

## LITHOLOGIC LOG

Project: Livermore

620-58

Elevation: \_\_\_\_\_

Date Drilled: 8/1/79-9/30/79

Depth (ft)	Description
0-3	<u>Cobbles, silt, sand</u> - cobbles of angular, white to red cryptocrystalline quartz in lt-brown silt-sand matrix.
3-15	<u>Altered tuff and quartz gravels</u> - in light brown clay matrix. Lt-brown to rusty red crystal bearing tuffs (?) altered mostly to clay, minor crystals of clear k-spar and quartz. 5-10% of tuffs have azurite along fractures. Finely crystalline, rhodochrosite comprises 3-8% of sample, crystals of magnetite 1-2% and trace of cinnabar and possibly some pyrargyrite, and rare almandite. Quartz appears as both white and clear vein filling material, rare open frac contain tiny euhedral crystals. Quartz also occurs as white, often vuggy, replacement silica, commonly stained red.
15-25	As above with decrease in azurite to $\approx 2\%$ and corresponding increase in rhodochrosite and/or pyrargyrite to $\approx 8-10\%$ . Trace of subhedral rose quartz.
25-35	<u>Sandy clay</u> - lt. brown with common angular frags of white to clear quartz 1-10 mm and lesser amounts of above rock in angular frags.
35-45	<u>Sandy tuffaceous clays</u> - lt. brown to blue-gray sandy clay with small rounded to angular rock frags. Some larger frags (>10 mm) of altered tuffs.
45-55	<u>Altered tuffs and quartz</u> - tuffs altered to clay and sometimes replaced by white silica. Azurite as in 3-15 ft. only associated with quartz in this interval, $\approx 3\%$ rhodochrosite and/or pyrargyrite. Small fractures (1-5 mm) often filled with clear quartz. Both $\text{FeO}_2$ and $\text{Fe}_2\text{O}_3$ staining along some fractures. Pyrolusite also occurs along some fractures.
55-65	<u>Altered tuff and quartz</u> - quartz decreases to $\approx 10\%$ with corresponding increase in tan to yellow-brown tuffs.
55-80	<u>Silicified tuffs</u> - white silicified tuffs, commonly iron stained along tight fractures. Light golden brown crystals common in rock, possibly grossularite. 2-3% azurite, trace of magnetite, pyrargyrite, epidote, almandite and pyrolusite. Becoming more tan colored and less silicified with depth.
80	<u>Silicified tuff</u> - lt. tan, altered to clays and 30-80% quartz. Poorly formed crystals of white to clear quartz set in a matrix of altered tuff. Trace of epidote, almandite, pyrolusite and magnetite.

## LITHOLOGIC LOG

Project: Livermore

620-58 continued

Elevation: \_\_\_\_\_

Date Drilled: \_\_\_\_\_

Depth (m)	Description
105-120	<u>Quartz and altered tuffs</u> - 60% white, finely crystalline quartz with 10-12% azurite, 1-2% epidote and pyrargyrite. 40% tan to red altered tuff with similar mineralization to the quartz.
120-150	<u>Andesite</u> - Possibly andesitic tuff. Light gray to light green, hard. Ferromag minerals chloritized and white tabular feldspars (0.5-2.0 mm) altered to kaolin (?) pseudomorphs of feldspar often have fresh appearance and rare unaltered hornblende. Trace of azurite.
150-160	<u>Andesite</u> - As above but becoming harder with depth, some fresh plag and rare trace of azurite. Greenish color fading, becoming more lt.-med. gray.
160-200	<u>Andesite</u> - Becoming white, finely crystalline, apparently undergone leaching and silicified. 10% angular chloritized Femags set in the white groundmass. Leaching and silicification becoming more intense with depth. Clear to milky quartz becoming common below 175. Rare trace of pyrite.
200- 300	<u>Silicified-Andesite</u> - Silicification nearly complete below 200', many fragments appear to be 50-80% small (<0.5 mm) anhedral quartz crystals in white silicic and/or kaolin groundmass, sometimes completely silicified. Trace of pyrite, and rare iron staining. Pseudomorphs or original feldspar still common in some samples. Green, silicified, anhedral phenocrysts of Femags (1-3 mm) comprise 0-20% of cuttings.