

3

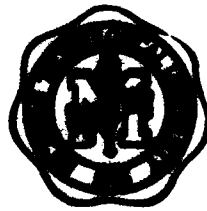
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DEVELOPMENT of a PREDICTIVE MODEL to
ASSESS the EFFECTS of EXTENDED SEASON
NAVIGATION on
GREAT LAKES CONNECTING WATERS

AD-A202 197

APPENDIX A

Site and Soil Conditions



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Michigan Technological University

Houghton, Michigan

October 1985

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REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

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		PROGRAM ELEMENT NO.	PROJECT NO.
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12. PERSONAL AUTHOR(S) Hodek, R.J., G.R. Alger, and H.S. Santeford			
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16. SUPPLEMENTARY NOTATION			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	
		St. Marys River System, Computer Model, Winter Navigation, Sediment Translocation, Water Quality, Structure Damage, Hydraulic Changes	
19. ABSTRACT (Continue on reverse if necessary and identify by block number) The object of this study was to develop a method for forecasting the physical effects of the passage of commercial vessels through Great Lakes connecting waters during that period of time when traffic is normally at a minimum due to a more or less continuous ice cover. The physical impacts examined were sediment translocation, water quality effects, direct damage to existing structures, and changes in the gross hydraulic regime. Also associated with Appendix A but bound separately are; Development of a Predictive Model to Assess the Effects of Extended Season Navigation on Great Lakes Connecting Waters, Final Report; the User's Manual for Prediction of Vessel Impacts in a Confined Waterway; Appendix B, Observed Vessel Induced Water Level Drawdowns; and Appendix C, Observed Ice Thicknesses and Water Turbidities.			
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL Thomas Freitag		22b. TELEPHONE (Include Area Code) (313) 226-7590	22c. OFFICE SYMBOL CENCE-PD-EA

DEVELOPMENT OF A PREDICTIVE MODEL TO
ASSESS THE EFFECTS OF EXTENDED SEASON
NAVIGATION ON
GREAT LAKES CONNECTING WATERS

APPENDIX A
SITE AND SOIL CONDITIONS

by Ralph J. Hodek
George R. Alger
Henry S. Santeford

Submitted to the U.S. Army Cold Regions
Research and Engineering Laboratory
in partial fulfillment of
Contract No. DACA89-85-k-0001

Michigan Technological University
Houghton, Michigan

October 31, 1985

From 1473

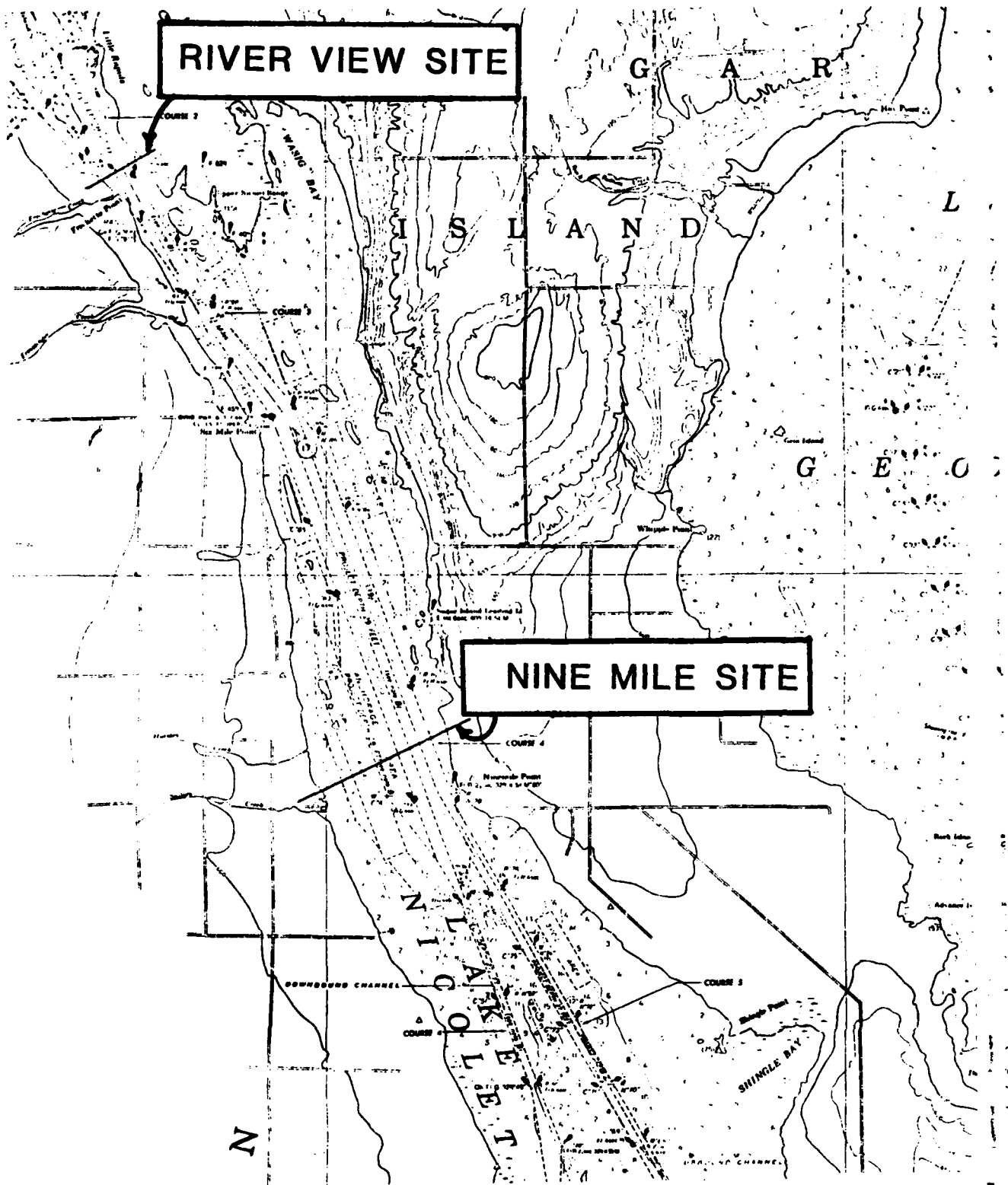
This appendix contains the general locations of all data gathering sites used along the St. Mary's River as shown on portions of NOAA Great Lakes chart 14883. The general site locations are followed by detailed data arranged by site.

Individual site data includes all soil data collected, detailed cross-section information as appropriate, and the specific locations of light extinction and turbidity data acquisition for the Lake Nicolet and Lake Munuscong sites. The light extinction and turbidity data are located in Appendix C.

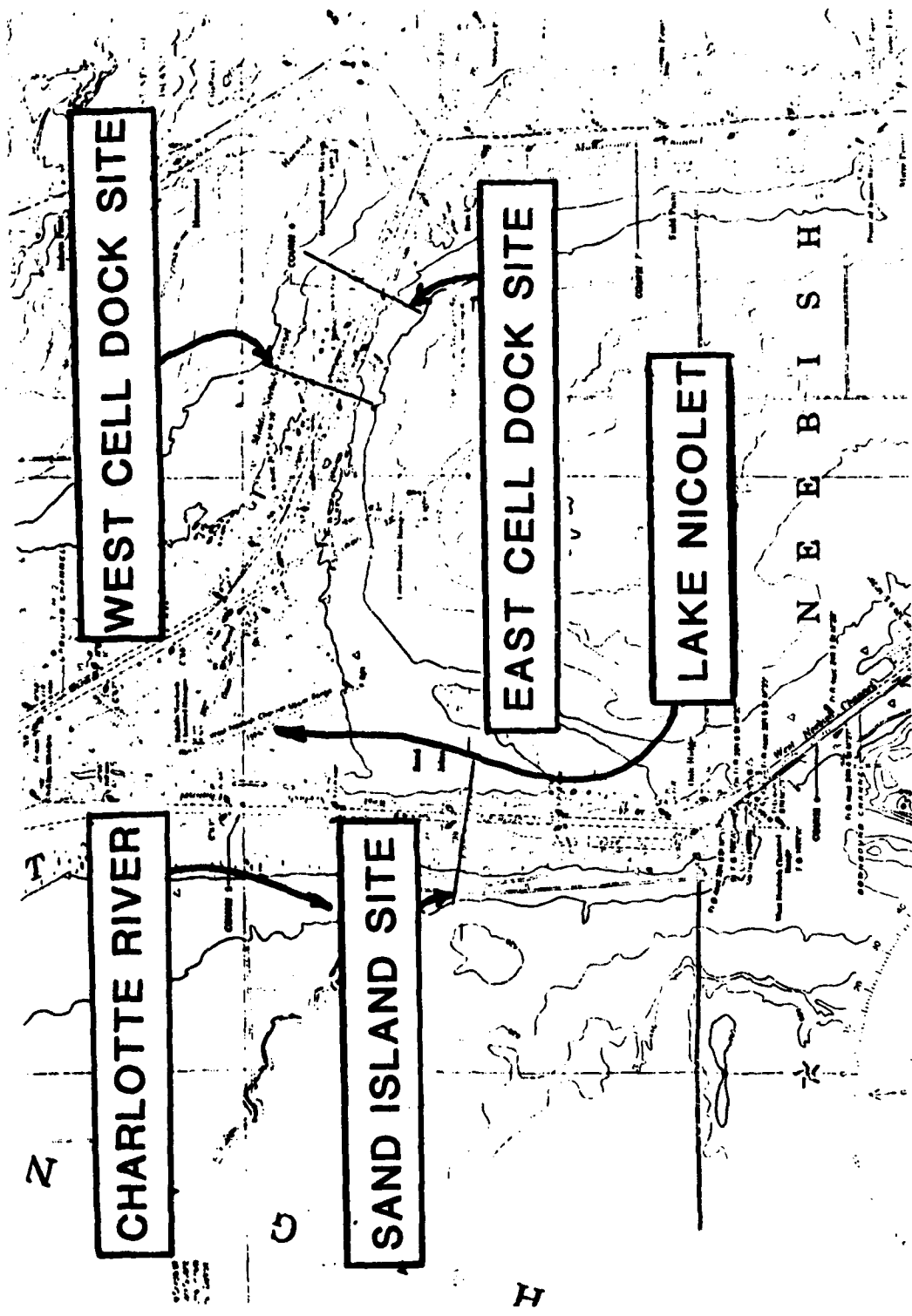
The "green side" or "red side" referred to in much of the data defines the side of the channel at which the data were collected. Facing upstream the red side is to the right and the green side is to the observer's or vessel's left.

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

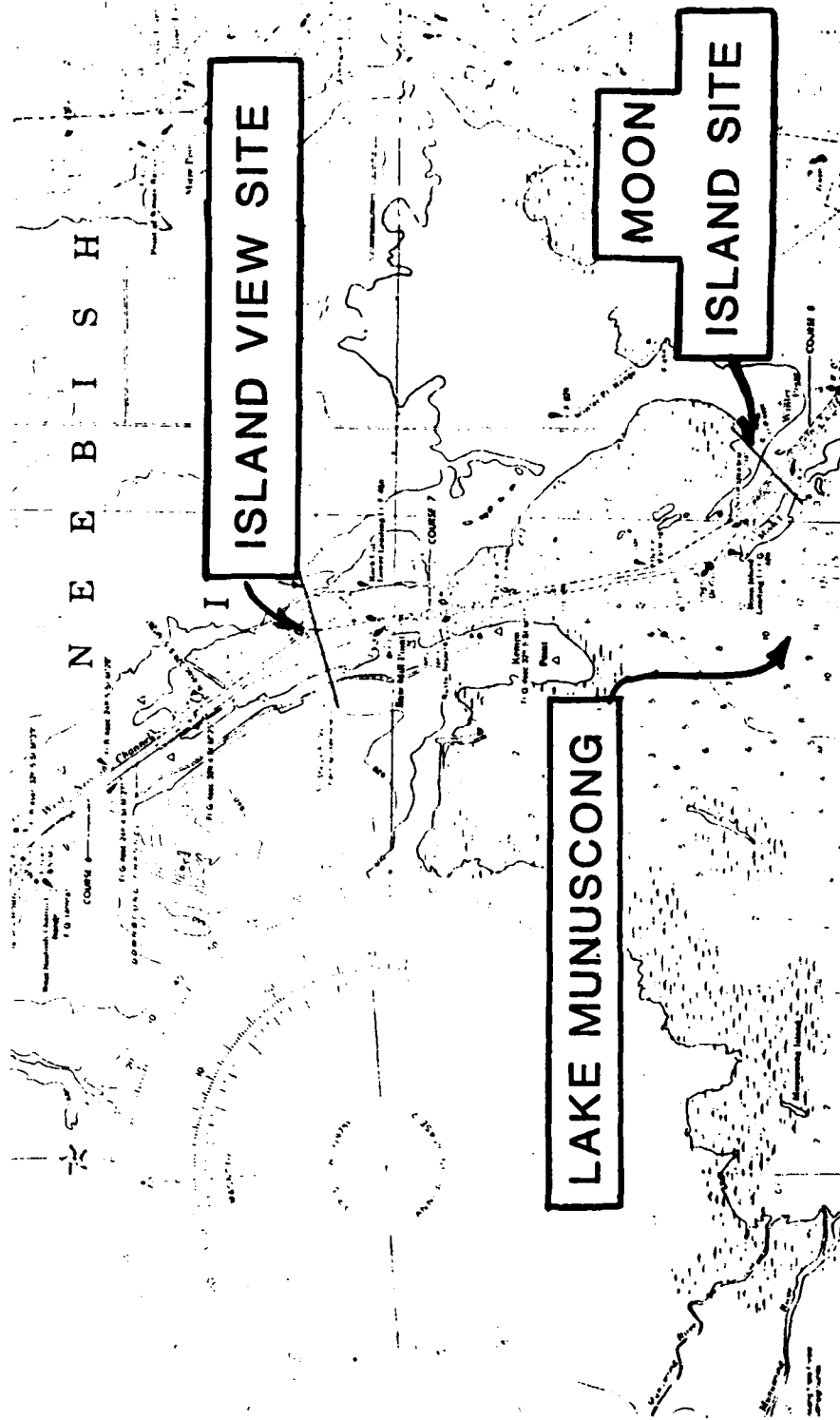




Site Locations in the Northern Portion of the Study Area

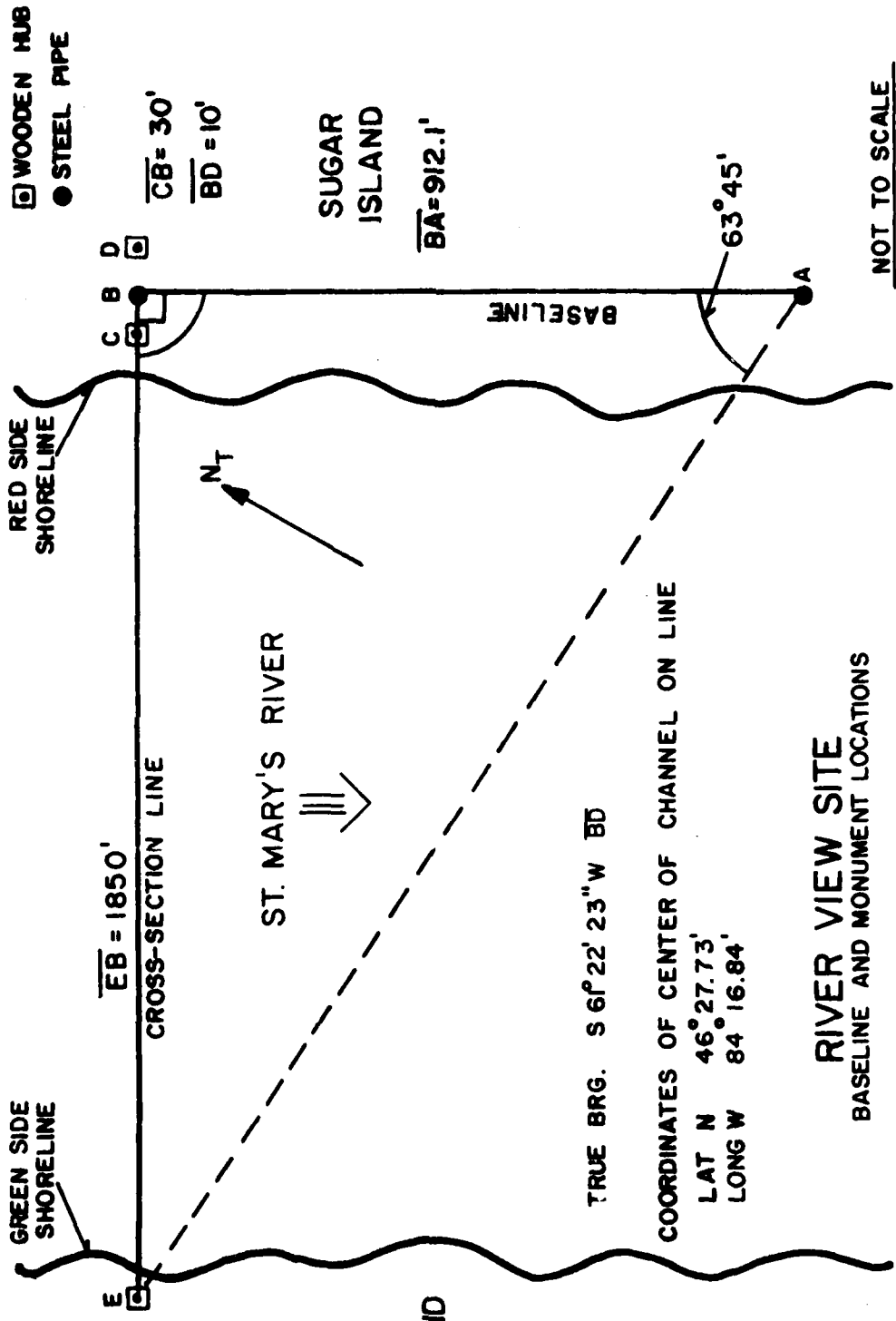


Site Locations in the Central Portion of the Study Area



Site Locations in the Southern Portion of the Study Area

RIVER VIEW



AA1

XX
SOUNDING DATA

NAME OF SECTION RIVER VIEW
XX

DATE OF SOUNDING NOVEMBER 8, 1984

WATER SURFACE ELEVATION in feet = 97.6

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
E	0.0	102.6
2	37.0	97.6
3	45.0	96.1
4	55.0	95.3
5	65.0	94.3
6	78.0	92.3
7	110.0	92.3
8	205.0	92.3
9	248.0	90.6
10	338.0	78.1
11	368.0	77.6
12	424.0	79.3
13	517.0	85.0
14	540.0	82.6
15	577.0	66.2
16	620.0	64.8
17	693.0	64.6
18	705.0	65.8
19	801.0	65.4
20	1049.0	64.6
21	1081.0	63.0
22	1106.0	65.6
23	1132.0	66.0
24	1142.0	64.2
25	1191.0	66.6
26	1211.0	77.6
27	1225.0	79.1
28	1322.0	85.1
29	1333.0	90.6
30	1357.0	91.6
31	1378.0	89.9
32	1391.0	91.1
33	1412.0	91.6
34	1425.0	91.3
35	1436.0	91.0
36	1488.0	92.6
37	1528.0	92.6
38	1558.0	91.8
39	1570.0	91.7
40	1577.0	92.9

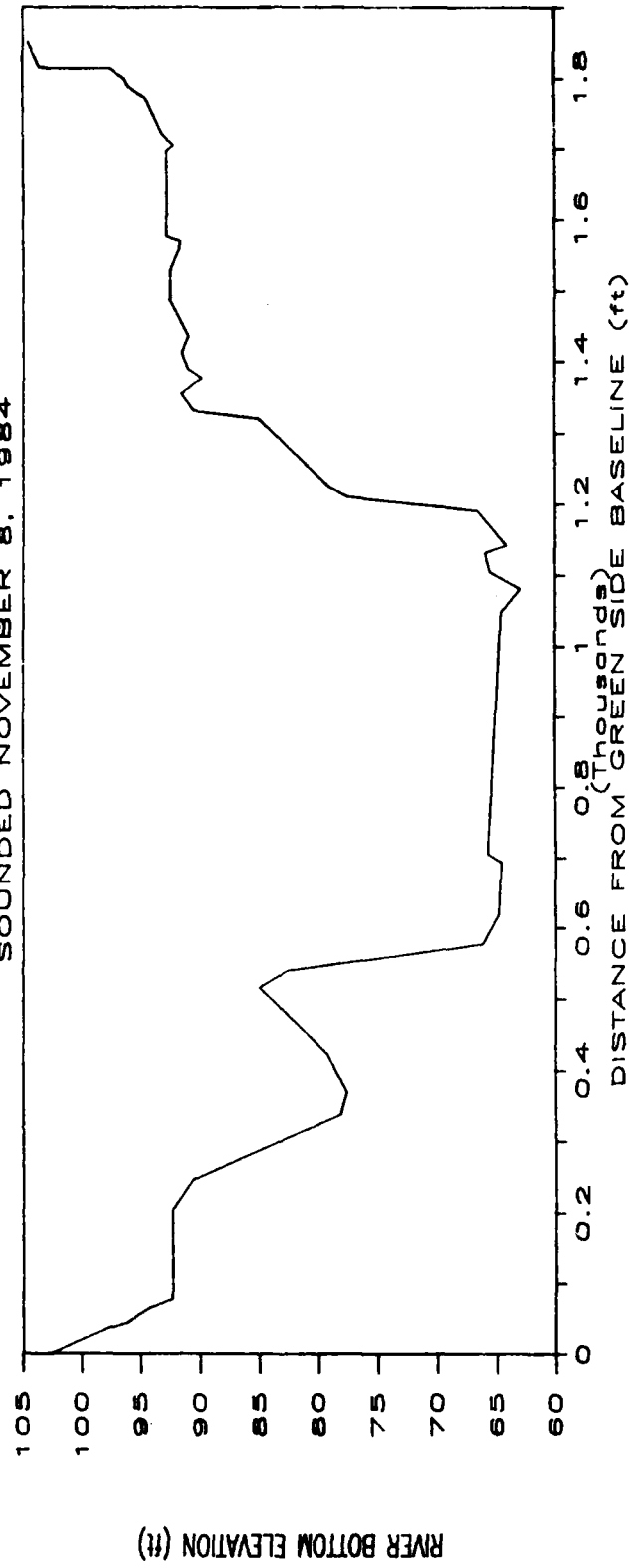
XX
SOUNDING DATA (continued)

NAME OF SECTION RIVER VIEW
XX

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
41	1606.0	92.9
42	1697.0	92.9
43	1704.0	92.3
44	1721.0	93.3
45	1772.0	94.7
46	1790.0	96.1
47	1800.0	96.4
48	1813.5	97.6
49	1813.6	102.6
50	1816.0	103.6
B	1850.0	104.6

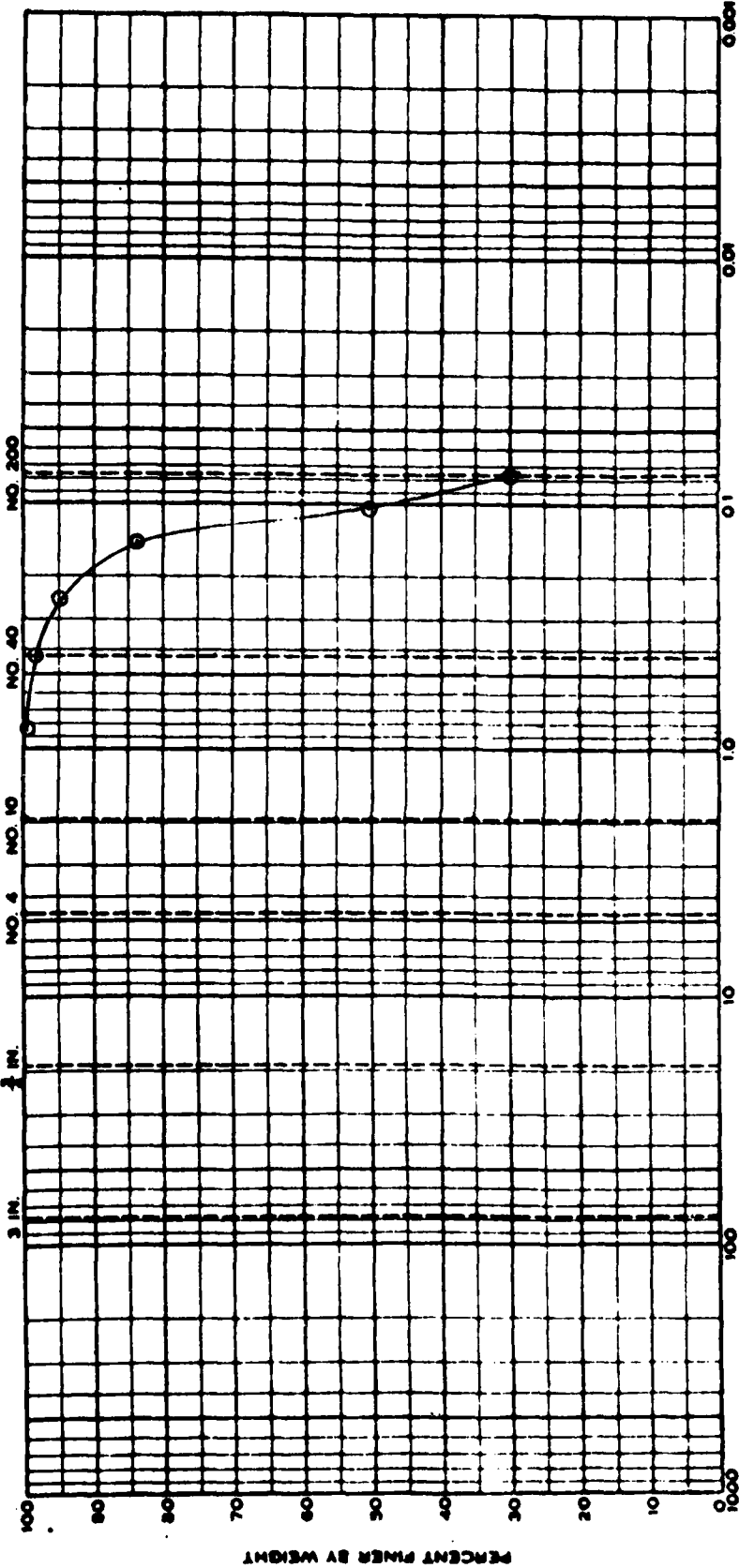
RIVER VIEW CROSS-SECTION

SOUNDED NOVEMBER 8, 1984



AA4

U.S. STANDARD SIEVE SIZE



GRAIN SIZE IN MILLIMETERS

SILT OR CLAY	
Project	DACA89-85-K-0001
Area	River View, Green Side
Boring No.	50 ft. Offshore, 3 ft. Deep
Date	Sampled 3/14/79

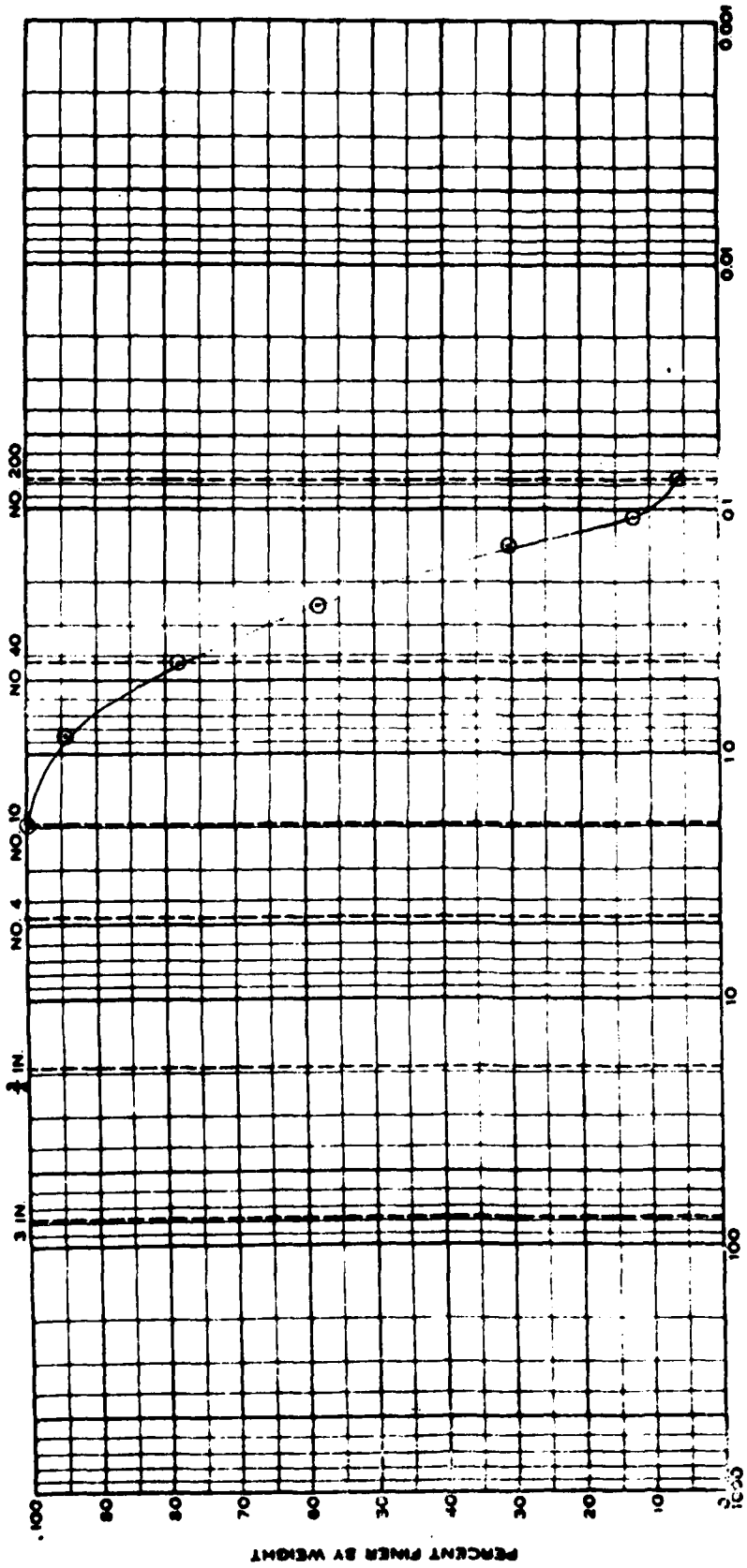
Sample No.	Elev or Depth	Classification	Net	WC	LL	PL	PI
		SM					
							P - 200 = 30%

GRADATION CURVES

DOT 92 5425

PL 5 5027

U S STANDARD SIEVE SIZE

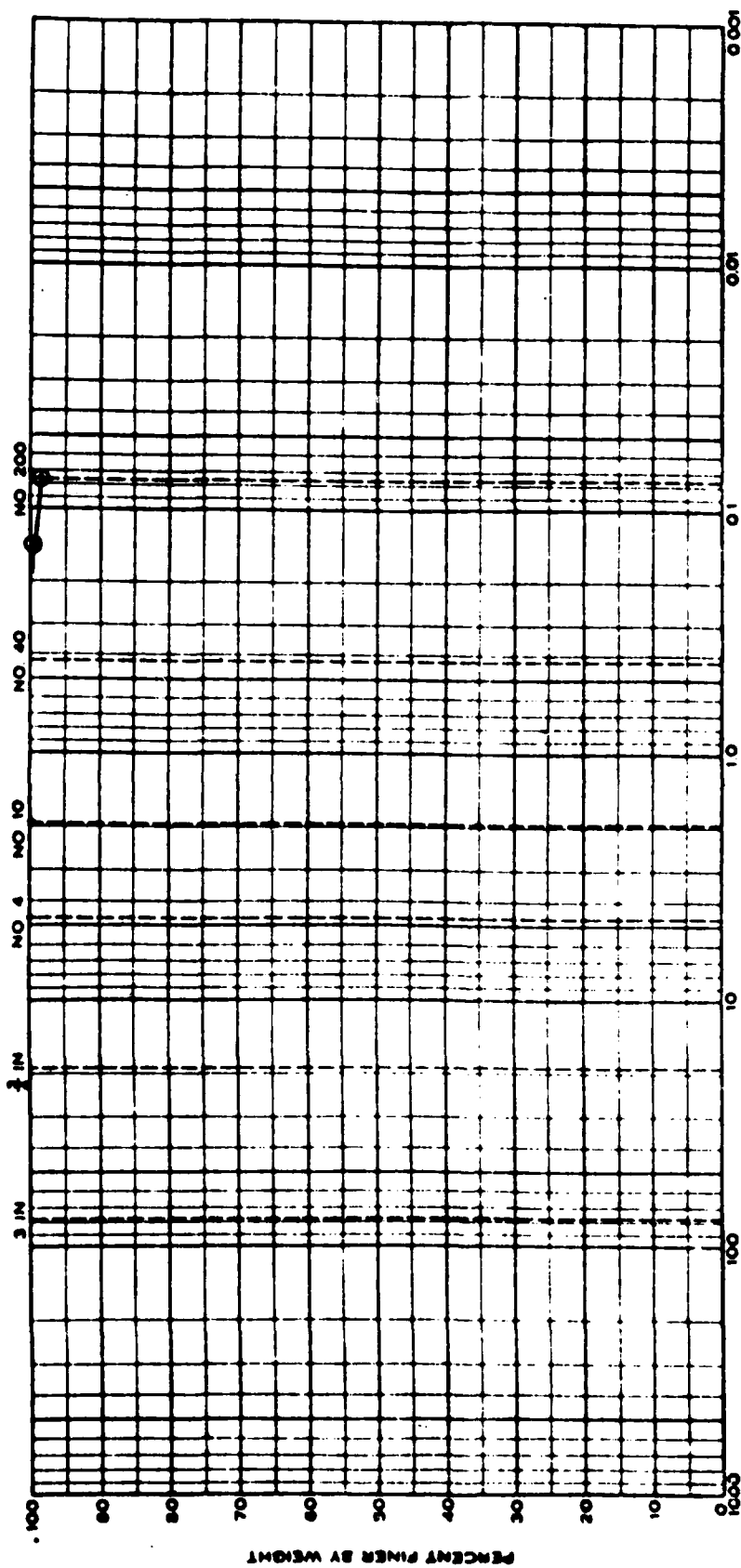


GRAIN SIZE IN MILLIMETERS

COBBLES		GRAVEL		SAND		SILT OR CLAY	
Coarse	Fine	Coarse	Fine	Medium	Fine		

Sample No.	Elev or Depth	Classification	NatWC	LL	PL	PI
		SP-SM				
P-200 = 6.1%						
GRADATION CURVES						
Project	DACA89-85-K-0001					
Area	River View Green Side					
Boring No.	Trap Sample					
Date	Sampled 6/16/85					

U S STANDARD SIEVE SIZE



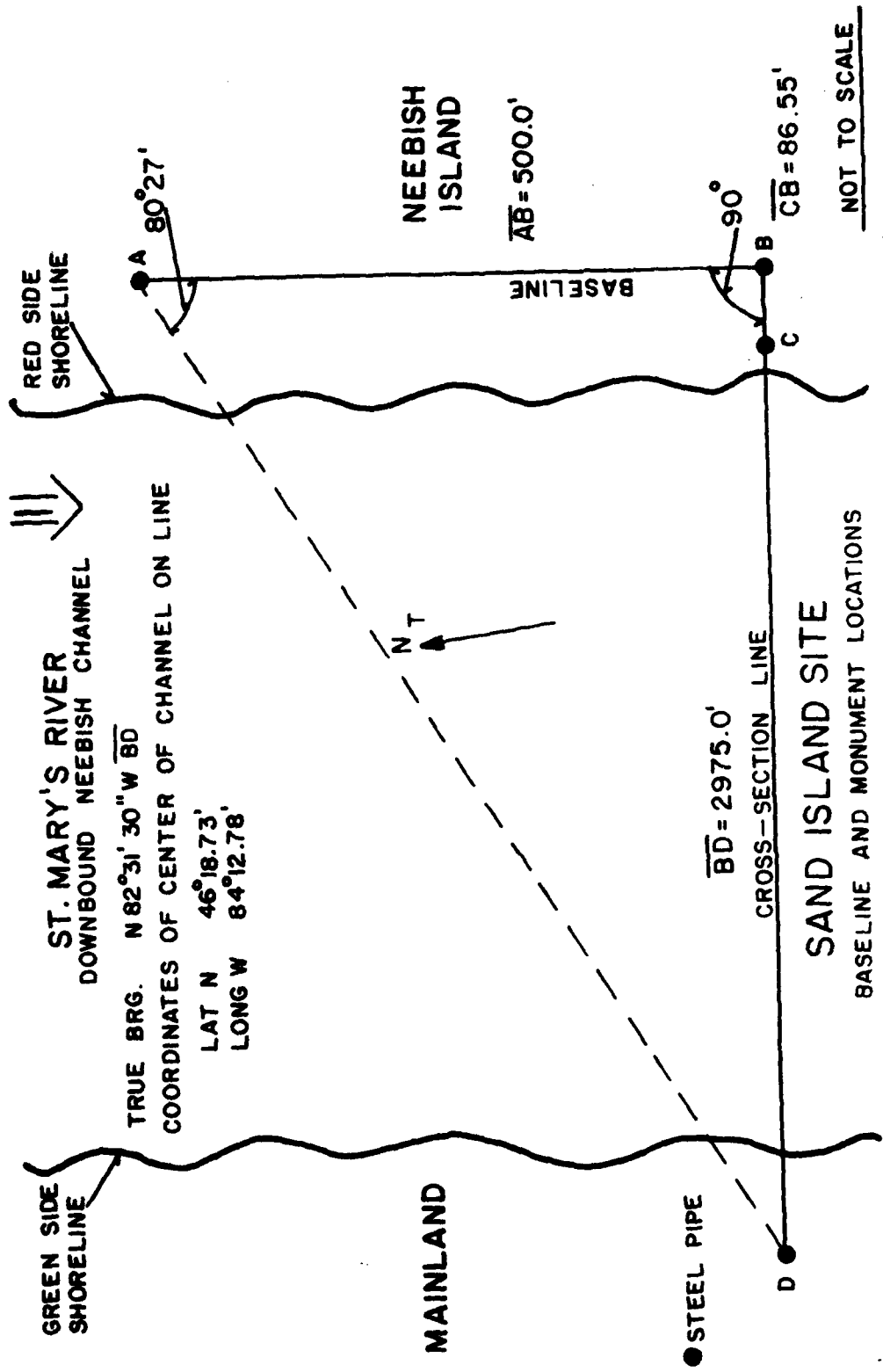
PERCENT FINER BY WEIGHT

GRAIN SIZE IN MILLIMETERS

COBBLES		GRAVEL		SAND		SILT OR CLAY		
Sample No.	Elev or Depth	Classification	NatWC	LL	PL	PI	Project	
		CH		68	33		DACA89-85-K-0001	
				to	to		Area River View, Red Side	
				77	45		Boring No. Composite, 0-400ft. Offshore	
							Date Sampled Feb. - Mar. 1977	
GRADATION CURVES								

P-200 = 98%

SAND ISLAND



XX
SOUNDING DATA

NAME OF SECTION SAND ISLAND
XX

DATE OF SOUNDING JULY 26, 1985

WATER SURFACE ELEVATION in feet = 100

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
D	0.0	102.0
2	11.0	99.5
3	16.0	99.0
4	19.0	98.9
5	20.0	98.6
6	30.0	98.3
7	40.0	98.0
8	50.0	97.5
9	60.0	97.0
10	80.0	96.5
11	90.0	93.5
12	136.4	96.6
13	187.9	95.0
14	333.1	93.6
15	500.7	93.1
16	535.5	93.6
17	542.1	93.3
18	597.2	93.0
19	650.1	92.5
20	668.8	93.3
21	685.0	93.4
22	706.0	92.8
23	719.0	92.6
24	746.0	93.5
25	784.0	93.4
26	818.0	93.9
27	835.0	93.5
28	898.0	94.0
29	939.0	92.4
30	994.0	93.3
31	1016.0	93.0
32	1063.0	93.4
33	1198.0	91.8
34	1226.0	91.9
35	1264.0	92.8
36	1294.0	92.3
37	1343.0	92.2
38	1366.0	90.6
39	1406.0	90.5
40	1432.0	89.9

XX
SOUNDING DATA (continued)

NAME OF SECTION SAND ISLAND
XX

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
41	1546.0	90.4
42	1561.0	90.7
43	1583.0	90.7
44	1606.0	91.3
45	1651.0	91.5
46	1686.0	92.5
47	1694.0	91.3
48	1725.0	91.9
49	1747.0	80.0
50	1771.0	68.3
51	1782.0	66.9
52	1832.0	67.0
53	1878.0	66.2
54	1885.0	64.0
55	1889.0	64.0
56	1893.0	62.6
57	1903.0	62.7
58	1907.0	64.6
59	1930.0	66.2
60	1982.0	66.3
61	2015.0	66.5
62	2045.0	66.5
63	2063.0	66.8
64	2080.0	70.5
65	2098.0	81.0
66	2105.0	90.2
67	2115.0	92.9
68	2127.0	93.1
69	2185.0	91.6
70	2209.0	91.9
71	2226.0	91.9
72	2240.0	91.6
73	2251.0	92.3
74	2259.0	91.8
75	2306.0	92.7
76	2340.0	92.0
77	2355.0	91.5
78	2369.0	92.5
79	2388.0	92.2
80	2410.0	92.3
81	2427.0	92.4
82	2439.0	92.2
83	2450.0	92.7
84	2484.0	92.7

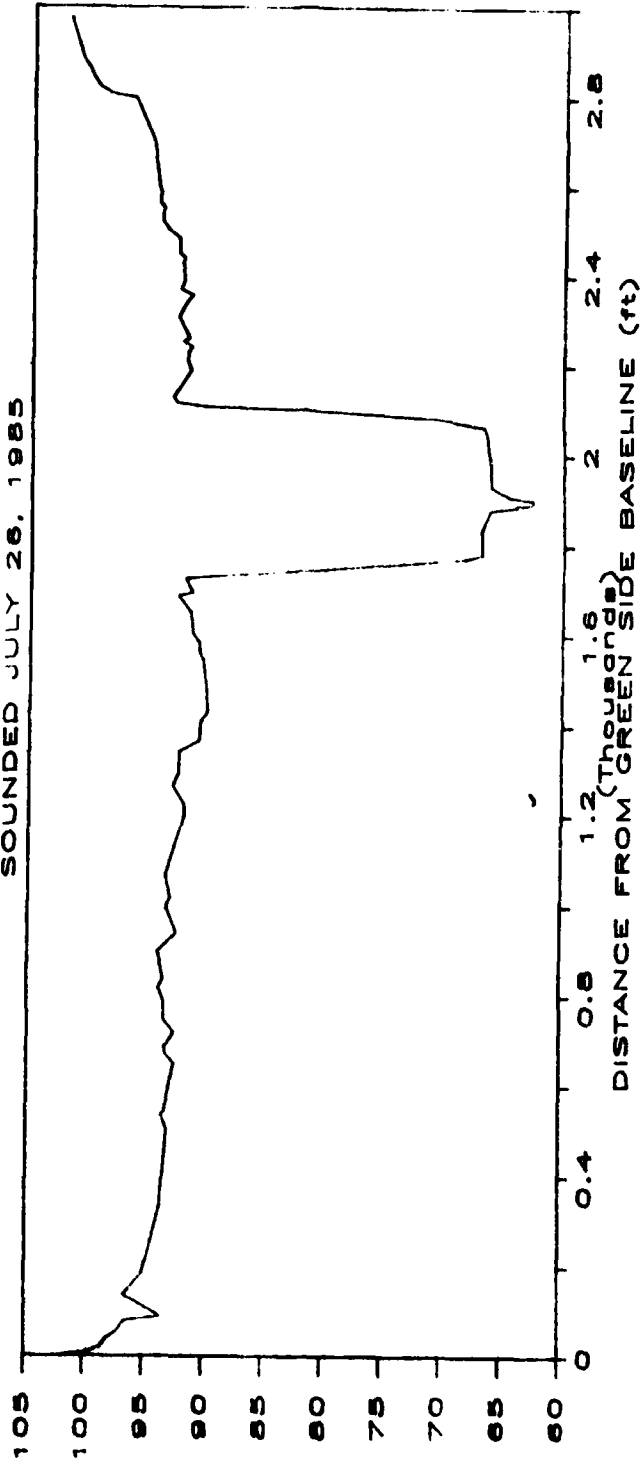
XX
SOUNDING DATA (continued)

NAME OF SECTION SAND ISLAND
XX

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
85	2501.0	93.6
86	2522.0	94.1
87	2550.0	94.0
88	2564.0	94.4
89	2585.0	94.3
90	2601.0	94.5
91	2706.0	95.0
92	2798.0	96.5
93	2804.0	98.0
94	2808.0	98.6
95	2821.0	99.5
96	2888.0	101.0
B	2975.0	102.0

SAND ISLAND CROSS-SECTION

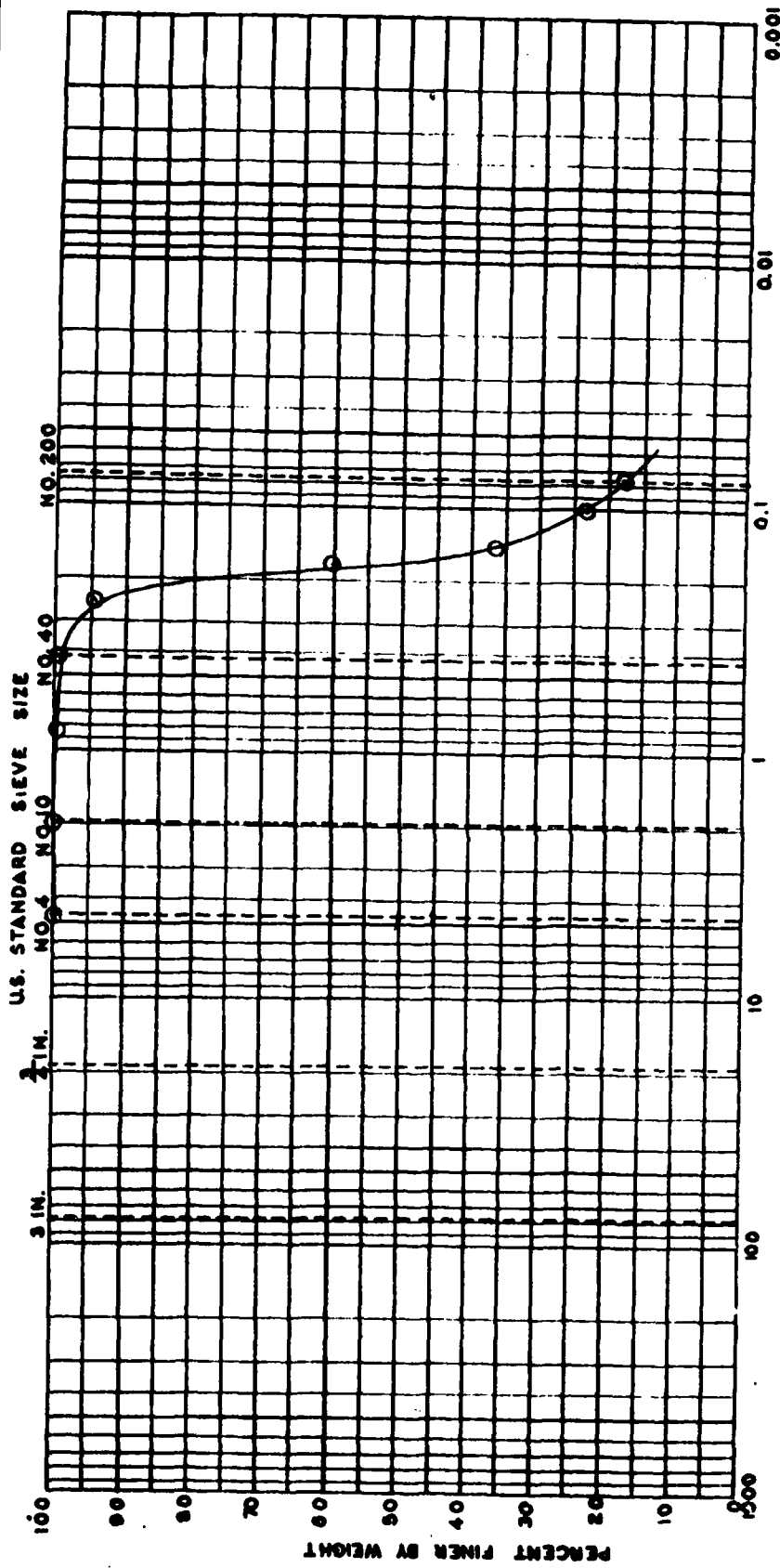
SOUNDED JULY 26, 1985



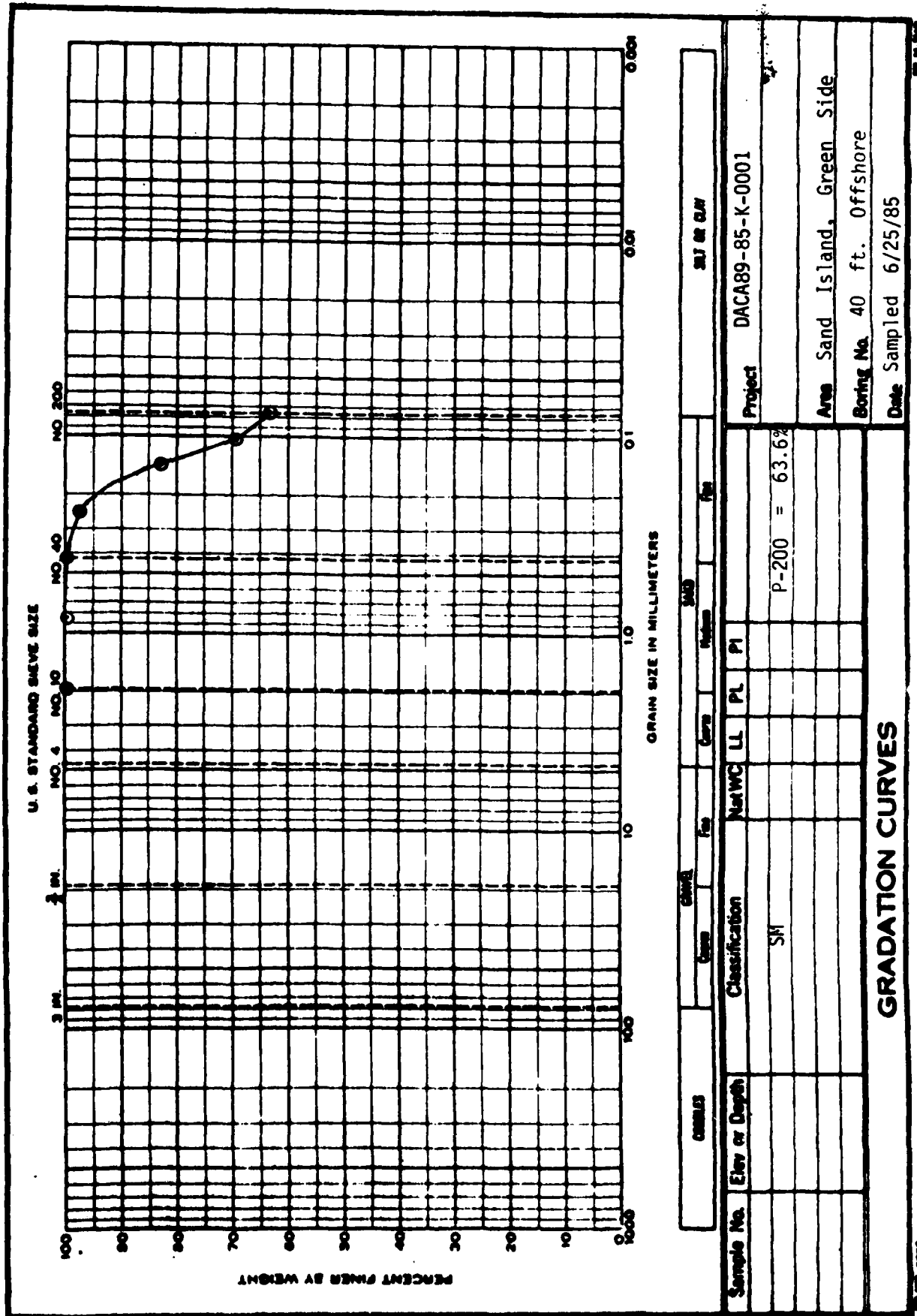
RIVER BOTTOM ELEVATION (ft)

585

DISTANCE FROM GREEN SIDE BASELINE (ft)



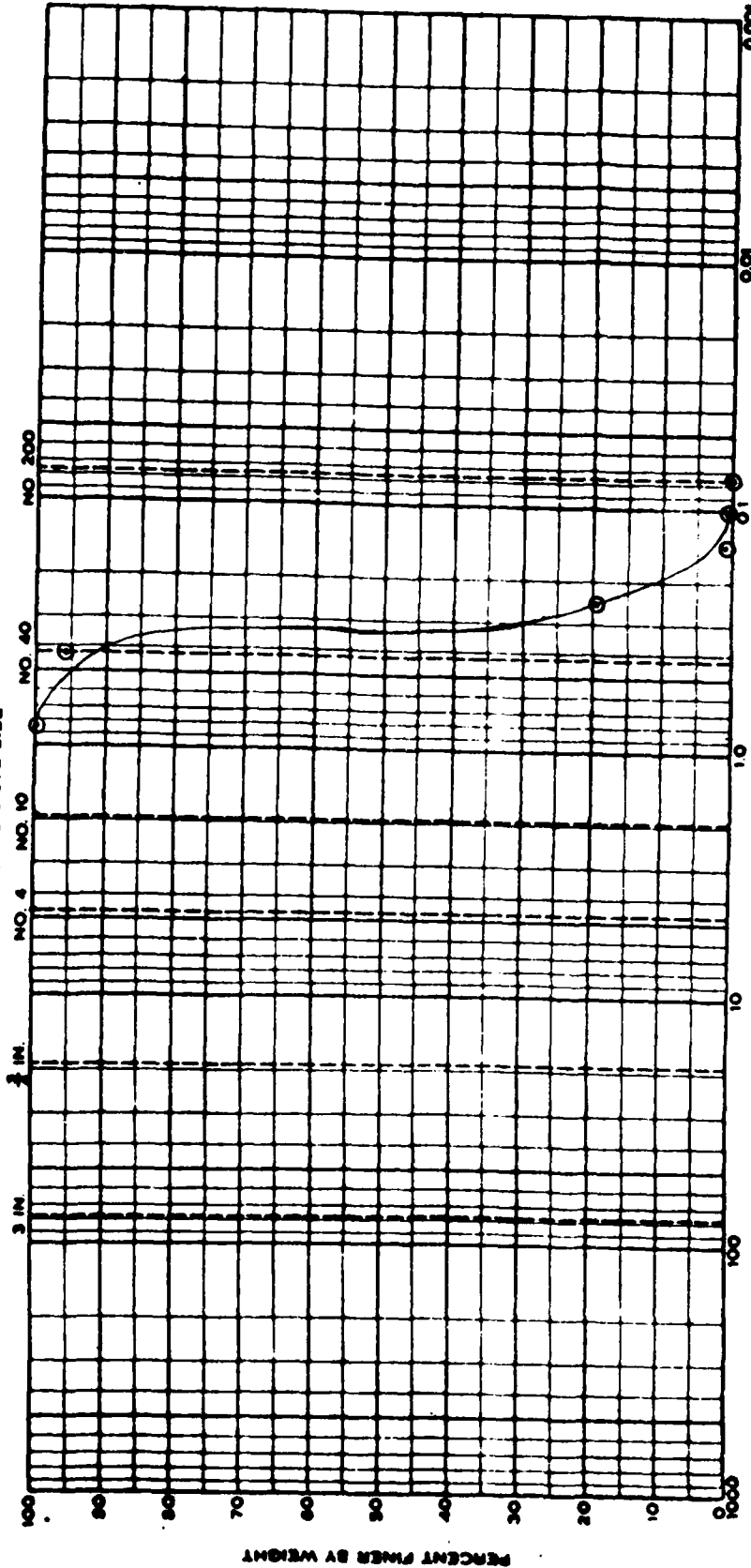
COBBLES		GRAVEL		FINE SAND		SILT OR CLAY	
COARSE		FINE		COARSE		MEDIUM	
FINE		MEDIUM		FINE		FINE	
SAMPLE NO.	ELEV. OR DEP.	CLASSIFICATION	NAT'VC	LL	PL	PI	
		SM					
		P-200 = 17.6%					
PROJECT		DACAB9-85-K-0001					
AREA		Sand Island, Green Side					
BORING NO.		15 ft. Offshore, Top 6 in.					
DATE SAMPLED		11/17/84					
GRADATION CURVES							



Sample No.	Elev or Depth	Classification	Net WC	LL	PL	PI
		SF				
			P-200 = 63.6%			
Project DAC89-85-K-0001						
Area Sand Island, Green Side						
Boring No. 40 ft. Offshore						
Date Sampled 6/25/85						

GRADATION CURVES

U.S. STANDARD SIEVE SIZE



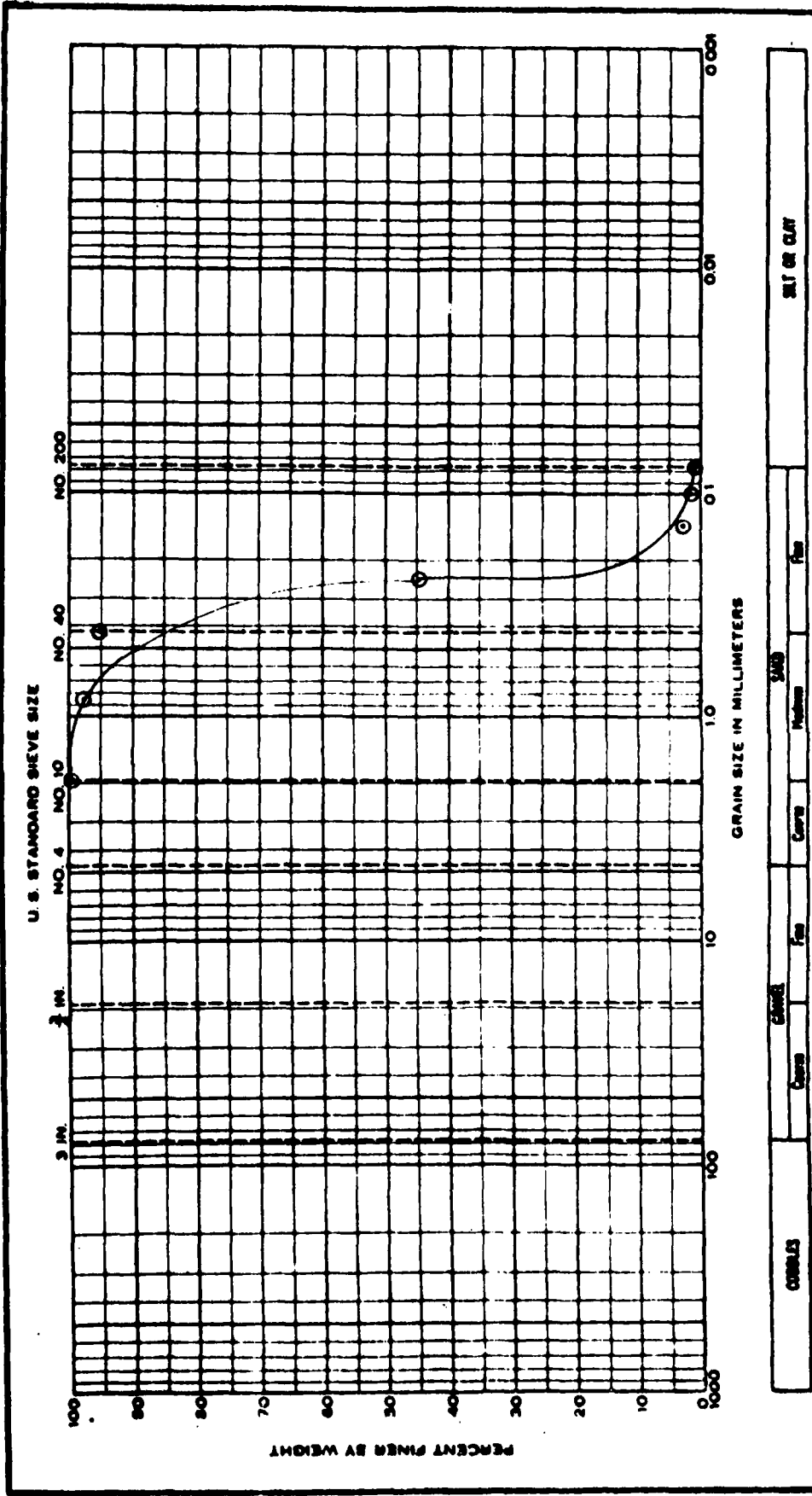
GRAIN SIZE IN MILLIMETERS

COBBLES		GRAVEL		SAND		FINE SAND		SILT OR CLAY	
Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine	Coarse	Fine

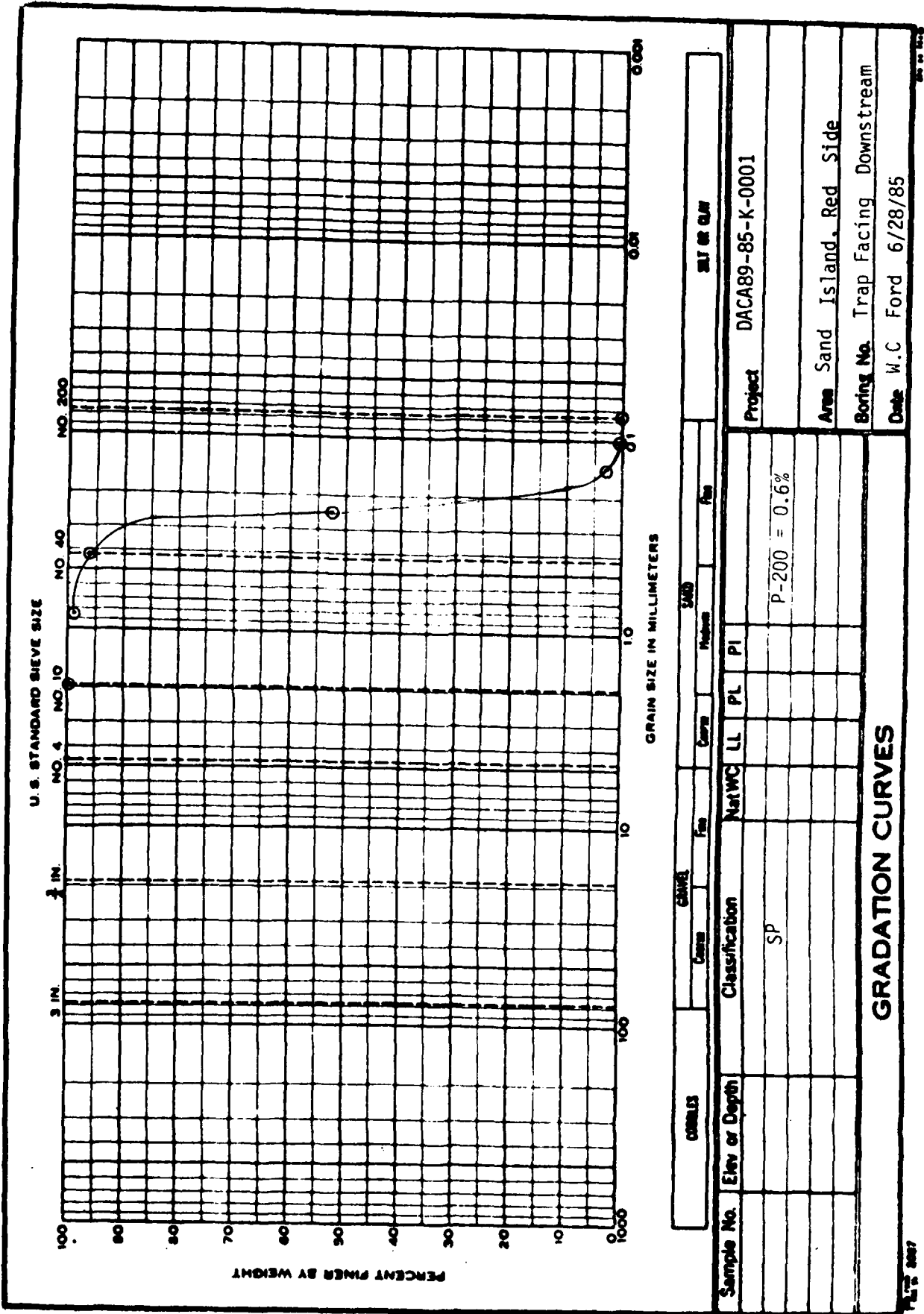
Sample No.	Elev or Depth	Classification	NatWC	LL	PL	PI	Project	
		SP					DACA89-85-K-0001	
							Area	Sand Island, Red Side
							Boring No.	30 ft. Offshore
							Date	Sampled 6/25/85

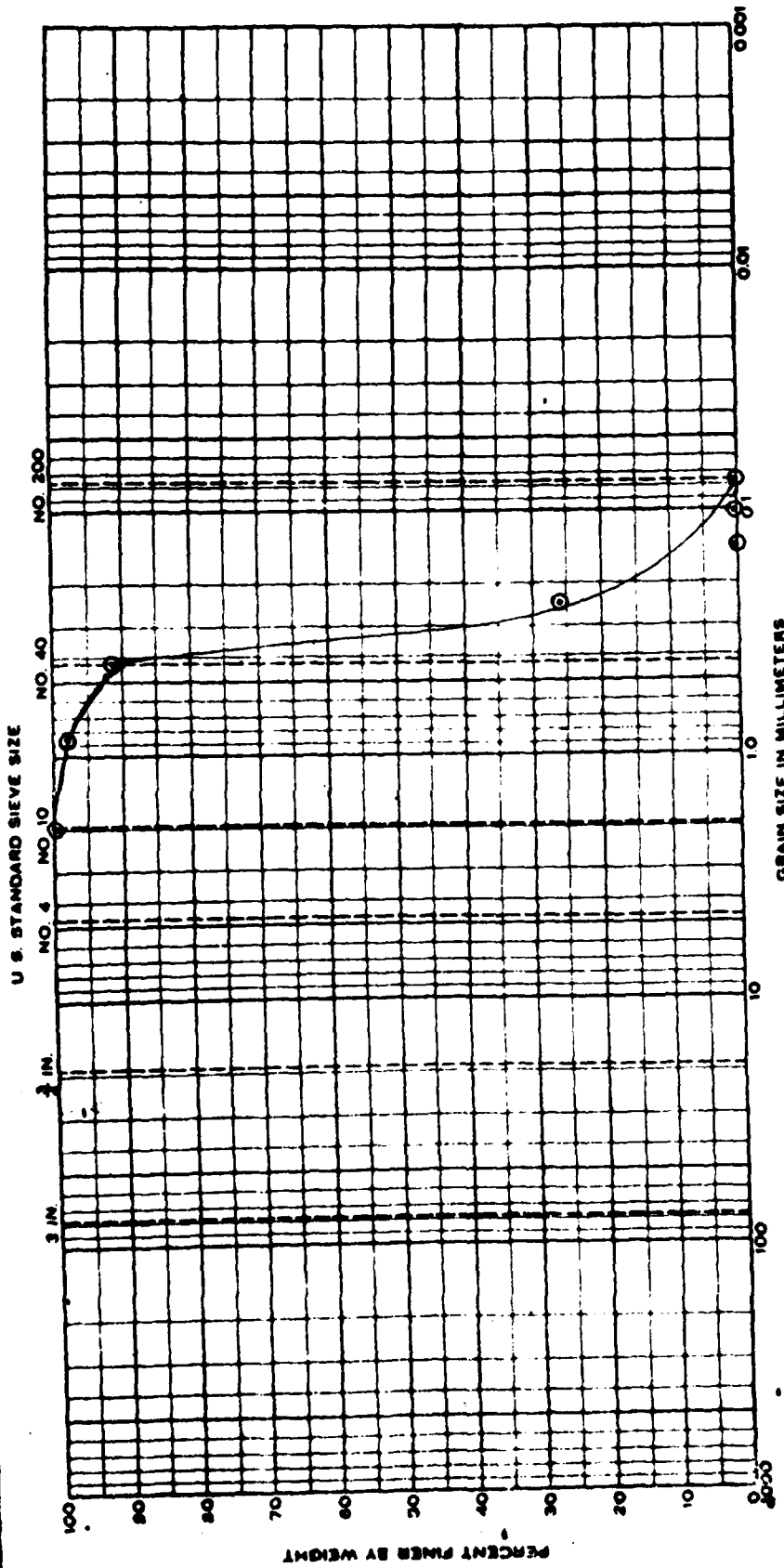
GRADATION CURVES

P-200 = 0.2%



CORRALS		GRAVEL		SAND		SILT OR CLAY	
Coarse	Fine	Coarse	Fine	Medium	Fine		
Sample No.	Elev or Depth	Classification	NatWC	LL	PL	PI	Project
		SP					DACA89-85-K-0001
							Area Sand Island Red Side
							Boring No. Trap Facing Upstream
							Date J.R. Barker 6/28/85
GRADATION CURVES							

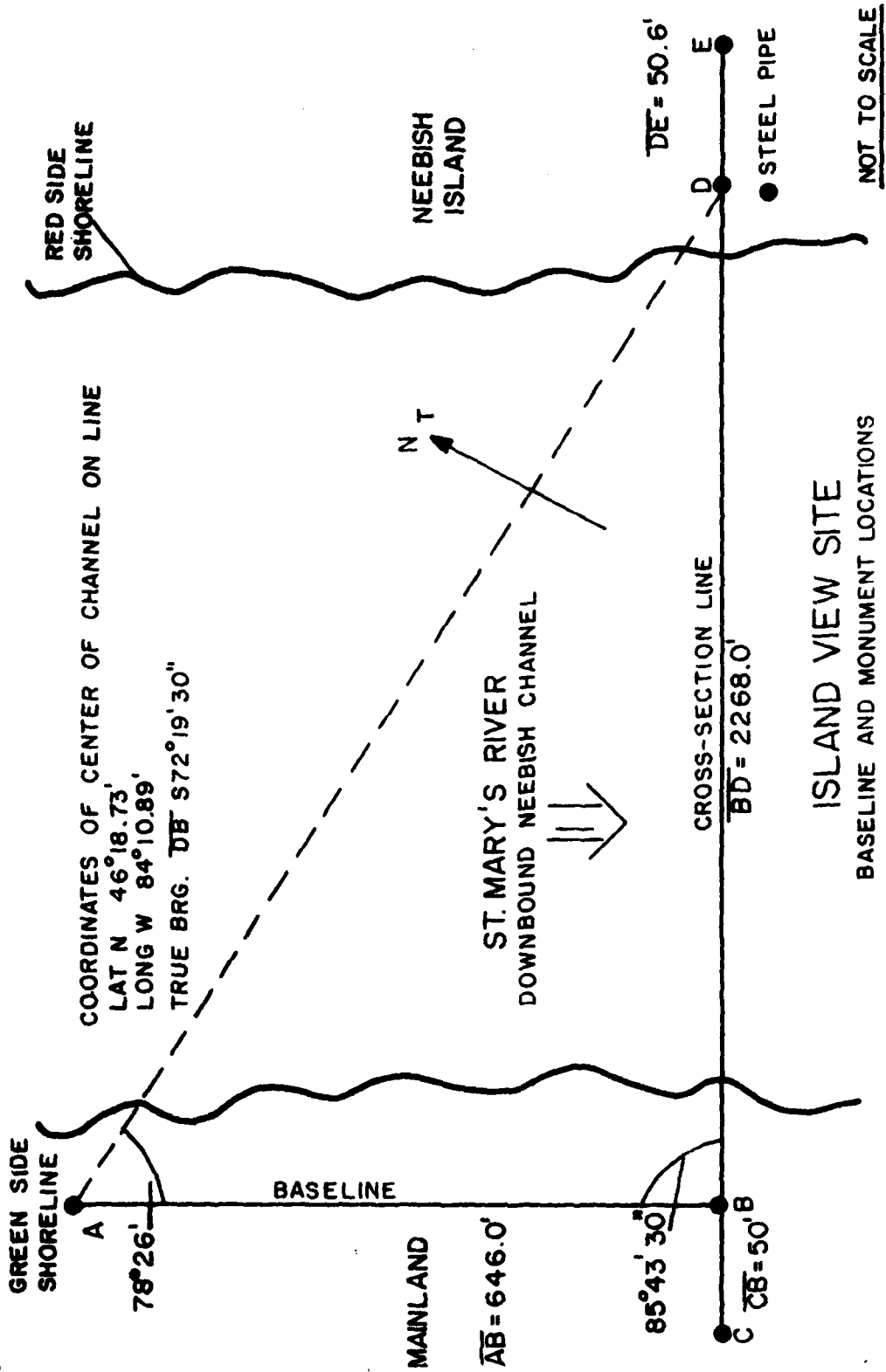




COBBLES		GRAVEL		SANDS		SILT OR CLAY	
Sample No.	Elev or Depth	Classification	NatWC	LL	PL	PI	Project
		SP					DACA89-85-K-0001
							Area Sand Island, Red Side
							Boring No. Trap Facing Shore
							Date C.M. Beeghly 6/25/85

GRADATION CURVES

ISLAND VIEW



CC
SOUNDING DATA

NAME OF SECTION ISLAND VIEW
CC

DATE OF SOUNDING NOVEMBER 2, 1984

WATER SURFACE ELEVATION in feet = 96.31

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
B	0.0	99.3
2	12.0	98.3
3	14.0	97.3
4	15.2	96.3
5	25.0	95.1
6	35.0	94.9
7	45.0	94.6
8	55.0	94.1
9	65.0	93.6
10	75.0	93.4
11	85.0	93.1
12	95.0	93.0
13	236.0	91.7
14	254.0	82.7
15	270.0	80.7
16	305.0	79.5
17	418.0	74.7
18	478.0	73.3
19	599.0	73.2
20	622.0	72.3
21	668.0	72.4
22	712.0	71.6
23	733.0	61.6
24	891.0	61.3
25	944.0	62.7
26	959.0	62.3
27	983.0	63.3
28	1063.0	62.3
29	1083.0	61.0
30	1235.0	63.7
31	1250.0	64.5
32	1267.0	73.6
33	1285.0	75.7
34	1306.0	76.3
35	1320.0	81.2
36	1413.0	81.5
37	1607.0	85.3
38	1703.0	85.3
39	1999.0	88.0
40	2074.0	90.9

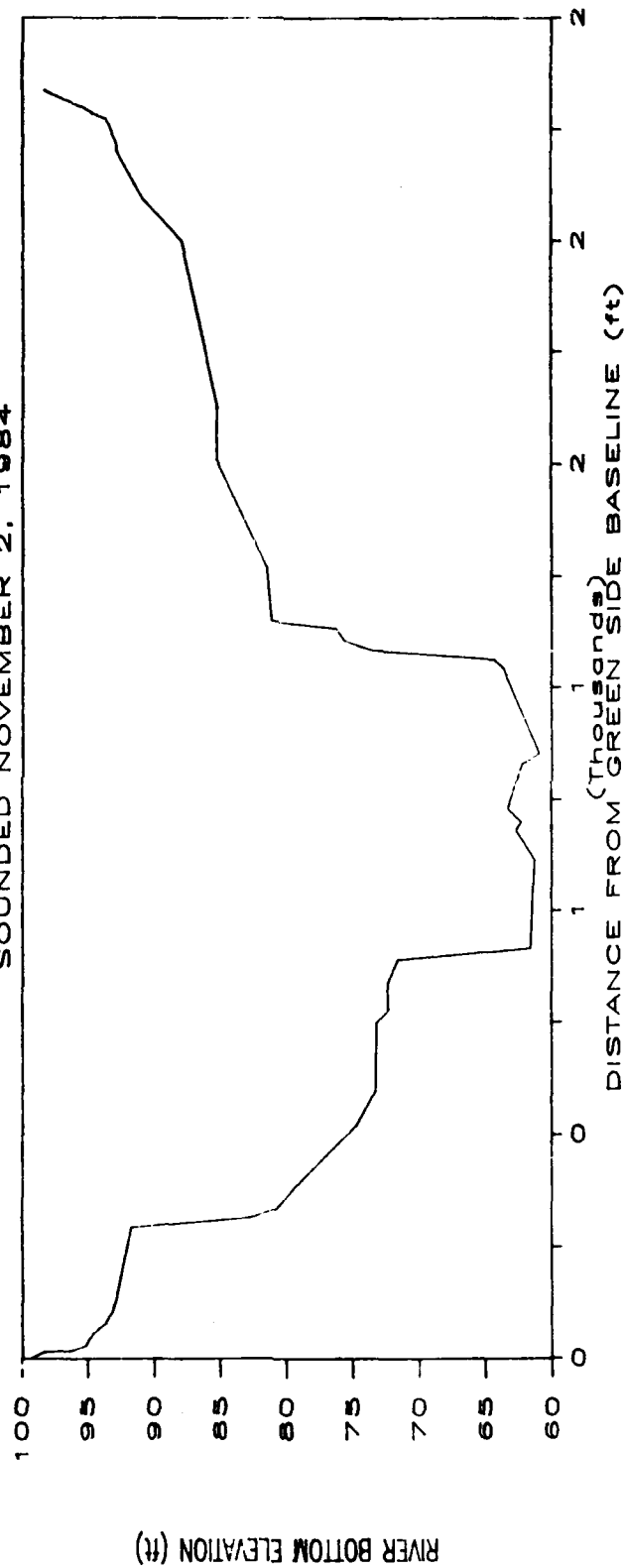
A
SOUNDING DATA (continued)

NAME OF SECTION ISLAND VIEW

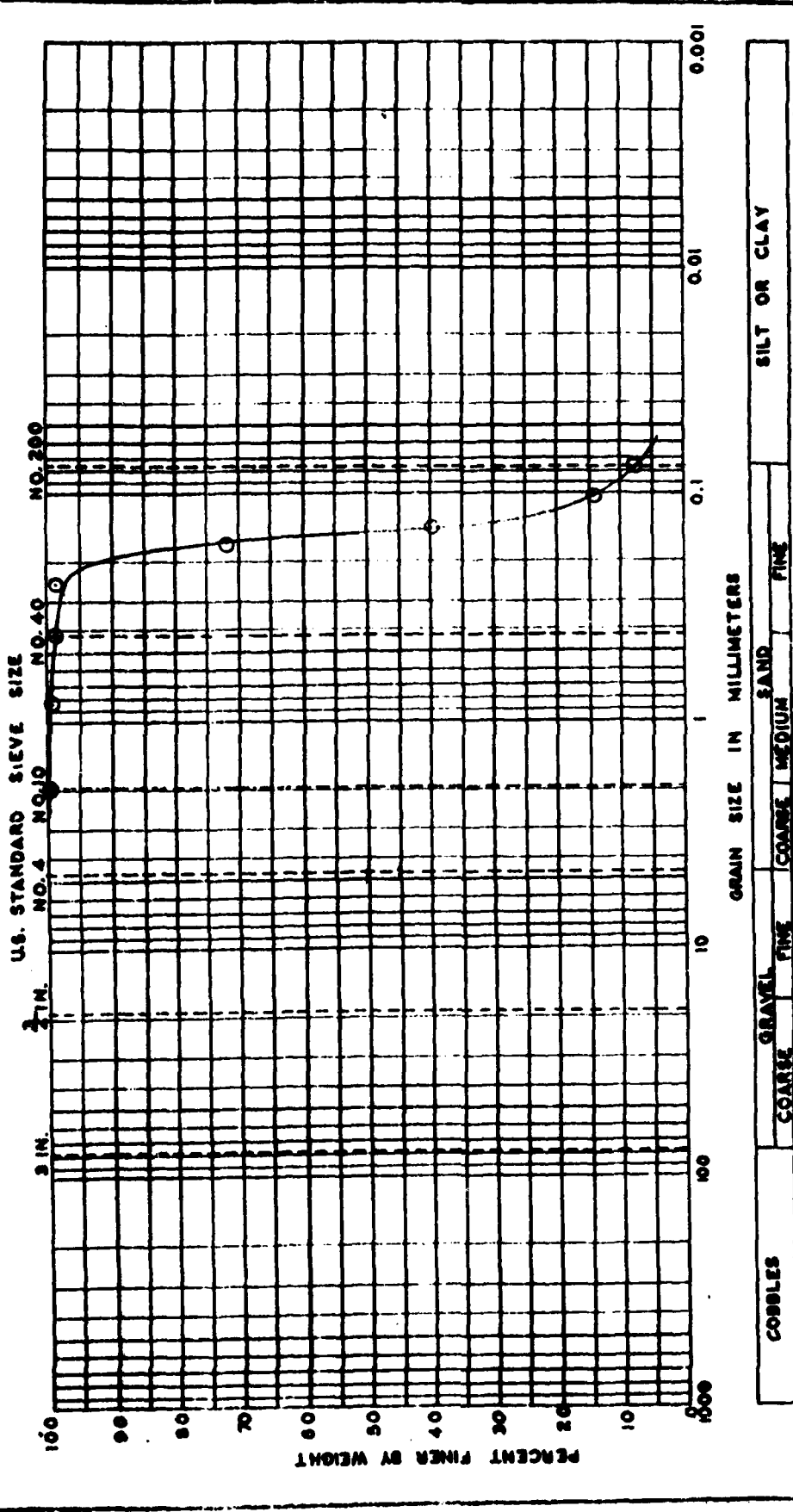
DATA POINT	DISTANCE(ft)	ELEVATION(ft)
41	2148.0	92.6
42	2158.0	92.8
43	2168.0	92.9
44	2178.0	93.0
45	2188.0	93.2
46	2198.0	93.3
47	2208.0	93.5
48	2218.0	93.7
49	2228.0	94.7
50	2238.0	95.4
51	2247.0	96.3
D	2268.0	98.3

ISLAND VIEW CROSS-SECTION

SOUNDED NOVEMBER 2, 1984



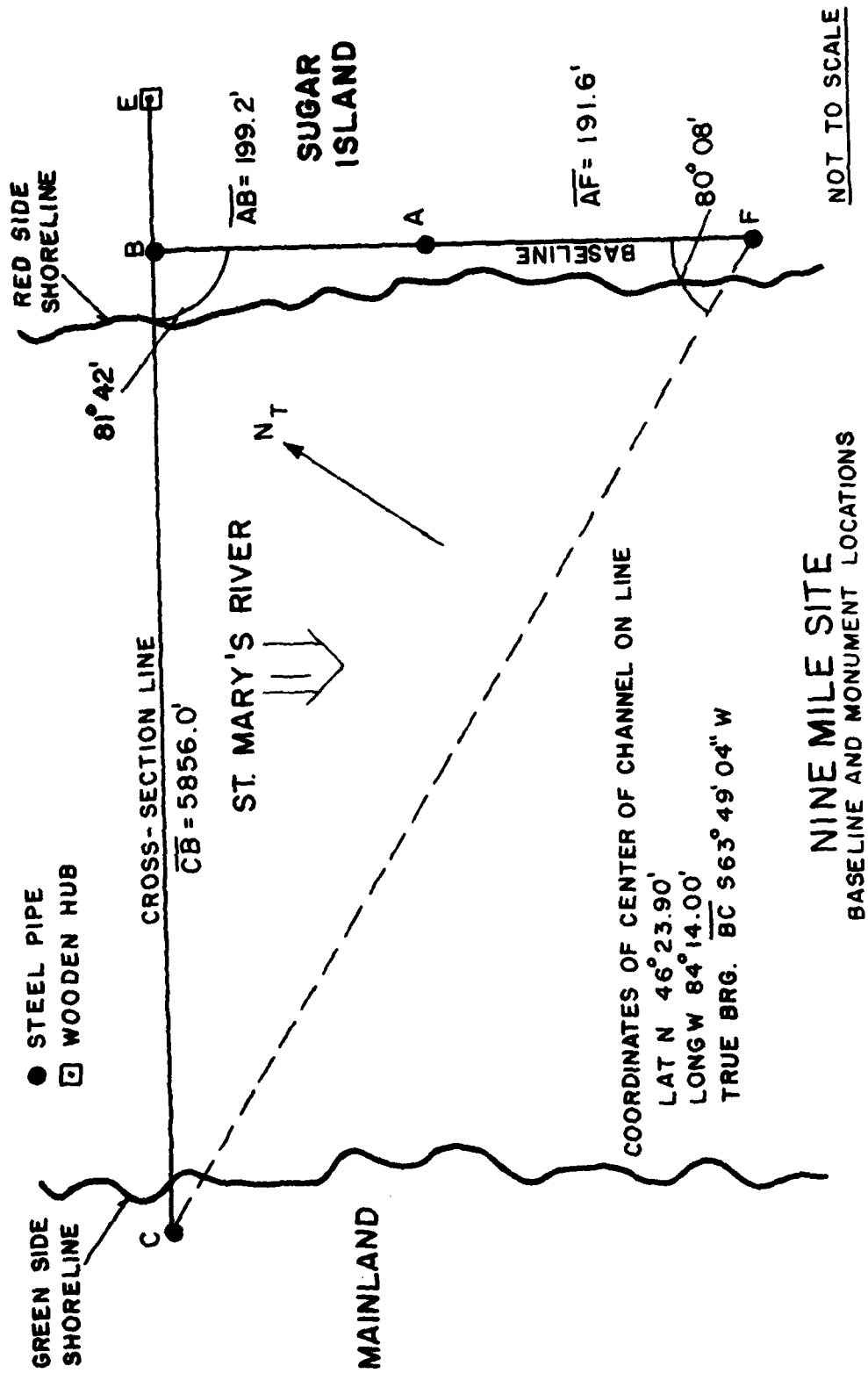
AC4



SAMPLE NO.	ELEV. OR DEP.	CLASSIFICATION	GRAIN SIZE IN MILLIMETERS			PROJECT
			COARSE	MEDIUM	FINE	
		SP-SM				DACA89-85-K0001
						Island View, Green Side
						30 ft. Offshore
						Sampled 11/17/84

GRADATION CURVES

NINE MILE



XX
SOUNDING DATA

NAME OF SECTION NINE MILE
XX

DATE OF SOUNDING NOVEMBER 6, 1984

WATER SURFACE ELEVATION in feet = 94.1

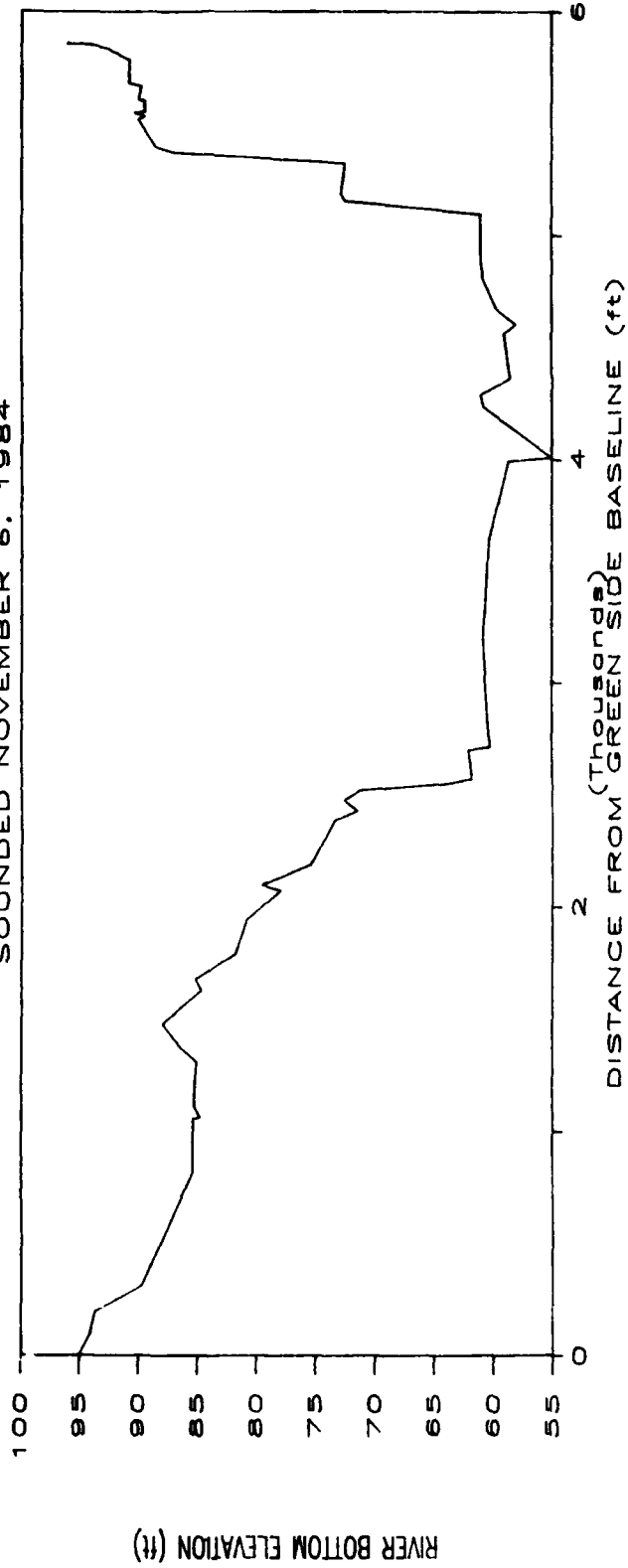
DATA POINT	DISTANCE(ft)	ELEVATION(ft)
C	0.0	95.1
2	100.0	94.1
3	200.0	93.6
4	314.0	89.7
5	816.0	85.4
6	1054.0	85.4
7	1059.0	84.8
8	1108.0	85.3
9	1306.0	85.1
10	1371.0	86.5
11	1475.0	88.0
12	1547.0	86.5
13	1625.0	84.7
14	1673.0	85.2
15	1785.0	81.8
16	1939.0	80.8
17	2067.0	78.0
18	2092.0	79.6
19	2185.0	75.4
20	2384.0	73.4
21	2428.0	71.5
22	2473.0	72.6
23	2519.0	71.2
24	2547.0	64.1
25	2570.0	61.8
26	2701.0	62.1
27	2714.0	50.2
28	2798.0	60.5
29	3174.0	60.9
30	3644.0	60.3
31	3993.0	58.7
32	4008.0	55.1
33	4236.0	60.9
34	4287.0	61.1
35	4363.0	58.6
36	4562.0	59.1
37	4604.0	58.1
38	4676.0	59.8
39	4807.0	60.9
40	4878.0	61.1

XX
SOUNDING DATA (continued)

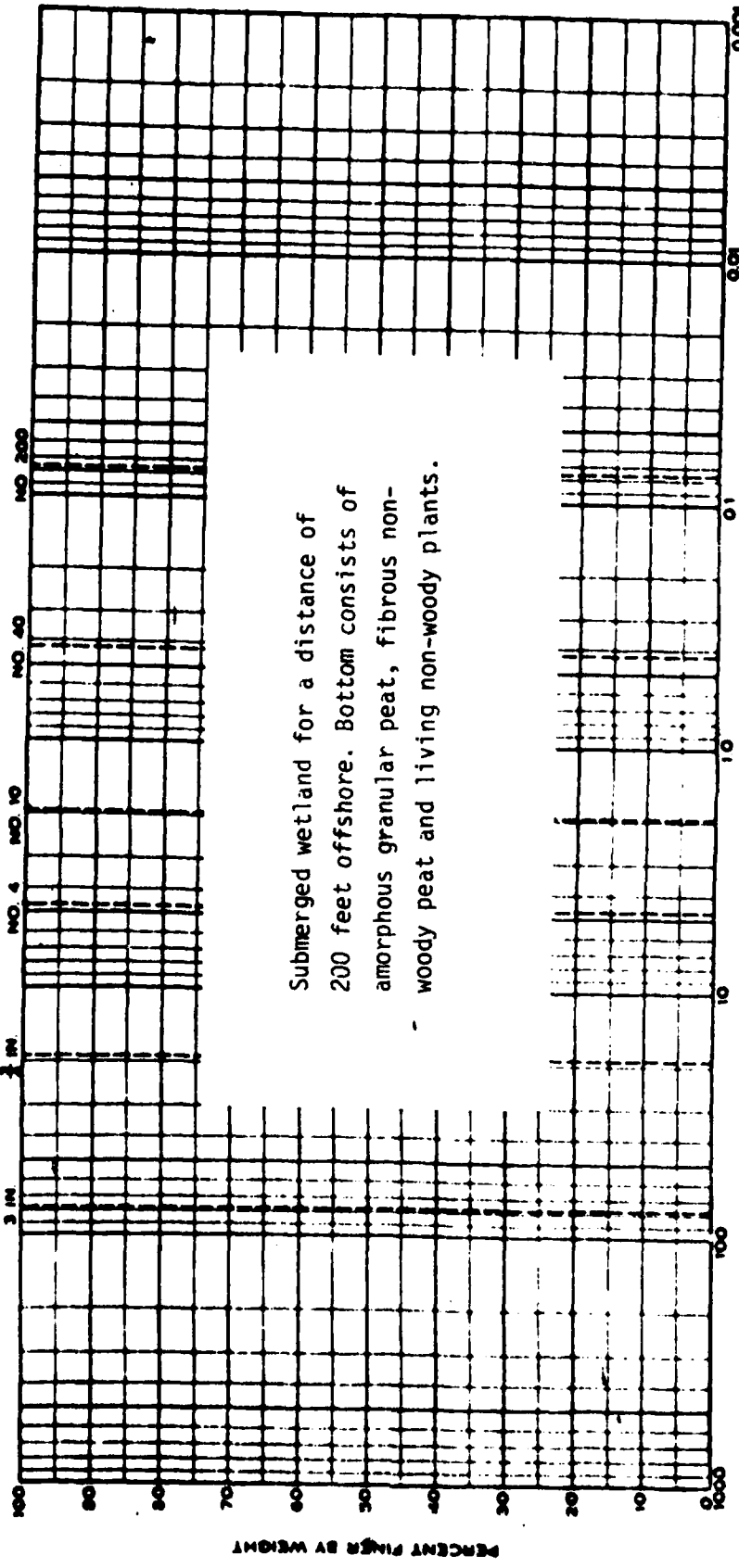
NAME OF SECTION NINE MILE
XX

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
41	5094.0	61.1
42	5153.0	72.6
43	5184.0	72.9
44	5319.0	72.5
45	5369.0	87.1
46	5396.0	88.7
47	5517.0	90.1
48	5532.0	89.5
49	5548.0	90.4
50	5549.0	89.5
51	5598.0	89.5
52	5607.0	90.1
53	5666.0	89.8
54	5680.0	90.9
55	5781.0	90.8
56	5791.0	91.2
57	5801.0	91.6
58	5811.0	91.8
59	5821.0	92.3
60	5831.0	92.6
61	5841.0	93.3
62	5849.0	94.1
63	5852.0	94.6
64	5852.5	96.1
B	5856.0	96.1

NINE MILE CROSS-SECTION
SOUNDED NOVEMBER 6, 1984



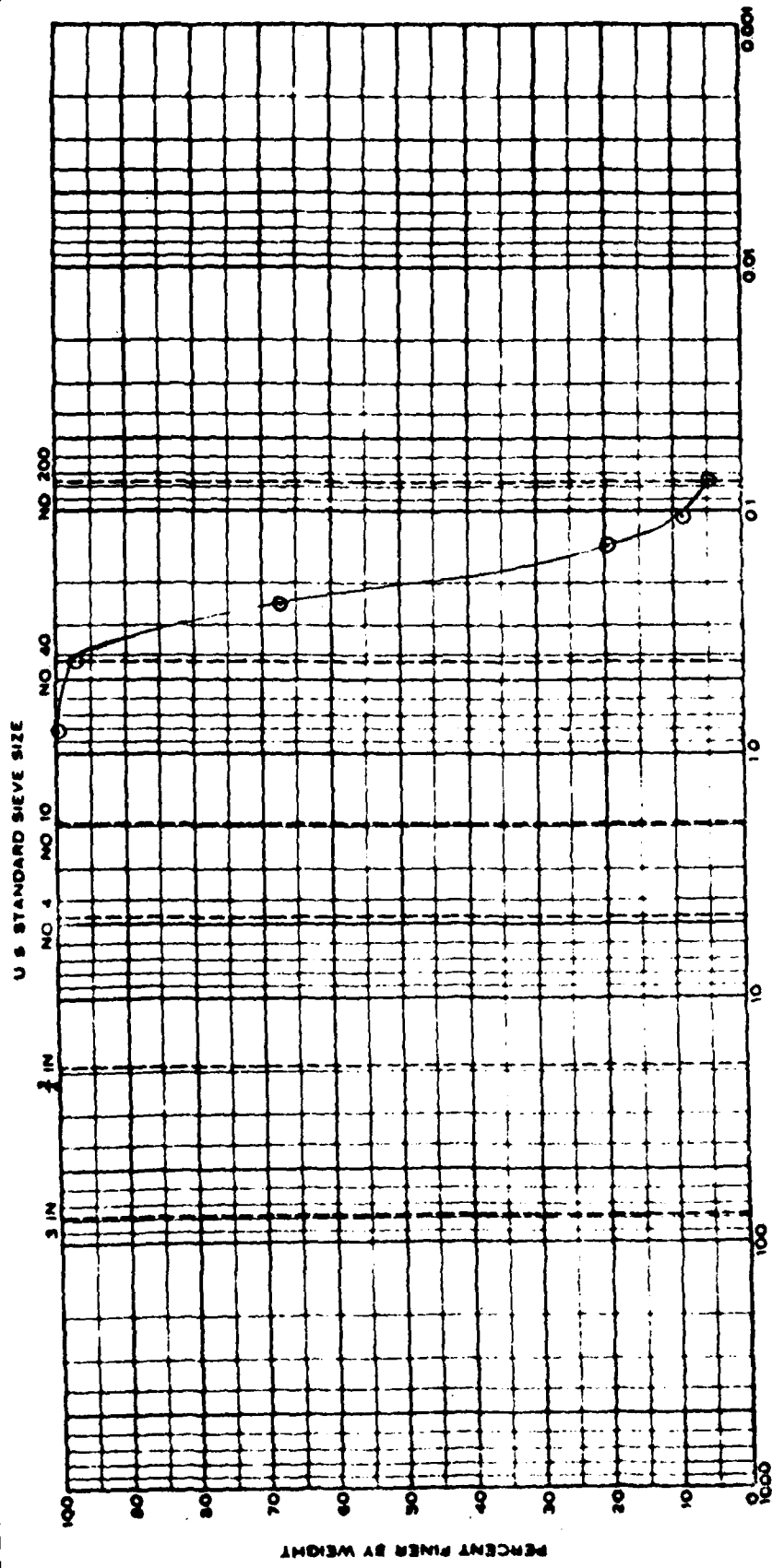
U. S. STANDARD SIEVE SIZE



Submerged wetland for a distance of 200 feet offshore. Bottom consists of amorphous granular peat, fibrous non-woody peat and living non-woody plants.

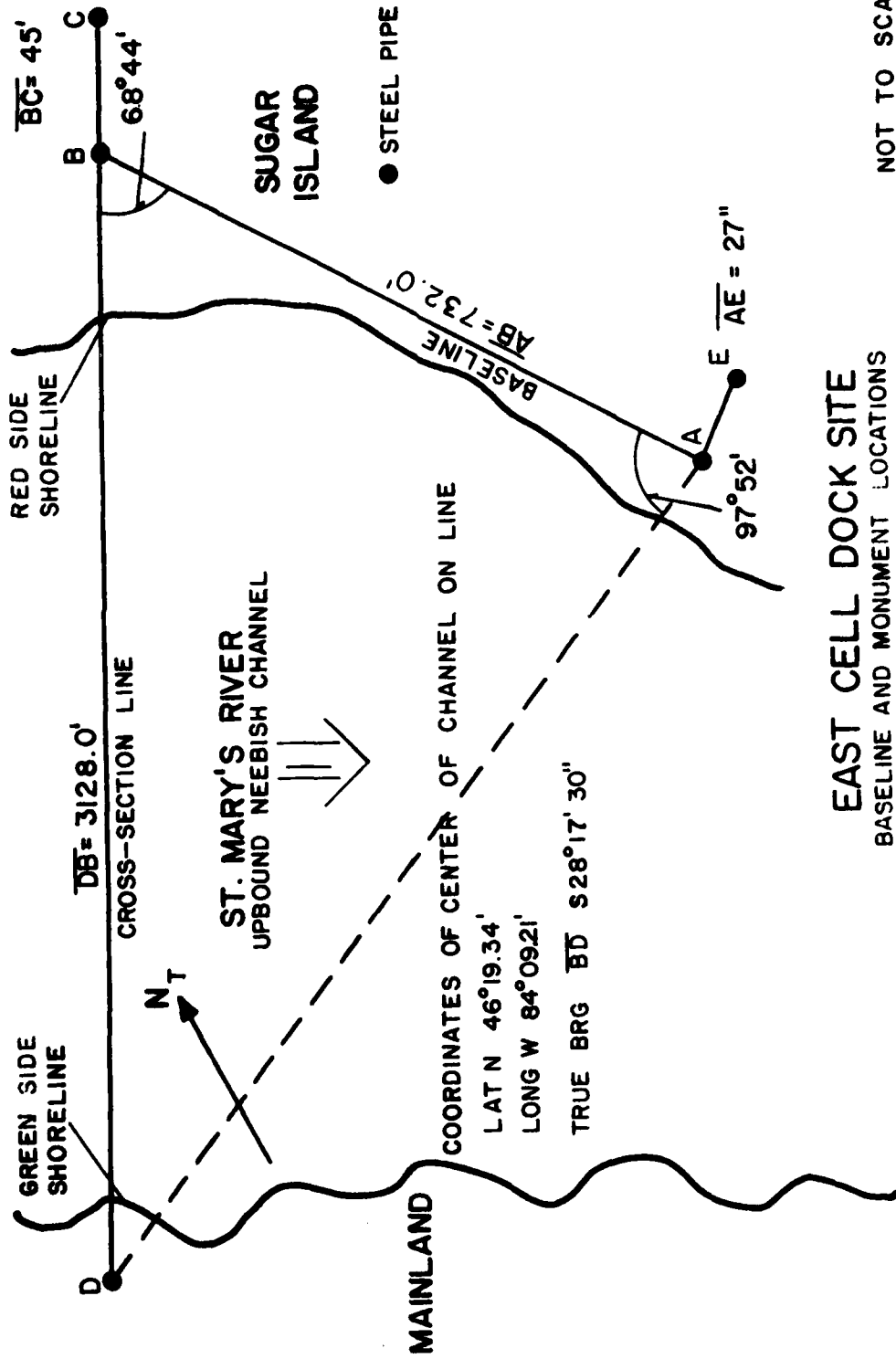
GRAIN SIZE IN MILLIMETERS

CONDUIT		CABLE		FIBER		SMB		SILT OR CLAY	
Sample No.	Elev or Depth	Classification	NetWC	LL	PL	PI	Project		
							DACA89-85-K-0001		
Area							Nine Mile, Green Side		
Boring No.							Observations		
Date							May 1985		
GRADATION CURVES									



COARSE		FINE		SAND		SILT OR CLAY	
Gravel	Coarse	Fine	Coarse	Medium	Fine		
Sample No.	Elev or Depth	Classification	NatWC	LL	PL	PI	Project
		SP					DACA89-85-K-0001
							Area
							Nine Mile, Red Side
							Boring No.
							150 ft. Offshore
							Date
							Sampled 2/15/79
GRADATION CURVES							

EAST CELL DOCK



EAST CELL DOCK SITE
BASELINE AND MONUMENT LOCATIONS

NOT TO SCALE

@@
 SOUNDING DATA

NAME OF SECTION EAST CELL DOCK
 @@

DATE OF SOUNDING NOVEMBER 7, 1984

WATER SURFACE ELEVATION in feet = 100.0

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
D	0.0	102.0
2	14.0	100.0
3	20.0	98.9
4	28.0	98.4
5	32.0	97.4
6	35.0	96.4
7	40.0	96.3
8	50.0	96.0
9	65.0	95.4
10	76.0	94.7
11	91.0	94.8
12	97.0	94.3
13	135.0	94.3
14	147.0	94.9
15	165.0	94.7
16	183.0	93.4
17	203.0	92.1
18	257.0	86.0
19	307.0	82.7
20	375.0	79.0
21	381.0	76.4
22	384.0	77.0
23	387.0	76.0
24	394.0	72.5
25	410.0	64.5
26	422.0	64.9
27	429.0	63.6
28	437.0	63.0
29	463.0	63.4
30	469.0	62.3
31	475.0	62.3
32	484.0	63.6
33	486.0	62.0
34	511.0	64.0
35	514.0	63.5
36	525.0	64.6
37	528.0	63.6
38	543.0	63.6
39	558.0	66.0
40	573.0	66.5

XX
SOUNDING DATA (continued)

NAME OF SECTION EAST CELL DOCK
XX

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
41	583.0	67.5
42	605.0	64.4
43	618.0	64.0
44	639.0	64.2
45	649.0	70.0
46	656.0	72.0
47	662.0	71.1
48	672.0	72.9
49	695.0	71.8
50	744.0	72.2
51	762.0	73.2
52	824.0	72.5
53	830.0	72.9
54	961.0	72.7
55	1001.0	74.6
56	1012.0	74.4
57	1033.0	73.3
58	1048.0	74.3
59	1078.0	74.3
60	1174.0	77.7
61	1197.0	80.6
62	1229.0	81.5
63	1256.0	81.0
64	1297.0	82.1
65	1321.0	81.6
66	1347.0	82.8
67	1372.0	89.5
68	1383.0	91.0
69	1393.0	90.9
70	1400.0	90.5
71	1418.0	92.9
72	1440.0	90.6
73	1473.0	89.1
74	1474.0	89.9
75	1488.0	89.9
76	1501.0	89.2
77	1526.0	89.6
78	1583.0	87.8
79	1617.0	88.8
80	1630.0	88.0
81	1664.0	89.7
82	1690.0	89.4
83	1697.0	88.4
84	1708.0	88.2

XX
SOUNDING DATA (continued)

NAME OF SECTION EAST CELL DOCK
XX

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
85	1714.0	88.8
86	1736.0	89.0
87	1757.0	90.0
88	1765.0	89.1
89	1774.0	89.7
90	1778.0	89.2
91	1781.0	89.8
92	1790.0	92.0
93	1798.0	92.0
94	1805.0	90.7
95	1816.0	92.6
96	1820.0	94.8
97	1828.0	94.7
98	1839.0	91.2
99	1857.0	90.0
100	1887.0	90.7
101	1930.0	90.7
102	1963.0	91.8
103	1981.0	90.7
104	2047.0	90.9
105	2080.0	91.6
106	2105.0	91.2
107	2118.0	91.7
108	2141.0	93.6
109	2157.0	92.6
110	2182.0	92.8
111	2222.0	93.7
112	2254.0	93.4
113	2316.0	94.0
114	2328.0	94.6
115	2388.0	95.0
116	2489.0	95.0
117	2503.0	94.8
118	2531.0	94.8
119	2575.0	95.2
120	2595.0	94.5
121	2605.0	95.2
122	2652.0	95.0
123	2689.0	93.8
124	2739.0	93.8
125	2791.0	94.8
126	2842.0	94.8
127	2959.0	96.1
128	2999.0	96.9

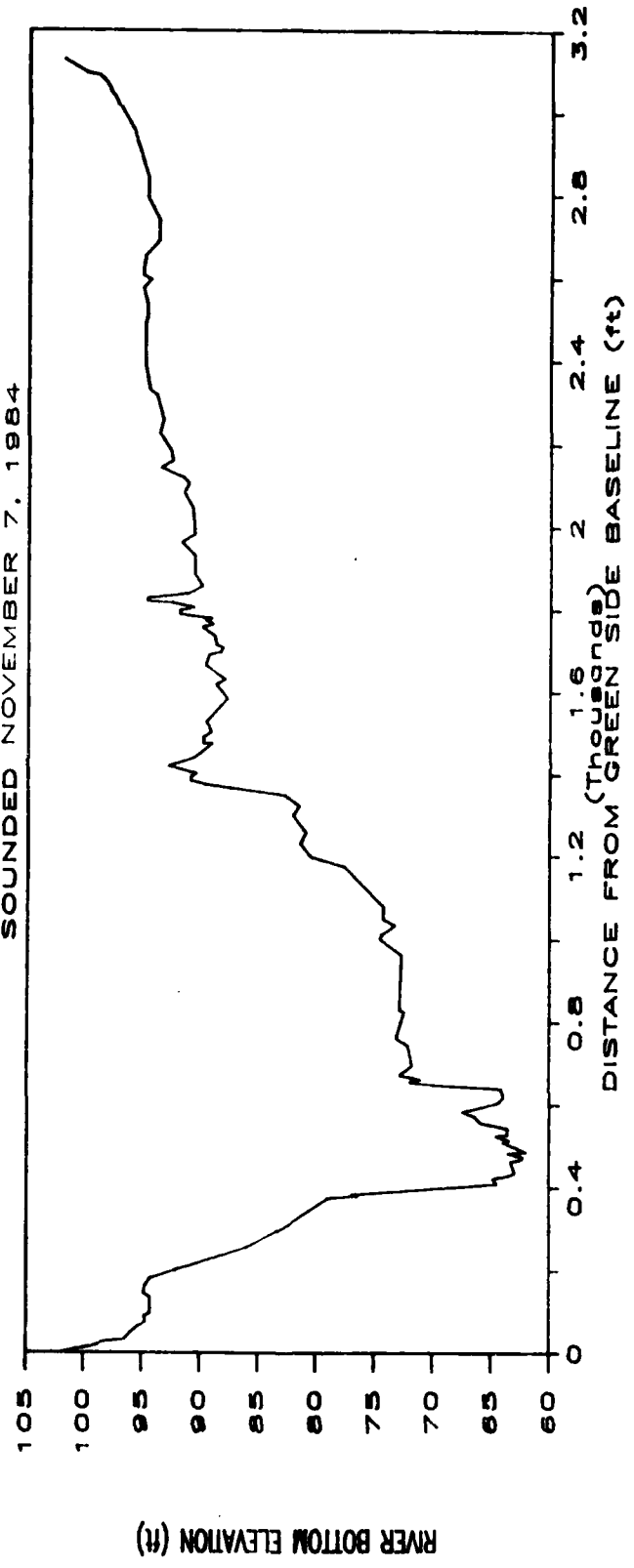
SOUNDING DATA (continued)

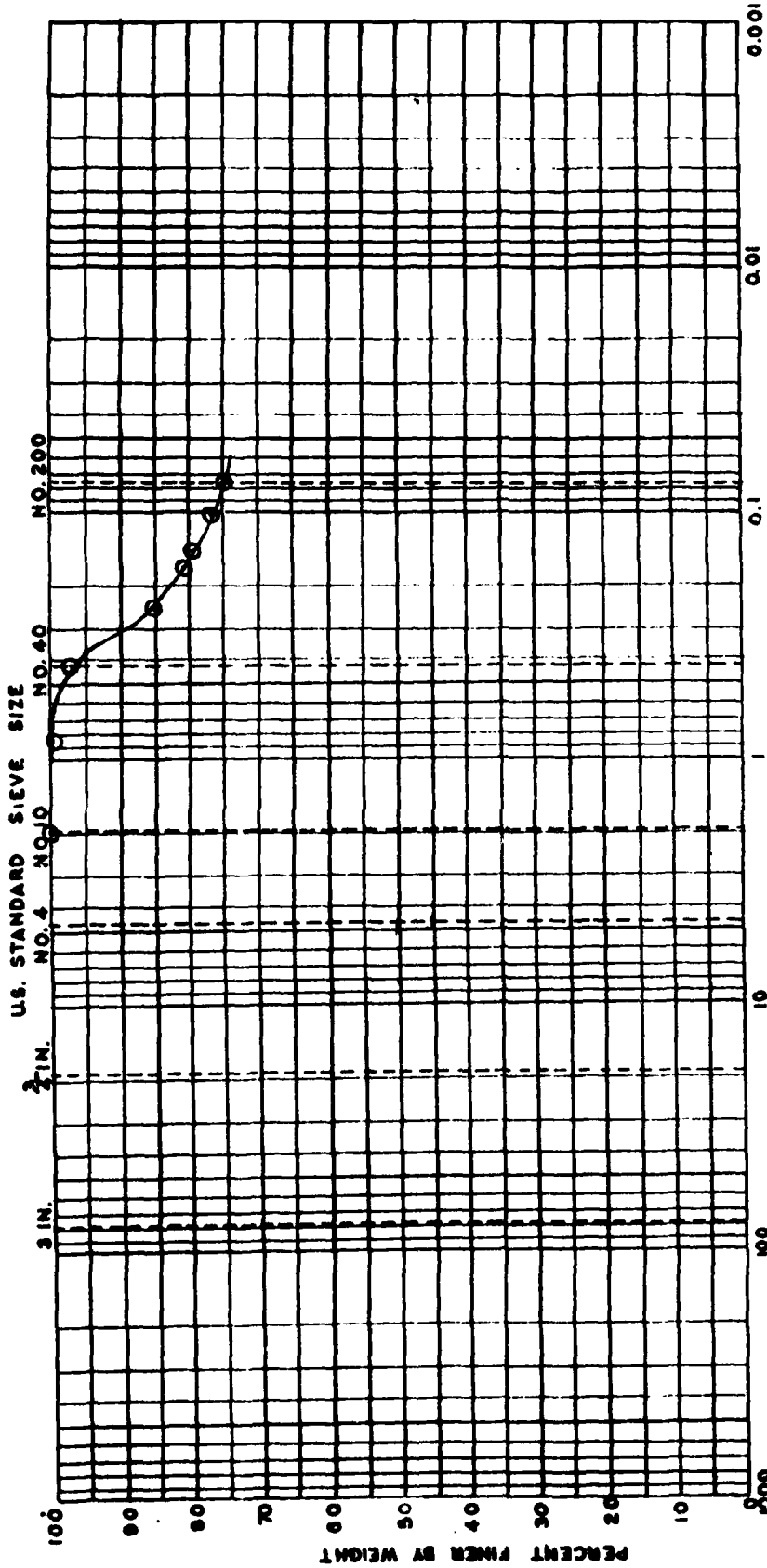
NAME OF SECTION EAST CELL DOCK
#####

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
129	3009.0	97.1
130	3019.0	97.4
131	3029.0	97.5
132	3039.0	97.7
133	3049.0	98.0
134	3059.0	98.1
135	3069.0	98.3
136	3079.0	98.6
137	3089.0	99.0
138	3095.0	100.0
B	3128.8	102.0

EAST CELL DOCK CROSS-SECTION

SOUNDED NOVEMBER 7, 1984





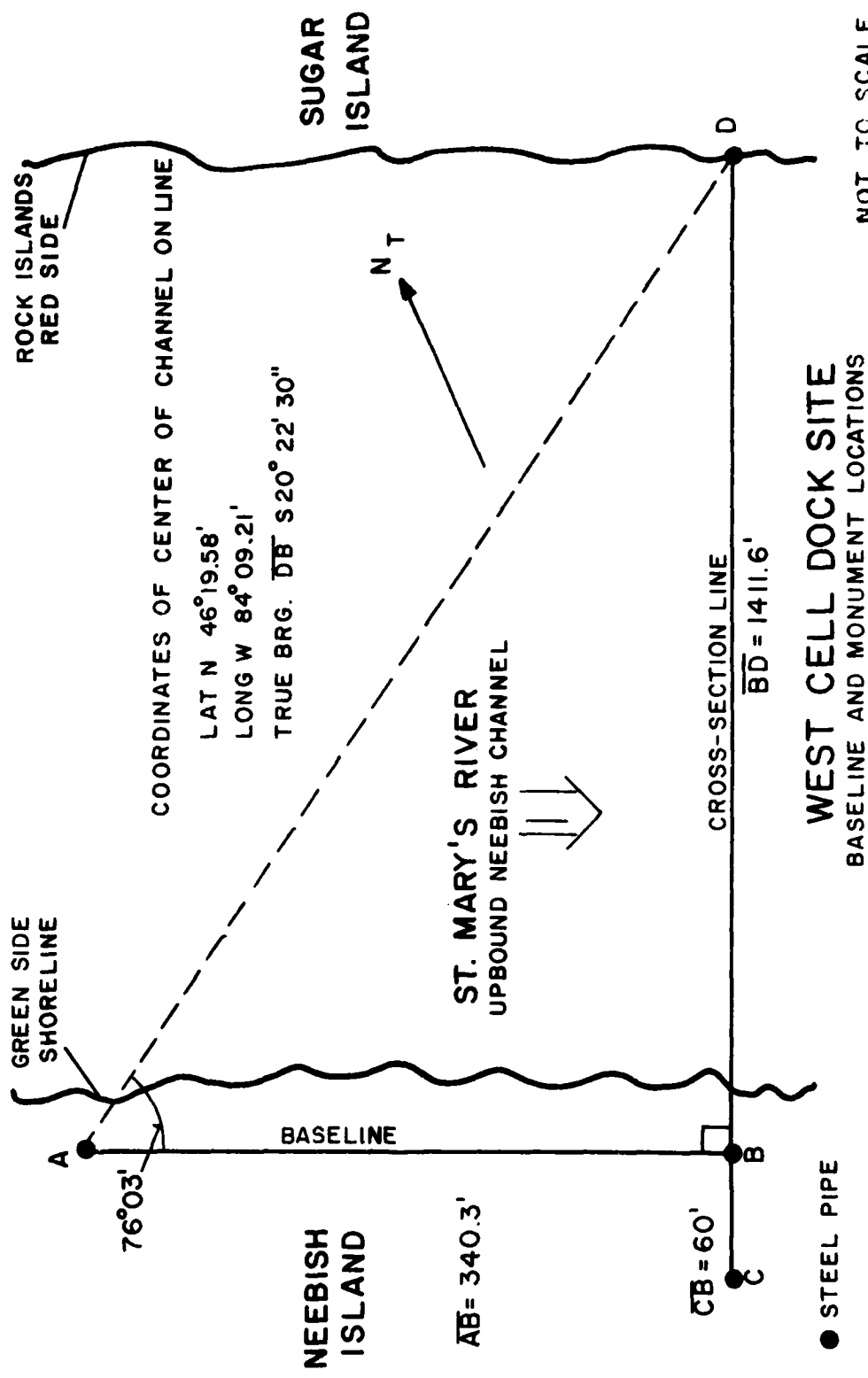
GRAIN SIZE IN MILLIMETERS

COBBLES GRAVEL FINE COARSE MEDIUM FINE SILT OR CLAY

SAMPLE NO.	ELEV. OR DEP.	CLASSIFICATION	MAT/CL	LL	PL	PI
		ML				
P-200 = 74.5%						
PROJECT DAC89-85-K-0001						
AREA East Cell Dock, Red Side						
BORING NO. 50 ft. Offshore, Top 6 in.						
DATE Sampled 11/17/84						

GRADATION CURVES

WEST CELL DOCK



NOT TO SCALE

WEST CELL DOCK SITE
BASELINE AND MONUMENT LOCATIONS

XX
SOUNDING DATA

NAME OF SECTION WEST CELL DOCK
XX

DATE OF SOUNDING NOVEMBER 7, 1984

WATER SURFACE ELEVATION in feet = 100.0

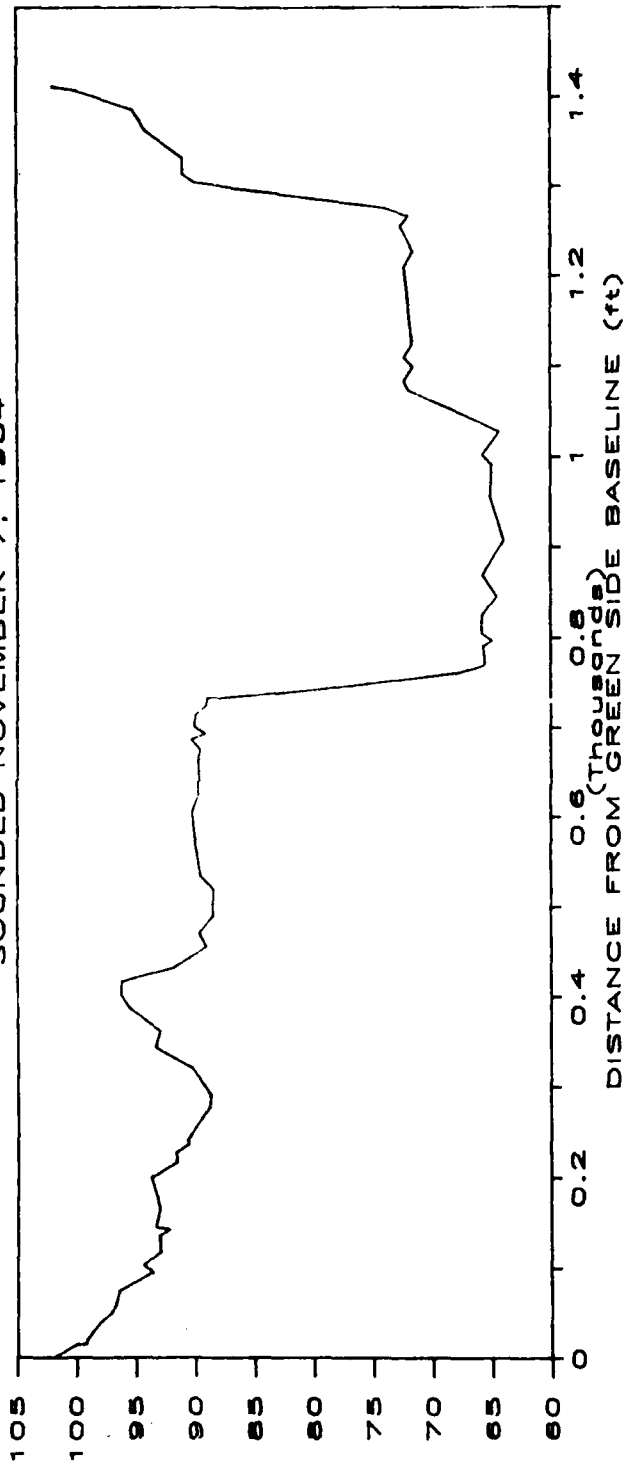
DATA POINT	DISTANCE(ft)	ELEVATION(ft)
B	0.0	102.0
2	15.0	100.0
3	15.5	99.2
4	20.0	99.1
5	30.0	98.6
6	40.0	98.0
7	50.0	97.1
8	60.0	96.7
9	75.0	96.4
10	95.0	93.6
11	103.0	94.4
12	118.0	93.0
13	136.0	93.1
14	143.0	92.2
15	146.0	93.4
16	166.0	93.0
17	200.0	93.8
18	218.0	91.6
19	228.0	91.7
20	238.0	90.6
21	243.0	90.7
22	279.0	88.8
23	292.0	88.7
24	322.0	90.3
25	345.0	93.4
26	363.0	93.0
27	388.0	95.6
28	403.0	96.3
29	418.0	96.2
30	433.0	91.8
31	456.0	89.1
32	471.0	89.7
33	490.0	88.5
34	519.0	88.5
35	535.0	89.6
36	578.0	90.1
37	605.0	90.3
38	625.0	89.7
39	661.0	89.8
40	675.0	89.6

XX
SOUNDING DATA (continued)

NAME OF SECTION WEST CELL DOCK
XX

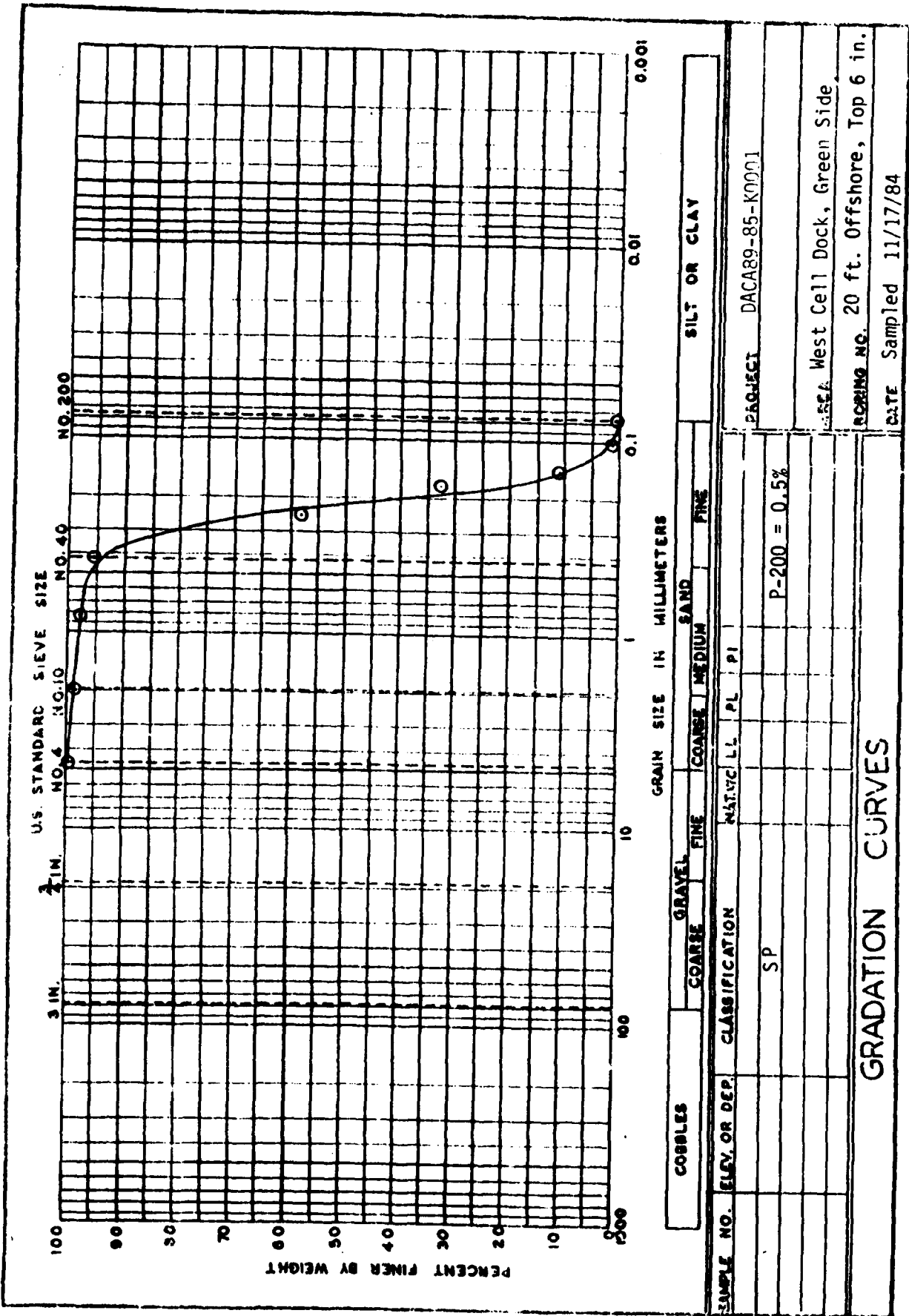
DATA POINT	DISTANCE(ft)	ELEVATION(ft)
41	687.0	90.4
42	693.0	89.2
43	701.0	90.1
44	714.0	90.0
45	724.0	89.1
46	732.0	89.0
47	743.0	79.0
48	760.0	68.0
49	769.0	65.6
50	790.0	65.8
51	796.0	65.0
52	804.0	65.9
53	825.0	65.8
54	845.0	64.6
55	869.0	65.8
56	907.0	64.0
57	955.0	65.1
58	991.0	65.0
59	1002.0	65.8
60	1028.0	64.3
61	1074.0	72.0
62	1084.0	72.4
63	1099.0	71.6
64	1110.0	72.4
65	1124.0	71.7
66	1210.0	72.4
67	1227.0	71.6
68	1256.0	72.7
69	1267.0	72.0
70	1276.0	74.0
71	1305.0	90.1
72	1315.0	91.1
73	1332.0	91.1
74	1362.0	94.2
75	1386.0	95.3
76	1407.0	100.0
D	1411.6	102.0

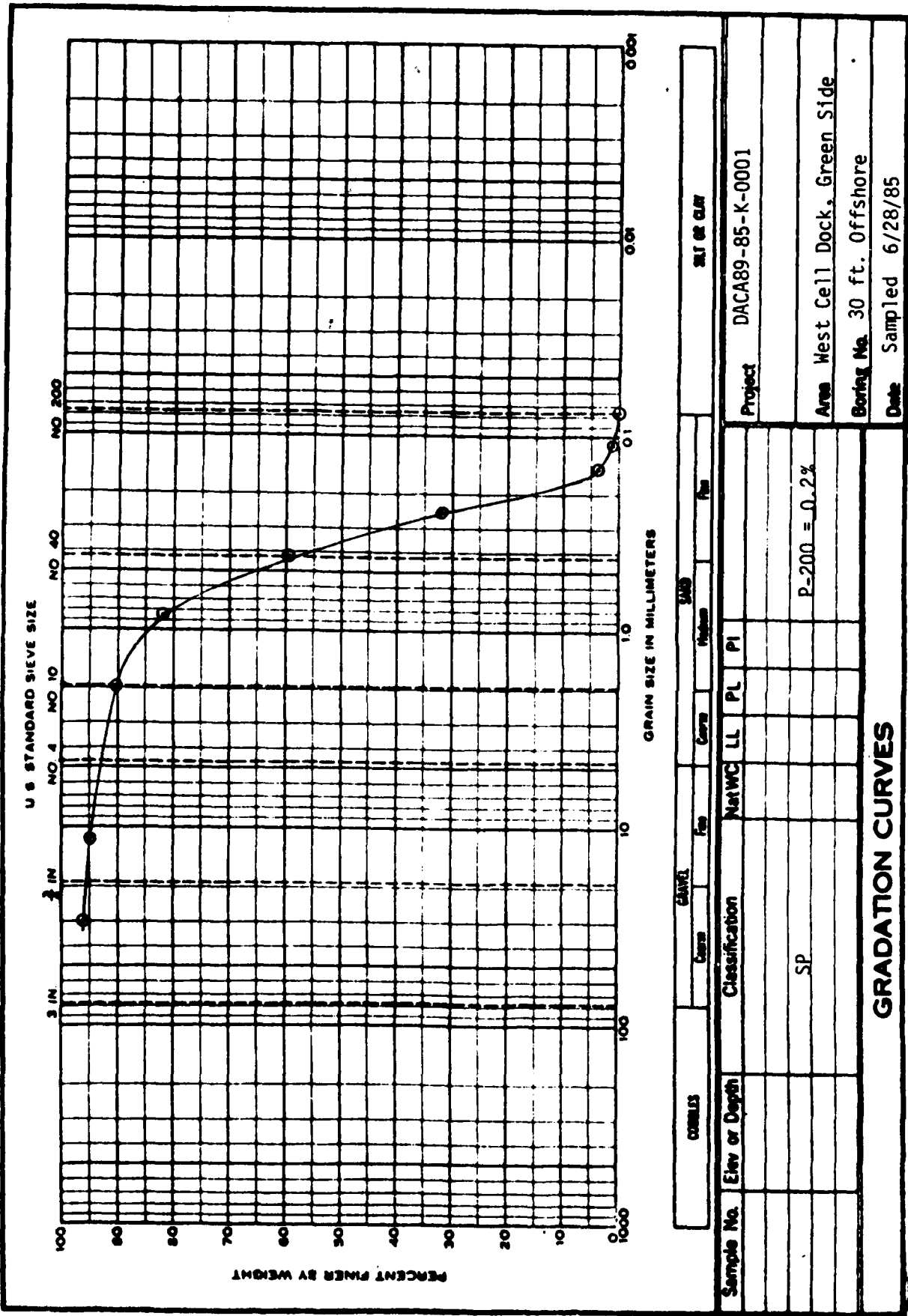
WEST CELL DOCK CROSS-SECTION
SOUNDED NOVEMBER 7, 1984

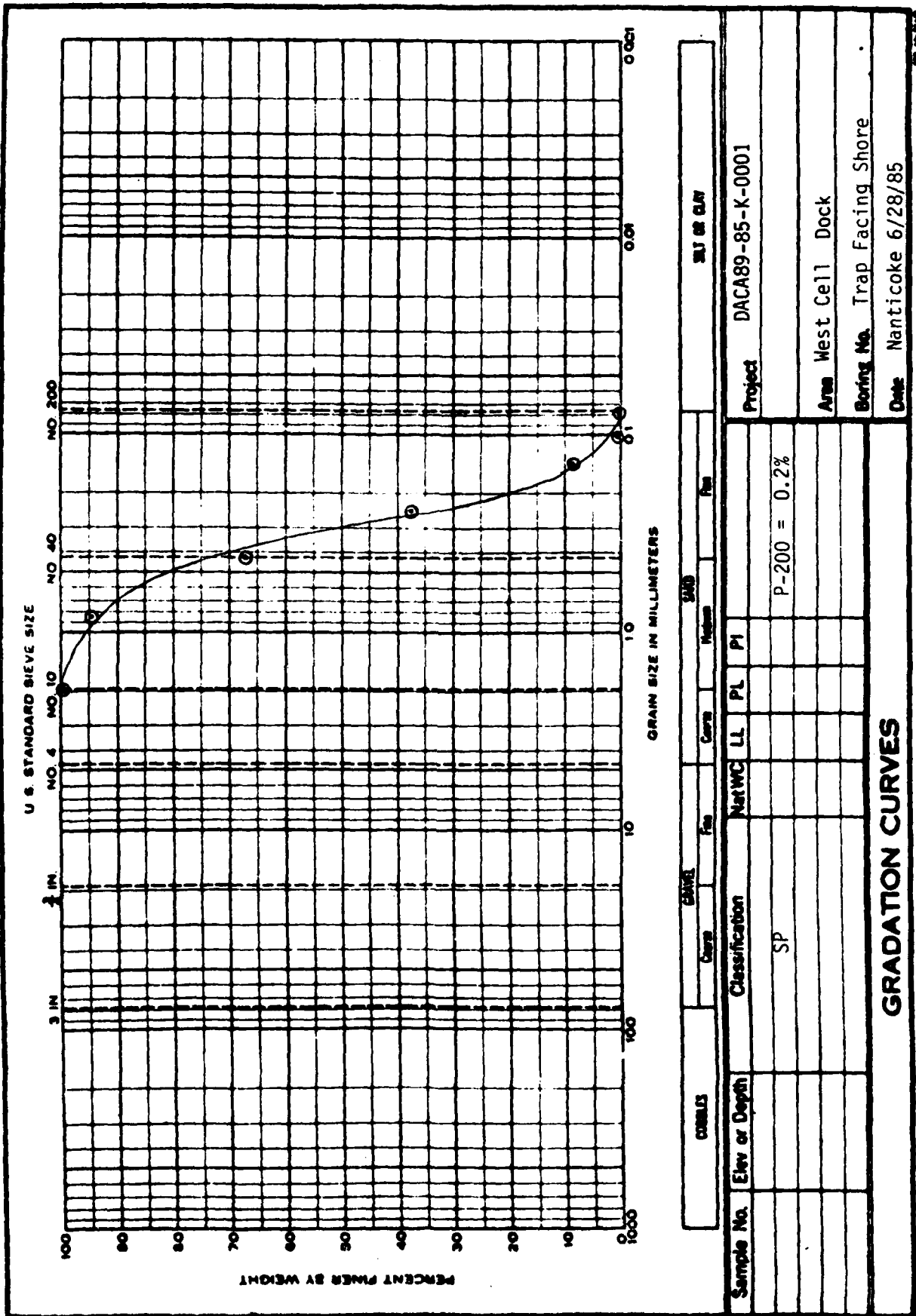


RIVER BOTTOM ELEVATION (ft)

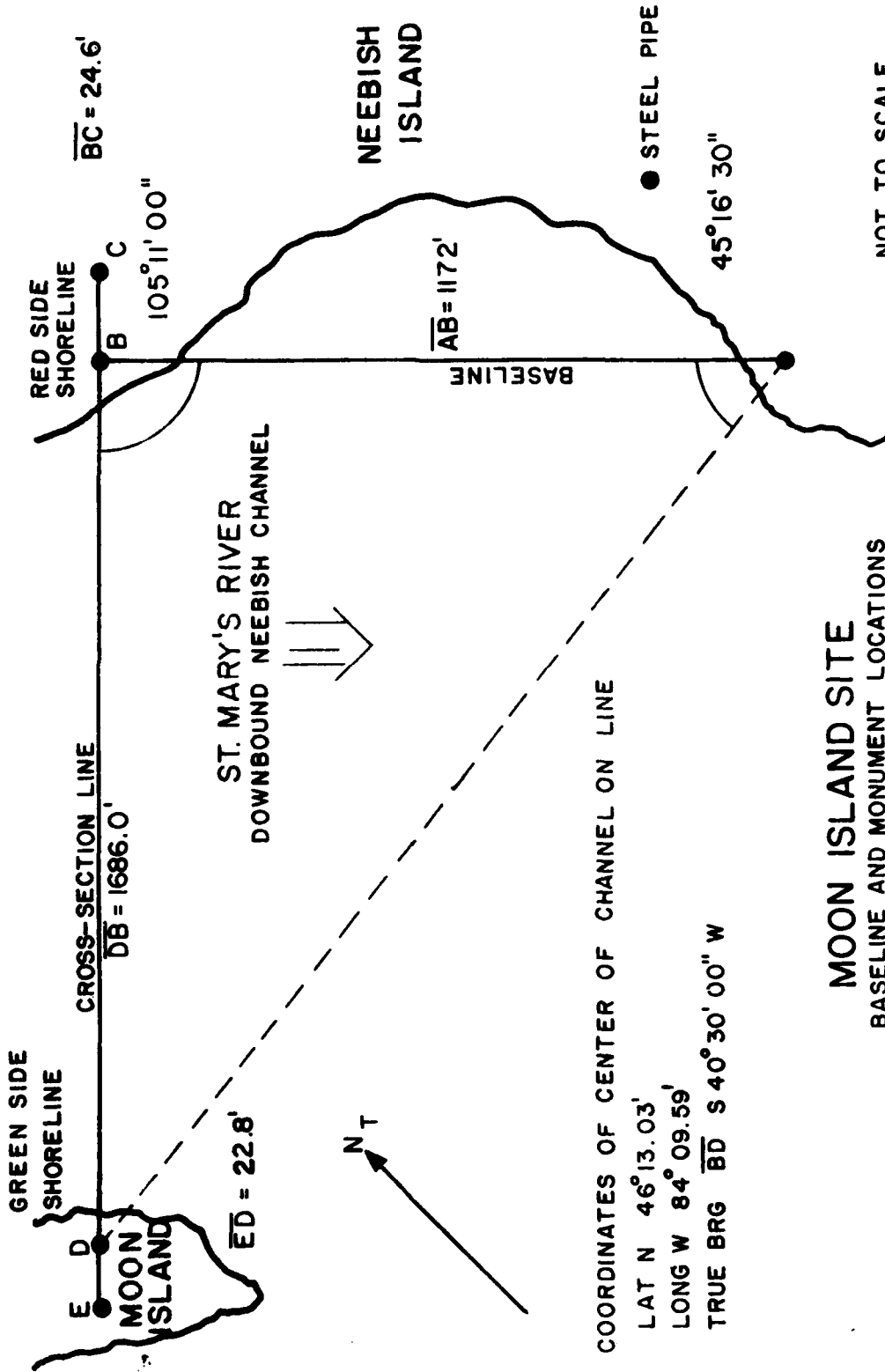
AF4







MOON ISLAND



XX
SOUNDING DATA

NAME OF SECTION MOON ISLAND
XX

DATE OF SOUNDING NOVEMBER 7, 1984

WATER SURFACE ELEVATION in feet = 100.0

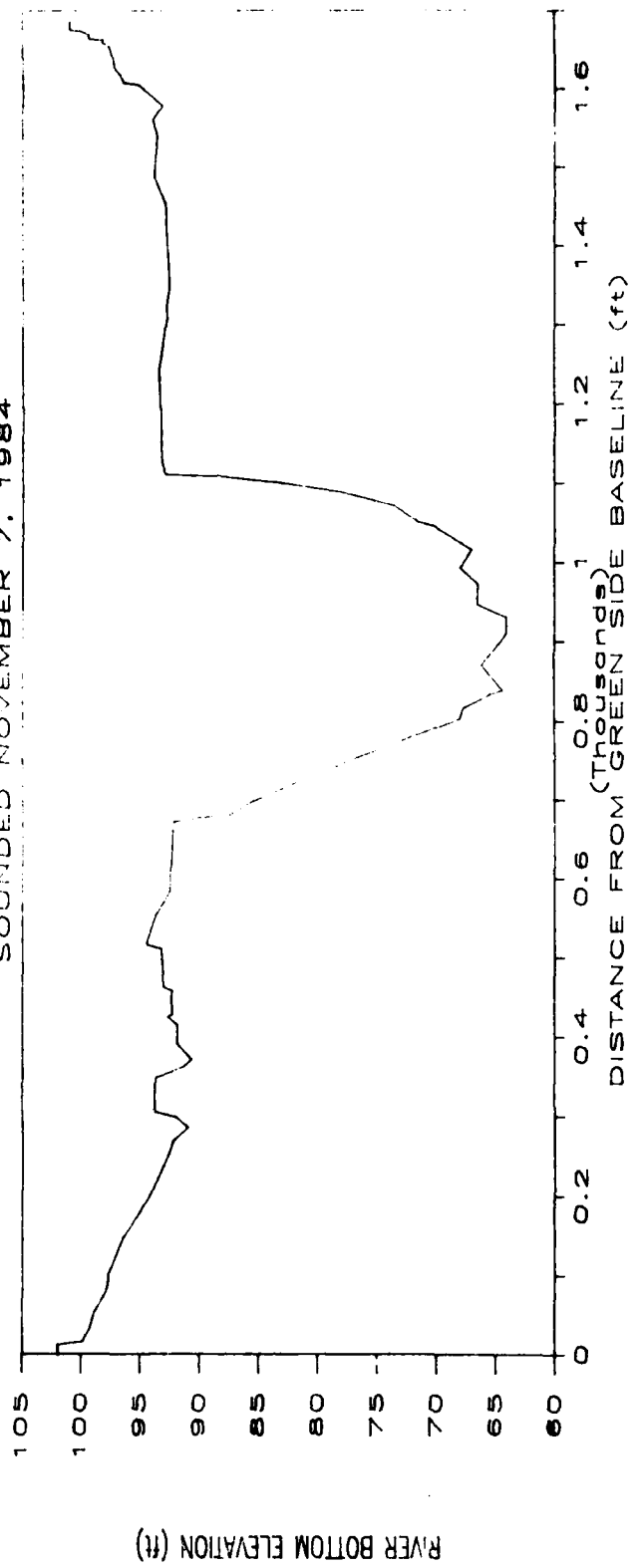
DATA POINT	DISTANCE(ft)	ELEVATION(ft)
D	0.0	102.0
2	13.0	102.0
3	17.0	99.8
4	24.0	99.6
5	34.0	99.2
6	44.0	99.0
7	54.0	98.8
8	70.0	98.2
9	83.0	97.8
10	92.0	97.7
11	100.0	97.7
12	148.0	96.4
13	200.0	94.2
14	253.0	92.6
15	270.0	92.2
16	287.0	91.0
17	300.0	92.0
18	307.0	93.8
19	350.0	93.7
20	364.0	91.3
21	373.0	90.7
22	392.0	91.9
23	416.0	91.9
24	426.0	92.7
25	429.0	92.3
26	448.0	92.4
27	459.0	92.3
28	464.0	93.1
29	512.0	93.3
30	517.0	94.5
31	554.0	93.7
32	583.0	92.5
33	672.0	92.2
34	677.0	90.2
35	680.0	87.5
36	697.0	85.6
37	753.0	76.7
38	803.0	68.0
39	816.0	67.7
40	834.0	65.4

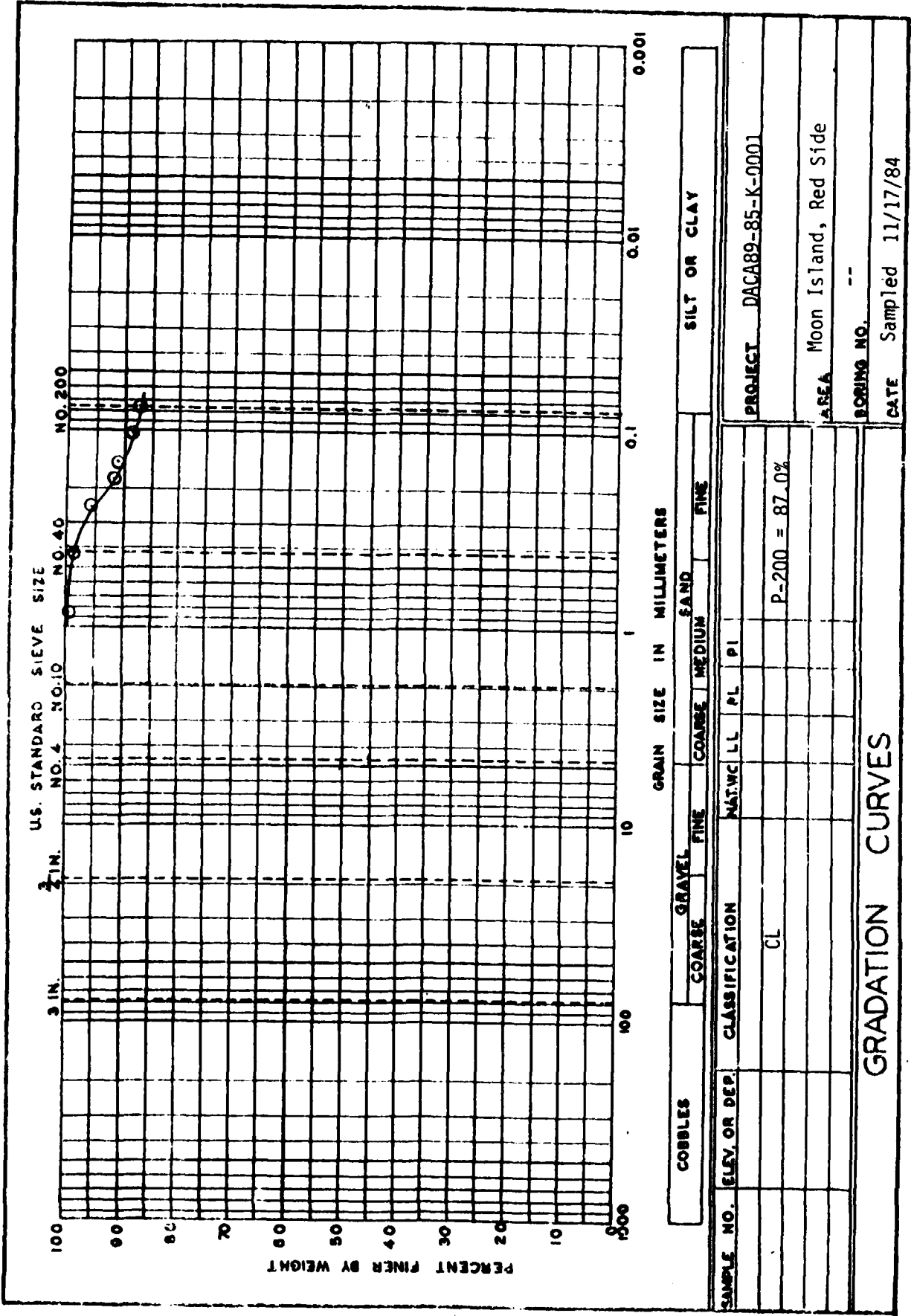
SOUNDRING DATA (continued)

NAME OF SECTION MOON ISLAND

DATA POINT	DISTANCE(ft)	ELEVATION(ft)
41	839.0	64.4
42	871.0	66.2
43	910.0	64.1
44	931.0	64.1
45	948.0	66.6
46	973.0	66.5
47	994.0	68.0
48	1017.0	67.0
49	1046.0	70.2
50	1052.0	71.6
51	1072.0	73.6
52	1090.0	78.0
53	1102.0	83.4
54	1110.0	88.5
55	1113.0	93.0
56	1130.0	93.3
57	1241.0	93.5
58	1311.0	92.8
59	1322.0	92.9
60	1347.0	92.6
61	1454.0	93.0
62	1488.0	93.9
63	1540.0	93.6
64	1561.0	94.0
65	1580.0	93.2
66	1606.0	95.2
67	1609.0	96.5
68	1619.0	96.8
69	1629.0	97.3
70	1639.0	97.4
71	1649.0	97.6
72	1654.0	97.7
73	1659.0	98.2
74	1663.0	98.2
75	1664.0	99.4
76	1669.0	99.4
77	1674.0	100.0
78	1675.0	101.0
B	1686.0	101.0

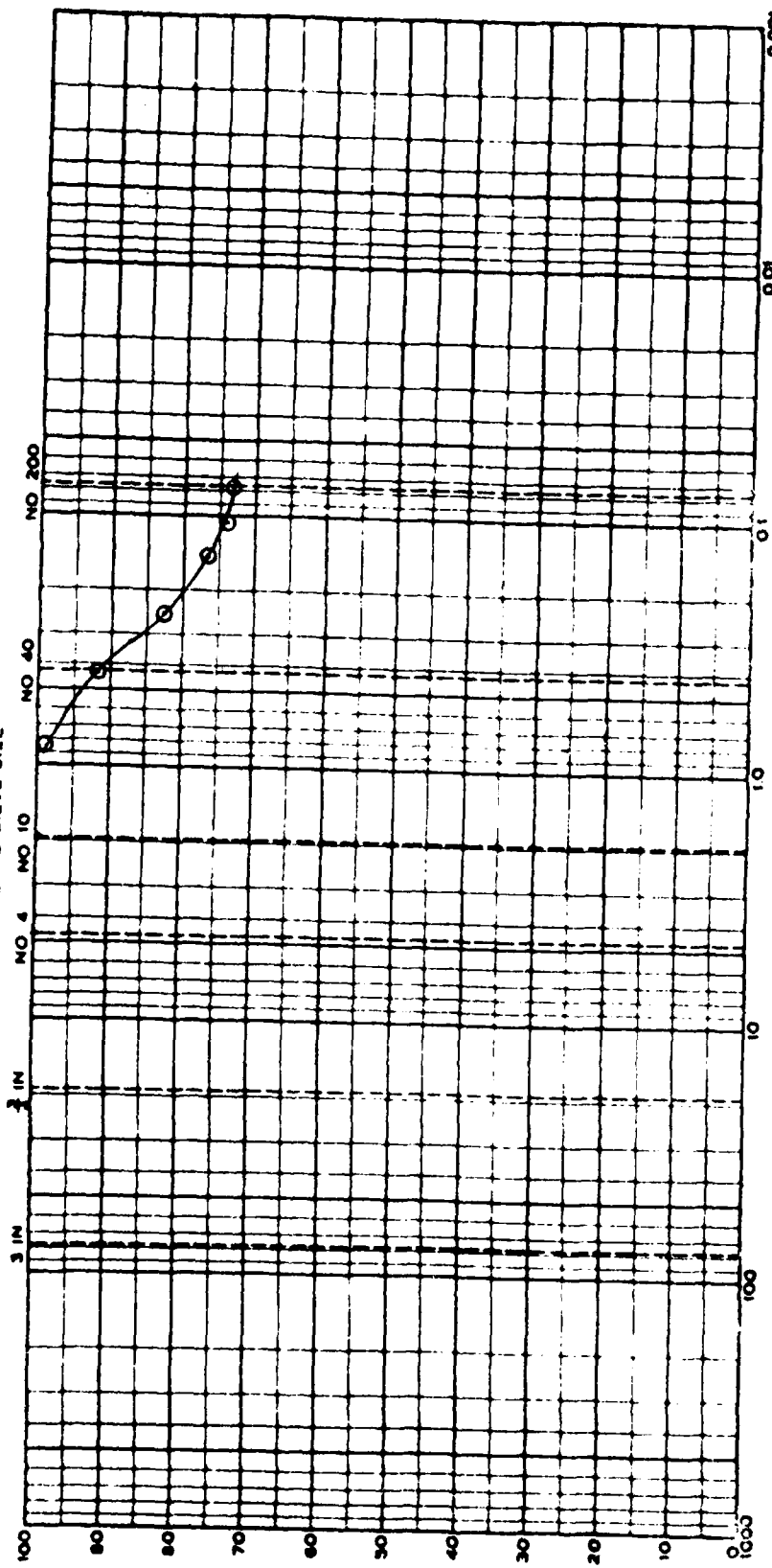
MOON ISLAND CROSS-SECTION
SOUNDED NOVEMBER 7, 1984





COBBLES		GRAVEL		SAND		SILT OR CLAY	
COARSE		FINE		MEDIUM		FINE	
SAMPLE NO.	ELEV. OR DEP.	CLASSIFICATION	NAT. W.C.	L.L.	P.L.	P.I.	
		CL					P-200 = 87.0%
PROJECT		DACA89-85-K-0001					
AREA		Moon Island, Red Side					
BORING NO.		--					
DATE		Sampled 11/17/84					
GRADATION CURVES							

U S STANDARD SIEVE SIZE



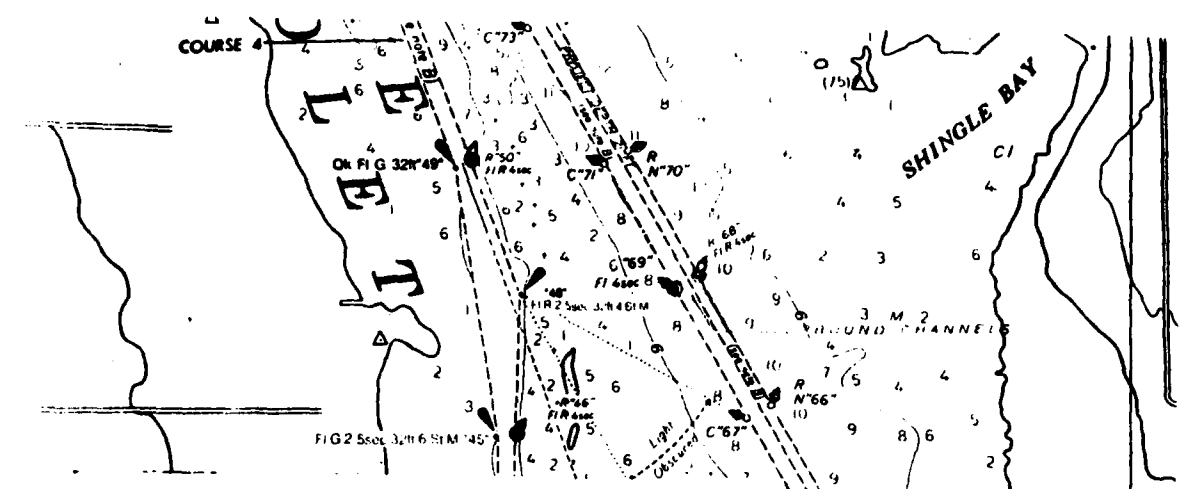
GRAIN SIZE IN MILLIMETERS

COBBLES		GRAVEL		SAND		SILT OR CLAY	
Sample No.	Elev or Depth	Classification	Net WC	LL	PL	PI	Project
		CL					DACA89-85-K-0001
							Area
							Moon Island Red Side
							Boring No.
							20 ft. Offshore
							Date
							Sampled 6/27/85
GRADATION CURVES							

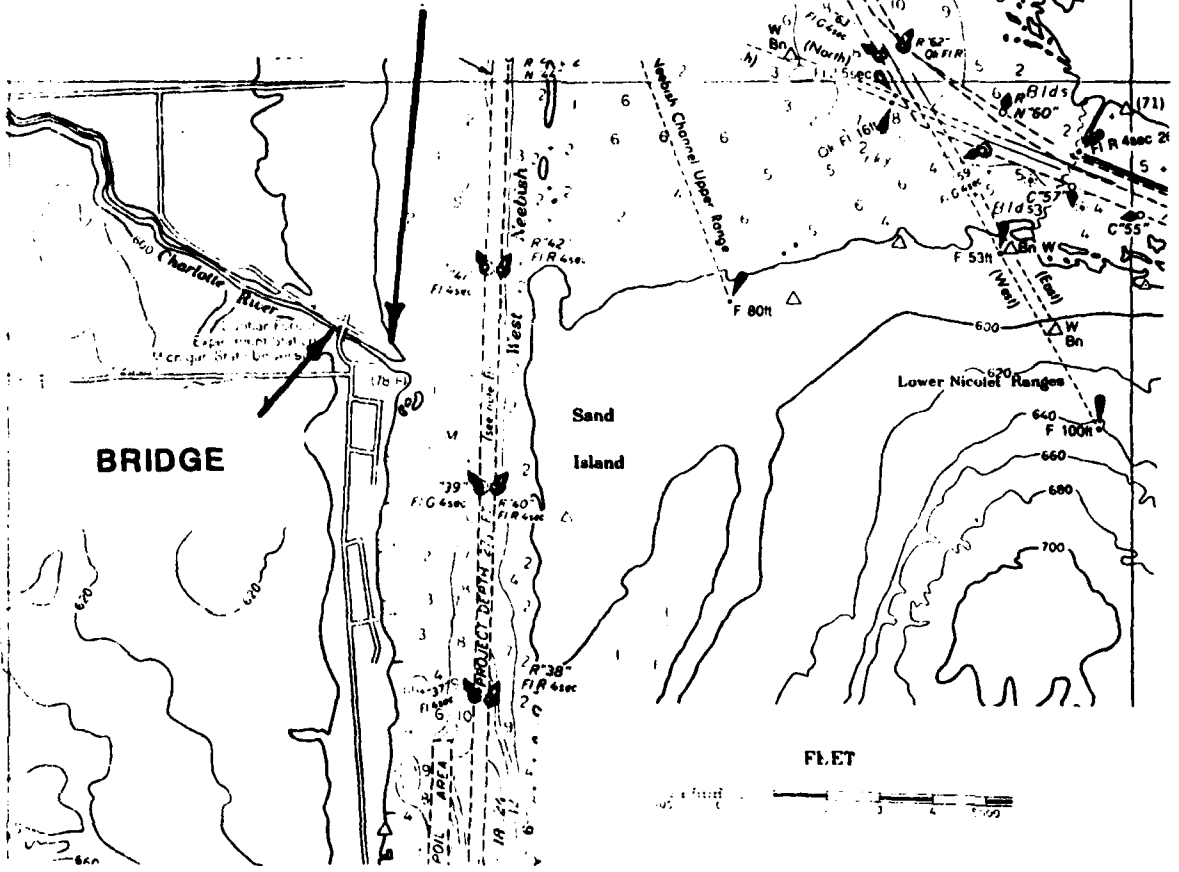
p-200 = 73.3%

PL 7 5087

CHARLOTTE RIVER

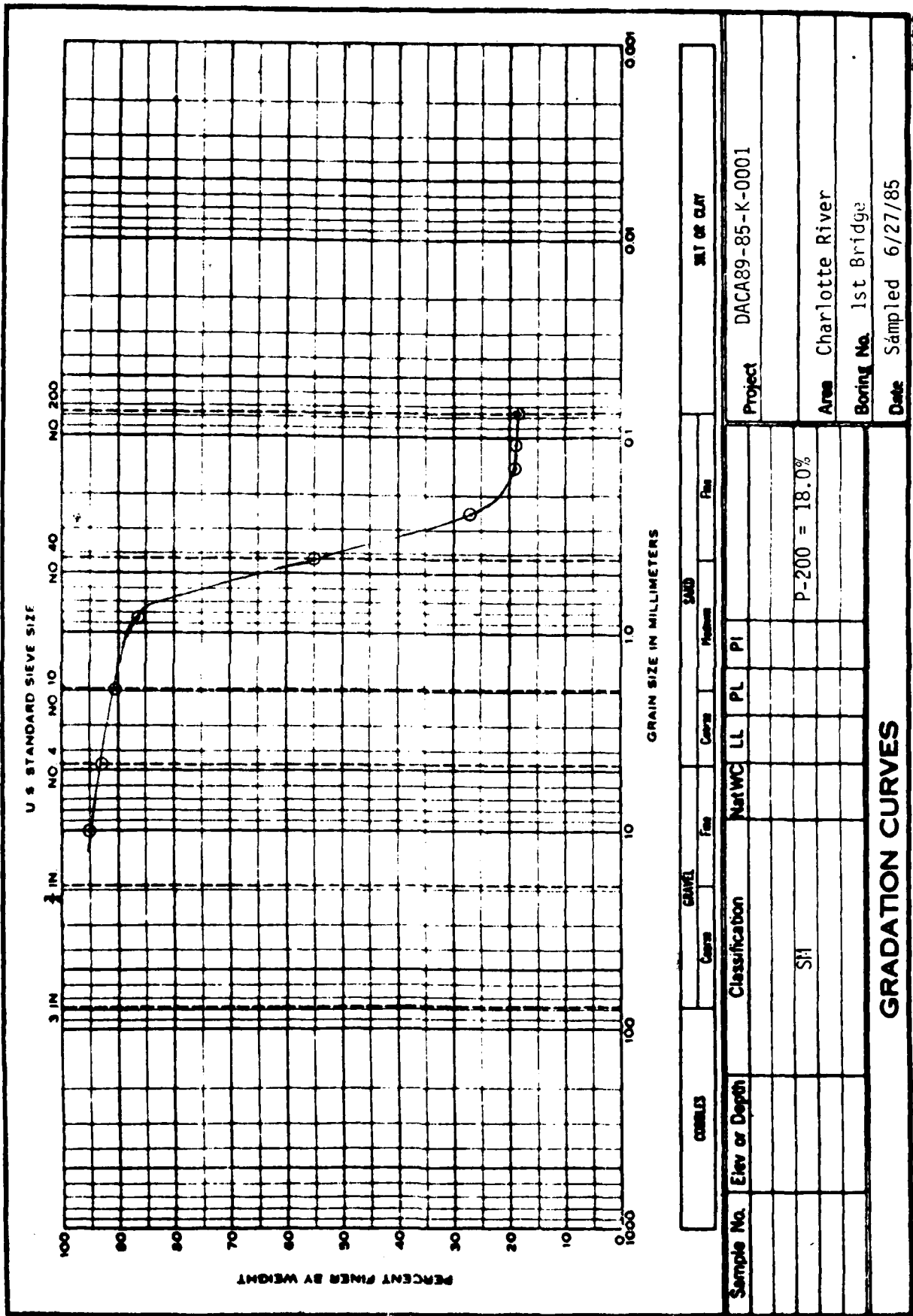


CHARLOTTE RIVER SITE



SITE LOCATION

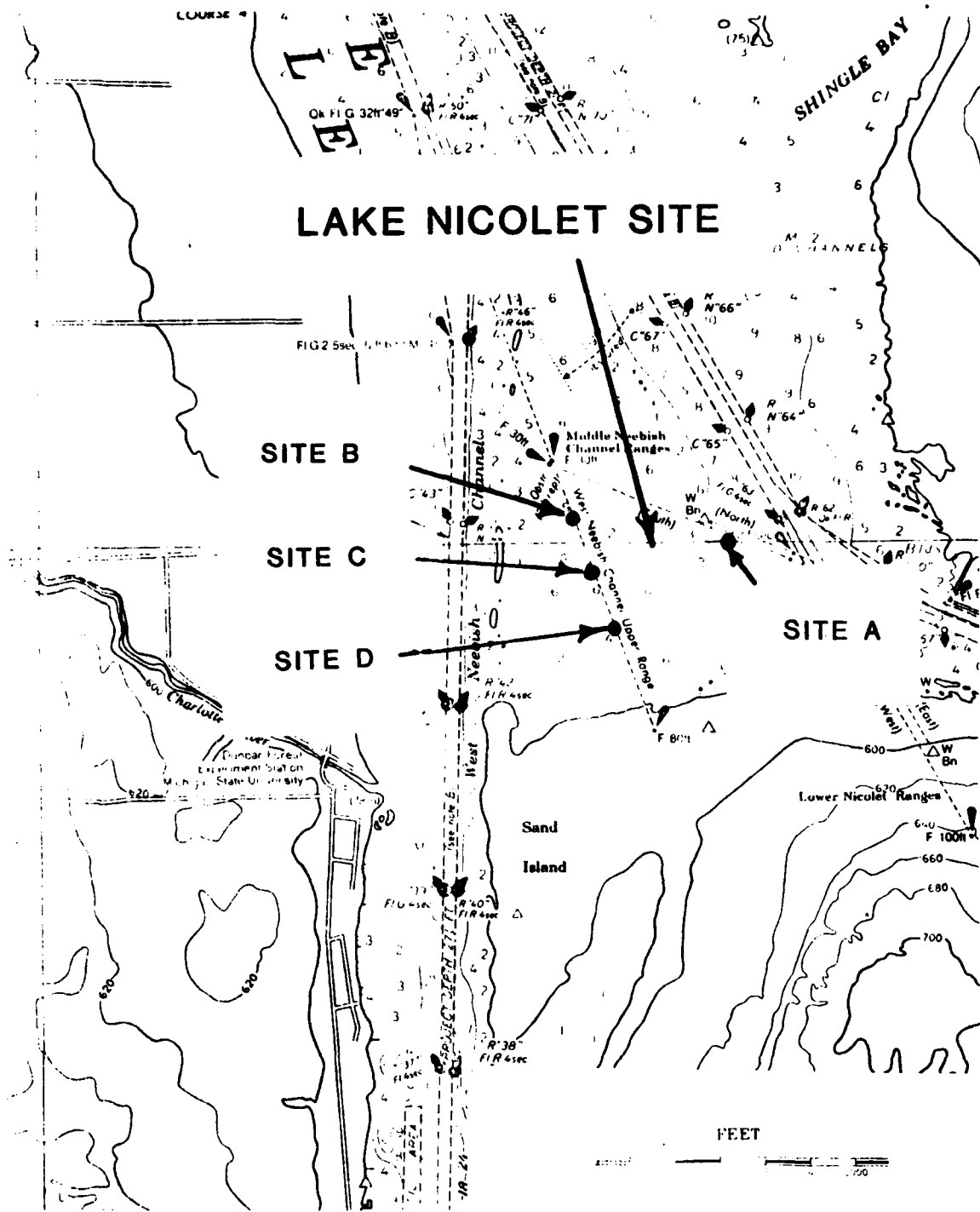
CHARLOTTE RIVER



Project	DACA89-85-K-0001
Area	Charlotte River
Boring No.	1st Bridge
Date Sampled	6/27/85

Sample No.	Elev or Depth	Classification	NatWC	LL	PL	PI
		SM				
		P-200 = 18.0%				

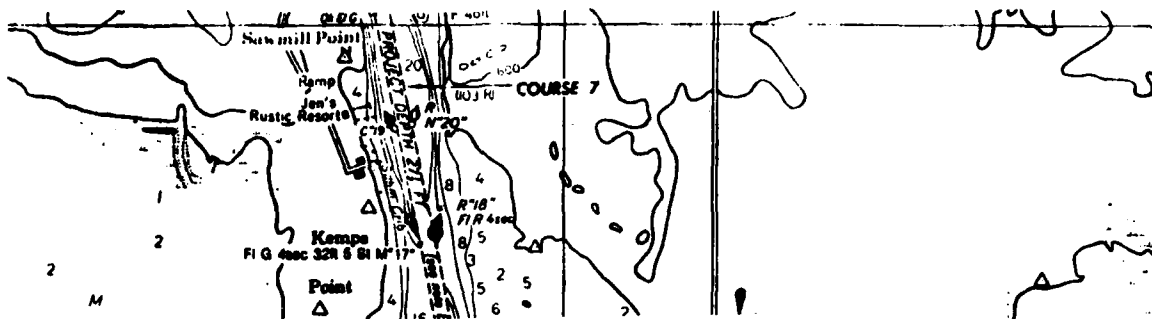
LAKE NICOLET



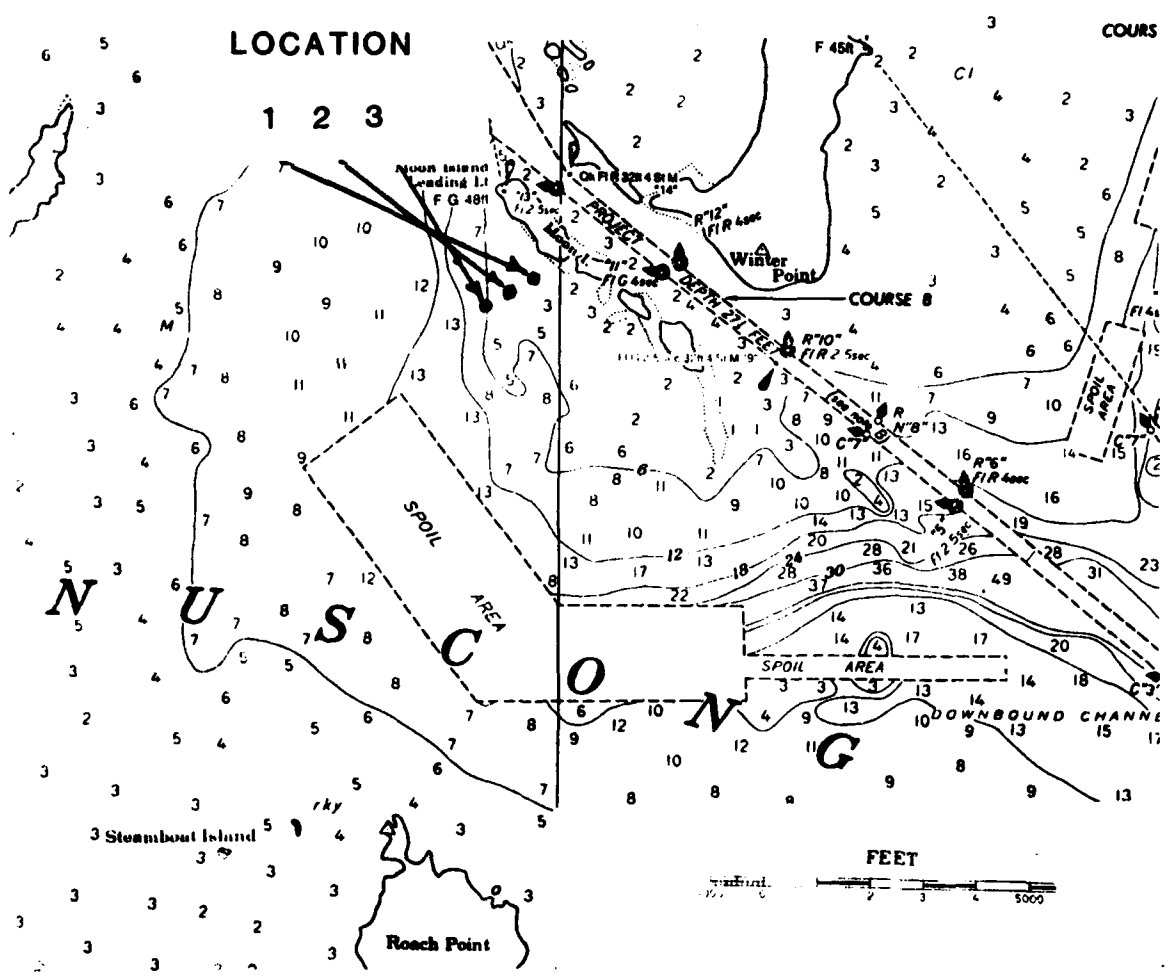
SITE LOCATION

LAKE NICOLET

LAKE MUNUSCONG



LAKE MUNUSCONG SITE



SITE LOCATION

LAKE MUNUSCONG