl	55	Qtz	32	Anhy	10	DS/ VS	vfg	Sp	2	Py	1	Cp (?)	Fairly coherent piece of flow-banded unit, dissected by a network pf qtz-sp-py veins with anhy in centers, where the veins are thick. Cm-sized vugs are filled with qtz+sp-py along the walls and with blocky anhydrite in the centers. Sphalerite shows a variation on chemical composition. The center of the sphalerite aggregates shows a brown-yellow color (Zn rich or iron poor sphalerite) and the edge shows a dark brown to black color (iron rich sphalerite).
23	14R	1	16	118	122	4	157.68	LtGnGr	LtGr	Cm	Pv	GSC/ Sil	vfg	Qtz	53	Cl	45	Anhy	12	DS/ VS	vfg	Py	Tr				Network of irregular qtz(trace py) veins cut piece.
23	14R	1	17	122	130	1	157.72	Wht	Gr	Cm	Pv	Sf/ GSC	vfg	Anhy	70	Cl	30			DS/ VS	vfg	Py	Tr				Small rubbly pieces, representing thick anhy vein with clayey wall rock. Trace oy accompanying anhy.
23	14R	2	1	0	3	2	157.8	Wht	DkGr	Cm	Pv	Sf/ GSC	vfg	Anhy	55	Qtz	23	Cl	22	DS	vfg	Py	Tr				Piece is a 1.2 cm thick anhydrite vein with trace pyrite and silicified, dark gray halo in brecciated green-gray clayey wall rock.
23	14R	2	2	3	6	2	157.83	LtGnGr	DkGr	Cm	Pv	GSC	vfg	Cl	60	Qtz	35	Anhy	5	DS	vfg	Py	Tr				Clayey, incipiently silicified rock with qtz-hem-py vein network and anhy (py) vein on edge.
23	14R	2	3	6	9	3	157.86	LtGnGr	DkGr	Cm	Pv	GSC/ Sil	vfg	Qtz	50	Cl	48	Anhy	2	DS	vfg	Py	Tr				Relict flow banding manifested in dark gray silicified stripes in otherwise clayey rock.
23	14R	2	4	9	12	2	157.89	LtGnGr	DkGr	Cm	Pv	GSC/ Sil	vfg	Qtz	60	Cl	38	Anhy	2	DS/ VS	vfg	Py	Tr				Clasts are clayey, but quartz(-py) veins are abundant.
23	14R	2	5	12	23	5	157.92	LtGnGr	DkGr	Cm	Pv	GSC/ Sil	vfg	Qtz	50	Cl	40	Anhy	10	DS	vfg	Py	Tr				Rubble. Similar to Piece 6.

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Identifiers								Color		Alteration											Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	
23	14R	2	6	23	29	3	158.03	LtGnGr	DkGr	Cm	Pv	GSC/ Sil	vfg	Qtz	50	Cl	40	Anhy	10		DS	vfg	Py	Tr				Flow-banded rock with spotty texture (due to <0.1 mm quartz blebs), cut by qtz and anhy rich vein. Py is rare in rock.
24	14R	2	7	29	35	5	158.09	GnGr	Gr	Cm	Pv	Sil	vfg	Qtz	85	Cl	12	Anhy (1), Mt (1)			DS/ VS/ VF	vfg	Py	1				Highly silicified rock. Vugs are lined with qtz and py overgrown by anhy. Py veinlet with narrow bleached halo.
24	14R	2	8	35	50	6	158.15	GnGr	DkGr	Cm	Pv	GSC	vfg	Cl	50	Qtz	45	Anhy	1		DS/ VS	vfg	Py	Tr				Rubble. Small rounded rock fragments. Mix of breccia, flow-banded pieces, anhy veins, representing rock types from core 14.
24	15R	1	1	0	6	5	166.1	Gr	DkGr	Cm	Pv	Sil	vfg	Qtz	85	Cl	14	Anhy	tr		DS/ VF/ VS	vfg	Py	1				Highly silicified rock. Vesicles lined with qtz+py. Qtz-py veinlets with dark gray silicified halos.
25	15R	1	2	6	17	10	166.16	LtGrGn	LtGr	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy(tr), Hm (tr)			DS	vfg	Py	Tr				The following flow-banded unit is in parts autoclastic and shows areas of pseudobrecciation by alteration along microcracks in other parts of the core. It is similar to Unit 23, but much more silicified. Overall, the pieces from Core 15R1 are similar to each other. the comment in the following are restricted to significant differences between pieces from this unit. Piece 2 is flow banded, central part is fairly coherent, upper part is brecciated with rotated clasts, lower part is pseudobrecciated, where the rock is altered to textureless light greenish-gray material along microcracks. Where brecciated, the cement is dark gray and rich in qtz. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.
25	15R	1	3	17	25	7	166.27	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy	tr		DS	vfg	Py	Tr				Silghtly brecciated, Dark gray, siliceous cement.
25	15R	1	4	25	34	9	166.35	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy(tr), Hm (tr)			DS	vfg	Py	Tr				Pervasively silicified autoclastic breccia. Some of the larger clasts show pseudobrecciated texture owing to alteration alteration to light greenish-gray material along microcracks associated with virtual loss of flow-banded texture. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.
25	15R	1	5	34	39	4	166.44	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy(tr), Hm (tr)			DS	vfg	Py	Tr				Similar to Piece 4. Cut by qtz vein. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.
25	15R	1	6	39	45	4	166.49	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy (tr), Mt (tr)			DS	vfg	Py	Tr				High degree of pseudobrecciation. Rock contains dark greenish-gray vernels that have trace mt.
25	15R	1	7	45	51	4	166.55	LtGrGn	GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy(tr), Hm (tr)			DS	vfg	Py	Tr				Flow-banded pseudoclastic rock. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.
25	15R	1	8	51	60	8	166.61	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy (tr), Mt (tr), Hm (tr)			DS	vfg	Py	Tr				Same. Anhy-qtz-py veinlets. Trace mt in dark greenish-gray material. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.

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Identifiers								Color		Alteration											Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	
25	15R	1	9	60	71	10	166.7	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy(tr), Hm (tr)			DS	vfg	Py	Tr				Flow-banded with relict spherulitic texture in dark gray areas. Flow banded clasts are rotated relative to each other. Individual clasts are cut by network of qtz and anhy veinlets. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.
25	15R	1	10	71	79	7	166.81	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy(tr), Hm (tr)			DS	vfg	Py	Tr				Weak flow banding. Spherulitic texture. Spherules vary in size from 0.1 to 1 mm. Spherules seem to be replaced by qtz and anhy. They often have concentric light gray outer part and white inner part. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.
25	15R	1	11	79	99	19	166.89	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy(tr), Hm (tr)			DS	vfg	Py	Tr				Autobrecciated piece with flow banding. Spherulitic and pseudobrecciated domains. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.
25	15R	1	12	99	108	7	167.09	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy (tr), Mt (tr)			DS	vfg	Py	Tr				Contains small mt-rich clasts of unknown origin. Few qtz veinlets.
25	15R	1	13	108	117	9	167.18	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy(tr), Hm (tr)			DS	vfg	Py	Tr				Patchy anhydrite coating (extremely fine-grained) on surface of piece (also observed on Piece 8 - 11. Could be anhydrite precipitated during drilling, if borehole temperatures at this depths were > 150C, although this is highly speculative. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.
25	15R	1	14	117	130	12	167.27	GrGn	DkGr	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy(tr), Hm (tr)			DS	vfg	Py	Tr				Beautiful flow-banding in rotated fragments set in a dark gray spherulitic matrix, which is softer than the clasts and is often vuggy. Light gray to greenish-gray screens are harder than dark (often spherulitic) screen and stand out on back side of piece. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.
25	15R	1	15	130	135	4	167.4	GrGn	DkGr	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy (tr), Mt (tr), Hm (tr)			DS	vfg	Py	Tr				Coherent flow-banded piece, pseudobrecciated by alteration to light greenish-gray material, which also produced zoned halos in flow-banded kernels. Dark gray material is slightly spherulitic and forms apophysis in piece. Dark gray area is vuggy and vugs are lined with anhy. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.
25	15R	1	16	135	144	7	167.45	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy (tr), Mt (tr), Hm (tr)			DS	vfg	Py	Tr				Autobreccia with rotated flow-banded clasts. Dark screens in flow banded fragments are clearly spherulitic. Rare fine (<0.5 mm) ovoid spots filled with sugary quartz and hematite.
25	15R	1	17	144	149	2	167.54	GrGn	Lt-GrGn	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Anhy(tr), Hm (tr)			DS	vfg	Py	Tr				Same as Piece 16.

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Identifiers								Color		Alteration												Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)								Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)						Dominant (%)		Secondary (%)		Others	
25	15R	2	1	0	9	8	167.59	Gn	Wht	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	29	Anhy (1), Hm (tr)		VS	vfg	Py	tr					Green and white flow banded volcanic rock. Some are brecciated. Dark green bands are partly sperulitic. Trace of vfg py in rare anhy veins. Rare ovoid hematite in qtz spotts (amygdales?).
25	15R	2	2	9	18	8	167.68	Gn	Wht	Cm	Pv	Sil/ GSC	vfg	Qtz	65	Cl	31	Anhy	3	VS	vfg	Py	1					More brecciated piece, similar to above. Cut by a fine network of irregular qtz-py veins. Rare anhy filled vugs (?) with pyrite.
25	15R	2	3	18	22	2	167.77	Gn	Wht	Cm	Pv	Sil/ GSC	vfg	Qtz	65	Cl	25	Anhy	10	VS	vfg	Sp	tr	Py	tr			Small brecciated piece. Fragments rarely show flow banding, spherulitic remnants. Fine qtz-(sp-py) veinlets with anhy selvages.
25	15R	2	4	22	31	7	167.81	Gn	Wht	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	29	Anhy	3	VS	vfg	Py	tr	Sp	tr			Partially fractured flow banded piece with sperulitic bands. Rare remnant fresh plagioclase. Piece is cut by fine qtz-(py-sp) veinlets with anhy selvages.
25	15R	2	5	31	37	5	167.9	Gn	Wht	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	29	Anhy (tr), Hm (tr), Mt (tr)		VF	vfg	Py	tr					Incredibly hygroscopic flow banded sample with rare ovoid. < 0.1 - 0.3 mm spots of hematite and qtz (amygdales?). Very rare voids are lined by flaky mt or drusy py.
26	15R	2	6	37	42	3	167.96	DkGrBr		Cm	Pv	Sil/ GSC	vfg	Qtz	80	Cl	19	Anhy (1), Mt (tr), Pl (tr)		DS	vfg	Py	tr					Hygroscopic hard silicified unit with anhy lined and filled vesicles. 1 or 2 apparently fresh plagioclase phenocrysts.
26	15R	2	7	42	45	2	168.01	DkGrBr		Cm	Pv	Sil/ GSC	vfg	Qtz	80	Cl	20	Mt (tr), Anhy (tr)		DS	vfg	Py	tr					Sinilar to above. Cut by very fine qtz veinlets.
26	15R	2	8	45	54	8	168.04	DkGrBr		Cm	Pv	Sil/ GSC	vfg	Qtz	80	Cl	18	Mt (1), Anhy (1)		VS	vfg	Py	tr					Hygroscopic silicified volcanic rock with qtz-anhy (later) 0.1 mm amygdales cut by a fine network of 0.1 mm qtz-py-mt veins with patchy anhy centers narrow bleached halos. Dark xenolith (?) is fairly clayey, mt-bearing. Groundmass is also mt-bearing.
26	15R	2	9	54	59	4	168.13	DkGrBr		Cm	Pv	Sil/ GSC	vfg	Qtz	80	Cl	20	Mt (tr), Anhy (tr)		VF/ VS	vfg	Py	tr					Similar to above. Rare py in amygdales.
26	15R	2	10	59	69	8	168.18	DkGrBr		Cm	Pv	Sil/ GSC	vfg	Qtz	80	Cl	18	Pl (1), Mt (1), Anhy (1)		VF/ VS	vfg	Py	tr					Similar to above. 2 xenoliths which both contain fresh interlocking plagioclase (0.5 - 2 mm long). Some of the veins are up to 3 mm wide with anhy space fill.
25	16R	1	1	0	7	5	175.7	Gn	Wht	Cm	Pv	Sil/ GSC	vfg	Qtz	70	Cl	30	Hm (tr), Anhy (tr)		VS	vfg	Py	tr					Fallen piece of Unit 25 above. Flow banded with rare hairline qtz veinlets. Cut by small fault. Patches of autobrecciation.Rare fine ovoid hematite spots.
26	16R	1	2	7	15	6	175.77	DkGrBr	LtGn	Cm	Pv	Sil/ GSC	vfg	Qtz	65	Cl	25	Mt (5), Anhy (1)		VS	vfg	Py	4					Hard, dark silicified rock cut by a 1 Cm (top) to 3 cm (base) breccia vein of GSC altered fragments hosted in a matrix of qtz with areas of vfg py and minor mt. The breccia vein is contiguous with a network of fine qtz-py-mt veinlets similar to these seen in the rest of this unit. The breccia vein has a distinct mt-bearing alteration halo. Very late anhy veinlets cuts all other veins.

Leg 193 Alteration/Mineralization Log - Hole 1189B

Identifiers								Color		Alteration												Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)								Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)						Dominant (%)		Secondary (%)		Others	
26	16R	1	3	15	25	9	175.85	DkGrBr		Cm	Pv	Sil	vfg	Qtz	80	Cl	17	Mt (1), Anhy (1)		VS	vfg	Py	1				Silicified rock cut by a fine network of qtz-mt veins with vfg py-qtz patches at wider intersection points. Mt occurs in alteration halos to qtz-py veins and in pale halos to rare hairline anhy veinlets.
26	16R	1	4	25	31	4	175.95	DkGrBr		Cm	Pv	Sil	vfg	Qtz	80	Cl	19	Mt (tr), Anhy (tr)		VS	vfg	Py	1				Similar to above with a qtz-mt vein network. Rare anhy vesicle and vug fill. Py in patches in veins, as above.
26	16R	1	5	31	35	5	176.01	DkGrBr		Cm	Pv	Sil	vfg	Qtz	80	Cl	20	Mt (tr), Anhy (tr)									Similar material, with little veining. Very vuggy qtz veins with narrow pale clay halos. Anhy vesicle fill. Very rare hematite spots. Mt is disseminated throughout the rock.
26	16R	1	6	35	45	8	176.05	DkGrBr		Cm	Pv	Sil	vfg	Qtz	80	Cl	20	Mt (tr), Anhy (tr)		VS	vfg	Py	tr	Sp	tr		Similar to above. Fine qtz-py veinlets in uncut surface only (cut the wrong way). Anhy vesicle lining and fill. Rare drusy py +- mt in vesicles. Tr disseminated mt in rock. One sph-filled vesicle. Xenolith similar to those in 15R2, Piece 10.
26	16R	1	7	45	53	7	176.15	DkGrBr		Cm	Pv	Sil	vfg	Qtz	80	Cl	17	Mt (tr), Anhy (2)		VS	vfg	Py	1				Hairline and vuggy 1-3 mm qtz+-anhy+-py+-mt veinlets. Mt also occurs in vein halos. Anhy lined and filled vesicles.
26	16R	1	8	53	59	5	176.23	DkGrBr		Cm	Pv	Sil	vfg	Qtz	80	Cl	17	Mt (1), Anhy (1)		VS	vfg	Py	1				Similar to above. Very rare fresh plagioclase phenocrysts.
26	16R	1	9	59	66	6	176.29	DkGr		Cm	Pv	Sil	vfg	Qtz	80	Cl	19	Mt (tr), Anhy (1)		VS	vfg	Py	tr				Similar to above. Qtz-anhy-py hairline, vein network with 1-2 mm dark silicified halos. Anhy vesicle fill. Qtz spots in patches (amygdales?).
26	16R	1	10	66	74	6	176.36	DkGr		Cm	Pv	Sil	vfg	Qtz	80	Cl	17	Mt (tr), Anhy (1), Plag (tr)		VS	vfg	Py	tr				Similar to above. Porous qtz-py (spaces after anhy?) veins evolve to qtz-anhy-(mt) veins. Hairline qtz-py veinlets. Very rare fresh plagioclase.
27	16R	1	11	74	81	6	176.44	DkGr	Wht	Cm	Pv	Sil	vfg	Qtz	70	Cl	29	Mt (tr), Anhy (1)		VS	vfg	Py	tr	Cp	tr	Cv (tr)	Shard-like texture defined by white clay +- sulfate domains. Rounded vesicles lined by anhydrite. Hairline qtz-py vein has a pale halo. Mt disseminated throughout the rock. Cpy and covellite on an irregular fracture surface. Py also disseminated in white clay domains.
27	16R	1	12	81	88	4	176.51	DkGr	Wht	Cm	Pv	Sil	vfg	Qtz	70	Cl	29	Mt (tr), Anhy (1), FeOx Tr)		VS	vfg	Py	tr	Cp	tr		Same as above. Cp on fracture surfaces with anhy. Rounded chloritic patch (xenolith?).
27	16R	1	13	88	95	5	176.58	DkGr	Wht	VH	Pv	Sil	vfg	Qtz	70	Cl	19	Mt (tr), Anhy (1), FeOx (tr), Plag (tr)		VS	vfg	Py	tr				Vesicular volcanic rock with shard-like texture. Qtz lined circular vesicles. Coarse vug (1 cm vesicle) lined by qtz and py (drusy). Green clay patch (xenolith?). Trace remnant igneous plagioclase. Disseminated mt, possibly igneous?
27	16R	1	14	95	103	7	176.65	DkGr	Wht	VH	Pv	Sil	vfg	Qtz	60	Cl	20	Mt (tr), Anhy (10)		VS	vfg	Py	1				Similar to above. Central fracture with 2 mm bleached halo. Qtz-anhy and clay domains form shard-like texture. Qtz lined vesicles.
27	16R	1	15	103	114	9	176.73	DkGr	Wht	VH	Pv	Sil	vfg	Qtz	60	Cl	20	Mt (tr), Anhy (10)		VS	vfg	Py	1				Same as above. Rare rounded green chloritic xenoliths.
27	16R	1	16	114	123	7	176.84	DkGr	Wht	VH	Pv	Sil	vfg	Qtz	60	Cl	20	Mt (tr), Anhy (10)		VS	vfg	Py	1				Same as above.

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Identifiers								Color		Alteration											Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	
27	16R	1	17	123	130	6	176.93	DkGr	Wht	VH	Pv	Sil	vfg	Qtz	70	Cl	15	Mt (tr), Anhy (5)		VS	vfg	Py	1	Cp	tr		Same as above. Trace drusy py and platy cpy in coarse vesicles.
27	16R	1	18	130	138	6	177	DkGr	Wht	VH	Pv	Sil	vfg	Qtz	70	Cl	20	Mt (tr), Anhy (2)		VS	vfg	Py	tr	Cv	tr		Same as above. Trace drusy py and covellite in some qtz-lined vesicles.
27	16R	1	19	138	142	3	177.08	Gr	Gn	VH	Pv	Sil	vfg	Qtz	80	Cl	14	Mt (tr), Anhy (5)		VS	vfg	Py	1				Similar to above, but more completely altered. Cut by a vuggy qtz-py vein which has fine bleached volcanic fragments.
27	16R	2	1	0	12	10	177.12	DkGr	Wht	VH	Pv	Sil	vfg	Qtz	70	Cl	24	Mt (tr), Anhy (tr)		VS/ VF	vfg	Py	1	Cp	tr		Similar to above. Shard-like texture defined by qtz and clay domains. Py occurs in a fine qtz-py veinlet. Cp occurs as fine crystals in vesicles overgrowing the qtz lining.
27	16R	2	2	12	20	8	177.24	DkGr	Wht	VH	Pv	Sil	vfg	Qtz	70	Cl	24	Mt (tr), Anhy (tr)		VS/ VF	vfg	Py	tr	Cp	tr		Similar to above. Cp in vesicles, py (very rare) in groundmass. White clay+-qtz lines vesicles.
27	16R	2	3	20	29	8	177.32	DkGr	Wht	VH	Pv	Sil	vfg	Qtz	70	Cl	25	Mt (tr), Anhy (tr)		VF	vfg	Py	tr	Cp	tr		White clay+-drusy py lined vesicles. Rare cp and py on vesicle walls.
27	16R	2	4	29	40	9	177.41	DkGr	Wht	VH	Pv	Sil	vfg	Qtz	70	Cl	25	Mt (tr), Anhy (tr)		VF	vfg	Cp	tr				Qtz lined vesicles. Rare cp on vesicle walls.
28	17R	1	1	0	11	11	185.3	Gr	LtGr	Cm	Pv	Sil	vfg	Qtz	85	Cl	13	Anhy	tr	VS/ VF	vfg	Py	2				Strongly vesicular, intensely silicified sugary volcanic rock. Cut by a fine qtz-py vein with a pale halo (silification overprinting silification). Vesicles lined by qtz +- trace py. Some vesicles filled with qtz-py in vein halo. Patches of blue-gray clay in groundmass of rock.
28	17R	1	2	11	22	11	185.41	Gr	LtGr	Cm	Pv	Sil	vfg	Qtz	85	Cl	13	Anhy	tr	VS/ VF	vfg	Py	2				Same as above. 2 small (< 0.5 cm) patches of chloritic material.
28	17R	1	3	22	28	3	185.52	Gr		Cm	Pv	Sil	vfg	Qtz	80	Cl	20	Anhy (tr), Mt (tr)		VS/ VF	vfg	Py	tr				Slightly cherty silicified rock. Py occurs in fine irregular qtz-py veinlets and in microvesicles. Trace disseminated magnetite.
29	17R	1	4	28	31	2	185.58	GrGn		Cm	Pv	GSC/ Sil	vfg	Qtz	70	Cl	30	Anhy (tr), Mt (tr)		DS	vfg	Py	tr				Flow banded gray-green volcanic rock. Strongly silicified. Trace mt and py disseminated on fracture surfaces.
29	17R	1	5	31	35	3	185.61	GrGn		Cm	Pv	GSC/ Sil	vfg	Qtz	70	Cl	30	Anhy (tr), Mt (tr)									Flow banded gray-green silicified volcanic rock with remnant sperulitic texture. Rare dark spots contain Mt+Hm+Cl.
29	17R	1	6	35	44	8	185.65	Gn	Wht	Cm	Pv	GSC/ Sil	vfg	Qtz	70	Cl	30	Anhy (tr), Hm (tr)		VS/ VF	vfg	Py	tr				Flow banded altered volcanic rock. GSC alteration overprinted by silification. Cut by fine qtz-py veins with a zone of stockwork veining/ brecciation. Qtz has a reddish color (hematite?). Rare dark hem-qtz spots in rock.
30	17R	1	7	44	52	4	185.74	DkGrBr		Cm	Pv	Sil	vfg	Qtz	85	Cl	14	Plag (1), Mt (tr)									Cherty silicified volcanic rock. Rare remnant fresh plagioclase phenocrysts.
30	17R	1	8	52	56	3	185.82	DkGrBr		Cm	Pv	Sil	vfg	Qtz	60	Cl	40			VS	vfg	Py	tr				Chaotic flow banding defined by qtz and white clay. Traces of blue clay. Fine qtz-py veinlets.
30	17R	1	9	56	60	2	185.86	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	80	Cl	20	Anhy (tr)									Strongly silicified rock with folded flow banding.
30	17R	1	10	60	64	2	185.9	DkGrBr		Cm	Pv	Sil	vfg	Qtz	70	Cl	30	Mt (tr)		DS	vfg	Py	tr				Cherty silicified rock with greenish clay patches. Vugs lined by drusy qtz and trace py. Bleached margin.

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Identifiers								Color		Alteration										Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)						Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)				Dominant (%)		Secondary (%)		Others	
30	17R	1	11	64	67	2	185.94	DkGrBr		Cm	Pv	Sil	vfg	Qtz	75	Cl	25	Mt (tr)		VS	vfg	Py	tr				Faintly flow banded silicified unit. Banding defined by green clay layers. Minor hairline qtz-py-mt veinlets.
30	17R	1	12	67	70	2	185.97	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	85	Cl	15			DS	vfg	Py	tr				Gray strongly silicified flow banded volcanic rock with soft green (chloritic) spinifex textured xenolith wrapped by the banding.
30	17R	1	13	70	73	2	186	DkGrBr		Cm	Pv	Sil	vfg	Qtz	75	Cl	25	Mt (tr)									Flow banded silicified unit. Banding defined by blue-green clay layers.
30	17R	1	14	73	80	3	186.03	DkGrBr		Cm	Pv	Sil	vfg	Qtz	83	Cl	15	Mt (tr)		VS/ VF	vfg	Py	2				Flow banded silicified unit with irregular hairline qtz-py veinlets. Py also on vug linings with qtz.
30	17R	1	15	80	83	2	186.1	Gr		Cm	Pv	Sil	vfg	Qtz	95	Cl	5			VS	vfg	Py	tr				Tube pumice, replaced by silica. Cut by a hairline qtz-py vein.
30	17R	1	16	83	87	2	186.13	DkGrBr		Cm	Pv	Sil	vfg	Qtz	75	Cl	15	Mt (tr)		VS	vfg	Py	tr				Flow banded silicified unit. Banding defined by blue-green clay layers.
30	17R	1	17	87	92	5	186.17	DkGn	Gr	Cm	Pv	Sil	vfg	Qtz	85	Cl	15			VS/ VF	vfg	Py	tr	Cv	tr		Sugary, porous, silicified green colored rock with rare irregular qtz-py veinlets. One covellite crystal seen in a vug. Remnant flow banding.
30	17R	1	18	92	97	2	186.22	Gn	Gr	Cm	Pv	Sil	vfg	Qtz	75	Cl	25			VS	vfg	Py	tr				2 larger green and 10-15 < 1cm, gray fragments of silicified flow banded volcanic rock. Minor qtz-py veinlets.
31	17R	1	19	97	101	3	186.27	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	75	Cl	24			VS/ DS	vfg	Py	1	Cp	tr		Clastic rock. White, green and blue clay fragments are subangular to rounded, 0.5-2mm in size (sandstone). Hosted in a hard silicified matrix. Py occurs as fine drusy crystals in voids and as fine disseminated crystals. Trace disseminated cp.
31	17R	1	20	101	104	2	186.31	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	75	Cl	25			DS	vfg	Py	tr				Similar to above piece. Rubble.
32	17R	1	21	104	107	2	186.34	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	75	Cl	25	Mt	tr	VS/ DS	vfg	Py	tr				Rubble: Flow banded silicified volcanic rock. Banding defined by green clay rich layers. Cut by fine network of qtz-py veinlets. Trace of disseminated mt and py.
32	17R	1	22	107	112	2	186.37	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	75	Cl	25	Mt	tr	VS/ DS	vfg	Py	tr				Same as above.
32	17R	1	23	112	117	2	186.42	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	75	Cl	25	Mt	tr	VS/ DS	vfg	Py	tr				Same as above.
32	17R	1	24	117	122	2	186.47	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	75	Cl	25	Mt	tr	VS/ DS	vfg	Py	tr				Same as above.
32	17R	1	25	122	129	2	186.52	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	75	Cl	25	Mt	tr	VS/ DS	vfg	Py	tr				Same as above.
32	17R	1	26	129	132	2	186.59	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	75	Cl	25	Mt	tr	VS/ DS	vfg	Py	tr				Same as above.
32	17R	1	27	132	137	3	186.62	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	75	Cl	25	Mt	tr	VS/ DS	vfg	Py	tr				Same as above.
32	17R	1	28	137	145	5	186.67	Gr	Gn	Cm	Pv	Sil	vfg	Qtz	75	Cl	25	Mt	tr	VS/ DS	vfg	Py	tr				Similar to above. Some bands contain fine (< 0.1mm) qtz spots. Qtz-py vein network quite well developed. Mt occurs in patches of reddish-brown clay and as disseminations.
32	18R	1	1	0	4	3	195	LtGnGr	DkGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Anhy(1), Hem (tr), Mt (tr)		VS/ DS	vfg	Py	1				Breccia with flow-banded clasts, cemented by vein network of qtz-hem-py.
32	18R	1	2	4	12	6	195.04	LtGnGr	DkGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Anhy(1), Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Same as Piece 1.

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Identifiers								Color		Alteration												Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)								Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)						Dominant (%)		Secondary (%)		Others	
33	18R	1	3	12	25	11	195.12	GrGn	DkGr	Cm	Pv	Sil	vfg	Qtz	60	Cl	36	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr			Cp (tr)	Brecciated with GSC-altered clasts. Some anhydrite filling vugs in clasts. Clasts are moderately silicified with qtz forming rounded blebs in groundmass (vesicle fill or spherulites)
33	18R	1	4	25	30	4	195.25	GrGn		Cm	Pv	Sil	vfg	Qtz	65	Cl	34	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Flow-banded piece with incompletely altered plagioclase phenocrysts. Rare inclusions of chalcopyrite in qz/hem veins.
33	18R	1	5	30	40	9	195.3	LtGr	GrGn	Cm	Pv	Sil	vfg	Qtz	70	Cl	29	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Light greenish-gray flow-banded clasts and graygreen clasts without flow-banding are set in a matrix of qtz-hem-py. Replacive alteration of rock along qtz vein network indicated by plagioclase phenocrysts in hematitic quartz.
33	18R	1	6	40	45	4	195.4	LtGnGr	DkGr	Cm	Pv	Sil	vfg	Qtz	65	Cl	34	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr			Cp (tr), Sp (tr)	Flow-banded to spherulitic clasts. Spherules(?) are harder than surrounding DrGnGr clayey groundmass. Network of qtz-hem veins.
34	18R	1	7	45	50	4	195.45	LtGnGr	GrGn	Cm	Pv	Sil	vfg	Qtz	55	Cl	43	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr			Sp(tr)	Light green clasts with gray silicified blebs and silicification along hairline qtz veins. Network of qtz-hem veins, and alteration of rock to gray-green silicified material along veins.
34	18R	1	8	50	59	8	195.5	LtGnGr	Lt-GnGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr			Sp(tr)	Light greenish-gray GSC-altered rock, slightly silicified with network of qtz-hem veins with gray-green alteration halos.
34	18R	1	9	59	63	5	195.59	LtGnGr	GrGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				GSC-altered rock, cut by network of qtz-py and qtz-hem veins, along which the rock is darker in color and noticably silicified.
34	18R	1	10	63	68	5	195.63	LtGnGr	GrGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Same as Piece 9.
34	18R	1	11	68	74	5	195.68	LtGnGr	Gr	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr			Cp (tr), Sp (tr)	Dense network of vein gives rock brecciated appearance.
34	18R	1	12	74	78	3	195.74	GrGn	LtGr	Cm	Pv	Sil	vfg	Qtz	60	Cl	40	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Brecciated. Some clasts have qtz amygdales, others are flow-banded. Piece is pervasively silicified.
34	18R	1	13	78	83	4	195.78	GrGn	LtGr	Cm	Pv	Sil	vfg	Qtz	60	Cl	40	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Flow-banding and pseudobrecciation. Larger flow-banded clasts have relict perlitic texture in few domains.
34	18R	1	14	83	89	5	195.83	LtGr	GnGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr			Cp (tr)	Coherent flow-banded piece with local development of perlitic textures and pseudobreccias.
34	18R	1	15	89	93	2	195.89	LtGr	GnGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Same as Piece 14.
34	18R	1	16	93	100	6	195.93	GrGn	LtGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Flow-banding and pseudobrecciation. Replacement of rock by gray-green silicified material along vein qtz-hem vein network. Mt-bearing small inclusions are present in the flow-banded clasts.
34	18R	1	17	100	113	12	196	LtGnGr	GrGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Flow-banded clasts in qtz-rich cement with trace hem-mt-py.

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Identifiers								Color		Alteration										Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)						Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)				Dominant (%)		Secondary (%)		Others	
34	18R	1	18	113	119	5	196.13	LtGnGr	GrGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Flow-banded clasts, slightly rotated, but brecciated appearance is mainly due to alteration of rcok to silicified gray-green material along qtz network. Mt-bearing blebs and drak qtz-rich veins +/- mt-py-hem.
34	18R	1	19	119	124	4	196.19	LtGnGr	GrGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Flow-banding less obvious. Perlitic to pseudobrecciated textures.
34	18R	1	20	124	131	6	196.24	LtGnGr	GrGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Flow-banding less obvious. Perlitic to pseudobrecciated textures.
34	18R	1	21	131	142	10	196.31	LtGnGr	GrGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	50	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Flow-banding less obvious. Perlitic to pseudobrecciated textures.
34	18R	2	1	0	11	10	196.42	LtGnGr	GrGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Rotated clasts, cut by network of qtz veinlets. Advanced pseudobrecciation (40-50% of rock is dark greenish-gray silicified rock). Mt-bearing blebs in kernels and in “matrix.”
34	18R	2	2	11	17	6	196.53	LtGnGr	GrGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Same as Piece 1.
34	18R	2	3	17	24	6	196.59	LtGnGr	GrGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr	Sp	tr		Same as Piece 1. Trace sphalerite as vug fill.
34	18R	2	4	24	36	5	196.66	GrGn	Lt-GnGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Rubble. Same as Piece 1. Trace anhydrite as vug fill.
35	18R	2	5	36	44	6	196.78	GrGn	Lt-GnGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Breccia with dark graygreen vuggy clasts and light greenish-gray flow-banded clasts. In small clastst flow-banded texture has been wiped out by pervasive recrystallization.
35	18R	2	6	44	48	3	196.86	GrGn	Lt-GnGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Similar to Piece 5
35	18R	2	7	48	59	10	196.9	GrGn	LtGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Polymict breccia. Flow-banded clasts, dark graygreen vuggy clasts, perilitic clasts (resembling Core 18R1, Piece 8) and textureless bleached clasts cemented by qtz-hem-sulfide bearing matrix. Sulfide veins in clasts are terminated at the boundary of fragments, indicating that the resedimentation post-dates formation of those veins.
35	18R	2	8	59	74	14	197.01	GrGn	LtGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Similar to Piece 7 but more matrix and oxides. One clasts is light gray and flow-banded with a dark gray mt-py-rich center.
36	18R	2	9	74	78	2	197.16	LtGnGr	LtGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Minor flow-banding, perlitic to pseudobrecciated textures. Dark gray cement with trace py. Little, if any, rotation of clasts.
36	18R	2	10	78	83	3	197.2	LtGnGr	LtGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Minor flow-banding, perlitic to pseudobrecciated textures. Dark gray cement with trace py. Little, if any, rotation of clasts.
36	18R	2	11	83	86	2	197.25	LtGnGr	LtGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Minor flow-banding, perlitic to pseudobrecciated textures. Dark gray cement with trace py. Little, if any, rotation of clasts.
36	18R	2	12	86	93	5	197.28	LtGnGr	LtGr	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)		VS/ DS	vfg	Py	tr				Minor flow-banding, perlitic to pseudobrecciated textures. Dark gray cement with trace py. Little, if any, rotation of clasts.

Leg 193 Alteration/Mineralization Log - Hole 1189B

Identifiers								Color		Alteration											Sulfide Mineralization							Comments
Unit	Core	Sec	Pc#	Inter. Top	Inter. Bottom	length (cm)	Depth core top	Dom.	Sec.	Inten - sity	Style	Type	Grain Size	Mineralogy (non sulfides)							Style	Grain Size	Mineralogy					
														Dominant (%)		Secondary (%)		Others (%)					Dominant (%)		Secondary (%)		Others	
36	18R	2	13	93	99	4	197.35	GrGn		Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)			VS/ DS	vfg	Py	tr				Similar to Piece 8 in Core 18R1. Pseudobrecciated appearance owing to qtz-py vein network with naroow bleached halos.
36	18R	2	14	99	105	2	197.41	LtGnGr	LtT-nGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)			VS/ DS	vfg	Py	tr				Rubble. Similar to Piece 15.
36	18R	2	15	105	115	9	197.47	LtGnGr	LtT-nGn	Cm	Pv	Sil	vfg	Qtz	50	Cl	48	Hem (tr), Mt (tr)			VS/ DS	vfg	Py	tr				Breccia with rotated tannish-gray clasts, some of which have light gray patches in centers. Qtz-py-mt rich cement. Qtz vug fills in clasts.

Leg 193 Sulfide Log - Hole 1189A

Identifiers					% Mineralization	Style of Mineralization	Sulfide Mineralogy																		Comments
							Pyrite			Chalcopyrite			Sphalerite			Other				Other				Total Sulfide %	
Unit	Core	Sec.	Piece	Interval			Texture	Grain Size	%	Texture	Grain Size	%	Texture	Grain Size	%	Mineral	Texture	Grain Size	%	Mineral	Texture	Grain Size	%		
3	2R	1	14	93-101	15	DS / VS	Dr	Vfg	15															15	Sm clay.
7	3R	1	13	76-81	15	DS	Gran	Vfg	15															15	
7	3R	1	14	81-84	20	DS	Gran	Vfg	20															20	
7	3R	1	16	89-96	5	DS / VS	Gran	Vfg	5															5	
14	7R	1	17	99-103	10	VS / DS	Gran	Fg	8	Int	Vfg	2												10	Py + cp within qtz + FeOx (Jasper).
15	8R	1	4	14-24	5	VS / DS	Gran	Vfg	5	Int	Vfg	Tr												5	Qtz + py veinlets.
15	8R	1	5	24-32	5	VS	Gran	Vfg	5															5	Qtz+anhy+py veinlets network.
15	8R	1	9	59-62	5	VS	Gran	Vfg	5															5	< 0.5 mm qtz veins; one vein 3 mm; 50% py in veins.
15	8R	1	13	80-85	5	VS	Gran	Vfg	4	Gran	Vfg	1												5	Veinlets network.
15	8R	1	16	98-103	5	VS	Gran	Vfg	5	Int	Vfg	Tr												5	Qtz+anhy+py veinlets network.
17	10R	1	3	7-11	5	DS / VS	Gran	Vfg	5															5	Vfg disseminated py; > 50% py in veins; veins with less than 0.5 mm.
18	10R	1	10	90-100	7	VS / DS	Gran	Vfg	7															7	In qtz veins + disseminated in altered rock.
18	10R	1	13	125-132	10	VS	Gran	Vfg	10															10	Qtz veins with haloes in altered rock.
19	11R	1	2	6-10	5	VL	Gran	Fg	5															5	Filling vesicles; on top of quartz.
19	11R	1	5	25-30	5	DS	Gran	Mg	5															5	
19	11R	1	6	30-38	5	DS / VS	Gran	Mg	5															5	In qtz veins + disseminated in altered rock.
20	12R	1	16	120-127	30	SM	Gran	Vfg	20	Gran	Vfg	10												30	Patches (clasts?) of disseminated cp+ py in silica - anhy matrix.

Leg 193 Sulfide Log - Hole 1189A

Identifiers				Associated Gangue																				Total	Total sulfide +	
				Barite			Anhydrite			Quartz/Silica			Clays			Other				Other				Total		
Unit	Core	Sec.	Piece	Texture	Grain Size	%	Texture	Grain Size	%	Tex-ture	Grain Size	%	Tex-ture	Grain Size	%	Min-eral	Texture	Grain Size	%	Min-eral	Texture	Grain Size	%	Gangue %	Gangue %	Comments
3	2R	1	14				Gran	Vfg	15	Gan	Vfg	65	Gran	Vfg	5									85	100	
7	3R	1	13				Gran	Vfg	35	Gan	Vfg	50												85	100	
7	3R	1	14				Gran	Vfg	30	Gan	Vfg	50												80	100	
7	3R	1	16				Gran	Vfg	80	Gan	Vfg	15												95	100	
14	7R	1	17				Gran	Vfg	15	Gan	Vfg	65				FeOx	Msv	Vfg	10					90	100	Qtz veins crosscutting the clay.
15	8R	1	4				Msv	Vfg	60	Gan	Vfg	20	Msv	Vfg	15									95	100	
15	8R	1	5				Msv	Vfg	55	Gan	Vfg	25	Msv	Vfg	15									95	100	Qtz-anhy-py veinlet network.
15	8R	1	9				Gran	Vfg	70	Gan	Vfg	25												95	100	Lightly altered.
15	8R	1	13				Msv	Vfg	60	Gan	Vfg	15	Msv	Vfg	20									95	100	
15	8R	1	16				Msv	Vfg	25	Gan	Vfg	60	Msv	Vfg	10									95	100	
17	10R	1	3				Gran	Fg	45	Gan	Vfg	50												95	100	Qtz-py veins network in a vfg anhy matrix.
18	10R	1	10				Gran	Vfg	86	Gan	Vfg	7												93	100	Lightly altered. TS
18	10R	1	13							Gan	Vfg	60	Msv	Vfg	30									90	100	Lightly altered.
19	11R	1	2				Gran	Vfg	45	Gan	Fg / vfg	50												95	100	Lightly altered.
19	11R	1	5				Gran	Vfg	20	Msv-Gran	Fg / vfg	65	Msv	Vfg	10									95	100	Subhedral to euhedral py in voids in highly silicified material.
19	11R	1	6				Gran	Vfg	20	Gan	Vfg	60	Msv	Vfg	15									95	100	Euhedral py in vesicles.
20	12R	1	16				Gran	Vfg	40	Gan	Vfg	30												70	100	Lightly altered. TS

Leg 193 Sulfide Log - Hole 1189B

Identifiers							Sulfide Mineralogy																								
Unit	Core	Sec	Pc#	Inter.	% Min.	Style of Min.	Pyrite			Chalcopyrite			Sphalerite			Galena			Enargite			Covellite			Other				Tot. S %	
							Text.	Gr.	%	Text.	Gr.	%	Text.	Gr.	%	Text.	Gr.	%	Text.	Gr.	%	Text.	Gr.	%	Min.	Text.	Gr.	%		Comments
1	1R	1	1a			SMS/SB		Vfg	30		Vfg	20		Vfg	Tr															50	Patches of sulfides and coating on anhydrite. Sphalerite? coats anhydrite.
1	1R	1	1b			SMS/SB		Vfg	30		Vfg	20																	50	
3	2R	1	1			SB/DS		Vfg	10																				10	
3	2R	1	2			DS		Vfg	15																				15	
3	2R	1	3			DS		Vfg	15																				15	
3	2R	1	5			DS		Vfg	5		Vfg	Tr													Cov	Coat	Efg	Tr	5	Covellite (possibly bornite; blue irridescence) forms a tarnish on pyrite in one piece. This piece was put in a separate small vial marked part of piece 5.
3	3R	1	1		25	SMS/VS	Dis	Vfg	25																				25	
3	3R	1	2		60	SMS/VS	Dis	Vfg	60																				60	Pyrite / anhydrite network veins. Euhedral crystals.
3	3R	1	3		15	VS	Dis	Vfg	15																				15	Pyrite shows some oxidation.
3	3R	1	4		25	VS	Dis	Vfg	21	Dis	Vfg	3	Dis	Efg	1 (?)										Cov	Coat	Efg	Tr	25	Chalcopyrite clearly overgrows pyrite. There is a blue tarnish on the pyrite that could be covellite or bornite. In some areas, a black mineral overlapping pyrite appears to be sphalerite.
3	3R	1	5		10	VS/DS	Dis	Vfg	10																				10	Disseminated and filling anastomosing anhydrite / pyrite fine veins.
4	5R	1	1			SMS/SB		Vfg	70																				70	
4	5R	1	2			SMS/SB		Vfg	40																				40	
4	5R	1	3			DS		Vfg	5																				5	
4	5R	1	5			SMS/SB		Vfg	50																				50	
5	6R	1	6			MS		Vfg	90		Vfg	Tr		Vfg	Tr														90	Vuggy euhedral pyrite. Reddish brown sphalerite occurs with chalcopyrite.
8	7R	1	1		15	VS/DS	Dis	Vfg	15																				15	Pyrite occurs in association with quartz in stockwork type veins.
8	7R	1	2		10	VS/DS	Dis	Vfg	10																				10	Pyrite occurs in association with quartz in stockwork type veins.
14	10R	1	4			DS		Vfg	10																					Pyrite in silica/quartz matrix and with quartz crystals in vugs. Fragments of altered (anhydrite-clay) volcanic rock contain disseminated pyrite. Anhydrite crystals in some vugs.
14	10R	1	6		5	DS		Vfg	5		Vfg	Tr																	5	Pyrite along vein selvages. Isolated chalcopyrite within the groundmass.
14	10R	1	7		5	VS/DS		Vfg	5																				5	Pyrite in thin veins throughout the sample associated with clay rich veins.
17	11R	1	3			DS		Vfg	5																				5	Pyrite in thin veins throughout the sample associated with clay rich veins.
18	11R	1	5		5	VS/DS		Vfg	3		Vfg	2																	5	Disseminated pyrite and aggregates of chalcopyrite
20	13R	1	6		5	VS		Vfg	5					Vfg	Tr											Tn	Vfg	Tr	5	Pyrite within fractures between altered clasts.
20	13R	1	7		7	VS		Vfg	7																				7	Pyrite within fractures between altered clasts.
	14R	1	1		7	VS/DS	Dis	Vfg	7																				7	Hematite associated with quartz.

Leg 193 Sulfide Log - Hole 1189B

Identifiers				Associated Gangue																										Tot.		
				Barite			Anhydrite			Quartz			Silica			Smectite			Clays			Oxides			Other				Tot.	S+G	
Unit	Core	Sec	Pc#	Text.	Gr.	%	Text.	Gr.	%	Text.	Gr.	%	Text.	Gr.	%	Text.	Gr.	%	Text.	Gr.	%	Text.	Gr.	%	Min.	Text.	Gr.	%	G %	%	Comments
1	1R	1	1a					Vfg	25											Efg	25								50	100	5 mm fragment of bleached vesicular lava. Proportion of anhydrite vs clay is unknown and asssumed to be 50-50.
1	1R	1	1b					Vfg	25											Efg	25								50	100	Proportion of anhydrite vs clay is unknown and asssumed to be 50-50.
3	2R	1	1					Vfg	45											Efg	45								90	100	Anhydrite-clay breccia cemented by pyrite. Vuggy margins of fragments are lined with pyrite. Proportion of anhydrite vs clay is unknown and asssumed to be 50-50.
3	2R	1	2					Vfg	43											Efg	42								85	100	
3	2R	1	3					Vfg	43											Efg	42								85	100	Pyrite scattered throughout anhydrite-clay and in vugs. Hemispherical vfg pyrite in a vug. Proportion of anhydrite vs clay is unknown and asssumed to be 50-50.
3	2R	1	5					Vfg	48											Efg	47								95	100	Vial of fine rubble.
3	3R	1	1				Gra	Vfg	25	Dis	Vfg	5							MSV	Efg	45								75	100	
3	3R	1	2				Gra	Vfg	5	Dis	Vfg	35																	40	100	
3	3R	1	3				Gra	Vfg	10	Dis	Vfg	45							MSV	Efg	30								85	100	
3	3R	1	4				Gra	Vfg	40	Dis	Vfg	10							MSV	Efg	25								75	100	
3	3R	1	5				Gra	Vfg	50	Dis	Vfg	5							MSV	Efg	35								90	100	
4	5R	1	1					Vfg	15											Efg	15								30	100	Anhydrite-clay fragments cemented by vuggy pyrite. Proportion of anhydrite vs clay is unknown and asssumed to be 50-50.
4	5R	1	2					Vfg	25		Vfg	10								Efg	25								60	100	Anhydrite-clay fragments cemented by vuggy pyrite and quartz. Quartz precipitated on pyrite so is later. Proportion of anhydrite vs clay is unknown and asssumed to be 50-50.
4	5R	1	3					Fg-vfg	55											Efg	40								95	100	Clear anhydrite crystals and white anhydrite-clay. Proportion of anhydrite vs clay is unknown and asssumed to be 50-50.
4	5R	1	5					Vfg	20					Efg	10					Efg	20								50	100	Very small fragment.
5	6R	1	6					Vfg	3		Vfg	7																	10	100	Quartz crysrtals in vugs. Massive quartz seams in pyrite.
8	7R	1	1				Gra	Vfg	15	Dis	Vfg	5							MSV	Efg	65								85	100	Quartz crystals in vugs. Pyrite overgrows quartz.
8	7R	1	2				Gra	Vfg	40	Dis	Vfg	5							MSV	Efg	45								90	100	Quartz crystals in vugs. Pyrite overgrows quartz.
14	10R	1	4																												
14	10R	1	6																												
14	10R	1	7																												
17	11R	1	3																												
18	11R	1	5																												
20	13R	1	6																												
20	13R	1	7																												
	14R	1	1				Gra	Vfg	13	Dis	Vfg	70							MSV	Efg	5				Hm	Dis	Vfg	5				

Leg 193 Structure Log - Hole 1189A

Core identifiers							Structure				Structural orientation						Mineral infill						Alteration Halo		
											App.dip, pitch of line		Calculated/Measured orientation				Nonsulfides			Sulfides					
Core	Sec	pc#	Interv. (cm)	Depth mbsf piece top	Length of piece (cm)	oriented piece Y/N	Feature Generation	Length (cm)	Thickness (mm)	Unit - Host-rock	A.f.	S.f.	Strike Trend	Dip	Dip direction	General orientation	Dom.	Sec.	Others	Dom.	Sec.	Others	Intensity	Dom.	Comments
2R	1	2	6-14	9.76	5	Y	Va			2-ALT/IGN			0	0		H	Anhy						Md	Clay	1 mm halo
2R	1	2	6-14	9.76	5	Y	So			2-ALT/IGN	19E	0N	0	19	90	Sh									Elongated vesicles
2R	1	6	33-41	10.03	6	Y	So			2-ALT/IGN	0E	11S	90	11	180	Sh									Elongated vesicles
2R	1	8	47-57	10.17	7	Y	So			2-ALT/IGN			190	85	280	Sv									Elongated vesicles
2R	1	12	77-86	10.47	4	N	Va	3	1	2-ALT/IGN							Anhy			Py					
2R	1	14	93-102	10.63	3	N	Bc			3-ALT/IGN							Anhy	Qtz		Py					Fragments with blue clay alteration, 2-30 mm. Matrix of coarse anhydrite and scattered pyrite.
2R	1	15	102-117	10.72	11	N	Bc			4-ALT/IGN							Anhy	Qtz		Py					Fragments with blue clay alteration, 2-30 mm. Matrix of coarse anhydrite and scattered pyrite.
2R	1	16	117-126	10.87	8	Y	Bc			4-ALT/IGN							Anhy	Qtz		Py					Fragments with blue clay alteration, 2-30 mm. Matrix of coarse anhydrite and scattered pyrite.
2R	1	17	126-136	10.96	6	N	Bc			4-ALT/IGN							Anhy	Qtz		Py					Fragments with blue clay alteration, 2-50 mm. Matrix of coarse anhydrite and scattered pyrite.
3R	1	8	42-50	19.82	6	Y	So			5-ALT/IGN	38W	49N	236	54	326	Inc									Flowbanding, elongated vesicles
3R	1	10	56-63	19.96	4	N	Bc			6-ALT/IGN							Chl	Anhy	Qtz	Py				Chl	
3R	1	11	63-69	20.03	4	N	V1	4	5	7-ALT/IGN							Anhy			Py			Md	clay,si, py	3 mm halo with dissem. pyrite in gray clay and silica
3R	1	11	63-69	20.03	4	N	V2	1	1	7-ALT/IGN							Anhy								Crosscuts halo around V1 vein
3R	1	12	69-76	20.09	5	N	Va1	4	1	7-ALT/IGN							Anhy			Py			Hi	Clay, py	0.5 mm halo
3R	1	12	69-76	20.09	5	N	Va2	3	1	7-ALT/IGN							Anhy						Hi	Clay, py	0.5 mm halo
3R	1	16	89-94	20.29	3	N	Va	>3	>30	7-ALT/IGN							Anhy	Qtz		Py					Banded, coarse anhydrite and quartz with pyrite veinlets
4R	1	1	0-5	29.1	1	N	Va		1	8-ALT/IGN							Qtz			Py					
4R	1	2	5-17	29.15	11	Y	So			8-ALT/IGN	15W	12S	232	19	322	Sh									Elongated vesicles
4R	1	2	5-17	29.15	11	Y	Va	10	1-2	8-ALT/IGN						Ir	Qtz			Py					Irregular veins
4R	1	3	17-23	29.27	5	Y	So			8-ALT/IGN	13W	0N	180	13	270	Sh									Elongated vesicles
4R	1	3	17-23	29.27	5	Y	Va	1-5	1-2	8-ALT/IGN						Ir,sw	Qtz			Py					Irregular veins in network
5R	1	1	0-8	38.8	6	Y	V2	3	2	9-ALT/IGN	18W	11N	301	21	31	Sh	Anhy								Coarse anhydrite
5R	1	1-9	0-62	38.8		Y/N	Bc,V1		0.5-2	9-ALT/IGN						Sw		Qtz	Anhy	Py			Hi,Vh	Chl	Breccia with vein-network of si-py-anhy veins with halos of chlorite. Chlorite also overprints breccia fragments
6R	1	1-5	0-31	48.6		N	Bc,V1		0.5-2	9-ALT/IGN						Sw		Qtz	Anhy	Py			Hi,Vh	Chl	Breccia with vein-network of si-py-anhy veins with halos of chlorite. Chlorite also overprints breccia fragments
6R	1	6	31-42	48.91	10	Y	Va	>9	20-30	9-ALT/IGN			330	80	60	Sv,ir	Qtz			Py					Vein showing brecciation
6R	1	6	31-42	48.91	10	Y	So			9-ALT/IGN			0	52	90	Inc									Relict flowbanding?
6R	1	7	42-48	49.02	4	N	Va	>3	20	9-ALT/IGN							Anhy	Qtz		Py					Coarse anhydrite
6R	1	8	48-54	49.08	-	N	Bc, V1			9-ALT/IGN						Sw		Qtz	Anhy	Py			Hi,Vh	Chl	Breccia with vein-network of si-py-anhy veins with halos of chlorite.
6R	1	9	54-62	49.14	6	N	Bc			9-ALT/IGN						Sw	Qtz			Py					Banded altered volcanics in fragments cemented by quartz with minor pyrite

Leg 193 Structure Log - Hole 1189A

Core identifiers							Structure				Structural orientation						Mineral infill						Alteration Halo		
											App.dip, pitch of line		Calculated/Measured orientation				Nonsulfides			Sulfides					
Core	Sec	pc#	Interv. (cm)	Depth mbsf piece top	Length of piece (cm)	oriented piece Y/N	Feature Generation	Length (cm)	Thickness (mm)	Unit - Host-rock	A.f.	S.f.	Strike Trend	Dip	Dip direction	General orientation	Dom.	Sec.	Others	Dom.	Sec.	Others	Intensity	Dom.	Comments
6R	1	9	62-69	49.22	4	N	Bc			9-ALT/IGN						Sw	Qtz			Py					Banded altered volcanics in fragments cemented by quartz with minor pyrite
7R	1	2	4-11	58.34	6	Y	so			10-ALT/IGN	67E	26N	348	67	78	Inc									Defined by vesicles
7R	1	2	4-11	58.34	6	Y	Va	5	3	10-ALT/IGN	43E	70N	289	71	19	Sh	Anhy			Py					Fibres perpendicular to vein walls
7R	1	2	4-11	58.34	6	Y	Vb	6	<1	10-ALT/IGN										Py					Parallel bedding
7R	1	3	11-24	58.41	10	Y	So			10-ALT/IGN	73E	37N	347	73	77	Inc									pyrite in vesicles
7R	1	3	11-24	58.41	10	Y	Va	2	2	10-ALT/IGN	67E	31N	346	68	76	Inc	Anhy			Py			Hi	Py	Core of vein anhydrite, lined by pyrite
7R	1	3	11-24	58.41	10	Y	Vb	4	2	10-ALT/IGN	65E	63N	318	71	48	Inc	Anhy			Py			Hi	Py	Ends against vesicle
7R	1	3	11-24	58.41	10	Y	Vc	2	2-3	10-ALT/IGN	90E	-	0	90	90	V				Py			Hi	Py	
7R	1	3	11-24	58.41	10	Y	Vd	5	<1	10-ALT/IGN	11E	20N	298	22	28	Inc				Py			Md	Py	Thick hairline crack
7R	1	3	11-24	58.41	10	Y	Ve	4	<1	10-ALT/IGN	55W	5N	184	55	274	Inc				Py					Hairline crack
7R	1	5	27-43	58.57	14	Y	V1a	5	<1	10-ALT/IGN	7E	25N	285	26	15	Inc				Py			Hi	Chl	1 cm thick halo
7R	1	5	27-43	58.57	14	Y	V1b	3	<1	10-ALT/IGN	60E	0	0	60	90	Inc				Py			Hi	Chl	
7R	1	5	27-43	58.57	14	Y	Vb	5	<1	10-ALT/IGN	10E	0	0	10	90	Sh				Py			Hi	Chl	1 cm thick halo
7R	1	5	27-43	58.57	14	Y	Vc	5	<1	10-ALT/IGN	67W	67S	135	73	225	Inc				Py			Hi	Chl	2 cm thick halo
7R	1	7	47-55	58.77	4	Y	So			10-ALT/IGN	63E					Inc									Anhydrite and pyrite in small vesicles
7R	1	7	47-55	58.77	4	Y	Va	4	<1	10-ALT/IGN	50W	0	180	50	270	Inc	Anhy	Qtz		Py			Hi	Chl	White bleaching overprinted by green clay-chlorite alteration
7R	1	7	47-55	58.77	4	Y	Vb	5	<1	10-ALT/IGN	60E	0	0	60	90	Inc	Anhy			Py			Hi	Chl	White bleaching overprinted by green clay-chlorite alteration
7R	1	7	47-55	58.77	4	Y	Vc	3	<1	10-ALT/IGN	80W					Sv	Anhy			Py					
7R	1	7	47-55	58.77	4	Y	Vd	5	1	10-ALT/IGN						Sh	Anhy			Py					
7R	1	13	78-88	59.08	7	Y	So			12-ALT/IGN	5E	9N	299	10	29	Sh									Defined by vesicles
8R	1	2	3-10	68.03	6	Y	Va	3-5	<1	15-ALT/IGN	55E	0	0	58	90	Inc	Anhy	Qtz		Py			Hi	Clay	
8R	1	2	3-10	68.03	6	Y	Vb	3-5	<1	15-ALT/IGN	23E	45N	293	47	23	Inc	Qtz			Py			Hi	Clay	
8R	1	2	3-10	68.03	6	Y	Vc		<1	15-ALT/IGN						Inc	Qtz			Py			Hi	Clay	
8R	1	2	3-10	68.03	6	Y	So			15-ALT/IGN	57W		60	57	150	Inc									Flow-banding
8R	1	3	10-13	68.1	3	N	Va1-2	3	0.5	15-ALT/IGN							Anhy	Qtz		Py					Veins overprint earlier bleaching and sulfate alteration
8R	1	4	15-24	68.15	6	Y	Va	4-5	<1	15-ALT/IGN	28W	34S	128	41	218	Inc	Qtz	Anhy		Py					Va network overprinting earlier clay-sulphate alteration. Veins contain black vitreous material.
8R	1	4	15-24	68.15	6	Y	Vb	4-5	<1	15-ALT/IGN	52E	0	0	52	90	Inc	Qtz	Anhy		Py					
8R	1	5	24-31	68.24	6	N	Bc,Va	0.5-4	0.5-1	15-ALT/IGN						Sw	Qtz			Py					Veins overprint clay-sulphate alteration.
8R	1	6	31-45	68.31	-	N	Va	0.5-3	0.5-1	15-ALT/IGN						Sw	Qtz			Py					Veins overprint clay-sulphate alteration.
8R	1	7	45-52	68.45	4	Y	V1	2-3	<1	15-ALT/IGN	?87E	0	0	87	90	Sw	Qtz	Clay		Py			Sl		Veins overprint clay-sulphate alteration and fine possible cleavage which is followed by fine py veining.
8R	1	7	45-52	68.45	4	Y	V2a	4-5	<1	15-ALT/IGN							Qtz			Py			Sl		
8R	1	7	45-52	68.45	4	Y	V2b	3	<1	15-ALT/IGN							Qtz			Py			Sl		
8R	1	7	45-52	68.45	4	Y	?So			15-ALT/IGN															Apparent cleavage. Probably flowbanding.
8R	1	8	52-59	68.52	7	Y	V1	1-2	<0.5	15-ALT/IGN						Sw	Qtz			Py					Apparent cleavage. Probably flowbanding.
8R	1	8	52-59	68.52	7	Y	V2a	4	<1-1	15-ALT/IGN	80E	0	0	80	90	Sv	Qtz			Py			Sl		Apparent cleavage. Probably flowbanding.
8R	1	8	52-59	68.52	7	Y	V2b	4	<1	15-ALT/IGN	77E					Inc	Qtz			Py			Sl		Apparent cleavage. Probably flowbanding.

Leg 193 Structure Log - Hole 1189A

Core identifiers							Structure				Structural orientation						Mineral infill						Alteration Halo		
											App.dip, pitch of line		Calculated/Measured orientation				Nonsulfides			Sulfides					
Core	Sec	pc#	Interv. (cm)	Depth mbsf piece top	Length of piece (cm)	oriented piece Y/N	Feature Generation	Length (cm)	Thickness (mm)	Unit - Host-rock	A.f.	S.f.	Strike Trend	Dip	Dip direction	General orientation	Dom.	Sec.	Others	Dom.	Sec.	Others	Intensity	Dom.	Comments
8R	1	8	52-59	68.52	7	Y	V2c	5	<1	15-ALT/IGN	39W	0	180	39	270	Inc	Qtz			Py			Sl		Apparent cleavage. Probably flowbanding.
8R	1	8	52-59	68.52	7	Y	S1?			15-ALT/IGN		88N	150	88	60	V									Non-mineralised, mm-spaced fractures are aligned as an apparent cleavage; no compositional or colour banding so no evidence they follow bedding.
8R	1	9	59-65	68.59	3	Y	V1a	3	<1	15-ALT/IGN	3W	0	180	3	270	H	Qtz			Py			Hi	Clay	Black vitreous material as seen earlier;possible very fine qtz+py. Veins overprint chlorirtic alteration and have narrow haloes
8R	1	9	59-65	68.59	3	Y	V1b	5	<1	15-ALT/IGN	28E	0	0	28	90	Inc	Qtz			Py			Hi	Clay	Black vitreous material as seen earlier;possible very fine qtz+py. Veins overprint chlorirtic alteration and have narrow haloes
8R	1	9	59-65	68.59	3	Y	V1c	2	<1	15-ALT/IGN	46W	7N	187	46	277	Inc	Qtz			Py			Hi	Clay	Black vitreous material as seen earlier;possible very fine qtz+py. Veins overprint chlorirtic alteration and have narrow haloes
8R	1	10	65-72	68.65	6	Y	V1a	5	<1	15-ALT/IGN	28E	0	0	28	90	Inc	Qtz			Py					
8R	1	10	65-72	68.65	6	Y	V1b	3	<1	15-ALT/IGN	18E	45N	289	48	19	Inc	Qtz			Py					
8R	1	14	85-93	68.85	7	Y	Va	5	<1	15-ALT/IGN	55W		317	55	227	Inc	Qtz			Py					V1a, V1b overprint bleaching
8R	1	14	85-93	68.85	7	Y	Vb	3	<1	15-ALT/IGN	30E	12N	340	32	70	Inc	Qtz			Py					V1a, V1b overprint bleaching
8R	1	11-19	72-124	68.72		Y/N	Va	0.5-5	0.5-3	15-ALT/IGN						Sw	Qtz			Py					Veins overprint clay-sulphate alteration.
9R	1	1	0-6	77.7	5	Y	So			16-ALT/IGN	28E	0	0	28	90	Inc									
9R	1	1	0-6	77.7	5	Y	So			16-ALT/IGN	90E	0	0	90	90	V									
9R	1	1	0-6	77.7	5	Y	Va	4	<1-5	16-ALT/IGN							Qtz	Anhy		Py					Forms saddle reef in synform and discontinuous along fold axis
9R	1	5	28-40	77.98	10	Y	So			16-ALT/IGN	38W	25N	211	42	301	Inc									
9R	1	5	28-40	77.98	10	Y	Va	4	<1-3	16-ALT/IGN	48E	47S	44	57	134	Inc	Anhy	Qtz		Py					Cut early chlorite bands subparallel So
9R	1	5	28-40	77.98	10	Y	Vb	6	1-2	16-ALT/IGN	72W	0	180	72	270	Inc	Anhy	Qtz		Py					Cut early chlorite bands subparallel So
9R	1	8	52-59	78.22	6	Y	V1	5	1	16-ALT/IGN							Chl								
9R	1	8	52-59	78.22	6	Y	V2	6	1-2	16-ALT/IGN	38E	27N	327	43	57	Inc	Qtz	Anhy		Py	Cp				
9R	1	8	52-59	78.22	6	Y	So			16-ALT/IGN	12E	22N	298	25	28	Inc									Lower limb, kink fold
9R	1	8	52-59	78.22	6	Y	So			16-ALT/IGN	55E	38N	331	12	61	Sh									Upper limb, kink fold
9R	1	1-12	0-85	77.7		Y/N	Bc			16-ALT/IGN							Anhy	Qtz		Py					Unconnected fragments with banding cemented by anhydrite with minor quartz and pyrite
10R	1	4	11-25	87.41	12	Y	Va	12	1	19-ALT/IGN	88E	0	0	88	90	Cur	Anhy	Qtz		Py			Hi		Appears to form part of a stockwork system
10R	1	4	11-25	87.41	12	Y	Vb	4	1-3	19-ALT/IGN	70W	35N	194	71	284	Cur	Anhy	Qtz		Py			Hi		Appears to form part of a stockwork system
10R	1	4	11-25	87.41	12	Y	Vc	5	<1	19-ALT/IGN	22W	8N	199	23	289	Inc	Anhy	Qtz		Py			Hi	Clay	Appears to form part of a stockwork system
10R	1	4	11-25	87.41	12	Y	Vd			19-ALT/IGN	48E	53S	50	60	140	Inc	Anhy	Qtz		Py			Hi	Clay	Appears to form part of a stockwork system
10R	1	4	11-25	87.41	12	Y	Ve			19-ALT/IGN						Sh	Anhy	Qtz		Py			Hi	Clay	Appears to form part of a stockwork system
10R	1	4	11-25	87.41	12	Y	Vf			19-ALT/IGN	13E														
10R	1	5	25-39	87.55	13	Y	Va	11	<1	19-ALT/IGN	68E	50S	26	70	116	Inc	Qtz	Anhy		Py			Hi	Clay	

Leg 193 Structure Log - Hole 1189A

Core identifiers							Structure				Structural orientation						Mineral infill						Alteration Halo		
											App.dip, pitch of line		Calculated/Measured orientation				Nonsulfides			Sulfides					
Core	Sec	pc#	Interv. (cm)	Depth mbsf piece top	Length of piece (cm)	oriented piece Y/N	Feature Generation	Length (cm)	Thickness (mm)	Unit - Host-rock	A.f.	S.f.	Strike Trend	Dip	Dip direction	General orientation	Dom.	Sec.	Others	Dom.	Sec.	Others	Intensity	Dom.	Comments
10R	1	5	25-39	87.55	13	Y	Vb	3	<1	19-ALT/IGN	32W	37S	130	44	220	Inc	Qtz	Anhy		Py			Hi	Clay	
10R	1	5	25-39	87.55	13	Y	Vc	3	<1	19-ALT/IGN	33W		340	32	250	Inc	Qtz	Anhy		Py			Hi	Clay	
10R	1	5	25-39	87.55	13	Y	So			19-ALT/IGN	38E	57S	63	60	153	Inc									
10R	1	6	39-52	87.69	11	Y	Va	13	0.1-1	19-ALT/IGN	65E		60	65	150	Inc				Py			Cm	Clay	Alteration haloes range from 1mm to 1cm thickness and halo is clay to chlorite to silica
10R	1	6	39-52	87.69	11	Y	Vb	13	0.1-1	19-ALT/IGN	90		350	90	260	V				Py			Cm	Clay	Alteration haloes range from 1mm to 1cm thickness and halo is clay to chlorite to silica
10R	1	6	39-52	87.69	11	Y	Vc	5	0.2	19-ALT/IGN	24E	22S	42	31	132	Inc				Py			Cm	Clay	Alteration haloes range from 1mm to 1cm thickness and halo is clay to chlorite to silica
10R	1	6	39-52	87.69	11	Y	Vd	2	0.1	19-ALT/IGN	46E	45N	316	55	46	Inc				Py			Cm	Clay	Alteration haloes range from 1mm to 1cm thickness and halo is clay to chlorite to silica
10R	1	8	56-66	87.86	7	Y	Va	5	0.2	19-ALT/IGN	13E	18S	55	22	145	Sh	Anhy			Py			Vhi	Clay	Anhydrite lines walls, followed by by py+anhy; anhy in extensional cavities
10R	1	8	56-66	87.86	7	Y	Vb	4	0.2	19-ALT/IGN	45W						Anhy			Py			Vhi	Clay	Anhydrite lines walls, followed by by py+anhy; anhy in extensional cavities
10R	1	8	56-66	87.86	7	Y	Vc	2	0.2	19-ALT/IGN	58E	0	0	58	90	Inc	Anhy			Py			Vhi	Clay	Anhydrite lines walls, followed by by py+anhy; anhy in extensional cavities
10R	1	8	56-66	87.86	7	Y	Vd	5	0.2	19-ALT/IGN	14E	7N	334	16	64	Sh	Anhy			Py			Vhi	Clay	Anhydrite lines walls, followed by by py+anhy; anhy in extensional cavities
10R	1	9	66-87	87.96	21	Y	Va	7	0.1-3	19-ALT/IGN	53E	0	0	53	90	Inc	Anhy			Py			Hi	Clay	Anhydrite veins; pyrite in center of veins
10R	1	9	66-87	87.96	21	Y	Vb	7	0.1-1	19-ALT/IGN	45W	26N	206	48	296	Inc	Anhy			Py			Hi	Clay	Anhydrite veins; pyrite in center of veins
10R	1	9	66-87	87.96	21	Y	Vc	7	0.1-0.3	19-ALT/IGN	46W	29S	152	50	242	Inc	Anhy			Py			Hi	Clay	Anhydrite veins; pyrite in center of veins
10R	1	9	66-87	87.96	21	Y	Vd	7	0.1-3	19-ALT/IGN	33E	30N	318	41	48	Inc	Anhy			Py			Hi	Clay	Anhydrite veins; pyrite in center of veins
10R	1	10	89-102	88.19	12	Y	Va	3	3	19-ALT/IGN	28E	44N	299	44	29	Inc	Qtz	Anhy		Cp			Hi	Clay	
10R	1	10	89-102	88.19	12	Y	Vb	5	1-3	19-ALT/IGN	15E	50N	283	51	13	Inc	Anhy	Qtz		Py			Hi	Clay	
10R	1	10	89-102	88.19	12	Y	Vc	5	1	19-ALT/IGN	17E	47N	286	48	16	Inc	Anhy	Qtz		Py			Hi	Clay	
10R	1	10	89-102	88.19	12	Y	Vd	12	0.3	19-ALT/IGN	85E	0	0	85	90	V	Anhy	Qtz		Py			Hi	Clay	
10R	1	10	89-102	88.19	12	Y	So			19-ALT/IGN	76W	60N	203	77	293	Inc									Vesicles
10R	1	11	102-115	88.32	8	Y	Bc			19-ALT/IGN							Clay	Anhy							Cementing altered volcanic fragments
10R	1	11	102-115	88.32	8	Y	Va		0.5-1	19-ALT/IGN						Sw	Qtz			Py					Cross-cutting breccia
10R	1	12	115-125	88.45	9	Y	So			19-ALT/IGN	70E	15S	54	78	144	Inc									
10R	1	12	115-125	88.45	9	Y	Va			19-ALT/IGN	35W	27N	216	41	306	Inc	Anhy	Qtz		Py					
10R	1	12	115-125	88.45	9	Y	Vb			19-ALT/IGN	75E	70N	324	78	54	Sv	Anhy	Qtz		Py					Follows probable earlier chlorite zone
10R	1	13	125-133	88.55	6	Y	Va	2	7	19-ALT/IGN	40W	18S	159	42	249	Inc	Anhy	Qtz		Py					
10R	1	13	125-133	88.55	6	Y	Vb	2	6	19-ALT/IGN	26W	33N	323	39	53	Inc	Anhy	Qtz		Py	Cp				
10R	1	13	125-133	88.55	6	Y	Vc	6	1-3	19-ALT/IGN	77E	68S	300	79	30	Sv	Anhy	Qtz		Py					
10R	1	14	133-143	88.63	3	N	Va		1	19-ALT/IGN						Sw	Anhy	Qtz		Py					
11R	1	3	13-19	97.03	2	N	Va	>3	1	20-ALT/IGN							Qtz			Py			Md	Clay	1 mm halo
11R	1	6	30-38	97.2	3	N	Va	>2	3	20-ALT/IGN							Qtz			Py					
11R	1	6	30-38	97.2	3	N	Vb	>2	1	20-ALT/IGN							Qtz	Anhy		Py					
11R	1	7	38-55	97.28	5	N	Va	>5	1	20-ALT/IGN							Qtz			Py			Md	Clay	1.5mm halo
11R	1	8	55-62	97.45	5	N	Va	>5	1	20-ALT/IGN							Qtz			Py			Md	Clay	1.5mm halo
11R	1	9	62-65	97.52	2	N	Va	>5	1	20-ALT/IGN							Qtz			Py			Md	Clay	1.5mm halo

Leg 193 Structure Log - Hole 1189A

Core identifiers							Structure				Structural orientation						Mineral infill						Alteration Halo		
											App.dip, pitch of line		Calculated/Measured orientation				Nonsulfides			Sulfides					
Core	Sec	pc#	Interv. (cm)	Depth mbsf piece top	Length of piece (cm)	oriented piece Y/N	Feature Generation	Length (cm)	Thickness (mm)	Unit - Host-rock	A.f.	S.f.	Strike Trend	Dip	Dip direction	General orientation	Dom.	Sec.	Others	Dom.	Sec.	Others	Intensity	Dom.	Comments
11R	1	11	70-80	97.6	9	Y	So			20-ALT/IGN	63W	51S	148	67	238	Inc									Lined with quartz and pyrite
11R	1	12	80-97	97.7	15	Y	So			20-ALT/IGN	90	0	0	90		V							Md	Clay	1.5mm halo
11R	1	13	97-117	97.87	13	N	Va	>5	1	20-ALT/IGN							Qtz			Py					1.5mm halo
12R	1	1	0-6	106.5	2	N	Va	2		20-ALT/IGN							Anhy			Py					2-4mm halo
12R	1	2	6-14	106.56	4	N	Va	4	0.5	20-ALT/IGN							Qtz			Py					
12R	1	5	30-41	106.8	10	Y	So			20-ALT/IGN	40W	22S	154	43	244	Inc									
12R	1	6	41-50	106.91	5	N	Va	5	>3	20-ALT/IGN							Qtz	Anhy		Py				Anhy	0.5mm halo
12R	1	7	50-62	107	11		Va	5	0.5	20-ALT/IGN	23W	25S	132	32	222	Inc				Py			Cm	Qtz	
12R	1	7	50-62	107	11	Y	Vb	7	0.5	20-ALT/IGN	45E	42N	318	53	48	Inc				Py			Cm	Qtz	
12R	1	8	62-70	107.12	10	Y	So			20-ALT/IGN						V									Elongate vesicles
12R	1	10	78-88	107.28	8	Y	So			20-ALT/IGN	44W	70N	251	71	341	Inc									Elongate vesicles
12R	1	12	93-101	107.43	7	Y	So			20-ALT/IGN	60W	26S	64	61	154	Inc									Elongate vesicles
12R	1	16	120-128	107.7	7	Y	So			21-ALT/IGN	4W	0	180	4	270	H									Bedding, includes sulphide clasts
13R	1	2	6-15	116.16	4	N	Va	>4	1	22-ALT/IGN						Inc	Qtz	Anhy		Py					
13R	1	3	15-23	116.25	2	N	Va	>2	1-1.5	22-ALT/IGN							Qtz	Anhy		Py			Md	Clay	3 mm halo
13R	1	4-5	23-38	116.33	1-3	N	Va		1	22-ALT/IGN							Qtz	Anhy		Py			Md	Clay	
13R	1	6	38-45	116.48	4	N	Bc			22-ALT/IGN							Qtz			Py					Altered volcanic fragments cemented by quartz and very minor pyrite
13R	1	8	51-57	116.61	5	N	Bc			23-ALT/IGN							Qtz			Py					Altered volcanic fragments cemented by quartz and very minor pyrite
13R	1	10	62-72	116.72	2	N	Va	>3	>10	24-ALT/IGN							Qtz	Anhy		Py					

Leg 193 Structure Log - Hole 1189B

Core identifiers							Structure				Structural orientation						Mineral infill						Alteration Halo		
											App.dip, pitch of line		Calculated/Measured orientation				Nonsulfides			Sulfides					
Core	Sec	pc#	Interv. (cm)	Depth cur. top (mbsf)	Length of piece (cm)	oriented piece Y/N	Feature Generation	Length (cm)	Thickness (mm)	Unit - Host-rock	A.f.	S.f.	Strike Trend	Dip	Dip direction	General orientation	Dom.	Sec.	Others	Dom.	Sec.	Others	Intensity	Dom.	Comments
1R	1	1a-1b	0-19	31	3-4	N	bc			1							Anhy	Qtz							Fragments ≤ 0.5 cm of py, cpy
2R	1	1	0-10	40.1	3	N	Va,bc			3						Sw	Anhy			Py					Fragments of flowbanding volcanics 2-8mm, coarse anhydrite
2R	1	2	10-20	40.2	4	N	Va,bc			3						Sw	Anhy			Py					
2R	1	3	20-30	40.3	<1-1	N	Va,bc			3						Sw	Anhy			Py	Cpy				
2R	1	5	40-50	40.5	<1	N	Va,bc			3							Anhy			Py					
3R	1	1	0-12	49.7	2	N	bc			3							Qtz			Py					Cementing altered volcanic fragments, mm to cm in size
3R	1	2	12-23	49.82	1.5	N	Va			3						Sw	Qtz			Py					Fluid conduit
3R	1	4	34-46	50.04	2	N	bc			3						Sw	Qtz	Anhy		Py					Cementing 1-5 mm volcanic fragments
3R	1	5	46-56	50.16	1	N	Va,bc		≤ 1	3						Sw	Anhy			Py					Breccia network in altered volcanic rock
3R	1	6	56-68	50.26	1	N	So			3															Chaotic flowbanding
5R	1	1	0-12	69.3	1	N	Bc			4							Qtz			Py					≤ 5mm altered volcanic rock fragments
5R	1	2	12-23	69.42	2	N	Bc			4							Qtz			Py					≤7mm altered volcanic rock fragments
5R	1	3	23-34	69.53	1	N	Bc			4							Anhy	Qtz		Py					≤5mm altered volcanic rock fragments
5R	1	5	45-55	69.75	1	N	Bc			4							Qtz			Py					≤10mm altered volcanic rock fragments
6R	1	1-3	0-13	79	<1-3	N	Bc			5							Qtz	Hm		Py	Cpy				Up to 2cm variably altered fragments, hematite overprinting py-qtz assemblage
6R	1	4	34-45	79.34	4	N	Va,Bc			5						Sw,ir	Qtz	Hm		Py					Irregular vein with offshoots crosscutting so-flowbanding
6R	1	5	45-56	79.45	3	N	Bc			5							hem	Qtz		Py					Few <cm fragments in hem-qtz-py matrix
7R	1	1	0-11	88.7	4	N	Bc			8							Qtz			Py					Fragments 1-2mm of flowbanded, altered volcanics
7R	1	2	11-22	88.81	1	N	Va			9							Anhy	Qtz		Py					≤10mm altered volcanic rock fragments
8R	1	1-2	0-6	98.4	2	N	Va		<0.1	9						Sw,ir	Qtz			Py					Hairline qtz veinlets in network, some with pyrite
8R	1	5	14-24	98.54	1.5	N	Va		<0.5	9							Qtz			Py					
8R	1	6-8	24-33	98.64	1-2	N	Bc			10							Qtz			Py					Mm-cm fragments of flowbanded volcanics
8R	1	10	37-42	98.77	4	N	Va,Vb	4	≤0.5	11							Qtz			Py			Hi	Si	2-4mm siliceous halos
8R	1	12	50-62	98.9	1.5	N	Va,Vb	1.5	≤0.5	11							Qtz			Py					
8R	1	13	62-65	99.02	1.5	N	Va,Vb		<0.5-2	11						Sw	Qtz			Py					Vein network partly brecciated
8R	1	15	68-71	99.08	2	N	Va	2	0.5	11							Qtz	Anhy		Py			Md	Si	2mm siliceous halo
9R	1	1-2	0-9	108.1	2-3	N	Bc,Va		<0.5-2	12						Sw	Qtz			Py					Vein network partly brecciated
10R	1	1	0-14	117.9	12	Y	Va1	12	2-4	13						Sv,ir	Anhy	Qtz		Py	Cpy		Md	Si	Quartz rims the vein of coarse anhydrite
10R	1	1	0-14	117.9	12	Y	Va2	4	0.5	13						Sh,ir	Anhy	Qtz		Py	Sph		Md	Si	Quartz rims the vein
10R	1	1	0-14	117.9	12	Y	Va3	1-5	≤0.5-1	13	10E	35N	284	36	14	Sw,sh,ir	Qtz	Anhy		Py	Sph	Cpy	Md	Si	Sphalerite especially abundant rimming vesicles, intersected by the veins, which tend to follow primary banding in the rock
10R	1	2	14-23	118.04	1-3	N	Va		≤1	13						Sw	Qtz	Anhy		Py					Fine network
10R	1	3	23-33	118.13	9	Y	V1a	5	3	13			180	80	270	Sv,ir	Anhy	Qtz		Py					Quartz rims the vein
10R	1	3	23-33	118.13	9	Y	V1b	5	4	13			355	70	85	Inc	Anhy	Qtz		Py	Cpy				Quartz rims the vein

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Core identifiers							Structure				Structural orientation						Mineral infill						Alteration Halo		
											App.dip, pitch of line		Calculated/Measured orientation				Nonsulfides			Sulfides					
Core	Sec	pc#	Interv. (cm)	Depth cur. top (mbsf)	Length of piece (cm)	oriented piece Y/N	Feature Generation	Length (cm)	Thickness (mm)	Unit - Host-rock	A.f.	S.f.	Strike Trend	Dip	Dip direction	General orientation	Dom.	Sec.	Others	Dom.	Sec.	Others	Intensity	Dom.	Comments
10R	1	3	23-33	118.13	9	Y	V1c	3.5	1	13	10E	28N	288	29	18	Inc	Anhy	Qtz		Py	Sph				Quartz rims the vein
10R	1	3	23-33	118.13	9	Y	V1d	3	2	13	20W	40S	113	42	203		Anhy	Qtz		Py	Cpy				Quartz rims the vein
10R	1	3	23-33	118.13	9	Y	V1e	4	0.5	13	40W	65S	111	67	201	Inc	Qtz			Py					Minor pyrite, follow primary banding in rock
10R	1	3	23-33	118.13	9	Y	V2	5	5	13			358	58	98	Inc	Anhy								Cuts v1-veins, coarse (2-3mm) anhydrite
10R	1	4	33-37	118.23	3	N	Bc,Va	2.5		13							Qtz			Py					Highly chloritized fragments 2-12 mmm
10R	1	5	37-49	118.27	<1-3	N	Va		<1-2	14						Sw	Qtz			Py					Trace to minor pyrite, highly chloritized fragments
10R	1	6	49-56	118.39	4	N	Va	3	0.5	14							Qtz			Py					
10R	1	6	49-56	118.39	4	N	Vb	4-2	<0.5	14							Anhy			Qtz					Irregular veinlets
10R	1	7	56-63	118.46	4	N	So			14															<1mm thick, flowbands
10R	1	8	63-77	118.53	2-5	N	So			15															Flattened vesicles, altered feldspar laths
11R	1	1-8	0-43	127.6	1-4	N	Bc			16-18							Qtz			Py	Cpy				Polymict breccia, <1-10mm fragments of variably altered volcanic rock. Piece 3, jasperoid breccia
11R	1	2	7-14	127.67	4	N	Va	3	0.5	19							Anhy								
11R	1	9	43-59	128.03	2-7	Y/N	So			19			3	88	93										Stretched, aligned vesicles
11R	1	9	43-59	128.03	2-7	Y/N	Lo			19			180	33	270										
11R	1	10	59-68	128.19	8	Y	So			19			0	90	-										Stretched, aligned vesicles
11R	1	10	59-68	128.19	8	Y	Lo			19			0	90	-										
11R	2	3	30-42	128.58	8	Y	So			19			180	78	270										Streched, aligned vesicles
11R	2	4	42-50	128.7	8	Y	So			19			198	76	288										Aligned, streched vesicles
11R	2	4	42-50	128.7	8	Y	Va	4	1	19	48W	15N	194	49	284		Anhy	Mt		Py					
11R	2	6	60-76	128.88	3-4	Y/N	Va	3	≥0.5	19							Anhy								
11R	2	8	81-107	129.09	27	Y	Va	4	0.7	19	30W	18N	209	34	299		Anhy	Chl		Py					Chlorite and pyrite in selvage/ halo
11R	2	8	81-107	129.09	27	Y	So			19			170	72	260										Aligned, stretched, flow banded vesicles
11R	2	9	107-114	129.35	3.5	N	Va	2	0.5	19							Anhy	Chl		Py					Chlorite and pyrite in selvage/ halo
11R	2	10	114-135	129.42	21	Y	So			19			180	69	270										Stretched, flattened vesicles
11R	2	10	114-135	129.42	21	Y	Lo			19			0	67	90										Stretched, flattened vesicles
11R	2	10	114-135	129.42	21	Y	Va	4	≥0.5	19	19E	31N	300	35	30		Anhy								
11R	3	1	0-29	129.69		Y	So			19			180	75	270										
11R	3	1	0-29	129.69		Y	Lo			19			270	75	0										
11R	3	1	0-29	129.69		Y	Va		≥0.2	19							Anhy								
12R	1	1	0-8	137.3	7	N	Va		<0.5	19							Anhy	Chl							
12R	1	1	0-8	137.3	7	N	So			19															Aligned tubular vesicles, curved trail
12R	1	1	8-25	137.38	16	Y	Va	5	<0.5	19	15E	15S	45	21	135		Anhy	Chl							Chlorite in selvage
12R	1	1	8-25	137.38	16	Y	Vb	2	1.5	19			180	2	270		Anhy	Chl		Py					Minor pyrite
12R	1	1	8-25	137.38	16	Y	So			19			0	76	90										Flattened vesicles
12R	1	1	25-43	137.55	16	Y	Va	16	<0.5	19			0	88	90		Anhy			Py					Minor pyrite, 0.5 mm halo of bleaching
12R	1	1	25-43	137.55	16	Y	Vb	4	<0.5	19			180	9	270		Anhy			Py					Minor pyrite
12R	1	1	25-43	137.55	16	Y	Vc	5	<0.5	19			180	3	270		Anhy			Py					Minor pyrite
12R	1	1	25-43	137.55	16	Y	So			19			0	84	90										Aligned vesicles
12R	1	1	43-68	137.73	22	Y	Va	22	<0.5	19			350	80	80		Anhy	Chl							Chlorite in selvage
12R	1	1	43-68	137.73	22	Y	So			19			355	84	85										Flattened stretched vesicles
12R	1	1	68-82	137.98	14	Y	So			19			101	80	191										Flattened vesicles
12R	1	1	82-98	138.12	14	Y	So			19															Tubular vesicles, undulating trails

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Core identifiers							Structure				Structural orientation						Mineral infill						Alteration Halo		
											App.dip, pitch of line		Calculated/Measured orientation				Nonsulfides			Sulfides					
Core	Sec	pc#	Interv. (cm)	Depth cur. top (mbsf)	Length of piece (cm)	oriented piece Y/N	Feature Generation	Length (cm)	Thickness (mm)	Unit - Host-rock	A.f.	S.f.	Strike Trend	Dip	Dip direction	General orientation	Dom.	Sec.	Others	Dom.	Sec.	Others	Intensity	Dom.	Comments
12R	1	1	82-98	138.12	14	Y	Va	4	1	19	7W	24S	105	25	195		Anhy								
12R	1	1	82-98	138.12	14	Y	Vb	13	<0.5	19			168	90	258		Anhy								Acicular 1 mm anhydrite crystals
12R	1	1	101-114	138.31	13	Y	Va	4	<0.5	19			0	68	90		Anhy								
12R	1	1	101-114	138.31	13	Y	Vb	2-3	<0.5	19							Anhy								
12R	1	1	101-114	138.31	13	Y	So			19	87E														Aligned vesicles
12R	1	1	118-131	138.48	11	Y	Va	10	<0.5	19			7	68	97		Anhy	Chl		Py					Minor pyrite, chlorite in selvage
12R	1	1	118-131	138.48	11	Y	So			19	78W														Tubular vesicles
12R	1	1	131-141	138.61	8	Y	So			19	78W														Tubular vesicles
12R	1	1	131-141	138.61	8	Y	Va	3	<0.5	19							Anhy	Chl	Mt						Chlorite and magnetite in selvage
12R	1	2	0-18	138.71	16	Y	Va	2	<0.5	19	20W	26S	127	31	217		Anhy								
12R	1	2	0-18	138.71	16	Y	So			19			25	75	115										Flattened, stretched vesicles
12R	1	2	18-29	138.89	9	Y	So			19	61E														Tubular vesicles
12R	1	2	29-40	139	10	Y	Va	7	<0.5	19							Anhy	Chl	Mt						Chlorite and magnetite in selvage
12R	1	2	40-48	139.11	4-5	N	Va	4	<0.5	19							Anhy								
12R	1	2	48-58	139.19	9	Y	Va	3	<0.5	19			150	46	240		Anhy								
12R	1	2	62-71	139.33	8	Y	Lo			19			355	85	85										Tubular vesicles
12R	2	10	92-99	139.63	6	N	Va	3	1	19							Anhy			Py					Minor very fine pyrite
12R	2	11	99-113	139.7	12	Y	Va	2	1	19	48W	11N	190	48	280		Anhy							Clay	2-3 mm halo of bleaching
12R	2	13	118-126	139.89	8	Y	Va	2	<0.5	19	22W	24N	228	31	318		Anhy								Coarse anhydrite in crust
12R	3	10	65-73	140.73	7	N	Va	6	<0.5	19						Sv	Anhy								Crust
12R	3	10	65-73	140.73	7	N	So			19						Sv									Tubular vesicles
13R	1	4	20-26	147.2	2-3	N	Bc			20							chl	Qtz		Py					1-25 mm fragments, polymict
13R	1	5	26-31	147.26	3	N	Va	<1-2	<0.5	20							Qtz			Py					Several veinlets
13R	1	6-9	31-38	147.31	1-3	N	Va,Bc	<1	<0.5-1	20						Sw	Qtz			Py	Cpy	Tt			Fragments cemented by qtz-py veinlets in network
13R	1	10	48-56	147.48	7	N	Va	<1-2	<0.5-0.5	20						Sw	Qtz			Py					Hairline veinlets in network
14R	1	1	0-10	156.5	5	N	Va	3	0.1-0.5	22										Py					Network
14R	1	1	0-10	156.5	5	N	Vb	2	1	22							Anhy								
14R	1	1	0-10	156.5	5	N	Vc	2	1	22							Anhy								
14R	1	1	0-10	156.5	5	N	Vd	1	1	22										Py					Small net of veinlets
14R	1	1	0-10	156.5	5	N	So			22															Vesicles with lining fine siica cores of coarser qtz +py, some hematite-stained qtz euhedra
14R	1	2	10-15	156.6	4	N	V1	3	<0.1	23							Qtz			Py					
14R	1	2	10-15	156.6	4	N	V2	3	5	23							Anhy								
14R	1	3	15-26	156.65	1	N	Va	1	<0.5	23										Py					Rubbly piece
14R	1	4	26-30	156.76	3	N	Va	3	<0.5	23							Qtz			Py					Vein network, some veins contain probable smoky qtz
14R	1	5	30-33	156.8	3	N	Va	3	<0.3	23							Anhy			Py				Chl	Vein network; fine halo
14R	1	6	33-36	156.83	3	N	Va	2-3	<0.5	23							Anhy			Py				Chl	Vein network; fine halo
14R	1	7	36-43	156.86		N	Va		<0.3-5	23							Qtz			Py				Chl	Net cements 1-5cm sized clasts
14R	1	8	43-52	156.93	4	N	Va	3	1	23							Anhy								On face
14R	1	8	43-52	156.93	4	N	Vb			23							Qtz			Py				Chl	Fine vein network; fine halo
14R	1	11	66-76	157.16	10	Y	Va	5	3	23							Anhy	Qtz		Py					Qtz lines vein;anhy cuts qtz and is later fill; hairline veins extend out into rock from this vein
14R	1	11	66-76	157.16	10	Y	So			23	75E	5S	1	75	91										General orientation of chl+clay laminae
14R	1	12	76-86	157.26	9	Y	Bc			23															Breccia-clasts in silica matrix
14R	1	13	86-96	157.36	8	Y	Bc			23															Breccia-clasts in silica matrix
14R	1	14	96-107	157.46	10	Y	Bc			23															Breccia-clasts in silica matrix

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Core identifiers							Structure				Structural orientation						Mineral infill						Alteration Halo		
											App.dip, pitch of line		Calculated/Measured orientation				Nonsulfides			Sulfides					
Core	Sec	pc#	Interv. (cm)	Depth cur. top (mbsf)	Length of piece (cm)	oriented piece Y/N	Feature Generation	Length (cm)	Thickness (mm)	Unit - Host-rock	A.f.	S.f.	Strike Trend	Dip	Dip direction	General orientation	Dom.	Sec.	Others	Dom.	Sec.	Others	Intensity	Dom.	Comments
14R	1	15	107-118	157.57	11	Y	Va	2	0.7	23	55E	30S	22	57	112		Anhy	Qtz		Sp	Py	Cpy			Anhydrite cores, rimmed by sphalerite, minor chalcopyrite and pyrite, outer rim of quartz. Sphalerite zoned from light Zn-rich core to dark fe-rich rim
14R	1	15	107-118	157.57	11	Y	Vb	2	<0.1	23	23W	21S	138	30	228		Anhy	Qtz		Sp	Py	Cpy			
14R	1	15	107-118	157.57	11	Y	Vc	5	0-7	23	23W	25S	132	32	222		Anhy	Qtz		Sp	Py	Cpy			
14R	1	15	107-118	157.57	11	Y	Vd	3	<0.1-2	23	43E	30N	328	48	58		Anhy	Qtz		Sp	Py	Cpy			
14R	1	15	107-118	157.57	11	Y	Ve	4	<0.1-2	23	46E						Anhy	Qtz		Sp	Py	Cpy			
14R	1	15	107-118	157.57	11	Y	Vf	2	1	23	60E		56	60	146		Anhy	Qtz		Sp	Py	Cpy			
14R	1	15	107-118	157.57	11	Y	Vg	1	<0.1-1	23	32W	11N	197	33	287		Anhy	Qtz		Sp	Py	Cpy			
14R	1	15	107-118	157.57	11	Y	Vh	3	3	23	20W						Anhy	Qtz		Sp	Py	Cpy			
14R	1	15	107-118	157.57	11	Y	Vi	1	0.1-1	23	30E	55S	68	57	158		Anhy	Qtz		Sp	Py	Cpy			
14R	1	15	107-118	157.57	11	Y	Vj	5	<0.1-2	23	25S	15E	60	28	150		Anhy	Qtz		Sp	Py	Cpy			
14R	1	15	107-108	157.57	11	Y	So			23	43W	7S	172	43	262										1mm chl-clay laminae
14R	2	1	0-3	157.79	1	N	Va	3	10	23							Anhy								
14R	2	2	3-6	157.82	3	N	V1	3	<0.1	23							Qtz								Radiates off from thick irregular space in piece
14R	2	2	3-6	157.82	3	N	V2	1	2	23							Qtz	Clay							
14R	2	6	23-30	158.02	4	N	Va	3	20	23							Qtz	Anhy							Forces open bedding
15R	1	1	0-5	166.1	4	N	Va	1-4	≤0.5	24							Qtz	Anhy		Py			Md	Si	1-3 mm halos, anhydrite present only in the thickest vein
15R	1	2-17	5-149	166.15	3-20	Y/N	Va,Bc	<0.1-2	<0.5-2	25						Sw	Qtz	Anhy		Py					Dense network, trace anhydrite and pyrite
15R	1	5	34-39	166.44	4	N	Va	3	0.5	25							Anhy								
15R	2	1-5	0-38	167.6	2-7	Y/N	Va,bc	<0.1-2	<0.5-1	25						Sw	Qtz	Anhy		Py					Dense network, trace pyrite and anhydrite
15R	2	7-10	42-68	168.02	2-8	Y/N	Va	<1-5	≤0.5	26						Sw	Qtz	Mt	Anhy	Py			Md	Si	Minor pyrite, some veins contain magnetite, few thicker veins contain trace anhydrite
16R	1	1	0-7	175.7	5	N	Va,Bc	<0.1-2	≤0.5	25						Sw	Qtz	Anhy		Py					Trace pyrite and anhydrite
16R	1	2	7-15	175.77	7	Y	V1,Bc	<0.5-2	<0.5-2	26			180	86	270	Sw,v	Qtz	Mt		Py			Md	Clay	Pyrite fills open space between fragments, alteration halo surrounds vein system and affects fragments
16R	1	2	7-15	175.77	7	Y	V2	1	<0.5	26							Anhy								Crosscuts V1 veins and their halos
16R	1	3	15-25	175.85	9	Y	V1	0.5-5	<0.5-1	26	48E	26N	336	50	66	Sw, inc	Qtz	Mt		Py					Measurement on main vein in network
16R	1	3	15-25	175.85	9	Y	V1b			26			0	14	90	Sh	Qtz	Mt		Py					Measurement on main vein in network
16R	1	3	15-25	175.85	9	Y	V1c			26	14E	26N	297	29	27		Qtz	Mt		Py					Measurement on main vein in network
16R	1	3	15-25	175.85	9	Y	V1d			26	70E	61S	33	73	123		Qtz	Mt		Py					Measurement on main vein in network
16R	1	3	15-25	175.85	9	Y	V2	≤1	<0.5	26							Anhy								Veinlets crosscut V1
16R	1	4	25-31	175.95	4	N	Va	1-3	<0.5-2	26						Sw	Qtz	Mt		Py					Pyrite in center of veins, magnetite occurs in selvage
16R	1	5	31-35	176.01	3	N	Va	2	1	26							Qtz	Anhy						Clay	Hairline alteration halos
16R	1	6	35-44	176.05	2-4	N	V1	1-3	<0.5	26						Sw	Qtz			Py					Minor pyrite
16R	1	6	35-44	176.05	2-4	N	V2	0.5	<0.5	26							Anhy								
16R	1	7	44-53	176.14	7	Y	Va		≤0.5	26	37E	42S	50	50	140	Sw	Qtz	Mt		Py					Pyrite in center of veins, magnetite occurs in selvage
16R	1	8	53-60	176.23	6	N	V1	<1-3	<0.5	26						Sw	Qtz	Mt							Magnetite in selvages
16R	1	8	53-60	176.23	6	N	V2	<0.5-1	<0.5	26							Anhy	Mt							Magnetite in selvages
16R	1	9	60-66	176.3	1-5	N	Va	<0.5-2	<0.5	26						Sw	Qtz	Anhy					Md	Clay	Hairline halos

Leg 193 Structure Log - Hole 1189B

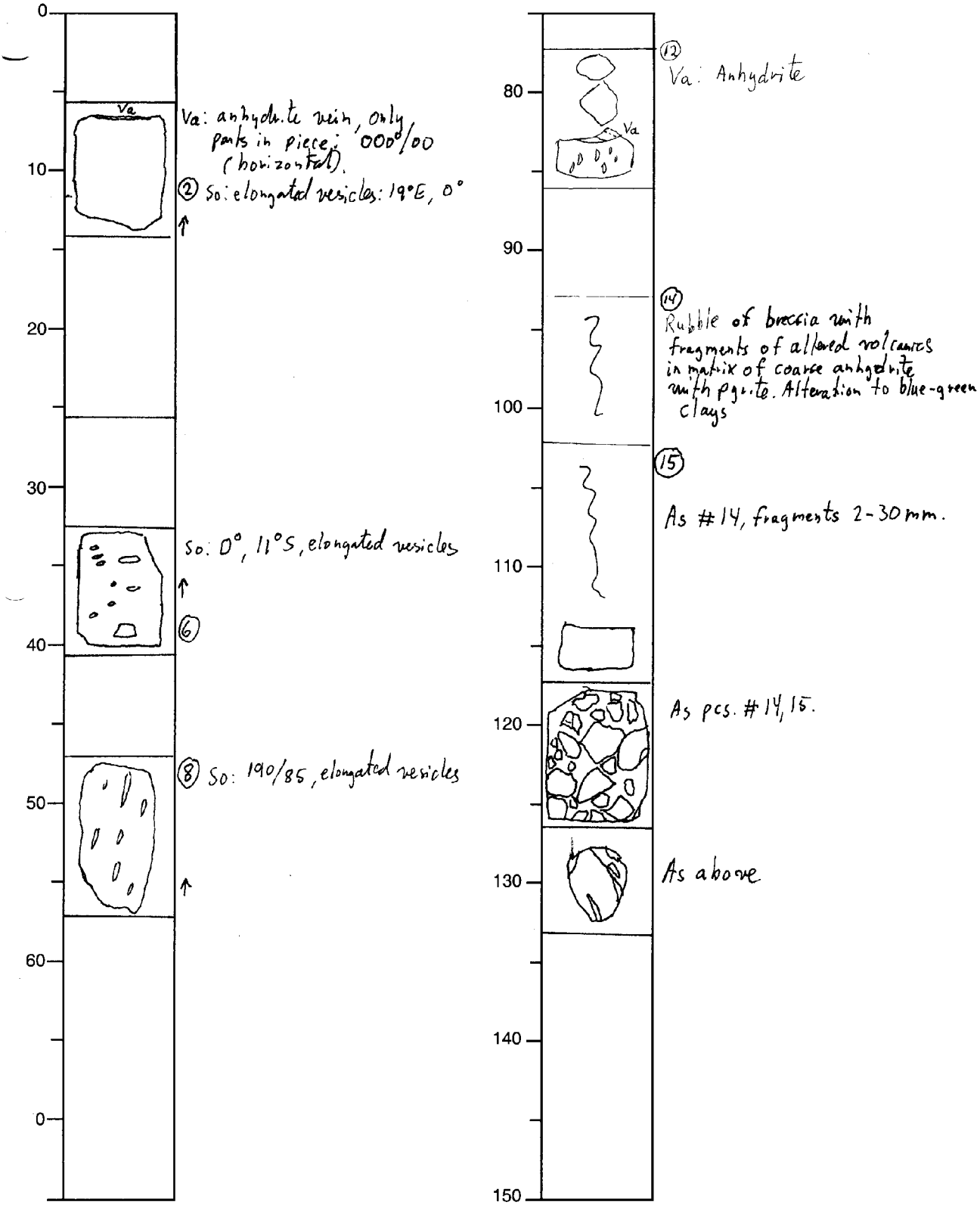
Core identifiers							Structure				Structural orientation						Mineral infill						Alteration Halo		
											App.dip, pitch of line		Calculated/Measured orientation				Nonsulfides			Sulfides					
Core	Sec	pc#	Interv. (cm)	Depth cur. top (mbsf)	Length of piece (cm)	oriented piece Y/N	Feature Generation	Length (cm)	Thickness (mm)	Unit - Host-rock	A.f.	S.f.	Strike Trend	Dip	Dip direction	General orientation	Dom.	Sec.	Others	Dom.	Sec.	Others	Intensity	Dom.	Comments
16R	1	10	66-74	176.36	6	Y	Va	<1-6	<0.5-1	26	38E	15N	341	40	71	Sw	Qtz	Anhy	Mt	Py			Md	Clay	Hairline halos
16R	1	11	74-81	176.44	6	Y	Va	6	<0.5	27	24W	34S	123	39	213		Qtz						Md	Clay	1 mm halo
16R	1	12	81-88	176.51	6	Y	Va	5	<0.5-1	27							Qtz			Py					Minor pyrite
16R	1	12	81-88	176.51	6	Y	Vb	3	<0.5	27							Qtz	Mt							Magnetite in halo
16R	1	13	88-94	176.58	4	Y	Va	2	<0.5	27							Qtz								
16R	1	14	94-103	176.64	6	Y	J	6	-	27													Md	Clay,si	1-2 mm halo around fracture
16R	1	19	138-142	177.08	3	N	Va	3	1.5-2	27							Qtz	Anhy		Py					
16R	2	1	0-11	175.13	10	Y	Va	10	0.5-1	27	60W	61N	226	68	316		Qtz			Py			Md	Clay	Hairline halo around branch of vein, pyrite in center of vein
16R	2	2	11-20	175.24	8	Y	Va	6	0.3	27						Sv	Qtz			Py					
16R	2	2	11-20	175.24	8	Y	Vb	5	<0.5	27						Sh	Qtz			Py					
16R	2	4	29-40	175.42	9	Y	Lo			27							Qtz			Py					Tubular vesicles
17R	1	1-2	0-22	185.3	20	Y	Va	20	≤0.5	28			0	90	90	V	Qtz			Py			Md	Si	Distinct 7 mm white halo followed outwards by a faint 10 mm gray halo
17R	1	1	0-11	185.3	10	Y	Va	6	).5	28	29W	10N	198	30	288	Inc	Qtz			Py			Md	Si	
17R	1	1	0-11	185.3	10	Y	Vb	3	<0.5	28						Ir	Qtz			Py					
17R	1	3	22-28	185.52	4	Y	Vc	<1-3	<0.5	28							Qtz			Py					Minor pyrite
17R	1	4-5	28-35	185.58	2-3	N	Va	<0.5	<0.5	29						Sw	Qtz			Py					Crosscuts flowbanded volcanic rocks
17R	1	6	35-44	185.65	8	Y	Va,Bc		≤0.5	29							Qtz			Py					Veins and cement between fragments
17R	1	8-13	53-73	185.83	2-3	N	So		<0.5	30															Flowbanding, partly folded/ distorted
17R	1	14	73-79	186.03	4	N	Va	4	<0.5	30							Qtz			Py					
17R	1	14	73-79	186.03	4	N	Vb	1	<0.5	30							Qtz			Py					
17R	1	15	79-83	186.09	2	N	Va	2	<0.5	30							Qtz			Py					
17R	1	17	83-92	186.13	5	N	Va	1-2	<0.5	30							Qtz			Py					
17R	1	18	92-96	186.22	3	N	Va	1-2	<0.5	30							Qtz			Py					
17R	1	21-28	104-145	186.34	1-6	N	Va	<1-4	<0.5-1	32						Sw	Qtz	Mt	Hm	Py					Magnetite in piece 23, hematite in piece 26
18R	1	1-21	0-142	195	1-12	Y/N	Va,Bc	<1-12	<0.5-2	32-34						Sw	Qtz	Hm		Py	Sph	Cpy			
18R	1	1	0-4	195	5	N	Va	5	0.1-1	32						Sw	Qtz	Hm		Py					Vein network
18R	1	2	4-12	195.04	6	Y	Va	5	0.2-0.3	32	52E	36N	330	56	60	Sw	Qtz	Hm		Py	Sph				Part of network system
18R	1	2	4-12	195.04	6	Y	Vb	3	0.1-0.2	32	30E	0N	0	30	90		Qtz	Hm		Py	Sph				Part of network system
18R	1	2	4-12	195.04	6	Y	Vc	3	0.1-0.2	32	32E	10N	344	33	74		Qtz	Hm		Py	Sph				Part of network system
18R	1	3	12-25	195.12	12	Y	Va	7	1	33	55E	10N	353	55	83	Sw	Qtz	Hm		Py	Sph				Part of network system
18R	1	3	12-25	195.12	12	Y	Vb	3	2	33	48E	10S	9	48	99		Qtz	Hm		Py	Sph				Part of network system
18R	1	3	12-25	195.12	12	Y	Vc	1	2	33	47W		120	47	210		Qtz	Hm		Py	Sph				Part of network system
18R	1	3	12-25	195.12	12	Y	Vd	5	1-2	33	50W	30N	206	53	296		Qtz	Hm		Py	Sph				Part of network system
18R	1	4	25-31	195.25	5	N	Va		<0.1	33						Sw	Qtz			Py					Vein network
18R	1	5	31-40	195.31	8	Y	Va		1-10	33						Sw	Qtz	Hm		Py					Vein network and patches
18R	1	5	31-40	195.31	8	Y	So			33	34E	10N	345	35	75										
18R	1	6	40-45	195.4	3	N	V1	3	5	33							Clay	Hm							Patches
18R	1	6	40-45	195.4	3	N	V2	3-4	0.1-2	33						Sw	Qtz	Hm		Sph	Py	Cpy			Vein network and patches
18R	1	7	45-50	195.45	4	N	V1	4	0.1	34							Qtz	Clay							Fine vein network
18R	1	7	45-50	195.45	4	N	V2	4	0.1-2	34						Sw	Qtz	Hm		Sph	Py	Cpy			Vein network and patches
18R	1	8	50-60	195.5	7	Y	Va	7	0.1-2	34						Sw	Qtz	Hm		Sph	Py				Vein network
18R	1	9	60-64	195.6	5	N	Va	5	0.1-2	34						Sw	Qtz	Hm		Py					Vein network
18R	1	10	64-68	195.64	5	N	V1	5	0.1-1	34							Chl	Anhy							Vein network
18R	1	10	64-68	195.64	5	N	V2	5	0.1-2	34						Sw	Qtz	Hm	Anhy	Sph	Py	Cpy			Vein network
18R	1	12	73-83	195.73	6	N	V1	6	0.1	34							Chl	Qtz	Clay						Vein network, bleaching of perlitic rock
18R	1	12	73-83	195.73	6	N	V2	6	0.1-2	34						Sw	Qtz	Hm		Py	Sph				Vein network, bleaching of perlitic rock

Leg 193 Structure Log - Hole 1189B

Core identifiers							Structure				Structural orientation						Mineral infill						Alteration Halo		
											App.dip, pitch of line		Calculated/Measured orientation				Nonsulfides			Sulfides					
Core	Sec	pc#	Interv. (cm)	Depth cur. top (mbsf)	Length of piece (cm)	oriented piece Y/N	Feature Generation	Length (cm)	Thickness (mm)	Unit - Host-rock	A.f.	S.f.	Strike Trend	Dip	Dip direction	General orientation	Dom.	Sec.	Others	Dom.	Sec.	Others	Intensity	Dom.	Comments
18R	1	12	73-83	195.73	6	N	Vb	1-2	0.1	34							Qtz	Clay							
18R	1	13	83-89	195.83	4	N	Va	4	0.1	34						Sw	Qtz	Clay	Hm						Vein network, bleaching
18R	1	13	83-89	195.83	4	N	Va	4	0.1	34							Qtz	Clay							Vein network, bleaching
18R	1	13	83-89	195.83	4	N	Va	3	0.1	34							Qtz								Vein network, bleaching
18R	1	14	89-93	195.89	3	N	Va	3-5	0.1-1	34							Clay	Qtz						Chl	1 mm halo
18R	1	14	89-93	195.89	3	N	Vb	0.5	0.5	34						Sw	Qtz	Clay		Py					Patch
18R	1	15	93-100	195.93	5	N	Va	5	1-2	34						Sw	Qtz	Hm							Vein network
18R	1	16	100-113	196	12	Y	Va	12	0.1-5	34						Sw	Qtz	Hm		Py					Vein network, associated bleaching
18R	1	19	124-130	196.24	6	Y	Va	7	1-4	34	52E		330	52	60	Sw	Qtz	Clay							
18R	1	20	130-142	196.3	11	Y	V1	11	0.1-30	34							Clay	Qtz							Vein network
18R	1	20	130-142	196.3	11	Y	V2			34						Sw	Qtz	Hm		Sph	Py				
18R	2	1-15	0-115	196.42	1-14	Y/N	Va,Bc	<1-14	<0.5-2	34-36						Sw	Qtz	Anhy	Hm	Py					
18R	2	1	0-12	196.42	9	Y	Va	9	0.1-1	34						Sw	Qtz	Anhy	Hm	Py					Vein network
18R	2	2	12-17	196.54	5	N	Va	5	0.1-5	34						Sw	Qtz	Anhy	Hm	Py					
18R	2	3	17-25	196.59	5	N	Va	5	0.1-5	34						Sw	Qtz	Hm		Py					
18R	2	3	17-25	196.59	5	N	Vb	1	4	34							Qtz	Hm		Py					
18R	2	5	37-44	196.79	7	N	Va	7	0.1-5	35						Sw	Qtz	Anhy	Hm						Vein network
18R	2	7	49-59	196.91	9	Y	Va	9	0.1-3	35						Sw	Qtz	Anhy		Py					
18R	2	7	49-59	196.91	9	Y	Vb	2	0.2	35						Sv	Qtz	Clay		Py					
18R	2	8	59-75	197.01	14	Y	Va	14	0.1-5	35						Sw	Qtz	Anhy	Hm	Py					Vein network
18R	2	9	75-79	197.17	3	N	Va			36						Sw	Clay								Vein network
18R	2	9	75-79	197.17	3	N	Vb			36							Qtz								Vein network
18R	2	12	86-93	197.28	6	N	Va	6	0.1-3	36						Sw	Qtz	Anhy	Hm	Py					Vein network
18R	2	15	105-115	197.47	10	Y	Va		0.1-5	36						Sw	Qtz	Anhy	Hm	Py					
18R	2	15	105-115	197.47	10	Y	So			36						Inc	Qtz								Flow banding

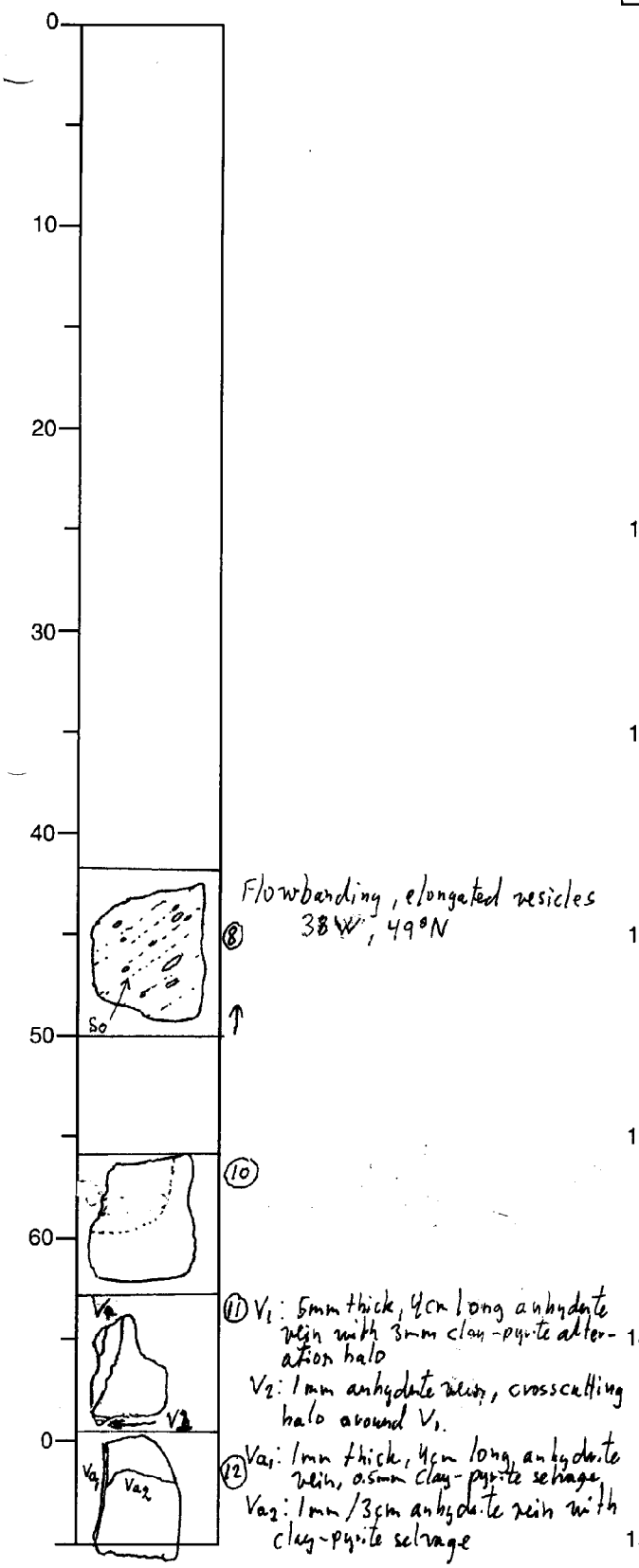
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189A	2R	1	BJE



STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189A	3R	1	BOE



(8) Flowbanding, elongated vesicles 38W, 49°N

(10)

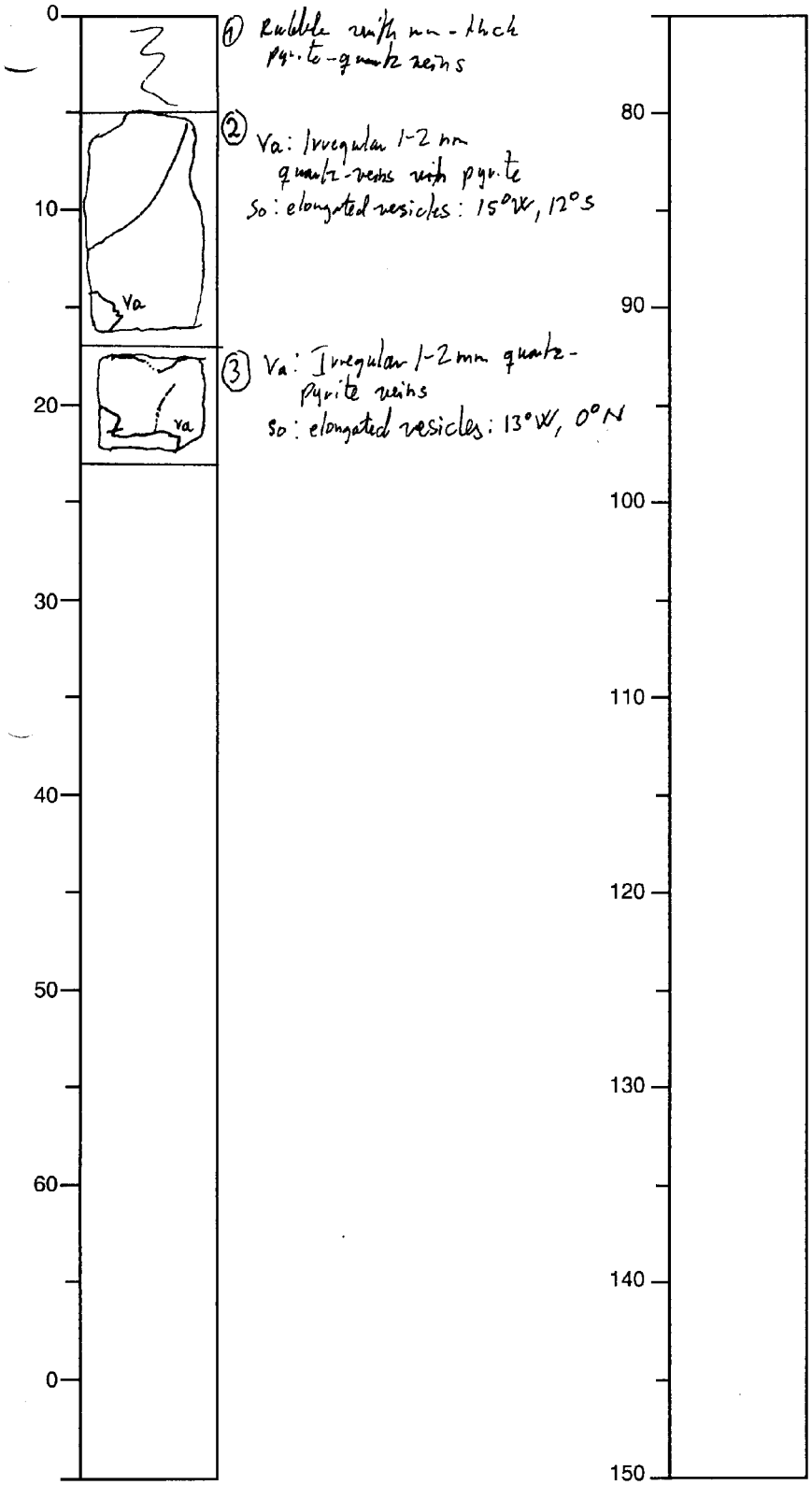
(11) V_1: 5mm thick, 4cm long anhydrite vein with 3mm clay-pyrite alteration halo
V_2: 1mm anhydrite vein, crosscutting halo around V_1.

(12) Va_1: 1mm thick, 4cm long anhydrite vein, 0.5mm clay-pyrite selvage
Va_2: 1mm/3cm anhydrite vein with clay-pyrite selvage

(16) Banded coarse anhydrite with lamina of pyrite, part of vein. and quartz

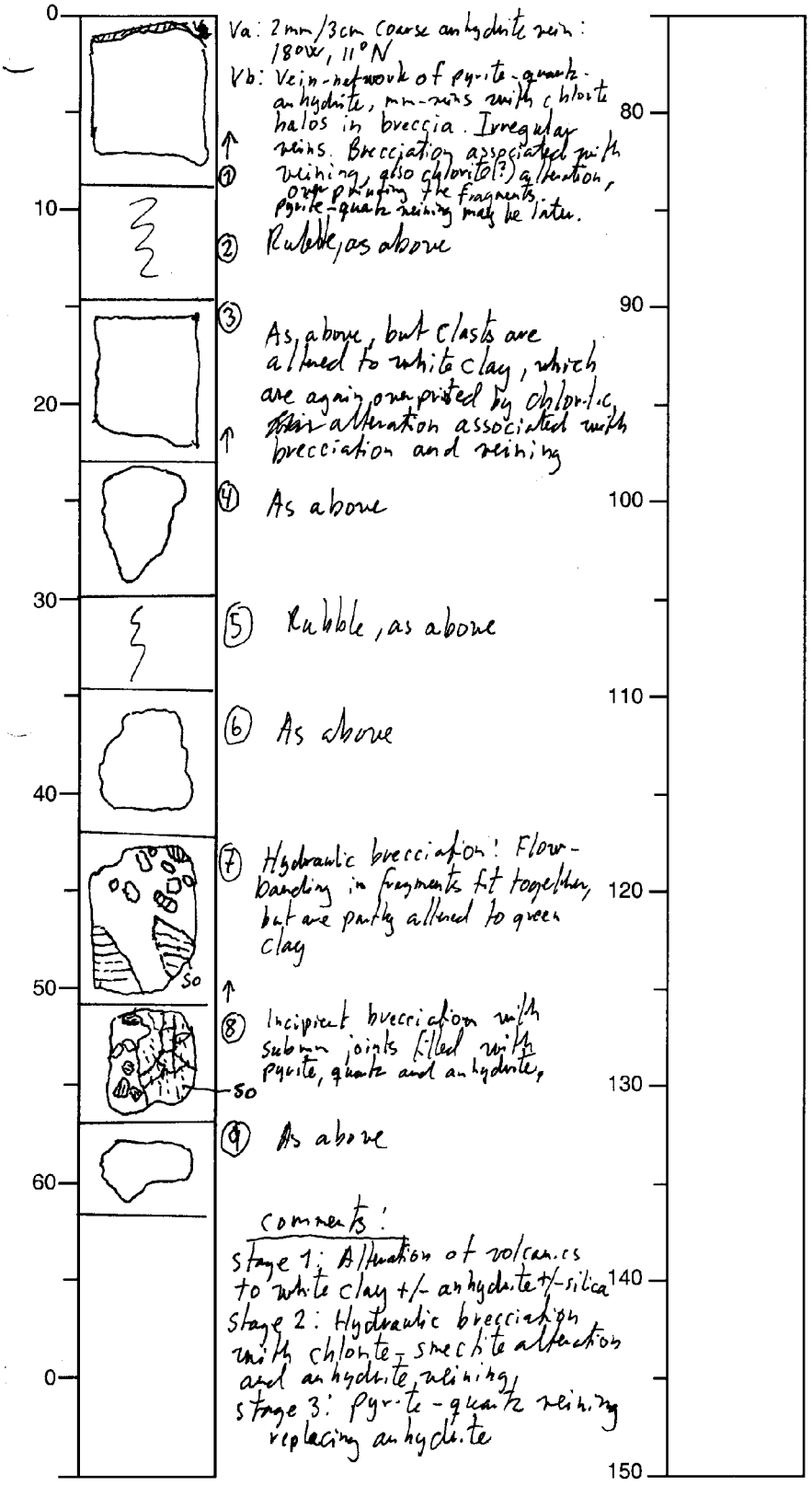
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189A	4R	1	BJE



STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189A	5R	1	BJG



Va: 2mm/3cm coarse anhydrite vein: 180W, 11°N

Vb: Vein-network of pyrite-quartz-anhydrite, mm-vns with chlorite halos in breccia. Irregular veins. Brecciation associated with veining, also chloritic(?) alteration, over printing the fragments, pyrite-quartz veining may be later.

① ↑

② Rubble, as above

③ As, above, but clasts are altered to white clay, which are again overprinted by chloritic, alteration associated with brecciation and veining

↑

④ As above

⑤ Rubble, as above

⑥ As above

⑦ Hydraulic brecciation! Flow-banding in fragments fit together, but are partly altered to green clay

↑

⑧ Incipient brecciation with subvn joints filled with pyrite, quartz and anhydrite,

⑨ As above

comments:

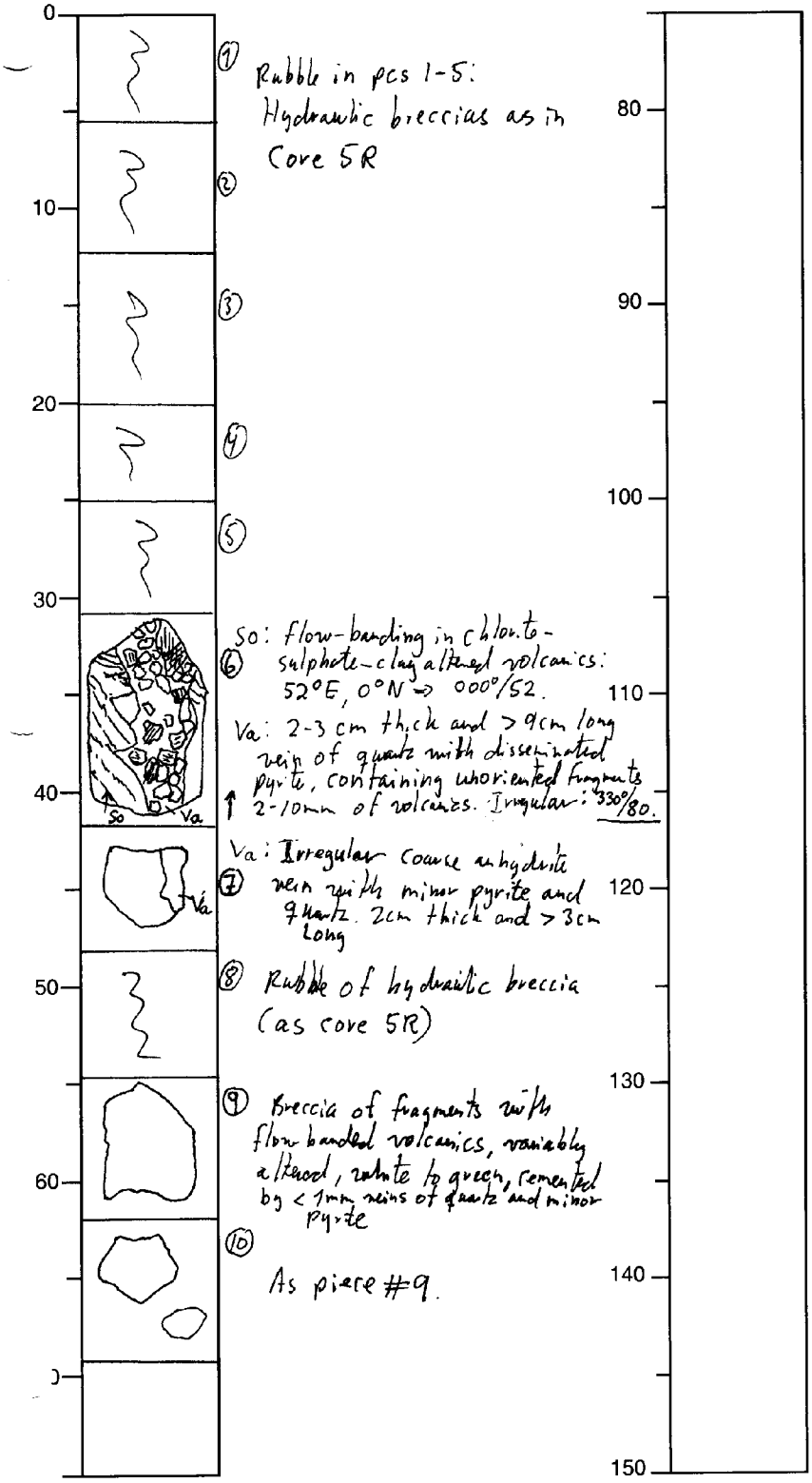
stage 1: Alteration of volcanics to white clay +/- anhydrite +/- silica

stage 2: Hydraulic brecciation with chlorite-smectite alteration and anhydrite veining

stage 3: Pyrite-quartz veining replacing anhydrite

STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189A	6R	1	BJE



(1) Rubble in pcs 1-5: Hydraulic breccias as in Core 5R

(2)

(3)

(4)

(5)

(6) So: flow-banding in chlorite-sulphate-clay altered volcanics: 52°E, 0°N ⇒ 000°/52.
Va: 2-3 cm thick and > 9cm long vein of quartz with disseminated pyrite, containing unoriented fragments 2-10mm of volcanics. Irregular: 330°/80.

(7) Va: Irregular coarse anhydrite vein with minor pyrite and quartz. 2cm thick and > 3cm long

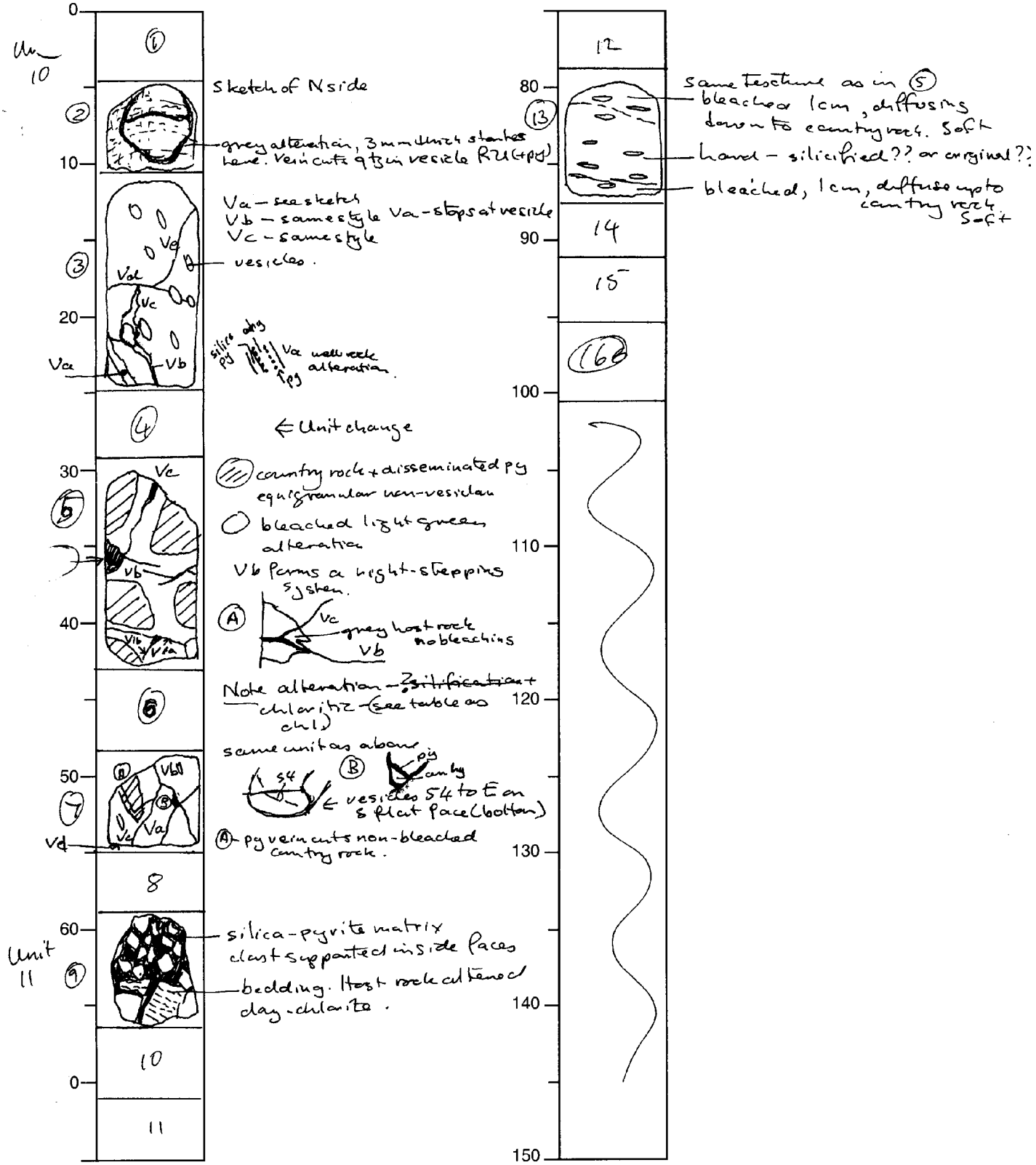
(8) Rubble of hydraulic breccia (as core 5R)

(9) Breccia of fragments with flow banded volcanics, variably altered, white to green, cemented by < 1mm veins of quartz and minor pyrite

(10) As piece #9.

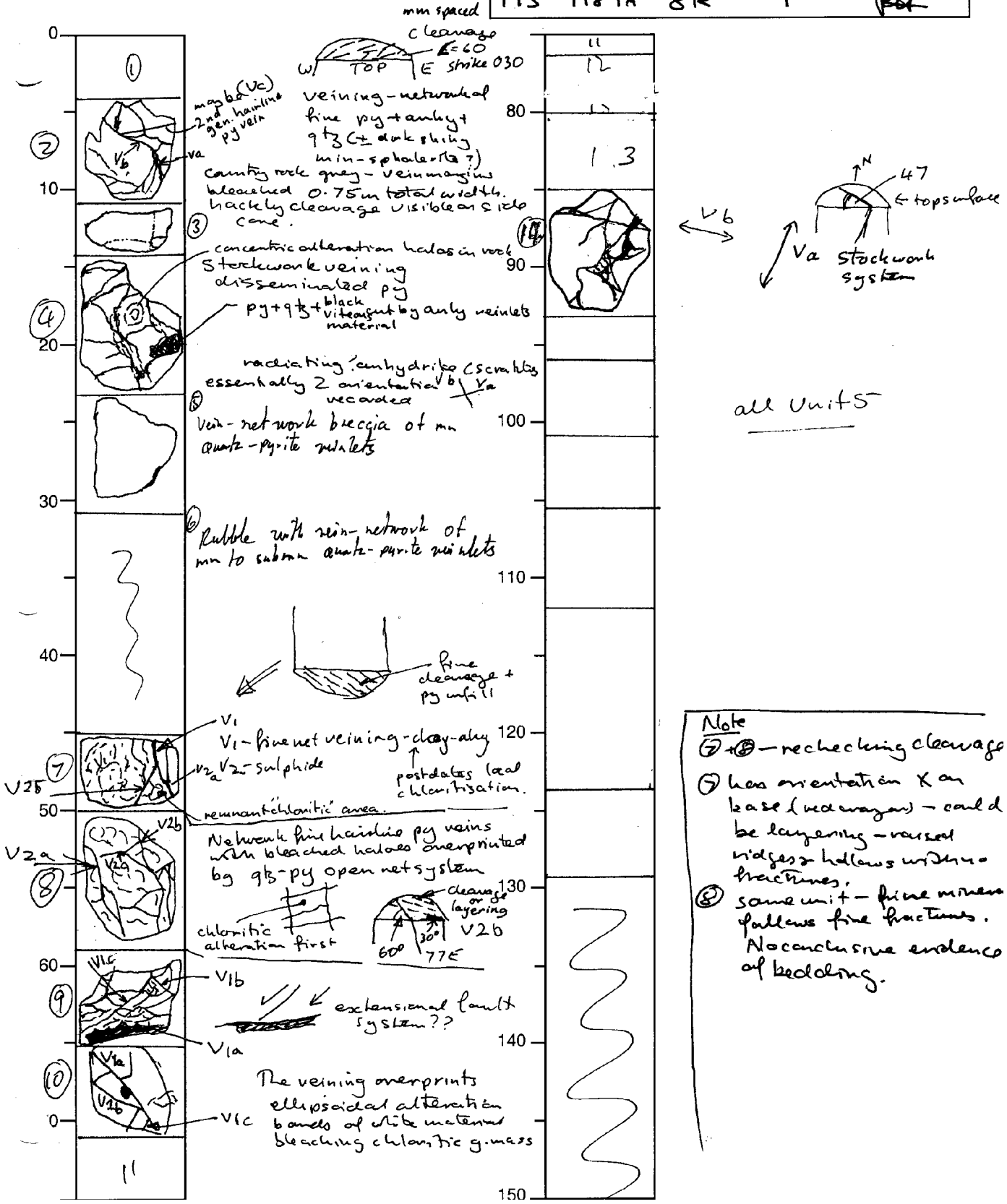
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189A	7R	1	RJFF



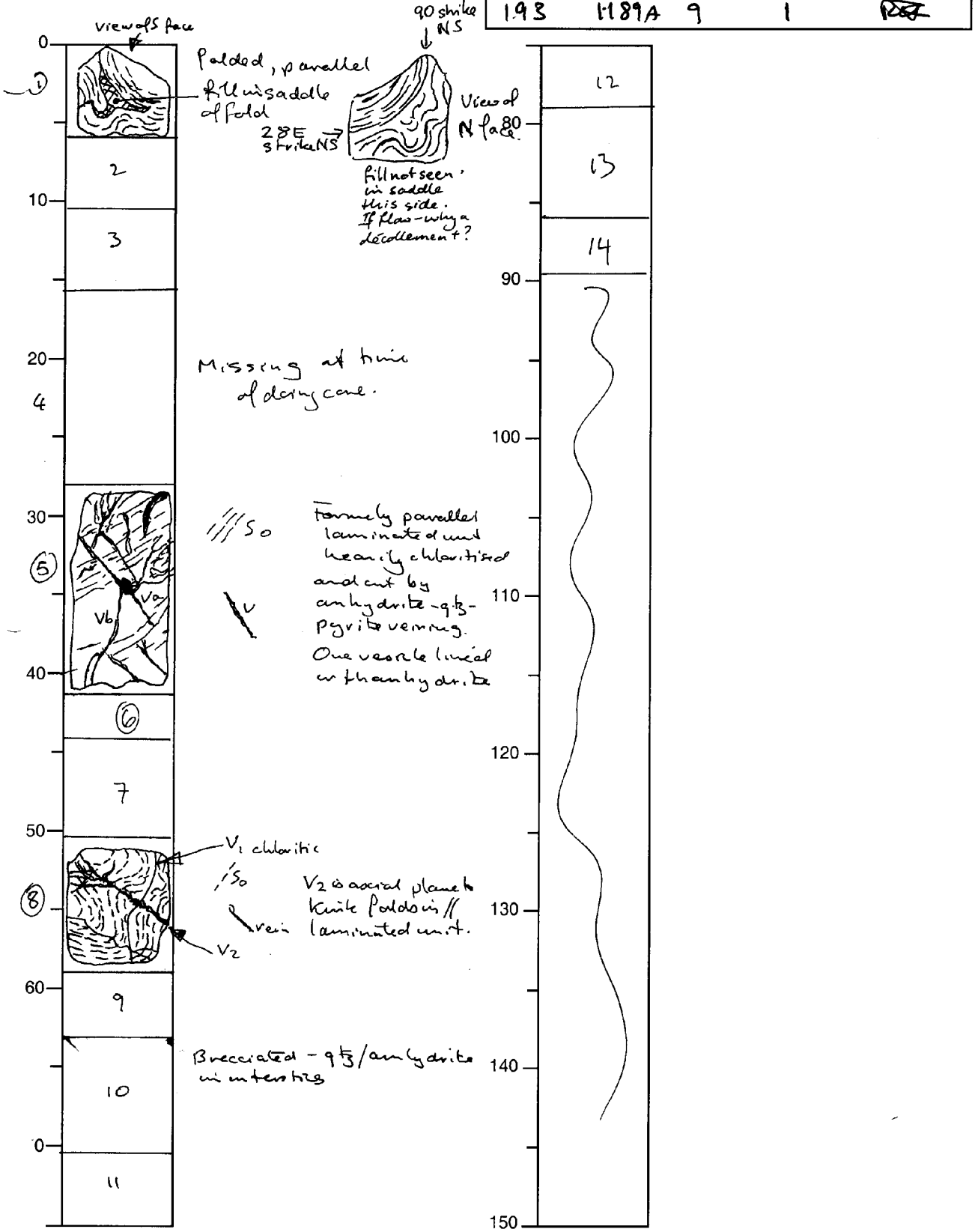
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189A	8R	1	[illegible]



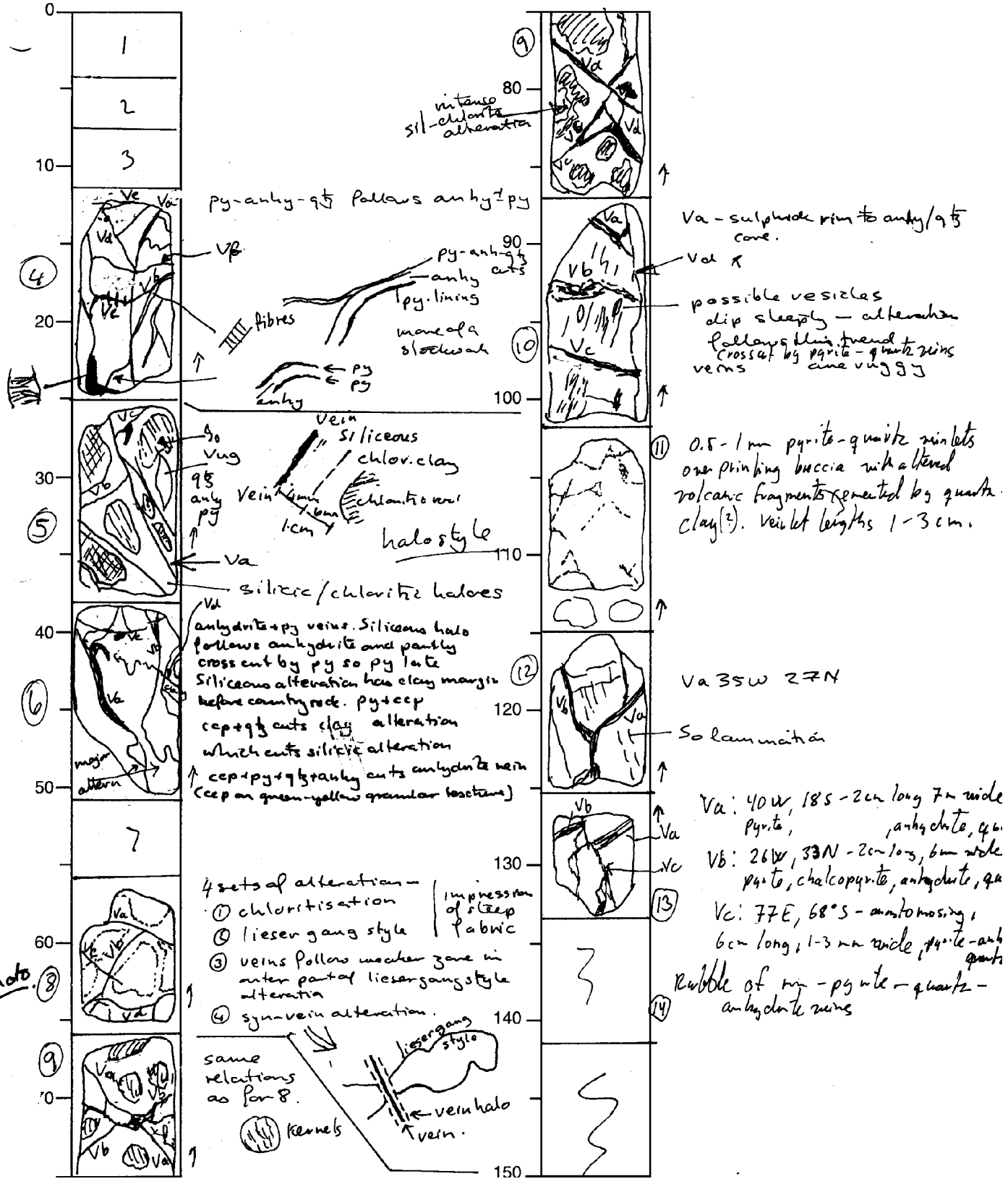
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189A	9	1	RSF



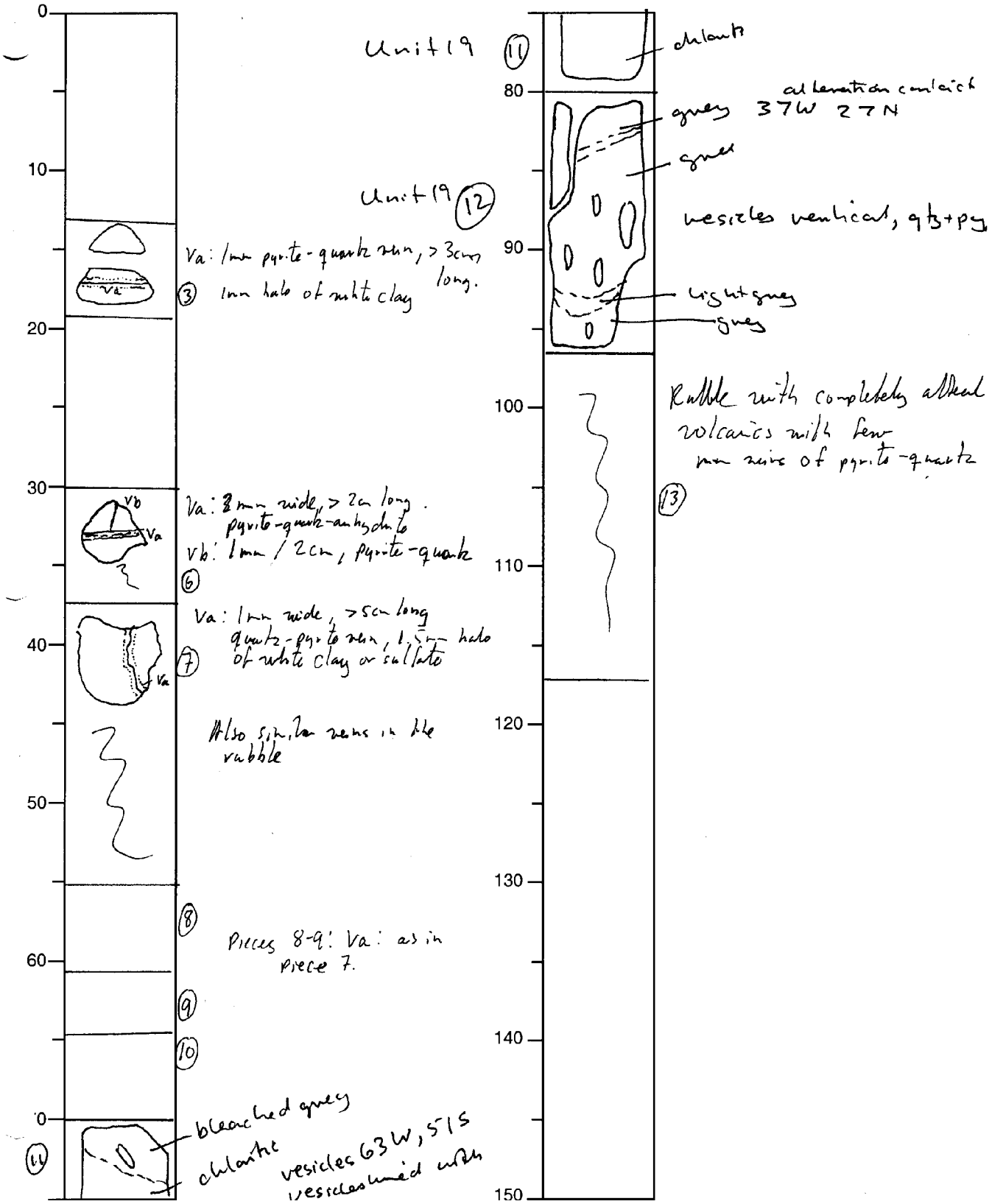
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189A	10R	1	RA



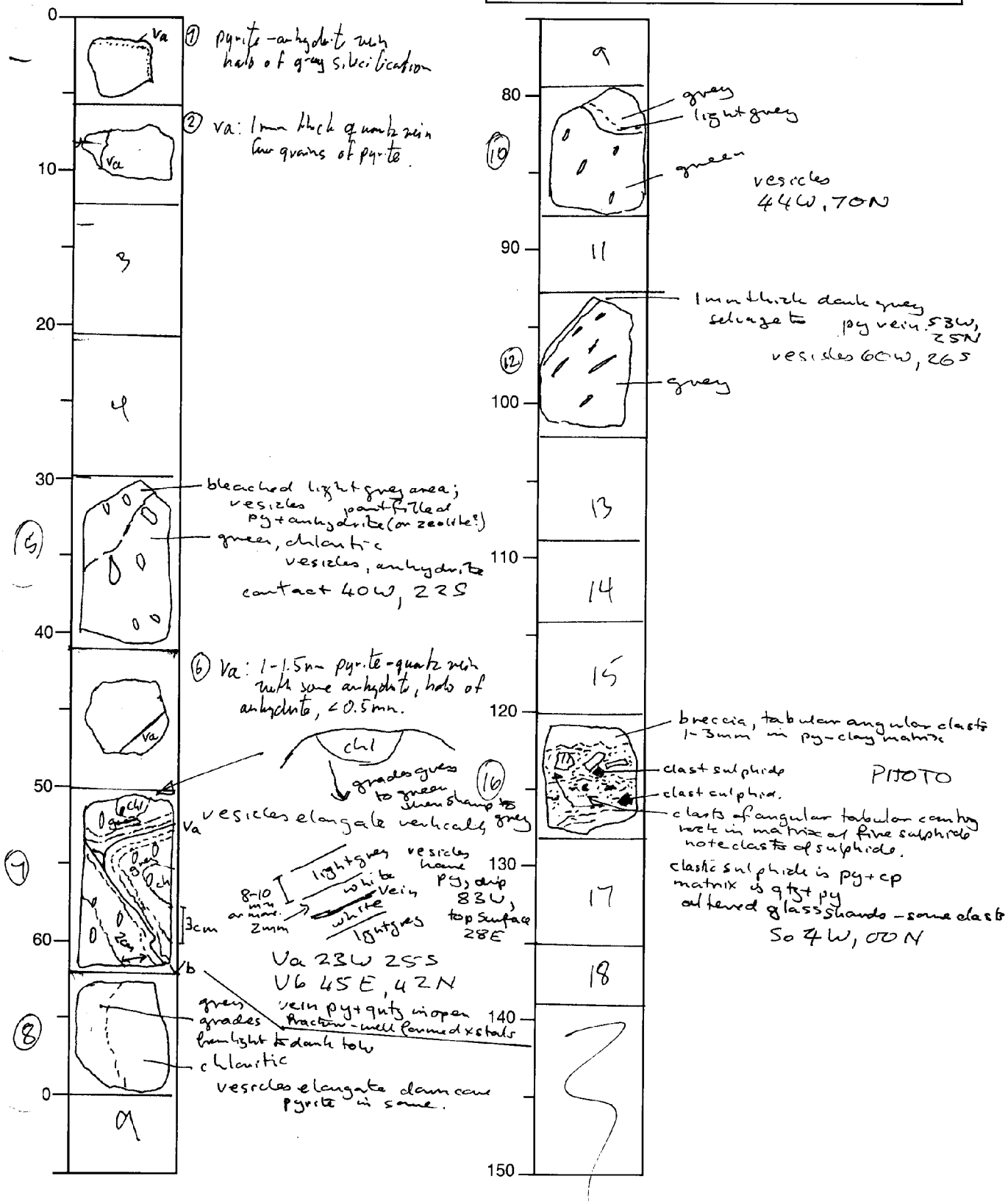
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
		115R	1	RMF



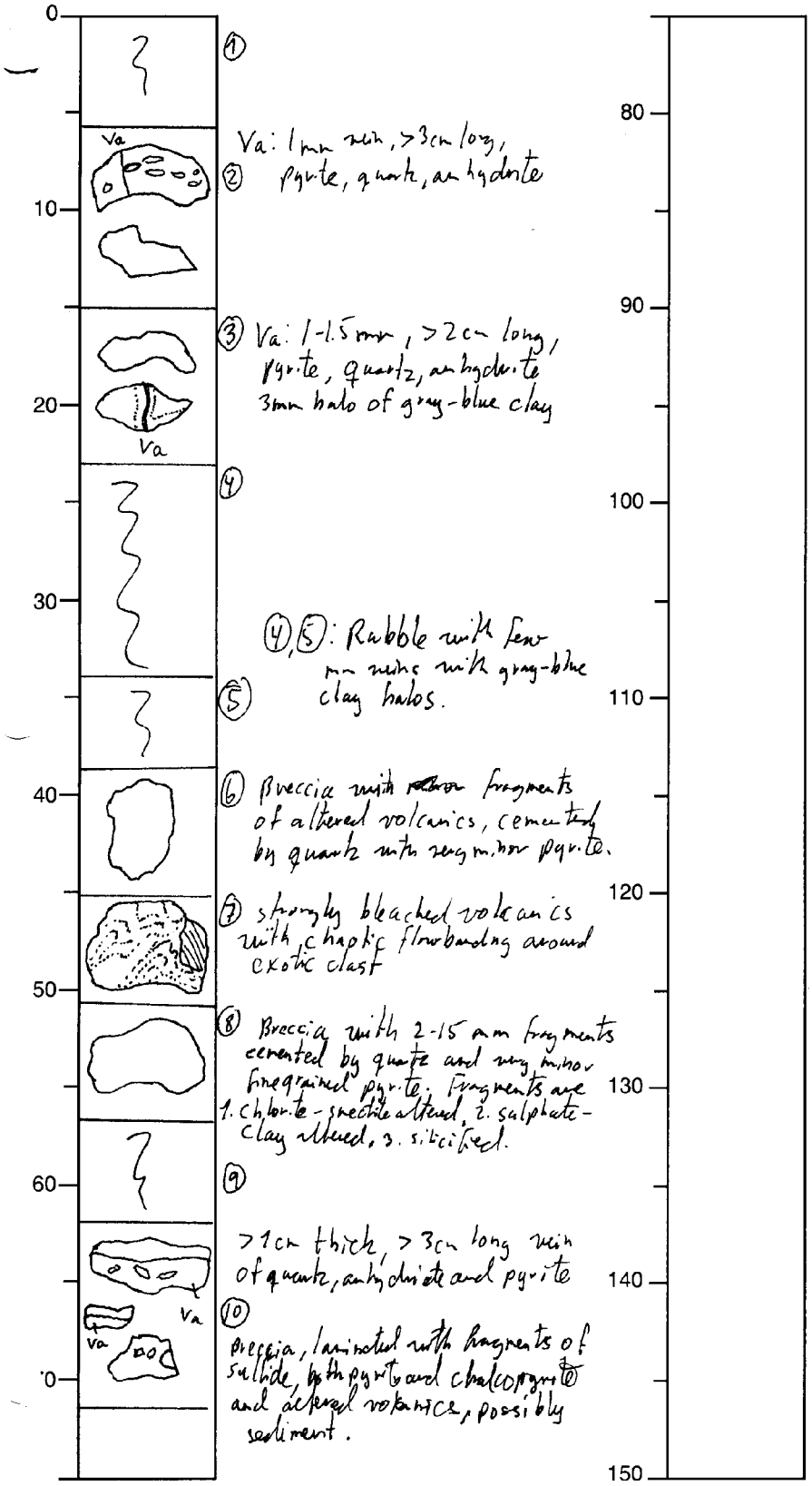
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189A	12R	1	RAF



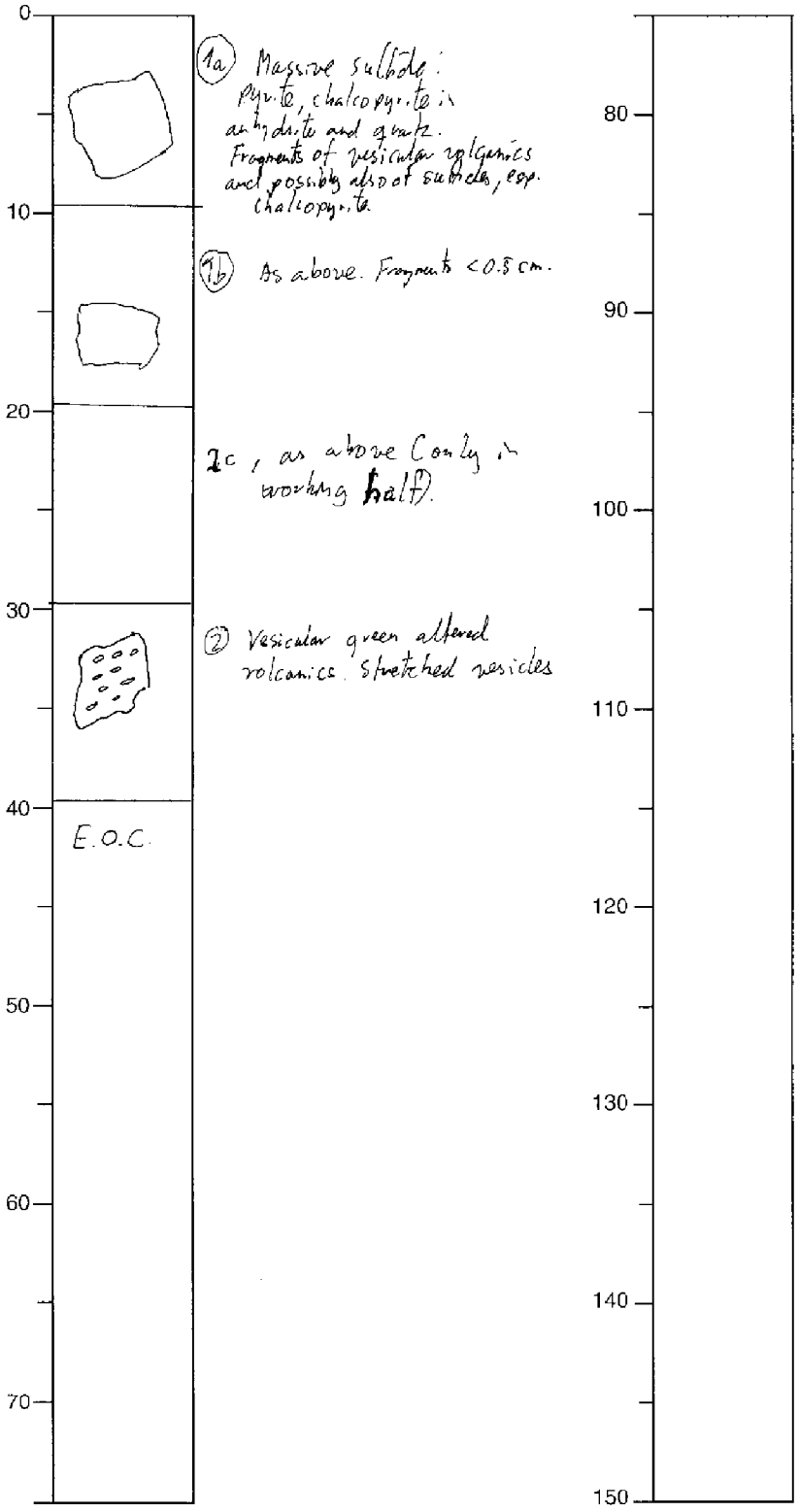
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189A	13R	1	BJE



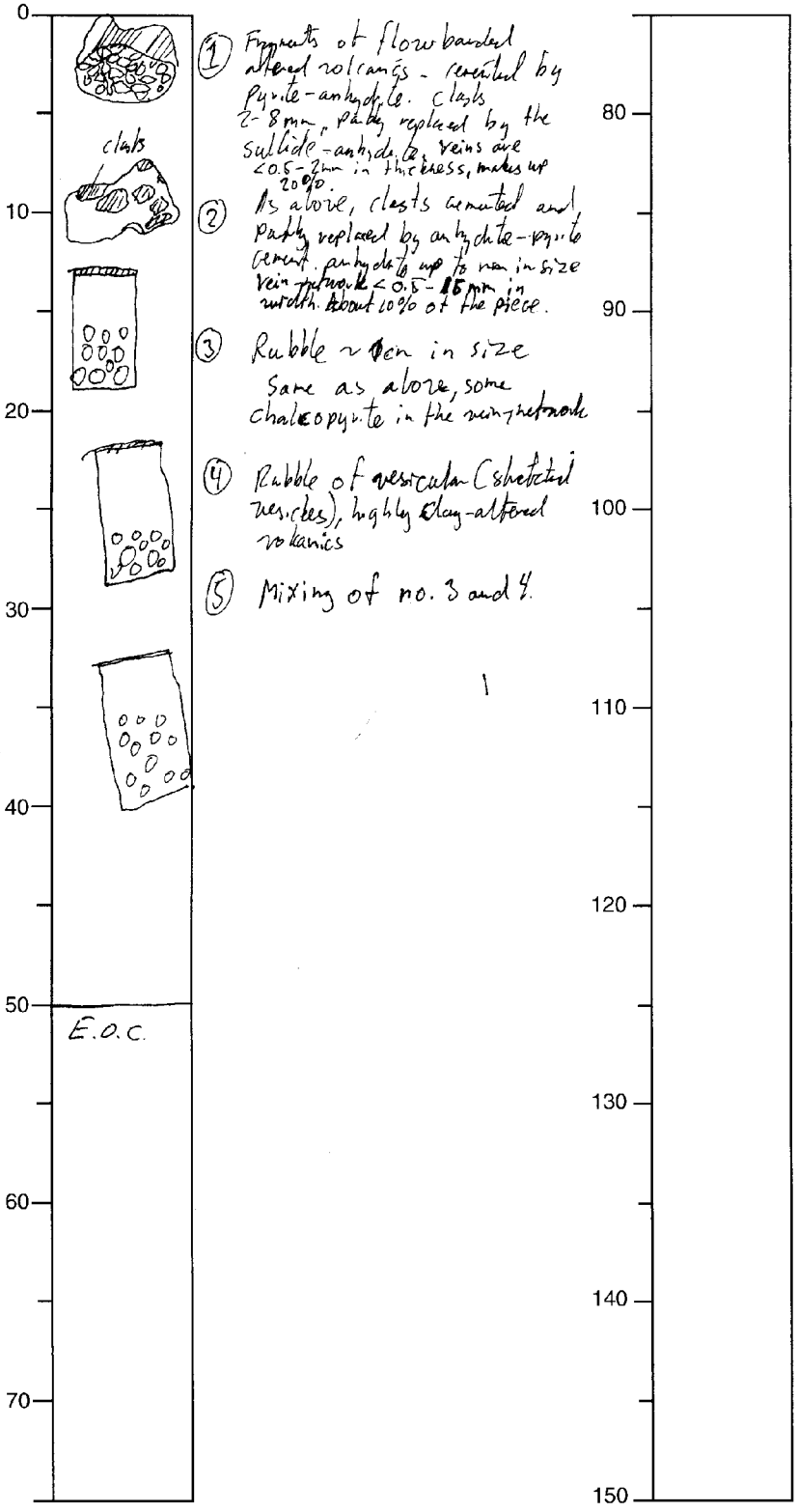
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	1R	1	BJB



STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189 B	2R	1	BJE



(1) Fragments of flow banded altered volcanics - cemented by pyrite-anhydrite. clasts 2-8mm, partly replaced by the sulfide-anhydrite, veins are <0.5-2mm in thickness, makes up 20%.

(2) As above, clasts cemented and partly replaced by anhydrite-pyrite cement. anhydrite up to mm in size vein network <0.5-15mm in width. about 10% of the piece.

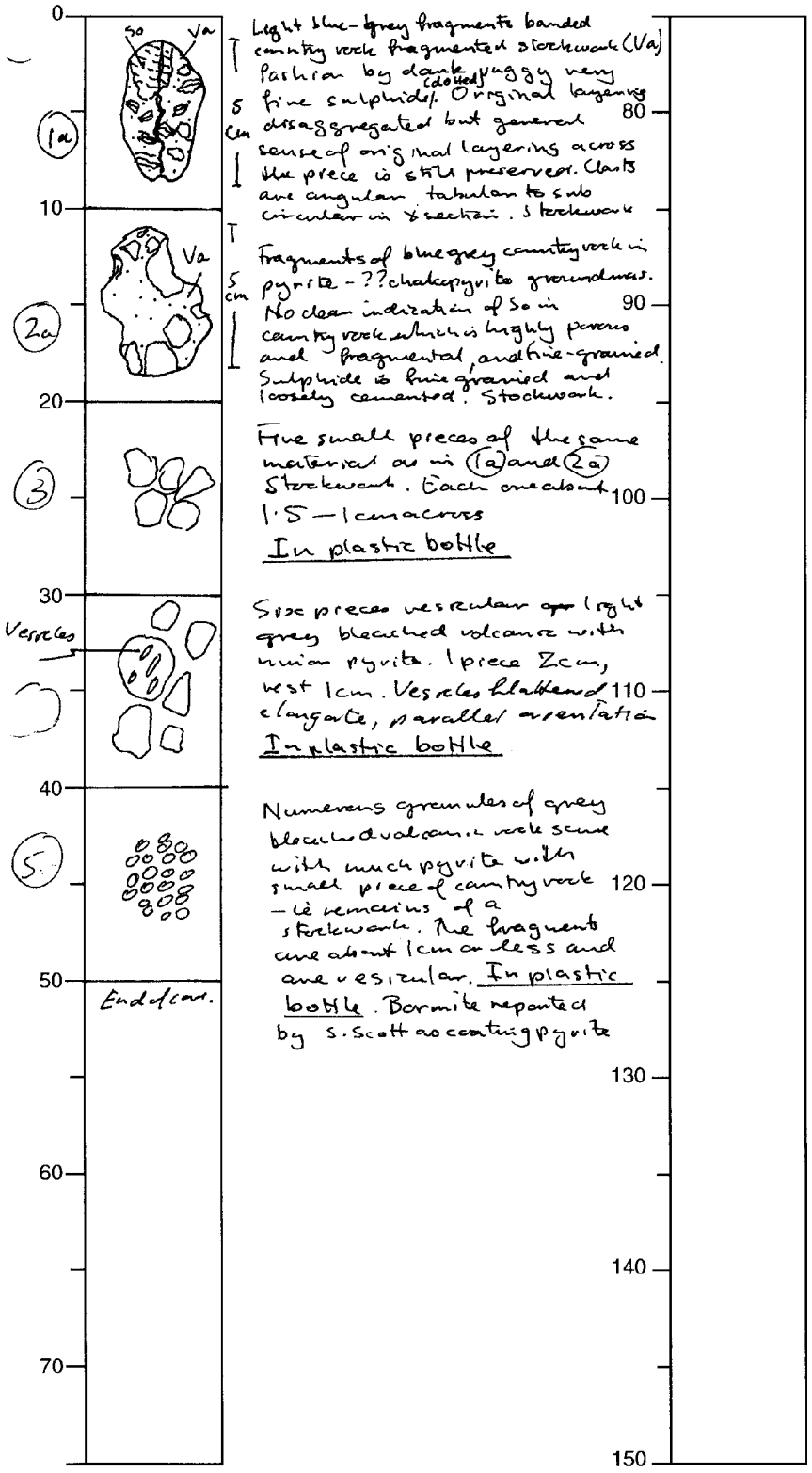
(3) Rubble ~ 4cm in size
Same as above, some chalcopyrite in the vein network

(4) Rubble of vesicular (skeletal vesicles), highly clay-altered volcanics

(5) Mixing of no. 3 and 4.

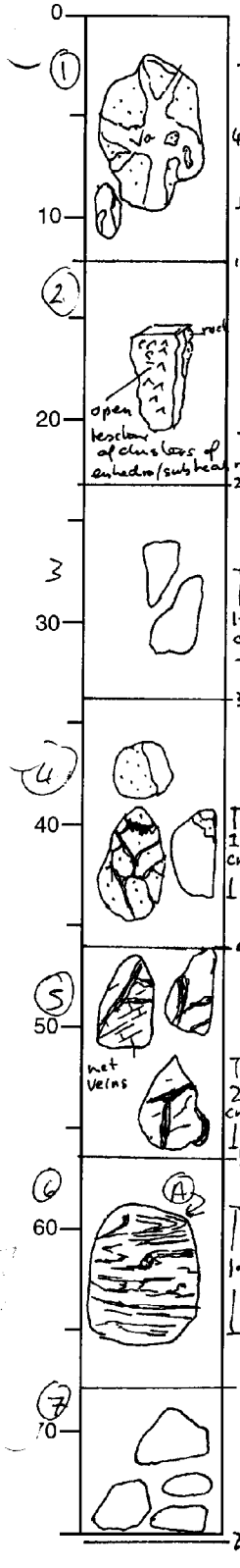
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
195	1189B	2R	2	RHF ~~RTB~~



STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	3R	1	RFF



0–12 cm: Va stockwork of anhy-py intergrown with very fine py+qtz in fragmented fine-grained blue-grey volcanic rock which appears in hand to have been disaggregated and recemented – looks granular.

4 cm: Va ranges from 1 mm to 10 cm thick. Rock cemented with anhy (fine) deadcut by later py+anhy.

12–25: Pyrite growing on blue-grey rock – part of stockwork as above. Rock may have spherulitic texture – is finely veined by py. 1 piece – open vein?

2.5 cm

25–34: 2 pieces of light grey rock, fine grained coated by py and with ½ halo of bleaching 0.7 mm thick at contact of py with rock – formed a vein with clay alteration

1.5 cm

34–46: 3 pieces of light grey possibly formerly spherulitic volcanic with stockwork veining of dominantly pyrite + fine anhy + quartz forming dark to grey fine veins together with some py which have bluebornite coat others brown and oxidised. Chalcopy. coats pyrite.

1 cm

46–57: 3 pieces stockwork veined light-grey rock. Veining is darker grey – py travels from stockwork into fine parallel cracks 1 mm spaced which may be primary layering. Veining is py+anhy – qtz.

2 cm

57–68: Flow banded light grey volcanic with mm scale flow bands and "recumbent" fold at (A) + vergence of folds below. Contains very finely disseminated ~~probable~~ py – is finely vesicular.

1.5 cm

68–76: 4 pieces of grey coarsely vesicular grey volcanic rock with fine pyrite. enhedral. Finely disseminated py as fine thin laminae // to original laminations?

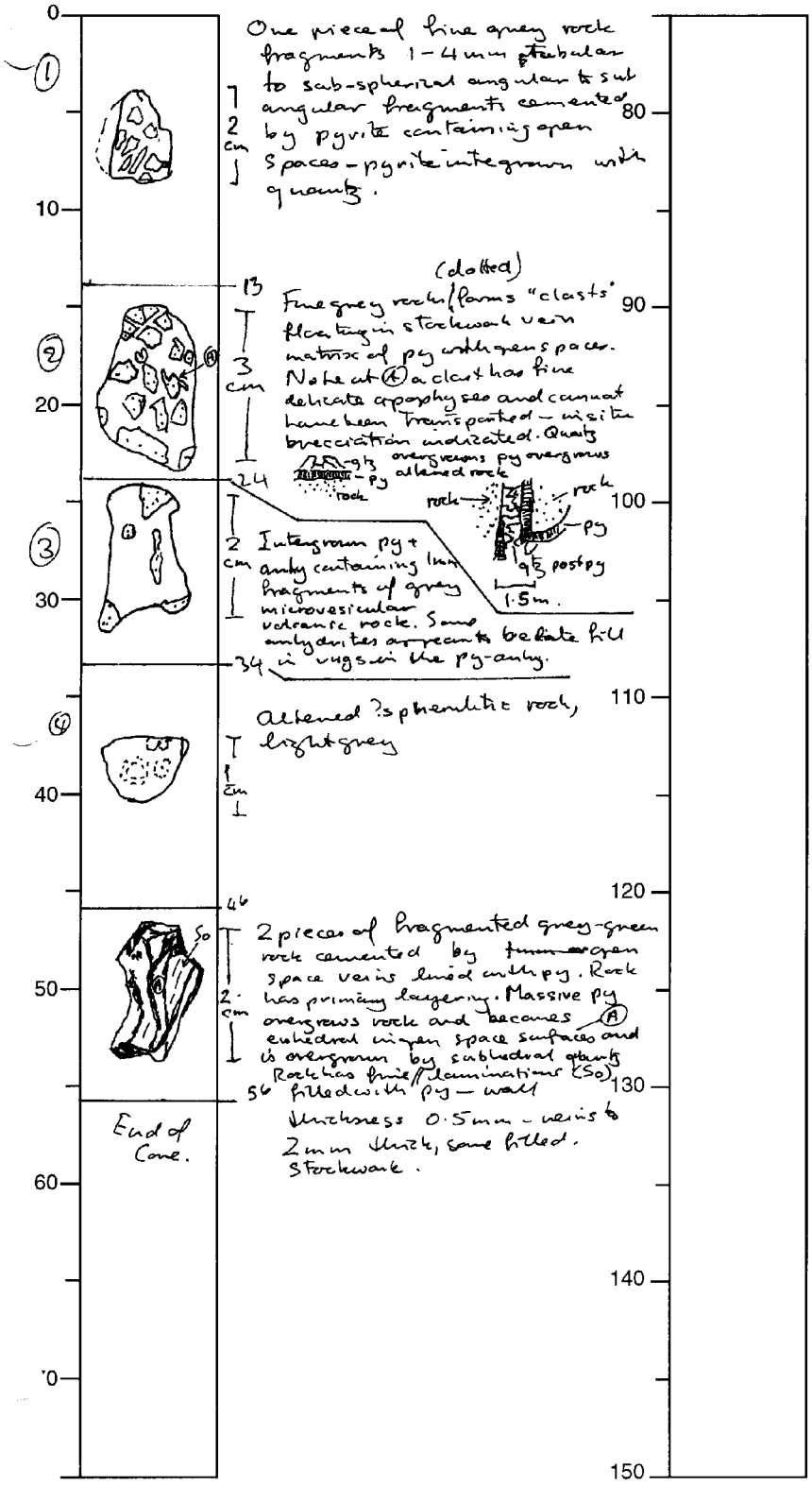
In plastic bottle

84: End of Core.

Numerous 1 cm sized pieces of vesicular light grey volcanic rocks with fine veinlets of py+ probable quartz along what ~~may be~~ is primary layering and thicker veinlets of pyrite + quartz crossing layering. Rocks look fragmented then recemented. Fine sub mm S0 laminations // py veinlets. Blue possible copper sulphate stain in two places on one piece. Py is in stockwork

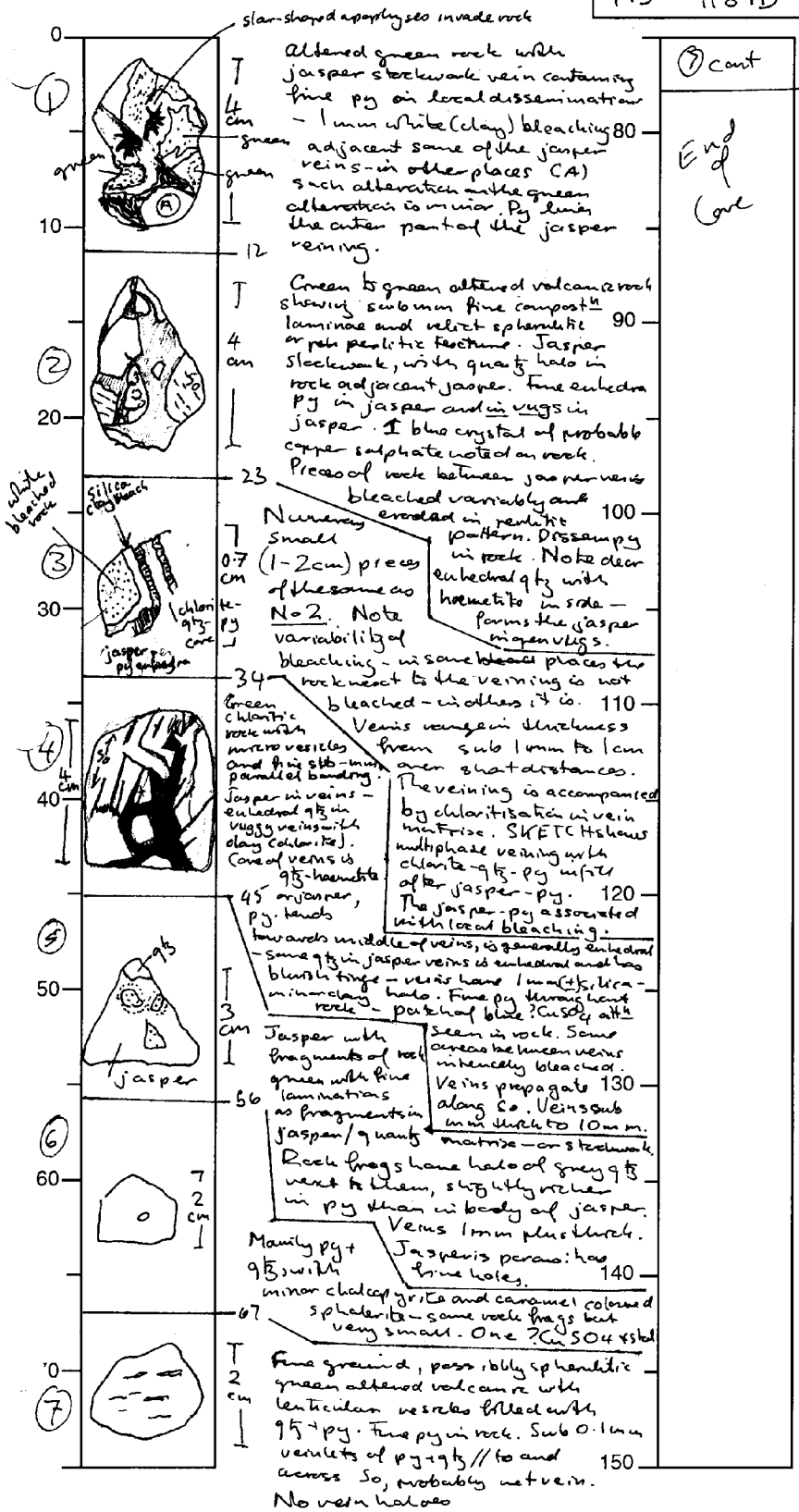
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	5R	1	[illegible]



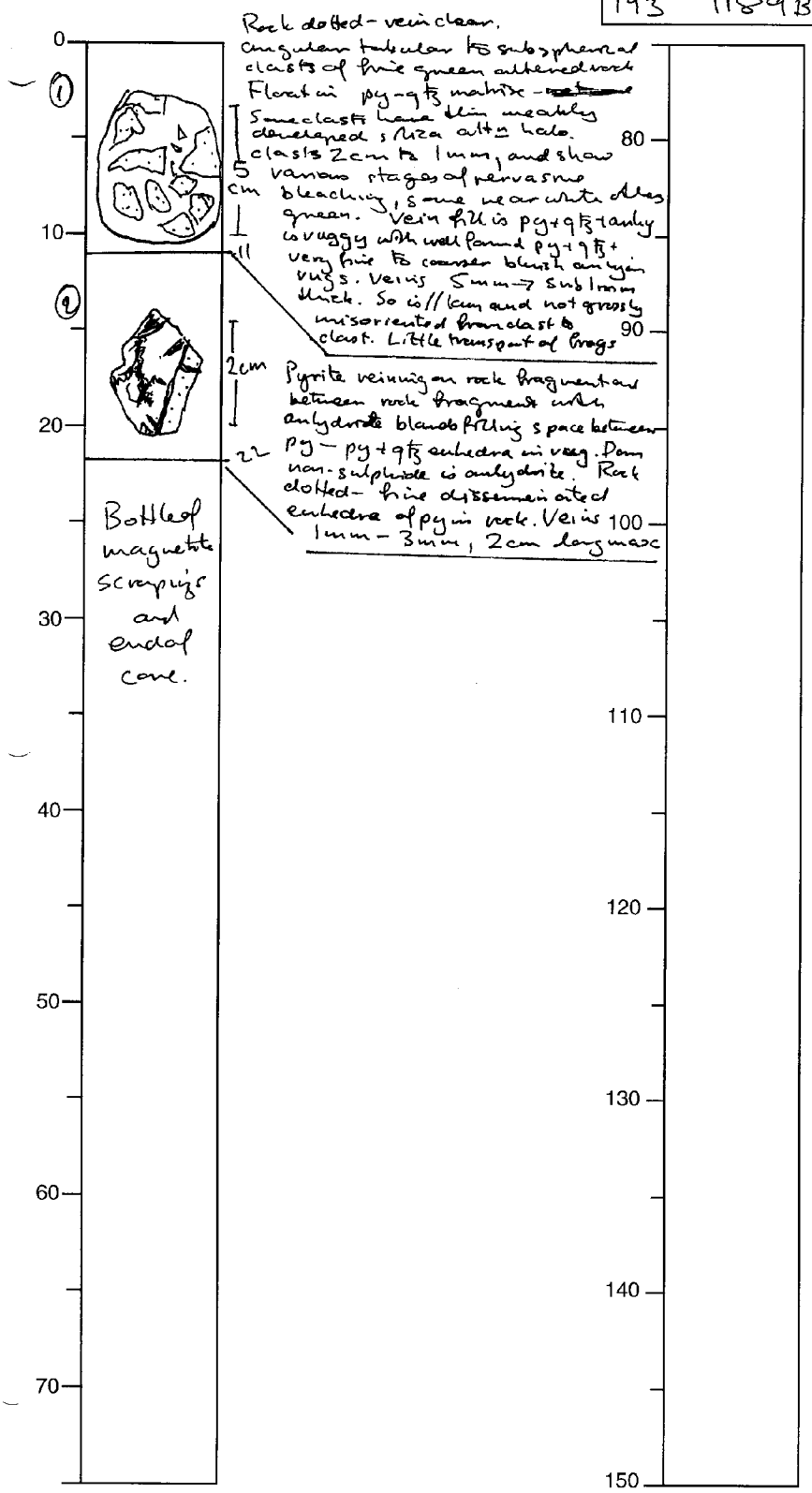
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	6R	1	~~RH~~



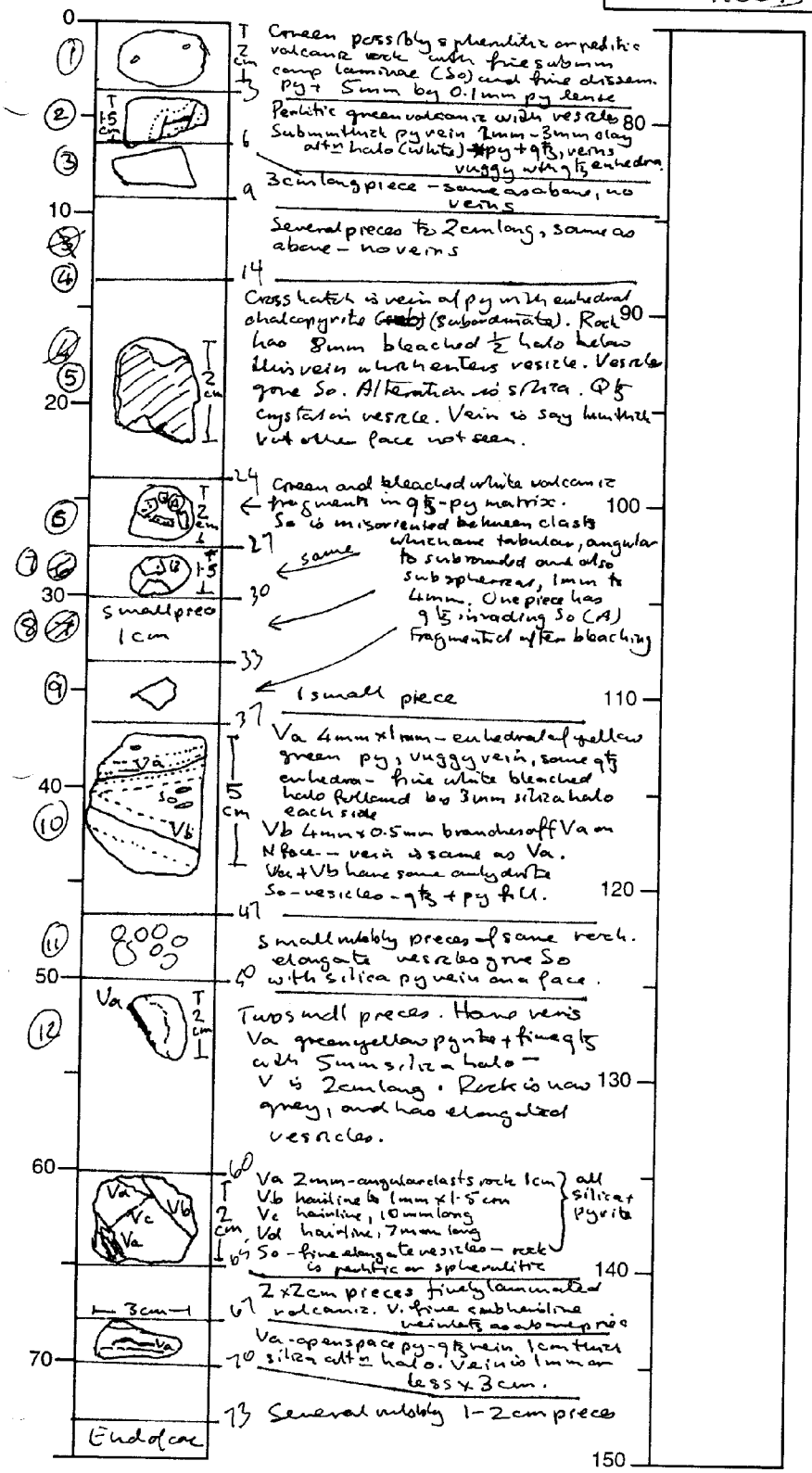
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	7R	1	RSET



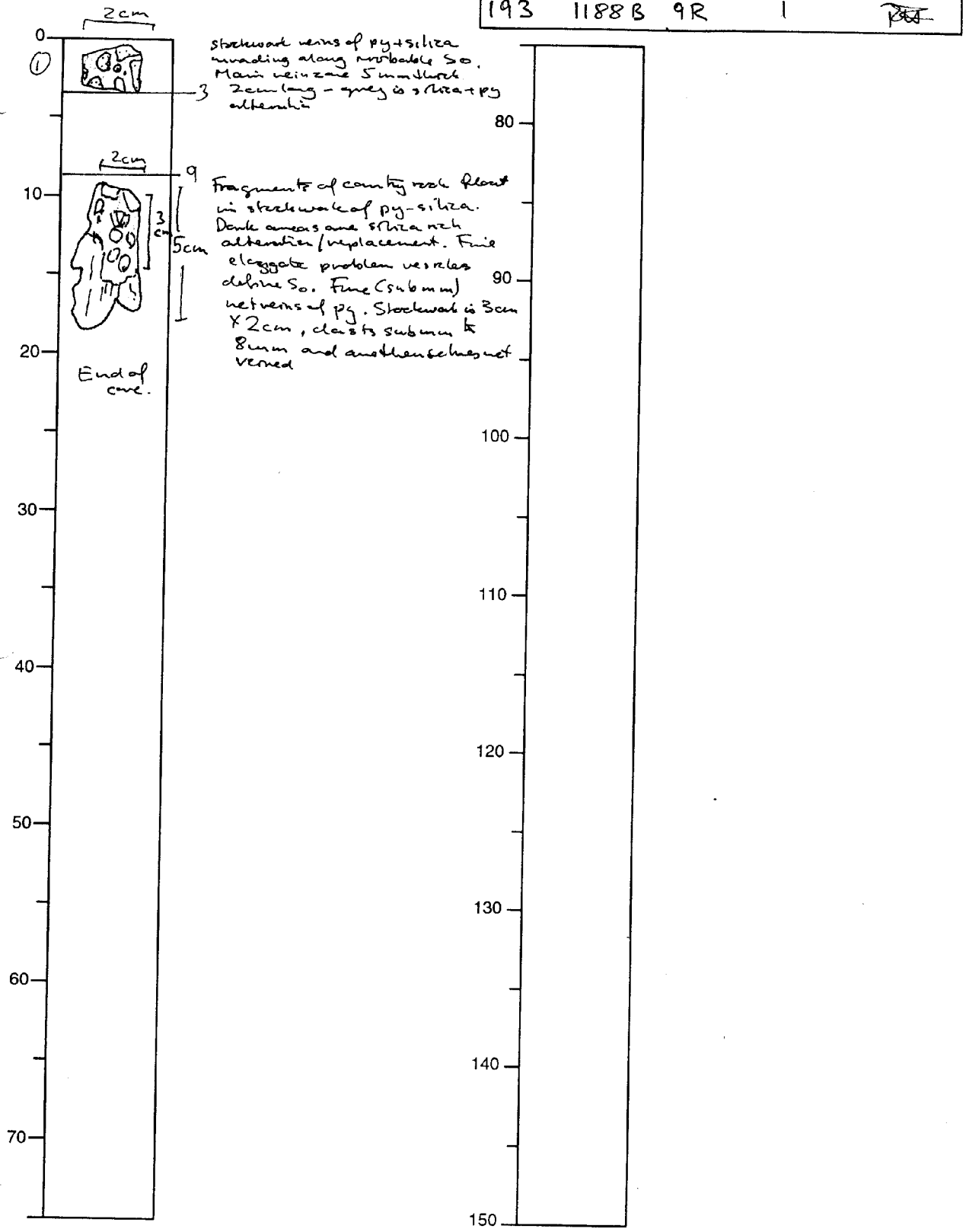
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1188B	8R		



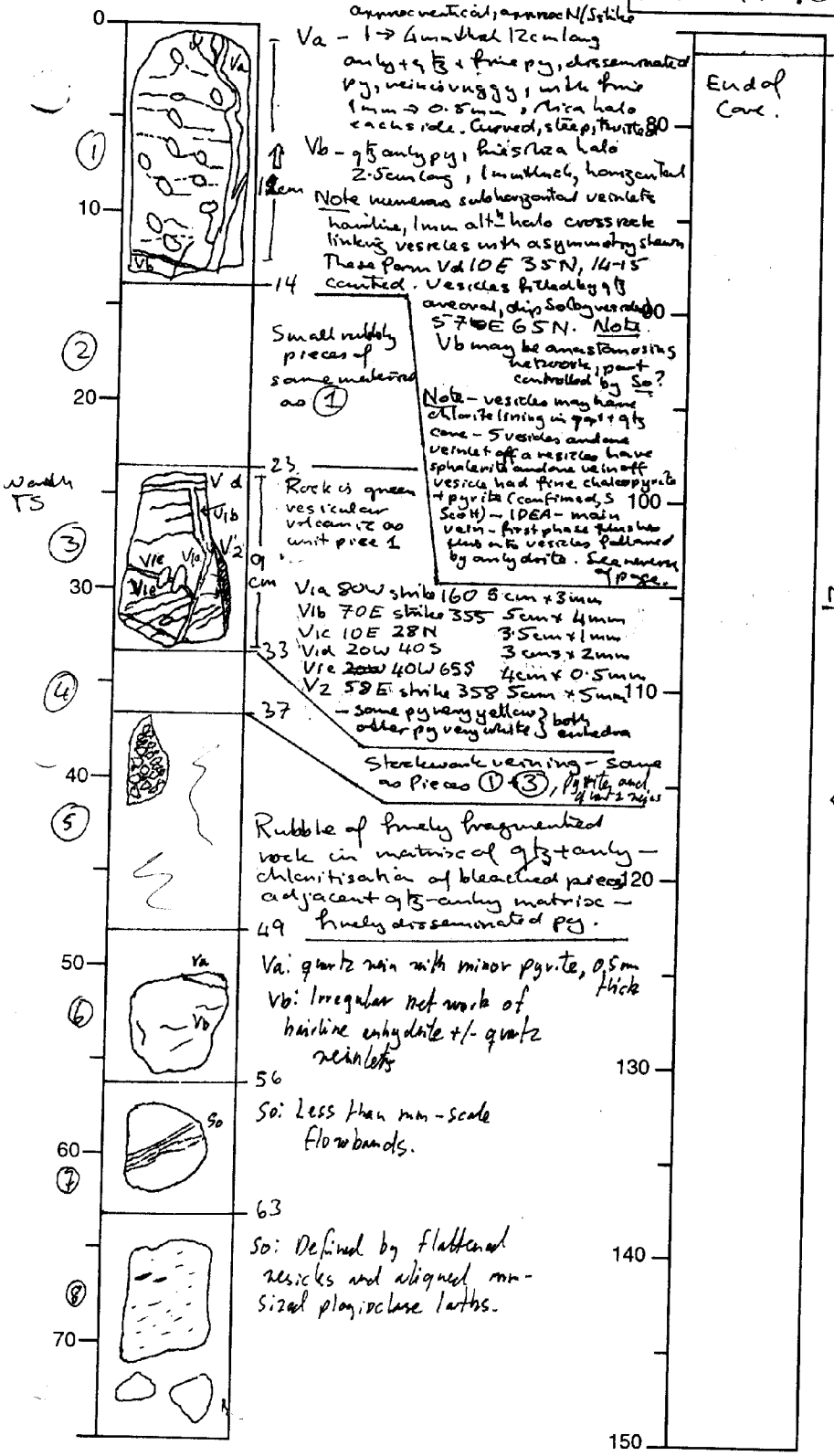
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1188B	9R	1	[illegible]



STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	10R	1	[illegible]



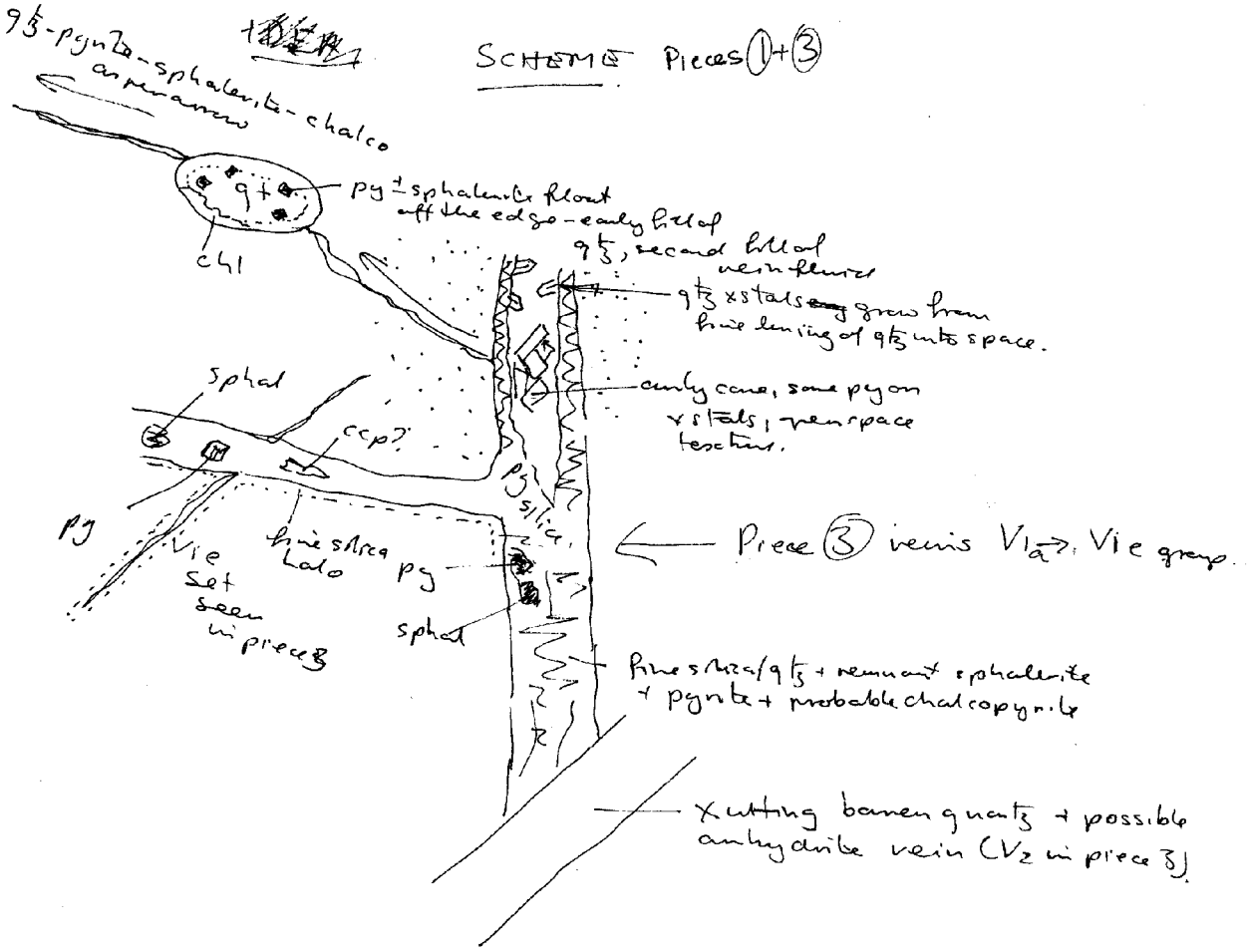
NOTES ON PIECE 3

Veins 1a → 1e are part of a system of py-qtz-anhy veins which are cut by the vein V2. V1a → 1e are similar in general appearance to Va + Vb in piece (1). These veins and veinlets have a chlorite halo about <0.1 to 1mm (particularly wide). The V1e set may well follow primary layering although this cannot be seen in piece (3). They spike of the thicker V1a, V1b, V1d and V1c veins into the rock. The assemblage in the V1a → V1e group is: quartz lining + anhydrite with py in open vugs - qtz lining veins and qtz vesicle fill, with qtz + py in open vesicles linked to V1c. V1c hosts honey coloured sphalerite in qtz core - sphalerite also seen in V1e set

V1a is lined with euhedral qtz in open vugs covered with patches of anhy with xstals growing into open spaces. Fine qtz lining of Veins 1a has qtz xstals + anhy overgrowing lining, with minor py in thin secondary fill. Sphalerite in vesicles with qtz as piece 1.

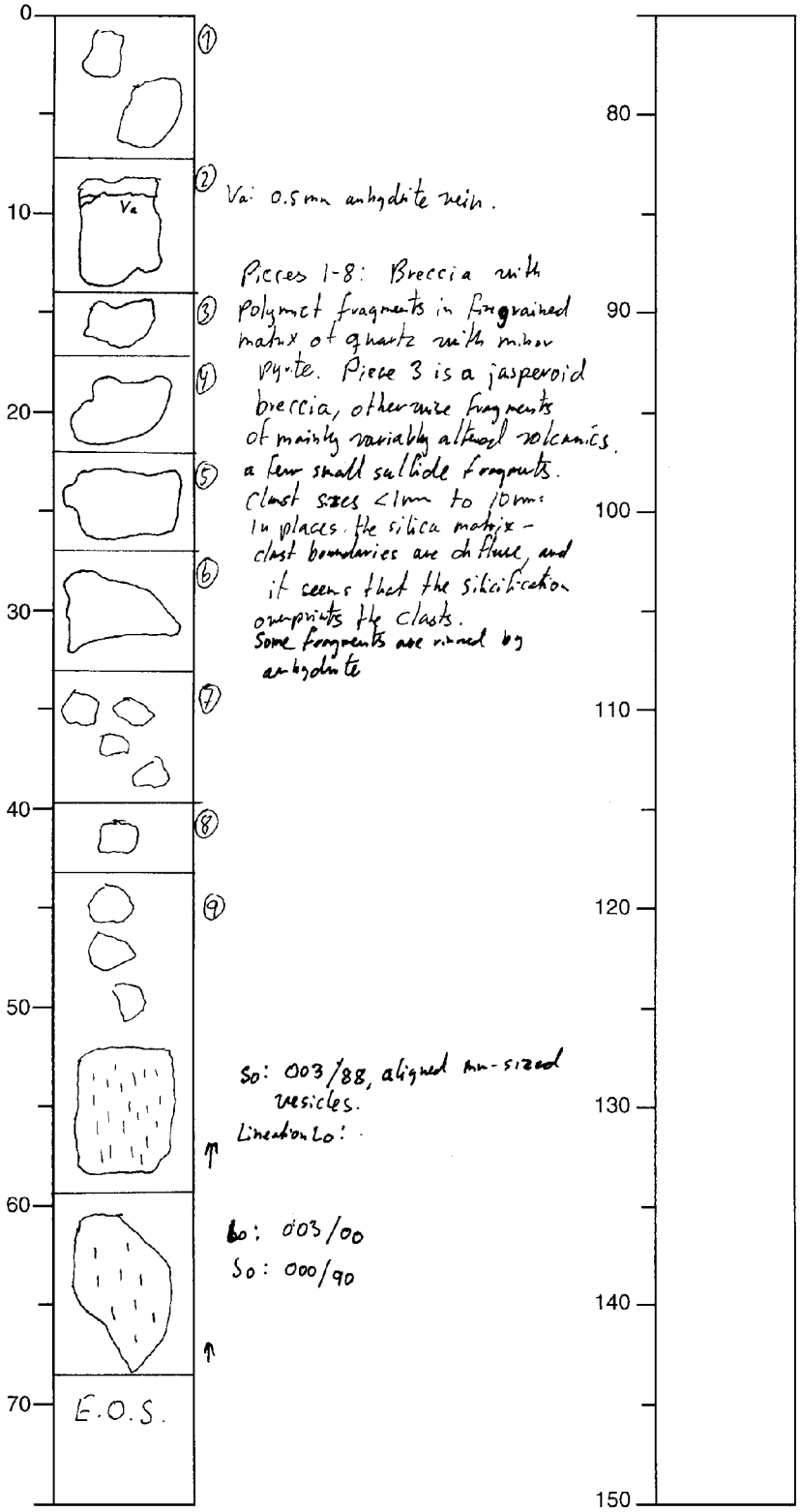
V2 is qtz but may have patches of anhydrite - some salt in white areas.

V1b has qtz lining with sphalerite and probably chalcopyrite + pyrite coated by anhydrite with xstals growing across vein. Relations hard like picture for piece (1) as described on reverse of page


qtz-pyrite-sphalerite-chalco aggregate
SCHEME Pieces ① + ③
py ± sphalerite blebs off the edge - early filled
qtz, second filled vein-filling
qtz xstals grow from free lining of qtz into space.
anhy core, some pyrite xstals, vein space textures.
sphal
ccp?
py
Vie
Set seen in piece 3
thin silica halo
py
sphal
Piece ③ veins Via, Vie group.
Pure silica/qtz + remnant sphalerite + pyrite + probable chalcopyrite
Xcutting barren quartz + possible anhydrite vein CV2 in piece 3

STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	11R	1	BJE



Va: 0.5mm anhydrite vein.

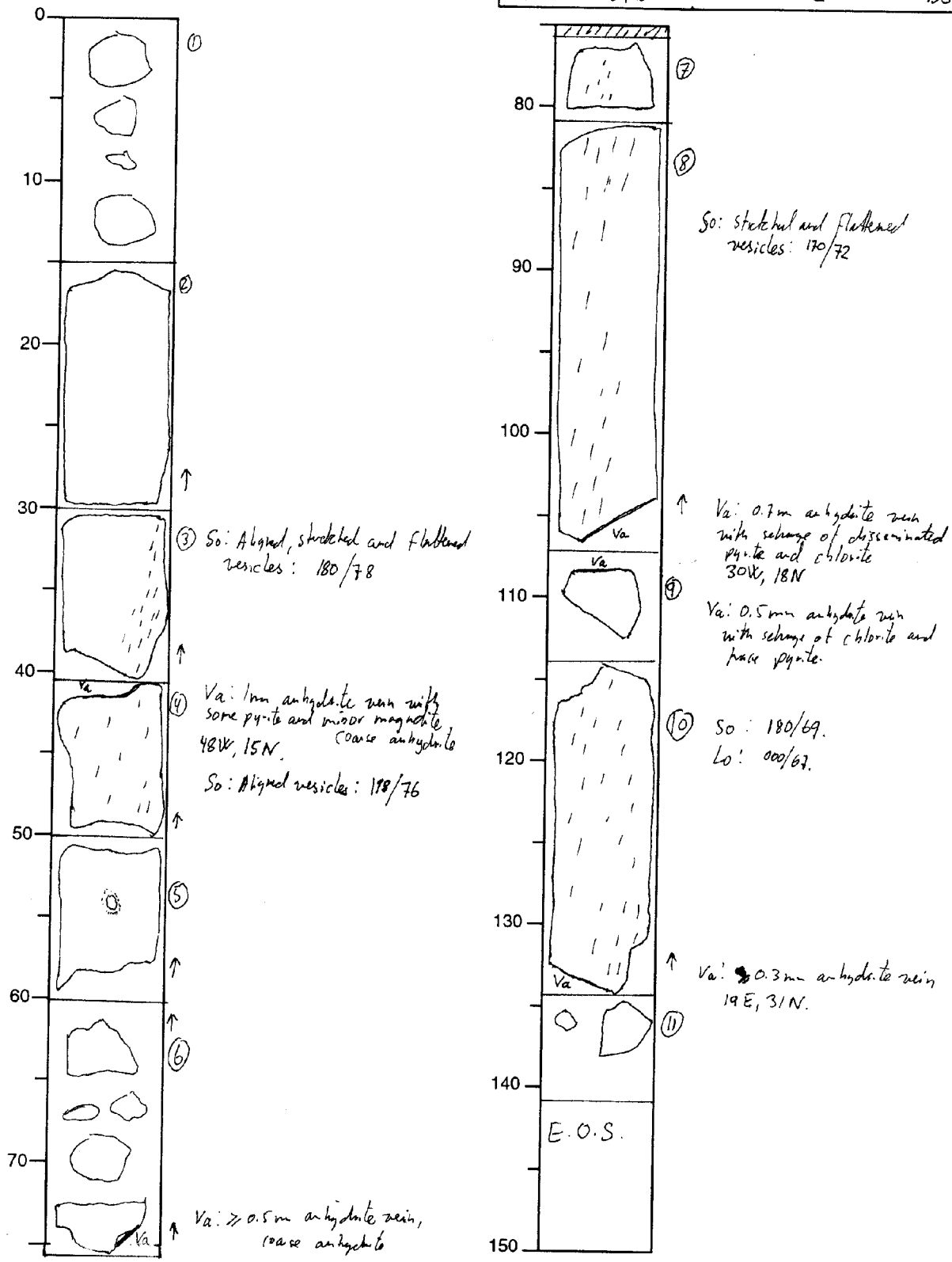
Pieces 1-8: Breccia with polymict fragments in fine grained matrix of quartz with minor pyrite. Piece 3 is a jasperoid breccia, otherwise fragments of mainly variably altered volcanics, a few small sulfide fragments. Clast sizes <1mm to 10mm. In places the silica matrix - clast boundaries are diffuse, and it seems that the silicification overprints the clasts. Some fragments are veined by anhydrite

So: 003/88, aligned mm-sized vesicles.
Lineation Lo:

Lo: 003/00
So: 000/90

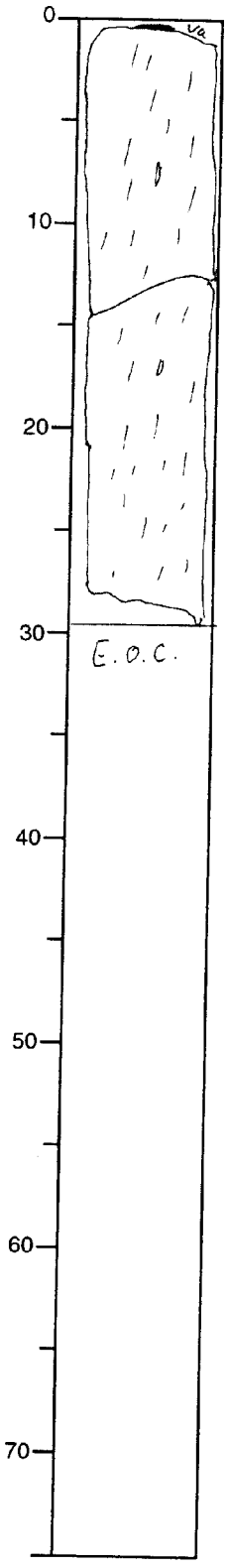
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	11R	2	BJE

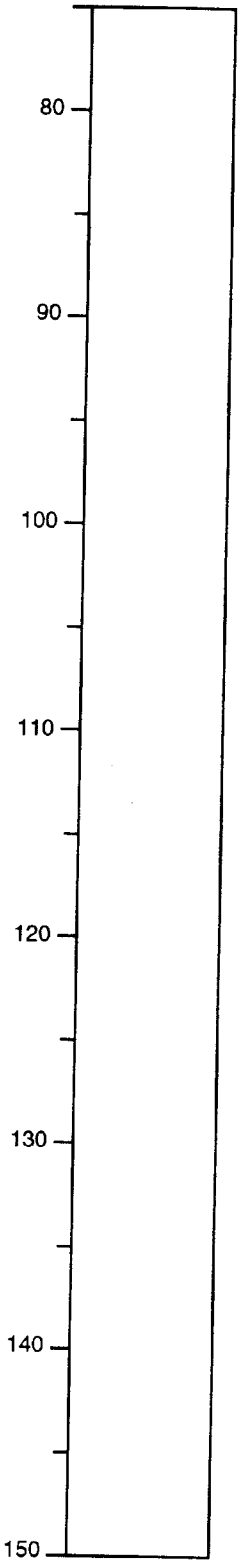


STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	11R	03	BJE

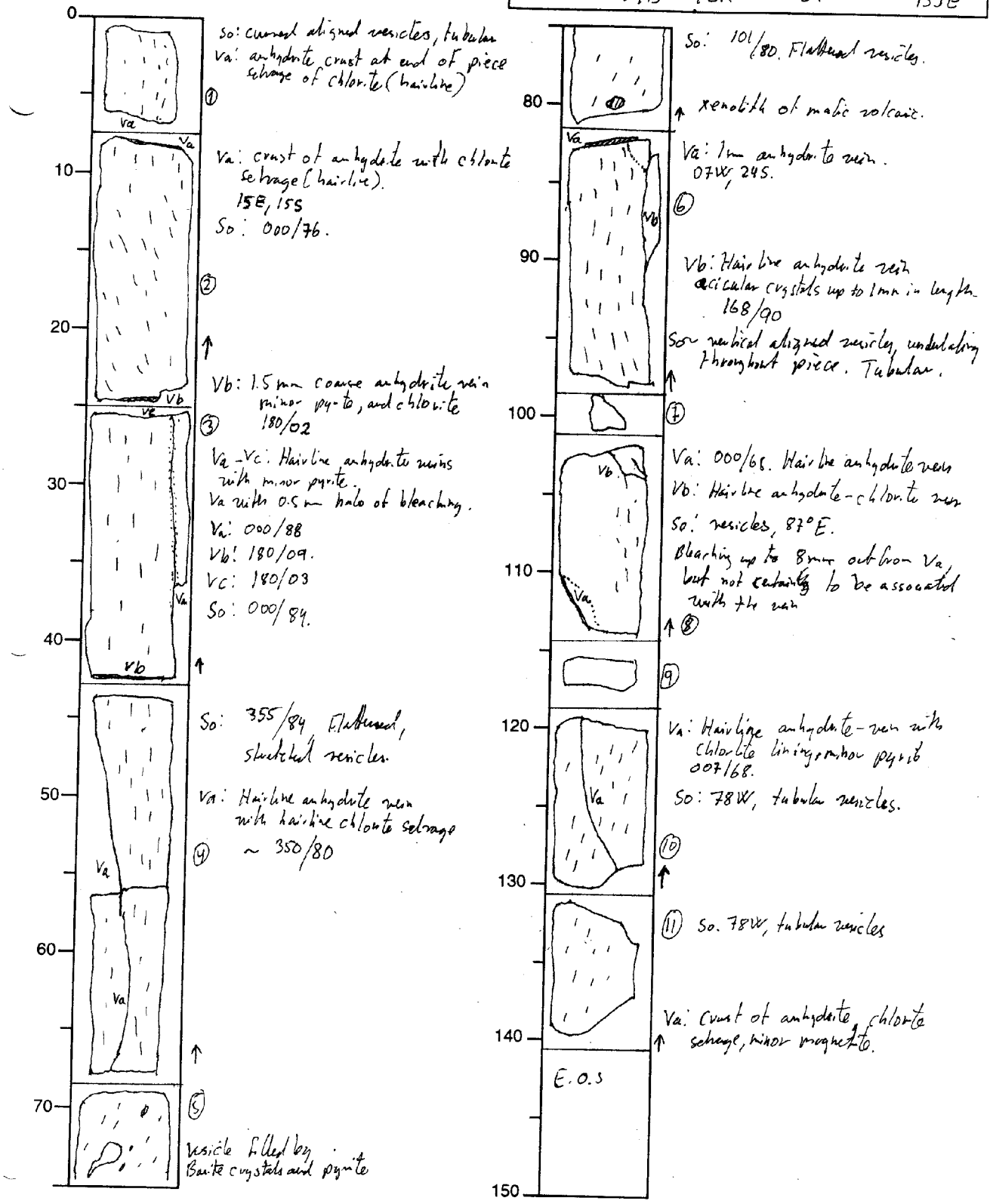


So: 180/75.
Lo ≈ 270/75.
Tubular vesicles.
Da: coarse anhedral vein ≥ 0.2 mm



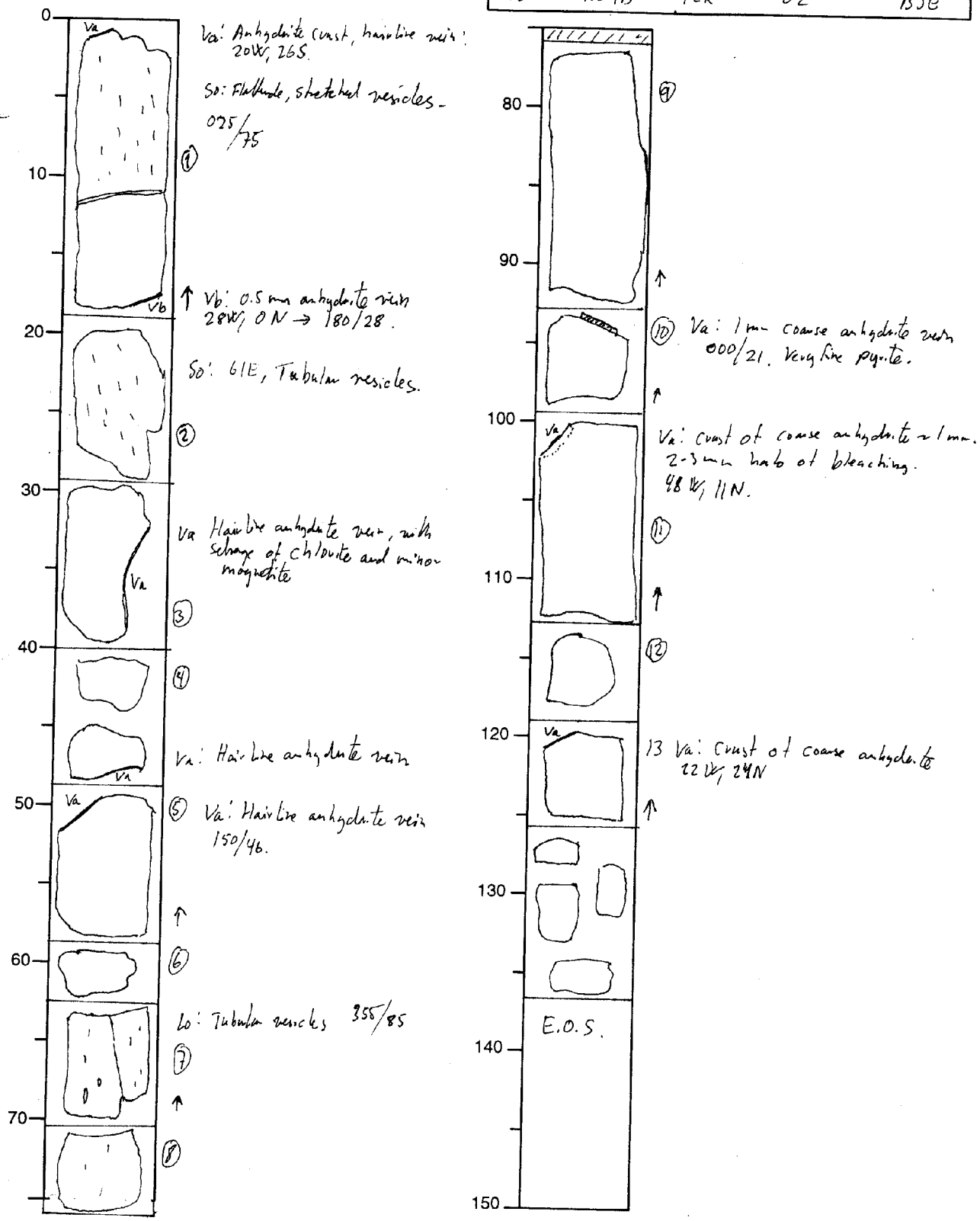
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	12R	01	BJE



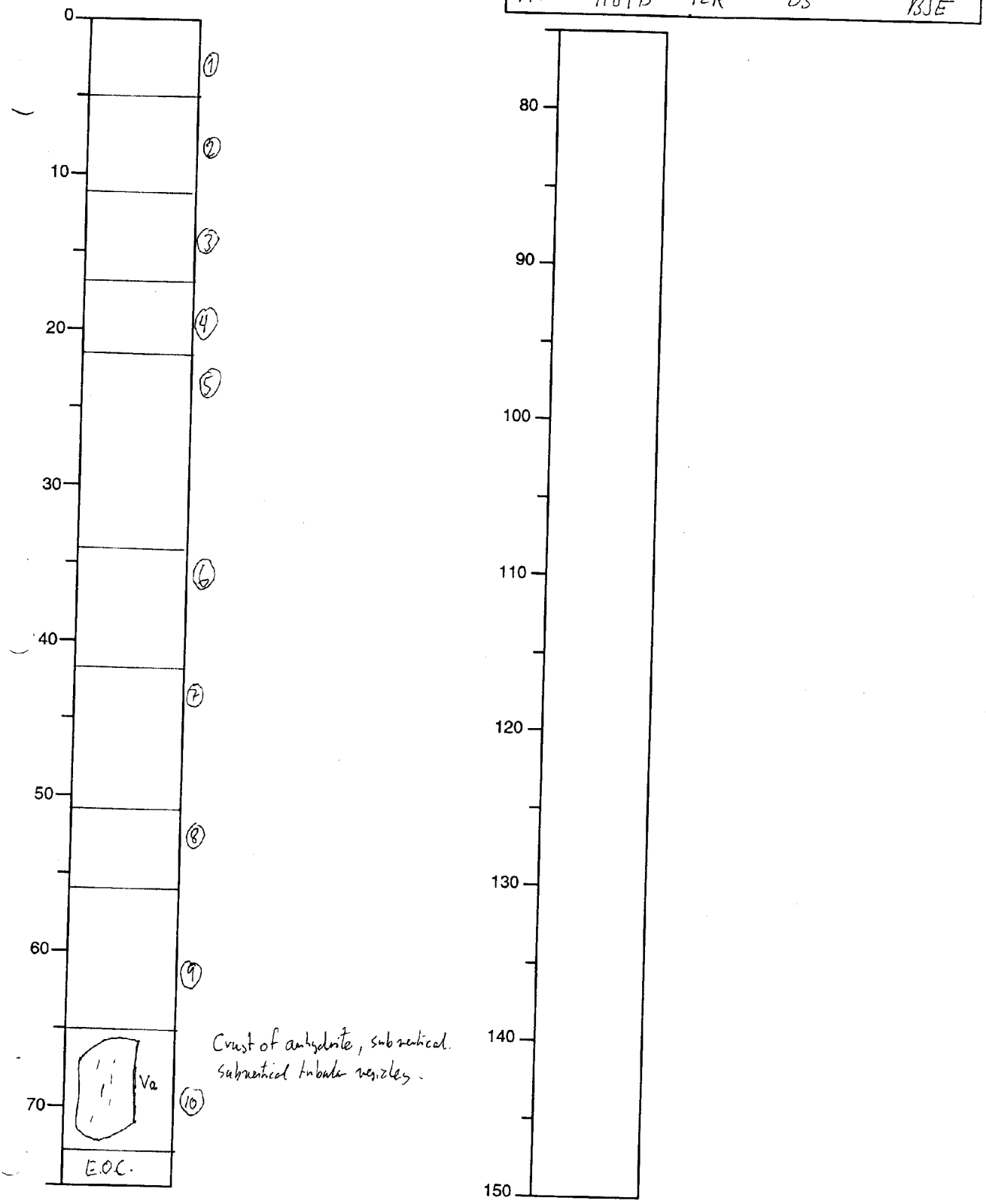
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	12R	02	BJE



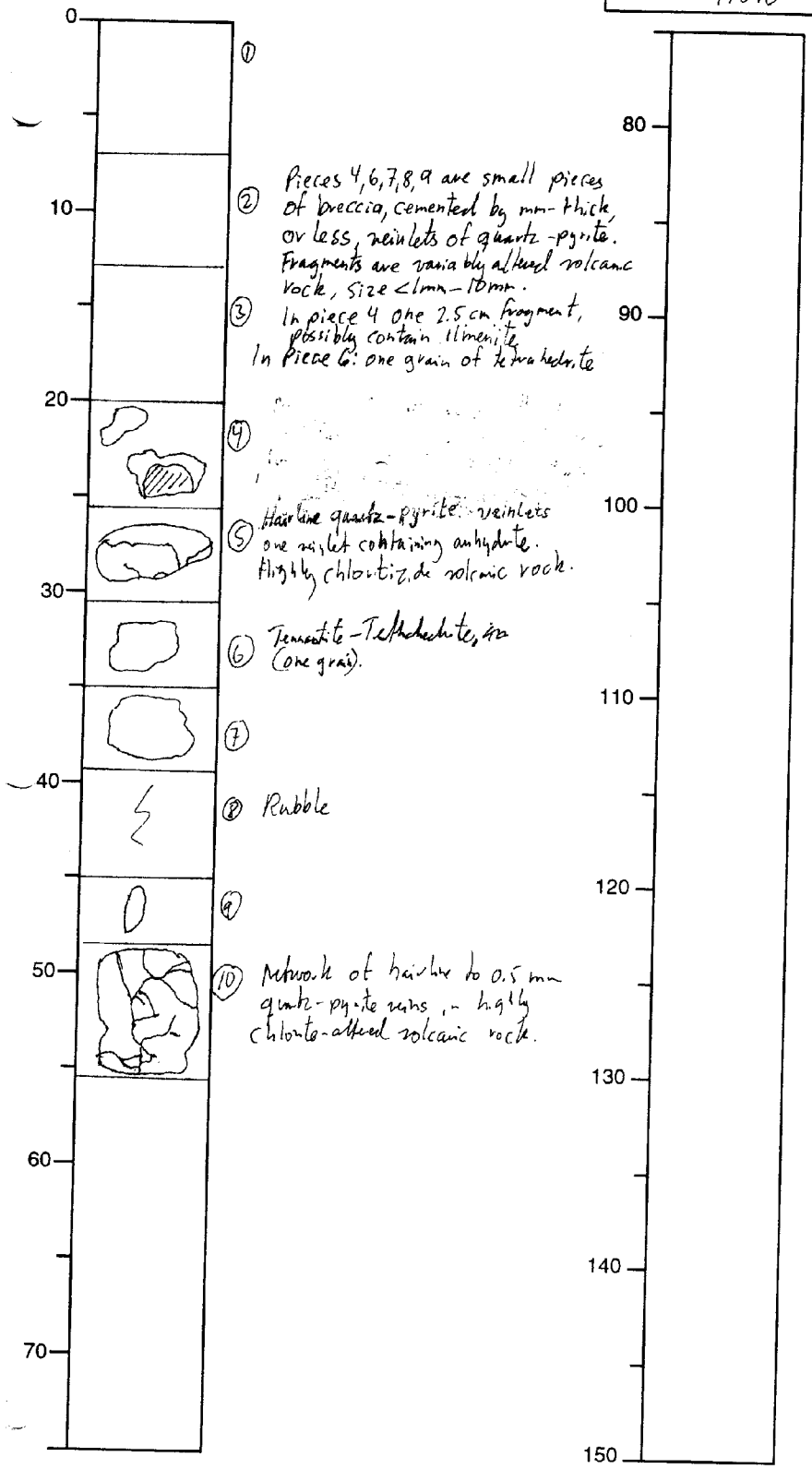
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	12R	03	BJE



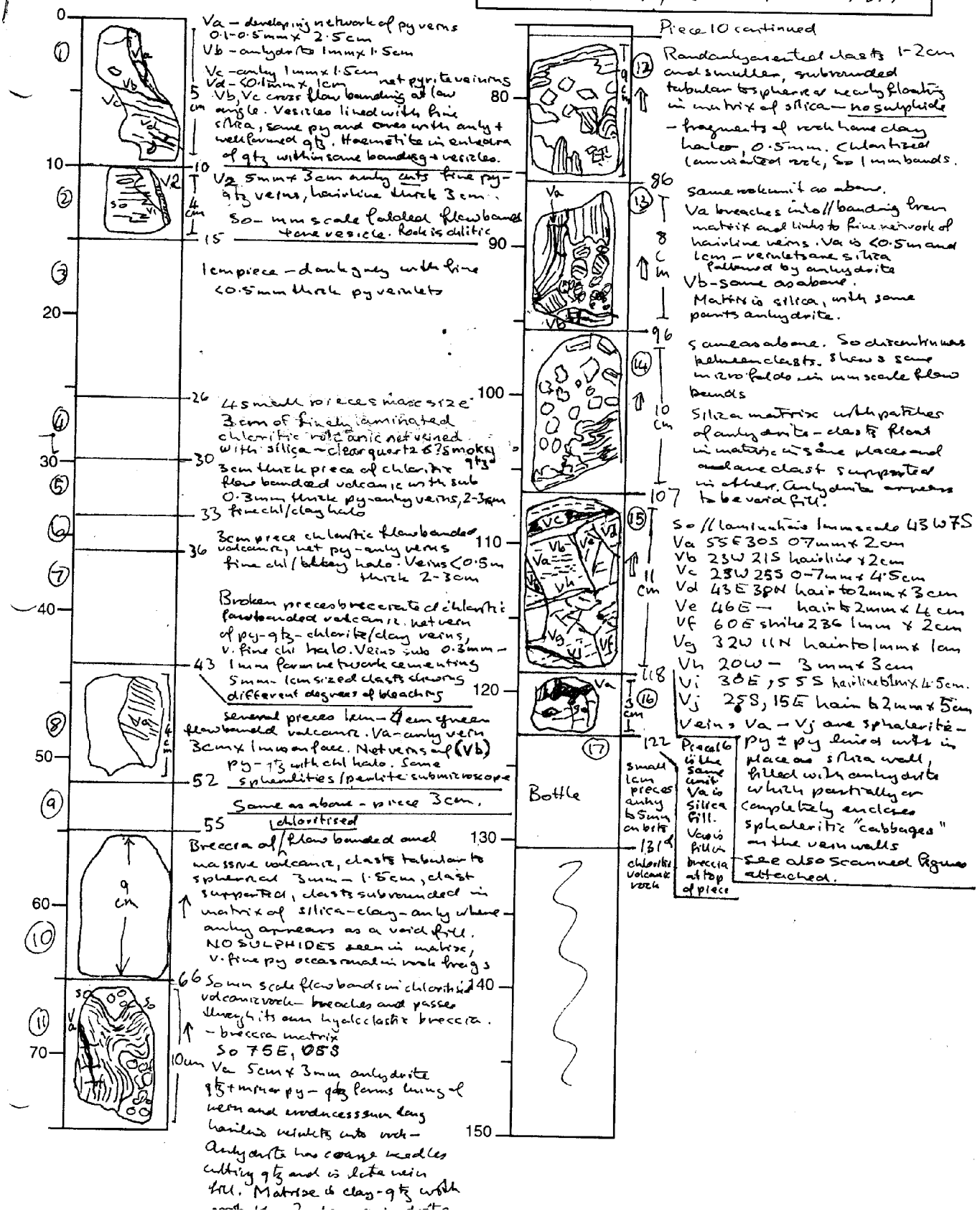
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	13R	01	BJE



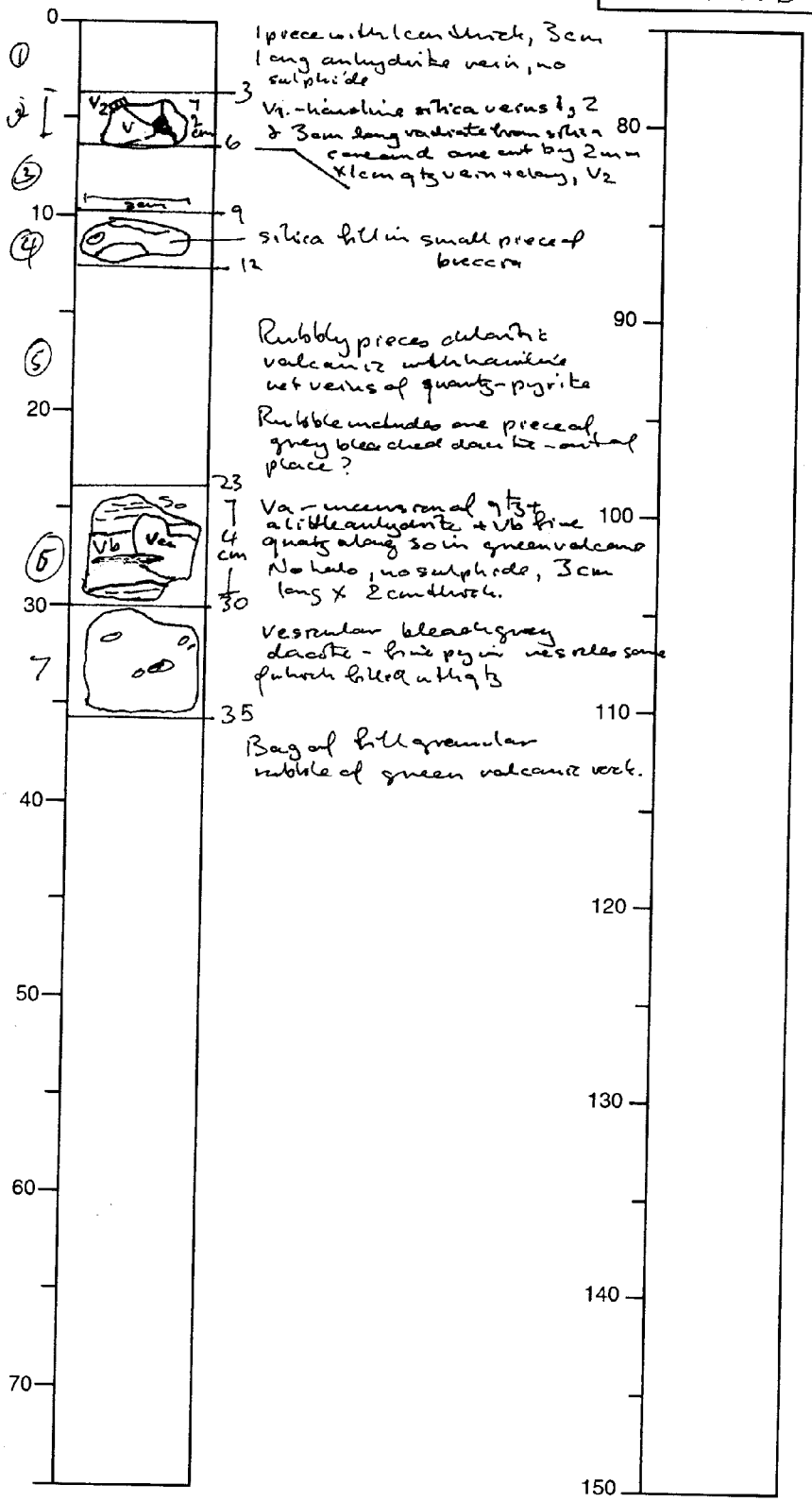
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	14R	1	RAT



STRUCTURAL GEOLOGY DESCRIPTION

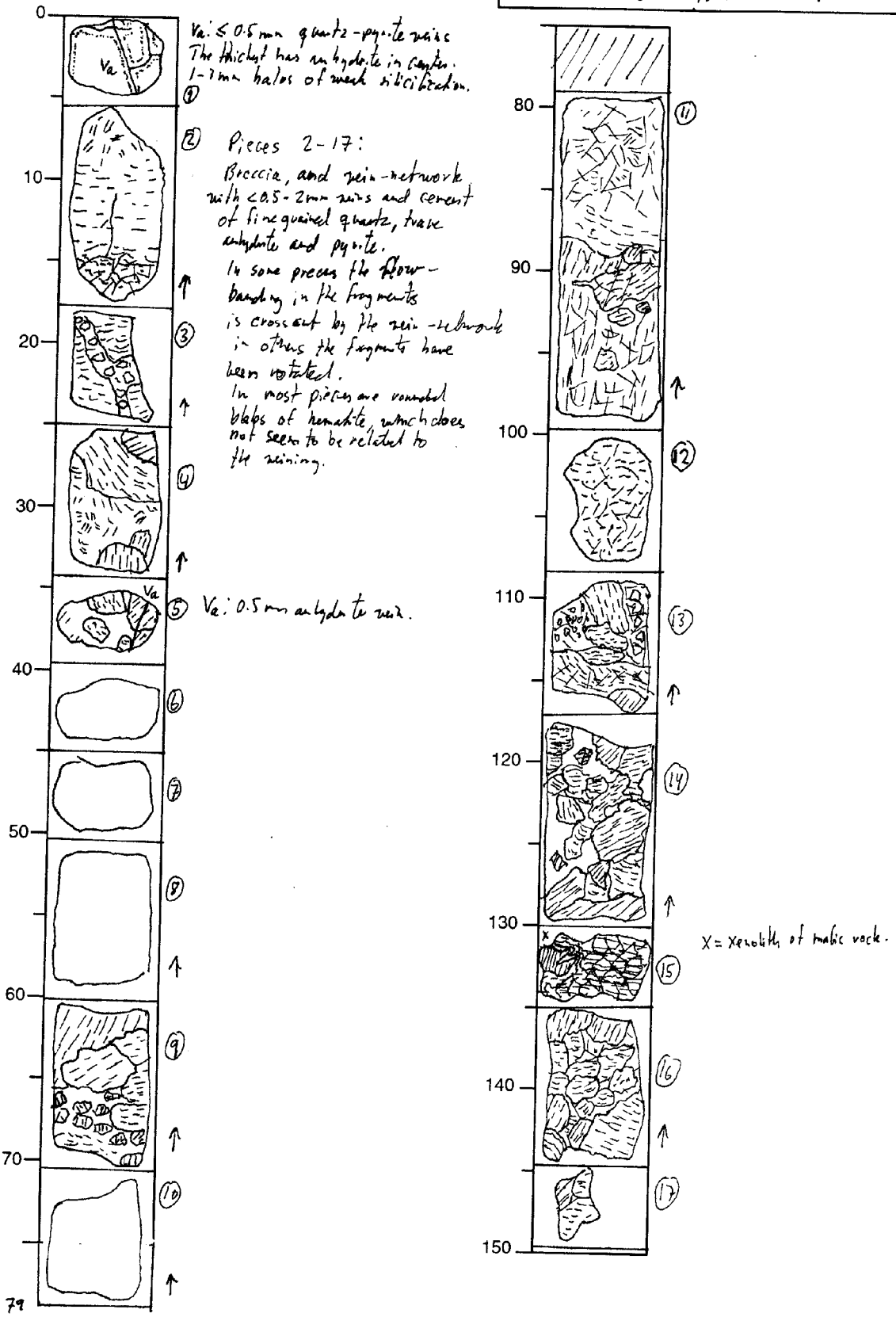
Leg	Hole	Core	Section	Observer
193	1189B	14R	2	R[illegible]



Entered chronologically into Structlog1189B.xls

STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	15R	01	BJE



Va: ≤ 0.5 mm quartz-pyrite veins
The thicker has anhydrite in center.
1-3 mm halos of weak silicification.

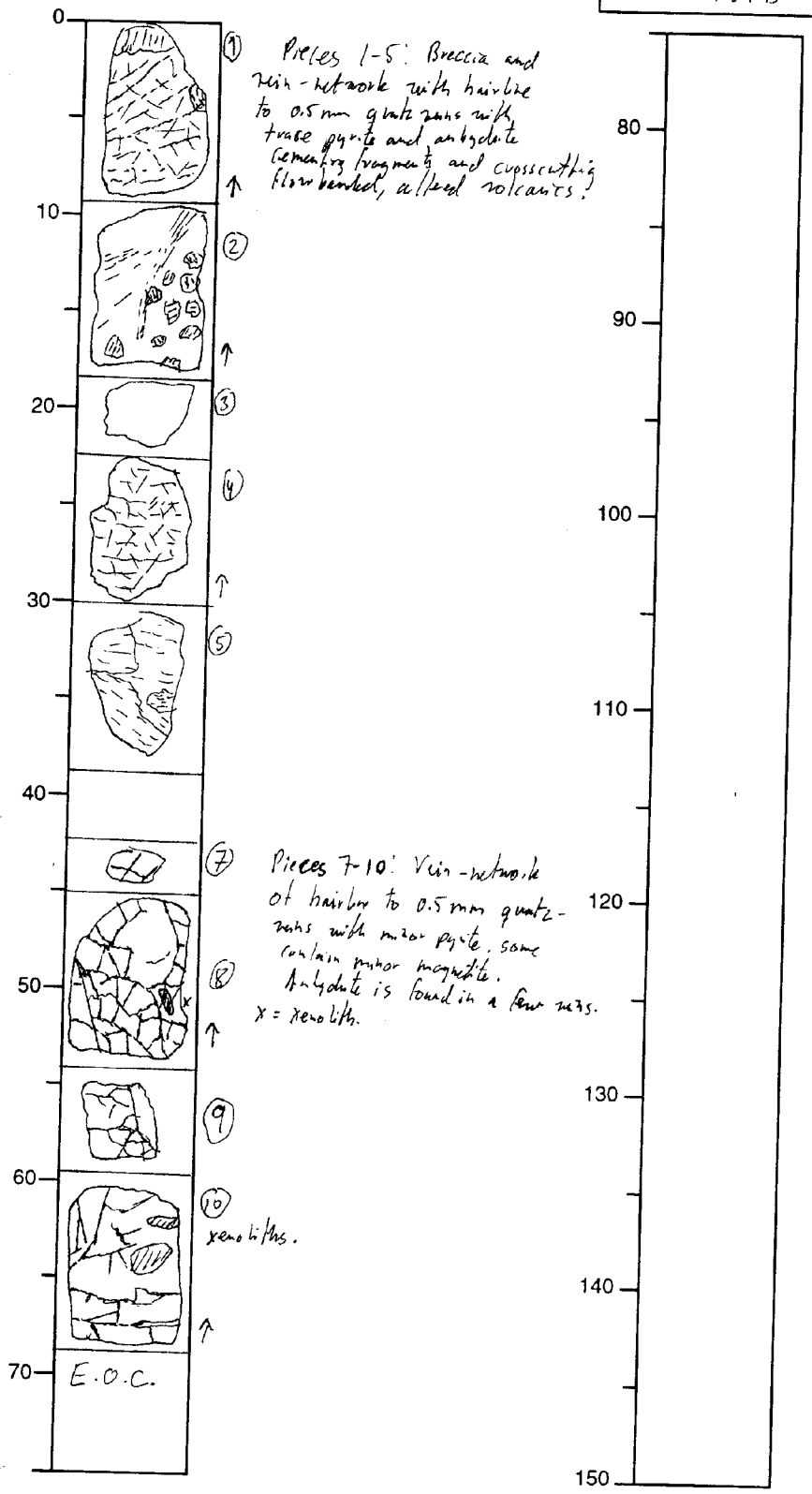
Pieces 2-17:
Breccia, and vein-network with <0.5-2 mm veins and cement of fine grained quartz, trace anhydrite and pyrite.
In some pieces the flow-banding in the fragments is crosscut by the vein-network in others the fragments have been rotated.
In most pieces are rounded blobs of hematite, which does not seem to be related to the veining.

Va: 0.5 mm anhydrite vein.

X = Xenolith of mafic rock.

STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189 B	15R	02	BJE



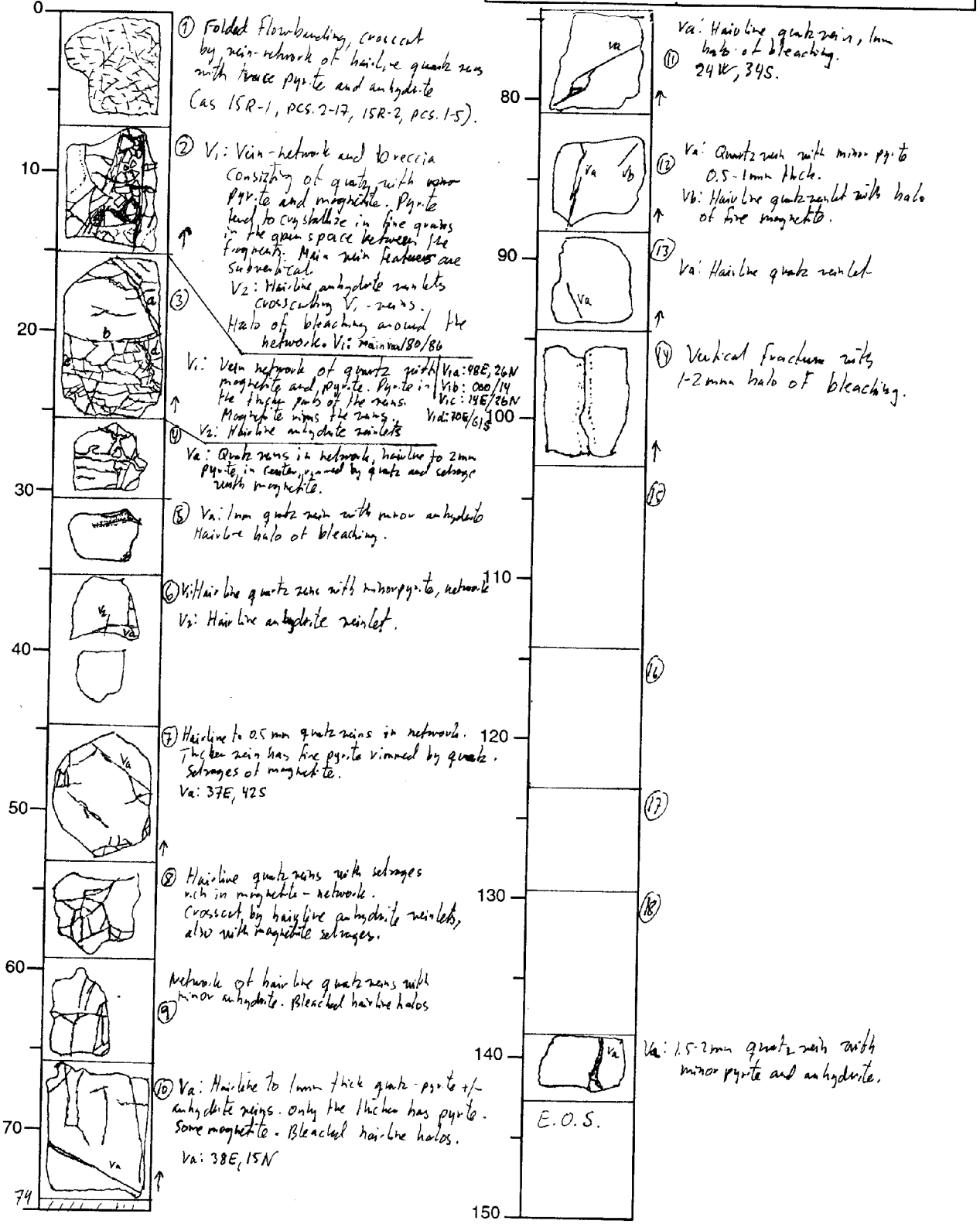
Pieces 1-5: Breccia and vein-network with hairline to 0.5 mm quartz veins with trace pyrite and anhydrite cementing fragments and crosscutting flow-banded, altered volcanics?

Pieces 7-10: Vein-network of hairline to 0.5 mm quartz-veins with minor pyrite, some contain minor magnetite. Anhydrite is found in a few veins. X = xenoliths.

xenoliths.

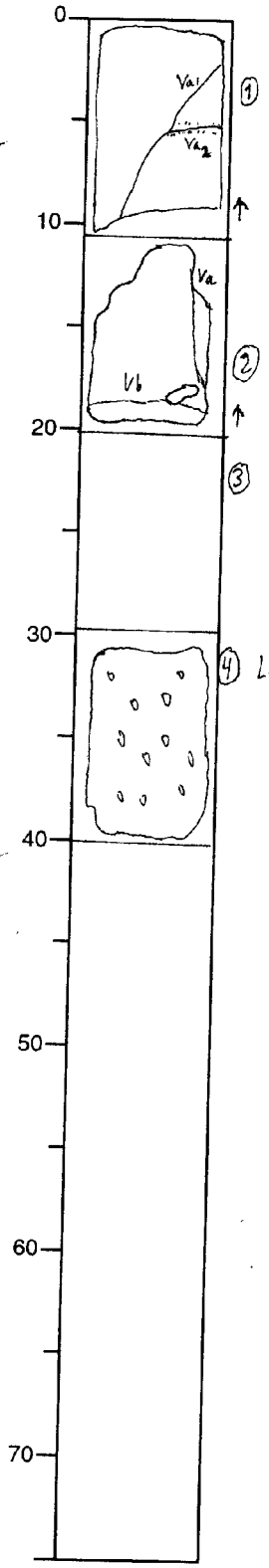
STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	16R	01	AJE



STRUCTURAL GEOLOGY DESCRIPTION

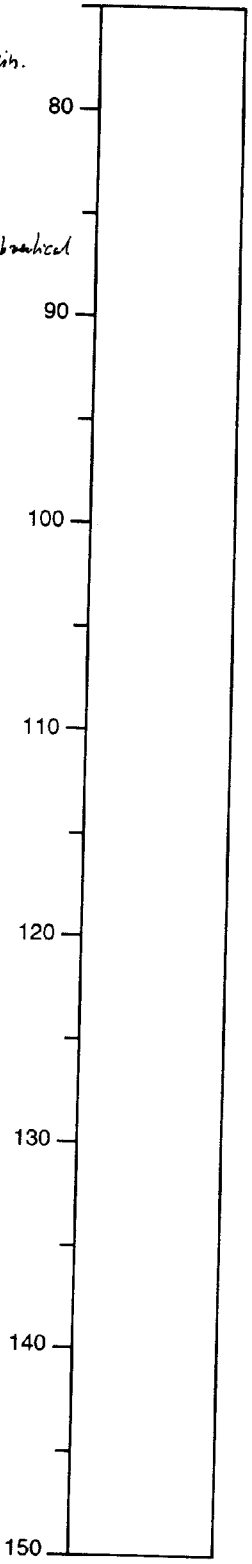
Leg	Hole	Core	Section	Observer
193	1189B	16R	02	BJE



Va1: 0.5 - 1 mm quartz-pyrite vein. Pyrite tends to occupy center of vein. Weak halo of clay-alteration around Va2.
Va1: 60W, 62N

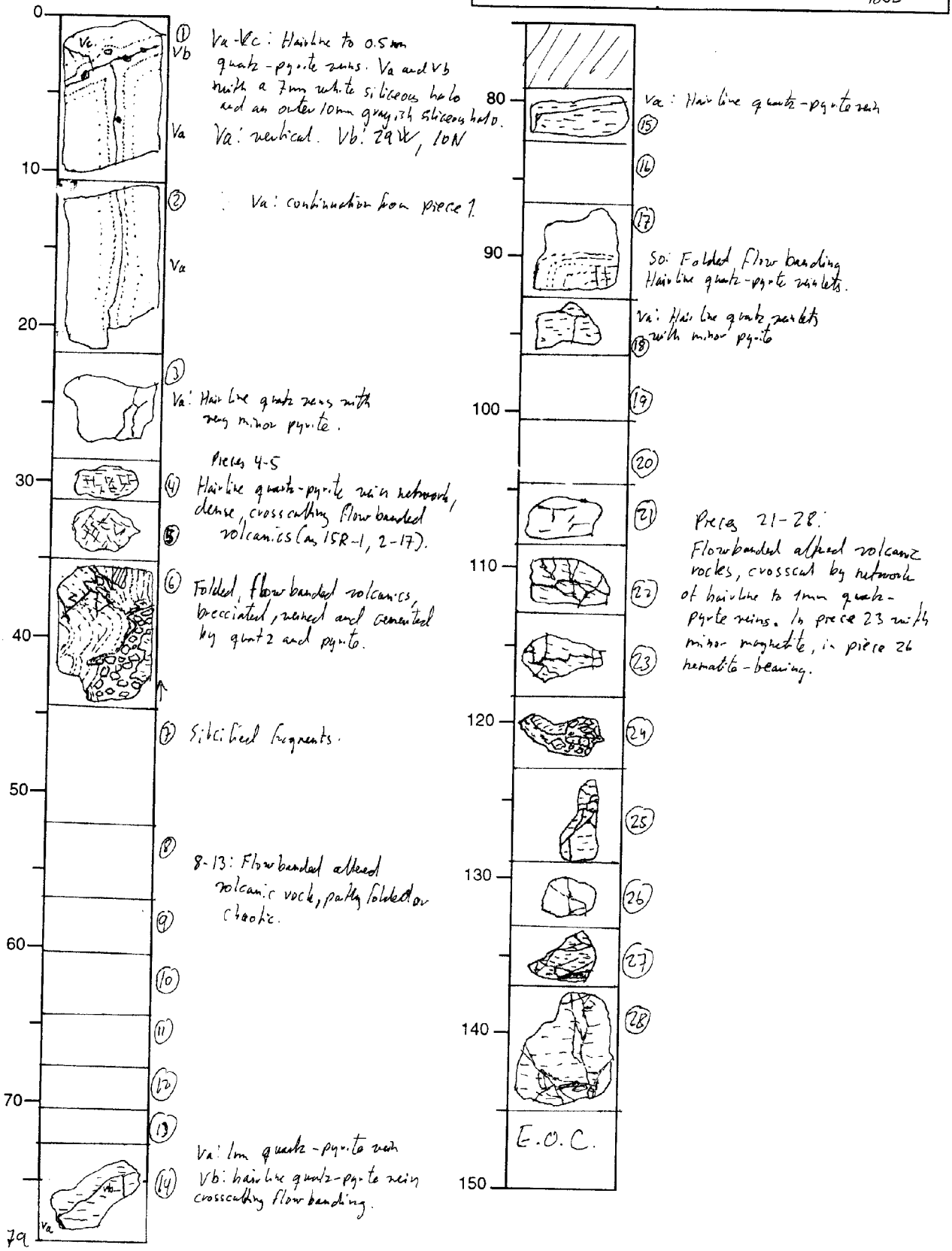
Va: 0.3 mm quartz-pyrite vein, subvertical
Vb: Hairline quartz-pyrite vein, subhorizontal.

4 Lo, tubular vesicles: 155/37



STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	17R	01	BJE



Va-Vc: Hairline to 0.5mm quartz-pyrite veins. Va and Vb with a 7mm white siliceous halo and an outer 10mm grayish siliceous halo. Va: vertical. Vb: 29W, 10N

Va: continuation from piece 1

Va: Hairline quartz-pyrite veins with very minor pyrite.

Pieces 4-5
Hairline quartz-pyrite vein network, dense, crosscutting flow banded volcanics (Cm 15R-1, 2-17).

Folded, flow banded volcanics, brecciated, veined and cemented by quartz and pyrite.

Silicified fragments.

8-13: Flow banded altered volcanic rock, partly folded or chaotic.

Va: 1mm quartz-pyrite vein
Vb: hairline quartz-pyrite vein crosscutting flow banding.

Va: Hairline quartz-pyrite veins

So: Folded flow banding
Hairline quartz-pyrite veinlets.

Va: Hairline quartz veinlets with minor pyrite

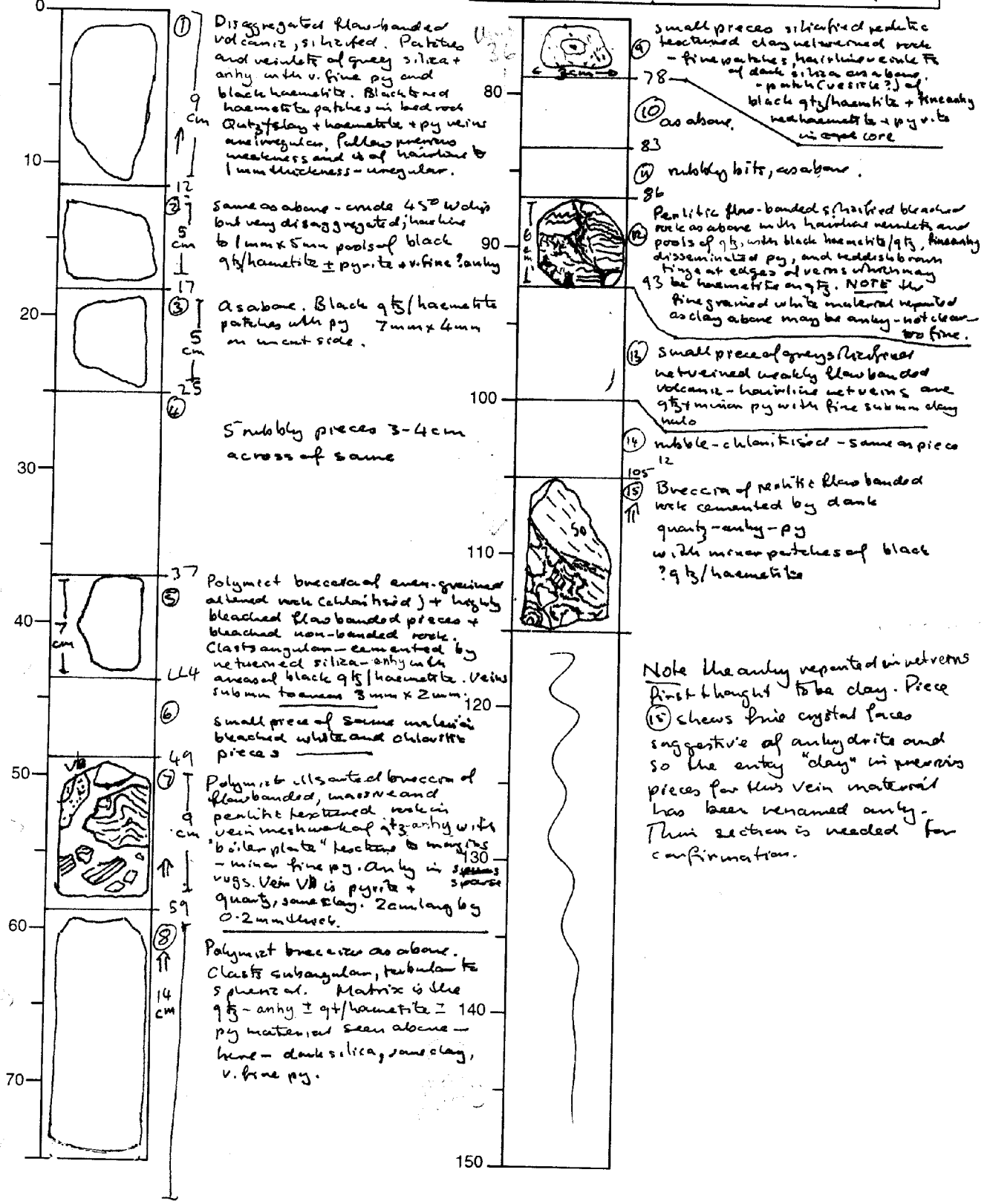
Pieces 21-28:
Flow banded altered volcanic rocks, crosscut by network of hairline to 1mm quartz-pyrite veins. In piece 23 with minor magnetite, in piece 26 hematite-bearing.

STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	18R	1	RUFF

STRUCTURAL GEOLOGY DESCRIPTION

Leg	Hole	Core	Section	Observer
193	1189B	18R	2	RTT



(1) Disaggregated flow-banded volcanic, silicified. Patches and veinlets of grey silica + anhy with v. fine py and black haematite. Black banded haematite patches in host rock Qtz/clay + haematite + py veins are irregular, pull-away from wallrock and is of hairline to 1 mm thickness - irregular.

(2) Same as above - crude 45° walls but very disaggregated; hairline to 1 mm x 5 mm pools of black qtz/haematite ± py-rite + v. fine ?anhy

(3) As above. Black qtz/haematite patches with py 7 mm x 4 mm in unconsolidated.

(4) 5 nubbly pieces 3-4 cm across of same

(5) Polymict breccia of even-grained altered rock (chloritised) + highly bleached flow banded pieces + bleached non-banded rock. Clasts angular - cemented by network silica - anhy with unusual black qtz/haematite. Veins sub mm to uneven 3 mm x 2 mm.

(6) small piece of same material bleached white and chloritic pieces

(7) Polymict unsorted breccia of flow banded, massive and perlitic textured rock in vein meshwork of qtz-anhy with "boiler plate" texture to margins - minor fine py. Anhy in vugs. Vein VB is pyrite + quartz, some clay. Zoned by 0-2 mm bands.

(8) Polymict breccia as above. Clasts subangular, tabular to spherical. Matrix is the qtz - anhy ± qtz/haematite ± py material seen above - here - dark silica, some clay, v. fine py.

(9) small pieces silicified pebbly textured clay veined rock - fine patches, hairline veinlets of dark silica as above - patchy (vesicles?) of black qtz/haematite + fine anhy ?haematite + py v.ts in core

(10) as above.

(11) nubbly bits, as above.

(12) Perlitic flow-banded silicified breccia rock as above with hairline veinlets and pools of qtz, with black haematite/qtz, finely disseminated py, and reddish brown tinge at edges of veins which may be haematite on qtz. NOTE the fine grained white material reported as clay above may be anhy - not clear too fine.

(13) Small piece of grey silicified veined weakly flow banded volcanic - hairline veins are qtz + minor py with fine sub mm clay halo

(14) nubble - chloritised - same as piece 12

(15) Breccia of perlitic flow banded rock cemented by dark quartz - anhy - py with minor patches of black ?qtz/haematite

Note the anhy reported in veins first thought to be clay. Piece (15) shows fine crystal faces suggestive of anhydrite and so the entry "clay" in previous pieces for this vein material has been renamed anhy. Thin section is needed for confirmation.