PRELIMINARY DATA SUMMARY

February 1986

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

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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. Herman C. Miller at (919) 261-3511.

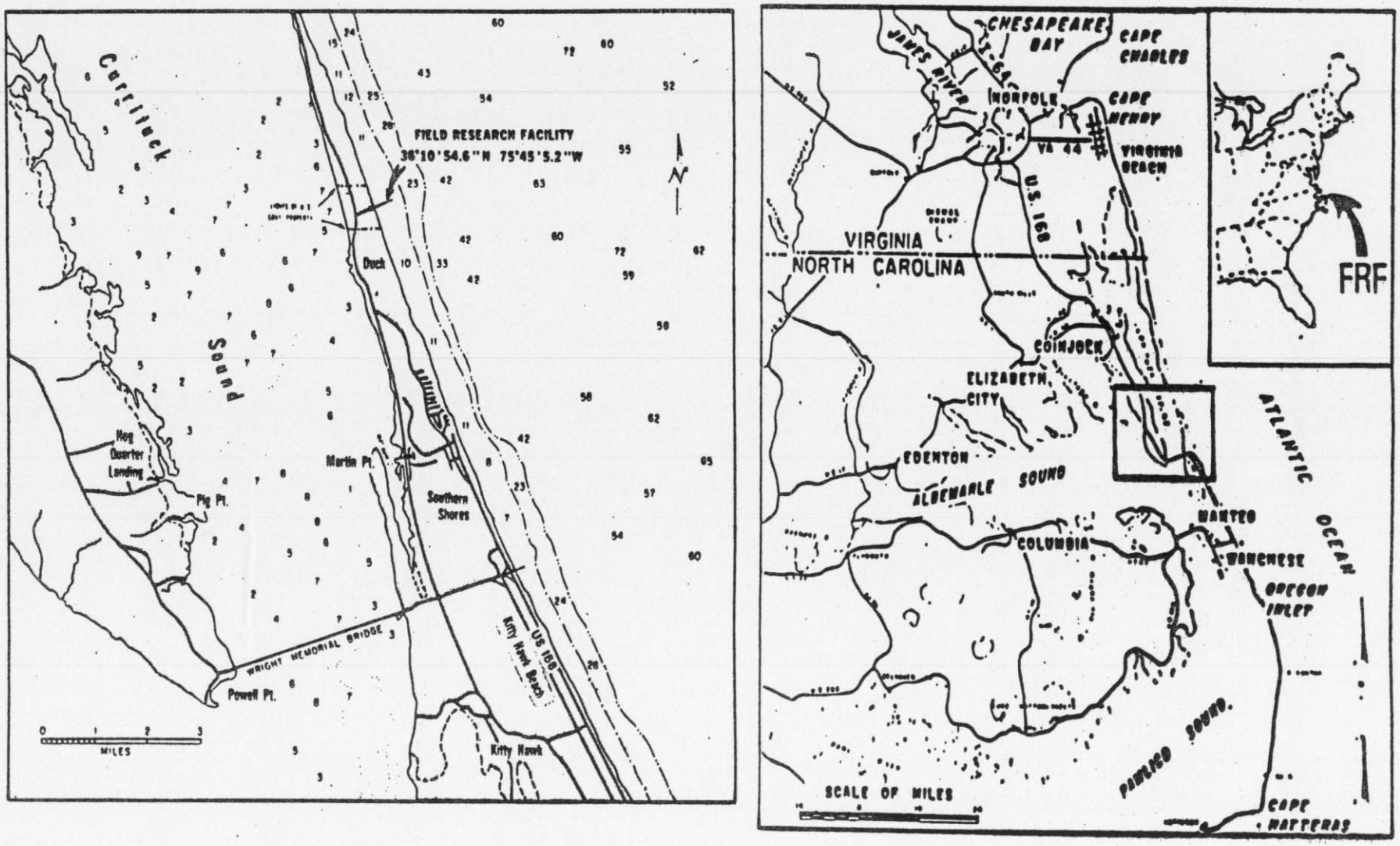
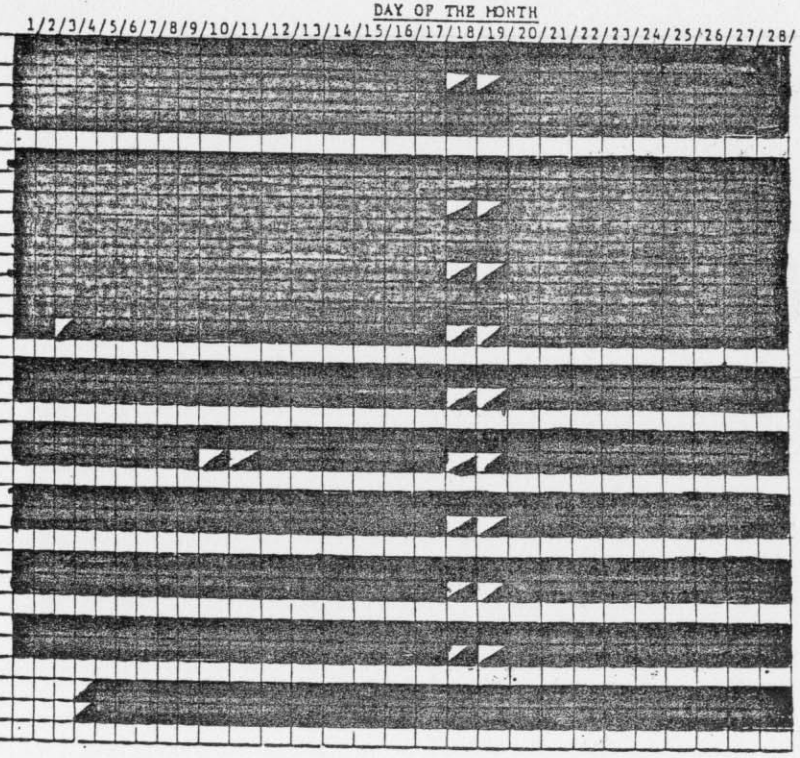


Figure 1. FRF Location Map

TABLE 1
Instrument Status/Data Availability
February 1986

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
865-1370	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 ◪

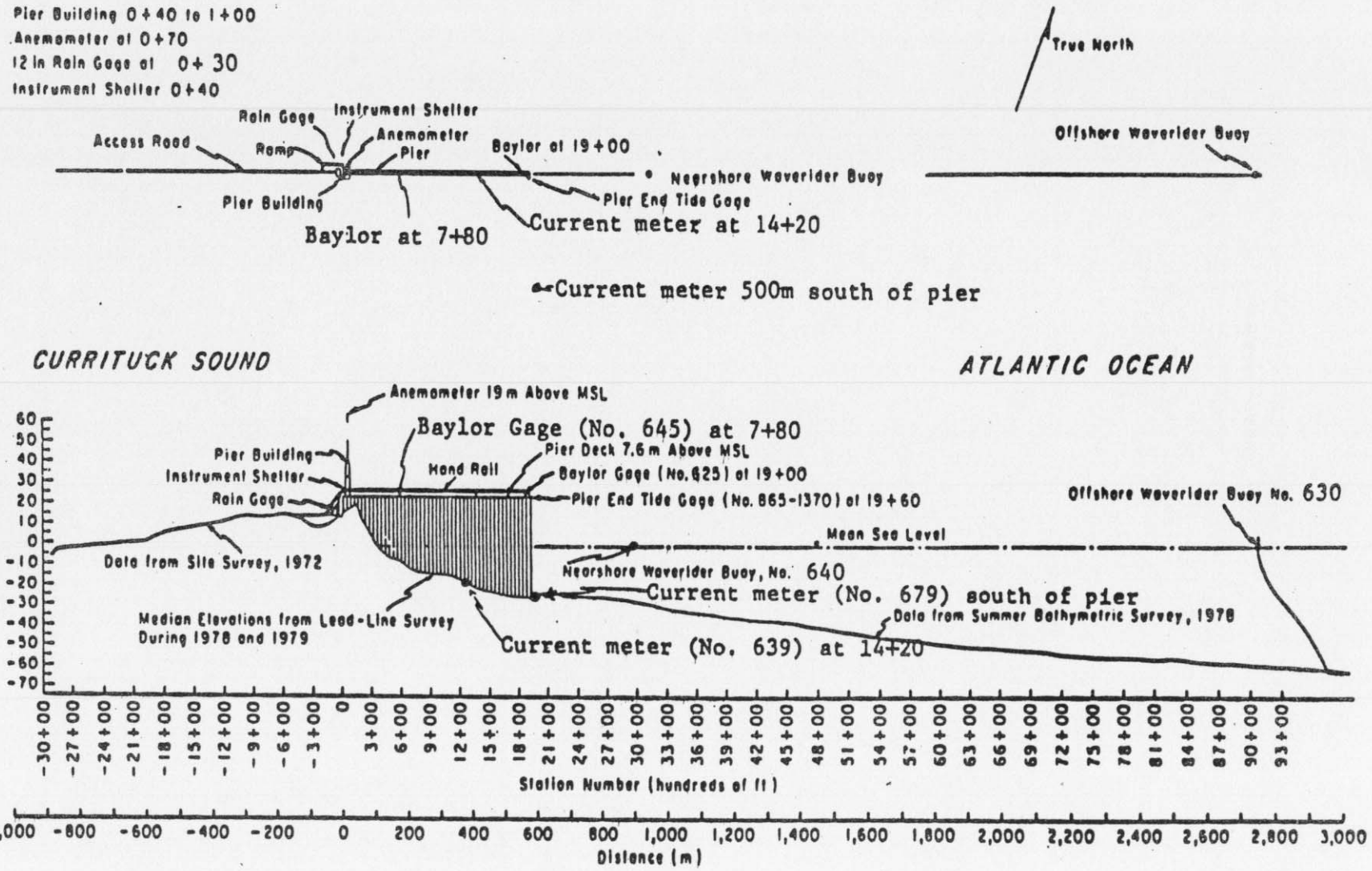


Figure 2. Instrument locations at FRF.

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 (C) to degrees Fahrenheit (F) -
   (C x 9/5) + 32 = F

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

TABLE 2: METEOROLOGICAL DATA

PART 1

FEBRUARY 1986

DAY	HOUR	WIND SPEED (M/S)	WIND DIRECTION (DEG TN)	TEMPERATURE (DEG C)	ATM PRESSURE (MB)	PRECIPITATION (MM)
1	100	2	188	1.6	1031.7	0
	700	0		3.5	1033.9	0
	1300	5	144	8.4	1032.9	0
	1900	4	143	6.2	1031.2	0
2	100	5	191	10.0	1028.1	0
	700	7	216	9.9	1025.3	0
	1300	7	245	14.5	1021.8	0
	1900	4	244	12.8	1020.3	0
3	100	3	261	11.4	1020.1	0
	700	6	8	7.7	1021.0	0
	1300	7	4	7.8	1022.5	0
	1900	5	21	7.2	1022.2	0
4	100	7	73	8.1	1020.4	0
	700	0		9.4	1018.8	0
	1300	4	255	10.9	1017.6	0
	1900	4	139	8.7	1015.7	0
5	100	5	213	11.9	1013.7	0
	700	7	215	12.3	1013.0	0
	1300	9	243	16.8	1009.2	0
	1900	7	256	14.3	1009.7	0
6	100	4	216	12.7	1011.2	0
	700	3	240	11.0	1013.6	0
	1300	7	15	8.4	1015.6	0
	1900	12	75	9.5	1012.7	0
7	100	6	74	10.1	1008.7	0
	700	4	310	10.6	1008.8	0
	1300	6	350	6.8	1011.9	0
	1900	3	322	5.2	1015.2	0
8	100	3	5	3.9	1017.7	0
	700	3	34	3.5	1019.3	0
	1300	3	37	3.9	1019.4	0
	1900	6	28	4.7	1018.9	0
9	100	7	10	5.6	1018.5	0
	700	8	2	5.0	1020.1	0
	1300	5	1	7.7	1020.3	0
	1900	4	7	6.0	1019.9	0
10	100	3	1	6.5	1018.9	0
	700	5	357	5.7	1018.0	0
	1300	7	11	7.5	1015.5	0
	1900	9	13	6.6	1013.9	0
11	100	5	21	6.6	1009.4	0
	700	3	359	6.3	1003.6	6
	1300	12	353	4.0	1006.2	0
	1900	8	336	.6	1013.2	0
12	100	6	338	.6	1016.0	0
	700	4	330	-.2	1019.4	0
	1300	4	350	1.4	1020.5	0
	1900	3	315	.5	1020.7	0
13	100	3	336	-1.0	1021.2	0
	700	9	356	-1.6	1022.8	0
	1300	9	331	-1.2	1024.4	0
	1900	5	323	-1.9	1027.2	0
14	100	3	305	-3.0	1028.2	0
	700	3	170	-2.5	1026.9	0
	1300	6	225	3.7	1022.2	0
	1900	0		4.4	1016.6	0
15	100	4	356	3.6	1010.8	0
	700	7	332	.7	1010.9	0
	1300	9	330	3.5	1016.2	0
	1900	3	8	2.5	1019.1	0
16	100	1	253	1.6	1022.3	4
	700	0		-.2	1024.7	0
	1300	4	200	9.0	1023.6	0
	1900	5	180	8.3	1021.3	0

TABLE 2: METEOROLOGICAL DATA

PART 2

FEBRUARY 1986

DAY	HOUR	WIND SPEED (M/S)	WIND DIRECTION (DEG TN)	TEMPERATURE (DEG C)	ATM PRESSURE (MB)	PRECIPITATION (MM)
17	100	4	194	9.1	1020.9	0
	700	4	199	10.4	1020.6	0
	1300	7	204	18.7	1017.2	0
	1900	5	195	15.2	1016.7	0
18	100	5	200	15.2	1014.8	0
	700	4	181	15.2	1011.7	0
	1300	5	211	17.1	1001.9	0
	1900				1004.6	0
19	100	Operator Error			1007.3	0
	700	3	137	6.7	1010.7	0
	1300	4	140	8.9	1008.7	3
	1900	4	138	7.9	1006.0	0
20	100	5	75	7.5	1006.0	0
	700	6	333	9.0	1010.9	0
	1300	9	3	7.1	1012.7	0
	1900	5	338	8.9	1015.1	0
21	100	2	333	8.4	1015.6	0
	700	1	146	7.2	1013.9	0
	1300	4	213	13.9	1011.7	0
	1900	6	206	16.3	1009.1	0
22	100	8	6	7.1	1014.6	0
	700	9	7	5.3	1017.7	0
	1300	7	27	6.4	1016.9	0
	1900	8	4	6.1	1014.7	5
23	100	8	324	5.5	1011.5	0
	700	10	351	4.5	1013.0	0
	1300	12	357	6.1	1014.5	0
	1900	7	25	5.7	1016.6	0
24	100	7	37	5.1	1017.3	0
	700	5	40	4.9	1017.4	0
	1300	5	26	6.5	1014.6	0
	1900	7	61	5.9	1009.3	0
25	100	12	357	3.2	1007.5	4
	700	14	356	2.9	1008.7	0
	1300	10	339	2.7	1009.9	0
	1900	6	326	2.8	1011.4	0
26	100	8	337	.6	1012.2	0
	700	5	320	-.8	1012.2	0
	1300	3	231	3.7	1009.4	0
	1900	5	194	4.1	1006.0	0
27	100	7	142	5.4	1000.1	0
	700	4	270	6.8	997.0	0
	1300	7	351	5.1	995.2	0
	1900	7	342	3.3	1003.5	0
28	100	3	338	1.9	1009.0	4
	700	3	332	2.1	1012.2	0
	1300	9	9	3.6	1012.8	0
	1900	9	11	1.3	1014.5	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

FEBRUARY 1986

GAGE		645		625		640		630	
		Baylor at 7+80		Baylor at 19+00		Nearshr Wvrdr		Farshr Wvrdr	
DAY	TIME	Hmo(m)	T(sec)	Hmo(m)	T(sec)	Hmo(m)	T(sec)	Hmo(m)	T(sec)
1	1	.32	9.75	.64	8.83	.73	8.83	.72	8.83
	7	.34	10.89	.74	8.83	.71	10.89	.74	10.89
	13	.30	9.75	.65	9.75	.70	9.75	.65	8.83
	19	.34	10.89	.69	10.89	.66	10.89	.54	10.89
2	1	.33	12.34	.54	9.75	.61	9.75	.60	10.89
	7	.32	10.89	.70	9.75	.63	10.89	.72	9.75
	13	.27	10.89	.54	10.89	.55	10.89	.67	10.89
	19	.29	10.89	.55	10.89	.53	10.89	.61	10.89
3	1	.31	9.75	.40	10.89	.52	10.89	.56	9.75
	7	*		.57	10.89	.54	10.89	.62	10.89
	13	.59	4.13	.84	9.75	.91	9.75	.90	10.89
	19	.70	10.89	.99	10.89	.83	5.31	.96	5.63
4	1	.75	4.53	1.03	6.40	1.05	6.40	1.20	6.40
	7	.62	5.31	1.04	4.76	.97	5.99	1.12	5.63
	13	.55	5.31	.93	5.63	.97	5.02	1.07	6.40
	19	.35	5.63	.70	5.99	.70	10.89	.77	5.31
5	1	.45	5.02	.59	9.75	.64	5.31	.68	5.99
	7	.29	4.76	.45	10.89	.50	9.75	.67	10.89
	13	.27	5.02	.38	10.89	.39	9.75	.62	10.89
	19	.30	5.31	.41	10.89	.42	9.75	.62	8.83
6	1	.31	5.31	.45	10.89	.44	9.75	.50	6.40
	7	.30	8.06	.38	8.83	.41	8.06	.55	8.06
	13	.61	2.62	.64	2.78	.53	8.06	.55	6.87
	19	1.12	5.63	1.29	5.63	1.29	5.63	1.43	5.63
7	1	1.03	7.42	1.69	6.87	1.62	6.87	1.81	6.87
	7	1.05	8.06	1.38	7.42	1.29	6.87	1.47	8.06
	13	.97	8.83	1.29	8.06	1.30	8.06	1.48	8.83
	19	.90	9.75	1.17	9.75	1.29	9.75	1.47	9.75
8	1	1.01	10.89	1.50	9.75	1.38	9.75	1.45	9.75
	7	.83	8.83	1.21	9.75	1.25	9.75	1.28	10.89
	13	.80	9.75	1.18	10.89	1.01	10.89	1.01	9.75
	19	.56	6.40	.87	10.89	.90	9.75	.97	9.75
9	1	.76	3.79	1.05	10.89	.90	9.75	.92	8.06
	7	.67	4.13	.90	8.83	.95	8.83	1.04	8.83
	13	.65	4.32	.95	8.83	.82	8.83	.90	9.75
	19	.47	4.13	.68	8.06	.75	8.06	.69	7.42
10	1	.33	5.99	.64	8.83	.54	8.83	.60	6.87
	7	.35	7.42	.51	8.83	.55	6.87	.59	7.42
	13	.53	2.69	.62	8.06			.57	7.42
	19	.87	5.02	1.00	4.53		*	1.30	5.02
11	1	.91	5.99	1.35	6.87			1.32	6.40
	7	.81	5.99	1.19	7.42			1.38	5.99
	13	1.13	5.99	1.53	5.31	1.42	6.87	1.46	5.31
	19	1.24	7.42	1.75	8.06	1.75	7.42	2.09	8.06
12	1	1.04	8.83	1.45	8.83	1.35	8.06	1.84	8.83
	7	1.13	5.02	1.35	8.83	1.29	6.40	1.58	7.42
	13	.90	7.42	1.18	8.83	1.01	8.06	1.30	7.42
	19	.69	5.99	.94	7.42	.90	7.42	1.07	7.42
13	1	.76	4.76	.85	9.75	.80	9.75	.84	8.83
	7	1.01	4.76	1.05	4.76	1.03	5.63	1.14	5.02
	13	1.07	5.99	1.15	5.99	1.19	5.99	1.27	5.99
	19	1.00	5.99	1.06	5.63	.96	6.40	1.03	6.40
14	1	.68	5.63	.62	6.40	.62	5.63	.77	5.99
	7	.39	5.02	.59	5.63	.51	6.87	.58	5.31
	13	.21	16.79	.43	16.79	.40	16.79	.55	16.79
	19	.25	16.79	.39	16.79	.31	8.83	.40	14.22
15	1	.23	14.22	.28	16.79	.31	8.83	.30	7.42
	7	.92	3.79	.91	7.42	.84	3.38	.94	3.79
	13	1.29	5.63	1.20	5.99	1.23	5.63	1.63	5.63
	19	.93	5.02	.85	5.63	.89	5.63	1.09	5.31
16	1	.47	5.31	.54	5.99	.55	5.31	.70	5.63
	7	.40	4.76	.59	5.63	.51	5.99	.57	5.31
	13	.51	5.02	.56	5.02	.57	5.31	.68	5.31
	19	.38	8.83	.59	9.75	.50	8.83	.59	7.42

*=Electronic problems

TABLE 3: WAVE DATA PART 2

FEBRUARY 1986

GAGE		645		625		640		630	
		Baylor at 7180		Baylor at 19100		Nearshore Wave dr		Foreshore Wave dr	
DAY	TIME	Hmo(m)	T(sec)	Hmo(m)	T(sec)	Hmo(m)	T(sec)	Hmo(m)	T(sec)
17	1	.29	10.89	.43	8.83	.46	9.75	.51	8.83
	7	.35	5.02	.46	8.83	.41	8.83	.53	5.31
	13	.46	4.76	.50	8.83	.54	9.75	.74	8.06
	19	.54	6.40	.58	6.40	.58	6.87	.79	7.42
18	1	.55	6.40	.61	6.87	.69	6.87	.97	6.40
	7	.51	6.40	.68	6.87	.60	6.87	.84	6.40
	13	.63	7.42	.65	8.06	.74	8.06	.89	8.06
	19								
19	1			Operator Error					
	7	.45	7.42	.52	7.42	.57	7.42	.62	8.06
	13	.43	8.83	.52	8.06	.55	8.06	.69	6.87
	19	.57	6.87	.66	6.40	.67	7.42	.80	8.06
20	1	.51	7.42	.75	8.06	.79	7.42	.84	7.42
	7	.67	7.42	.85	8.83	.94	8.83	1.03	7.42
	13	1.05	5.02	1.20	8.83	1.23	8.83	1.42	6.87
	19	1.02	5.63	1.25	9.75	1.37	9.75	1.34	9.75
21	1	1.13	12.34	1.44	10.89	1.46	12.34	1.53	6.87
	7	.98	10.89	1.19	10.89	1.24	12.34	1.38	10.89
	13	1.03	12.34	1.32	10.89	1.38	10.89	1.18	12.34
	19	.77	9.75	.97	12.34	.98	10.89	1.13	12.34
22	1	.93	3.64	1.21	12.34	1.18	12.34	1.17	12.34
	7	1.22	5.63	1.28	5.31	1.32	5.99	1.36	5.63
	13	.99	5.99	1.26	6.40	1.09	7.42	1.18	6.40
	19	1.00	5.99	1.00	6.87	1.10	5.99	1.32	6.40
23	1	.93	5.02	1.12	7.42	1.08	6.40	1.11	5.99
	7	.97	5.63	1.03	5.99	1.02	5.63	1.23	5.63
	13	1.00	5.99	1.49	5.68	1.35	5.99	1.49	5.99
	19	1.02	7.42	1.19	7.42	1.27	7.42	1.27	6.40
24	1	.99	10.89	1.34	10.89	1.25	9.75	1.17	9.75
	7	.82	5.02	1.10	8.83	1.19	10.89	1.21	9.75
	13	.83	9.75	1.09	9.75	.93	8.83	.83	8.83
	19	.72	5.02	.87	8.83	.92	8.83	.96	8.83
25	1	1.07	5.02	1.34	4.53	1.16	4.53	1.40	4.76
	7	1.55	6.40	1.88	6.40	1.93	5.99	2.46	6.40
	13	1.06	6.87	2.02	8.06	1.99	6.87	2.25	6.87
	19	1.27	6.40	1.53	7.42	1.60	8.83	1.82	7.42
26	1	1.04	7.42	1.62	9.75	1.50	9.75	1.78	6.87
	7	1.15	5.99	1.33	6.87	1.35	8.06	1.51	7.42
	13	.96	16.79	1.13	7.42	1.13	7.42	1.15	5.31
	19	.61	16.79	.77	14.22	.84	6.40	1.00	8.06
27	1	.59	16.79	.71	16.79	.68	16.79	.74	4.53
	7	.30	14.22	.47	14.22	.51	14.22	.56	14.22
	13	.40	2.95	.61	14.22	.63	10.89	.65	5.02
	19	1.15	5.63	1.07	4.53	1.27	10.89	1.42	5.31
28	1	1.07	5.63	1.22	6.40	1.21	6.87	1.47	8.06
	7	.91	8.06	1.04	8.06	1.09	8.83	1.35	7.42
	13	.92	6.87	1.21	8.06	1.05	8.06	1.21	8.06
	19	.94	5.02	1.22	10.89	1.16	12.34	1.20	10.89
	MEAN	.72	7.39	.93	8.65	.92	8.48	1.04	7.89
	STD	.31	3.22	.38	2.72	.37	2.35	.42	2.31

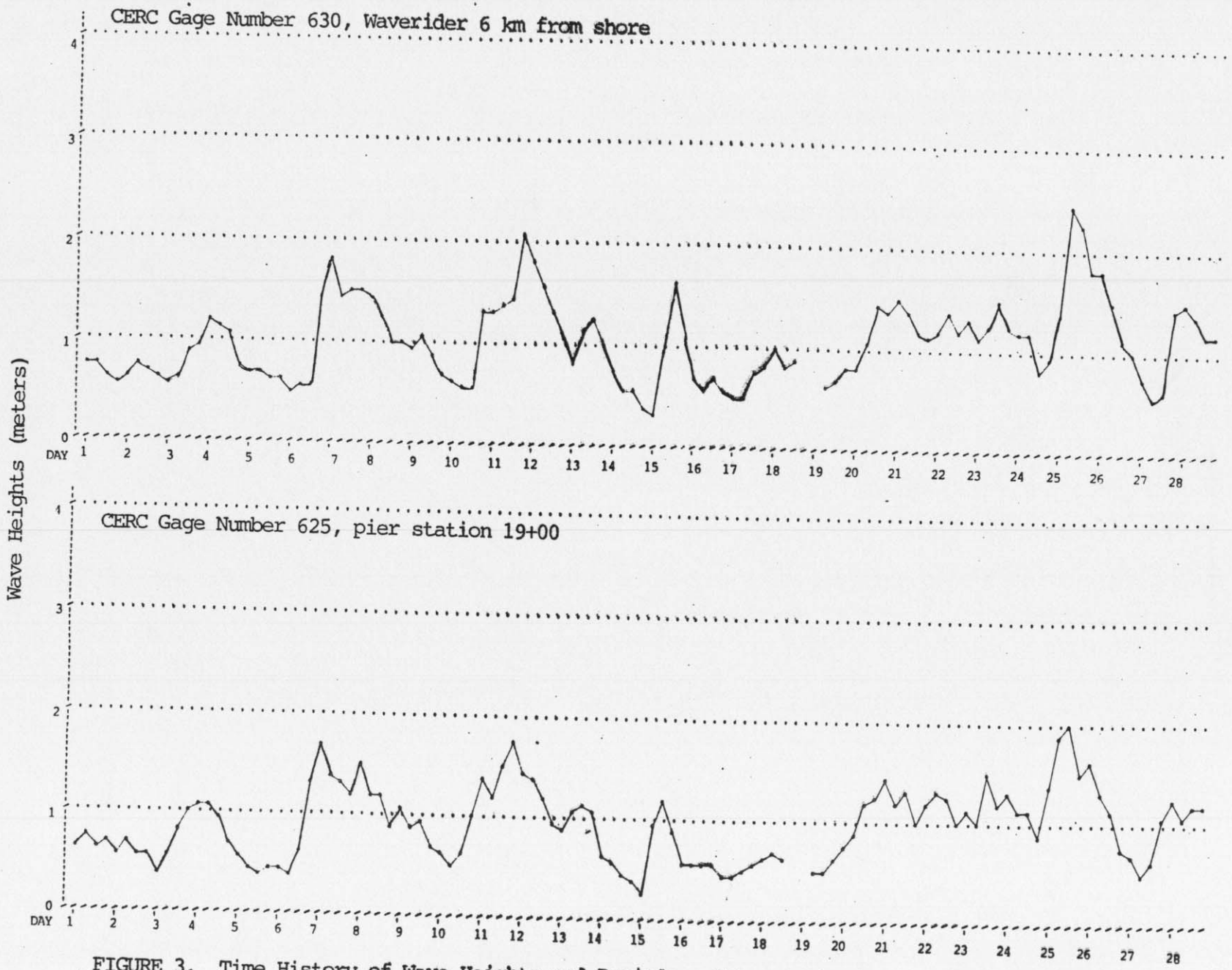


FIGURE 3. Time History of Wave Heights and Periods - February 1986 Part I: Heights

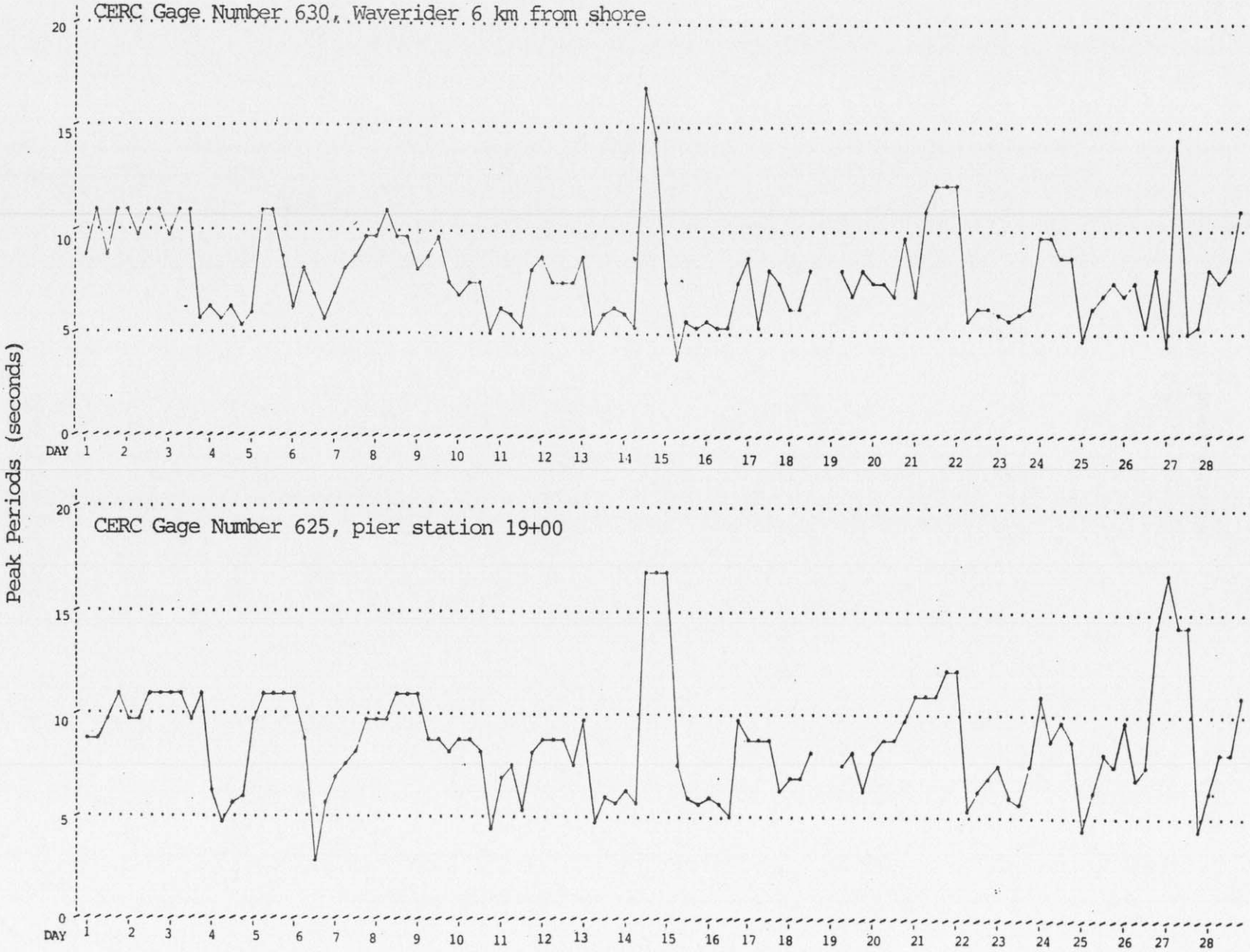


FIGURE 3. Time History of Wave Heights and Periods - February 1986 Part II: Periods

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 N20W, 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)

February 1986

		PIER MEASUREMENTS								BEACH MEASUREMENTS (500 UPDRIFT)				
		DYE AT 19400 (579m) (SURFACE)		CURRENT METER AT 14420(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
1	0100-Alongshore			6	S								10	S
	Cross-shore			0									3	OF
	Resultant			6	160								10	143
1	0700-Alongshore	4	S	1	S		0	0			34	N	3	S
	Cross-shore	10	Off	2	OF	176	46	Off		North			11	OF
	Resultant	11	92	3	96		50	94					11	86
1	1300-Alongshore			1	S								6	S
	Cross-shore			2	OF								5	OF
	Resultant			2	111								8	123
1	1900-Alongshore			3	N								3	N
	Cross-shore			7	OF								5	OF
	Resultant			8	45								6	38
2	0100-Alongshore			1	S								4	N
	Cross-shore			2	OF								2	OF
	Resultant			2	95								5	0
2	0700-Alongshore	23	N	2	N		7	N			7	N	6	N
	Cross-shore	23	Off	4	OF	149	33	Off		South			1	ON
	Resultant	33	25	4	45		34	57					6	334
2	1300-Alongshore			1	N								11	N
	Cross-shore			2	OF								1	ON
	Resultant			3	42								11	334
2	1900-Alongshore			3	N								10	N
	Cross-shore			7	OF								2	OF
	Resultant			7	45								11	357
3	0100-Alongshore			5	N								8	N
	Cross-shore			7	OF								11	OF
	Resultant			9	36								13	32
3	0700-Alongshore	0	0	2	N		0	0			22	S	1	N
	Cross-shore	0	0	4	OF	176	0	0		North			6	OF
	Resultant	0	0	4	45		0	0					6	59
3	1300-Alongshore			12	S								19	S
	Cross-shore			2	ON								8	OF
	Resultant			12	170								21	138
3	1900-Alongshore			9	S								17	S
	Cross-shore			0									6	OF
	Resultant			9	160								19	140
4	0100-Alongshore			9	S								19	S
	Cross-shore			1	ON								14	OF
	Resultant			9	169								24	124
4	0700-Alongshore	16	S	8	S		36	S			19	N	11	S
	Cross-shore	4	Off	1	OF	176	0	0		North			9	OF
	Resultant	16	146	8	149		36	160					15	121
4	1300-Alongshore			7	S								12	S
	Cross-shore			2	ON								5	OF
	Resultant			7	173								13	139
4	1900-Alongshore			11	S								18	S
	Cross-shore			3	OF								8	OF
	Resultant			11	145								20	137
5	0100-Alongshore			12	S								12	S
	Cross-shore			2	ON								0	
	Resultant			13	171								12	160
5	0700-Alongshore	9	N	2	S		12	N			21	N	8	S
	Cross-shore	16	Off	1	ON	140	0	0		South			1	OF
	Resultant	18	40	2	178		12	340					8	153
5	1300-Alongshore			0									4	N
	Cross-shore			2	OF								4	ON
	Resultant			2	70								6	291
5	1900-Alongshore			4	S								4	S
	Cross-shore			1	OF								6	OF
	Resultant			4	140								8	103
6	0100-Alongshore			1	S								6	S
	Cross-shore			5	OF								8	OF
	Resultant			5	82								10	106
6	0700-Alongshore	3	S	1	S		0	0			20	S	0	
	Cross-shore	2	Off	1	OF	128	0	0		North			0	
	Resultant	4	129	2	102								0	0
6	1300-Alongshore			9	S								14	S
	Cross-shore			1	ON								6	OF
	Resultant			9	169								15	136
6	1900-Alongshore			22	S								29	S
	Cross-shore			1	ON								19	OF
	Resultant			22	162								35	127

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
7	0100-Alongshore			10	S								22	S
	Cross-shore			2	ON								8	OF
	Resultant			10	172								24	140
7	0700-Alongshore	34	S	12	S		51	S			63	S	20	S
	Cross-shore	0	0	3	ON	152	0	0		North			3	OF
	Resultant	34	160	12	175		51	160					20	152
7	1300-Alongshore			10	S								12	S
	Cross-shore			1	ON								5	OF
	Resultant			10	163								13	136
7	1900-Alongshore			19	S								32	S
	Cross-shore			7	ON								9	OF
	Resultant			21	181								33	144
8	0100-Alongshore			10	S								21	S
	Cross-shore			1	ON								9	OF
	Resultant			10	168								23	136
8	0700-Alongshore	38	S	16	S		44	S			52	S	19	S
	Cross-shore	10	On	3	ON	176	4	On		North			4	OF
	Resultant	39	174	16	169		44	166					20	147
8	1300-Alongshore			5	S								10	S
	Cross-shore			1	ON								11	OF
	Resultant			5	169								15	112
8	1900-Alongshore			14	S								33	S
	Cross-shore			5	ON								5	OF
	Resultant			15	180								34	151
9	0100-Alongshore			12	S								25	S
	Cross-shore			4	ON								4	OF
	Resultant			13	180								25	151
9	0700-Alongshore	44	S	16	S		38	S			43	S	22	S
	Cross-shore	4	Off	5	ON	152	5	Off		North			3	OF
	Resultant	44	154	17	177		39	151					23	148
9	1300-Alongshore			9	S								20	S
	Cross-shore			2	ON								4	OF
	Resultant			10	169								21	149
9	1900-Alongshore			9	S								14	S
	Cross-shore			1	ON								5	OF
	Resultant			9	165								15	142
10	0100-Alongshore			5	S								17	S
	Cross-shore			2	OF								6	OF
	Resultant			5	143								18	140
10	0700-Alongshore	41	S	13	S		8	N			2	N	19	S
	Cross-shore	8	On	1	ON	117	2	Off		South			10	OF
	Resultant	41	171	13	163		9	351					22	132
10	1300-Alongshore			8	S								15	S
	Cross-shore			1	ON								6	OF
	Resultant			8	167								16	137
10	1900-Alongshore			16	S								25	S
	Cross-shore			5	ON								6	OF
	Resultant			16	177								26	146
11	0100-Alongshore			13	S								26	S
	Cross-shore			4	ON								8	OF
	Resultant			14	176								27	144
11	0700-Alongshore	41	S	11	S		47	S			97	S	14	S
	Cross-shore	0	0	2	ON	152	0	0		North			11	OF
	Resultant	41	160	11	172		47	160					18	122
11	1300-Alongshore			31	S								50	S
	Cross-shore			11	ON								9	OF
	Resultant			33	180								51	150
11	1900-Alongshore			28	S								50	S
	Cross-shore			11	ON								6	OF
	Resultant			30	181								50	153
12	0100-Alongshore			18	S								42	S
	Cross-shore			6	ON								6	OF
	Resultant			19	177								42	152
12	0700-Alongshore	68	S	10	S		55	S			91	S	17	S
	Cross-shore	0	0	3	ON	152	8	Off		North			2	OF
	Resultant	68	160	10	177		56	151					17	154
12	1300-Alongshore			13	S								32	S
	Cross-shore			6	ON								4	OF
	Resultant			14	183								32	152
12	1900-Alongshore			5	S								7	S
	Cross-shore			3	ON								0	
	Resultant			6	191								7	160

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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
12	0100-Alongshore			19	S								11	S
	Cross-shore			5	ON								6	OF
	Resultant			20	176								13	129
13	0700-Alongshore	55	5	17	S		47	S			107	S	29	S
	Cross-shore	0	0	6	ON	152	23	Off		North			3	OF
	Resultant	55	160	18	179		52	133					29	154
13	1300-Alongshore			22	S								39	S
	Cross-shore			9	ON								5	OF
	Resultant			24	181								39	153
13	1900-Alongshore			12	S								25	S
	Cross-shore			6	ON								4	OF
	Resultant			14	187								25	151
14	0100-Alongshore			8	S								19	S
	Cross-shore			3	ON								4	OF
	Resultant			9	181								20	147
14	0700-Alongshore	1	N	1	S		0	0			2	S	2	S
	Cross-shore	0	Off	2	OF	150	7	Off		South			7	OF
	Resultant	1	351	2	99		7	70					7	86
14	1300-Alongshore			0									0	
	Cross-shore			2	OF								1	ON
	Resultant			2	70								1	250
14	1900-Alongshore			0									8	N
	Cross-shore			2	OF								2	OF
	Resultant			2	70								8	354
15	0100-Alongshore			1	N								8	N
	Cross-shore			7	OF								15	OF
	Resultant			7	63								17	43
15	0700-Alongshore	38	S	9	S		51	S			58	S	3	S
	Cross-shore	8	Off	1	ON	152	5	On		North			4	OF
	Resultant	39	149	9	169		51	166					5	106
15	1300-Alongshore			25	S								33	S
	Cross-shore			9	ON								6	OF
	Resultant			27	180								33	150
15	1900-Alongshore			8	S								16	S
	Cross-shore			3	ON								7	OF
	Resultant			8	183								17	135
16	0100-Alongshore			7	S								13	S
	Cross-shore			0									6	OF
	Resultant			7	160								15	136
16	0700-Alongshore	12	S	4	S		14	S			9	S	7	S
	Cross-shore	6	Off	1	OF	152	14	Off		North			6	OF
	Resultant	13	133	4	146		20	115					9	118
16	1300-Alongshore			7	S								12	S
	Cross-shore			1	ON								9	OF
	Resultant			7	169								15	121
16	1900-Alongshore			1	S								8	S
	Cross-shore			1	OF								4	OF
	Resultant			1	133								8	135
17	0100-Alongshore			0									3	N
	Cross-shore			2	OF								1	OF
	Resultant			2	70								3	353
17	0700-Alongshore	13	N	2	S		47	N			34	S	2	S
	Cross-shore	0	0	2	OF	140	110	Off		South			4	OF
	Resultant	13	340	2	115		120	273					4	95
17	1300-Alongshore			2	S								0	
	Cross-shore			1	OF								1	OF
	Resultant			3	132								1	70
17	1900-Alongshore			0									3	N
	Cross-shore			2	OF								1	OF
	Resultant			2	70								3	350
18	0100-Alongshore			1	S								3	N
	Cross-shore			2	OF								2	OF
	Resultant			2	90								4	17
18	0700-Alongshore	22	N	2	S		61	N			85	N	0	
	Cross-shore	8	Off	1	OF	140	15	Off		South			3	OF
	Resultant	23	359	2	130		63	354					3	70
18	1300-Alongshore			2	S								5	N
	Cross-shore			2	OF								10	OF
	Resultant			3	119								11	41
18	1900-Alongshore													
	Cross-shore													
	Resultant													

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OF=OFFSHORE

DAY	TIME	PIER MEASUREMENTS: DYE AT 19+00 (579m) (SURFACE) SPEED	DIR	CURRENT METER AT 14+20(433m) I.D.#639 (DEPTH -4.2m MSL) SPEED	DIR	DYE AT MID-SURF ZONE (SURFACE) DIST. FROM BASELINE(M)	SPEED	DIR	BEACH MEASUREMENTS (500 UPDRIFT): DYE 12M OFFSHORE (SURFACE) LOCATION	SPEED	DIR	CURRENT METER AT SOUTH TRIPOD (DEPTH -4.8m MSL) I.D.#679 SPEED	DIR
19	0100-Alongshore												
	Cross-shore												
	Resultant					Operator Error							
19	0700-Alongshore	0	0	5	S		0	0		16	N	15	S
	Cross-shore	0	0	1	ON	152	5	Off	North			3	OF
	Resultant			5	167		5	70				15	147
19	1300-Alongshore			3	S							12	S
	Cross-shore			2	ON							0	
	Resultant			4	197							12	160
19	1900-Alongshore			6	S							12	S
	Cross-shore			1	ON							4	OF
	Resultant			6	171							12	139
20	0100-Alongshore			10	S							6	S
	Cross-shore			1	ON							8	OF
	Resultant			10	167							10	108
20	0700-Alongshore	61	S	10	S		44	S		38	S	10	S
	Cross-shore	0	0	1	ON	152	0	0	North			4	OF
	Resultant	61	160	10	165		44	160				11	141
20	1300-Alongshore			19	S							40	S
	Cross-shore			8	ON							5	OF
	Resultant			21	183							40	153
20	1900-Alongshore			13	S							20	S
	Cross-shore			5	ON							5	OF
	Resultant			14	182							21	147
21	0100-Alongshore			9	S							21	S
	Cross-shore			4	ON							3	OF
	Resultant			10	185							22	151
21	0700-Alongshore	36	S	16	S		34	S		27	N	27	S
	Cross-shore	4	On	7	ON	176	12	Off	North			10	OF
	Resultant	36	166	18	183		36	141				29	140
21	1300-Alongshore			2	S							6	S
	Cross-shore			2	ON							1	ON
	Resultant			3	214							6	172
21	1900-Alongshore			1	S							4	S
	Cross-shore			1	ON							0	
	Resultant			1	191							4	160
22	0100-Alongshore			7	S							10	
	Cross-shore			3	ON							7	OF
	Resultant			8	183							12	123
22	0700-Alongshore	55	S	23	S		68	S		47	S	28	S
	Cross-shore	6	On	8	ON	164	10	Off	North			8	OF
	Resultant	56	166	24	180		68	151				29	144
22	1300-Alongshore			15	S							30	S
	Cross-shore			5	ON							5	OF
	Resultant			16	178							30	151
22	1900-Alongshore			15	S							27	S
	Cross-shore			5	ON							7	OF
	Resultant			16	177							28	145
23	0100-Alongshore			16	S							31	S
	Cross-shore			6	ON							6	OF
	Resultant			17	180							31	149
23	0700-Alongshore	51	S	14	S		41	S		65	S	16	S
	Cross-shore	0	0	4	ON	164	8	Off	North			3	OF
	Resultant	51	160	15	176		41	149				17	148
23	1300-Alongshore			22	S							41	S
	Cross-shore			9	ON							6	OF
	Resultant			23	182							41	151
23	1900-Alongshore			13	S							32	S
	Cross-shore			5	ON							6	OF
	Resultant			14	180							33	150
24	0100-Alongshore			8	S							17	S
	Cross-shore			3	ON							6	OF
	Resultant			8	184							18	139
24	0700-Alongshore	28	S	12	S		25	S		28	S	14	S
	Cross-shore	6	On	3	ON	164	8	Off	North			8	OF
	Resultant	28	171	12	175		27	143				16	132
24	1300-Alongshore			8	S							16	S
	Cross-shore			0								10	OF
	Resultant			8	160							18	128
24	1900-Alongshore			14	S							18	S
	Cross-shore			1	ON							13	OF
	Resultant			14	165							22	123

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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			23	S								41	S
	Cross-shore			7	ON								8	OF
	Resultant			24	177								41	149
25	0700-Alongshore	87	S	31	S		152	S			102	S	56	S
	Cross-shore	0	0	15	ON	188	0	0		North			7	OF
	Resultant	87	160	34	186		152	160					56	153
25	1300-Alongshore			38	S								55	S
	Cross-shore			14	ON								6	OF
	Resultant			41	181								55	154
25	1900-Alongshore			20	S								29	S
	Cross-shore			11	ON								1	ON
	Resultant			23	190								29	162
26	0100-Alongshore			21	S								42	S
	Cross-shore			7	ON								2	OF
	Resultant			22	179								42	157
26	0700-Alongshore	29	S	13	S		44	S			89	S	16	S
	Cross-shore	9	Off	7	ON	176	13	Off		North			7	OF
	Resultant	30	143	14	189		45	143					17	136
26	1300-Alongshore			7	S								13	S
	Cross-shore			5	ON								4	OF
	Resultant			8	197								13	142
26	1900-Alongshore			1	S								7	S
	Cross-shore			1	ON								1	ON
	Resultant			2	200								7	169
27	0100-Alongshore			0									3	N
	Cross-shore			1	OF								2	OF
	Resultant			1	70								4	13
27	0700-Alongshore	0	0	3	N		15	N			4	S	11	N
	Cross-shore	114	Off	2	OF	126	8	On		South			0	
	Resultant	114	70	4	19		17	313					11	340
27	1300-Alongshore			18	S								10	S
	Cross-shore			5	ON								6	OF
	Resultant			19	176								12	131
27	1900-Alongshore			19	S								27	S
	Cross-shore			7	ON								5	OF
	Resultant			20	181								28	149
28	0100-Alongshore			12	S								26	S
	Cross-shore			5	ON								6	OF
	Resultant			13	182								27	147
28	0700-Alongshore	44	S	6	S		47	S			21	S	13	S
	Cross-shore	2	Off	2	ON	152	23	On		North			5	OF
	Resultant	44	157	7	181		52	186					14	138
28	1300-Alongshore			17	S								31	S
	Cross-shore			4	ON								8	OF
	Resultant			18	173								32	145
28	1900-Alongshore			14	S								22	S
	Cross-shore			4	ON								4	OF
	Resultant			15	177								23	149

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.

Table 5

SUPPLEMENTAL OBSERVATIONS

February 1986

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	0830	75			93	5.2	1.0228	2.4
2	0855	105	150		44	6.2	1.0242	1.2
3	0805			80	81	6.6	1.0244	2.4
4	0810	75	60	75	137	5.5	1.0238	4.3
5	0800	80		80	52	5.3	1.0232	2.4
6	0805	100			67	7.0	1.0232	2.7
7	0810	60		65	91	6.9	1.0226	1.5
8	0845	60			134	6.2	1.0226	1.2
9	0825	50	25	60	33	5.8	1.0228	1.5
10	0745	90			18	5.5	1.0228	2.7
11	0800	50	60	55	106	5.3	1.0212	1.8
12	0830	50	60	60	140	4.5	1.0210	1.2
13	0815	40		50	134	4.1	1.0224	0.9
14	0815	50			64	3.4	1.0216	1.5
15	0840	40		50	52	4.2	1.0224	0.9
16	0920	35			14	3.9	1.0226	1.8
17	0830	95			24	4.7	1.0244	3.0
18	0935	100			38	5.6	1.0253	3.3
19	0800	40			46	5.4	1.0234	4.0
20	0815	80	60	60	122	6.3	1.0212	1.5
21	0805	70		65	143	6.0	1.0217	3.0
22	0805	90		80	116	5.6	1.0226	1.2
23	0810	40		50	112	5.5	1.0228	1.8
24	0825	55		80	114	5.7	1.0214	2.1
25	0830	30		50	176	5.0	1.0214	1.2
26	0915	40		50	119	4.6	1.0219	0.9
27	0830	120			12	4.9	1.0244	2.7
28	0825	40	115		93	4.7	1.0236	1.5

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.

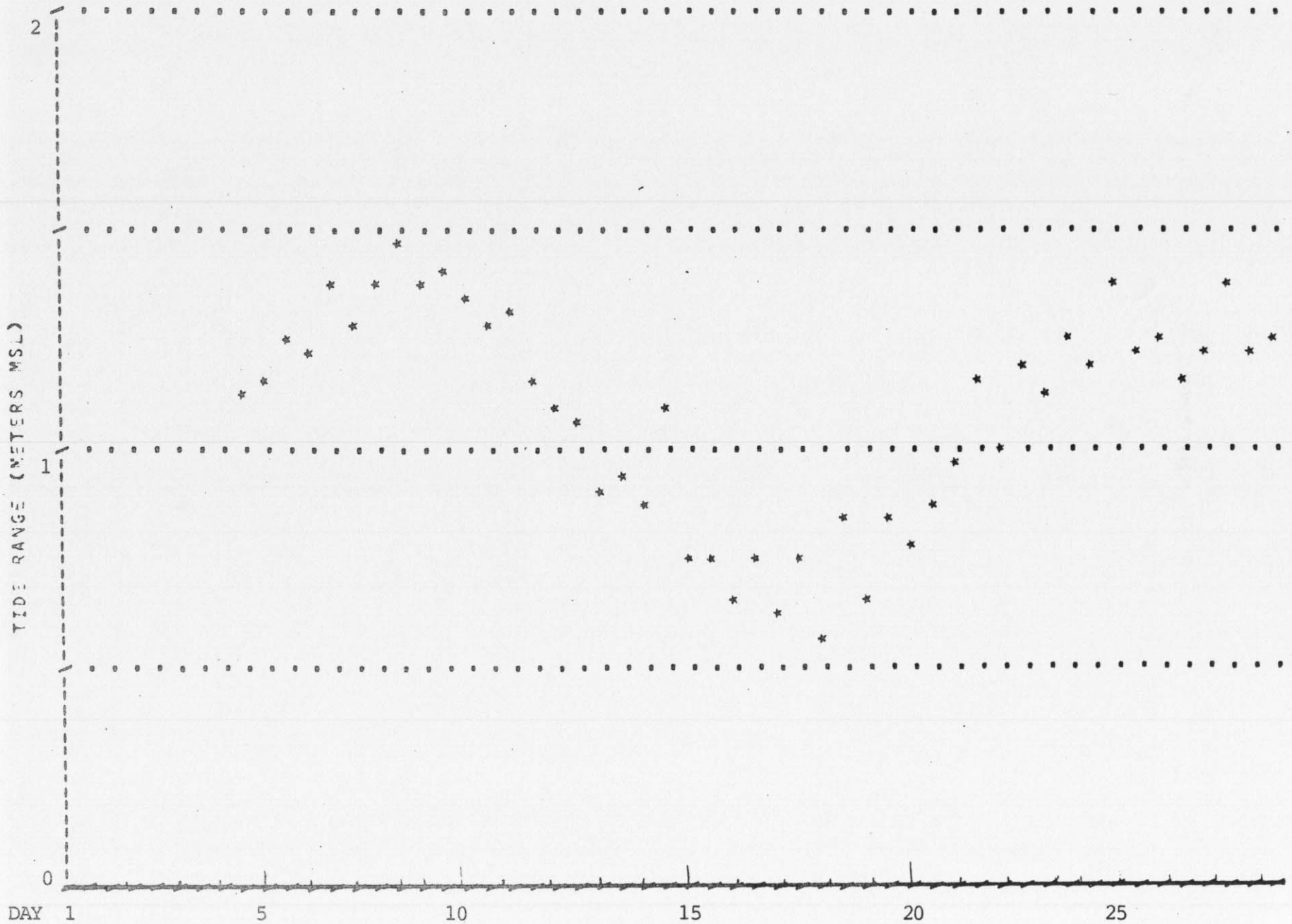
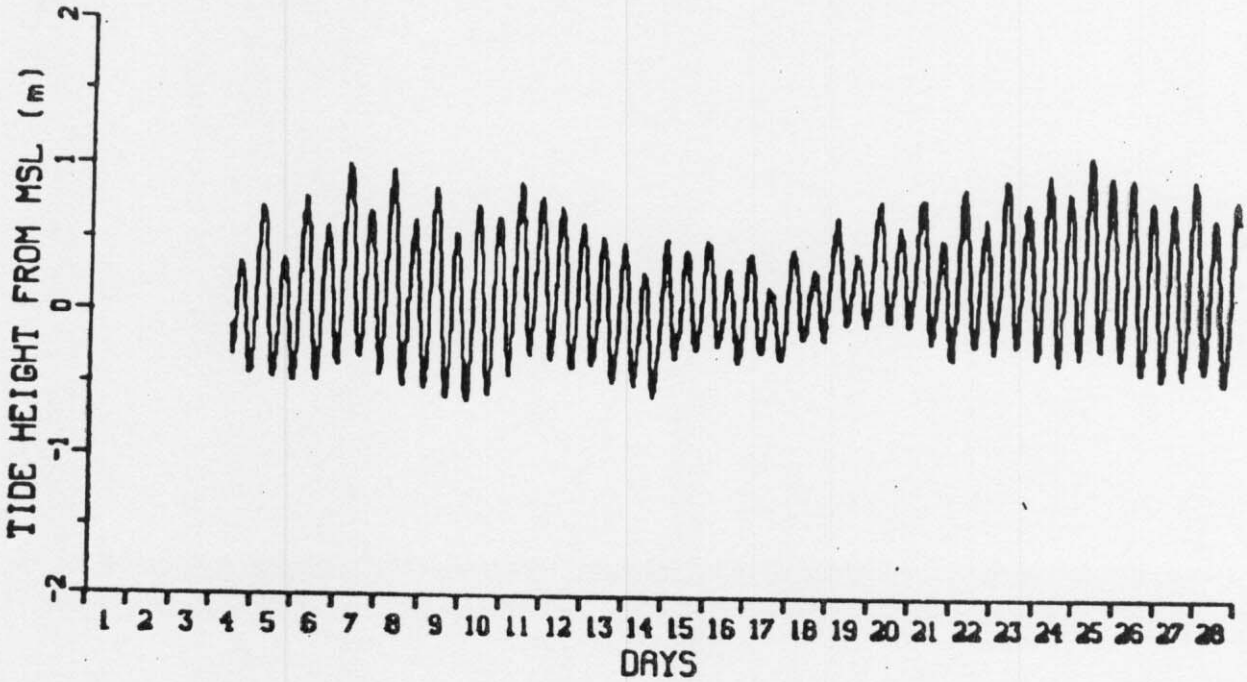


FIGURE 4. Time History of Tide Range, February 1986 (Gage No. 865-1370)

FIGURE 5

FRF TIDE HEIGHTS



MONTHLY MEAN WATER LEVELS (METERS MSL)

Extreme Low -	-.62 on 10 February at 0212 hrs.
Extreme High -	1.09 on 25 February at 0748 hrs.
Monthly Mean -	.17
Mean Low Water -	-.34
Mean High Water -	.74
Mean Range -	1.08

TABLE 6

WATER LEVELS (METERS MSL)
Tidal Characteristics

February 1986

MID-CYCLE DAY	TIME	LOW	HIGH	MEAN	RANGE
1	712				
1	1937				
2	802				
2	2028	Gage Inoperative			
3	853				
3	2118				
4	943				
4	2208	-.43	.71	.03	1.14
5	1034	-.46	.69	.04	1.14
5	2259	-.48	.78	.06	1.26
6	1124	-.47	.75	.09	1.22
6	2349	-.36	1.01	.24	1.37
7	1214	-.30	.98	.28	1.28
8	40	-.43	.95	.21	1.38
8	1305	-.51	.96	.17	1.48
9	130	-.52	.85	.12	1.37
9	1355	-.59	.81	.07	1.40
10	220	-.62	.73	.02	1.35
10	1446	-.57	.73	.08	1.30
11	311	-.43	.90	.21	1.33
11	1536	-.28	.86	.28	1.15
12	401	-.32	.78	.24	1.10
12	1626	-.37	.68	.13	1.05
13	452	-.36	.54	.09	.90
13	1717	-.47	.47	-.00	.94
14	542	-.50	.39	-.06	.88
14	1807	-.58	.51	-.10	1.09
15	632	-.32	.43	.07	.75
15	1858	-.24	.50	.10	.74
16	723	-.22	.43	.08	.65
16	1948	-.33	.41	.02	.74
17	813	-.26	.36	.01	.62
17	2038	-.31	.44	.02	.75
18	904	-.17	.41	.10	.57
18	2129	-.17	.66	.18	.83
19	954	-.06	.59	.23	.65
19	2219	-.07	.77	.29	.84
20	1044	-.04	.76	.32	.79
20	2310	-.08	.79	.32	.87
21	1135	-.18	.78	.25	.97
22	0	-.29	.87	.23	1.16
22	1225	-.21	.78	.26	.99
23	50	-.25	.93	.30	1.18
23	1316	-.21	.91	.33	1.12
24	141	-.29	.96	.30	1.25
24	1406	-.33	.86	.29	1.19
25	231	-.28	1.09	.38	1.37
25	1456	-.23	.99	.40	1.23
26	322	-.29	.95	.33	1.24
26	1547	-.38	.79	.23	1.17
27	412	-.43	.78	.18	1.21
27	1637	-.42	.94	.24	1.36
28	502	-.37	.86	.20	1.23
28	1728	-.46	.80	.14	1.26

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 January and the two surveys taken during February on profile line 188, located 517 m south of the pier. The prominent nearshore bar (110 to 120 m) which had developed during January migrated shoreward during February eventually molding itself to the foreshore (120 m). In addition, the storm bar (220 to 400 m) migrated 80 m also onshore. Only minor changes are visible on the remainder of the profile.

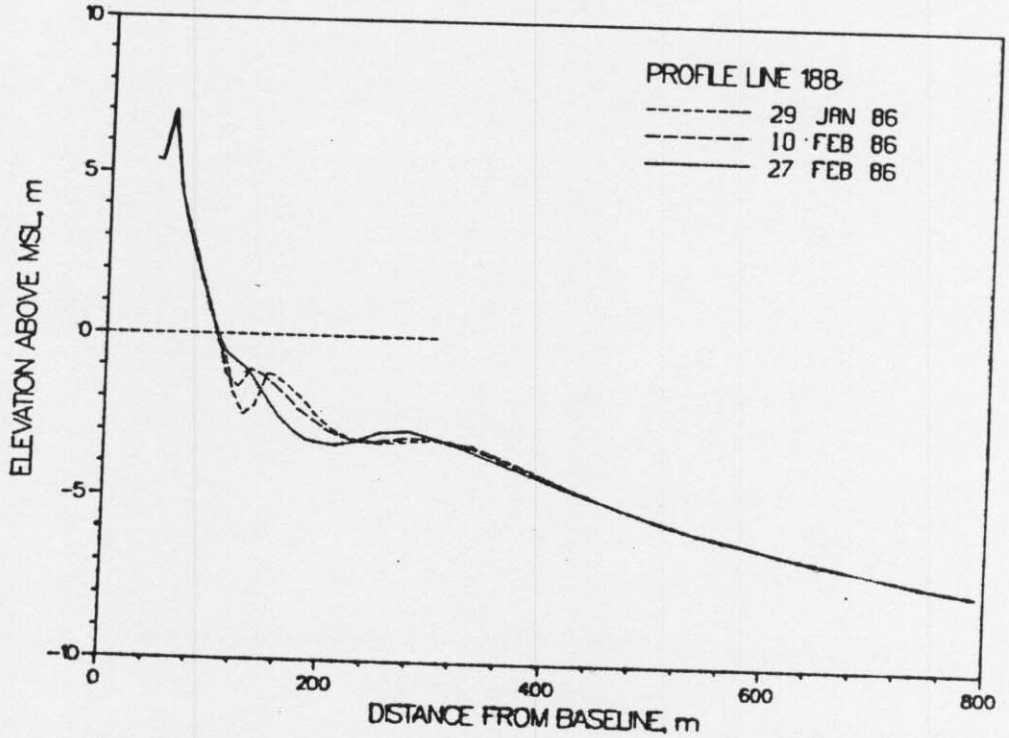


Figure 6. Monthly CRAB profiles on profile 188 - 517 meters south of pier.

The profile envelope (Figure 7) reflects the maximum changes which occurred on the profile between January and February. The two changes visible in the nearshore (150 and 180 m) are a result of the onshore migration of the nearshore bar while the offshore changes (260 to 380 m) reflect the storm bar's shoreward migration.

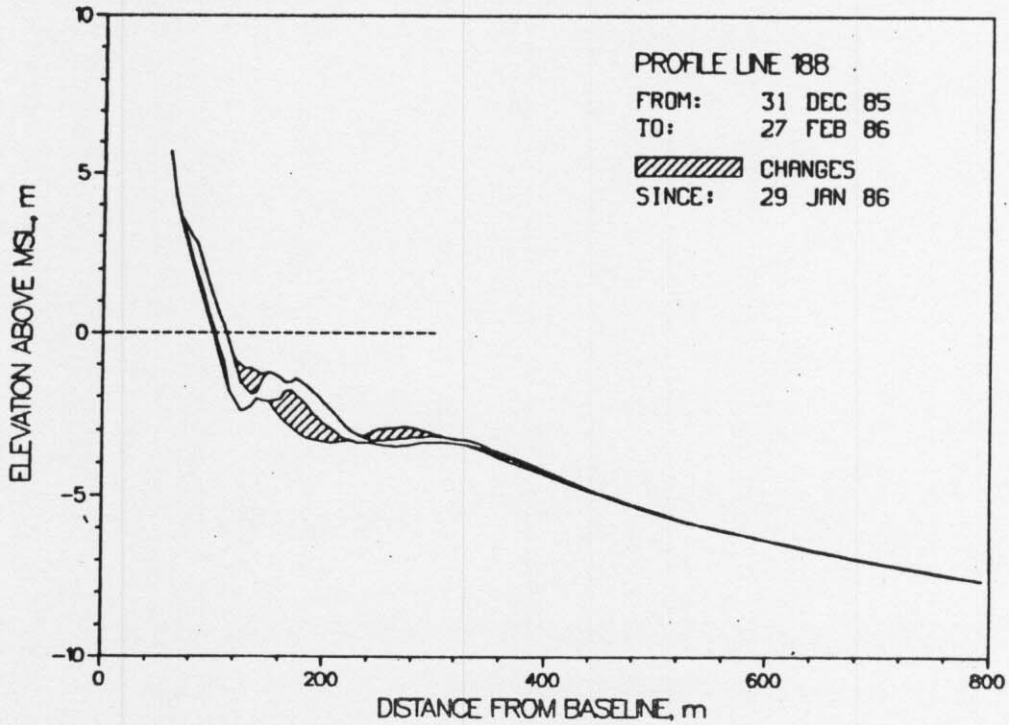


Figure 7. CRAB profile envelope - profile 188.

B. Bathymetry. This month's bathymetric survey (Figure 8) completed on 28 February shows a distinct shore parallel bar north of the pier centered at 250 m. The bar is interrupted by a shoal 200 m south of the pier. Seaward of the bar, the contours are shore parallel, except in the vicinity of the pier. The trough under the pier is relatively shallow and symmetric, typical of surveys following times without major wave and currents associated with storms. In comparison to the prior survey completed on 22 January 1986, there was up to 1 m of erosion at the January bar position. Accretion of sediment seaward of 225 m formed the bar mentioned above. Accretion landward of 150 m filled in the deep trough between the beach and inshore bar present in January.

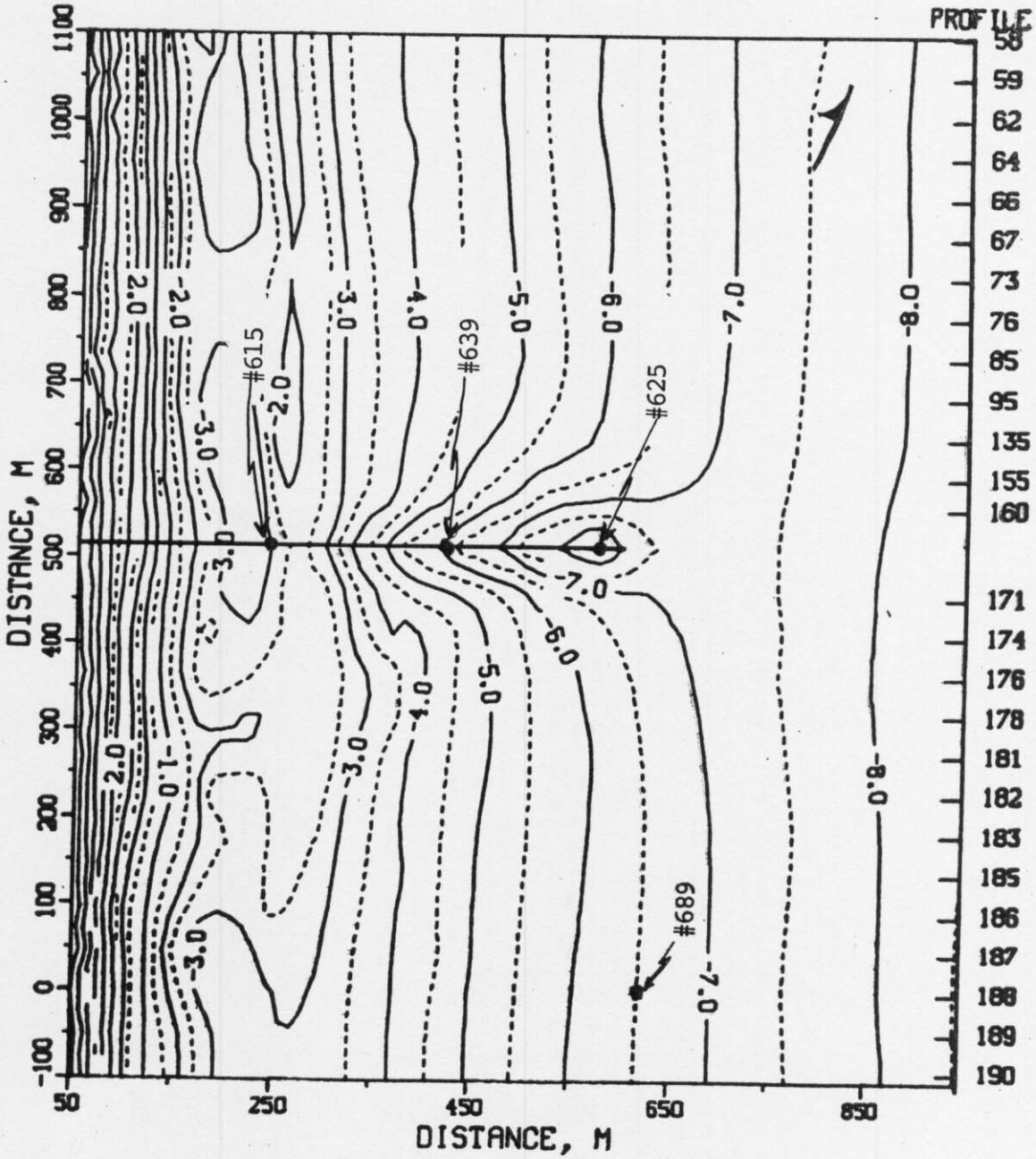


FIGURE 8. FRF BATHYMETRY 28 FEB 86
CONTOURS IN METERS

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
25 Feb (0900)	25 Feb (1400)

B. Storm Synopsis.

Following the passage of a cold front early on 25 February, strong northerly winds (maximum speed of 14.40 m/s at 0700 on the 25th) generated by a strong Canadian high pressure system in conjunction with a weak storm well out in the Atlantic briefly produced waves exceeding 2 m. A maximum Hmo (gage #625) of 2.13 m was recorded at 1400 hours on the 25th.

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