GL0148&4

Petrographic Analyses
Corehole N-1 Newberry Volcano, Oregon

Depth: 531'

Rock Type: (from whole rock geochemistry): Basaltic Andesite

Description: Holocrystalline, very fine grained equigranular, pilotaxitic; Euhedral to subhedral Labradorite plagioclase laths, <0.01 to 0.35mm, in intergranular matrix of granular clinopyroxene and granular opaque iron ore.

Depth: 597'

Rock Type: Basaltic Andesite

Description: Holocrystalline, very fine grained equigranular; Euhedral to subhedral Labradorite plagioclase laths, <0.01 to 0.25mm, in an intergranular matrix of granular to subhedral (<0.01mm) clinopyroxene and granular opaque iron ore.

Depth: 1061'

Rock Type: Andesite

Description: Holocrystalline, seriate, vesicular; Phenocrysts of euhedral Labradorite plagioclase, 0.3 to 1.8mm, with minor subhedral columnar Augite, 0.1 to 0.3mm, and trace rounded Olivine grains, 0.1mm, in an intergranular groundmass of Labradorite laths <0.01 to 0.2mm, granular clinopyroxene and granular opaque iron ore. Vesicles are rounded bubbles (diktytaxitic) up to 0.3mm.

Depth: 1172'

Rock Type: N/A

Description: Hypohyaline, porphyritic, unwelded crystal vitric tuff. Agglomerate of fiamme and lapilli of porphyritic brown glass, 0.1 to 8mm, in a frothy vesicular red brown to red orange glassy matrix. Glass lapilli contain approximately 15% phenocrysts of Labradorite plagioclase, 0.05 to 1.1mm, Augite, 0.05 to 0.35mm, and Olivine, 0.01 to 0.6mm, as well as abundant plagioclase microlites and black crystallites. Tuff also contains about 20% lithic fragments up to 6.0mm of basaltic andesite, cinder scoria and porphyritic rhyodacite (Oligoclase plagioclase laths up to 0.8mm in a cryptofelsic matrix).

Depth: 1175'

Rock Type: Rhyodacite

Description: Hypohyaline, porphyritic, welded crystal vitric tuff. Flow banded matrix of dusky reddish brown devitrified glass with trace black crystallites. Contains approximate 20% phenocrysts including Labradorite, up to 1.6mm, and Augite, up to 1.1mm. Rare lithic inclusions of basaltic andesite and porphyritic rhyodacite as above. Glass characterized by minor perlitic fracturing and rare highly arcuate vesicles up to 0.5mm.

Depth: 1180'

Rock Type: N/A

Description: Hypohyaline, welded pumice lapilli tuff; Lithic fragments up to 5.0mm in length, predominantly pumice lapilli but also including basaltic andesite, cinder scoria and porphyritic rhyodacite, in a vitroclastic yellow brown to red brown groundmass of angular glass shards, glass dust/ash and phenocrysts. Labradorite laths up to 2.45mm, euhedral to subhedral embayed Augite up to 0.6mm and opaque iron ore constitute about 10% of the total rock. Rare vesicles are partially to completely infilled by radiating crystals of tridymite.

Depth: 1212.5'

Rock Type: Andesite

Description: Holocrystalline, very fine grained equigranular, vesicular; Euhedral to subhedral Labradorite plagioclase laths, <0.01 to 0.2mm, in an intergranular groundmass of granular clinopyroxene and opaque iron ore.

Depth: 1461.4'

Rock Type: Basaltic Andesite

Description: Holocrystalline; very fine grained equigranular, pilotaxitic; Euhedral to subhedral Labradorite plagioclase laths, up to 0.15mm, in an intergranular groundmass of granular clinopyroxene and opaque iron ore.

Depth: 1578'

Rock Type: Andesite

Description: Holocrystalline; seriate-glomeroporphyritic, pilotaxitic; Phenocrysts of euhedral Labradorite plagioclase laths, up to 0.8mm, subhedral columnar Augite, up to 0.6mm, and granular Olivine grains, up to 0.2mm in an intergranular groundmass of Labradorite to andesine laths, <0.01 to 0.2mm, with granular Augite and opaque iron ore.

Depth: 1864.3'

Rock Type: N/A

Description: Holohyaline, weakly welded lithic lapilli tuff; Rounded to spindle-shaped lapilli, 1 to 12mm, of pumiceous glass and brown glass with perlitic fractures plus minor basaltic andesite flow and scoria inclusions in a vitroclastic groundmass. Groundmass consists of yellow to yellow brown angular glass shards, globular glass beads and glass dust that is partially replaced by clays.

Depth: 1956'

Rock Type: Tholeiitic Basalt

Description: Hypohyaline, porphyritic, vesicular; Phenocrysts of olivine, up to 1.1mm, in an intersertal matrix of dusky red, nearly opaque devitrified glass with subordinant Labradorite microlites, granular Olivine, granular Augite and very rare opaque iron ore. Material is vesicular with arcuate to rounded cavities up to 7.0mm.

Depth: 2168'

Rock Type: Hypohyaline, porphyritic, welded vitric tuff; Agglomerate of fiamme and elongate lapilli of brown porphyritic glass, up to 15mm in length, with minor matrix material composed of yellow brown glass dust and clay minerals. Phenocrysts, approximately 5% of total rock, of euhedral Andesine plagioclase laths up to 1.0mm, trace subhedral columnar Augite and iron oxide granules. Trace inclusions of basaltic andesite and cinder scoria. Perlitic fractures are well developed in the glass lapilli.

Depth: 2301'

Rock Type: Basaltic Andesite

Description: Contact between "intrusive basalt" (b) and Basaltic Andesite host (a).

a) Hypocrystalline, seriate; vesicular; Phenocrysts of euhedral Labradorite plagioclase laths up to 2.1mm, subhedral (to euhedral) columnar Augite, up to 2.2mm, and subhedral rounded olivine, up to 0.5mm in an intersertal matrix of opaque dusky red brown devitrified glass. Vesicles are elongate irregularly-shaped cavities (diktytaxitic) up to 1.4mm and are commonly lined with yellow brown to red brown clays.

b) Hypohyaline, very fine grained equigranular, hyalopilitic; Labradorite microlites, less than .01mm and rare euhedral Augite microphenocrysts (<0.01mm) in an intersertal groundmass of dusky red brown to red black opaque devitrified glass. Flow banding, characterized by varying proportions of glass to microlites and thin planar concentrations of small, less than 0.05mm, rounded bubble vesicles, is parallel to the contact with the host material. The groundmass displays a distinctive reaction rim (chilled margin) adjacent to the seriate basaltic andesite defined by an increase in the opaqueness and red pigmentation of the glass in a zone that ranges from 0.5 to 2.0mm. This glassy material also infills voids (fractures and vesicles) in the seriate basaltic andesite.

Depth: 2375'

Rock Type: Basaltic Andesite

Description: Holocrystalline, seriate, vesicular; Phenocrysts (2% of total rock) of euhedral Labradorite plagioclase laths, up to 0.9mm, and rare subhedral to rounded Olivine crystals, up to 0.3mm, in an intergranular groundmass of euhedral Labradorite laths, <0.01 to 0.2mm, with granular clinopyroxene and rare opaque iron ore. Approximately 2% of the groundmass is intersertal brown glass. The vesicles are rounded cavities up to 0.5mm partially to completely infilled with greenish brown balls of clay. The Olivine grains are partially to completely replaced by iddingsite and iron rich clays.

Depth: 2478'

Rock Type: Tholeiitic Basalt

Description: Hypocrystalline, ophiomottled, vesicular; Euhedral to subhedral Labradorite laths up to 0.3mm and trace subhedral Olivine crystals up to 0.3mm, enveloped by ophitic Augite crystals, up to 2.3mm across, and partially (20%) by intersertal red brown glass. Vesicles are rounded to irregularly shaped cavities which are partially to completely infilled by radiating mass of siderite and red brown clays.

Depth: 2707'

Rock Type: Basaltic Andesite

Description: Hypocrystalline, seriate; Phenocrysts of euhedral Labradorite plagioclase, up to 2.6mm, in an intergranular groundmass of euhedral to subhedral Labradorite laths, <0.01 to 0.2mm, granular clinopyroxene and opaque iron ore. About 4% of the groundmass is intersertal brown glass.

Depth: 2889.5'

Rock Type: Basaltic Andesite

Description: Hypocrystalline, seriate, pilotaxitic, vesicular; Euhedral to subhedral Labradorite laths, <.01 to 1.4mm, trace granular clinopyroxene and rare opaque iron ore in a brown to reddish brown intersertal glass matrix. Glass is partially devitrified and altered to yellow brown clays. Vesicles comprise about 10% of total area and are irregularly-shaped rounded cavities up to 2.0mm in length.

Depth: 2927'

Rock Type: Basaltic Andesite

Description: Holocrystalline, seriate, vesicular; Phenocrysts of euhedral Labradorite plagioclase, up to 1.7mm, and rare remnant Olivine, up to 0.25mm, in an intergranular groundmass of Labradorite laths, <0.01 to 0.2mm, granular clinopyroxene and granular opaque iron ore. Olivine crystals are pervasively altered to iddingsite, clays and iron oxide. Also present are trace amounts of intersertal brown glass that are partially altered to yellow brown clays. Vesicles are round cavities (diktytaxitic) approximately 1.0mm in diameter.

Depth: 3115'

Rock Type: Andesite

Description: Hypohyaline, glomeroporphyritic, unwelded crystal vitric tuff; Phenocrysts of Andesine, Augite and opaque iron ore in a massive frothy vesicular groundmass of red brown altered glass. Relic vitroclastic textures and pumice lapilli can be recognized. Phenocrysts comprise approximately 5% of total rock and are commonly concentrated in clots. Minor lithic fragments of basaltic andesite and cinder scoria, up to 5.0mm, are also present.

Depth: 3117'

Rock Type: Dacite

Description: Hypohyaline, welded lithic lapilli tuff; Agglomerated fiamme and lapilli, up to 15.0mm, composed of devitrified glass and collapsed pumice fragments in a vitroclastic groundmass of fine grained glass shards, glass dust/ash and plagioclase microlites. Glass lapilli contain minor amounts of microlites and microphenocrysts, up to 0.3mm, of plagioclase (andesine?) clinopyroxene and iron ore. All glassy material has been devitrified and pervasively altered to yellow, yellow brown, and red brown clays and trace iron oxides. Tuff also contains abundant (20% of total rock) inclusions of basaltic andesite, cinder scoria and porphyritic rhyodacite(?) up to 8mm.

Depth: 3128'

Rock Type: Basaltic Andesite. Designated "Intrusive".

Description: Hypohyaline; very fine grained equigranular, weakly hyalopilitic vesicular. Microlites of Labradorite to Andesine plagioclase, with rare phenocrysts up to 1.3mm, and minor granules of clinopyroxene with rare embayed Augite phenocrysts up to 0.25mm in an intersertal groundmass of dusky red brown to black opaque devitrified glass. Abundant rounded bubble cavities up to 2mm in diameter that are very commonly infilled with siderite crystals and layered yellow brown to red brown clays.

Depth: 3350'

Rock Type: Andesite

Description: Holohyaline, welded lapilli tuff. Agglomerate of fiamme and lapilli of devitrified glass, up to 10mm in length, in a groundmass of devitrified glass dust/ash. Rare plagioclase microphenocrysts up to 0.2mm. Glassy material is pervasively altered to yellow, yellow brown and red brown clays and irregular patches of zeolite(?). Lithic clasts of basaltic andesite and cinder scoria up to 3mm in length comprise about 10% of total rock.

Depth: 3595.1'

Rock Type: Basaltic Andesite

Description: Hypohyaline, seriate, very fine grained equigranular, vesicular; Euhedral to subhedral laths of Labradorite plagioclase, <.01 to 0.2mm, with rare phenocrysts up to 0.8mm, and rare phenocrysts of subhedral Augite up to 0.35mm in an intersertal groundmass of opaque dusky red brown devitrified glass. Irregular-shaped to rounded vesicles (diktytaxitic) up to 4mm in length comprise about 5% of total area. Vesicles are partially infilled with pale green clays, yellow brown clays and siderite crystals.

Depth: 3802'

Rock Type: Rhyodacite

Description: Holocrystalline; porphyritic, pilotaxitic; Laths of Andesine plagioclase up to 4.5mm, rare granular opaque iron ore, and very rare embayed columnar clinopyroxene crystals up to 0.3mm in a massive to weakly flow banded cryptofelsic groundmass. Section has many fractures, generally subparallel to flow banding, that range from 0.05 to 0.4mm across. Fractures are partially to completely infilled with massive to drusy siderite crystals, drusy tridymite crystals, and green to yellow green clays. Groundmass replacement by green clays up to 0.2mm surround each fracture.

Depth: 3812'

Rock Type: Rhyodacite

Description: Hypocrystalline; porphyritic, hyalopilitic, vesicular; Laths of Andesine plagioclase up to 3.2mm, minor remnant columnar clinopyroxene phenocryts up to 0.5mm and rare granular opaque iron ore in an intersertal groundmass of brown glass with minor inclusions of plagioclase microlites and black crystallites. Groundmass is partially devitrified and altered to yellow and yellow brown clays. Clinopyroxene is partially to completely replaced by red brown clays and iron oxides. Vesicles are elongate with rounded to arcuate geometries ranging in size from 0.1 to 3.0mm. They display a distinct planar orientation and distribution.

Depth: 3859'

Rock Type: Rhyolite

Description: Hypohyaline, porphyritic, vesicular; Laths of Andesine plagioclase up to 3.5mm, commonly rounded or embayed, with very rare granular opaque iron ore and subhedral columnar clinopyroxene, up to 0.25mm in an intersertal groundmass of brownish greenish devitrified glass with abundant black crystallites. Vesicles are elongate, irregularly-shaped to rounded cavities that are less than 1.0mm in length. There are very rare inclusions of dark glassy fiamme and glass spherulites. The clinopyroxene is partially to completely replaced by red brown clays and iron oxides and some plagioclase phenocrysts display minor replacement by carbonate. Yellow green to green clays and siderite crystals are present in some vesicles.

Figure 2 P/A

PRECIPITATION AND/OR ALTERATION MINERALOGY OF CORE HOLE GEO N-1. This figure was compiled by GEO personnel from the data in Table 2 P/A. This table includes x-ray diffraction work conducted for GEO by Keith Barger (USGS) and Terry Keith (USGS). In addition, Table 2 P/A contains results from x-ray diffraction work conducted for GEO by Portland State University (Mike Cummings,Geology Department) and Sonoma State University (Walt Vennum, Geology Department).

Note: USGS Open File Report 86-440 is included as a cross reference.

CORE HOLE GEO N-1

PRECIPITATION/ALTERATION MINERALOGY

NEWBERRY VOLCANO, OREGON

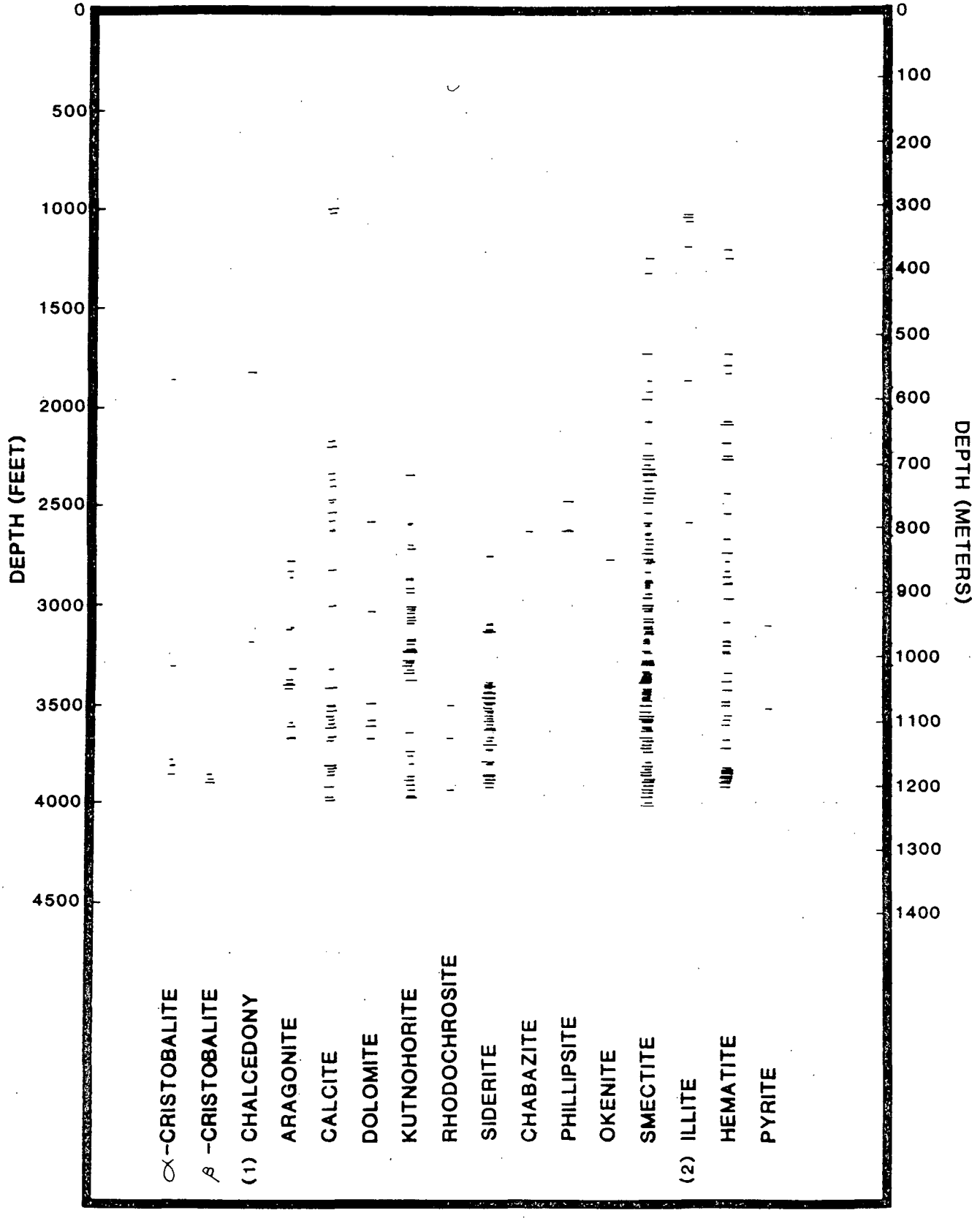

Figure 2 P/A

TABLE 2 P/A(continued)

Precipitation/Alteration Mineralogy

for GEO Core Hole N-1

Newberry Volcano, Oregon

Depth	Description	Mineralogy
1864.3	(clay-rich?)lithic tuff	plagioclase, alpha-cristobalite(?), illite-smectite(?), (mixed layer)
2481	fracture flg-$CaCO_3$?	calcite, phillipsite
2587	cream-colored botryoids	calcite plus some kutnohorite, smectite
2628	olive "clay" dep. on zeolite(?)	smectite, chabazite, plagioclase, calcite, phillipsite(?) illite
2630	clear to milky fracture coatings	phillipsite, chabazite, calcite(Mn?)
2636	pseudocubic min. H<4	PSU, chabazite
2638	clear xls, 2 dir.cleavage?	SSU, phillipsite
2680	yellow "clay"	plagioclase, smectite
2698	extr. small sample-radiating needles	kutnohorite
2705	cream-colored fracture flg.	kutnohorite
2774	white to pale green (clay?)	smectite, calcite
2776		smectite
2811	white min, small sample-in vugs	okenite
2864	cream-colored botryoids	kutnohorite
2865	acicular xls, radiating	aragonite
2868	cream-colored botryoid	kutnohorite
2875	green "clay"	smectite
2889	tuff unit, clay-altered	smectite, plagioclase
2906	pale olive green "clay"	smectite, plagioclase, orthopyroxene (?)
2917	cream to pale gr. scaley frac. flg.	Ca-kutnohorite plus Mg-kutnohorite
3084	cream col. min. fills ves. of dike	kutnohorite, siderite, smectite
3103	white (trigonal?) xls H3	SSU, aragonite
3115	pale green tuff	SSU, smectite
3134	olive green fractures coating	smectite, plagioclase, orthopyroxene (?)
3180		smectite
3181		chalcedony, smectite
3227		chalcedony, smectite

TABLE 2 P/A (see Fig. 2 P/A)

Precipitation/Alteration Mineralogy

for GEO Core Hole N-1

Newberry Volcano, Oregon

Depth	Description	Mineralogy
3312	green "clay" & calcite(?)	smectite + kutnohorite, aragonite, plagioclase,alpha-cristobalite
3323	green "clay" & calcite(?)	PSU, Mg-calcite or kutnohorite, smectite
3345	pale olive "clay" frac.flg.	PSU, smectite
3350.6	tuff unit, clay-altered	PSU, smectite
3367	yellow, transluc. H4	SSU Ca-kutnohorite
3397	clear, vitr. pseudocubic H5	SSU aragonite
3497	yellow fracture coating	Mn-siderite + Fe-rhodochrosite?, calcite
3537	greenish-yel. frac. coating	Mn-siderite
3555	brown botryoids in vugs	Mn-siderite, smectite, hematite
3587	fibrous "fuzz"-zeolite	Mn-siderite, calcite
3589	clear to pale yel. min, striated faces	SSU, aragonite plus calcite, dolomite, Mn-siderite
3589A	cream colored open space flg	SSU, Mn-siderite
3595	green "clay"	SSU, smectite
3600	yellow botryoids	Mn-siderite
3612	brown botryoids	siderite
3615	light brown botryoids	siderite
3635	white "fuzzy" min	kutnohorite
3646	green min, fracture flg.	smectite
3659	clear min 1 cleavage dir.	SSU aragonite
3679	yellow xls on yellow botryoids	Fe rhodochrosite (?)
3784	green "clay"	smectite plus plagioclase, alpha-cristobalite
3791	white fracture flg.	Mg-kutnohorite
3793	olive green fracture flg.	tridymite, Mn-siderite, smectite, kutnohorite
3808	green "clay" fracture flg.	smectite plus plagioclase, alpha-cristobalite, hematite

TABLE 2 P/A(continued)

Precipitation/Alteration Mineralogy

for GEO Core Hole N-1

Newberry Volcano, Oregon

Depth	Description	Mineralogy
3846	white min, H3	calcite
3850	tiny brown botryoids	Mn-siderite, plus calcite, plagioclase, alpha-cristobalite, kutnohorite

Mineral identifications by x-ray analysis at the following laboratories:

PSU	Portland State Univ.
SSU	Sonoma State Univ.
Not specified	USGS

Thin Section Descriptions
Newberry Crater Core Hole N-3

Depth: 487'

Rock Type: (from whole rock geochemistry) Basaltic Andesite

Description: Holocrystalline, seriate-glomeroporphyritic; Phenocrysts of subhedral to euhedral labradorite plagioclase laths up to 2.1mm, minor subhedral to euhedral olivine crystals up to 0.9mm and trace rounded to subhedral augite crystals up to 0.6mm in an intergranular matrix of labradorite microlaths, granular clinopyroxene <.01mm and granular iron ore <.01mm.

Depth: 848'

Rock Type: Andesite

Description: Holocrystalline, very fine grained equigranular, pilotaxitic. Flow banded euhedral laths and microlaths of labradorite plagioclase up to 0.4mm in an intergranular matrix of granular clinopyroxene <.01mm and granular iron ore.

Depth: 1062'

Rock Type: Basaltic Andesite

Description: Holocrystalline, seriate-glomeroporphyritic, locally subophitic; Euhedral laths of labradorite plagioclase, 0.1 to 2.6mm, and trace phenocrysts of subhedral to rounded olivine up to 0.8mm in a subophitic to granular matrix of clinopyroxene with very rare granular iron ore <.01mm.

Depth: 1266'

Rock Type: N/A

Description: Hypohyaline, crystal lapilli tuff, unwelded; Globular to arcuate lapilli of phenocryst-bearing glass and pumice up to 6.0mm and minor (10%) lapilli of basaltic cinder scoria, 0.1 to 3.0mm, in a frothy vitroclastic glass groundmass. Phenocrysts consist of euhedral to subhedral labradorite laths, <.01 to 0.4mm, and rare euhedral columnar augite, <0.1 to 0.2mm. Glass and pumice has been altered to a yellow brown to red brown palagonite.

Depth: 1353'

Rock Type: Basaltic Andesite

Description: Holocrystalline, seriate-glomeroporphyritic, vesicular; Euhedral laths of labradorite, .01 to 1.8mm, and subhedral to rounded

grains of olivine up to 0.8mm in an intergranular matrix of rounded to anhedral grains of clinopyroxene, 0.005 to 0.2mm, and rare iron ores <.01mm. Vesicles are elongate, generally rounded cavities up to 2.5mm in length; diktytaxitic.

Depth: 1702'

Rock Type: Basaltic Andesite

Description: Holocrystalline, fine grained equigranular, weakly pilotaxitic, vesicular. Euhedral laths of labradorite plagioclase, <0.01 to 0.6mm, and minor subhedral to rounded grains of olivine and augite, up to 0.3mm, in an intergranular matrix of granular clinopyroxene, olivine and trace iron oxides <.01mm. Vesicles are subrounded bubble cavities up to 0.4mm; diktytaxitic.

Depth: 1791'

Rock Type: N/A

Description: Hypohyaline, crystal lapilli tuff, unwelded; Crystal-bearing glassy lapilli and rare pumiceous fragments up to 7.0mm rounded fragments of cinder scoria and basalt up to 6.0mm in a crystal-rich ashy matrix. Abundant euhedral laths of plagioclase (labradorite?), <0.1 to 0.6mm, very minor columnar to anhedral phenocrysts of augite up to 0.5mm and very rare olivine crystals up to 0.4mm. Glass material has been altered to yellow brown palagonite.

Depth: 1796'

Rock Type: Basalt

Description: Hypohyaline, vitric tuff, densely welded. Agglomerated lapilli and fiamme of yellow brown glass up to 1cm in length in a matrix of yellow brown to reddish brown crystal-rich ash and vitroclastic material. Fluidal banding well developed. Phenocrysts include plagioclase, clinopyroxene and iron ore. Also contains lithic fragments of cinder scoria, basalt and rhyodacite(?).

Depth: 1827'

Rock Type: N/A (Basaltic Andesite?)

Description: Hypohyaline, porphyritic, vesicular; Euhedral laths of labradorite plagioclase, <0.01 to 1.0mm, with trace subhedral to rounded grains of clinopyroxene and very rare olivine <0.1mm in a frothy, vesicular green glass groundmass. Round bubble-shaped vesicles up to 0.5mm are also present.

Depth: 1861'

Rock Type: Basaltic Andesite

Description: Hypocrystalline, seriate-glomeroporphyritic; Euhedral laths of labradorite plagioclase, <0.01 to 3.4mm, with minor subhedral, embayed olivine, <0.01 to 1.2mm, and trace subhedral to granular augite, <0.01mm to 0.6mm, in an intersertal dark green glassy groundmass. Groundmass contains abundant microlites and cryptolites of plagioclase, clinopyroxene and iron ore.

Depth: 1949'

Rock Type: Basaltic Andesite

Description: Holocrystalline, seriate-glomeroporphyritic; Euhedral laths of labradorite plagioclase, 0.02 to 4.0mm, with rare subhedral, embayed crystals of olivine up to 1.1mm and very rare subhedral columnar augite up to 0.35mm, in an intergranular matrix of plagioclase microlites, granular clinopyroxene and granular iron ore. Olivine is partially altered to iddingsite.

Depth: 2102'

Rock Type: N/A (Basaltic Andesite?)

Description: Holocrystalline, seriate glomeroporphyritic; Euhedral laths of labradorite plagioclase, 0.02 to 3.0mm, with rare subhedral to rounded grains up to 0.3mm of olivine and augite in an intergranular matrix of plagioclase microlites and granular clinopyroxene and iron ore <0.01mm. Olivines are partially altered to iddingsite.

Depth: 2216'

Rock Type: Basaltic Andesite

Description: Holocrystalline, seriate, pilotaxitic. Euhedral and embayed and sieve-textured bytownite plagioclase laths (approximately 5% of total rock) up to 2.3mm and rare embayed grains of olivine up to 0.3mm in an intergranular matrix of labradorite plagioclase laths, granular clinopyroxene and granular iron ore. Microlites display subparallel orientations.

Depth: 2275'

Rock Type: Basaltic Andesite

Description: Holocrystalline, seriate-glomeroporphyritic, vesicular; Euhedral laths of labradorite plagioclase, 0.2 to 4.0mm, with minor subhedral to rounded grains of augite, up to 0.4mm, and rare subhedral, embayed grains of olivine, up to 0.7mm, in an intergranular matrix of plagioclase microlites, granular clinopyroxene and granular iron oxides. Vesicles are rounded to elongate cavities, 0.2 to 0.8mm; diktytaxitic.

Depth: 2343'

Rock Type: Basaltic Andesite

Description: Holocrystalline, seriate-glomeroporphyritic. Euhedral laths of labradorite plagioclase, 0.1 to 3.2mm, with rare subhedral, embayed olivine grains up to 0.3mm and subhedral, embayed augite grains up to 0.4mm in an intergranular matrix of plagioclase microlites, granular clinopyroxene and granular iron ore.

Depth: 2387'

Rock Type: Basaltic Andesite

Description: Holocrystalline, very fine grained equigranular, ophimottled, pilotaxitic, vesicular; Euhedral labradorite plagioclase laths, 0.1 to 0.3mm with rare phenocrysts up to 0.6mm in an intergranular matrix that grades from granular clinopyroxene with subordinant granular iron ore to subophitic clinopyroxene to intermeshed ophimottle plates of clinopyroxene up to 0.4mm. Vesicles are irregular to rounded cavities up to 0.75mm; diktytaxitic. Plagioclase microlaths display subparallel orientations.

Depth: 2441'

Rock Type: Basaltic Andesite

Description: Holocrystalline, very fine grained equigranular, pilotaxitic; Euhedral laths of labradorite plagioclase, <.01mm to 0.2mm, in an intergranular matrix of granular clinopyroxene and granular iron oxides. Very minor, <5%, intersertal green glass.

Depth: 2511'

Rock Type: Rhyodacite

Description: Holohyaline, pumice lapilli tuff, poorly welded; Rounded to irregularly-shaped pumice fragments up to 3mm and trace cinder and basaltic clasts up to 0.8mm in a vitroclastic matrix of glass shards and ash. Rare embayed plagioclase phenocrysts up to 0.2mm.

Depth: 2524'

Rock Type: N/A (Rhyodacite?)

Description: Holohyaline, pumice lapilli tuff, poorly welded. Pumice lapilli up to 5mm, and lithic fragments of cinders and basalt up to 4mm, in a vitroclastic matrix of glass shards and ash. Similar to 2511' but has a higher percentage of lithics and larger pumice lapilli.

Depth: 2538'

Rock Type: Tholeiitic Basalt

Description: Holohyaline, seriate; Euhedral laths of labradorite plagioclase, 0.1 to 0.7mm, with abundant rounded grains of olivine, 0.1 to 0.4mm, infilled by subophitic (locally granular) clinopyroxene. Very rare granules of iron ore <0.1mm. Sample has a microdiabasic texture. Olivines are commonly rimmed by iddingsite.

Depth: 2644'

Rock Type: Tholeiitic Basalt

Description: Holocrystalline, seriate, vesicular; Euhedral laths of labradorite plagioclase, 0.1 to 1.8mm, with minor amounts of rounded to subhedral olivine grains, <0.1 to 0.2mm, infilled by subophitic clinopyroxene and granular iron ore. Very minor amount (<2%) of intersertal brown glass. Vesicles are rounded cavities which are commonly lined with brown glass; diktytaxitic. Very similar to 2538'.

Depth: 2799'

Rock Type: Tholeiitic Basalt

Description: Hypocrystalline, fine grained equigranular; Euhedral laths of labradorite plagioclase, <0.1 to 0.5mm, and rare subhedral to rounded grains of olivine, <0.1mm, infilled by subophitic to weakly ophimottled clinopyroxene. Minor amount, approximately 5%, of intersertal dark brown opaque devitrified glass.

Depth: 2881'

Rock Type: Tholeiitic Basalt

Description: Hypocrystalline, fine grained equigranular; ophimottled; Euhedral laths of Labradorite plagioclase, <0.1 to 0.6mm, and very rare subhedral, embayed olivine up to 0.4mm, infilled partially by ophitic crystals of clinopyroxene up to 1.4mm across and partially by intersertal brownish green glass. Clinopyroxene to glass ratio is approximately 2:1. Very rare granular iron ore.

Depth: 3020'

Rock Type: N/A (Tholeiitic Basalt)

Description: Hypocrystalline, very fine grained equigranular, vesicular; Euhedral microlaths of Labradorite plagioclase, up to 0.4mm but generally <0.1mm, with very minor granular clinopyroxene and iron ore, <0.01mm, in a highly vesicular intersertal groundmass of dark brown opaque devitrified glass. Vesicles are small, <0.2mm, and round.

Depth: 3087'

Rock Type: N/A (Tholeiitic Basalt?)

Description: Holocrystalline, very fine grained equigranular; Euhedral laths of labradorite plagioclase, <0.1 to 0.3mm, with rare phenocrysts up to 0.9mm, in an intergranular matrix of granular clinopyroxene <0.01mm and granular iron ore <0.01mm.

Depth: 3098'

Rock Type: Tholeiitic Basalt

Description: Holocrystalline, fine grained equigranular, pilotaxitic; Euhedral laths of labradorite plagioclase, <0.1mm to 0.2mm with rare phenocrysts up to 4.0mm, and minor amounts of rounded to subhedral olivine, <0.1mm to 0.2mm, in an intergranular matrix of granular clinopyroxene <0.01mm and granular iron ore <0.01mm. Olivine crystals are pervasively to completed replaced by iddingsite and iron oxides.

Depth: 3122'

Rock Type: Dacite

Description: Hypohyaline, lithic lapilli crystal tuff, welded; Globular to spindle-shaped lapilli and fiamme of crystal-bearing devitrified glass up to 15mm in length in a crystal-rich vitroclastic matrix of arcuate glass shards, ash and glass dust. Phenocrysts in the glass lapilli and matrix are identical consisting of andesine plagioclase laths, <0.05 to 0.8mm, and rare columnar crystals of augite, <0.01 to 0.15mm. Tuff also contains approximately 20% lithic fragments ranging up to 6.0mm in length. Lithics are basalt, cinders, rhyodacite(?) and pumice. Glass and matrix are brown to yellow brown.

Depth: 3143'

Rock Type: N/A (Dacite or Andesite)

Description: Hypohyaline, lithic vitric tuff, welded. Subangular to rounded lithic fragments, <0.1 to 10mm, in a crystal-bearing dusky red brown glassy matrix. Lithic fragments are extremely varied: several basalts, basaltic cinder scoria, pumice, rhyodacite and frothy red brown glassy material (pre-existing tuff?). Phenocrysts includes euhedral, partially embayed labradite plagioclase laths up to 1.1mm in length and subhedral to euhedral columnar augite up to 0.4mm in length.

Depth: 3204'

Rock Type: N/A (Basaltic Andesite)

Description: Hypocrystalline, very fine grained equigranular; Microlites and microlaths of labradorite plagioclase up to 0.3mm in length, rare subhedral, embayed crystals of clinopyroxene up to 0.2mm and rare polygonal iron ore up to 0.1mm in an intersertal matrix of pale green glass. Basaltic cinder scoria inclusions, <0.1 to 1.4mm are also incorporated in the glassy matrix.

Depth: 3239'

Rock Type: Basaltic Andesite

Description: Hypocrystalline, seriate-glomeroporphyritic, vesicular. Euhedral labradorite plagioclase laths, 0.1 to 5mm, in an intergranular matrix of plagioclase microlites, granular clinopyroxene <0.05mm and opaque iron ore <0.01mm. Approximately 20% of the groundmass is intersertal dark greenish gray dust-filled, devitrified glass. Vesicles, <0.1 to 1.5mm, comprise approximately 15% of total area. Cavities range from irregular arcuate to rounded geometries. Vesicles are partially to completely filled with greenish to greenish brown clays. There is also very minor replacement of plagioclase by greenish brown clays.

Depth: 3263'

Rock Type: N/A (Rhyolite?)

Description: Holohyaline, glass flow; Agglomerate of rounded, arcuate and spindle-shaped pale green glassy fragments up to 5mm. Glass displays flow banding and contains abundant crystalline of plagioclase. Individual glass fragments have devitrified rims and open into irregular arcuate void spaces partly filled by black opaque material, yellow brown clays and spherical crystals of cristobalite up to .125mm.

Depth: 3311'

Rock Type: Rhyolite

Description: Hypocrystalline, cryptocrystalline, pilotaxitic; Microlites of plagioclase, <0.1mm, in a cryptocrystalline groundmass with abundant crystallites of plagioclase and iron ore with some very pale green glass. Rock composed of planar bands ranging from approximately 0.075 to 0.15mm. Platy fractures well developed along planar lamina with red brown opaque iron oxides and intergrowths of euhedral trydymite and cristobalite crystals lining open voids.

Depth: 3352'

Rock Type: N/A (Basalt?)

Description: Hypocrystalline, seriate, fine grained equigranular, pilotaxitic, vesicular; Microlaths of labradorite plagioclase, 0.1 to 0.2mm, with rare phenocrysts up to 0.75mm in an intergranular matrix of clinopyroxene and iron ore granules <.05mm grading into an intersertal groundmass of pale green glass. Glass constitutes approximately 20% of groundmass. Very rare of olivine up to 1.1mm in length completely replaced by a fine grained mixture of iddingsite, iron oxides and sphene. Vesicles, up to 0.6mm in length, are rounded elongate cavities partially filled by greenish clays; diktytaxitic.

Depth: 3365'

Rock Type: Rhyodacite

Description: Hypocrystalline, porphyritic; Embayed laths of andesine plagioclase up to 0.8mm, subhedral embayed columnar augite up to 0.3mm, and polygonal iron ore grains up to 0.1mm, in a cryptofelsic groundmass. Rock is flow banded, characterized by irregular lamina of holocrystalline cryptofelsic material alternating with cryptofelsic material grading into dark opaque green glass. Sporadic fractures parallel to the flow banding, <0.2mm, partially infilled with very fine grained cristobalite and calcite crystals.

Depth: 3472'

Rock Type: Rhyodacite

Description: Holocrystalline, porphyritic; Subhedral embayed andesine plagioclase, laths up to 2.1mm, subhedral embayed columnar clinopyroxene up to 0.7mm and polygonal to granular iron ore up to 0.1mm in a cryptofelsic groundmass. Rare fractures, <0.1mm, are partially infilled by cristobalite and yellow brown clays.

Depth: 3541'

Rock Type: Rhyodacite

Description: Holocrystalline, porphyritic, pilotaxitic; Subhedral embayed andesine plagioclase, laths up to 1.95mm, rare subhedral embayed columnar augite up to 0.3mm, and very rare iron ore up to 0.1mm, in a cryptofelsic groundmass. Flow banded with minor fractures subparallel to flow banding up to 0.95mm in width. Fractures contain drusy crystals of tridymite with interstitial calcite and iron oxides and also layers of yellow brown clays.

Depth: 3608'

Rock Type: Rhyodacite

Description: Holocrystalline, porphyritic; Trace amounts of phenocrysts consisting of subhedral embayed andesine laths up to 1.0mm, subhedral embayed augite crystals up to 0.2mm and granular iron ore <0.05mm in a cryptofelsic groundmass.

Depth: 3741'

Rock Type: Basaltic Andesite

Description: Hypocrystalline, seriate, vesicular; Euhedral laths of labradorite plagioclase, <0.1mm to 2.45mm, and minor rounded to subhedral columnar augite, <0.1mm to 0.5mm, in an intersertal matrix of dark gray green glass with abundant crystallites of clinopyroxene and iron ore. Approximately 20% of slide composed of lithic inclusions ranging from 1.2mm to 8.0mm in length. Lithics include rhyodacite, basaltic cinder scoria and flow basalts of widely varying textures. Rims of some inclusions, especially rhyodacite, show evidence of partial melting. Vesicles range from <.1mm to 2.2mm in length characterized by rounded to elongate geometries. Vesicles are partially to completely filled with massive to euhedral saucer-shaped siderite crystals and red to yellow brown clays. Minor patchy replacement of glassy groundmass by siderite is also present adjacent to siderite-bearing vesicles.

Depth: 3790'

Rock Type: Tholeiitic Basalt

Description: Hypocrystalline, seriate-fine grained equigranular, pilotaxitic, vesicular; Euhedral laths of labradorite plagioclase, 0.05 to 0.35mm, with rare rounded grains of augite less than 0.2mm in an intersertal matrix of black opaque devitrified glass with minor inclusions of granular clinopyroxene and iron ore <.01mm. Pseudomorphs of olivine completely replaced by red brown clays and carbonate are also present. Large round vesicles constitute approximately 5% of total area and range in size from 0.5 to 8mm. Vesicles are partially to completely infilled by botryoidal masses of clays (opaque black, dusky reddish brown, greenish brown, dark green), euhedral saucer-shaped siderite, and drusy aggregates of colorless calcite crystals.

Depth: 3961'

Rock Type: Tholeiitic Basalt

Description: Hypocrystalline, seriate-microdiabasic, vesicular; Euhedral laths of labradorite plagioclase, <0.1mm to 0.9mm, surrounded by subophitic platlets of augite up to 0.3mm and partially by intersertal devitrified, altered glass with minor granules of iron ore <0.05mm. Glass is pervasively altered to red brown to brown clays. Vesicles are rare and consist of rounded cavities up to 0.6mm which are partially to completely infilled by greenish brown clays, radiating spherical crystals of siderite and very fine-grained mosaic aggregates of carbonate.

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