

## LITHOLOGIC LOG

Project: Jemez  
847-29

Location: SE-1/4 SE-1/4 NE-1/4 16 18N 4E

Elevation: 9320'

Date Drilled: 9-11, 9-12, 1979

Foam 0-50m, rockbit 50-97m TD Hammer

Depth (m)	Description
0 - 12m	Loose, very porous white lapilli tuff. Pumice lapilli are aphanitic except for a few percent very fine grain mafics and small clusters of white fine grained feldspar.
12 - 45m	Mixed silicic volcanic material: silicic (rhyolitic?) fine grain lava and pumice, sanidine, and quartz in approximately subequal volumes. Some quartz characterized by euhedral bipyramids, but in general quartz is difficult to separate from sanidine. Some of the pumice fragments contain small crystals of biotite and hornblende only visible with the hand lens. Some of the euhedral quartz crystals contain very small pumice fragments and may indicate crystal growth after deposition and while cooling in the still hot volcanic ash.
45 - 92m TD	Purple, fine grain-aphanitic andesite with accessory green clinopyroxene and plagioclase.
	<p>Comments: Upper unit interpreted to be Tshisege member of Bandelies Tuff. Middle unit is interpreted Otowi member of Bandelies Tuff. Lower unit is interpreted to be lower member andesite of Palizo Canyon Formation. Pumice, quartz, and sanidine that occasionally constitute significant part of cuttings in the bottom unit are interpreted as accidental washout material from the fragile top unit. They are not phenocrysts in the andesite.</p>

LITHOLOGIC LOG

Project: Jemez

847-28

Location: SW-1/4, SW-1/4, SW-1/4 6 18N 4E

Elevation: 8380'

Date Drilled: 8-21  
 Method Air (rotary to 80')  
 (Hammer 300')

Depth (m)	Description
0 -6m	Forest Duff, Regolith composed primarily of lapilli tuff.
6 - 27m	Whiteish tan lapilli tuff with 10% qtz, also some minute hornblende crystals visible. Some feldspars also distinguishable.
27 - 91m	Medium grey crystal tuff with abundant quartz crystals ( 50%). Mafics less visible some feldspars present.
Comments: Water noted at 65 meters.	

LITHOLOGIC LOG

Project: Jemez

847-25

Location: NW-1/4, SW-1/4 SW-1/4 18 18N 4E

Elevation: 9080'

Date Drilled: 9-18-79

Method: Foam/hammer

Depth (m)

Description

0 - 7m

Subequal amounts of lava fragments, quartz, and clay. Lava fragments are light to dark gray and red where oxidized and aphanitic to fine grain.

7 - 92m

Volcanic lava flow as above. Occasional feldspar and pyroxene phenocrysts visible .5mm, but otherwise fine grain to aphanitic. Some green amygdaloidal minerals at 80m.

Comments: No significant water encountered. Assumed subsaturated. Upper unit colluvium. Lower unit interpreted to be andesite of Paliza Canyon Formation.

LITHOLOGIC LOG

Project: Jemez

847-23

Location: SW-1/4 SW-1/4 SW-1/4 10 18N 4E

Elevation: 9360'

Date Drilled: 9-17-79

Method: Foam

Depth (m)

Description

0-68m TD

Very loose, white lapilli tuff. Low density 10-20% of lapilli light enough to float in water. Abundant subhedral quartz. Fine grain purple-gray lava at 64-68m is interpreted to be xenolith material.

Comments: No significant water encountered. Assumed subsaturated.

LITHOLOGIC LOG

Project: Jemez

847-22

Location: SW-1/4 NW-1/4 NE-1/4 10 18N 4E

Elevation: 8900'

Date Drilled: 9-14 - 9-15-79

Method: Air, rotary, hammer

Depth (m)	Description
0 - 3m	Soil & regolith composed of high organics and highly altered volcanics
3 - 33m	Medium gray slightly porphyritic to med fine grain latitic to andesitic. Plag. alkali feldspars, some small indistinguishable mafics, qtz with pyrite inclusions seen.
33 - 76m	Darker greenish fine grain slightly porphyritic andesite some feldspars and pyroxenes visible, pyrite visible
76 - 92m	back to the gray variation

## LITHOLOGIC LOG

Project: Jemez  
847-21

Location: NE-1/4 NW-1/4 SE-1/4 10 18N 4E

Elevation: 8680'

Date Drilled: 9-11-79

Method: Foam, Hammer 22-97m

Depth (m)	Description
0 - 21m	Mixed silicic volcanic material. Very low color index: white to light gray. Fine grain to aphanitic. Material is low density lava and pumice. Most cuttings are mineralized with very fine grain, euhedral pyrite. Feldspar alteration imparts blue-green color to some cuttings.
21 - 92mTD	Gray-green to gray-purple andesite with pyrite cubes as in above unit. Fine grain groundmass, 10% plagioclase phenocrysts. Accessory green clinopyroxene laths to 1 mm length. Occasional cuttings in which phenocrystalline feldspar is 50% whole rock volume.
	Comments: Upper unit interpreted to be lower (Otowi) member of Bondelier tuff. Lower unit interpreted to be lower member andesite of Plaza Canyon formation as indicated for the surface geology by Smith, Bailey & Ross.

LITHOLOGIC LOG

Project: Jemez

847-20

Location: NE-1/4 SE-1/4 NW-1/4 11 18N 4E

Elevation: 8680'

Date Drilled: 8-10

Method Air, rotary

Depth (m) Description

- 0 - 9.1 Regolith composed of volcanic debris, andesite and some latite porphyritic with sandidine, qtz, plag., no mafics visable  
Groundmass dark gray to greenish
- 9.1 - 24 Same lith as above but decrease in alteration and soil present in samples. Also present is an almost aphanitic dark gray lith. (Latitic)
- 24 - 72 Appearance of rhyolitic tuff debris with andesitic and latitic fragments mixed in. A lot of qtz phenos in tuff 50% decreasing abundance of andesitic and latic xenos as you progress down hole.
- 72 - 87 Darker gray porphyritic-aphanitic andesite-latite qtz, sandine, plag., hornblende much more competent rock than in previous interval.
- 87 - 90TD White-yellowish well lithified, very fine grain, felsite (rhyolitic) well lithified tuff.

Comments: Drilled in 5 hrs. No excess water observed

## LITHOLOGIC LOG

Project: Jemez

847-18

Location: SE-1/4 NE-1/4 NE-1/4 2 18N 4EElevation: 9180'Date Drilled: 9-7-79Method: Foam

Depth (m)	Description
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0 - 14m	50% clear, subhedral to anhedral quartz; 50% fine grain andesitic (?) lava fragments and pumice.
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14 - 27m	75% quartz as above; 25% pumice and felsite.
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27 - 92m TD	10% quartz as above; 90% felsite and pumice. Pyrite from 45-97m disseminated and as veins
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Comments: No significant water encountered. Assumed subsaturated. Interpreted to be very silicic, poorly welded lithic-crystal tuff. Possible Bandelier tuff.



LITHOLOGIC LOG

Project: Jemez  
 847 - 17

Location: NE-1/4 SE-1/4 SE-1/4 2 18N 4E

Elevation: 9050

Date Drilled: 8-8 - 8-10  
 (Mechanical problems, rig  
 down full day)

Depth (m)	Description
0 - 9	Regolith composed primarily of tuffaceous material whiteish in color, mixed with soil & clays. Tuff has some phenos of qtz and plag.
9 - 36	Whiteish tuff as above with out well defined soils and clays (color also grey, grey-blue, yellowish)
36 - 42	Tuff with significant quantities of FeS <sub>2</sub> .
42 - 48	Dark grey fine grain (aphanitic) with some felspaar phenos (small) Latitic-andesitic
48 - 90	Lighter grey with some phenos of plag. and pyroxene (augite-hypersthene) Andesitic lots of FeS <sub>2</sub> pyrite.

Comments: Drilled easily rotary-air noticeable water at about 40" for the duration of the hole

LITHOLOGIC LOG

Project: Jemez

847-16

Location: SW-1/4 NE-1/4 NE-1/4 33 21N 3E

Elevation: 9050'

Date Drilled: 9-25-79

Method: Foam

Depth (m)

Description

0 - 92m TD

Gray-brown tuff with abundant ( 25%) euhedral to anhedral quartz, some of which is bipyramidal.

Comments: Drilled blind 25-92m TD. Lithology assumed to be constant to bottom hole based on penetration rate. No significant water encountered; assumed subsaturated. Interpreted to be Tshirege member of Bandelies Tuff.

LITHOLOGIC LOG

Project: Jemez

847-15

Location: SE-1/4 NW-1/4 SE-1/4 27 21N 3E

Elevation: 9180'

Date Drilled: 9-25-79

Method: Foam

Depth (m)	Description
0 - 48m	Pale orange to brown tuff with abundant euhedral to anhedral quartz. Some bipyrimidal quartz. Quartz up to 25% by volume.
48 - 92m TD	Pale orange claystone, siltstone and fine grain sandstone. Sandstone shows predominantly quartz grains in orange (clay) matrix.
	<p>Comments: Upper unit is interpreted to be Tshirege member of Bandelies Tuff. Lower unit is interpreted to be Abiquiu "Tuff".                      No significant groundwater encountered. Assumed subsaturated.</p>

## LITHOLOGIC LOG

Project: Jemez847-14

Geologist \_\_\_\_\_

Elevation: 9910Date Drilled: 8-1-79

150 cps

Method: Foam

Depth (m)	Description
0-130	Porphyritic biotite bearing qtz latite. Some (augite) pyroxenes
130-150	Por. qtz. latite. Some biotite & pyrox.
150-190	Por. bio. bearing qtz. latite with pyrox.
190-230	Por. pyrox-bio. bearing qtz latite
230-280	Darker groundmass Por. qtz. trachyte slightly vesicular Slight increasing amount of vesicular gas pockets with increase in depth to 280'

## LITHOLOGIC LOG

Project: Jemez

847-12

Location: NW-1/4 NW-1/4 NW-1/4 29 21N 4EElevation: 10,020Date Drilled: 8-3 - 8-5-79Method: Foam

Depth (m)	Description
0 - 6	Biotite, hornblende bearing qtz. trachyte, high clay content
6 - 15	Same as above. Clay content down to 2%
15 - 18	More aphanitic with loss of biotite & hornblende, phenocrysts are less abundant
18 - 27	Porphyritic biotite, hornblende bearing qtz trachyte
27 - 30	Slightly more aphanitic lesser amounts of hornblende & biotite
30 - 49	Por. biotite qtz trachyte
49 - 92	Por. hornblende & biotite bearing qtz trachyte
	$Fe_3O_4$ present in all above

## LITHOLOGIC LOG

Project: Jemez847-11Location SW-1/4 SW-1/4 SW-1/4 29 21N 4EElevation: 10,300'Date Drilled: 8-2-79Method Foam

Depth (m)	Description
0 - 18	Porphyritic biotite hornblende bearing qtz. latite
10 - 30	Porphyritic hornblende biotite qtz latite
30 - 49	Porphyritic hornblende biotite bearing qtz trachyte
49 - 55	Porphyritic hornblende biotite bearing qtz trachyte with some signs of alteration (iron stain and some psilomelane)
55 - 61	Porphyritic qtz trachyte some signs of alteration
61 - 67	Porphyritic qtz trachyte
67 - 92	Porphyritic biotite bearing qtz trachyte Fe <sub>3</sub> O <sub>4</sub> in significant quantities 3-5%

## LITHOLOGIC LOG

Project: Jemez847-10Location: NW-1/4 NW-1/4 NE-1/4 28 21N 4EElevation: 9760'Date Drilled: 8-5 - 8-6-79Method: Foam

Depth (m)	Description
0 - 15	Regolith composed of clays, altered biotite, some hornblende and qtz. Probable source rock qtz. latite
15 - 21	Porphyritic biotite bearing, hornblende. Qtz. latite. Still has clay component 10 - 15%.
21 - 92	Por. biotite bearing hornblende qtz. latite

LITHOLOGIC LOG

Project: Jemez

847-9

Location: SW $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$  23 21N 4E

Method: hammer/foam

Elevation: 9790'

Date Drilled: 8/22/79

≈120cps.

Depth (m)	Description
0- 70m	Orange-tan to brick red biotite quartz latite porphyry. Some cuttings are fresher in appearance and gray in color. Feldspar phenocrysts vary in size and abundance. Some cuttings devoid of any phenocrysts. Feldspar, quartz, and biotite in 90% of samples. Aphanitic groundmass ≈80% by volume. Quartz phenocrysts are often quite clear and perfectly euhedral bipyramids. Tschicoma Formation.
70-122m TD	Mixed rhyolitic material. Some cuttings showing flowbanded texture and were apparently lava. Some material more white and pumiceous and resembling many of the local lapilli tuffs i.e., El Cajete, member of the Valles Rholite, S,B,R, 1970. All cuttings contain biotite phenocrysts, and are fine grain to aphanitic. Coarser specimens show considerable quartz content, >50%. Yellow-orange stain coats many of the cuttings. Possibly Bandelier Tuff, pumice bed of Tshirege Member.
<p>Comments: 0-75m very hard hammer drilling.            75-129m soft, fast-drilling            no water made or lost in hole.</p>	





## LITHOLOGIC LOG

JTG

Project: Jemez

847-7

Location: NW $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$  30 21N 5EMethod: hammer/foamElevation: 9980'Date Drilled: 8/10/79 $\approx$ 150cps.

Depth (m)	Description
0-27m	Sandy, brown clay and lithic fragments of varying size of pyroxene andesite and quartz latite. Apparently slide material and colluvial infill to South Fork Polvadera Creek.
27-92m TD	Brick red and dark gray hornblende, plagioclase quartz latite porphyry. Groundmass fine grain to glassy. 87-97m more highly oxidized to brick red color.
	<p>Comments: Driller reports rock hard enough to hammer, but fast penetration <math>\approx</math>80'hr. Also, much water made during drilling. Rocks are presumed to be saturated. Lateral groundwater motion expected in steep upper drainage basin.</p>
	27-92m TD, Tschicoma Formation

## LITHOLOGIC LOG

Project: Jemez

847-5

Location: SW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$  28 21N 5EMethod: hammer/foamElevation: 10,930'Date Drilled: 8/19/79-8/20/79

≈150cps.

Depth (m)	Description
0- 70m	Hornblende, plagioclase quartz latite porphyry. Matrix predominantly gray and fresh in appearance but some cuttings oxidized to brick red color. Groundmass fine grain to cryptocrystalline. Plagioclase phenocrysts somewhat smaller and sparser than most of Tschicoma Formation. Hornblendes 1-3mm.
≈70m	Fine grain basaltic chips encountered in one 10' sample pile. Possible basalt dike.
70-100m	Same material as 0-75m.
100-136m TD	Quartz latite porphyry similar to 75-105m, but cuttings coming back larger and groundmass grayish-purple. Plagioclase phenocrysts more abundant, larger (3-4mm) and more albitic. More abundant quartz phenocrysts. Probably flow contact at 100m. Possible alluvial debris at 110m and 116m noted. Small traces of fine-grain turquoise color mineral noted at 112-120m.
	Comments: Penetration rates: 60'/hr. to 380' (122m) 20'/hr. to 440' TD.
	Driller reports saturated rocks below 65.
	Tschicoma Formation.

## LITHOLOGIC LOG

Project: Jemez

847-4

Location: NE $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$  36 21N 4E

Method: Foam. Hammer: 122m-161mTD

Elevation: 9600'Date Drilled: 8/29/79-8/31/79

≈120cps.

Depth (m)	Description
0-100m	80-90% rhyolite. Material is both as aphanitic lava fragments and pumice. 10-20% gray to brick red quartz latite. Accessory quartz and sanidine.
100-152m	Gray to brick red quartz latite. Contains white feldspar phenocrysts and fine grain to aphanitic groundmass. Accessory hornblende and biotite.
	<p>Comments: No significant water encountered. Assumed subsaturated. Top unit is probably a lapilli tuff of the Bandelier Formation. Lower unit is interpreted to be a lava flow of the Tschicoma Formation. Occasional pumice fragments in samples below 105m are interpreted to be washout material from upper unit.</p>

## LITHOLOGIC LOG

JTG

Project: Jemez

847-3

Location: NW $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$  31 21N 5E

Method: Foam

Elevation: 9880'Date Drilled: 8/31/79

≈120 cps.

Depth (m)	Description
0-25m	Very loose, porous lapilli tuff: 80% white pumice fragments, some with biotite and hornblende phenocrysts; 15% clear anhedral to subhedral quartz and sanidine; 5% xenoliths (?) of gray latite. Minor black obsidian.
25-30m	Mixed latitic and rhyolitic lava fragments. <5% pumice, ≈5% quartz and sanidine as above.
30-92m TD	Varying amounts of white pumice, latitic and rhyolitic lava fragments and 1-5% quartz plus sanidine. Pumice approximately 10-15% by volume.
	<p>Comments: No significant water encountered. Assumed subsaturated. Formations are probably Bandelier tuff or equivalent. The zone from 25-30m is interpreted to be a colluvial zone between pyroclastic events. Lowest formation is probably poorly welded crystal-lithic tuff.</p>

## LITHOLOGIC LOG

Project: Jemez

847-2

Location: SE-1/4 NE-1/4 NE-1/4 31 21N 5EElevation: 9740'Date Drilled: 8-26 - 8-28

Depth (m)	Description
0 - 20m	Mixed volcanic material: gray latite lava, white pumice lapilli, and rhyolite (?) f.g. lava. Interpreted as colluvial material shet into valley bottom from adjacent Cerro Toledo Rhyolite and Tschicoma formations.
20 - 120	Mixed rhyolitic (?) material including fine grain to aphanitic light gray lava fragments and pumice lapilli. Variations in lava to pumice ratios. Many lost circulation zones. Interpreted as bedded lapilli tuffs with high content of volcanic xenoliths.
120 - 152TD	Fine grain rhyolitic lava flow. Continued lost circulation zones, interpreted as fractured or jointed (cooling) lava.

Comments: No significant water encountered in hole. Formations probably dry to subsaturated. Graded bedding of lapilli tuffs produces porosity-permeability contrasts between layers of air fall deposits. Layers several centimeters to a meter thick gather and possibly conduct horizontally the groundwater that is percolating downward.

*clean*

LITHOLOGIC LOG

Project: Jemez

847 - 1

Location: SE-1/4 SE-1/4 NW-1/4 32 21N 5E

Elevation: 9600

Date Drilled: 8-24 - 8-26-79

Method Foam

Depth (m)	Description
0 - 12	Mixed volcanic lithologies, dark grey-brownish porphyritic latite (rhyolite?) with qtz, sandidine, plag. some augite, also some pyrite xtalization. Also appearance of whiteish tuff with 30% qtz crystals
12 - 33	Same as above, also the introduction of a light grey lith with a few phenos of augite, and feldspars
33 - 40	Same basic lith however whiteish tuff seems to be more predominately pumice.
40 - 46	Predominately tuff pumice, whiteish floats
46 - 70	Back to three distinct lithologies (same as above)
70 - 79	Same 3 lith but also some obsidian fragments ( 2-3%)
79 - 85	Obsidian disappeared same liths as above
85 - 94	Primarily light grey porphyritic latite (rhyolite?) Phenos of sandidine, qtz., plag., and hornblende
94 - 104	Primarily pumice (with some other liths from above) Also some obsidian ( 1-2%)
104 - 113	Back into mixed liths
113 - 116	Time grain pumice frags
116 - 122	Mixed liths as above; with obsidian (2-5%)
122 - 128	Slight color change brownish-red also lith frags appear to be more rounded. Seems to indicate a paleo surface and possibly an alluvial environment. Composition is basically the same latitic, rhyolitic, the tuff-pumice is almost absent, some obsidian well rounded
128 - 137	Back to 2 liths as above (no pumice)
137 - 152	All 3 liths once again present