SP 12

MCG00005001

25

1. SAMPLE NUMBER	27	6. SAMPLER TYPE	Phleger
2. LATITUDE	16° 40' 00"N	7. WATER DEPTH (fm.)	3100
3. LONGITUDE	60° 38' 00"W	8. CORE LENGTH (in.)	3
4. DATE	20 March 1953	9. CORE PENETRATION (in.)	

5. SUBSAMPLE DEPTH IN CORE (in.)				
10. COLOR	Very pale orange			
11. SPHERICITY (avg.)				
12. ROUNDNESS (avg.)				
13. SURFACE TEXTURE (avg.)				
14. TOTAL SUBSAMPLE WEIGHT (gm.)	20.4			

15. SIZE ANALYSIS

a. <−2ϕ (%)		QD ϕ		QD ϕ		QD ϕ		QD ϕ
b. −2ϕ to −1ϕ (%)		Sk. ϕ		Sk. ϕ		Sk. ϕ		Sk. ϕ
c. −1ϕ to 0ϕ (%)		Md. ϕ		Md. ϕ		Md. ϕ		Md. ϕ
d. 0ϕ to 1ϕ (%)	10							
e. 1ϕ to 2ϕ (%)								
f. 2ϕ to 3ϕ (%)								
g. 3ϕ to 4ϕ (%)								
h. 4ϕ to 6ϕ (%)	54							
i. 6ϕ to 8ϕ (%)								
j. > 8ϕ (%)	36							

16. WET DENSITY (lbs./ft.³)				
17. WATER CONTENT (%)				
18. MAXIMUM POROSITY (%)				
19. MINIMUM POROSITY (%)				
20. ODOR	None			
21. RIGIDENSE (mm.)				
22. DOMINANT MINERAL (%)				
23. SECONDARY MINERAL (%)				
24. ORGANIC CONTENT (%)				
25. OTHER MINERALS (%)				
26. SUBSAMPLE SLIDE NUMBER				

27. REMARKS: Core contained trace of shell.

Reprint Ron Walton
DATA From "Monterey submarine Canyon, California: Genesis and Relationship to continental geology" Bruce D. Martin 1964.
Oceanog. office Library. QE39M3
Rfll

SAMPLE DESCRIPTIONS

MONTEREY CANYON

M-8 (8131)

Start: 36°46'33"N 121°56'20"W

Finish: 36°48'03"N 121°56'18"W

Depth: 285 fms. to 100 fms.

Lith: SILTSTONE: gray, with some iron stains. Fresh angular sub-conchoidal fractures suggest rock in place. Compact, light, but breaks easily by hand. Largest piece rounded on surface in contact with ocean, but angular fractures on side broken from subcrop. Worm tubes common in upper 3cm near surface, but few towards center of rock. Material rather brittle. Seems slightly more indurated than rocks of similar lithology from other dredgings. No bedding noted.

Size: Largest piece 23cm X 18cm X 13cm. About 30 pieces above 2.5cm.

Weight: Twenty-five pounds; 11.4 kg.

M-10 (7475)

Start: 36°47'02"N 122°01'35"W

Finish: 36°48'17"N 122°02'43"W

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M-10 (Continued)

Depth: 300 fms. to 50 fms.

Lith: SANDY SILTSTONE: gray, fairly compact. Angular to sub-angular. Grains fairly well-sorted, quartz, small (1%) amount of biotite. Few pieces with slabby bedding are less well-sorted composed of dark and light bands of laminae. Pseudo-conchoidal fracture. Rare fragments of pelecypods. Few worm tubes.

Size: Largest piece, 13cm X 15cm X 10cm.

Weight: Thirty pounds; 13.6 kg.

Notes: Lithology much like Purisima formation exposed on beach near Santa Cruz.

M-9 (7461)

Start: 36°46'50"N 121°57'37"W

Finish: 36°45'52"N 121°56'28"W

Depth: 180 fms. to 150 fms.

Lith: SILTSTONE: gray to light-brown. Low density. Compact, slightly rounded on edges. Pieces smaller than 3cm exhibit fresh fractures. Somewhat bored by worms on surface, but not at depth. Micaceous. Subconchoidal fracture. Some pieces almost lithographic;

M-9 (Continued)

others with veinlets of silica. Broke into innumerable pieces on drying. Siltstone comprises 45 per cent of total sample.

SANDSTONE: gray, oxidized to brown color on some surfaces. Surface texture knobby, rough. No fresh fractures. Calcite cement. Quartz principal mineral. Sandstone of two types--one fine-grained, well-sorted; the other poorly sorted with grains ranging from 2mm to 0.25mm, dark minerals (5%). Approximately 100 pieces of rock with those below 2cm well-rounded, 0.8 or more. Sandstone is 45 per cent of total sample.

LIMESTONE: gray, coated with manganese(?). Dense; sucrosic texture. A few solution pits. Similar to C-5 (8165) except microscopic examination of insoluble residue, mainly quartz, and no glauconite(?). No fresh fractures. One mold and one cast of pelecypods (Arca[?]). Texture finer than limestone in Gabilan Range and in Big Sur area. Limestone is 7 per cent of total sample.

M-9 (Continued)

GRANODIORITE: gray with quartz, biotite, feldspar. Porphyritic. Unlike other igneous rocks dredged, but more like granodiorites along the coastline. Rounded, no fresh fractures, not "weathered." Granodiorite comprised 3 per cent of total sample.

Size: Siltstone, largest piece-20cm X 15cm X 13cm.
Sandstone, largest piece-23cm X 21cm X 18cm.
Limestone, largest piece-13cm X 9cm X 8cm.
Granodiorite, largest piece-12cm X 12cm X 8cm.

Weight: One-hundred fifteen pounds; 52.4 kg.

Notes: This dredging contained the most varied lithology of all dredgings. Certainly, the igneous and carbonate rocks are not in place. On the basis of fresh fractures and angular edges, the siltstone appears to be the dominant lithology; however, a few fresh fractures may be on the sandstone, indicating that it is in place.

M-12 (8124)

Start: 36°45'52"N
122°01'15"W

Finish: 36°47'24"N
122°03'27"W

Depth: 477 fms. to 110 fms.

M-12 (Continued)

Lith: SILTSTONE: gray with iron oxide stains, micaceous. Laminae up to 1cm thick. Pieces less than 3cm are angular; larger pieces sub-angular, sub-round to round. Indurated, but can be broken by hand. Few worm tubes. Rare fragments of pelecypods. Freshly broken rock exhibits solution pits (leached microfossils[?]).

Size: Largest piece, 30cm X 15cm X 13cm; well-rounded.

Weight: Fifty pounds; 22.9 kg. Approximately 10 per cent by weight below 3cm in diameter.

Notes: Sample similar to M-12 (7464), but does not contain the manganese(?) coated siltstones or rounded boulders of granodiorite. This dredging (M-10) probably is higher on canyon wall than M-12.

M-14 (7464)

Start: 36°44'50"N 122°01'02"W

Finish: 36°45'03"N 122°04'15"W

Depth: 532 fms. to 500 fms.

Lith: SILTSTONE: brown-gray. Iron stained; compact, but breaks easily by hand. Micaceous. Some

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M-14 (Continued)

larger pieces sub-round to round. Smaller pieces more angular. No bedding noted. About one-half of sample composed of fragments below 3cm diameter. Siltstone is 90 per cent of total.

SILTSTONE: gray coated with bluish-black manganese(?). Thirty-one pieces rounded to sub-rounded. More indurated than siltstone described above. Some highly siliceous and hard. Molds of pelecypods in few pieces. Five per cent of total sample.

GRANODIORITE: gray with quartz, biotite, and feldspar. Five pieces. Phenocrysts larger than those in igneous rocks dredged in canyons. Clasts well-rounded.

Size: Largest piece (brown-gray siltstone) 12 cm X 8cm X 5cm.

Weight: Ninety-five pounds; 43.1 kg.

Notes: The rounded pieces of granodiorite suggest that dredging began near canyon axis. The largest piece of brown-gray siltstone is slightly rounded with a few arborescent corals on one surface. This indicates rock type in place.

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M-14 (Continued)

Dr. O. Hartman, Allan Hancock Foundation, looked at the worm tubes and thought they indicated several worm species present. U-shaped tubes not noted, but most straight. Tubes oxidized.

M-16 (8156)

Start: 36°43'00"N 122°02'30"W

Finish: 36°42'35"N 122°01'50"W

Depth: 517 fms. to 490 fms.

Lith: SILTSTONE: gray. Easily broken by hand. Many fragments (75%) highly bored by worms, while the remainder not bored. Bored rocks round to sub-round; non-bored ones, angular. The former has slightly higher quantities of mica. No reaction with dilute HCL.

Size: Largest piece, bored--14cm X 9cm X 7cm.
Largest piece, non-bored--5cm X 3cm X 3cm.

Weight: Five pounds; 2.2 kg.

Notes: All material resembles the Purisima formation (Pliocene) exposed in the vicinity of Santa Cruz at the north end of Monterey Bay. Borings by worms may be relict. Angular, non-bored material considered to be in place.

M-18 (8129)

Start: 36°45'30"N 122°08'00"W Finish: 36°47'15"N 122°08'15"W

Depth: 600 fms. to 160 fms.

Lith: SILTSTONE: gray, well-sorted, Dark minerals give a "salt and pepper" appearance. No bedding noted, but fossils (pelecypods) oriented in the same plane suggest incipient bedding. Rounded, hard, dense, and "weathered" on the surface. Four pieces above 8cm in diameter. No reaction with dilute HCl. One piece bored by worms. Two siliceous sponges.

Size: Largest piece, 17cm X 12cm X 4cm.

Weight: Ten pounds; 4.5 kg.

Notes: Not considered in place. Size indicates possible derivation from subcrops higher on canyon wall.

M-17 (8154)

Start: 36°46'00"N 121°59'10"W Finish: 36°45'18"N 121°59'12"W

Depth: 483 fms. to 160 fms.

Lith: SANDSTONE: Gray, very fine-grained. Much muscovite(?) which glitters when rock rotated in light. About 10 pieces of rock,

M-17 (Continued)

angular to sub-round. Probably in place. Small dredge contained about a cup of fine sand and pebble. Arenaceous worm tubes on surface of largest fragment.

Size: Largest piece, 6cm X 5cm X 1.5cm.

Weight: One-half pound; 0.2 kg.

Notes: Not analyzed for sediment parameters, because not enough material, too indurated, and most of it used for microfaunal studies and petrographic slides.

M-22 (8157)

Start: 36°40'15"N 122°07'30"W Finish: 36°40'40"N 122°07'35"W

Depth: 690 fms. to 600 fms.

Lith: CHERT: black, polished, and somewhat rounded pebbles. Some pieces with somewhat angular edges. About 10 pieces. Largest pebble 1cm in diameter. One piece same as above, but white in color.

SILTSTONE: green-black. Can be broken by hand with difficulty. Largest piece 1.5cm in diameter.

M-22 (Continued)

Notes: Rock types disseminated in a quart of green mud. Mud collected in a small dredge attached to a large dredge. Rocks may or may not be indicative of the lithology underlying the green mud cover. On geologic map (Fig. 20) the dredging shown as a rock type. The siltstone possibly is the dominant lithology of the covered rocks.

M-19 (8155)

Start: 36°45'20"N 122°01'45"W

Finish: 36°44'50"N 122°00'30"W

Depth: 583 fms. to 533 fms.

Lith: SILTSTONE: brown. Indurated breaking with a subconchoidal fracture. Only two pieces of rock above 2.5cm; numerous smaller pieces. Density of two types, about 50% of each type. The one of lower density possibly with many diatoms (later micropaleontological work did not indicate diatoms; therefore, the density difference between the two types probably related to porosity). Surface in contact with water has 2 patches of Bryozoa and soft, pink sponges(?).

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M-19 (Continued)

SANDSTONE: gray, friable, fine-grained, well-sorted. Largest piece rounded; smaller clasts, angular. Slightly iron stained. Few worm borings. About 50 per cent of total sample.

Size: Siltstone, largest piece-8cm X 5cm X 5cm.
Sandstone, largest piece-15cm X 13cm X 8cm.

Weight: Five pounds; 2.6 kg.

M-25 (8152)

Start: 36°42'32"N 122°01'00"W

Finish: 36°42'30"N 121°57'45"W

Depth: 550 fms. to 200 fms.

Lith: GRANODIORITE: gray, quartz, biotite, and feldspar. Very angular edges of dredged material. Oxidized surface and organisms on portion in contact with the ocean. Large feldspar phenocrysts not present as on coastline rocks. Loose sand in small dredge. Definitely in place.

Size: Largest piece-30cm X 10cm X 10cm.

Weight: Seventy-five pounds; 34.0 kg.

Notes: This is the first dredging going seaward in Monterey Canyon to exhibit evidence of granodiorite in place.

M-27 (7462)

Start: 36°42'00"N Finish: 36°41'10"N
122°01'05"W 122°00'45"W

Depth: 780 fms. to 240 fms.

Lith: GRANODIORITE: gray. Quartz, feldspar, and biotite. Rocks angular with fresh fractures. Not porphyritic. Some pieces "weathered" to depth of 1cm below the surface in contact with ocean.

Size: Largest piece-9cm X 3cm X 2cm.

Weight: Three pounds; 1.3 kg.

Notes: Angular edges and fresh fractures indicate rock type in place. Lithology similar to other in-place granodiorite dredgings.

This station near that of Shepard and Emery (1941) where they also dredged granodiorite.

M-29 (8126)

Start: 36°40'20"N Finish: 36°39'12"N
122°05'40"W 122°00'20"W

(Note: Ship's log lists latitude at Finish as 37°39'12"N. This location is incorrect; so latitude changed to above figure.)

Depth: 640 fms. to 200 fms.

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M-29 (Continued)

Lith: SANDSTONE: gray. Clasts well-rounded. Indurated, with pelecypods and gastropods. Fine-grained, fair to well-sorted. Many dark minerals give a slight "salt and pepper" appearance. Does not react with dilute HCl. No evidence of fresh fractures. Surfaces completely covered with bryozoans, corals, sponges, and arenaceous worm tubes. Nine pieces of rock. Approximately 90 per cent of total sample.

LIMESTONE: gray, dense, fine-texture. Surface color greenish-white. After dissolving in dilute HCl, remaining solution dark green. Color possibly a result of glauconite(?). This same effect noted in sample C-5 (8165). One piece.

Size: Sandstone, largest piece-21cm X 18cm X 19cm.
Limestone, largest piece-21cm X 10cm X 10cm.

Weight: Forty-five pounds; 20.4 kg.

Notes: Dredging probably from rubble in a tributary to Carmel Canyon. Neither the sandstone nor the limestone in place. Limestone finer-textured than those in the Gabilan Range or Big Sur area.

M-31 (7471)

Start: 36°40'12"N 122°06'30"W

Finish: 36°38'43"N 122°04'22"W

Depth: 880fms. to 750 fms.

Lith: SILTSTONE: dark-brown, altered to light-brown on surface. Hard; subconchoidal fracture. Some edges angular and others round (approximately 75% angular). Fracture suggests breaking along planes of laminae. Radiolarians and diatoms. No reaction with dilute HCl. Siliceous, dense. Three pieces of rock.

QUARTZITE: white, with muscovite. Outline of individual grains visible, but grains interlocked. Three planes of jointing or fracture give pyramidal shape to specimens. Possibly somewhat gneissic. Muscovite in laminae. No reaction with acid. Four pieces of rock.

Size: Siltstone, largest piece-3cm X 3cm X 2cm.
Quartzite, largest piece-4cm X 4cm X 3cm.

Weight: One-quarter pound; 0.12 kg.

Notes: Both rock types considered in place. Small quantity of sample probably because dredge

M-31 (Continued)

could not break off the indurated material from outcrop.

C-2 (8162)

Start: 36°32'50"N 121°57'33"W Finish: 36°32'51"N 121°57'54"W

Depth: 100 fms. to 75 fms.

Lith: GRANODIORITE: gray, with quartz, biotite, and feldspar. Similar to other dredged granodiorites, but dark minerals compose up to 10 per cent of total. Twenty pieces of rock, but only two show evidence of fresh fractures, which may have occurred in dredging. Shape round to sub-round to subangular, but weighted more to the round shape. Organisms and oxidation on all surfaces. "Weathering" common on surfaces and at a depth of 10cm. "Weathered" mineral some type of clay, probably derived from feldspar.

Size: Largest piece-26cm X 14cm X 10cm.

Weight: Forty pounds; 18.1 kg.

Notes: One piece of rock, 20cm in diameter, seemingly solid and not fractured, when hit lightly

C-2 (Continued)

with a hammer broke into numerous fragments. The fracture planes were covered with many, irregular tracks, similar to worm castings. These data suggest that organisms may have worked into the rock along planes of weakness and thus weakened the induration.

C-3 (7468)

Start: 36°34'24"N 122°01'18"W Finish: 36°33'15"N 122°01'18"W

Depth: 340 fms. to 220 fms.

Lith: GRANODIORITE: gray, with quartz, feldspar fresh to somewhat altered, and biotite. Two examples exhibit slickensides. Many interstices filled with inspissated tar (CCl_4 test). About one-half of rock angular and with fresh fractures. Another one-fourth of total sample formed of granodioritic rubble recemented by "dead" hydrocarbons. The remainder of dredging appears to be fault gouge.

FAULT GOUGE: green-gray, very indurated. Hard, dense. Black specks of tar scattered throughout. Hackly fracture. Very fine-

C-3 (Continued)

grained, cannot observe individual minerals. No evidence of bedding.

Size: Granodiorite, largest piece-10cm X 10cm X 8cm.
Fault Gouge, largest piece-15cm X 10cm X 12cm.

Weight: Thirty pounds; 13.6 kg.

Notes: This dredging just to east of limestone dredging C-5 (8165). C-3 lithology suggests sample came from a fault zone, owing to slickensides, inspissated tar, and that the rocks to the west are non-igneous. Tar may have risen to surface along fault zones.

Depth of dredging, distance from steamer lanes, and tar within rock interstices negates the possibility that the hydrocarbon came from a passing ship.

C-4 (7470)

Start: 36°37'40"N 122°03'17"W Finish: 36°38'00"N 122°01'35"W

Depth: 600 fms. to 170 fms.

Lith: GRANODIORITE AND FELSITE: Highly fragmented; about 2,500 pieces. Lithology variable; three main types.

a-GRANODIORITE A: gray, with quartz, "weathered" feldspar, and biotite. Some

fragments more dense than others. "Weathering" common to a depth of 10cm from the surface in contact with the ocean to unaltered material away from the oceanic contact. Rock angular with organism only on oxidized side in contact with ocean. Eighty-five per cent.

b-GRANODIORITE B: Similar to "A", but finer-grained. Large (1cm) phenocrysts on portion in contact with ocean. Approximately 5 per cent of total sample.

c-FELSITE: red-purple color or cast. Some "weathered". Phenocrysts up to 0.5cm on surface in contact with ocean. Gradational from coarse-grained near surface in contact with ocean to fine-grained away from this region. White, powdery "weathered" material on fractures and in interstices. Twenty pieces of rock. About 10 per cent of total (based on volume, not quantity).

Size: Largest piece 20cm X 18cm X 10cm.

Weight: One hundred twenty-five pounds; 56.7 kg.

Notes: Fragmental character explained by "weathered" nature. It is curious that certain fragments

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C-4 (Continued)

exhibit phenocrysts near surface in contact with ocean. Possibly this phenomenon can be explained either by crystal growth, when in contact with sea water, or is just a fortuitous occurrence.

C-5 (8165)

Start: 36°32'45"N 122°01'40"W

Finish: 36°32'15"N 122°00'42"W

Depth: 246 fms. to 200 fms.

Lith: LIMESTONE: gray-brown. Compact and dense. Extremely hard. Somewhat banded. Under 100-power microscope, grains difficult to distinguish. Small solution pits lined with secondary calcite(?). Subconchoidal fracture. Only one piece of rock. Organisms on one side only.

Insoluble residue investigation: Calcium carbonate 94.9 per cent of total rock. Residue composed of mica, glauconite(?), and siliceous hollow tubes; the last may be echinoderm spicules. Quartz fragments angular. (Later studies showed diatoms and radiolarians also present).

Size: Rectangular-18cm X 18cm X 16cm.

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C-5 (Continued)

Weight: One and one-half pounds; 0.7 kg.

Notes: Angularity and extremely hard pull on winch accumulator indicates rock in place. No evidence that rock rafted to west wall of canyon by kelp. This rock type probably would be more difficult to break from outcrop than any other type dredged.

C-11 (8160)

Start: 36°36'40"N 122°04'00"W

Finish: 36°37'10"N 122°03'35"W

Depth: 760 fms. to 450 fms.

Lith: SILTSTONE I: brown. Possible micro-fossils noted with hand lens. Fragments all angular. Rectangular shape noted on some fragments with laminae, suggesting similarities to Monterey shale. Sixty pieces above 1cm in diameter. Seventy-five per cent of total sample.

SILTSTONE II: gray-black to gray-brown. Siliceous, dense, and hard. No reaction with dilute HCl. Banded, angular edges. Subconchoidal fracture. One piece laced with veinlets of unknown white mineral. Twenty-five per cent of total sample.

C-11 (Continued)

Size: Siltstone I, largest piece-2.5cm X 2.5cm X 1cm.
Siltstone II, largest piece-2.5cm X 1.5cm X 1cm.

Notes: Obtained in small dredge attached to large dredge. The small size of the material probably passed through the large openings of the big dredge.

Soquel Canyon

Two dredgings in Soquel Canyon (Fig. 20) recovered rock in both cases. Station S-1 is on the east wall and station S-2 on the west wall. The VELERO IV station numbers are indicated in parentheses immediately following the report number.

S-1 (8163)

Start: 36°50'46"N 121°57'30"W Finish: 36°50'18"N 121°57'45"W

Depth: 133 fms. to 107 fms.

Lith: SANDSTONE: gray with iron stains. Fine-grained with inclusions of black material and composed mainly of quartz grains. Rather poorly-sorted in some fragments and better-sorted in others. No angular edges

S-1 (Continued)

on fragments, but probably in place because dredge caught twice while retrieving dredge. Bored by worms, but not as commonly as in siltstone described below. Largest piece with conical yellow, soft sponges on one side. Sponges about 1.5cm in height. One solitary coral noted. Approximately 75 per cent of total sample.

SILTSTONE: gray with some iron stains, but not as oxidized as sandstone described above. Worm borings common with U-shaped tubes. Appears to be composed principally of quartz grains.

Size: Sandstone, largest piece-20cm X 15cm X 12cm.
Siltstone, largest piece-8cm X 8cm X 2.5cm.

Weight: Thirty-five pounds; 15.8 kg.

Notes: In place. Dredging (siltstone) appears similar to Purisima (Pliocene) formation on land.

Worm tubes filled with green mud. May be relict. Fewer worm tubes noted in sandstone than in siltstone.

S-2 (7476)

Start: 36°48'59"N 121°59'29"W

Finish: 36°49'33"N 122°00'30"W

Depth: 270 fms. to 170 fms.

Lith: SANDSTONE: gray with bluish cast. Largest fragment iron stained to about 3cm below surface, but center not affected. Angular fractures indicate rock in place. Friable. Grains angular to round. Poorly-sorted, ranging from 2mm to 0.25mm. Grains mainly quartz and feldspar. Calcareous matrix with some white "weathered" material probably derived from alteration of feldspars. No fossils. About 25 pieces of rock.

Size: Largest piece-22cm X 19cm X 13cm.

Weight: Eleven pounds; 5.0 kg.

Notes: Sandstone has appearance of a "granite wash." Unlike any other rock type dredged from canyons.

MGG00005003

TABLE 2

SEDIMENT PARAMETERS

WALL ROCKS (Dredgings)

STATION	DEPTH (Fms.)	MEAN DIAM. Microns	MEAN DIAM. ø	STND. DEV. ø	SKEWNESS ø	KURTOSIS ø
M-8	285 to 100	11.1	6.5	1.3	-0.1	-0.3
M-10	300 to 50	62.7	4.0	2.7	+0.4	-0.3
M-9	180 to 150	10.0	6.6	2.1	+0.1	-0.7
M-12	477 to 110	13.7	6.2	1.9	+0.2	-0.4
M-14	532 to 500	16.6	5.9	1.9	+0.4	-0.4
M-16	517 to 490	10.0	6.7	1.7	+0.2	-0.5
M-19	583 to 533	12.4	6.3	1.9	+0.1	-0.5
S-1	133 to 107	500.7	1.0	2.2	+1.3	+3.3
S-2	270 to 170	6.4	7.3	1.8	-0.2	-0.3

TABLE 3

SEDIMENT PARAMETERS

(See Fig. 20B for station location)

GRABS

STATION	DEPTH (Fms.)	MEAN DIAM. Microns	MEAN DIAM. ø	STND. DEV. ø	SKEWNESS ø	KURTOSIS ø
AM	46	39.4	4.7	2.4	+0.4	-0.2
BM	191	16.7	5.9	2.6	+0.1	-0.7
CM	397	44.1	4.5	2.1	+0.6	+0.1
DM	701	874.2	0.2	1.6	+0.2	-0.6
EM	1,073	750.5	0.4	1.4	+0.1	-0.3
FM (Mud)	1,299	13.7	6.2	2.2	+0.1	-0.5
FM (Sand)	1,299	227.0	2.1	0.9	-0.5	+0.7
GM (Mud)	1,497	8.9	6.8	2.4	-0.4	+0.3
GM (Sand)	1,497	191.4	2.4	0.8	-0.3	+1.6
AS	117	7.3	7.1	1.6	+0.1	-0.6
BS	416	5.1	7.6	1.6	-0.1	-0.5
CS	374	15.1	6.0	2.3	+0.1	-0.6
AC *	194	84.8	3.6	1.6	+0.9	+2.4
BC	191	554.4	0.9	1.2	+0.2	+0.6
CC	478	158.0	2.6	2.9	+0.3	+0.1
DC *	417	84.2	3.6	1.9	+0.9	+1.3

* Not taken in canyon axis

TABLE 3 (Continued)

GRABS (Continued)

STATION	DEPTH (Fms.)	MEAN DIAM. Microns	MEAN DIAM. ø	STND. DEV. ø	SKEWNESS ø	KURTOSIS ø	PENETRATION (Feet)
EC(Mud)	875	17.6	5.8	2.7	-0.1	-0.5	
EC(Sand)	875	75.2	3.7	3.3	+0.2	-0.6	
CORES							
I(top)	66	9.0	6.8	2.3	-0.1	-0.8	1.5
I(bottom)	66	26.4	5.2	1.9	+0.6	+0.1	
II(top)	345	6.5	7.2	1.8	-0.1	-0.7	3.6
II(bottom)	345	8.8	6.8	2.2	-0.3	-0.2	
III(top)	900	6.0	7.3	1.6	-0.1	-0.6	3.5
III(bottom)	900	5.9	7.4	1.9	+0.3	-0.5	
IV	1,400	15.6	6.0	1.9	+0.2	-0.5	0.4
V(top)	1,130	4.0	8.0	1.7	-0.4	-0.3	1.8
V(bottom)	1,130	4.7	7.3	1.7	-0.2	-0.5	

(a) TABLE 4 (See Figure 20B)

LOCATIONS AND DEPTHS OF GREEN MUD DREDGINGS

Station	Start	Finish	Depth (fathoms)
M-1	36°48'00"N	36°47'30"N	213 to 143
(7455)	121°53'00"W	121°52'40"W	
M-2	36°46'55"N	36°47'45"N	170 to 48
(7459)	121°51'55"W	121°52'40"W	
M-3	36°49'00"N	36°48'12"N	210 to 45
(7458)	121°53'10"W	121°51'42"W	
M-4	36°47'27"N	36°48'25"N	193 to 105
(7456)	121°53'00"W	121°53'15"W	
M-5	36°47'00"N	36°45'48"N	300 to 150
(7460)	121°54'56"W	121°53'58"W	
M-6	36°48'30"N	36°48'28"N	147 to 50
(8164)	121°53'00"W	121°52'15"W	
M-7	36°45'14"N	36°45'20"N	127 to 95
(8153)	121°56'08"W	121°55'27"W	
M-11	36°46'45"N	36°45'18"N	430 to 80
(8130)	121°58'01"W	121°56'28"W	
M-13	36°46'09"N	36°44'33"N	440 to 300
(8132)	121°58'04"W	121°59'30"W	
M-15	36°46'26"N	36°35'20"N	300 to 140
(8133)	121°58'40"W	121°56'30"W	
M-20	36°44'45"N	36°43'42"N	560 to 500
(8159)	122°10'05"W	122°10'00"W	

(a) TABLE 4 (Continued)

Station	Start	Finish	Depth (fathoms)
M-21	36°44'50"N	36°45'04"N	550 to 250
(7465)	122°02'00"W	121°59'23"W	
M-23	36°43'10"N	36°43'00"N	500 to 365
(8151)	122°00'20"W	121°58'00"W	
C-1	36°32'30"N	36°32'12"N	317 to 300
(8161)	122°01'01"W	122°00'30"W	
C-7	36°34'00"N	36°32'57"N	500 to 330
(7469)	122°01'45"W	122°02'30"W	
C-9	36°36'24"N	36°34'50"N	690 to 520
(8128)	122°02'28"W	122°05'05"W	
[illegible]-1	36°48'30"N	36°49'36"N	Approximately
(8158)	122°13'50"W	122°12'50"W	500 fathoms

(b) TABLE 4 (See Figure 2CB)

LOCATIONS AND DEPTHS OF AXIAL GRAB SAMPLES

Station	Location	Depth (fathoms)
	MONTEREY CANYON	
AM (8135)	36°48'10"N; 121°47'38"W	46
BM (8136)	36°47'45"N; 121°52'00"W	191
CM (8137)	36°46'45"N; 121°56'15"W	397
DM (8138)	36°43'24"N; 122°01'21"W	701
EM (8139)	36°41'15"N; 122°06'10"W	1073
FM (8146)	36°35'00"N; 122°09'22"W	1299
GM (8147)	36°35'20"N; 122°16'25"W	1497
	CARMEL CANYON	
AC (8142)	36°32'02"N; 121°56'49"W	194
BC (8141)	36°32'10"N; 121°56'41"W	191
CC (8144)	36°33'24"N; 122°00'50"W	478
DC (8143)	36°33'03"N; 122°00'57"W	417
EC (8140)	36°38'16"N; 122°04'14"W	875
	SOQUEL CANYON	
AS (8148)	36°51'30"N; 121°57'42"W	117
BS (8149)	36°48'28"N; 122°04'14"W	416
CS (8150)	36°37'20"N; 122°04'38"W	374

(c) TABLE 4 (See Figure 20B)

LOCATIONS AND DEPTHS OF CORES

Station		Location	Depth (fathoms)
I	(7477)	36°47'20"N; 121°49'00"W	66
II	(7480)	36°46'51"N; 121°56'26"W	345
III	(7474)	36°38'27"N; 121°09'00"W	900
IV	(7473)	36°33'56"N; 122°17'06"W	1400
V	(7472)	36°40'20"N; 122°25'00"W	1130

LOCATIONS

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From Dissertation BDM

DUPLICATE

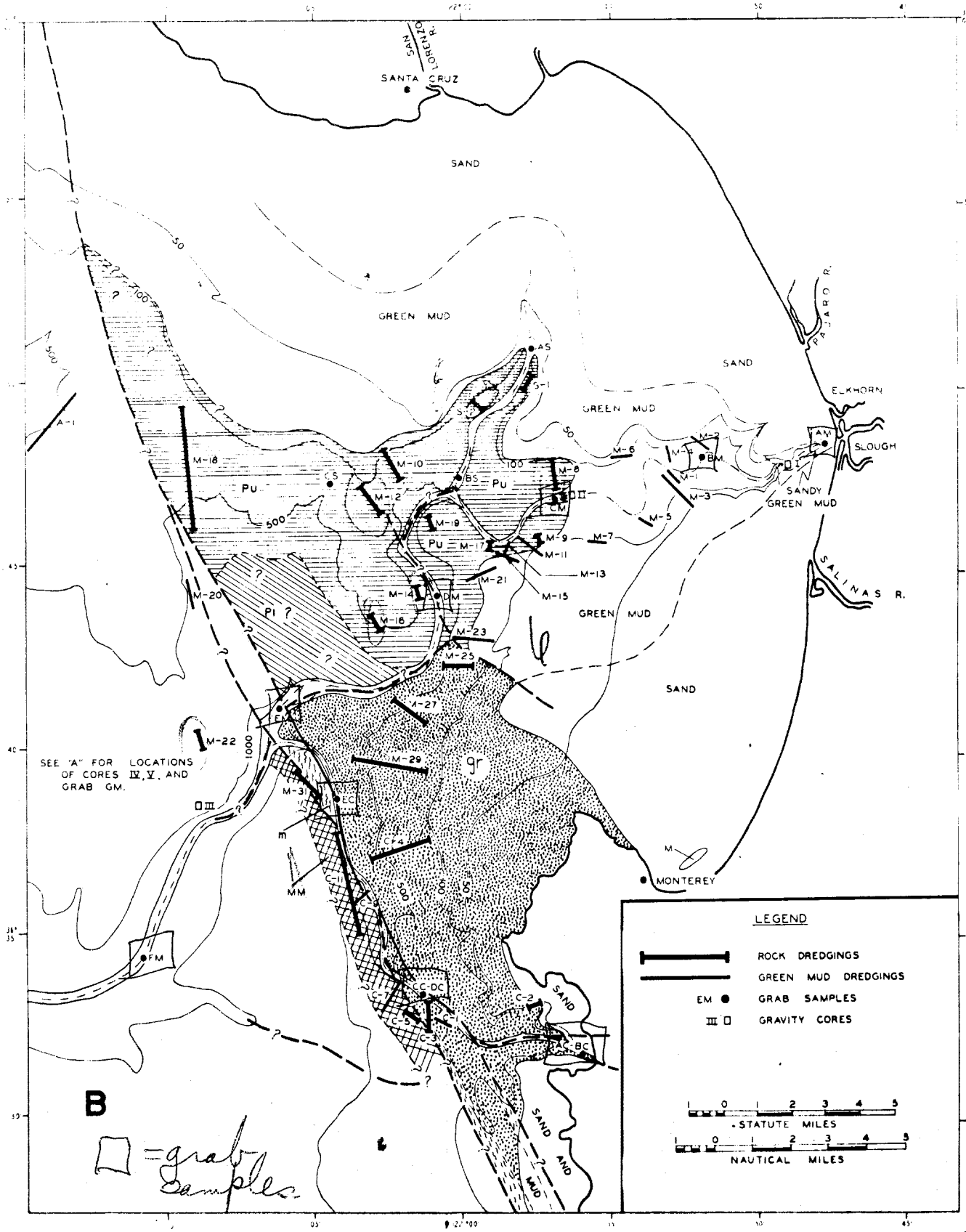
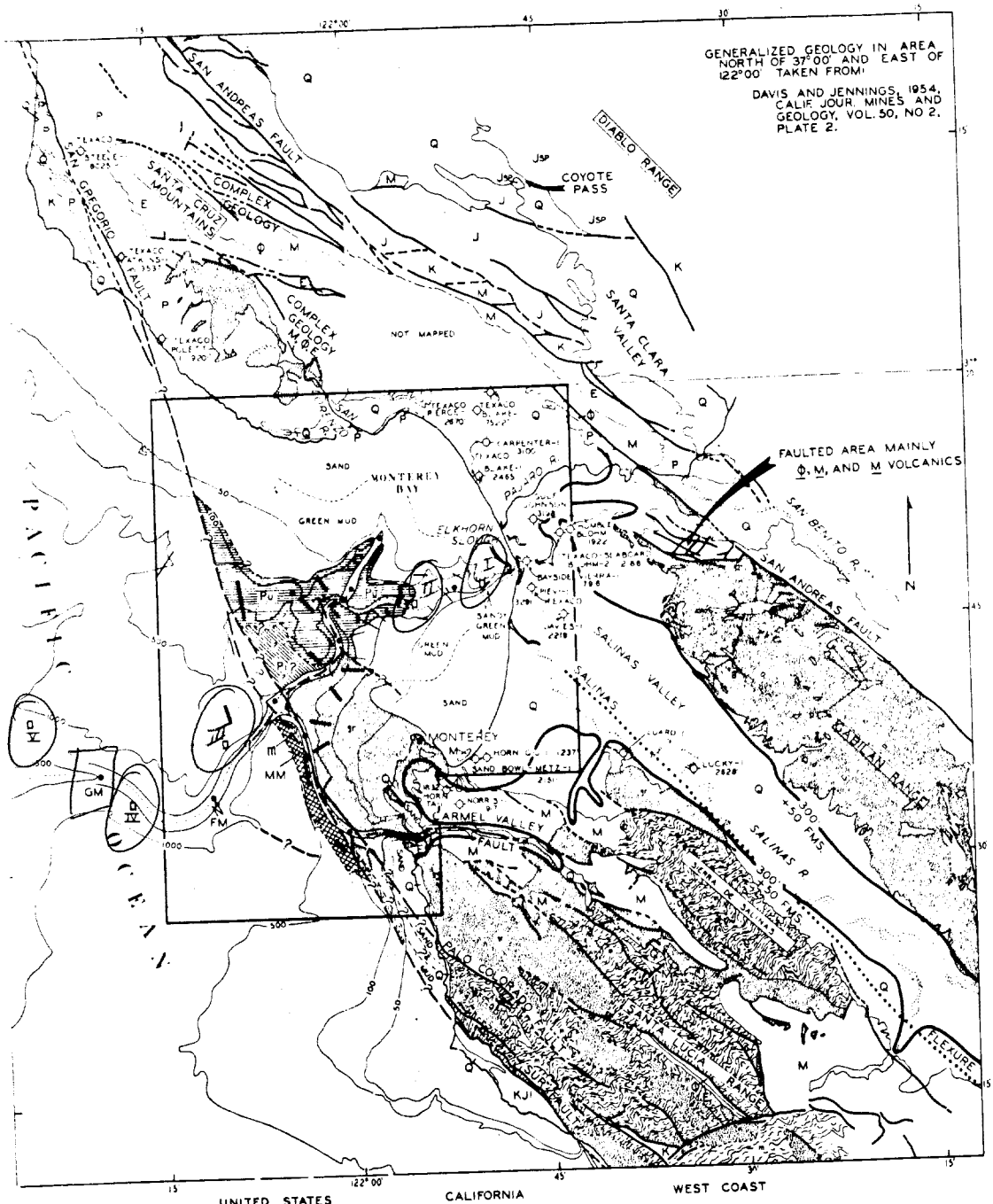


Figure 20

MGG00005003

DUPLICATE

From Dissertation BDM



UNITED STATES CALIFORNIA WEST COAST

MONTEREY CANYON

MARINE AND CONTINENTAL GEOLOGY

CONTOURS IN FATHOMS

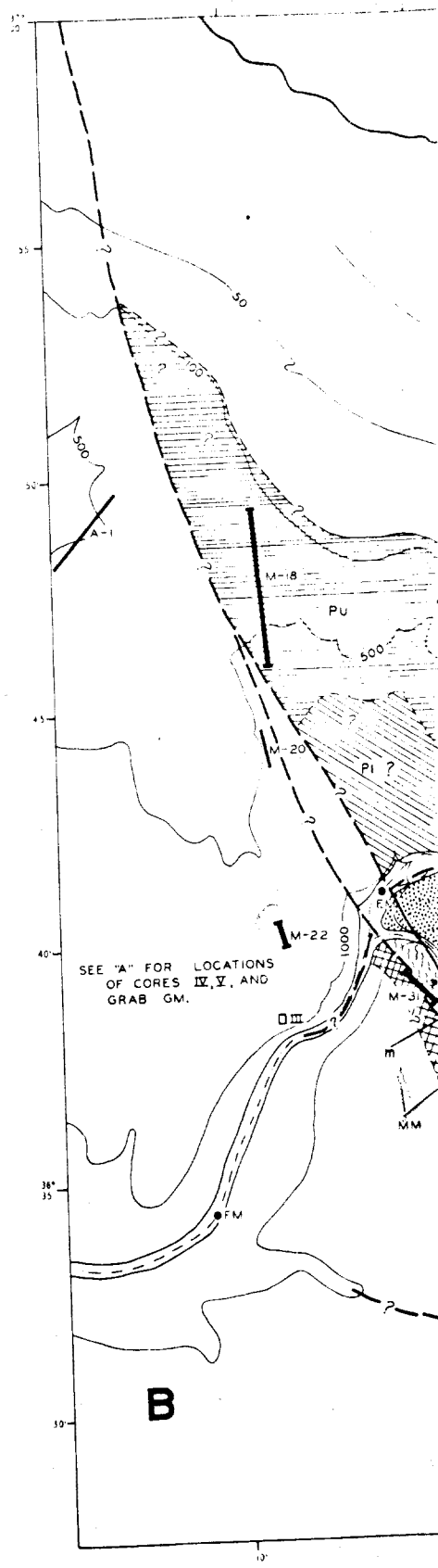
LEGEND

Q—QUATERNARY AND PLEISTOCENE-NONMARINE
P—PLIOCENE-POSSIBLY UPPER PART MARINE PLEISTOCENE
Pu—UPPER PLIOCENE
Pl—LOWER PLIOCENE?
M—MIOCENE
UM—UPPER MIOCENE
MM—MIDDLE MIOCENE
LM—LOWER MIOCENE
Φ—OLIGOCENE
E—EOCENE
K—UPPER CRETACEOUS
KJf—FRANCISCAN GROUP
gr—CRETACEOUS GRANODIORITE
m & ls—PRE-CRETACEOUS METAMORPHICS

SOURCES:
STATE GEOLOGIC MAP:
SANTA CRUZ SHEET
SAN FRANCISCO SHEET
GALLIHER, E.W., 1932
R.V. VELERO IV 1961, 1962

STATUTE MILES
NAUTICAL MILES

A



B

O = core
□ = grab

Reprint from "Monterey Submarine Canyon, California: Genesis & Relationships to Continental Geology" Bruce D. Martin 1964. Oceanog. Office Library QE39M3

MGG00005003

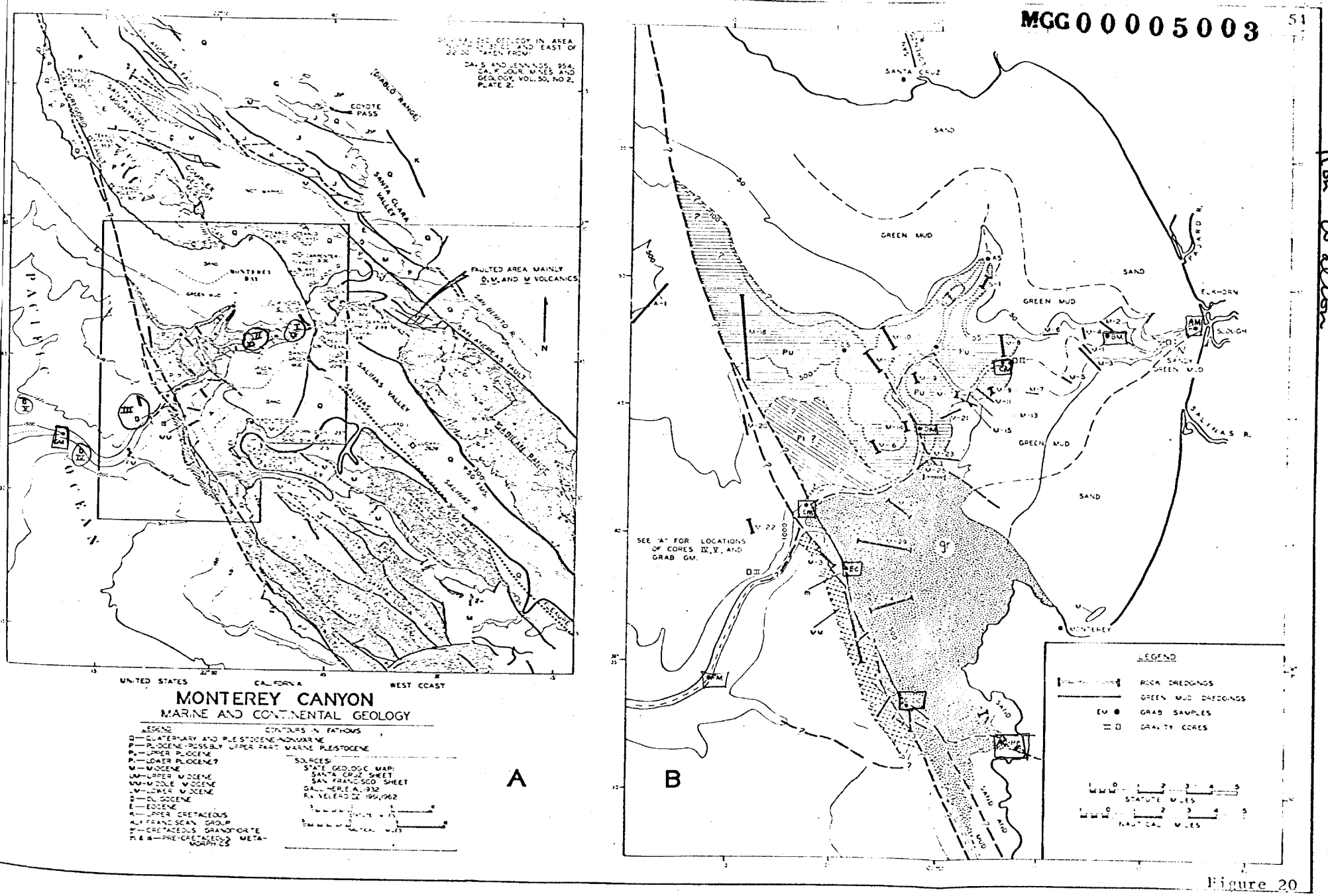


Figure 20

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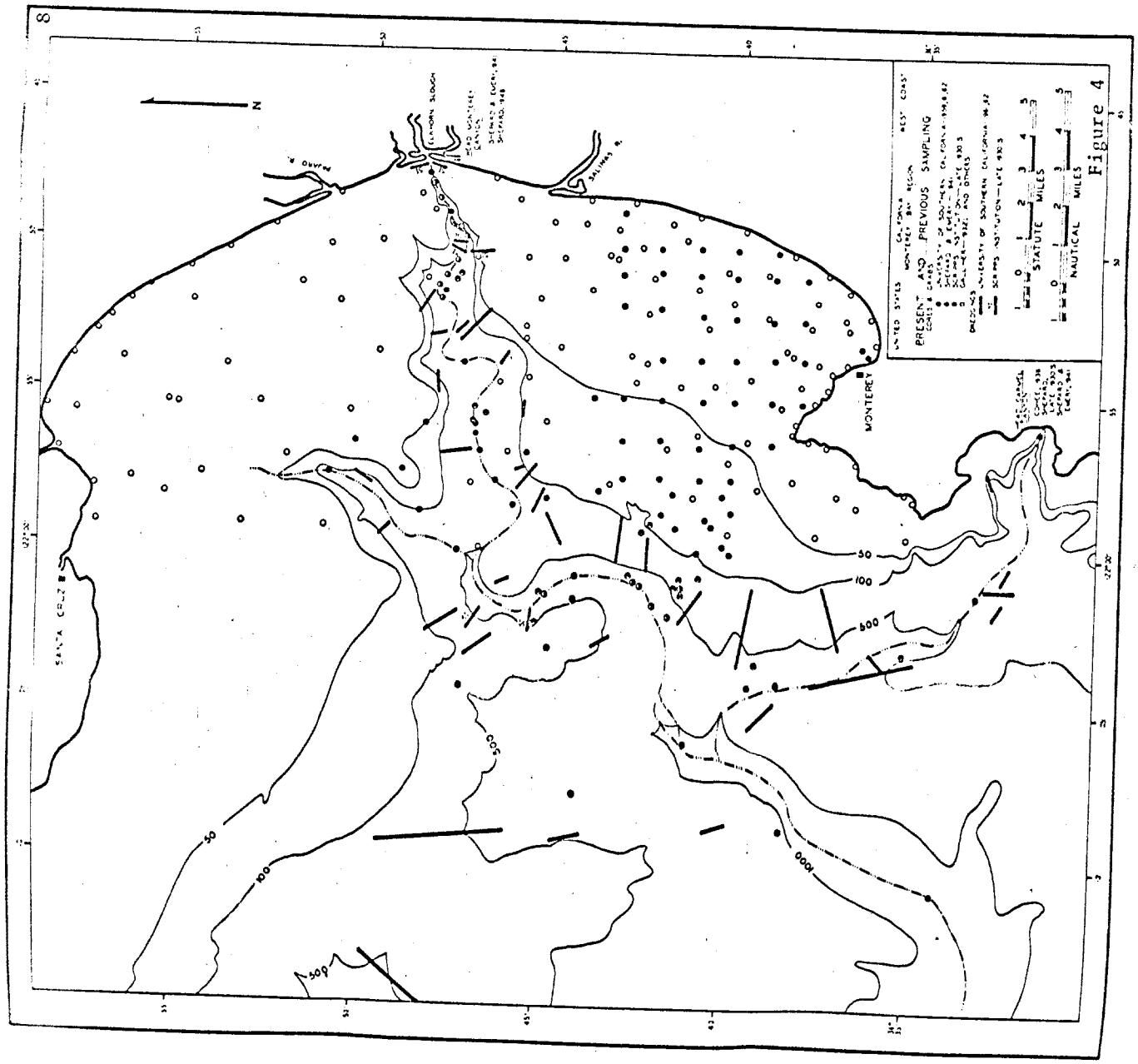

Figure 4

NDCA 050868-1 35
Ale

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TEXTORAL ANALYSIS RAW DATA
FOR TABLE #3

SAMPLE NUMBER 1 CODE NUMBER 1

Not Cumulative

AM

WEIGHT PERCENTAGES	PHI is in usable form	WEIGHT	PERCENTAGE
	-.5000	.0560	.1878
	.5000	.7310	2.4519
	1.5000	1.7900	6.0039
	2.5000	4.1990	14.0840
	3.5000	8.4500	28.3424
	4.5000	5.5200	18.5148
	5.5000	1.5400	5.1654
	6.5000	1.4400	4.8299
	7.5000	1.6600	5.5679
	8.5000	1.1800	3.9579
	9.5000	3.2480	10.8942

SAMPLE NUMBER 2 BM CODE NUMBER 1

BM

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	.5000	.0470	.0992
	1.5000	.2580	.5448
	2.5000	8.2080	17.3325
	3.5000	5.7430	12.1273
	4.5000	7.4800	15.7953
	5.5000	3.7800	7.9821
	6.5000	3.7200	7.8554
	7.5000	4.4000	9.2913
	8.5000	3.4800	7.3486
	9.5000	10.2400	21.6234

SAMPLE NUMBER 3 CM CODE NUMBER 1

CM

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	.5000	.0070	.0156
	1.5000	.1070	.2378
	2.5000	12.1780	27.0700
	3.5000	14.6350	32.5316
	4.5000	4.6200	10.2696
	5.5000	3.5600	7.9134
	6.5000	2.7600	6.1351
	7.5000	1.8200	4.0456
	8.5000	1.5000	3.3343
	9.5000	3.8000	8.4469

SAMPLE NUMBER 4 DM CODE NUMBER 1

WEIGHT PERCENTAGES

DM

PHI	WEIGHT	PERCENTAGE
-1.5000	61.2840	37.8000
-.5000	21.4820	13.2501
.5000	23.0820	14.2370
1.5000	23.4410	14.4584
2.5000	28.1360	17.3543
3.5000	4.0190	2.4789
4.5000	.6830	.4213

SAMPLE NUMBER 5 EM CODE NUMBER 1

WEIGHT PERCENTAGES

EM

PHI	WEIGHT	PERCENTAGE
-1.5000	12.0930	20.1920
-.5000	12.3770	20.6662
.5000	13.6140	22.7317
1.5000	13.7170	22.9037
2.5000	7.1180	11.8851
3.5000	.3830	.6395
4.5000	.5880	.9818

SAMPLE NUMBER 6 FM CODE NUMBER 1

WEIGHT PERCENTAGES

6 FM

PHI	WEIGHT	PERCENTAGE
-.5000	.0350	.0782
.5000	.1250	.2793
1.5000	.2750	.6144
2.5000	1.4220	3.1768
3.5000	3.2850	7.3388
4.5000	12.9200	28.8638
5.5000	5.6200	12.5553
6.5000	5.2000	11.6170
7.5000	4.2800	9.5617
8.5000	3.7200	8.3106
9.5000	7.8800	17.6042

FM IS CONT.

MC3000005003

SAMPLE NUMBER 7 FM CODE NUMBER 1

7FM

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	-1.5000	.4210	.3810
	-.5000	3.6420	3.2960
	.5000	9.7380	8.8128
	1.5000	18.6810	16.9062
	2.5000	68.6860	62.1604
	3.5000	7.7220	6.9884
	4.5000	1.6080	1.4552

SAMPLE NUMBER 8 GM CODE NUMBER 1

8 GM

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	-1.5000	.3920	.8834
	-.5000	.1550	.3493
	.5000	.2610	.5882
	1.5000	1.7520	3.9481
	2.5000	.1070	.2411
	3.5000	1.9690	4.4371
	4.5000	5.2400	11.8082
	5.5000	4.6600	10.5012
	6.5000	6.9600	15.6842
	7.5000	6.9400	15.6391
	8.5000	5.1000	11.4927
	9.5000	10.8400	24.4276

SAMPLE NUMBER 9 GM. CODE NUMBER 1

9GM

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	-1.5000	.7090	.6362
	-.5000	.2240	.2010
	.5000	2.9470	2.6446
	1.5000	24.1050	21.6314
	2.5000	64.8060	58.1559
	3.5000	16.5560	14.8571
	4.5000	2.0880	1.8737

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SAMPLE NUMBER 12 DC CODE NUMBER 1

n DC

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	-.5000	.0500	.1091
	.5000	.3920	.8556
	1.5000	3.5490	7.7465
	2.5000	18.5860	40.5684
	3.5000	13.8170	30.1589
	4.5000	2.7600	6.0244
	5.5000	1.4000	3.0558
	6.5000	1.2000	2.6193
	7.5000	1.1200	2.4447
	8.5000	.9800	2.1391
	9.5000	1.9600	4.2782

SAMPLE NUMBER 13 CC CODE NUMBER 1

CC

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	-1.5000	6.1910	13.9002
	-.5000	3.0340	6.8120
	.5000	3.3720	7.5709
	1.5000	3.6860	8.2759
	2.5000	10.1980	22.8968
	3.5000	8.0880	18.1594
	4.5000	2.4400	5.4783
	5.5000	1.8400	4.1312
	6.5000	1.1300	2.5371
	7.5000	1.2400	2.7841
	8.5000	.9200	2.0656
	9.5000	2.4000	5.3885

SAMPLE NUMBER 14 AC CODE NUMBER 1

AC

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	-1.5000	.0490	.1162
	-.5000	.0970	.2300
	.5000	.3470	.8226
	1.5000	1.8850	4.4688
	2.5000	13.4800	31.9575
	3.5000	18.2790	43.3347
	4.5000	3.7640	8.9234
	5.5000	1.0000	2.3707
	6.5000	.7800	1.8492
	7.5000	.5800	1.3750
	8.5000	.5200	1.2328
	9.5000	1.4000	3.3190

SAMPLE NUMBER 15 ~~DC~~ CODE NUMBER 1

15 DC
BC

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	-1.5000	1.8240	6.3025
	-.5000	3.6860	12.7363
	.5000	10.4180	35.9974
	1.5000	10.3480	35.7555
	2.5000	1.3900	4.8029
	3.5000	.7070	2.4429
	4.5000	.5680	1.9626

SAMPLE NUMBER 16 EC CODE NUMBER 1

16 EC

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	-1.5000	.0730	.2597
	-.5000	.3100	1.1028
	.5000	.8300	2.9527
	1.5000	.8920	3.1732
	2.5000	2.7740	9.8684
	3.5000	3.4510	12.2768
	4.5000	3.1200	11.0993
	5.5000	2.5800	9.1782
	6.5000	3.0800	10.9570
	7.5000	3.3600	11.9530
	8.5000	2.7000	9.6051
	9.5000	4.9400	17.5738

SAMPLE NUMBER 17 EC CODE NUMBER 1

17 EC

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	-1.5000	.9740	2.0996
	-.5000	2.8880	6.2256
	.5000	8.8080	18.9873
	1.5000	6.9900	15.0682
	2.5000	4.3670	9.4139
	3.5000	3.9220	8.4546
	4.5000	2.3200	5.0012
	5.5000	2.7200	5.8635
	6.5000	2.7200	5.8635
	7.5000	2.8600	6.1653
	8.5000	2.2600	4.8718
	9.5000	5.5600	11.9856

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CORE I (TOP)

SAMPLE NUMBER 28 7477 T CODE NUMBER 1

7477 T

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	.5000	.0050	.0102
	1.5000	.0300	.0614
	2.5000	.2430	.4971
	3.5000	5.6460	11.5498
	4.5000	11.1200	22.7477
	5.5000	3.1800	6.5052
	6.5000	4.2000	8.5918
	7.5000	5.3400	10.9238
	8.5000	5.0200	10.2692
	9.5000	14.1000	28.8438

CORE II (BOTTOM)

SAMPLE NUMBER 29 7477 B CODE NUMBER 1

7477 B

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	-.5000	.0110	.0205
	.5000	.0610	.1139
	1.5000	.0790	.1475
	2.5000	.6510	1.2156
	3.5000	11.7400	21.9222
	4.5000	24.2310	45.2468
	5.5000	3.8800	7.2452
	6.5000	2.8000	5.2285
	7.5000	2.2800	4.2575
	8.5000	1.8800	3.5105
	9.5000	5.9400	11.0918

CORE II (TOP)

SAMPLE NUMBER 30 7480 T CODE NUMBER 1

7480 T

WEIGHT PERCENTAGES	PHI	WEIGHT	PERCENTAGE
	3.5000	.3480	.7218
	4.5000	4.7470	9.8455
	5.5000	9.6600	20.0353
	6.5000	8.4600	17.5464
	7.5000	6.4800	13.4398
	8.5000	5.2000	10.7850
	9.5000	13.3200	27.6263

CORE II (BOTTOM)

SAMPLE NUMBER 31 CODE NUMBER 1

7480 B

WEIGHT PERCENTAGES

7480
B

PHI	WEIGHT	PERCENTAGE
-.5000	.0970	.1903
.5000	.1760	.3453
1.5000	.6000	1.1772
2.5000	2.5570	5.0169
3.5000	1.9380	3.8024
4.5000	4.5000	8.8291
5.5000	7.3800	14.4797
6.5000	8.1800	16.0493
7.5000	8.8200	17.3050
8.5000	5.0000	9.8101
9.5000	11.7200	22.9948

CORE III (TOP)

SAMPLE NUMBER 32 7474 T CODE NUMBER 1

WEIGHT PERCENTAGES

7474
T

PHI	WEIGHT	PERCENTAGE
3.5000	.0200	.0409
4.5000	4.5200	9.2509
5.5000	7.7800	15.9230
6.5000	8.3800	17.1510
7.5000	9.2600	18.9521
8.5000	6.2400	12.7712
9.5000	12.6600	25.9108

CORE III (BOTTOM)

SAMPLE NUMBER 33 7474 B CODE NUMBER 1

WEIGHT PERCENTAGES

7474
B

PHI	WEIGHT	PERCENTAGE
3.5000	.7820	1.5894
4.5000	3.5000	7.1135
5.5000	6.8600	13.9425
6.5000	9.3000	18.9017
7.5000	9.7600	19.8366
8.5000	6.0600	12.3166
9.5000	12.9400	26.2997

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CORE IV

SAMPLE NUMBER 34 7473 CODE NUMBER 1

WEIGHT PERCENTAGES

7473

PHI	WEIGHT	PERCENTAGE
3.5000	6.5250	12.2870
4.5000	17.0200	32.0497
5.5000	6.0200	11.3360
6.5000	7.5800	14.2736
7.5000	5.2800	9.9426
8.5000	3.9800	7.4946
9.5000	6.7000	12.6165

CORE 5 (TOP)

SAMPLE NUMBER 35 7472 (T) CODE NUMBER 1

WEIGHT PERCENTAGES

7472 T

PHI	WEIGHT	PERCENTAGE
3.5000	.4360	.8766
4.5000	3.4200	6.8763
5.5000	7.0000	14.0743
9.5000	8.2600	16.6077
7.5000	10.8800	21.8755
8.5000	6.8200	13.7124
9.5000	12.9200	25.9772

CORE V (BOTTOM)

SAMPLE NUMBER 36 7472 (B) CODE NUMBER 1

WEIGHT PERCENTAGES

7472 B

PHI	WEIGHT	PERCENTAGE
3.5000	1.0810	2.1750
4.5000	3.3800	6.8007
5.5000	6.7800	13.6416
6.5000	8.3000	16.6999
7.5000	10.3400	20.8044
8.5000	6.4800	13.0380
9.5000	13.3400	26.8405