



REFERENCES

Beach Erosion Board. 1933. Interim report. U.S.Army Beach Erosion Board, Interim Rept., 1933.

Bascom, W.H. 1951. The relationship between sand size and beach face slope. Trans. Am. Geophys. Union, 32 : 866-874.

Bruun, P. 1963. Progress of tracer project Florida Univ., Coastal Engr. Lab., Rept., 2, Mimeograph.

Bowen, A.J., and D.L. Inman, and Simmons, V.P. 1968. Wave "set-down" and "set-up": J. Geophys. Res., 73, no.8 : 2569-77.

Bowen, A.J., and Inman, D.L. 1969. Rip currents, 2 : laboratory and field observations : J. Geophys. Res., 74 : 5479-90.

Bowen, A.J. 1969 a. Rip currents, 1 : theoretical investigations. J. Geophys. Res., 74 : 5467-78.

Bowen, A.J. 1969 b. The generation of longshore currents on a plane beach. J. Mar. Res., 37 : 206-15.

CCOP/UNDP. 1976. A decade of offshore hydrocarbon exploration in the CCOP region, 1965-1975. CCOP Newsletter., 3, no.1 & 2 : 1-9.

Defant, A. 1961. Physical oceanography. 2 : 342-55 on currents, New York, Pergamon Press.

Dubois, R.N. 1972. An inverse relation between foreshore slope and mean grain size as a function of the heavy mineral content. Geol. Soc. Am. Bull., 83 : 871-76.

Evans, O.F. 1939. Mass transport of sediments on subaqueous terraces.

J. Geol., 47 : 324-34.

Emery, K.O. and Niino, H. 1963. Sediments of the Gulf of Thailand and adjacent continental shelf. Geol. Soc. Am. Bull., 74 : 541-554.

Emery, K.O. 1969. Distribution pattern of sediments on the continental shelves of Western Indonesia : Bangkok, U.N. ECAFE, Committee for Co-ordination of Joint Prospecting for Mineral Resources in Asian Offshore Areas, Tech. Bull., 2 : 79-82.

. 1971. Bottom sediments of Malacca Strait : Bangkok, U.N. ECAFE, Committee for Co-ordination of Joint Prospecting for Mineral Resources in Asian Offshore Areas, Tech. Bull., 4.

Folk, R.L. and Ward, W.C. 1957. Brazos river bar : a study in the significance of grain size parameters. J. Sediment. Petrol., 27 : 3-26.

Fox, W.T., J.W. Ladd, and Martin, M.K. 1966. A profile of the four moment measures perpendicular to a shore line, South Haven, Michigan. J. Sediment. Petrol., 36 : 1126-30.

Fox, W.T., and Davis, R.A. 1973. Simulation model for storm cycles and beach erosion on Lake Michigan. Geol. Soc. Am. Bull., 84 : 1769-90.

Groen, P. 1967. On the residual transport of suspended matter by an alternating tidal current. Netherlands Jour. Sea Res., 3(4) : 564-74.

Goldsmith, V. 1973. Internal geometry and origin of vegetated coastal sand dunes. J. Sediment. Petrol., 43 : 1128-43.

Harrison, W., and Krumbein, W.C. 1964. Interactions of the beach - ocean - atmosphere system at Virginia Beach, Virginia. U.S.Army Coastal Engr. Research Center, Tech. Memo. no.7, 102 pp.

H.O. Pub. 93. 1967. Sailing directions for the Western shores of the South China Sea. U.S. Government Printing Office, Washington.

Harrison, W. 1969. Empirical equations for foreshore changes over a tidal cycle. Mar. Geol., 7 : 529-51.

Honjo, S., and K.O. Emery and Yamamoto, S. 1974. Non-Combustible suspended matter in surface waters off eastern Asia. Sedimentology, 21 : 555-75.

Inman, D.L. 1949. Sorting of sediments in the light of fluid mechanics. J. Sediment. Petrol., 19, no.2 : 51-70.

Inman, D.L., and Filloux, J. 1960. Beach cycles related to tide and local wind wave regime. J. Geol., 68, no.2 : 225-31.

Inman, D.L., and Bagnold, R.A. 1963. Littoral processes. In The sea, ed. M.N. Hill, 3 : 529-33. Interscience, New York.

Inman, D.L., and Frautschy, J.D. 1965. Littoral processes and the development of shorelines. Proc. Coast. Eng. Spec. Conf., ASCE, (Santa Barbara, Calif.), pp.511-36.

Inman, D.L. 1971. Nearshore processes. In Mc Graw - Hill Encyclopedia of Science and Technology, 9, 3d ed. New York : Mc Graw - Hill Book Co.Inc.

Inman, D.L., R.J. Tait, and Nordstrom, C.E. 1971. Mixing in the surf zone. J. Geophys. Res., 76 : 3493-514.

Ichiye, T. 1966. Gulf of Thailand, in the Encyclopedia of Oceanography, ed. R.W. Fairbridge, Reinhold publishing Coorporation, N.Y. 339-342.

Iwata, N. 1970. A note on wave set-up longshore currents and undertows. J. Oceanogr. Soc. Japan. 26 : 233-36.

King, C.A.M., and Williams, W.W. 1949. The formation and movement of sand bars by wave action. Geogr. J., 113 : 70-85.

King, C.A.M. 1951. Depth of disturbance of sand on sea beaches by waves. J. Sediment. Petrol., 21 : 131-40.

King, C.A.M. 1959. Beaches and coasts. Edward Arnold, London, 403 pp.

King, C.A.M. 1972. Beaches and coasts. 2 nd ed. St. Martin's Press, New York, 570 pp.

Komar, P.D. 1971. The mechanics of sand transport on beaches. J. Geophys. Res., 76 no.3 " 713-21.

Komar, P.D. 1976. Beach processes and sedimentation. In Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

Komar, P.D., and Inman,D.L. 1970. Longshore sand transport on beaches. J. Geophys. Res., 75: 5914-5927.

Lafond, E.C. 1938. Relationship between mean sea level and sand movements. Science, 88, no. 2274 : 112-13.

Longuet - Higgins, M.S., and Stewart, R.W. 1960. Changes in the form of short gravity waves on long waves and tidal currents. J. Fluid Mech., 8 : 565-83.

\_\_\_\_\_. 1962. Seawaves and beach cusps. Geograph. J. 128 : 194-201.

\_\_\_\_\_. 1963. A note on wave set-up. J. Mar. Res., 21 : 4-10.

\_\_\_\_\_. 1964. Radiation stresses in water waves : a physical discussion, with applications. Deep - Sea Res., 11 : 529-62.

Munk, W.H. 1949. The solitary wave theory and its application to surf problems. N.Y. Acad. Sci. Ann., 51 : 376-424.

Miller, R.L., and Zeigler, J.M. 1958. A model relating dynamics and sediment pattern in equilibrium in the region of shoaling waves, breaker zone, and foreshore. J. Geol., 66 : 417-41.

Miller, R.L., and Zeigler, J.M. 1964. A study of sediment distribution in the zone of shoaling waves over complicated bottom topography. In Papers in marine geology, ed. R.L. Miller, pp.133-53. Macmillan, New York.

NEDECO. 1972. "Deep - Seaport of Laem Chabang - Survey and Design."

A Report Submitted to the Port Authority of Thailand, Ministry  
of Communication by the NEDECO, The Netherlands.

Oomkens, E., and Terwindt, J.H.H. 1960. Inshore estuarine sediments  
in the Haringvliet (Netherlands) : Geol. en Mijnbouw, 23 :  
701-10.

Pattullo, J., W. Munk, R. Revelle, and Strong, E. 1955. The seasonal  
oscillation in sea level. J. Marine Res., 14 : 88-155.

Pattullo, J.G. 1966. Seasonal changes in sea level. In The Sea, ed.  
by M.N. Hill, Interscience Publ., New York, pp.485-96.

Pukasab, P., and Pochanasomburana, P. 1958. The types of tides and  
mean sea level in the Gulf of Thailand. In Proceedings of the  
Ninth Pacific Science Association, Bangkok, 1957., 16,  
Oceanography : 126-30.

Postma, H. 1961. Transport and accumulation of suspended matter in  
the Dutch Wadden Sea. Netherlands Jour. Sea Research, 1 (1, 2) :  
148-90.

Parke, M.L. JR., K.O. Emery, Raymond Szymankiewicz, and Reynolds, L.M.  
1971. Structural Framework of Continental Margin in South China  
Sea. Am. Assoc. Petroleum Geologists Bull., 55 no.5 : 723-51.

Robinson, A.H.W. 1956. The submarine morphology of certain port  
approach channel systems. J. Inst. Navig. 9 : 20-46.

Robinson, M.K. 1963. Physical oceanography of the Gulf of Thailand : unpub. ms., Scripps Inst. Oceanography, 29 p.

Robinson, M.K. 1974. NAGA REPORT, 3 part 1, The University of California Scripps Institution of Oceanography, La Jolla, California.

Rourke, O' and Le Blond, P.H. 1972. Longshore currents in a semi - circular Bay. J. Geophys. Res., 77 (in press).

Shepard, F.P., and LaFond, E.C. 1940. Sand movements near the beach in relation to tides and waves. Am. J. Sci., 238 : 272-85.

Shepard, F.D. 1948. Submarine geology : Harper and Brothers, New York, 348 pages.

Shepard, F.P. 1950. Beach cycles in southern California. U.S. Army Beach Erosion Board, Tech. Mem., 20 : 26 pp.

Shepard, F.P. 1952. Revised nomenclature for depositional coastal features. Bull. Am. Assoc. of Petrol. Geol. 36, no.10 : 1902-12.

Strahler, A.N. 1966. Tidal cycle of changes on an equilibrium beach. J. Geol., 74 : 247-68.

Sonu, C.J. and McCloy, J.M. and McArthur, D.S. 1967. Longshore currents and nearshore topography. Chapter 32 in Proc. 10 th Conf. Coast. Eng., Tokyo, 524-49.

Schwartz, M.L. 1967. Littoral zone tidal cycle sedimentation. J.  
Sediment. Petrol., 37 : 677-83.

Siripong, A. 1976. The causes of the fluctuation of the sea - level  
at Sattahip. Unpublished paper, 350 pp.

Thompson, W.O. 1937. "Original Structures of Beaches, Bars and Dunes,"  
Geol. Soc. Amer. Bull., 48 : 723-53.

Woollands, M.A. and Haw, D. 1976. "Tertiary Stratigraphy and Sedimen-  
tation in the Gulf of Thailand." SEAPEX Programme, Offshore  
South East Asia Conference (February 1976), Singapore Paper 7.,  
22 pp.

APPENDICES

## APPENDIX A

Elevations of profiles A to L from MSL reference in metres

Profile	Seaward Distance	12 Jul 75	24 Oct 75		11 Feb 76		14 May 76		2 Jul 76	
		Elevat <sup>n</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}
		metres	metres	metres	metres *	metres	metres	metres *	metres	metres *
A	0	+1.1587	+1.1367	-0.0220	+1.0837	-0.0530	+1.0087	-0.0750	+0.8547	-0.1500
	8	-0.0413	-0.0573	-0.0160	+0.0707	+0.1120	+0.1487	+0.0780	+0.0467	-0.1020
	16	-0.2893	-0.3253	-0.0360	-0.3223	+0.0030	-0.2513	+0.0710	-0.2773	-0.0260
	24	-0.5113	-0.6433	-0.1320	-0.7613	-0.1180	-0.6033	+0.1580	-0.5733	+0.0300
	32	-0.7993	-1.0253	-0.2260	-1.4613	-0.4360	-1.0733	+0.3880	-1.0133	+0.0600
	40	-1.1713	-	-	-	-	-1.2993	-	-1.3252	-0.0260
	48	-	-	-	-	-	-	-	-1.3333	-
	56	-	-	-	-	-	-	-	-1.2753	-
B	0	+1.3407	+1.0907	-0.2500	+1.1867	+0.0960	+1.0427	-0.1470	+1.0327	-0.0100
	8	+0.0047	-0.0653	-0.0700	+0.0457	+0.1110	+0.2367	+0.1910	-0.0453	-0.2820

\* elevation difference compared with the previous survey

## APPENDIX A

(cont)

Profile	Seaward Distance	12 Jul 75	24 Oct 75		11 Feb 76		14 May 76		2 Jul 76	
		Elevat <sup>n</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}
	metres	metres	metres	metres *	metres	metres *	metres	metres	metres	metres *
B	16	-0.3213	-0.3353	-0.0140	-0.3173	+0.0180	+0.2273	+0.5446	-0.3173	-0.5446
	24	-0.5733	-0.6233	-0.0500	-0.7523	-0.1790	-0.5773	+0.1750	-0.6113	-0.0340
	32	-0.8073	-1.0693	-0.2620	-1.2263	-0.1570	-1.0493	+0.1770	-0.9213	+0.1280
	40	-1.0913	-	-	-	-	-1.3993	-	-1.4053	-0.0060
	48	-	-	-	-	-	-	-	-1.3313	-
C	0	+1.5667	+1.2347	-0.0320	+1.6397	+0.4050	+1.2847	-0.4090	+1.2847	+0.0540
	8	+0.2987	+0.1267	-0.0960	+0.7727	+0.6460	+0.2467	-0.5260	+0.1047	-0.1420
	16	-0.2353	-0.2393	-0.0260	-0.0983	+0.1410	-0.1193	-0.0210	-0.3013	-0.1820
	24	-0.4937	-0.3793	+0.0360	-0.3293	+0.0500	-0.4933	-0.1640	-0.4733	+0.0200
	32	-0.7133	-0.6893	-0.0780	-0.6193	+0.0700	-0.8293	-0.2100	-0.7153	+0.1140
	40	-0.9373	-1.0113	-0.1580	-0.9693	+0.0420	-1.2533	-0.2840	-0.9493	+0.3040

## APPENDIX A

(cont)

Profile	Seaward Distance	12 Jul 75	24 Oct 75		11 Feb 76		14 May 76		2 Jul 76	
		Elevat <sup>n</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}
		metres	metres	metres	metres *	metres	metres	metres *	metres	metres *
C	48	-1.2693	-	-	-1.3283	-	-1.3913	-0.0630	-1.3353	+0.0560
	56	-	-	-	-	-	-1.4313	-	-	-
	64	-	-	-	-	-	-1.4313	-	-	-
D	0	+1.2667	+1.2347	-0.0320	+1.6397	+0.4050	+1.2307	-0.4090	+1.2847	+0.0540
	8	+0.2227	+0.1267	-0.0960	+0.7727	+0.6460	+0.2467	-0.5260	+0.1047	-0.1420
	16	-0.2133	-0.2393	-0.0260	-0.0983	+0.1410	-0.1193	-0.0210	-0.3013	-0.1820
	24	-0.4153	-0.3793	+0.0360	-0.3293	+0.0500	-0.4933	-0.1640	-0.4733	+0.0200
	32	-0.6113	-0.6893	-0.0780	-0.6193	+0.0700	-0.8293	-0.2100	-0.7153	+0.1140
	40	-0.8533	-1.0113	-0.1580	-0.9693	+0.0420	-1.2533	-0.2840	-0.9493	+0.3040
	48	-1.1033	-	-	-1.3283	-	-1.3913	-0.0630	-1.3353	+0.0560
	56	-1.3453	-	-	-	-	-1.4313	-	-	-

## APPENDIX A

(cont)

Profile	Seaward Distance	12 Jul 75	24 Oct 75		11 Feb 76		14 May 76		2 Jul 76	
		Elevat <sup>n</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}
	metres	metres	metres	metres *	metres	metres *	metres	metres	metres	metres *
D	64	-	-	-	-	-	-1.4313	-	-	-
E	0	+1.0627	+1.3967	+0.3340	+1.2567	-0.1400	+1.4747	+0.2180	+1.4887	+0.0140
	8	+0.2467	+0.4007	+0.1540	-0.4267	+0.0260	+0.3387	-0.0880	-0.0193	-0.3580
	16	-0.2493	-0.4653	-0.2160	-0.2843	+0.1810	-0.0413	+0.2430	-0.2953	-0.0540
	24	-0.4713	-0.3733	+0.0980	-0.5043	-0.1310	-0.3873	+0.1170	-0.5033	-0.1160
	32	-0.6713	-0.5873	+0.0840	-0.7033	-0.1160	-0.7073	-0.0040	-0.7233	-0.0160
	40	-0.8433	-0.7893	+0.0540	-0.9953	-0.2060	-1.0193	-0.0240	-1.0193	-
	48	-1.0317	-0.9913	+0.0404	-1.3713	-0.4204	-1.2733	-0.5184	-1.3855	-0.1122
	56	-1.2033	-	-	-	-	-1.4493	-	-	-
	64	-	-	-	-	-	-1.5673	-	-	-

## APPENDIX A

(cont)

Profile	Seaward Distance	12 Jul 75		24 Oct 75		11 Feb 76		14 May 76		2 Jul 76	
		Elevat <sup>n</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>							
	metres	metres	metres	metres *	metres	metres *	metres	metres *	metres	metres	metres *
F	0	+1.1507	+1.7367	+0.5860	+1.2417	-0.4950	+1.7287	+0.4870	+2.7237	+0.9950	
	8	+0.2207	+1.4127	+1.1920	+0.1357	-1.2770	+1.3827	+1.2470	+1.7927	+0.4110	
	16	-0.0963	+0.3287	+0.4250	-0.4483	-0.7770	+0.2087	+0.6570	+1.2807	+1.0720	
	24	-0.5893	-0.5153	+0.0740	-0.6335	-0.1180	-0.2543	+0.3790	+0.1777	+0.4320	
	32	-0.8033	-0.5493	+0.2540	-0.8733	-0.3240	-0.5013	+0.3720	-0.3263	+0.2750	
	40	-0.9833	-0.6733	+0.3100	-0.9753	-0.3020	-0.7833	+0.1920	-0.5243	+0.2590	
	48	-1.1393	-0.9053	+0.2340	-1.3023	-0.3970	-0.9753	+0.3270	-0.7163	+0.2590	
	56	-1.3433	-	-	-1.5033	-	-1.1393	+0.3640	-0.8593	+0.2800	
	64	-	-	-	-	-	-1.3313	-	-1.2043	+0.1270	
	72	-	-	-	-	-	-	-	-1.4593	-	
G	0	+1.2607	+0.8147	-0.4460	+0.9457	+0.1310	+1.0827	+0.1370	+1.0887	+0.0060	
	8	+0.5227	+1.1507	+0.6280	+0.4947	-0.6560	+0.2477	-0.2470	+0.0227	-0.2250	

Y  
in

## APPENDIX A

(cont)

Profile	Seaward Distance	12 Jul 75		24 Oct 75		11 Feb 76		14 May 76		2 Jul 76	
		Elevat <sup>n</sup>	Elevat <sup>n</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}
	metres	metres	metres	metres *	metres	metres *	metres	metres *	metres	metres	metres *
G	16	-0.2573	+0.8157	+1.0730	-0.3643	-1.1800	+0.0157	+0.3800	-0.1913	-0.2070	
	24	-0.5353	-0.2523	+0.2830	-0.6143	-0.3620	-0.3363	+0.2780	-0.3053	+0.0310	
	32	-0.7133	-0.3953	+0.3180	-0.7063	-0.3110	-0.5063	+0.2000	-0.4993	+0.0570	
	40	-0.9113	-0.6313	+0.2800	-0.9183	-0.2870	-0.8063	+0.1120	-0.6113	+0.1950	
	48	-1.0493	-0.8303	+0.2190	-1.1423	-0.3120	-1.0203	+0.1220	-0.6793	+0.3410	
	56	-1.1933	-1.0633	+0.1300	-1.3583	-0.2950	-1.1603	+0.1980	-0.8733	+0.2870	
	64	-	-	-	-1.4383	-	-	-	-1.1033	-	
	72	-	-	-	-	-	-	-	-1.2893	-	
H	0	+1.1827	+1.2437	+0.0610	+1.2667	+0.0230	+1.3787	+0.1120	+1.3647	-0.0140	
	8	+0.1467	+0.2817	+0.1350	+0.5267	+0.2450	+0.5767	+0.0500	+0.3927	-0.1840	
	16	-0.0283	-0.0183	+0.0050	+0.3657	+0.3840	-0.2133	-0.5790	-0.1313	+0.0820	

## APPENDIX A

(cont)

Profile	Seaward Distance	12 Jul 75	24 Oct 75		11 Feb 76		14 May 76		2 Jul 76	
		Elevat <sup>n</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}
	metres	metres	metres	metres *	metres	metres *	metres	metres	metres	metres *
H	24	-0.1973	-0.2373	-0.0400	-0.4323	-0.1950	-0.2293	+0.2030	-0.2573	-0.0280
	32	-0.4173	-0.5473	-0.1300	-0.6023	-0.0550	-0.4353	+0.1670	-0.4413	-0.0060
	40	-0.6413	-0.6873	-0.0460	-0.7543	-0.0670	-0.7373	+0.0173	-0.6713	+0.0660
	48	-0.8533	-0.7840	+0.0690	-0.8943	-0.1100	-0.9213	-0.0270	-0.8513	+0.0700
	56	-1.0193	-0.9783	+0.0410	-1.0753	-0.0970	-1.0413	+0.0340	-0.9953	+0.0460
	64	-1.1513	-1.2033	-0.0520	-1.2673	-0.0640	-1.1993	+0.0680	-1.1573	+0.0420
	72	-	-	-	-	-	-1.3553	-	-1.4173	-0.0620
I	0	+1.1307	+1.2207	+0.0900	+1.1917	-0.0290	+1.2907	+0.0990	+1.3327	+0.0420
	8	+0.2267	+0.4287	+0.2020	+0.3387	-0.0900	+0.2907	-0.0480	+0.3387	+0.0480
	16	-0.0173	-0.1833	-0.1660	-0.1253	+0.0580	-0.1153	+0.0100	-0.2393	-0.1240
	24	-0.2753	-0.1833	+0.0920	-0.5033	-0.3200	-0.2533	+0.2500	-0.4133	-0.1600
	32	-0.3773	-0.3903	-0.0130	-0.4073	-0.0170	-0.4853	-0.0780	-0.5593	-0.0740
	40	-0.5313	-0.5873	-0.0560	-0.5503	+0.0370	-0.7093	-0.1590	-0.7633	-0.0540

## APPENDIX A

(cont)

Profile	Seaward Distance	12 Jul 75	24 Oct 75		11 Feb 76		14 May 76		2 Jul 76	
		Elevat <sup>n</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}	Elevat^{n}	Diff^{ce}
	metres	metres	metres	metres *	metres	metres *	metres	metres	metres	metres *
I	48	-0.7053	-0.7033	+0.0020	-0.8543	-0.1510	-0.9773	-0.1230	-0.9933	-0.0160
	56	-0.9033	-0.9373	-0.0340	-1.2193	-0.2820	-1.1633	+0.3380	-1.0813	+0.0820
	64	-1.1153	-1.2433	-0.1280	-1.3313	-0.0880	-1.2233	+0.1080	-1.1713	+0.0520
	72	-	-	-	-	-	-	-	-1.2893	-
J	0	+0.9307	+1.3797	+0.4490	+1.1597	-0.2200	+1.2867	+0.1270	+0.9227	-0.3640
	8	+0.2927	+0.7177	+0.4250	+0.4227	-0.2950	+0.6427	+0.2200	+0.2567	-0.3860
	16	+0.0247	-0.1103	-0.1350	-0.3773	-0.2670	-0.2593	-0.1180	-0.0693	+0.1900
	24	-0.1453	-0.4023	-0.2570	-0.5773	-0.1750	-0.1873	+0.3900	-0.2993	-0.1120
	32	-0.3273	-0.4973	-0.1700	-0.4923	+0.0050	-0.3193	+0.1730	-0.4393	-0.1200
	40	-0.5433	-0.5393	+0.0040	-0.4463	+0.0930	-0.5013	-0.0550	-0.5833	-0.0820
	48	-0.6813	-0.5173	+0.1640	-0.6673	-0.1500	-0.8793	-0.2120	-0.8193	+0.0600
	56	-0.8033	-0.6823	+0.1210	-1.0063	-0.3240	-1.3513	-0.3450	-1.0373	+0.3140

## APPENDIX A

(cont)

Profile	Seaward Distance	12 Jul 75		24 Oct 75		11 Feb 76		14 May 76		2 Jul 76	
		Elevat <sup>n</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>		Elevat <sup>n</sup>	Diff <sup>ce</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>
	metres	metres	metres	metres *	metres	metres *	metres	metres *	metres	metres	metres *
J	64	-0.9473	-0.9353	+0.0120	-1.2713	-0.3360	-1.1233	+0.1480	-1.0493	+0.0740	
	72	-	-	-	-	-	-	-	-1.1133	-	
K	0	+0.8627	+0.6837	-0.1790	+1.1587	+0.4750	+1.2907	+0.1320	+1.2487	-0.0420	
	8	+0.2567	-0.1463	-0.4030	+0.5057	+0.6520	+0.6397	+0.1340	+0.3327	-0.3070	
	16	-0.0113	-0.3933	-0.3820	-0.3043	+0.0890	-0.1783	+0.1260	+0.0947	+0.2730	
	24	-0.1653	-0.4513	-0.2860	-0.5863	-0.1350	-0.4843	+0.1020	-0.3613	+0.1230	
	32	-0.3873	-0.4623	-0.0750	-0.6353	-0.1730	-0.2123	+0.4230	-0.4293	-0.2170	
	40	-0.6073	-0.5023	+0.1050	-0.4353	+0.0670	-0.4043	+0.0310	-0.4473	-0.0430	
	48	-0.6633	-0.5033	+0.1600	-0.5663	-0.0630	-0.6080	-0.0420	-0.5733	+0.0350	
	56	-0.7293	-0.7173	+0.0120	-0.7363	-0.0190	-0.7803	-0.0440	-0.7513	+0.0290	
	64	-0.8493	-	-	-0.9963	-	-0.8843	+0.1120	-0.8813	+0.0030	
	72	-1.0273	-	-	-1.1163	-	-0.9403	+0.1760	-1.0113	-0.0710	

## APPENDIX A

(cont)

Profile	Seaward Distance	12 Jul 75		24 Oct 75		11 Feb 76		14 May 76		2 Jul 76	
		Elevat <sup>n</sup>	Elevat <sup>n</sup>	Dif <sup>ce</sup>		Elevat <sup>n</sup>	Dif <sup>ce</sup>	Elevat <sup>n</sup>	Dif <sup>ce</sup>	Elevat <sup>n</sup>	Dif <sup>ce</sup>
	metres	metres	metres	metres *	metres	metres *	metres	metres *	metres	metres	metres *
K	80	-	-	-	-1.2263	-	-1.0823	+0.1440	-	-	-
	88	-	-	-	-	-	-1.1903	-	-	-	-
	96	-	-	-	-	-	-1.2143	-	-	-	-
L	0	+1.1307	+0.9557	-0.1750	+1.1497	+0.1940	+1.2107	+0.0610	+1.2087	+0.0020	
	8	+0.5807	+0.4377	-0.1040	+0.6437	+0.2060	+0.5227	-0.1210	+0.4067	-0.1160	
	16	+0.1987	+0.1957	-0.0030	-0.0573	-0.2530	-0.0373	+0.0200	+0.1427	+0.1800	
	24	-0.0893	-0.2623	-0.1730	-0.5593	-0.2970	-0.4713	+0.0880	-0.5193	-0.0480	
	32	-0.5073	-0.6293	-0.1220	-0.6853	-0.0560	-0.5913	+0.0940	-0.4333	+0.1583	
	40	-0.5893	-0.7483	-0.1590	-0.8153	-0.0670	-0.6773	+0.1380	-0.4413	+0.2360	
	48	-0.6593	-0.7493	-0.0900	-0.7003	+0.0490	-0.6813	+0.0190	-0.5333	+0.1480	
	56	-0.7373	-0.6743	+0.0630	-0.6314	+0.0430	-0.6633	-0.0320	-0.5653	+0.0980	
	64	-0.7492	-0.6763	+0.0729	-0.7353	-0.0590	-0.6353	+0.1000	-0.6553	-0.0200	

## APPENDIX A

(cont)

Profile	Seaward Distance	12 Jul 75	24 Oct 75		11 Feb 76		14 May 76		2 Jul 76	
		Elevat <sup>n</sup>	Elevat <sup>n</sup>	Diff <sup>ce</sup>						
	metres	metres	metres	metres *						
L	72	-0.8593	-	-	-0.7743	-	-0.7173	+0.0570	-0.7893	-0.0720
	80	-0.9613	-	-	-0.9203	-	-0.8153	+0.1050	-0.9333	-0.1180
	88	-	-	-	-1.1103	-	-0.9913	+0.1190	-	-
	96	-	-	-	-	-	-1.1153	-	-	-
	104	-	-	-	-	-	-1.2693	-	-	-
	112	-	-	-	-	-	-1.3213	-	-	-

## APPENDIX B

## Sediment sizes and sorting coefficient

Profile	Seaward Distance metres	24 Oct 75			11 Feb 76			14 May 76			2 Jul 76		
		(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting
A	0	2.53	2.70	0.54	1.77	1.90	0.89	2.10	2.10	0.62	1.80	1.80	0.51
	8	3.03	3.05	0.49	2.72	2.80	0.50	2.53	2.60	0.74	2.33	2.30	0.55
	16	2.82	3.05	1.02	2.93	2.95	0.42	2.13	2.60	1.32	2.23	2.30	0.71
	24	2.05	2.40	1.36	2.95	2.55	1.58	2.97	3.10	0.89	1.73	2.10	1.47
	32	2.05	2.70	-	-	-	-	1.83	3.20	2.34	2.07	2.60	1.79
	40	-	-	-	-	-	-	2.03	3.00	2.12	-	-	-
B	0	1.50	1.55	0.95	1.97	2.15	0.88	2.03	2.10	0.68	1.27	1.30	0.83
	8	1.25	0.80	1.74	2.61	2.75	0.54	2.67	2.70	0.53	2.37	2.40	0.64
	16	3.02	3.20	0.93	1.95	2.25	1.30	2.13	2.70	1.43	2.50	2.60	0.75
	24	2.53	2.95	1.08	-	-	-	2.53	2.90	1.23	2.40	2.60	1.03
	32	3.28	3.50	0.75	-	-	-	2.33	3.00	1.51	2.20	2.60	1.24

## APPENDIX B

(cont)

Profile	Seaward Distance metres	24 Oct 75			11 Feb 76			14 May 76			2 Jul 76		
		(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting
C	0	1.35	1.30	0.71	1.65	1.70	0.80	1.63	1.70	0.65	1.40	1.40	0.73
	8	1.08	1.15	0.64	2.38	2.40	0.56	2.33	2.50	0.77	1.73	1.70	0.64
	16	2.13	2.40	1.49	1.98	2.60	1.45	2.07	2.50	1.25	1.90	2.00	1.00
	24	3.03	3.05	0.57	2.62	2.85	0.97	2.13	2.70	1.23	2.20	2.20	0.84
	32	3.00	3.10	0.73	2.35	2.95	1.25	2.90	3.00	0.73	1.93	2.50	1.39
	40	-	-	-	-	-	-	1.77	2.90	-	-	-	-
	48	-	-	-	-	-	-	3.00	3.10	0.96	-	-	-
	56	-	-	-	-	-	-	3.27	3.30	0.37	-	-	-
D	0	1.50	1.55	0.88	0.77	0.60	0.96	1.70	1.70	0.62	1.20	1.20	0.76
	8	0.23	0.40	1.15	2.58	2.70	0.45	2.27	2.40	0.93	2.20	2.40	0.76
	16	2.85	2.90	0.70	1.98	2.55	1.34	2.27	2.60	1.13	2.67	2.80	0.83

## APPENDIX B

(cont)

Profile	Seaward Distance metres	24 Oct 75			11 Feb 76			14 May 76			2 Jul 76		
		(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting
D	24	2.85	3.05	0.88	2.43	2.70	0.98	2.37	2.90	1.27	2.77	2.90	0.63
	32	2.65	3.00	1.19	1.83	2.20	1.33	2.97	3.00	0.40	2.37	2.60	0.89
	40	2.43	3.20	1.73	-	-	-	2.40	3.10	1.52	-	-	-
	48	-	-	-	-	-	-	3.03	3.10	0.43	-	-	-
	56	-	-	-	-	-	-	3.00	3.10	0.63	-	-	-
	64	-	-	-	-	-	-	3.13	3.20	0.40	-	-	-
E	0	1.12	1.20	1.21	1.97	2.20	1.05	1.60	1.60	0.81	0.83	0.80	0.62
	8	0.07	0.10	0.96	2.62	2.65	0.54	3.20	2.40	0.62	2.20	2.20	0.62
	16	1.77	1.70	1.22	2.10	2.60	1.30	1.73	2.10	1.24	2.63	2.70	0.58
	32	2.67	2.80	0.91	2.70	2.80	0.83	2.00	2.50	1.24	2.20	2.60	1.05
	40	2.35	2.80	1.42	2.12	2.55	1.51	2.27	2.80	1.31	2.50	2.80	0.99

## APPENDIX B

(cont)

Profile	Seaward Distance	24 Oct 75			11 Feb 76			14 May 76			2 Jul 76		
		(Phi) Mean	(Phi) Median	Sorting									
	metres						-						
E	48	2.78	2.95	0.87	2.05	2.65	1.41	2.80	2.90	0.89	2.43	2.70	0.98
	56	-	-	-	-	-	-	3.17	3.30	0.77	-	-	-
F	0	1.07	1.20	1.41	0.00	0.10	0.91	0.87	1.10	1.52	1.50	1.40	1.61
	3	-0.62	-1.85	1.14	-0.03	-0.20	0.94	-0.03	-0.20	1.84	0.23	0.10	0.93
	16	1.20	1.20	0.79	2.00	2.20	1.26	2.33	2.50	0.78	2.30	2.20	0.47
	24	2.17	2.00	1.30	2.75	2.85	0.80	1.97	2.40	1.28	2.90	2.90	0.48
	32	2.87	2.90	0.37	2.92	2.95	0.61	2.83	2.90	0.75	2.90	3.00	0.67
	40	2.95	3.30	-	2.78	2.95	0.86	1.87	2.40	1.63	2.40	2.80	1.17
	48	2.27	3.10	1.36	3.08	3.40	1.05	3.13	3.20	0.40	2.87	2.90	0.54
	56	-	-	-	-	-	-	3.07	3.10	0.44	-	-	-
	64	-	-	-	-	-	-	3.30	3.30	0.30	-	-	-

## APPENDIX B

(cont)

Profile	Seaward Distance	24 Oct 75			11 Feb 76			14 May 76			2 Jul 76		
		(Phi) Mean	(Phi) Median	Sorting									
	metres	.	.	-	.	.	-	.	.	-	.	.	-
G	0	-1.05	-0.90	-	1.20	1.10	1.37	1.63	1.70	0.79	2.87	3.00	0.91
	8	-0.63	-0.80	0.85	1.90	2.30	1.31	2.10	2.40	1.02	2.43	2.60	0.97
	16	1.87	2.40	1.08	1.82	2.60	1.50	2.33	2.60	0.98	1.83	2.40	1.50
	24	0.30	0.20	0.80	2.13	2.55	1.16	2.77	2.80	0.71	2.37	2.70	1.03
	32	2.90	2.85	0.50	1.93	2.40	1.16	2.77	2.90	0.91	2.70	2.80	0.74
	40	3.12	3.15	0.47	1.53	1.60	1.79	2.87	2.90	0.57	2.37	2.70	1.09
	48	3.13	3.20	0.61	-	-	-	3.07	3.10	0.39	2.93	3.00	0.43
	56	-	-	-	-	-	-	2.97	3.00	0.45	2.87	2.90	0.57
H	0	0.58	0.20	1.33	2.05	2.50	0.47	2.57	2.60	0.54	0.67	0.60	0.74
	8	1.12	0.95	0.94	3.03	3.10	-	2.33	2.60	1.15	2.33	2.50	0.76
	16	1.87	2.30	1.44	2.60	2.65	0.60	2.00	2.20	1.02	2.63	2.70	0.85

## APPENDIX B

(cont)

Profile	Seaward Distance metres	24 Oct 75			11 Feb 76			14 May 76			2 Jul 76		
		(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting
H	24	1.60	1.80	1.30	2.88	2.90	0.69	2.70	2.80	0.40	2.67	2.70	0.79
	32	1.53	1.60	1.45	3.03	3.05	0.52	2.77	2.80	0.84	2.66	2.80	0.87
	40	2.93	3.00	0.44	3.02	3.05	0.38	0.80	0.50	1.60	2.80	2.90	0.84
	48	3.18	3.20	0.90	2.33	2.85	1.19	2.90	2.90	0.40	2.07	2.50	1.46
	56	3.47	3.50	0.43	2.85	2.95	0.79	3.07	3.10	0.36	-	-	-
	64	-	-	-	-	-	-	2.97	3.00	0.34	-	-	-
I	0	1.53	2.00	1.44	2.53	2.55	0.44	2.27	2.30	0.58	1.40	1.40	0.97
	8	1.42	1.35	0.54	2.72	2.80	0.45	0.57	0.10	1.68	2.27	2.40	0.65
	16	2.13	2.50	1.04	1.90	2.20	1.22	2.07	2.50	1.21	2.83	2.90	0.40
	24	2.90	3.00	0.46	2.80	2.85	0.75	2.39	2.60	1.27	-	-	-
	32	1.50	1.60	1.57	2.97	3.00	0.09	2.70	2.80	0.79	2.77	2.80	0.81

## APPENDIX B

(cont)

Profile	Seaward Distance metres	24 Oct 75			11 Feb 76			14 May 76			2 Jul 76		
		(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting
I	40	3.00	3.00	0.35	2.18	2.80	1.37	2.07	2.60	1.32	3.07	3.10	0.36
	48	2.93	3.35	1.19	-	-	-	-	-	-	-	-	-
	56	-	-	-	-	-	-	2.90	2.90	0.40	-	-	-
	64	-	-	-	-	-	-	2.90	2.90	0.24	-	-	-
J	0	2.37	2.40	0.70	2.77	2.80	0.39	2.40	2.50	0.65	2.03	2.00	0.55
	8	2.80	2.85	0.37	2.45	2.55	1.03	2.57	2.70	0.79	2.50	2.60	0.62
	16	2.00	2.50	1.60	0.03	0.10	1.19	0.70	0.40	1.76	2.40	2.40	0.81
	24	2.40	2.90	1.33	2.15	2.90	1.55	2.80	2.80	0.43	2.53	2.70	0.97
	32	2.53	2.85	1.00	3.00	3.40	1.17	2.67	2.70	0.90	2.70	2.80	0.84
	40	3.00	3.00	0.36	2.53	3.00	1.34	2.77	2.80	0.45	-	-	-
	48	3.13	3.10	0.29	2.45	2.90	1.34	1.87	2.60	1.62	1.90	2.60	1.60
	56	3.17	3.30	0.94	2.98	3.00	0.85	2.97	3.00	0.44	-	-	-

## APPENDIX B

(cont)

Profile	Seaward Distance metres	24 Oct 75			11 Feb 76			14 May 76			2 Jul 76		
		(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting
J	64	-	-	-	-	-	-	2.87	2.90	0.36	-	-	-
	72	-	-	-	-	-	-	3.07	3.10	0.45	-	-	-
	80	-	-	-	-	-	-	2.93	2.90	0.44	-	-	-
<hr/>													
K	0	1.80	2.10	1.22	2.83	2.80	0.36	2.73	2.90	0.45	2.53	2.60	0.60
	8	2.85	2.90	0.33	2.75	2.80	0.90	2.07	2.50	1.25	2.23	2.30	0.71
	16	2.68	2.95	1.14	1.02	0.35	1.73	1.57	2.20	1.56	2.47	2.60	0.77
	24	4.00	4.00	0.24	2.93	2.95	0.44	1.83	2.70	1.26	2.90	2.90	0.25
	32	3.05	3.10	0.90	1.98	2.00	0.36	2.90	2.90	0.32	2.80	2.80	0.40
	40	3.03	3.00	0.35	3.05	3.10	0.47	2.80	2.80	0.40	2.97	3.00	0.45
	48	3.05	3.10	0.47	3.05	3.10	0.81	2.87	2.90	0.36	3.03	3.10	0.43
	56	-	-	-	3.03	3.10	0.89	2.90	2.90	0.40	-	-	-

## APPENDIX B

(cont)

Profile	Seaward Distance	24 Oct 75			11 Feb 76			14 May 76			2 Jul 76		
		(Phi) Mean	(Phi) Median	Sorting									
	metres												
K	64	-	-	-	-	-	-	3.07	3.10	0.18	-	-	-
	72	-	-	-	-	-	-	3.13	3.20	0.41	-	-	-
	80	-	-	-	-	-	-	3.27	3.30	0.37	-	-	-
	88	-	-	-	-	-	-	3.27	3.30	0.34	-	-	-
	96	-	-	-	-	-	-	3.47	3.50	0.34	-	-	-
<hr/>													
L	0	2.17	2.40	0.89	2.72	2.65	0.45	2.60	2.70	0.81	2.73	2.80	0.44
	8	2.67	2.80	0.78	2.88	2.85	0.33	1.87	1.70	0.98	2.17	2.30	0.85
	16	2.40	2.80	1.48	2.62	2.95	1.10	2.10	2.70	1.53	2.57	2.70	0.64
	24	1.97	2.80	1.72	3.02	3.00	0.19	2.90	2.90	0.48	2.73	2.20	-
	32	2.23	3.20	1.73	2.93	3.00	0.75	3.07	3.10	0.36	3.13	3.20	0.51
	40	2.85	3.00	0.27	2.88	2.95	0.75	3.03	3.10	0.98	3.37	3.40	0.36

## APPENDIX B

(cont)

Profile	Seaward Distance	24 Oct 75			11 Feb 76			14 May 76			2 Jul 76		
		(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting	(Phi) Mean	(Phi) Median	Sorting
	metres	metres	metres	metres	metres	metres	metres	metres	metres	metres	metres	metres	metres
L	48	-	-	-	3.33	3.35	0.41	3.03	3.10	0.87	3.53	3.60	0.29
	56	-	-	-	2.93	2.95	0.42	3.07	3.10	0.47	-	-	-
	64	-	-	-	3.00	3.00	0.16	3.17	3.20	0.37	-	-	-
	72	-	-	-	3.00	3.00	0.16	3.07	3.10	0.37	-	-	-
	80	-	-	-	0.33	0.35	0.57	3.27	3.30	0.36	-	-	-
	88	-	-	-	3.12	3.10	0.26	3.10	3.10	0.40	-	-	-
	96	-	-	-	-	-	-	3.37	3.40	0.36	-	-	-
	104	-	-	-	-	-	-	3.60	3.70	0.37	-	-	-
	112	-	-	-	-	-	-	3.67	3.70	0.28	-	-	-

## APPENDIX B-2

Wentworth grade scale (1922)

Class name		Phi unit	Metric unit	Microns
			mm.	$\mu$
GRAVEL  (GRANULE)	Very Coarse	-5	64-32	
	Coarse	-4	32-16	
	Medium	-3	16- 8	
	Fine	-2	8- 4	
	Very Fine	-1	4- 2	
<hr/>				
SAND	Very Coarse	0	2.000-1.000	2000-1000
	Coarse	1	1.000-0.500	1000- 500
	Medium	2	0.500-0.250	500- 250
	Fine	3	0.250-0.125	250- 125
	Very Fine	4	0.125-0.062	125- 62

## APPENDIX C

## Content of suspended solid and tidal data of nearshore stations

Date	Time	Tide		Station I			Station 2		
		Survey	Sea level*	Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom
	h.m.	dms.	ppm.	ppm.	ppm.	ppm.	ppm.	ppm.	ppm.
11 Jul 75	2140	Ebb	30.1	-	-	-	-	-	86.21
	2207	Ebb	29.4	1.13	-	15.82	-	-	-
<hr/>									
12 Jul 75	0730	Ebb	21.0	-	-	-	-	13.23	112.44
	0740	Ebb	19.9	-	8.31	43.9	-	-	-
	1155	Ebb	10.0	-	-	216.43	-	-	259.17
	1510	Flood	15.0	-	-	-	-	-	64.53
	1530	Flood	16.6	-	-	238.19	-	-	-
	1837	Flood	27.3	-	-	-	-	2.52	-
	1840	Flood	28.7	-	21.03	2.04	-	-	-
	1955	Flood	30.5	2.64	0.40	33.87	207.94	-	0.66

\* sea level above MSL.

## APPENDIX C

(cont)

Date	Time	Tide		Station 1			Station 2		
		Survey	Sea level *	Surface	Mid-depth	Bottom	Survey	Mid-depth	Bottom
	h.m.	dms.	ppm.	ppm.	ppm.	ppm.	ppm.	ppm.	ppm.
24 Oct 75	1027	Ebb	30.3	7.29	-	2.29	-	-	-
	1045	Ebb	29.4	-	-	-	4.47	-	24.44
	1815	Ebb	27.4	-	5.85	12.32	-	-	-
	1827	Ebb	26.6	-	-	-	-	15.28	1.39
	2310	Ebb	15.2	-	-	-	-	-	20.36
	2325	Ebb	14.3	-	-	5.96	-	-	-
25 Oct 75	0700	Flood	30.7	-	0.35	1.97	-	-	1.36
	0830	Flood	32.9	2.28	4.51	1.35	2.71	-	0.51
12 Feb 76	1335	Ebb	26.5	-	-	-	-	15.42	7.87
	1407	Ebb	25.5	-	6.14	12.48	-	-	-
	1920	Ebb	16.7	-	-	-	-	-	14.13

## APPENDIX C

(cont)

Date	Time	Tide		Station 1			Station 2		
		Survey	Sea level*	Surface	Mid-depth	Bottom		Mid-depth	Bottom
	h.m.	dms.	ppm.	ppm.	ppm.	ppm.	ppm.	ppm.	ppm.
12 Feb 76	1930	Ebb	16.5	-	-	6.81	-	-	-
	2345	Flood	22.4	-	-	-	-	8.22	6.54
	2355	Flood	22.4	-	12.14	9.48	-	-	-
13 Feb 76	0715	Flood	33.0	2.14	11.73	57.57	5.16	6.74	6.94
14 May 76	1200	Flood	13.6	-	-	24.59	-	-	51.38
	1515	Flood	23.5	-	-	-	-	-	31.36
	15.20	Flood	25.2	-	2.10	16.84	-	-	-
	17.10	Flood	30.0	3.71	4.77	0.87	1.63	3.00	3.66
	2010	Flood	31.5	1.43	4.54	0.81	1.38	1.82	1.32

## APPENDIX C

(cont)

Date	Time	Tide		Station 1			Station 2		
		Survey	Sea level*	Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom
	h.m.	dms.	ppm.	ppm.	ppm.	ppm.	ppm.	ppm.	ppm.
15 May 76	0615	Ebb	23.0	-	1.21	1.94	-	3.23	12.73
	10.00	Ebb	10.7	-	-	9.31	-	-	35.29

## APPENDIX D

## Content of suspended solid at offshore stations

Date	Time	Tide		Station 3			Station 4		
		Survey	Sea level	Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom
	h.m.		dms.	ppm.	ppm.	ppm.	ppm.	ppm.	ppm.
13 Jul 75	0915	Ebb	20.6	-	-	-	33.31	6.63	7.68
	1000	Ebb	17.9	5.35	-	4.16	-	-	-
24 Oct 75	1130	Ebb	29.0	-	-	-	0.55	3.90	5.85
	1225	Ebb	28.3	0	1.90	0	-	-	-
12 Feb 76	1505	Ebb	23.5	5.03	3.22	2.93	-	-	-
	1530	Ebb	22.5	-	-	-	5.28	3.40	2.98
14 May 76	1730	Flood	31.0	-	-	-	3.15	2.13	2.31
	1800	Flood	32.0	2.70	1.11	1.93	-	-	-

## APPENDIX E

## Beaufort Wind Scale

Force	Knots	M/sec	Km/hr	Mile/hr	Description
0	0	0	0	0	Calm
1	2	0.9	3	2	Light air
2	5	2.4	9	5	Light breeze
3	9	4.4	16	10	Gentle breeze
4	13	6.7	24	15	Moderate breeze
5	18	9.3	34	21	Fresh breeze
6	24	12.3	44	28	Strong breeze
7	30	15.5	55	35	Moderate gale
8	37	18.9	68	42	Fresh gale
9	44	22.6	82	50	Strong gale
10	52	26.4	96	59	Whole gale
11	60	30.5	110	68	Storm
12	68	34.8	125	78	Hurricane (12 or above)
13	76	39.2	141	88	
14	85	43.8	158	98	
15	94	48.6	175	109	
16	104	53.5	193	120	

After International Meteorological Committee, Paris 1946, and  
 Meteorological observers Handbook, London, 1939.

## APPENDIX F-1

Percentage frequency of wind directions (1967-1972)

## APPENDIX F-2

MONTHLY VALUE OF PERCENTAGE FREQUENCY OF WIND SPEED (1967-1972)

SPEED Beaufort	1	2	3	4	5	6
MONTH						
JAN	13.3	28.1	31.7	9.9	0.4	
FEB	14.8	28.0	36.1	13.1	0.2	
MAR	8.0	21.6	41.6	22.9	0.2	0.9
APR	9.9	22.7	42.6	16.5	0.1	
MAY	11.9	28.0	37.4	12.0	0.2	
JUN	11.9	28.6	36.3	11.9	0.2	
JUL	8.9	23.6	41.4	16.9	0.2	
AUG	11.3	24.9	37.9	14.1	0.2	
SEP	16.9	29.0	28.5	8.2		
OCT	19.3	34.3	25.7	5.0		
NOV	13.3	32.1	36.6	9.3	0.4	
DEC	11.4	32.6	35.4	9.5	0.2	

\* ALL HOURS COMBINED.

## APPENDIX F-3

## CLIMATOLOGICAL INFORMATION

(1967-1972)

MONTH	MEAN MAX TEMP (C)	MEAN MIN TEMP (C)	MEAN PRECIP (MM.)	MAX PRECIP (MM.)	MIN PRECIP (MM.)	24HR. MAX PRECIP (MM.)	MEAN REL. HUMIDITY (%)	PREVAIL. WIND DIR	MEAN WIND SPEED (KNOTS)
JAN	31.8	17.8	24.6	80.8	0	13.2	67.8	N	6
FEB	31.9	20.4	76.7	184.9	12.2	37.3	73.9	S	6
MAR	32.8	21.8	38.4	108.2	T	24.6	73.5	S	8
APR	33.5	23.5	61.7	143.3	21.1	21.8	74.8	S	7
MAY	34.7	23.6	247.6	412.0	33.5	64.8	74.8	S	6
JUN	32.9	23.9	95.0	220.2	23.9	30.2	72.8	SW	6
JUL	33.4	37.3	75.9	196.9	31.8	21.8	72.7	SW	7
AUG	32.9	23.9	95.5	163.6	13.2	22.4	75.0	SW	7
SEP	33.2	23.2	193.8	297.9	117.6	53.1	76.3	SW	5
OCT	33.2	21.6	214.4	363.0	80.3	49.0	78.6	N	5
NOV	32.8	20.4	72.6	211.8	18.0	37.6	70.0	N	6
DEC	33.1	19.7	64.5	360.9	T	48.0	67.9	N	6

## APPENDIX G-1

Percentage Frequency of wind directions (1975-1976)

DIR	MONTH (1975)											
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
N	51.5	2.7	0.4	4.4	14.3	0.0	6.0	-	-	-	20.7	54.9
NNE	0.0	2.2	0.0	0.1	0.0	0.0	3.9	-	-	-	6.0	5.8
NE	3.2	4.9	0.1	2.8	0.3	0.0	0.0	-	-	-	24.9	20.8
ENE	0.3	2.1	0.0	0.0	0.0	0.0	0.0	-	-	-	3.3	0.1
E	1.6	1.2	0.4	1.0	2.3	0.0	3.5	-	-	-	13.9	1.3
ESE	0.0	0.3	0.0	0.0	0.9	0.0	0.0	-	-	-	0.3	0.0
SE	2.2	1.8	1.6	0.4	2.0	0.3	2.0	-	-	-	0.3	0.3
SSE	0.1	0.0	0.0	0.0	1.2	0.4	0.0	-	-	-	0.3	0.0
S	4.6	6.6	13.7	9.6	15.6	5.8	10.1	-	-	-	0.7	0.5
SSW	0.1	9.7	19.1	13.8	5.7	11.3	2.3	-	-	-	0.4	0.0
SW	6.7	45.1	53.4	51.9	18.3	50.3	16.4	-	-	-	6.3	1.6
WSW	0.5	6.3	10.1	7.8	9.4	15.3	3.2	-	-	-	0.3	0.1
W	7.0	11.5	0.3	6.1	18.4	15.4	21.5	-	-	-	6.4	3.1
WNW	0.8	0.3	0.0	0.0	0.7	0.3	1.6	-	-	-	0.6	0.3
NW	3.6	0.3	0.1	1.7	4.4	0.4	19.8	-	-	-	1.4	2.6
NNWO.	0.0	0.0	0.0	0.0	0.1	0.0	4.7	-	-	-	0.1	0.7
CALM	17.7	5.0	0.8	0.4	6.4	0.5	5.0	-	-	-	14.1	7.8
VARBL	0.1	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-	0.0	0.1
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	-	-	-	100.0	100.0

## APPENDIX G-1

(cont)

DIR	MONTH (1976)				
	JAN	FEB	MAR	APR	MAY
N	30.3	12.2	6.5	3.6	3.6
NNE	0.0	0.0	0.7	0.4	1.2
NE	2.7	0.0	1.5	0.8	0.3
ENE	0.4	0.0	0.0	0.7	2.5
E	3.0	1.0	1.5	0.7	4.8
ESE	0.1	0.1	0.1	0.8	2.7
SE	0.7	1.9	2.2	8.2	3.1
SSE	0.0	0.1	2.4	11.2	5.0
S	1.3	25.4	47.2	47.1	10.2
SSW	1.2	3.0	10.5	7.5	11.7
SW	6.5	37.2	19.9	6.9	21.3
WSW	1.9	4.0	0.4	2.5	11.8
W	14.1	10.3	1.9	2.6	4.0
WNW	0.4	0.0	0.0	0.3	2.1
NW	8.6	1.0	1.2	1.3	2.4
NNW	6.3	0.0	0.0	1.5	5.4
CALM	22.5	3.6	4.0	3.9	7.9
VARBL	0.0	0.2	0.0	0.0	0.0
TOTAL	100.0	100.0	100.0	100.0	100.0

## APPENDIX G-2

Percentage frequency of wind speed (1975-1976)

MONTH	SPEED (BEAUFORTS)						
	0	1	2	3	4	5	6
JAN 75	17.7	9.4	30.0	35.6	7.3		
FEB	5.2	3.3	20.1	52.7	18.8		
MAR	0.8	1.3	8.5	54.6	33.6	1.2	
APR	0.4	2.5	18.1	64.3	14.7		
MAY	6.5	6.7	29.0	42.5	13.2	2.2	
JUN	0.6	0.3	3.2	16.7	57.5	18.9	2.9
JUL	5.0	4.3	23.7	26.2	24.6	12.8	3.5
AUG							
SEP							
OCT							
NOV	14.3	9.7	26.1	29.0	18.3	2.2	0.3
DEC	7.8	1.2	13.0	26.6	35.4	13.0	3.0
<hr/>							
JAN 76	22.6	9.7	32.8	28.9	6.1		
FEB	3.6	18.4	42.4	33.2	2.4		
MAR	4.0	4.0	58.9	30.7	2.4		
APR	3.9	8.8	19.0	53.1	15.1	0.1	
MAY	7.9	36.3	38.3	14.3	3.2		

## APPENDIX G-3

## Total Precipitation and Air Temperature (1975-1976)

MONTH	TOTAL PRECIPITATION mm	MAX. TEMP. °C	MEAN TEMP. °C
JAN 75	40.4	32.7	26.0
FEB	17.0	33.6	27.0
MAR	10.7	33.5	28.4
APR	47.5	37.1	29.1
MAY	358.7	34.3	28.4
JUN	70.7	32.4	28.2
JUL	50.8	33.0	28.1
AUG	132.5	33.4	28.7
SEP	84.9	33.4	27.3
OCT	286.7	33.8	26.8
NOV	68.0	33.2	26.4
DEC	18.9	33.3	24.0
<hr/>			
JAN 76	00.0	32.0	24.2
FEB	22.0	31.7	27.3
MAR	70.0	32.2	28.0
APR	98.2	34.2	29.4
MAY	248.4	33.6	28.4
JUN	19.4	33.7	29.2
JUL	197.1	33.4	28.7
AUG	213.7	33.5	27.9
SEP	153.3	32.6	27.5
OCT	420.5	34.0	26.4

## APPENDIX H-1

Observed values of sea level (1975-1976)

MONTH	MEAN dms	MAXIMUM dms	MINIMUM dms	MAXIMUM RANGE dms
June 1975	22.14	31.9	8.0	23.9
July	21.83	31.9	8.0	23.9
August	22.17	31.7	8.9	22.8
September	23.08	31.9	12.2	19.7
October	23.32	33.3	9.9	23.4
November	26.23	35.9	11.6	24.3
December	26.78	36.7	11.5	25.2
<hr/>				
January 1976	25.78	35.2	11.5	23.7
February	25.68	34.4	13.8	20.6
April	24.58	32.1	11.2	20.9
May	23.32	32.7	9.9	22.8

VITA

NAME : Lt. Jg. Gullaya Sapsomwong RTN.

QUALIFICATION : B.Sc. in Marine Science from Chulalongkorn University,  
Bangkok, Thailand in 1971.

POSITION : Acting Chief of the Chemical Oceanographic Section,  
Hydrographic Department, Royal Thai Navy.

OFFICE : Chemical Oceanographic Section,  
Hydrographic Department,  
Royal Thai Navy,  
Bangkok 6, Thailand.



✓