PRELIMINARY DATA SUMMARY

May 1985

U.S. Army Engineer Waterways Experiment Station
Coastal Engineering Research Center
Field Research Facility
Duck, North Carolina

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Duck, North Carolina

This report provides a summary of basic oceanographic, meteorological and bottom profile data for the month. The data were obtained as part of the Field Research Facility Measurement and Analysis Work Unit at the U.S. Army Engineer Waterways Experiment Station, Coastal Engineering Research Center's Field Research Facility in Duck, North Carolina. The data were collected and the analyses performed by the FRF staff. These summaries are intended to make the data readily available to all FRF users, and comments on their content and usefulness are invited.

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I. INTRODUCTION

The U.S. Army Engineer Waterways Experiment Station, Coastal Engineering Research Center's (CERC) Field Research Facility (FRF) is located on the Outer Banks of North Carolina, near the village of Duck (Fig.1).

The FRF research program provides a means for obtaining high-quality field data, particularly during storms, in support of the U.S. Army Corps of Engineers' coastal engineering research missions. The FRF consists of a 561-m (1,840 ft) long concrete research pier supported on 0.91 m (3 ft) diameter steel piles. The pier deck is 6.1 m (20 ft) wide, 7.74 m (25.4 ft) above mean sea level (MSL), and extends from behind the dunes to approximately the 7.6 m (25 ft) depth contour. In addition, a main building contains offices, an instrument repair shop, and a data acquisition room.

One of the responsibilities of the FRF research program is the collection, analysis and dissemination of data on local oceanographic and meteorological conditions. Bottom profiles along both sides of the pier and periodic bathymetric surveys are also performed.

This summary is intended to provide basic data as soon as possible after they are obtained. Most of the data are daily observations or the results of preliminary data analysis. In many instances, continuous analog records and more extensive analyses will be made available later by the CERC Coastal Engineering Information and Analysis Center (CEIAC).

Table 1 is a list of instruments used, their status during the month, and the data collection status. Figure 2 identifies the location of the instruments. The water depth at the wave gages and current meters vary and may best be determined from the information contained in Figure 8. Other installation information is contained in Table 1. All times unless otherwise specified are referenced to Eastern Standard Time (EST).

Section II presents the meteorological data; Sections III through VI, oceanographic data; Section VII, nearshore profiles and bathymetry; and Section VIII, if included, documents special events that occurred at the FRF during the month.

Questions and/or comments concerning the data may be directed to Mr. H. Carl Miller at (919) 261-3511.

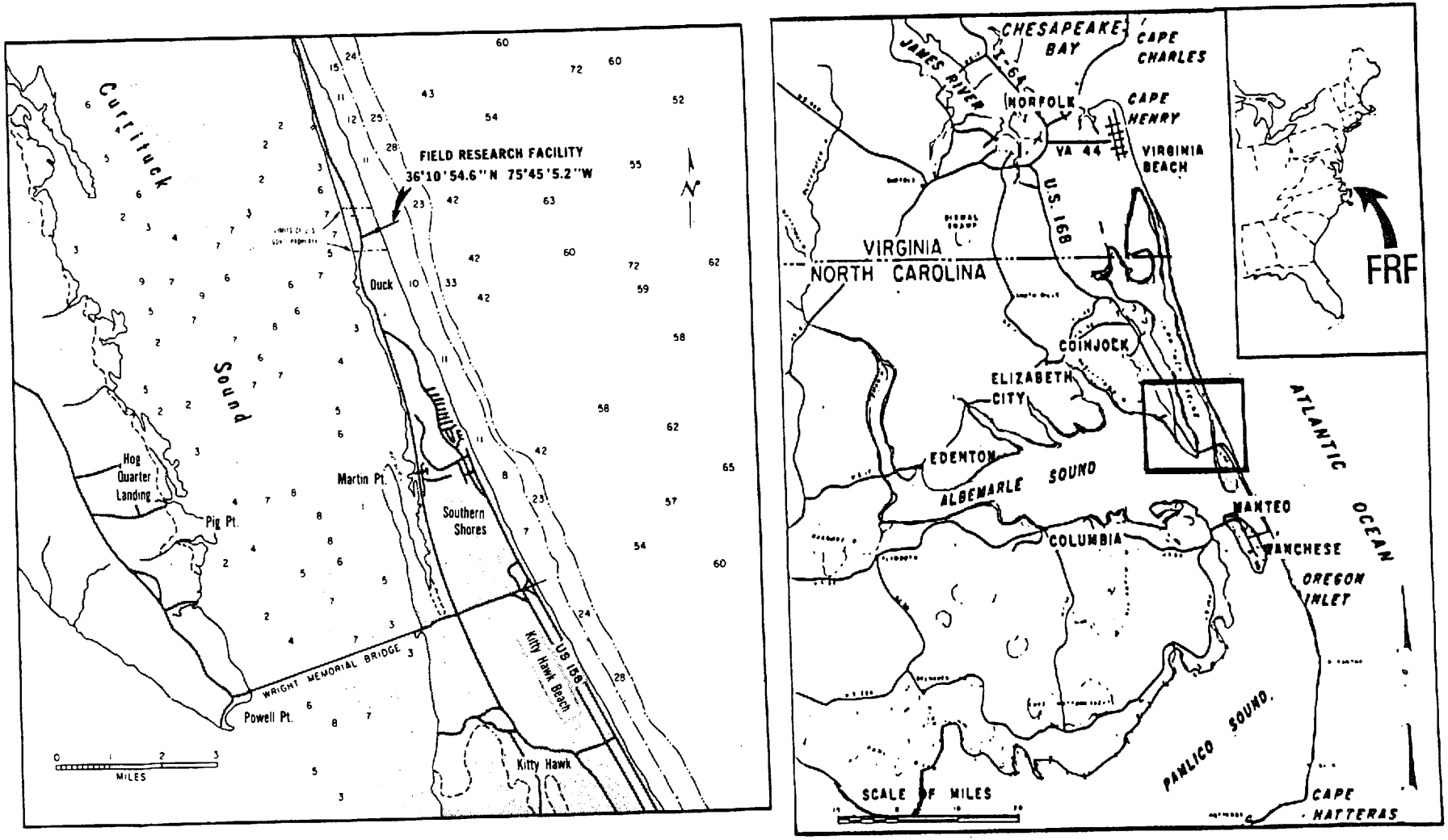
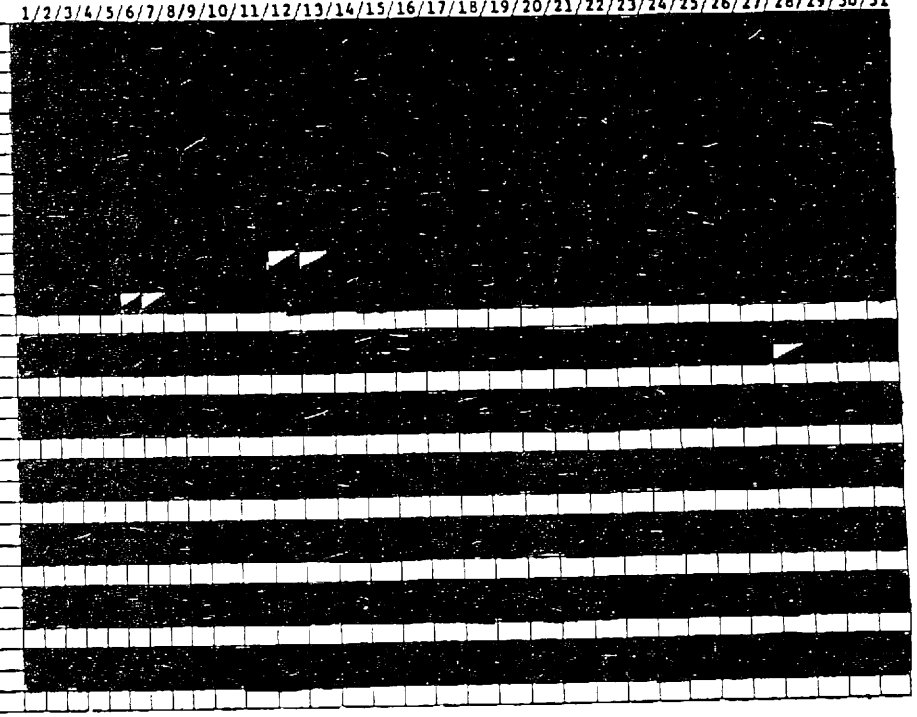


Figure 1. FRF Location Map

TABLE 1
INSTRUMENT STATUS/DATA AVAILABILITY
May 1985

GAGE NUMBER	DESCRIPTION/REMARKS	DEPTH AT SENSOR	
	Barometric Pressure		Instrument Status
			Data Collected
			Analog Record
	Precipitation		Instrument Status
			Data Collected
			Analog Record
	Air Temperature		Instrument Status
			Data Collected
			Maximum/Minimum
	Anemometer on Lab Bldg - Elevation 19m (MSL)		Instrument Status
			Data Collected
			Analog Record
645	Baylor staff located at station 7+80 on FRF pier	See profile data	Instrument Status
			Data Collected
625	Baylor staff located at station 19+00 on FRF pier	See profile data	Instrument Status
			Data Collected
640	Waverider buoy located 1.0 km from shore	Approx. 8.5 m. MSL	Instrument Status
			Data Collected
630	Waverider buoy located 6.0km from shore	Approx. 18 m. MSL	Instrument Status
			Data Collected
639	Current meter at station 14+20 on FRF pier	See profile data	Instrument Status
			Data Collected
679	Current meter 500M south (0.5km offshore)	Approx. 6 m MSL	Instrument Status
			Data Collected
863-1370	NOAA primary tide station located at seaward end of FRF pier		Instrument Status
			Data Collected



Instrument Status: Operational ■ - Daily Observation: YES ■
Data Collected: ALL ■, SOME ◪
Analog Record: ALL ■, PARTIAL ◪
Preliminary Analysis: ALL ■, SOME ◪

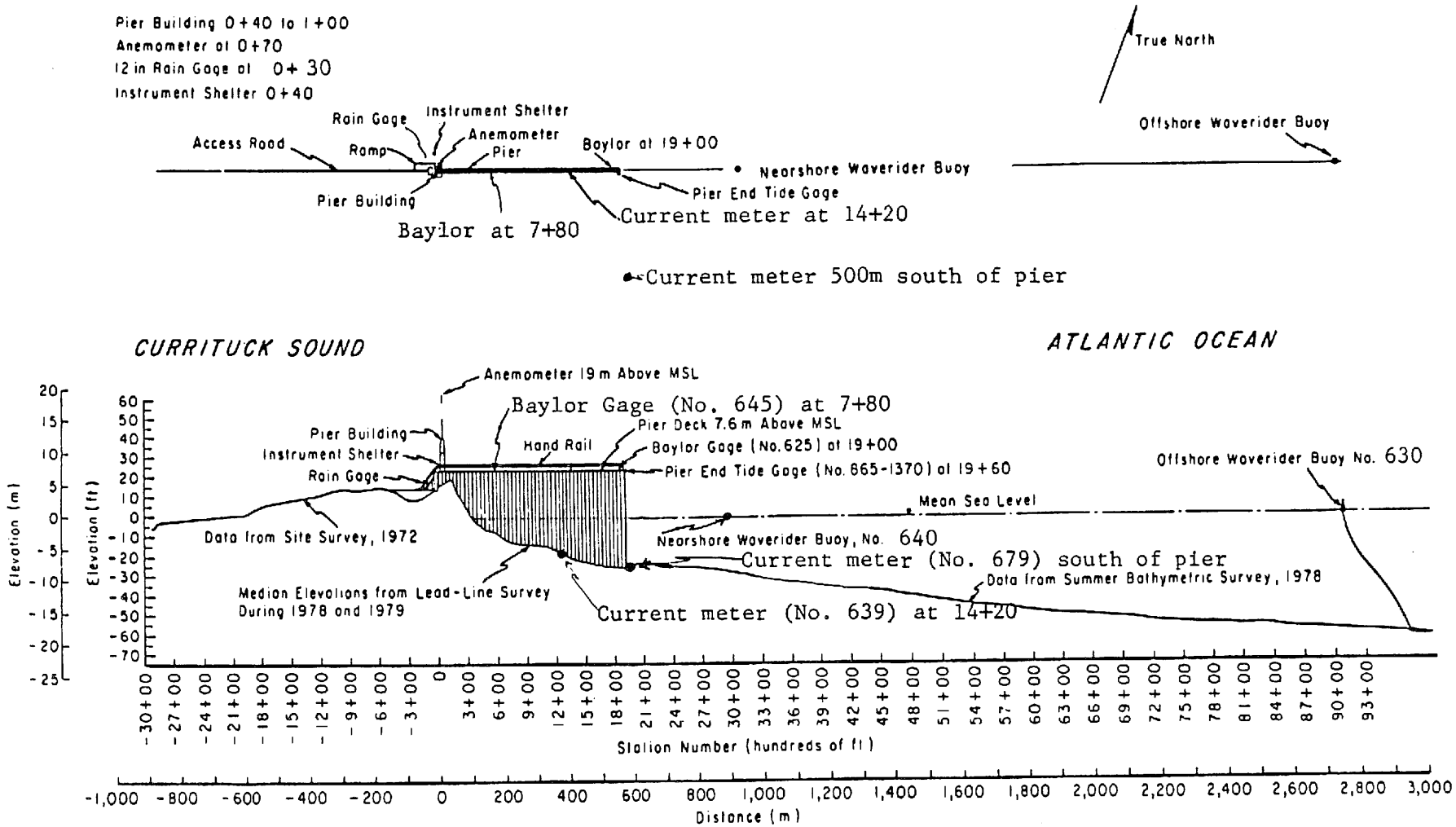


Figure 2. Instrument locations at FRF.

II. METEOROLOGICAL DATA

A variety of instruments have been installed at the FRF (Fig. 2) to monitor the meteorological conditions. The data presented in Table 2 are collected and stored on magnetic tape using a Data General NOVA-4 computer. For each instrument identified in Table 1 as having analog outputs, chart records are obtained, a log is maintained and the records are stored for future reference.

The wind measurements are obtained from a Weather Measure Skyvane located on the FRF laboratory building (Fig. 2), 19.1 m above mean sea level (MSL).

The high and low temperatures are obtained from daily readings of NWS maximum and minimum thermometers and represent the extreme temperature values since the last reading.

The following may be useful for converting the data in Table 2 to other frequently used units of measurement:

1. Millimeters (mm) to inches (in) -
mm x .03937 = in

2. Millibars (mb) to inches of mercury (in Hg) -
mb x 0.02953 = in Hg

3. Degrees Celcius (^{o}C) to degrees Fahrenheit (^{o}F) -
(^{o}C x 9/5) + 32 = ^{o}F

4. Meters per second (m/s) to knots (kn) -
m/s x 1.943 = kn

TABLE 2: METEOROLOGICAL DATA

PART 1

MAY 1985

DAY	HOUR	WIND SPEED (M/S)	WIND DIRECTION (DEG TN)	TEMPERATURE (DEG C)	ATM PRESSURE (MB)	PRECIPITATION (MM)
1	100	4	216	17.2	1018.6	0
	700	5	246	18.4	1019.1	7
	1300	4	175	25.3	1016.8	0
	1900	6	202	20.3	1015.5	0
2	100	6	233	18.9	1015.5	0
	700	4	229	20.1	1015.9	0
	1300	4	137	21.3	1014.8	0
	1900	6	180	20.8	1012.5	0
3	100	5	210	19.9	1010.2	0
	700	4	203	19.2	1007.2	0
	1300	13	2	11.2	1009.9	0
	1900	12	38	11.6	1014.1	0
4	100	9	45	10.4	1016.5	0
	700	7	41	11.6	1019.3	0
	1300	4	67	14.5	1021.2	0
	1900	4	156	12.8	1020.7	0
5	100	3	174	11.1	1021.3	0
	700	4	223	16.1	1021.9	0
	1300	5	159	18.7	1020.0	0
	1900	6	201	18.4	1017.2	0
6	100	7	243	17.1	1017.0	0
	700	6	237	17.8	1016.2	0
	1300	5	247	26.3	1026.4	0
	1900	4	199	22.1	1011.5	0
7	100	6	246	19.4	1010.7	0
	700	5	261	20.0	1010.0	0
	1300	4	59	19.5	1011.1	0
	1900	3	71	15.8	1013.4	0
8	100	2	66	14.7	1016.1	0
	700	3	33	15.4	1018.8	0
	1300	4	51	16.3	1020.7	0
	1900	3	96	15.7	1020.3	0
9	100	5	110	16.2	1022.1	0
	700	6	88	16.7	1024.1	0
	1300	5	106	20.8	1025.6	0
	1900	6	125	17.6	1023.9	0
10	100	3	127	17.4	1022.5	0
	700	4	198	19.7	1022.9	0
	1300	4	147	23.7	1021.2	0
	1900	5	204	22.1	1019.5	0
11	100	4	241	19.9	1019.6	0
	700	3	164	17.0	1018.9	0
	1300	4	129	21.0	1019.4	0
	1900	3	193	22.3	1017.2	0
12	100	4	164	16.9	1017.6	0
	700	3	150	17.4	1013.2	3
	1300	3	156	21.0	1017.4	0
	1900	4	196	22.3	1016.2	0
13	100	2	168	18.0	1015.7	0
	700	3	169	17.3	1015.2	0
	1300	3	135	21.8	1015.0	0
	1900	4	199	22.8	1013.6	0
14	100	3	224	20.8	1013.4	0
	700	1	273	21.0	1013.6	0
	1300	2	99	27.7	1013.6	0
	1900	4	67	19.0	1014.5	0
15	100	4	77	18.3	1016.2	0
	700	9	75	19.0	1017.2	0
	1300	7	75	20.6	1018.5	0
	1900	5	92	18.8	1017.2	0
16	100	4	96	18.3	1014.1	0
	700	2	111	20.3	1013.5	0
	1300	4	126	21.7	1010.2	0
	1900	4	132	19.6	1005.8	0

TABLE 2: METEOROLOGICAL DATA

PART 2

MAY 1985

DAY	HOUR	WIND SPEED (M/S)	WIND DIRECTION (DEG TN)	TEMPERATURE (DEG C)	ATM PRESSURE (MB)	PRECIPITATION (MM)
17	100	5	193	20.3	999.9	0
	700	6	240	20.0	997.7	0
	1300	6	259	24.2	994.8	0
	1900	8	303	19.4	991.9	0
18	100	5	297	16.5	994.9	0
	700	9	325	15.9	997.5	0
	1300	5	338	20.0	1001.3	0
	1900	5	144	17.5	1004.0	0
19	100	7	319	16.3	1007.6	0
	700	6	321	15.9	1012.0	0
	1300	4	125	20.0	1014.6	0
	1900	4	177	19.1	1015.2	0
20	100	4	225	19.9	1016.9	0
	700	3	209	22.0	1019.3	0
	1300	8	160	23.8	1018.3	0
	1900	6	203	22.5	1017.5	0
21	100	4	217	21.0	1017.3	0
	700	3	162	19.8	1016.6	0
	1300	7	157	22.4	1015.1	0
	1900	3	188	22.4	1012.5	0
22	100	5	251	21.8	1012.5	0
	700	2	11	20.7	1014.2	0
	1300	7	61	19.0	1015.8	0
	1900	4	88	17.8	1015.1	0
23	100	7	103	18.8	1013.1	0
	700	3	11	18.9	1011.5	6
	1300	4	124	23.1	1009.6	0
	1900	4	126	20.6	1007.4	9
24	100	7	23	17.3	1007.7	3
	700	7	33	17.0	1007.9	7
	1300	3	19	18.2	1007.4	0
	1900	6	330	17.0	1006.5	0
25	100	6	345	14.8	1006.9	0
	700	5	342	14.5	1008.2	0
	1300	5	32	19.9	1009.0	0
	1900	3	33	17.3	1009.1	0
26	100	1	243	16.9	1009.9	0
	700	5	314	20.2	1011.1	0
	1300	1	68	27.9	1011.4	0
	1900	3	150	20.4	1011.2	0
27	100	6	251	21.7	1012.2	0
	700	3	254	22.2	1013.4	0
	1300	4	244	28.4	1012.1	0
	1900	4	210	24.8	1010.1	0
28	100	7	246	22.0	1010.8	0
	700	8	250	21.9	1010.2	0
	1300	6	264	29.3	1009.9	0
	1900	6	229	25.8	1007.1	0
29	100	5	309	22.7	1008.3	0
	700	2	250	21.2	1010.0	0
	1300	10	33	17.5	1012.9	0
	1900	12	39	15.4	1014.7	0
30	100	6	50	15.1	1015.6	0
	700	8	52	16.5	1017.4	0
	1300	4	70	18.4	1016.7	0
	1900	2	58	16.7	1015.7	0
31	100	1	167	16.3	1014.9	0
	700	4	157	19.6	1014.3	0
	1300	5	193	27.3	1011.7	0
	1900	6	195	24.2	1009.0	0

III. WAVE DATA

Wave data were collected from two Baylor staff gages (CERC gage Nos. 625 and 645) and Waverider buoys (CERC gage Nos. 630 and 640, Table 1 and Figure 2). The data were collected, analyzed, and stored on magnetic tape using a Data General NOVA-4 computer.

The NOVA-4 is programmed to sample the wave gages every 6 hours near 0100, 0700, 1300, and 1900 EST at a sampling rate of four times per second, collecting data in 20-minute records.

Wave height (Hmo) is an energy-based statistic equal to four times the standard deviation of the sea surface elevations. The wave period is identified from the computation of a variance (energy) spectrum using a Fast Fourier Transform of 4096 data points (1024 sec). The period (Tp) is that associated with the maximum energy density in the spectrum. When this analysis is complete, the data are written to magnetic tape and entered into the CERC data base.

Table 3 presents the wave heights and periods for each wave record obtained during the month. The monthly means shown in Table 3 are an average of the values computed for all data records collected. The monthly standard deviations are standard deviations from the monthly mean of values for each record.

Figure 3 is a time history of the Hmo and Tp values for the Waverider 6 km from shore (630) and the Baylor gage at pier station 19+00 (625).

Differences in wave periods between wave gages (Table 4 and Figure 3) may be due to wave breaking or reformation, or the presence of multiple wave trains containing nearly equal energy.

TABLE 3: WAVE DATA PART 1

MAY 1985

GAGE		645 Baylor at 7+80		625 Baylor at 19+00		640 Nearshr Wvrdr		630 Farshr Wvrdr	
DAY	TIME	Hmo(m)	T(sec)	Hmo(m)	T(sec)	Hmo(m)	T(sec)	Hmo(m)	T(sec)
1	1	.40	7.42	.57	7.42	.60	7.42	.79	7.42
	7	.35	5.99	.50	7.42	.55	7.42	.65	6.87
	13	.40	5.63	.47	8.83	.53	7.42	.62	8.06
	19	.46	5.63	.48	14.22	.48	14.22	.72	6.87
2	1	.35	7.42	.36	12.34	.36	14.22	.51	7.42
	7	.33	12.34	.39	12.34	.41	14.22	.57	8.06
	13	.34	5.99	.36	12.34	.41	6.87	.51	8.06
	19	.45	3.15	.50	3.05	.50	10.89	.58	8.06
3	1	.38	5.99	.40	6.40	.45	6.87	.52	6.40
	7	.59	5.31	.71	8.06	.75	8.06	1.05	8.06
	13	1.48	5.02	1.56	5.99	1.60	5.99	2.09	5.99
	19	1.59	6.87	2.25	7.42	2.26	7.42	2.45	7.42
4	1	1.27	9.75	1.85	8.83	1.95	8.83	2.20	7.42
	7	.90	7.42	1.61	12.34	1.66	12.34	1.81	10.89
	13	1.09	12.34	1.63	10.89	1.57	12.34	1.44	12.34
	19	.79	12.34	1.31	12.34	1.36	12.34	1.33	9.75
5	1	.75	10.89	1.12	10.89	1.05	9.75	1.12	9.75
	7	.49	9.75	1.01	9.75	1.08	10.89	1.00	8.83
	13	.50	5.02	.85	8.83	.91	8.06	.91	12.34
	19	.44	12.34	.64	12.34	.62	12.34	.72	9.75
6	1	.28	10.89	.49	10.89	.53	10.89	.61	10.89
	7	.22	6.40	.28	9.75	.30	8.06	.44	8.83
	13	*		.42	8.06	.29	9.75	.37	8.06
	19	.33	6.40	.42	3.38	.44	3.26	.50	3.51
7	1	.33	5.31	.32	7.42	.32	7.42	.49	5.63
	7	.23	5.99	.24	6.87	.27	5.99	.43	5.63
	13	.28	5.63	.28	6.40	.30	6.87	.43	5.99
	19	*		.46	2.95	.44	2.78	.45	2.95
8	1	.24	4.13	.34	3.95	.34	3.95	.45	3.95
	7	.27	3.95	.44	4.53	.46	4.53	.60	3.64
	13	.28	4.76	.45	4.76	.44	5.02	.63	3.64
	19	.25	3.79	.39	5.02	.41	5.63	.51	5.02
9	1	.24	6.87	.38	12.34	.41	6.40	.42	6.87
	7	.40	2.19	.46	12.34	.43	6.87	.51	5.99
	13	.43	5.31	.58	3.95	.62	5.63	.61	6.40
	19	.87	5.99	.73	5.99	.77	6.87	.93	5.99
10	1	.83	6.87	.92	6.40	1.00	6.40	1.13	5.99
	7	.75	6.40	.74	5.63	.79	6.87	1.00	5.99
	13	.61	6.87	.66	5.63	.67	6.87	.94	5.99
	19	.65	5.99	.73	6.87	.71	5.99	.92	5.63
11	1	.57	6.40	.65	6.40	.68	6.40	.90	6.40
	7	.58	5.99	.59	6.40	.63	6.40	.79	5.99
	13	.46	5.99	.53	5.99	.54	6.40	.68	5.99
	19	.48	5.99	.49	6.87	.51	7.42	.66	7.42
12	1	.49	5.31	.51	5.99	.55	5.99	.69	6.40
	7	.60	5.31	.53	8.06	.58	8.06	.71	7.42
	13	.54	6.87	.57	6.87	.63	7.42	.81	6.40
	19	.58	5.63	.58	6.87	.63	7.42	.81	6.87
13	1	.63	6.87	.60	5.63	.67	6.87	.89	6.87
	7	.59	5.02	.59	6.87	.64	5.63	.80	8.06
	13	.58	5.99	.60	5.63	.63	7.42	.87	6.87
	19	.46	7.42	.47	6.87	.51	8.06	.67	8.83
14	1	.63	6.40	.57	8.06	.66	6.87	.85	7.42
	7	.72	5.99	.67	7.42	.71	8.06	.84	7.42
	13	.60	6.87	.55	8.83	.61	7.42	.76	6.87
	19	.56	7.42	.59	7.42	.57	8.83	.79	8.06
15	1	.61	8.83	.70	8.06	.69	9.75	.91	8.83
	7	.62	6.40	.82	3.51	.84	8.83	1.01	8.06
	13	.92	5.63	1.32	6.40	1.46	6.40	1.86	6.40
	19	.96	7.42	1.40	8.83	1.46	7.42	1.83	8.06
16	1	.86	8.06	1.46	7.42	1.35	8.06	1.59	8.06
	7	.72	6.87	1.14	8.06	1.19	8.83	1.42	7.42
	13	.79	8.06	1.13	8.06	1.05	6.87	1.24	7.42
	19	.71	6.87	.96	6.87	1.00	7.42	1.26	8.83

*=Electronic Problems

TABLE 3: WAVE DATA

MAY 1985

DAGE		645 Baylor at 7+80		625 Baylor at 19+00		640 Nearshr Wvrdr		630 Farshr Wvrdr	
DAY	TIME	Hmo(m)	T(sec)	Hmo(m)	T(sec)	Hmo(m)	T(sec)	Hmo(m)	T(sec)
17	1	.69	8.06	1.02	8.06	1.07	7.42	1.28	6.87
	7	.51	8.06	.84	8.06	.85	8.83	1.03	7.42
	13	.42	8.06	.69	7.42	.72	8.06	.85	8.83
	19	.54	8.06	.76	6.87	.85	8.06	.99	8.06
18	1	.41	8.83	.69	8.06	.70	7.42	.89	8.06
	7	.40	7.42	.63	9.75	.70	9.75	.79	7.42
	13	.59	4.76	.75	9.75	.74	10.89	.97	5.31
	19	.58	5.63	.78	5.31	.79	5.31	.91	5.99
19	1	.43	8.83	.60	9.75	.60	9.75	.70	9.75
	7	.42	9.75	.66	8.83	.65	9.75	.76	8.83
	13	.43	8.83	.59	9.75	.67	9.75	.64	9.75
	19	.50	8.06	.65	8.83	.75	3.38	.84	8.83
20	1	.35	8.06	.55	9.75	.51	8.83	.63	8.06
	7	.36	8.83	.45	9.75	.52	8.83	.58	8.83
	13	.56	8.83	.60	9.75	.60	8.83	.74	8.83
	19	.55	3.64	.62	8.83	.63	8.83	.87	8.83
21	1	.77	5.63	.62	5.99	.64	6.40	1.00	5.63
	7	.74	5.63	.62	6.87	.67	8.06	.94	6.87
	13	.66	5.63	.61	8.06	.59	8.83	.86	5.31
	19	.76	6.40	.75	6.87	.76	6.40	.99	6.40
22	1	.75	5.99	.65	7.42	.70	7.42	.90	7.42
	7	.50	5.63	.53	6.40	.53	6.40	.71	6.87
	13	.58	3.38	.70	3.15	.65	8.06	.74	3.38
	19	.55	7.42	.68	4.32	.69	4.13	.85	3.79
23	1	.58	6.40	.69	7.42	.65	4.76	.77	7.42
	7	.45	6.40	.60	3.79	.62	4.13	.78	4.53
	13	.45	16.79	.66	5.02	.66	16.79	.73	4.76
	19	.52	5.02	.69	5.63	.73	5.99	.91	5.31
24	1	.53	5.99	.74	6.40	.76	4.76	1.18	4.53
	7	.93	5.63	1.14	6.87	1.15	5.99	1.48	6.87
	13	.82	6.87	1.11	8.06	1.16	6.87	1.39	6.87
	19	.81	6.87	1.26	9.75	1.48	9.75	1.56	8.83
25	1	.99	5.99	1.48	8.83	1.45	8.83	1.76	8.83
	7	.88	5.31	1.46	8.06	1.39	8.06	1.79	4.76
	13	.70	5.63	1.13	7.42	1.19	9.75	1.36	6.87
	19	.57	6.40	1.08	9.75	1.21	8.83	1.26	8.83
26	1	.55	6.40	.99	8.83	1.02	8.06	1.12	7.42
	7	.40	5.02	.86	9.75	.87	9.75	.94	8.06
	13	.38	14.22	.71	8.83	.82	8.83	.82	8.83
	19	.32	5.02	.74	8.06	.73	8.06	.70	5.99
27	1	.27	8.83	.55	8.83	.61	8.06	.61	8.06
	7	.27	14.22	.49	7.42	.51	7.42	.51	7.42
	13	.23	6.87	.44	6.40	.51	6.40	.59	8.06
	19	.36	3.05	.47	8.06	.49	8.06	.55	7.42
28	1	.23	7.42	.33	7.42	.34	6.40	.50	6.87
	7	.21	7.42	.31	14.22	.31	6.87	.46	6.87
	13	.21	6.87	.26	7.42	.29	7.42	.35	6.40
	19	.29	6.87	*		.28	10.89	.53	3.51
29	1	.21	8.06	.26	6.87	.26	9.75	.37	8.06
	7	.23	12.34	.31	8.83	.31	8.06	.40	8.83
	13	.86	4.53	1.01	4.53	1.17	4.53	1.09	4.76
	19	1.35	5.63	1.61	5.99	1.49	5.63	1.67	5.99
30	1	.80	4.76	1.21	6.40	1.17	8.06	1.43	8.06
	7	.72	5.63	1.03	8.83	1.05	8.83	1.18	9.75
	13	.57	6.87	.96	8.06	1.02	8.83	1.15	9.75
	19	.49	6.40	.95	8.06	.92	9.75	.98	8.83
31	1	.40	6.40	.76	6.87	.80	8.83	.84	6.87
	7	.36	6.87	.66	8.83	.68	8.83	.66	8.06
	13	.47	6.40	.84	8.83	.80	8.06	.85	8.83
	19	.41	8.06	.62	9.75	.69	9.75	.80	8.06
	MEAN	.56	6.92	.74	7.76	.76	7.91	.90	7.24
	STD	.26	2.30	.36	2.27	.37	2.26	.40	1.75

*=Electronic Problems

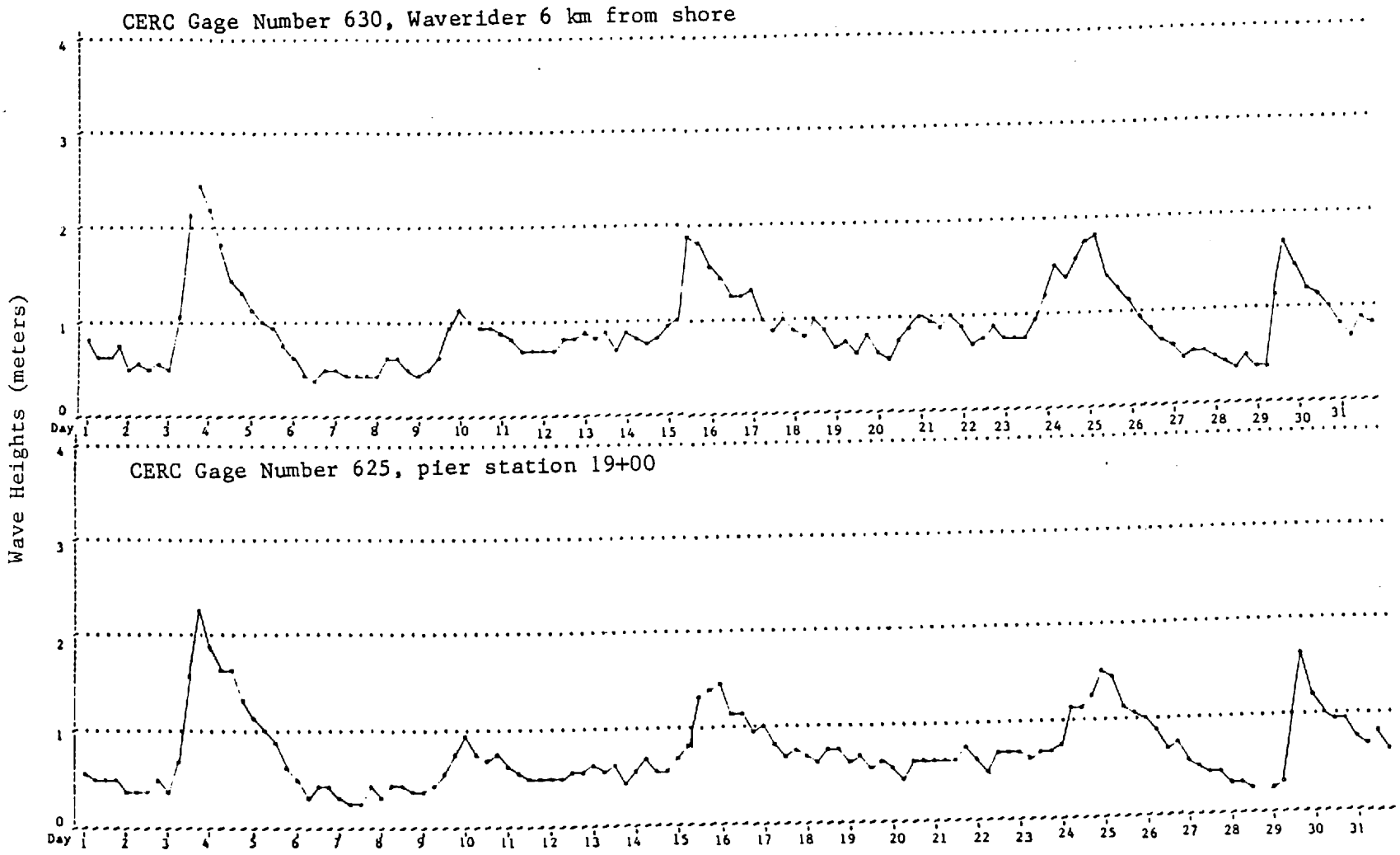


FIGURE 3. Time History of Wave Heights and Periods - May 1985 Part I: Heights

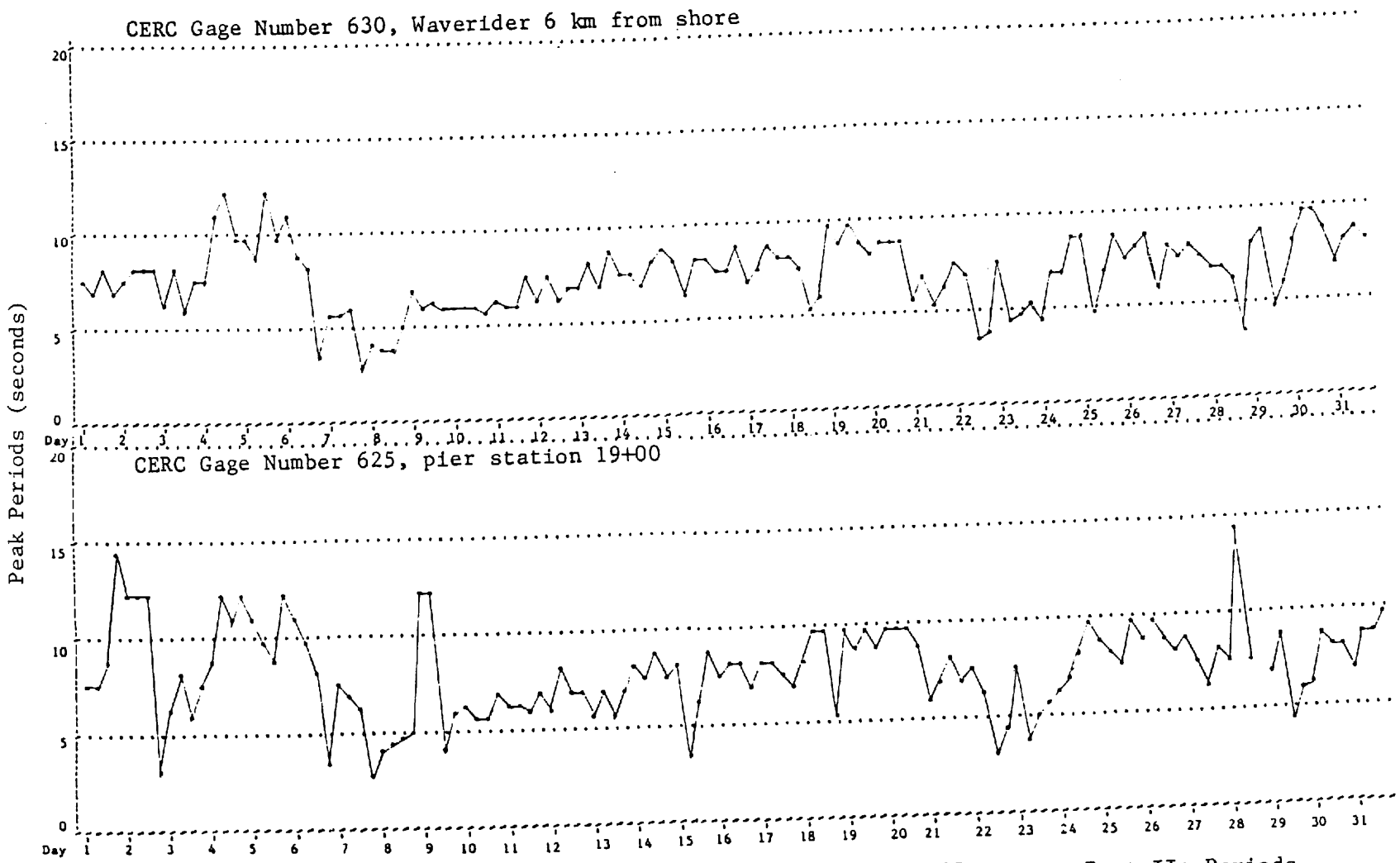


FIGURE 3. Time History of Wave Heights and Periods - May 1985 Part II: Periods

IV. CURRENT DATA

Current data (Table 4) are collected from two Marsh-McBirney electromagnetic biaxial current meters (Table 1 and Figure 2) and by visually observing the movement of dye on the water surface in the surf and at the seaward end of the pier, as well as 500 m updrift of the pier 12 m offshore.

Since the shoreline orientation is approximately N20°W, alongshore currents flow either toward 340° (i.e. northward) or toward 160° (i.e. southward). Similarly, cross-shore currents are either onshore (westward) or offshore (eastward).

All current speeds are given in centimeters per second.

TABLE 4: CURRENT DATA
(SPEEDS IN CM/SEC)
May 1985

		PIER MEASUREMENTS								BEACH MEASUREMENTS (500 UP DRIFT)				
		DYE AT 19+00 (579m) (SURFACE)		CURRENT METER AT 14+20(433m) I.D.#639 (DEPTH -4.2m MSL)		DYE AT MID-SURF ZONE (SURFACE) DIST. FROM BASELINE(M)				DYE 12M OFFSHORE (SURFACE)			CURRENT METER AT SOUTH TRIPOD (DEPTH -4.8m MSL) I.D.#679	
DAY	TIME	SPEED	DIR	SPEED	DIR		SPEED	DIR		LOCATION	SPEED	DIR	SPEED	DIR
1	0100-Alongshore			9	N								17	N
	Cross-shore			2	OF								8	OF
	Resultant			9	352								19	5
1	0700-Alongshore	27	N	10	N		29	N			24	S	7	N
	Cross-shore	16	Off	2	OF	140	0	0		South			3	OF
	Resultant	31	11	10	353		29	340					7	6
1	1300-Alongshore			6	N								10	N
	Cross-shore			1	OF								4	OF
	Resultant			6	352								11	3
1	1900-Alongshore			10	N								5	N
	Cross-shore			4	OF								2	OF
	Resultant			10	1								5	359
2	0100-Alongshore			4	N								15	N
	Cross-shore			0									2	OF
	Resultant			4	340								15	348
2	0700-Alongshore	8	N	2	N		36	N			8	S	5	N
	Cross-shore	13	Off	1	OF	137	29	Off		South			1	OF
	Resultant	16	40	2	0		46	19					5	353
2	1300-Alongshore			1	N								4	N
	Cross-shore			0									1	OF
	Resultant			1	340								4	351
2	1900-Alongshore			5	N								3	N
	Cross-shore			2	OF								2	OF
	Resultant			6	2								4	17
3	0100-Alongshore			4	N								4	N
	Cross-shore			1	OF								1	ON
	Resultant			4	355								4	321
3	0700-Alongshore	18	N	0			38	N			23	S	3	N
	Cross-shore	8	Off	1	ON	128	23	Off		South			0	
	Resultant	20	4	1	250		44	11					3	340
3	1300-Alongshore			28	S								35	S
	Cross-shore			8	ON								19	ON
	Resultant			29	176								40	189
3	1900-Alongshore			40	S								43	S
	Cross-shore			9	ON								22	ON
	Resultant			41	173								48	187
4	0100-Alongshore			25	S								27	S
	Cross-shore			3	ON								12	ON
	Resultant			25	166								30	183
4	0700-Alongshore	47	S	9	S		87	S			69	S	15	S
	Cross-shore	5	Off	3	ON	177	22	Off		North			9	ON
	Resultant	47	154	10	176		90	146					18	190
4	1300-Alongshore			1	N								8	S
	Cross-shore			1	ON								1	ON
	Resultant			1	300								8	171
4	1900-Alongshore			8	N								9	N
	Cross-shore			2	OF								5	OF
	Resultant			8	354								10	9
5	0100-Alongshore			3	S								8	N
	Cross-shore			8	ON								1	ON
	Resultant			8	228								8	330
5	0700-Alongshore	11	N	2	N		0	0			61	S	7	N
	Cross-shore	17	Off	1	ON	254	61	Off		South			1	OF
	Resultant	20	36	2	323		61	70					7	349
5	1300-Alongshore			5	N								9	N
	Cross-shore			1	OF								11	OF
	Resultant			6	348								14	30
5	1900-Alongshore			16	N								24	N
	Cross-shore			6	OF								12	OF
	Resultant			17	359								27	6
6	0100-Alongshore			5	N								13	N
	Cross-shore			1	OF								3	OF
	Resultant			5	350								13	354
6	0700-Alongshore	18	N	8	N		9	N			7	N	12	N
	Cross-shore	13	Off	1	OF	128	12	Off		South			5	OF
	Resultant	22	17	8	351		15	33					13	3
6	1300-Alongshore			2	N								5	N
	Cross-shore			0									2	OF
	Resultant			2	340								5	359
6	1900-Alongshore			5	N								9	N
	Cross-shore			1	OF								3	OF
	Resultant			5	353								9	356

KEY = ALL SPEEDS IN CM/SEC
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S =SOUTHWARD, SHORE PARALLEL
ON=ONSHORE
OF=OFFSHORE

TABLE 4: CURRENT DATA
(SPEEDS IN CM/SEC)

		PIER MEASUREMENTS						BEACH MEASUREMENTS (500 UPDRIFT)					
		DYE AT 19+00 (579m) (SURFACE)		CURRENT METER AT 14+20(433m) I.D.#639 (DEPTH -4.2m MSL)		DYE AT MID-SURF ZONE (SURFACE) DIST. FROM				DYE 12M OFFSHORE (SURFACE)		CURRENT METER AT SOUTH TRIPOD (DEPTH -4.8m MSL) I.D.#679	
DAY	TIME	SPEED	DIR	SPEED	DIR	BASELINE(M)	SPEED	DIR	LOCATION	SPEED	DIR	SPEED	DIR
7	0100-Alongshore			3	N							5	N
	Cross-shore			1	OF							3	OF
	Resultant			3	357							6	10
7	0700-Alongshore	12	N	6	N		0	0		0	0	9	N
	Cross-shore	11	Off	1	OF	126	5	Off	South			3	OF
	Resultant	16	22	6	352		5	70				9	358
7	1300-Alongshore			3	S							4	S
	Cross-shore			2	OF							0	
	Resultant			3	133							4	160
7	1900-Alongshore			0								2	S
	Cross-shore			0								1	ON
	Resultant			0	0							2	179
8	0100-Alongshore			3	S							6	S
	Cross-shore			1	OF							2	ON
	Resultant			3	149							6	176
8	0700-Alongshore	22	S	3	S		11	S		38	S	6	S
	Cross-shore	0	0	2	ON	128	0	0	North			4	ON
	Resultant	22	160	4	185		11	160				7	194
8	1300-Alongshore			12	S							25	S
	Cross-shore			2	ON							10	ON
	Resultant			13	170							27	182
8	1900-Alongshore			12	S							19	S
	Cross-shore			1	OF							4	ON
	Resultant			12	156							19	172
9	0100-Alongshore			4	S							2	S
	Cross-shore			1	OF							2	ON
	Resultant			4	141							3	204
9	0700-Alongshore	6	S	0			17	N		13	N	4	S
	Cross-shore	6	On	1	OF	137	0	0	North			2	OF
	Resultant	8	202	1	70		17	340				4	136
9	1300-Alongshore			4	S							4	S
	Cross-shore			1	ON							1	ON
	Resultant			4	182							4	170
9	1900-Alongshore			0								1	N
	Cross-shore			2	ON							1	ON
	Resultant			1	250							1	276
10	0100-Alongshore			1	S							3	S
	Cross-shore			1	ON							0	
	Resultant			1	203							3	160
10	0700-Alongshore	14	N	1	S		41	N		23	N	3	S
	Cross-shore	8	On	2	ON	141	0	0	South			2	ON
	Resultant	16	311	2	228		41	340				4	191
10	1300-Alongshore			0								4	S
	Cross-shore			1	ON							1	ON
	Resultant			1	250							4	169
10	1900-Alongshore			5	N							6	N
	Cross-shore			1	OF							3	OF
	Resultant			5	352							7	1
11	0100-Alongshore			7	N							8	N
	Cross-shore			2	OF							3	OF
	Resultant			7	353							9	2
11	0700-Alongshore	22	N	4	N		40	N		21	N	8	N
	Cross-shore	0	0	1	OF	152	0	0	South			4	OF
	Resultant	22	340	4	351		40	340				9	7
11	1300-Alongshore			3	N							4	N
	Cross-shore			1	OF							3	OF
	Resultant			3	357							4	17
11	1900-Alongshore			4	N							5	N
	Cross-shore			1	OF							3	OF
	Resultant			4	350							6	9
12	0100-Alongshore			5	N							7	N
	Cross-shore			1	OF							3	OF
	Resultant			5	347							7	2
12	0700-Alongshore	16	N	4	N		76	N		15	N	5	N
	Cross-shore	4	Off	0		140	38	Off	South			2	OF
	Resultant	17	354	4	340		85	7				5	1
12	1300-Alongshore			3	N							1	N
	Cross-shore			0								0	
	Resultant			3	340							1	340
12	1900-Alongshore			3	N							2	N
	Cross-shore			0								0	
	Resultant			3	340							2	340

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S =SOUTHWARD, SHORE PARALLEL
ON-ONSHORE
OF=OFFSHORE

TABLE 4: CURRENT DATA
(SPEEDS IN CM/SEC)

		PIER MEASUREMENTS								BEACH MEASUREMENTS (500 UPDRIFT)			CURRENT METER AT SOUTH TRIPOD (DEPTH -4.8m MSL) I.D.#679	
		DYE AT 19+00 (579m) (SURFACE)		CURRENT METER AT 14+20(433m) I.D.#639 (DEPTH -4.2m MSL)		DYE AT MID-SURF ZONE (SURFACE) DIST. FROM				DYE 12M OFFSHORE (SURFACE)				
DAY	TIME	SPEED	DIR	SPEED	DIR	BASELINE(M)	SPEED	DIR	LOCATION	SPEED	DIR	SPEED	DIR
13	0100-Alongshore			6	N							5	N
	Cross-shore			2	OF							5	OF
	Resultant			6	358							7	25
13	0700-Alongshore	15	N	3	N		55	2		79	N	2	N
	Cross-shore	0	0	0		140	0	0	South			1	OF
	Resultant	15	340	3	340		55	340				2	12
13	1300-Alongshore			5	N							1	N
	Cross-shore			1	OF							5	OF
	Resultant			5	352							5	64
13	1900-Alongshore			1	N							0	
	Cross-shore			0								1	ON
	Resultant			1	340							1	250
14	0100-Alongshore			7	N							7	N
	Cross-shore			3	OF							8	OF
	Resultant			8	360							10	26
14	0700-Alongshore	23	N	5	N		68	N		83	N	5	N
	Cross-shore	7	On	1	OF	152	20	On	South			3	OF
	Resultant	24	323	5	353		71	323				6	6
14	1300-Alongshore			6	N							5	N
	Cross-shore			3	OF							2	OF
	Resultant			7	2							5	4
14	1900-Alongshore			2	N							3	S
	Cross-shore			0								1	ON
	Resultant			2	340							3	172
15	0100-Alongshore			5	N							2	N
	Cross-shore			1	OF							2	OF
	Resultant			5	348							3	16
15	0700-Alongshore	20	S	1	N		22	S		21	S	7	S
	Cross-shore	9	On	0		146	29	On	North			0	
	Resultant	22	136	1	340		37	107				7	160
15	1300-Alongshore			10	S							27	S
	Cross-shore			7	ON							11	ON
	Resultant			12	195							30	183
15	1900-Alongshore			10	S							34	S
	Cross-shore			2	ON							12	ON
	Resultant			10	169							36	179
16	0100-Alongshore			4	S							23	S
	Cross-shore			2	ON							3	ON
	Resultant			4	183							23	168
16	0700-Alongshore	36	S	1	S		36	N		10	S	6	S
	Cross-shore	0	0	0		157	5	On	North			0	
	Resultant	36	160	1	160		36	331				6	160
16	1300-Alongshore			3	N							9	S
	Cross-shore			2	ON							7	ON
	Resultant			3	308							11	198
16	1900-Alongshore			2	N							2	S
	Cross-shore			2	ON							1	ON
	Resultant			3	306							2	195
17	0100-Alongshore			2	N							10	S
	Cross-shore			3	ON							9	ON
	Resultant			4	292							14	200
17	0700-Alongshore	8	N	3	N		10	0		52	S	1	N
	Cross-shore	21	On	1	ON	164	17	On	North			3	ON
	Resultant	22	271	3	316		20	219				3	266
17	1300-Alongshore			4	N							3	N
	Cross-shore			1	ON							2	ON
	Resultant			4	325							3	298
17	1900-Alongshore			3	N							1	S
	Cross-shore			2	ON							1	ON
	Resultant			4	306							1	201
18	0100-Alongshore			3	S							9	S
	Cross-shore			3	OF							1	ON
	Resultant			5	116							9	164
18	0700-Alongshore	34	S	3	S		55	S		43	S	8	S
	Cross-shore	14	Off	5	ON	128	6	Off	North			4	ON
	Resultant	36	138	5	218		56	154				10	188
18	1300-Alongshore			2	S							10	S
	Cross-shore			3	ON							4	ON
	Resultant			3	213							11	183
18	1900-Alongshore			3	N							10	S
	Cross-shore			2	OF							2	OF
	Resultant			4	17							10	151

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OF=OFFSHORE

TABLE 4: CURRENT DATA
(SPEEDS IN CM/SEC)

		PIER MEASUREMENTS								BEACH MEASUREMENTS (500 UPDRIFT)				
		DYE AT 19+00 (579m) (SURFACE)		CURRENT METER AT 14+20(433m) I.D.#639 (DEPTH -4.2m MSL)		DYE AT MID-SURF ZONE (SURFACE) DIST. FROM				DYE 12M OFFSHORE (SURFACE)			CURRENT METER AT SOUTH TRIPOD (DEPTH -4.8m MSL) I.D.#679	
DAY	TIME	SPEED	DIR	SPEED	DIR	BASELINE(M)	SPEED	DIR	LOCATION	SPEED	DIR	SPEED	DIR
19	0100-Alongshore			6	N							5	N
	Cross-shore			1	ON							0	
	Resultant			6	334							5	340
19	0700-Alongshore	30	S	2	S		13	S		7	S	6	S
	Cross-shore	3	Off	5	ON	128	1	Off	North			4	ON
	Resultant	31	154	5	227		13	154				7	195
19	1300-Alongshore			2	N							7	S
	Cross-shore			0								1	OF
	Resultant			2	340							7	148
19	1900-Alongshore			12	N							9	N
	Cross-shore			3	OF							5	OF
	Resultant			12	353							10	7
20	0100-Alongshore			9	N							9	N
	Cross-shore			1	OF							3	OF
	Resultant			9	348							9	358
20	0700-Alongshore	16	N	7	N		44	N		41	N	5	N
	Cross-shore	10	Off	0		128	13	Off	South			2	OF
	Resultant	19	11	7	340		46	357				5	360
20	1300-Alongshore			10	N							6	N
	Cross-shore			2	OF							3	OF
	Resultant			10	350							6	8
20	1900-Alongshore			15	N							14	N
	Cross-shore			3	OF							6	OF
	Resultant			15	353							16	4
21	0100-Alongshore			9	N							9	N
	Cross-shore			0								2	OF
	Resultant			9	340							9	350
21	0700-Alongshore	29	N	11	N		23	N		43	N	1	N
	Cross-shore	6	On	1	OF	140	45	Off	South			5	OF
	Resultant	30	329	11	347		50	43				5	56
21	1300-Alongshore			9	N							3	N
	Cross-shore			1	OF							2	OF
	Resultant			9	343							4	9
21	1900-Alongshore			14	N							8	N
	Cross-shore			4	OF							2	OF
	Resultant			14	355							8	358
22	0100-Alongshore			9	N							2	N
	Cross-shore			1	OF							2	OF
	Resultant			9	344							3	28
22	0700-Alongshore	12	N	6	N		22	N		36	N	1	N
	Cross-shore	9	On	0		128	0	0	South			4	OF
	Resultant	15	303	6	340		22	340				4	55
22	1300-Alongshore			8	N							6	N
	Cross-shore			1	OF							7	OF
	Resultant			8	344							9	28
22	1900-Alongshore			10	N							11	N
	Cross-shore			1	OF							8	OF
	Resultant			10	348							14	14
23	0100-Alongshore			6	N							0	
	Cross-shore			0								2	OF
	Resultant			6	340							2	70
23	0700-Alongshore	15	N	5	N		21	N		20	N	1	N
	Cross-shore	2	On	1	ON	130	6	Off	South			1	OF
	Resultant	15	331	5	332		22	357				1	35
23	1300-Alongshore			4	N							9	S
	Cross-shore			0								2	ON
	Resultant			4	340							9	174
23	1900-Alongshore			1	N							11	S
	Cross-shore			3	ON							4	ON
	Resultant			3	275							12	179
24	0100-Alongshore			3	S							20	S
	Cross-shore			5	ON							10	ON
	Resultant			6	217							22	186
24	0700-Alongshore	51	S	5	S		76	S		101	S	21	S
	Cross-shore	18	On	6	ON	164	53	On	North			6	ON
	Resultant	54	179	8	208		93	195				22	176
24	1300-Alongshore			1	S							15	S
	Cross-shore			5	ON							11	ON
	Resultant			5	244							19	196
24	1900-Alongshore			2	S							15	S
	Cross-shore			4	ON							9	ON
	Resultant			5	219							18	189

KEY = ALL SPEEDS IN CM/SEC
N =NORTHWARD, SHORE PARALLEL
S =SOUTHWARD, SHORE PARALLEL
ON=ONSHORE
OF=OFFSHORE

		PIER MEASUREMENTS								BEACH MEASUREMENTS (500 UPDRIFT)				
		DYE AT 19+00 (579m) (SURFACE)		CURRENT METER AT 14+20(433m) I.D.#639 (DEPTH -4.2m MSL)		DYE AT MID-SURF ZONE (SURFACE) DIST. FROM				DYE 12M OFFSHORE (SURFACE)			CURRENT METER AT SOUTH TRIPOD (DEPTH -4.8m MSL) I.D.#679	
DAY	TIME	SPEED	DIR	SPEED	DIR	BASELINE(M)	SPEED	DIR	LOCATION	SPEED	DIR	SPEED	DIR
25	0100-Alongshore			7	S							25	S
	Cross-shore			9	ON							15	ON
	Resultant			11	212							30	191
25	0700-Alongshore	61	S	7	S		87	S		67	S	18	S
	Cross-shore	9	On	4	ON	176	22	On	North			11	ON
	Resultant	62	169	8	194		90	174				21	191
25	1300-Alongshore			3	S							16	S
	Cross-shore			6	ON							11	ON
	Resultant			7	224							20	196
25	1900-Alongshore			0								7	S
	Cross-shore			5	ON							5	ON
	Resultant			5	250							9	196
26	0100-Alongshore			3	N							1	S
	Cross-shore			4	ON							3	ON
	Resultant			6	288							3	227
26	0700-Alongshore	16	S	3	N		87	S		22	S	4	N
	Cross-shore	0	0	1	ON	150	0	0	North			4	OF
	Resultant	16	160	4	321		87	160				5	30
26	1300-Alongshore			3	N							5	S
	Cross-shore			0								1	OF
	Resultant			3	340							5	150
26	1900-Alongshore			4	N							3	S
	Cross-shore			3	ON							2	ON
	Resultant			5	303							4	197
27	0100-Alongshore			6	N							4	N
	Cross-shore			0								2	OF
	Resultant			6	340							4	7
27	0700-Alongshore	9	N	9	N		17	N		27	N	3	N
	Cross-shore	12	Off	1	OF	152	5	Off	South			1	OF
	Resultant	15	33	9	343		18	357				3	358
27	1300-Alongshore			6	N							1	N
	Cross-shore			0								1	OF
	Resultant			6	340							1	26
27	1900-Alongshore			7	N							0	
	Cross-shore			0								2	ON
	Resultant			7	340							2	250
28	0100-Alongshore			8	N							8	N
	Cross-shore			1	OF							0	
	Resultant			8	344							8	340
28	0700-Alongshore	16	N	9	N		5	N		22	N	6	N
	Cross-shore	14	Off	1	OF	140	7	Off	South			0	
	Resultant	22	22	9	343		9	36				6	340
28	1300-Alongshore			7	N							6	N
	Cross-shore			0								1	OF
	Resultant			7	340							6	350
28	1900-Alongshore			7	N							0	
	Cross-shore			0								0	
	Resultant			7	340							0	0
29	0100-Alongshore			11	N							5	N
	Cross-shore			2	OF							0	
	Resultant			12	349							5	340
29	0700-Alongshore	2	N	5	N		19	N		30	S	2	S
	Cross-shore	4	Off	1	OF	130	6	On	North			0	
	Resultant	4	40	5	346		20	323				2	160
29	1300-Alongshore			3	S							12	S
	Cross-shore			4	ON							7	ON
	Resultant			5	216							14	188
29	1900-Alongshore			12	S							24	S
	Cross-shore			7	ON							11	ON
	Resultant			14	189							26	184
30	0100-Alongshore			5	S							18	S
	Cross-shore			4	ON							6	ON
	Resultant			6	194							19	177
30	0700-Alongshore	51	S	3	S		76	S		59	S	16	S
	Cross-shore	15	On	4	ON	152	11	On	North			8	ON
	Resultant	53	172	5	210		77	169				18	185
30	1300-Alongshore			2	S							18	S
	Cross-shore			1	OF							6	ON
	Resultant			3	141							19	179
30	1900-Alongshore			3	S							18	S
	Cross-shore			1	ON							10	ON
	Resultant			3	175							20	189
31	0100-Alongshore			1	N							6	S
	Cross-shore			0								4	ON
	Resultant			1	340							7	191
31	0700-Alongshore	5	S	5	N		18	S		38	S	3	S
	Cross-shore	1	On	1	ON	140	31	Off	North			1	ON
	Resultant	5	169	5	330		36	100				3	186
31	1300-Alongshore			8	N							9	N
	Cross-shore			0								3	OF
	Resultant			8	340							9	357
31	1900-Alongshore			9	N							6	N
	Cross-shore			0								0	
	Resultant			9	340							6	340

KEY = ALL SPEEDS IN CM/SEC
N =NORTHWARD, SHORE PARALLEL
S =SOUTHWARD, SHORE PARALLEL
ON=ONSHORE
OF=OFFSHORE

V. SUPPLEMENTAL OBSERVATIONS

Visual wave direction measurements (Table 5) taken at the seaward end of the pier are made of both the primary wave train (i.e. that having the larger wave heights) and the secondary wave train (which must be clearly distinguishable as a wave train separate from the primary waves) but not surface chop or capillary waves. The direction of the primary wave train just north of the seaward end of the pier is also determined using a Raytheon Marine Pathfinder radar and measuring alignment of the wave crests. The pier axis (considered perpendicular to the beach at the FRF) is orientated 70° east of true north; consequently, wave angles greater than 70° imply the waves were coming from the south side of the pier.

The width of the surf zone (seawardmost breaker position to shoreline) is determined from the pier deck.

Measurements of surface water temperature, density, and visibility are made daily at the seaward end of the FRF pier. A jar along with a thermometer is lowered about .3 m (1 ft) into the water and allowed to remain for at least one minute. The jar is removed, the temperature read and a hydrometer is used to determine the density. A secci disc is used to determine the surface visibility.

SUPPLEMENTAL OBSERVATIONS

May 1985

DAY	TIME	WAVE APPROACH ANGLE AT PIER END (° from True N) PRIMARY	SECONDARY	RADAR WAVE ANGLE (° from True N)	WIDTH OF SURF ZONE (M)	WATER CHARACTERISTICS AT PIER END TEMP (°C)	DENSITY (g/cc)	SECCI VIS (M)
1	0700	120	35	–	17	17.3	1.0225	2.1
2	0730	120	–	–	35	14.0	1.0251	2.4
3	0730	100	–	–	37	13.6	1.0255	2.4
4	0900	60	–	70	149	12.8	1.0258	0.9
5	0900	75	–	–	119	13.8	1.0256	1.5
6	0830	130	–	–	23	13.3	1.0255	1.8
7	0715	150			9	14.0	1.0255	2.7
8	0700	55	–	–	55	15.0	1.0254	2.7
9	0800	108	–	–	57	17.3	1.0214	3.0
10	0800	117	–	–	62	16.8	1.0238	6.1
11	0830	95	–	–	91	15.8	1.0250	3.0
12	0900	90	–	–	84	14.0	1.0258	3.0
13	0830	85	–	–	79	15.0	1.0260	3.0
14	0745	130	–	–	62	15.8	1.0253	3.4
15	0800	45	–	–	114	17.7	1.0247	4.9
16	0630	85	110	–	119	19.4	1.0204	2.1
17	1100	95	–	–	87	16.9	1.0248	1.8
18	0900	10	–	–	18	17.8	1.0242	1.2
19	0845	30	–	–	30	17.9	1.0240	2.1
20	0830	100	–	–	37	18.8	1.0240	3.4
21	0700	105	–	–	36	18.5	1.0240	3.3
22	0730	85	100	–	28	17.9	1.0246	3.0
23	0700	60	80	–	35	19.5	1.0240	3.9
24	0700	50	–	50	82	19.9	1.0215	3.0
25	1015	50	–	60	234	18.9	1.0221	1.8
26	0830	60	–	50	81	18.9	1.0225	2.1
27	0615	75	–	–	30	19.0	1.0228	1.5
28	0645	90	–	–	24	18.5	1.0240	1.8
29	0700	95	–	–	18	18.5	1.0238	4.0
30	0700	45	–	60	77	18.5	1.0235	2.1
31	0700	60	–	–	41	20.3	1.0208	2.4

VI. WATER LEVELS

The National Ocean Services (NOS) has established a primary tide station (No. 865-1370) at the seaward end of the FRF pier. A Leupold-Stevens digital recording float-type tide gage is used to collect data every 6 minutes throughout the month.

Figure 4 shows the range of each cycle while Figure 5 shows the variation in mean water levels computed over a tidal cycle period (12.42 hours), and contains a list of selected mean and extreme values. This presentation is useful in identifying effects on both meteorological and astronomical forces on the open coast water levels.

Table 6 contains the time of the center of each sampling interval and the range, high, low, and mean water levels during each tidal cycle.

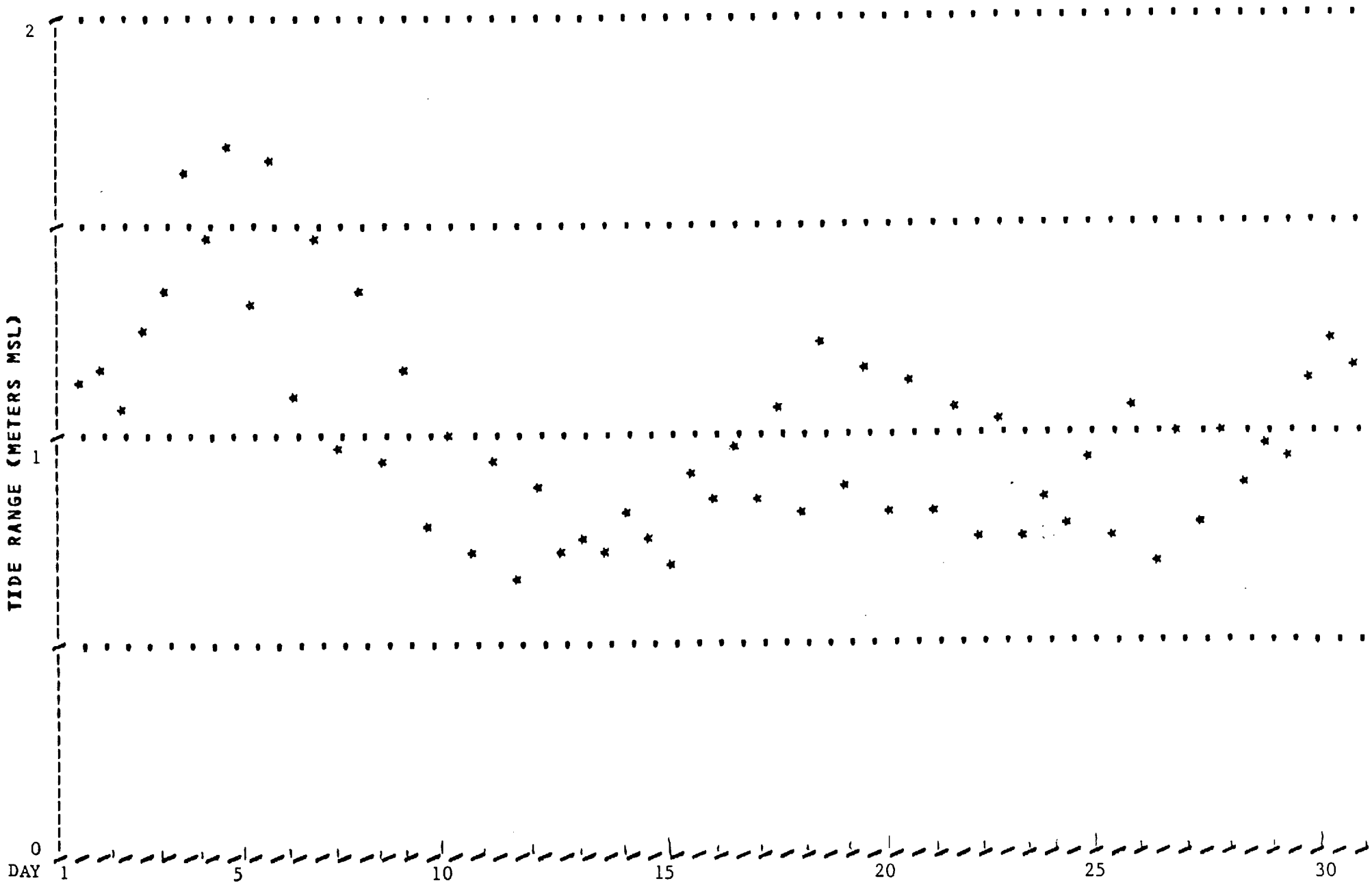

FIGURE 4. Time History of Tide Range, May 1985 (Gage No. 865-1370)

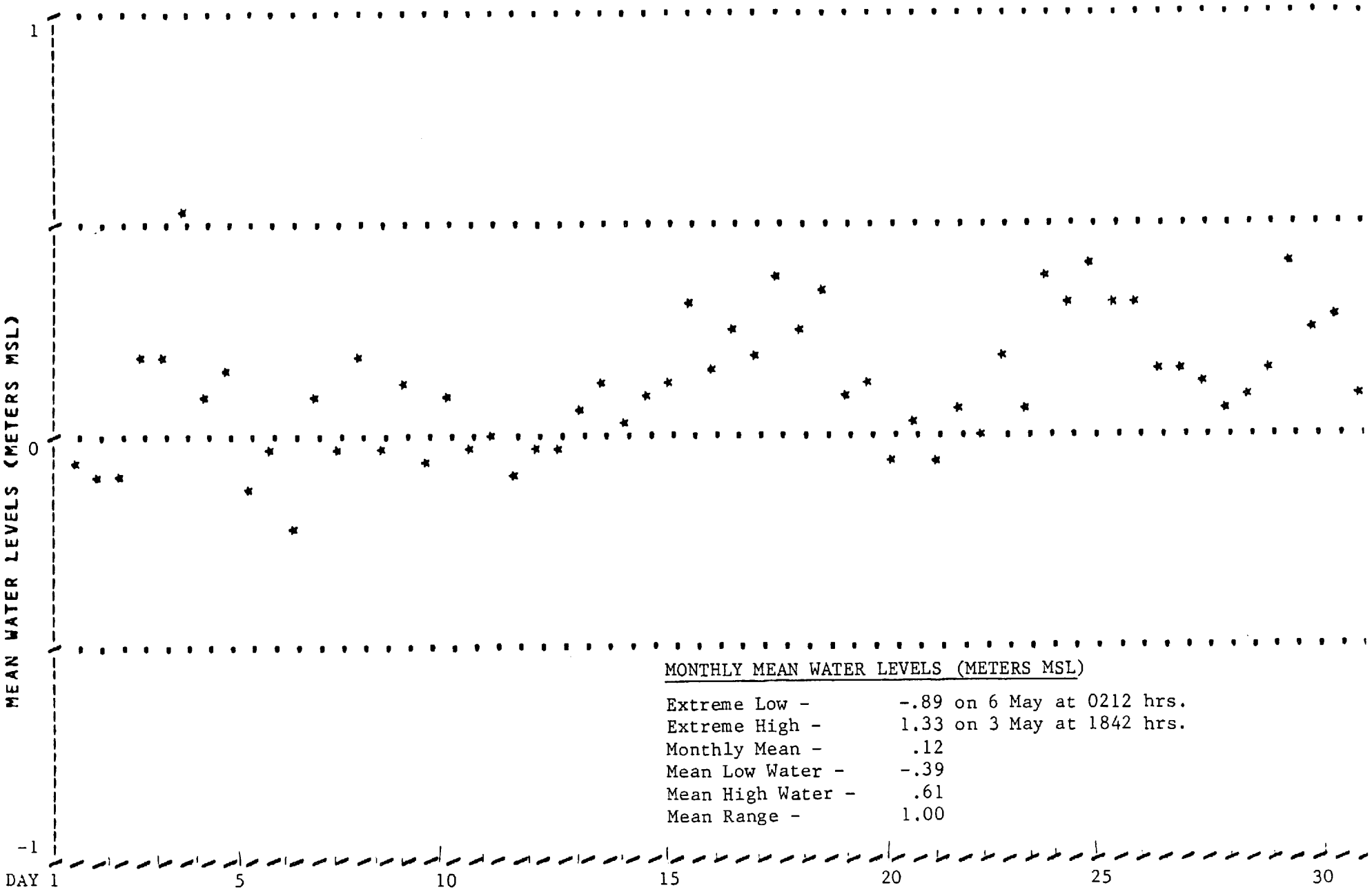

FIGURE 5. Time History of Mean Water Levels, May 1985 (Gage No. 865-1370)

TABLE 6
WATER LEVELS (METERS MSL)
Tidal Characteristics
May 1985

MID-DAY	CYCLE TIME	LOW	HIGH	MEAN	RANGE
1	612	-.67	.45	-.08	1.12
1	1837	-.68	.46	-.09	1.15
2	702	-.64	.43	-.09	1.07
2	1928	-.45	.80	.18	1.25
3	753	-.56	.78	.19	1.34
3	2018	-.30	1.33	.52	1.63
4	843	-.65	.81	.10	1.46
4	2108	-.71	.97	.14	1.67
5	934	-.77	.55	-.13	1.32
5	2159	-.89	.76	-.04	1.65
6	1024	-.74	.35	-.22	1.09
6	2249	-.65	.82	.09	1.47
7	1114	-.50	.48	-.04	.98
7	2340	-.49	.86	.20	1.35
8	1205	-.49	.46	-.02	.95
9	30	-.47	.69	.12	1.16
9	1255	-.43	.35	-.05	.78
10	120	-.42	.57	.10	.99
10	1346	-.40	.33	-.05	.73
11	211	-.48	.46	.01	.94
11	1436	-.44	.22	-.10	.66
12	301	-.49	.37	-.04	.86
12	1526	-.41	.31	-.05	.72
13	352	-.33	.44	.06	.76
13	1617	-.23	.48	.12	.71
14	442	-.39	.43	.04	.83
14	1707	-.29	.47	.09	.76
15	532	-.22	.46	.12	.69
15	1758	-.15	.75	.32	.90
16	623	-.26	.57	.17	.83
16	1848	-.24	.72	.24	.96
17	713	-.22	.64	.20	.86
17	1938	-.17	.90	.38	1.07
18	804	-.17	.65	.23	.82
18	2029	-.28	.93	.36	1.21
19	854	-.33	.54	.10	.87
19	2119	-.49	.67	.11	1.16
20	944	-.48	.33	-.08	.80
20	2210	-.54	.58	.02	1.12
21	1035	-.48	.33	-.07	.80
21	2300	-.46	.61	.08	1.06
22	1125	-.37	.39	.01	.76
22	2350	-.34	.69	.18	1.03
23	1216	-.30	.45	.07	.75
24	41	-.05	.80	.37	.85
24	1306	-.09	.68	.31	.77
25	131	-.07	.88	.42	.95
25	1356	-.08	.67	.31	.75
26	222	-.24	.81	.31	1.05
26	1447	-.19	.51	.16	.70
27	312	-.33	.66	.16	.99
27	1537	-.26	.51	.13	.77
28	402	-.45	.54	.07	.99
28	1628	-.34	.54	.10	.88
29	453	-.36	.60	.15	.96
29	1718	-.07	.87	.40	.94
30	543	-.32	.80	.26	1.12
30	1808	-.33	.88	.29	1.21
31	634	-.52	.63	.09	1.16

VII. NEARSHORE PROFILES

A. Nearshore Profiles. In order to document profile response away from the pier, surveys of four profile lines extending 900 to 1,000 m from shore and located 489 and 581 m north and 517 and 608 m south of the FRF pier are conducted bi-weekly, after storms, and during more complete bathymetric surveys.

These profiles are obtained using the CRAB-Zeiss surveying system; a Zeiss Elta-2 first-order, self-recording electronic theodolite distance meter in combination with the Coastal Research Amphibious Buggy (CRAB), a 10.7 m high, self-powered, mobile tripod on wheels.

Figure 6 shows the last survey in April and the two surveys taken during May on profile line 188, located 517 m south of the pier. The May surveys show only minor changes to the profile. These include a 30 m shoreward migration of the nearshore bar (120 to 160 m) and 40 m of shoreward movement of the outer bar (320 m).

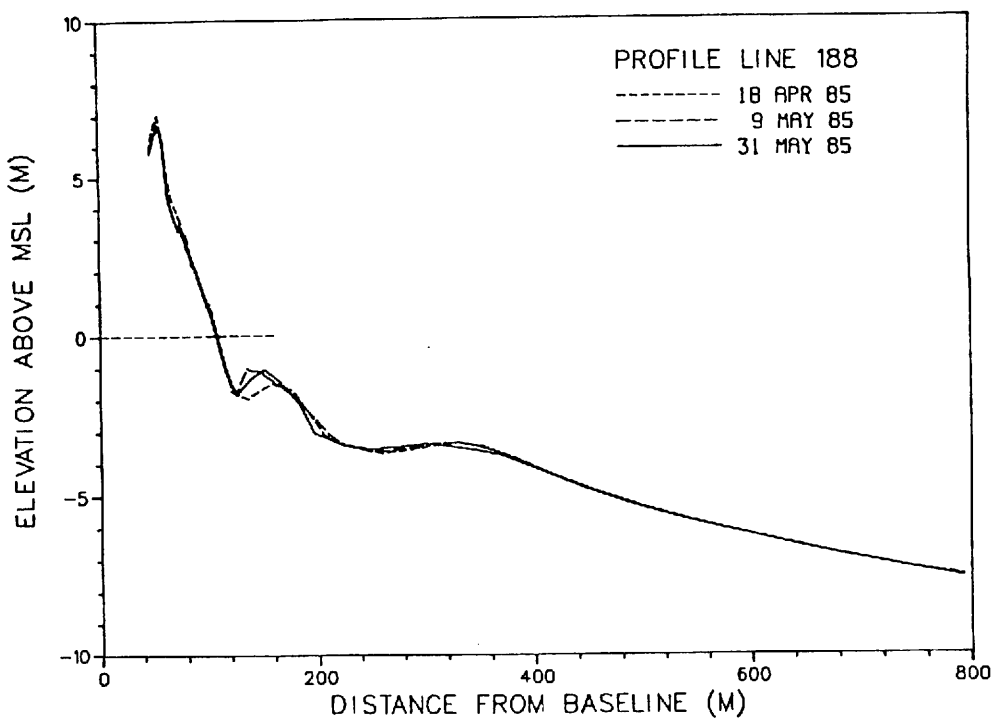

Figure 6. Monthly CRAB profiles on profile 188 - 517 meters south of pier.

The profile envelope (Figure 7) reflects the maximum changes which occurred on the profile between January and May. The major change (150 m) is a result of the growth and shoreward migration of the nearshore bar.

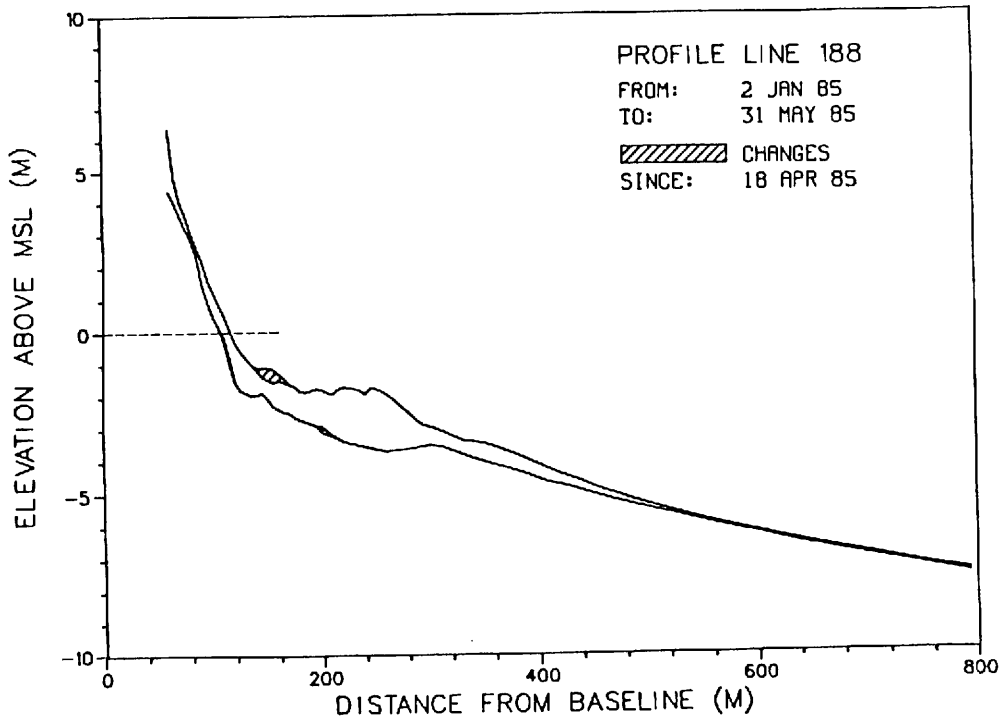

Figure 7. CRAB profile envelope - profile 188.

B. Bathymetry. There was no bathymetric survey conducted during May; however, the April survey is included for reference.

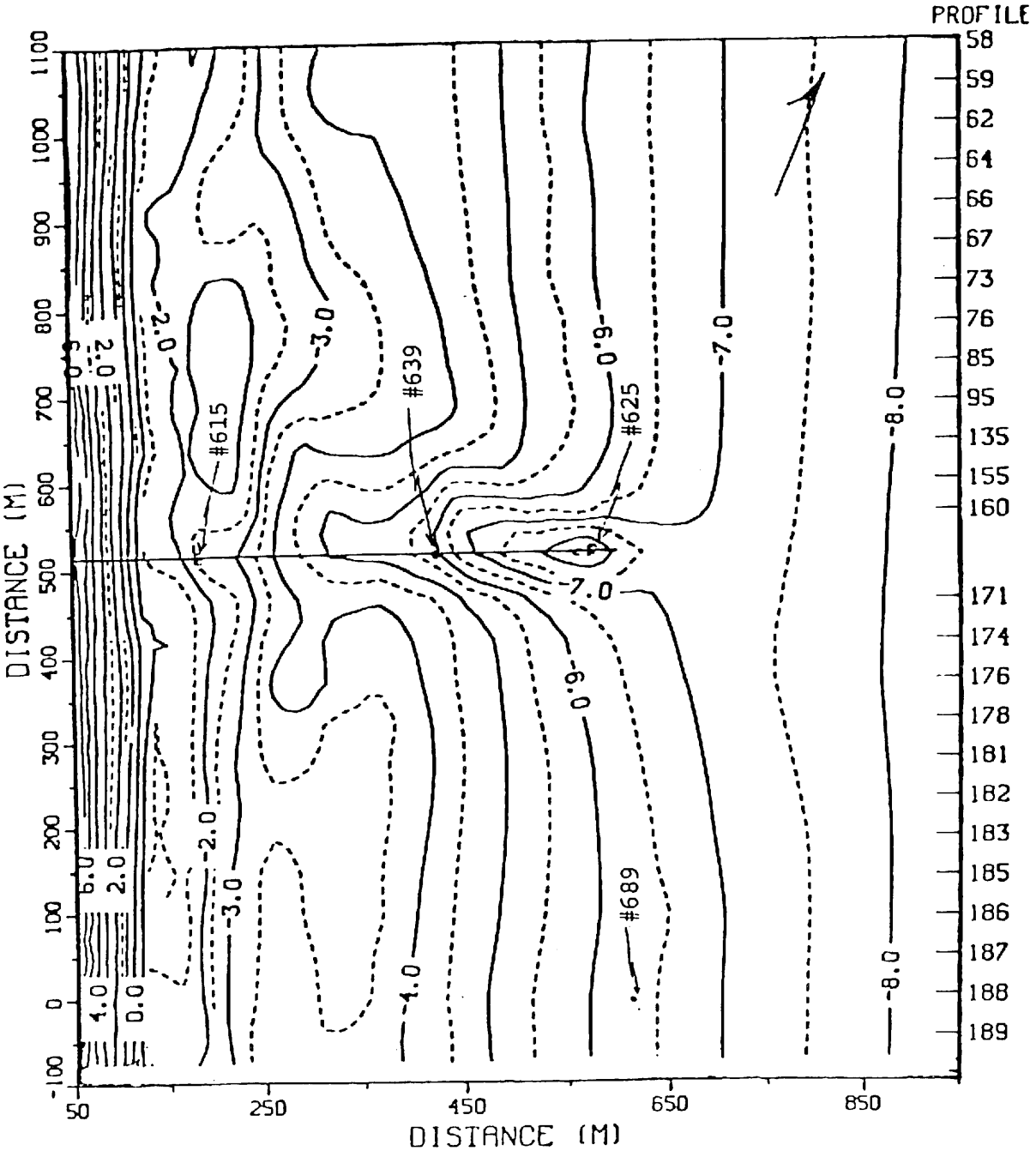

FIGURE 8. FRF BATHYMETRY 23 APR 85
CONTOURS IN METERS

VIII. SPECIAL EVENTS

A. Storm Data Collection. The following list identifies times when the wave height at the seaward end of the pier (i.e. as measured by the Baylor gage #625 at pier station 19+00) exceeded 2 m and wave records were obtained every hour:

START	END
3 May (1900)	4 May (0100)

Distribution List

Government Agencies:

OCE
BERH
NAO
NASA/Wallops Flight Center
NOAA (NOS, NWS)
SAD
SAW
U.S. Geological Survey
U.S. National Park Service
U.S. Naval Academy
U.S. Naval Civil Eng. Lab
U.S. Naval Facilities Eng. Com.
U.S. Naval Research Lab

Colleges/Universities:

California Inst. of Tech.
Duke University
East Carolina University
Florida Inst. of Tech.
Louisiana State University
NC State University
Old Dominion University
Oregon State University
Prince George's College
Rutgers University
Scripps Inst. of Oceanography
Stockton State College
Texas A&M University
University of Akron
University of Delaware
University of Florida
University of Maryland
University of North Carolina
University of Northern Colorado
University of Rhode Island
University of Virginia
Virginia Inst. of Marine Science

Others:

City of Va. Beach, VA
Coastal Barge Corporation
Coastal and Est. Res., Inc.
Dr. Galvin
GEOMET, Inc.
Greenhorne & O'Mara, Inc.
Dr. Hylton
Ms. Johnson
Mary Marr, Inc.
Masonite Corporation
Moffatt & Nichol, Eng.
Offshore Coastal Technologies
Research Planning Institute, Inc.
Mr. Rowland
Mr. Savage
Sea Port Supply Corp.
Shell Development
Sohio Petroleum Co.
Mr. & Mrs. Valpey

Foreign:

W. F. Baird & Asso. Coastal Engineers, Ltd (Canada)
Ministry of Construction, Coastal Division (Japan)
Norwegian Hydrodynamic Laboratories (Norway)
University of New South Wales (Australia)
University of Sydney (Australia)