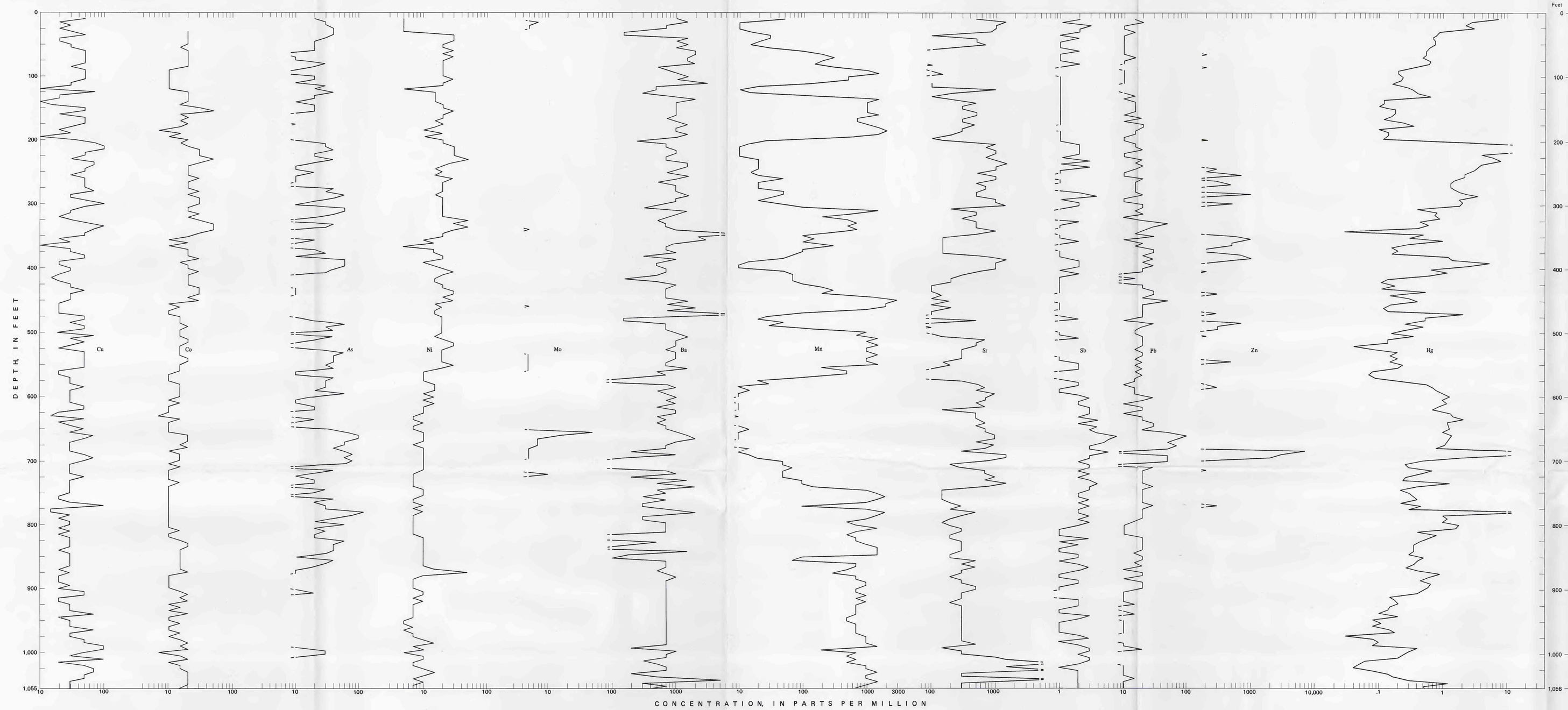
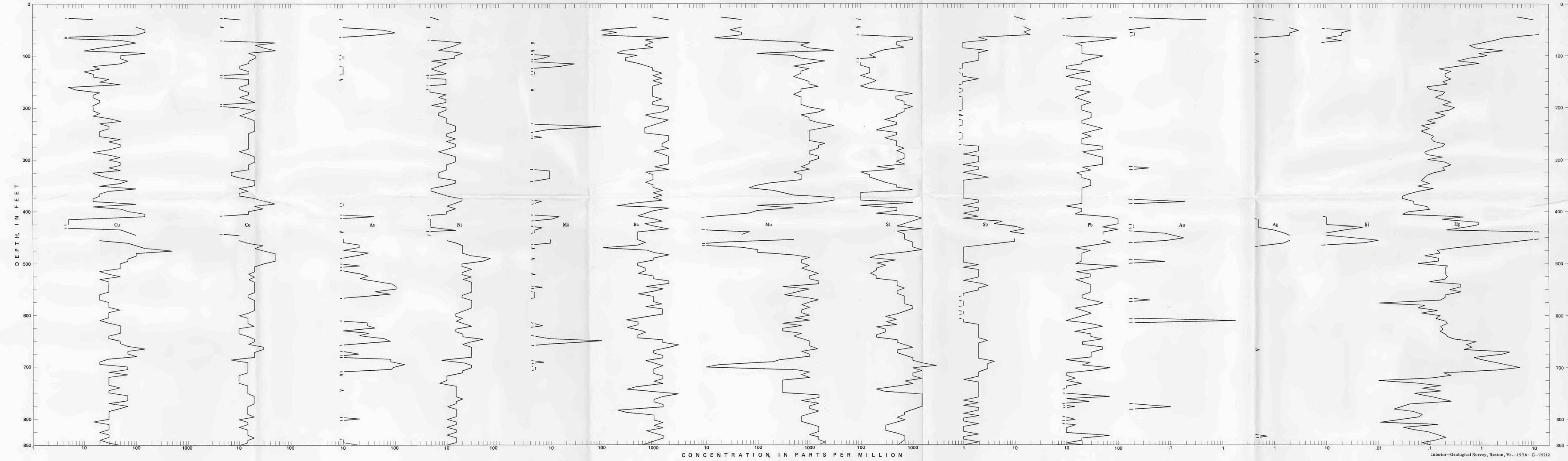


DDH-3

Feet	Metres	
0-15:		Kate Peak Formation. No core. Bleached rock same as 15–34 ft interval except contains minor alunite
15-34:		Kaolinite, quartz, leucoxene, and anatase. Bleached rock is light gray, stained shades of yellow and red
34:		Base of oxidized zone
34-70:		Mixed-layer illite-montmorillonite (35:65), quartz, and pyrite. Rock is light gray, soft, and cut by numerous fractures; tends to crumble into small fragments
70-108:		Montmorillonite, calcite, quartz, and pyrite. Sparse flakes of pale-brown to white mica. Rock is light gray, soft; less fractured than 34- to 70-ft interval
108-117:		Mixed-layer illite-montmorillonite, quartz, and pyrite. Local gypsum along fractures
117-125:		Kaolinite, quartz, pyrite, leucoxene, and anatase. Rock harder than enclosing rock
125-132:		Mixed-layer illite-montmorillonite (70:30), quartz, and pyrite. Lower contact is along fracture dipping 60°
132-195:		Chlorite, montmorillonite, calcite, and quartz. Remnant hornblende and pyroxene. Medium-gray to medium-dark-gray groundmass. Accessory magnetite and apatite. Scattered narrow calcite and pyrite veinlets
195-199:		Mixed-layer illite-montmorillonite, quartz, and pyrite. Rock very crumbly
199-300:		Kaolinite, quartz, pyrite, and leucoxene. Rock lighter colored and harder than enclosing rock. Locally porous; porphyritic character mostly obliterated. Some small patches of quartz; local thin veinlets of quartz and pyrite. Volcanic breccia from 227 to 274 ft. Numerous fractures from 201 to 215 ft
284:		Small vugs contain quartz and pyrite crystals
300-305:		Mixed-layer illite-montmorillonite, montmorillonite or mixed-layer montmorillonite-chlorite, kaolinite, quartz, and pyrite
305-323:		Chlorite, montmorillonite, calcite, and quartz. Dull, greenish-gray groundmass. Sparse pyrite locally replaces magnetite
323-343:		Hornblende-pyroxene dacite. Phenocrysts of plagioclase (sodic andesine) as much as 4 mm long. Hornblende, 2–3 mm long, has resorption rim of magnetite. Augite and hypersthene 1 mm long or less. Very sparse biotite. Accessory magnetite and ilmenite
343-356:		Mixed-layer illite-montmorillonite, quartz, and pyrite
356-365:		Montmorillonite, mixed-layer illite-montmorillonite, calcite, quartz, and pyrite
365-376:		Mixed-layer illite-montmorillonite (65:35), mixed-layer montmorillonite-chlorite, quartz, and pyrite
376-385:		Kaolinite, quartz, and pyrite. Pyrite locally in thin veinlets
385-397:		Alunite, quartz, and pyrite. Rock is light gray. Breccia fragments common
397-409:		Kaolinite, quartz, and pyrite. Same as 376- to 385-ft interval
409-444:		Mixed-layer illite-montmorillonite, illite, mixed-layer montmorillonite-chlorite, kaolinite, quartz, and pyrite. Rock is light gray. Pyrite, finely disseminated and in thin veinlets
444-465:		Montmorillonite, chlorite, calcite, quartz, and pyrite. Rock is greenish gray to light gray. Sparse flakes of reddish-brown mica. Several narrow calcite veinlets
465-492:		Mixed-layer illite-montmorillonite (70:30), quartz, and pyrite
492-501:		Montmorillonite, mixed-layer illite-montmorillonite, calcite, quartz, and pyrite
501-542:		Hornblende-pyroxene dacite. Medium-dark-gray to dark-gray groundmass, slightly altered.
542-552:		Montmorillonite, chlorite, calcite, quartz, and pyrite. Grades into unaltered rock above
552-576:		Mixed-layer montmorillonite-chlorite, quartz, and pyrite. Rock is soft and cut by numerous fractures
576-591:		Kaolinite, quartz, and pyrite. Rock is very light gray
591-605:		Alunite, minor kaolinite, quartz, and pyrite. Rock is light gray, slightly harder than enclosing rock
605-624:		Kaolinite, quartz, and pyrite. Rock is very light gray and soft. Altered plagioclase only phenocrysts discernible
624-678:		Alunite, quartz, pyrite, and leucoxene. Rock is very light gray and hard. Several coarser grained vuggy zones. Contains some kaolinite from 624 to 642 ft and 670 to 678 ft
678-699:		Kaolinite, quartz, pyrite, and leucoxene. Microgranular texture
699-750:		Mixed-layer illite-montmorillonite (70:30), quartz, and pyrite. Rock is soft and crumbly
750-779:		Montmorillonite, calcite, quartz, and pyrite. Rock megascopically similar to rock overlying interval except altered plagioclase contains some calcite
779-787:		Montmorillonite, chlorite, calcite, quartz, and pyrite. Sparse biotite altered to white mica
787-849:		Montmorillonite, calcite, quartz, and pyrite. Rock is light gray and soft
849-861:		Montmorillonite, quartz, and pyrite. Rock is medium light gray and soft. Numerous slickensided fractures
861-878:		Montmorillonite, minor chlorite, calcite, quartz, and pyrite. Numerous fractures
878-910:		Montmorillonite, chlorite, calcite, minor epidote, quartz, and pyrite. Numerous calcite veinlets from 915 to 928 ft
910-988:		Chlorite, montmorillonite, calcite, and quartz. Degree of alteration is variable
977:		Probable contact between Kate Peak and Alta Formations
988-1018:		Montmorillonite, calcite, quartz, and pyrite. Some mixed-layer illite-montmorillonite in upper part; minor chlorite in lower part. Narrow celestite veinlets near bottom
1018-1056:		Montmorillonite, chlorite, calcite, quartz, and pyrite. Sparse celestite and quartz veinlets. Rock is soft and contains numerous slickensided fractures from 1,043 to 1,056 ft

EXPLANATION

Alteration zone	Alteration mineral assemblage
Unaltered zone	Unaltered dacite
Propylitic zone	Chlorite-montmorillonite-calcite-quartz assemblage
	Montmorillonite-chlorite-calcite-quartz-pyrite assemblage
	Montmorillonite-calcite-quartz-pyrite assemblage
Argillic zone	Illite-montmorillonite(mixed layer)-quartz-pyrite assemblage
	Kaolinite-quartz-pyrite assemblage
Alunitic zone	Alunite-quartz-pyrite assemblage
	Alunite-jarosite-quartz assemblage



DDH-4

Feet	Metres	
0-21:		Kate Peak Formation. No core. Silicified ledge
21-31:		Quartz. Silicified ledge. Rock is very pale orange to grayish orange and porous. Numerous fractures and vugs
31-43:		No core
43-61:		Quartz and leucoxene. Rock is pinkish gray to pale red, porous, and vuggy. Fractures coated with iron oxides or jarosite
61-70:		Alunite, jarosite, and quartz. Rock is grayish yellow and finely granular. Veinlets of quartz
70-72:		Argillic assemblage. Gradational zone
72-88:		Pyroxene dacite. Groundmass is dark gray. Sparse hornblende
88-92		Mixed-layer illite-montmorillonite, mixed-layer montmorillonite-chlorite, and quartz
92:		Base of oxidized zone
92-102:		Mixed-layer illite-montmorillonite (65:35), mixed-layer montmorillonite-chlorite, quartz, and pyrite
102-339:		Montmorillonite, chlorite, calcite, quartz, pyrite, and leucoxene. Groundmass is very light gray to greenish gray. Local biotite altered to reddish-brown mica. Accessory apatite. Some ash-flow tuffs in 190- to 227-ft interval
339-373:		Mixed-layer illite-montmorillonite (70:30), montmorillonite, quartz, pyrite, and leucoxene
373-381:		Mixed-layer illite-montmorillonite, montmorillonite, siderite, quartz, and pyrite
381-396:		Mixed-layer illite-montmorillonite (70:30), quartz, and pyrite. Similar to 339- to 373-ft
396-401:		Chlorite, montmorillonite, and quartz. Groundmass is medium gray. Relict hornblende. Sparse biotite
401-407:		Mixed-layer illite-montmorillonite (70:30), montmorillonite, kaolinite, quartz, and pyrite
407-411:		Quartz with minor kaolinite. Rock porous; resembles rock in silicified ledges
411-461:		Alunite, jarosite, quartz, anatase, diaspore, leucoxene, and rutile. Rock is yellowish gray, commonly granular and locally vuggy. No core from 447 to 454 ft
461-470:		Kaolinite, quartz, pyrite, leucoxene, and anatase. Rock is light gray. Sparse pyrite and gypsum veinlets
470-492:		Mixed-layer illite-montmorillonite, montmorillonite, quartz, and pyrite. Some kaolinite in upper part. Fractures commonly slickensided
492-497:		Chlorite, montmorillonite, calcite, and quartz. Narrow calcite veinlets
497-521:		Montmorillonite, quartz, and pyrite. Rock is light gray
521-547:		Montmorillonite, chlorite, calcite, quartz, and pyrite. Sparse biotite altered to white mica. Local relict magnetite or ilmenite
547-677:		Chlorite, montmorillonite, calcite, quartz, and leucoxene. Disseminated pyrite locally common. Much variation in degree of alteration; least altered from 649 to 677 ft, most altered from 552 to 583 and 606 to 626 ft. Accessory apatite and magnetite. Calcite veinlets common in lower part. Clay-rich breccia zones from 589 to 596 and 626 to 632 ft
677-683:		Pyroxene dacite. Plagioclase (andesine-labradorite) slightly altered. Sparse biotite
683-689:		Mixed-layer illite-montmorillonite, quartz, and pyrite. Includes porous siliceous rock from 684 to 686 ft
689-697:		Alunite, quartz, pyrite, leucoxene. Medium light gray, porous, granular; numerous small vugs
697-704:		Mixed-layer illite-montmorillonite, quartz, and pyrite. Porphyritic structure destroyed
704-715:		Chlorite, montmorillonite, quartz, local pyrite, and leucoxene. Sparse calcite and quartz veinlets
715-760:		Mixed-layer illite-montmorillonite, montmorillonite, mixed-layer montmorillonite-chlorite, minor chlorite, quartz, and local pyrite. Some plagioclase phenocrysts partly altered to calcite
760-784:		Chlorite, montmorillonite, calcite, quartz, and minor epidote. Accessory magnetite and apatite. A few calcite veinlets in lower part
784-830:		Montmorillonite, chlorite, minor illite-montmorillonite, calcite, quartz, and pyrite. Groundmass greenish gray. Some remnant magnetite. Irregular narrow quartz and calcite veinlets from 803 to 825 ft
830-843:		Chlorite, montmorillonite, calcite, quartz, local pyrite, and leucoxene. Accessory magnetite and apatite
843-850:		Montmorillonite, chlorite, calcite, quartz, pyrite, and leucoxene

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COLUMNAR SECTIONS SHOWING ALTERATION MINERAL ASSEMBLAGES AND GEOCHEMISTRY IN DDH-3 AND DDH-4