LABORATORY ITEM 470

MGG09005046

A SUMMARY OF SEDIMENT SIZE AND CHEMISTRY OF TWO CORES FROM LITTLE CREEK, VA. AND TWO CORES FROM THE NORFOLK NAVAL SHIPYARD. NAVY DIVERS. NOV 1973.

Prepared by: J. Bowman
R. Oser

Prepared for: Code 6110

July 1974

Geological Laboratory
Nearshore Surveys Division
Oceanographic Surveys Department

NAVAL OCEANOGRAPHIC OFFICE
WASHINGTON, D.C. 20373

MGG-0 9 0 0 5 0 4 6

GRAVEL, SAND SILT, CLAY — Percent of the total sample weight within the four size classes.

Class ranges are:

1. Gravel - coarser than 2 mm
2. Sand - 2 to 0.0625 mm
3. Silt - 0.0625 to 0.0039 mm
4. Clay - finer than 0.0039

MEAN (MM) — The geometric mean of the distribution expressed in millimeters.

MEAN (PHI) — The logarithmic mean of the distribution expressed in phi units ($-\log_2$) of the diameter in millimeters.

STAN DEV — Standard deviation. A measure of the degree of spread or dispersion of the distribution about the mean expressed in phi units.

$$s = \sqrt{\frac{\sum f \quad (X_i - \bar{X})^2}{100}}$$

SKEWNESS — A measure of the asymmetry of the distribution. Positive values denote skewness of the distribution toward the fine particles; negative values denote skewness toward the coarse particles. A normal distribution has a skewness of 0.

$$\text{Skewness} = \frac{2 \sum f \quad (X_i - X)^3}{100 \quad s^3}$$

KURTOSIS — A measure of the peakedness of the distribution. Positive values denote a "leptokurtic" distribution more "peaked" than normal. Negative values denote a "platykurtic" distribution, or a distribution more "flat" than normal. When using the following formula, a normal curve has a kurtosis of 0.

$$\text{Kurtosis} = \left[\frac{\sum f \quad (X_i - \bar{X})^4}{100 \quad s^4} \right] - 3$$

$CACO_3$ — Percent of the total sample weight soluble in 2 N HCL.

ORG CARBON — Percent organic carbon of the total sample weight as determined using a Leco carbon analyzer.

COLOR — Wet sediment color, based on the Geological Society of America Rock-Color Chart, as determined in the laboratory.

NITROGEN — Percent nitrogen of the total sample weight as determined by the Kjeldahl method.

The results of the sediment size and composition analyses are printed out in tabular form.

The following is an explanation of the terms encountered on the data printout sheet:

CRUISE A number assigned to each cruise for identification purposes.

SAMPLE A consecutive number applied to each core taken successively throughout the cruise.

LATITUDE Expressed in degrees, minutes, and tenths of minutes.

LONGITUDE Expressed in degrees, minutes and tenths of minutes.

TAKEN Date in day, month, and year that core was taken.

CORER TYPE Letters corresponding to sampling device code below.

Corers		Grabs	
HYP	Hydroplastic piston	SPK	Shipek Sediment Sampler
HYG	Hydroplastic gravity	HLP	Alpine Heavy Duty Grab
KUP	Kullenberg piston	SMS	Small Mud Snapper
KUG	Kullenberg gravity	VVS	Van Veen Grab
PHL	Phlegar gravity	BED	Birge-Ekman Dredge
MEG	Modified Ewing gravity	DLS	Dietz-LaFond Snapper
MEP	Modified Ewing piston	OPG	Orange Peel Grab
VIB	Vibrocorer	SBS	Scoopfish Bottom Sampler
BOM	Boomerang	DOC	Diver Operated Corer
EWP	Ewing piston		
EWG	Ewing gravity		

LENGTH Length of core recorded in centimeters as observed in the laboratory.

PENETRATION Penetration of coring device recorded in centimeters as observed in the field.

DEPTH The uncorrected sonic sounding in meters.

ANALYZED Date in day, month, and year that core was analyzed in the laboratory.

I.D. No. Three or four digit laboratory project number followed by consecutive number assigned to each subsample analyzed.

INTERVAL Interval of subsample as measured in centimeters from the top of the core.

MM Particle diameter size intervals based on Wentworth size grades in millimeters.

PER Percent of total sample weight within the given size interval.

MGG09005046

LOG FOR CORE SAMPLES

Project No: 470
Location: Little Creek, Norfolk NSY

Logged By J.C. Bowman
Date Logged 21 May 74

	La No.	Color	Calc. Mat.	Sediment Type	Remarks
Sample No: LC #1 Lat: Long: Date: Nov, 73 Water depth:	469-1	Medium Gray N4	Yes	Sand	0"-12" (0-30cm) Shell fragments
Sample No: Lat: Long: Date: Water depth:	469-2	Medium Gray N4	Yes	Sand	12"-44" (30-112 cm) shell fragments
Sample No: Lat: Long: Date: Water depth:	469-3	Medium Gray N4	NO	Silty Clay	44"-75" (112-190cm) Slight Ammonia odor
Sample No: LC #2 Lat: Long: Date: Nov, 73 Water depth:	469-4	Greenish black 5G2/1	Yes	Silt	0"-12" (0-30 cm) Shell fragments
Sample No: Lat: Long: Date: Water depth:	469-5	Greenish black 5G2/1	NO	Silty Sand	12"-48" (30-122cm)
Sample No: Lat: Long: Date: Water depth:	469-6	Greenish black 5G2/1	NO	Silt	48"-73" (122-185cm)
Sample No: Lat: Long: Date: Water depth:					
Sample No: Lat: Long: Date: Water depth:					
Sample No: Lat: Long: Date:					

MØG09005046

LOG FOR CORE SAMPLES

Project No: 470
Location: Little Creek, Norfolk NSY

Logged By J.C. Bowman
Date Logged 21 May 74

	La No.	Color	Calc. Mat.	Sediment Type	Remarks
Sample No: NSY-1 Lat: 76° 20' (N) Long: 36° 57' W) Date: Nov, 73 Water depth:	469-7	Black N1	No	Silt	0"-12" (0-30 cm) Oil odor
Sample No: Lat: Long: Date: Water depth:	469-8	Black N1	No	Silt	12"-44" (30-112 cm) Oil odor
Sample No: Lat: Long: Date: Water depth:	469-9	Black N1	No	Silt	44"-77" (112-196 cm) Oil odor Oil Slicks
Sample No: NSY-2 Lat: 76° 20' N Long: 36° 57' W Date: Nov, 73 Water depth:	469-10	Black N1	No	Silt	0"-12" (0-30 cm)
Sample No: Lat: Long: Date: Water depth:	469-11	Black N1	No	Silt	12"-46" (30-117 cm) Oil Slicks Oil odor
Sample No: Lat: Long: Date: Water depth:	469-12	Black N1	No	Silt	46"-80" (117-203 cm)
Sample No: Lat: Long: Date: Water depth:					
Sample No: Lat: Long: Date: Water depth:					
Sample No: Lat: Long:					

SEDIMENT SIZE AND COMPOSITION DATA

CRUISE LCREEK TAKEN 0NOV73 LATITUDE 0 .00 MARSDEN SQUARE LENGTH 190.0 ANALYZED 0JUN74
SAMPLE LC-1 DEPTH .0 LONGITUDE 0 .00 CORER TYPE DOC PENETRATION .0

	SUBSAMPLE ID.	470 1	470 2	470 3
	DEPTH INTERVAL	.0- 30.0	30.0-112.0	112.0-190.0
MEAN (PHI)	DIAM (MM)	PERCENT	PERCENT	PERCENT
<-4	>16.000	.000	.000	.000
-4 TO -3	16.000 TO 8.000	.000	.000	.000
-3 TO -2	8.000 TO 4.000	.000	.000	.000
-2 TO -1	4.000 TO 2.000	.179	.126	.000
-1 TO 0	2.000 TO 1.000	1.600	1.421	.777
0 TO 1	1.000 TO .500	21.819	28.089	13.777
1 TO 2	.500 TO .250	44.356	55.567	32.210
2 TO 3	.250 TO .125	24.026	10.002	1.150
3 TO 4	.125 TO .063	5.324	1.098	1.319
4 TO 5	.063 TO .031	.650	.045	.328
5 TO 6	.031 TO .016	.301	.013	8.029
6 TO 7	.016 TO .008	.204	.161	8.500
7 TO 8	.008 TO .004	.170	.413	6.634
8 TO 9	.004 TO .002	.008	.440	4.241
9 TO 10	.002 TO .001	.004	.080	1.512
>10	<.001	1.359	2.543	21.524
	GRAVEL (>2.0 MM)	.179	.126	.000
	SAND (2.0-.063 MM)	97.126	96.178	49.233
	SILT (.063-.004 MM)	1.324	.632	23.491
	CLAY (<.004 MM)	1.371	3.063	27.276
	MEAN (MM)	.2940	.3277	.0336
	MEAN (PHI)	1.766	1.610	4.894
	STANDARD DEVIATION	1.416	1.733	3.876
	SKEWNESS	1.688	1.955	.148
	KURTOSIS	18.091	16.836	-1.532
	ORGANIC CARBON	.070	.089	.620
	NITROGEN (KJELDAHL)	.028	.026	.061
	COLOR (GSA)	N4	N4	N4

MGG09005046

SEDIMENT SIZE AND COMPOSITION DATA

CRUISE LCREEK TAKEN 0NOV73 LATITUDE 0 .00 MARSDEN SQUARE LENGTH 190.0 ANALYZED 0JUN74
SAMPLE LC-2 DEPTH .0 LONGITUDE 0 .00 CORER TYPE PENETRATION .0

	SUBSAMPLE ID.	470 4	470 5	470 6
	DEPTH INTERVAL	.0- 30.0	30.0-122.0	122.0-185.0
BEAM (PHI)	DIAM (MM)	PERCENT	PERCENT	PERCENT
<-4	>16.000	.000	.000	.000
-4 TO -3	16.000 TO 8.000	.000	.000	.000
-3 TO -2	8.000 TO 4.000	.000	.000	.000
-2 TO -1	4.000 TO 2.000	.301	.203	.000
-1 TO 0	2.000 TO 1.000	1.901	.824	.000
0 TO 1	1.000 TO .500	21.845	11.279	.125
1 TO 2	.500 TO .250	44.450	39.712	3.354
2 TO 3	.250 TO .125	14.932	25.405	16.063
3 TO 4	.125 TO .063	6.170	7.752	13.558
4 TO 5	.063 TO .031	.722	.442	5.092
5 TO 6	.031 TO .016	.754	2.907	8.759
6 TO 7	.016 TO .008	.926	2.543	9.254
7 TO 8	.008 TO .004	.406	1.968	8.668
8 TO 9	.004 TO .002	2.022	1.467	6.728
9 TO 10	.002 TO .001	.059	.079	5.354
>10	<.001	5.513	5.420	23.034
	GRAVEL (>2.0 MM)	.301	.203	.000
	SAND (2.0-.063 MM)	89.297	84.971	33.100
	SILT (.063-.004 MM)	2.808	7.861	31.783
	CLAY (<.004 MM)	7.594	6.966	35.117
	MEAN (MM)	.2070	.1491	.0119
	MEAN (PHI)	2.272	2.745	6.389
	STANDARD DEVIATION	2.486	2.487	3.078
	SKEWNESS	1.158	.973	.018
	KURTOSIS	4.750	3.167	-1.443
	ORGANIC CARBON	.234	.260	.277
	NITROGEN (KJELDAHL)	.013	.026	.027
	COLOR (GSA)	5G2/1	5G2/1	5G2/1

MGG09005046

SEDIMENT SIZE AND COMPOSITION DATA

CRUISE NORFLK TAKEN 0NOV73 LATITUDE 76 20.00 N MARSDEN SQUARE 116 LENGTH 1.9 ANALYZED 0JUN74
SAMPLE NSY-1 DEPTH .0 LONGITUDE 36 57.00 W CORER TYPE DOC PENETRATION ******

	SUBSAMPLE ID.	470 7	470 8	470 9
	DEPTH INTERVAL	.0- 30.0	30.0-112.0	112.0-196.0
DIAM (PHI)	DIAM (MM)	PERCENT	PERCENT	PERCENT
<-4	>16.000	.000	.000	.000
-4 TO -3	16.000 TO 8.000	.000	.000	.000
-3 TO -2	8.000 TO 4.000	.000	.000	.000
-2 TO -1	4.000 TO 2.000	.769	1.788	4.555
-1 TO 0	2.000 TO 1.000	.819	5.046	10.416
0 TO 1	1.000 TO .500	1.331	9.083	15.184
1 TO 2	.500 TO .250	2.117	12.595	18.980
2 TO 3	.250 TO .125	3.331	8.881	12.694
3 TO 4	.125 TO .063	2.367	3.843	4.403
4 TO 5	.063 TO .031	.468	1.469	.392
5 TO 6	.031 TO .016	.462	.093	.588
6 TO 7	.016 TO .008	8.800	5.692	3.523
7 TO 8	.008 TO .004	8.800	7.549	4.434
8 TO 9	.004 TO .002	6.517	3.266	3.000
9 TO 10	.002 TO .001	5.681	2.426	3.128
>10	<.001	58.538	38.269	18.706
	GRAVEL (>2.0 MM)	.769	1.788	4.555
	SAND (2.0-.063 MM)	9.964	39.448	61.676
	SILT (.063-.004 MM)	18.531	14.803	8.934
	CLAY (<.004 MM)	70.736	43.961	24.834
	MEAN (MM)	.0024	.0149	.0699
	MEAN (PHI)	8.708	6.073	3.839
	STANDARD DEVIATION	2.833	4.269	4.128
	SKEWNESS	-.866	-.127	.306
	KURTOSIS	2.235	-1.604	-1.198
	ORGANIC CARBON	2.016	4.116	1.664
	NITROGEN (KJELDAHL)	.286	.247	.159
	COLOR (GSA)	N1	N1	N1

MGG09005046

SEDIMENT SIZE AND COMPOSITION DATA

CRUISE NORFLK TAKEN 0NOV73 LATITUDE 76 20.00 N MARSDEN SQUARE 116 LENGTH 203.0 ANALYZED 0JUN74
SAMPLE NSV-2 DEPTH .0 LONGITUDE 36 57.00 W CORER TYPE DOC PENETRATION .0

	SUBSAMPLE ID.	470 10	470 11	470 12
	DEPTH INTERVAL	.0- 30.0	30.0-117.0	117.0-203.0
DIAM (PHI)	DIAM (MM)	PERCENT	PERCENT	PERCENT
<-4	>16.000	.000	.000	.000
-4 TO -3	16.000 TO 8.000	.000	.000	.000
-3 TO -2	8.000 TO 4.000	.000	.000	.000
-2 TO -1	4.000 TO 2.000	.000	.280	1.727
-1 TO 0	2.000 TO 1.000	.726	1.744	1.801
0 TO 1	1.000 TO .500	1.696	1.612	2.620
1 TO 2	.500 TO .250	1.237	2.280	4.154
2 TO 3	.250 TO .125	1.852	4.194	4.977
3 TO 4	.125 TO .063	1.481	2.311	2.620
4 TO 5	.063 TO .031	.444	.730	.457
5 TO 6	.031 TO .016	1.400	.000	.827
6 TO 7	.016 TO .008	12.518	1.045	4.730
7 TO 8	.008 TO .004	4.629	5.398	14.313
8 TO 9	.004 TO .002	3.652	17.748	8.678
9 TO 10	.002 TO .001	1.259	.175	3.537
>10	<.001	69.106	62.485	49.560
	GRAVEL (>2.0 MM)	.000	.280	1.727
	SAND (2.0-.063 MM)	6.992	12.140	16.172
	SILT (.063-.004 MM)	18.991	7.173	20.326
	CLAY (<.004 MM)	74.017	80.408	61.775
	MEAN (MM)	.0019	.0022	.0040
	MEAN (PHI)	9.066	8.807	7.981
	STANDARD DEVIATION	2.553	2.924	3.402
	SKEWNESS	-.946	-.941	-.647
	KURTOSIS	2.980	2.432	.471
	ORGANIC CARBON	4.052	3.828	4.844
	NITROGEN (KJELDAHL)	.312	.258	.260
	COLOR (GSA)	N1	N1	N1

MGG09005U46