Sample 92-12C, Clay Fraction

Weight (g)	1, 92-4C 70 mm	2, 92-12C 0-5 mm
Dry Bottle	10.7708	10.4968
Wet Sample+Bottle	16.9018	16.2721
Wet Sample	6.1938	5.7753
Dry Sample +Bottle	12.5833	12.3588
Dry Sample	1.8125	1.8620
H2O(-)	70.7%	67.8%
Washed Dry Sample+Bottle	12.4864	12.2010
Washed Dry Sample	1.7156	1.7042
Loss/Dry Sample	5.3%	8.5%
Non-clay fraction Bottle	10.5928	10.6182
Non-clay + Bottle	11.2334	11.6543
Non-clay fraction	0.6406	1.0361
Clay fraction Bottle	10.7708	10.4968
Clay + Bottle	11.6862	11.0195
Clay fraction	0.9154	0.5227
Non-clay + Clay	1.5560	1.5588
Clay/(Non-clay+Clay)	59 %	34 %

± 5%

Randolph, The # you wanted — 125 -

				C.F.=8.333		
					AVG.	Wahed
	Sample	Total Carbon	Inorganic Carbo	AVG. CaCO3	Organic	Samples for
	Number	AVG %	AVG %	%	Carbon %	Chemistry(g)
1	A87-1C	1.191	0.049	0.41	1.14	5.4
	192-202mm					
2	A87-17C	4.810	4.509	37.57	0.30	5.3
	67-87mm					
3	A87-18C	0.851	0.663	5.52	0.19	8.0
4	A89-3C	0.943	0.400	3.34	0.54	5.2
	0-5mm					
5	A89-4C	0.601	0.442	3.68	0.16	5.5
	45-55mm					
6	A90-2C	0.501	0.227	1.89	0.27	5.7
	0-5mm					
7	A90-3C	0.541	0.331	2.76	0.21	5.2
	0-5mm					
8	A90-7C	0.087	0.064	0.54	0.02	13.4
9	A92-4C	0.345	0.081	0.67	0.26	4.7
	0-5mm					
10	A92-4C	0.377	0.058	0.48	0.32	4.8
	70mm					
11	A92-4C	0.346	0.057	0.47	0.29	5.4
	102-107mm					
12	A92-6C	0.922	0.033	0.27	0.89	4.9
	0-5mm					
13	A92-6C	0.157	0.019	0.16	0.14	5.6
	60mm					
14	A92-6C	0.154	0.014	0.12	0.14	5.3
	62mm					
15	A92-6C	0.327	0.018	0.15	0.31	4.9
	85-90mm					
16	A92-6C	0.589	0.012	0.10	0.58	5.4
	100mm					
17	A92-6C	0.474	0.015	0.12	0.46	5.1
	130-135mm					
18	A92-12C	1.511	0.155	1.30	1.36	4.6
	0-5mm					
19	A92-12C	0.489	0.085	0.71	0.40	4.6
	150-155mm					
20	A92-15C	0.407	0.073	0.61	0.33	5.2
	95mm					
Unwahed 2	A87-17C	4.729	4.462	37.18	0.27	
	67-87mm					
Unwashed 20	A92-15C	0.332	0.050	0.42	0.28	
	95mm					

(Rev. April 1985)

DEPARTMENT OF THE INTERIOR

REQUISITION

COPY FOR YOUR INFORMATION

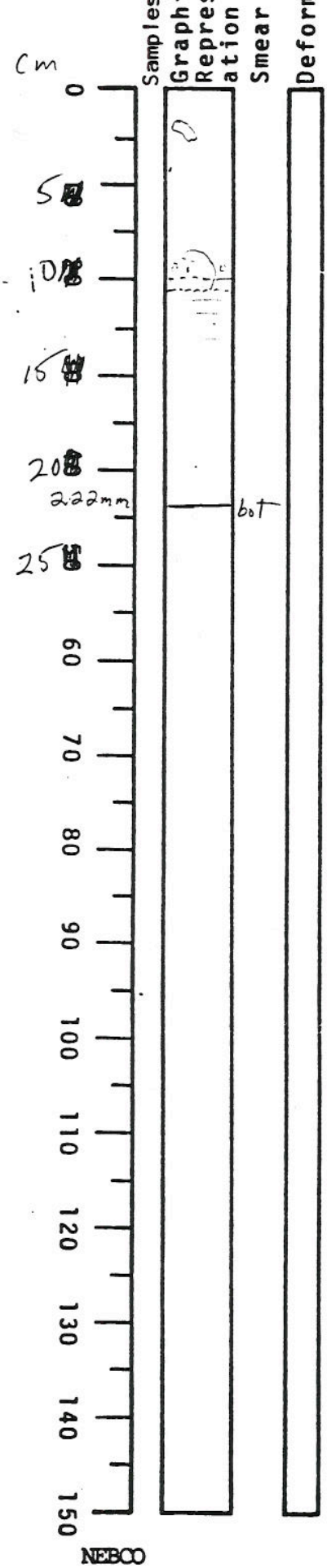
To: PURCHASING	Bureau/Office USGS/OEMG/PMG	Requisition No. 5-9460- 4440 Date 6/9/95
Appropriation/Allotment No. 001 - 5-9460-33521 0C26.9Z $2,800.00	Charge shipping costs to	
Vendor XRAL LABORATORIES 1885 LESLIE STREET TORONTO, ONTARIO M3B 3J4 1-800-387-0255	Deliver to USGS, PMG JIM HEIN 345 MIDDLEFIELD ROAD, MS 999 MENLO PARK, CA 94025	

ITEM OR FORM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	MER PACKAGE	20		140.00	$2800.00
	CE: RANDOLPH KOSKI EXT. 3208 CPO: PETER BARNES				
	TOTAL				**$2,800.00**

To Be Completed by Fiscal Authority Only

FUND CERTIFICATION: Funds in the amounts shown are available and chargeable to the cost authorities shown above.

Signature R. A. Koski	Date 6/9/95	Approved by (Signature) for [illegible]	Date 6/12/95
Title R. Koski, Geologist		Title ADMINISTRATIVE OFFICER, PMG	
Requisitioned by (Signature) Hein	Date	Bureau Officer (Signature)	Date
Title ologist		Title	



LOCATOR								SAMPLE NO.					SEC.
L	2	9	4	W	0			A	8	7	-	1	C

STATION#				OBSERVER

10YR 4/2
Dark yellowish brown
minor burrows - of pale brown
Brown Mud - noncalcareous

gradational contact over 5 mm - yellowish gray 5Y 7/2

faint bedding on X-ray

Gray mud, Non Calcareous
between
light olive gray 5Y 5/2 and
olive gray 5Y 4/1

X-ray shows rock fragments
to 9 mm scattered throughout core
but most common below 14 cm
& concentrated in ~~the~~ lowermost
1 cm as a layer
Looks like basalt or ultramafic
Rx-

Samples:

220-222 (nanno) removed Rx fragment for XRD
0-5 mm - Nannos, smear, XRD, C-org
200-205 - XRD, Corg, smear
Rock frag. removed at 192-200
extract clay in 9 mm long
a jar

20-25 mm foram sample (1/20/95)
200-210 mm foram "

VISUAL CORE DESCRIPTION

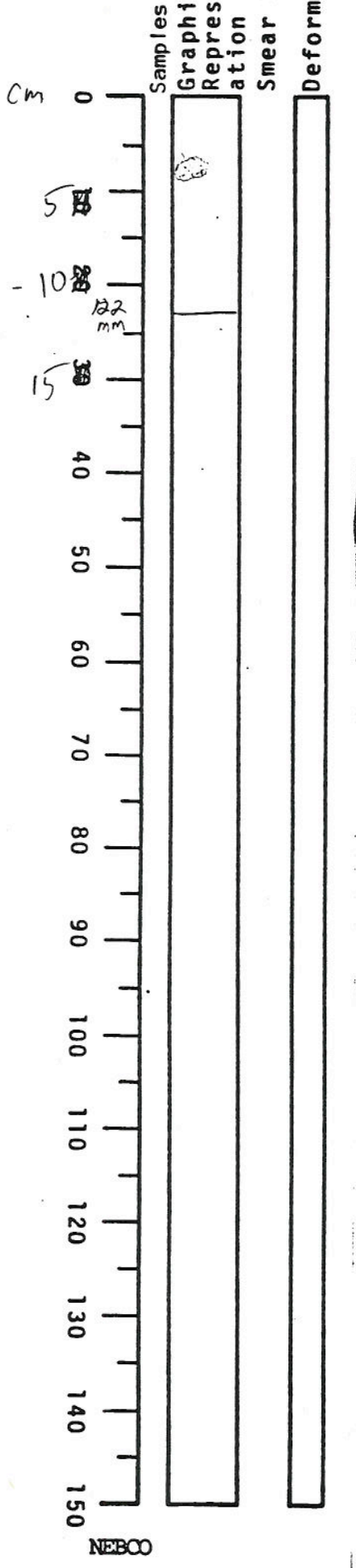
LOCATOR	SAMPLE NO.	SEC.
L 2 9 4 W 0	A 8 7 - 17	C

STATION#	OBSERVER

Samples | Graphic Representation | Smear | Deform

Cm 0 5 10 15 20 30 40 50 60 70 80 90 100 110 120 130 140 150

122 mm



Sandy lens - 25-45 mm of rock frags + forams

Gray Carbonate Mud
Light Olive gray 5Y 5/2

X-Ray shows V. lg Rx Fragments one covering most of low half of Core

Samples:
0-5 mm: Nannos
118-122 mm: Nannos
67-87 mm: XRD, Corg

Basalt large Rx. Frag. removed at 70-95 mm
→ 40x35x20 mm

+ one small Rx. Frag.

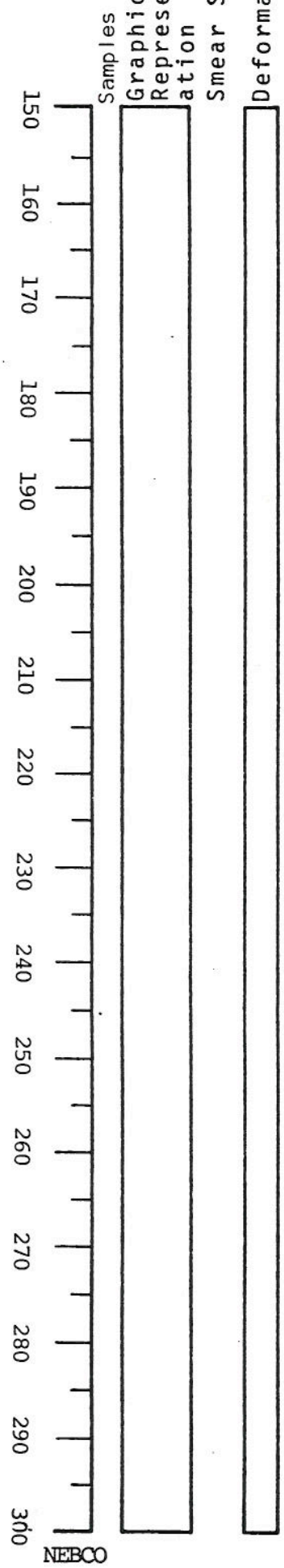
10-20 mm foram sample (4/20/95)
110-120 mm " "

NEBCO

VISUAL CORE DESCRIPTION

LOCATOR	SAMPLE NO.	SEC.
L 2 9 4 W 0	A 8 7 1 8	C

STATION#	OBSERVER
C O R E	C



No Stratigraphy, Sample in plastic Bag -

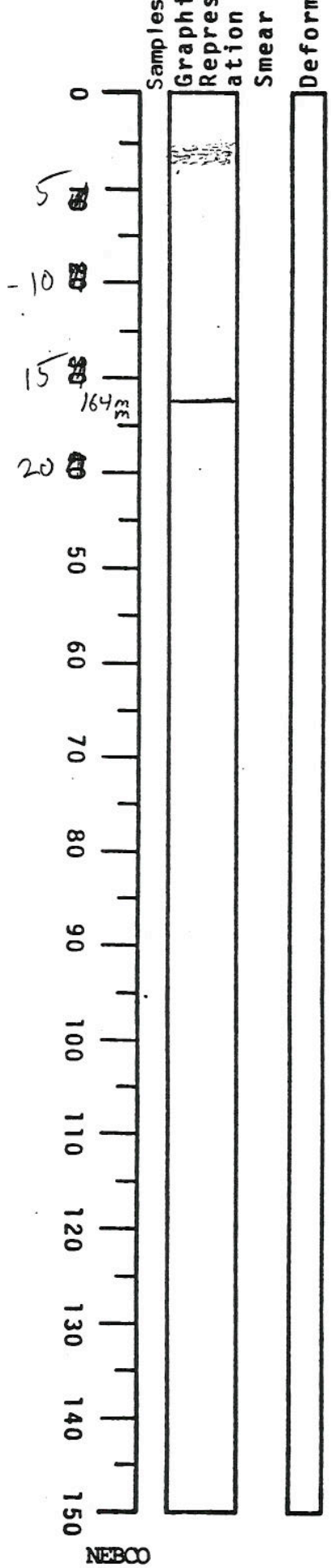
on large Cobble 75 x 38 x 35 mm + 10 smaller pebbles of Basalt

Sandy silt

moderately calcareous -

light olive ~~gray~~
5Y 5/2

Sample : 1 smear
1 XRD, Corg
1 Nano



LOCATOR								SAMPLE NO.					SEC.
L	2	9	4	W	0			A	8	9	-	3	C

STATION#				OBSERVER

Olive-gry 5Y 4/1 greenish-brown mud
contact gradational

gray mud –

silty mud

med. dark gray, N4

slightly Calcareous

x-ray shows discontinuous bedding & large rock (Pumice) fragment – beds distorted around pumice – smaller Rx. Frags at Top –

Samples: 0-2 smear
162-164 "

0-5 XRD, Corg, Carbonate

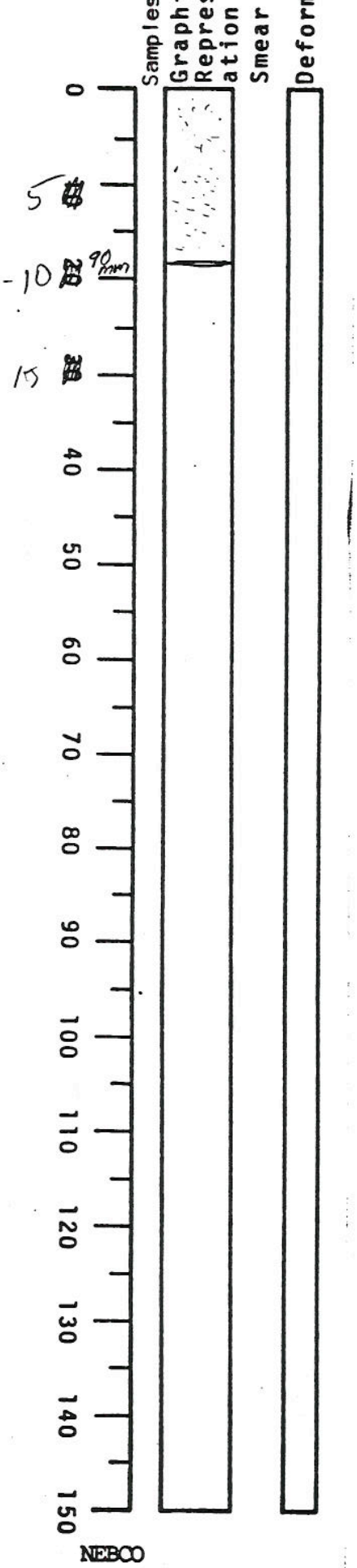
160-164 XRD, Corg, Carbonate

105-120 mm: Rock Frag. at 114 mm removed, about 25mm pumice ∴ didn't show well on X-ray

15-25mm foram sample
150-160mm foram sample

LOCATOR								SAMPLE NO.					SEC.	
L	2	9	4	W	0			4	8	9	-	4	C	

STATION#				OBSERVER



sandy silt
gray-green calcareous silt
light olive gray 5Y 5/2

light-reflecting sand grains of feldspar, (look like mica though)
also forams & rx frags,
No Sed Structures

samples
40 mm, Smear.

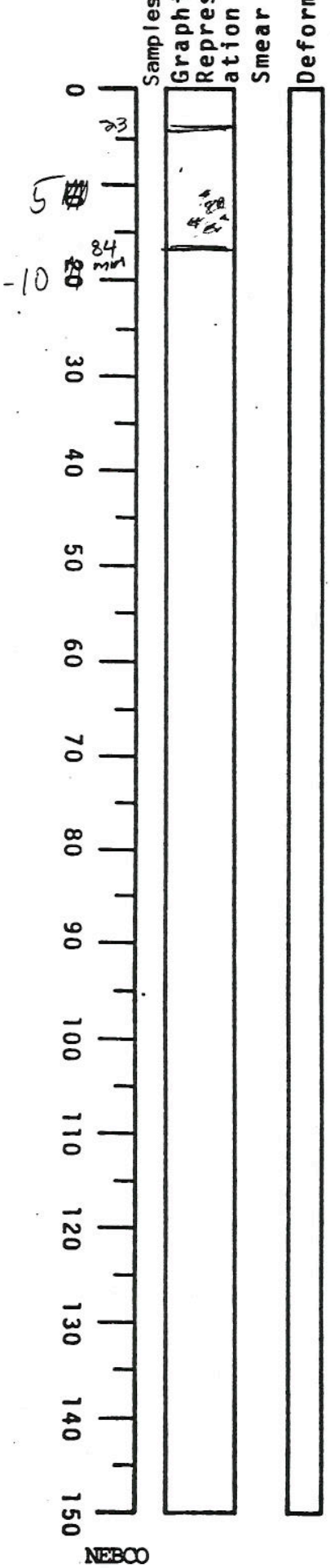
45-55 XRD, Corg
45-55

Rock Frag. Basalt, 11 mm, Tried to removed from core, but couldn't find - another on about 8 mm at 15 mm from top of core - which was removed = small Fe or Mn oxide concretion

20-30mm foram sample
80-90mm foram sample

LOCATOR								SAMPLE NO.					SEC.	
L	2	9	4	W	0			A	9	0	2	C		

STATION#				OBSERVER



Dark yellowish brown 10YR 4/2 brown sandy silt

Contact gradational

Gray mud, – Greenish Gray 5GY 6/1 mottled dark greenish gray ↳ 5G 4/1

Not Calcareous

Sand and silt in unit 1 = opaques, Rx. Fragt, forams, Slightly Calcareous

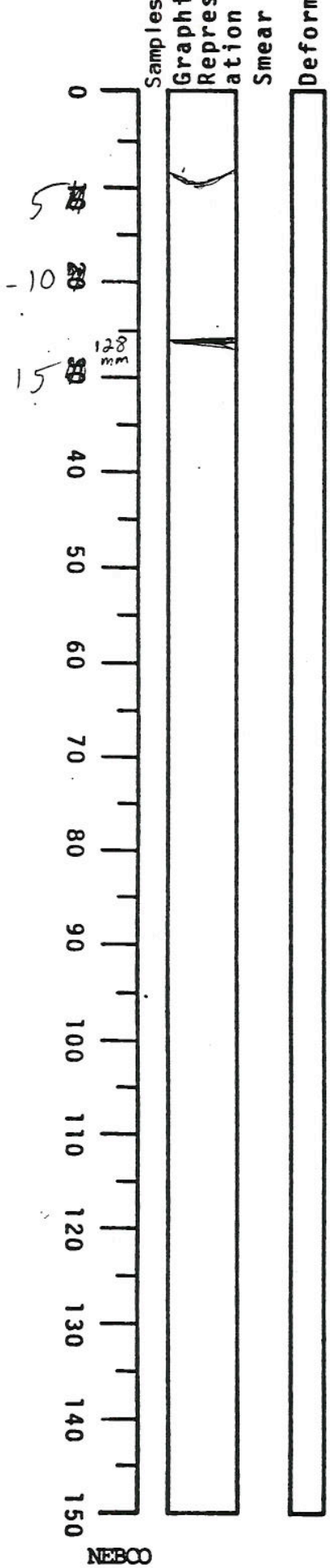
0-5 : XRD, Corg, Smear, nannos

80-84 : XRD, Corg, Smear, nannos

X-Ray shows few small < 8 mm pebbles – randomly scattered

0-20 mm foram sample

80-~~90~~ 84 mm foram sample



LOCATOR								SAMPLE NO.					SEC.	
L	2	9	4	W	0			A	9	0-3	C			

STATION#				OBSERVER

lt. olive gray 5Y 5/2 brownish-green silty mud - non-calcareous

gray silty mud
Slightly Calcareous
medium Gray N5

subtle color differences;

Samples:

0-5"; XRD, Corg, Nannos, Smear

124-128; " " " "

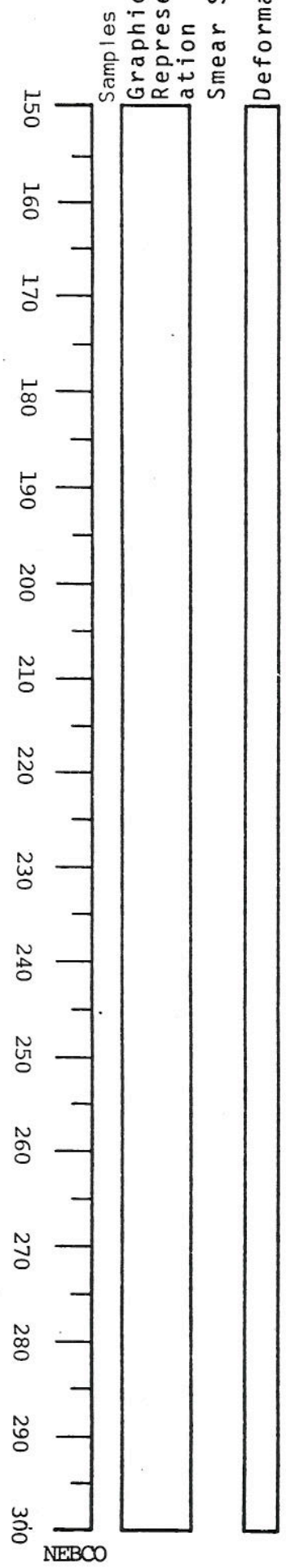
X-ray shows discontinuous bedding maybe from bottom currents or Slumping

10-20 mm foram sample
115-125 mm foram sample

VISUAL CORE DESCRIPTION

LOCATOR	SAMPLE NO.	SEC.
L 2 9 4 W O	A 9 0 + 7 C	

STATION#	OBSERVER



Pebbly, Sandy silt

grey, largest pebble is 27 x 25 x 18 mm

Dark greenish gray 5GY 4/1

No Stratigraphy,

In plastic Bag.

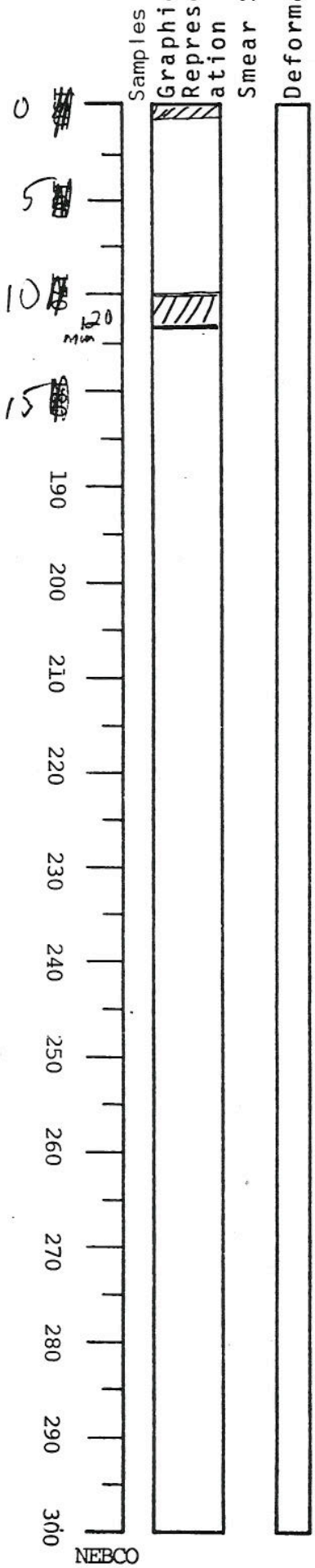
slightly Calcareous

Samples: 1 smear
1 XRD, Coy
1 Nannos

VISUAL CORE DESCRIPTION

LOCATOR								SAMPLE NO.					SEC.	
L	2	9	4	W	0			A	9	2	4	C		

STATION#				OBSERVER



Black mn oxide??

orange-brown coarse sandy silt

black mn oxide??

NO Close color on chart – light brown 5YR 5/6

Not much black mn oxide(?) in archive half

NO Carbonate
easily leachable Fe as in others

Samples: 60 mm Smear
0-5 XRD
70 mm XRD, Diatoms, Cocc
115-120 XRD

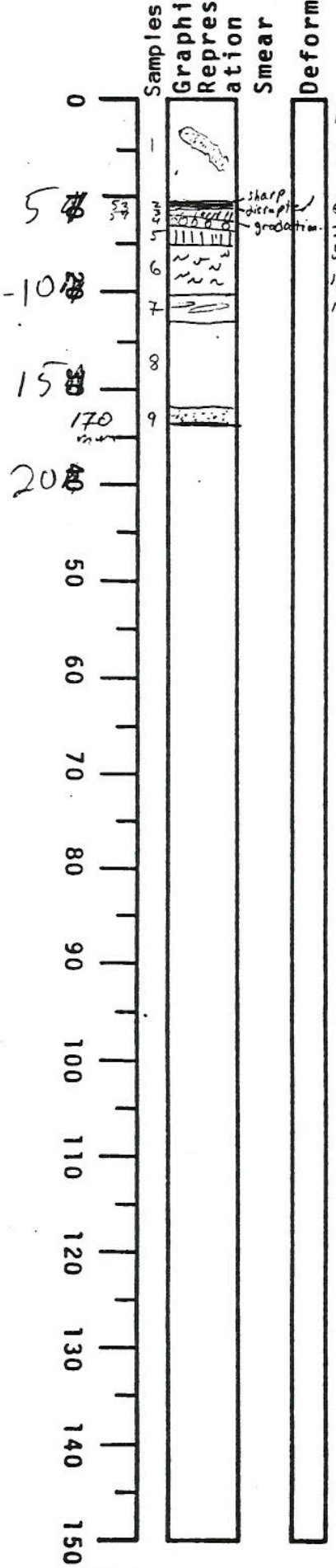
X-Ray shows Nothing

110-120 mm foram sample (5/1/95)

VISUAL CORE DESCRIPTION

LOCATOR								SAMPLE NO.					SEC.
L	2	9	4	W	0			A	9	2	-6	C	

STATION#				OBSERVER
5	all			



Brighty Brown 5YR 2/2

Chocolate brown Sandy & Silty mud w/ Sand lens

6 CM Vdark brown Sandy silt - Brownish Black 5YR 2/1

3-5 CM greenish Sandy silt - Pale Olive 10Y 6/2

5-10 CM - Chocolate brown silty mud w/ mixed bed 3 & 4

12-20 CM Pale Brown silty mud - moderate yellowish-brown 10YR 5/4

10-15 CM lenses of greenish mud in ± 6 silty mud - light olive gray 5Y 5/2

Pale Brown

10 mm sand, pale Brown, same color as 8; Dark yellowish Brown 10YR 4/2

Sand & Silt nearly all Volcaniclastic; All layers Non-Calcareous

all but greenish lenses are iron-rich

Sampler Narrow: 0-5
165-170

Smear Slides: 0-5
60
100
160

XRD: 0-5 mm + Corg
60 mm
62 mm
25-90 mm
100 mm
130-135 mm
168-172 mm

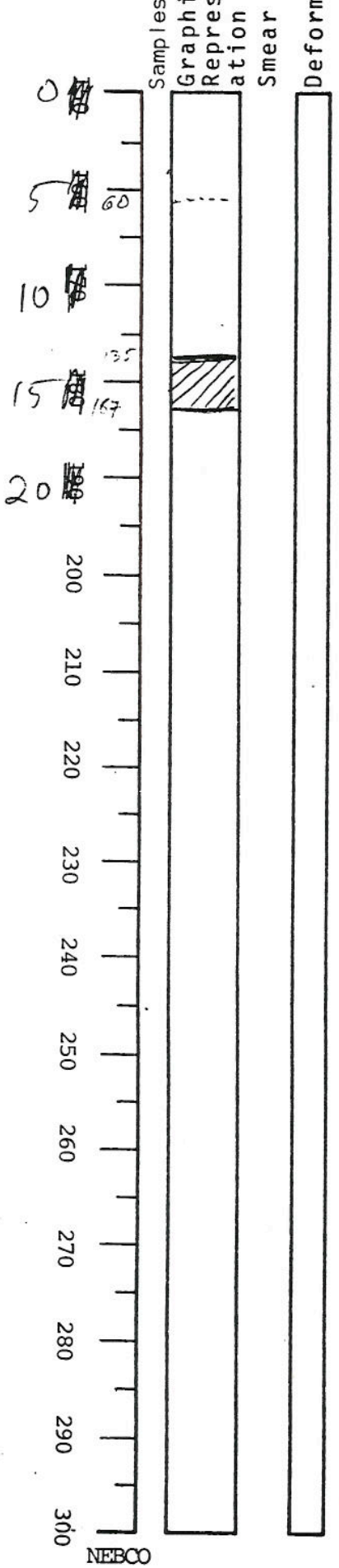
X-ray shows

0-22 mm Sandy silty mud
22-37 mm - Sandy silt
37-54 - mud
54-65 - Sandy silt
65-75 - mud
75-170 - poorly developed banding on coarser & finer layers
115-170 - Current modified banding

10-20 mm foram sample
160-170 mm foram sample

LOCATOR	SAMPLE NO.	SEC.
L 2 9 4 W 0	A 9 2 - 1 2	C

STATION#	OBSERVER



Chocolate Brown mud

Dusky brown 5YR 2/2

Chocolate brown silty mud

yellow-orange goethite, semiconsolidated - replaced or cemented Sand.

↳ bit darker Than Dark yellowish orange 10YR 6/6

All NON-Calcareous

Samples:

0-5 mm: smear, nonno, YRD, Corg

130-135 mm: " " "

165-167 mm: XRD, Corg -

X-ray shows:

0-22 - sand & pebble (To 9mm) rich mud

22-62 - few coarse grains

62-104 - Sand & pebble (To 3mm) rich

104-135 - few coarse grains

135-167 - wispy structure for goethite

0-10 mm foram sample

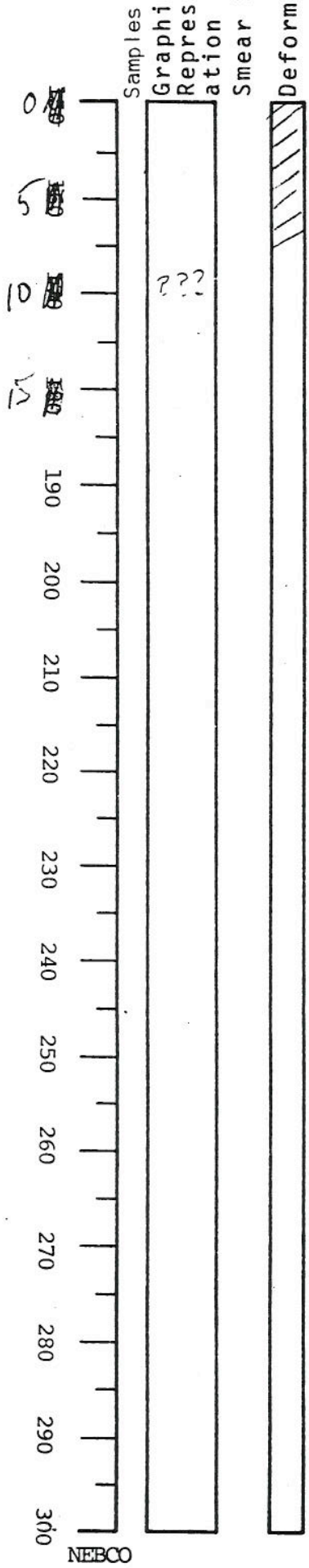
160-170 mm foram sample (brown mud)

160-170 mm foram sample (orange clast)

VISUAL CORE DESCRIPTION

LOCATOR								SAMPLE NO.					SEC.
L	2	9	4	W	0			A	9	2	1	5	C

STATION#				OBSERVER



about
50-100 mm of completely disrupted orange-brown coarse-sandy silt
Some black chips

No stratigraphy preserved

Nothing in color chart comes close - but - light brown 5YR 5/6

Sample: finer 1
Corg XRD 1
nanno 1

? NO ARCHIVE CORE ;

X-Ray shows nothing : perhaps 1 small pebble -

10-20mm ~~foram sample~~ solid chunk - no sample
100-110 mm foram sample

Blanco Fracture Zone Sediment Smear Slide Descriptions

work by Jim Hein

Sample Number	Sediment Type	Composition	Comments
A87-1c, 0-5mm	Volcaniclastic, biosiliceous silty mud	Quartz, plagioclase, diatoms, spicules, radiolaria, glass, opaques, altered rock frags., clays, pyroxene, amphibole, rare foraminifera	Biosilica mostly diatoms
A87-1c, 200-205mm	Volcaniclastic silty biosiliceous ooze	Diatoms, spicules, altered rock frags., quartz, plagioclase, opaques, glass, clays, pyroxene, amphibole	Diatoms mostly fragmented
A87-17c, 67-87mm	Silty nannofossil ooze	Nannofossils, foraminifera, rock frags., quartz, plagioclase, opaques, clays, calcite, radiolaria, pyroxene, chert (rare, mosaic)	Foraminifera mostly fragmented & recrystallized
A87-18c	biocarbonate, volcaniclastic muddy silt	Nannofossils, foraminifera, plagioclase, quartz, clays, calcite, altered rock frags., glass, amphibole, pyroxene	--
A89-3c, 0-5mm	Biosilica-bearing volcaniclastic muddy silt	Plagioclase, quartz, rock frags., calcite, diatoms, radiolaria, spicules, opaques, glass, amphibole, pyroxene, rare foraminifera	--
A89-3c, 162-164mm	Glass-rich, volcaniclastic silty mud	Rock frags., glass, quartz, plagioclase, clays, opaques	No microfossils
A89-4c, 45mm	Volcaniclastic silty sand	Plagioclase, quartz, rock frags., calcite (mostly foraminifera frags.), pyroxene, clays, opaques, amphibole	Mostly subangular-subrounded grains; all foraminifera fragmented
A90-2c, 0-5mm	Biosilica-bearing, volcaniclastic sandy silt	Plagioclase, quartz, rock frags., pyroxene, opaques, glass, diatoms, radiolaria, spicules, amphibole, calcite, rare: foraminifera, silicoflagellates	Poorly sorted, mostly subangular grains; calcite mostly foraminifera fragments
A-90-2c, 80-84mm	Glass-rich, volcaniclastic silty mud	Quartz, plagioclase, glass, rock frags., pyroxene, clays, calcite, amphibole, rare: diatoms, radiolaria, spicules, fish debris	Some very delicate pennate diatoms
A90-3c, 0-5mm	Glass-rich, volcaniclastic muddy silt	Plagioclase, quartz, glass, opaques, clays, pyroxene, amphibole, calcite, rare: rock frags., diatoms, radiolaria, spicules	Microfossils fragmented; rare very delicate pennate diatoms
A90-3c, 124-128mm	Glass-rich, volcaniclastic muddy silt	Quartz, plagioclase, glass, rock frags., opaques, clays, pyroxene, amphibole, calcite, rare: diatoms, spicules	--
A90-7c	Volcaniclastic silty mud	Plagioclase, rock frags., opaques, pyroxene, quartz, calcite, amphibole	--
A92-4c, 55mm	Silica & Fe oxide(?) replaced bacterial mat	Strands, threads, fibers, & spicules of bacteria replaced by silica & Fe oxides(?), glass, rare: black opaques, diatoms	Individual cells seen on some strands of bacterial colonies
A92-6c, 0-5mm	Biosilica-rich, ferruginous(?), volcaniclastic silty mud	Quartz, plagioclase, clays, diatoms, radiolaria, spicules, opaques, rock frags., glass, zeolites, pyroxene, rare barite(?)	Most very delicate diatoms are broken; some bacterial strands
A92-6c, 60mm	Biosilica-bearing, volcani-clastic sandy & silty mud	Rock frags. altered to smectite, glass altered to smectite, clays, quartz, zeolites, opaques, diatoms, radiolaria, spicules, plagioclase, pyroxene	Very fine-grained clay matrix
A92-6c, 100mm	Volcaniclastic muddy silt	Rock frags. altered to quartz and smectite, quartz, glass altered to smectite, opaques, zeolites, barite(?), rare: diatoms, spicules	Hydrothermally altered rock frags.

hydrothermally altered

Hydrothermally altered

A92-6c, 160mm	Volcaniclastic muddy silt	Quartz (rare polycrystalline), plagioclase, zeolites, rock frags. altered mostly to quartz & smectite, rare: diatoms, radiolaria, spicules	Hydrothermally altered rock frags; phillipsite cross-twins
A92-12c, 0-5mm	Biosilica-bearing mud	Quartz, plagioclase, opaques, glass, diatoms, radiolaria, spicules, pyroxene, amphibole	Very-fine grained
A92-12c, 155mm	Biosilica-bearing, silica & Fe oxide(?) replaced bacterial mat	Strands of bacteria replaced by silica & Fe oxide(?), plagioclase, quartz, diatoms, radiolaria, spicules, glass, opaques, pyroxene	Bacterial mat mixed with biosilica & volcaniclastic grains
A92-15c	Silica & Fe oxide(?) replaced bacterial mat	Strands of bacteria replaced by silica & Fe oxide(?), plagioclase, quartz, clays, diatoms, radiolaria, spicules	--

12c contaminated by 15c *

Clays refers to clay minerals; glass. is volcanic glass shards; frags. is fragments; spicules refers to sponge and radiolaria silica spicules

Optical Mineralogy of Blanco Fracture Zone cores

Gretchen Luepke

Twenty smear slides were made at designated intervals within the cores, generally at the intervals where samples for X-ray diffraction (XRD) analyses were taken. Identification of minerals was made primarily in the sand-sized (>0.062 mm) range; much of the material was of less than 0.062 mm size.

All but one sample (A92-4c) contained quartz. Although plagioclase was identified in most of the XRD analyses, it could be quickly identified in smear slides only when twinning was evident. Clay minerals usually could not be optically identified, and in all samples many grains appeared to be altered.

Core A92-4c yielded no positive results from a smear-slide examination. It looked like oxidized organic debris.

Diatoms, radiolaria, and/or foraminifera was seen in many samples. Material identified as detrital carbonate may also be derived from skeletal debris.

XRD analyses show the presence of amphibole and/or pyroxene in most samples. Amphiboles identified include blue-green and hornblende; much rarer basaltic and brown hornblende, tremolite/actinolite and, rarest of all, glaucophane. Pyroxenes are usually clinopyroxenes, but hypersthene occurs in 3 samples. Epidote includes clinozoisite and possibly zoisite.

The following table lists the minerals (other than quartz and plagioclase) identified in each core interval. No quantitative order is implied. Where no core interval is given, the sample was taken in the middle of the core.

A90-2c	0-5 mm	hypersthene, clinopyroxene; green, blue-green, brown, & basaltic hornblende; epidote, micas; apatite,glaucophane, garnet, tourmaline, opaque mineral; detrital carbonate	diatoms, radiolaria
A90-2c	80-84 mm	green, blue-green, & basaltic hornblende; epidote, micas, pyroxene; glaucophane, apatite, garnet, tourmaline; opaque mineral, detrital carbonate	diatoms, radiolaria
A90-3c	0-5 mm	epidote, pyroxene, micas; green, blue-green, & basaltic hornblende; tremolite/actinolite, apatite, garnet, aegerine-augite, sphene, tourmaline, rutile?; detrital carbonate	diatoms, forams
A90-3c	124-128 mm	green, blue-green, brown, & basaltic hornblende; tremolite/actinolite, glaucophane, epidote, pyroxene, micas; apatite, garnet, opaque mineral, sphene, tourmaline, rutile, zircon; detrital carbonate	diatoms; glass shard?
A90-7c		green & blue-green hornblende; epidote, pyroxene, micas; opaque mineral, detrital carbonate	
A92-6c	0-5 mm	pyroxene, epidote, micas, large clay crystals	diatoms
A92-6c	60 mm	pyroxene, micas; large clay crystals	diatoms
A92-6c	100 mm	micas, large clay crystals; possible zeolites	diatoms

X-ray Diffraction Mineralogy of Sediment Cores from the Blanco Fracture Zone

Sample No.	Dominant >25%	Common 5 - 25%	Minor <5%	XRD No.
A87-1C, 0-5mm	quartz, chlorite	plagioclase, amorphous, illite	amphibole(?)	871C05
A87-1C, 192-202mm	chlorite, amorphous	quartz, plagioclase, illite	--	871C92
A87-1C, 200-205mm	chlorite, plagioclase, amorphous	quartz, illite	--	871C20
A87-1C, 220-222mm	plagioclase, pyroxene	amorphous, smectite	--	871C22
A87-17C, 67-87mm	calcite	chlorite, quartz, plagioclase, amorphous	illite	8717C7
A87-18C	calcite, plagioclase	quartz, chlorite	illite	8718CC
A89-3C, 0-5mm	plagioclase, quartz	chlorite, calcite, illite	amphibole, stilbite	A893C0
A89-3C, 155-160mm	quartz, plagioclase	chlorite, illite, pyroxene, amorphous	calcite, amphibole	A893C1
A89-4C, 45-55mm	plagioclase, quartz	pyroxene, calcite, chlorite	illite, amphibole	A894C4
A90-2C, 0-5mm	plagioclase, quartz	chlorite, pyroxene	illite, amphibole, calcite	902C05
A90-2C, 80-84mm	quartz, plagioclase	pyroxene, chlorite, illite, amorphous	calcite(?), amphibole	902C80
A90-3C, 0-5mm	plagioclase, quartz	chlorite, pyroxene(?), illite, amorphous	amphibole	903C05
A90-3C, 124-128	quartz, plagioclase	chlorite, pyroxene, illite, amorphous	calcite, amphibole	903C24
A90-7C	plagioclase, chlorite	sepiolite, pyroxene	amphibole, quartz, analcite, calcite	A907CC
A92-4C, 0-5mm	birnessite	amorphous	--	924C05
A92-4C, 70mm	amorphous	--	--	924C70
A92-4C, 102-107mm	birnessite	amorphous	quartz	12C102
A92-6C, 0-5mm	quartz, plagioclase	smectite	phillipsite	926C05
A92-6C, 60mm	smectite	barite(?), quartz, pyrite, clinoptilolite	phillipsite, stevensite(?)	926C60

A92-6C, 62mm	smectite	pyrite, barite, clinoptilolite	phillipsite(?), ilmenite(?)	926C62
A92-6C, 85-90mm	smectite, quartz	clinoptilolite, pyrite	pyroxene, sepiolite(?), mixed-layer clays(?), phillipsite(?)	926C85
A92-6C, 100mm	quartz, smectite	phillipsite(?), pyrite	barite(?), clinoptilolite	926C10
A92-6C, 130-135mm	quartz, smectite	--	barite(?), phillipsite, clinoptilolite, mixed-layer clays	6C1305
A92-6C, 168-172mm	quartz, plagioclase	smectite, pyrite	pyroxene	6C1682
A92-12C, 0-5mm	quartz, plagioclase	chlorite	--	12C05M
A92-12C, 130-135mm	plagioclase, quartz	calcite, chlorite	illite	12C130
A92-12C, 150-155mm	amorphous	quartz, plagioclase	--	12C150
A92-15C, 95mm	amorphous	quartz, plagioclase	chlorite	15C95M

* Halite ,which is percipitated from the seawater, is also found in many samples.

Clay fractions of the core, 92-6C, are approximately

1) 0-5mm : 34 %
2) 130-135mm : 18 %