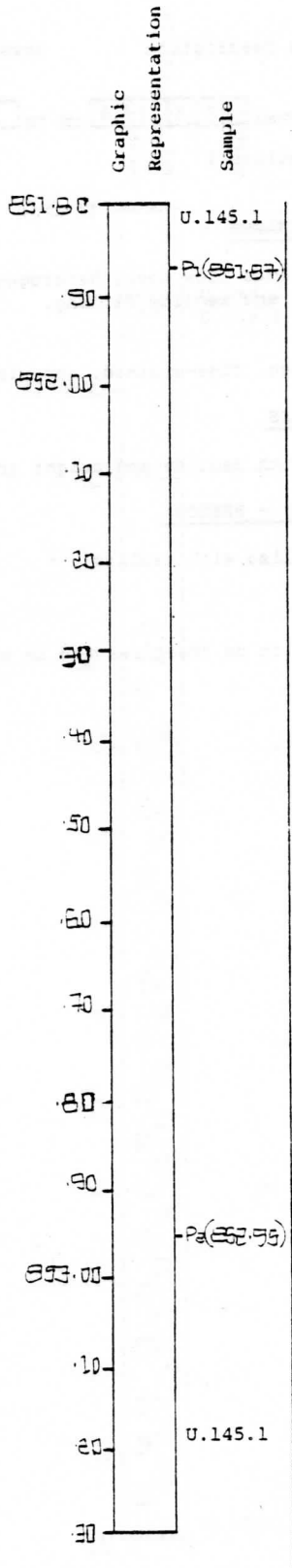


Visual Core Description

Observer ...CP.....

Depth Interval 85179 cm to 85319 cm

Box 146, Section 2



LITHOLOGY-PETROGRAPHY

U.145.1 Massive grey-green basalt (as above)

VESICLES/AMYGDALES

Zeolite filled vesicles (laumontite), small number filled with bright green mineral

FRACTURES - VEINS - BRECCIA

Zeolite filled veins

ROCK ALTERATION

851.80 - 853.00 Oxidization to red

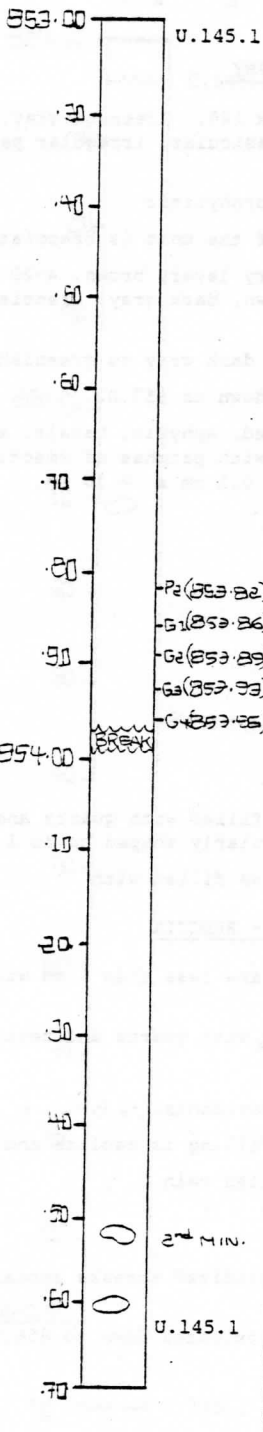
Visual Core Description

Observer ...CR.....

Depth Interval 8 5 3 1 9 cm to 8 5 4 6 4 cm

Box 146, Section 3

Graphic Representation
Sample



LITHOLOGY-PETROGRAPHY

853.19 - 854.64 Grey green, massive basalt (as above)

VESICLES/AMYGDALES

Vesicles filled with zeolite (laumontite ?)

Many amygdules spherical up to 5 mm diameter.

854.40 Vugs filled with laumontite and quartz.

FRACTURES - VEINS - BRECCIA

Veins and fractures filled with zeolite.

854.00 Near vertical fractures

ROCK ALTERATION

853.19 - 854.20 Red oxidization

Visual Core Description ObserverViareck.

Depth Interval

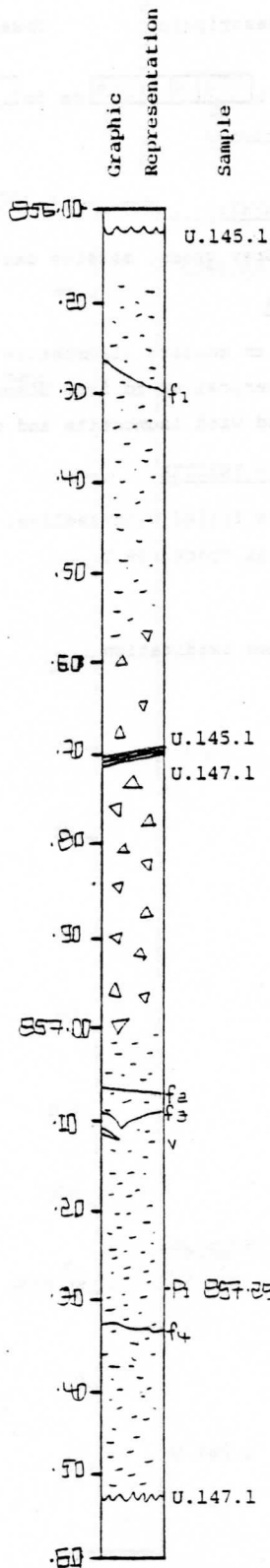
8	5	6	1	2
---	---	---	---	---

 cm to

8	5	7	5	3
---	---	---	---	---

 cm

Box 147, Section 1



LITHOLOGY-PETROGRAPHY

Continuation of Box 146. Greenish-gray, fine-grained basalt, slightly vesicular, irregular patches of smectite, aphytic.

856.50 Becoming porphyritic

856.60 The base of the unit is brecciated, dark gray.

U.147.1 Sedimentary layer, brown, 4-20 mm thick, soft oxidized, red, brown, dark gray, brecciated partly down to 856.90.

Color changes from dark gray to greenish gray.

Breccia continues down to 857.02.

857.20 Fine grained, aphyric, basalt, streaky, greenish-gray/gay with patches of smectite. Dipping with ~ 60° - 80°. 0.1 mm x > 10 mm.

STRUCTURE

856.23 Massive

856.50 Streaky

856.60 Brecciated

856.85 Brecciated

857.30 Streaky

VESICLES/AMYGDALES

U.145.1 Vesicles filled with quartz and zeolites. Vesicles are irregularly shaped up to 1 x 5 mm.

857.25 Few vesicles filled with

FRACTURES - VEINS - BRECCIA

U.145.1 Veinlets are less than 1 mm wide, mostly hairlike.

f₁ Fracture is filled with quartz and zeolite.

Fractures are subhorizontal (f₂, f₃, f₄)

U.147.1 Breccia-filling is zeolite and calcite.

857.12 Quartz filled vein

ROCK ALTERATION

856.37 Slightly oxidized streaks appear from 856.37 downwards.

U.147.1 Strongly oxidized down to 856.92

Visual Core Description

ObserverCP.....

Depth Interval

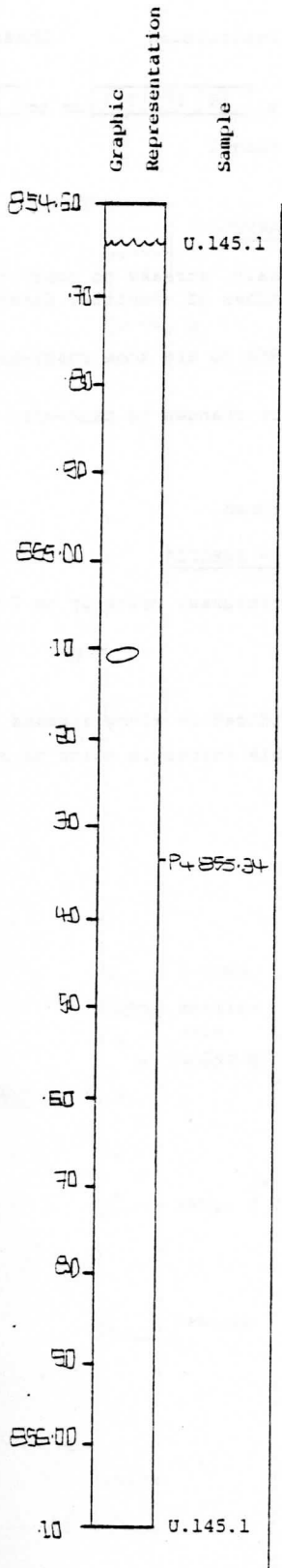
8	5	4	6	4
---	---	---	---	---

 cm to

8	5	6	1	2
---	---	---	---	---

 cm

Box 146, Section 4



LITHOLOGY-PETROGRAPHY

Grey-green basalt (as above)

VESICLES/AMYGDALES

Vesicles of zeolite and dark green mineral.

855.10 Vesicle filled with quartz and laumontite

856.02 Laumontite filled cavity with quartz

FRACTURES - VEINS - BRECCIA

Near vertical fractures filled with zeolite (unknown white radiating mineral).

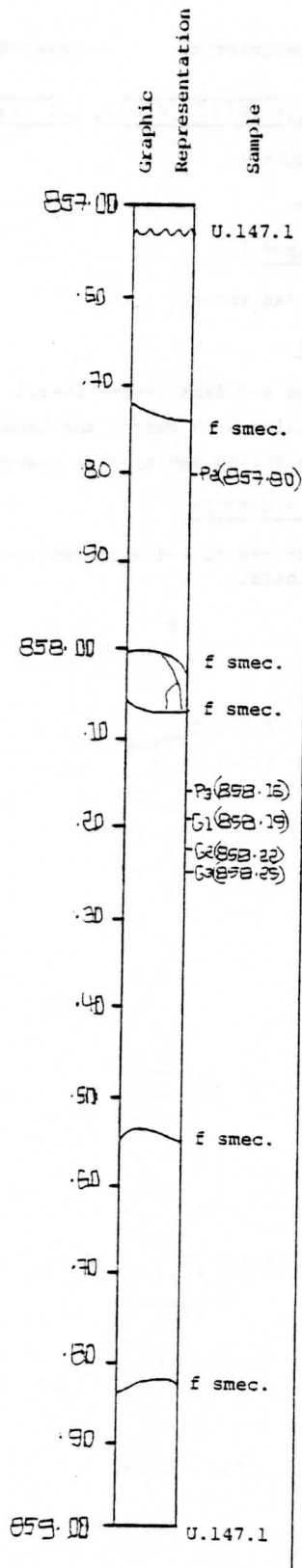
ROCK ALTERATION

Red oxidization

Visual Core Description ObserverVierbeck.

Depth Interval 8 5 7 5 3 cm to 8 5 9 0 5 cm

Box 147, Section 2



LITHOLOGY-PETROGRAPHY

Greenish-gray, basalt, streaky to contorted (irregular) arrangement of patches of smectite, fine-grained, porous

Between 858.60 - 858.70 are some rusty-brown oxidized streaks

At 858.90 the color changes to pink-gray

STRUCTURE

Irregularly structured.

FRACTURES - VEINS - BRECCIA

Smectite-coated fractures; veins up to 7 mm in ϕ , or 3 x 20 mm.

ROCK ALTERATION

858.60-858.70 Oxidization along streaks

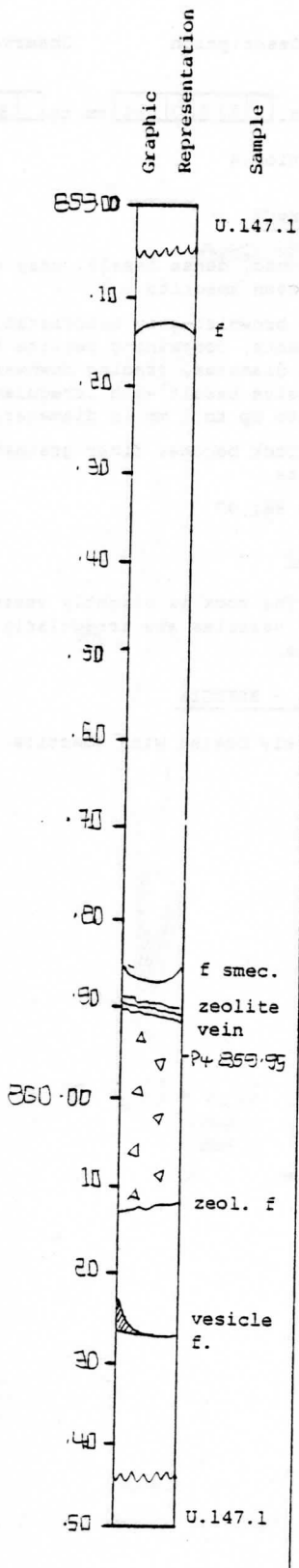
858.90 Recognizable change in color to reddish dark gray.

Visual Core Description

Observer Viereck

Depth Interval 25005 cm to 36044 cm

Box 147, Section 3



LITHOLOGY-PETROGRAPHY

Greenish gray basalt; quite a lot of patches of smectite. Dip of the oriented patches is ~ 70°.

brecciated from 859.90 - 860.25, flow-internal breccia.

Greenish gray, dense, fine-grained basalt below, less streak below 860.25.

STRUCTURE

859.50 Streaky

859.90 - 860.25 Brecciated?

860.25 Massive

VESICLES/AMYGDALES

860.25 Vesicle is filled with white zeolite!

FRACTURES - VEINS - BRECCIA

859.90 - 860.25 Veins contain brecciated basaltic fragments compound by zeolite.

OTHER

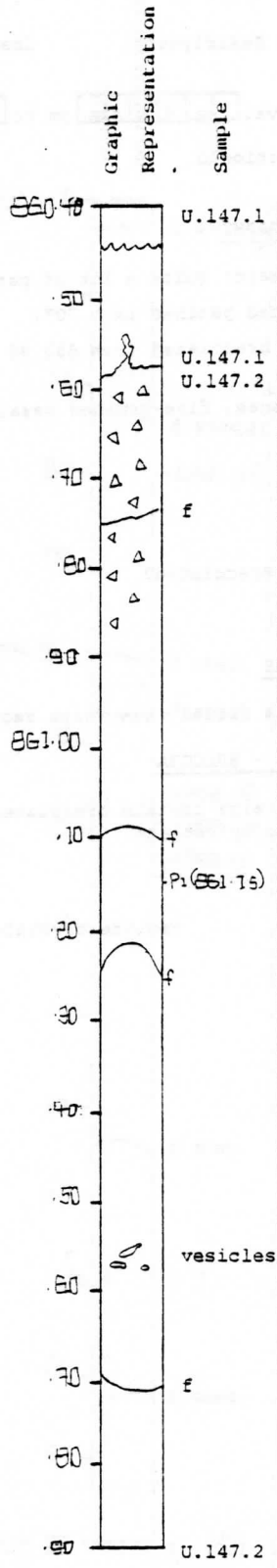
860.25 zeolite crystals.

Visual Core Description

Observer Viereck

Depth Interval 860.44 cm to 861.97 cm

Box 147, Section 4



LITHOLOGY-PETROGRAPHY

U.147.1 Fine-grained, dense basalt, gray with irregular patches of dark green smectite.

U.147.2 Slightly brownish-gray brecciated, part with gray porous fragments, containing zeolite filled vesicles, up to 10-20 mm in diameter, grading downward into a greenish gray massive basalt with irregularly arranged patches of smectite up to 1 mm in diameter.

Below 861.70 the rock becomes finer grained with less patches of smectite.

Core continues to 861.97

VESICLES/AMYGDALES

860.90 - 861.70 The rock is slightly vesicular with zeolite fillings, vesicles are irregularly shaped and up to 2 mm in size.

FRACTURES - VEINS - BRECCIA

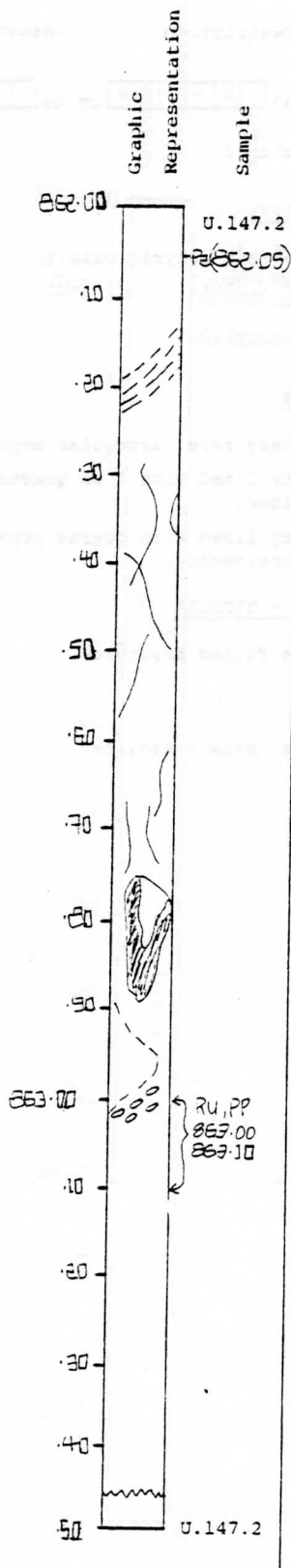
Fractures are rarely coated with smectite.

Visual Core Description

Observer ... I.L. Gibson

Depth Interval 86179 cm to 86346 cm

Box 148, Section 1



LITHOLOGY-PETROGRAPHY

Fine-grained aphyric basalt, green-gray colour.
 862.15 Becoming progressively brecciated and reddish purple.
 862.50 Breccia contains some angular fragments and large amounts of amygdaloidal flow top.
 862.80 Transition
 862.90 - 863.46 Massive green-gray aphyric basalt.

STRUCTURE

862.00 - 862.70 Weak flow structure
 862.80 - 863.40 Massive

VESICLES/AMYGDALES

None

FRACTURES - VEINS - BRECCIA

862.50 White 'zeolite' filling cracks in breccia.
 862.85 Some small (~ 2 mm) amygdales.

ROCK ALTERATION

862.30 ? Pervasive smectite
 ? + zeolite

OTHER

Flow breccia

Visual Core Description

Observer I.L. Gibson

Depth Interval

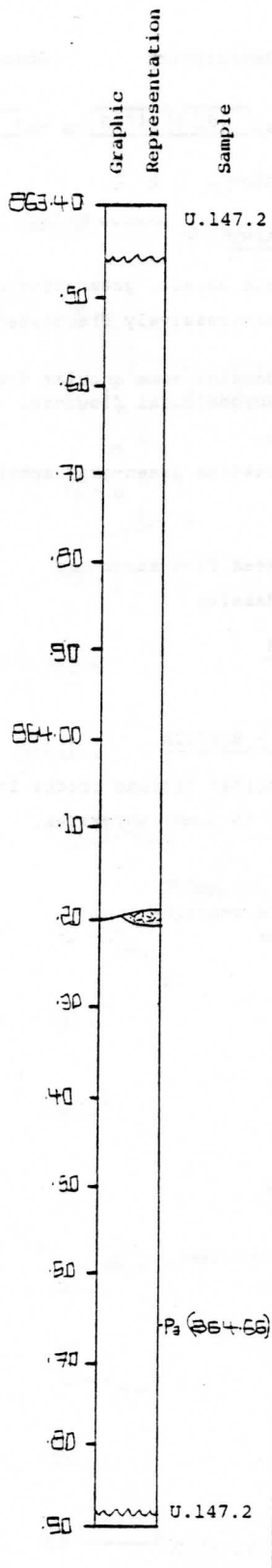
8	6	3	4	6
---	---	---	---	---

 cm to

8	6	4	8	9
---	---	---	---	---

 cm

Box 148, Section 2



LITHOLOGY-PETROGRAPHY

Fine-grained grey-green aphyric basalt.

STRUCTURE

Isotropic?

VESICLES/AMYGDALES

863.40 - 864.10 Very rare irregular amygdales.

864.20 Open cavity lined with 1 mm quartz crystals. Appear grey in colour.

864.63 Open cavity lined with quartz crystals. Blue grey due to chalcedony.

FRACTURES - VEINS - BRECCIA

Incipient smectite filled fractures.

ROCK ALTERATION

Pervasive smectite, plus ? zeolite.

Visual Core Description

Observer ... I.L. Gibson ...

Depth Interval

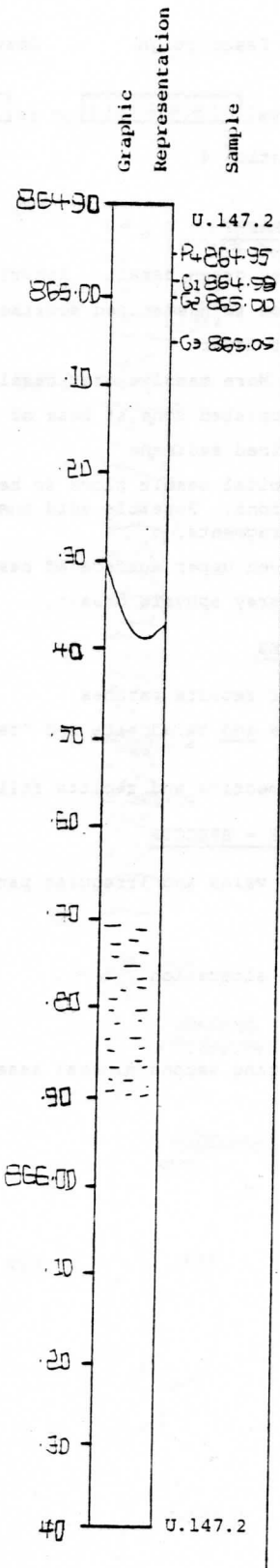
8	6	4	8	9
---	---	---	---	---

 cm to

8	6	6	3	4
---	---	---	---	---

 cm

Box 148, Section 3



LITHOLOGY-PETROGRAPHY

Fine-grained, grey-green, aphyric basalt.

STRUCTURE

- 864.90 - 865.60 Massive
- 865.60 - 865.88 Weak platy flow structure
- 865.90 - 866.10 Massive
- 866.20 Flow structure
- 866.20 - 866.40 Massive

FRACTURES - VEINS - BRECCIA

- 865.30 - 865.39 Dark smectite coated fracture
- 865.60 - 865.88 Smectite alteration along the flow structure.
- 866.32 Vein filling included smectite, quartz and two types of zeolites, one with polysynthetic twinning. 0.5 mm wide vein.

ROCK ALTERATION

? Pervasive green smectite.

Visual Core Description

Observer I.L. Gibson

Depth Interval

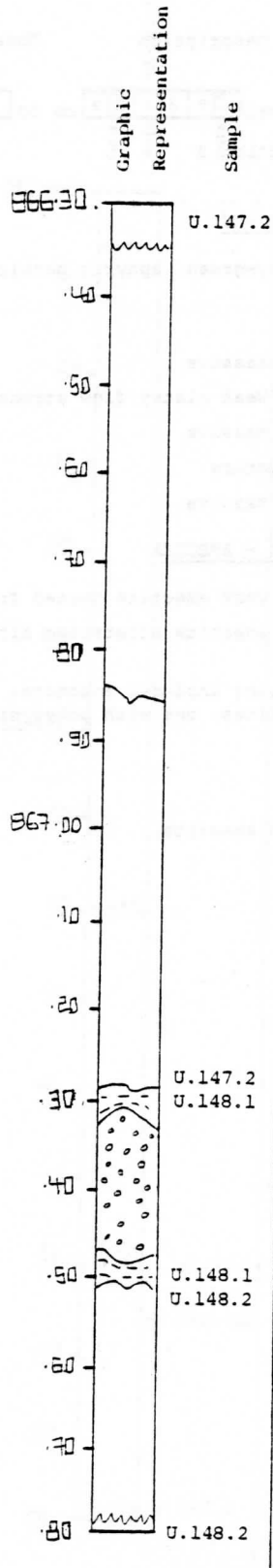
3	6	6	3	4
---	---	---	---	---

 cm to

3	6	7	7	9
---	---	---	---	---

 cm

Box 148, Section 4



LITHOLOGY-PETROGRAPHY

- U.147.2 Fine-grained, grey green basalt. Aphyric.
- 866.75 Transition to haematized scoriaceous basalt.
- 866.85 Very soft layer
- 867.00 - 867.20 More massive grey basalt
- 867.27 Dark brecciated zone at base of flow.
- 867.30 Fine-grained sediment
- U.148.1 Amygdaloidal basalt block in between two sedimentary horizons. Possible acid pumice tuff with flattened fragments.
- 867.50 Very uneven upper surface of basalt lava.
- U.148.2 Purple grey aphyric basalt.

VESICLES/AMYGDALES

- 867.20 Irregular zeolite patches.
- U.148.1 Smectite and celadonite and "zeolite" in amygdales.
- U.148.2 Small smectite and zeolite filled cavities.

FRACTURES - VEINS - BRECCIA

- 867.10 Smectite veins and irregular patches.

ROCK ALTERATION

Pervase smectite alteration

OTHER

- U.148.1 Interesting second mineral assemblage. Acid tuff?

Visual Core Description

Observer ... RFW.....

Depth Interval

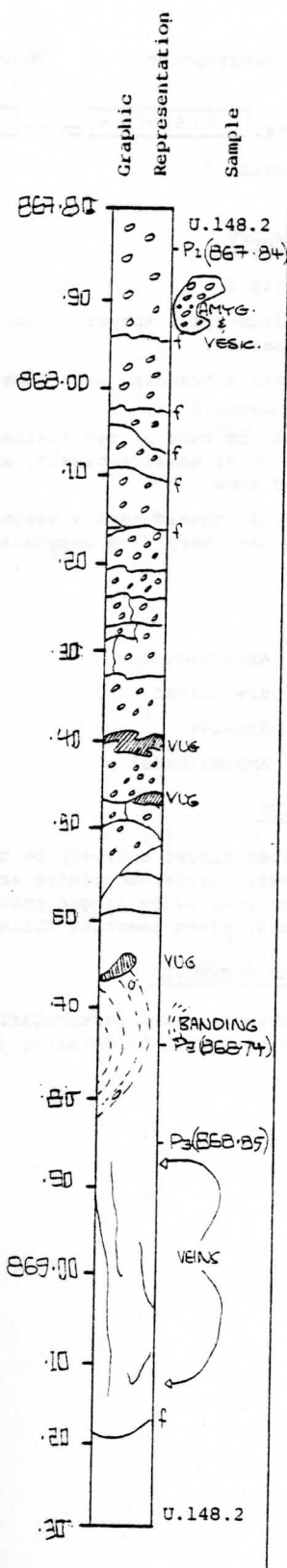
8	6	7	7	9
---	---	---	---	---

 cm to

8	6	9	3	4
---	---	---	---	---

 cm

Box 149, Section 1



LITHOLOGY-PETROGRAPHY

Continuing U.148.2

Amygdaloidal basalt, medium gray, aphyric, holocrystalline, fine grained.

868.50 Fragment, 3 cm diameter, of vesicular basalt, similar to that in lower parts of the box (top of next unit).

868.70 Banding is curved in circular (spherical) fashion. Amygdales become scarce below bands, essentially absent in lowermost part of section.

STRUCTURE

867.80 - 869.10 Amygdaloidal

868.70 Banded

Bands 5 mm apart, 1 mm thick, forming ring about 13 cm in diameter

869.20 - 869.34 Massive

VESICLES/AMYGDALES

867.80 - 869.20 Amygdules vary greatly in size and shape. Large ones (> 2 cm) have been called vugs. Filling is almost entirely laumontite, smectite lined. Smaller vesicles, 1-2 mm, spherical to ovoid, are filled with green smectite. Zeolite amygdules are absent in lower 40 cm of core.

FRACTURES - VEINS - BRECCIA

867.80 - 869.20 Fractures numerous, almost all sub-horizontal, several sub-vertical; most intense in amygdale zone. Some fractures sub-vertical. Lining is smectite and laumontite (?). Veinlets in lower part of core are hairline, zeolite and smectite filled.

Visual Core Description

Observer ... RFW.....

Depth Interval

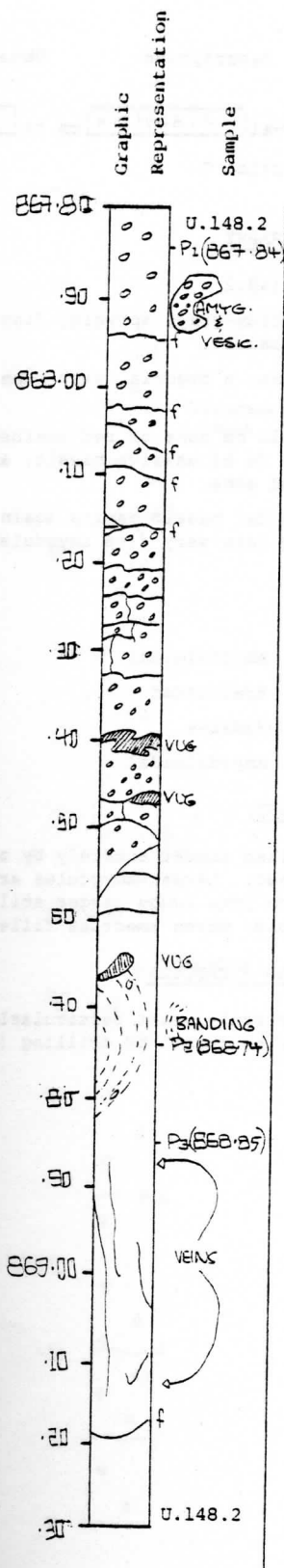
8	6	7	7	9
---	---	---	---	---

 cm to

8	6	9	3	4
---	---	---	---	---

 cm

Box 149, Section 1



LITHOLOGY-PETROGRAPHY

Continuing U.148.2

Amygdaloidal basalt, medium gray, aphyric, holocrystalline, fine grained.

868.50 Fragment, 3 cm diameter, of vesicular basalt, similar to that in lower parts of the box (top of next unit).

868.70 Banding is curved in circular (spherical) fashion. Amygdales become scarce below bands, essentially absent in lowermost part of section.

STRUCTURE

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Bands 5 mm apart, 1 mm thick, forming ring about 13 cm in diameter

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FRACTURES - VEINS - BRECCIA

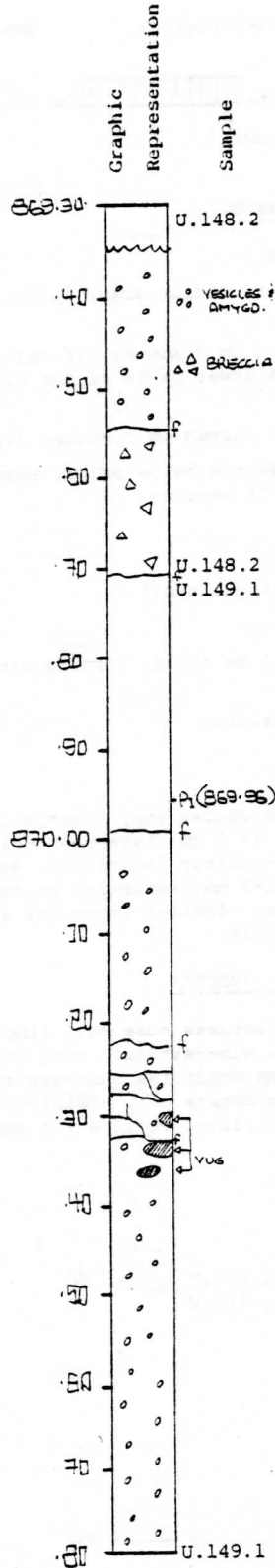
867.80 - 869.20 Fractures numerous, almost all sub-horizontal, several sub-vertical; most intense in amygdule zone. Some fractures sub-vertical. Lining is smectite and laumontite (?). Veinlets in lower part of core are hairline, zeolite and smectite filled.

Visual Core Description

Observer ...RHW.....

Depth Interval 86934 cm to 87080 cm

Box 149, Section 2



LITHOLOGY-PETROGRAPHY

Continuing unit 148.2

Amygdaloidal, medium-gray, aphyric, fine-grained, holocrystalline basalt.

869.55 Grades into a breccia, with some scoriaticus clasts.

[U.148.2] Below 869.70, a 10 cm zone of red stained, highly altered breccia, then 20 cm of massive basalt, and another 3 cm wide, red stained zone.

870.05 Amygdaloidal basalt begins again, large amygdules and vugs grading into very fine amygdules by the bottom of the section.

STRUCTURE

869.30 - 869.55 Amygdaloidal

869.55 - 869.70 Brecciated

869.70 - 870.05 Massive

870.05 - 870.80 Amygdaloidal

VESICLES/AMYGDALES

Vesicles are filled almost entirely by zeolite (laumontite) and smectite lined. Larger amygdules are irregular in shape, up to 2 cm long (vugs larger still). Smaller amygdules are void, green smectite filled.

FRACTURES - VEINS - BRECCIA

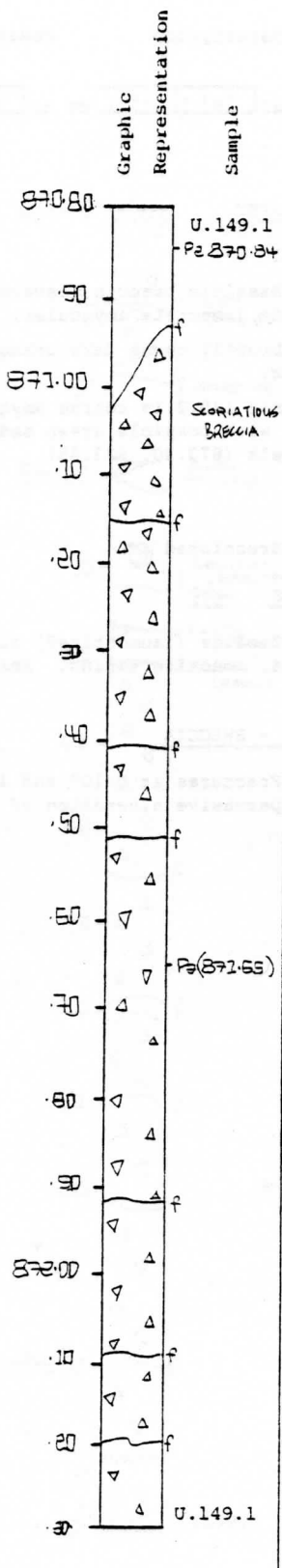
Fractures are irregular, not particularly lined with anything, so may be result of drilling (< 0-10°).

Visual Core Description

Observer RHW

Depth Interval 870.80 cm to 872.31 cm

Box 149, Section 3



LITHOLOGY-PETROGRAPHY

Continuing U.149.1

Amygdaloidal, fine-grained, aphyric, holocrystalline basalt.

871.00 Grades into altered scoriatic breccia zone, that has some reddish zones in it.

871.53 Begins several large scoriatic clasts to 871.90. Scoriatic, altered breccia continues to section bottom.

* NOTE: The zone from 869.70 to 872.90, i.e. U.149.1, might be broken in several other places, rather than 869.70. Whether or not it represents >1 unit is unclear, probably not, but the boundaries are difficult to pick out. 149.1 might also be part of U.149.2 flow top???

STRUCTURE

Breccia

VESICLES/AMYGDALES

870.80 - 872.10 Filling in breccia and amygdules is almost entirely zeolite (laumontite) with some smectite lining. Small amygdules at section top are ovoid (1 mm long) and smectite filled.

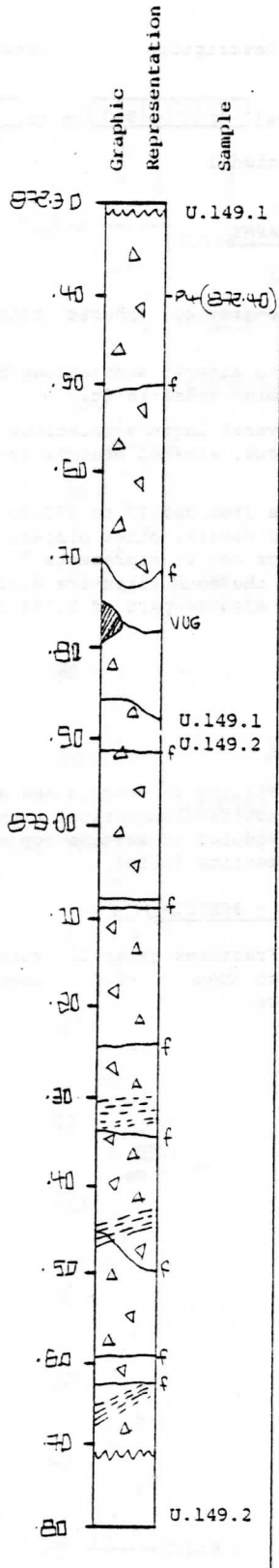
FRACTURES - VEINS - BRECCIA

870.80 - 872.20 Fractures generally subhorizontal, at high angle to core (65°). Smectite patchy on fracture surface.

Visual Core Description

Observer RHW

Depth Interval 87231 cm to 87371 cm



LITHOLOGY-PETROGRAPHY

Continuing U.149.1

872.30 - 872.70 Basaltic breccia, several large, amygdaloidal clasts (smectite/amygdules).

872.90 Breccia abruptly turns dark orange for 20 cm. Contact not planar.

U.149.2 Top of unit 149.2 is coarse amygdaloidal clasts in basalt matrix, with possible green sediments (2-4 cm thick) at two levels (873.30, 873.45).

STRUCTURE

872.30 - 873.71 Brecciated

VESICLES/AMYGDALES

872.30 - 873.71 Zeolite (laumontite?) filling in amygdules and vugs, smectite lining. Smaller vesicles smectite filled.

FRACTURES - VEINS - BRECCIA

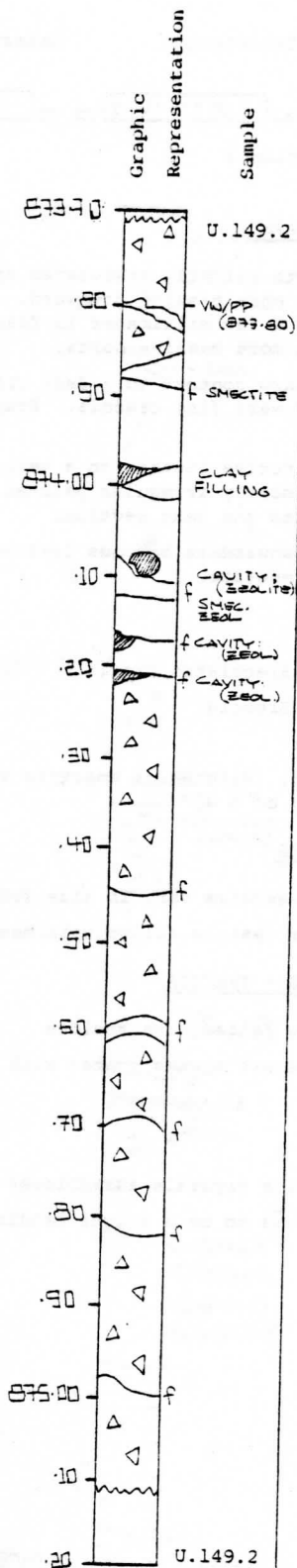
872.30 - 873.71 Fractures at 0-10° and 45°, lining uncertain due to pervasive alteration of entire rock.

Visual Core Description

Observer ... Viereck

Depth Interval 87371 cm to 87511 cm

Box 150, Section 1



LITHOLOGY-PETROGRAPHY

Continuation of Box 149.

Gray, brecciated, very vesicular basalt with fragments from 1 to 30 mm in size.

873.86 A sharp contact to a greenish gray, fine-grained, porous basalt which is strongly fractured and weakened.

874.00 Soil filling, grayish-green, soft porous.

The gray breccia which this section started with continues from 874.22 to 874.31 - partly its amygdaloidal, gray fragments swimming in a zeolite mass.

From 874.32 on the average size of fragments increases, greenish gray fragments become dominant. The zeolite-filled brecciated zones concentrate on small areas.

874.70 Average size of fragments is several cm.

874.94 Dense, fine-grained, greenish gray basalt with irregular patches of smectite, with a few vesicles and little brecciation.

STRUCTURE

873.70 - 873.86 Breccia

873.86 - 874.20 Fine-grained with veins and fractures.

874.20 - 874.40 Gray breccia

874.45 Less zeolite, more and bigger greenish-gray fragments.

VESICLES/AMYGDALES

873.70 - 875.11 Vesicles are up to 3 mm in diameter, some are stretched. They are filled by zeolite and/or smectite.

FRACTURES - VEINS - BRECCIA

Fractures are mainly coated by smectite and/or zeolite.

Veins in the brecciated parts are filled with zeolite, (most likely laumontite), smectite and lithic fragments < 1 mm.

Veins here means interspace between brecciated fragments.

874.05 - 874.20 Large open cavities, filled with a white zeolite (laumontite?). The fractures are coated with smectite ± zeolite.

ROCK ALTERATION

The greenish, weakened part seems to be strongly weathered.

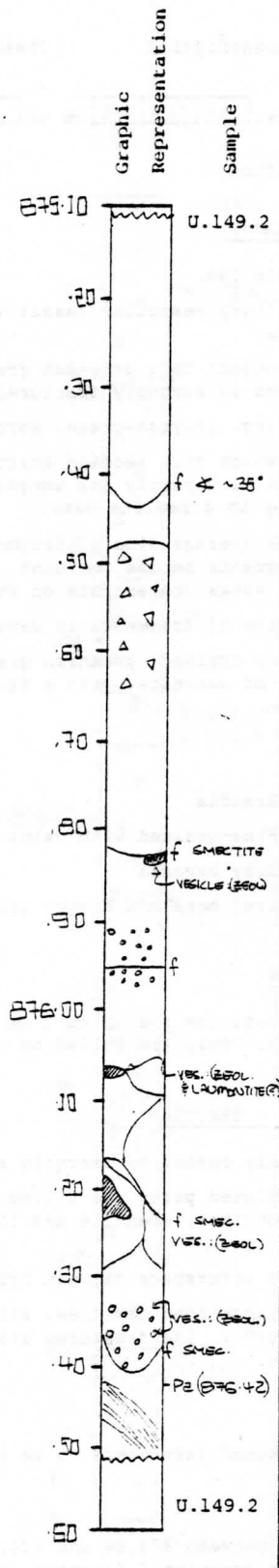
OTHER

The greenish part between 873.86 and 874.22 seems to be a big, only little brecciated fragment in the gray breccia cavity.

Visual Core Description Observer Viereck

Depth Interval 875111 cm to 876511 cm

Box 150, Section 2



LITHOLOGY-PETROGRAPHY

This section starts slightly brecciated with zeolite filling, becoming more massive downward. It's gray with fragments of a few millimeter in fractured zones and several cm in more massive parts.

At 875.48 is a sharp contact to a dark gray to slightly reddish dark gray very fine breccia. Fragment size is 1 - 10 mm.

At 875.66 undistinctive contact to a vesicular greenish gray basalt with mostly irregular patches of smectite. Continues down into the next section.

From 876.40 on downward it becomes less vesicular with less patches of smectite.

STRUCTURE

875.10 - 875.48 Brecciated basalt

875.48 - 875.55 Breccia

875.66 Vesicular

876.40 - downward. Patches of smectite are little oriented to a dip of ~ 40°.

VESICLES/AMYGDALES

875.66 Rounded vesicles vary in size from 1 to 30 mm.

876.24 Irregular vesicle filled with massive zeolite.

FRACTURES - VEINS - BRECCIA

875.50 Veins are filled with zeolite

875.83 Fractures are always coated with smectite and less zeolite.

OTHER

876.10 Big zeolite crystals assemblage?

876.45 There seems to be a slight banding with a dip of ~ 50°.

Visual Core Description

Observer ...Viereck.....

Depth Interval

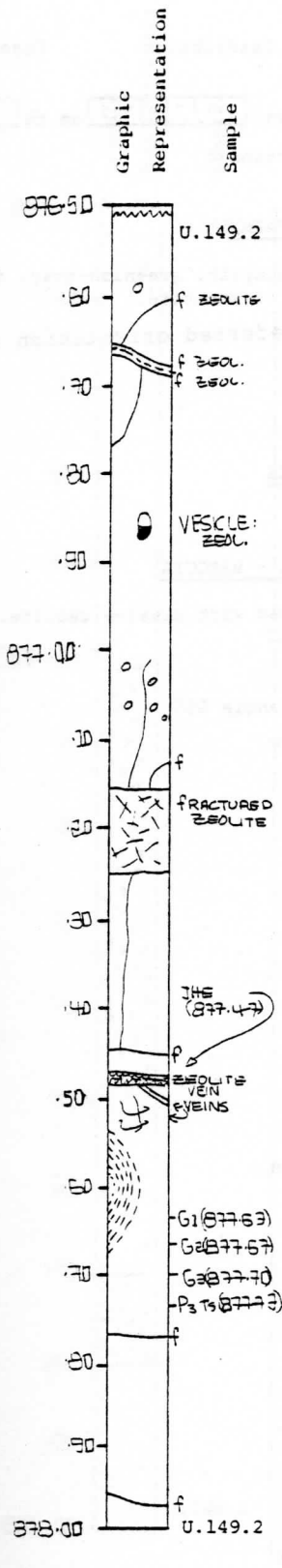
8	7	6	5	1
---	---	---	---	---

 cm to

8	7	8	0	2
---	---	---	---	---

 cm

Box 150, Section 3



LITHOLOGY-PETROGRAPHY

Greenish-gray, fine-grained basalt, with a few large vesicles and a few patches of smectite, aphyric, massive.

STRUCTURE

Massive, slightly vesicular.

VESICLES/AMYGDALES

Vesicles are 20 mm in diameter, round to subround, filled with zeolite.

876.84 Vesicle is partly filled with stratified quartz and zeolite. The upper half is an open cavity; stratified part is subhorizontal.

FRACTURES - VEINS - BRECCIA

877.15-877.23 Fractures are coated by zeolite (laumontite?)

877.45 Broad band of massive zeolite

877.50 Hairlike veins are filled with zeolite

OTHER

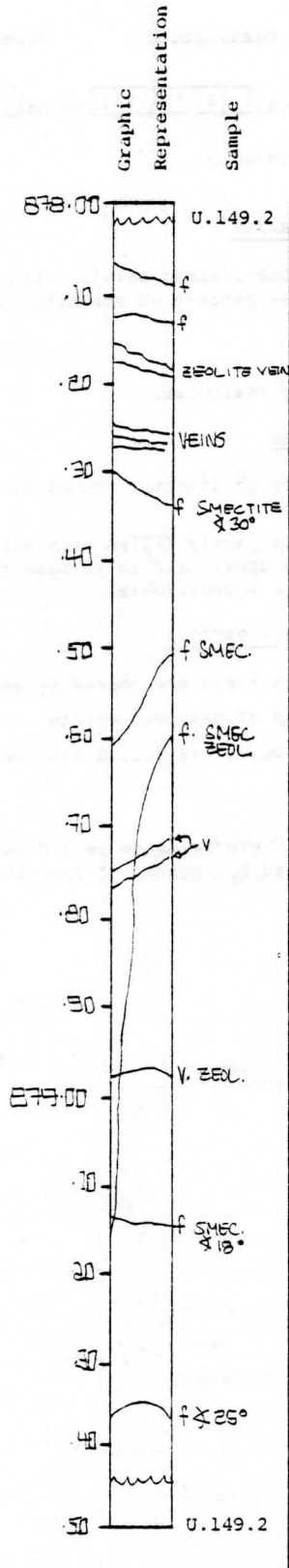
877.52 - 877.79 There seems to be a flow banding which curves--it's marked by patches of smectite.

Visual Core Description

Observer Viereck

Depth Interval 87802 cm to 87946 cm

Box 150, Section 4



LITHOLOGY-PETROGRAPHY

Dense, massive, aphyric, greenish-gray, fine-grained basalt. Patches of smectite.

Patches have preferred orientation with a 40° dip

STRUCTURE

Massive

VESICLES/AMYGDALES

None

FRACTURES - VEINS - BRECCIA

878.35 Vein filled with massive zeolite. Width: 6-20 mm angle of dip: ~ 40°.

f - dip angle 65°

f - fracture dip angle 85°

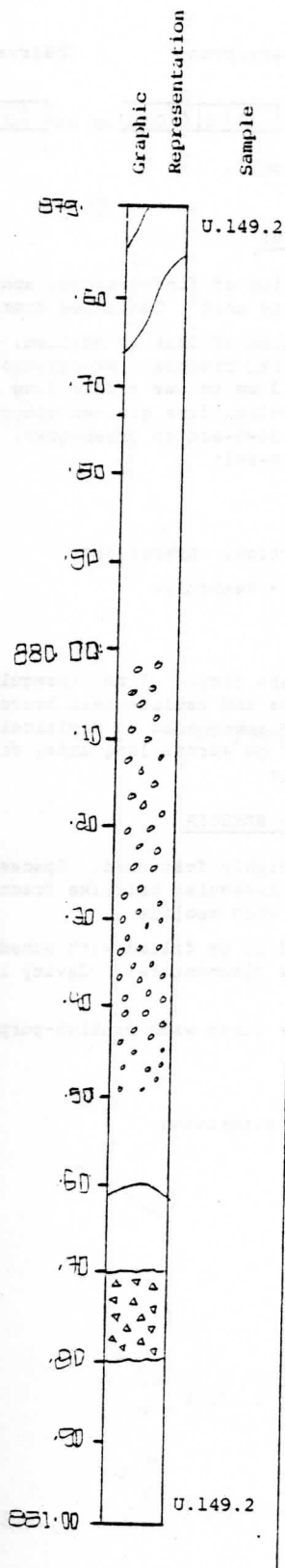
Veins are hairlike.

Visual Core Description

Observer N. Gruver

Depth Interval 87946 cm to 88100 cm

Box 151, Section 1.



LITHOLOGY-PETROGRAPHY

Gray-green, fine-grained, aphyric, vesicular basalt.
Interpretation = massive part of flow unit.

880.00 - 880.50 Very vesicular portion of unit.

885.75 Breccia clast.

STRUCTURE

Poorly developed flow banding defined by wisps of smectite in upper portion of core.

VESICLES/AMYGDALES

Subround to irregular shape, variable size - < 1 mm - 3 cm, coarsening downward in section.

Filled with green smectite, unknown massive hard white mineral (quartz? zeolite?) and, shiny, translucent zeolite, and minor amounts of calcite.

Some vesicles have stratified filling.

FRACTURES - VEINS - BRECCIA

Unit not highly fractured.

Fractures lined with green smectite.

Zeolite fills in spaces between fragments of brecciated clasts.

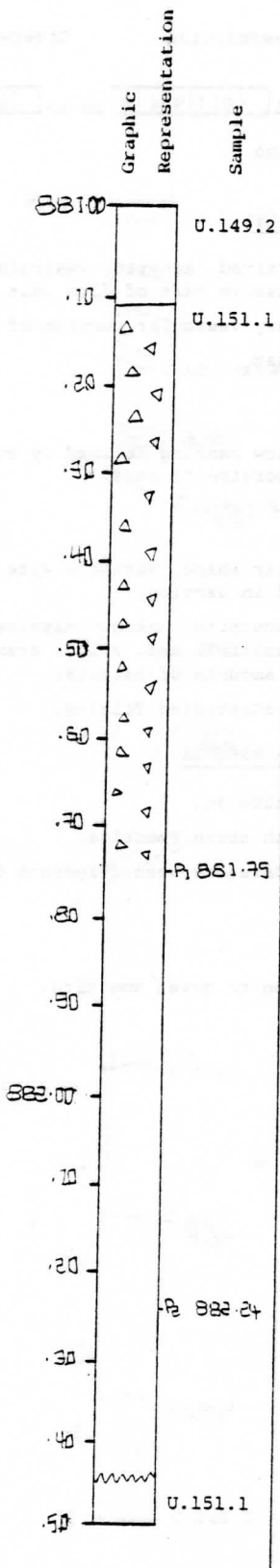
ROCK ALTERATION

Pervasive alteration to green smectite.

Visual Core Description Observer ... N. Gruv

Depth Interval 88100 cm to 88245 cm

Box 151, Section 2



LITHOLOGY-PETROGRAPHY

U.149.2 Lower portion of fine-grained, aphyric, vesicular, green gray unit. Continued from above.

U.151.1 Upper portion of unit is mottled, green-gray to purplish green-gray breccia. Brecciated clasts are of variable size ~ 3 mm to cms across long axis. They are primarily vesicular, fine grained aphyric basalt. The breccia grades downward to green-gray, fine-grained, aphyric, vesicular basalt.

STRUCTURE

U.151.1 - upper portion. Brecciated

U.151.1 - downward - vesicular

VESICLES/AMYGDALES

U.151.1 Vesicles are tiny, 1 mm, irregular and filled with smectite and zeolite near breccia. This grades downward to subrounded to elliptical vesicles ranging from ~ 2-10 mm across long axis, filled with smectite and zeolite.

FRACTURES - VEINS - BRECCIA

U.151.1 Unit not highly fractured. Spaces between breccia clasts and irregular hairlike fracture in breccia are filled with zeolite.

Large cavity at 882.10 is filled with euhedral blades of vitreous zeolite (laumontite). Cavity is ~ 1 cm across long axis.

Other fractures are lined with pinkish-purple smectite.

ROCK ALTERATION

Pervasive smectite alteration.

Visual Core Description

Observer ... N. Gruver

Depth Interval

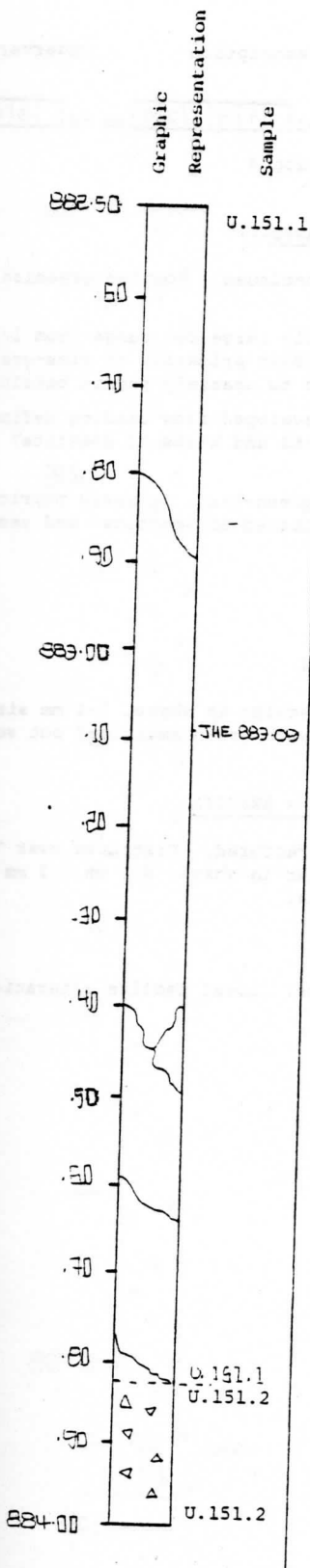
8	8	2	4	5
---	---	---	---	---

 cm to

8	8	4	0	0
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 cm

Box 151, Section 3



LITHOLOGY-PETROGRAPHY

U.151.1 Gray-green, fine-grained, very sparsely phyrlic basalt. Phenocrysts - plagioclase, < 1% of rock, ~ 2 mm long.

U.151.2 Mottled dark gray, light gray, and green and purplish gray breccia. Poorly sorted clasts of vesicular to non-vesicular, fine-grained basalt. Matrix is largely zeolitized.

STRUCTURE

Vesicular (U.151.1)

VESICLES/AMYGDALES

U.151.1

Vesicles = 2-5% of rock, are primarily elliptical, and range in size from 1 mm to 2 cm across long axis.

883.08 is lined with massive zeolite ?, superimposed on zeolite is euhedral quartz, projecting into open space.

Most vesicles are lined with green smectite and filled with platy, vitreous, sometimes radiating zeolites and/or quartz.

FRACTURES - VEINS - BRECCIA

Unit 151.1. Not highly fractured. Core angle to fracture varies from 60°-80°. They are lined with black, green, and pink smectite. Upper fracture also contains zeolite.

ROCK ALTERATION

Pervasive smectite. Zeolite altering some of ground mass locally.

OTHER

883.85 Contact somewhat arbitrary. Placed at base of more massive portion of flow and at top of breccia zone below.