



INL Lithologic Core Storage Library

Idaho National Laboratory
Building CFA-663

Operated by the U.S. Geological Survey
for the U.S. Department of Energy

Contact:
Linda C. Davis
PO Box 8072
Pocatello, ID.
83209

Official Name: NRF-15

Logged By: T.R. LeMaitre

Selected Aliases:

USGS Site ID: USGS 433942 112545001

Contractor Well ID:

Drilling Agency: USGS

Year Drilled: 2008

Names of Drillers: M. Gilbert and J. Blom

Well Status: Complete

Total Depth of Hole (ft): 759.0

Total Core Recovered (ft): Total

Beginning Depth (ft): 0

Ending Depth (ft): 759.0

Continuous Recovery

Selected Intervals Recovered

Notes:

County & State: Butte Co., ID

Quadrangle Name: Circular Butte 3NW

Lat / Lng: 43°39'42.18", 112°54'50.60"




Tns / Rng / Sec: T04N R30E S20

UTM Coordinates: 345667.274, 4835865.862

Surface Elevation (ft): 4,841.87






Core Geological Profile

Lithologic Patterns





-  Basalts
-  Rhyolites
-  Sedimentary Rock

Soil Patterns
















(See Unified Soil Classification System.)

-  Gravels - clean
-  Gravels with fines
-  Sands - clean
-  Sands with fines
-  Silts and clays








Intervals in Absentia

-  Surficial material
-  Natural void
-  Interval not cored
-  Missing interval

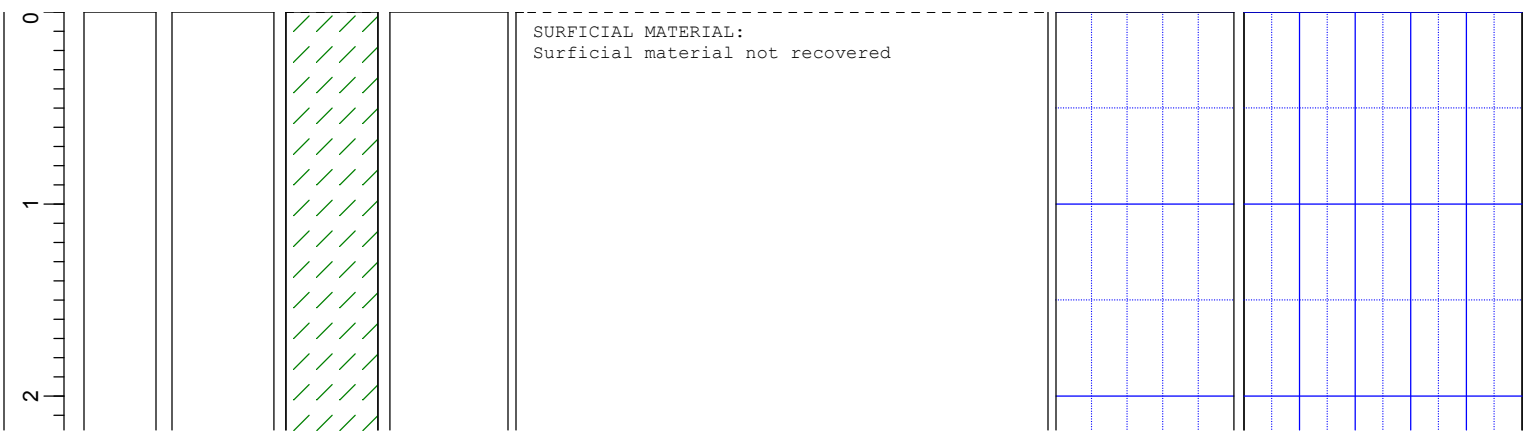
Igneous and Sedimentary Structure Symbols

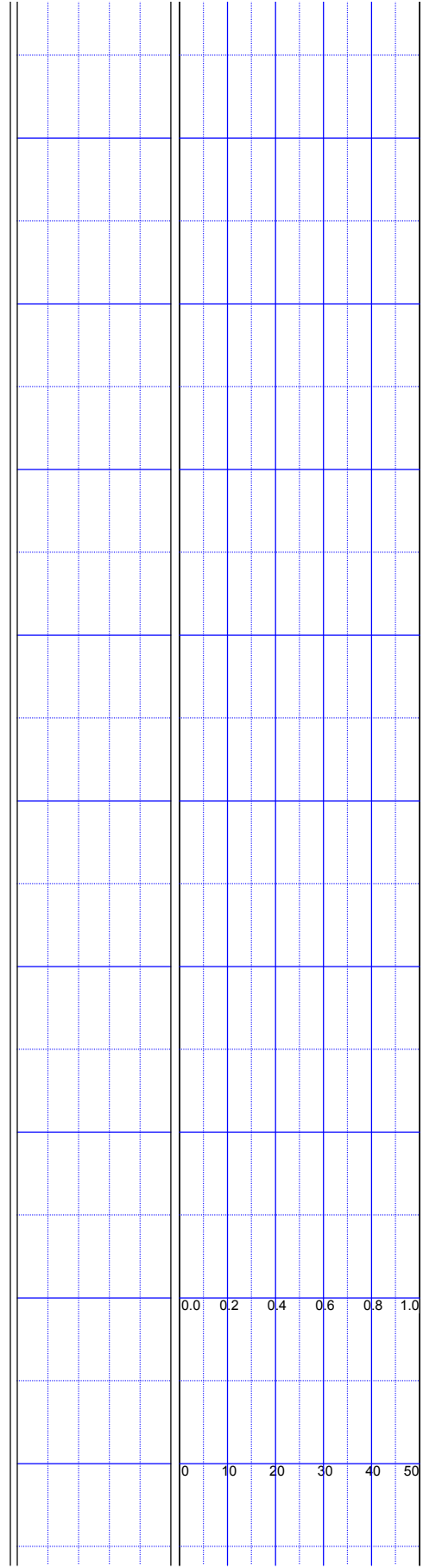
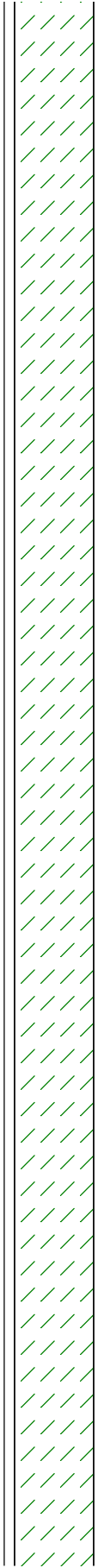
-  Vesicle zone
-  Large vesicles
-  Vesicle planes
-  Mega vesicles
-  Vesicle Cylinders
-  Pipe vesicles
-  Pillows
-  Vesicle Sheet
-  Flow/Mold
-  Spatter feature
-  Ripple marks
-  Mud cracks
-  Imbricated bedding
-  Graded bedding
-  Cross bedding

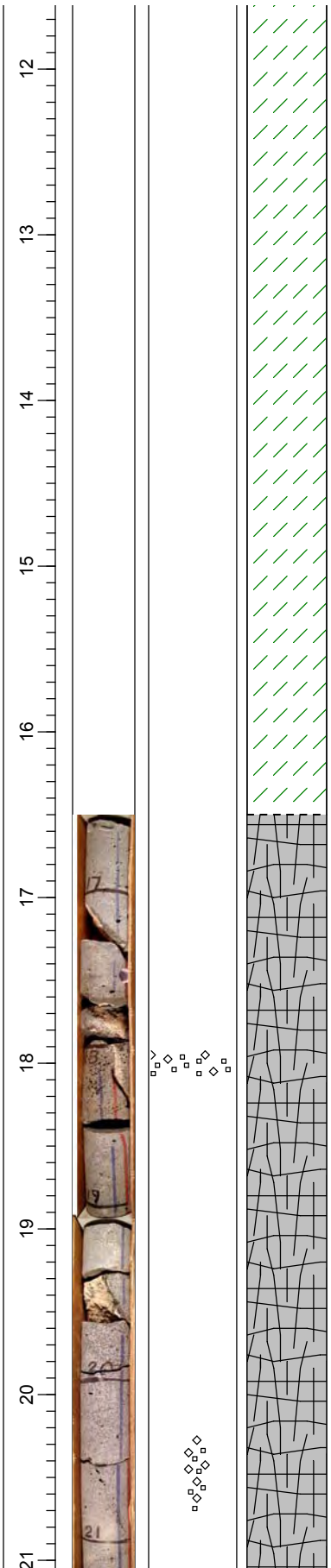
Soil Structure Symbols

-  Structureless - Single Grained
-  Structureless - Massive
-  Platy
-  Granular
-  Blocky
-  Prismatic
-  Columnar

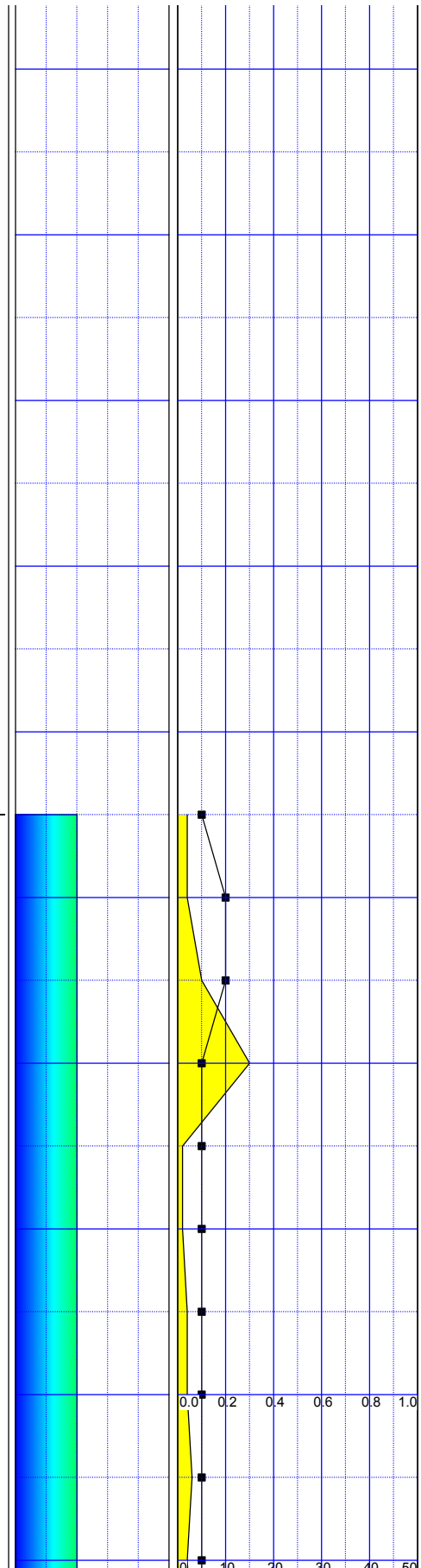
Depth (feet & tenths)	Core Photo	Igneous, Soil and Sed Structures	Lithology	Description	Fracture Frequency (See fracture classification on website.)	Vesicle Characteristics
				Miscellaneous Text Lithologic Description	0 1 2 3 4 5	Mean Size (in) 0 0.2 0.4 0.6 0.8 1.0 Volume Percentage 0 10 20 30 40 50

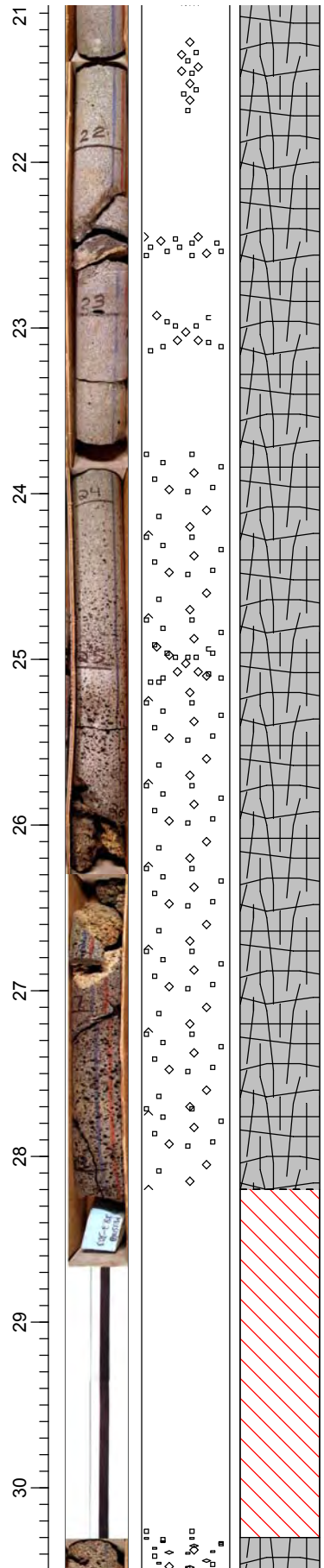






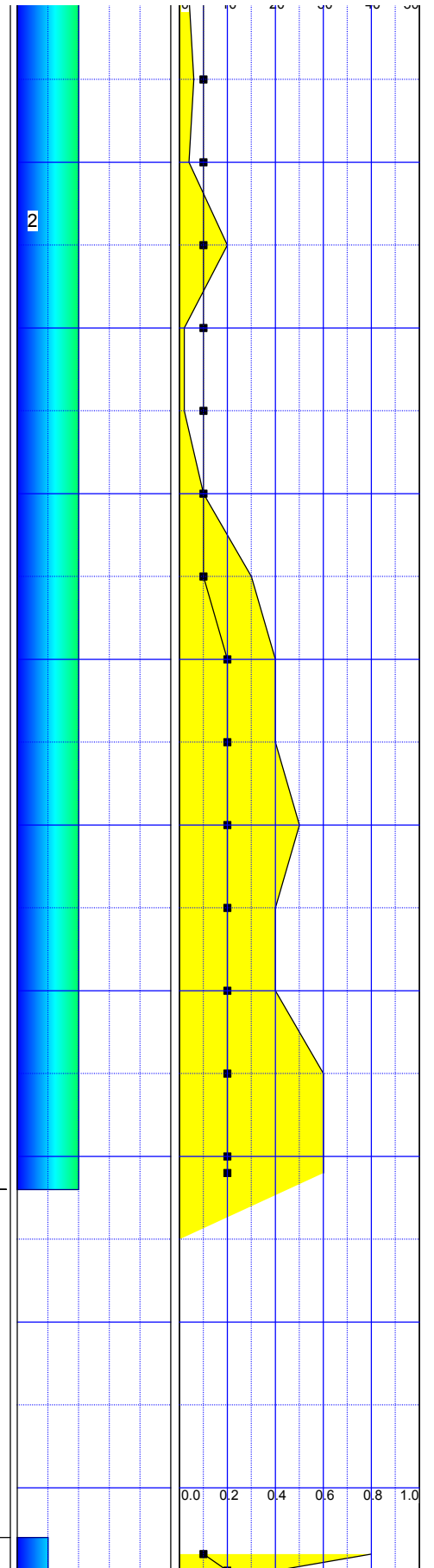
BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Slightly porphyritic, massive, vesicular, slightly diktytaxitic basalt; massive from 16.5 feet to 24.2 feet with areas of slightly diktytaxitic structure, becoming increasingly vesicular from 24.2 feet to 28.2 feet, vesicle columns and vesicle planes occur in massive section
 COMPOSITION: 50% plagioclase, 20% olivine, 10% pyroxene, 20% groundmass; submillimeter to 1 mm plagioclase laths, anhedral to euhedral submillimeter to 2 mm olivine microcrysts and glomerocrysts, submillimeter subhedral pyroxene
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: 10YR 8/2 Very Pale Orange mud in some natural fractures

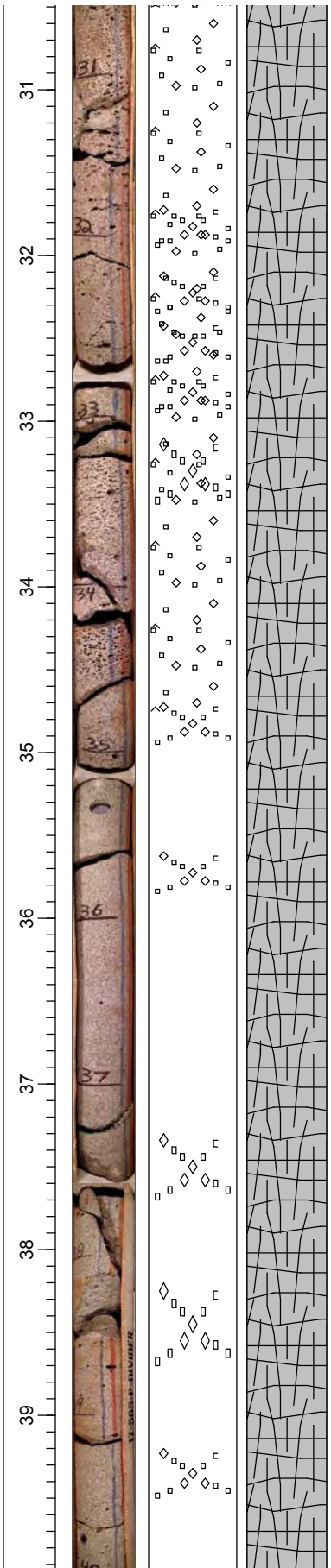




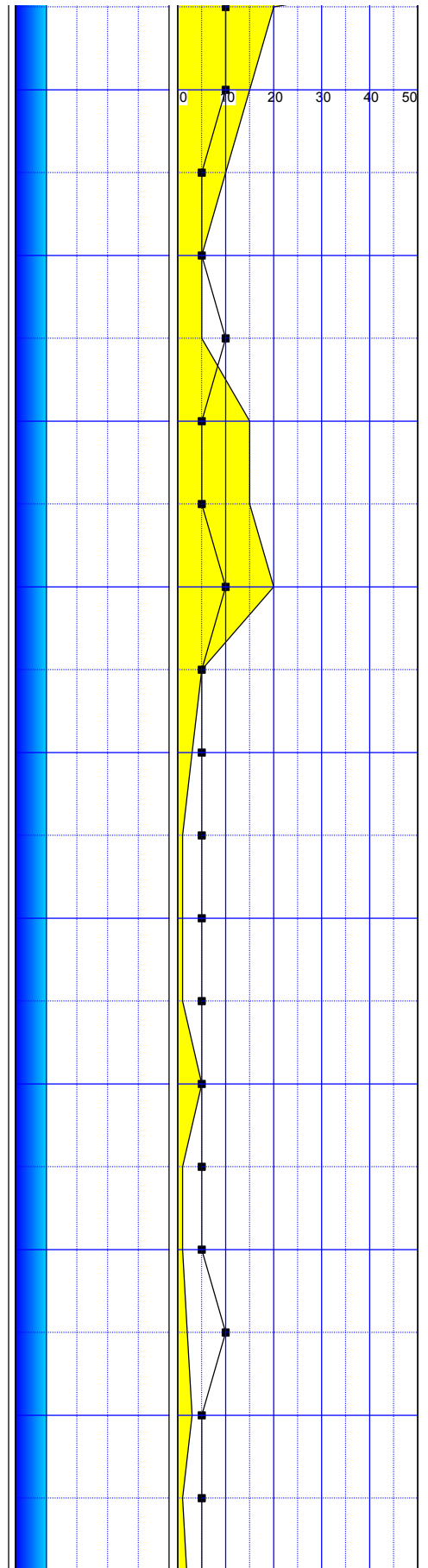
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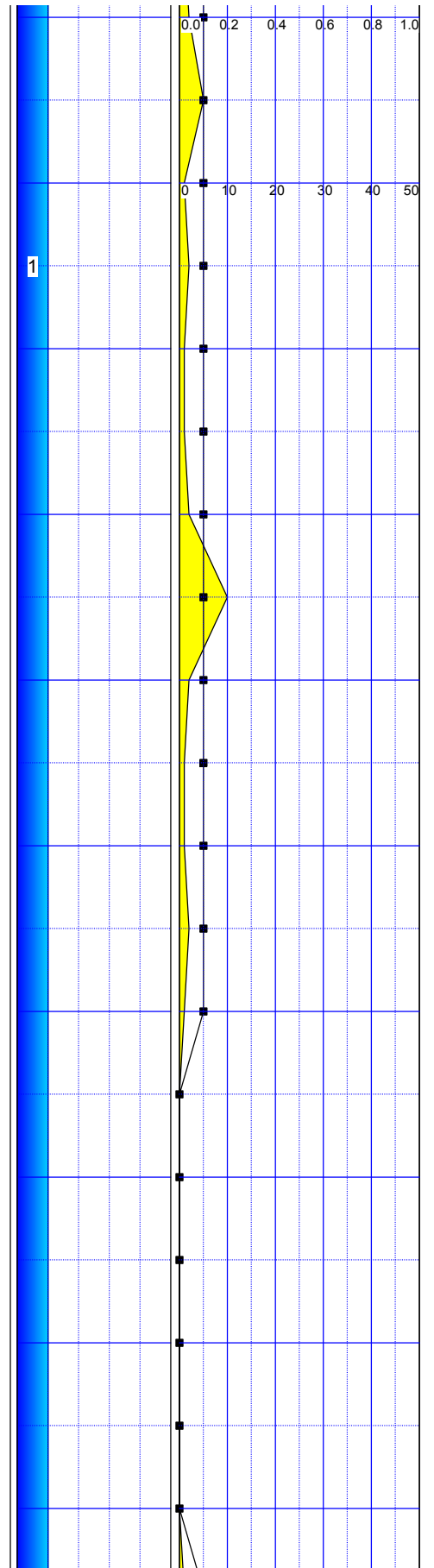
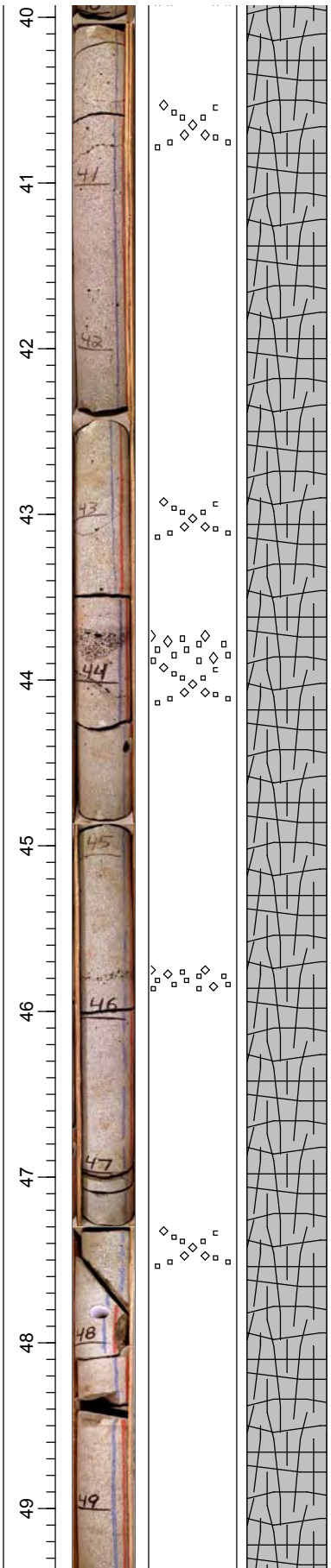
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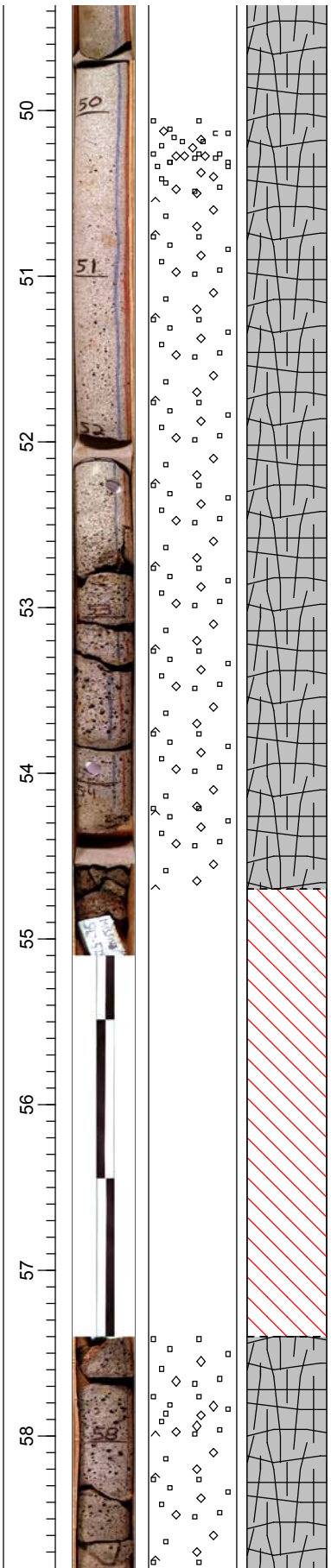




TEXTURE: Aphanitic, vesicular, diktytaxitic basalt; vesicular from 30.3 feet to 35.1 feet and increasingly vesicular from 50.3 feet to 54.7 feet, diktytaxitic from 35.1 feet to 50.3 feet, upper vesicular zone has some large vesicles and megavesicles, vesicle planes and vesicle sheets are common throughout diktytaxitic section
 COMPOSITION: 50% plagioclase, 30% olivine, 5% pyroxene, 15% groundmass; submillimeter plagioclase laths, subhedral submillimeter olivine microcrysts and some glomerocrysts, submillimeter pyroxenes
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to iddingsite, 10YR 8/2 Very Pale Orange mud in some fractures

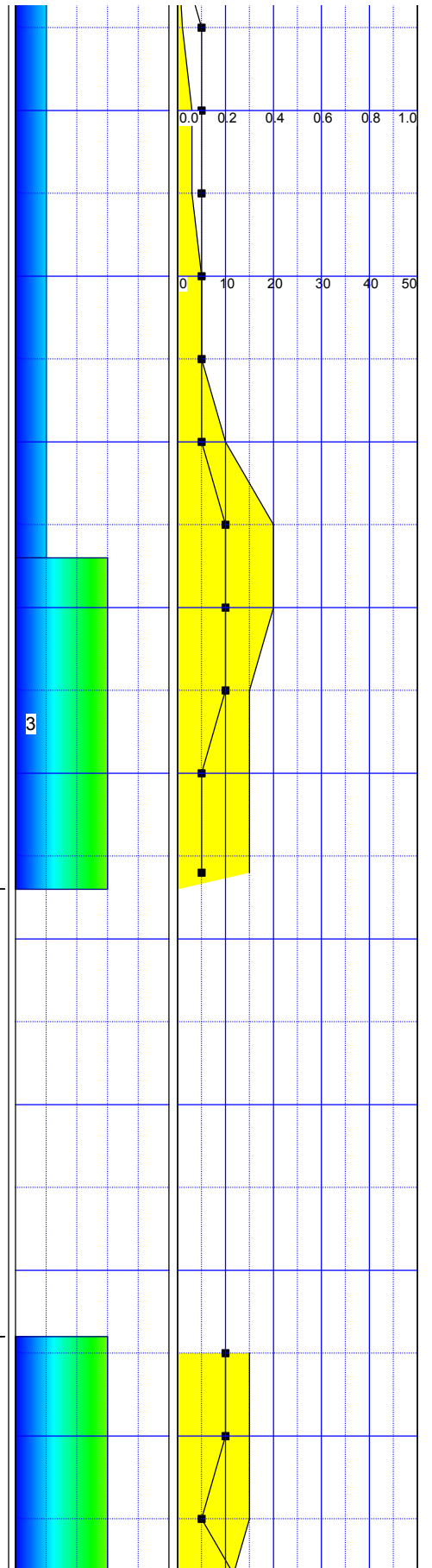


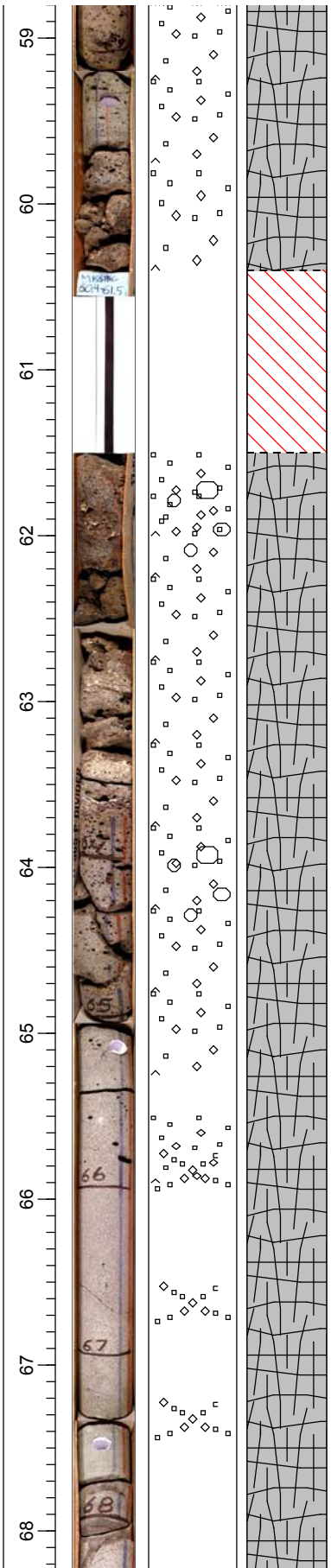




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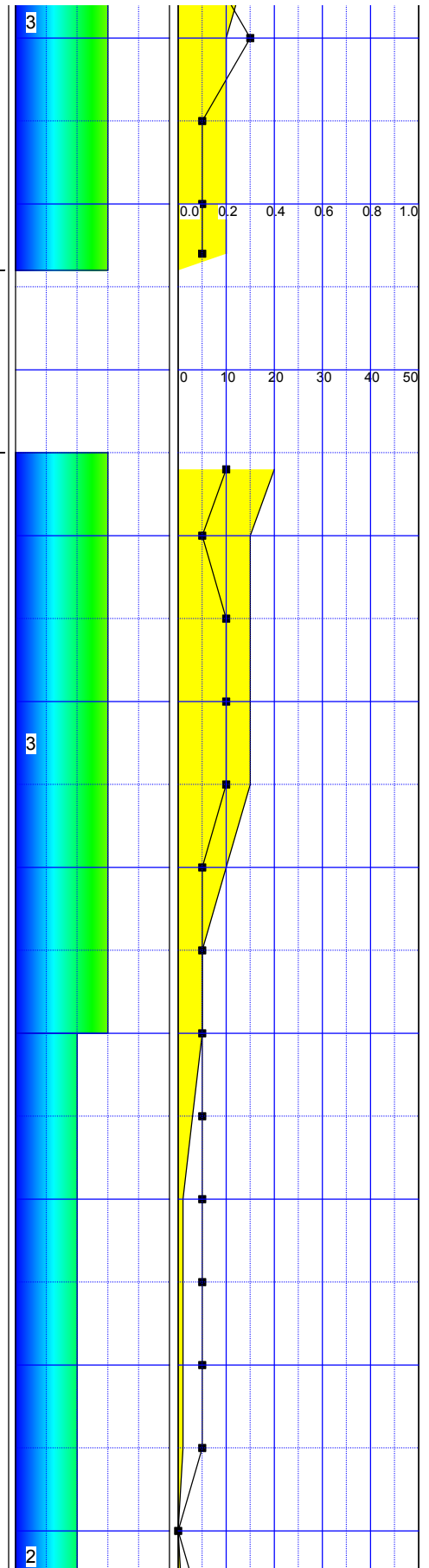
BASALT:
 COLOR: N3 Dark Gray
 TEXTURE: Mostly aphanitic, vesicular basalt; vesicular throughout
 COMPOSITION: 40% plagioclase, 20% olivine, 2% pyroxene, 38% groundmass; submillimeter to 1 mm plagioclase laths, submillimeter olivines, rare subhedral submillimeter pyroxenes
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to iddingsite, 10YR 8/2 Very Pale Orange calcitic mud in fractures

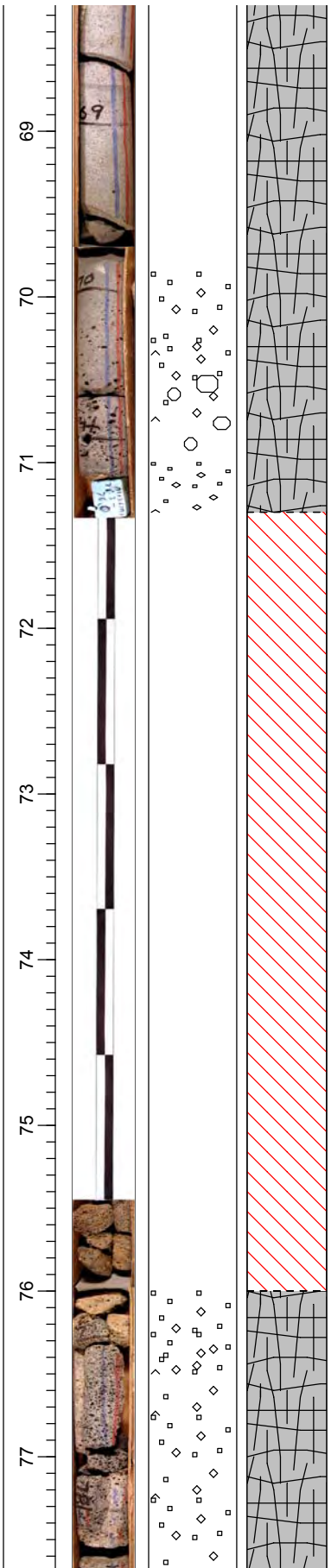




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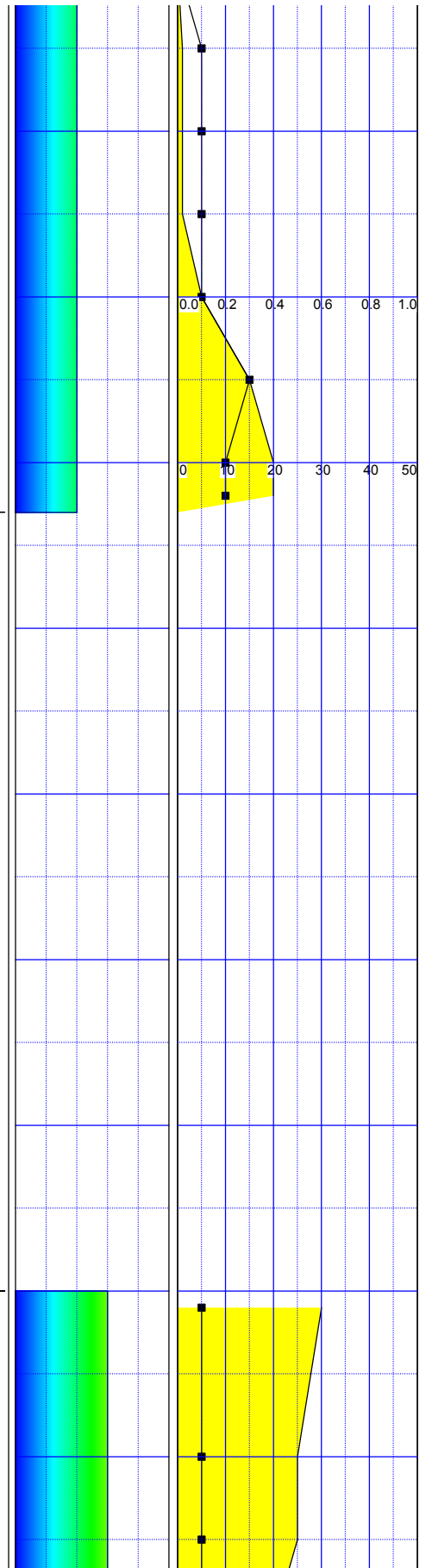
BASALT:
 COLOR: N3 Dark Gray grading to N4 Medium Dark Gray
 TEXTURE: Mostly aphanitic, vesicular, diktytaxitic basalt; decreasingly vesicular from 61.5 feet to 65.9 feet and increasingly vesicular from 70.1 feet to 71.3 feet, diktytaxitic from 65.9 feet to 70.1 feet, vesicle planes common throughout, rare large vesicles throughout
 COMPOSITION: 45% plagioclase, 35% olivine, 5% pyroxene, 15% groundmass; submillimeter to 1 mm plagioclase laths, submillimeter to 1 mm olivine microcrysts and glomerocrysts
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to iddingsite, 10YR 8/2 Very Pale Orange calcic mud in some vesicles and in some fractures

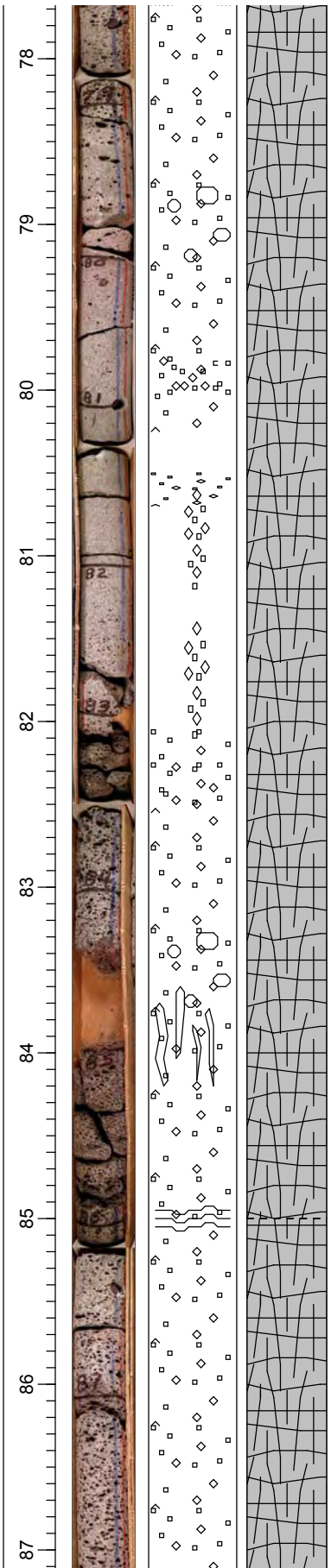




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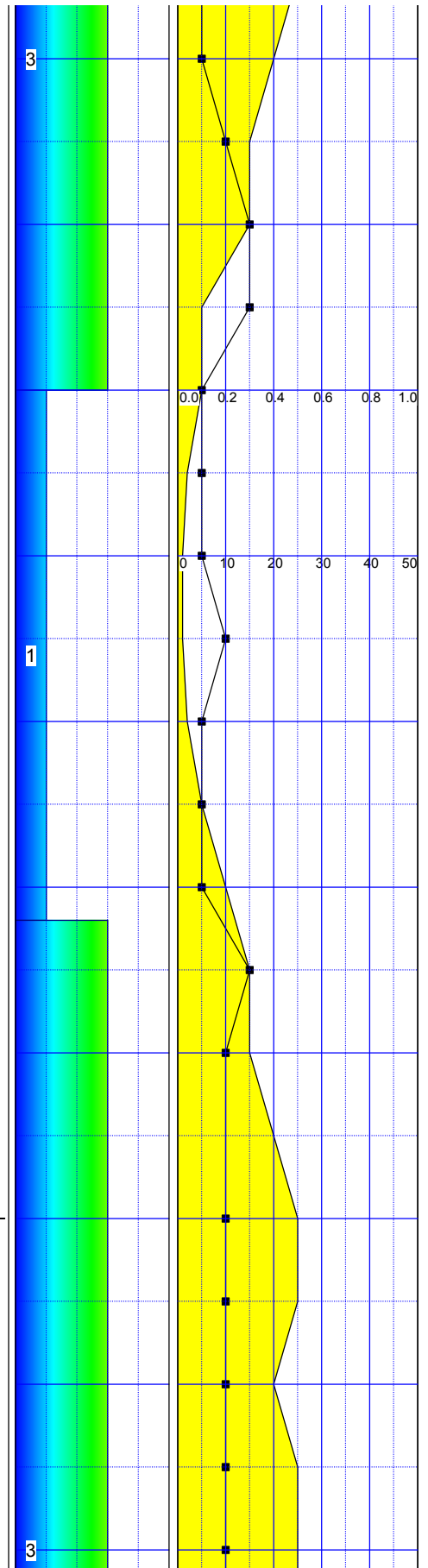
BASALT:
COLOR: N3 Dark Gray grading to N4 Medium Dark Gray
TEXTURE: Porphyritic, vesicular, diktytaxitic basalt; decreasingly vesicular from 76.0 feet to 80.7 feet and increasingly vesicular from 82.3 feet to 85.0 feet, diktytaxitic from 80.7 feet to 82.3 feet, large vesicles present in upper vesicular zone, vesicle planes and vesicle columns present in diktytaxitic section, pipe vesicles present at base
COMPOSITION: 50% plagioclase, 25% olivine, 25% groundmass; submillimeter to 2 mm tabular plagioclase laths, submillimeter to

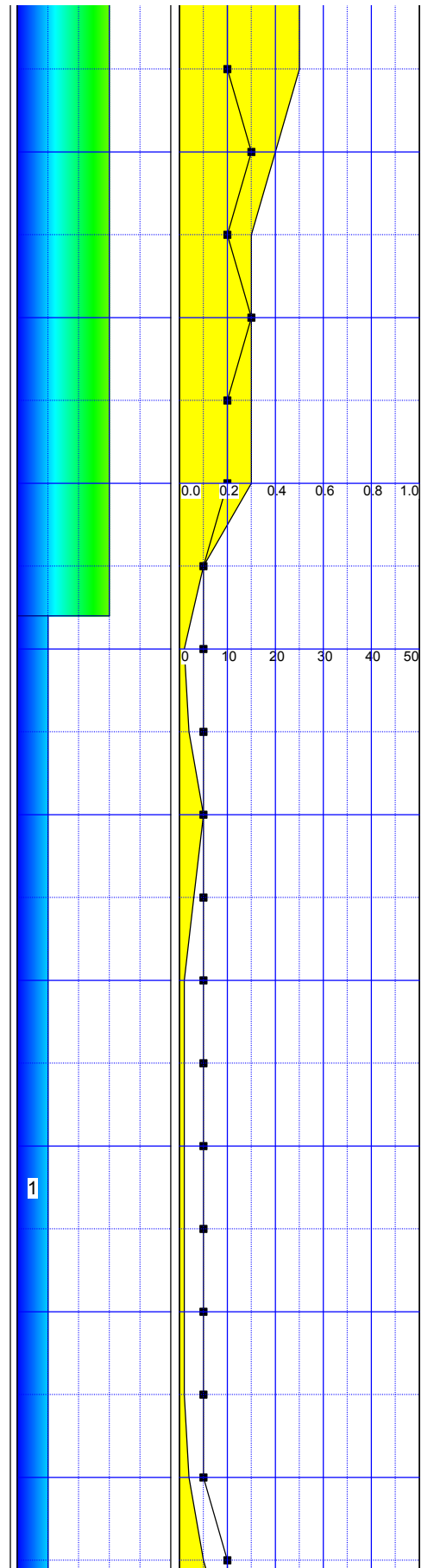
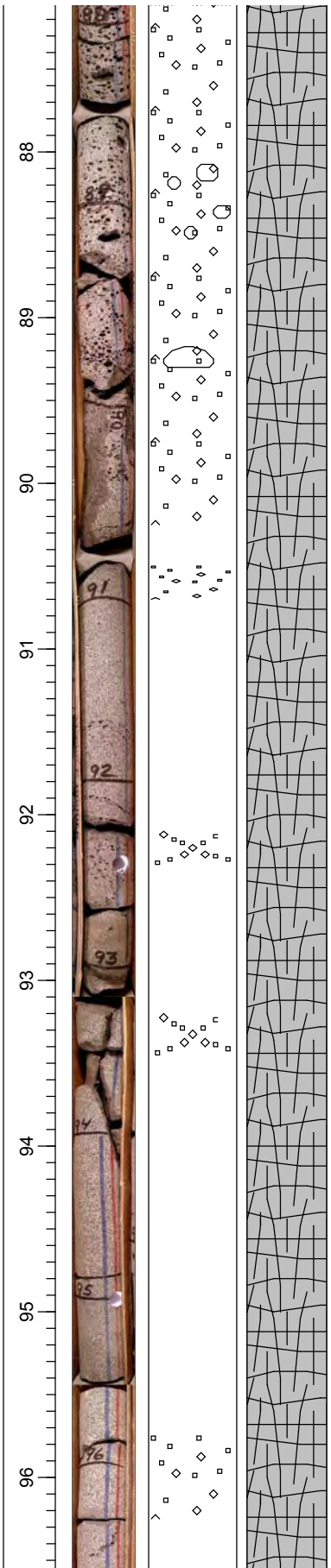


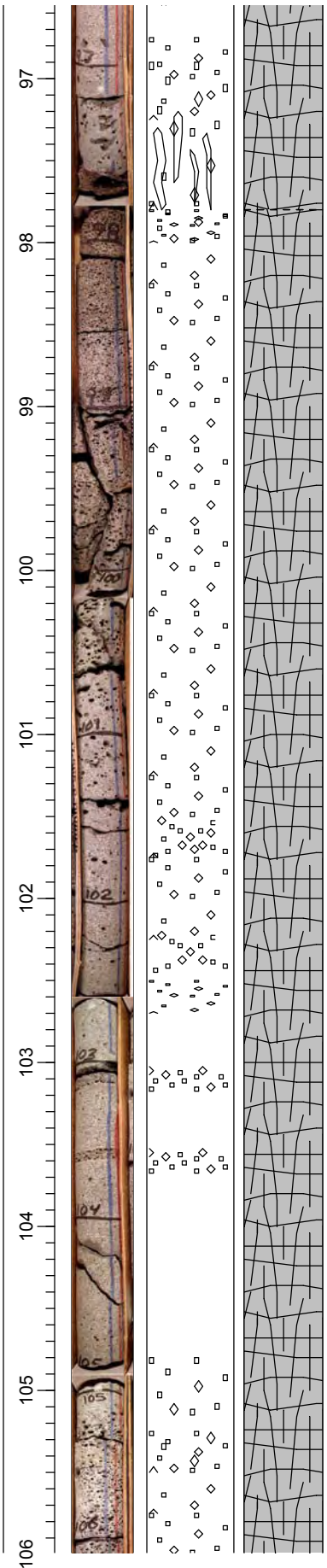


1 mm olivine microcrysts and glomerocrysts, submillimeter black mineral present though rare
 XENOLITHS/AUTOLITHS: Rare
 ALTERATION: Slight to moderate alteration of olivine to iddingsite, mostly 10YR 8/2 Very Pale Orange to somewhat 10R 6/6 Moderate Reddish Orange colored calcitic mud in upper vesicles, flow and mold structure at base

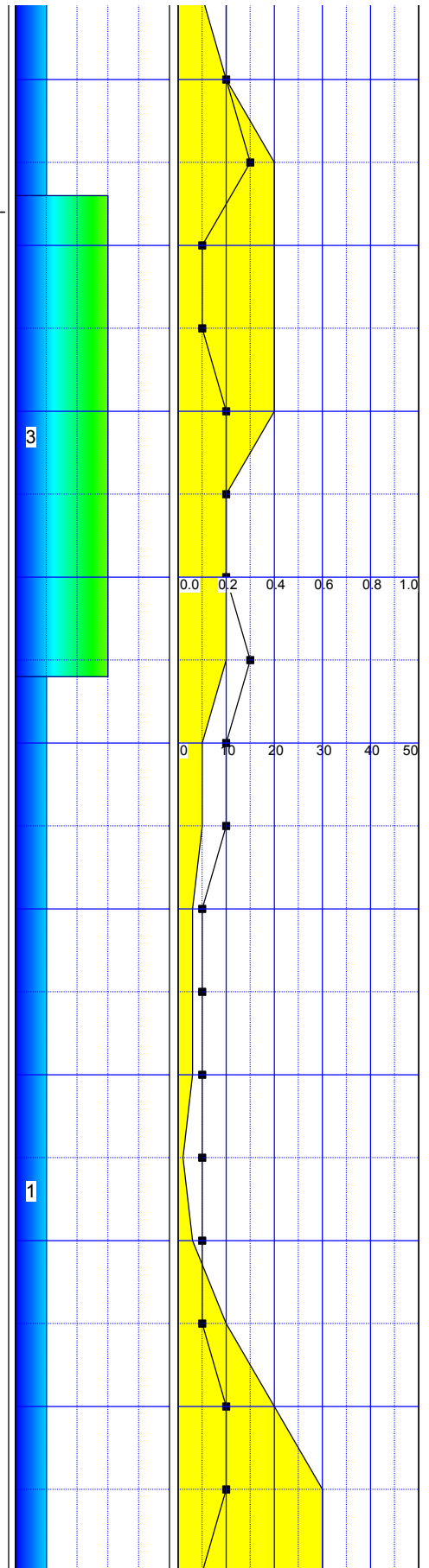
BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Slightly porphyritic, vesicular, diktytaxitic basalt; vesicular from 85.0 feet to 90.7 feet and from 96.9 feet to 97.8 feet, diktytaxitic from 90.7 feet to 96.9 feet with small slightly vesicular zone from 92.3 feet to 92.7 feet, rare large vesicles and very rare megavesicles, vesicle planes occur throughout, pipe vesicles present at base
 COMPOSITION: 50% plagioclase, 20% olivine, 30% groundmass; tabular mostly submillimeter up to 2 mm plagioclase laths, subhedral olivine microcrysts, some black mineral present
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Moderate alteration of olivine to iddingsite

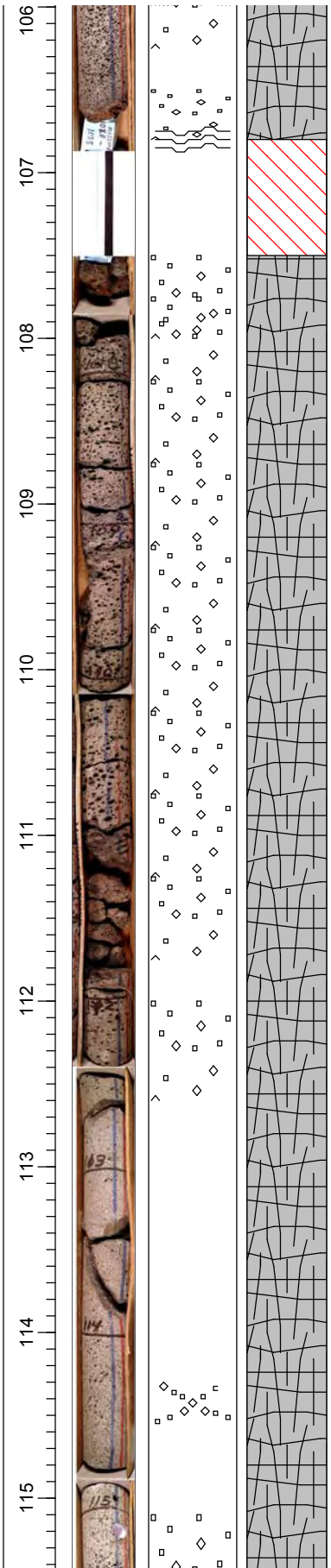






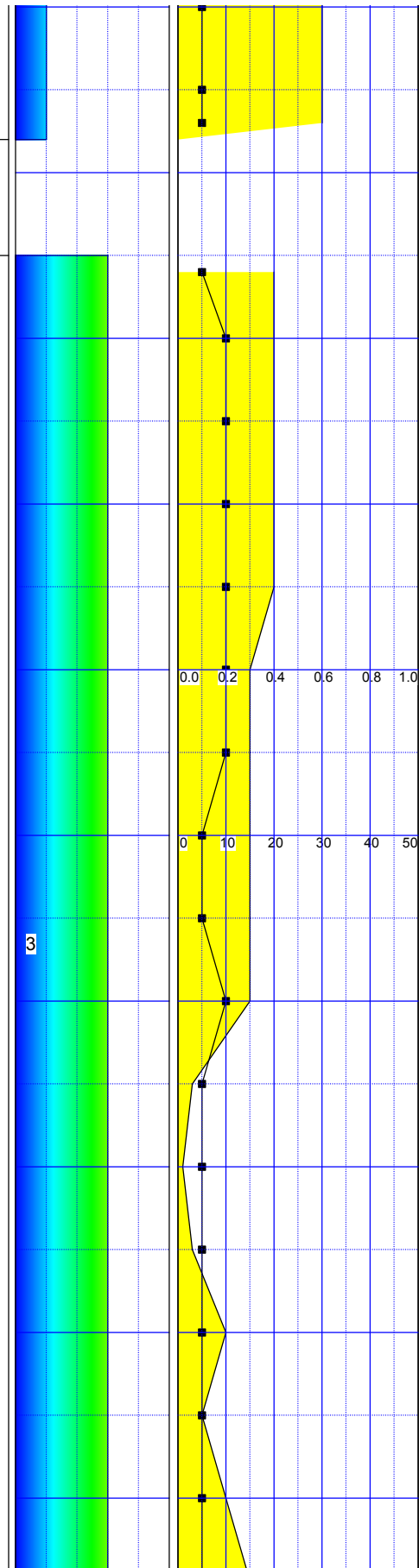
BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Mostly aphanitic, vesicular, diktytaxitic basalt; decreaseignly vesicular from 97.8 feet to 102.6 feet and increasingly vesicular from 104.8 feet to 106.8 feet, diktytaxitic from 102.6 feet to 104.8 feet, vesicles planes present throughout, vesicle sheets occuring in diktytaxitic region, large vesicles present in upper vesicular region
 COMPOSITION: 40% plagioclase, 40% olivine, 20% groundmass; tabular submillimeter to 1 mm plagioclase laths, subhedral to euhedral olivine microcrysts and glomerocrysts, rare pyroxene
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to iddingsite, flow and mold structure at base

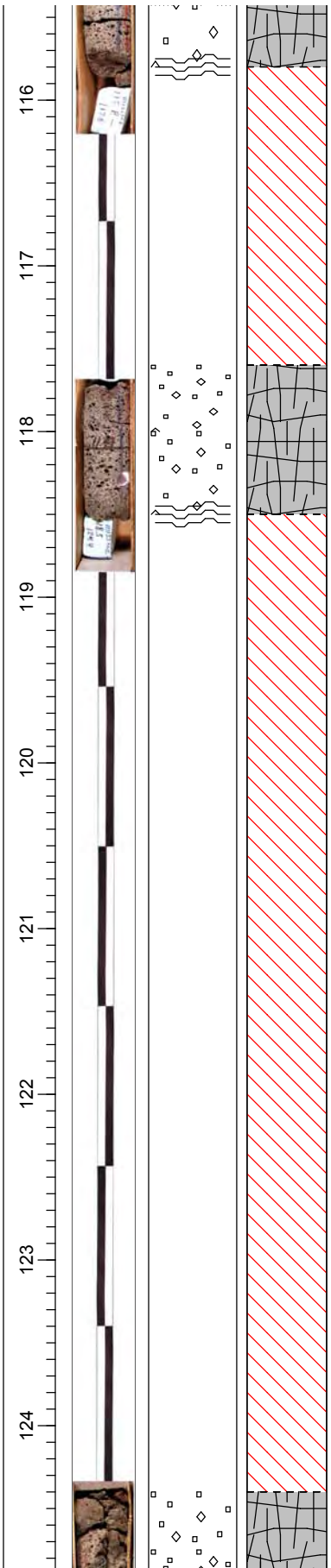




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BASALT:
COLOR: N3 Dark Gray
TEXTURE: Aphanitic, vesicular, diktytaxitic basalt; vesicular zones from 107.5 feet to 112.6 feet and from 115.1 feet to 115.8 feet, diktytaxitic with few vesicles from 112.6 feet to 115.1 feet, few vesicle planes
COMPOSITION: 45% plagioclase, 30% olivine, 25% groundmass; tabular submillimeter plagioclase laths, subhedral to euhedral submillimeter olivine microcrysts and glomerocrysts, rare pyroxene
XENOLITHS/AUTOLITHS: None noted
ALTERATION: Moderate alteration of olivine to iddingsite, flow and mold structure at base



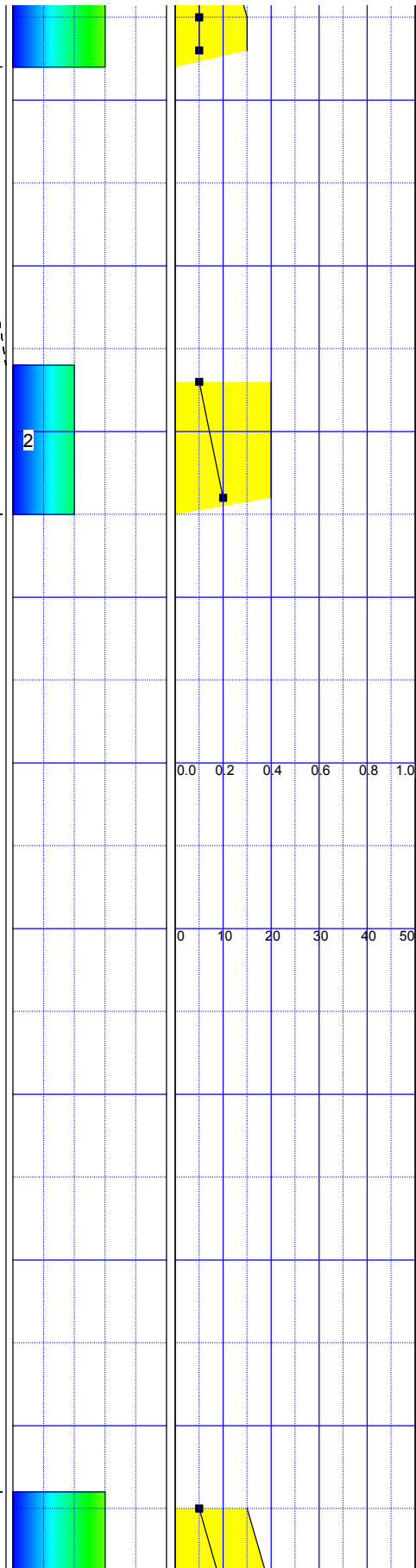


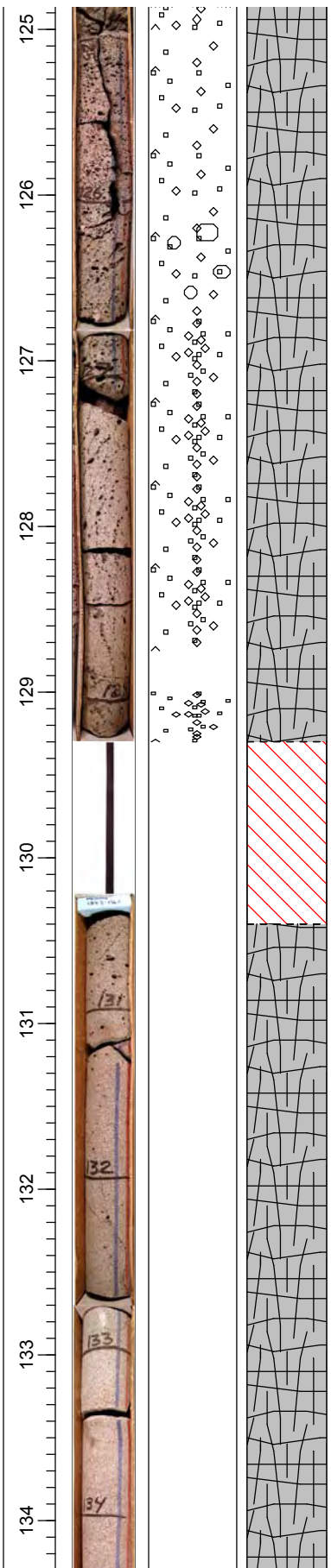
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BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Mostly aphanitic, vesicular basalt;
 vesicular throughout
 COMPOSITION: 50% plagioclase, 20% olivine,
 30% groundmass; tabular submillimeter to 1
 mm plagioclase laths, olivine microcrysts
 and glomerocrysts
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight to moderate alteration of
 olivine to iddingsite

MISSING INTERVAL:
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BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Aphanitic, vesicular, diktytaxitic
 basalt; decreasingly vesicular from 124.4

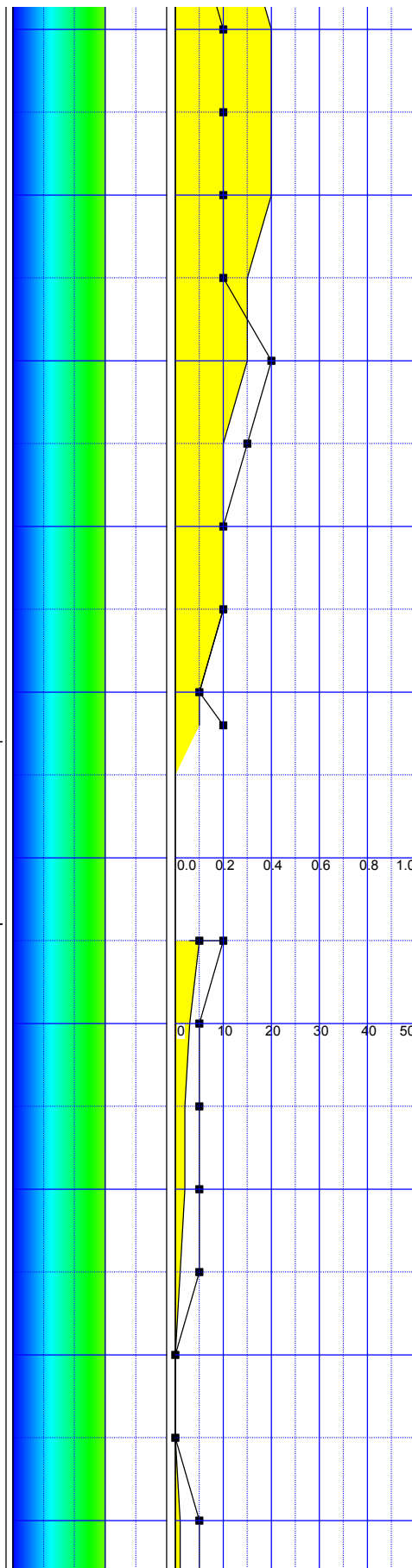


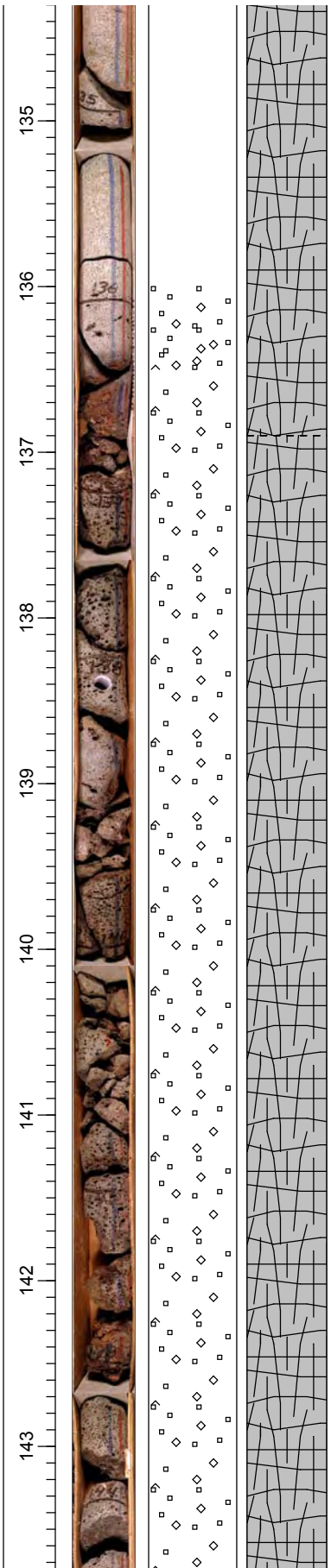


feet to 129.3 feet, numerous vesicle columns from 127.0 feet to 129.3 feet, rare large vesicles present in vesicular zone
 COMPOSITION: 55% plagioclase, 30% olivine, 20% groundmass, tabular submillimeter lathwork plagioclase, subhedral olivine, rare pyroxene
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight to moderate alteration of olivine to iddingsite

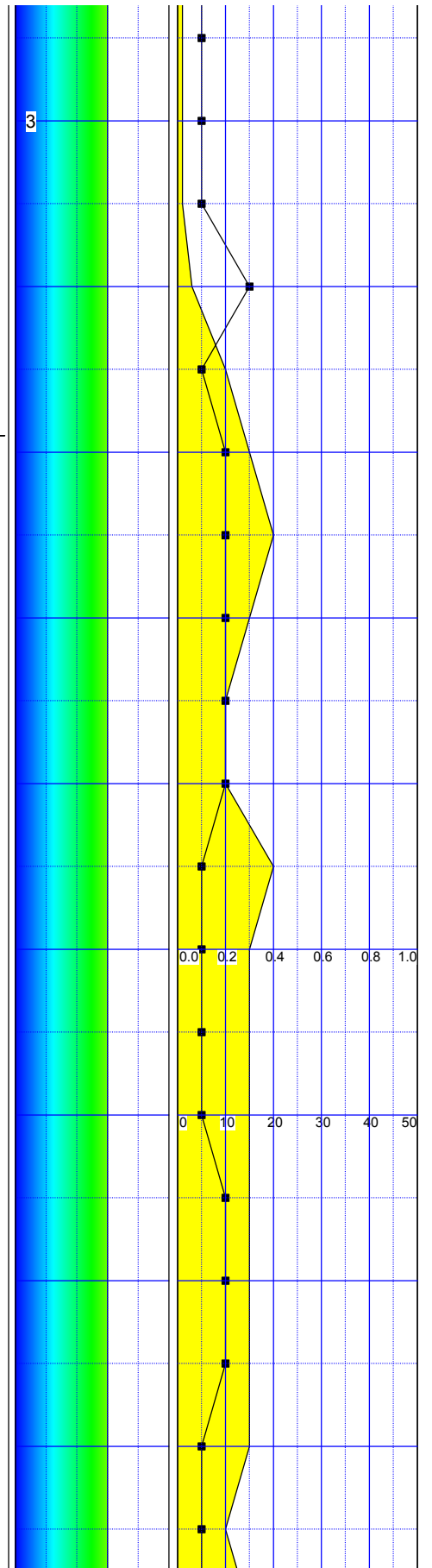
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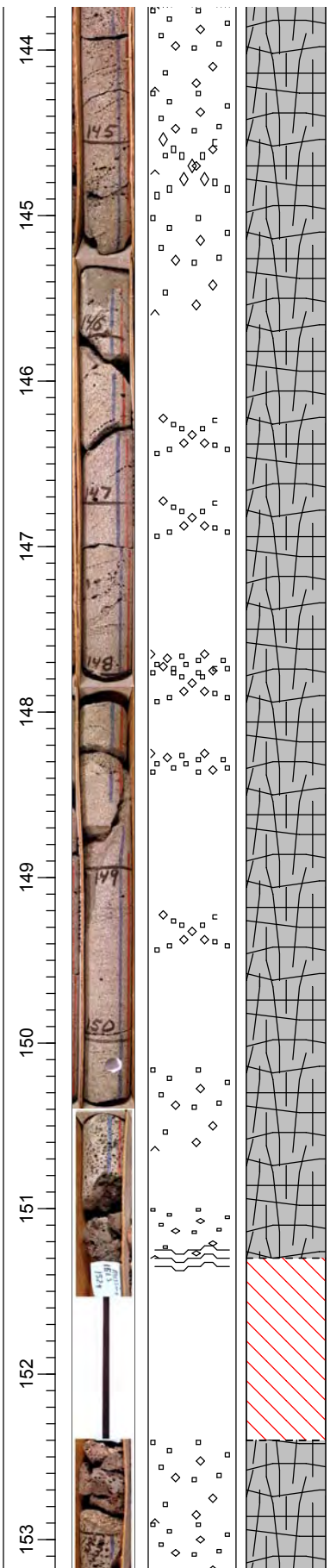
BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Aphanitic, vesicular, diktytaxitic basalt; slightly vesicular from 130.4 feet to 131.2 feet and increasingly vesicular from 136.0 feet 136.9 feet, diktytaxitic from 131.2 feet to 136.0 feet
 COMPOSITION: 55% plagioclase, 30% olivine, 20% groundmass, tabular submillimeter lathwork plagioclase phenocrysts, submillimeter subhedral olivine, rare submillimeter pyroxene
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight to moderate alteration of olivine to iddingsite, 5YR 3/4 Moderate Brown flow and mold structure at base





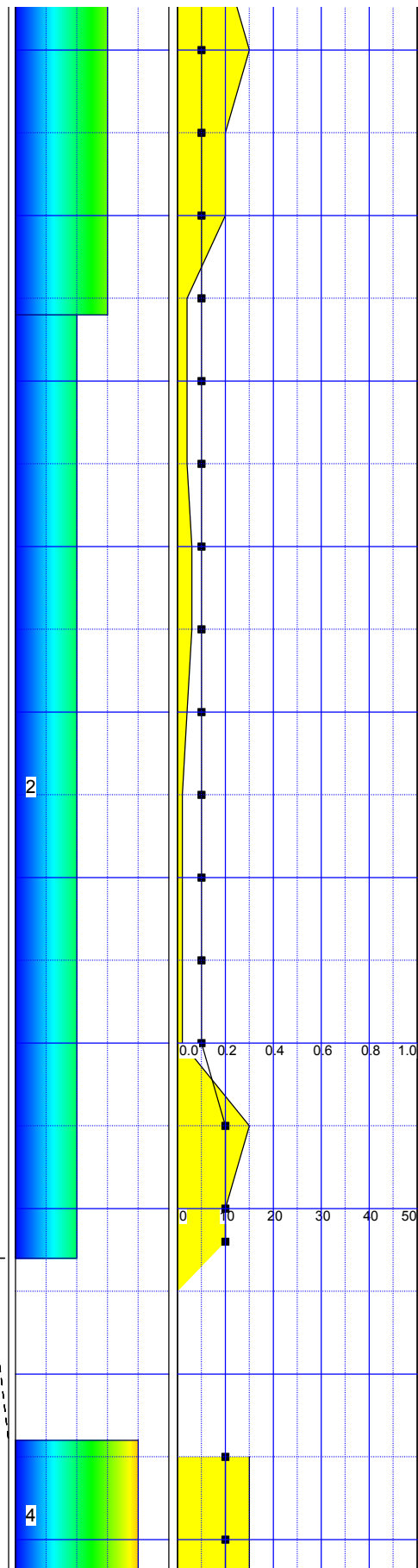
BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Aphanitic, vesicular, diktytaxitic basalt; vesicular from 136.9 feet to 145.6 feet and from 150.4 feet to 151.3 feet, diktytaxitic from 145.6 feet to 150.4 feet, numerous vesicle planes present throughout lower part of upper vesicular zone and in diktytaxitic region
 COMPOSITION: 40% plagioclase, 20% olivine, 40% groundmass; tabular submillimeter lathwork plagioclase, subhedral olivine
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Moderate alteration of olivine to iddingsite, 5YR 6/4 Light Brown and 10YR 8/2 Very Pale Orange calcitic mud in fractures in upper part of section and in some vesicles in lower part of section

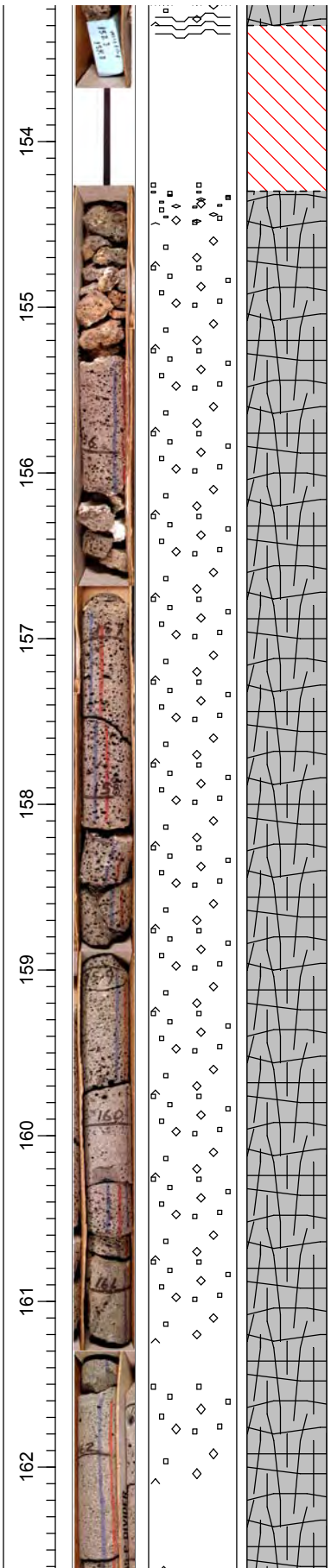




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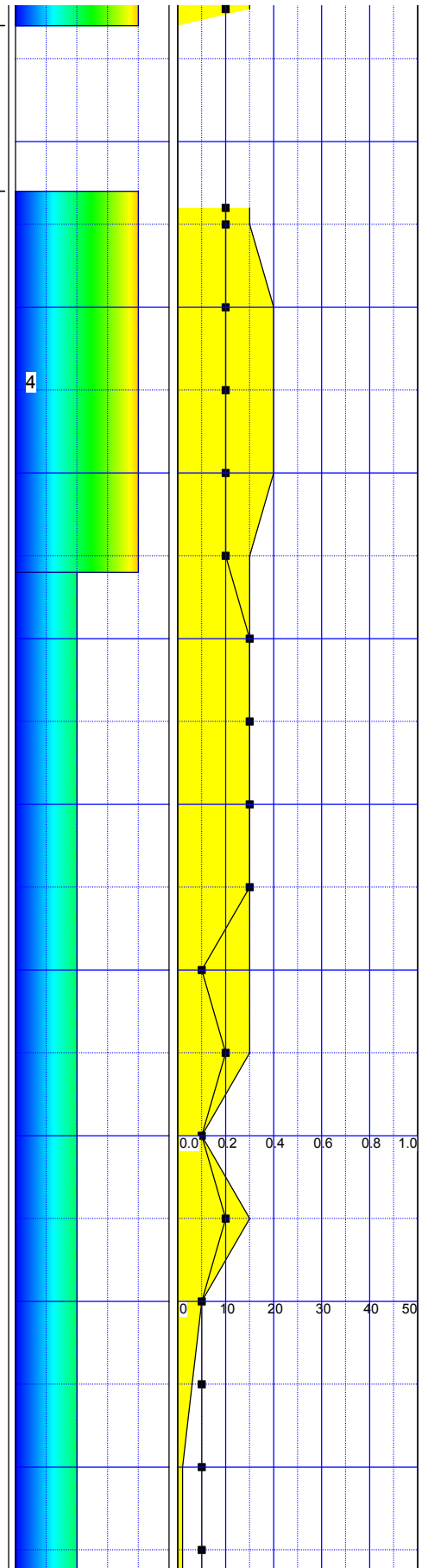
BASALT:
 COLOR: 5YR 3/2 Grayish Brown ranging to 5R
 4/2 Grayish Red
 TEXTURE: Aphanitic, vesicular basalt;
 vesicular throughout
 COMPOSITION: 40% plagioclase, 25% olivine,
 35% groundmass; tabular submillimeter
 plagioclase laths, submillimeter olivine
 microcrysts, rare submillimeter pyroxenes
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Moderate alteration of olivine
 to iddingsite

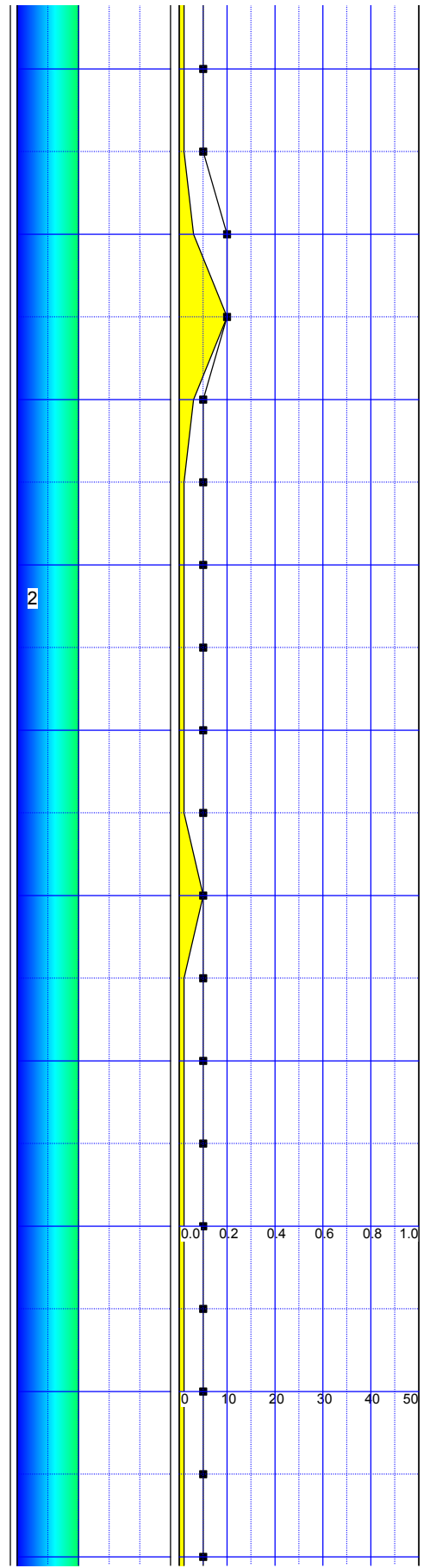
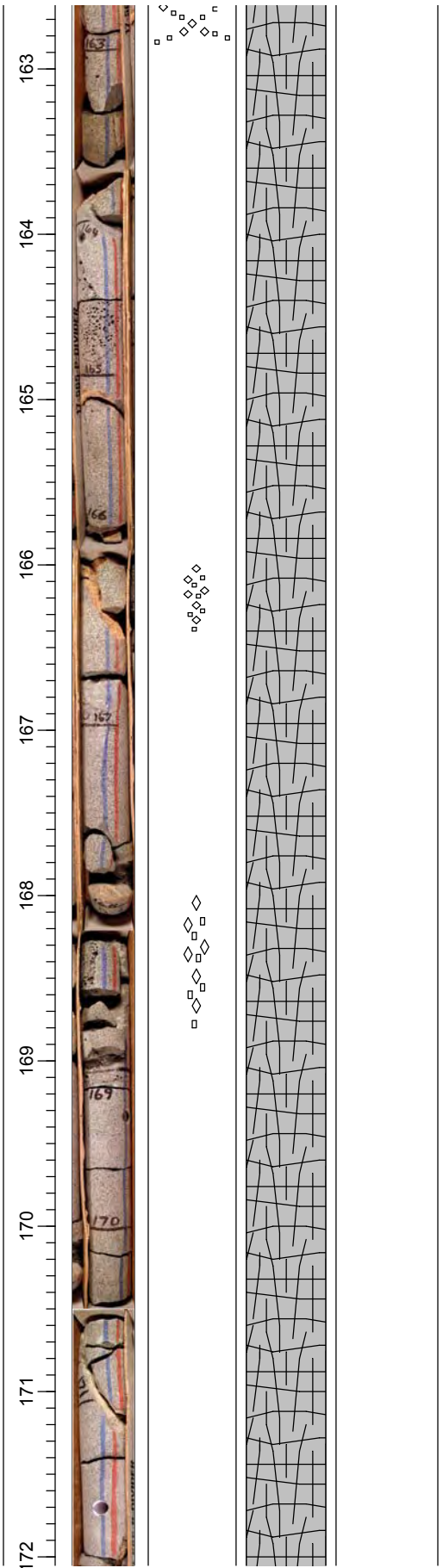


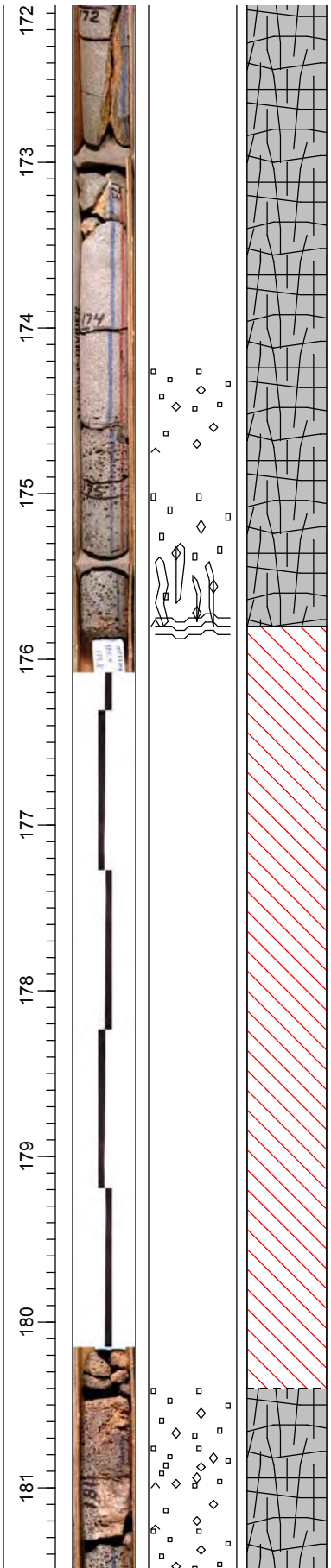


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BASALT:
COLOR: N4 Medium Dark Gray
TEXTURE: Mostly aphanitic, vesicular, diktytaxitic basalt; vesicular from 154.3 feet to 162.1 feet and from 174.5 feet to 175.8 feet, diktytaxitic from 162.1 feet to 174.5 feet containing small vesicular zones, vesicle planes rare and occur in lowermost part of diktytaxitic region, vesicle columns occur throughout diktytaxitic region, pipe vesicles present at the base
COMPOSITION: 55% plagioclase, 25% olivine, 20% groundmass; tabular submillimeter to 1 mm plagioclase laths, submillimeter subhedral olivine
XENOLITHS/AUTOLITHS: None noted
ALTERATION: 5YR 6/4 Light Brown calcitic mud and N9 White deposit on many fractures and in some vesicles throughout section

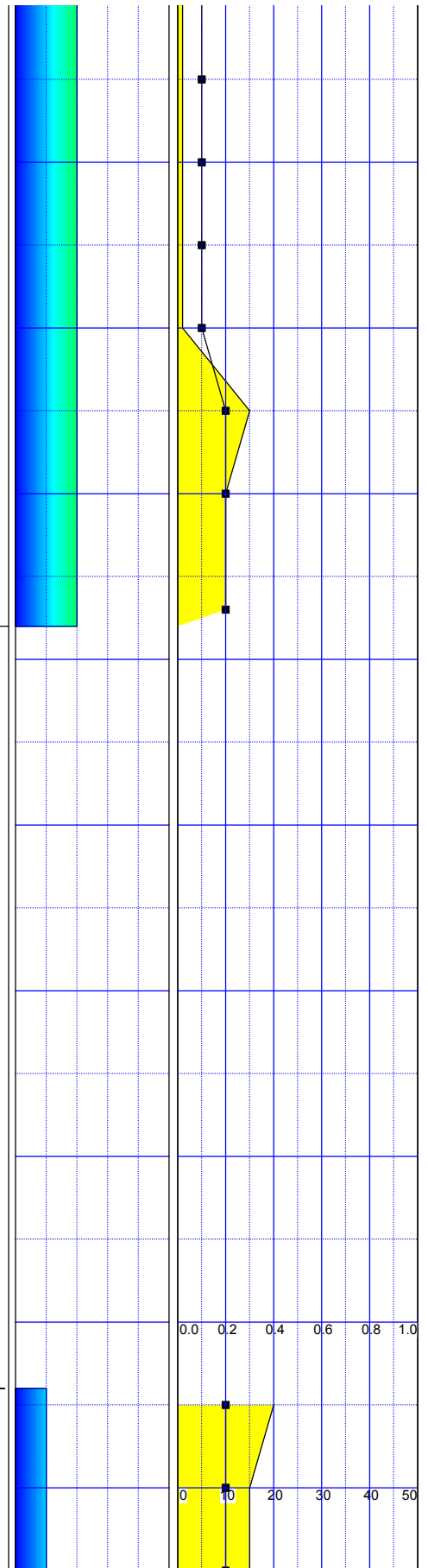


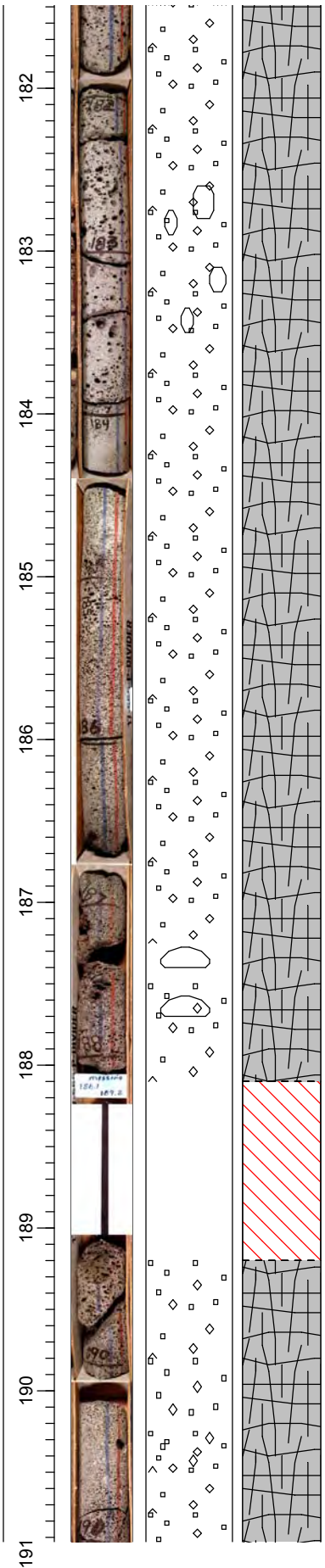




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BASALT:
COLOR: N4 Medium Dark Gray
TEXTURE: Phaneritic, vesicular basalt;
vesicular throughout section, few large
vesicles and rare megavesicles
COMPOSITION: 55% plagioclase, 35% olivine,
20% groundmass; tabular submillimeter to 3
mm lathy and felty plagioclase phenocrysts,
subhedral to euhedral submillimeter olivine
microcrysts to 2 mm olivine glomerocrysts

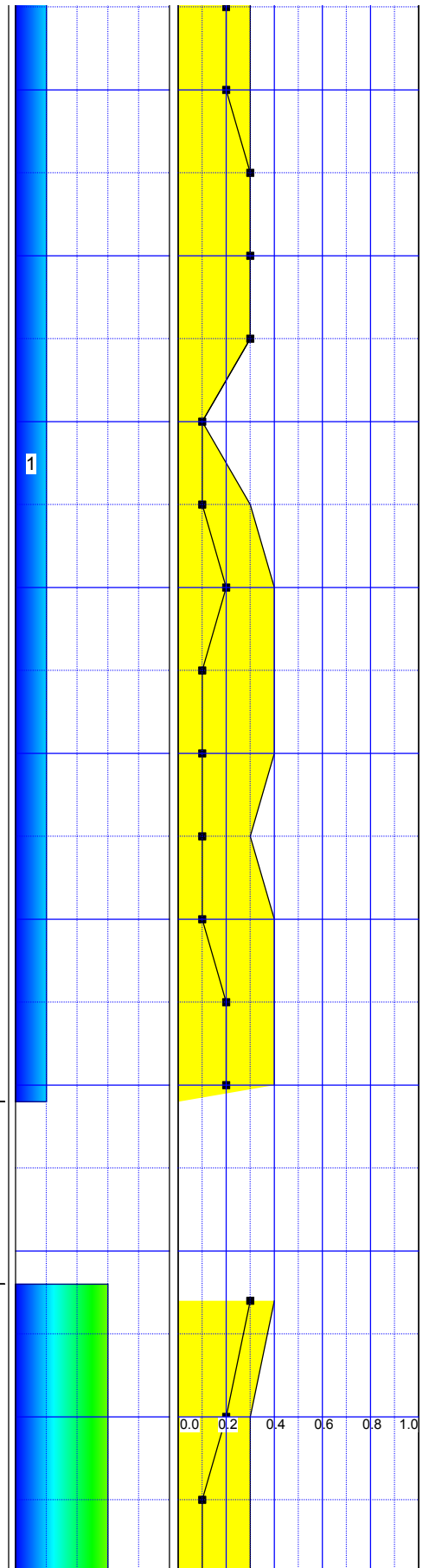


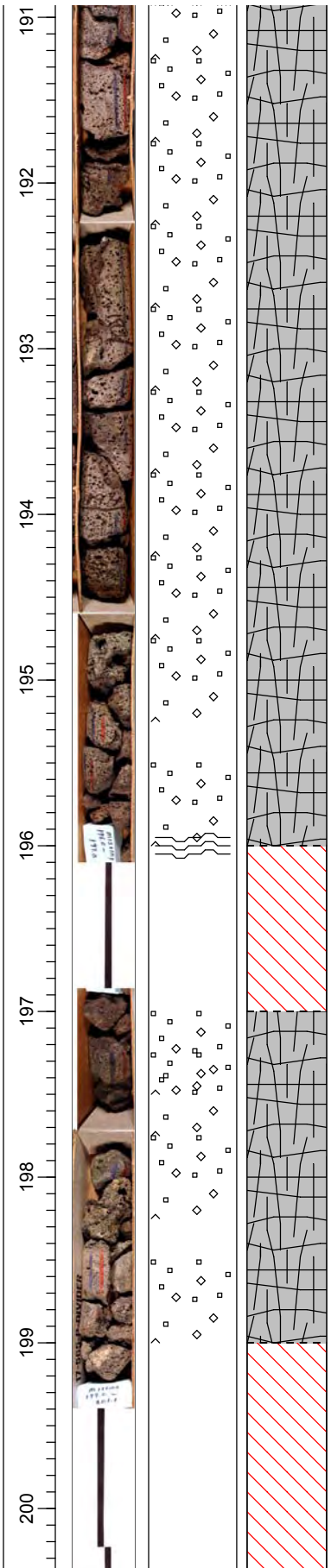


XENOLITHS/AUTOLITHS: None noted
 ALTERATION: 10YR 8/2 Very Pale Orange calcitic mud and 5YR 6/4 Light Brown mud in fractures and some vesicles in upper part of section, flow and mold or spatter at base of section

MISSING INTERVAL:
 Missing interval not recovered

BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Phaneritic, vesicular basalt; vesicular throughout section
 COMPOSITION: 45% plagioclase, 25% olivine, 30% groundmass; tabular submillimeter to 4 mm lathy and felty plagioclase phenocrysts, subhedral to euhedral submillimeter olivine microcrysts to 2 mm olivine glomerocrysts
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Light to moderate areas of alteration of olivine to iddingsite, spatter or flow and molds present at base

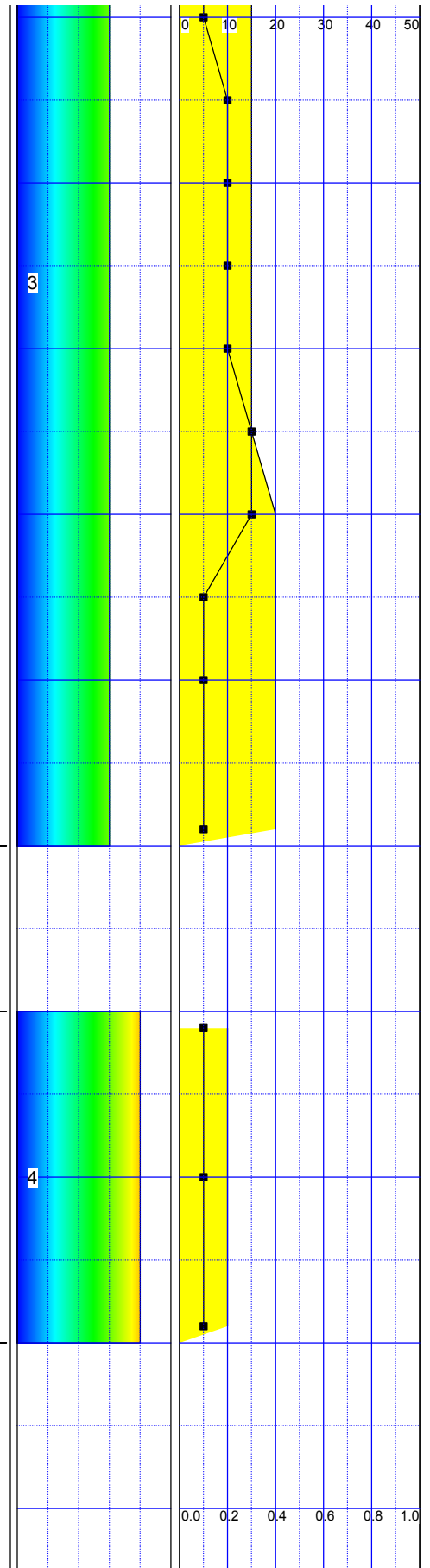


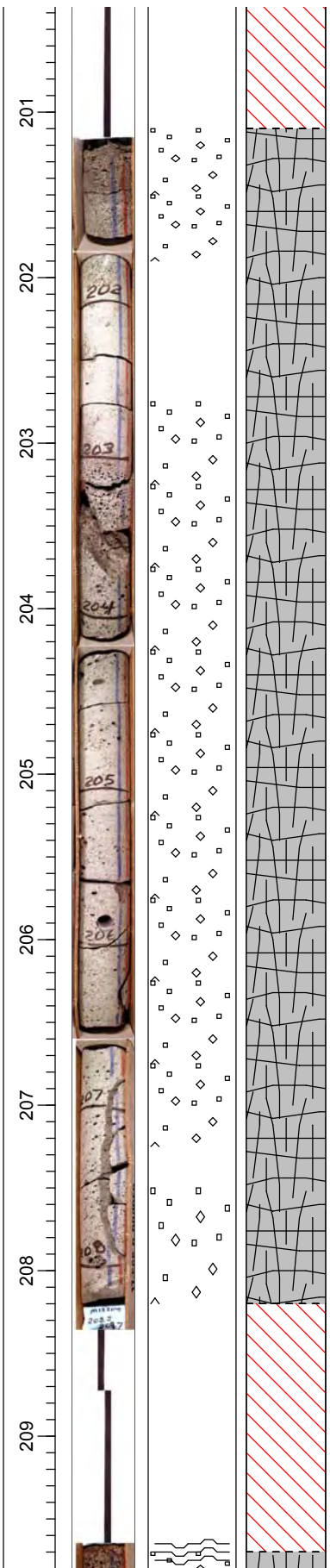


MISSING INTERVAL:
Missing interval not recovered

BASALT:
 COLOR: N3 Dark Gray
 TEXTURE: Porphyritic, vesicular basalt;
 vesicular throughout section, ophitic if
 groundmass is pyroxene
 COMPOSITION: 25% plagioclase, 5% olivine,
 70% groundmass; tabular submillimeter to 2
 mm plagioclase phenocrysts, rare
 submillimeter olivine, submillimeter
 pyroxene noted in groundmass
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Very small amounts of 10YR 8/2
 Very Pale Orange mud on fracture surfaces,
 slight alteration of olivine to iddingsite

MISSING INTERVAL:
Missing interval not recovered

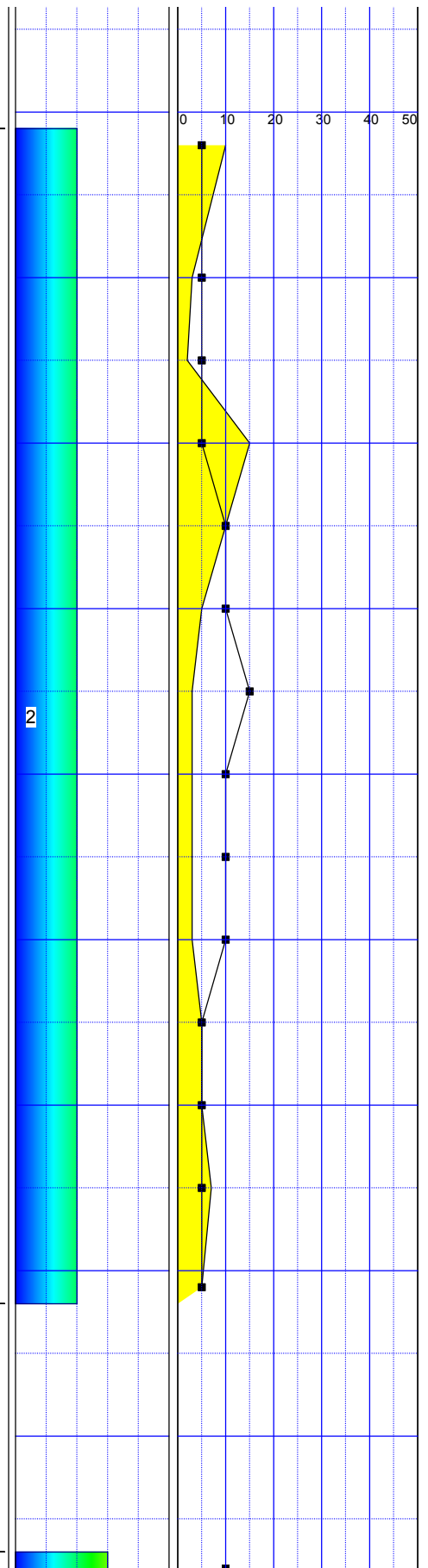


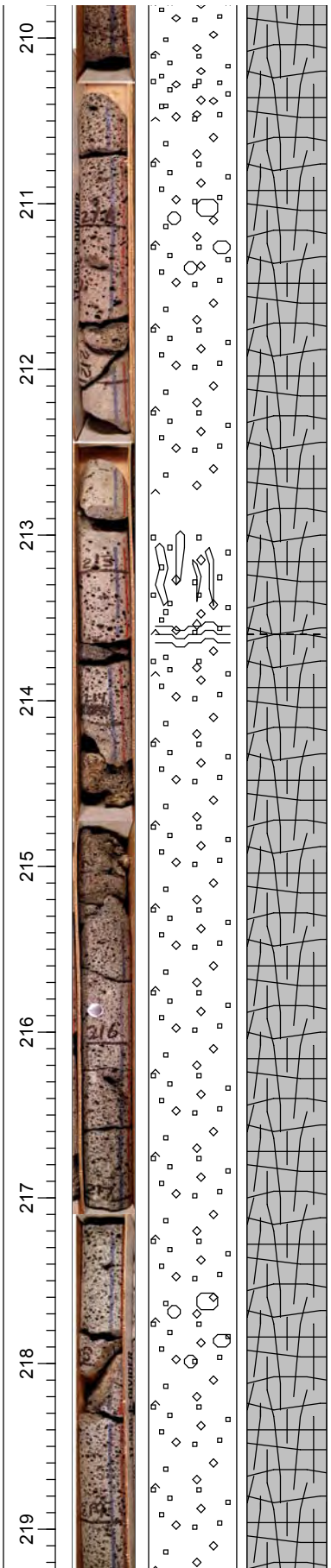


BASALT:
 COLOR: N5 Medium Gray
 TEXTURE: Porphyritic, mostly vesicular basalt; vesicular except where section becomes massive with very few vesicles from 202.0 feet to 202.7 feet
 COMPOSITION: 55% plagioclase, 30% olivine, 15% groundmass; tabular submillimeter to 3 mm lathwork plagioclase phenocrysts, submillimeter anhedral to subhedral olivine microcrysts with rare 1 mm to 2 mm glomerocrysts, rare submillimeter pyroxene
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Moderate alteration of olivine to iddingsite

MISSING INTERVAL:
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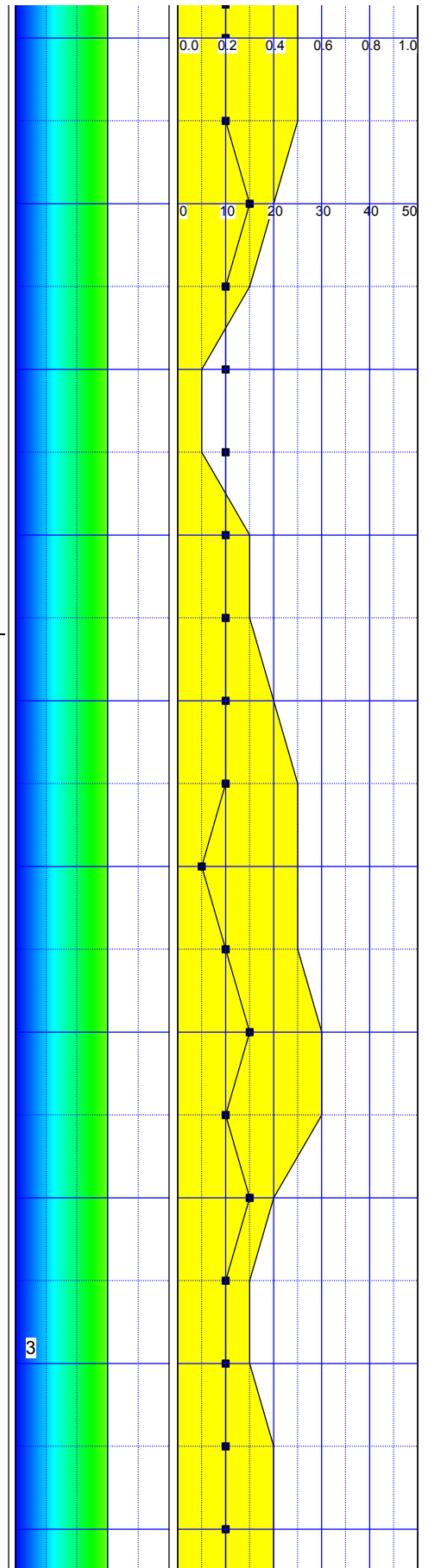
BASALT:

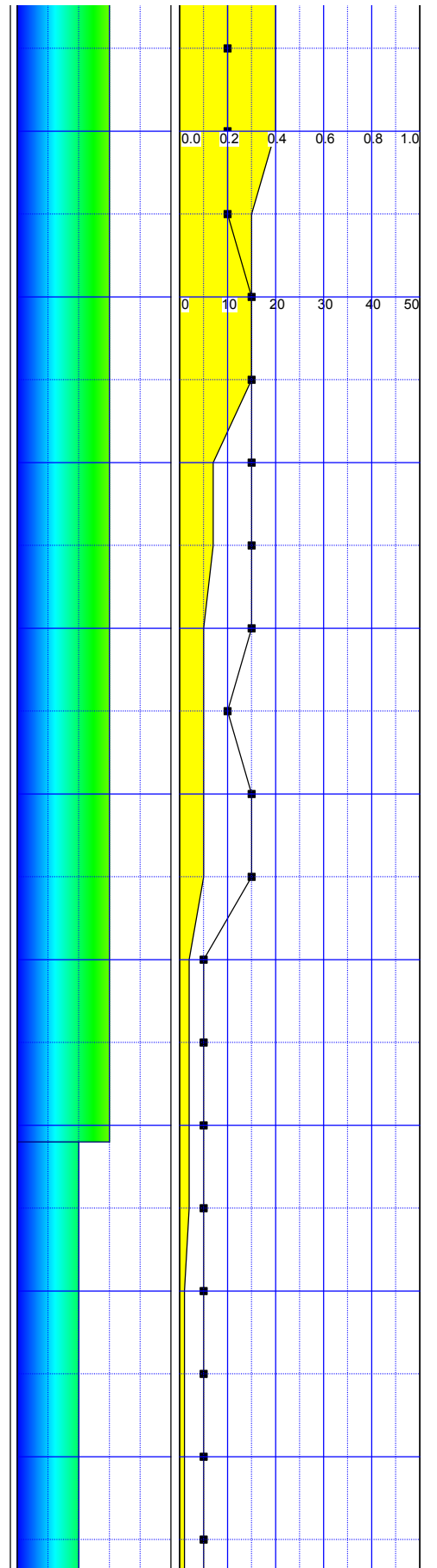
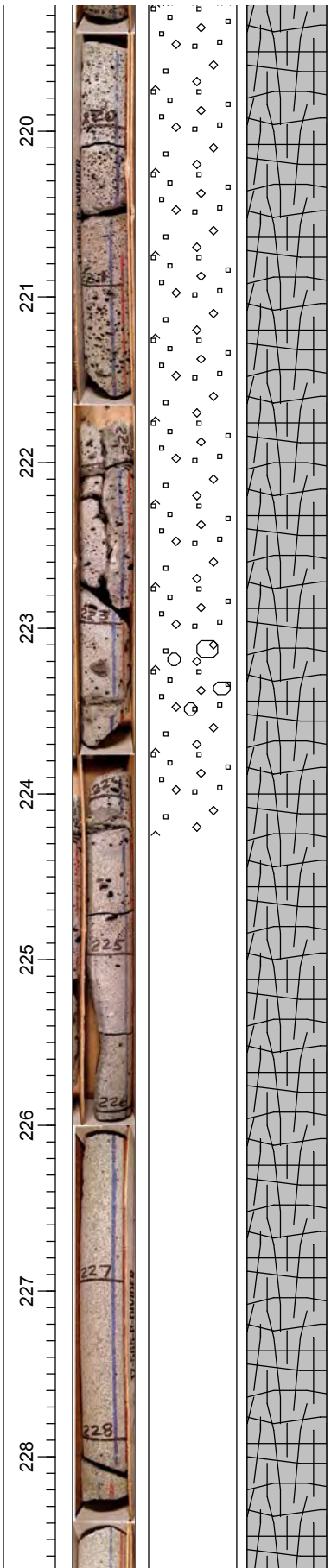


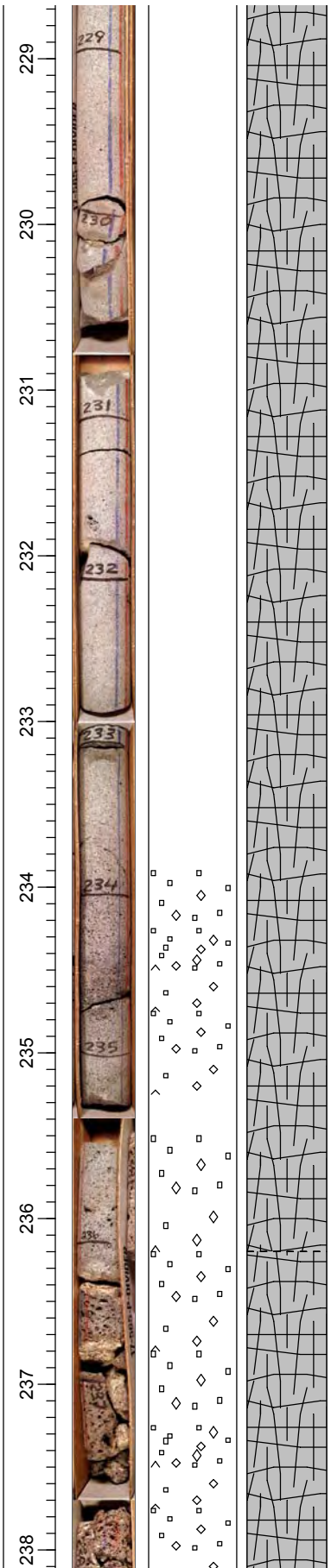


COLOR: 5R 4/2 grading to N4 Medium Dark Gray
 TEXTURE: Porphyritic, vesicular basalt; vesicular throughout, in areas of low amount of vesicles diktytaxitic texture appears, rare pipe vesicles at base, rare large vesicles
 COMPOSITION: 40% plagioclase, 20% olivine, 40% groundmass; tabular lathy plagioclase phenocrysts up to 1 mm in size, rare pyroxene
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Moderate alteration of olivine to iddingsite, flow and mold structure at base

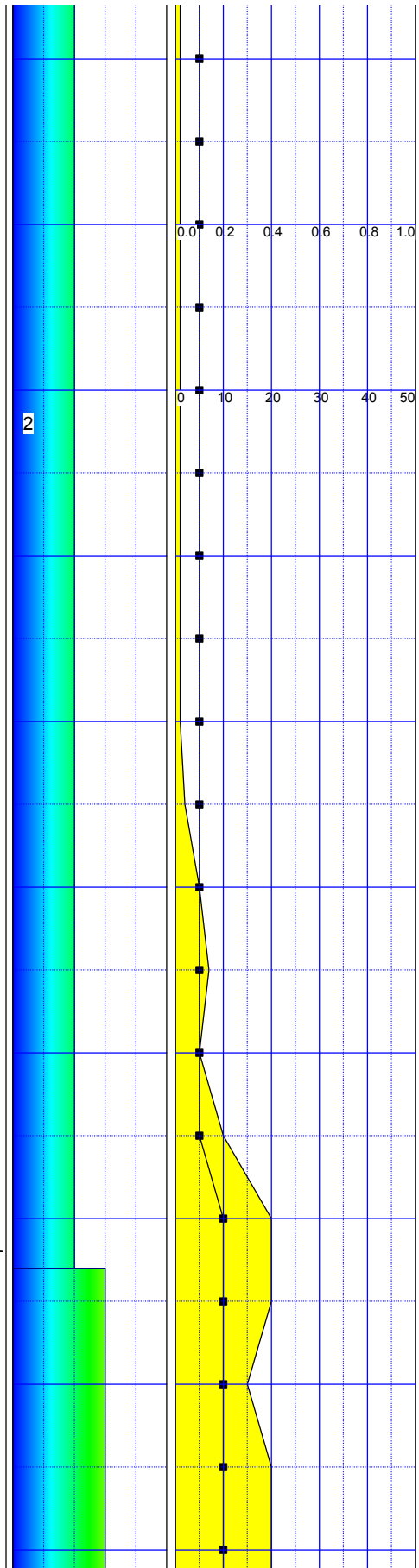
BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Slightly phaneritic, vesicular, diktytaxitic basalt; vesicular from 213.5 feet to 224.9 feet and from 233.9 feet to 236.2 feet, diktytaxitic from 224.9 feet to 233.9 feet, very rare large vesicles
 COMPOSITION: 50% plagioclase, 30% olivine, 15% pyroxene, 5% groundmass; tabular lathy plagioclase phenocrysts up to 2 mm in length, subhedral olivine microcrysts, anhedral submillimeter pyroxene
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to iddingsite, some small amounts of 10YR 8/2 Very Pale Orange mud in some vesicles near fractures and on some fracture surfaces

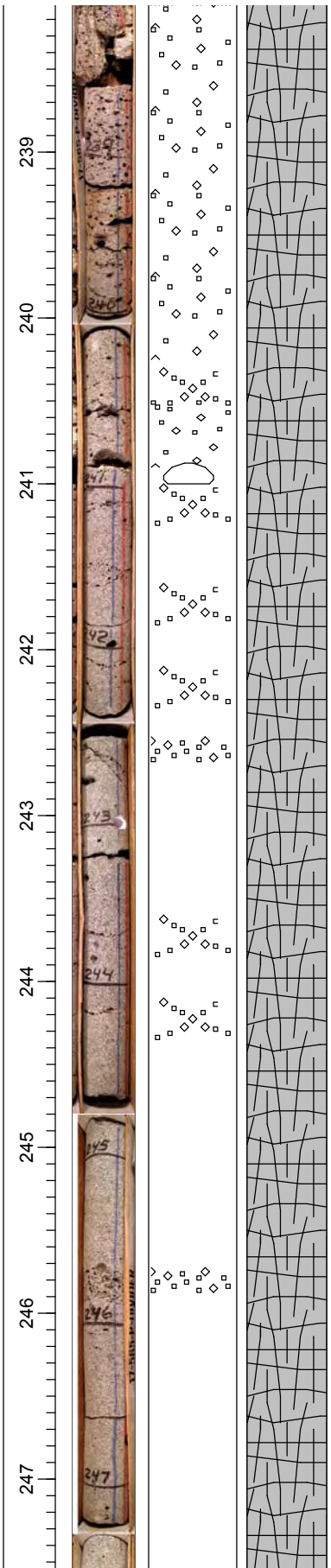




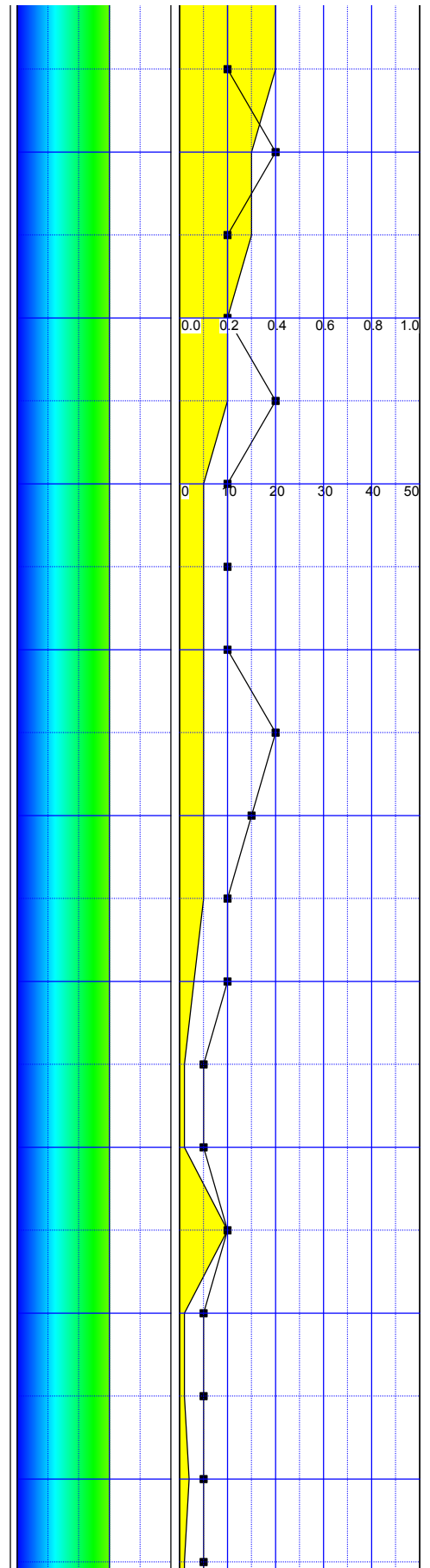


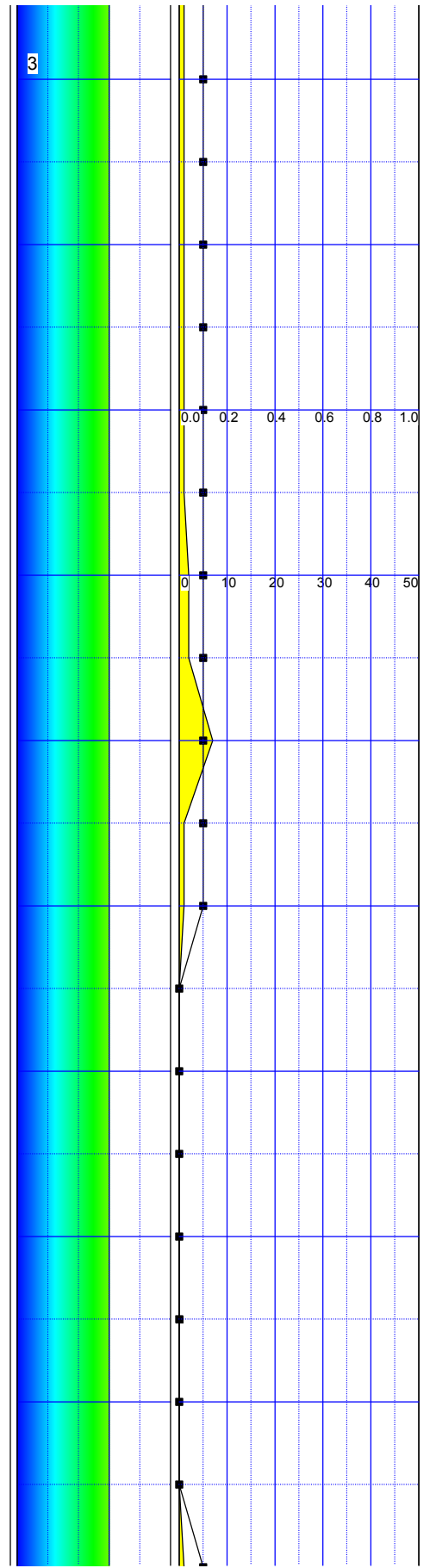
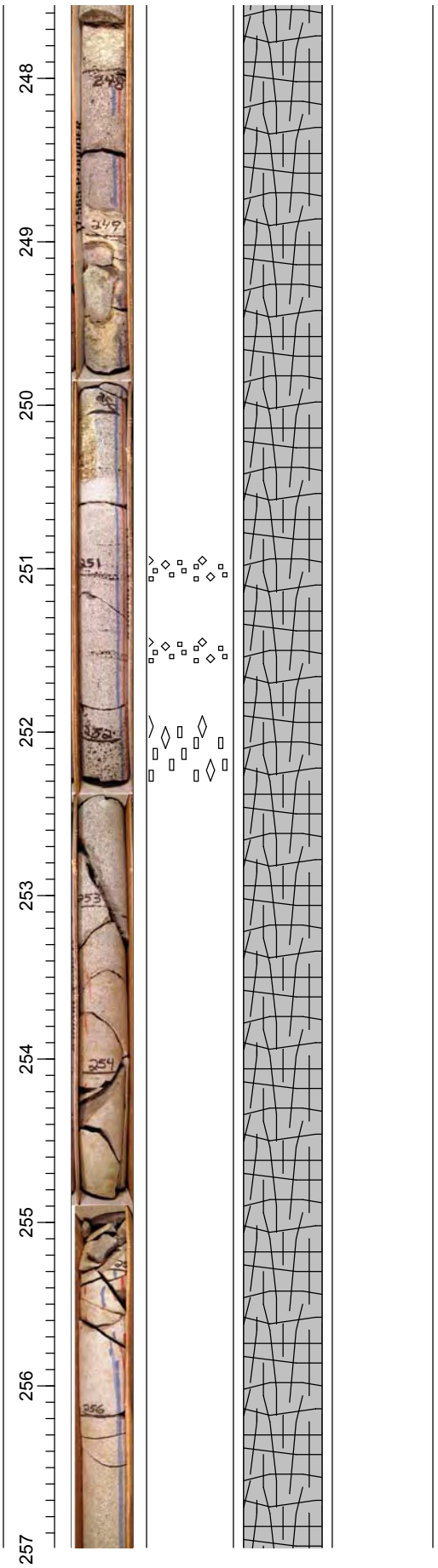
BASALT:
 COLOR: 5YR 4/1 Brownish Gray grading to N4
 Medium Dark Gray
 TEXTURE: Phaneritic, porphyritic, vesicular,
 diktytaxitic, massive basalt; becoming
 decreasingly vesicular from 236.2 feet to
 240.9 feet with very rare megavesicles and
 slightly vesicular from 265.1 feet to 265.6
 feet, diktytaxitic from 240.9 feet to 254.0
 feet and from 256.3 feet to 265.1 feet,
 massive from 254.0 feet to 256.3 feet, few
 vesicle planes and few vesicle sheets with
 both occurring above massive section
 throughout diktytaxitic area, very rare pipe
 vesicles at base
 COMPOSITION: 55% plagioclase, 25% olivine,
 5% pyroxene, 15% groundmass; tabular lathy

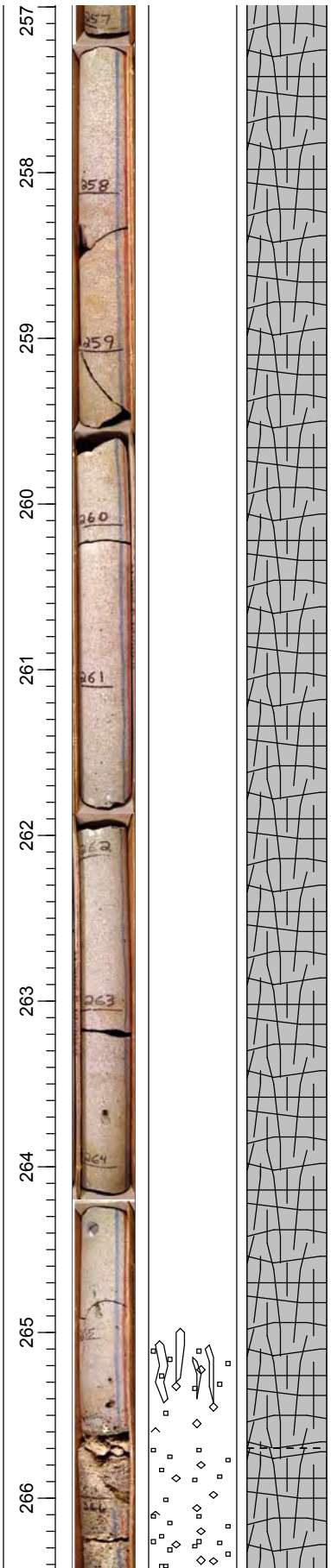




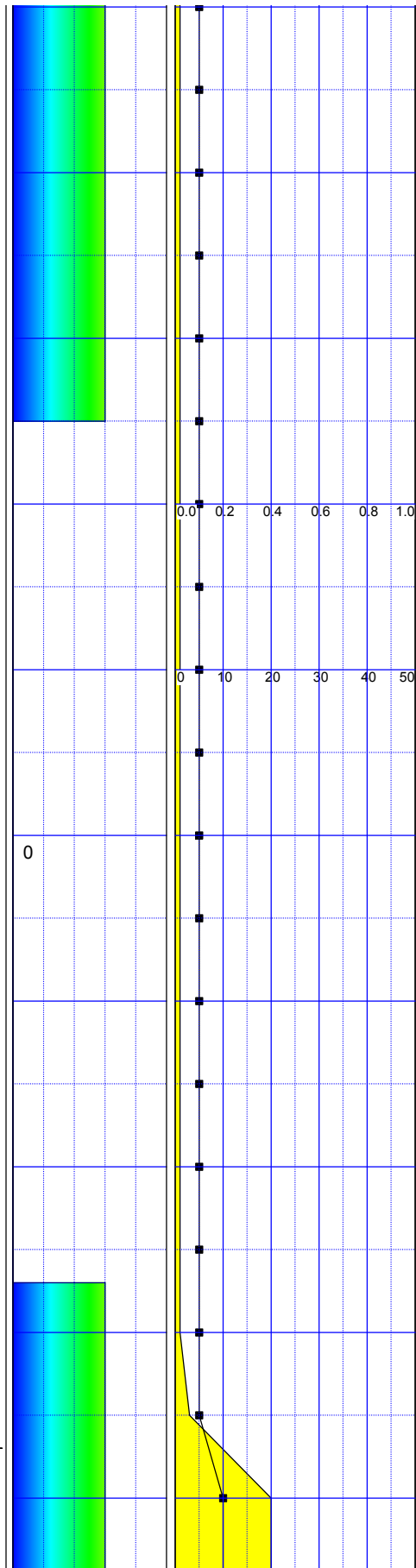
plagioclase phenocrysts up to 2 mm in length, submillimeter subhedral olivine microcrysts to 2 mm subhedral to euhedral olivine glomerocrysts, submillimeter pyroxene
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to iddingsite, 10YR 8/2 Very Pale Orange calcitic mud in most fractures and in vesicles around fractures with thickest area of mud at top of section

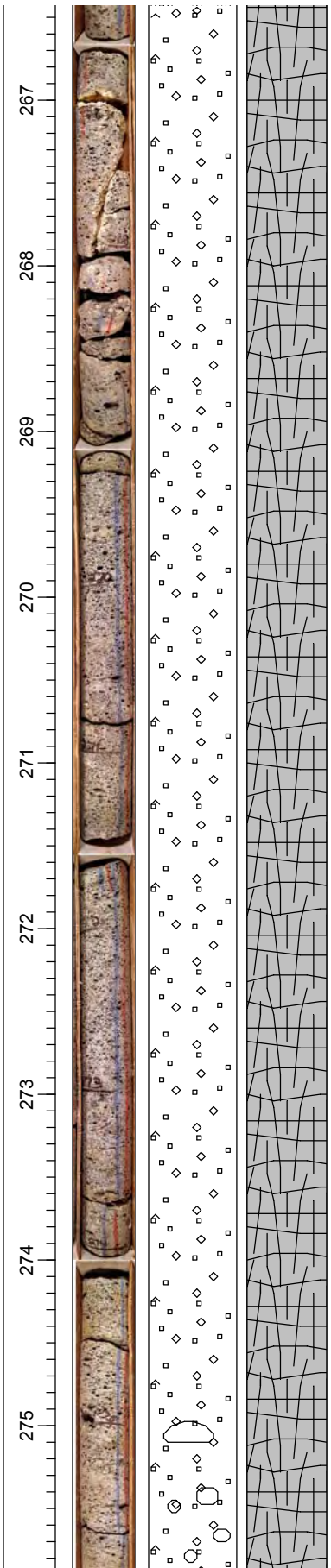




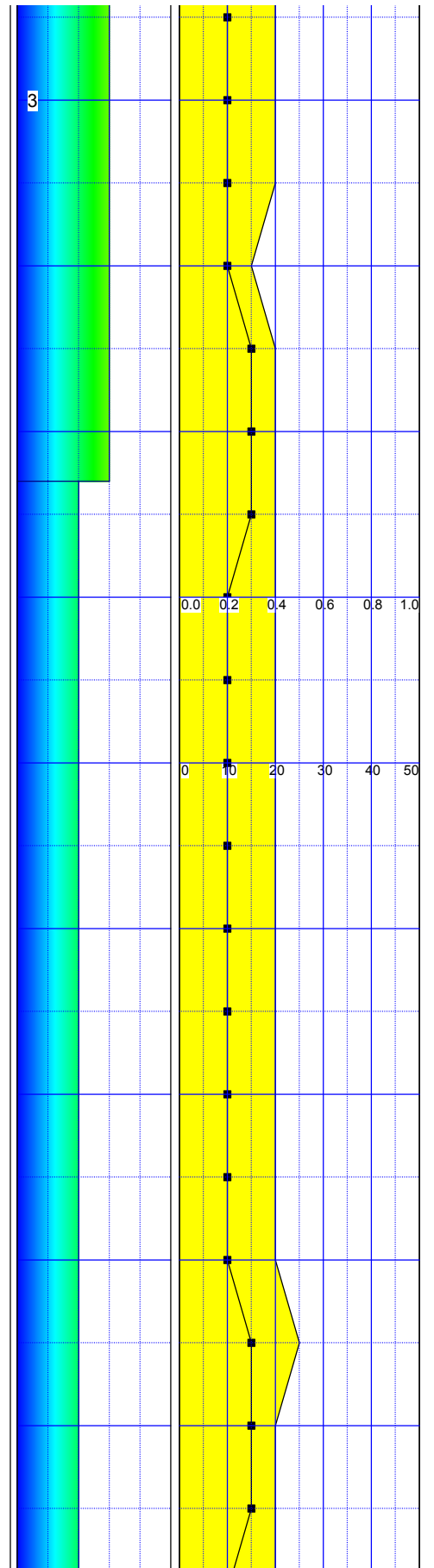


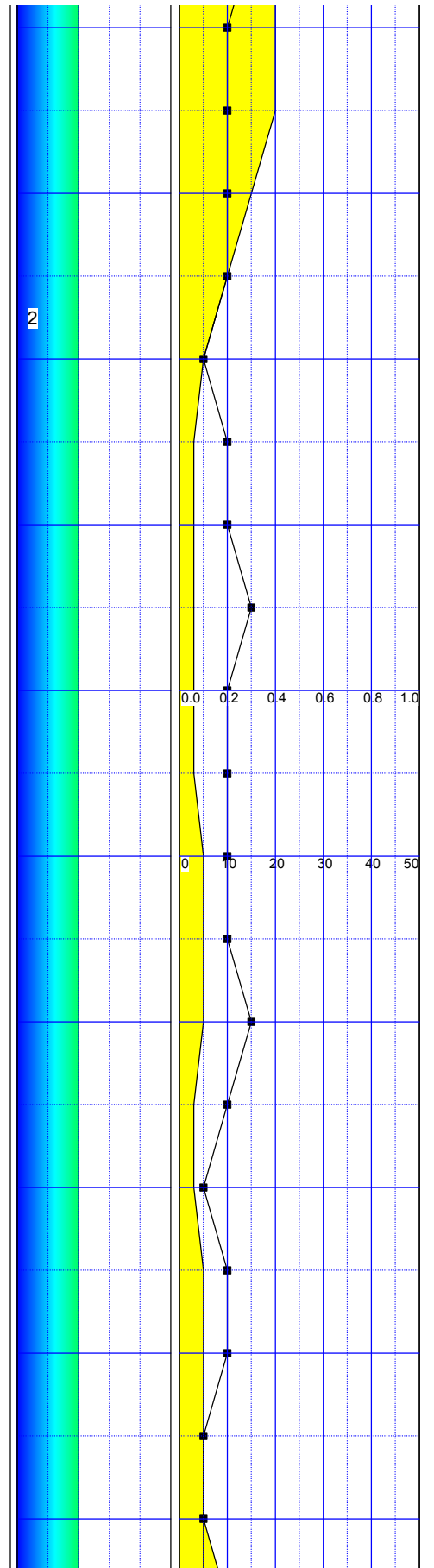
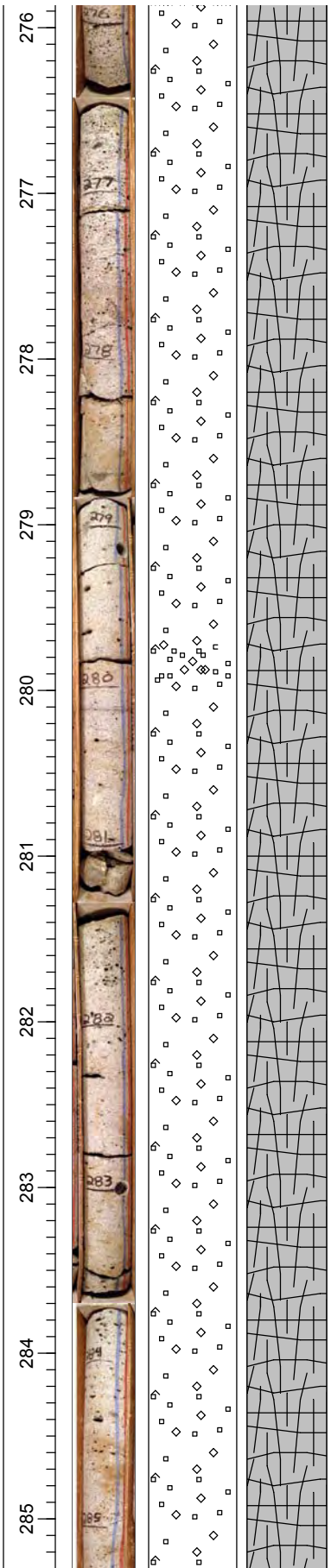
 BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Slightly phaneritic, vesicular,
 slightly diktytaxitic basalt; vesicular
 throughout though decreasing vesicles from
 265.6 feet to 282.5 feet and increasing from
 282.5 feet to 287.6 feet, slightly

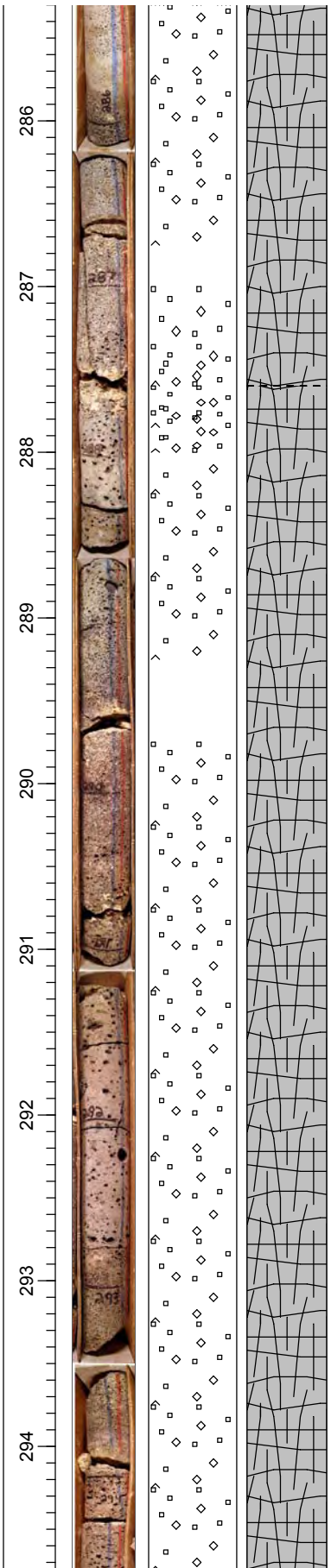




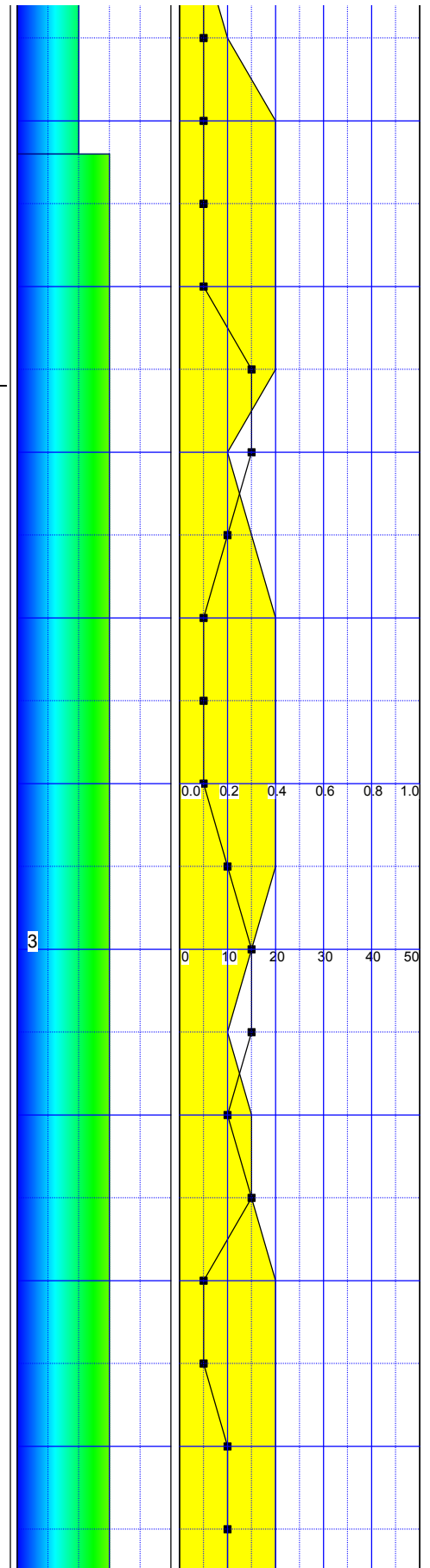
diktytaxitic from 278.4 feet to 283.7 feet, vesicle planes rare and only in diktytaxitic section, very rare large vesicles and megavesicles present above diktytaxitic section
 COMPOSITION: 40% plagioclase, 25% olivine, 35% groundmass; tabular submillimeter to rare 1 mm plagioclase phenocrysts, subhedral olivine microcrysts to rare 1 mm glomerocrysts, rare discernable pyroxene
 XENOLITHS/AUTOLITHS: Rare, located in bottom 3 feet of section
 ALTERATION: Slight alteration of olivine to iddingsite, 10 YR 8/2 Very Pale Orange calcitic mud located in most fractures and some vesicles throughout section as well as at top and at base

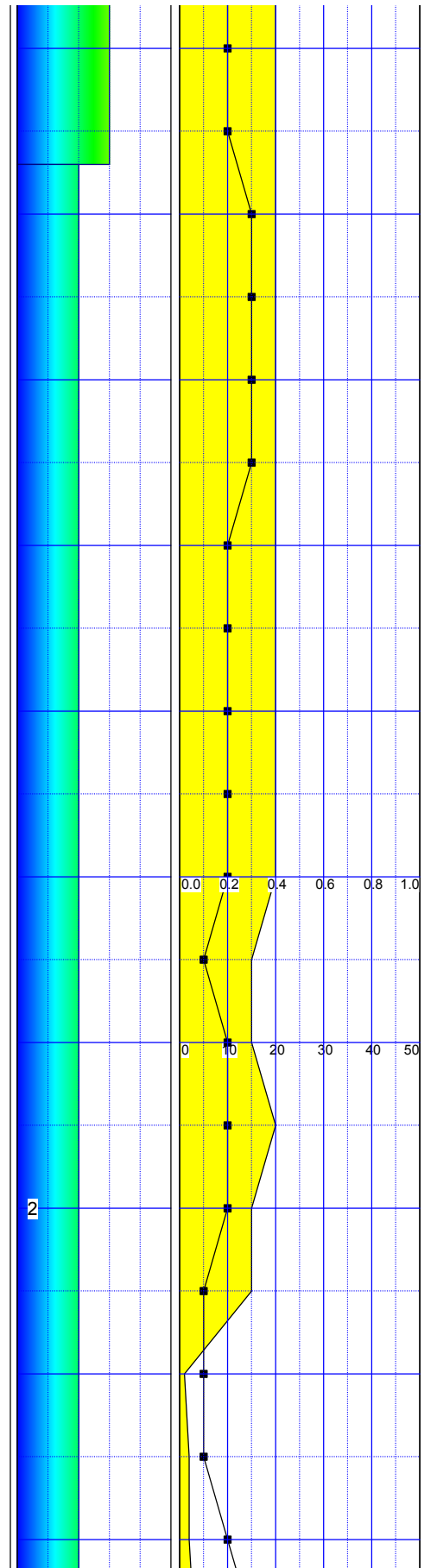
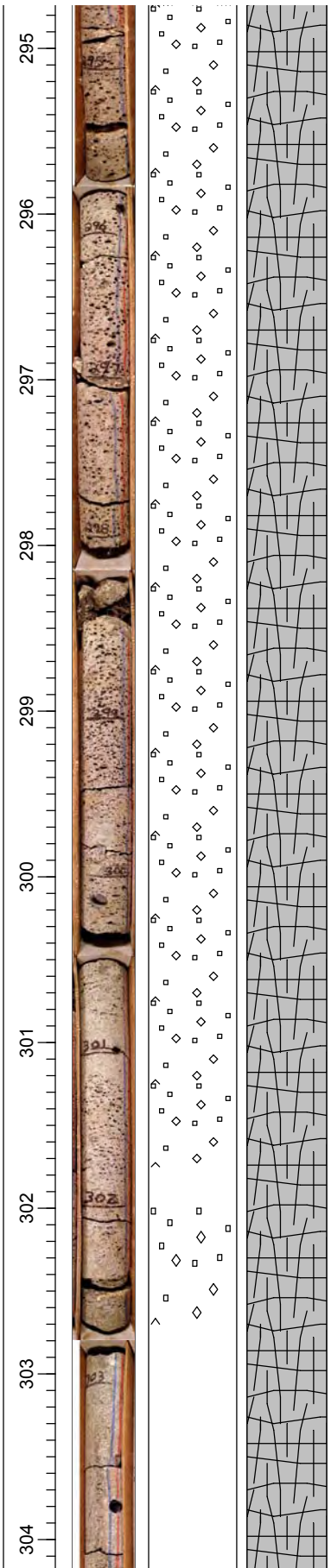


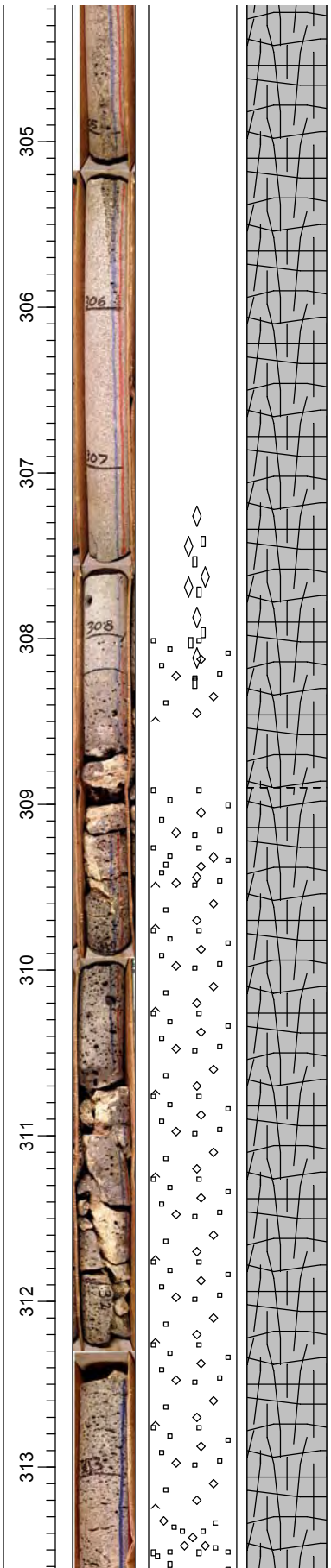




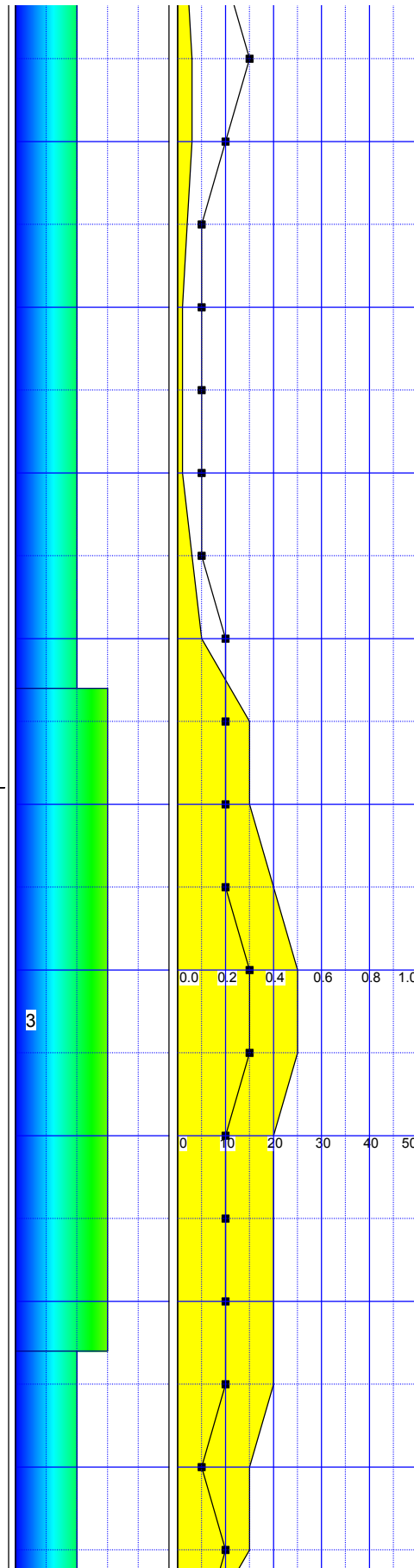
BASALT:
 COLOR: 5R 4/2 Grayish Red grading to N4
 Medium Dark Gray
 TEXTURE: Slightly phaneritic, vesicular,
 diktytaxitic basalt; decreasingly vesicular
 from 287.6 feet to 302.7 feet and vesicular
 from 308.0 feet to 308.9 feet, diktytaxitic
 from 302.7 feet to 308.0 feet, vesicle
 columns present from 307.2 feet to 308.3
 feet
 COMPOSITION: 50% plagioclase, 20% olivine,
 5% pyroxene, 25% groundmass; tabular
 submillimeter lathy plagioclase phenocrysts,
 subhedral olivine microcrysts and rare
 glomerocrysts, rare subhedral submillimeter
 pyroxene
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: 10 YR 8/2 Very Pale Orange
 calcitic mud found on most fracture surfaces
 and in some vesicles around fractures,
 slight alteration of olivine to iddingsite

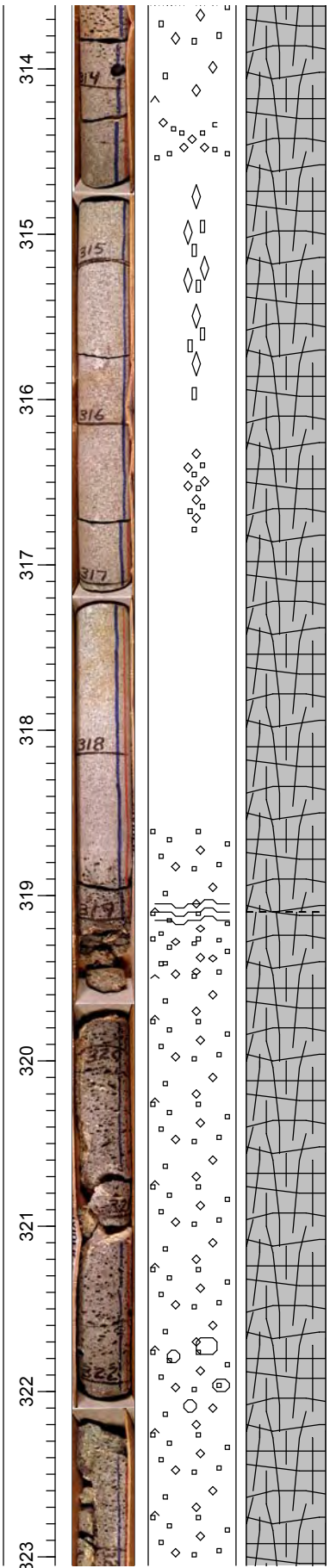




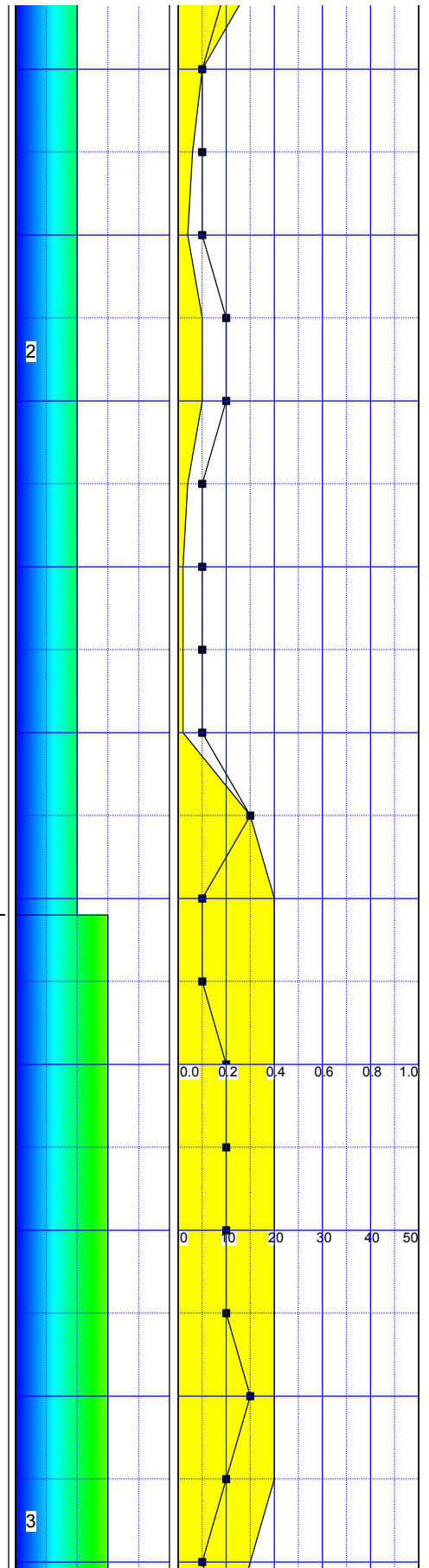


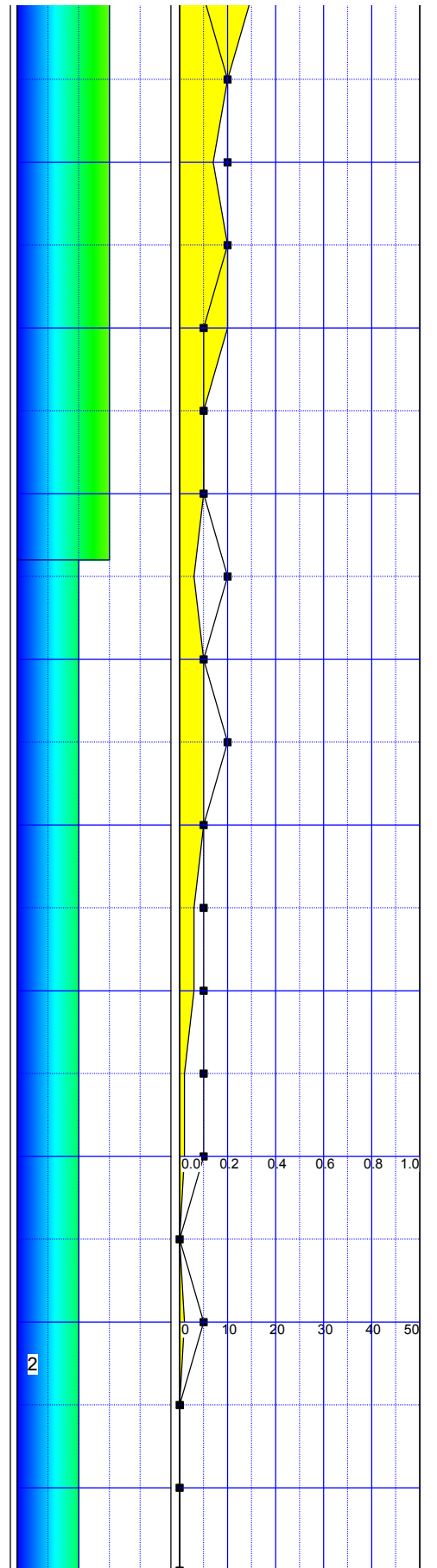
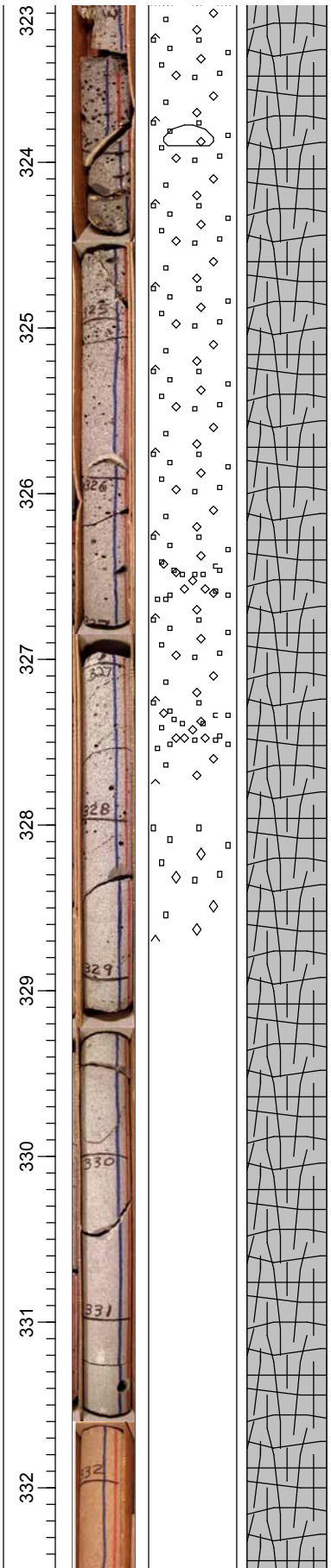
BASALT:
 COLOR: N5 Medium Gray
 TEXTURE: Aphanitic, vesicular, diktytaxitic basalt; vesicular from 308.9 feet to 314.2 feet and from 318.6 feet to 319.1 feet, diktytaxitic from 314.2 feet to 318.6 feet, vesicle planes present in upper vesicular zone, large vesicle columns present from 314.7 feet to 316.0 feet and from 316.3 feet to 316.8 feet
 COMPOSITION: 50% plagioclase, 25% olivine, 25% groundmass; submillimeter tabular lathy plagioclase phenocrysts, submillimeter subhedral olivine microcrysts and glomerocrysts
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Flow and mold structure noted at base, 10YR 8/2 Very Pale Orange calcitic mud noted in vesicles and fractures throughout upper vesicular zone and on flow and mold structure, slight alteration of olivine to iddingsite

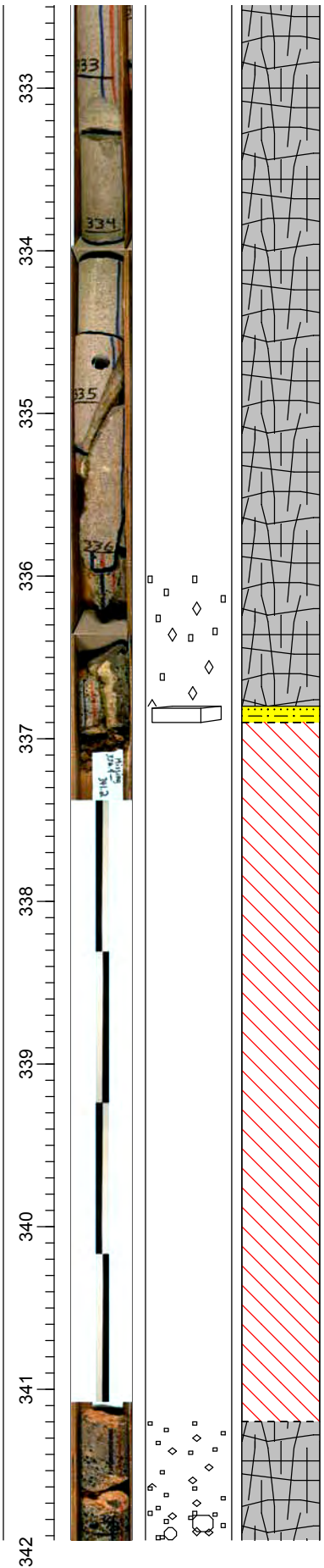




BASALT:
 COLOR: N5 Medium Gray
 TEXTURE: Mostly aphanitic, vesicular, diktytaxitic basalt; vesicular from 319.1 feet to 328.7 feet and from 336.0 feet to 336.8 feet, diktytaxitic from 328.7 feet to 336.0 feet, vesicle planes in lower half of upper vesicular zone, few large vesicles and rare megavesicles
 COMPOSITION: 45% plagioclase, 35% olivine, 20% groundmass; tabular lathy submillimeter to 1 mm plagioclase phenocrysts, subhedral to euhedral submillimeter to 2 mm olivine microcrysts and glomerocrysts, rare discernable submillimeter pyroxenes
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to iddingsite, 10YR 8/2 Very Pale Orange calcitic mud and most natural fracture surfaces and in some vesicles around natural fractures



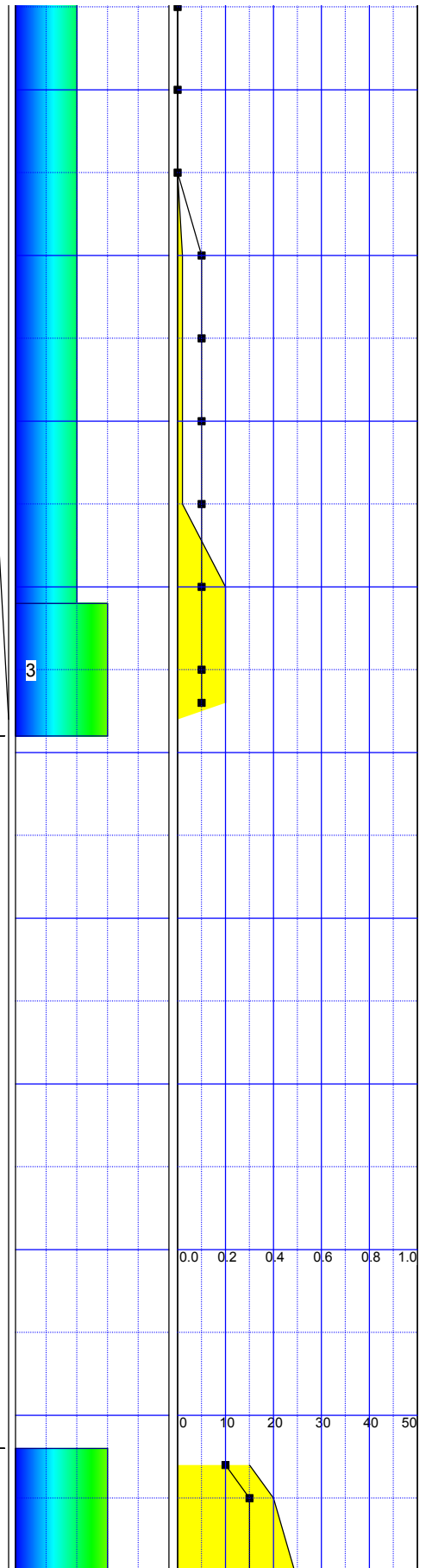


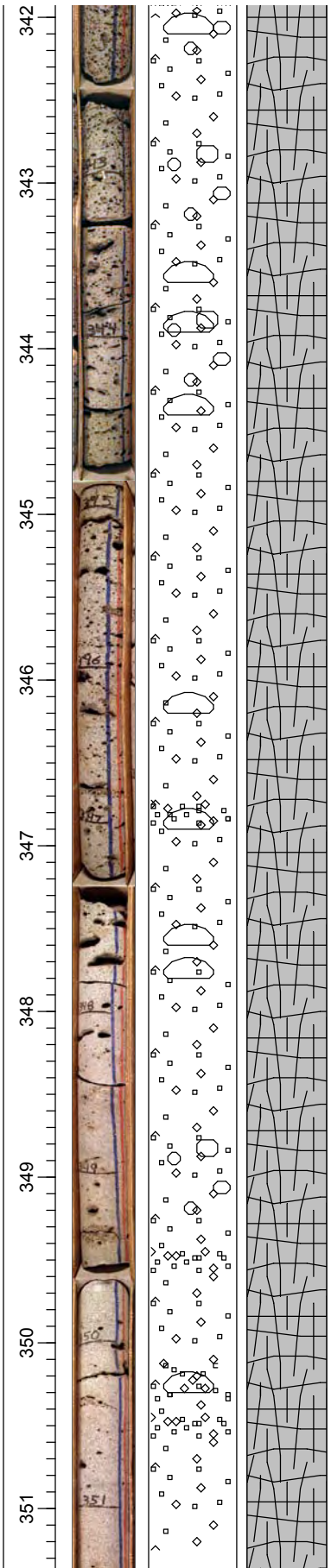


SANDS WITH FINES:
 TEXTURE: Sands with fines, USCS Soil Classification Silty Sand SM, fine grained, moderately sorted, subrounded
 COLOR: 5YR 5/2 Pale Brown
 CONSISTENCY: Friable
 STRUCTURE: Structureless - massive
 CARBONATES: No discernable carbonates
 ROCKS: None noted
 ROOTS/FOSSILS: None noted

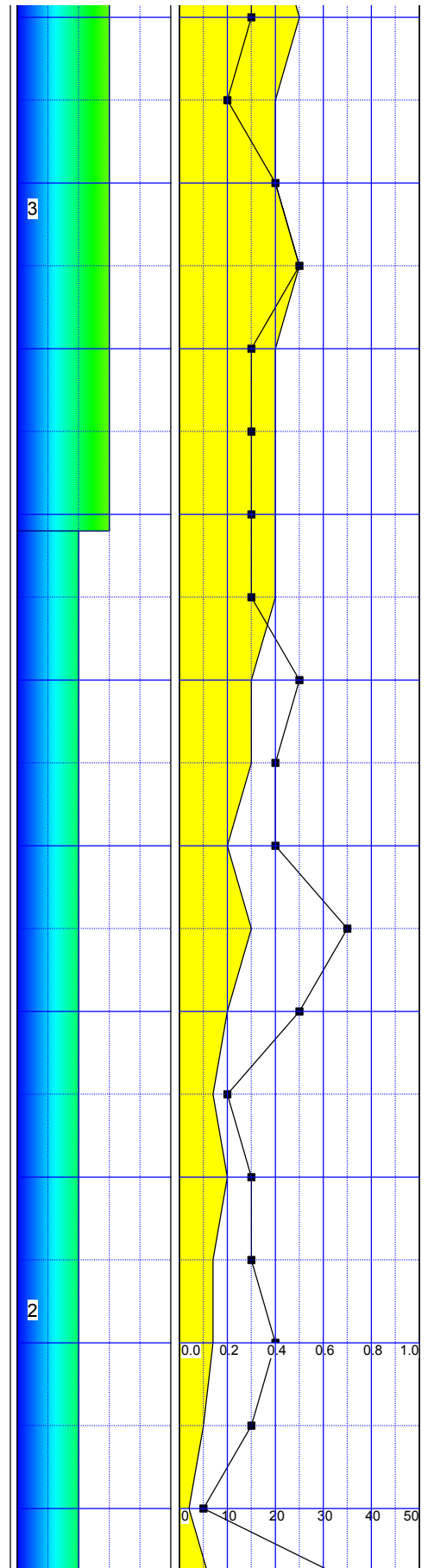
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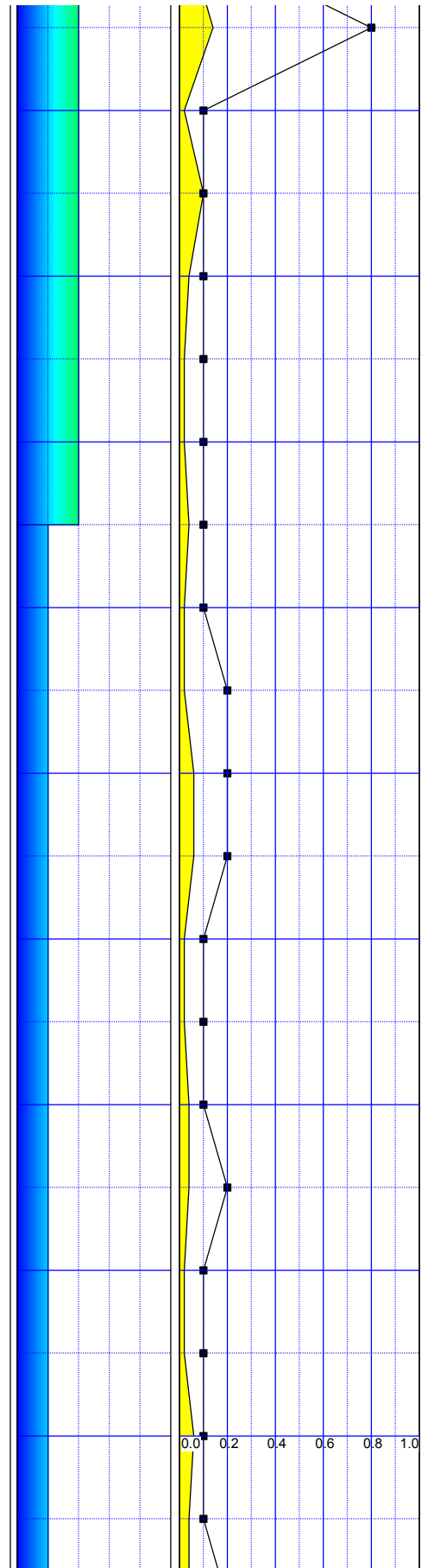
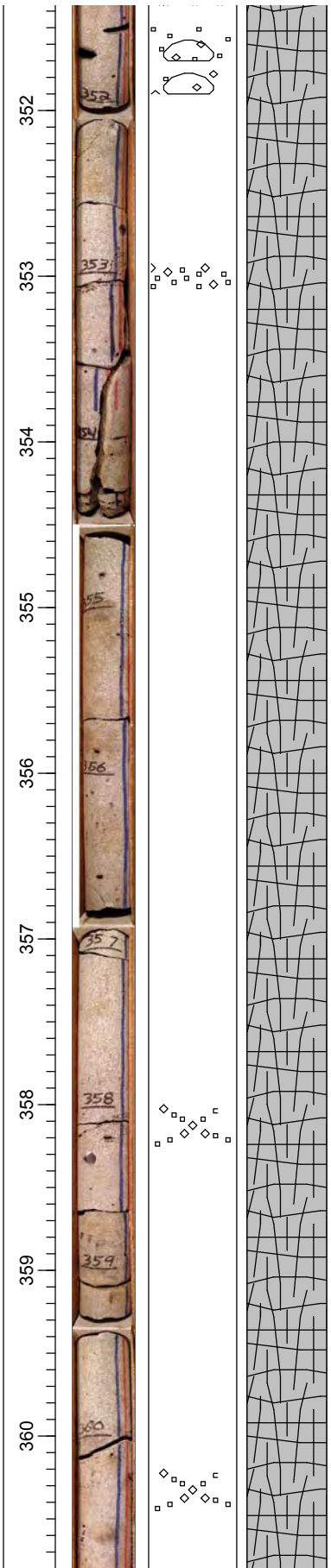
BASALT:
 COLOR: Ranging in color from N6 Medium Light Gray to N4 Medium Dark Gray
 TEXTURE: Slightly phaneritic, vesicular, massive, diktytaxitic basalt; decreasingly vesicular from 341.2 feet to 351.9 feet and increasingly vesicular from 390.7 feet to

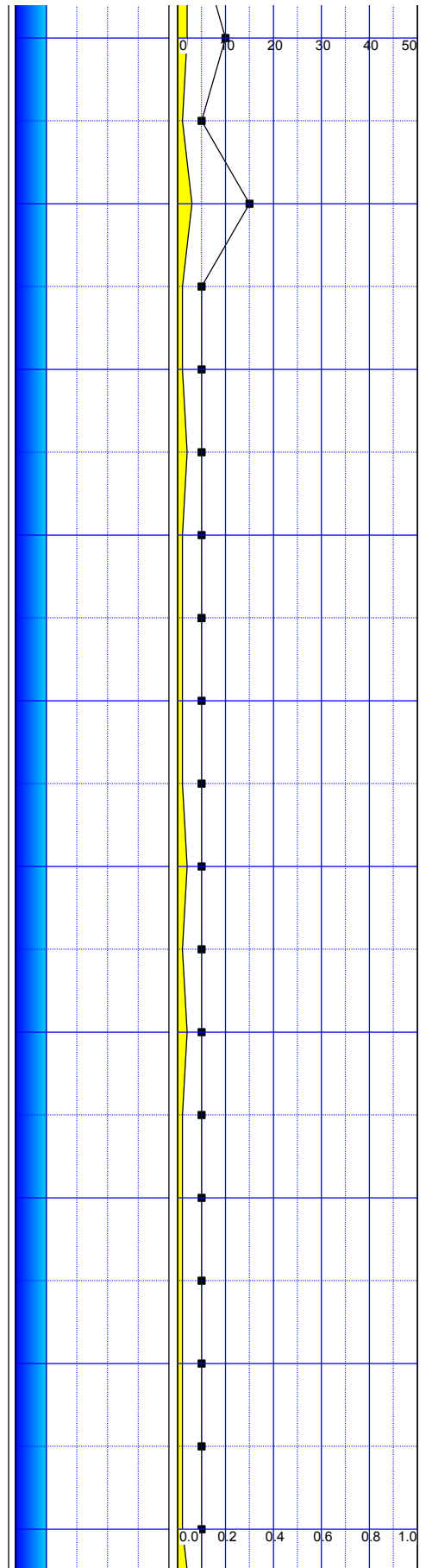
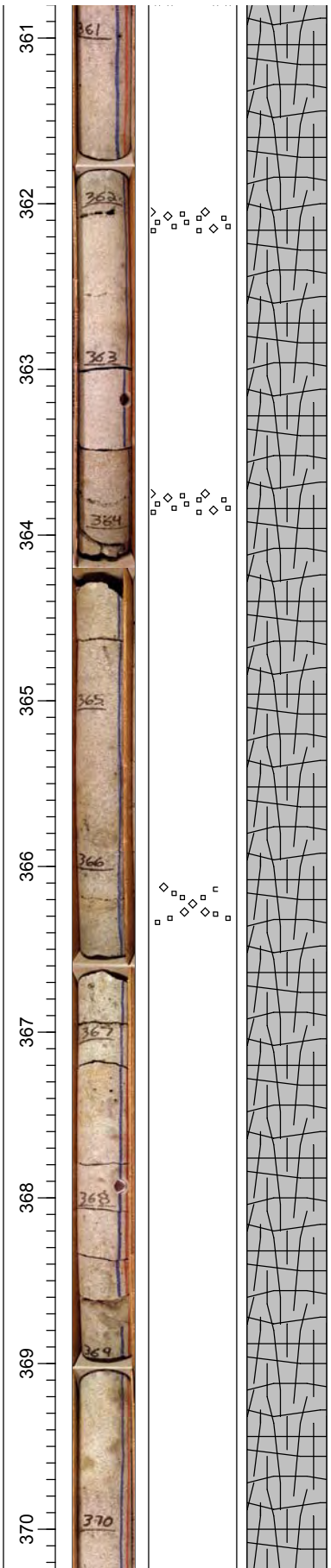


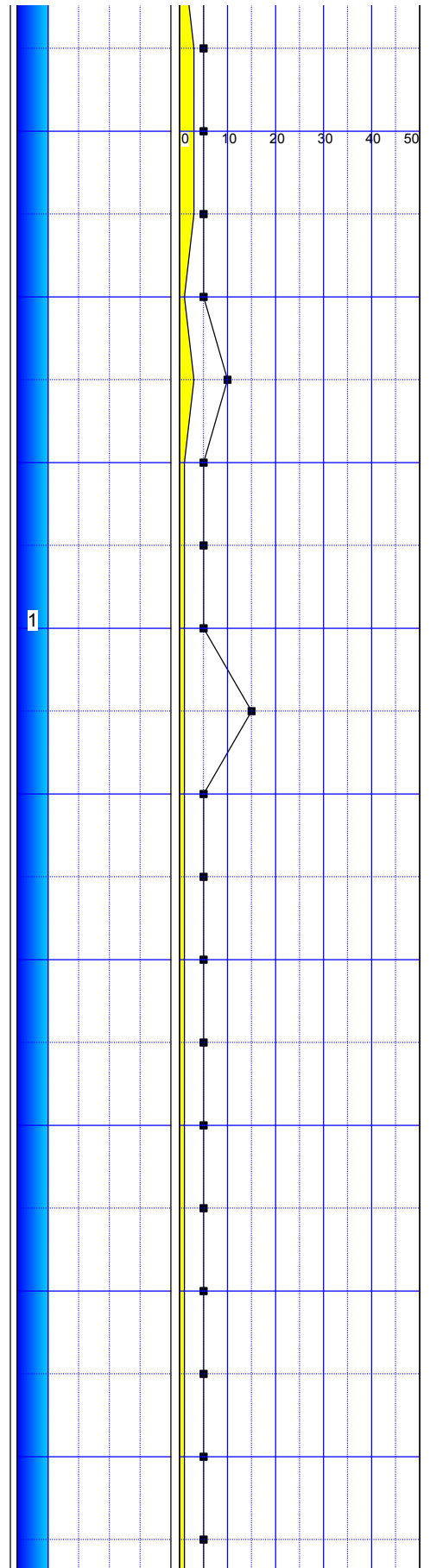
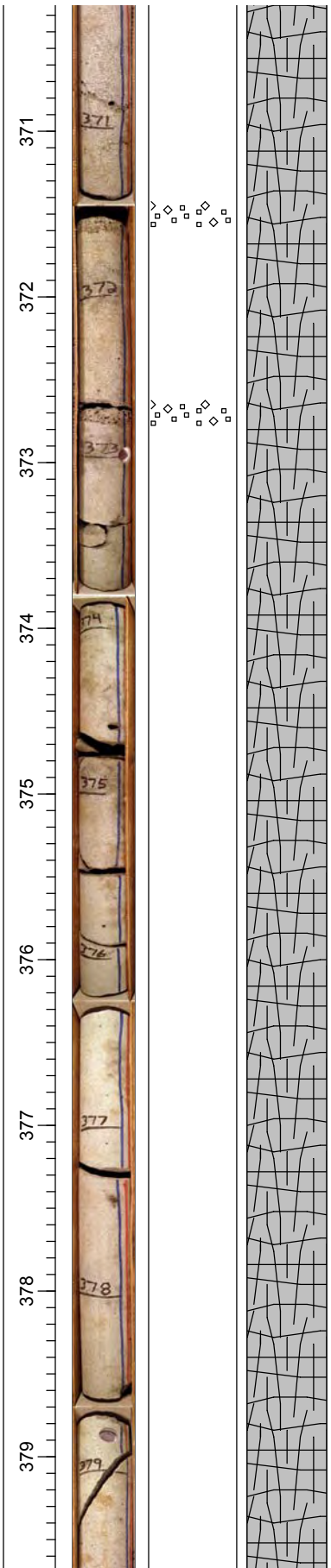


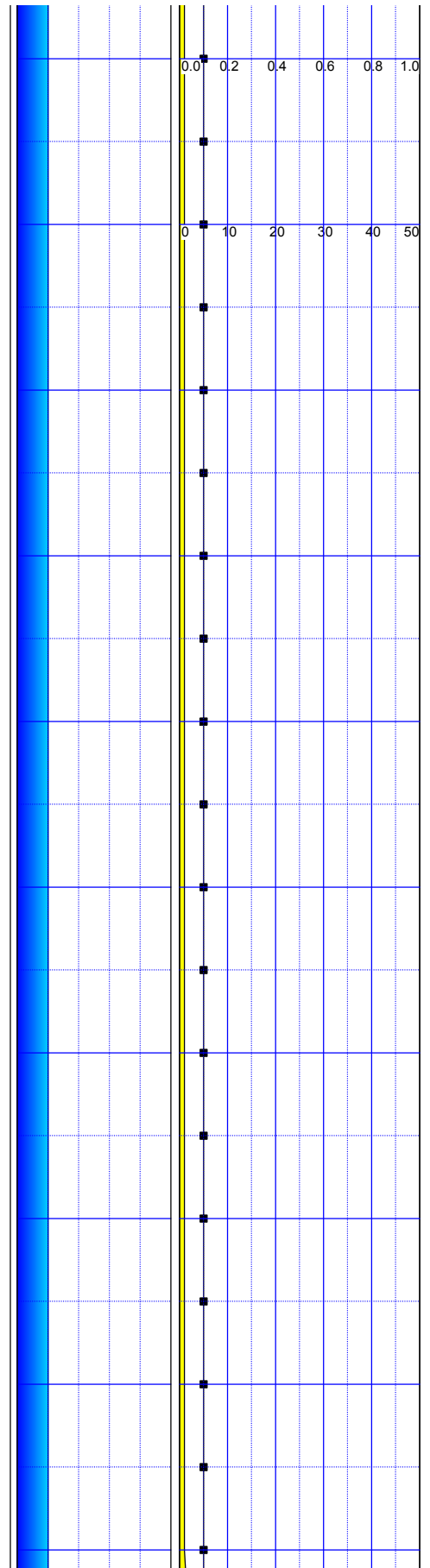
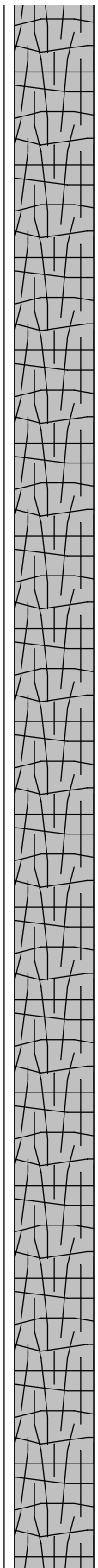
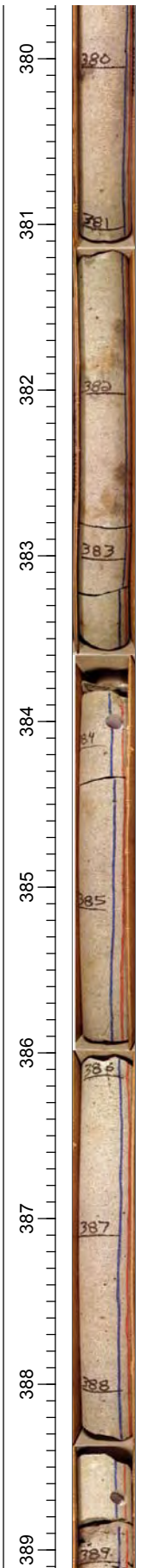
393.4 feet, intermittently massive and diktytaxitic from 351.9 feet to 390.7 feet with sparse vesicles, vesicle planes and vesicle sheets common, large vesicles and megavesicles common in upper vesicular zone
 COMPOSITION: 55% plagioclase, 35% olivine, 10% groundmass; tabular submillimeter to rare 2 mm lathy plagioclase phenocrysts, subhedral submillimeter olivine microcrysts and glomerocrysts
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to iddingsite, calcitic mud ranging from 5YR 6/4 Light Brown to 10YR 8/2 Very Pale Orange in color noted in some natural fractures

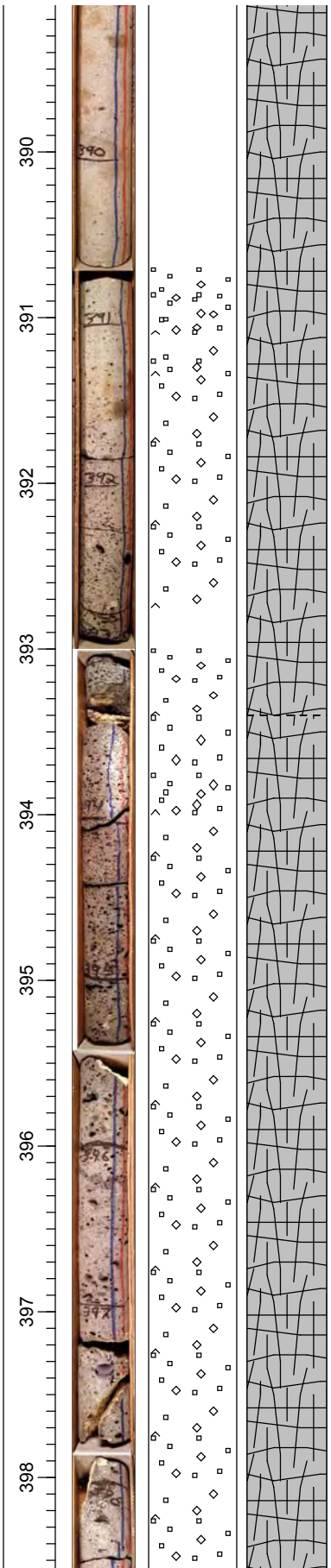




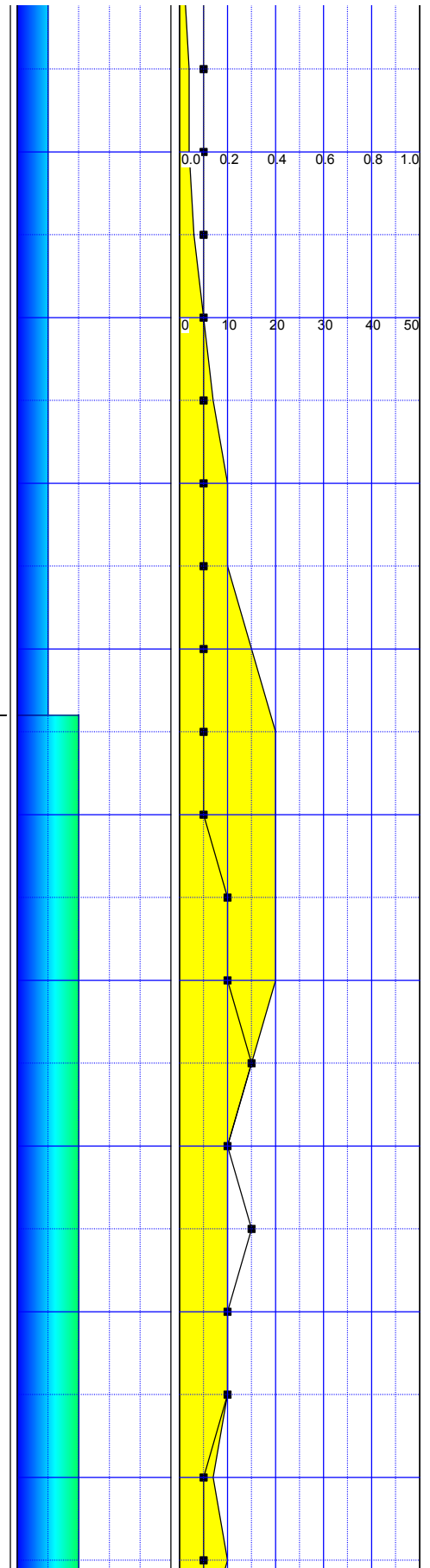


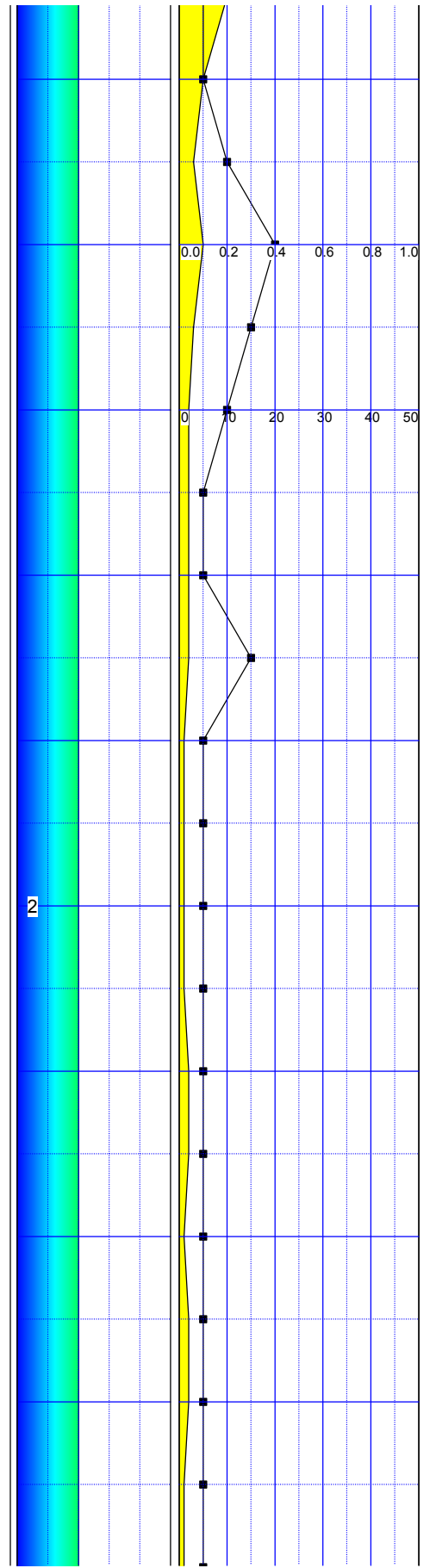
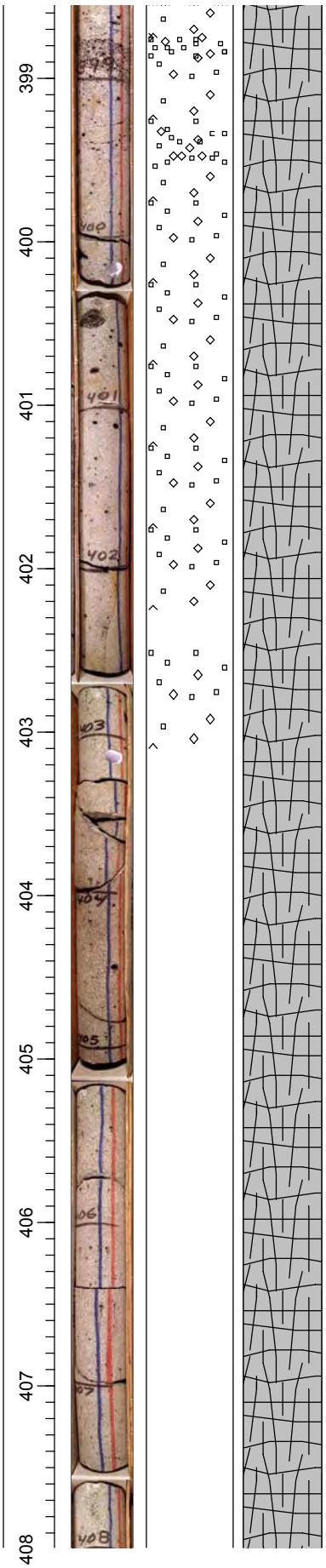


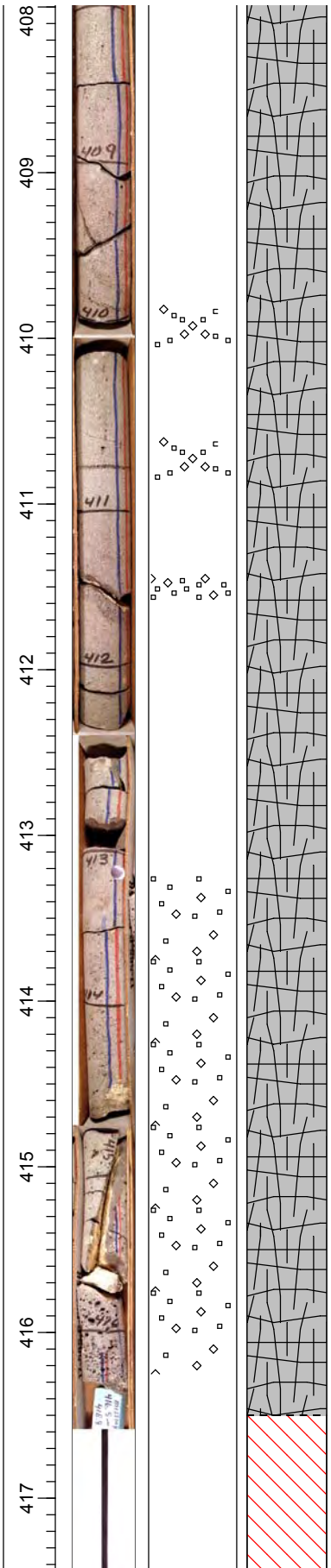




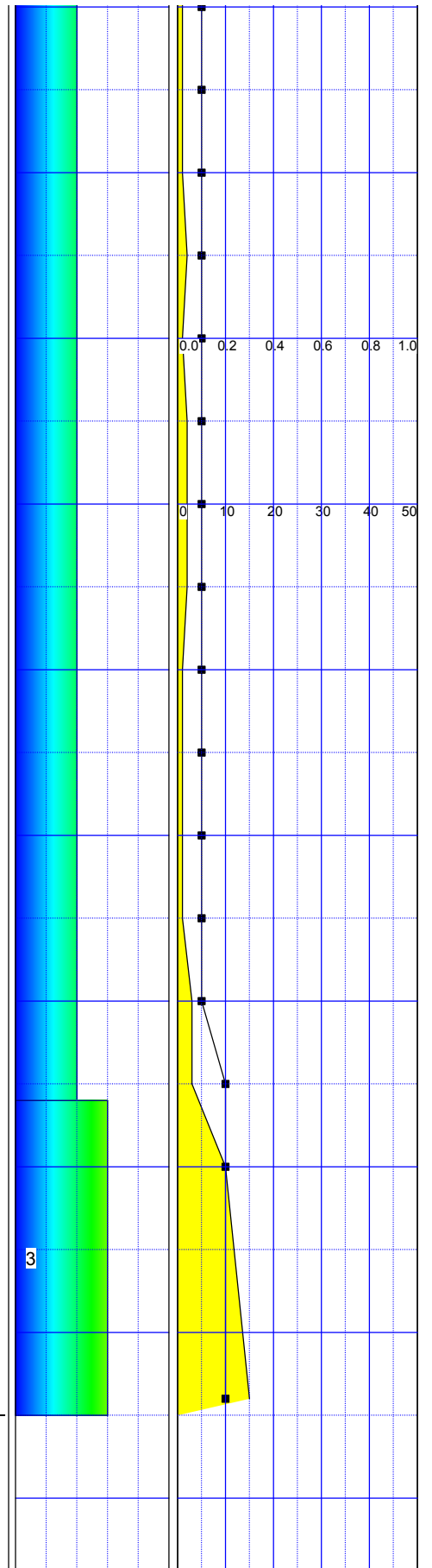
BASALT:
 COLOR: N4 Medium Dark Gray ranging to N5 Medium Gray
 TEXTURE: Slightly phaneritic, vesicular, diktytaxitic basalt; decreasingly vesicular from 393.4 feet to 403.1 feet and increasingly vesicular from 413.5 feet to 416.5 feet, diktytaxitic with sparse vesicles from 403.1 feet to 413.5 feet, few vesicle panes and vesicle sheets
 COMPOSITION: 55% plagioclase, 30% olivine, 15% groundmass; tabular lathy submillimeter to 2 mm plagioclase phenocrysts, subhedral submillimeter olivine microcrysts and phenocrysts
 XENOLITHS/AUTOLITHS: Rare autoliths in lower part of section
 ALTERATION: Slight to moderate alteration of olivine to iddingsite, 10YR 8/2 Very Pale Orange calcitic mud on natural fracture surfaces and in some vesicles around natural fractures, sparry calcite in few large vesicles

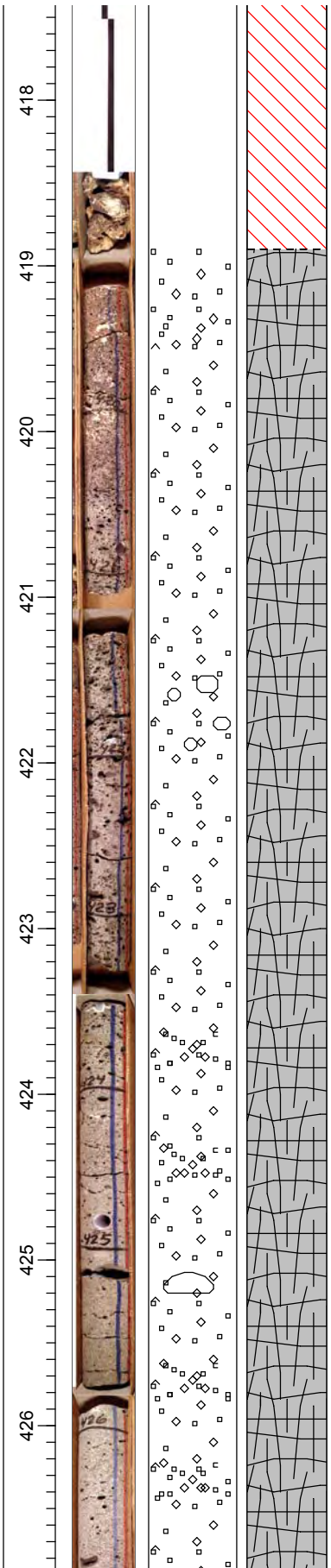




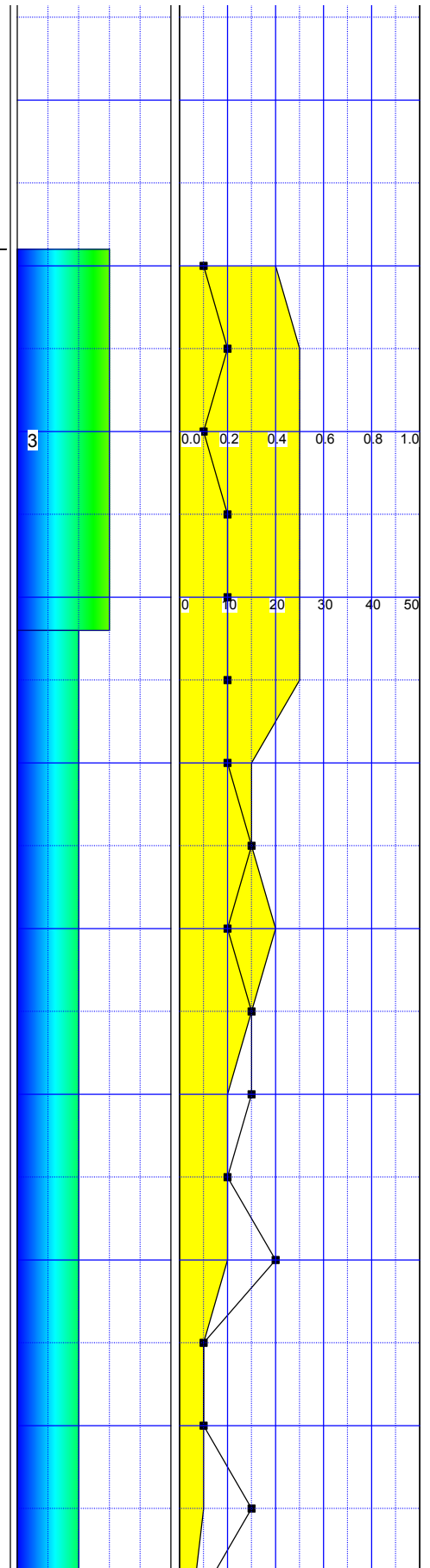


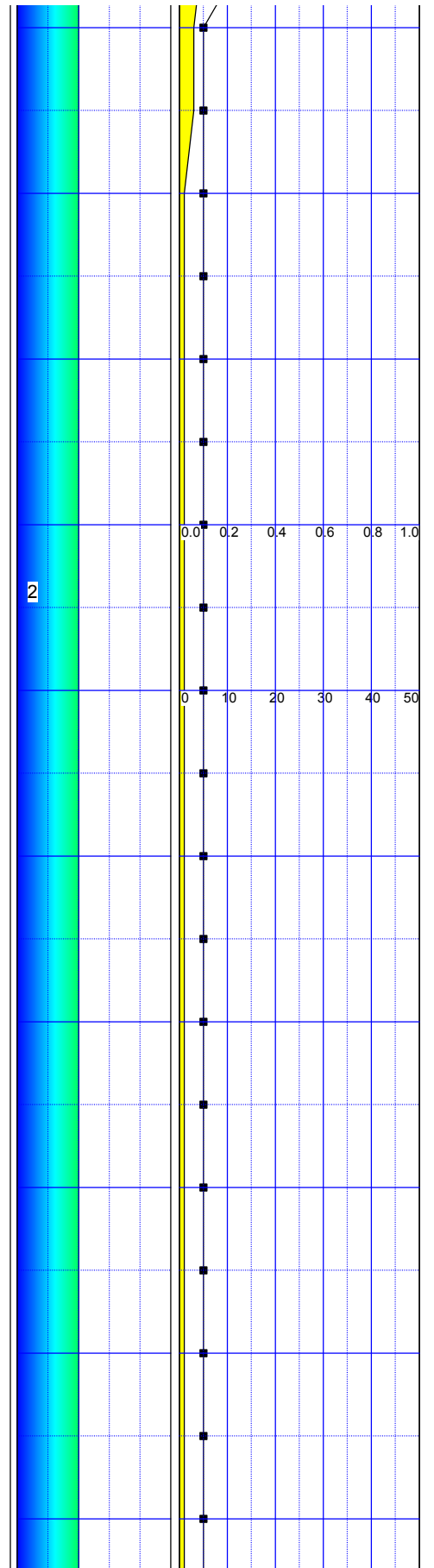
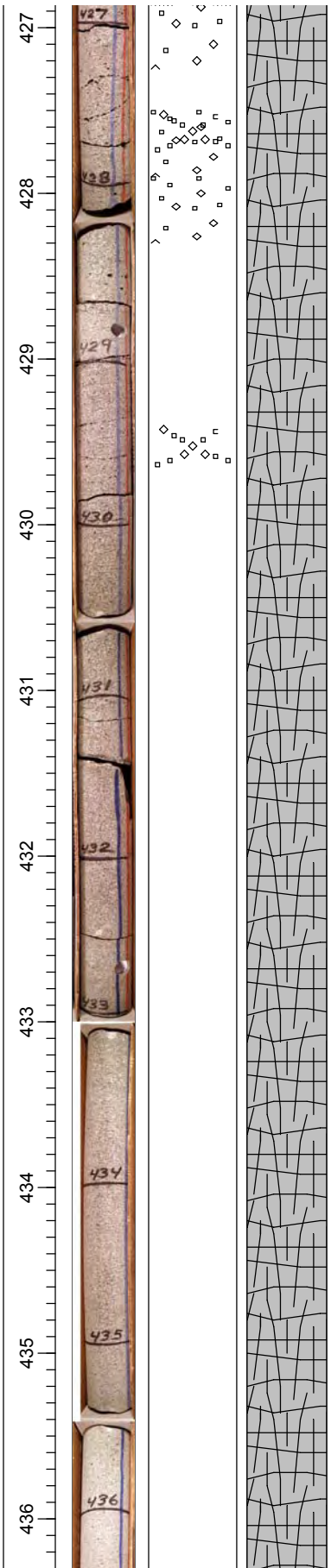
MISSING INTERVAL:
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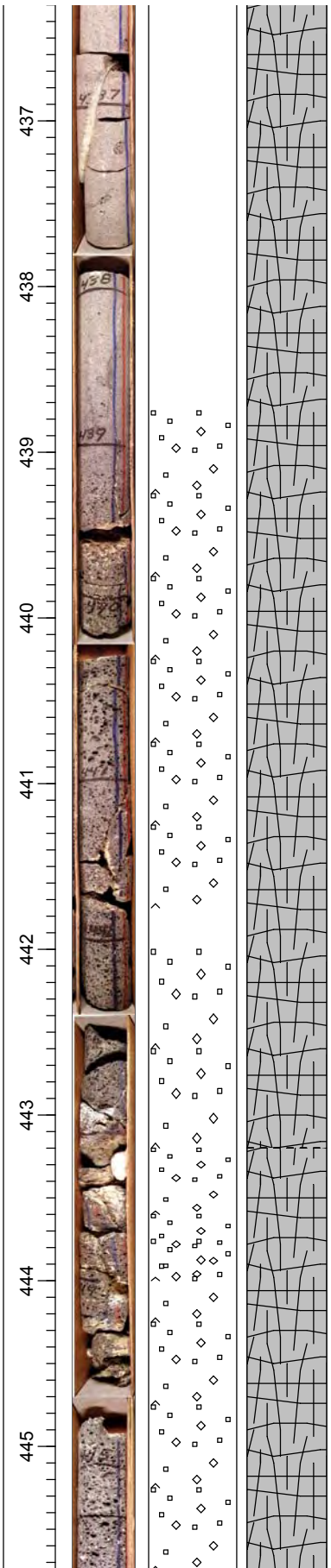




BASALT:
COLOR: N5 Medium Gray
TEXTURE: Mostly aphanitic, vesicular, diktytaxitic basalt; decreasingly vesicular from 418.9 feet to 428.3 feet and increasingly vesicular from 439.0 feet to 443.2 feet, diktytaxitic from 428.3 feet to 439.0 feet, vesicle planes common in lower half of upper vesicular zone into the upper half of the diktytaxitic zone, few large vesicles and rare megavesicles
COMPOSITION: 55% plagioclase, 30% olivine, 15% groundmass; tabular lathy submillimeter to 1 mm plagioclase phenocrysts, subhedral to euhedral submillimeter olivine, rare discernable pyroxene
XENOLITHS/AUTOLITHS: Rare autoliths
ALTERATION: Slight alteration of olivine to iddingsite, very rare calcite in few vesicles, 10YR 8/2 Very Pale Orange calcitic mud on most natural fracture surfaces and in some vesicles near fractures, flow and mold structure at base

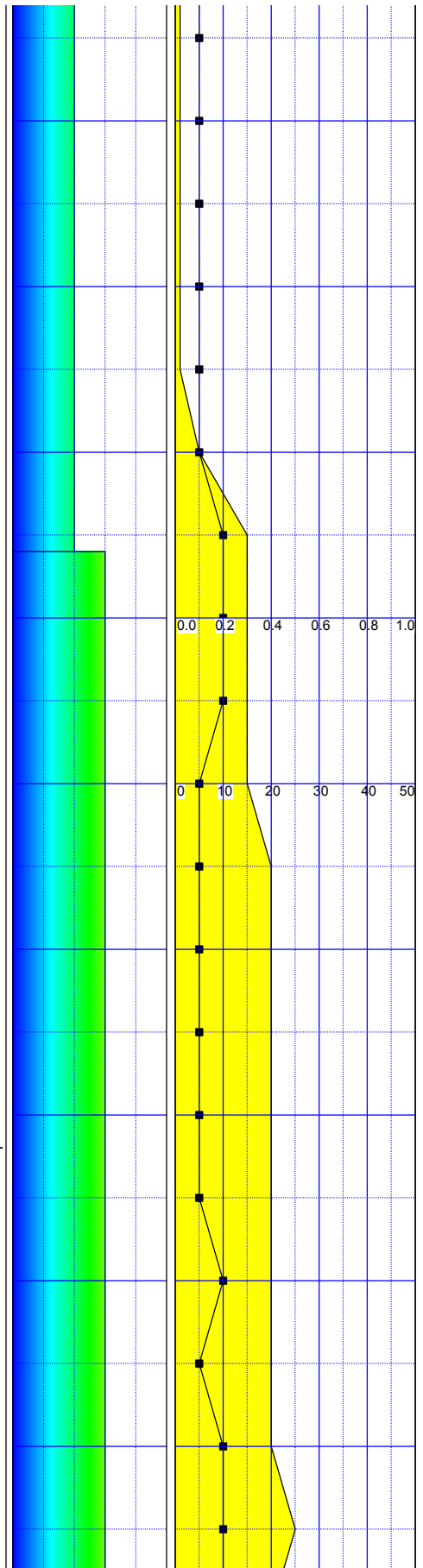


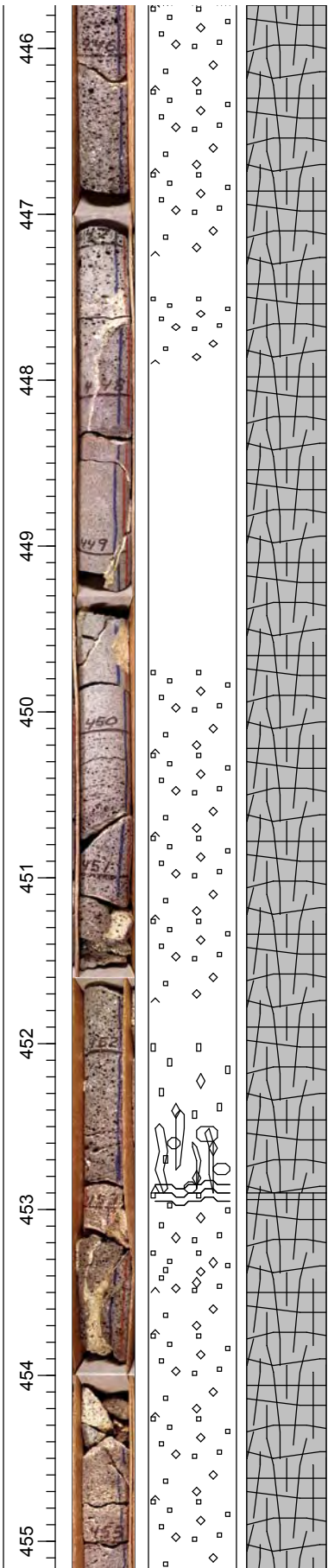




443.2
 feet: 10YR
 8/2 Very
 Pale
 Orange
 very
 calcitic
 highly
 compacted
 mud with
 mud
 cracks.
 Not a unit
 but
 filling a
 void or
 very large
 vesicle
 in the
 basalt
 section.

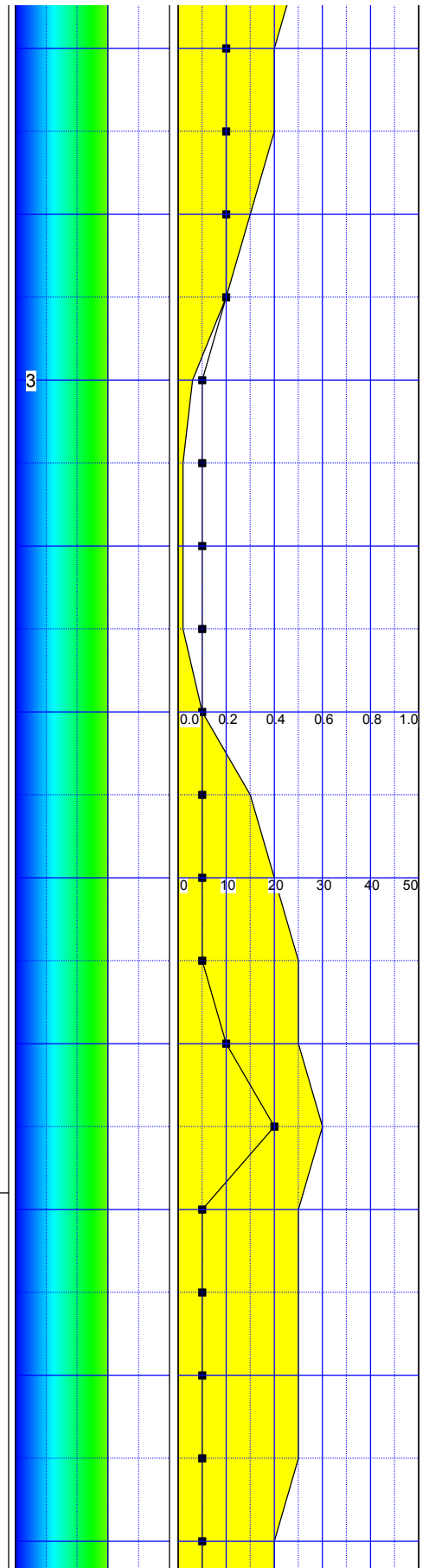
BASALT:
 COLOR: N5 Medium Gray ranging to N4 Medium Dark Gray
 TEXTURE: Aphanitic, vesicular, diktytaxitic basalt; vesicular from 443.2 feet to 447.9 feet and from 450.0 feet to 452.9 feet, diktytaxitic from 447.9 feet to 450.0 feet, rare large vesicles near base, ophitic if groundmass is pyroxene, rare small pipe vesicles at base
 COMPOSITION: 35% plagioclase, 25% olivine, 40% groundmass; tabular submillimeter plagioclase phenocrysts, subhedral submillimeter olivine, rare discernable submillimeter pyroxene
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: very slight alteration of olivine to iddingsite, 10YR 8/2 Very Pale Orange calcitic mud on most fracture surfaces and in some vesicles near fractures, rare calcite in some vesicles and sparry calcite in large vesicles in lower part of section, 5R 3/4 Dusky Red flow and

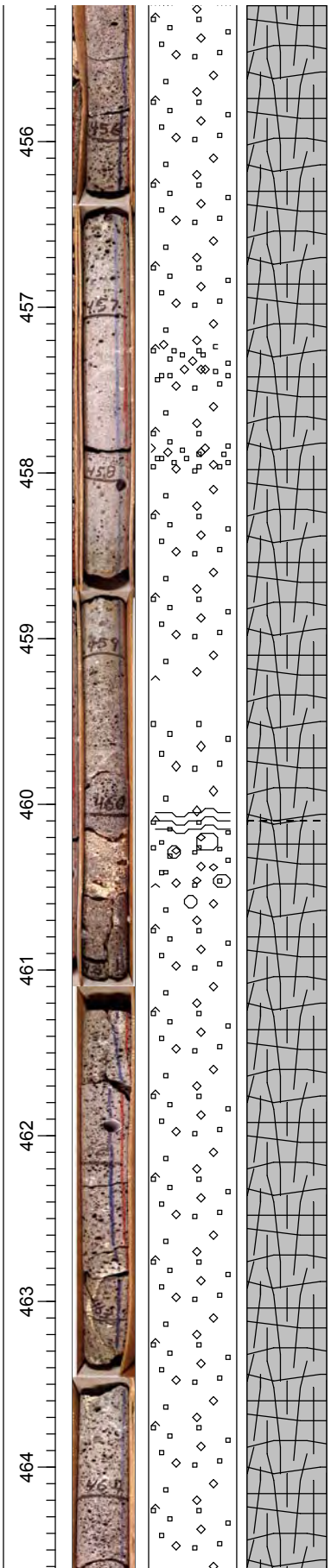




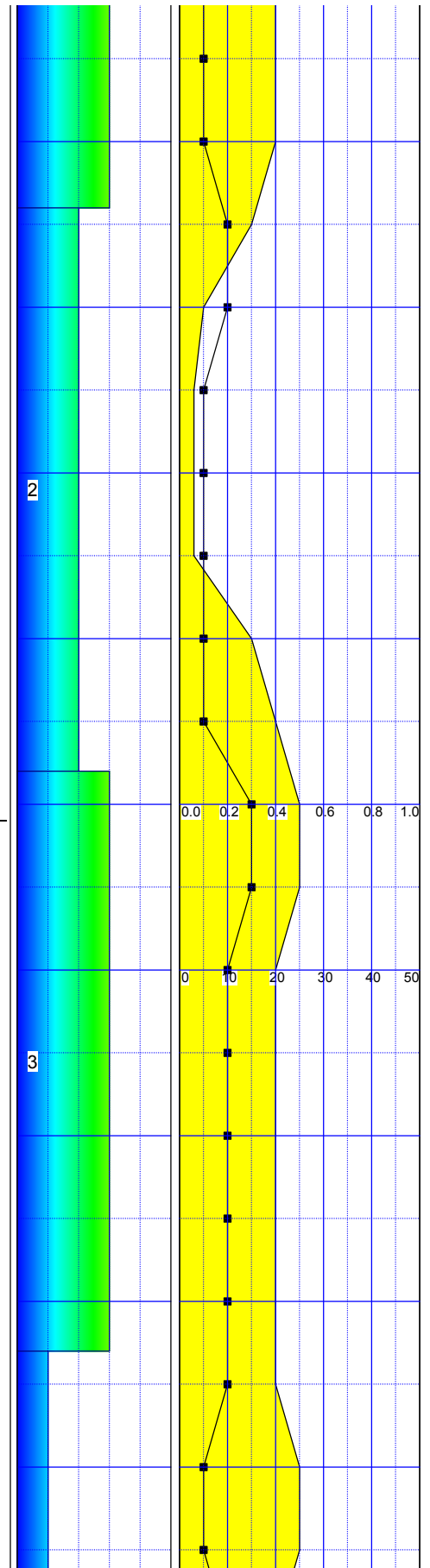
mold structure at base

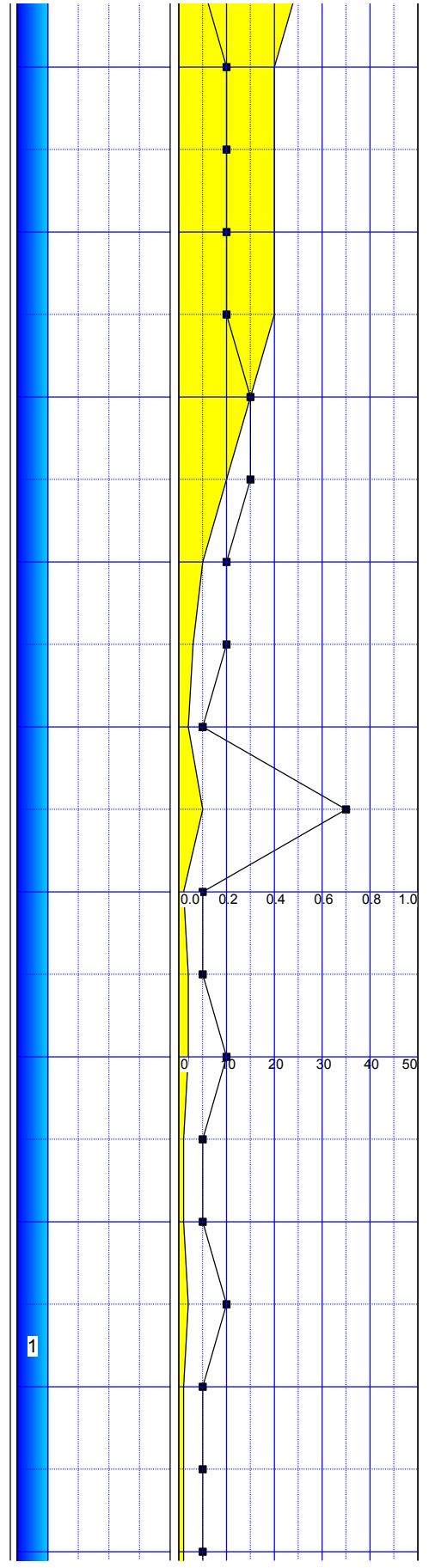
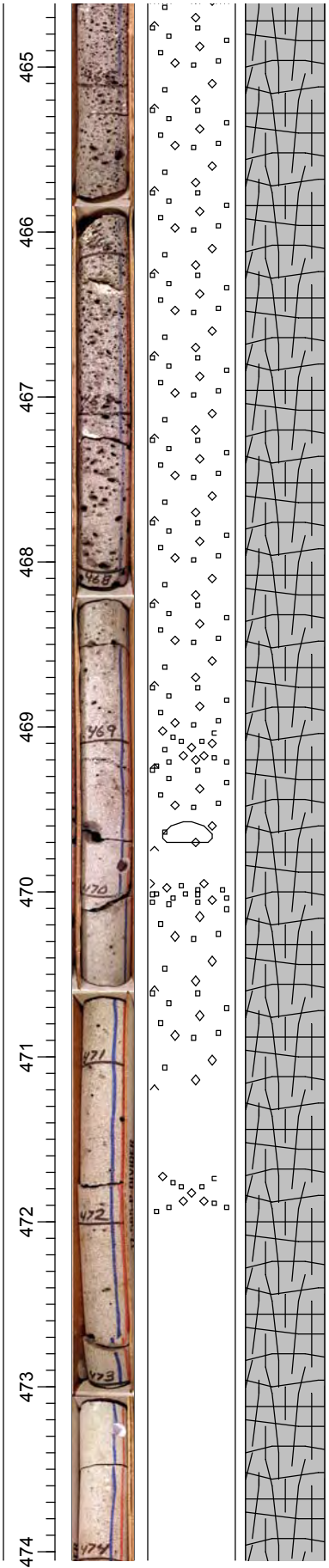
BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Aphanitic, mostly vesicular, slightly diktytaxitic basalt; decreasingly vesicular from 452.9 feet to 457.7 feet and increasingly vesicular from 457.7 feet to 460.1 feet, slightly diktytaxitic where section is least vesicular, rare vesicle planes and vesicle sheets
 COMPOSITION: 40% plagioclase, 25% olivine, 35% groundmass; tabular lathy submillimeter plagioclase phenocrysts, subhedral submillimeter olivine
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to iddingsite, flow and mold structure at base, calcite noted in few vesicles

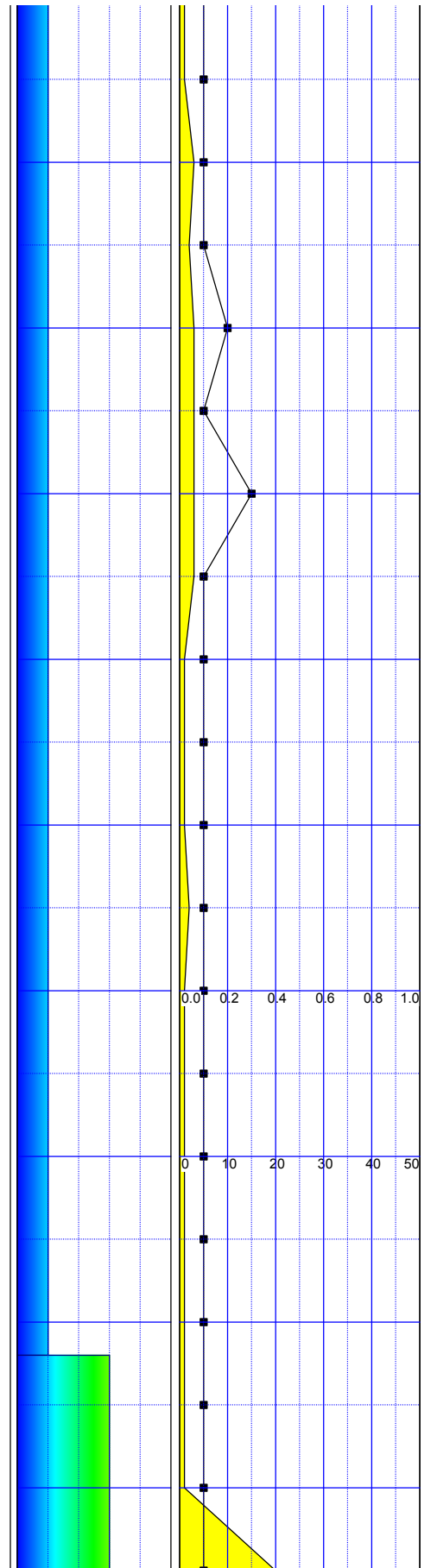
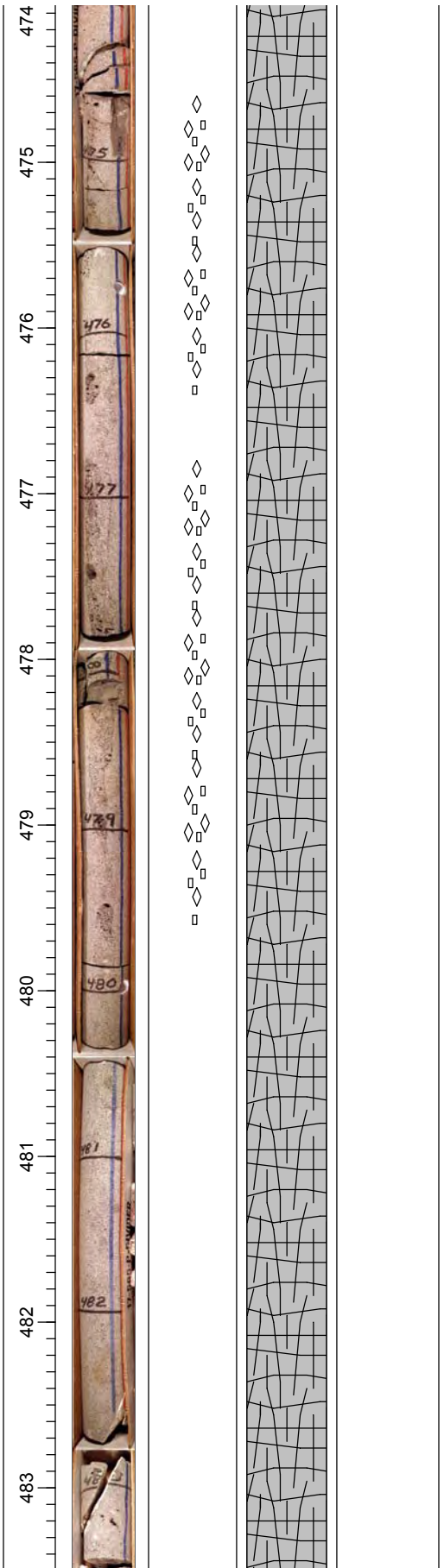


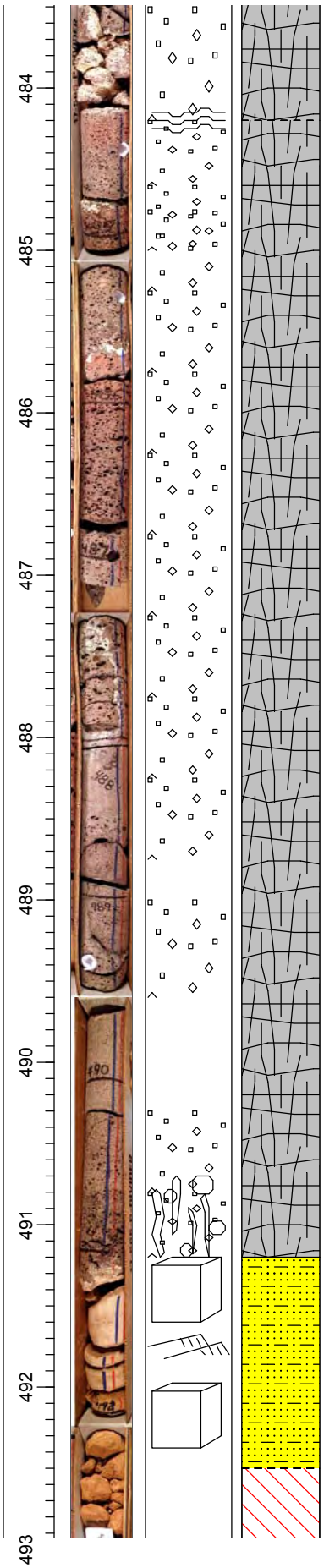


BASALT:
 COLOR: N6 Medium Light Gray to N4 Medium Dark gray
 TEXTURE: Aphanitic, vesicular, diktytaxitic basalt; decreasingly vesicular from 460.1 feet to 471.2 feet and vesicular from 483.5 feet to 484.2 feet, diktytaxitic from 471.2 feet to 483.5 feet, few vesicle planes and vesicle sheets, large vesicle columns from 474.6 feet to 476.4 feet and from 476.8 feet to 479.6 feet, rare megavesicles
 COMPOSITION: 55% plagioclase, 30% olivine, 15% groundmass; tabular lathy submillimeter plagioclase phenocrysts, submillimeter subhedral olivine microcrysts to 1 mm subhedral to euhedral olivine glomerocrysts
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight to moderate alteration of olivine to iddingsite, calcite and sparry calcite deposits in some vesicles, 10YR 8/2 Very Pale Orange calcitic mud located on fracture surfaces and in some vesicles around fractures and in most vesicles at base of section, flow and mold structure located at base





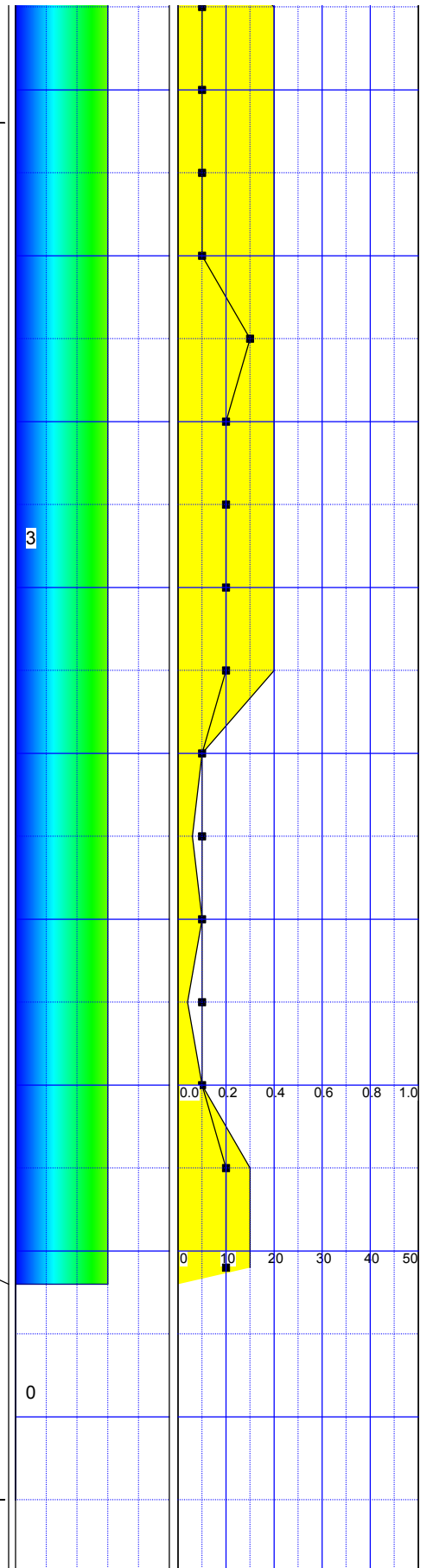


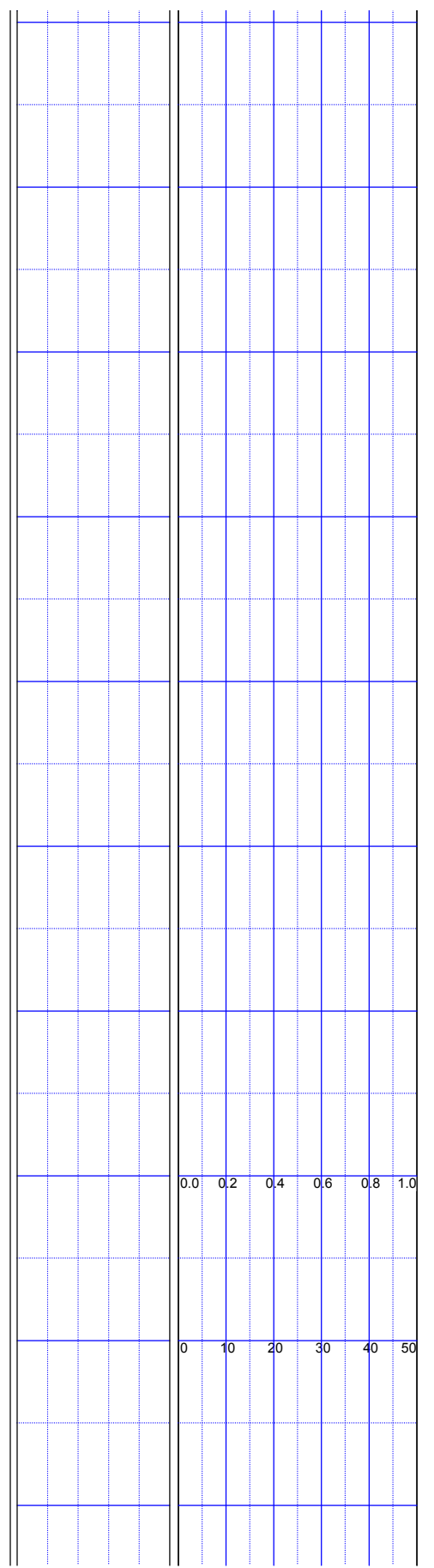
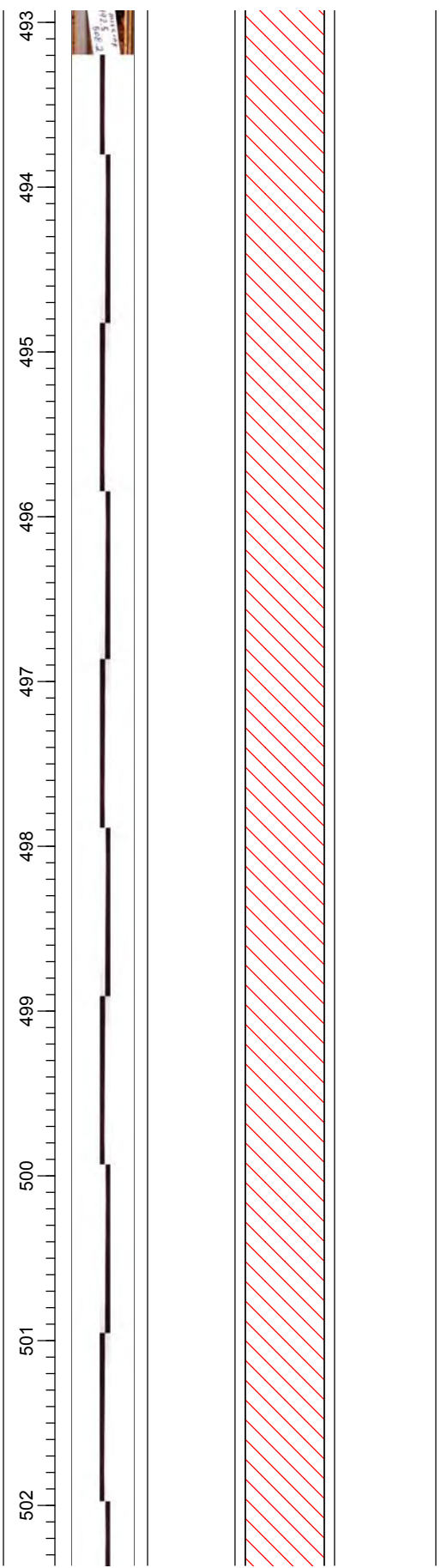


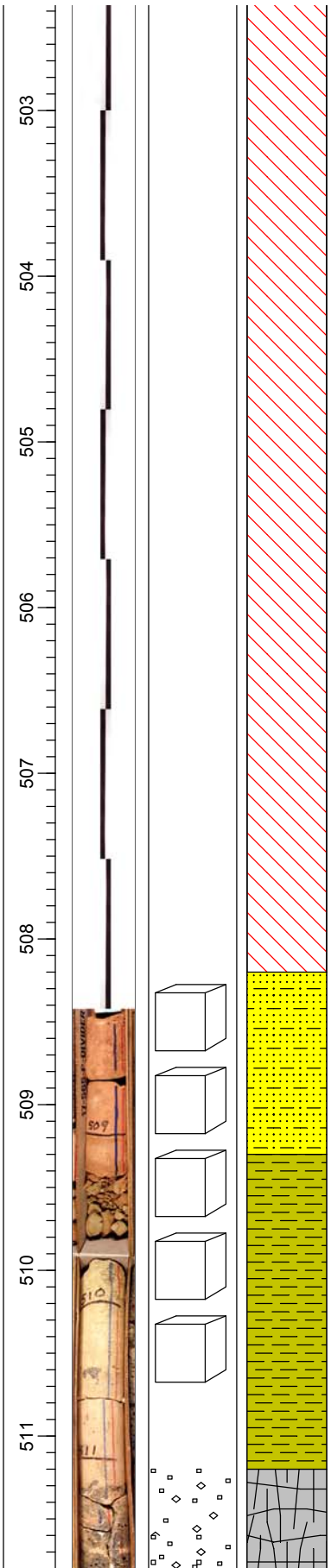
BASALT:
 COLOR: 5R 4/2 Grayish Red to N4 Medium Dark Gray
 TEXTURE: Aphanitic, vesicular, diktytaxitic basalt; vesicular from 484.2 feet to 489.6 feet and from 490.3 feet to 491.2 feet, diktytaxitic from 489.6 feet to 490.3 feet, rare small pipe vesicles and rare large vesicles at base
 COMPOSITION: 25% plagioclase, 40% olivine, 35% groundmass; tabular submillimeter plagioclase phenocrysts, subhedral to euhedral submillimeter to rare 2 mm olivine microcrysts and glomerocrysts
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: High amount of alteration of olivine to iddingsite, 10YR 8/2 Very Pale Orange calcitic mud in some vesicles and on fracture surfaces, calcite noted in few vesicles

SANDS WITH FINES:
 TEXTURE: Sands with fines, USCS Classification Silty Sand SM, fine grained, moderately sorted, subangular
 COLOR: 5YR 6/4 Light Brown
 CONSISTENCY: Extremely firm
 STRUCTURE: Structureless - massive: ripple marks noted at 491.8 feet
 CARBONATES: Yes
 ROCKS: None noted
 ROOTS/FOSSILS: None noted

MISSING INTERVAL:
 Missing interval not recovered



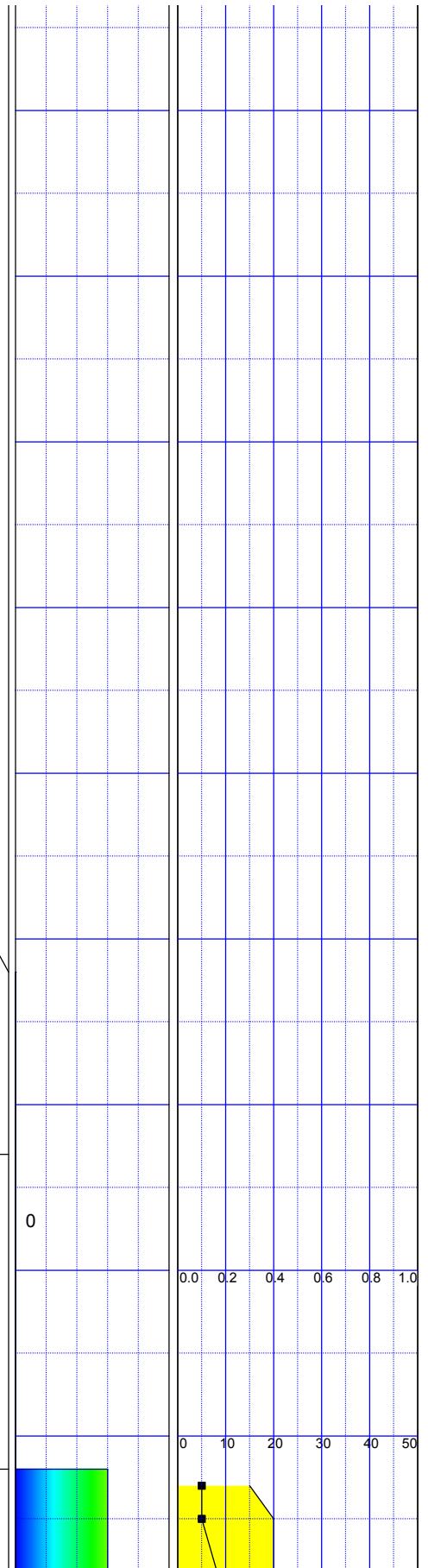


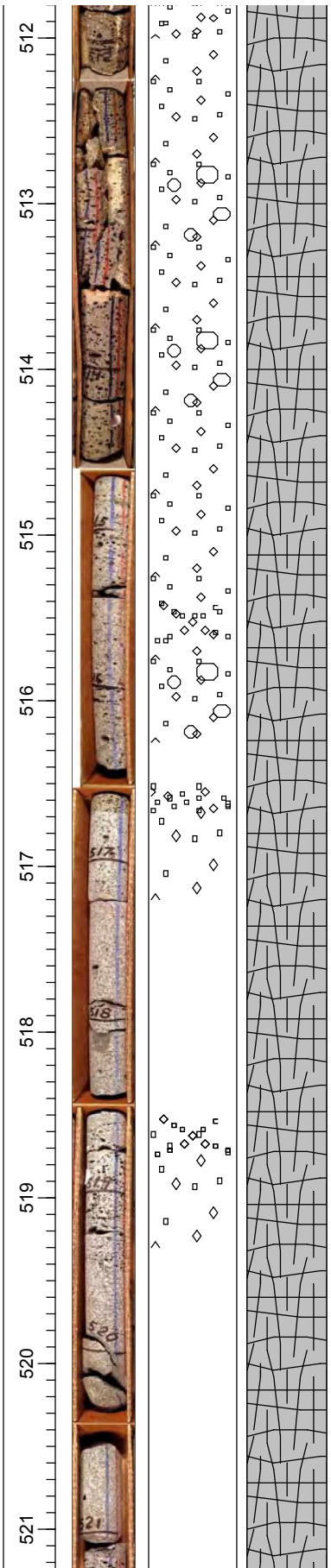


SANDS WITH FINES:
 TEXTURE: Sands with fines, USCS
 Classification Silty Sand SM, fine grained, moderately sorted, subangular
 COLOR: 5YR 6/4 Light Brown
 CONSISTENCY: Firm to extremely firm
 STRUCTURE: Structureless - massive
 CARBONATES: Yes
 ROCKS: None noted
 ROOTS/FOSSILS: None noted

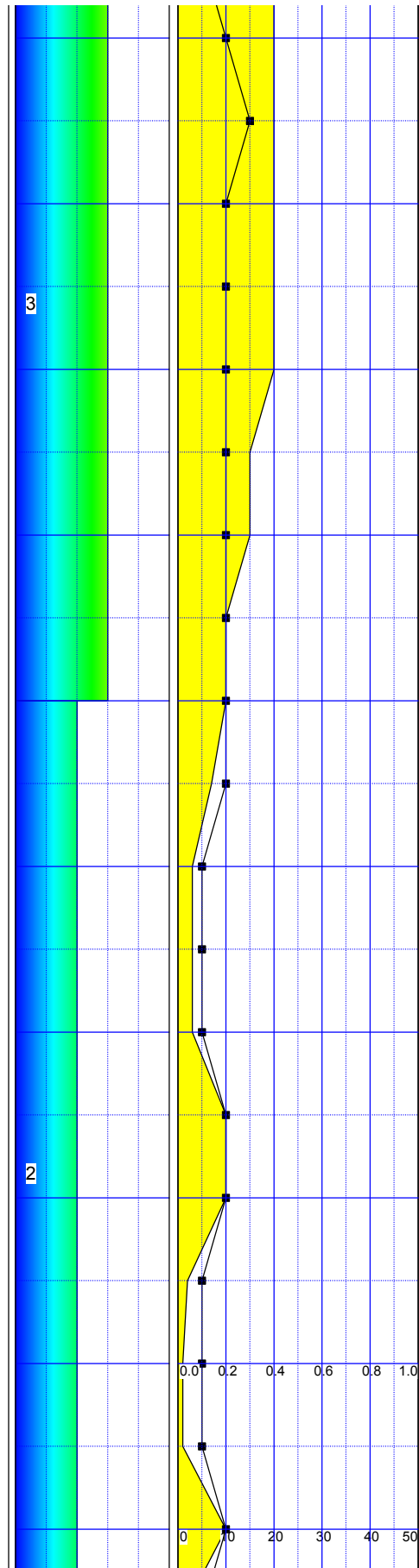
SILT AND CLAY:
 TEXTURE: Sands with fines*, USCS
 Classification Silty Sand SM, fine grained, poorly sorted, subangular
 COLOR: 10YR 8/2 Very Pale Orange
 CONSISTENCY: Firm to extremely firm
 STRUCTURE: Structureless - massive
 CARBONATES: Yes
 ROCKS: Basalt clasts 3 mm up to 3 cm in diameter noted
 ROOTS/FOSSILS: None noted
 *Much more silt than sand

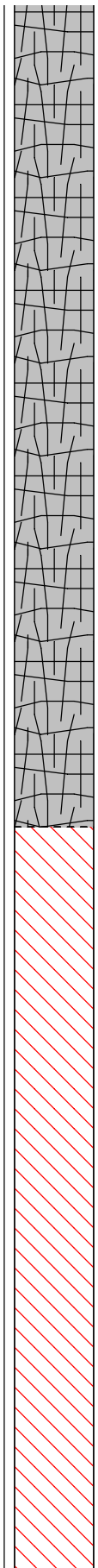
BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Phaneritic, vesicular, diktytaxitic basalt; vesicular from 511.2 feet to 517.2 feet and from 518.6 feet to 519.3 feet,



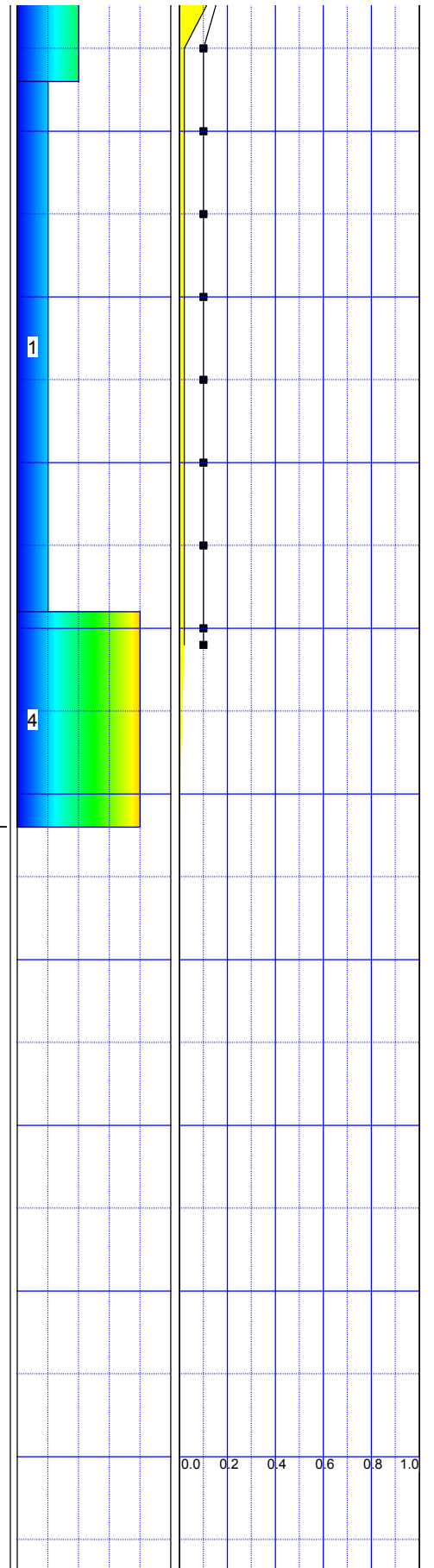


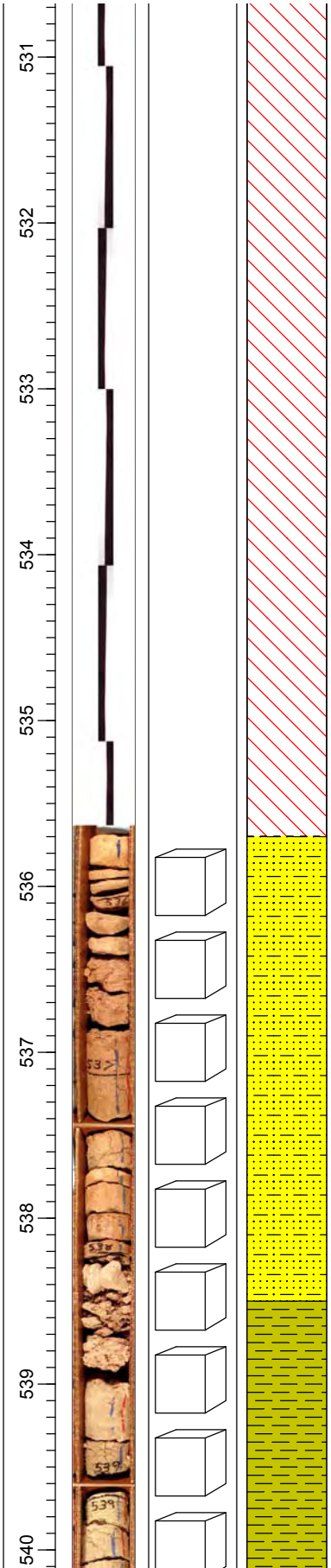
diktytaxitic from 517.2 feet to 518.6 feet and from 519.3 feet to 526.2 feet, rare vesicle planes, rare large vesicles, vesicle sheet at 516.6 feet
 COMPOSITION: 40% plagioclase, 25% olivine, 35% groundmass; tabular lathy submillimeter to rare 2 mm plagioclase phenocrysts, submillimeter to 1 mm anhedral to subhedral olivine microcrysts and glomerocrysts
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: 10YR 8/2 Very Pale Orange mud in some vesicles, calcite deposits in few vesicles





MISSING INTERVAL:
Missing interval not recovered

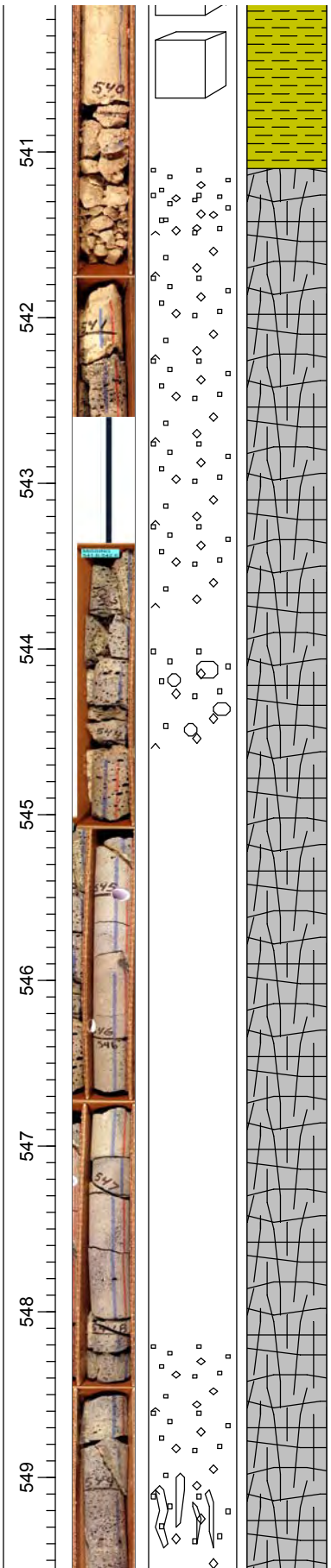




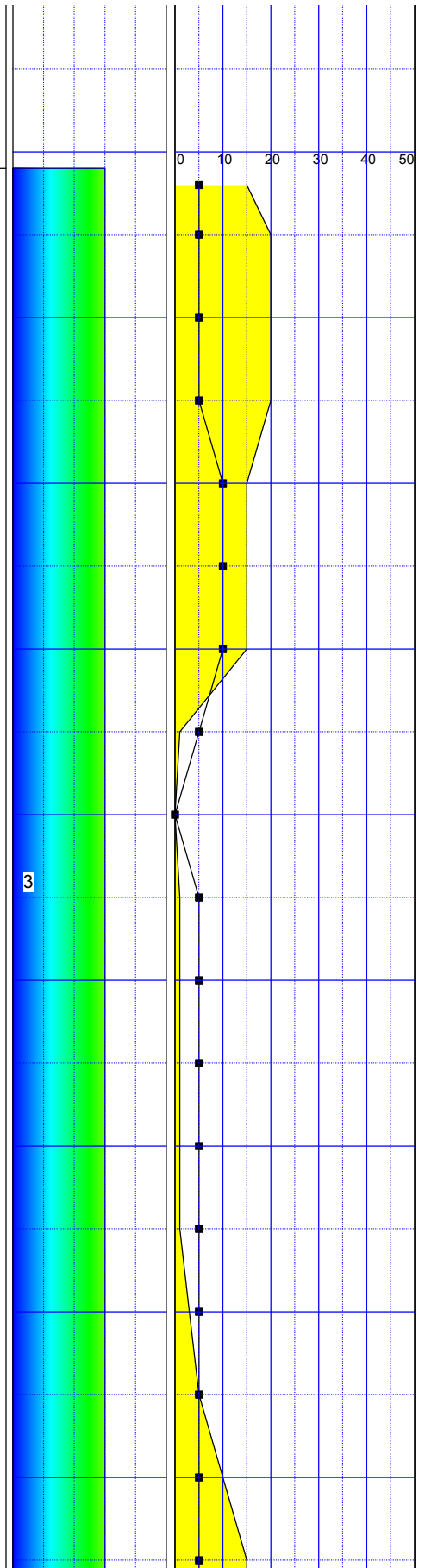
SANDS WITH FINES:
 TEXTURE: Sand with fines, USCS
 Classification Silty Sand SM, fine grained,
 moderately sorted, subangular
 COLOR: 10YR 7/4 Grayish Orange grading to
 5YR 6/4 Light Brown grading to 10YR 8/2 Very
 Pale Orange
 CONSISTENCY: Extremely firm
 CARBONATES: High reactivity to HCl
 ROCKS: None noted
 ROOTS/FOSSILS: None noted

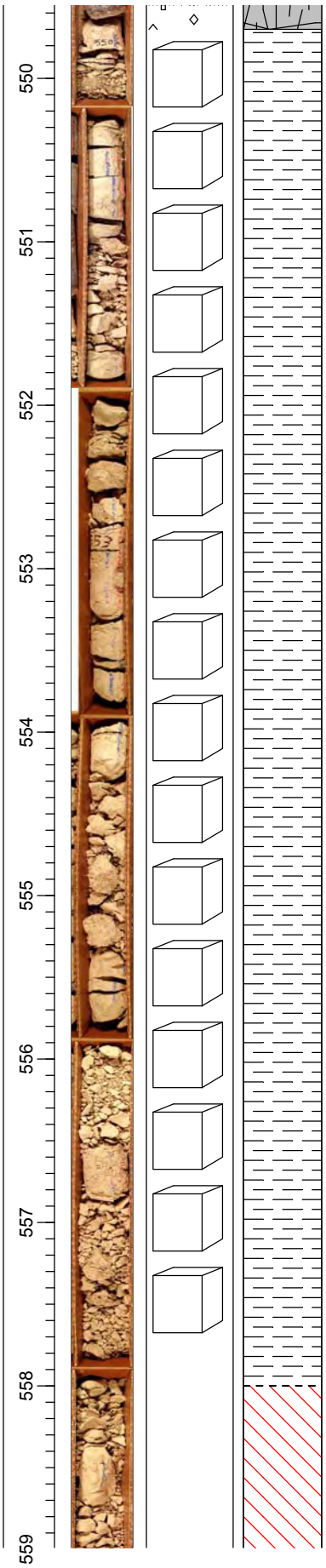
SILT AND CLAY:
 TEXTURE: Silt and Clay, USCS Classification
 Silt ML, poorly sorted
 COLOR: 10YR 7/4 Grayish Orange grading to
 10YR 8/2 Very Pale Orange
 CONSISTENCY: Extremely firm
 CARBONATES: High reactivity to HCl
 ROCKS: Basalt clasts ranging in size from 3
 mm to 4 cm
 ROOTS/FOSSILS: None noted

					0	10	20	30	40	50
					0.0	0.2	0.4	0.6	0.8	1.0

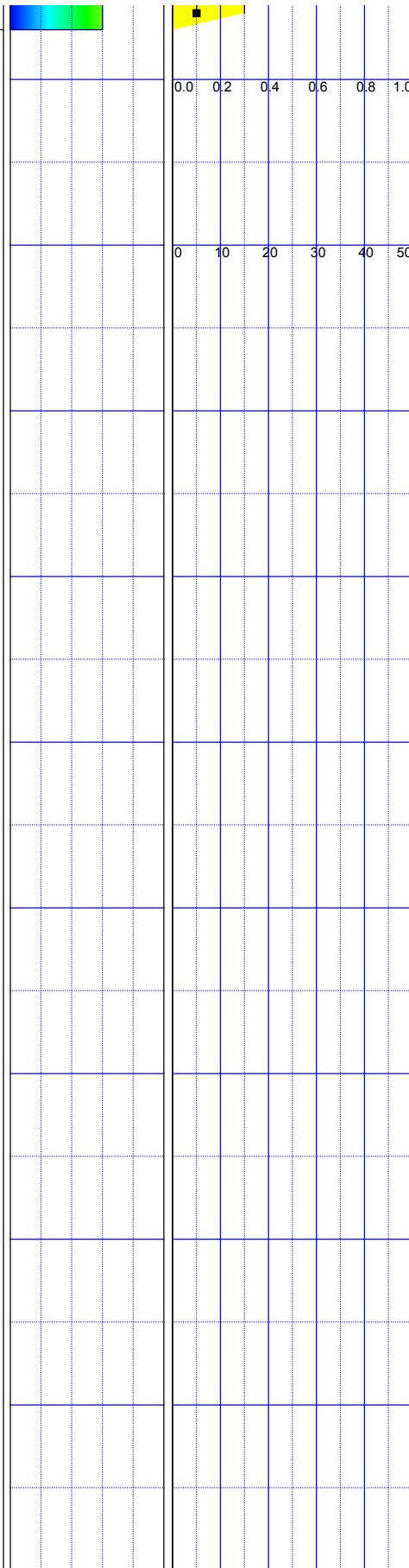


BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Aphanitic, vesicular, diktytaxitic basalt; vesicular from 541.1 feet to 544.6 feet and from 548.2 feet to 549.7 feet, diktytaxitic from 544.6 feet to 548.2 feet, rare large vesicles, pipe vesicles at the base, subophitic if groundmass is pyroxene
 COMPOSITION: 30% plagioclase, 20% olivine, 50% groundmass; tabular submillimeter plagioclase phenocrysts, submillimeter subhedral olivine microcrysts and rare olivine glomerocrysts up to 1 mm
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: 10YR 8/2 Very Pale Orange calcitic mud on fracture surfaces and in some vesicles, calcite filling some vesicles at base

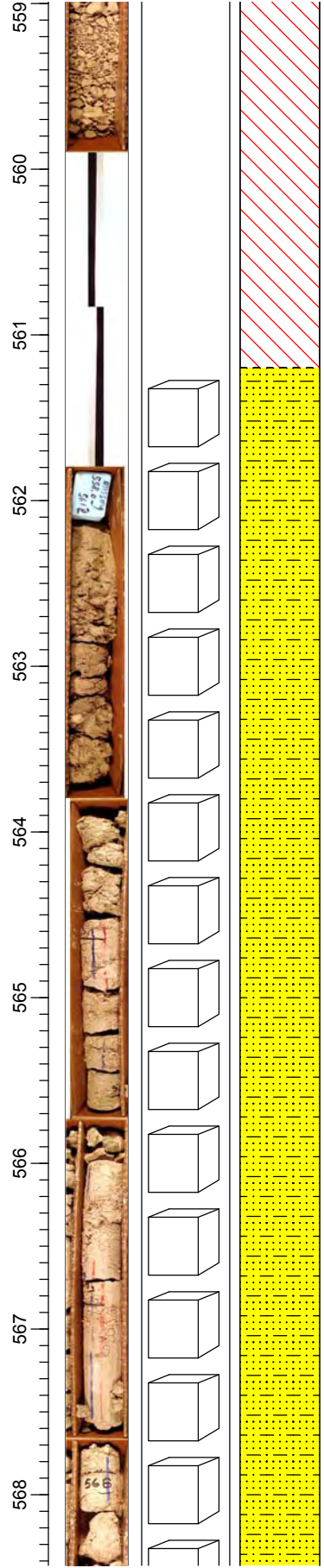




CLAY:
 TEXTURE: Silt and Clay, USCS Classification
 Clay CL, moderately sorted
 COLOR: 10YR 7/4 Grayish Orange grading to
 10YR 8/2 Very Pale Orange
 CONSISTENCY: Extremely firm
 CARBONATES: High reactivity to HCl
 ROCKS: None noted
 ROOTS/FOSSILS: None noted

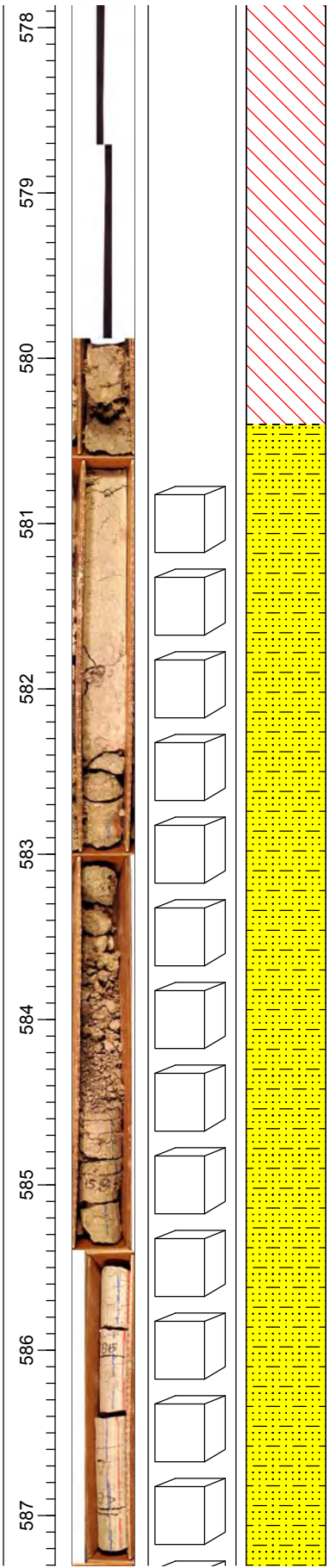


MISSING INTERVAL:
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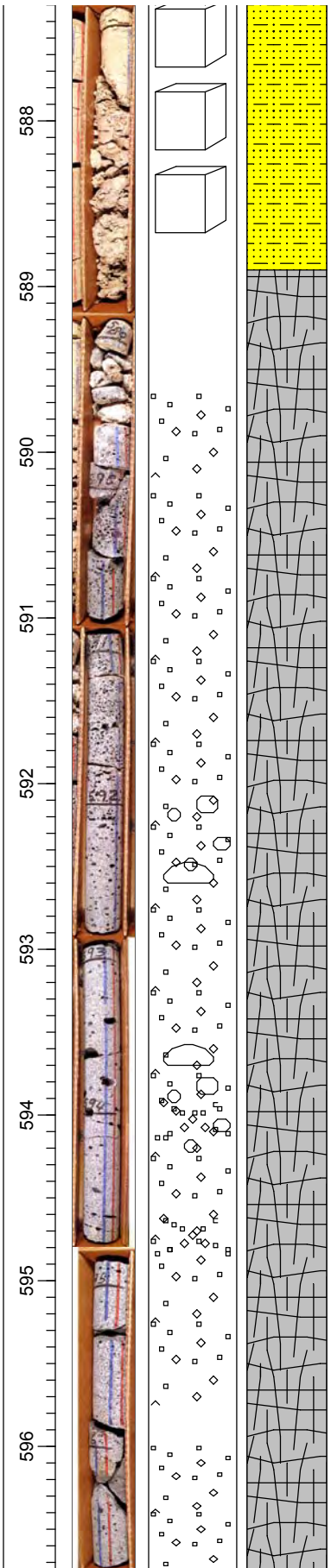
SANDS WITH FINES:
TEXTURE: Sand with fines, USCS
Classification Silty Sand SM, fine grained, moderately sorted, subangular
COLOR: 10YR 7/4 Grayish Orange grading to 10YR 8/2 Very Pale Orange
CONSISTENCY: Friable
CARBONATES: High reactivity to HCl
ROCKS: None noted
ROOTS/FOSSILS: None noted

Depth (ft)	Grain Size Distribution (%)				
	> 75µm	47.5 - 75µm	25 - 47.5µm	7.5 - 25µm	< 7.5µm
559					
560	0.0	0.2	0.4	0.6	0.8
561	0	10	20	30	40
562					
563					
564					
565					
566					
567					
568					

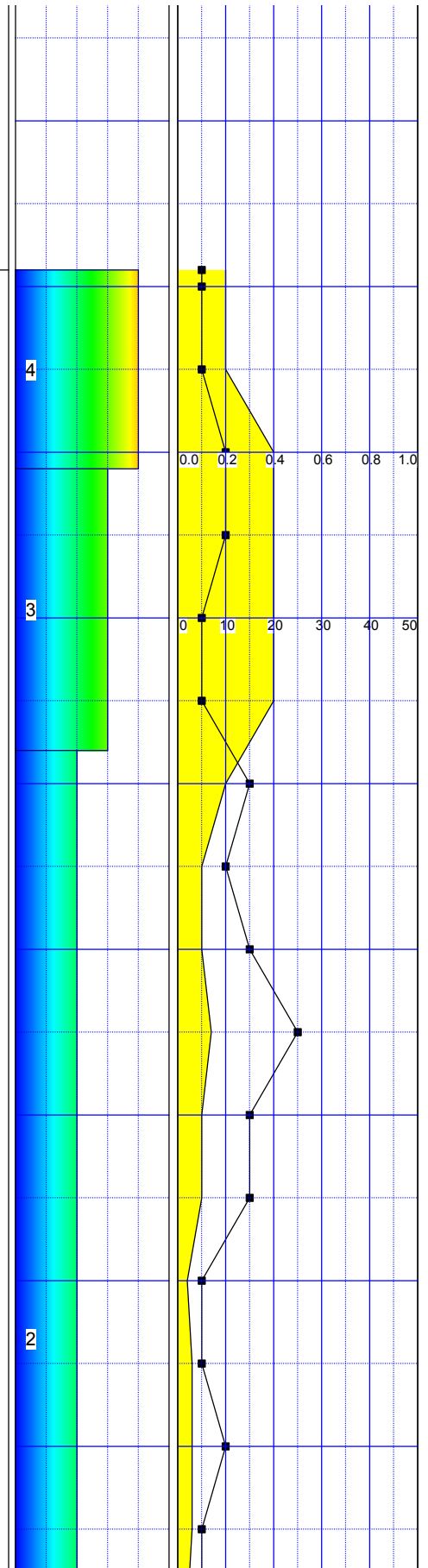


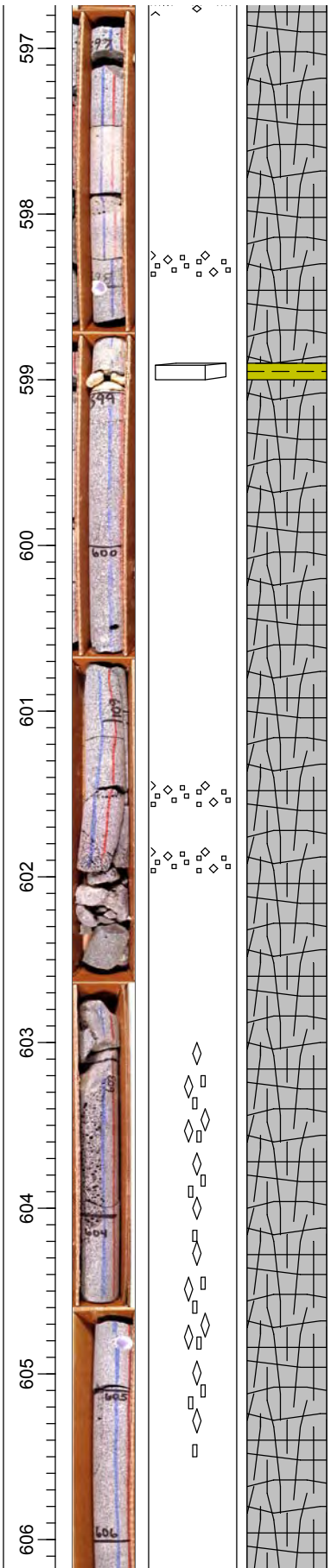
SANDS WITH FINES:
 TEXTURE: Sand with fines, USCS
 Classification Silty Sand SM, fine grained,
 moderately sorted, subangular
 COLOR: 10YR 7/4 Grayish Orange grading to
 10YR 8/2 Very Pale Orange
 CONSISTENCY: Friable
 CARBONATES: High reactivity to HCl
 ROCKS: None noted
 ROOTS/FOSSILS: None noted

Elevation	Soil Properties					
	0.0	0.2	0.4	0.6	0.8	1.0
578						
579						
580						
581						
582						
583						
584						
585						
586						
587						



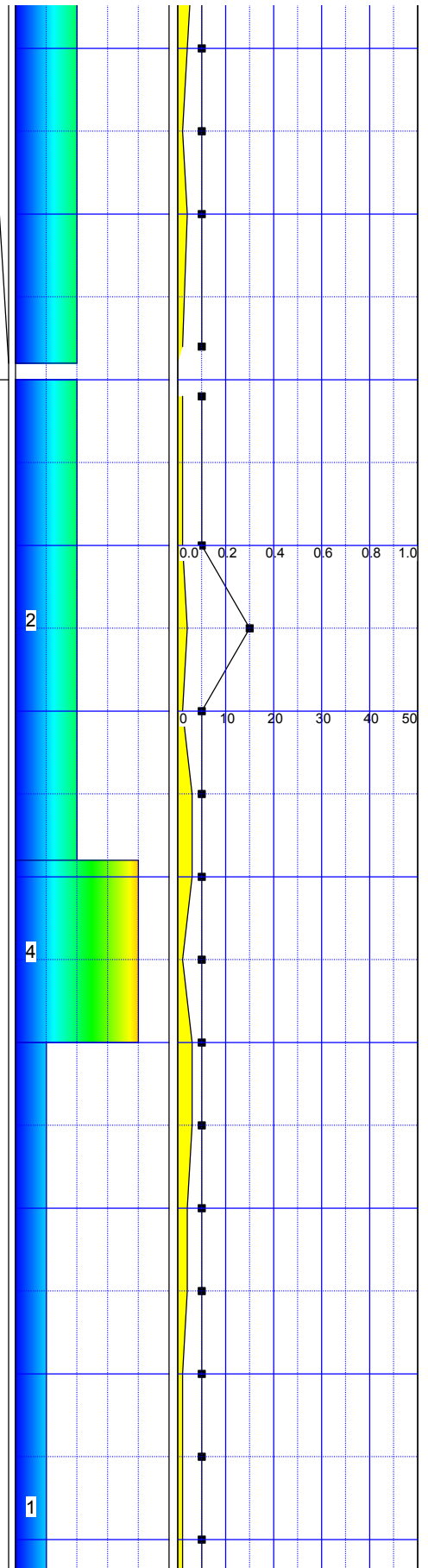
BASALT:
COLOR: N4 Medium Dark Gray
TEXTURE: Aphanitic, vesicular, diktytaxitic; vesicular from 588.9 feet to 596.8 feet with areas of diktytaxitic texture, diktytaxitic from 596.8 feet to 598.9 feet, few large vesicles and megavesicles, vesicle planes common in lower half of vesicle zone, vesicle sheet present at 598.3 feet
COMPOSITION: 55% plagioclase, 25% olivine, 20% groundmass; tabular lathy submillimeter plagioclase phenocrysts, submillimeter anhedral to subhedral olivine microcrysts, rare discernable pyroxenes
XENOLITHS/AUTOLITHS: None noted
ALTERATION: Very slight alteration of olivine to iddingsite, 10YR 8/2 Very Pale Orange calcitic mud in vesicles and on fracture surfaces near bounding sediment layers

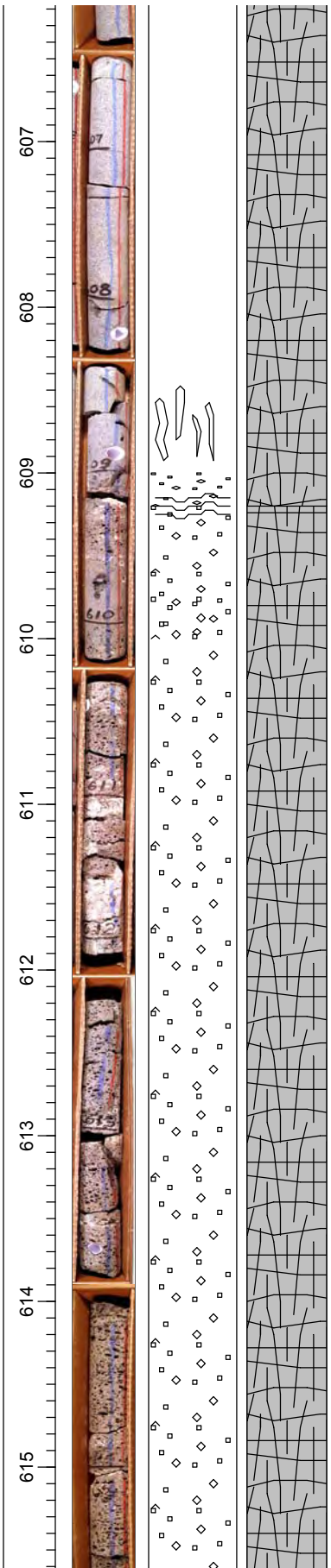




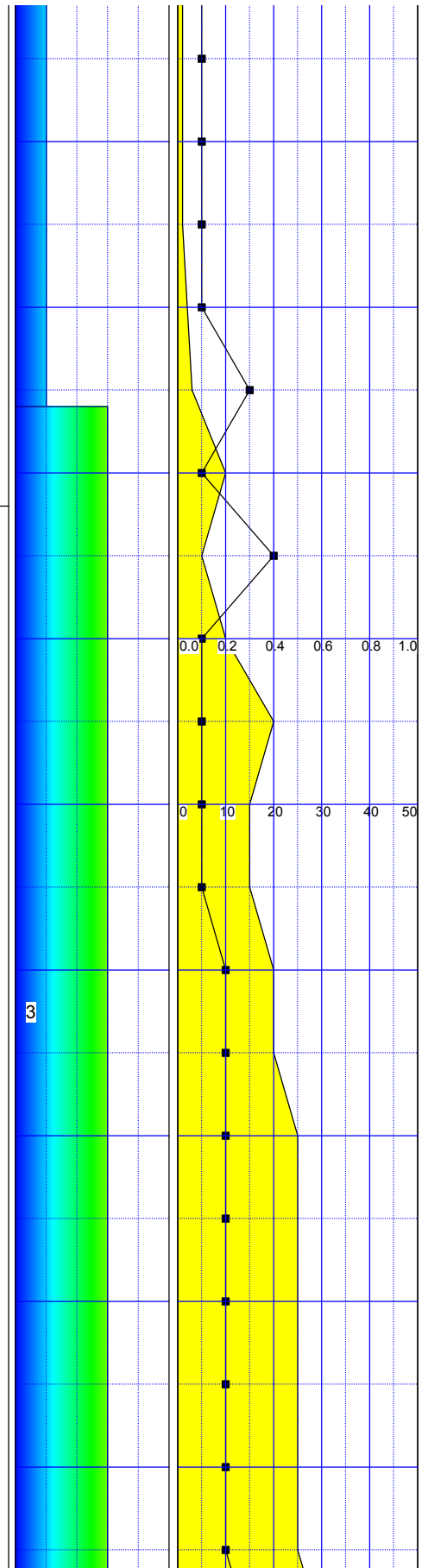
SILT AND CLAY:
 TEXTURE: Silt and Clay, USCS Classification Silt ML, poorly sorted
 COLOR: 10YR 7/4 Grayish Orange
 CONSISTENCY: Firm
 CARBONATES: High reactivity to HCl
 ROCKS: Basalt clasts ranging in size from 1 to 2 mm
 ROOTS/FOSSILS: None noted

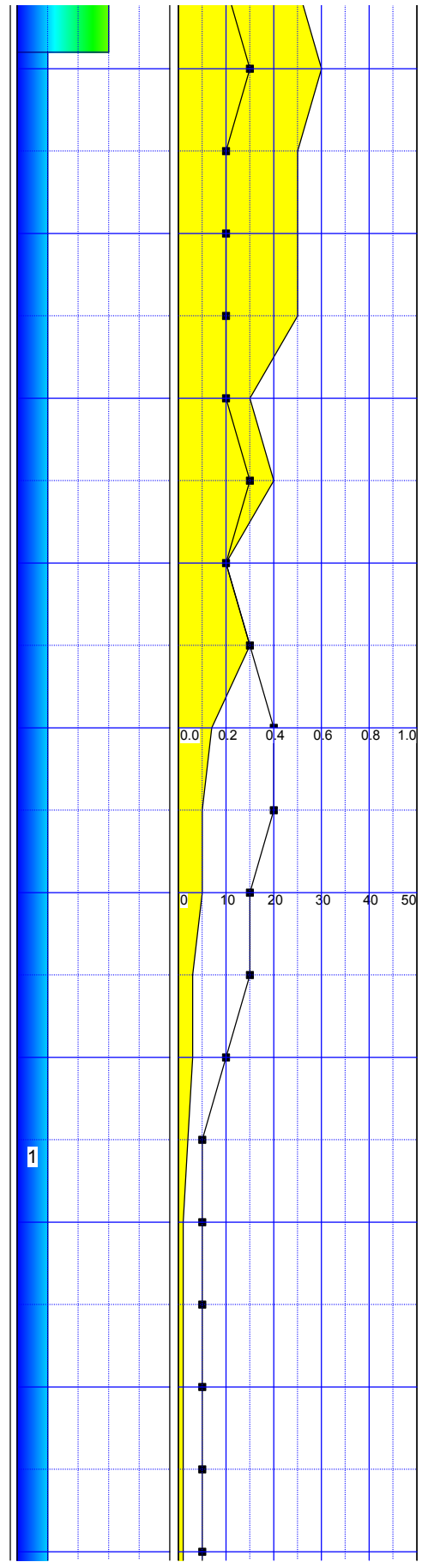
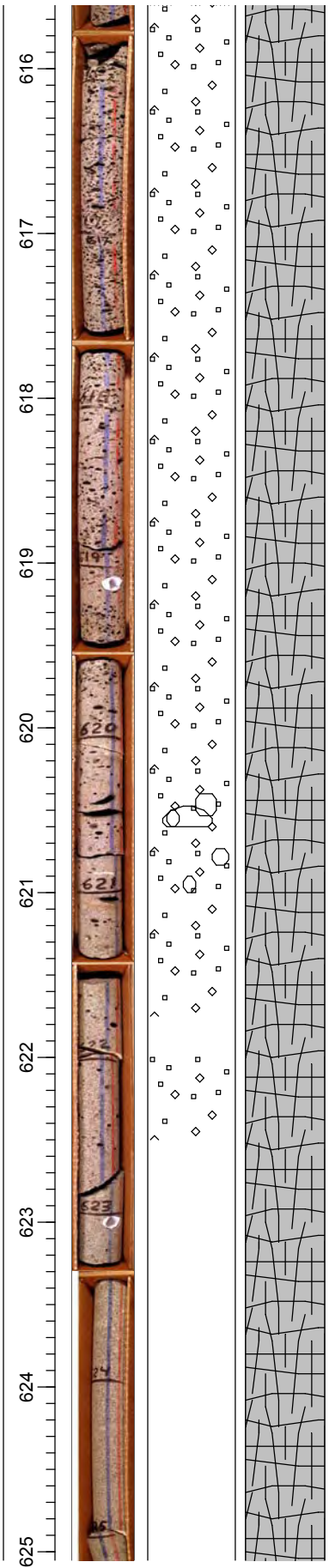
BASALT:
 COLOR: N4 Medium Dark Gray
 TEXTURE: Mostly aphanitic, diktytaxitic, slightly vesicular basalt; diktytaxitic throughout, vesicular from 609.0 to 609.2 and where vesicle sheets and columns and pipe vesicles occur, vesicle sheets at 601.5 feet and 601.9 feet, vesicle column from 603.0 feet to 605.5 feet, pipe vesicles at base, rare large vesicles
 COMPOSITION: 55% plagioclase, 25% olivine, 20% groundmass; tabular lathy submillimeter plagioclase phenocrysts, submillimeter subhedral olivine microcrysts and few olivine glomerocrysts up to 1 mm
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: 10YR 7/4 Grayish Calcitic mud on fracture surfaces, rare sparry calcite in large vesicles, 5R 3/4 Dusky Red flow and mold structure at base

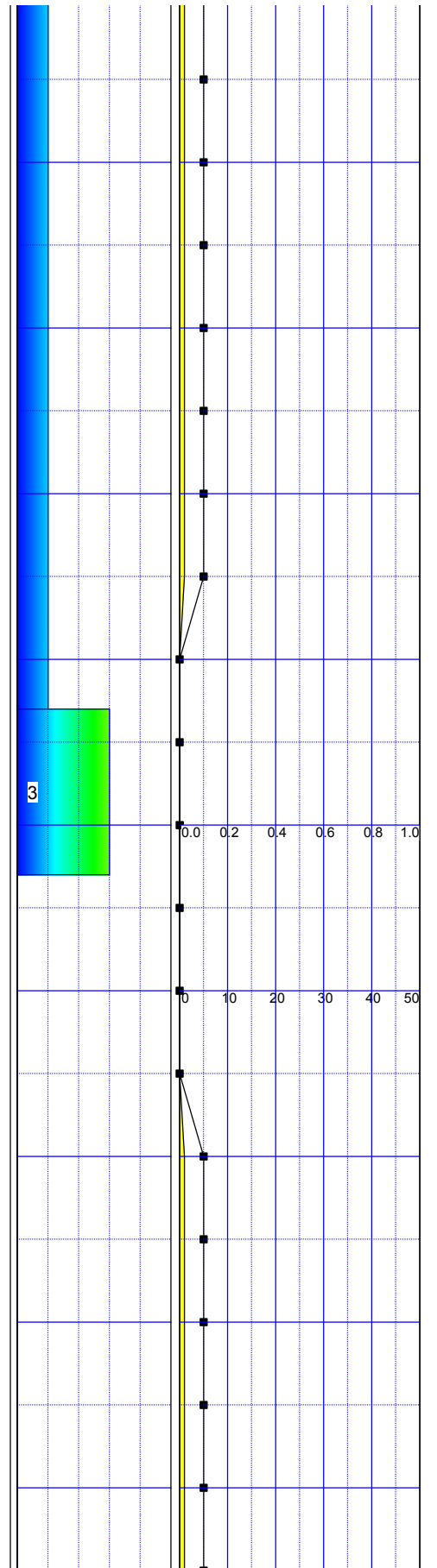
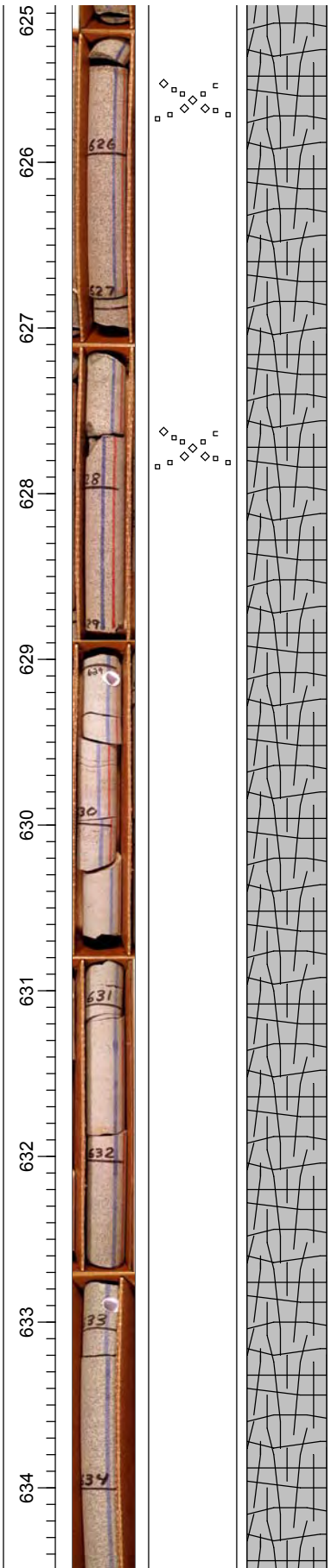


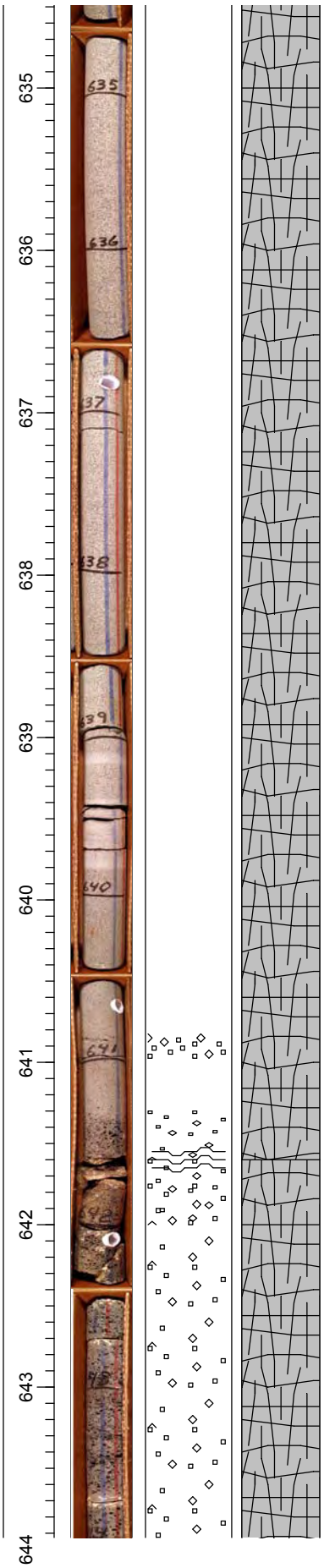


BASALT:
 COLOR: 5RP 4/2 Grayish Red Purple grading to N4 Medium Dark Gray
 TEXTURE: Slightly phaneritic, vesicular, diktytaxitic, massive basalt; vesicular from 609.2 feet to 622.5 feet and from 641.3 feet to 641.6 feet, diktytaxitic from 622.5 feet to 629.0 feet and from 632.0 feet to 641.3 feet, massive from 629.0 feet to 632.0 feet, rare large vesicles and megavesicles, vesicle sheet at 640.9 feet, rare vesicle planes
 COMPOSITION: 60% plagioclase, 30% olivine, 10% groundmass; tabular lathy plagioclase phenocrysts up to 1 mm in length, submillimeter anhedral to subhedral olivine microcrysts
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to iddingsite, calcite noted in some vesicles around fractures, rare sparry calcite noted in large vesicles, 5R 3/4 Dusky Red flow and mold structure at base

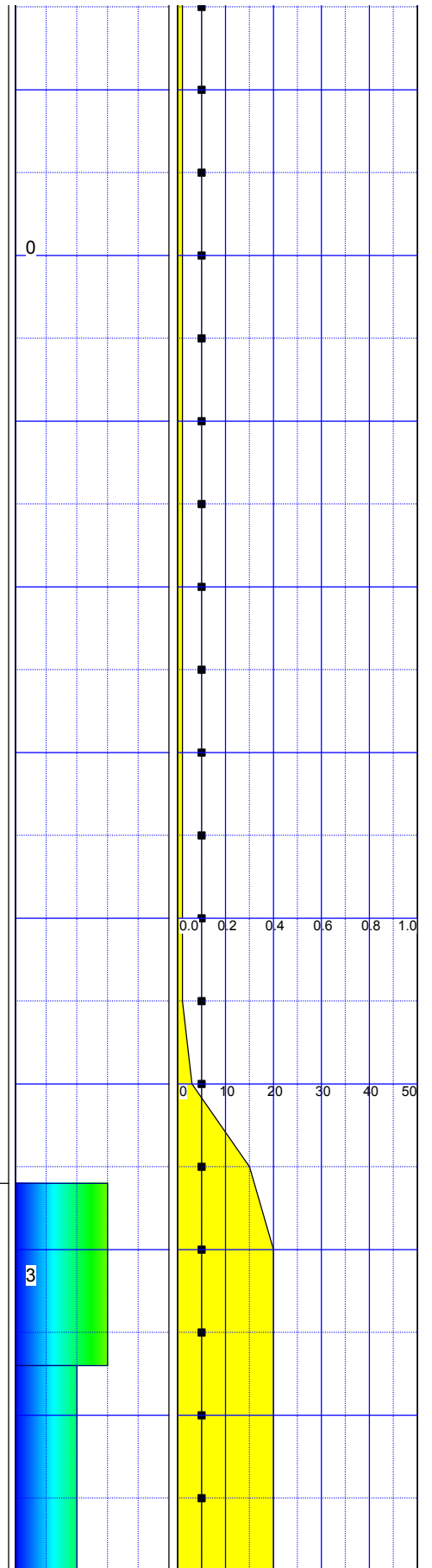


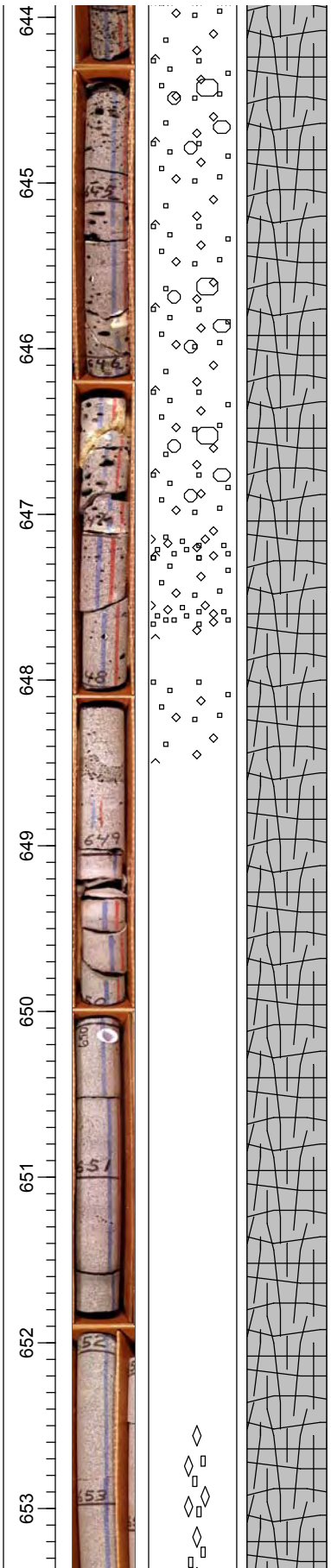




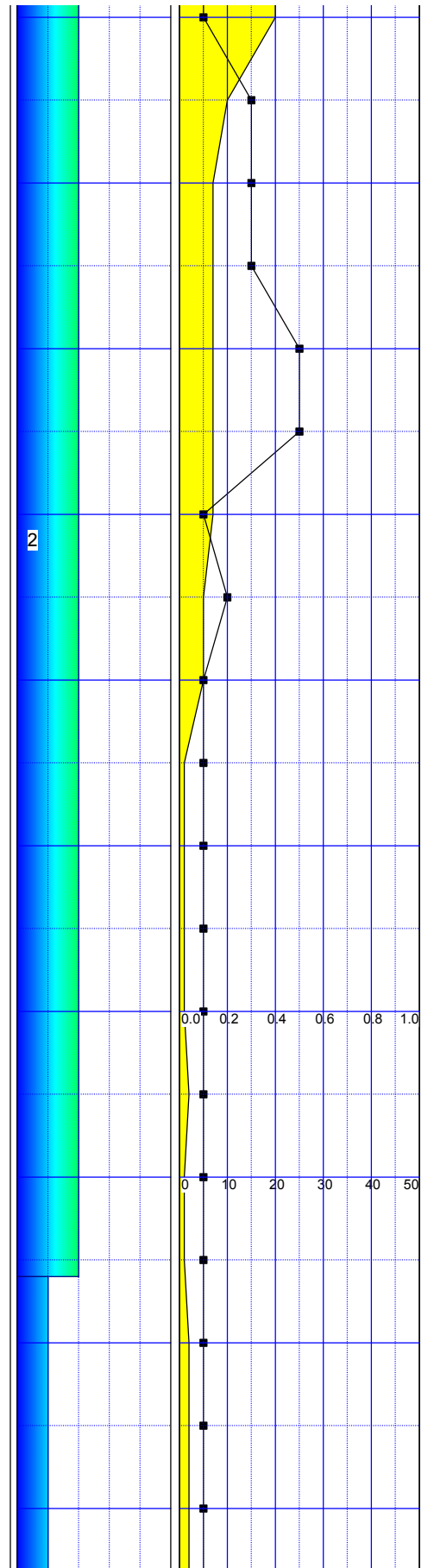


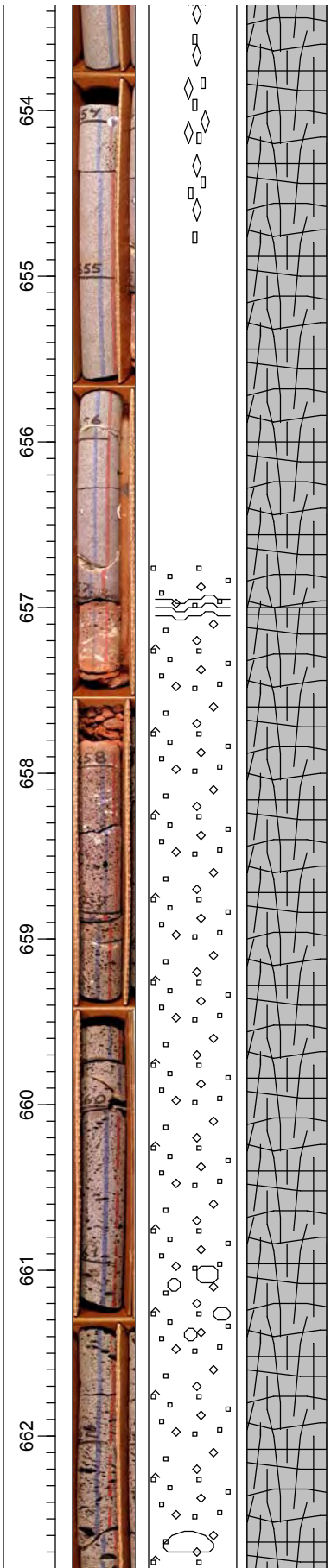
BASALT:
 COLOR: N5 Medium Gray
 TEXTURE: Aphanitic, vesicular, diktytaxitic basalt; vesicular 641.6 feet to 648.5 feet and from 656.9 feet to 657.0 feet, diktytaxitic from 648.5 feet to 656.9 feet, vesicle sheets just above diktytaxitic section, vesicle column present from 652.5 feet to 654.8 feet, large vesicles present at lower end of upper vesicular zone, pipe vesicles at base
 COMPOSITION: 50% plagioclase, 30% olivine, 20% groundmass; tabular lathy submillimeter plagioclase phenocrysts, subhedral submillimeter olivine microcrysts
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Very slight alteration of olivine to iddingsite, calcite and sparry calcite located in some larger vesicles, 10YR 8/2 Very Pale Orange calcitic mud located on fracture surfaces and in few



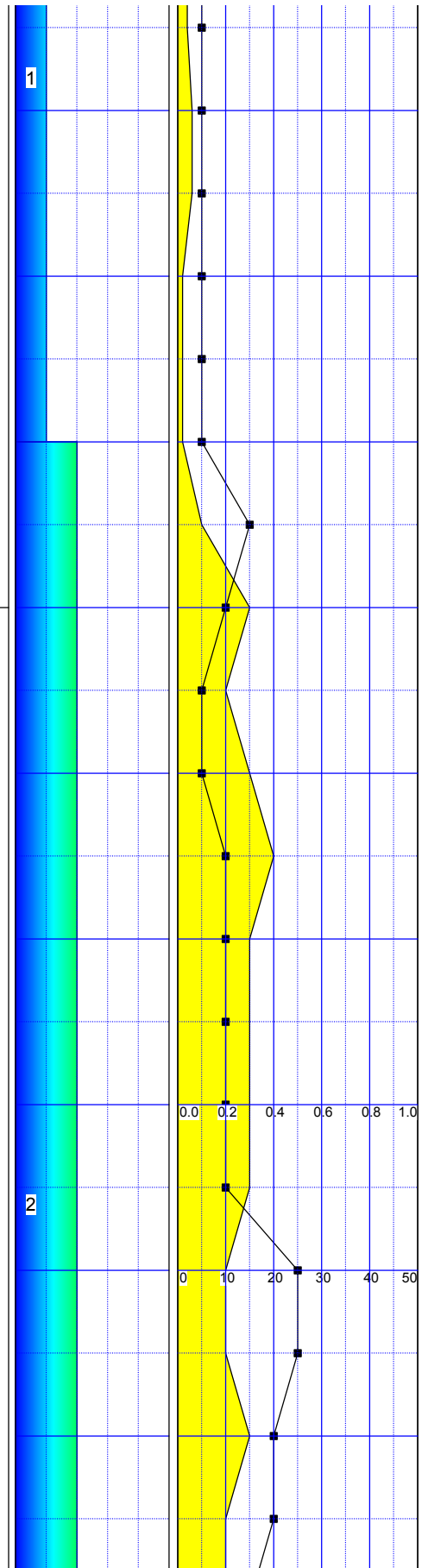


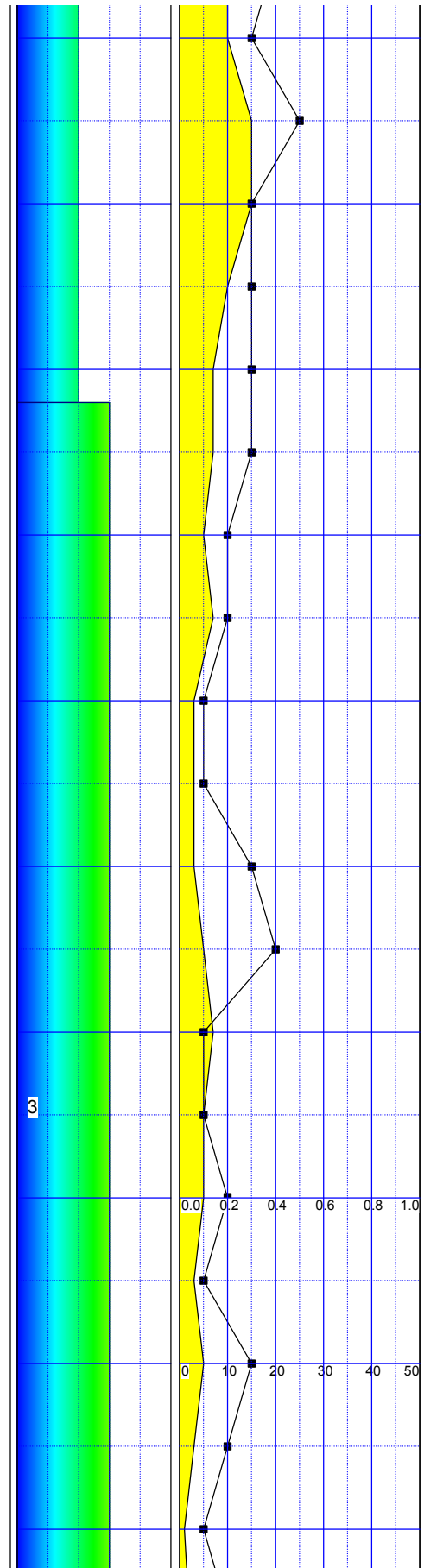
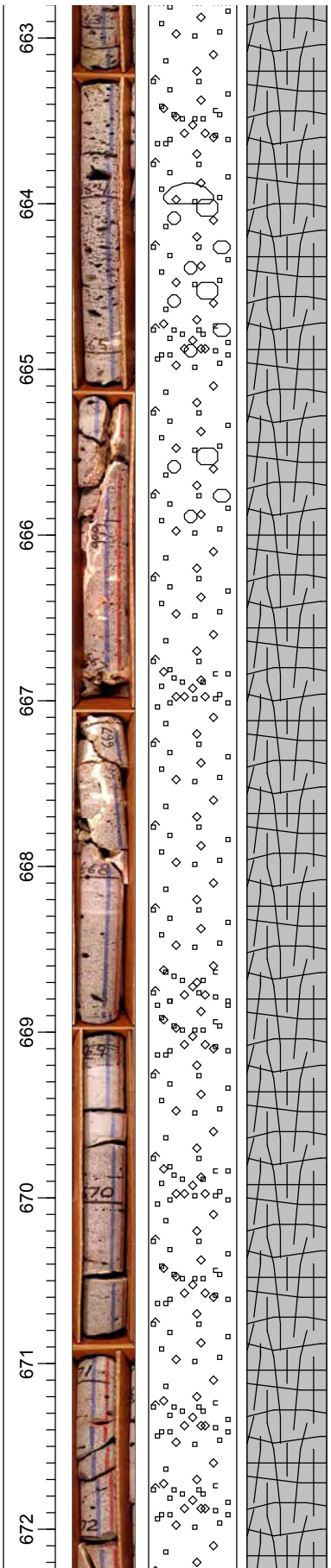
vesicles

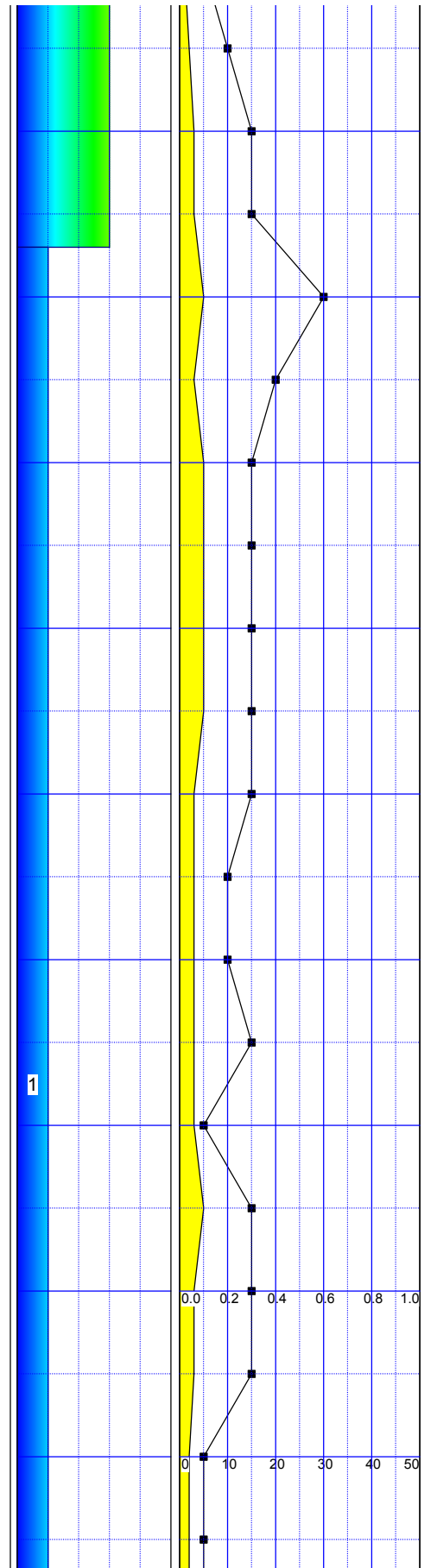
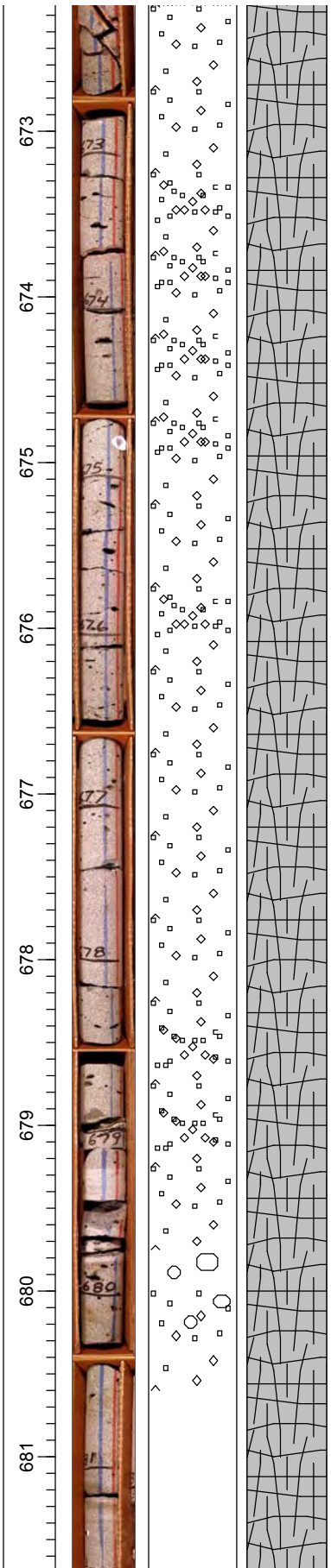


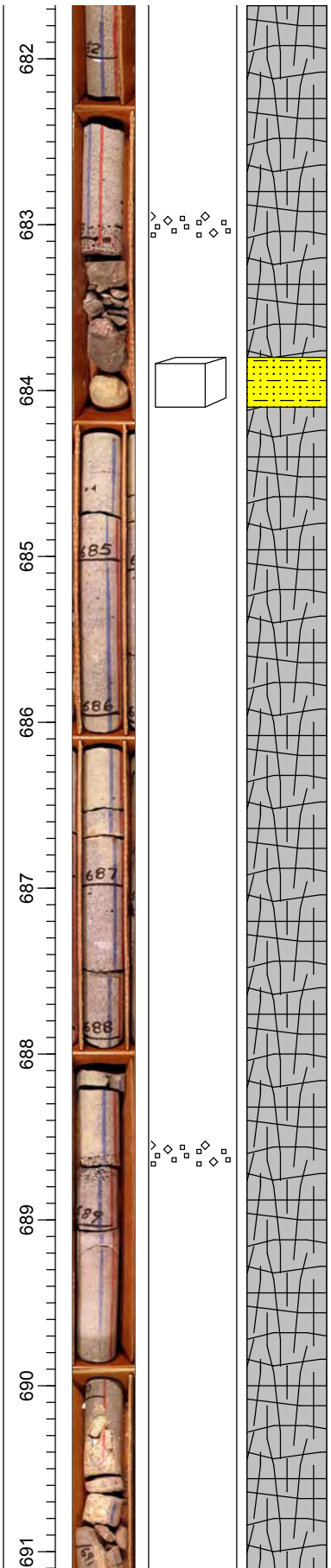


BASALT:
 COLOR: 5R 2/2 Blackish Red grading to N5 Medium Gray
 TEXTURE: Aphanitic, vesicular, diktytaxitic basalt; vesicular from 657.0 feet to 680.6 feet, diktytaxitic from 680.6 feet to 683.8 feet, few megavesicles and numerous large vesicles throughout vesicular zone, few vesicle sheets present in vesicular zone, vesicle planes common in vesicular zone
 COMPOSITION: 55% plagioclase, 30% olivine, 15% groundmass; tabular lathy submillimeter plagioclase phenocrysts, submillimeter anhedral to subhedral olivine microcrysts, some rare pyroxenes present
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to iddingsite, 10YR 8/2 Very Pale Orange and 10YR 7/4 Grayish Orange calcite-cemented mud containing sand grains filling many fractures and on fracture surfaces, 10R 4/6 Moderate Reddish Brown silt and mud in vesicles and fractures in upper part of section



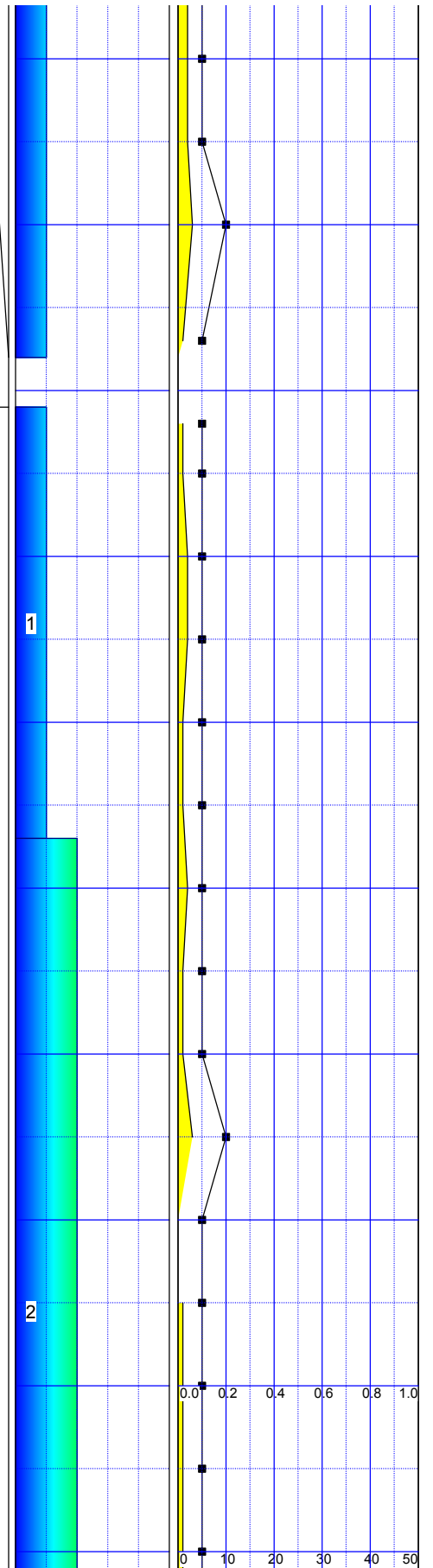


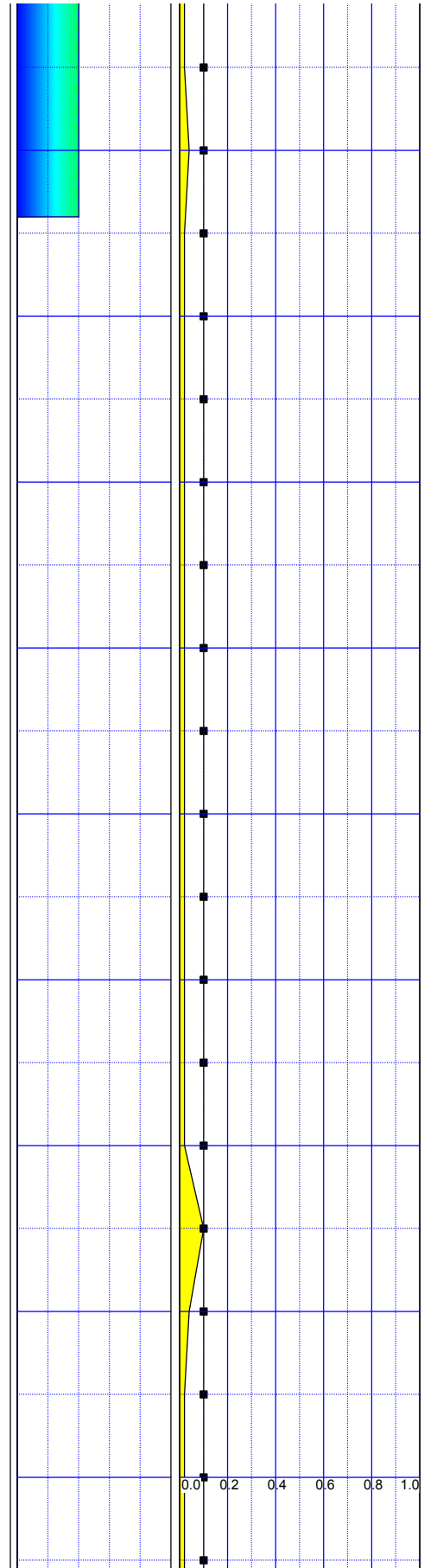
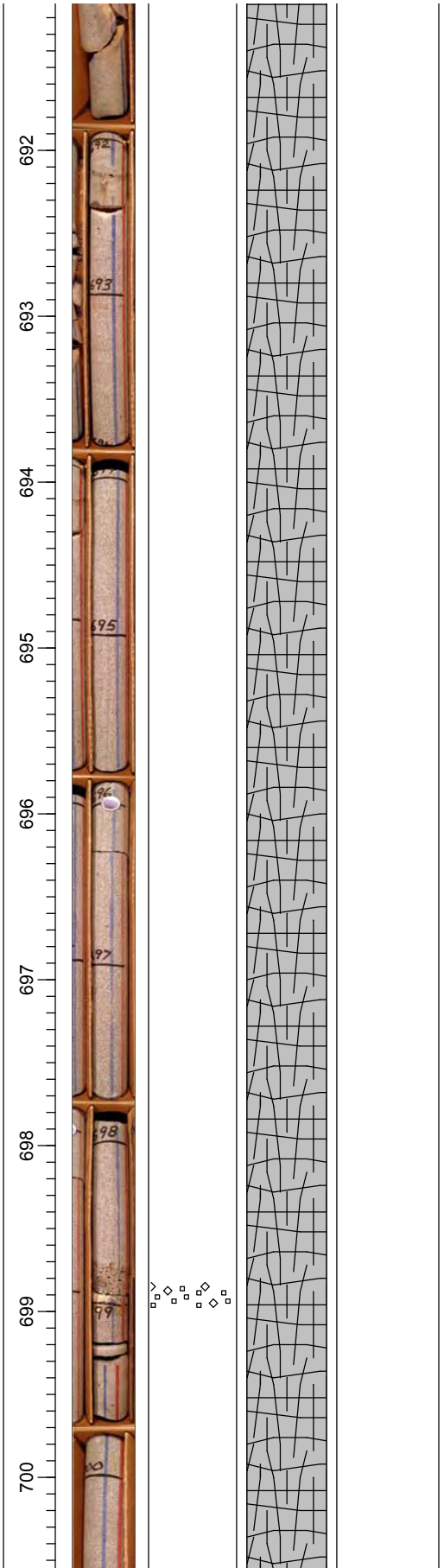


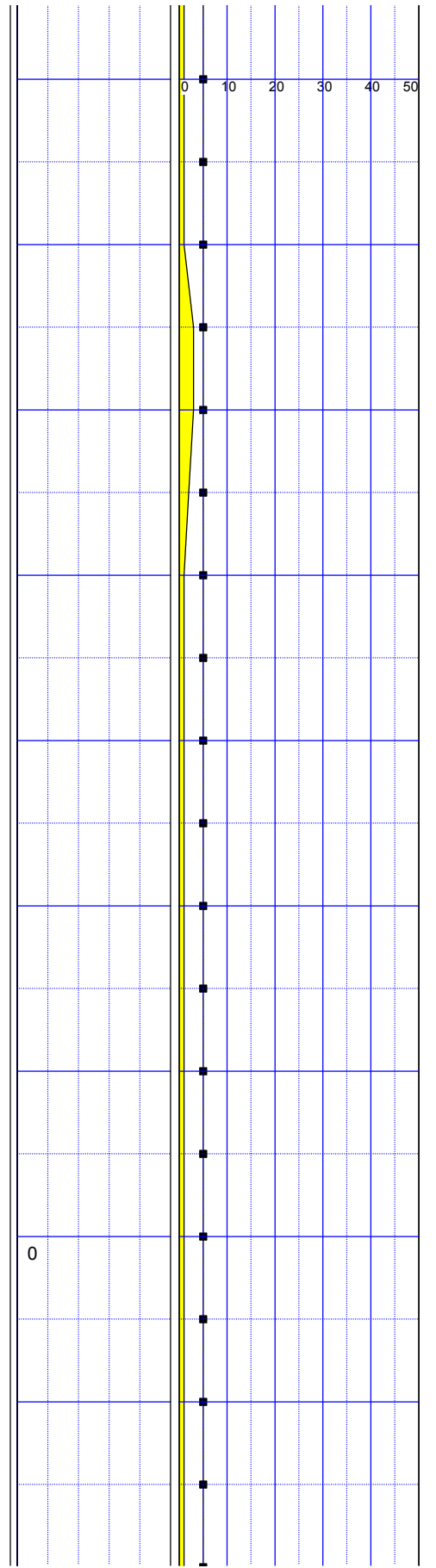
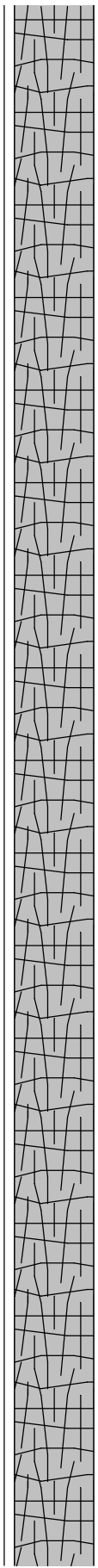


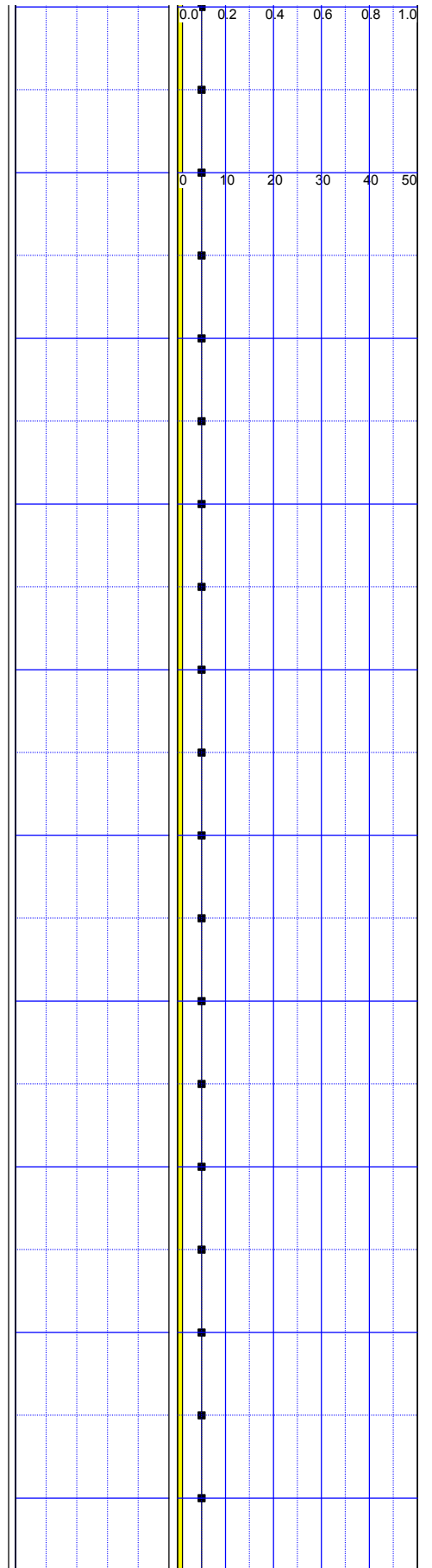
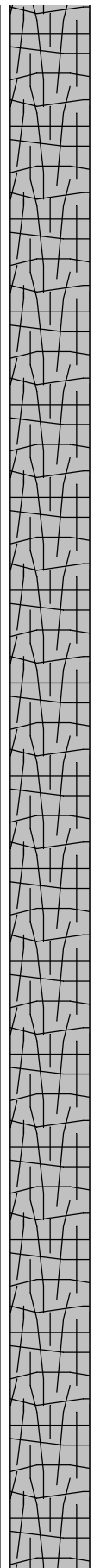
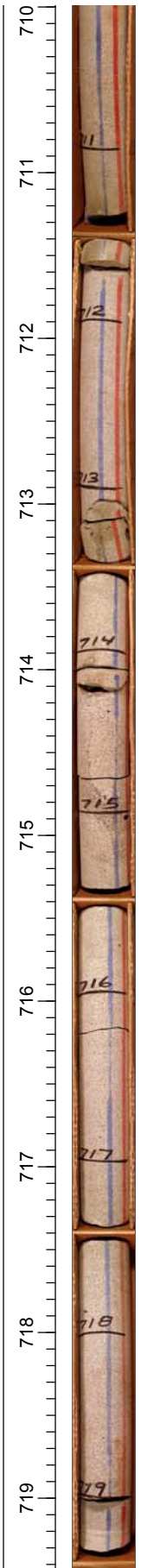
SANDS WITH FINES:
 TEXTURE: Sands with Fines, USCS
 Classification Silty Sand SM, fine grained,
 moderately sorted, subrounded
 COLOR: 10YR 7/4 Grayish Orange to 10YR 8/2
 Very Pale Orange
 CONSISTENCY: Extremely firm, cemented
 CARBONATES: High reactivity to HCl
 ROCKS: None noted
 ROOTS/FOSSILS: None noted

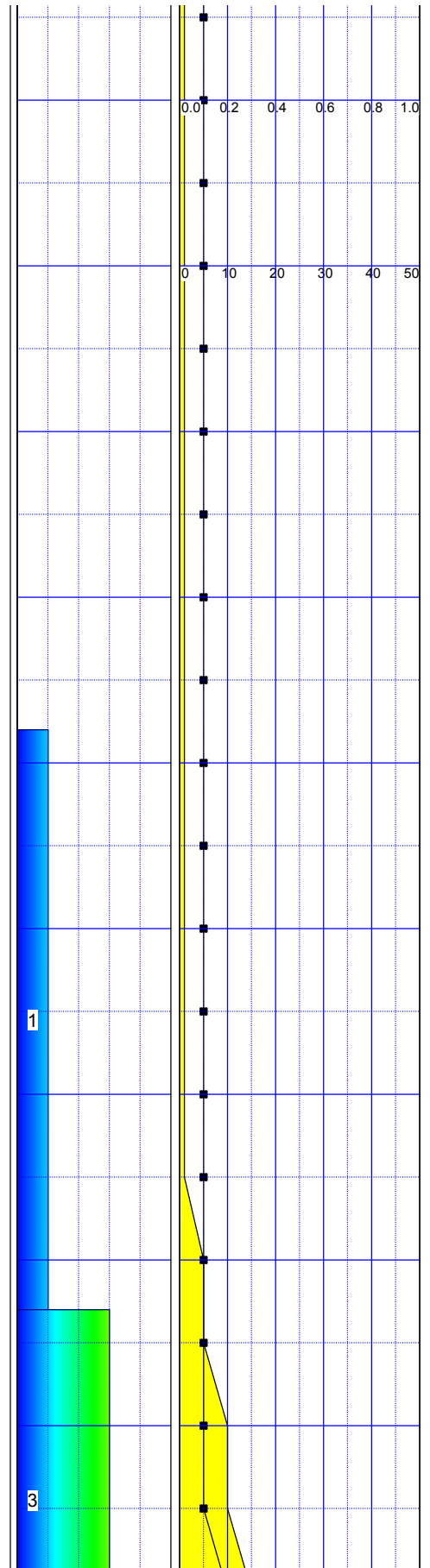
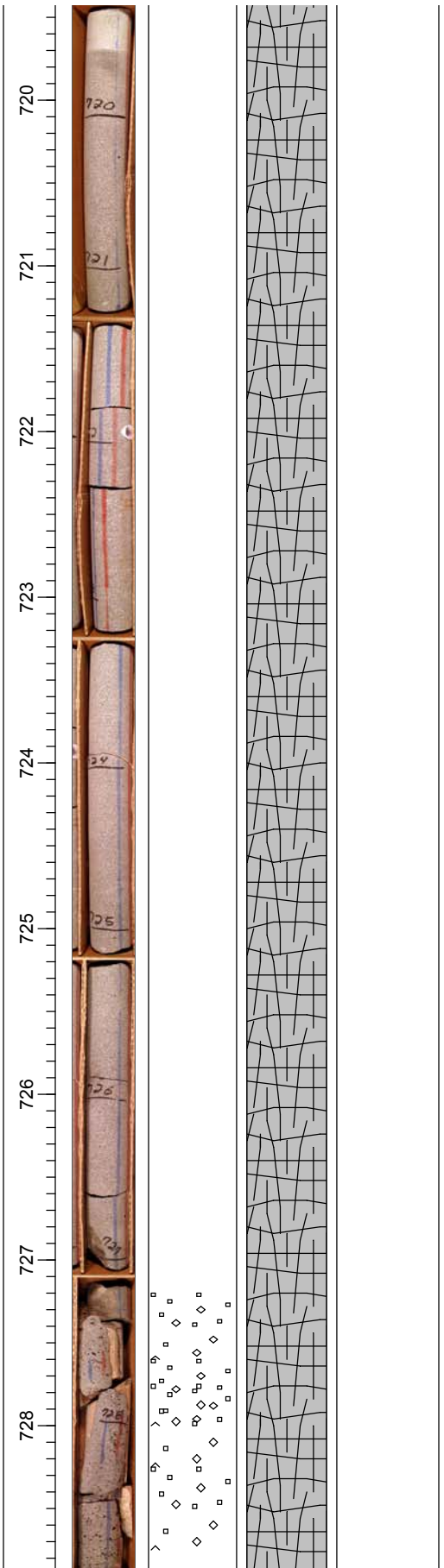
BASALT:
 COLOR: N5 Medium Gray
 TEXTURE: Aphanitic, vesicular, diktytaxitic
 basalt; vesicular from 727.2 feet to 730.2
 feet, diktytaxitic from 684.1 feet to 727.2
 feet, few vesicle sheets present in
 diktytaxitic region
 COMPOSITION: 55% plagioclase, 30% olivine,
 15% groundmass; tabular lathy submillimeter
 plagioclase phenocrysts, submillimeter
 anhedral to subhedral olivine microcrysts,
 some rare pyroxenes present
 XENOLITHS/AUTOLITHS: None noted
 ALTERATION: Slight alteration of olivine to
 iddingsite, 10YR 8/2 Very Pale Orange and
 10YR 7/4 Grayish Orange calcite-cemented mud
 containing sand grains filling many
 fractures and on fracture surfaces

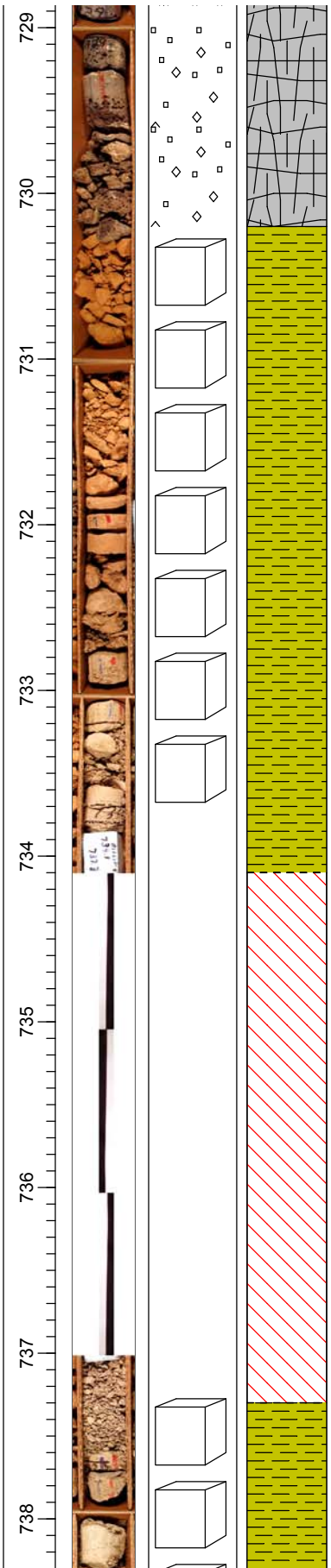








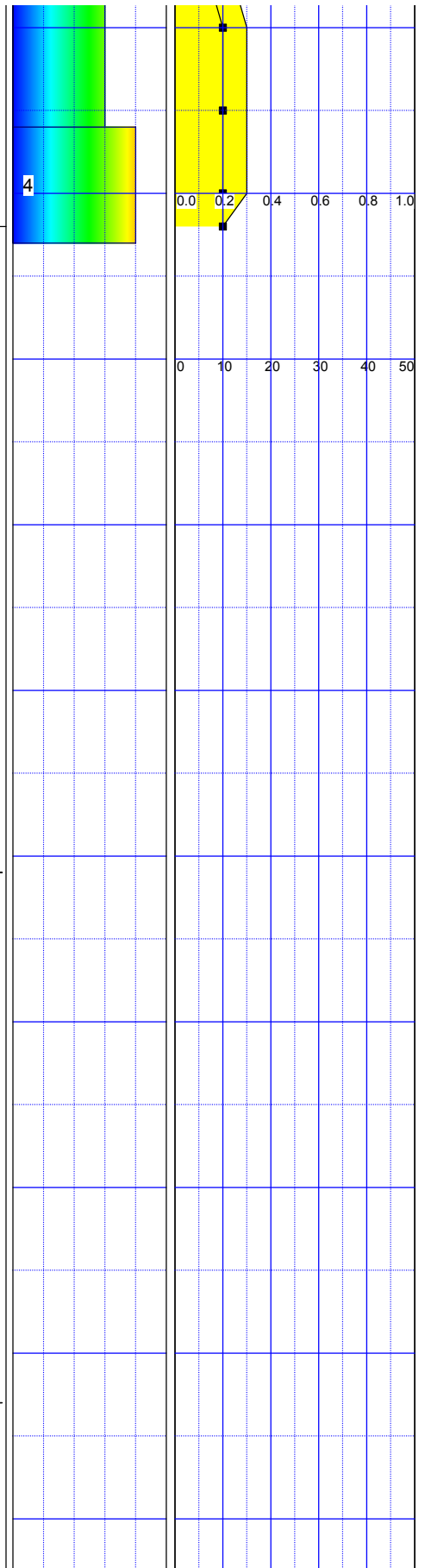


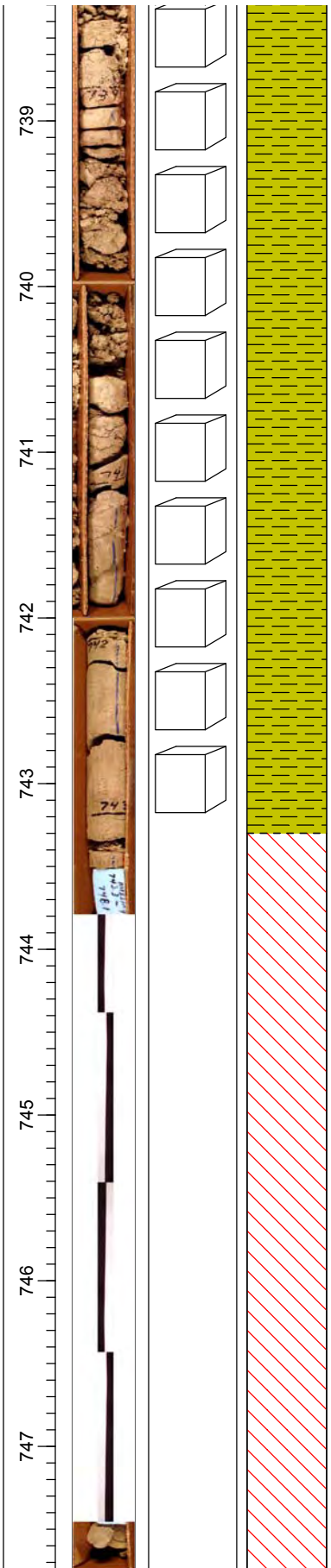


SILT AND CLAY:
 TEXTURE: Silt and Clay, USCS Classification
 Silt ML, poorly sorted
 COLOR: 5YR 6/4 Light Brown grading to 10YR
 8/2 Very Pale Orange
 CONSISTENCY: Firm
 CARBONATES: High reactivity to HCl
 ROCKS: None noted
 ROOTS/FOSSILS: None noted

MISSING INTERVAL:
 Missing interval not recovered

SILT AND CLAY:
 TEXTURE: Silt and Clay, USCS Classification
 Silt ML, moderately sorted
 COLOR: 10YR 7/4 Grayish Orange grading to
 10YR 8/2 Very Pale Orange
 CONSISTENCY: Firm
 CARBONATES: High reactivity to HCl
 ROCKS: None noted
 ROOTS/FOSSILS: None noted





MISSING INTERVAL:
Missing interval not recovered

