

NOAA Technical Report NWS 32



Pertinent Meteorological and Hurricane Tide Data for Hurricane Carla

Silver Spring, Md.
August 1982

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- NWS 14 Weekly Synoptic Analyses, 5-, 2-, and 0.4-Millibar Surfaces for 1968. Staff, Upper Air Branch, National Meteorological Center, May 1971, 169 p. (COM-71-50383)
- NWS 15 Some Climatological Characteristics of Hurricanes and Tropical Storms, Gulf and East Coasts of the United States. Francis P. Ho, Richard W. Schwerdt, and Hugo V. Goodyear, May 1975, 87 p. (COM-75-11088)

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Malcolm Baldrige, Secretary

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John V. Byrne, Administrator

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PERTINENT METEOROLOGICAL AND HURRICANE TIDE
DATA FOR HURRICANE CARLA

Francis P. Ho and John F. Miller
Water Management Information Division
Office of Hydrology
National Weather Service, NOAA
Silver Spring, Maryland

ABSTRACT. All available meteorological data have been analyzed to provide information as accurate as possible for use in dynamic storm surge models. Detailed analyses are presented of the storm track, forward speed, central pressure, and radius to maximum wind. Particular attention is given to the period surrounding landfall. Tide gage and high water mark data are presented to give both a time history and geographic depiction of the storm surge.

1. INTRODUCTION

Numerous reports have been prepared describing Hurricane Carla. Each of these reports has been directed toward some specific aspect of the storm, presenting meteorological data, oceanic data, analysis of the wind field, surveys of damages, etc. This report, which combines the meteorological and oceanographic data and the analysis, provides information useful for storm surge modeling. The amount of observed data available from historical hurricanes varies greatly and almost all of it requires further analysis and interpretation before it can be of use to storm surge modelers. An effort has been made for this publication to gather all the pertinent published and unpublished information into one report. The amount of data available for any single storm also varies during different portions of the storm's life, from various geographic regions, and from different sections of the hurricane. Almost all of it is also subject to numerous uncertainties in interpretation. We have attempted to bring this information together to make a comprehensive analysis, to develop an accurate storm track, to prepare a time history of central pressure and radius to maximum winds, and to catalog high-water-mark data.

This report should be viewed as a comprehensive, authoritative source of the information required by storm surge modelers. Our intention is to provide quantitative information with as little ambiguity as possible on the track of the storm, its intensity, and the observed storm surges. Because our purpose is to develop data useful in surge modeling, some minor oscillations in movement, radius of maximum wind, etc., have been smoothed in the analysis. We welcome comments and suggestions on methods of improving the presentation or on additional data which would be useful in the development of storm surge models.

This report is an expansion of similar meteorological and storm surge data for Hurricane Carla, September 1961, published in the U.S. Weather Bureau Technical Paper No. 48 (Harris 1963).

2. PREVIOUS REPORTS

There have been several previous reports on Hurricane Carla, although only one of them was directed specifically toward an evaluation of factors important for storm surge generation. General records and observed high water mark elevations plus miscellaneous meteorological data observed by private industries were compiled and published by the U.S. Army Corps of Engineers, Galveston District (1962). The U.S. Navy reconnaissance flight data on Carla were included in the Navy's annual tropical storm report (U.S. Fleet Weather Facility 1961). The National Weather Service research aircraft reports were summarized by Gray and Shea (1976).

Cooperman and Sumner (1981) and Cry (1961) provided a general description of Carla's history. These reports for the Environmental Data and Information Service's (EDIS) Climatological Data, National Summary were intended to provide a broad view of the storms for climatological records. Selected high water marks, winds and a generalized track were presented in each paper. The Hurricane Season of 1961 (Dunn and Staff 1962) provides a description of significant features of all Atlantic tropical storms that occurred during 1961. Important features mentioned in regard to Carla are the continued increase in intensity from the storm's beginning until it crossed the Texas coast.

Weather Bureau Technical Paper No. 48, Characteristics of the Hurricane Storm Surge, (Harris 1963) provides some tide gage records, plots of high water marks, synoptic weather maps at 12-h intervals from 0600 CST September 7 to 1800 CST September 12, 1961, and a general discussion of the character and extent of coastal flooding. Though concerned with storm surge, the text was mostly descriptive and displayed the tide-gage and high-water-mark data on a scale that does not permit accurate detailed evaluation.

Detailed analyses of wind fields for many major hurricanes are made by the Hydrometeorological Branch of the Water Management Information Division (Office of Hydrology, NWS) for the U.S. Army Corps of Engineers (COE). Available data are used in combination with an empirically derived wind profile to develop a complete wind field analysis for specific times. The study for this storm was included as part of a series of memorandum reports to the COE (U.S. Weather Bureau 1962). Wind charts are given for 6-h intervals from 0600 CST September 9 to 0600 CST September 10, then at 3-h intervals to 0900 CST September 12. It should be noted that many of the relations used to estimate the wind fields in regions of sparse or no data in that study have been revised in subsequent research. (See for example, Schwerdt, et al. 1979.)

Smoothed "best" tracks have been given in several NOAA publications. Cry et al. (1965) combined data from all available sources into a comprehensive report showing the most accurate and consistent locations for all tropical cyclones during their life cycle for the period 1871-1963. These tracks were designed to provide a smoothed track for all storms. Neumann et al. (1978) have extended the period covered and prepared revised tracks where additional data have indicated they were necessary. The objective for these studies was to provide a firm climatological base and dealt with the tropical cyclone solely on the synoptic scale. Positions were given along the smoothed tracks at daily intervals for the earlier years and a 12-h intervals subsequent to 1930.

3. SCOPE OF REPORT

Values of meteorological data we believe pertinent for storm surge models are presented in tabular and graphical form in this report. The time period covered in detail starts at 0000 CST on September 9, 1961, and ends at 1800 CST on September 12, 1961. Since we are concerned with storm surge and not with a comprehensive look at the 3-dimensional structure of tropical storms, the data presented are limited to the surface. Reconnaissance aircraft data and other upper-air data are used, as necessary, in determining surface parameters such as track, central pressure, size, winds, etc. A brief history of the storm is provided from its beginning as a tropical depression just north of the coast of Columbia, South America, until it finally dissipated in Canada nearly two weeks later. Detailed analyses were made for the period most important for storm surge generation along the continental coast of the United States. For this period, data were analyzed to provide a time history of central pressure, radius of maximum wind, and forward speed. This information is tabulated and presented in table 1 at 3-hourly intervals for September 9 and 12 and at hourly intervals for the more crucial times of September 10 and 11.

Continuous tide gage records and observed high water marks have been tabulated. Data are presented on the location, and to the extent possible, the time of high water. Every attempt has been made to provide locations and descriptions of high water marks as accurately as possible. Original records have been reviewed in each case to obtain the maximum available information.

4. SOURCES OF DATA

The reports discussed in section 2 were used to the maximum extent possible in these investigations. To insure the accuracy and completeness of this report and to enable us to provide more detailed information on track positions, speed, central pressure, etc., original records were carefully examined. This permitted us to provide the most comprehensive and detailed analysis yet developed on meteorological factors important for storm surge prediction.

4.1 Meteorological Information

The basic information is obtained from the regular reporting network of weather stations operated by the National Weather Service (NWS), NOAA. These reports are part of the nation's historic weather records and are maintained at the National Climatic Center (NCC), Environmental Data and Information Service. Additional data on Hurricane Carla are stored on microfilm files at the NCC. This latter extensive data file on Hurricane Carla includes the following items for most of the period September 3-16, 1961:

- Teletypewriter traffic (circuits 7021 and 7072)
- Surface observations from Central America through Canada
- Ship weather observations
- Weighing rain gage charts
- Triple register-wind, rain, and sunshine records
- Barograms and temperature records
- Radiosonde records
- Radar scope photographs
- U.S. Navy Weather reconnaissance flight data

In addition, meteorological data were collected by research aircraft of the National Hurricane Research Project (NHRP). The collected data were processed by computer, which produced printouts of flight data, flight-level wind information, and other meteorological information. These listings are stored on microfilm files in the NOAA Hurricane Research Laboratory in Miami, Florida. A detailed description of this meteorological information collected by aircraft, including the instrumentation, its calibrations and reliabilities, were published in the NHRP report No. 52 (Hawkins et al., 1962).

In addition to the network of regular reporting stations, observations are taken by many private individuals and corporations for their own uses. In some cases, this material is filed with NCC as part of NOAA's Cooperative Reporting Network. Additionally, after many severe storms, surveys are made to obtain supplementary data that are not routinely collected by any Federal agency. Many wind records, barographic traces, and individual meteorological observations were obtained by such a survey conducted by the U.S. Army Corps of Engineers. This information is in the files of the Galveston District, Corps of Engineers, and was made available to us for this report.

4.2 Tide Gage Data and Observed High Water Marks

The primary source of tide gage data in the United States is NOAA's National Ocean Survey (NOS). NOS maintains a network of tide gages along the coastal and inland waters of the United States. Tide gage data for this regular reporting network were obtained from the National Ocean Survey, Rockville, Maryland. Additional tide gages are maintained by other Federal agencies, private individuals, and industries for their own uses. This information was obtained in the poststorm survey by the Galveston District, Corps of Engineers, and was used in this report.

Frequently, surveys after major hurricanes obtain "high water marks." These high water levels are determined from marks left on the sides of buildings or inside buildings, from debris lines, and from eyewitness reports. These high water marks are subject to varying degrees of uncertainty. Only the high water marks verified by eyewitnesses who remained during the storm passage contain an indication of the time of highest surge. While these may only be approximate, they provide a more comprehensive documentation of the extent and height of storm surge flooding than the much more sparse recording tide gages. The original records in the files of the Galveston District Corps of Engineers were examined to catalog those high water marks. These data were originally plotted on USGS quadrangle sheets to determine their precise locations. This information is presented in this report in both graphical and tabular form.

5. GENERAL METEOROLOGICAL SITUATION

Hurricane Carla developed initially as a weak perturbation on the Intertropical Convergence Zone (ITCZ). Increased shower activity was noted on September 1 and 2, and a closed circulation was evident on the morning of September 3 (0600 CST). By the morning of September 4, the circulation had intensified and the storm was classified as a tropical depression. The complete storm track is shown in figure 1. The circulation, which had been first noticed along the ITCZ on September 3, had intensified about 150 nmi northwest of the coast of South America (approximately 12.6N 77.0W) and had moved northeastward and was located at 0600 CST about 200 nmi east of the Nicaraguan coast (approximately 14.2N 80.2W). During the 4th

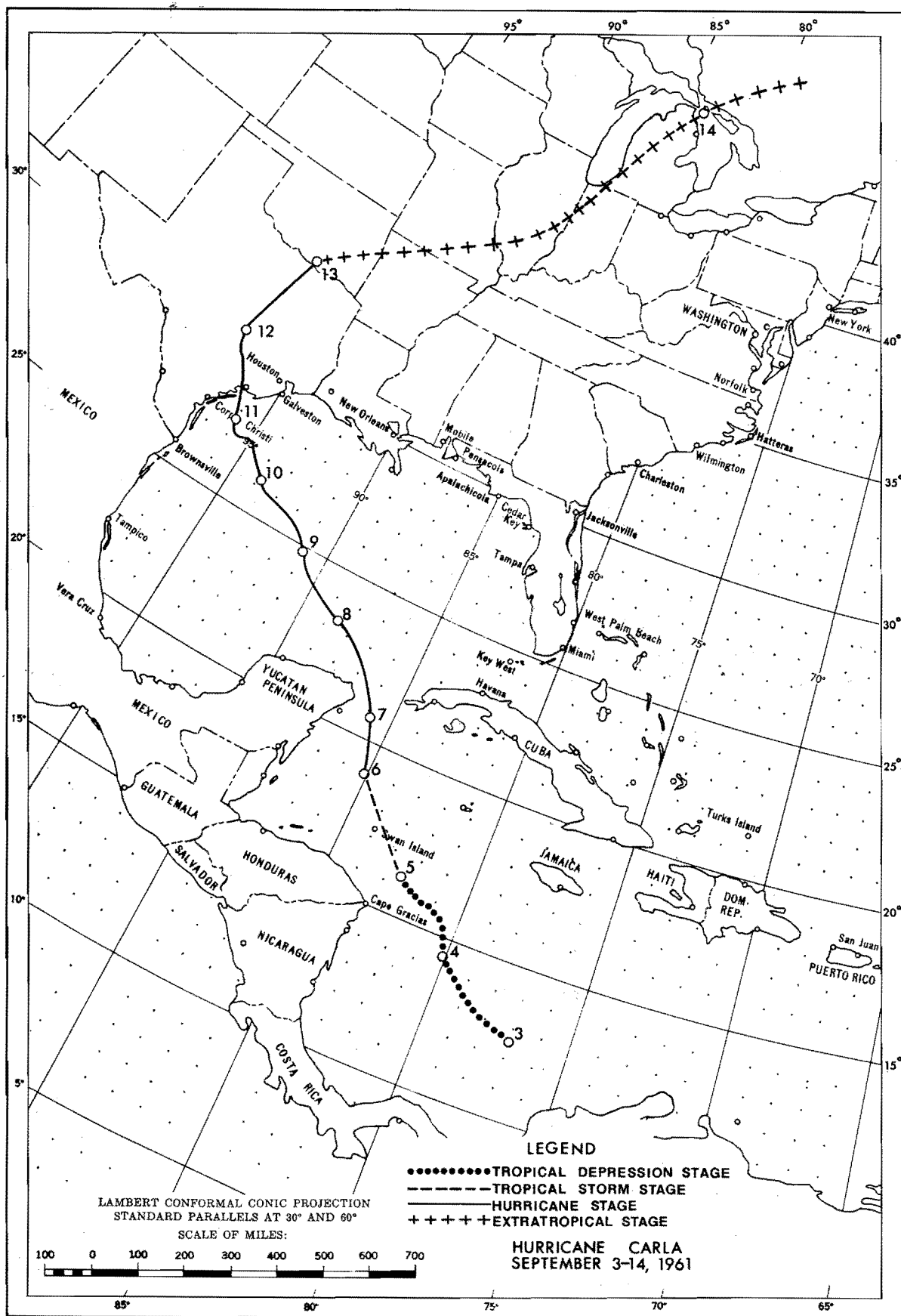


Figure 1.--Hurricane track, September 3-14, 1961, for Hurricane Carla.

through the morning of the 6th, the storm continued to steadily intensify. By 0600 CST on the 6th, the storm was located about 150 nmi from the Yucatan Peninsula (approximately 19.0N 85.1W), and had reached hurricane intensity. The storm turned to a more northerly course on the 6th and early on the 7th as it continued to intensify. This slightly more northerly direction kept the storm over the warm waters of the Yucatan Channel. As it moved through the channel, maximum winds were estimated to have increased to about 110 mph, and gales, extending out several hundred miles, battered both Cuba and the coast of Mexico.

Late on the 7th, after entering the Gulf of Mexico, Carla turned to a more generally west-northwesterly course that continued until the storm had almost reached the Texas coast. A significant feature of Carla was the steady increase in intensity from the time a closed circulation was first observed until the storm had crossed the Texas coast.

Early on the 9th, Carla was a very severe storm with the storm circulation covering the entire Gulf of Mexico (fig. 2). Maximum winds near the center were estimated near 135 mph and fringe effects were being felt by all Gulf Coast States. During the night of the 10/11th, the storm changed direction to a more northwesterly course and crossed the Texas coast during the early afternoon of the 11th. The storm reached its greatest intensity (931 mb) just prior to landfall. After landfall the storm weakened rapidly.

The storm moved nearly due northward across central Texas on the 12th, and, by 0600 CST the 13th, the center was located in south central Oklahoma. During this period, the storm circulation became diffuse and there was no apparent eye north of the Waelder, Texas, region (about 90 nmi inland). From the time the storm crossed the Texas coast until 0600 CST on the 13th, the storm weakened and the central pressure had increased 56 mb, from 931 to 987 mb. Damage across Texas along the path of the storm ranged from severe to moderate.

Carla became extratropical during the 13th and turned more toward the northeast. By noon, the storm had combined with a quasi-stationary front which had been lying with a west-southwest to east-northeast orientation across southern Kansas and northern Oklahoma on the 12th. The combined storm system moved rapidly off to the northeast and was over southern Lake Michigan by midnight of the 13th. The storm continued to the northeast crossing Ontario and Quebec, Canada, on the 14th and 15th.

6. ANALYSIS OF METEOROLOGICAL PARAMETERS

A primary focus of this report is to analyze, objectively and in detail, those meteorological factors of hurricanes used in storm surge models. For this purpose, we began with the raw observational data and then compared our analyses with previous analyses. This permitted an unbiased review of all available information. This section describes the analyses of the present study. The intent of our analysis was to yield specific values of the hurricane's central pressure, the radius of maximum wind, the direction and speed of its forward motion, and the location of its center at various time intervals. We paid particular attention to the period just before and after landfall since this is the time interval most critical for storm surge computation. The basic observational data used in our analyses are given in the appendix.

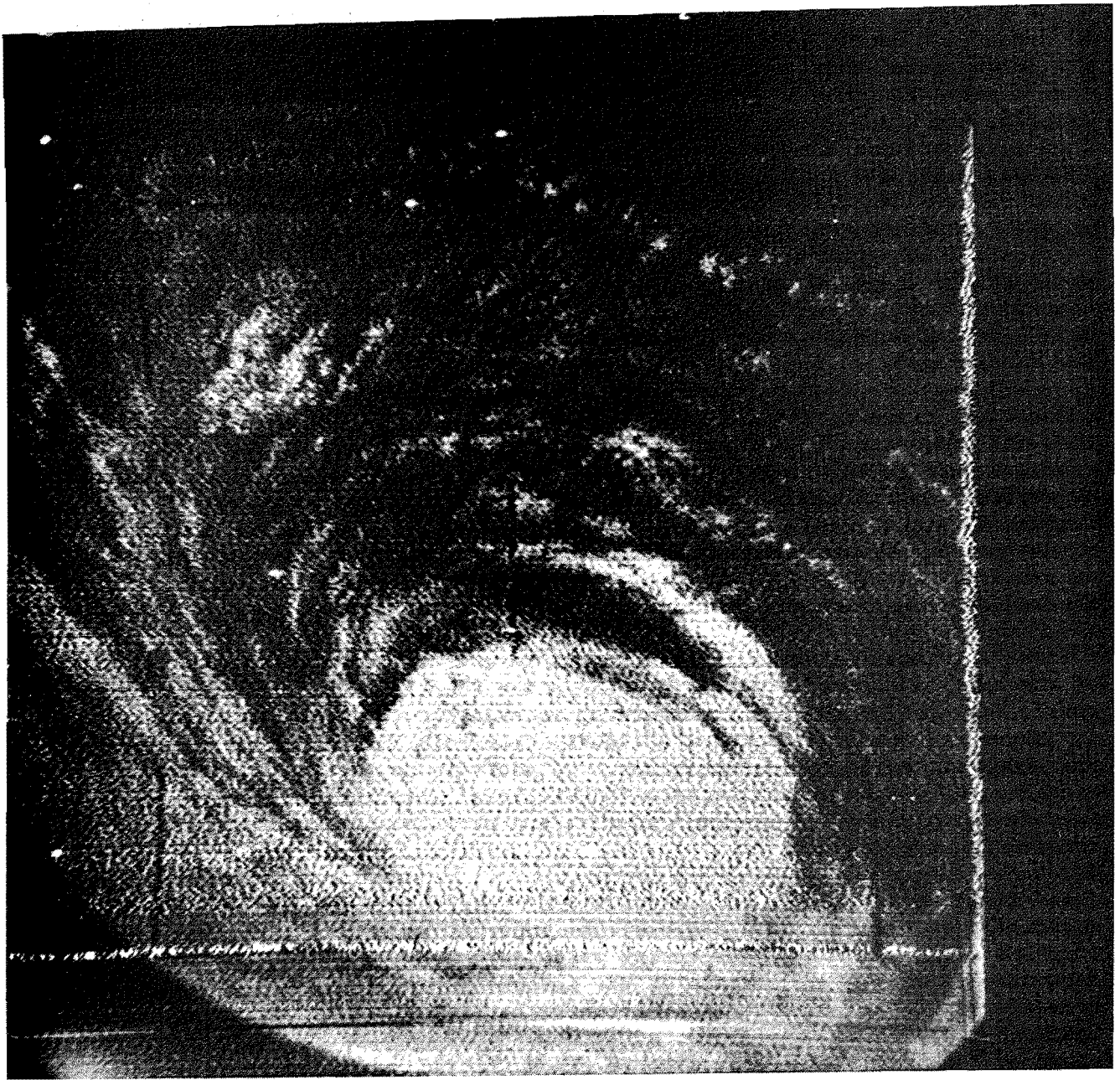


Figure 2.--Satellite photograph for September 10, 1961.

6.1 Storm Track

Generally, the analyses of meteorological data are weighted toward synoptic-scale motions. Such analyses were given in the investigations cited in section 2, except for Harris (1963). The hurricane track obtained is a best estimate of the large-scale storm motion and not a precise location of the eye at discrete time intervals. Such an analysis of the large-scale motion does not precisely describe the track needed for storm modeling. Track differences of a few miles in a large-scale storm motion can be significant for replicating high water on the open coast and inside bays and estuaries. A surge model requires, among other factors, specific information on the precise landfall point, the time of landfall, and accurate positions at closely spaced intervals in time along the hurricane track prior to and after the hurricane's landfall or along the track while the hurricane is near the coast for storms that move along the coast. Therefore, the analysis of this report emphasizes the meteorology in greater detail during September 10-11, when Hurricane Carla was approaching and crossing the Texas coast.

The final track determined for Hurricane Carla from 0000 CST September 9 through 1800 CST September 12 is shown in figure 3, with locations of the meteorological stations used in this report. The stations are either a Weather Service office or military installation, except for Freeport, and regularly report to the National Weather Service. Data from Freeport were obtained from recording instruments maintained by private industry. The positions of the hurricane center are shown at 6-h intervals from 0000 CST September 9 to 12. The central pressure (mb) and the radius of maximum winds (nmi) are plotted to the left of 12-h positions.

Since a primary interest in this report is a detailed determination of the path of the hurricane immediately before and after landfall, the area nearest the coast, enclosed in the box in figure 3, is enlarged for greater clarity in figure 4. The hurricane locations are at hourly intervals with values for the central pressure and radius of maximum winds. In addition to regularly reporting weather stations and weather radar observation stations, observations by personnel of private industries, private individuals, and eyewitnesses were useful aids in determining the storm track.

Any final determination of the track and speed of forward motion of a hurricane, especially over sparse data regions, has inherent uncertainties. The selected track is finalized from a subjective analysis to account for all available information. Figure 5 is an example of the information used in our analysis. Radar from all available land stations, Brownsville and Galveston, Texas and Lake Charles, Louisiana, are shown as solid dots. Aircraft-reconnaissance penetration fixes are shown by the triangles. The selected track, fitted by eye, is shown by the open circles. The times are indicated every 3 h starting with 1500 CST on September 10.

The data from radar fixes and aircraft penetration are the primary resource used in determining the track and speed of forward motion of the hurricane over the open ocean. However, information obtained from all ships operating in the area was considered in determining the final track and speed of motion. The information from each of these sources was carefully evaluated before a final track was selected.

Some characteristics of radar precipitation echoes in Carla and other tropical storms were discussed by Senn and Stevens (1965), who examined the horizontal motion of small radar precipitation echoes in Hurricane Donna and other tropical

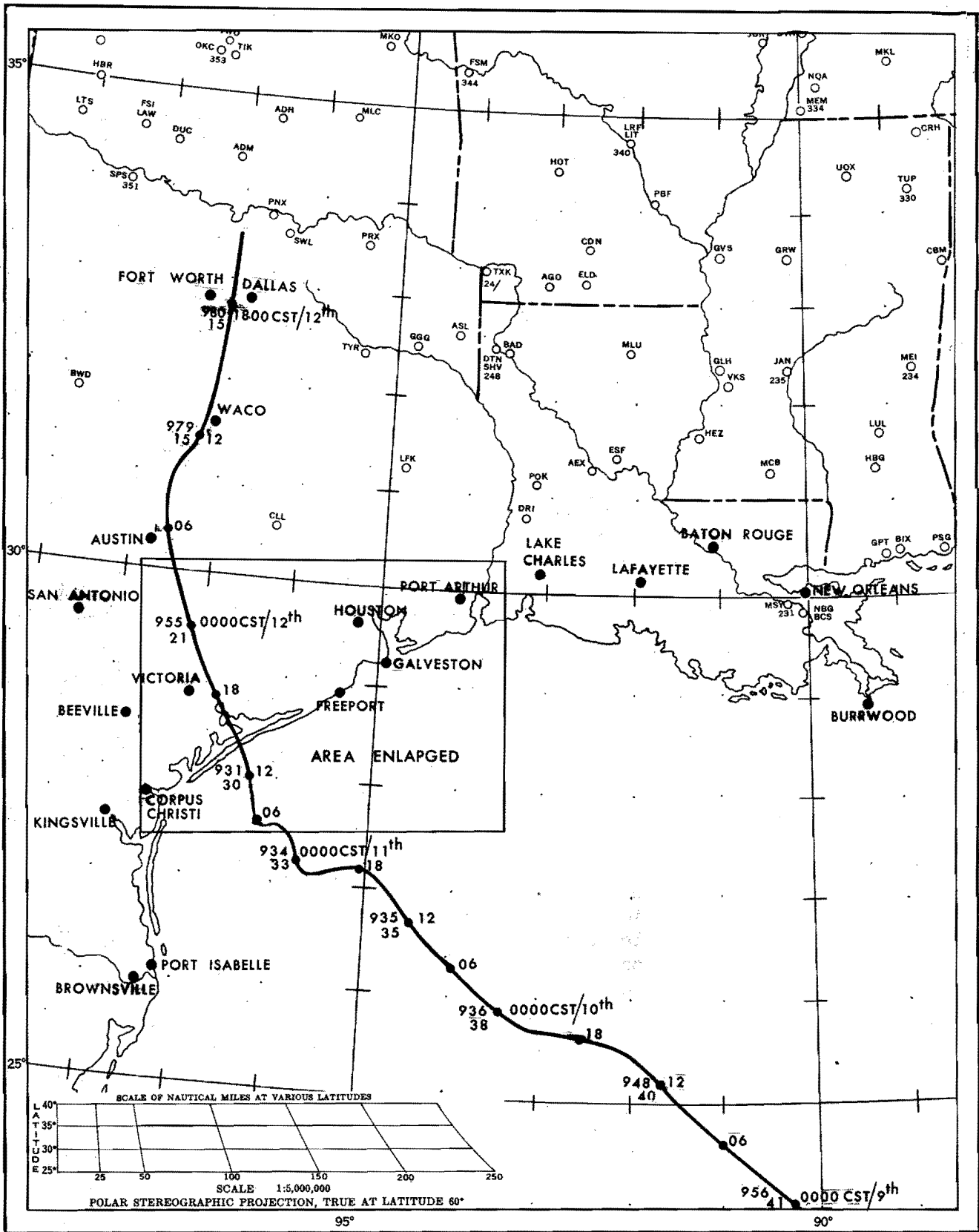


Figure 3.--Hurricane track, 6-hourly positions from September 9 to 12, with central pressure and radius of maximum winds plotted at 12-h intervals.

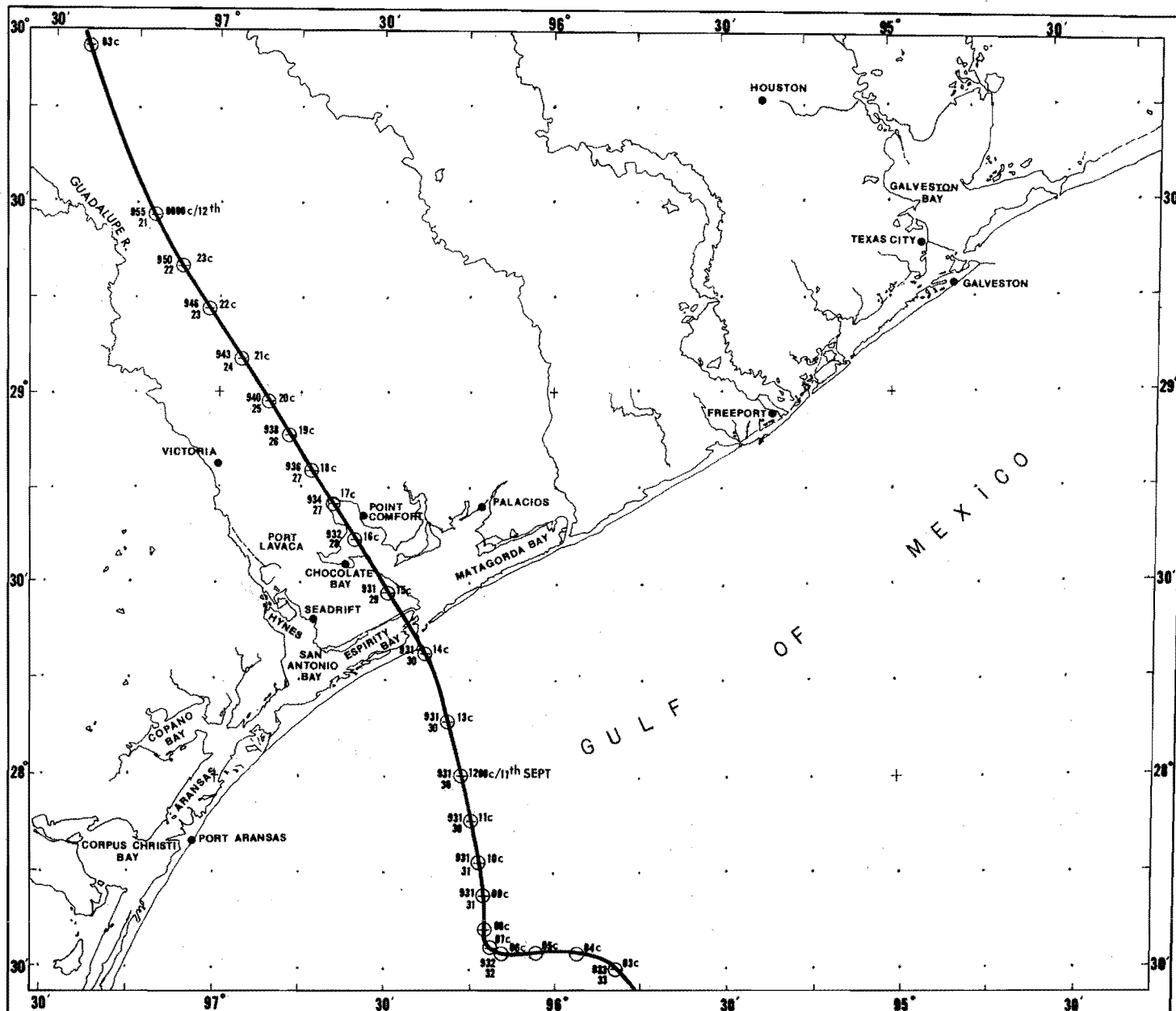


Figure 4.--Hurricane track, hourly positions, 0300-2400 CST on September 11.

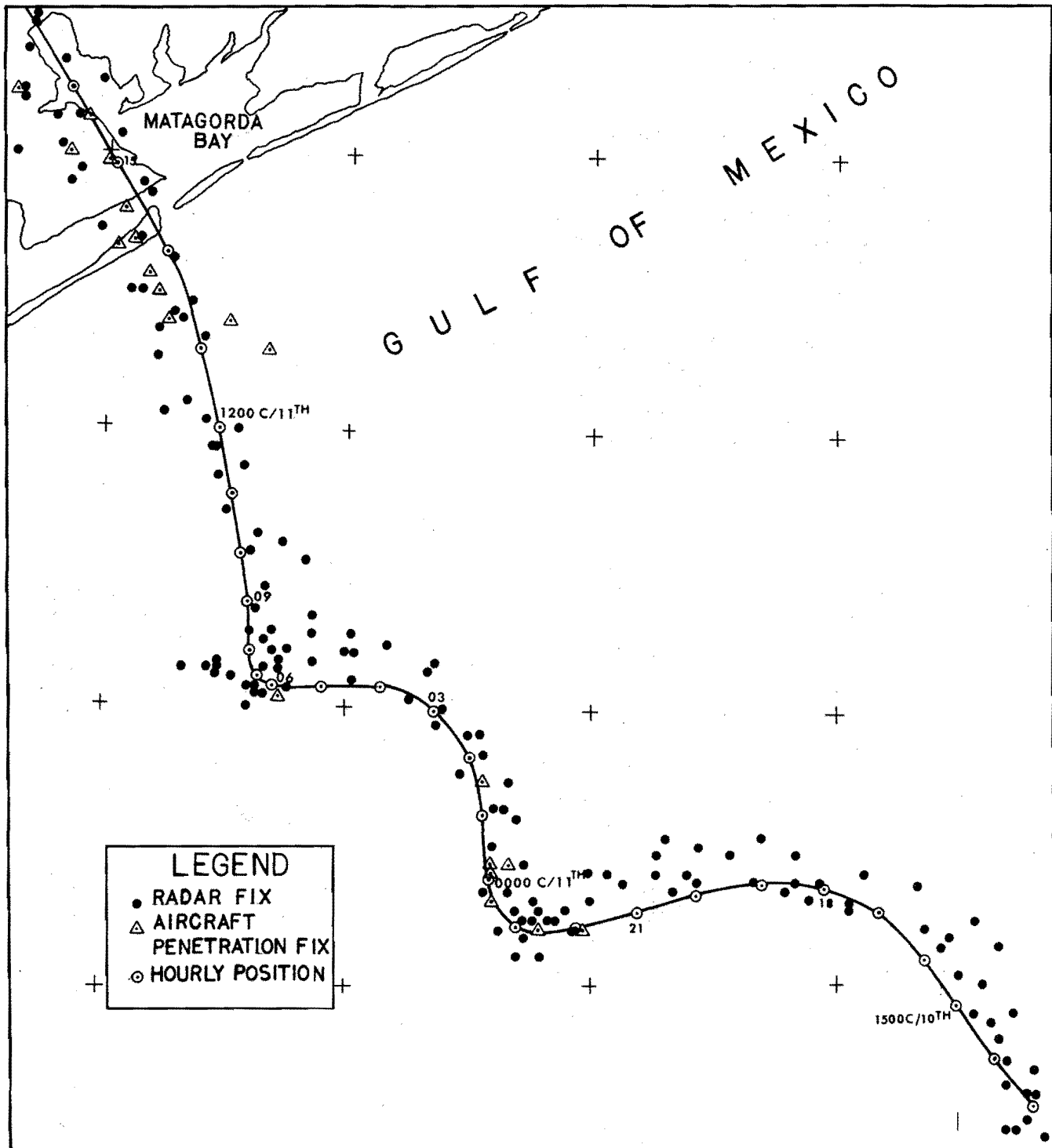


Figure 5.--Hurricane eye center obtained from radar weather observations (.) and aircraft reconnaissance penetration fixes (Δ) together with positions of hurricane center (⊙) on the selected best track.

storms. They found that considerable differences exist in the motion of echoes under different atmospheric conditions and pointed out that the echoes become more concentrated near the core region when observed over land and at night. Holliday (1966) compared the center fixes of the eyes of several hurricanes determined by reconnaissance aircraft with the best-fit radar track obtained by coastal radars. Results of the comparison indicate that the maximum differences vary from 13 to 37 nmi in individual hurricanes. He also identified the causes of these deviations for each storm. [See table 1 of Holliday (1966).]

The track position selected deviates from the average radar position line for much of the evening of the 10th and early morning of the 11th. We chose to follow a more westerly and southerly track that relies heavily on the aircraft reconnaissance fixes. Radar locations are based upon echoes return from the wall cloud. These have shown some bias in location relative to the pressure and wind center, our primary interest. Pressure, wind, and dropsonde observations obtained by aircraft penetrations are usually more accurate than radar eye fixes from land-based observation points. Center positions determined by aircraft must, of course, be evaluated in terms of possible navigational error. Some published tracks for Hurricane Carla have shown a loop on the 11th between 0500 and 0800 CST. Examination of the data is inconclusive. Our analysis shows a definite slowing of forward speed starting at 0500 and continuing until shortly after daybreak as the storm changed direction, but we have chosen not to depict any loop in the track.

6.2 Forward Speed

The translation speed of the hurricane is another important ingredient for surge determination along the open coast in bays and estuaries. Hourly positions were the basic building blocks for determining this forward speed of translation. First, speeds between successive hours were determined and plotted on a time scale, and a smooth curve was drawn subjectively to minimize abrupt changes. Second, speeds from three successive hours were then averaged and plotted at the midhour, and a smooth curve drawn from these data was used to adjust the hourly locations. The new locations were examined with regard to the observed data and, if necessary, some further adjustments were made. This process was continued in an iterative fashion until the best combination between smooth forward speeds and observed eye positions was obtained. This process helped obtain the best possible estimates of forward speed and hourly locations.

There is a distinct slowing of forward progress on the night of September 9-10 (fig. 6) and then again on the morning of September 11. About daybreak on the 11th, the hurricane had become nearly stationary and available data suggest that Carla was then moving in an aimless, wandering fashion over a very small region. We have interpreted these data as showing a slow movement continuing along the selected track. Between 7:00 a.m. and 8:00 a.m. on the morning of the 11th, the hurricane began to accelerate and reached a peak forward speed (13 mph) at landfall, approximately 1415 CST, September 11. The storm then decelerated rapidly slowing to 6 1/2 kn by 1800 on the 11th. It then began to accelerate and reached a peak of nearly 14 kn on the afternoon of the 12th. By this time, the hurricane was well inland and only minimal wind effects were felt along the coast and in the bays and estuaries.

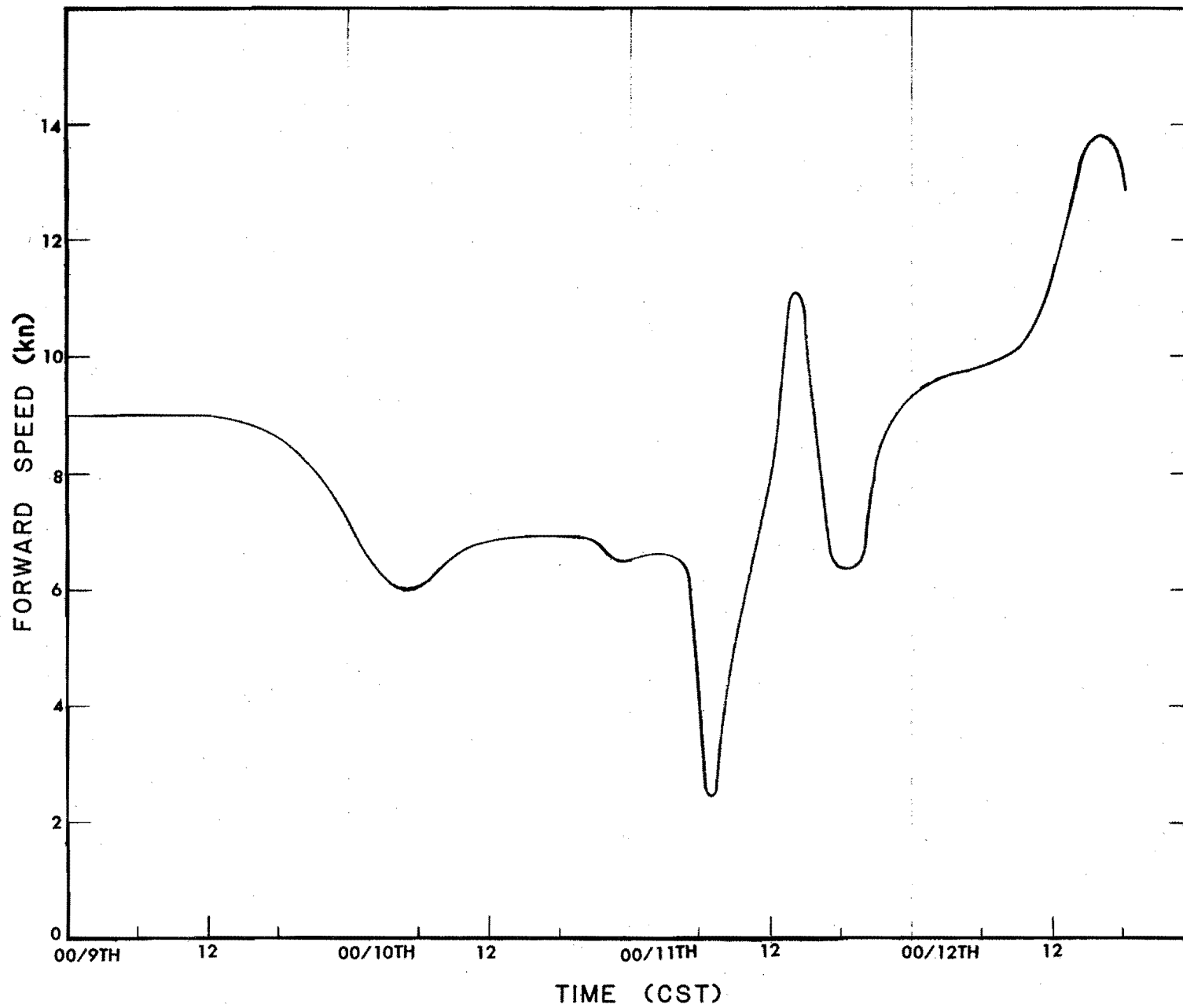


Figure 6.--Variation of forward speed with time, Hurricane Carla, September 9-12, 1961.

6.3 Central Pressure

The most important factor in storm surge modeling is the intensity of the hurricane, which is directly related to its central pressure. Figure 7 shows the finalized track of Hurricane Carla as the storm crossed the Texas coast. Also shown are minimum pressures observed at regular reporting stations and minimum pressures obtained in poststorm surveys from irregularly reporting stations. These observations were not all obtained at the same time. Since the storm track did not cross any station location, none of the values are equal to the storm's minimum central pressure.

Figure 8 shows our analysis of the pressure information determined from land stations and aircraft reconnaissance flights to obtain a time history of Carla's minimum pressure. The curve drawn is, in general, a curve fitted closely to the data by eye. An exception is the early morning of September 10. There are a series of five observations by Navy reconnaissance aircraft and one by the NOAA research flight facility aircraft collected on the 10th, for which the two higher observations seem to be erroneous or to denote short term fluctuations in the central pressure of the hurricane. It seems more appropriate to draw for the mass of data with central pressures below 940 mb. The point indicated for Victoria, Texas, is for the lowest pressure observed at the station. The station is located at about 13 nmi to the left of the track and could be expected to have a central pressure higher than the minimum observed at the eye. Likewise, Port Lavaca is located slightly to the left of the track. By the time the hurricane had moved inland and was passing Austin and Fort Worth, the storm had become diffuse, there was no readily discernible eye, and lesser differences could be expected between the minimum central pressure observed at the center of the storm and that observed at nearby stations. Although Austin is slightly to the left of the track, no difference is shown between the central pressure at Austin and that in the center.

6.4 Wind Analysis

Supplemental to the minimum pressure reported at stations during hurricane passage, surface winds were recorded at several weather stations operated by the National Weather Service and the military services. Also, anemometer readings recorded by private industries were collected in posthurricane surveys. Numerous reports of wind conditions during the passage of Carla were also collected from cooperative observers and private individuals. These reports were at time of maximum wind occurrences and, in some cases, included additional information on the time and directions of wind shifts and the period of calm wind, if observed. Even though most of these unofficial reports were estimates made by inexperienced observers, they gave good indications of hurricane track positions relative to the observing location. They were used as an aid in the wind analyses as well as in determining the storm track over land.

Figure 9 is an example of wind analysis from a plot of wind data recorded by regularly reporting stations and ships. Flight-level winds reported by reconnaissance aircraft within 3 h of map time were also plotted on the chart as a supplemental aid in the analysis. This streamline analysis for the surface winds shows the flow pattern of the hurricane circulation. The magnitude of the wind is indicated by isotachs, dashed isolines of wind speeds.

The streamline and isotach analysis yielded results that were slightly different from the wind fields prepared for the COE by the Hydrometeorological Branch of the

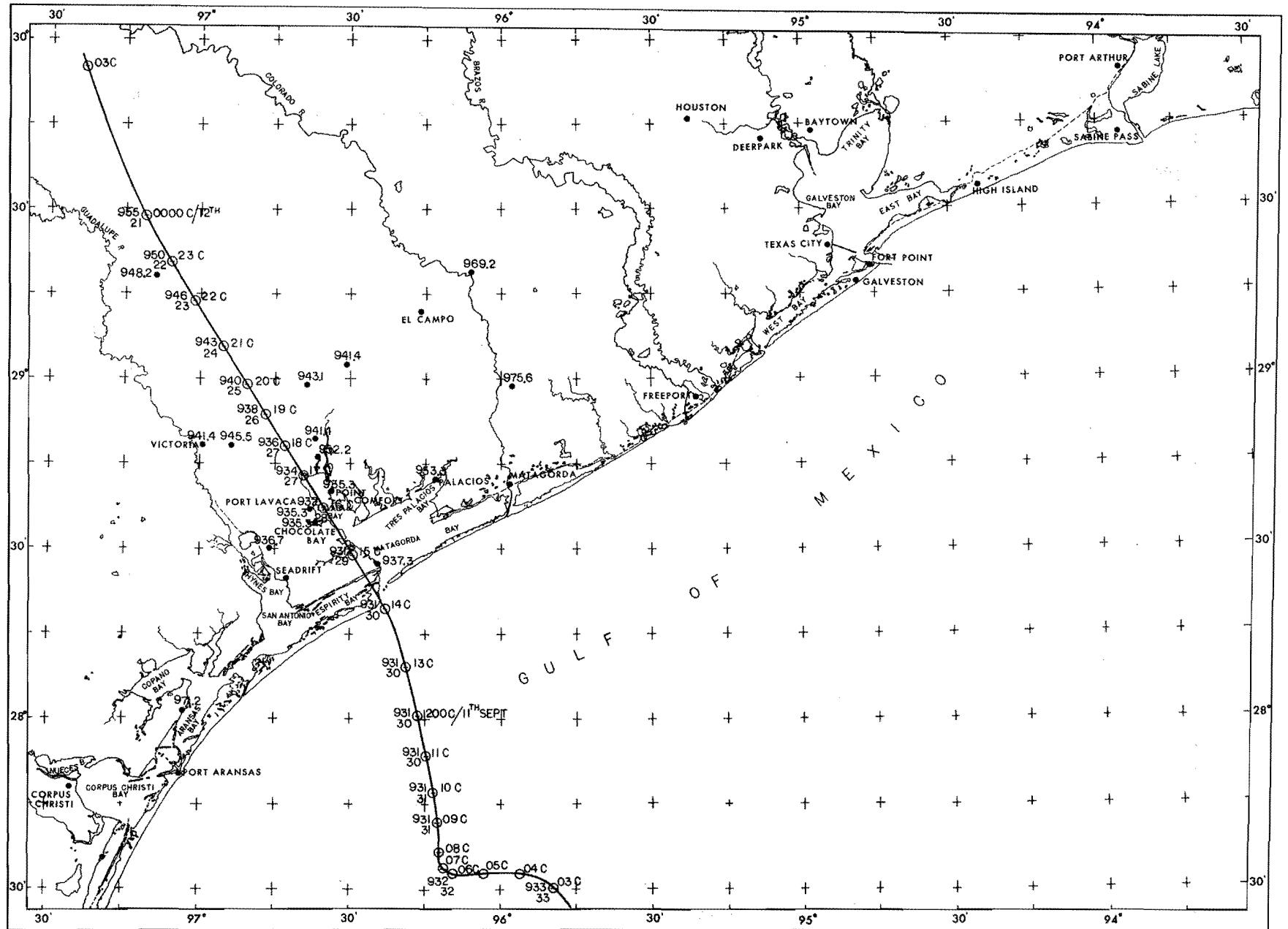


Figure 7.--Minimum pressure observed by land stations during Hurricane Carla.

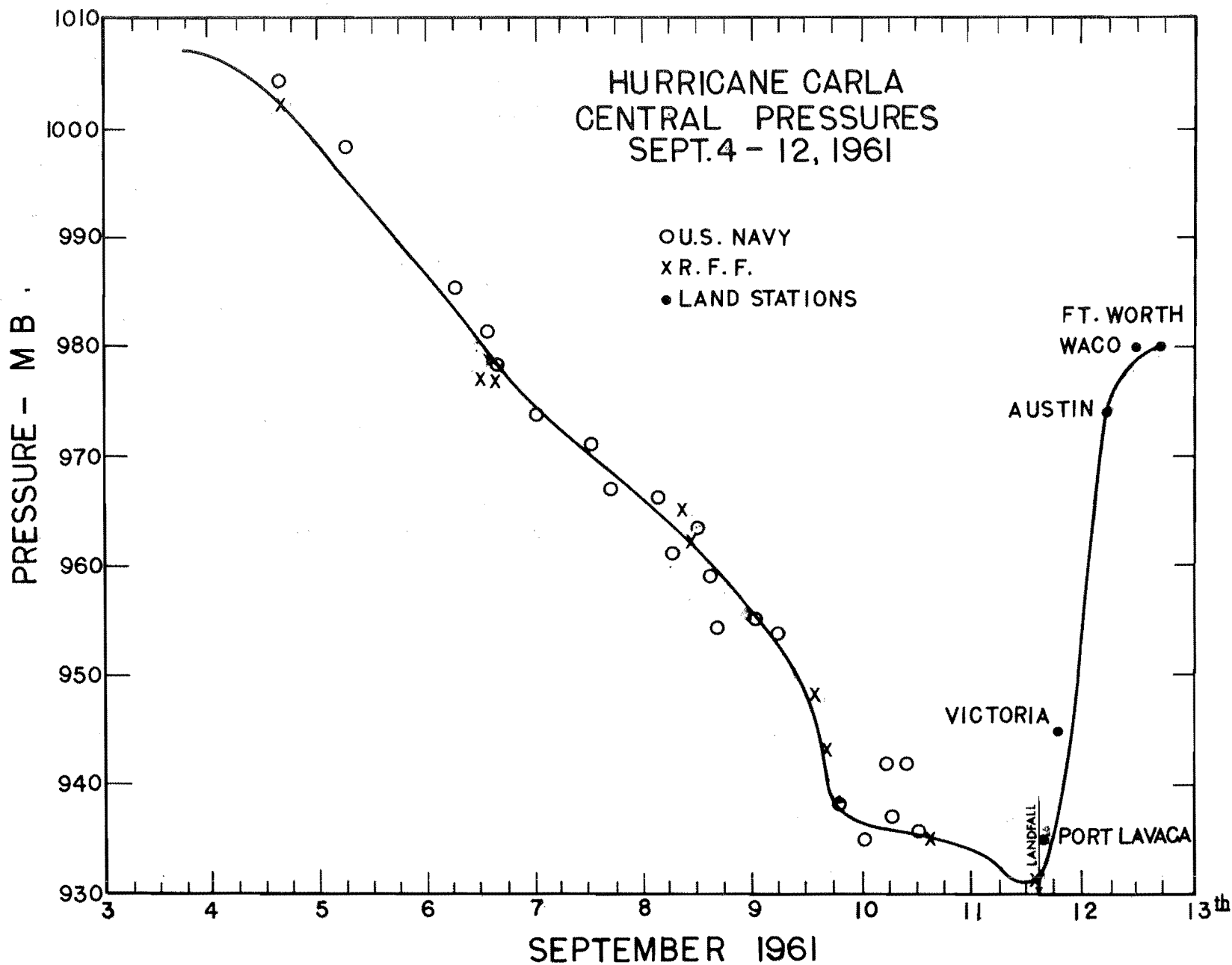
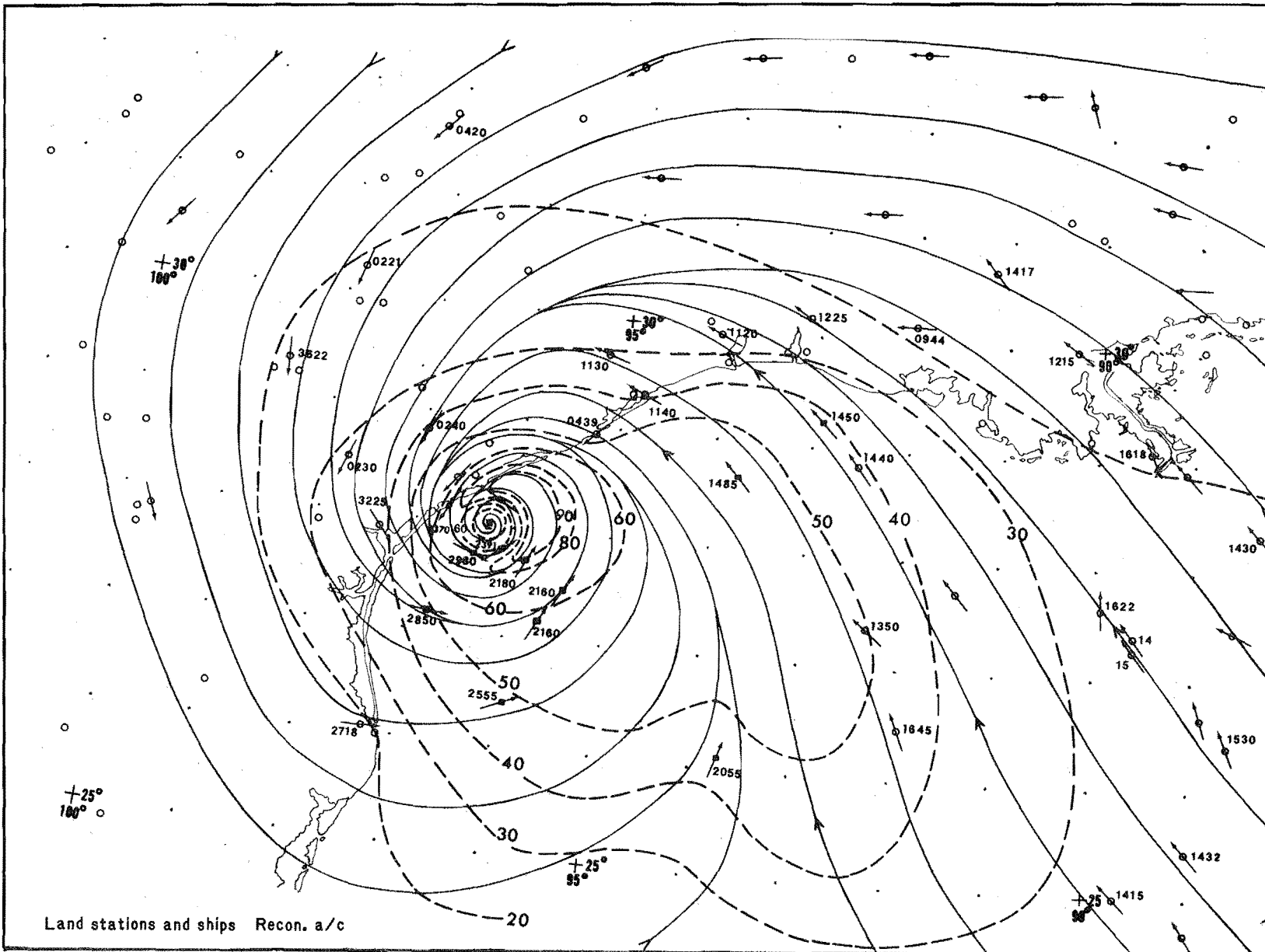


Figure 8.--Variation of central pressure with time, Hurricane Carla, September 4-12, 1961.



HURRICANE CARLA 1800 GMT SEPTEMBER 11, 1961

Figure 9.--Example of streamline analysis, 0300 CST, September 11, 1961; isotachs are shown in dashed lines.

NWS (U.S. Weather Bureau 1962). In the earlier analyses, available data were used in conjunction with an empirical wind-pressure profile. Our analysis results from use of actual surface wind observations, supplemented by flight level and surface wind observations made from reconnaissance aircrafts. We did not use any model results to supplement the observed data. Time and space adjustments of aircraft reports were considered in the analysis. The reconnaissance aircraft data were not used in the earlier report.

6.5 Radius to Maximum Winds

The size of a hurricane is denoted by the distance between the lowest central pressure and the bank of highest winds around the center. The radius to maximum winds was determined from all the observations available for this storm. Three different types of observations were available. The first measure includes the maximum flight-level winds and estimated surface winds as reported by reconnaissance aircraft. The second is the radar eye diameter, also reported by reconnaissance aircraft. Some optical reports were used when the reconnaissance aircraft was in the eye of the storm. The third measure, useful only after the hurricane was near shore, estimates the radius from surface wind records at land stations.

Flight-level winds, recorded at one-second (1-s) intervals by the reconnaissance aircraft of the U.S. Weather Bureau Research Flight Facility, were processed and 10-s averages of the 1-s intervals are available on magnetic tapes. The aircraft location for each observation was translated as a relative position to the storm center. From a listing of these wind records, composite maps of flight-level winds at given time intervals were plotted. Analyses of these maps yielded another measure of the radius to maximum winds.

Figure 10 is an example of a composite map of flight-level winds for the period 1750 to 2255 GMT on September 10, 1961. The wind data recorded at an altitude of 13,800 ft (4,200 m) were plotted at translated positions relative to the storm center. The highest wind speed recorded along each leg of penetration of the eye was about 25 nmi from the center. This distance is nearly one half of the eye diameter reported at flight time. We interpret these high wind speeds to be recorded near wall clouds forming the eye of the hurricane. The radial profile of flight-level winds, recorded on the 8th and 10th (fig. 11), shows a lack of concentration of the maximum winds at the eye wall, and the area of extreme high winds is spread over a distance of more than 10 nmi. This led us to place more weight on analyses of the observations rather than use the distance to observed maxima directly.

From the 8th to the 10th, Carla continued its intensification until a minimum central pressure of 931 mb was reached prior to landfall on the 11th. However, Carla's maximum winds increased only slightly during this period. It is of interest to note that a very remarkable feature of Carla was the horizontal extent of the extreme high winds. On the 8th, the maximum observed surface winds were estimated at 110 kn, and the 45-kn winds extended to 100 nmi from the center. Flight level winds over 50 kn extended to the 200 nmi radius (Colon 1963). On the 9th and 10th, the magnitude of maximum surface winds remained at 110 kn, while 80- to 85-kn surface winds extended to 110 nmi from the center. On the 10th, maximum surface winds of 100 kn, extending to 40 nmi from the center in the west quadrant and 100 nmi from the eye in the northwest quadrant, were reported by reconnaissance aircraft at 1900 GMT; 110 kn winds, extending to 70 nmi from the eye, were reported in the north quadrant at 2300 GMT.

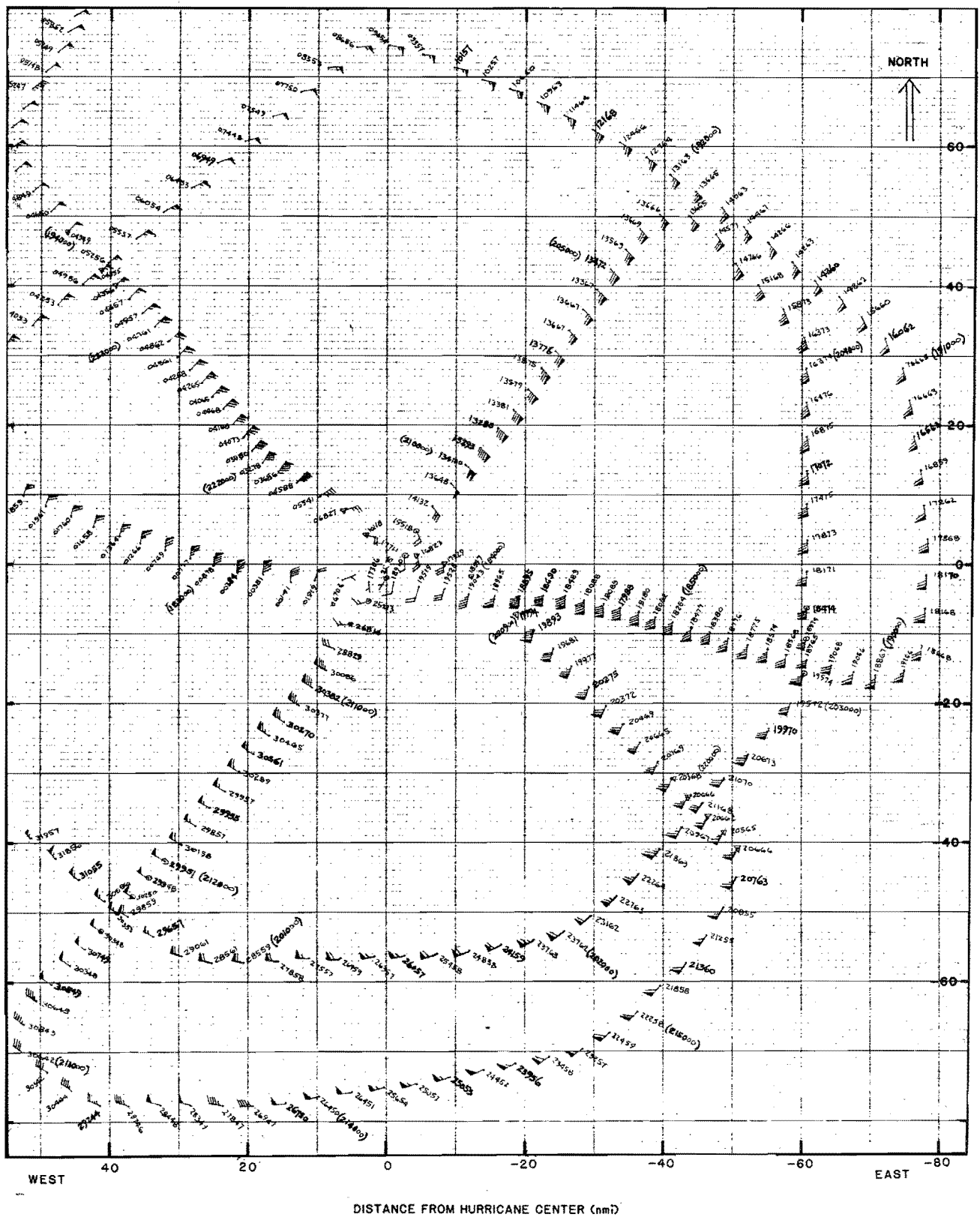


Figure 10.--An example of composite map of flight-level (13,800 ft.) winds 1750 to 2250 GMT (1150-1650 CST), September 10, 1961. Numerals indicate wind direction (in degrees) and wind speeds (in knots). Time of observation is shown in parentheses (in hours, minutes and seconds).

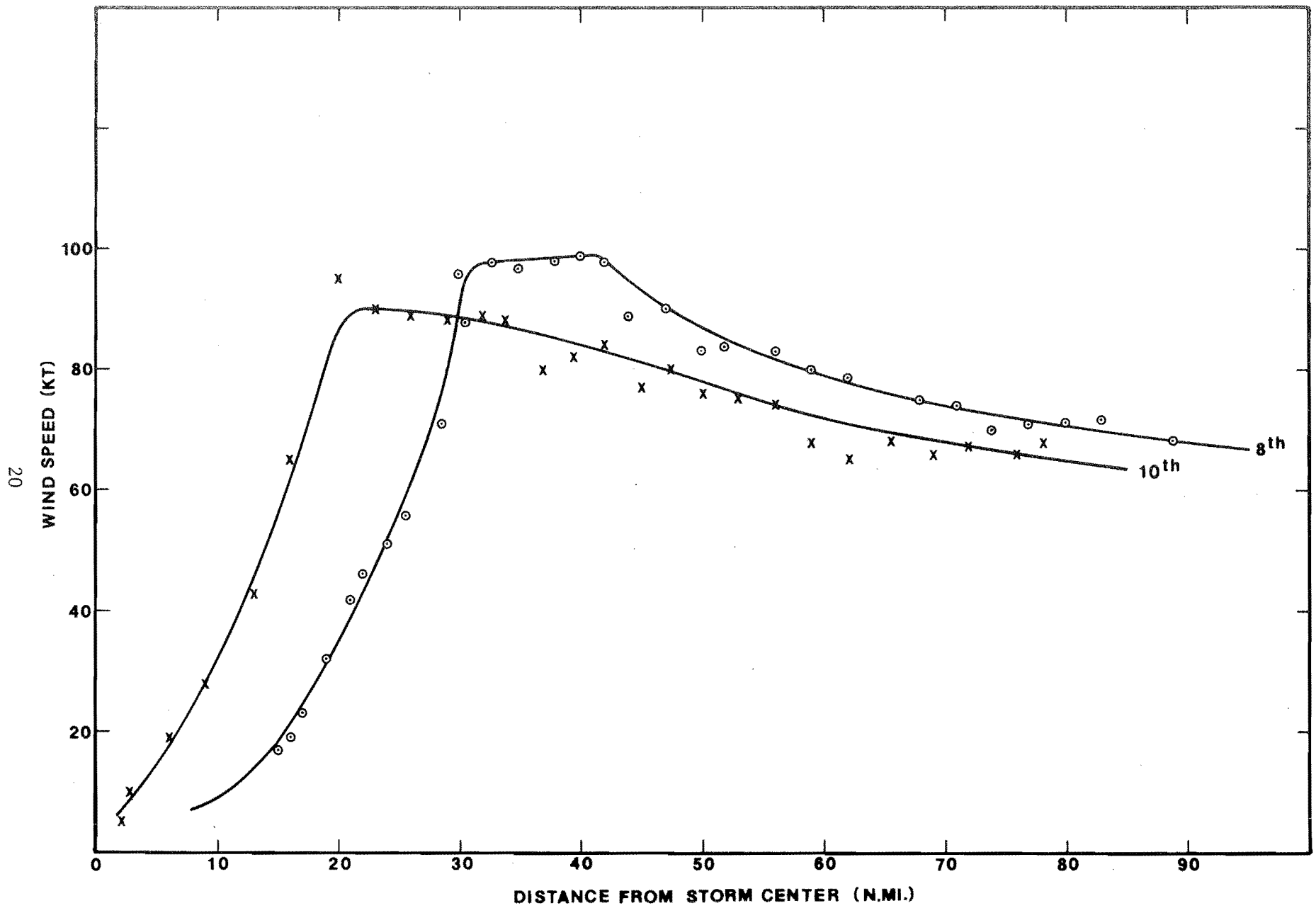


Figure 11.--Radial profile of flight-level winds, Hurricane Carla, September 8 and 10, 1961.

Because of these reconnaissance flight reports of the extent of extreme winds in Carla, our analysis of the radius of maximum winds gives a smooth curve of gradually decreasing radius between the 8th and the 10th. We did not portray a steep drop in radius on the 9th, even though the radial wind profile for that day and the maximum flight-level winds shown on figure 12 suggested a significant reduction in radius. This transitory change in radius of maximum winds was not consistent with the horizontal extent of extreme surface winds in Carla.

Figure 12 provides a curve from which the radius of maximum winds can be determined. It is based on analysis of all available observations just described. Although no specific relation between eye diameter and radius to maximum winds is considered in this report, we qualitatively suggest that they will tend to either increase or decrease together. The eye diameter reports from the reconnaissance aircraft were plotted and further supported the trend for the radius to maximum winds to decrease as the storm approached the Texas coast. In the analyses, the flight level at which winds were recorded has been taken into account. The analyzed results of flight-level winds, yielding an estimated radius of 35 nmi on the 10th at altitudes of 9880 ft (3,010 m) appear to agree fairly well with those obtained from surface winds estimated by reconnaissance aircraft. These surface winds were estimated during low-level penetration of the eye. Reconnaissance flight reports of the 11th show that the aircraft descended to 1,000 ft (310 m) in the eye and observed maximum surface winds of 120 kn, 25 nmi from the center, through a break in clouds.

6.6 Summary of Meteorological Data

The individual parameters from our analysis of Hurricane Carla are listed in table 1. These are listed for locations of the hurricane center at 3-hourly intervals on September 9 and 12 and at hourly intervals on September 10 and 11. For each location, central pressure, speed, direction, and size (both in nautical and statute miles) are listed. The table provides, in convenient form, the information that could be obtained from analysis of the basic data described in the various sections.

7. TIDE GAGE DATA AND HIGH WATER MARK INFORMATION

The abnormally high water levels during Carla were obtained from tide gage records and from high-water-mark elevations obtained by poststorm surveys. For consistency, all water levels must be related to a common datum. The datum for the topographic charts, published by the Geological Survey, is referred to as the National Geodetic Vertical Datum (NGVD). This datum is fixed and does not reflect the changing stance in sea level since it's establishment nor to subsidence along the Texas coast area. In this report, all water level observations have been translated to the NGVD datum as far as possible.

In the region of this study, the local tidal bench marks are tied to the NGVD datum plane from the Geodetic Net. The most recent survey, prior to Carla, to establish tidal bench marks was carried out in 1959.

7.1 Tide Gage Data

Table 2 gives hourly tide heights recorded at tide gages at stations along or just interior to the Gulf Coast for the period of September 9 through September 12, 1961. The water elevations are given in terms of the NGVD datum. Data for

stations inside bays and estuaries are given in table 3. The tide levels are for the NGVD datum against the 1959 surveys. There was no attempt to approximate the changes in local sea level due to subsidence between 1959 and 1961. The data provided are actual gage readings. No effort has been made to remove the predicted astronomical tide. Table 4 gives the predicted astronomical tide for the tide gages at Galveston Pier 21 and at Pleasure Pier.

Only a limited number of tide gage stations are installed and maintained by NOS. Other Federal agencies, state or local agencies, or private corporations have installed and maintained some additional tide gages to provide data for their individual needs. Data from these gages are supplementary to the National network of tide gages maintained by NOS. The organization responsible for maintaining the gage is indicated in the tables. Locations are given in degrees, minutes, and seconds of latitude and longitude. Whether the tide is determined from a continuous graph of a recording gage or by individual observations at selected times on a staff gage, is indicated in this table to give some perspective on the quality of the observations. Where available, the highest tide observed and the time of observation are given as the last line of data for each station in the table.

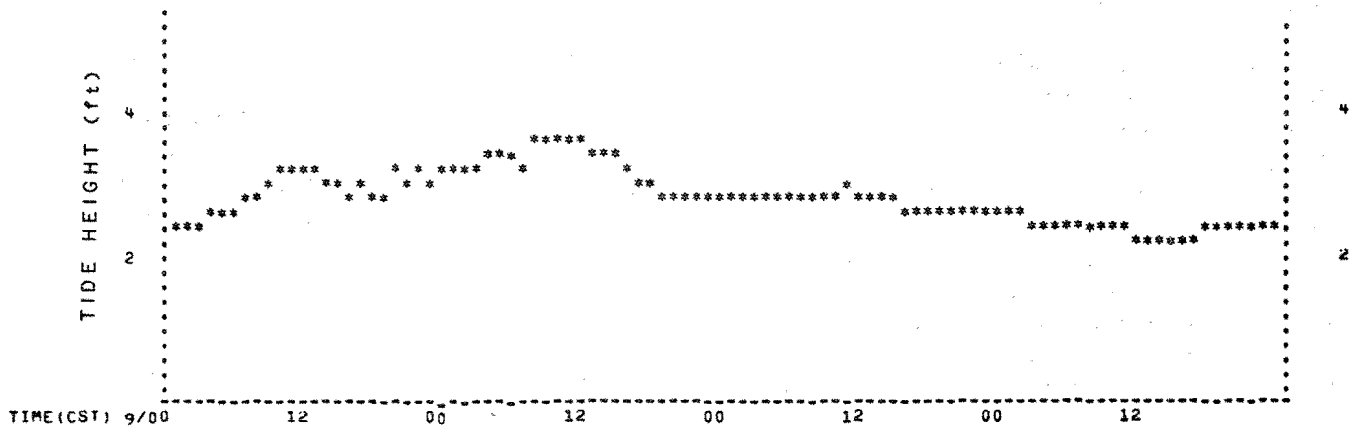
The tide gage records listed in tables 2 and 3, except for Freeport and Baytown (Humble Docks), are shown in figures 13 to 29. The two stations not plotted have only fragmentary records. Data are plotted only to the nearest 0.2 ft.

7.2 High Water Mark Data

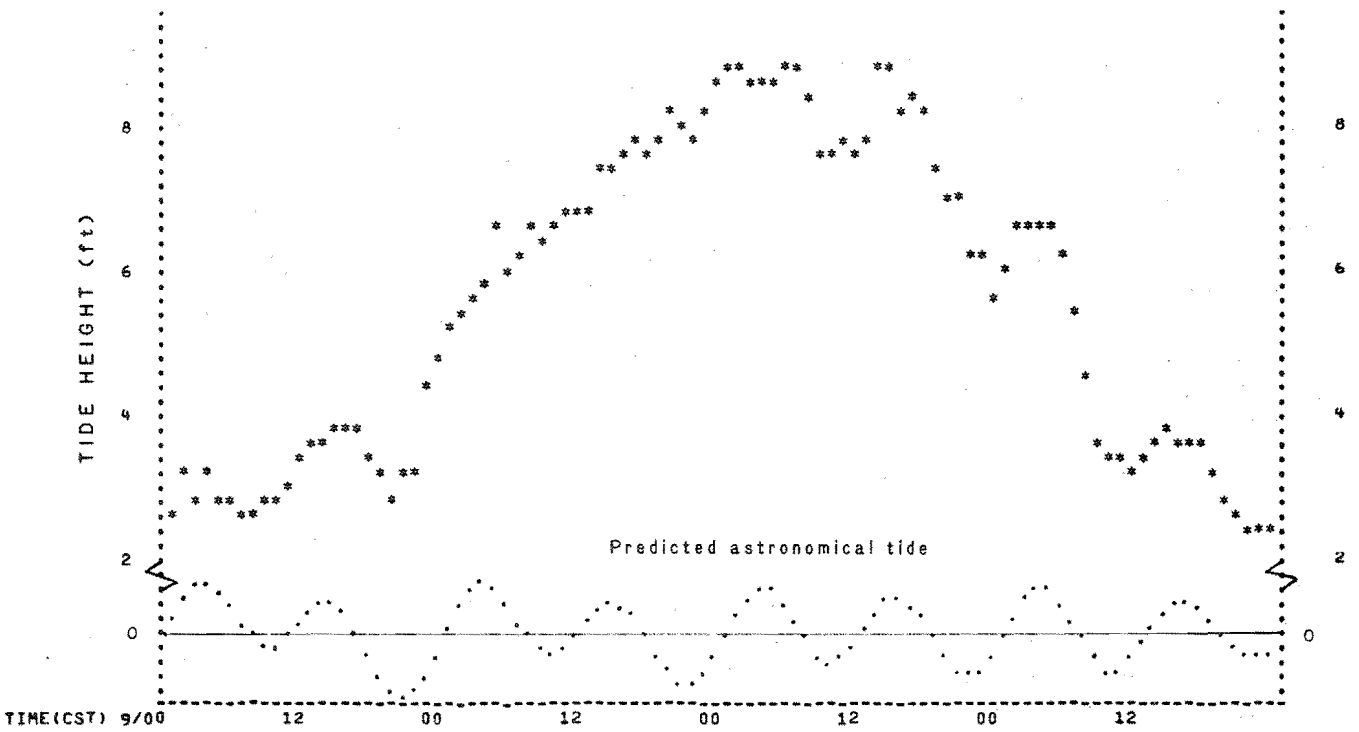
Posthurricane surveys were conducted by field personnel of the U.S. Army Corps of Engineers. Table 5 provides these high-water levels (ft) determined from the high-water marks (H.W.M.). This table also gives the location of the high-water marks in degrees, minutes, and seconds of latitude and longitude and the terrain elevation of the locations (elv) in feet. Double asterisks (**) in the remarks column denote that the high-water level was determined from a debris or drift line. Other measurements which were made inside a house or other structure may be compared to still water levels that would be measured in a stilling well or tide gage house excluding wave action. Since the time of high water is not known, we cannot subtract the effect of normal astronomical tides from these high-water elevations. The high-water marks are in terms of NGVD datum referred to the 1959 survey.

7.3 Geographic Distribution of Storm Surge

In general, the highest surges occurred to the right of the storm track. This can be seen from examination of figure 30. The figure shows tide gage and selected high-water-mark elevations observed in Carla; the precise locations of the data points are given in table 5. It is a generalized representation from detailed charts published by the U.S. Army Corps of Engineers, Galveston District, (1962). The maximum surges along the open coast to the right of the hurricane track were reported as between 10 and 12 feet. Highest reported values of storm tide, between 20 and 22 feet, were observed inside Matagorda Bay.



BAYOU RIGAND, LOUISIANA
 LATITUDE 29 16 --N LONGITUDE 89 59 --W RECORDER MAINT.BY NOAA-NOS



GALVESTON (PLEASURE PIER) TEXAS
 LATITUDE 29 16 56N LONGITUDE 94 47 53W RECORDER MAINT.BY NOAA-NOS

Figure 13.--Tide gage record for Bayou Rigand, Louisiana (top) and Pleasure Pier, Galveston, Texas (bottom) for period from September 8-12, 1961.

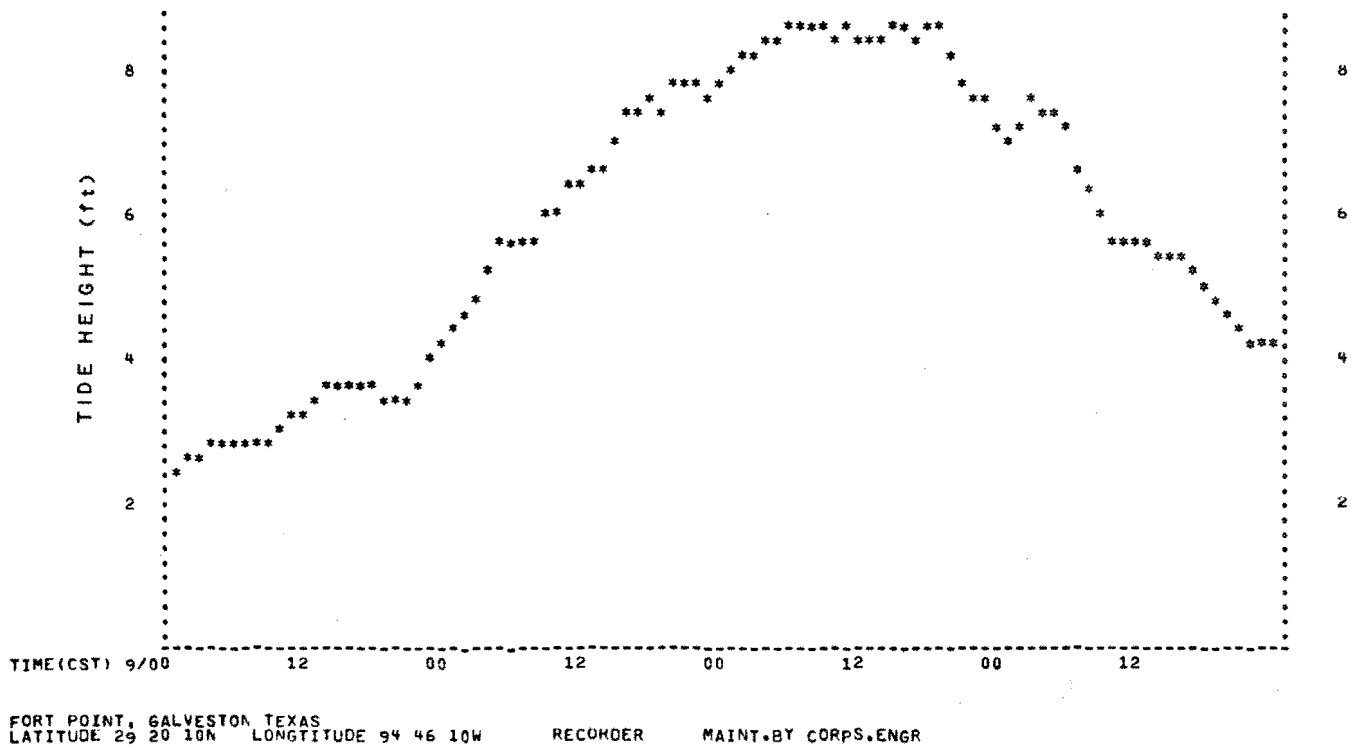
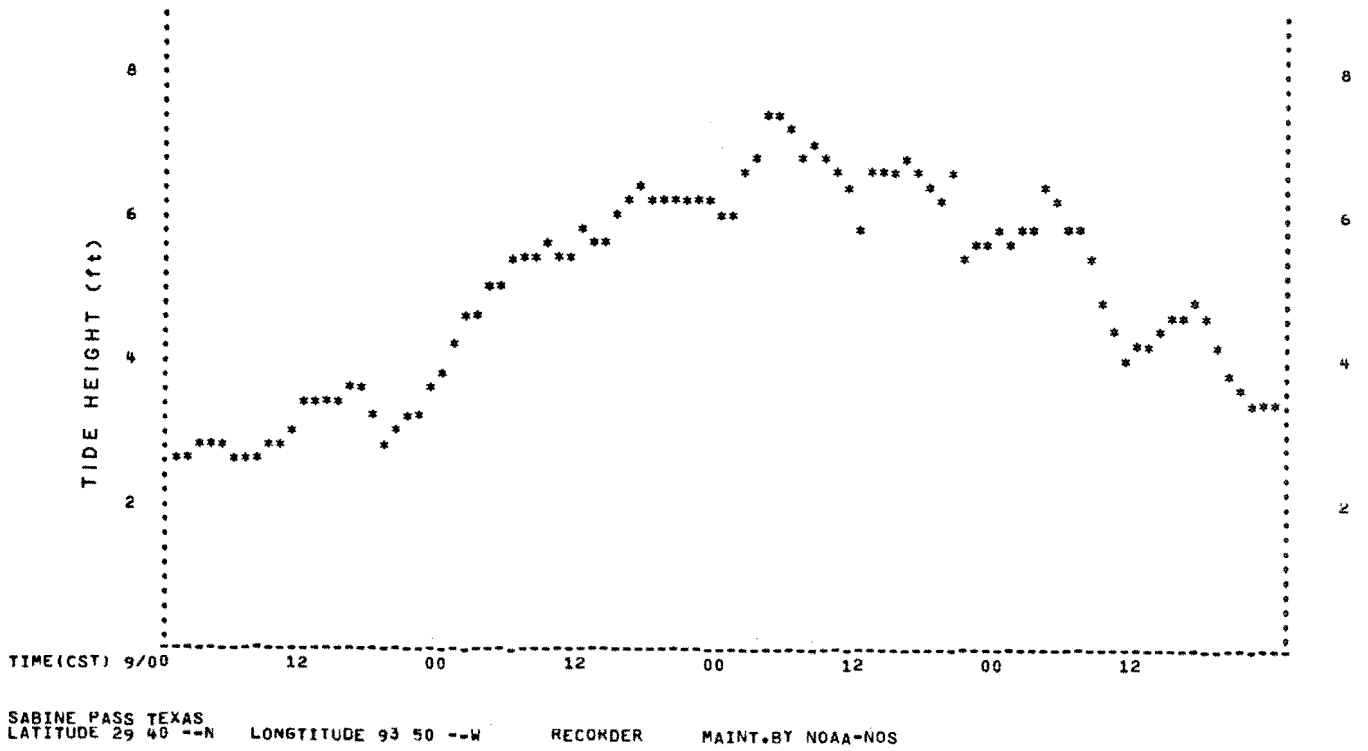


Figure 14.--Tide gage record for Sabine Pass, Texas (top) and Fort Point, Galveston, Texas (bottom).

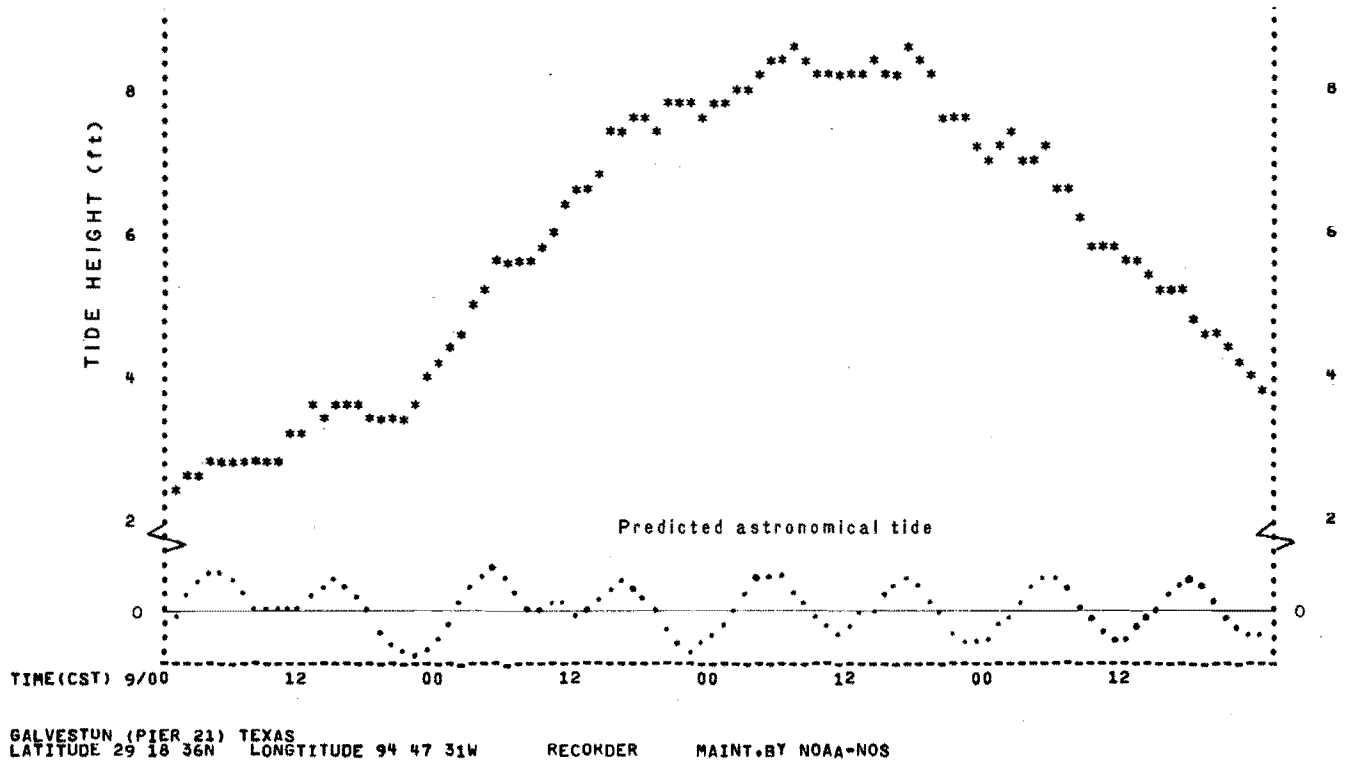
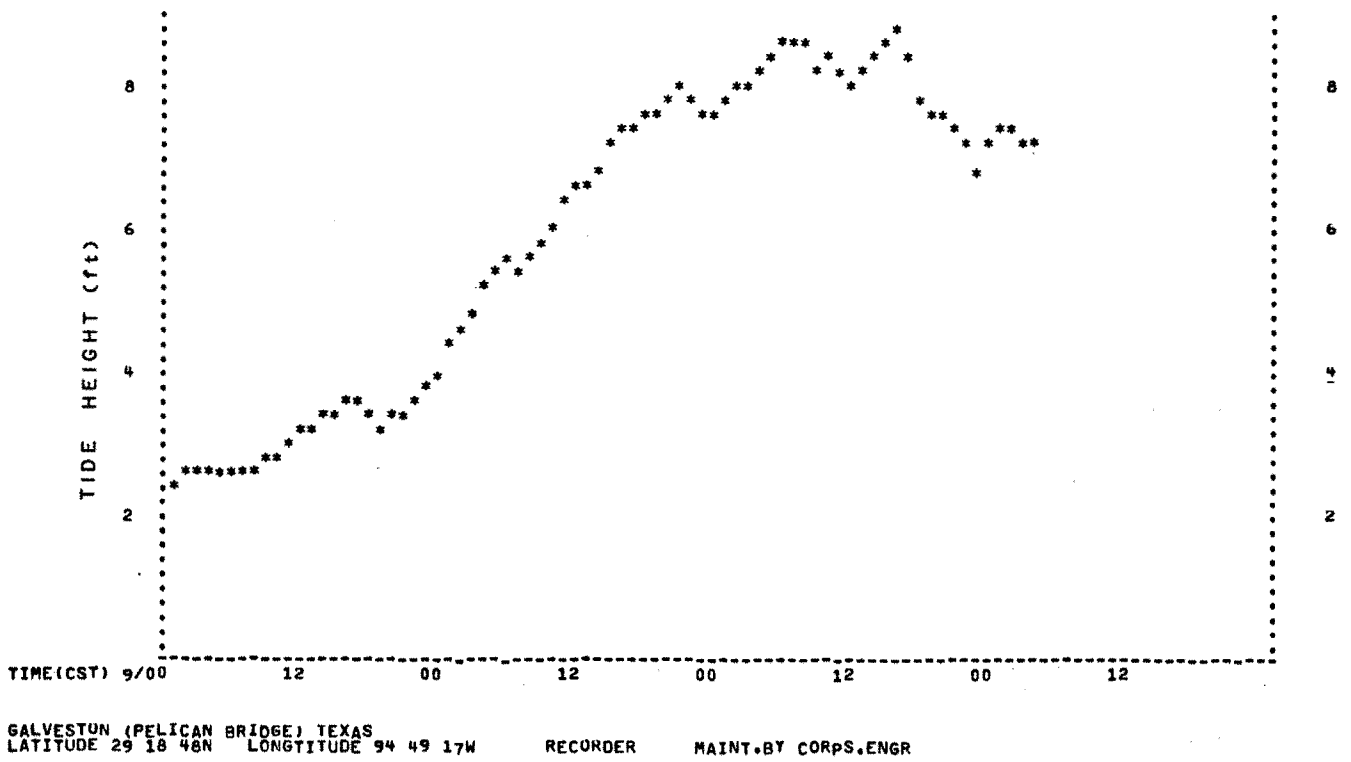


Figure 15.--Tide gage record for Pelican Bridge (top) and Pier 21 (bottom) Galveston, Texas.

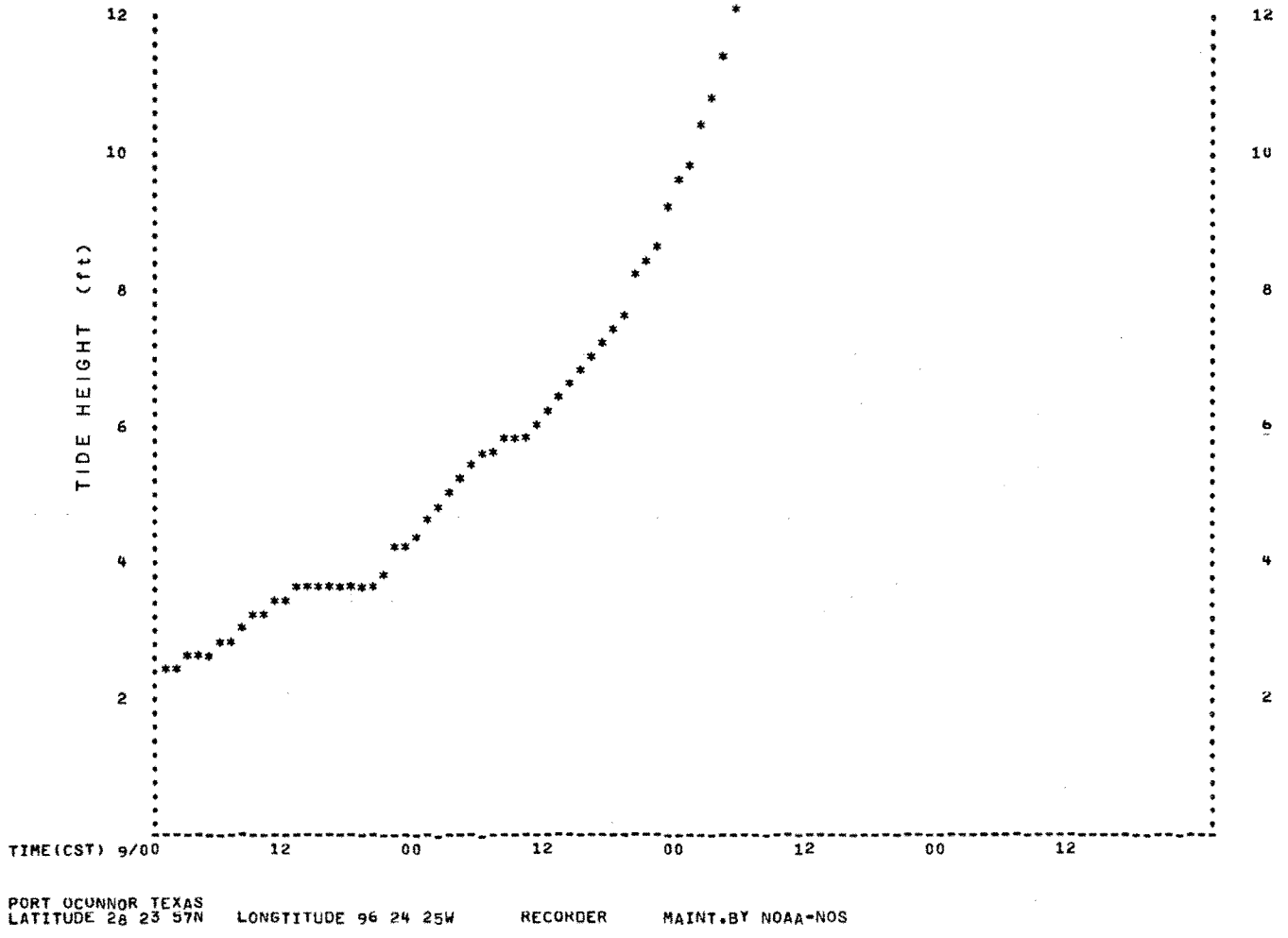


Figure 16.--Tide gage record for Port O'Connor, Texas.

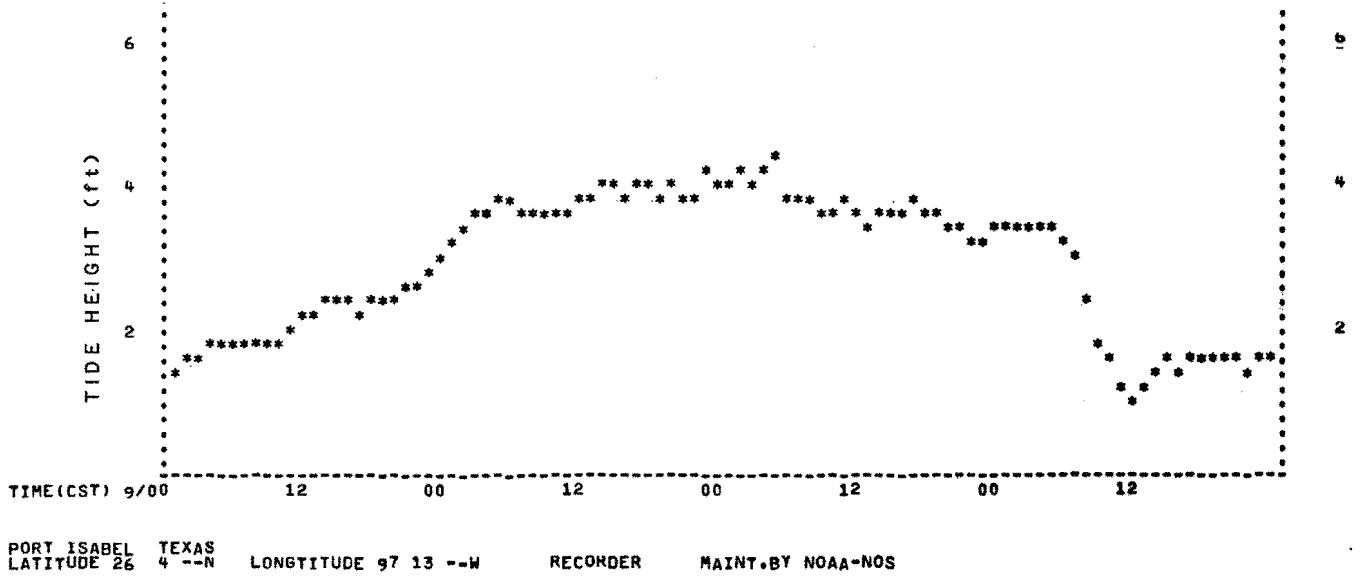
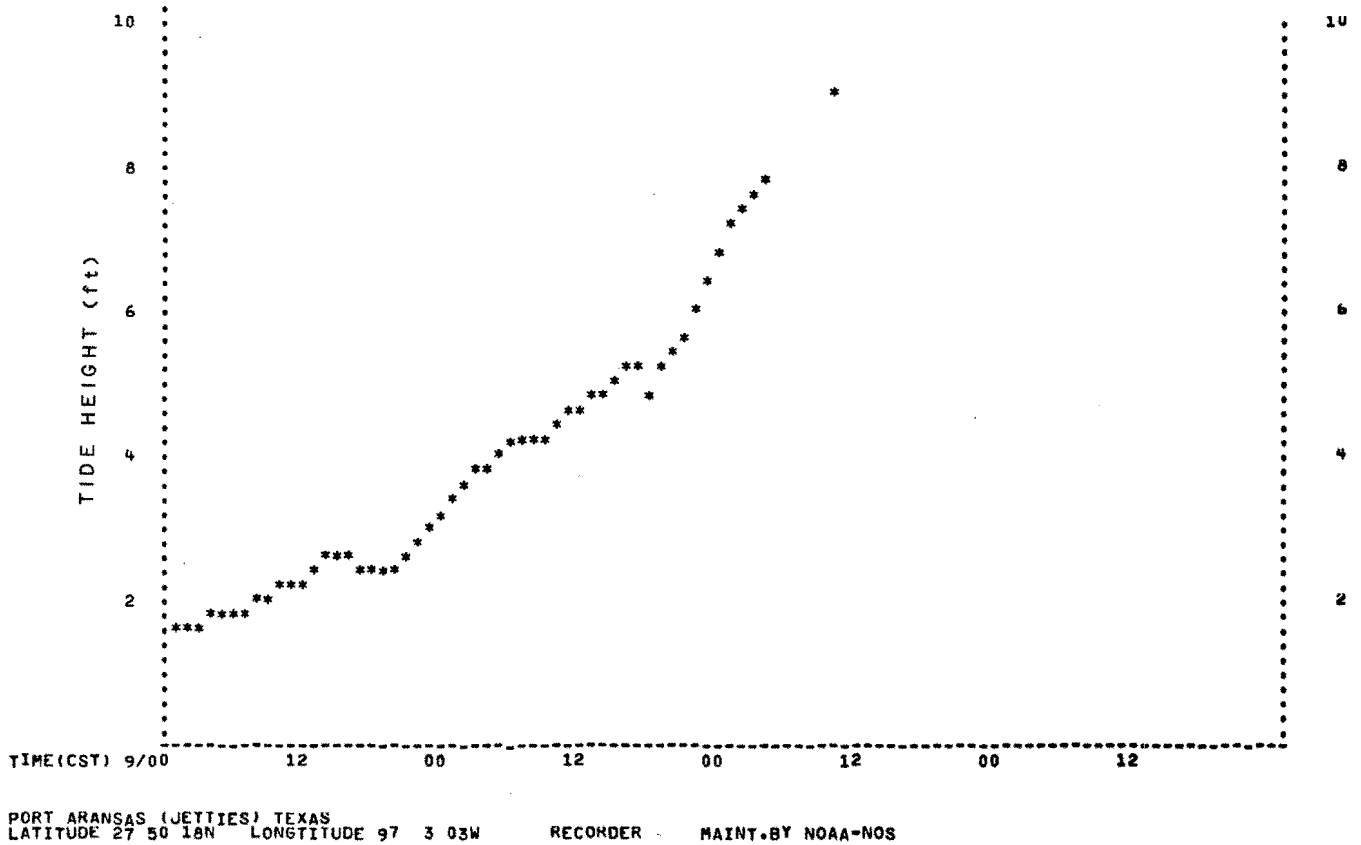


Figure 17.--Tide gage record for Port Aransas, Texas (top) and Port Isabel, Texas (bottom).

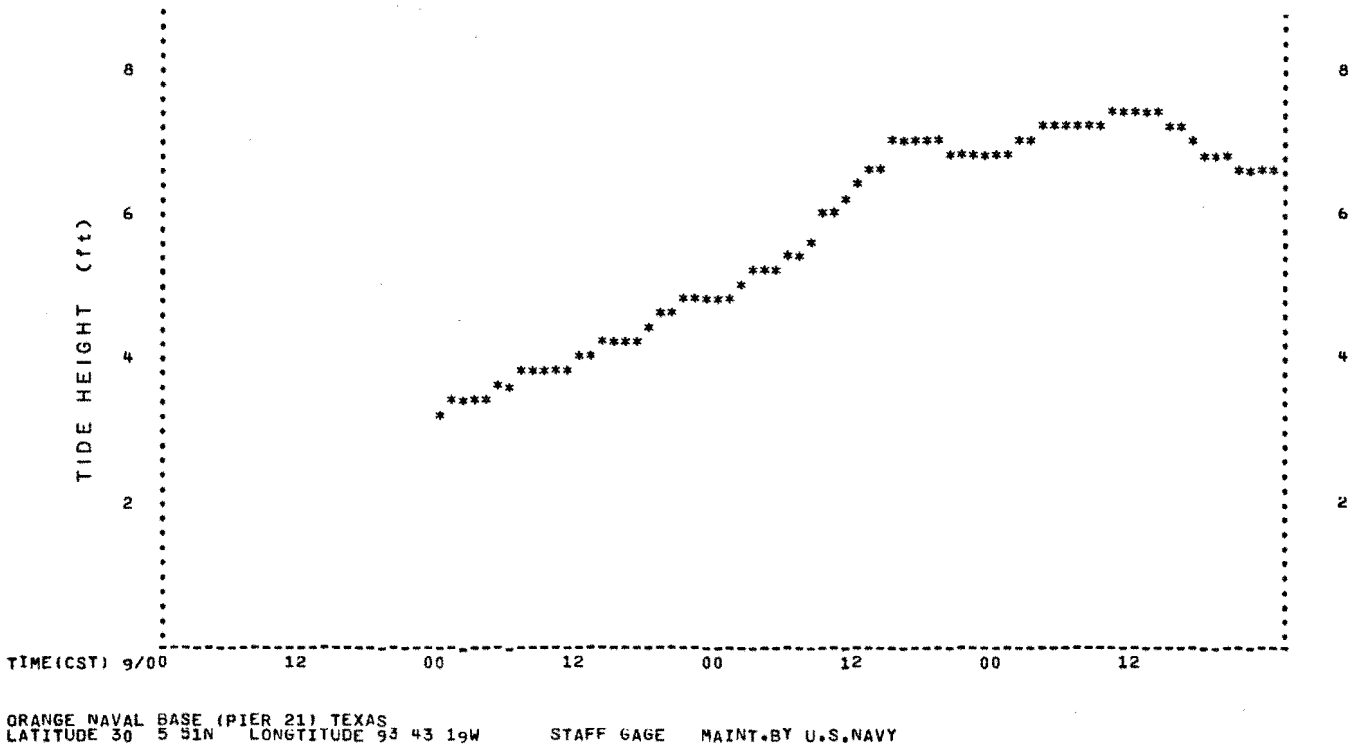
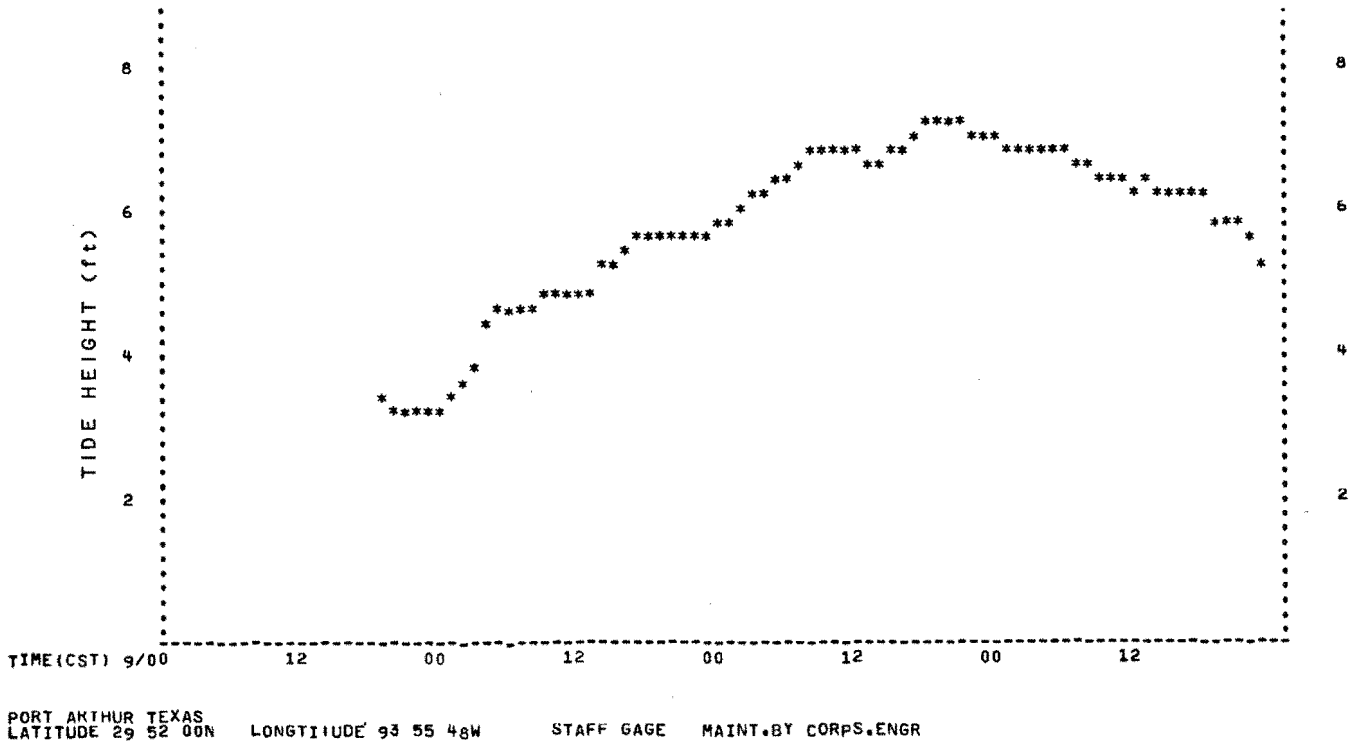
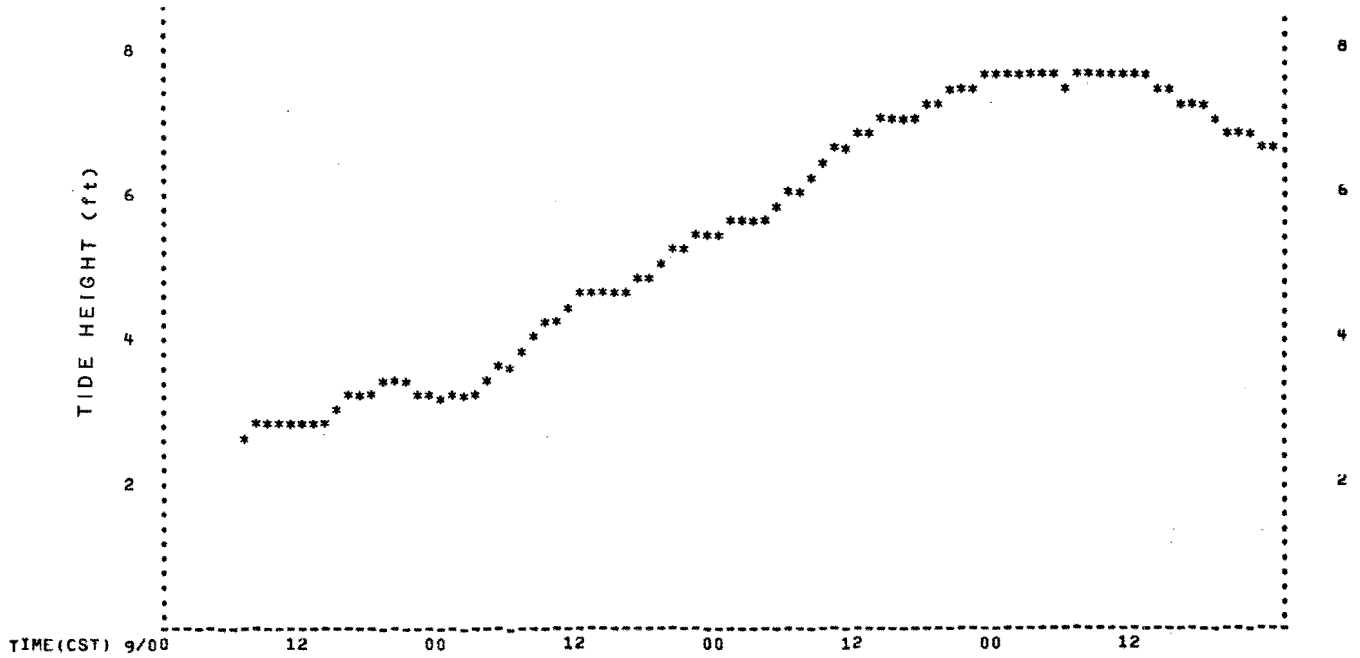
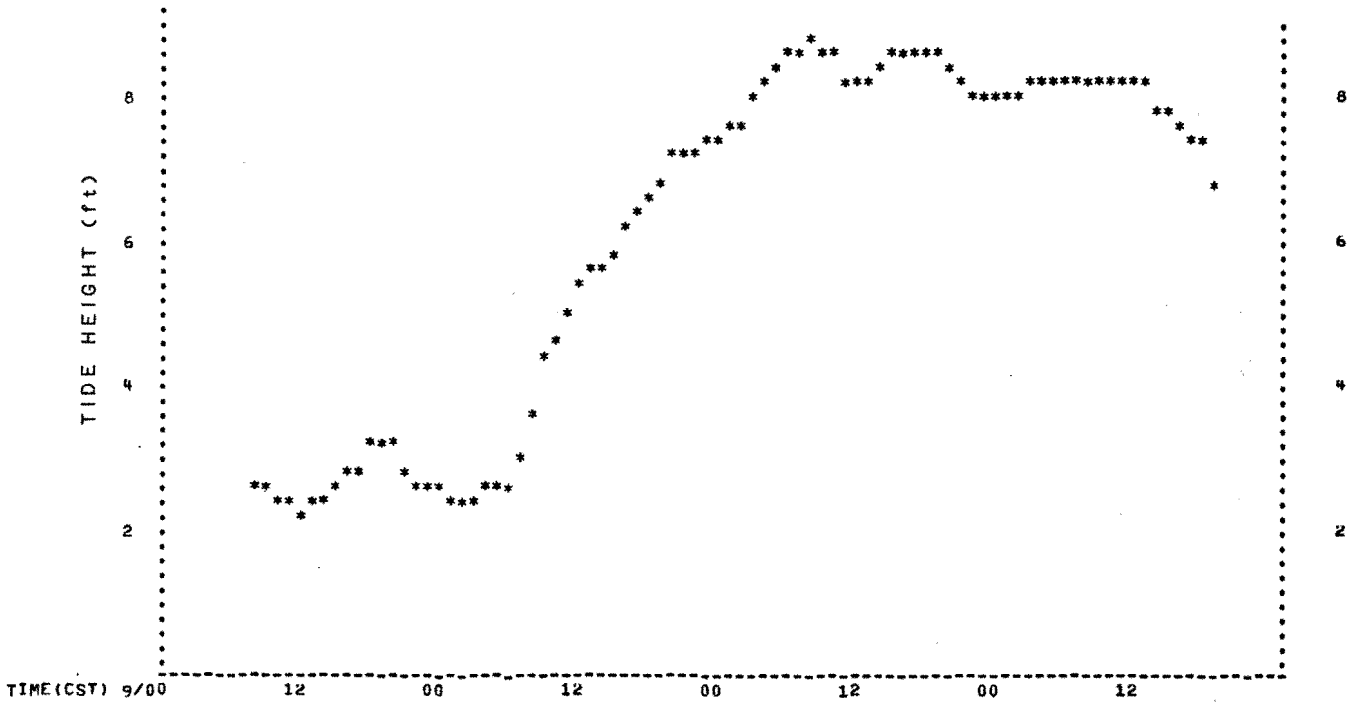


Figure 18.--Tide gage record for Port Arthur, Texas (top) and Orange Naval Base, Texas (bottom).



BRAKE BAYOU, BEAUMONT TEXAS
 LATITUDE 30 5 --N LONGITUDE 94 10 --W STAFF GAGE MAINT. BY CITY



MUD BAYOU BRIDGE, HIGH ISLAND TEXAS
 LATITUDE 29 35 40N LONGITUDE 94 23 15W RECORDER MAINT. BY CORPS. ENGR

Figure 19.--Tide gage record for Brake Bayou, Beaumont, Texas (top) and Mud Bayou Bridge, High Island, Texas (bottom).

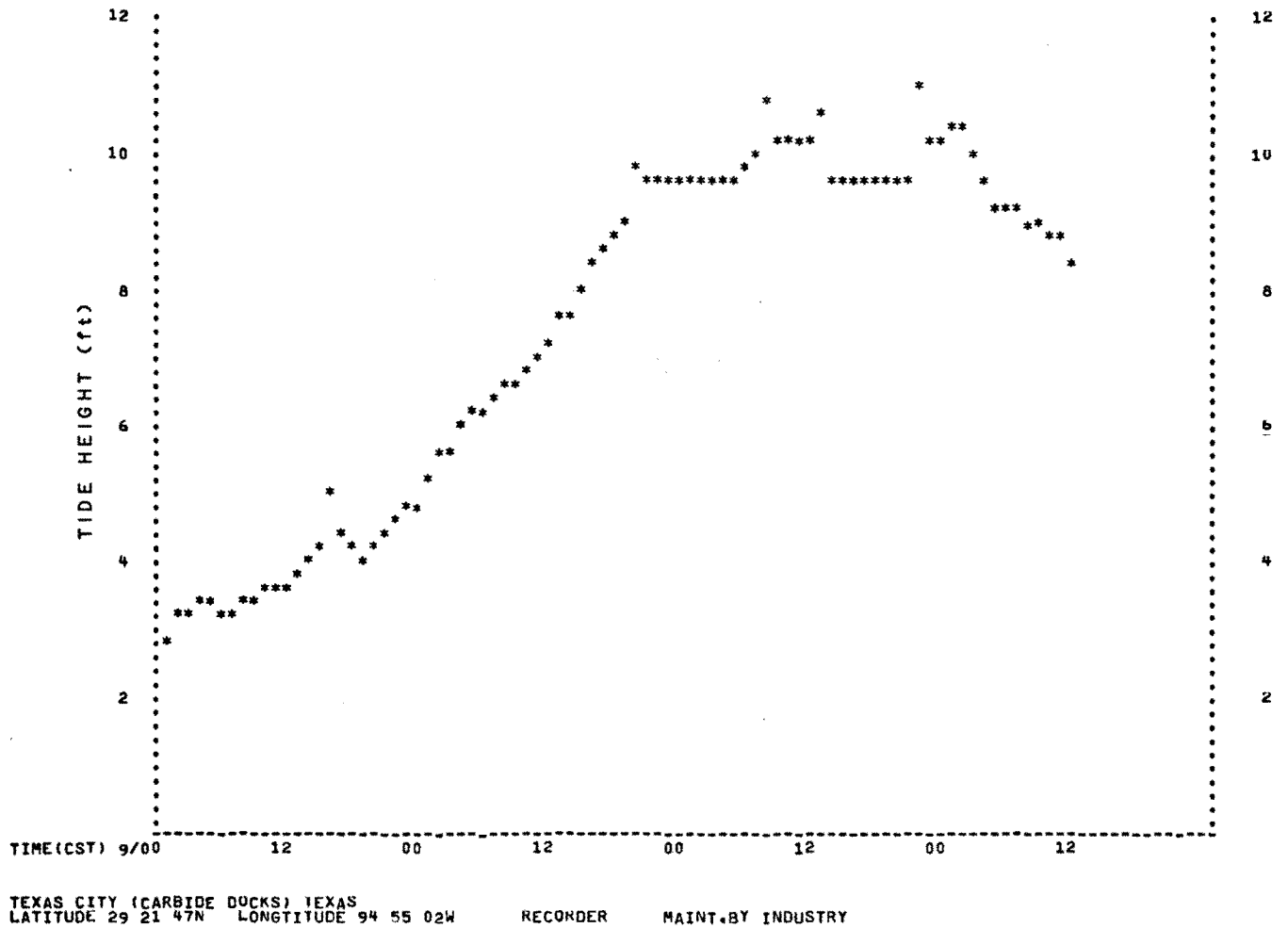


Figure 20.--Tide gage record for Carbide docks, Texas City, Texas.

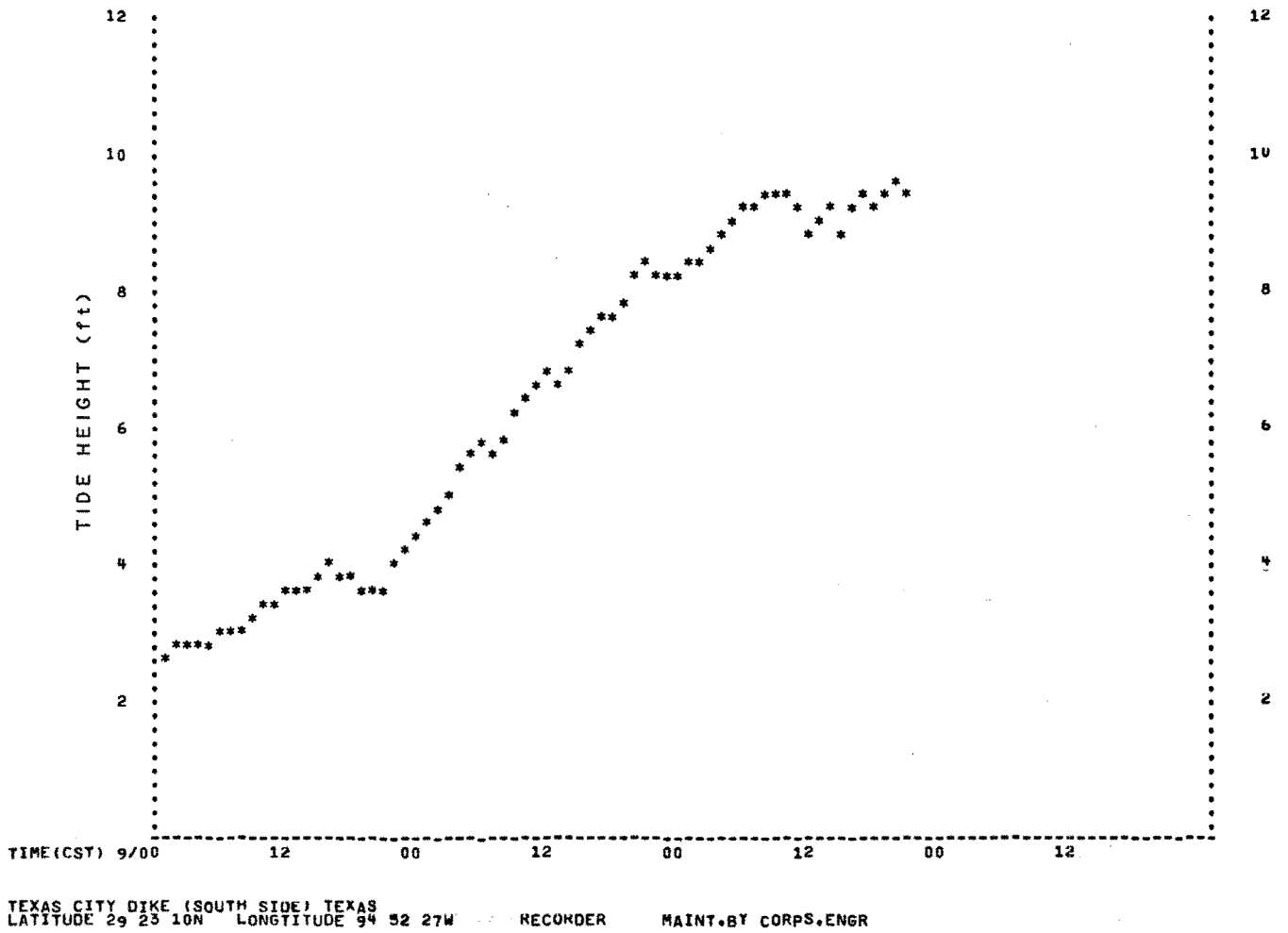


Figure 21.--Tide gage record for Texas City Dike (south side), Texas City, Texas.

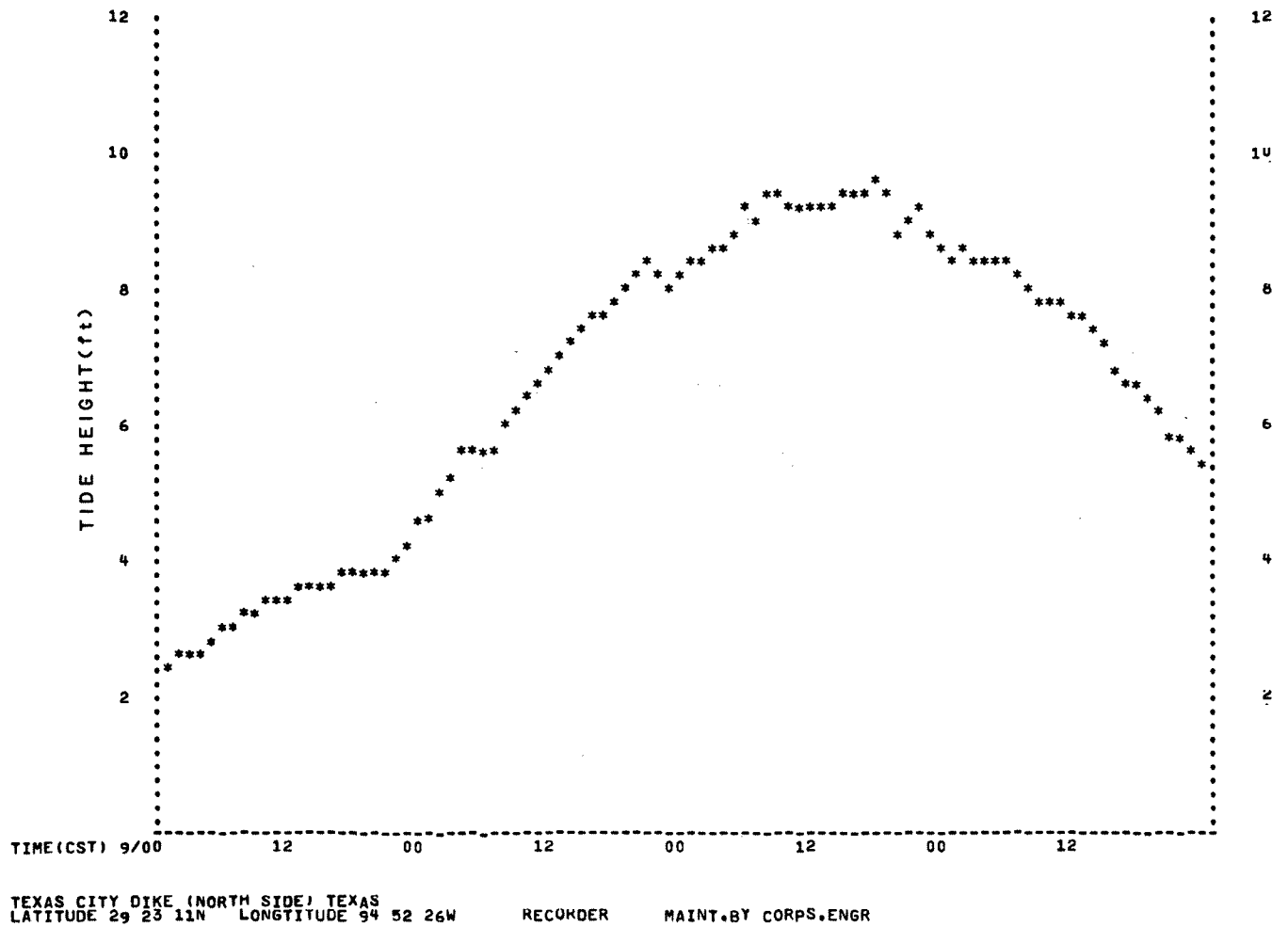


Figure 22.--Tide gage record for Texas City Dike (north side), Texas City, Texas.

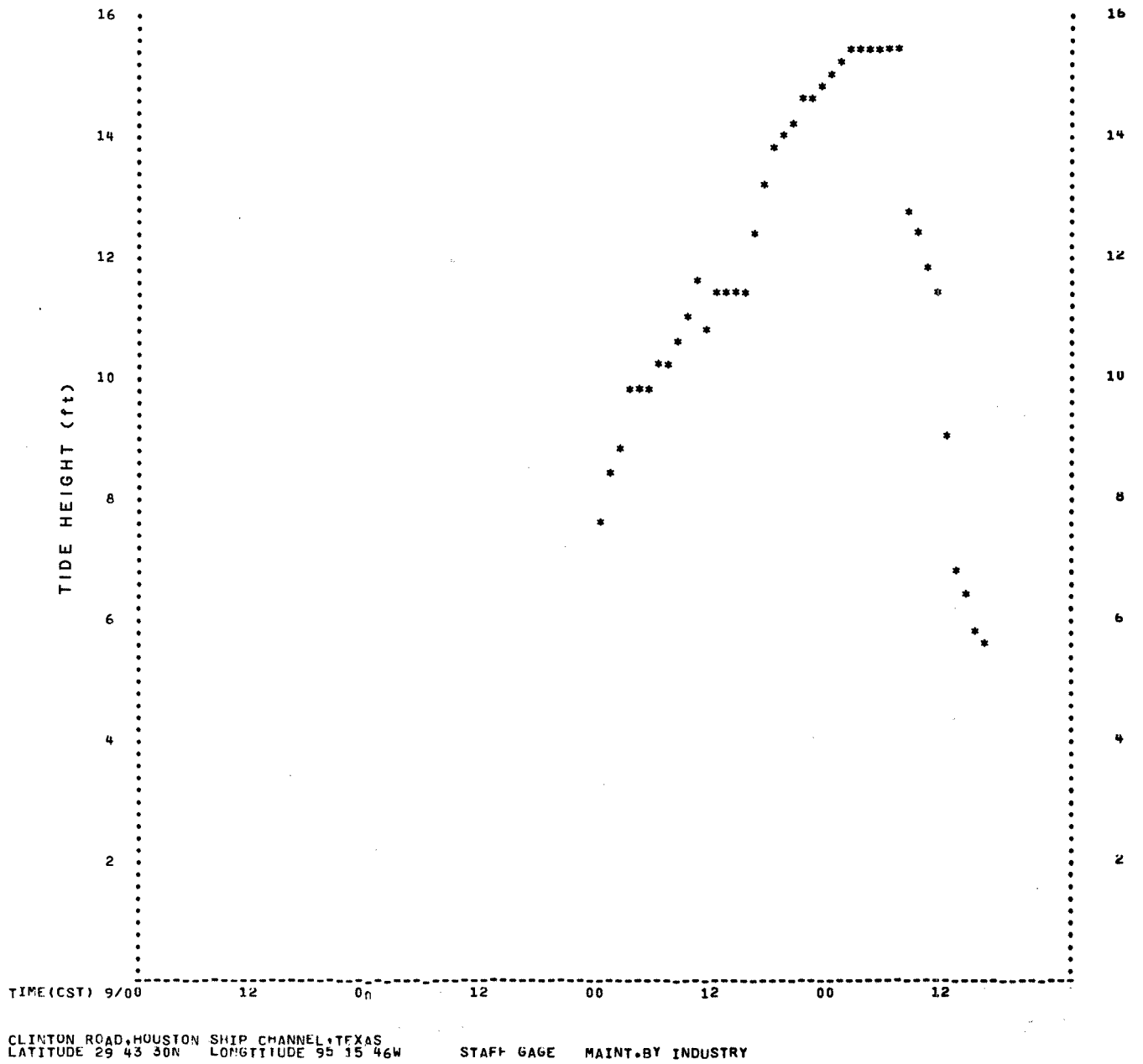


Figure 23.--Tide gage record for Clinton Road, Houston Ship Channel, Texas.

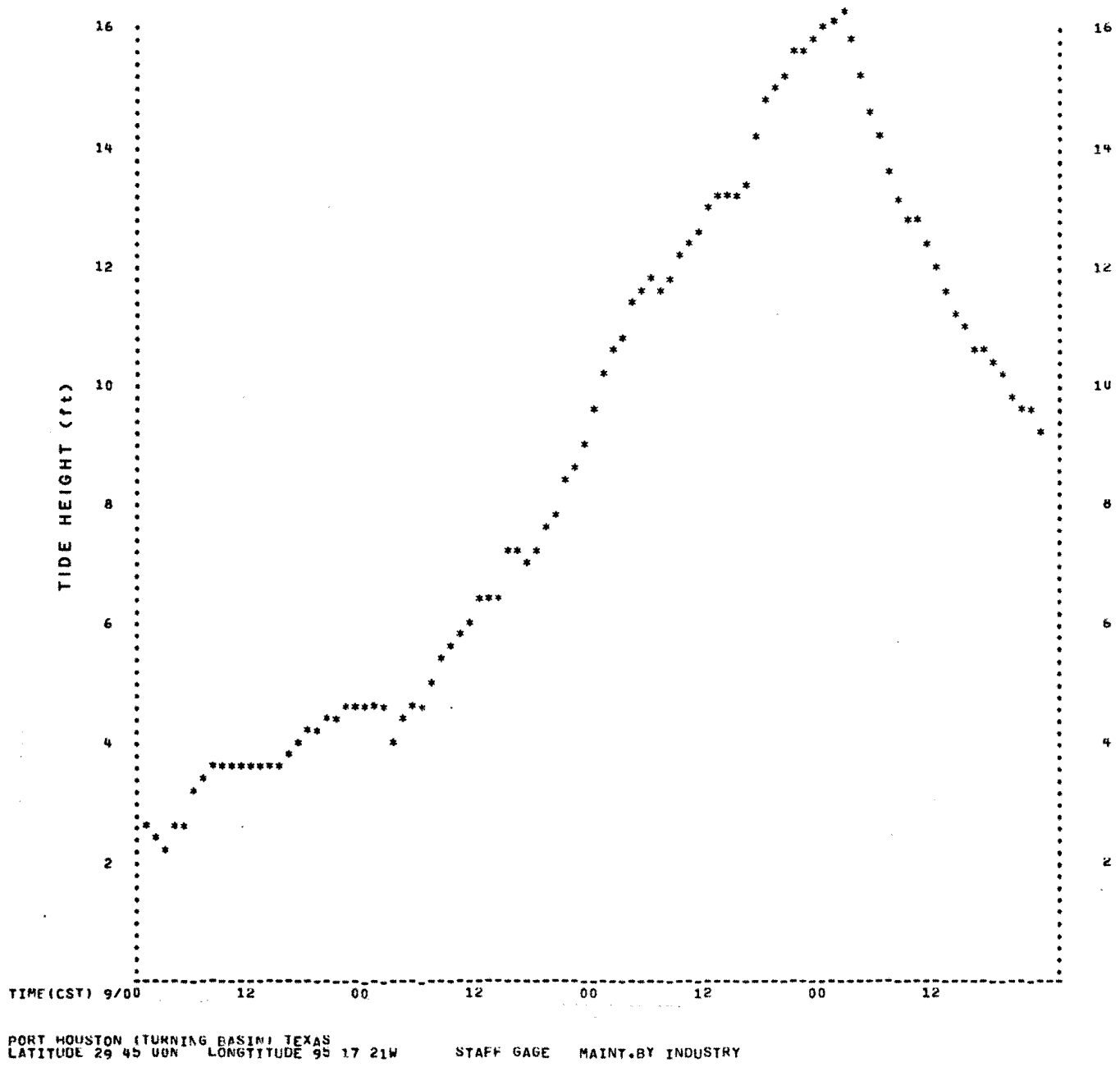


Figure 24.--Tide gage record for Port Houston (Turning Basin), Texas.

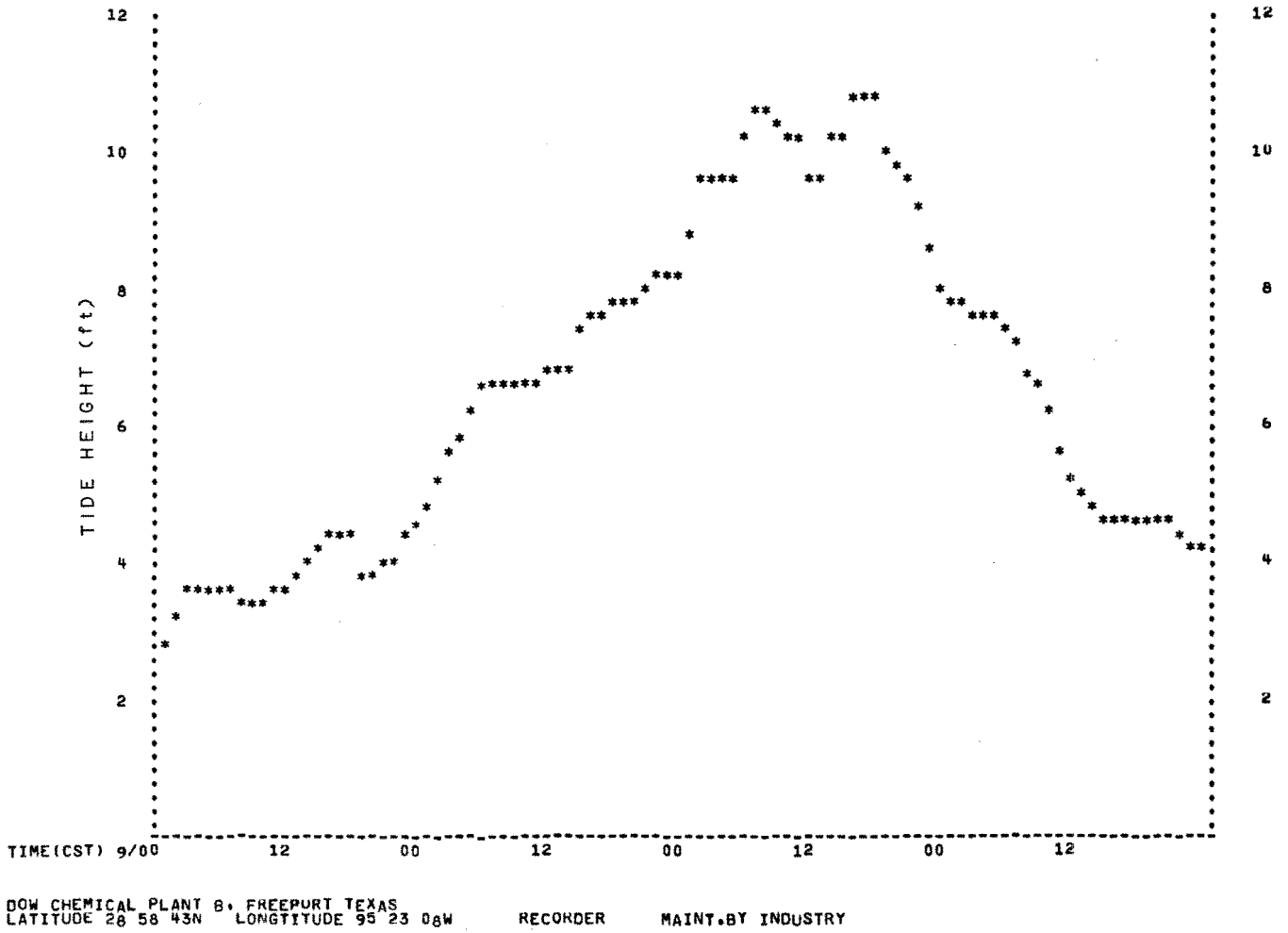


Figure 25.--Tide gage record for Dow Chemical Plant B, Freeport, Texas.

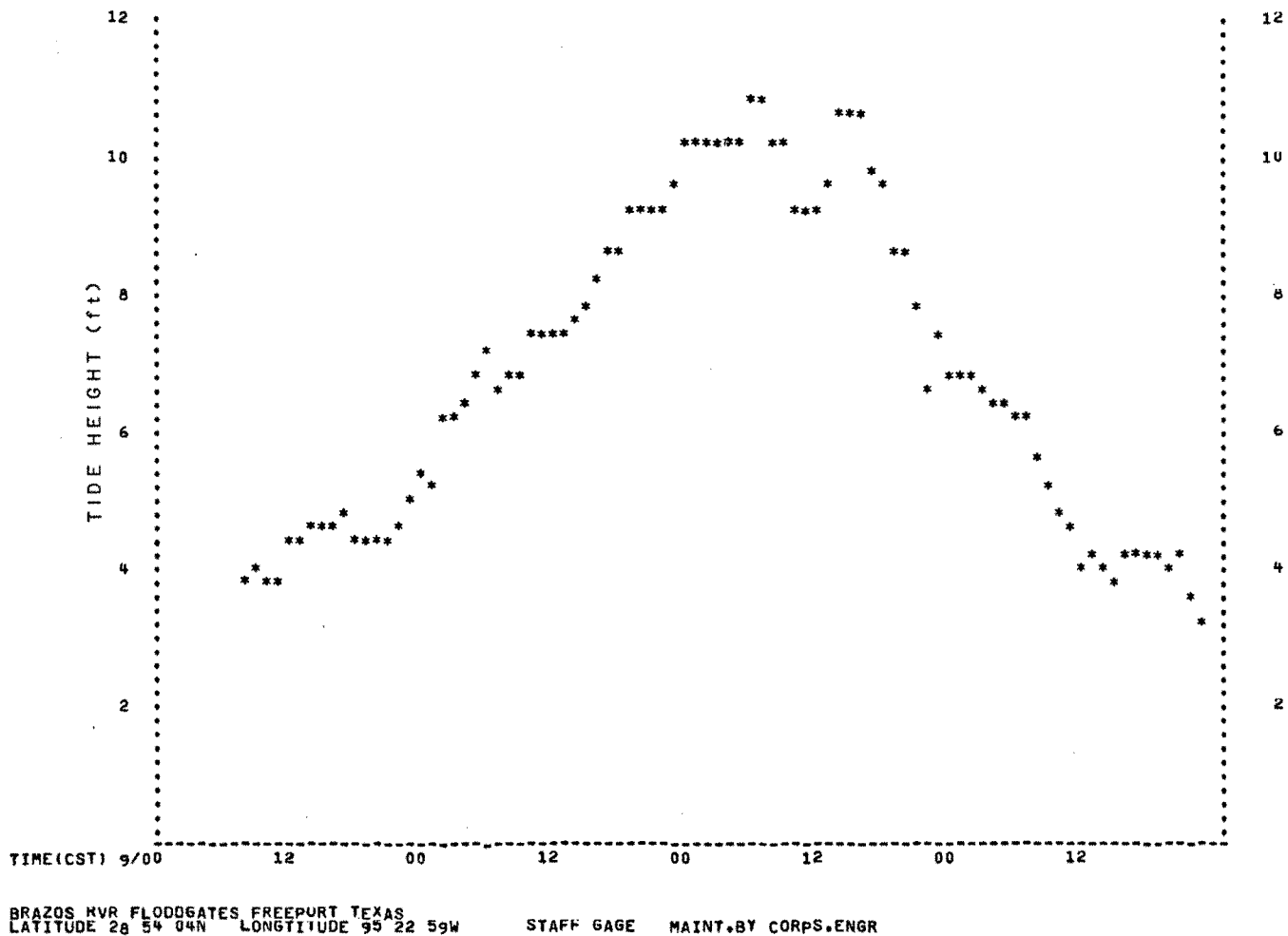


Figure 26.--Tide gage record for Brazos River Floodgate, Freeport, Texas.

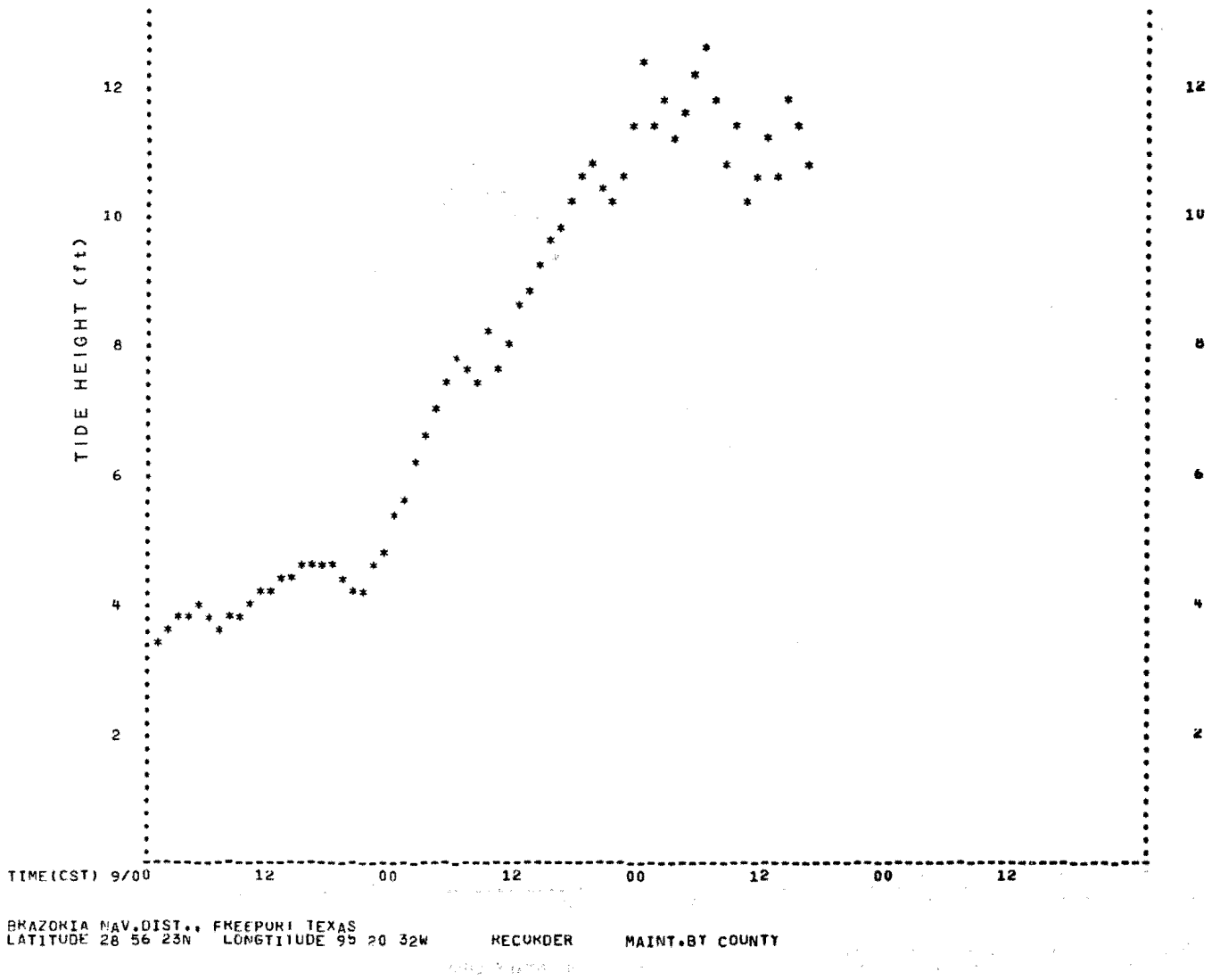


Figure 27.--Tide gage record for Brazoria Navigational District, Freeport, Texas.

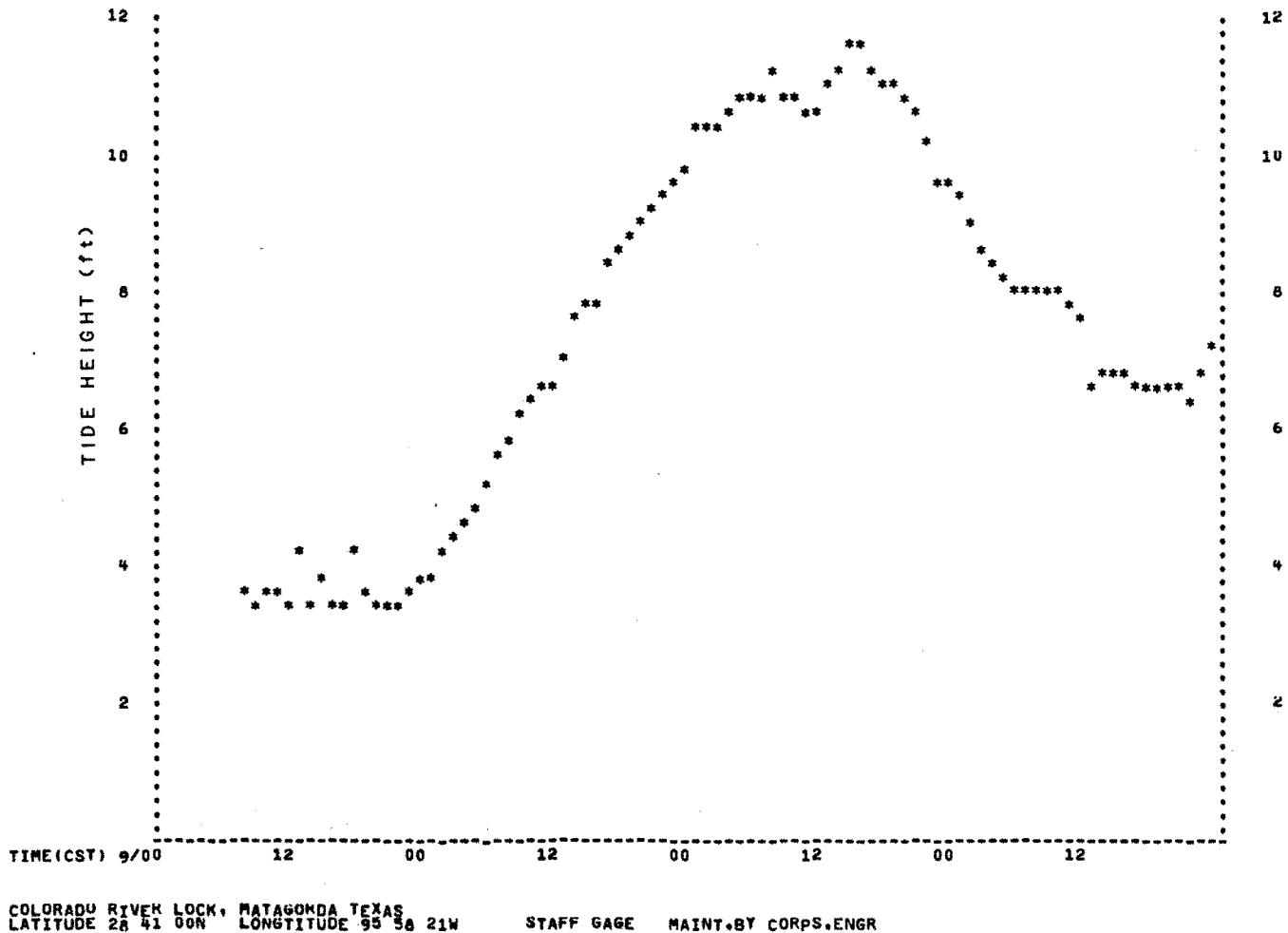


Figure 28.--Tide gage record for Colorado River Lock, Matagorda, Texas.

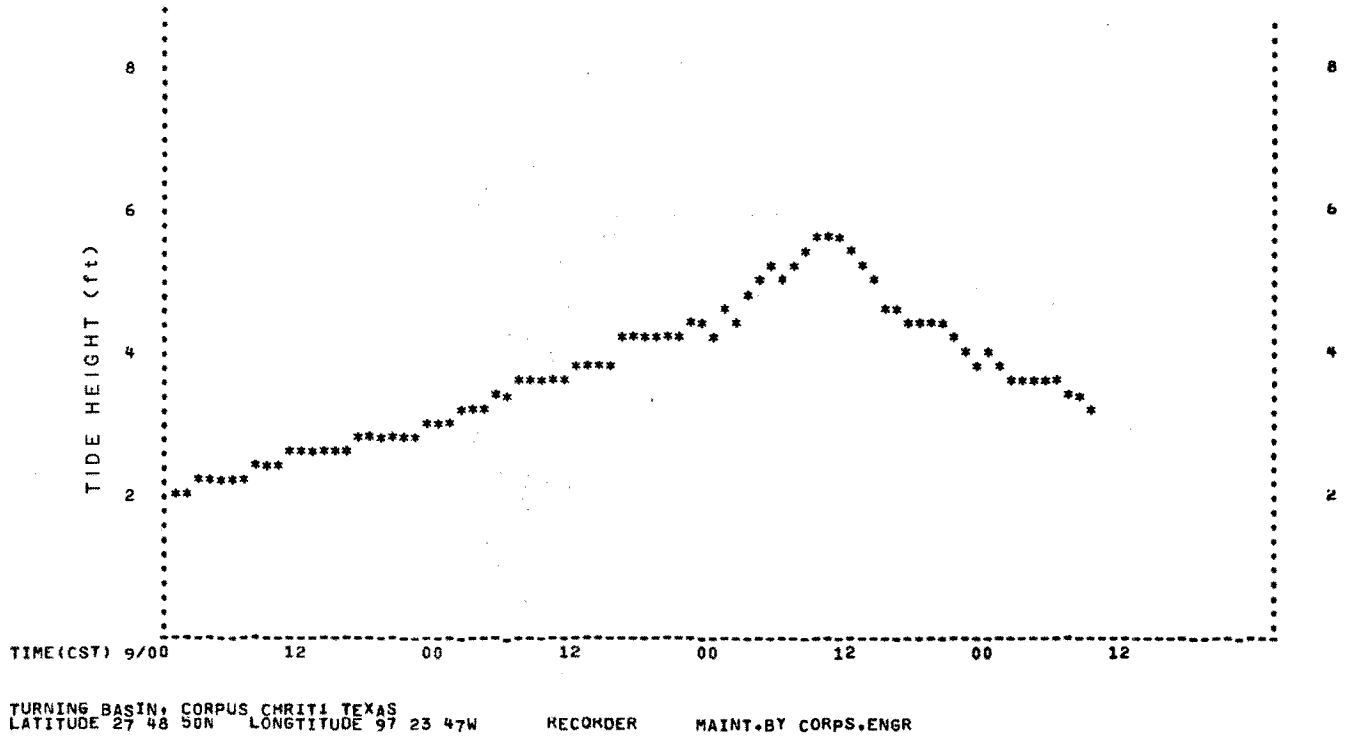
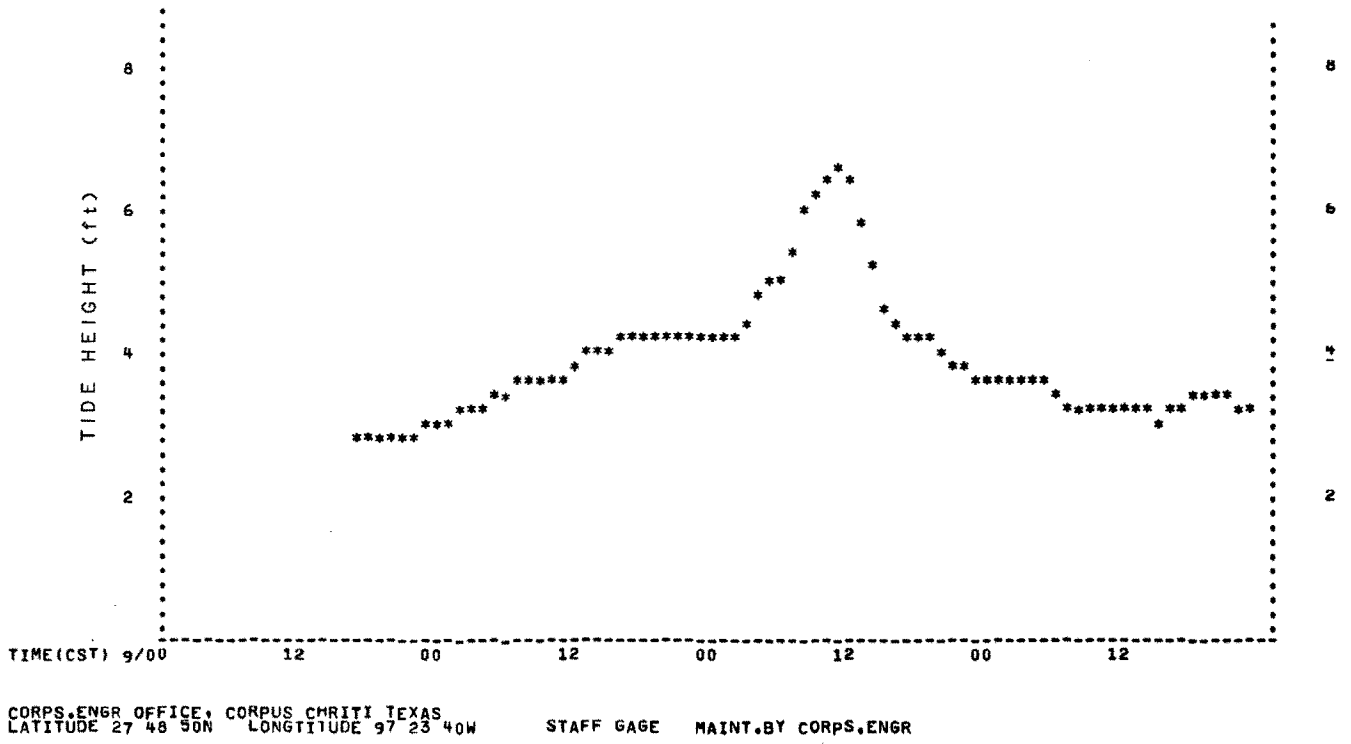


Figure 29.--Tide gage record for Corps of Engineers Office (top) and Turning Basin (bottom), Corpus Christi, Texas.

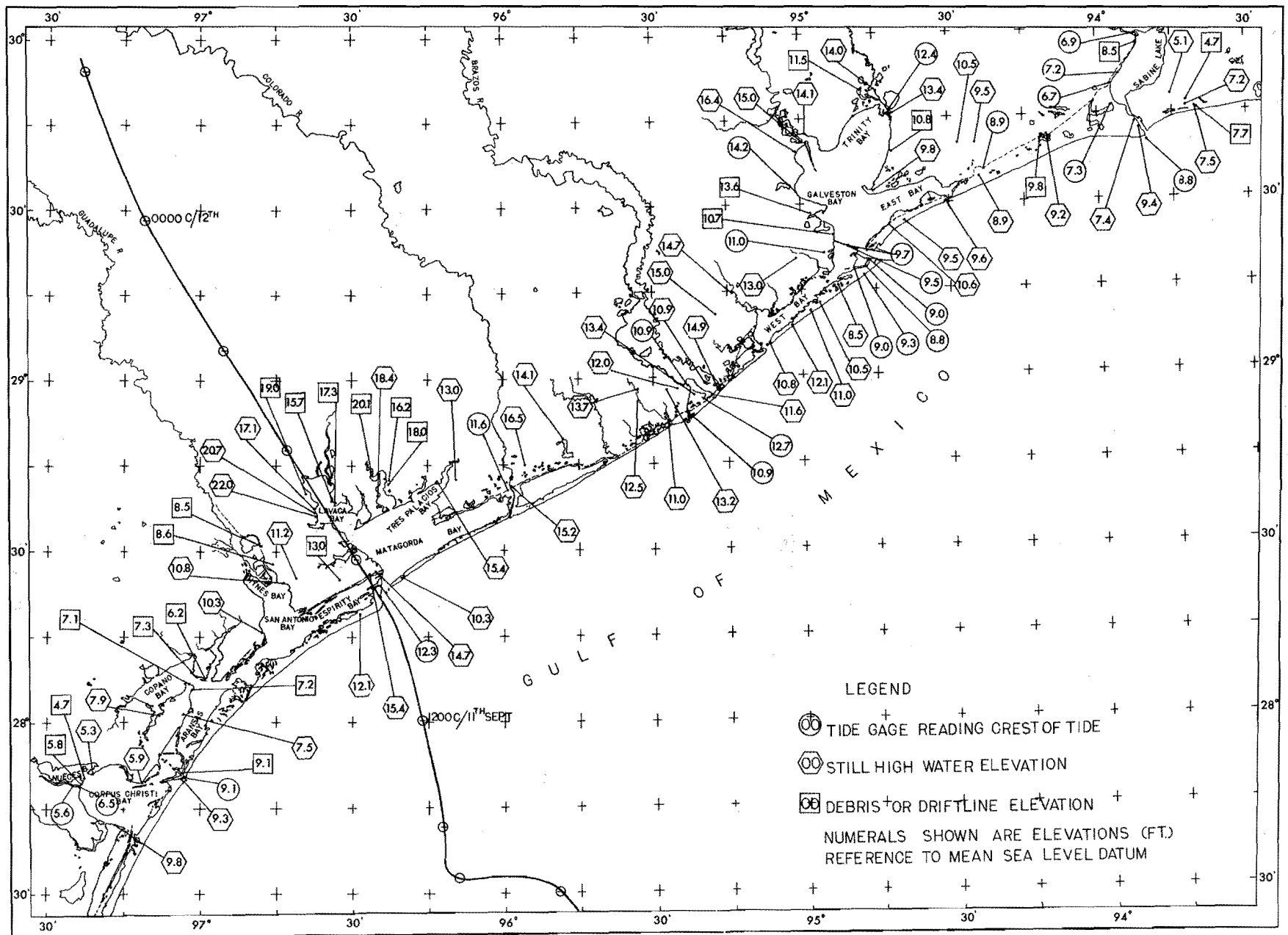


Figure 30.--Maximum water elevation observed during Hurricane Carla.

Table 1.--Location of storm center, forward speed, size and central pressure, Hurricane Carla, September 9-12, 1961

TIME CST	LAT		LONG		P MB	DIR	SPEED		RADIUS	
							KT	MPH	N.MI	ST.MI
9TH SEPTEMBER										
0000	24	00	90	12	956	310	9.0	10.4	41	47
0300	24	18	90	36	954	310	9.0	10.4	41	47
0600	24	36	91	00	953	310	9.0	10.4	41	47
0900	24	52	91	20	951	320	9.0	10.4	41	47
1200	25	12	91	40	948	320	9.0	10.4	40	46
1500	25	28	92	03	944	300	9.0	10.4	40	46
1800	25	36	92	36	938	280	10.0	11.5	39	45
2100	25	36	93	12	937	290	11.0	12.7	39	45
10TH SEPTEMBER										
0000	25	55	93	30	936	310	7.5	8.6	38	44
0100	26	00	93	37	936	310	6.4	7.4	38	44
0200	26	03	93	41	936	310	5.1	5.9	38	44
0300	26	07	93	45	936	310	5.0	5.8	38	44
0400	26	10	93	49	936	310	5.0	5.8	38	44
0500	26	15	93	52	936	310	5.0	5.8	37	43
0600	26	18	93	57	936	310	5.5	6.3	37	43
0700	26	22	94	01	936	320	6.0	6.9	37	43
0800	26	27	94	05	936	320	6.0	6.9	37	43
0900	26	31	94	10	936	320	6.0	6.9	37	43
1000	26	35	94	15	936	310	6.5	7.5	36	42
1100	26	39	94	21	936	300	7.9	9.0	36	42
1200	26	42	94	30	935	280	6.6	7.6	35	41
1300	26	43	94	35	935	280	4.6	5.3	35	40
1400	26	45	94	40	935	310	5.5	6.3	35	40
1500	26	51	94	43	935	350	7.0	8.1	35	40
1600	26	59	94	44	935	350	8.0	9.2	35	40
1700	27	05	94	49	935	320	7.3	8.4	35	40
1800	27	09	94	57	935	280	8.0	9.2	35	40
1900	27	11	95	06	934	270	8.5	9.8	34	39
2000	27	10	95	16	934	260	8.1	9.3	34	39
2100	27	08	95	24	934	250	7.2	8.3	33	39
2200	27	06	95	31	934	270	5.7	6.6	34	39
2300	27	06	95	37	934	280	5.4	6.2	34	39
11TH SEPTEMBER										
0000	27	09	95	42	934	310	5.4	6.2	33	38
0100	27	15	95	43	934	350	6.5	7.5	33	38
0200	27	22	95	44	934	350	7.4	8.5	33	38
0300	27	28	95	50	933	300	7.6	8.7	33	38
0400	27	31	95	56	933	290	7.0	8.1	33	38
0500	27	33	96	05	933	290	6.8	7.8	33	37
0600	27	36	96	12	933	300	5.0	5.8	32	37
0700	27	38	96	15	933	310	1.6	1.8	32	37
0800	27	38	96	15	933	310	1.6	1.8	32	36
0900	27	41	96	17	933	330	5.0	5.8	31	36
1000	27	47	96	18	931	350	6.0	6.9	30	35
1100	27	53	96	18	931	360	6.5	7.5	30	35
1200	28	00	96	18	931	360	7.7	8.9	30	35
1300	28	09	96	19	931	350	9.5	10.9	30	35
1400	28	19	96	23	931	330	11.1	12.8	30	34
1500	28	29	96	30	931	330	10.4	12.0	29	33
1600	28	37	96	36	933	330	8.2	9.6	28	32
1700	28	43	96	39	934	330	6.2	7.6	28	31
1800	28	48	96	44	936	330	6.2	7.1	27	31
1900	28	53	96	47	938	330	6.2	7.1	26	30
2000	28	58	96	50	940	330	7.5	8.6	25	29
2100	29	05	96	56	943	330	8.7	10.0	24	28
2200	29	13	97	01	946	330	9.3	10.7	24	27
2300	29	21	97	07	950	330	10.0	11.5	23	25
12TH SEPTEMBER										
0000	29	30	97	13	955	340	10.0	11.5	21	24
0300	29	58	97	25	965	340	10.0	11.5	19	22
0600	30	27	97	35	975	350	9.5	10.9	17	20
0900	30	55	97	34	977	020	9.5	10.9	16	18
1200	31	20	97	25	979	020	10.5	12.1	15	17
1500	31	55	97	17	985	020	12.0	13.8	14	16

Table 2.--Tide gage data from Gulf Coast stations (NGVD Datum) in Hurricane Carla, September 9-12, 1961

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
LOCATION																								
BAYOU RIGAND, LOUISIANA																								
LATITUDE 29 16 --N LONGTITUDE 89 59 --W RECORDER MAINT.BY NOAA-NOS																								
DATE 9TH	2.3	2.4	2.4	2.6	2.6	2.7	2.8	2.8	3.0	3.1	3.2	3.1	3.1	3.0	3.0	2.9	3.0	2.9	2.9	3.1	3.0	3.1	3.0	3.1
DATE 10TH	3.1	3.1	3.2	3.3	3.3	3.3	3.2	3.6	3.6	3.6	3.5	3.5	3.4	3.4	3.3	3.2	3.0	3.0	2.9	2.8	2.8	2.9	2.9	2.9
DATE 11TH	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	3.0	2.9	2.9	2.8	2.8	2.7	2.6	2.6	2.6	2.6	2.6	2.5	2.6	2.5
DATE 12TH	2.6	2.5	2.4	2.4	2.5	2.3	2.3	2.3	2.3	2.3	2.3	2.2	2.2	2.1	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.3	2.3	2.3
HIGHEST OBSERVED TIDE																								
3.0FT RECORDED AT 1100HRS ON 11TH SEPT.																								

SABINE PASS TEXAS																								
LATITUDE 29 40 --N LONGTITUDE 90 50 --W RECORDER MAINT.BY NOAA-NOS																								
DATE 9TH	2.5	2.7	2.8	2.8	2.8	2.6	2.2	2.7	2.9	2.9	3.0	3.4	3.3	3.3	3.3	3.5	3.5	3.1	2.8	3.0	3.2	3.2	3.7	3.9
DATE 10TH	4.2	4.7	4.7	5.0	5.0	5.3	5.4	5.4	5.5	5.3	5.4	5.8	5.6	5.7	6.0	6.1	6.4	6.2	6.2	6.2	6.1	6.1	6.1	6.0
DATE 11TH	6.0	6.5	6.9	7.4	7.3	7.2	6.9	7.0	6.8	6.5	6.4	5.8	6.5	6.7	6.7	6.8	6.7	6.4	6.1	6.7	5.4	5.7	5.6	5.9
DATE 12TH	5.7	5.8	5.8	6.3	6.2	5.9	5.8	5.3	4.8	4.4	4.0	4.1	4.2	4.4	4.5	4.7	4.8	4.5	4.2	3.9	3.7	3.4	3.3	3.3
HIGHEST OBSERVED TIDE																								
7.4FT RECORDED AT 0412HRS ON 11TH SEPT.																								

FORT POINT, GALVESTON TEXAS																								
LATITUDE 29 20 10N LONGTITUDE 94 46 10W RECORDER MAINT.BY CORPS.ENGR																								
DATE 9TH	2.5	2.6	2.7	2.9	2.9	2.9	2.9	2.9	2.9	3.0	3.1	3.2	3.4	3.5	3.5	3.6	3.6	3.5	3.4	3.3	3.4	3.6	4.0	4.2
DATE 10TH	4.4	4.6	4.8	5.2	5.6	5.7	5.6	5.7	6.0	6.0	6.3	6.4	6.5	6.7	7.0	7.3	7.4	7.5	7.4	7.8	7.9	7.8	7.6	7.9
DATE 11TH	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.5	8.4	8.6	8.4	8.4	8.4	8.6	8.5	8.3	8.7	8.5	8.1	7.9	7.7	7.6	7.2
DATE 12TH	7.0	7.2	7.5	7.3	7.4	7.1	6.7	6.4	6.0	5.7	5.6	5.6	5.5	5.4	5.3	5.3	5.2	5.0	4.8	4.6	4.4	4.2	4.1	4.2
HIGHEST OBSERVED TIDE																								
8.7FT RECORDED AT 0800HRS AND 8.8FT AT 1801HRS ON 11TH SEPT																								

Table 2.--(continued)

	1	2	3	4	5	6	7	8	9	10	TIME (IN HOURS CST)				15	16	17	18	19	20	21	22	23	24
											11	12	13	14										
LOCATION																								
GALVESTON (PLEASURE PIER) TEXAS																								
LATITUDE 29 16 56N												LONGITUDE 94 47 53W												
RECORDER												MAINT.BY NOAA-NOS												
DATE 9TH	2.6	3.1	2.9	3.2	2.9	2.8	2.7	2.7	2.8	2.8	3.0	3.4	3.6	3.6	3.8	3.9	3.8	3.5	3.1	2.9	3.2	3.1	4.3	4.8
DATE 10TH	5.2	5.3	5.6	5.9	6.6	6.0	6.1	6.5	6.3	6.6	6.9	6.9	6.8	7.3	7.3	7.5	7.9	7.6	7.9	8.1	8.0	7.9	8.1	8.6
DATE 11TH	8.8	8.8	8.7	8.7	8.6	8.8	8.8	8.4	7.7	7.7	7.8	7.5	7.9	8.8	8.8	8.2	8.4	8.2	7.4	7.0	7.0	6.1	6.2	5.7
DATE 12TH	6.0	6.6	6.7	6.6	6.7	6.1	5.4	4.6	3.7	3.3	3.3	3.2	3.3	3.7	3.8	3.7	3.7	3.5	3.2	2.9	2.6	2.4	2.4	2.3
HIGHEST OBSERVED TIDE																								
9.1FT RECORDED AT 0630HRS AND 8.8FT AT 1554HRS ON 11TH SEPT																								

GALVESTON (PIER 21) TEXAS																								
LATITUDE 29 18 36N												LONGITUDE 94 47 31W												
RECORDER												MAINT.BY NOAA-NOS												
DATE 9TH	2.3	2.6	2.6	2.8	2.8	2.8	2.8	2.8	2.9	2.9	3.2	3.2	3.5	3.4	3.6	3.7	3.7	3.4	3.4	3.4	3.4	3.5	4.0	4.1
DATE 10TH	4.4	4.5	5.0	5.1	5.5	5.6	5.5	5.6	5.8	6.0	6.3	6.5	6.6	6.9	7.3	7.4	7.6	7.5	7.4	7.8	7.8	7.9	7.6	7.8
DATE 11TH	7.8	8.0	8.0	8.2	8.5	8.4	8.5	8.4	8.1	8.1	8.1	8.2	8.2	8.3	8.1	8.1	8.6	8.4	8.2	7.5	7.5	7.6	7.1	7.0
DATE 12TH	7.2	7.3	7.0	7.0	7.1	6.7	6.5	6.1	5.9	5.8	5.8	5.6	5.5	5.4	5.2	5.2	5.1	4.9	4.7	4.5	4.3	4.1	4.0	3.9
HIGHEST OBSERVED TIDE																								
8.6FT RECORDED AT 1706HRS ON 11TH SEPT.																								

FREEPORT TEXAS																								
LATITUDE 28 56 45N												LONGITUDE 95 18 29W												
RECORDER												MAINT.BY NOAA-NOS												
DATE 9TH	3.0	3.0	3.3	3.2	3.4	3.2	3.1	3.2	3.3	3.3	3.5	3.7	3.7	3.7	3.9	3.9	4.1	3.8	3.5	3.5	3.6	3.7	4.2	4.7
DATE 10TH																								
DATE 11TH																								
DATE 12TH																								
HIGHEST OBSERVED TIDE																								
GAGE FAILED, HIGHWATER MARK 11.7FT REPORTED IN THE FLOAT WELL.																								

Table 2.--(concluded)

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
LOCATION																								
PORT OCONNOR TEXAS																								
LATITUDE 28 23 57N	LONGTITUDE 96 24 25W				RECORDER				MAINT.BY NOAA-NOS															
DATE 9TH	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.5	3.6	3.7	3.7	3.7	3.7	3.7	3.9	4.1	4.2	4.3
DATE 10TH	4.5	4.8	5.0	5.1	5.3	5.5	5.6	5.9	5.8	5.9	6.0	6.2	6.3	6.6	6.8	7.0	7.2	7.4	7.7	8.1	8.3	8.6	9.2	9.5
DATE 11TH	9.9	10.4	10.9	11.3	12.2																			
DATE 12TH																								

HIGHEST OBSERVED TIDE
12.2FT (NOAA-NOS ADJUSTED ELEV.) REACHED PRIOR TO GAGE FAILURE.

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
LOCATION																								
PORT ARANSAS (JETTIES) TEXAS																								
LATITUDE 27 50 18N	LONGTITUDE 97 3 03W				RECORDER				MAINT.BY NOAA-NOS															
DATE 9TH	1.6	1.7	1.7	1.8	1.8	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.4	2.5	2.6	2.5	2.4	2.3	2.3	2.3	2.7	2.9	3.0	3.2
DATE 10TH	3.4	3.6	3.8	3.9	4.0	4.1	4.1	4.1	4.2	4.3	4.5	4.6	4.8	4.9	5.0	5.1	5.2	4.9	5.1	5.4	5.6	6.0	6.4	6.9
DATE 11TH	7.2	7.4	7.7	7.9																				
DATE 12TH																								

HIGHEST OBSERVED TIDE
9.0FT REPORTED AT 1000HRS AFIER GAGE FAILURE.

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
LOCATION																								
PORT ISABELL TEXAS																								
LATITUDE 26 4 --N	LONGTITUDE 97 13 --W				RECORDER				MAINT.BY NOAA-NOS															
DATE 9TH	1.4	1.7	1.7	1.8	1.8	1.9	1.8	1.8	1.8	1.9	2.0	2.1	2.2	2.3	2.3	2.4	2.1	2.3	2.3	2.4	2.5	2.7	2.9	3.0
DATE 10TH	3.1	3.4	3.6	3.7	3.8	3.8	3.7	3.7	3.7	3.7	3.7	3.8	3.8	4.0	4.0	3.9	4.0	4.0	3.9	4.0	3.9	3.9	4.1	4.0
DATE 11TH	4.0	4.1	4.0	4.2	4.3	3.9	3.9	3.9	3.7	3.6	3.8	3.5	3.4	3.7	3.6	3.7	3.8	3.5	3.5	3.4	3.3	3.2	3.2	3.3
DATE 12TH	3.3	3.3	3.3	3.4	3.3	3.1	3.0	2.3	1.9	1.5	1.2	1.0	1.1	1.3	1.5	1.4	1.5	1.6	1.5	1.5	1.5	1.4	1.5	1.5

HIGHEST OBSERVED TIDE
4.3FT RECORDED AT 0506HRS ON 11TH SEPT.

Table 3.--Tide gage data from inland stations (NGVD Datum) in Hurricane Carla, September 9-12, 1961

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
LOCATION																								
PUKI ARTHUR TEXAS																								
LATITUDE 29 52 00N	LONGITUDE 95 55 48W				STAFF GAGE				MAINT.BY CORPS.ENGR															
DATE 9TH																			3.3	3.2	3.2	3.1	3.1	3.2
DATE 10TH	3.4	3.6	3.8	4.4	4.6	4.5	4.6	4.7	4.8	4.8	4.9	4.9	4.8	5.1	5.2	5.3	5.5	5.5	5.5	5.6	5.6	5.7	5.7	5.8
DATE 11TH	5.9	6.0	6.1	6.2	6.4	6.4	6.5	6.8	6.8	6.9	6.8	6.8	6.7	6.7	6.8	6.9	7.0	7.1	7.1	7.1	7.1	7.0	7.0	7.0
DATE 12TH	6.9	6.9	6.9	6.8	6.8	6.8	6.7	6.7	6.3	6.3	6.3	6.2	6.3	6.2	6.2	6.1	6.1	6.1	5.9	5.9	5.8	5.5	5.2	

HIGHEST OBSERVED TIDE
7.1FT REPORTED AT 18-2100HRS ON 11TH SEPT.

ORANGE NAVAL BASE (PIER 21) TEXAS																									
LATITUDE 30 5 51N		LONGITUDE 95 43 19W				STAFF GAGE				MAINT.BY U.S.NAVY															
DATE 9TH																								3.2	
DATE 10TH	3.3	3.4	3.4	3.4	3.5	3.6	3.8	3.8	3.8	3.8	3.9	4.0	4.0	4.1	4.1	4.1	4.2	4.4	4.6	4.7	4.8	4.8	4.8	4.8	
DATE 11TH	4.9	5.0	5.1	5.1	5.2	5.4	5.4	5.6	6.0	6.0	6.1	6.4	6.6	6.7	7.0	7.0	7.0	7.0	7.0	6.9	6.9	6.9	6.9	6.9	
DATE 12TH	6.9	7.0	7.0	7.1	7.1	7.2	7.2	7.2	7.2	7.3	7.4	7.4	7.4	7.3	7.2	7.1	7.0	6.8	6.8	6.8	6.7	6.7	6.7	6.6	

HIGHEST OBSERVED TIDE
7.4FT REPORTED AT 11-1300HRS ON 11TH SEPT

BRAKE BAYOU, BEAUMONT TEXAS																									
LATITUDE 30 5 --N		LONGITUDE 94 10 --W				STAFF GAGE				MAINT.BY CITY															
DATE 9TH							2.7	2.8	2.8	2.8	2.8	2.9	2.9	2.9	3.0	3.1	3.2	3.2	3.3	3.3	3.3	3.2	3.2	3.1	
DATE 10TH	3.1	3.1	3.2	3.4	3.5	3.6	3.8	4.0	4.1	4.2	4.4	4.5	4.5	4.6	4.7	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.4	5.4	
DATE 11TH	5.5	5.6	5.7	5.7	5.8	6.0	6.0	6.2	6.4	6.6	6.7	6.8	6.9	7.0	7.0	7.0	7.0	7.1	7.2	7.3	7.4	7.4	7.5	7.5	
DATE 12TH	7.5	7.6	7.6	7.5	7.5	7.4	7.6	7.7	7.7	7.6	7.6	7.6	7.5	7.4	7.3	7.2	7.1	7.1	7.0	6.9	6.8	6.8	6.7	6.7	

HIGHEST OBSERVED TIDE
7.7FT REPORTED 08-0900HRS ON 12TH SEPT

Table 3.--(continued)

	1	2	3	4	5	6	7	8	9	10	TIME (IN HOURS CST)				15	16	17	18	19	20	21	22	23	24				
											11	12	13	14														
LOCATION																												
MUD BAYOU BRIDGE, HIGH ISLAND TEXAS																												
LATITUDE 29 35 40N												LONGITUDE 94 23 15W																
RECORDER												MAINT. BY CORPS. ENGR																
DATE 9TH												2.5	2.5	2.4	2.4	2.2	2.3	2.4	2.5	2.8	2.9	3.1	3.1	3.1	2.9	2.7	2.6	2.6
DATE 10TH	2.4	2.3	2.4	2.5	2.6	2.6	3.0	3.7	4.3	4.6	5.0	5.4	5.6	5.7	5.9	6.1	6.3	6.7	6.9	7.1	7.2	7.2	7.3	7.3				
DATE 11TH	7.5	7.7	8.0	8.2	8.4	8.6	8.7	8.9	8.7	8.5	8.2	8.2	8.2	8.4	8.6	8.6	8.6	8.6	8.5	8.4	8.2	8.0	8.0	8.0				
DATE 12TH	8.0	8.0	8.1	8.1	8.2	8.2	8.2	8.1	8.2	8.2	8.2	8.2	8.1	7.9	7.8	7.6	7.4	7.3	6.9									
HIGHEST OBSERVED TIDE																												
8.9FT RECORDED AT 0800HRS ON 11TH SEPT																												

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GALVESTON (PELICAN BRIDGE) TEXAS																												
LATITUDE 29 18 48N												LONGITUDE 94 49 17W																
RECORDER												MAINT. BY CORPS. ENGR																
DATE 9TH	2.5	2.5	2.6	2.7	2.7	2.7	2.7	2.7	2.8	2.9	3.0	3.1	3.2	3.4	3.4	3.5	3.6	3.4	3.2	3.3	3.4	3.5	3.8	4.0				
DATE 10TH	4.5	4.6	4.8	5.1	5.4	5.6	5.4	5.6	5.8	6.0	6.3	6.5	6.7	6.9	7.2	7.3	7.4	7.5	7.7	7.8	8.0	7.8	7.6	7.7				
DATE 11TH	7.8	8.0	8.0	8.2	8.4	8.5	8.5	8.6	8.2	8.3	8.2	8.0	8.2	8.4	8.6	8.8	8.4	7.9	7.7	7.5	7.3	7.1	6.9	7.2				
DATE 12TH	7.4	7.3	7.2	7.2																								
HIGHEST OBSERVED TIDE																												
8.6FT RECORDED AT 0805HRS AND 8.8FT AT 1545HRS ON 11TH SEPT.																												

TEXAS CITY (CARBIDE DOCKS) TEXAS																												
LATITUDE 29 21 47N												LONGITUDE 94 55 02W																
RECORDER												MAINT. BY INDUSTRY																
DATE 9TH	2.9	3.1	3.2	3.3	3.3	3.2	3.2	3.3	3.4	3.5	3.6	3.7	3.9	4.0	4.2	5.0	4.3	4.1	4.0	4.2	4.4	4.6	4.8	4.9				
DATE 10TH	5.2	5.5	5.7	6.0	6.2	6.2	6.3	6.5	6.7	6.9	7.0	7.2	7.5	7.7	8.0	8.3	8.5	8.8	9.0	9.9	9.5	9.5	9.5	9.5				
DATE 11TH	9.5	9.5	9.5	9.6	9.7	9.9	10.0	10.9	10.2	10.2	10.2	10.2	10.6	9.7	9.7	9.7	9.7	9.6	9.6	9.6	9.6	11.0	10.1	10.2				
DATE 12TH	10.5	10.4	10.0	9.6	9.2	9.1	9.1	9.0	9.0	8.9	8.8	8.3																
HIGHEST OBSERVED TIDE																												
10.9FT RECORDED AT 0800HRS AND 11.0FT AT 2200HRS ON 11TH SEPT																												

Table 3.--(continued)

	1	2	3	4	5	6	7	8	9	10	TIME (IN HOURS CST)				15	16	17	18	19	20	21	22	23	24
											11	12	13	14										
LOCATION																								
TEXAS CITY DIKE (SOUTH SIDE) TEXAS																								
LATITUDE 29 23 10N LONGITUDE 94 52 27W RECORDER MAINT.BY CORPS.ENGR																								
DATE 9TH	2.6	2.9	2.9	2.9	2.9	3.0	3.0	3.0	3.2	3.3	3.4	3.5	3.6	3.7	3.8	4.0	3.9	3.8	3.6	3.5	3.7	4.0	4.2	4.4
DATE 10TH	4.6	4.8	5.0	5.3	5.5	5.8	5.6	5.9	6.1	6.4	6.6	6.8	6.6	6.9	7.1	7.3	7.5	7.7	7.9	8.1	8.3	8.2	8.1	8.1
DATE 11TH	8.3	8.4	8.6	8.8	9.0	9.2	9.2	9.3	9.3	9.4	9.1	8.9	9.0	9.2	8.9	9.1	9.3	9.2	9.3	9.5	9.3			
DATE 12TH																								

HIGHEST OBSERVED TIDE
9.4FT RECORDED AT 1000HRS AND 9.5FT AT 2000HRS ON 11TH SEPT

	1	2	3	4	5	6	7	8	9	10	TIME (IN HOURS CST)				15	16	17	18	19	20	21	22	23	24
											11	12	13	14										
TEXAS CITY DIKE (NORTH SIDE) TEXAS																								
LATITUDE 29 23 11N LONGITUDE 94 52 26W RECORDER MAINT.BY CORPS.ENGR																								
DATE 9TH	2.4	2.5	2.6	2.7	2.9	3.0	3.0	3.1	3.2	3.3	3.3	3.4	3.5	3.7	3.7	3.7	3.8	3.8	3.8	3.9	3.9	4.0	4.2	4.5
DATE 10TH	4.7	5.0	5.2	5.5	5.7	5.5	5.7	6.0	6.2	6.4	6.6	6.8	7.0	7.2	7.4	7.5	7.7	7.9	8.0	8.2	8.3	8.2	8.0	8.2
DATE 11TH	8.4	8.4	8.5	8.6	8.8	9.1	9.0	9.3	9.3	9.2	9.2	9.1	9.1	9.2	9.3	9.3	9.3	9.7	9.3	8.9	9.0	9.1	8.8	8.6
DATE 12TH	8.4	8.5	8.4	8.4	8.3	8.3	8.2	8.0	7.9	7.8	7.9	7.7	7.5	7.3	7.1	6.9	6.7	6.5	6.3	6.1	5.9	5.8	5.6	5.4

HIGHEST OBSERVED TIDE
9.7FT RECORDED AT 1745HRS ON 11TH SEPT

	1	2	3	4	5	6	7	8	9	10	TIME (IN HOURS CST)				15	16	17	18	19	20	21	22	23	24
											11	12	13	14										
BAYTOWN (HUMBLE DOCKS) TEXAS																								
LATITUDE 29 41 --N LONGITUDE 94 56 --W RECORDER MAINT.BY INDUSTRY																								
DATE 9TH																								
DATE 10TH																								
DATE 11TH																								
DATE 12TH	13.1	13.1	13.1	13.1	12.4	12.3	12.0	11.8	11.6	10.9	10.6	10.1	10.0	9.6	9.9	9.8	9.6	9.4	9.1	8.8	8.6	8.3	7.9	7.8

HIGHEST OBSERVED TIDE
13.7FT REPORTED AT 1800 AND 2000HRS ON 11TH SEPT

Table 3.--(continued)

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
LOCATION																								
CLINTON ROAD, HOUSTON SHIP CHANNEL, TEXAS																								
LATITUDE 29 43 30N LONGITUDE 95 15 46W																								
STAFF GAGE MAINT. BY INDUSTRY																								
DATE 9TH																								
DATE 10TH																								7.7
DATE 11TH	8.3	8.9	9.8	9.9	9.9	10.1	10.2	10.6	11.0	11.6	10.8	11.4	11.4	11.4	11.4	12.4	13.2	13.8	14.0	14.2	14.6	14.7	14.8	15.0
DATE 12TH	15.1	15.3	15.3	15.3	15.3	15.3	15.3	12.8	12.3	11.8	11.3	9.0	6.8	6.4	5.8	5.6								
HIGHEST OBSERVED TIDE																								
15.3FT REPORTED AT 02-0700HRS ON 12TH SEPT																								

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	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
PORT HOUSTON (TURNING BASIN), TEXAS																								
LATITUDE 29 45 00N LONGITUDE 95 17 21W																								
STAFF GAGE MAINT. BY INDUSTRY																								
DATE 9TH	2.6	2.4	2.2	2.5	2.7	3.1	3.4	3.5	3.5	3.6	3.6	3.6	3.6	3.7	3.7	3.8	4.0	4.2	4.2	4.3	4.4	4.6	4.6	4.6
DATE 10TH	4.6	4.5	4.0	4.3	4.5	4.6	5.0	5.4	5.6	5.8	6.0	6.4	6.4	6.4	7.1	7.1	7.0	7.2	7.6	7.8	8.3	8.6	9.0	9.6
DATE 11TH	10.1	10.6	10.9	11.4	11.6	11.8	11.7	11.9	12.1	12.4	12.7	13.0	13.1	13.1	13.1	13.4	14.2	14.8	15.0	15.2	15.6	15.7	15.8	16.0
DATE 12TH	16.1	16.3	15.8	15.2	14.7	14.1	13.5	13.1	12.8	12.8	12.4	12.0	11.6	11.2	11.0	10.7	10.5	10.3	10.1	9.8	9.6	9.5	9.1	
HIGHEST OBSERVED TIDE																								
16.3FT (EST'D) AT 0200HRS ON 12TH SEPT (MAX STAFF MARKING-15FT)																								

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DOW CHEMICAL PLANT B, FREEPORT TEXAS																								
LATITUDE 28 58 43N LONGITUDE 95 23 08W																								
RECORDER MAINT. BY INDUSTRY																								
DATE 9TH	2.8	3.1	3.5	3.5	3.6	3.6	3.5	3.4	3.3	3.4	3.5	3.6	3.8	4.0	4.2	4.3	4.4	4.4	3.8	3.9	4.0	4.0	4.3	4.6
DATE 10TH	4.9	5.2	5.6	5.9	6.2	6.5	6.5	6.6	6.6	6.6	6.6	6.9	6.9	6.9	7.3	7.6	7.7	7.9	7.9	7.9	8.0	8.2	8.2	8.1
DATE 11TH	8.8	9.6	9.6	9.7	9.7	10.1	10.5	10.6	10.4	10.1	10.1	9.7	9.7	10.1	10.1	10.9	10.9	10.9	10.0	9.8	9.5	9.2	8.6	8.0
DATE 12TH	7.9	7.8	7.6	7.5	7.5	7.4	7.1	6.8	6.6	6.1	5.6	5.1	5.0	4.8	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.4	4.2	4.1
HIGHEST OBSERVED TIDE																								
10.9FT RECORDED AT 16-1800HRS ON 11TH SEPT																								

Table 3.--(continued)

											TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24										
LOCATION																																		
BRAZOS RVR FLUDDGATES FREEPORT TEXAS																																		
LATITUDE 28 54 04N										LONGITUDE 95 22 59W																								
										STAFF GAGE				MAINT.BY CORPS.ENGR																				
DATE	9TH										3.9	4.0	3.8	3.9	4.3	4.3	4.6	4.6	4.5	4.8	4.3	4.3	4.4	4.4	4.7	5.0	5.3							
DATE	5.2	6.1	6.1	6.4	6.8	7.1	6.5	6.9	6.9	7.3	7.3	7.3	7.7	7.9	8.1	8.6	8.6	9.1	9.1	9.1	9.1	9.6	10.1											
DATE	11TH										10.1	10.1	10.1	10.1	10.1	10.8	10.9	10.1	10.1	9.2	9.2	9.2	9.6	10.6	10.6	10.6	9.8	9.6	8.6	8.6	7.9	6.6	7.4	6.8
DATE	12TH										6.8	6.8	6.5	6.3	6.5	6.2	6.1	5.6	5.2	4.9	4.6	4.0	4.1	4.0	3.9	4.1	4.2	4.1	4.2	4.0	4.1	3.6	3.2	
HIGHEST OBSERVED TIDE																																		
10.9FT REPORTED AT 0700HRS ON 11TH SEPT																																		

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BRAZORIA NAV.DIST., FREEPORT TEXAS																																		
LATITUDE 28 56 23N										LONGITUDE 95 20 32W																								
										RECORDER				MAINT.BY COUNTY																				
DATE	9TH										3.3	3.7	3.8	3.9	4.0	3.8	3.7	3.8	3.9	4.0	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.6	4.4	4.2	4.1	4.5	4.9	5.3
DATE	5.7	6.1	6.6	7.0	7.4	7.9	7.7	7.4	8.1	7.6	8.0	8.5	8.9	9.2	9.6	9.9	10.2	10.5	10.8	10.4	10.1	10.5	11.4	12.3										
DATE	11TH										11.4	11.9	11.2	11.7	12.2	12.7	11.8	10.9	11.3	10.1	10.6	11.2	10.5	11.9	11.3	10.8								
DATE	12TH																																	
HIGHEST OBSERVED TIDE																																		
12.7FT RECORDED AT 0610HRS GAGE FAILED TO REPORT MAX AFTER 1600HRS																																		

COLORADO RIVER LOCK, MATAGORDA TEXAS																																			
LATITUDE 28 41 00N										LONGITUDE 95 58 21W																									
										STAFF GAGE				MAINT.BY CORPS.ENGR																					
DATE	9TH										3.7	3.5	3.6	3.7	3.4	4.1	3.3	3.9	3.4	3.4	4.1	3.6	3.4	3.3	3.4	3.5	3.9								
DATE	3.9	4.1	4.3	4.5	4.8	5.2	5.6	5.9	6.1	6.3	6.5	6.7	7.0	7.6	7.8	7.9	8.4	8.6	8.8	9.0	9.2	9.4	9.6	9.9											
DATE	11TH										10.3	10.3	10.3	10.6	10.8	10.9	10.9	11.1	10.8	10.8	10.7	10.7	11.0	11.2	11.6	11.5	11.2	11.0	11.0	10.8	10.7	10.2	9.6	9.5	
DATE	12TH										9.3	9.0	8.6	8.4	8.1	8.0	8.0	8.0	8.0	8.0	8.0	7.8	7.5	6.7	6.8	6.9	6.9	6.7	6.6	6.5	6.6	6.6	6.4	6.8	7.1
HIGHEST OBSERVED TIDE																																			
11.6FT REPORTED AT 1500HRS ON 11TH SEPT																																			

Table 3.--(concluded)

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
LOCATION																								
CUMPS. ENGR OFFICE, CORPUS CHRITI TEXAS																								
LATITUDE 27 48 50N LONGITUDE 97 23 40W																								
STAFF GAGE MAINT. BY CORPS. ENGR																								
DATE 9TH																	2.8	2.8	2.9	2.8	2.9	2.9	3.0	3.0
DATE 10TH	3.0	3.1	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.7	3.7	3.8	4.0	4.0	4.0	4.2	4.2	4.1	4.2	4.2	4.2	4.2	4.2	4.2
DATE 11TH	4.2	4.2	4.3	4.9	5.0	5.0	5.3	6.0	6.2	6.4	6.5	6.4	5.8	5.2	4.6	4.3	4.2	4.2	4.1	4.0	3.9	3.8	3.7	3.7
DATE 12TH	3.6	3.6	3.6	3.5	3.5	3.4	3.2	3.2	3.2	3.2	3.1	3.1	3.1	3.1	3.0	3.2	3.2	3.3	3.3	3.3	3.3	3.2	3.1	
HIGHEST OBSERVED TIDE																								
6.5FT REPORTED AT 1100HRS ON 11TH SEPT																								

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TURNING BASIN, CORPUS CHRITI TEXAS																								
LATITUDE 27 48 50N LONGITUDE 97 23 47W																								
RECORDER MAINT. BY CORPS. ENGR																								
DATE 9TH	2.0	2.0	2.1	2.1	2.2	2.2	2.2	2.3	2.4	2.4	2.5	2.5	2.6	2.6	2.6	2.7	2.8	2.8	2.8	2.9	2.9	2.9	3.0	3.0
DATE 10TH	3.0	3.1	3.2	3.2	3.4	3.4	3.5	3.5	3.6	3.7	3.7	3.8	3.9	3.9	3.9	4.1	4.2	4.2	4.2	4.2	4.2	4.3	4.3	4.2
DATE 11TH	4.5	4.4	4.9	5.0	5.1	5.0	5.1	5.3	5.5	5.6	5.5	5.4	5.2	5.0	4.7	4.5	4.4	4.3	4.4	4.3	4.2	4.0	3.9	4.0
DATE 12TH	3.8	3.7	3.7	3.7	3.6	3.5	3.4	3.3	3.2															
HIGHEST OBSERVED TIDE																								
5.6FT RECORDED AT 1000HRS ON 11TH SEPT																								

Table 4.--Predicted astronomical tide at Galveston Pier 21 and at Pleasure Pier (NGVD Datum)

LOCATION	TIME (IN HOURS CST)																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
GALVESTON (PIER 21) TEXAS LATITUDE 29 18 36N LONGITUDE 94 47 31W									RE-ORDER	MAINT.BY NOAA-NOS															
DATE 9TH	-0.1	0.2	0.4	0.5	0.5	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.3	0.2	0.0	-0.3	-0.5	-0.6	-0.7	-0.6	-0.4	
DATE 10TH	-0.2	0.1	0.3	0.4	0.5	0.4	0.2	0.0	0.0	-0.1	-0.1	-0.1	0.0	0.2	0.3	0.4	0.3	0.2	0.0	-0.3	-0.5	-0.6	-0.5	-0.4	
DATE 11TH	-0.2	0.0	0.2	0.4	0.4	0.4	0.2	0.1	-0.1	-0.2	-0.3	-0.2	0.0	0.0	0.2	0.3	0.4	0.3	0.1	0.0	-0.3	-0.4	-0.4	-0.4	
DATE 12TH	-0.2	-0.1	0.1	0.3	0.4	0.4	0.3	0.0	-0.1	-0.3	-0.4	-0.3	-0.2	-0.1	0.0	0.2	0.3	0.4	0.3	0.1	-0.1	-0.2	-0.3	-0.3	

GALVESTON (PLEASURE PIER) TEXAS LATITUDE 29 16 56N LONGITUDE 94 47 53W									RE-ORDER	MAINT.BY NOAA-NOS															
DATE 9TH	0.2	0.5	0.7	0.7	0.6	0.4	0.1	0.0	-0.2	-0.2	0.0	0.1	0.3	0.4	0.4	0.3	0.0	-0.3	-0.6	-0.8	-0.9	-0.8	-0.6	-0.3	
DATE 10TH	0.1	0.4	0.6	0.7	0.6	0.4	0.1	0.0	-0.2	-0.3	-0.2	0.0	0.2	0.4	0.5	0.4	0.3	0.0	-0.3	-0.5	-0.7	-0.7	-0.6	-0.3	
DATE 11TH	0.0	0.3	0.5	0.6	0.6	0.4	0.2	0.0	-0.3	-0.4	-0.3	-0.2	0.1	0.3	0.5	0.5	0.4	0.3	0.0	-0.3	-0.5	-0.5	-0.5	-0.3	
DATE 12TH	0.0	0.2	0.5	0.6	0.6	0.4	0.2	0.0	-0.3	-0.5	-0.5	-0.3	-0.1	0.1	0.3	0.5	0.5	0.4	0.2	0.0	-0.2	-0.3	-0.3	-0.3	

Table 5.--Location and elevation of high water marks

STN IDENT.	LATITUDE DEG MM SS	LONGITUDE DEG MM SS	ELV. (FT)	H.W.M. (FT)	REMARKS (WHERE MEASURED)
					ANAHJAC
	29 50 02	94 44 37		14.0	**DRIFT LINE
	29 50 10	94 44 40		12.3	**DRIFT LINE
					ANGLETON
MILL	29 08 36	95 24 30		18.2	**DEBRIS DRIFT LINE AT ANGLETON
					BACLIFF
	29 30 34	94 58 21		16.8	**DRIFT ON BANK
	29 30 35	94 58 22		16.4	**DRIFT ON BANK
					BRAZORIA
R.R. BRIDGE	29 01 58	95 36 01	12	14.5	OVER FLOOR IN TWO HOUSES
	29 03 12	95 33 24		15.1	**AT MISSOURI PAC. RR BRIDGE
					CAPLEN
WASHERIA PHILLIPS	29 28 12	94 36 21	06	8.8	**YELLOW PAINT MARK
	29 29 21	94 33 20	06	8.8	**SUN OIL COMPANY
					CEDAR LAKE EAST
CABIN	28 52 10	95 26 47	03	11.0	INSIDE ON WALL OF CABIN
					CEDAR LAKE
HINKLE	28 58 06	95 33 42		13.7	**AT HINKLE FERRY
ELMER	28 56 11	95 32 58	05	12.5	INSIDE ON WALL OF STORE
BRIDGE	28 56 12	95 32 54		13.4	**ON CHURCHILL BRIDGE
SPORTMAN	28 56 48	95 33 42		13.5	**AT SPORTSMAN SPAN
MCNEEL	29 00 36	95 35 18		14.1	**AT MCNEEL BRIDGE
					COVE
	29 50 03	94 48 08		11.5	**DRIFT LINE
					DANBURY
	29 10 05	95 16 01	10	15.0	4 HOUSES 2-4FT OVER FLOOR
	29 10 30	95 17 00	10	15.0	ON GARAGE WALL
					DICKINSON
PAWLICK	29 27 06	95 03 29	16	16.0	**FENCE CORNER POST
GARAGE	29 27 19	95 03 15	00	12.7	WALL INSIDE GARAGE
DRIFT	29 27 22	95 02 51	00	14.6	**TOP OF BRIDGE
CITY WATERD	29 27 27	95 02 35	12	12.6	INSIDE PUMP HOUSE
CITY WATER	29 27 27	95 03 30	11	12.7	INSIDE PUMP HOUSE
					ELAKE
PORCH FLETCHER	29 25 05	94 41 46	06	08.6	**PORCH
	29 25 54	94 42 30	04	10.6	INSIDE REFRIGERATOR

Table 5.--(continued)

STN IDENT.	LATITUDE DEG MM SS	LONGITUDE DEG MM SS	ELV. (FT)	H.W.M. (FT)	REMARKS (WHERE MEASURED)
STORE ROBINSON	29 26 26 29 26 51	94 40 14 94 39 27	08 08	09.3 09.6	INSIDE GROCERY STORE INSIDE SWEDES STORE
FREEPORT					
OLD BRAZOS DOW CHEM LIGHTHOUSE GAUGE STN OLD BRAZOS OLD BRAZOS GIRONARD WESTERN OLD BRAZOS DIVERS DAM DIVERS DAM OYSTER CRK COMMUNITY GLADNEY	28 55 42 28 56 37 28 56 42 28 56 48 28 57 00 28 57 12 28 57 14 28 57 15 28 57 24 28 57 48 28 57 48 28 58 30 28 59 42 28 59 55	95 22 24 95 18 58 95 18 30 95 18 30 95 20 18 95 21 12 95 20 57 95 20 59 95 21 48 95 22 24 95 22 24 95 16 48 95 19 48 95 19 54	00 00 00 00 00 00 03 03 00 00 00 00 04	12.3 14.6 11.9 11.7 12.9 12.3 13.3 13.4 12.3 10.3 12.3 11.7 10.9 10.8	**AT DIVERSION DAM RECORDING GAGE INSIDE BRAZOS RIVER LIGHTHOUSE INSIDE GAGE HOUSING **OPPOSITE TERMINAL ST **AT BAY STREET BRIDGE **UNKNOWN **AT SEAFOOD RESTRUANT **AT COMMUNITY HOUSE, GOLF COURSE **DIVERSION DAM ON ESISTING RIVR **IN DEAD END OF OLD RIVER **AT JUNCTION WITH INTRACOASTAL **AT OYSTER CREEK COMMUNITY INSIDE OF HOUSE
FROZEN PT.					
TEXACO STN HEARST	29 30 22 29 30 54	94 30 23 94 30 43	05 03	9.6 8.8	IN REST ROOM INSIDE OF HOUSE
GALVESTON					
SF BLDG MAGNOLIA BURNETT C G DOCK C G GARAGE	29 17 50 29 18 24 29 18 33 29 18 43 29 19 48 29 19 59	94 48 44 94 47 49 94 47 14 94 46 38 94 46 23 94 46 14	06 05 05 08 04 06	08.6 08.7 08.9 08.6 08.7 09.0	INSIDE LAUNDRY INSIDE LOBBY OF BLDG INSIDE APARTMENT INSIDE BUILDING INSIDE PAINT HOUSE INSIDE TOOL BOX
HIGH ISLAND					
GULF STN MOBILE STN	29 30 52 29 34 17	94 29 01 94 23 53	5 5	9.2 8.9	INSIDE SERVICE STN INSIDE SERVICE STN
HIGHLANDS					
125CROW RD 125CROW RD 140CROW RD S JAC STPK SAN JACINN TRIUMPH BT TE MERGER TEXAS BUTA BOONEBOATL	29 45 04 29 45 04 29 45 05 29 45 12 29 45 56 29 47 41 29 48 18 29 50 07 29 52 30	95 02 28 95 02 28 95 02 33 95 05 07 95 05 21 95 04 05 95 05 41 95 06 02 95 05 37	07 07 02 06 10 05 09 12 05	13.8 14.4 14.7 14.7 14.4 13.6 14.4 14.6 19.9	**ON GUY WIRE IN FRONT OF HOUSE **BRICK ON HOUSE **BACK DOOR OF HOUSE CARETAKERS HOUSE **ABOVE CONC. FLOOR OF PORCH **ABOVE CONCRETE FLOOR **TOP 3 IN. PIPE ON FENCE **BOAT LIET BY CLUB HOUSE **SE CORNER STORAGE HOUSE
HOSKINS MOUND					
PETERSONLG PETERSONLD	29 14 31 29 14 31	95 13 45 95 13 46	10 05	14.7 14.7	IN HOUSE INSIDE HOUSE
JONES CREEK					
FLOOD GATE BRIDGE VELASCO DOW CHEM	28 53 48 28 57 30 28 58 42 28 58 43	95 22 54 95 22 36 95 23 06 95 23 08	00 00 00 00	10.6 10.3 11.0 10.9	**EAST FLOOD GATE **AT STATE HIGHWAY 36 DOW CHEM(A) WASTE WATER CANAL RECORDING GAGE

Table 5.--(continued)

STN IDENT.	LATITUDE DEG MM SS	LONGITUDE DEG MM SS	ELV. (FT)	H.W.M. (FT)	REMARKS (WHERE MEASURED)
GULF PARK	28 58 48	95 25 00		11.3	**AT NORTH END OF COUNTY ROAD 336
DOW CHEM	28 59 42	95 23 12	05	11.8	INSIDE OPERATOR SHACK, B. CANAL
DOW CHEM	28 59 42	95 23 12		12.5	**DRIFT LINE AT BARGE CANAL DOCK
DOW CHEM	28 59 45	95 23 22	00	14.6	**INTAKE PLATFORM
KAMEY	28 42 33	96 39 40		19.0	KAMEY **DRIFT LINE ON WEST SHORE
STOCK	28 49 30	95 47 48	12	14.1	LAKE AUSTIN INSIDE UTILITY SHED
JAMAICA	29 11 04	94 58 16	08	11.0	LAKE COMO INSIDE BUILDING
DOW CHEM	29 00 06	95 26 12		11.6	LAKE JACKSON IN FLOAT WELL OF RECORDER GAGE
CLUTE	29 00 54	95 24 00	07	12.0	**DRIFT LINE
BRAZOS OAK	29 01 30	95 25 54	12	12.3	**DRIFT, IN CITY OF LAKE JACKSON
AREA N	29 01 54	95 26 42	10	11.5	**DRIFT LINE IN SECTION 3
AREA N	29 02 06	95 26 54	10	11.5	**DRIFT LINE IN SECTION 1
LAKE BEND	29 02 36	95 24 54		14.1	**DRIFT LINE ON BANKS AT RR BRIG
LAKE BEND	29 02 36	95 24 54		14.1	**DRIFT LINE ON RR BRIDGE BANKS
RICHWOOD	29 03 30	95 24 24	14	16.0	**AT HIGHWAY 288 AND WALNUT
HOSKINS	29 04 36	95 22 48	11	15.0	**END OF COUNTY ROAD 223
HAVENWOOD	29 05 06	95 24 42	12	16.6	**DRIFT AT HIGHWAY 208 CROSSING
GORNOWICZ	29 06 18	95 24 24	10	16.7	INSIDE TWO HOUSES
STD OIL LP	29 38 37	95 00 03	10	13.6	LA PORTE **COMPANY SIGN POLE
GARAGE	29 38 37	95 00 50	11	16.4	INSIDE GARAGE
HOUSE	29 38 39	95 00 50	11	18.4	WAVE ACTION INSIDE HOUSE
TUNNEL ENT	29 42 32	95 00 47	10	14.6	**TUNNEL ENTRANCE
INTAKE STRC	29 43 32	95 03 23	00		**4TH RUNG OF LADDER-INTAKE STRC
RADIOTOWER	29 43 33	95 01 09	07	13.8	RADIO TOWER
SANBERTRON	29 43 34	95 03 27	05	14.3	INSIDE STATION
PARK	29 33 53	95 03 44		10.4	LEAGUE CITY **DRIFT LINE IN COUNTY PARK
LOCKS	28 40 58	95 58 22	00	11.0	MATAGORDA **COLORADO RIVER LOCKS
BRDGETENDR	28 41 14	95 57 56	05	15.2	WALL INSIDE HOUSE
PARKER BRO	28 41 28	95 58 34	05	12.1	TIED TO BENCH MARK ON LEVEE
LLOYDS CLUB	28 43 04	95 53 26	10	13.7	ON WALL
MARITIME	29 40 51	94 59 00		14.7	MORGAN POINT **ON PILING BENEATH OFFICE
PRIN GREEN	29 40 51	94 59 52	05	13.9	INSIDE WORKSHOP, YACHT BASIN
HULEN CAMP	29 40 53	94 59 25		15.0	**ON STEPS TO PIER
TRICITY	29 41 21	94 56 04	10	13.5	**MARK AT BASE OF DOUBLE GATE
GRACE OIL	29 42 19	94 58 29		14.1	**MARK ON TRANSFORMER PLATFORM
WEST MAIN	29 43 18	94 59 15	12	14.1	INSIDE DISPOSAL PLANT
CARETAKER	29 43 25	94 56 35	06	11.5	INSIDE CARETAKER'S HOUSE

Table 5.--(continued)

STN IDENT.	LATITUDE DEG MM SS	LONGITUDE DEG MM SS	ELV. (FT)	H.W.M. (FT)	REMARKS (WHERE MEASURED)
KILGORE CEDAR BAYU	29 43 53 29 43 55	94 59 21 94 56 15	12	13.4 14.1	**ON METAL POST MARK 30IN.ABOVE FLOOR IN HOUSE
FRDKANSACK	29 17 12 29 15 18	95 07 41 95 14 02	10 10	14.3 16.2	MUSTANG BAY INSIDE FISHING CAMP CAFE **ABOVE NORMAL TIDE REPORTED
FM BRAGG LEWDLN	28 38 20 28 38 58 28 40 13 28 43 52 28 43 47	96 27 26 96 26 52 96 24 47 96 25 58 96 26 20	07 10 10	15.5 16.3 18.4 14.3 20.1	OLIVIA BATHROOM WALL WALL INSIDE HOUSE BATHROOM WALL **DRIFT LINE **DRIFT LINE
DRIFT LINE TIDE GAGE GAGE DRIFT	30 02 36 30 02 40 30 04 32 30 04 36	93 49 50 93 49 51 93 50 48 93 50 50	01 00 00 00	6.7 6.7 6.7 6.6	ORANGEFIELD **INSIDE DRIFTLINE TIDE GAGE GAGE **DRIFT
WORKSHOP	29 40 27	94 36 02	10	10.9	OYSTER BAYOU **WORKSHOP FRONT DOOR POST
COMMUNITY	29 00 18	95 20 00		10.9	OYSTER CREEK **AT OYSTER CREEK COMMUNITY
BARRETTLBR POSTOFFICE CARETAKER TEXACO STN	28 42 00 28 42 02 28 42 15 28 42 51 28 42 53	96 13 02 96 12 59 96 14 38 96 12 35 96 09 54	11 11 11 06 05	15.4 13.4 13.1 15.2 13.0	PALACIOS INSIDE ON COUNTER INSIDE ON FILE CABINET WALL INSIDE HOUSE WALL INSIDE REST ROOM INSIDE HOUSE
MIDDLETON TERMINAL GLFATLANC GLFATLANC WHARF #3 CTYWAREHSE US CUSTOMS CTYWAREHSE	29 43 23 29 43 30 29 44 12 29 44 16 29 44 49 29 44 50 29 44 52 29 44 53	95 16 38 95 15 45 95 16 45 95 16 46 95 17 14 95 17 28 95 17 13 95 17 14	15 00 05 05 05 02 02 02	15.2 15.2 14.8 15.3 14.8 15.4 15.4 14.9	PARK PLACE MACHINE SHOP DOOR STAFF GAGE-PORT OF HOUSTON **WAREHOUSE DOOR AT IS.1118 POST **1ST POST ON LEFT ISLF **ON GATE TO WHARF NO.3 STEEL COLUMN INSIDE WAREHOUSE#4 ON DOOR INSIDE OFFICE OFFICE DOOR INSIDE WAREHOUSE 3
CHAMPION CHAMPION CHAMPION SHELL DOCK OLD DEPOT HESS TERML HESS TERML TUDDS YARD	29 43 04 29 43 13 29 43 27 29 43 44 29 44 27 29 44 32 29 44 36 29 44 58	95 12 49 95 13 10 95 12 52 95 08 15 95 09 17 95 12 00 95 12 08 95 10 12		15.4 14.7 14.9 13.7 14.5 14.2 14.3 15.3	PASADENA **MARK ON TREE **GAURD HOUSE GATE **MARKS ON BARRICADES **FLOOD LIGHT WEST END OF SLIP ON COMPRESSOR HOUSE DOOR IN HESS TANK FARM TERMINAL **ON GUARD HOUSE WINDOW INSIDE MACHINE SHOP

Table 5.--(continued)

STN IDENT.	LATITUDE DEG MM SS	LONGITUDE DEG MM SS	ELV. (FT)	H.W.M. (FT)	REMARKS (WHERE MEASURED)
					POINT COMFORT
ALCOA PLANT	28 39 57 28 44 07	96 34 14 96 33 35		15.2 14.1	**DRIFT LINE NEAR TURNING BASIN **DRIFT LINE EAST OF SWAN LAKE
					PORT ACRE
HOUSE HOUSE	29 53 44 29 54 17	94 02 25 94 02 26	04 05	4.2 5.9	INSIDE HOUSE INSIDE HOUSE
					PORT ARTHUR S.
GAURDHOUSE	29 51 02	93 58 25	06	7.2	INSIDE GUARD HOUSE
					PORT BOLIVAR
	29 23 04	94 46 07	03	09.3	WALL INSIDE HOUSE
					PORT LAVACA EAST
HOUSE CONC HOUSE COLL INS RUEMER CRYERS HOUSE DRIFT SHRIMP CO SHRIMP CO	28 34 15 28 34 55 28 36 01 28 36 03 28 36 05 28 36 36 28 36 51 28 37 15 28 37 15	96 33 45 96 34 08 96 36 58 96 36 56 96 36 58 96 37 11 96 37 19 96 37 29 96 37 29	10 11 15 15 15 15 15 10 10	12.8 17.6 17.2 22.0 21.3 20.7 18.7 14.3 17.1	SHOWER WALL INSIDE BRICK HOUSE ON WALL INSIDE HOUSE WALL INSIDE OFFICE WALL INSIDE HOUSE ON WALL INSIDE HOUSE INSIDE HOUSE ON BANK OF FAY **DRIFT UNDER HOUSE ON BANK INSIDE OF SAFE ON WALL INSIDE HOUSE
					PORT LAVACA W.
HANGER TURNERS	28 33 59 28 34 15 28 35 31	96 37 58 96 37 58 96 38 40	12 11 02	15.7 16.2 13.9	ON WALL INSIDE CONC BLK HANGER ON WALL INSIDE HOUSE **DRIFT LINE
					PORT OCONNOR
YOUNG LEWIS	28 25 56 28 25 56 28 26 54 28 26 56	96 27 03 96 27 05 96 24 33 96 24 18	04 04 05 05	15.2 15.4 14.7 15.4	FAINT MARK ON WALL INSIDE HOUSE WALL INSIDE BAPT. CHURCH WALL INSIDE CATH CHURCH
					SAEINE PASS
BUILDING	29 44 03	95 53 42	02	7.0	INSIDE BUILDING
					SAN LUIS PASS
CAMP SITE	29 05 53	95 06 32	05	10.8	IN ICE BOX IN BUS
					SARGENT
BULLARD	28 50 11	95 39 54	12	13.7	WALL INSIDE STORE

Table 5.--(continued)

STN IDENT.	LATITUDE DEG MM SS	LONGITUDE DEG MM SS	ELV. (FT)	H.W.M. (FT)	REMARKS (WHERE MEASURED)
					SEADRIFT
LAFITTE	28 24 30	96 42 49	07	10.3	INSIDE HOTEL LOBBY
BLANCHARD	28 24 31	96 42 41	07	10.5	**BACK OF STORE (DRIFT)
YBARRA	28 24 42	96 41 57	07	11.2	WALL INSIDE GARAGE
					SEA ISLE
SEA ISLE	29 09 05	95 01 35	08	12.1	**OUTBUILDING
					SETTEGAST
POH INSPBL	29 45 07	95 17 19	05	12.6	**HALF WAY DOWNSTAIRS ON PILING
DISPOSALPL	29 45 24	95 19 12	10	10.3	**CONCRETE WING WALL-BEFFLO BAYOU
					SMITH POINT
VANTUUN	29 32 13	95 45 38	05	9.8	INSIDE RESTROOM GROCERY STORE
					STANOLIND RESERVOIR
OUTHOUSE	29 40 16	95 29 17	07	10.5	IN OUTHOUSE
SHOP	29 40 24	95 24 37	07	9.5	INSIDE SHOP
					SWEENEY
	29 02 44	95 39 12	15	15.0	**APPROXIMATE
					TERRY
SUN OIL	30 00 25	93 58 57	07	7.0	IN BUILDING
					TEXAS CITY
1ST AVE N	29 23 06	94 57 01	06	10.0	INSIDE HOUSE 146
CORPS ENG	29 23 10	94 52 27	00	9.5	COE TIDE GAGE
CLARIMONT	29 23 26	94 56 22	10	10.5	INSIDE HOUSE
8TH AVE	29 23 30	94 53 36	08	10.6	INSIDE HOUSE
TEXAS C	29 23 40	94 55 40	09	10.3	INSIDE TEXAS C. BOWLING
WEST HAVEN	29 24 10	94 56 16	07	10.5	INSIDE HOUSE
ELEM SCHL	29 24 25	94 53 28	06	10.2	INSIDE SCHOOL
	29 24 59	94 53 27	06	10.2	INSIDE BARN
DRIFT	29 25 02	94 53 32	06	10.7	**DRIFT ON FENCE
BENCH MARK	29 27 22	94 58 21		11.4	**DRIFT RR TRACK
HOUSE	29 28 10	94 58 25	08	13.6	INSIDE HOUSE (GOOD)
					THE JETTIES
	29 22 17	94 44 56	05	9.6	HWM ABOVE BATHROOM FLOOR
					TIVOLI SE
	28 16 31	96 47 52	10	10.3	STORE ROOM WALL
					VIRGINIA POINT
FISH CO	29 19 43	94 56 47	00	11.2	INSIDE BATHROOM
FREDDY	29 19 57	94 57 54	06	11.3	INSIDE CAFE

Table 5.--(concluded)

STN IDENT.	LATITUDE DEG MM SS	LONGITUDE DEG MM SS	ELV. (FT)	H.W.M. (FT)	REMARKS (WHERE MEASURED)
DURO	29 20 16	94 57 40	04	11.0	INSIDE HOUSE
HOUSE	29 20 23	94 59 39	10	12.2	INSIDE HOUSE
PORCH	29 20 25	94 59 45	10	12.6	**ON PORCH
TCT RR	29 20 52	94 56 30	08	10.7	INSIDE TWO FRAME HOUSE
LAZY LANE	29 21 06	94 59 35	10	12.3	INSIDE HOUSE BATHROOM
BRIDGE	29 21 06	94 59 35	00	12.4	**DRIFT LINE TOP OF BRIDGE
CARBIDE DCK	29 21 47	94 55 02	05	11.0	RECORDING GAGE
CARBIDE	29 21 50	94 55 04	05	11.0	IN BARGE DOCK WAREHOUSE
CHURCH	29 22 18	94 58 00	10	11.0	INSIDE CHURCH AT LA MARQUE
					WADSWORTH
	28 45 27	95 55 54	10	16.5	INSIDE HOUSE
					WEST/GREENS BAYOU
TRINITYVAL	29 58 06	93 51 35	04	8.5	INSIDE BUILDING-CONSTRUCTION
DRIFTLINE	29 59 46	93 47 48	01	8.1	**DRIFT LINE
					WHITES RANCH
PORCH	29 40 18	94 21 50	06	9.6	**ON PORCH

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APPENDIX - METEOROLOGICAL DATA

This Appendix gives the basic meteorological data used to develop the analysis presented in this report. The tables list the observations of sea-level pressure and wind data at land stations and the hourly reports from ships. They also include positions of the hurricane center from reconnaissance aircraft and land-based radar data.

Table A.1 lists the hourly observations of sea-level pressure, wind direction, wind speed, and gustiness obtained at regular reporting stations. These hourly observations are from U.S. Weather Bureau Surface Weather Observations forms (WBAN 10) covering the period September 9 through September 12, 1961. The sea-level pressure is given in units of millibars (mb). The wind direction is given as the direction from which the wind was blowing to the nearest ten degrees, measured clockwise from north. The reported wind directions were, in most instances, in compass points, i.e., N, NNE, NE, ENE, etc., and converted to degrees from north. The observed wind speed is a 5-min average determined from recorded observations. The gustiness is characterized by sudden, intermittent increases in speed where at least 9 kn were indicated between peaks and valleys with a time interval of less than 20 s. The wind speed is determined to the nearest knot.

Similar information is available from observations taken by personnel in private industries or from privately maintained recording instruments (Table A.2). Generally, such stations did not have continuous records during the entire 4-day period of September 9 through 12. Also the data must be considered less reliable since the instruments are not routinely calibrated for accuracy as are those at the National Weather Service, Naval and Air Force installations, or other standard reporting stations. As an example, the anemometer at Sea Drift, Texas, is located at the Union Carbide Company Complex. It is sheltered by tall buildings and the reported wind speeds appear too low. At the same reporting station, the recording pin went off the barograph as the pressure at Sea Drift approached minimum. The lowest pressure was extrapolated down to read 936.7 mb (27.68 in) which may be 1-2 mb too low relative to the minimum pressure values analyzed for all stations. The surface pressure recorded at the Alcoa plant in Point Comfort, Texas, may be too high.

Four locations in the Port Lavaca area, near the path of the hurricane center, had barographs. These records provide the lowest observed barometric pressure as the hurricane center crossed the coast. The lowest pressure was 935.3 mb and was recorded in three of the four reporting stations. Lowest pressure recorded at the fourth station, the Texas Gas processing plant, was 939.7 mb. These pressures were recorded roughly 2 h after the hurricane made landfall, attesting to the intensity of the storm. The data are listed in table A.3.

The complete reconnaissance aircraft reports were considered too voluminous to reproduce entirely in this report. Table A.4 lists those reports that provided the locations of storm center, observed sea-level pressure, estimated surface winds, and/or the diameter of the eye. The majority of the reports came from Navy reconnaissance aircraft. A few additional reports were obtained from the aircraft of the U.S. Weather Bureau Research Flight Facility. These latter reports are indicated by "RFF" in the remarks column. For a few reports, the range and maximum winds from the storm center were obtainable. This information is also presented in the remarks column. The reported position of the storm

center has the same accuracy as the aircraft position determined by radar and the land navigational systems. With some exceptions, the accuracies of these positions is generally within 5 nmi. There was a period (from 1400 CST to 1800 CST on September 10) when one Navy flight apparently had significant navigational errors. Their positions departed approximately 32 nmi to the northeast from other eye locations. This large discrepancy was the result of inaccurate land navigation during the period (Holliday 1966). The Loran fixing (with the existing model at that time) was not considered suitable for navigation purposes in the western Gulf of Mexico due to the fast intersection angle of the radio beams. The central pressure data is given in millibars and is determined by dropsonde or extrapolation from flight-level data.

The National Weather Service maintains a series of radar observing stations along the U.S. coastline from Brownsville, Texas to Eastport, Maine. These radars are used to track hurricanes for use in the hurricane warning system. Three stations in this network were in a position to track Hurricane Carla as it approached the Texas coastline. These stations are at Brownsville and Galveston, Texas and at Lake Charles, Louisiana. The radar eye positions reported by these NWS stations, when the center was within range of the land base radar, are listed in table A.5 by half-hourly intervals.

To obtain weather reports from oceanic areas, the NWS solicits the cooperation of merchant ships of U.S. and foreign registry and of non-military U.S. Government ships. There are about 200 ships that participate in this program. Observations are visual plus barometric and occasionally cyanometric pressure. Most ships report the weather by radio at synoptic time when underway, but all ships, not just those in cooperative ship programs, are asked to send special radio reports when tropical storms or hurricanes are encountered and, especially, upon specific request by the NWS. Data from ships that reported through the regular reporting system and supplemented by those ships submitting weather observations after the arrival at their major destination are listed in table A.6. We have restricted our listing to the location of the reporting ship, its name or identification radio call sign (if available), sea level pressure, and wind data. The data are grouped by the time of observation from 1800 CST, September 8, through 1200 CST, September 12, 1961. This set of data was useful in the analyses of the pressure field and the wind field of the hurricane, especially when its center was located off the coast. The aneroid barometers on ships in the cooperative observing program are calibrated by the NWS when a ship is visiting a port in the U.S. where a port meteorological officer is assigned. The calibrations, however, may not be as frequent as desirable.

Table A.1--Surface observations from regularly reporting stations, hourly observations of sea level pressure and wind

AUSTIN, TEXAS

LATITUDE 30 18'N LONGITUDE 97 42'W
ELEVATION 597FT

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	1013.5	1012.5	1012.5	1012.5	1013.2	1013.5	1013.2	1011.5	1009.8	1009.5	1009.8	1010.2	1010.2											
		1012.9	1012.2	1012.9	1013.5	1013.5	1012.2	1010.8	1009.5	1009.5	1009.8	1010.2	1010											
WIND DIR(DEG)	040	020	360	360	020	020	020	020	040	06	060	040	040	040	040	060	040	060	040	040	040	040	020	030
WIND SPD (KT)	6	7	5	7	7	8	10	14	10	12	12	15	14	12	13	13	14	14	8	8	10	10	9	10
GUST (KT)																								
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	1010.2	1009.1	1008.5	1008.8	1008.1	1007.8	1005.8	1003.7	1002.7	1003.1	1003.7	1003.7												
		1009.5	1008.8	1008.1	1008.1	1008.2	1006.8	1005.1	1003.1	1003.1	1003.4	1003.7	1003											
WIND DIR(DEG)	030	040	040	030	030	020	020	020	020	020	020	040	020	040	040	040	040	040	040	040	020	040	030	030
WIND SPD (KT)	12	10	10	14	12	12	15	14	18	18	20	17	21	18	24	21	19	26	19	23	23	19	19	17
GUST (KT)													28	26	32	26	25	30	27	31	27	25	27	25
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	1002.4	1001.7	1000.7	1000.3	999.3	999.0	997.0	994.9	992.9	991.2	989.2	985.8												
		1002.0	1001.0	1000.7	999.7	999.3	998.3	995.6	993.9	991.9	990.5	987.5	984											
WIND DIR(DEG)	030	030	030	030	030	030	030	030	030	030	020	020	020	020	020	020	030	030	030	030	040	020	030	
WIND SPD (KT)	20	16	18	18	20	20	21	21	24	22	24	21	26	26	29	22	25	35	35	36	35	42	30	28
GUST (KT)	25	25	26		25	26		29	41	38	35	32	34	34	37	32	34	45	43	52	47	55	48	40
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	981.7	977.0	973.9	977.3	984.1	989.2	992.2	994.2	996.3	998.3	1000.3	1002.0												
		979.3	975.6	974.6	980.4	987.1	990.9	993.2	994.9	997.6	999.3	1001.4	1002											
WIND DIR(DEG)	030	030	040	040	020	340	340	270	250	250	230	220	220	220	220	220	240	220	200	200	200	200	200	200
WIND SPD (KT)	32	35	34	28	31	22	18	16	14	15	15	14	11	12	12	14	11	12	12	10	08	06	05	09
GUST (KT)	48	51	44	36	42	28	25	25				21												

Table A.1--(continued)

BEEVILLE TEXAS (NAS)

LATITUDE 28 27'N LONGITUDE 97 42'W
ELEVATION 240FT

		TIME (IN HOURS CST)																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
DATE	9TH SEPTEMBER																									
PRESSURE(MB)	1011.3	1010.3	1009.9	1010.5	1010.3	1010.7	1009.8	1006.8	1006.6	1007.1	1006.8	1006.8	1011.3	1010.6	1010.1	1010.4	1010.3	1010.5	1009.8	1007.7	1006.6	1006.6	1006.9	1006.8	1006.8	
WIND DIR(DEG)	040	020	020	020	020	020	020	020	060	040	060	060	040	060	040	060	060	090	060	060	060	060	040	040	020	
WIND SPD(KT)	07	05	07	08	07	08	08	10	16	16	15	17	18	20	16	16	18	10	12	11	10	13	12	10	10	
GUST(KT)																										
DATE	10TH SEPTEMBER																									
PRESSURE(MB)	1005.6	1004.5	1003.4	1003.1	1002.4	1002.1	999.7	997.2	996.2	994.6	994.0	993.6	1005.6	1004.3	1003.4	1003.3	1002.7	1002.5	1001.0	998.9	996.4	995.3	994.1	993.7	992	
WIND DIR(DEG)	020	020	045	020	020	020	020	020	020	020	020	020	020	020	020	020	020	020	020	020	020	020	020	020	020	020
WIND SPD(KT)	12	10	12	19	12	14	19	20	22	22	21	24	23	23	22	25	25	25	25	23	23	25	30	30	26	24
GUST(KT)	19	18	21	19	23	26	28	30	32	26	36	33	36	38	40	37	34	46	41	47	47	42	42	38	36	
DATE	11TH SEPTEMBER																									
PRESSURE(MB)	990.6	988.7	986.5	984.7	987.5	984.1	981.4	979.2	977.1	977.9	979.8	982.5	990.6	990.0	987.4	984.8	984.1	987.5	982.6	980.0	978.1	977.3	978.6	981.2	983	
WIND DIR(DEG)	020	020	020	360	360	020	020	020	020	020	020	020	020	360	360	340	340	340	320	320	290	290	290	270	270	
WIND SPD(KT)	30	32	33	30	30	30	35	35	32	31	28	30	32	33	34	35	37	35	35	34	34	30	30	29	30	
GUST(KT)	48	50	47	52	50	49	56	58	51	50	53	49	50	50	49	53	55	50	48	46	47	45	40	43		
DATE	12TH SEPTEMBER																									
PRESSURE(MB)	985.1	988.1	990.7	994.1	996.8	999.0	999.8	999.7	1000.0	1000.7	1002.4	1002.8	985.1	986.4	989.4	992.5	995.5	997.9	999.6	999.8	999.8	1000.3	1001.4	1002.6	1003	
WIND DIR(DEG)	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	210	160	160	180	200	
WIND SPD(KT)	30	30	25	25	25	25	25	22	21	21	20	22	15	14	13	250	210	160	160	160	180	180	200	200	250	
GUST(KT)	43	42	42	37	41	37	35	32	30	28	26	31									03	06	09	09	13	

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Table A.1--(continued)

BROWNSVILLE TEXAS (WBAS)

LATITUDE 25 54'N LONGITUDE 97 26'W
ELEVATION 20FT

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	1009.8	1008.1	1007.5	1008.1	1007.8	1008.5	1007.1	1005.8	1005.4	1004.1	1004.4	1003.7												
	1008.5	1007.8	1007.8	1008.1	1008.5	1007.8	1006.8	1005.4	1004.4	1005.1	1004.1	1002												
WIND DIR(DEG)	320	320	320	320	320	320	320	320	320	320	340	340	360	360	360	030	030	340	360	360	360	360	360	320
WIND SPD (KT)	09	10	10	10	11	12	14	12	15	14	15	10	15	18	15	15	15	15	15	25	15	18	12	15
GUST (KT)								22		20		18	25	23	22	25	30		49	22	23	23		
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	1001.7	1000.3	999.0	999.0	998.3	988.3	996.3	994.2	992.6	991.5	990.9	990.9												
	1000.3	999.7	998.6	998.6	998.6	997.3	995.3	993.2	992.2	991.2	990.9	990												
WIND DIR(DEG)	320	340	340	320	320	320	340	320	320	320	320	320	300	300	300	300	300	300	300	300	300	300	300	300
WIND SPD (KT)	15	18	16	22	24	17	15	15	14	20	22	15	14	25	28	25	25	25	25	25	25	25	25	30
GUST (KT)	23	23	22	26	30	30	20	26	30	3	35	15	32	36	39	38	36	40	40	43	44	46	43	48
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	989.8	989.8	990.2	991.2	992.2	993.6	993.9	994.6	994.9	995.6	998.0	999.7												
	989.8	990.2	990.5	991.9	992.2	993.9	994.2	994.6	994.9	996.3	998.6	1000												
WIND DIR(DEG)	290	290	290	270	270	290	290	270	250	270	270	270	250	250	270	270	270	250	250	250	230	200	230	200
WIND SPD (KT)	30	28	25	28	24	27	25	20	20	28	20	18	20	22	24	18	18	15	15	13	10	15	12	10
GUST (KT)	53	43	40	40	38	45	45	43	40	39	40	32	37	31	35	27								
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	1000.3	1000.0	1000.3	1001.7	1002.4	1003.1	1002.4	1000.7	1001.4	1002.0	1003.7	1004.7												
	1000.0	1000.0	1001.0	1001.0	1003.1	1002.7	1001.4	1001.0	1001.7	1003.1	1004.1	1004												
WIND DIR(DEG)	230	230	230	230	200	160	320	110	130	16	160	160	160	160	140	140	140	120	140	140	140	140	140	160
WIND SPD (KT)	10	10	10	07	05	03	03	03	13	13	14	16	16	16	10	08	09	10	13	17	12	10	10	10
GUST (KT)																								

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Table A.1--(continued)

CORPUS CHRISTI TEXAS (WBAS)

LATITUDE 27 46 N LONGITUDE 97 30 W
ELEVATION 40 FT

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	1011.1	1010.1	1009.8	1010.4	1010.4	1010.2	1008.8	1007.1	1006.7	1006.7	1006.7	1006.7	1006.0											
		1010.6	1009.8	1010.1	1010.4	1010.8	1009.8	1007.7	1007.1	1006.7	1006.4	1006.4	1005											
WIND DIR(DEG)	020	020	360	360	360	360	360	360	360	360	020	020	020	020	020	020	020	020	020	020	020	020	020	
WIND SPD (KT)	07	08	08	10	10	10	12	11	15	15	18	18	15	15	15	17	18	17	16	17	15	18	15	17
GUST (KT)																								
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	1004.7	1003.3	1002.0	1001.6	1001.0	1000.3	998.4	994.5	993.2	991.5	990.5	988.5												
		1004.0	1002.0	1001.6	1001.3	1000.8	999.3	996.9	994.2	992.5	990.5	990.5	987											
WIND DIR(DEG)	020	020	020	340	330	330	330	340	34	340	340	340	340	340	340	350	360	360	360	360	360	340	340	330
WIND SPD (KT)	17	18	18	20	21	18	21	20	22	23	23	23	30	24	25	30	32	35	43	40	40	35	40	38
GUST (KT)	24		24	30	28	25			27	29	30	30	43	32	33	42	52	55	55	56	56	50	53	55
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	984.0	981.7	980.6	979.3	979.6	980.1	979.5	979.0	981.0	983.7	986.1	989.1												
		983.2	981.3	980.3	979.3	980.0	979.6	979.6	980.0	982.3	985.0	988.1	990											
WIND DIR(DEG)	340	340	340	320	340	320	320	320	320	32	320	320	290	290	290	290	290	270	270	270	270	240	270	240
WIND SPD (KT)	45	45	50	48	45	50	55	55	55	50	55	25	25	30	30	35	25	30	25	30	30	40	40	35
GUST (KT)	61	53	60E	70E	60E	62E	75E	75E	75E	70E	75E	45E	45E	45E	45F	55E	40E	45E	35E	45F	45E	55E	55E	50
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	991.5	992.8	995.5	997.6	999.9	1001.6	1001.6	1001.0	1001.3	1002.0	1003.7	1004.3												
		992.2	994.2	996.6	998.9	1001.0	1001.6	1001.3	1001.0	1001.3	1003.0	1004.0	1004											
WIND DIR(DEG)	240	240	240	240	240	230	230	220	220	200	200	230	200	200	180	180	180	180	180	180	180	180	180	180
WIND SPD (KT)	38	35	33	35	25	25	26	25	20	15	18	20	15	10	07	14	11	10	14	17	08	11	13	10
GUST (KT)	52E	46E	39E	44F	38E	35E	38E	35E	30E	25E	24E	28E	20E											

Table A.1--(continued)

CORPUS CHRISTI TEXAS (NAS)
 LATITUDE 27 46*N LONGITUDE 97 30*W
 ELEVATION 44FT

		TIME (IN HOURS CST)																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
DATE		9TH SEPTEMBER																								
PRESSURE(MB)		1010.0	1009.0	1008.8	1009.0	1008.9	1009.3	1008.0	1006.4	1006.1	1005.5	1005.5	1004.8													
			1009.5	1008.6	1009.0	1009.2	1009.3	1008.9	1007.0	1006.2	1005.5	1005.2	1005.1	1003												
WIND DIR(DEG)		020	020	020	360	360	360	360	020	020	020	020	040	020	040	020	020	020	360	020	020	020	020	020	020	020
WIND SPD (KT)		08	10	11	12	14	13	16	15	14	12	15	14	15	14	13	13	10	15	15	15	16	18	18	20	
GUST (KT)							18	22	21	22	23	22	21	21	23	20	20	17	23	23	23	25	28	28	30	
DATE		10TH SEPTEMBER																								
PRESSURE(MB)		1001.5	1001.8	1000.5	1000.3	999.7	998.4	996.6	993.3	991.4	989.0	987.7	985.3													
			1002.5	1000.8	1000.5	999.8	999.1	997.5	995.2	992.3	990.2	987.9	986.6	983												
WIND DIR(DEG)		360	020	020	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	360	320	320	320	320	320	
WIND SPD (KT)		22	24	22	26	26	26	24	22	25	26	28	28	30	28	30	34	34	40	39	40	40	45	38	42	
GUST (KT)		29	34	35	34	33	34	33	34	34	40	42	43	41	42	48	48	53	56	56	56	60	45	45	54	
DATE		11TH SEPTEMBER																								
PRESSURE(MB)		981.7	978.0	973.0	975.4	975.2	976.5	976.8	976.8	979.0	982.5	986.4	989.9													
			978.4	977.3	975.5	975.0	976.5	976.3	976.2	977.4	980.6	984.8	988.1	991												
WIND DIR(DEG)		320	320	300	320	300	320	320	320	290	290	320	290	270	160	290	290	270	270	270	270	270	270	270	270	
WIND SPD (KT)		44	45	47	46	48	48	50	48	45	40	42	40	35	38	30	32	33	34	30	30	30	30	27	26	
GUST (KT)		60	67	66	65	64	66	64	60	58	58	60	49	53	52	46	44	45	45	44	44	40	45	38	39	
DATE		12TH SEPTEMBER																								
PRESSURE(MB)		991.9	993.5	995.4	997.4	999.7	1001.1	1001.1	1000.4	1000.2	1001.0	1002.8	1003.6													
			992.4	994.6	996.4	998.5	1000.5	1001.2	1000.8	1000.2	1000.5	1002.1	1003.5	1003												
WIND DIR(DEG)		270	250	230	230	200	200	200	200	200	200	200	200	160	160	160	160	160	160	160	160	160	160	160	160	
WIND SPD (KT)		26	26	17	18	16	15	16	16	14	14	15	14	14	15	15	15	12	12	13	11	12	12	12	12	
GUST (KT)		39	39	25	26	24	25	22	22																	

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Table A.1--(continued)

DALLAS TEXAS (WBAS)

LATITUDE 32 51'N LONGITUDE 96 51'W
ELEVATION 488FT

	TIME (IN HOURS CST)																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
DATE	9TH SEPTEMBER																								
PRESSURE(MB)	1015.2	1014.6	1014.6	1014.6	1015.2	1015.6	1015.6	1014.2	1012.5	1012.2	1011.9	1012.9	1013.2	1013.2	1014.9	1014.6	1014.6	1015.6	1015.6	1014.9	1013.5	1012.2	1011.9	1012.5	1013.2
WIND DIR(DEG)	110	110	090	070	070	070	070	090	130	130	110	090	090	110	090	090	110	090	110	110	110	090	110	110	
WIND SPD (KT)	03	06	06	04	08	07	08	07	10	09	12	12	11	15	12	15	12	14	15	11	13	12	10	12	
GUST (KT)																									
DATE	10TH SEPTEMBER																								
PRESSURE(MB)	1013.2	1012.5	1011.9	1012.5	1012.9	1012.5	1009.8	1008.1	1007.1	1007.5	1008.5	1009.5	1009.5	1012.9	1012.9	1011.5	1009.1	1007.5	1007.5	1008.5	1008.8	1009.5	1009.5	1009.5	
WIND DIR(DEG)	110	090	090	110	110	070	090	070	070	07	090	090	110	090	070	110	090	110	090	090	110	110	090	090	
WIND SPD (KT)	11	11	08	10	09	10	08	10	10	12	13	15	12	14	16	14	16	15	14	13	15	16	10	14	
GUST (KT)																									
DATE	11TH SEPTEMBER																								
PRESSURE(MB)	1008.8	1008.5	1008.5	1008.8	1009.5	1009.1	1008.5	1007.1	1006.4	1006.1	1006.4	1005.4	1004	1008.5	1008.5	1008.5	1009.1	1009.5	1009.1	1007.8	1006.8	1006.1	1006.1	1005.8	
WIND DIR(DEG)	090	090	090	060	060	060	060	060	070	09	120	120	070	070	090	070	070	090	070	070	070	070	070	070	
WIND SPD (KT)	15	10	10	10	10	11	10	13	13	12	15	15	15	17	13	14	15	14	14	14	14	14	16	15	
GUST (KT)																									
DATE	12TH SEPTEMBER																								
PRESSURE(MB)	1003.4	1007.0	998.6	996.3	993.9	991.9	989.8	986.1	982.7	984.1	988.8	991.5	992	1002.0	999.3	998.0	995.3	993.2	991.2	988.5	984.4	982.4	986.8	989.8	
WIND DIR(DEG)	070	070	070	070	070	070	090	090	110	110	120	140	140	140	140	180	230	230	230	250	250	250	250	230	
WIND SPD (KT)	15	19	23	19	20	22	22	18	22	24	23	21	22	30	28	22	30	29	18	15	15	15	16	16	
GUST (KT)	23	26	33	27	28	31	30	30	32	36	35	38	32	40	40	32	42	38	27	25	25	26	24	22	

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Table A.1--(continued)

DALLAS TEXAS (NAS)

LATITUDE 32 44'N LONGITUDE 96 58'W
ELEVATION 469FT

		TIME (IN HOURS CST)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																								
PRESSURE(MB)	1014.1	1013.5	1013.5	1013.9	1014.5	1014.5	1012.9	1011.2	1010.8	1010.8	1011.5	1012.2													
	1013.7	1013.4	1013.5	1014.4	1014.6	1013.8	1012.0	1010.9	1010.8	1011.2	1011.8	1012													
WIND DIR(DEG)	000	040	040	000	000	000	000	020	060	090	020	040	090	040	040	060	090	070	070	070	070	070	070	070	070
WIND SPD (KT)	00	04	02	00	00	00	00	03	08	06	08	10	09	10	09	13	13	09	10	08	09	08	12	12	
GUST (KT)																									
DATE	10TH SEPTEMBER																								
PRESSURE(MB)	1011.9	1012.0	1011.2	1012.1	1012.1	1012.1	1009.5	1007.6	1006.6	1006.6	1007.8	1008.1													
	1011.9	1011.4	1010.8	1012.1	1012.1	1010.5	1008.1	1006.9	1006.9	1007.6	1007.9	1008													
WIND DIR(DEG)	070	070	070	070	020	040	040	360	040	360	040	360	040	070	040	040	090	040	040	030	030	030	030	030	
WIND SPD (KT)	06	08	07	05	04	03	04	03	06	04	10	10	10	17	12	15	12	10	12	16	15	10	15	17	
GUST (KT)																									
DATE	11TH SEPTEMBER																								
PRESSURE(MB)	1008.0	1007.7	1007.7	1007.9	1008.0	1007.9	1006.9	1005.7	1004.4	1005.0	1004.8	1003.7													
	1007.8	1007.7	1007.7	1008.0	1008.1	1007.4	1005.9	1005.5	1004.7	1005.1	1004.6	1003													
WIND DIR(DEG)	070	050	070	070	050	050	050	030	030	030	030	050	050	050	050	050	050	050	050	050	050	050	050	050	
WIND SPD (KT)	14	12	14	12	10	11	09	10	13	14	13	14	12	16	12	11	12	13	15	16	14	13	12	16	
GUST (KT)																									
DATE	12TH SEPTEMBER																								
PRESSURE(MB)	1002.2	999.9	997.8	995.4	993.9	991.7	989.3	985.8	981.9	985.4	988.9	991.2													
	1000.6	998.5	996.7	993.8	992.8	990.6	987.8	983.9	982.3	986.8	990.2	992													
WIND DIR(DEG)	070	070	040	040	070	070	070	090	090	070	090	090	090	090	120	120	200	200	200	200	200	200	200	200	
WIND SPD (KT)	17	20	20	20	18	25	20	26	18	16	19	18	16	20	24	24	22	22	24	22	24	22	20	20	
GUST (KT)	23	26	27	26	30	34	30	34	24	31	30	26	24	28	32	40	34	34	30	27	29				

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Table A.1--(continued)

FORT WORTH TEXAS (WBAS)

LATITUDE 32 50*N LONGITUDE 97 3*W
ELEVATION 576FT

	TIME (IN HOURS CST)																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
DATE	9TH SEPTEMBER																								
PRESSURE(MB)	1014.7	1014.0	1014.0	1014.0	1015.5	1015.5	1015.2	1013.7	1012.0	1011.3	1011.6	1012.3	1013.0	1014.3	1014.0	1014.4	1015.8	1015.5	1014.3	1012.8	1011.6	1011.3	1012.0	1013.0	1013
WIND DIR(DEG)	090	090	070	360	040	050	050	090	090	070	110	090	070	070	110	090	070	090	090	090	090	070	070	090	
WIND SPD (KT)	13	08	06	05	09	08	08	10	13	17	12	13	13	18	19	15	20	17	17	13	18	14	12	19	
GUST (KT)											20	19													
DATE	10TH SEPTEMBER																								
PRESSURE(MB)	1012.6	1012.0	1011.6	1012.3	1012.5	1012.0	1009.5	1007.8	1006.8	1007.2	1008.6	1008.8	1008.8	1012.3	1012.0	1011.6	1012.7	1012.6	1010.6	1008.8	1006.8	1007.2	1008.2	1008.6	1008
WIND DIR(DEG)	090	090	090	040	070	040	040	070	070	070	070	070	090	090	090	090	070	070	070	070	070	070	070	070	
WIND SPD (KT)	16	13	11	07	09	10	10	11	13	12	15	21	16	19	20	20	23	17	20	20	20	13	15	17	
GUST (KT)																									
DATE	11TH SEPTEMBER																								
PRESSURE(MB)	1008.5	1008.1	1008.1	1008.6	1008.9	1008.6	1007.5	1006.1	1006.2	1005.5	1006.2	1004.8	1004.8	1008.1	1008.1	1008.5	1008.6	1708.8	1008.6	1006.8	1006.2	1005.9	1005.5	1005.5	1004
WIND DIR(DEG)	070	070	070	050	050	050	050	060	060	060	060	060	040	040	040	040	060	060	060	060	060	060	060	040	
WIND SPD (KT)	15	15	12	15	14	11	18	19	20	20	21	20	19	25	18	19	22	20	22	22	20	20	20	24	
GUST (KT)									24	29	29	29	30	29	28	26						25	30	30	32
DATE	12TH SEPTEMBER																								
PRESSURE(MB)	1002.7	1000.4	998.3	995.8	993.7	991.7	989.6	986.5	981.3	984.8	988.6	991.4	991.4	1001.3	999.0	997.2	994.4	992.4	991.0	988.2	983.0	981.0	986.8	990.0	992
WIND DIR(DEG)	060	060	060	060	060	060	060	060	090	090	090	090	090	110	110	200	220	220	220	220	220	220	220	240	
WIND SPD (KT)	28	27	29	32	30	32	32	30	32	32	35	26	33	30	38	40	27	22	22	22	22	25	25	21	
GUST (KT)	47	39	37	40	38	43	48	45	46	46	43	40	43	42	50	48	40	30	31	31	31	32	26	26	

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Table A.1--(continued)

FORT WORTH TEXAS (CARSWELL AFB)
 LATITUDE 32 46'N LONGITUDE 97 27'W
 ELEVATION 650FT

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	.	.	1014.5	.	.	.	.	.	1015.2	.	.	.	.	.	1012.0	.	.	.	.	1011.0	.	.	1012.4	.
WIND DIR(DEG)	140	000	000	000	070	070	020	090	140	090	090	110	090	070	090	070	090	090	090	090	090	090	090	090
WIND SPD (KT)	04	00	00	00	03	02	03	03	05	08	07	09	06	11	10	11	08	08	11	08	08	10	08	090
GUST (KT)																								
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	.	.	1012.0	.	.	.	.	.	1012.4	.	.	.	.	.	1007.6	.	.	.	.	1006.7	.	.	1008.4	.
WIND DIR(DEG)	090	090	090	090	040	040	090	040	040	070	070	040	070	070	090	070	090	110	090	090	090	090	090	090
WIND SPD (KT)	06	06	04	04	04	05	04	08	08	09	10	12	12	14	10	13	11	12	10	13	12	05	07	10
GUST (KT)																								
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	.	.	1003.0	.	.	.	.	.	1008.8	.	.	.	.	.	1006.4	.	.	.	.	1005.4	.	.	1005.8	.
WIND DIR(DEG)	060	090	050	050	040	040	050	040	050	060	060	070	060	050	060	050	050	040	050	050	050	060	050	050
WIND SPD (KT)	08	09	08	08	09	09	08	10	12	12	11	13	12	13	16	15	13	14	15	13	14	14	15	16
GUST (KT)																								
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	.	.	999.6	.	.	.	.	.	993.2	.	.	.	.	.	985.4	.	.	.	.	983.7	.	.	989.3	.
WIND DIR(DEG)	050	060	060	050	050	050	050	070	070	060	070	060	080	070	060	050	360	280	260	240	240	250	250	260
WIND SPD (KT)	17	15	20	18	20	23	23	20	22	26	15	15	16	16	17	16	13	15	14	12	13	14	14	12
GUST (KT)	31	22	25	30	32	32	32	38	38	39														

Table A.1--(continued)

GALVESTON TEXAS (W80)

LATITUDE 29 18'N LONGITUDE 94 48'W
ELEVATION 10FT

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	1011.9	1010.5	1009.8	1010.2	1010.5	1010.5	1007.8	1006.4	1006.4	1005.8	1005.1	1004.7												
	1011.2	1010.5	1009.8	1010.8	1010.5	1010.2	1007.1	1006.4	1005.8	1005.1	1005.4	1004												
WIND DIR(DEG)	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040
WIND SPD (KT)	12	14	15	14	16	17	17	18	20	20	21	24	20	20	19	22	17	24	23	24	29	27	28	
GUST (KT)	10	12	13	12	14	15	15	16	17	17	18	21	17	17	16	19	15	21	20	21	25	23	24	
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	1003.1	1001.4	1000.3	1000.3	999.7	998.7	997.3	994.9	993.9	993.6	993.2	994.2												
	1002.3	1000.3	1000.3	999.7	999.3	998.7	995.6	994.2	993.9	992.6	993.6	994												
WIND DIR(DEG)	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	090	090	090	
WIND SPD (KT)	32	29	30	30	35	30	31	32	34	35	34	36	40	42	42	42	43	45	48	48	49	54	49	52
GUST (KT)	28	25	26	26	30	26	27	28	30	30	30	31	35	36	36	36	37	39	42	42	43	47	43	45
DATE	11TH SEPTEMBER																							
PRESSURE(MB)		992.9	992.6	993.6	993.2	993.2	993.2	992.9	991.3	991.9	991.2	993.6	994.6											
		992.6	993.2	993.2	993.2	993.2	992.6	991.3	991.9	991.2	992.2	994.6	994											
WIND DIR(DEG)		090	090	090	090	110	110	110	110	110	110	135	135	135	135	999	999	100	100	160	160	160	180	
WIND SPD (KT)		52	62	59	59	62	60	68	62	63	56	49	42	61	52	52	999	999	35	32	35	38	45	
GUST (KT)		82	90	87	92	87	80	90	90	97	83	80						51	50	48	51			
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	994.6	994.3	994.6		999.7	1001.4	1001.7	1001.7	1002.0	1003.1	1004.1	1004.4												
	995.3	995.3	996.6	999.0	1000.7	1001.4	1001.7	1001.7	1002.4	1003.4	1004.4	1004												
WIND DIR(DEG)	180	160	160	200	200	180	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
WIND SPD (KT)	48	43	48	35	45	45	42	34	35	32	28	23	25	25	25	20	28	25	24	20	25	24	25	25
GUST (KT)				61	65	60	55	45	42	4	35	33	33											

Table A.1--(continued)

GALVESTON TEXAS (WBAS)

LATITUDE 29 16'N LONGITUDE 94 51'W
ELEVATION 10FT

		TIME (IN HOURS CST)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																								
PRESSURE(MB)	1011.2	1010.2	1010.2	1009.5	1010.2	1010.2	1010.5	1009.1	1007.1	1007.5	1006.1	1006.4	1005.8												
		1010.5	1009.8	1009.5	1009.8	1010.5	1009.8	1007.8	1007.1	1006.8	1006.4	1006.4	1005												
WIND DIR(DEG)	040	040	040	040	030	030	030	030	040	360	040	050	040	020	020	040	050	050	050	050	050	050	050	050	050
WIND SPD (KT)	13	12	15	16	15	19	16	19	19	19	19	13	18	19	19	22	15	16	17	26	26	23	20	30	
GUST (KT)														25		35				30	32	40	32	40	
DATE	10TH SEPTEMBER																								
PRESSURE(MB)	1004.1	1002.4	1001.0	1000.7	1000.0	999.9	997.0	994.6	993.9	992.9	994.2	993.6	993												
		1003.1	1001.4	1001.0	1000.3	1000.0	998.3	995.3	994.2	993.6	993.9	994.2	993												
WIND DIR(DEG)	050	050	050	050	050	050	050	040	040	040	070	040	040	070	070	070	070	070	070	070	070	070	070	070	
WIND SPD (KT)	24	26	23	27	25	22	27	28	39	35	29	35	30	36	39	40	34	38	35	37	33	45	45	41	
GUST (KT)	35	35	35	38	42	42	48	35	41	50	54	48	50	45	45	45	48	50	45	58	61	35	50	65	
DATE	11TH SEPTEMBER																								
PRESSURE(MB)	992.9	991.9	991.5	991.9	991.9	992.6	991.5	990.9	990.5	991.2	993.6	994.6	994												
		992.6	991.5	991.5	991.9	991.9	993.2	991.5	991.2	990.5	992.2	994.6	994												
WIND DIR(DEG)	090	090	110	110	090	090	090	110	090	110	110	090	090	110	110	110	110	180	180	200	200	200	200	200	
WIND SPD (KT)	45	55	44	45	43	43	40	35	32	35	45	40	38	33	42	50	41	42	40	35	32	35	38	35	
GUST (KT)	60	63	55	60	55	60	65	52	48	50	58	58	48	45	61	65	58	63	58	51	50	48	51	47	
DATE	12TH SEPTEMBER																								
PRESSURE(MB)	994.2	995.3	994.6	997.3	999.7	1001.4	1001.7	1001.7	1002.0	1003.1	1004.1	1004.4													
		995.6	995.3	996.6	999.0	1000.7	1001.4	1001.7	1001.7	1002.4	1003.4	1004.4	1004												
WIND DIR(DEG)	200	200	200	200	200	180	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	
WIND SPD (KT)	40	35	48	35	45	45	42	34	30	32	28	25	25	25	25	20	28	25	24	20	25	24	25	25	
GUST (KT)	55	45	58	61	55	70	55	45	42	40	35	31	33												

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Table A.1--(continued)

HOUSTON TEXAS (WBAS)

LATITUDE 29 39'N LONGITUDE 95 17'W
ELEVATION 62FT

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	1011.5	1010.8	1010.5	1010.5	1010.8	1011.2	1011.2	1011.2	1010.5	1008.8	1008.5	1008.1	1007.5	1008.1	1007.5	1008.1	1007.5	1008.1	1007.5	1008.1	1007.5	1008.1	1007.5	1007.5
		1011.2	1010.5	1010.5	1011.2	1011.2	1010.5	1008.8	1008.5	1007.8	1008.1	1008.1	1007											
WIND DIR(DEG)	020	020	020	040	040	040	040	020	040	040	040	050	050	020	040	040	040	040	040	040	040	040	040	030
WIND SPD (KT)	08	10	10	10	10	11	10	12	11	16	13	15	13	18	17	16	13	17	14	15	15	15	15	13
GUST (KT)																								
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	1006.1	1004.7	1003.1	1003.4	1003.1	1002.0	1000.7	999.3	997.6	997.3	997.6	997.3	997.6	997.6	997.6	997.6	997.6	997.6	997.6	997.6	997.6	997.6	997.6	997.6
		1005.1	1003.7	1003.4	1002.7	1003.1	1001.4	999.5	997.6	998.3	997.3	997.6	997.6	997.6	997.6	997.6	997.6	997.6	997.6	997.6	997.6	997.6	997.6	997.6
WIND DIR(DEG)	030	030	030	030	030	040	030	030	030	040	030	040	040	040	040	040	040	040	040	040	040	040	070	080
WIND SPD (KT)	15	15	13	17	17	20	18	15	15	17	18	18	20	18	24	22	24	25	25	25	30	27	28	35
GUST (KT)													32	28	35	31	38	40	40	45	40	42	40	43
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	996.3	994.6	993.6	994.2	993.9	992.9	992.2	990.5	989.5	988.8	990.9	991.5	992											
		995.9	993.6	993.6	994.2	994.2	992.9	991.5	990.2	989.5	989.5	991.5	992											
WIND DIR(DEG)	070	080	090	080	080	110	090	090	090	110	110	110	110	110	110	110	110	110	110	110	110	130	140	
WIND SPD (KT)	27	30	20	25	30	32	28	25	30	28	32	30	35	35	39	35	40	38	35	36	45	35	33	28
GUST (KT)	40	45	44	35	45	44	40	38	40	50	48	43	47	54	60	61	60	52	52	56	56	49	43	40
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	992.2	992.2	993.2	995.3	997.6	999.7	999.7	1000.3	1000.7	1001.7	1003.4	1003.7												
		992.2	992.2	994.2	996.3	998.6	999.7	1000.0	1000.3	1001.0	1002.4	1003.7	1003											
WIND DIR(DEG)	140	160	160	160	180	160	160	180	180	180	180	180	180	180	180	180	180	180	180	200	180	160	160	180
WIND SPD (KT)	35	30	23	25	25	20	16	23	22	17	18	17	19	18	13	18	18	18	13	16	15	14	13	11
GUST (KT)	48	45	42	38	35	32	30	33	30	27	26	25	26	25			29	18						

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Table A.1--(continued)

HOUSTON TEXAS (ELLINGTON AFB)
 LATITUDE 29 37'N LONGITUDE 95 10'W
 ELEVATION 50FT

		TIME (IN HOURS CST)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																								
PRESSURE(MB)		.		1011.2	.	.				1010.8	.				1009.5	.				1008.1	.				
						1010.5						1010.8							1008.1						1006
WIND DIR(DEG)		010	010	350	350	350	350	010	010	010	010	040	010	010	010	010	010	010	010	010	010	010	010	350	010
WIND SPD (KT)		04	04	05	06	06	08	08	10	07	08	14	10	10	10	10	10	10	09	10	12	10	12	13	16
GUST (KT)										15	16		16	16	16	18						17	20	20	22
DATE	10TH SEPTEMBER																								
PRESSURE(MB)		.		1004.1	.	.				1002.7	.				997.3	.								996.6	
						1000.7						1000.8							996.6						996
WIND DIR(DEG)		010	010	010	350	350	350	010	010	040	350	360	010	010	010	040	040	040	040	040	040	040	040	040	060
WIND SPD (KT)		12	12	13	12	15	15	14	15	12	17	20	20	21	17	25	23	20	24	25	23	25	22	27	29
GUST (KT)		18	18	16	20	20	22		23	22	24	29	23	35	30	35E	34	32	34	35	36	32	34	35	40
DATE	11TH SEPTEMBER																								
PRESSURE(MB)		.		994.6	.	.				993.9	.				991.4	.								992.2	
						993.9						993.9							990.5						992
WIND DIR(DEG)		060	060	060	050	030	080	080	080	080	080	080	080	080	130	080	100	100	130	130	130	130	130	130	130
WIND SPD (KT)		27	27	25	25	23	27	25	27	27	32	28	29	25	31	34	30	29	30	36	32	34	29	32	33
GUST (KT)		40	44	42	36	41	40	32	39	40	46	40	44	38	46	48	48	55	42	43	42	47	39	45	49
DATE	12TH SEPTEMBER																								
PRESSURE(MB)		.		993.9	.	.				998.0	.				1001.0	.								1003.1	
						995.3						1000.0							1001.4						1004
WIND DIR(DEG)		130	130	130	130	130	170	170	170	170	170	170	170	150	150	150	170	150	170	150	150	150	150	150	150
WIND SPD (KT)		35	31	27	26	22	24	20	22	20	15	18	17	14	16	16	10	16	16	14	13	10	10	08	10
GUST (KT)		51	52	43	42	30	37	28	32	31	26	32	27	27	24	30	22	28	25	24	24	21	19	10	08

Table A.1--(continued)

PORT ARTHUR TEXAS (WBAS)

LATITUDE 29 57'N LONGITUDE 94 1'W
ELEVATION 16FT

		TIME (IN HOURS CST)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE		9TH SEPTEMBER																							
PRESSURE(MB)		1011.3	1010.3	1010.0	1010.8	1010.8	1010.6	1009.3	1008.4	1008.2	1007.3	1008.1	1007.3												
		1010.7	1010.2	1010.2	1010.5	1011.1	1010.0	1008.8	1008.2	1007.7	1007.8	1007.9	1006												
WIND DIR(DEG)		040	040	040	040	020	040	040	040	020	040	040	040	040	020	040	040	040	040	040	040	040	040	040	040
WIND SPD (KT)		08	10	10	14	10	11	12	15	14	16	15	15	14	13	12	12	17	15	14	14	16	19	22	14
GUST (KT)																				22	22	23	28	30	20
DATE		10TH SEPTEMBER																							
PRESSURE(MB)		1005.8	1004.3	1003.9	1003.3	1004.0	1003.3	1002.4	1000.0	999.8	1000.6	1001.2	1000.9												
		1004.9	1003.7	1003.5	1003.3	1004.2	1002.9	1000.9	1000.0	1000.3	1000.8	1001.2	1000												
WIND DIR(DEG)		040	040	040	040	040	040	040	070	070	050	070	050	050	050	050	050	070	070	070	070	070	070	070	070
WIND SPD (KT)		17	20	18	15	18	13	23	25	23	21	28	29	22	29	28	30	28	25	27	30	30	28	29	26
GUST (KT)		27	27	25		25	24	30	32	29	30	39	38	31	37	40	40	39	35	39	36	40	39	37	35
DATE		11TH SEPTEMBER																							
PRESSURE(MB)		999.9	998.9	998.1	999.7	1000.2	1000.3	999.3	999.3	998.8	998.8	999.7	999.8												
		999.4	998.6	999.3	999.9	1000.6	1000.3	999.6	999.3	998.8	998.8	999.9	999												
WIND DIR(DEG)		070	070	070	110	090	110	110	110	110	110	110	110	110	110	090	110	110	110	110	110	110	110	110	110
WIND SPD (KT)		30	28	26	27	25	24	26	30	30	33	22	20	30	28	27	25	30	23	25	31	30	34	33	34
GUST (KT)		38	36	33	39	33	35	34	40	45	46	38	36	41	32	33	32	39	35	38	43	43	47	44	43
DATE		12TH SEPTEMBER																							
PRESSURE(MB)		999.1	999.3	998.9	1000.8	1001.6	1002.7	1002.3	1002.1	1002.3	1003.0	1004.2	1004.8												
		999.3	999.2	999.8	1001.0	1002.3	1002.4	1002.3	1002.3	1002.8	1003.4	1004.6	1004												
WIND DIR(DEG)		130	130	130	130	130	130	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	160	180	180
WIND SPD (KT)		29	28	25	26	29	27	29	25	24	18	25	23	28	28	26	18	19	18	20	21	18	16	12	16
GUST (KT)		38	37	35	38	40	36	36	32	33	27	35	39	36	34	34	25	24		30	31				

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Table A.1--(continued)

SAN ANTONIO TEXAS (WBAS)

LATITUDE 29 32'N LONGITUDE 98 28'W
ELEVATION 790FT

											TIME (IN HOURS CST)												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE 9TH SEPTEMBER																							
PRESSURE(MB)	1012.9	1011.9	1011.9	1011.9	1012.5	1012.9	1012.9	1012.9	1010.8	1008.8	1008.5	1008.5	1009.1	1009.1									
	1012.5	1011.9	1011.9	1011.9	1012.9	1012.9	1011.9	1010.2	1008.5	1008.1	1008.5	1009.1	1009										
WIND DIR(DEG)	340	340	340	340	340	360	360	020	040	040	040	070	040	070	070	070	070	050	050	050	040	020	040
WIND SPD (KT)	06	05	05	06	05	06	06	09	12	12	16	12	13	11	13	14	19	16	12	10	10	10	13
GUST (KT)																							
DATE 10TH SEPTEMBER																							
PRESSURE(MB)	1008.5	1007.8	1006.8	1007.1	1006.4	1006.1	1004.1	1002.0	1001.4	1001.4	1001.4	1002.0	1001.4	1001.4									
	1008.1	1007.1	1006.8	1006.8	1006.8	1006.4	1005.4	1003.1	1001.4	1001.4	1001.4	1001.7	1001.7	1001									
WIND DIR(DEG)	040	040	040	360	020	020	020	020	040	040	040	020	040	040	040	040	040	040	040	020	040	020	020
WIND SPD (KT)	15	12	10	10	13	14	13	15	360	18	16	18	18	18	21	18	15	20	15	15	18	18	15
GUST (KT)										30	25	25	24	25	38	25	27	28	21	25	28	26	32
DATE 11TH SEPTEMBER																							
PRESSURE(MB)	1000.7	999.3	998.6	998.3	997.6	996.6	993.9	992.6	990.5	988.8	987.5	985.1											
	1000.7	999.0	998.6	997.6	997.3	995.6	993.2	991.5	989.8	988.2	986.5	983											
WIND DIR(DEG)	020	020	020	020	020	020	020	360	360	360	360	360	020	360	360	360	360	360	360	360	360	340	340
WIND SPD (KT)	18	15	16	15	19	17	21	20	18	24	22	22	21	20	25	25	25	20	25	30	30	30	30
GUST (KT)	26	23	23	22	30	26	32	28	25	32	30	30	30	35	35	36	35	37	38	44	40	48	40
DATE 12TH SEPTEMBER																							
PRESSURE(MB)	982.4	982.4	984.8	988.5	991.9	994.2	995.9	998.0	999.0	1000.0	1001.4	1002.7											
	982.4	983.7	985.4	990.2	992.9	995.3	996.6	998.3	999.0	1000.7	1002.0	1003											
WIND DIR(DEG)	340	340	320	320	320	300	270	270	250	25	250	250	250	250	270	250	230	230	180	220	200	220	220
WIND SPD (KT)	20	22	22	24	21	16	18	18	18	15	17	16	13	14	09	10	10	08	06	06	06	04	03
GUST (KT)	37	36	30	32	30																		

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Table A.1--(continued)

SAN ANTONIO TEXAS (KELLY AFB)
 LATITUDE 29 23'N LONGITUDE 98 34'W
 ELEVATION 683FT

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	.	.	1012.0	1012.3	1008.6	1008.6
	.	.	.	.	.	1012.0	.	.	.	.	1011.3	.	.	.	.	.	.	1007.9	.	.	.	.	.
WIND DIR(DEG)	340	320	320	310	310	310	310	020	010	360	360	010	030	050	030	020	040	040	030	040	030	030	030	
WIND SPD (KT)	03	04	03	04	04	03	02	07	07	09	11	10	09	10	13	12	13	12	10	10	09	08	08	
GUST (KT)																								
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	.	.	1007.6	1006.2	1001.5	1000.1
	.	.	.	.	.	1006.6	.	.	.	.	.	1004.5	.	.	.	.	.	1000.1	.	.	.	.	.
WIND DIR(DEG)	020	020	010	360	360	360	360	360	010	360	360	010	020	010	020	020	030	360	360	010	020	360	010	
WIND SPD (KT)	11	10	09	11	11	12	12	14	15	15	17	15	17	17	17	20	20	15	12	15	14	20	17	
GUST (KT)												26		28	26	29	29	15	12	27	25	32	29	
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	.	.	998.8	996.1	992.0	986.9
	.	.	.	.	.	997.4	.	.	.	.	.	994.7	.	.	.	.	.	998.6	.	.	.	.	.
WIND DIR(DEG)	360	360	360	360	360	350	360	350	350	350	350	350	350	350	350	350	340	340	340	340	330	330	320	
WIND SPD (KT)	16	15	15	20	21	23	22	20	20	22	20	24	20	20	22	25	25	26	27	30	30	31	28	
GUST (KT)	28	30	23	30	28	38	29	32	30	36	32	34E	30E	30	34	34	34	37	39	40E	41	42	37	
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	.	.	983.9	992.0	997.4	1000.9
	.	.	.	.	.	987.3	.	.	.	.	.	995.4	.	.	.	.	.	998.4	.	.	.	.	.
WIND DIR(DEG)	310	300	290	280	270	270	260	240	250	240	230	230	230	230	240	250	250	180	170	000	150	170	210	
WIND SPD (KT)	23	22	18	18	17	18	20	18	16	14	13	13	13	12	14	10	09	03	03	00	03	02	02	
GUST (KT)	31	29	26	26	24	26	30	24	28	19	20	21												

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Table A.1--(continued)

SAN ANTONIO TEXAS (RANDOLPH AFB)
 LATITUDE 29 32'N LONGITUDE 98 17'W
 ELEVATION 771FT

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	.	1012.0	.	.	.	1011.6	.	1012.7	.	.	1011.6	.	.	1008.6	.	.	1008.2	.	1008.8	.	.	1008	.	.
WIND DIR(DEG)	320	330	330	340	320	320	330	010	010	040	030	030	040	030	030	020	030	040	040	040	030	030	030	020
WIND SPD (KT)	04	02	03	04	04	04	04	05	09	11	12	12	14	14	10	12	12	13	10	08	10	10	07	09
GUST (KT)											20	20	19	20	18	20	20	18						
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	.	1007.8	.	.	.	1007.1	.	1006.3	.	.	1005.3	.	.	1001.7	.	.	1001.5	.	1001.5	.	.	1000	.	.
WIND DIR(DEG)	030	020	010	010	360	010	010	010	020	020	020	040	010	030	020	030	030	030	030	020	020	020	020	020
WIND SPD (KT)	12	12	10	10	12	08	10	13	13	14	14	20	19	20	18	23	22	25	21	24	28	25	22	20
GUST (KT)												29	29	29	30	34	30	31	36	30	35	31	40	30
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	.	999.6	.	.	.	998.1	.	996.6	.	.	995.1	.	.	991.2	.	.	988.3	.	985.6	.	.	981	.	.
WIND DIR(DEG)	010	360	030	360	350	360	360	350	360	360	360	360	360	360	360	360	360	360	360	360	350	360	360	360
WIND SPD (KT)	15	15	16	15	15	16	18	20	22	20	24	22	25	26	27	26	28	30	32	30	30	32	30	30
GUST (KT)	32	27	28	27	33	31	31	33	39	29	32	34	35	39	43	38	40	47	42	44	51	55	46	43
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	.	979.9	.	.	.	984.9	.	990.4	.	.	994.6	.	.	998.1	.	.	999.5	.	.	.	.	.	.	.
WIND DIR(DEG)	330	320	310	290	280	270	260	240	240	240	240	240	240	230	240	220	230	210						
WIND SPD (KT)	23	28	24	26	20	18	17	19	16	14	15	15	14	16	12	08	09	09						
GUST (KT)	53	40	36	33	30	26	26	25	28	22	20	22	22	22	19									

Table A.1--(continued)

VICTORIA TEXAS

LATITUDE 29 51'N LONGITUDE 96 55'W
ELEVATION 117FT

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	.	.	.	.	.	1010.8	1011.2	1011.2	1009.5	1007.8	1007.5	1007.5	1007.8	1007.1										
WIND DIR(DEG)						1010.5	1011.2	1011.2	1010.5	1008.5	1007.8	1007.8	1007.5	1007.5	1006									
WIND SPD (KT)						020	360	020	020	020	040	050	050	020	020	040	040	020	020	020	020	020	020	020
GUST (KT)						15	10	13	16	12	19	20	20	20	18	19	18	17	11	12	15	15	20	19

DATE	10TH SEPTEMBER																							
PRESSURE(MB)	1006.1	1004.4	1003.4	1003.4	1002.7	1001.7	999.7	997.0	995.6	994.2	994.2	993.2												
WIND DIR(DEG)																								
WIND SPD (KT)	19	20	20	18	20	22	22	24	25	25	24	29	360	360	360	360	020	020	020	020	020	020	020	
GUST (KT)													28	24	23	30	32	32	34	33	34	35	32	36

DATE	11TH SEPTEMBER																							
PRESSURE(MB)	989.8	987.8	985.4	984.1	983.1	982.1	977.7	970.2	959.7	945.E	957.4	972.5												
WIND DIR(DEG)																								
WIND SPD (KT)	42	38	40	44	42	41	42	40	42	40	40	40	30	40	40	40	50	65	87					
GUST (KT)	54	53	57	57	53	53	52	50	50	48	48	48	52	59	62	70	87	130E						

DATE	12TH SEPTEMBER																							
PRESSURE(MB)
WIND DIR(DEG)																								
WIND SPD (KT)																								
GUST (KT)																								

Table A.1---(continued)

WACO TEXAS (WBAS)

LATITUDE 31 37'N LONGITUDE 97 13'W
ELEVATION 508FT

		TIME (IN HOURS CST)																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
DATE		9TH SEPTEMBER																								
PRESSURE(MB)		1013.9	1013.5	1013.2	1013.9	1014.2	1014.2	1012.9	1011.5	1010.8	1010.8	1011.9	1011.9													
			1013.9	1013.2	1013.5	1014.2	1014.6	1013.5	1012.2	1010.5	1010.8	1010.8	1011.9	1011												
WIND DIR(DEG)		360	045	020	360	360	360	360	045	045	045	020	050	050	050	050	030	050	050	070	070	070	040	040		
WIND SPD (KT)		04	04	06	09	09	10	08	10	10	08	12	12	16	15	14	12	12	15	16	11	14	15	15	17	
GUST (KT)																										
DATE		10TH SEPTEMBER																								
PRESSURE(MB)		1011.9	1011.2	1010.5	1010.8	1010.5	1010.2	1008.1	1006.1	1005.8	1005.8	1006.8	1007.1													
			1011.9	1010.9	1010.5	1010.5	1010.5	1008.8	1007.1	1005.8	1005.8	1006.4	1007.1	1007												
WIND DIR(DEG)		040	040	020	020	020	040	030	040	040	030	040	030	040	040	040	040	050	050	050	050	050	050	050	050	
WIND SPD (KT)		15	13	12	12	12	13	14	16	15	15	20	18	18	22	25	22	17	20	18	18	18	20	17	20	
GUST (KT)																										
DATE		11TH SEPTEMBER																								
PRESSURE(MB)		1006.4	1006.1	1005.8	1005.4	1005.4	1005.4	1005.4	1004.1	1002.4	1002.0	1000.3	1000.3	998.0												
			1006.1	1005.8	1005.8	1005.4	1005.4	1005.4	1003.4	1002.4	1001.4	1000.7	998.6	997												
WIND DIR(DEG)		040	040	040	040	040	020	040	040	04	020	040	040	040	040	040	040	030	040	040	030	030	040	040		
WIND SPD (KT)		18	18	18	18	20	20	22	25	25	20	20	20	25	28	25	28	26	25	22	30	30	40	35	30	
GUST (KT)																										
DATE		12TH SEPTEMBER																								
PRESSURE(MB)		994.6	991.9	989.2	987.1	985.4	983.1	980.0	985.8	989.2	992.2	995.6	997.6													
			992.9	990.5	988.2	986.5	984.4	980.4	983.7	987.8	990.5	993.9	996.6	998												
WIND DIR(DEG)		040	040	060	040	060	030	060	060	060	090	090	110	180	230	200	200	200	200	200	200	230	200	230	200	230
WIND SPD (KT)		30	35	30	25	28	28	25	25	20	25	35	35	25	20	22	24	22	18	16	18	18	20	20	23	
GUST (KT)		40	45	38	32	40	38	35	40	30	28	38	46	45	34	25	29									

Table A.1--(continued)

BATON ROUGE LOUISIANA (WB)

LATITUDE 30 32'N LONGITUDE 91 9'W
ELEVATION 60FT

	TIME (IN HOURS CST)																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
DATE	9TH SEPTEMBER																								
PRESSURE(MB)	1012.2	1011.5	1011.5	1011.9	1011.9	1012.9	1012.5	1011.5	1011.2	1011.2	1010.8	1011.5	1011.5	1012.2	1011.5	1011.9	1011.9	1012.9	1011.9	1011.2	1010.8	1010.5	1010.8	1011.9	1010
WIND DIR(DEG)	070	070	070	070	070	070	070	070	070	070	070	070	090	090	090	090	090	090	090	090	090	090	090	110	070
WIND SPD (KT)	10	10	10	10	13	12	12	12	12	14	17	17	17	11	12	19	19	15	13	15	15	15	17	10	10
GUST (KT)																									15
DATE	10TH SEPTEMBER																								
PRESSURE(MB)	1009.8	1008.8	1009.1	1009.1	1009.5	1011.2	1010.2	1009.5	1008.5	1008.5	1008.8	1010.2	1009.5	1008.8	1008.8	1008.8	1008.8	1009.8	1009.8	1010.2	1009.8	1010.2	1009.5	1009	
WIND DIR(DEG)	110	090	090	090	090	090	110	090	110	090	090	090	090	110	110	110	110	110	110	110	140	140	090	140	
WIND SPD (KT)	12	12	17	15	15	14	14	20	18	14	16	15	25	18	18	20	18	18	16	15	16	16	14	10	
GUST (KT)	21	20						30				35	35	33	37	30	35	26	23	23	23	20		09	
DATE	11TH SEPTEMBER																								
PRESSURE(MB)	1008.8	1003.8	1008.1	1008.8	1009.5	1010.5	1010.2	1009.5	1008.5	1008.5	1008.8	1009.8	1008.8	1008.5	1008.5	1008.5	1009.5	1010.2	1010.5	1008.8	1009.8	1010.2	1010.5	1010	
WIND DIR(DEG)	110	110	110	110	110	130	110	130	110	110	090	140	110	110	110	130	130	130	130	130	130	130	130	130	
WIND SPD (KT)	12	12	12	11	15	13	08	15	15	22	16	17	12	15	20	25	15	18	18	18	18	20	15	15	
GUST (KT)			20	20			30			40	34	40	33	30	40	27	43	24	37	28	27	32	25	25	
DATE	12TH SEPTEMBER																								
PRESSURE(MB)	1009.5	1003.5	1008.8	1009.1	1009.8	1010.2	1010.2	1009.1	1008.1	1008.1	1009.1	1009.8	1008.5	1008.1	1008.1	1008.5	1009.5	1009.8	1009.5	1009.5	1009.5	1009.5	1009.5	1009.5	
WIND DIR(DEG)	130	130	130	130	130	130	130	130	130	130	130	140	140	160	160	160	160	160	160	140	160	160	160	160	
WIND SPD (KT)	16	18	20	17	18	20	22	19	23	23	16	12	15	18	22	20	15	17	15	12	14	12	11	15	
GUST (KT)										35	38	20	25	30	32	30	22	28							

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Table A.1--(continued)

BURRWOOD, LA. (WBO)

LATITUDE 28 58'N LONGITUDE 89 23'W
ELEVATION 10FT

		TIME (IN HOURS CST)																									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
DATE		9TH SEPTEMBER																									
PRESSURE(MB)		1010.2	1008.8	1008.5	1009.1	1009.0	1010.2	1009.1	1008.8	1008.1	1008.8	1008.8	1009.5	1009	1009.5	1008.8	1008.5	1008.8	1009.8	1009.8	1008.1	1008.5	1008.1	1008.8	1008.8	1009.5	
WIND DIR(DEG)		110	110	110	110	110	110	110	110	110	120	120	120	120	120	120	120	120	120	140	140	140	140	140	140		
WIND SPD (KT)		22	25	23	20	23	22	24	21	16	20	25	25	20	22	30	20	25	25	25	25	25	23	28	25	30	
GUST (KT)		20	31	32	26	34	26	27	28	25	30	43	35	30	29	45	30	35	33	36	38	38	35	31	49		
DATE		10TH SEPTEMBER																									
PRESSURE(MB)		1008.5	1007.5	1007.8	1008.1	1009.1	1009.5	1008.8	1009.5	1009.1	1009.8	1010.5	1010.5	1008.1	1007.8	1007.8	1008.5	1009.8	1009.5	1009.1	1009.1	1009.1	1010.5	1010.5	1010		
WIND DIR(DEG)		140	140	140	140	140	160	160	160	160	160	160	160	160	140	140	160	160	160	160	160	160	160	160	160		
WIND SPD (KT)		26	29	21	28	22	23	25	20	20	20	20	20	21	27	26	24	25	23	25	25	25	25	19	19	21	20
GUST (KT)		32	34	25	32	29	28	28	28	40	30	30															
DATE		11TH SEPTEMBER																									
PRESSURE(MB)		1009.8	1009.5	1009.8	1010.5	1011.2	1011.2	1010.5	1010.2	1010.5	1010.8	1011.9	1011.9	1009.5	1009.5	1010.2	1010.8	1011.5	1010.8	1010.5	1010.5	1010.5	1011.5	1011.9	1011		
WIND DIR(DEG)		160	160	160	160	160	160	160	160	160	160	160	160	180	160	160	160	160	160	160	160	160	160	160	180	180	
WIND SPD (KT)		19	17	18	20	17	20	16	20	18	22	18	20	23	21	20	20	17	20	20	17	20	20	17	16	17	15
GUST (KT)																											
DATE		12TH SEPTEMBER																									
PRESSURE(MB)		1011.5	1010.5	1011.2	1011.9	1012.5	1012.9	1012.2	1011.5	1011.5	1011.7	1012.5	1011.9	1011.2	1010.8	1011.5	1011.9	1012.9	1012.9	1011.9	1011.5	1011.5	1012.5	1012.5	1011		
WIND DIR(DEG)		180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	180	
WIND SPD (KT)		18	18	24	18	20	13	14	23	24	20	17	19	18	17	15	16	18	17	18	16	16	16	19	22	18	
GUST (KT)																											

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Table A.1--(continued)

LAFAYETTE, LA. (FAA)

LATITUDE 30 12'N LONGITUDE 91 59'W
ELEVATION 40FT

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	1011.5	1011.2	1010.8	1010.8	1010.8	1011.2	1011.2	1010.8	1009.8	1009.5	1008.8	1009.1	1009.1											
		1011.2	1010.3	1010.5	1010.8	1011.2	1010.8	1010.2	1009.5	1008.8	1009.1	1009.8	1009											
WIND DIR(DEG)	040	040	040	040	040	040	040	040	040	040	060	060	040	040	040	040	060	060	040	040	070	070	070	070
WIND SPD (KT)	3	9	6	6	8	10	10	11	13	15	15	15	13	10	12	15	20	18	10	15	10	11	11	11
GUST (KT)											25		21											
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	1008.5	1006.8	1006.4	1006.8	1007.1	1007.5	1006.8	1005.8	1005.8	1006.1	1007.8	1007.5												
		1007.5	1006.3	1006.4	1006.8	1007.5	1007.1	1006.4	1005.8	1005.4	1006.8	1007.5	1007											
WIND DIR(DEG)	070	070	070	070	070	070	070	070	070	070	070	020	070	070	070	070	070	070	070	070	070	090	070	070
WIND SPD (KT)	10	10	11	11	11	10	14	17	15	15	20	17	15	15	15	12	12	12	12	10	15	10	13	18
GUST (KT)											30	27	25	25	25	25	18	25	21					
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	1006.4	1005.8	1005.8	1006.4	1007.1	1007.1	1006.8	1006.1	1006.1	1006.8	1007.5	1007.5												
		1006.1	1005.1	1006.4	1006.8	1007.5	1006.4	1006.1	1006.1	1006.1	1007.5	1007.5	1008											
WIND DIR(DEG)	070	070	090	090	070	070	090	070	070	070	090	090	110	060	090	090	070	090	090	090	090	090	090	090
WIND SPD (KT)	10	10	15	18	10	10	10	13	15	12	11	14	12	13	10	13	10	10	10	10	10	12	15	20
GUST (KT)			25	32											20									
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	1006.8	1006.4	1006.4	1007.5	1007.5	1007.8	1007.5	1006.8	1006.8	1007.8	1008.1	1008.1												
		1006.4	1006.4	1007.1	1007.5	1007.8	1007.8	1007.1	1006.8	1007.1	1008.1	1008.5	1008											
WIND DIR(DEG)	090	090	110	110	110	110	110	110	110	110	110	110	140	140	140	140	160	140	140	140	160	140	140	160
WIND SPD (KT)	15	15	15	15	15	15	15	15	15	15	18	18	15	20	25	18	16	15	12	14	15	16	13	14
GUST (KT)		30	27																		24	24	23	

Table A.1--(continued)

NEW ORLEANS, LA. (WBAS)

LATITUDE 29 59'N LONGITUDE 90 15'W
ELEVATION 0FT

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	1011.4	1010.5	1010.5	1011.0	1011.5	1011.6	1011.3	1010.0	1009.7	1009.7	1011.4	1011.0												
	1011.1	1010.9	1010.6	1011.3	1011.9	1011.6	1010.5	1010.2	1009.6	1011.2	1011.3	1010												
WIND DIR(DEG)	070	070	070	070	070	070	070	070	070	070	070	070	070	070	110	070	070	070	140	110	070	090	070	
WIND SPD (KT)	14	11	10	13	12	15	17	15	20	18	17	18	15	14	13	8	17	18	12	23	12	12	12	11
GUST (KT)																								
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	1009.2	1008.7	1008.5	1009.4	1009.7	1010.2	1009.4	1009.3	1008.9	1009.4	1010.7	1010.0												
	1009.3	1008.5	1008.8	1009.2	1010.3	1010.2	1009.3	1009.7	1009.4	1010.4	1010.1	1009												
WIND DIR(DEG)	090	090	090	090	090	090	090	090	090	110	100	100	100	100	100	100	100	100	110	110	110	110	110	
WIND SPD (KT)	14	15	8	10	15	16	12	11	15	11	14	16	14	14	12	13	12	13	14	15	14	15	14	14
GUST (KT)		30																						
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	1009.5	1008.9	1009.1	1009.9	1010.7	1010.7	1010.3	1009.3	1009.4	1010.0	1010.8	1011.3												
	1009.2	1008.6	1009.5	1010.0	1010.9	1010.3	1009.8	1009.3	1009.5	1010.8	1011.1	1011												
WIND DIR(DEG)	110	110	110	110	110	110	090	110	110	120	120	120	120	120	120	120	120	120	120	120	120	120	110	
WIND SPD (KT)	12	14	7	13	13	13	13	11	12	13	15	15	15	13	9	12	11	12	12	10	13	11	11	12
GUST (KT)	20		20			19							33											
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	1010.5	1009.9	1010.2	1010.5	1011.5	1011.6	1011.0	1010.0	1009.9	1010.3	1011.1	1010.6												
	1010.2	1009.9	1010.4	1010.8	1011.8	1011.4	1010.4	1009.7	1010.1	1011.0	1011.1	1010												
WIND DIR(DEG)	110	140	120	140	140	140	120	120	140	140	140	160	160	160	160	160	160	160	140	140	140	140	140	140
WIND SPD (KT)	11	10	11	12	10	11	13	15	18	14	17	18	16	19	15	18	19	17	10	11	11	12	16	12
GUST (KT)														24										

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Table A.1--(concluded)

LAKE CHARLES, LA. (WBAS)

LATITUDE 30 13'N LONGITUDE 93 9'W
ELEVATION 20FT

	TIME (IN HOURS CST)																									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
DATE	9TH SEPTEMBER																									
PRESSURE(MB)	1011.5	1010.8	1010.2	1010.8	1011.2	1010.8	1010.5	1009.5	1008.8	1008.5	1008.8	1009.1	1007	1007.2	1005.8	1004.7	1005.6	1005.4	1006.1	1004.4	1003.4	1003.4	1003.5	1004.4	1004.4	
		1011.2	1010.5	1010.2	1010.8	1011.2	1010.5	1010.2	1009.1	1008.8	1008.5	1009.1	1007													
WIND DIR(DEG)	020	020	020	020	050	050	030	030	050	030	030	030	030	030	050	030	050	070	070	070	050	050	060	060		
WIND SPD (KT)	8	4	6	7	9	9	8	11	13	12	10	10	14	14	12	18	20	22	18	16	20	20	22	22		
GUST (KT)																										
DATE	10TH SEPTEMBER																									
PRESSURE(MB)	1007.2	1005.8	1004.7	1005.6	1005.4	1006.1	1004.4	1003.4	1003.4	1003.5	1004.4	1004.4	1004	1006.4	1004.4	1005.4	1005.4	1006.1	1004.7	1003.7	1003.1	1002.7	1004.1	1004.4	1004	
WIND DIR(DEG)	040	060	040	060	060	060	040	040	060	060	060	060	060	060	060	090	090	060	090	060	060	090	060	090		
WIND SPD (KT)	18	18	13	22	25	25	23	23	28	30	28	37	25	33	30	25	25	25	25	25	28	25	25	25		
GUST (KT)	25	28	29	32	30	32	30	34	42	42	35	43	33	39	40	35	35	32	35	38	35	40	30	36		
DATE	11TH SEPTEMBER																									
PRESSURE(MB)	1004.1	1002.7	1002.7	1003.4	1004.1	1004.4	1003.4	1003.1	1002.4	1002.7	1003.4	1003.7	1003	1003.4	1002.7	1002.7	1003.4	1003.1	1004.4	1004.4	1003.1	1003.1	1002.7	1003.4	1003.7	1003
WIND DIR(DEG)	090	090	090	090	090	080	110	110	110	120	120	120	120	120	120	110	110	120	120	120	120	120	120	120		
WIND SPD (KT)	24	21	27	29	21	23	34	22	23	3	25	25	21	24	24	27	28	110	110	110	120	120	120	120		
GUST (KT)	31	34	36	42	36	31	50	35	33	45	41	35	28	30	33											
DATE	12TH SEPTEMBER																									
PRESSURE(MB)	1002.7	1002.0	1002.7	1003.4	1003.1	1003.7	1003.4	1003.7	1003.4	1003.1	1004.1	1005.1	1005.8	1006.1	1002.7	1002.4	1003.1	1003.7	1003.4	1003.7	1003.1	1004.4	1004.4	1005.4	1006.1	1006
WIND DIR(DEG)	120	120	120	120	120	120	140	140	140	140	140	150	150	160	150	150	150	150	150	150	150	150	150	160	160	
WIND SPD (KT)	28	30	34	33	27	30	27	28	28	29	35	36	35	32	28	20	18	17	15	15	17	16	15	16	14	
GUST (KT)	32	35	38			35	34	35	35	36	44	45	44	40	38	30	26	30	25	22	26	21	22			

Table A.2--Surface observations from other land stations

MUD BAYON BRIDGE (HIGH ISLAND) TEXAS
 LATITUDE 29 35'N LONGITUDE 94 25'W

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	.	.	.	.	.	.	.	.	.	1011.9	1012.5	1010.5	1009.1	1008.5	1007.8	1008.5	1007.1							
										1011.9	1012.5	1011.9	1009.5	1008.8	1007.8	1008.5	1008.5	1007						
WIND DIR(DEG)								020	040	040	060	040	040	040	040	020	040	040	040	040	040	020	040	040
WIND SPD (KT)								15	16	22	21	30	23	23	19	11	10	13	15	30	23	26	29	32
GUST (KT)																								
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	1005.8	1005.8	1004.7	1002.7	1003.1	1002.0	1000.3	998.7	998.7	998.3	999.3	999.3	999.3											
	1005.8	1005.1	1005.1	1003.1	1003.1	1001.7	999.3	998.7	998.3	998.7	999.7	999												
WIND DIR(DEG)	040	040	040	040	040	040	040	040	020	040	040	020	040	040	040	060	060	060						
WIND SPD (KT)	23	30	29	35	35	23	30	26	30	35	46	40	35	35	41	43	35	43						
GUST (KT)											50	55	47	52	61	52	52							
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	998.0	997.6	997.3	997.6	997.6	998.3	997.0	996.6	996.6	996.3	998.3	998.7												
	997.3	997.3	997.3	997.3	997.6	998.3	997.6	997.0	996.6	995.9	997.6	998.3	998											
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	998.7	.	998.7	1001.0	1001.7	1003.4	1003.4	1003.4	1004.7	1006.1
	.	.	999.3	1001.7	1002.7	1003.4	1003.4	1003.4	1003.4	1005.4

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Table A.2--(continued)

SHELL CHEMICAL CO., DEER PARK, TEXAS
 LATITUDE 29 43'N LONGITUDE 95 8'W

		TIME (IN HOURS CST)																									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
DATE	10TH SEPTEMBER																										
PRESSURE(MB)		.																									
WIND DIR(DEG)												060	050	060	070	070	060	060	060	070	070	070	070	070	080	090	090
WIND SPD (KT)												21	17	23	24	23	23	25	22	23	24	29	30	30	34	35	38
GUST (KT)												30	30	31	39	42	37	37	42	36	40	40	42	40	46	48	52
DATE	11TH SEPTEMBER																										
PRESSURE(MB)		.																									
WIND DIR(DEG)		080	100	100	100	100	100	100	100	110	110	100	110	120	130	110	120	110	130	120	130	130	130	130	150	140	
WIND SPD (KT)		34	35	40	50	38	39	39	41	38	39	42	41	41	45	46	48	52	43	50	41	43	40	36	36	43	
GUST (KT)		51	43	52	63	57	49	58	55	52	57	60	56	62	68	62	70	68	73	69	70	59	56	61	61		
DATE	12TH SEPTEMBER																										
PRESSURE(MB)		.																									
WIND DIR(DEG)		140	160	170	170	180	180	180	180																		
WIND SPD (KT)		43	45	35	36	24	30	23	31																		
GUST (KT)		60	68	62	48	43	43	39	44																		

DATA ENTERED ONLY FOR THOSE TIMES THAT WERE AVAILABLE

Table A.2--(continued)

DOW CHEMICAL (PLANT B) FREEPORT TEXAS
 LATITUDE 28 59'N LONGITUDE 95 24'W

		TIME (IN HOURS CST)																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
DATE	10TH SEPTEMBER																									
PRESSURE(MB)								997.0		996.3		996.3		995.6		992.2		989.5		988.2		987.5		988.8		986.1
WIND DIR(DEG)										996.3		996.3		993.2		990.5		988.8		987.5		988.5		988.2		986
WIND SPD (KT)										040		040		040		040		040		040		040		040		040
GUST (KT)										22		23		24		25		29		30		35		36		46
										45		43		37		42		47		50		52		59		75
DATE	11TH SEPTEMBER																									
PRESSURE(MB)		985.4		983.7		982.7		983.4		983.1		982.7		982.1		979.3		980.4		982.1		985.4		988.1		
			984.0		983.1		982.7		983.4		983.4		982.1		980.4		979.7		981.7		983.7		986.8		988	
WIND DIR(DEG)		040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	
WIND SPD (KT)		45	43	42	40	40	43	43	43	42	41	39	39	36	35	33	30	31	30	30	29	28	26	25	25	
GUST (KT)		71	71	76	69	69	71	70	69	68	67	67	64	60	58	56	54	52	56	52	53	47	50	43	37	
DATE	12TH SEPTEMBER																									
PRESSURE(MB)		988.8		989.2		991.2		993.6		995.6		996.6		997.0		998.0		998.7		999.0		1000.0		1000.3		
			988.8		990.2		992.2		995.3		996.3		996.6		997.3		998.3		999.0		999.3		1000.3		1000	
WIND DIR(DEG)		040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040	040		
WIND SPD (KT)		24	24	23	23	23	23	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22		
GUST (KT)		43	43	35	42	36	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33		

DATA ENTERED ONLY FOR THOSE TIMES THAT WERE AVAILABLE

Table A.2--(continued)

DOW CHEMICAL (PLANT A) FREEPORT TEXAS
 LATITUDE 28°47'N LONGITUDE 95°18'W

	TIME (IN HOURS CST)																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
DATE	10TH SEPTEMBER																								
PRESSURE(MB)	1002.4	1000.7	998.5	996.3	995.6	995.3	993.6	990.9	988.2	985.8	988.5	986.5													
	1001.7	1000.0	997.0	995.9	995.3	994.9	992.2	989.2	986.8	986.1	987.8	985													
DATE	11TH SEPTEMBER																								
PRESSURE(MB)	985.0	982.7	982.1	981.7	981.4	981.7	982.1	981.0	979.0	981.4	984.4	985.4													
	984.8	982.1	981.7	981.4	981.4	981.7	982.1	979.3	979.3	982.1	985.1	985													
DATE	12TH SEPTEMBER																								
PRESSURE(MB)	987.5	988.5	989.2	990.5	992.5	995.3	996.6	998.0	998.7	999.3	1000.3	1001.0													
	988.2	988.8	989.5	991.5	993.9	996.3	997.6	998.7	999.0	999.7	1000.7	1001													

DATA ENTERED ONLY FOR THOSE TIMES THAT WERE AVAILABLE

Table A.2--(continued)

PALACIOS TEXAS (FSS FAA)

LATITUDE 28 43'N LONGITUDE 96 15'W

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	1010.8	1009.5	1009.1	1009.1	1009.5	1010.2	1010.2	1008.1	1006.8	1006.8	1006.1	1006.1	1005.1											
	1010.2	1009.1	1009.1	1009.5	1010.2	1009.1	1007.8	1006.8	1006.4	1006.1	1006.1	1004												
WIND DIR(DEG)	020	020	020	360	020	020	020	020	040	040	040	040	020	020	040	020	020	020	040	020	020	020	020	020
WIND SPD (KT)	6	8	9	10	12	10	11	11	13	14	15	12	13	11	18	17	13	12	13	12	15	18	16	
GUST (KT)												20					23						23	

DATE 10TH SEPTEMBER

PRESSURE(MB)	1004.1	1002.0	1001.0	1001.0	1000.0	999.0	996.3	993.2	991.5															
	1003.4	1001.4	1001.0	1000.0	1000.0	997.6	994.9	992.6	991.2															
WIND DIR(DEG)	020	020	020	020	020	020	020	360	360	360	020	020	020	020	020	020	020	020	020	020	020	020	020	
WIND SPD (KT)	17	18	20	18	19	16	17	17	20	2	25	25	25	30	35	35	36	30						
GUST (KT)	23	25	25	24	26	30	25	25	38	35	35	30	45	45	48	47	46	43						

DATA ENTERED ONLY FOR THOSE TIMES THAT WERE AVAILABLE

Table A.2--(continued)

UNION CARBIDE, SEADRIFT, TEXAS
 LATITUDE 28 30'N LONGITUDE 96 46'W

	TIME (IN HOURS CST)																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
DATE	11TH SEPTEMBER																								
PRESSURE(MB)	984.4		981.0		976.6		976.0		975.3		974.3		967.8		951.6		936.7		958.3		971.2		978.7		
		984.8		978.0		976.3		975.3		975.3		974.3		961.1		944.8		947.5		965.8		975.3		982	
WIND DIR(DEG)	020	020	020	020	020	020	040	040	040	04	040	040	040	020	020	360	290	270	250	230	200	200	200	200	
WIND SPD (KT)	25	28	28	30	32	33	24	23	23	21	24	23	21	24	50	59	47	44	38	35	30	31	38	35	
GUST (KT)	67	57	55	58	61	63	62	50	50	48	49	51	50	57	78	88	76	88	76	67	57	52	57	58	
DATE	12TH SEPTEMBER																								
PRESSURE(MB)	984.1		987.1		990.9		994.6		997.6		999.0		1000.0		1000.0		1000.3		1001.2		1002.0		1003.1		
		985.1		988.8		992.9		996.3		999.0		999.3		1000.0		1000.0		1000.7		1001.4		1002.7		1003	
WIND DIR(DEG)	200	200	200	200	200	200	200	200	200	20	200	200													
WIND SPD (KT)	35	35	30	31	30	23	21	16	17	19	19	20													
GUST (KT)	53	52	52	50	49	45	40	33	31	28	28	29													

DATA ENTERED ONLY FOR THOSE TIMES THAT WERE AVAILABLE

Table A.2--(continued)

ALCOA PLANT, POINT COMFORT, TEXAS
 LATITUDE 28 30*N LONGITUDE 96 33*W

		TIME (IN HOURS CST)																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
DATE	10TH SEPTEMBER																									
PRESSURE(MB)						999.7		999.0		999.0		998.7		996.3		992.2		990.2		989.5		988.8		987.8		
WIND DIR(DEG)																										
WIND SPD (KT)						21	21	20	18	22	20	21	22	26	24	24	25	31	32	35	37	41	30	31	35	41
GUST (KT)						30	30	35	36	39	33	36	37	45	41	43	47	52	55	57	61	62	63	53	58	67
DATE	11TH SEPTEMBER																									
PRESSURE(MB)	987.7	980.7	978.0	976.6	976.6	975.3	972.6	960.4	967.8	980.7	994.6	1002.4														
WIND DIR(DEG)																										
WIND SPD (KT)	51	43	38	41	47	45	46	43	45	45	49	42	47	52	76											
GUST (KT)	82	70	65	64	71	71	67	71	72	63	64	63	69	78	105											

DATA ENTERED ONLY FOR THOSE TIMES THAT WERE AVAILABLE

Table A.2--(continued)

DU POINT PLANT, VICTORIA, TEXAS
 LATITUDE 28 44*N LONGITUDE 96 54*W

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	1008.1	1007.1	1005.4	1004.7	1004.1	1004.1	1004.1	1002.4	999.3	997.6	995.9	995.3	994.9											
	1007.8	1005.8	1005.1	1004.4	1004.1	1002.7	1001.4	998.0	996.6	995.3	994.9	992												
WIND DIR(DEG)																								
WIND SPD (KT)	19	17	18	16	19	21	22	23	23	23	28	27	25	27	26	31	30	34	36	38	38	34	36	38
GUST (KT)	27	26	23	26	30	30	30	30	31	35	36	39	36	37	43	44	45	50	47	56	51	61	50	55
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	990.5	998.8	996.5	984.8	983.1	982.1	976.6	965.1	951.6	953.6	966.8	976.0												
	990.2	997.1	985.4	984.1	982.7	979.3	971.9	958.3	950.9	961.7	972.9	979												
WIND DIR(DEG)																								
WIND SPD (KT)	42	42	40	42	42	41	43	41	40	39	39	030	020	020	020	010	330	290	250	240	230	220	210	
GUST (KT)	66	63	61	56	58	58	64	62	63	56	56	56	59	59	67	70	86	90	81	75	59	57	53	53
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	982.1	985.8	989.5	993.2	996.6	999.0																		
	983.7	988.1	991.5	994.9	997.0	999.3																		
WIND DIR(DEG)																								
WIND SPD (KT)	36	33	33	30	30	31	30	26	23	24	21	22												
GUST (KT)	52	51	44	43	41	41	44	38	35	33	31	33												

DATA ENTERED ONLY FOR THOSE TIMES THAT WERE AVAILABLE

Table A.2---(concluded)

USNAAS KINGSVILLE, TEXAS

LATITUDE 27 32'N LONGITUDE 97 53'W

	TIME (IN HOURS CST)																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DATE	9TH SEPTEMBER																							
PRESSURE(MB)	1010.8	1009.6	1009.1	1009.6	1009.6	1009.6	1009.4	1008.1	1005.9	1005.7	1005.7	1005.5	1005.5	1005.5	1004.8	1004.7	1004.7	1004.7	1004.7	1004.7	1004.7	1004.7	1004.7	1004.7
	1010.0	1009.1	1009.2	1009.5	1010.0	1008.5	1006.8	1005.7	1005.5	1005.5	1005.5	1005.7	1004											
DATE	10TH SEPTEMBER																							
PRESSURE(MB)	1004.2	1002.7	1001.9	1001.0	1000.6	999.5	998.0	996.2	994.0	992.2	991.6	991.0												
	1003.3	1001.9	1001.4	1000.7	1000.5	999.4	996.7	994.0	993.1	992.0	991.9	989												
DATE	11TH SEPTEMBER																							
PRESSURE(MB)	986.9	984.7	984.0	984.0	982.9	984.2	984.0	983.9	984.9	985.3	987.9	989.8												
	985.0	984.7	984.2	982.8	983.6	984.1	983.9	984.5	985.4	986.6	988.6	991												
DATE	12TH SEPTEMBER																							
PRESSURE(MB)	992.0	993.2	995.4	997.3	999.5	1000.9	1000.9	999.7	999.9	1000.7	1003.1	1003.3												
	992.4	994.4	996.3	998.3	1000.4	1000.9	1000.7	999.7	999.9	1001.7	1003.6	1002												

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DATA ENTERED ONLY FOR THOSE TIMES THAT WERE AVAILABLE

Table A.4--Pertinent data extracted from reconnaissance flight reports

DATE/TIME (CST)	STORM LAT	CENTER LONG	SEA LEVEL PRESSURE (MB)	SURFACE WIND (KT)	EYE DIAMETER (N.MI)	REMARKS
8 1200	23 22	89 15	963		65	RFF MAX.WINDS 35-40N.MI.FROM CENTER
8 1300	23 20	89 21			46	
8 1400	23 27	89 19			45	
8 1500	23 35	89 37	959			
8 1533	23 31	89 26			60	RFF
8 1600	23 32	89 40	954			
8 1730	23 36	89 45**		100	45	
9 100	24 06	90 15	955		51	
9 315	24 12	90 54				
9 400	24 24	90 37		110	51	
9 530	24 34	90 46	954	110	45	
9 1240	24 55	92 00				RFF MAX.WINDS(90KT) 90N.MI FROM CENTER
9 1345	25 09	92 08**	948		45	RFF
9 1715	25 22	92 16	943		40	RFF
9 1900	25 38	92 50				
9 2200	25 57	93 11				
10 0	26 11	93 26				
10 406	26 33	93 30	942		40	
10 507	26 20	93 34**			40	
10 540	26 09	93 40**		110		
10 645	26 09	93 49	937	110	40	MAX.WIND 25N.MI FROM CENTER
10 800	26 18	94 00				
10 830	26 24	94 06				
10 900	26 30	94 06				
10 930	26 36	94 06				
10 1000	26 42	94 10	942	110	36	
10 1033	26 40	94 13**				
10 1300	26 58	94 03	936	130		RFF 100 KT WIND EXT 40 NMI FROM CENTER
10 1445	27 06	94 06	935			
10 1515	27 08	94 08				
10 1700	27 16	94 30			29	
10 2130	27 06	95 29**				
10 2200	27 05	95 31**			29	
10 2230	27 13	95 40			30	
10 2300	27 12	95 42			30	
10 2330	27 12	95 42				
11 0	27 09	95 42			30	
11 30	27 06	95 36				
11 100	27 13	95 43			30	
11 200	27 22	95 43				
11 830	27 31	96 08**				
11 1045	28 09	96 10**				
11 1210	28 12	96 23	941	120	26	
11 1230	28 12	96 15			24	
11 1300	28 15	96 24				
11 1330	28 17	96 25				
11 1400	28 20	96 29				
11 1430	28 21	96 27				
11 1500	28 24	96 28				
11 1530	28 29	96 30				
11 1600	28 34	96 33				
11 1630	28 36	96 42				
11 1700	28 30	96 35				

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** STORM CENTER FIXED BY RADAR

Table A.5--Radar eye positions reported by NWS stations

TIME (CST)	BROWNSVILLE		GALVESTON		LAKE CHARLES	
	LAT	LONG	LAT	LONG	LAT	LONG
10TH SEPTEMBER						
600			26	07		
630			26	15		
700			26	15		
730			26	18		
800			26	20		
830			26	21		
900			26	25		
930			26	25		
1000			26	26		
1030			26	26		
1100			26	26		
1130	26	29	26	26	28	41
1200	26	32	26	26	28	42
1230			26	26	28	44
1300			26	26	28	41
1330	26	33	26	26	28	41
1400	26	38	26	26	28	43
1430	26	40	26	26	28	43
1500	26	44	26	26	28	44
1530	26	44	26	26	28	44
1600	26	44	26	26	28	44
1630	26	54	26	26	28	45
1700	26	56	26	26	28	45
1730	27	01	27	27	27	07
1800	27	05	27	27	27	11
1830	27	08	27	27	27	11
1900	27	09	27	27	27	12
1930	27	10	27	27	27	12
2000	27	14	27	27	27	16
2030	27	12	27	27	27	16
2100	27	14	27	27	27	11
2130	27	12	27	27	27	11
2200	27	06	27	27	27	09
2230	27	08	27	27	27	08
2300	27	07	27	27	27	07
2330	27	06	27	27	27	07
2400	27	06	27	27	27	07
2430	27	06	27	27	27	07
2500	27	06	27	27	27	07
2530	27	06	27	27	27	07
2600	27	06	27	27	27	07
2630	27	06	27	27	27	07
2700	27	06	27	27	27	07
2730	27	06	27	27	27	07
2800	27	06	27	27	27	07
2830	27	06	27	27	27	07
2900	27	06	27	27	27	07
2930	27	06	27	27	27	07
3000	27	06	27	27	27	07
3030	27	06	27	27	27	07
3100	27	06	27	27	27	07
3130	27	06	27	27	27	07
3200	27	06	27	27	27	07
3230	27	06	27	27	27	07
3300	27	06	27	27	27	07
3330	27	06	27	27	27	07
3400	27	06	27	27	27	07
3430	27	06	27	27	27	07
3500	27	06	27	27	27	07
3530	27	06	27	27	27	07
3600	27	06	27	27	27	07
3630	27	06	27	27	27	07
3700	27	06	27	27	27	07
3730	27	06	27	27	27	07
3800	27	06	27	27	27	07
3830	27	06	27	27	27	07
3900	27	06	27	27	27	07
3930	27	06	27	27	27	07
4000	27	06	27	27	27	07
4030	27	06	27	27	27	07
4100	27	06	27	27	27	07
4130	27	06	27	27	27	07
4200	27	06	27	27	27	07
4230	27	06	27	27	27	07
4300	27	06	27	27	27	07
4330	27	06	27	27	27	07
4400	27	06	27	27	27	07
4430	27	06	27	27	27	07
4500	27	06	27	27	27	07
4530	27	06	27	27	27	07
4600	27	06	27	27	27	07
4630	27	06	27	27	27	07
4700	27	06	27	27	27	07
4730	27	06	27	27	27	07
4800	27	06	27	27	27	07
4830	27	06	27	27	27	07
4900	27	06	27	27	27	07
4930	27	06	27	27	27	07
5000	27	06	27	27	27	07
5030	27	06	27	27	27	07
5100	27	06	27	27	27	07
5130	27	06	27	27	27	07
5200	27	06	27	27	27	07
5230	27	06	27	27	27	07
5300	27	06	27	27	27	07
5330	27	06	27	27	27	07
5400	27	06	27	27	27	07
5430	27	06	27	27	27	07
5500	27	06	27	27	27	07
5530	27	06	27	27	27	07
5600	27	06	27	27	27	07
5630	27	06	27	27	27	07
5700	27	06	27	27	27	07
5730	27	06	27	27	27	07
5800	27	06	27	27	27	07
5830	27	06	27	27	27	07
5900	27	06	27	27	27	07
5930	27	06	27	27	27	07
6000	27	06	27	27	27	07
6030	27	06	27	27	27	07
6100	27	06	27	27	27	07
6130	27	06	27	27	27	07
6200	27	06	27	27	27	07
6230	27	06	27	27	27	07
6300	27	06	27	27	27	07
6330	27	06	27	27	27	07
6400	27	06	27	27	27	07
6430	27	06	27	27	27	07
6500	27	06	27	27	27	07
6530	27	06	27	27	27	07
6600	27	06	27	27	27	07
6630	27	06	27	27	27	07
6700	27	06	27	27	27	07
6730	27	06	27	27	27	07
6800	27	06	27	27	27	07
6830	27	06	27	27	27	07
6900	27	06	27	27	27	07
6930	27	06	27	27	27	07
7000	27	06	27	27	27	07
7030	27	06	27	27	27	07
7100	27	06	27	27	27	07
7130	27	06	27	27	27	07
7200	27	06	27	27	27	07
7230	27	06	27	27	27	07
7300	27	06	27	27	27	07
7330	27	06	27	27	27	07
7400	27	06	27	27	27	07
7430	27	06	27	27	27	07
7500	27	06	27	27	27	07
7530	27	06	27	27	27	07
7600	27	06	27	27	27	07
7630	27	06	27	27	27	07
7700	27	06	27	27	27	07
7730	27	06	27	27	27	07
7800	27	06	27	27	27	07
7830	27	06	27	27	27	07
7900	27	06	27	27	27	07
7930	27	06	27	27	27	07
8000	27	06	27	27	27	07
8030	27	06	27	27	27	07
8100	27	06	27	27	27	07
8130	27	06	27	27	27	07
8200	27	06	27	27	27	07
8230	27	06	27	27	27	07
8300	27	06	27	27	27	07
8330	27	06	27	27	27	07
8400	27	06	27	27	27	07
8430	27	06	27	27	27	07
8500	27	06	27	27	27	07
8530	27	06	27	27	27	07
8600	27	06	27	27	27	07
8630	27	06	27	27	27	07
8700	27	06	27	27	27	07
8730	27	06	27	27	27	07
8800	27	06	27	27	27	07
8830	27	06	27	27	27	07
8900	27	06	27	27	27	07
8930	27	06	27	27	27	07
9000	27	06	27	27	27	07
9030	27	06	27	27	27	07
9100	27	06	27	27	27	07
9130	27	06	27	27	27	07
9200	27	06	27	27	27	07
9230	27	06	27	27	27	07
9300	27	06	27	27	27	07
9330	27	06	27	27	27	07
9400	27	06	27	27	27	07
9430	27	06	27	27	27	07
9500	27	06	27	27	27	07
9530	27	06	27	27	27	07
9600	27	06	27	27	27	07
9630	27	06	27	27	27	07
9700	27	06	27	27	27	07
9730	27	06	27	27	27	07
9800	27	06	27	27	27	07
9830	27	06	27	27	27	07
9900	27	06	27	27	27	07
9930	27	06	27	27	27	07

Table A.6--Sea level pressure and wind data from ship reports

SHIP IDENT	LAT		LONG		WIND		PRESSURE (MB)
					DIR (DEG)	SPD (KT)	
1800CST 8TH SEPTEMBER							
PJRAUS	19	0	85	6	170	24	1006.4
WBCW	20	42	95	24	290	22	1003.6
CRISTOBAL	21	42	85	6	160	25	1007.8
WCOQ	21	42	85	6	160	25	1007.8
	21	42	85	36	150	20	1006.4
SS J LOUIS	21	48	85	12	180	7	1008.1
GLIK	22	6	86	18	160	38	1003.1
MANAQUI	22	18	85	6	150	30	1005.4
	22	18	87	0	150	42	1001.6
BALAU	23	18	87	0	150	42	1001.6
DEL ORO	23	42	85	18	110	27	1008.6
JBCW	23	42	94	36	220	21	1004.1
GULFASAL	23	48	93	42	360	33	1000.1
KCSX	24	18	93	48	10	30	1003.4
	24	24	82	24	90	30	1011.6
DIONE	24	24	97	30	20	20	1007.1
	24	30	81	18	100	20	1012.9
KYOEI MARU	24	36	93	24	20	25	1003.6
	24	24	82	24	90	30	1011.6
KQTF	24	42	80	48	100	20	1012.6
WFOH	24	42	86	0	140	38	1006.4
	24	48	83	42	140	30	1010.6
ML GOSNEY	24	48	83	48	140	30	1010.2
EW SINCLAIR	24	48	93	0	10	38	1002.4
DEL SOL	25	0	94	54	30	25	1005.1
AMERTRADER	25	0	84	54	140	20	1010.2
MOBILPOWER	25	42	85	6	140	33	1010.2
	25	42	85	18	140	33	1010.2
AN KEMP	25	48	88	54	90	37	1001.4
PENN SUN	26	36	90	48	80	41	1002.1
KESE	26	36	93	54	50	35	1005.8
J E DYER	26	48	93	54	50	30	1006.8
NWFE	27	12	83	12	150	18	1013.2
TEXICO CON	27	12	87	42	80	35	1006.4
KRRJ	27	18	85	54	110	40	1010.8
CLARKESWHF	27	24	88	36	100	35	1006.8
TEXACOMONT	27	30	93	30	40	30	1009.1
KOFZ	27	36	87	24	110	35	1009.8
KYMU	28	12	90	48	90	45	
NKGL	28	12	91	36	90	35	1008.6
SSFLYING	28	36	93	54	60	25	1009.8
KWTK	28	42	87	18	90	30	1009.6
	28	42	87	18			1010.2
KSOE	28	42	87	24	130	27	1011.2
	28	42	87	24	130	27	1011.2
KRQW	28	54	92	24	60	27	1009.8
FLYINGWASH	29	0	92	54	80	25	1010.2
	29	48	80	24	90	11	1016.2
KLEO	29	48	89	48	100	25	1007.6
PCUO	29	54	87	30	100	25	1012.1

Table A.6--(continued)

SHIP IDENT	LAT		LONG		WIND		PRESSURE (MB)
					DIR (DEG)	SPD (KT)	
2100CST 8TH SEPTEMBER							
MANAQUI	22	0	85	0	170	30	1006.4
CRISTOBAL	22	24	85	24	120	25	1008.6
WCOQ	22	24	85	24	120	25	1008.6
NCSK	23	12	94	54	40	24	1004.8
TEXACO FLA	23	18	94	24	350	35	1003.7
DEL ORO	24	18	85	42	110	22	1009.1
WFOH	24	36	86	18	140	35	1006.8
AN KEMP	25	42	88	24	100	40	1003.1
PENNSYLSUN	26	36	90	18	80	45	1001.4
SABINE SUN	26	36	93	24	70	34	1005.8
DEL MUNDO	29	30	87	24	90	60	1011.2
JE DYER	26	48	93	0	50	22	1006.1
KIMA	28	30	92	30	60	30	1009.8
SS FLYING	28	30	93	6	70	26	1010.2
GULF LUBE	28	36	91	48	60	30	1009.8
PCUO	29	30	86	42	100	24	1013.1
SHIP	29	30	86	42	100	24	1013.1
0000CST 9TH SEPTEMBER							
GLFSHIPPER	19	54	84	12	140	22	1011.2
HBFH	20	42	85	6	310	33	1004.4
	21	48	84	48	170	25	1007.6
MANAQUI	21	54	85	6	150	25	1006.4
	22	24	86	36	160	25	1005.8
BALAO	23	0	87	36	140	55	1001.6
CRISTOBAL	23	18	85	18	120	25	1008.6
WCOQ	23	18	85	18	120	25	1008.6
ALCI	23	18	95	30	320	20	1005.8
JOHF	23	42	93	42	350	18	1002.1
	24	36	86	42	120	38	1006.1
DEL ORO	24	48	86	6	110	22	1009.1
DIONE	24	54	97	18	20	18	1007.8
ESSONNEWARK	25	0	84	0	120	29	1012.9
NOMAD	25	0	90	0	90	43	
	25	6	84	0	130	30	1010.2
ATL NAVIG	25	12	84	6	140	21	1012.9
AN KEMP	25	36	88	0	100	40	1003.1
	25	36	84	48	140	25	1010.2
AMERTRADER	25	54	85	48	140	20	1010.2
	26	12	84	48	130	35	1011.9
MOBILPOWER	26	30	86	54	120	38	1008.8
PENNSYLSUN	26	42	89	48	90	45	1000.3
	26	42	86	0	120	27	1009.6
	27	12	87	0	30	42	1007.1
	27	24	89	36	80	45	1005.8
DEL MUNDO	28	0	86	54	90	35	1009.8
WKIM	28	18	91	18	90	30	1010.8
KSOE	28	24	86	30	70	20	1011.7
PCUC	29	12	86	6	100	23	1012.1

Table A.6--(continued)

SHIP IDENT	LAT	LONG	WIND		PRESSURE (MB)
			DIR (DEG)	SPD (KT)	
0300CST 9TH SEPTEMBER					
JBCW	21 30	95 6	300	21	1002.8
TAIYUMARU	21 48	92 54	310	34	998.3
KYOEI MARU	22 54	93 54	330	26	1000.1
CRISTOBAL	24 24	95 12	90	25	1009.1
	24 24	95 12	100	49	1009.1
NOMAD	25 0	90 0	80	42	
DEL ORO	25 18	96 18	110	22	1009.1
SABINE SUN	26 36	92 30	70	45	998.3
PENNSYLSUN	26 48	99 12	90	50	999.7
JE DYER	26 48	91 12	70	30	999.7
KEMA	28 18	91 18	80	34	1005.4
PCUP	28 48	95 12	100	23	1011.6
0600CST 9TH SEPTEMBER					
CAMPATVES	19 6	91 24	240	30	999.1
GLFSHIPPER	21 12	95 0	150	30	1009.8
MANAQUI	21 36	84 54	150	27	1006.8
TAIYUMARU	22 0	92 24	290	32	997.6
HBFH	22 0	95 30	290	40	1002.1
KEHS	22 18	94 30	330	40	1001.4
KDEL MARU	22 48	93 36	300	34	998.6
ENSINCLAIR	23 0	94 0	320	45	1000.1
	23 6	97 30	150	25	1005.1
GULFASAL	23 24	94 0	290	30	999.1
BALAO	23 36	97 36	140	45	1003.7
SSHARSINAI	24 0	97 30	160	32	1008.1
	24 42	87 18	130	40	1003.1
NOMAD	25 0	90 0	110	43	
	25 12	84 42	140	15	1010.8
AN KEMP	25 18	87 18	140	40	1003.1
CRISTOBAL	25 30	85 6	140	27	1009.8
DEL ORO	25 30	86 36	140	21	1008.6
	25 36	84 6	140	27	1011.6
	25 36	85 24	120	30	1009.1
ACHILLES	25 36	85 18	160	40	1009.1
NRGV	25 36	86 54	80	21	1004.4
ESSONNEWARK	25 42	85 36	140	34	1011.2
TILLAMOOK	26 6	84 36	140	21	1011.2
AL E WATTS	26 12	85 42	140	40	1008.6
ML GOSNEY	26 18	86 12	150	40	1007.6
	26 36	86 0	130	30	1006.6
SABINE SUN	26 42	91 36	70	50	999.6
	26 54	86 18	140	30	1009.6
PENNSYLSUN	26 54	88 36	110	45	1002.7
JE DYER	26 54	90 30	80	40	997.6
AMERTRADER	27 0	86 54	140	25	1008.8
MOBILPOWER	27 18	88 24	140	40	1006.4
	27 30	84 18	110	35	1012.9
	27 30	88 54	110	40	1005.8
CLARKESHHF	27 42	87 42	110	35	1008.6
KCVE	27 42	95 0	80	50	1007.4

Table A.6--(continued)

SHIP IDENT	LAT	LONG	WIND		PRESSURE (MB)
			DIR (DEG)	SPD (KT)	
0600CST 9TH SEPTEMBER					
WKIM	27 54	90 12	90	30	1008.6
	28 12	91 6	90	40	1005.1
TEXACO MD	28 18	93 24	70	35	1005.8
	28 30	94 30	100	23	1011.8
RIO MANAMO	29 0	97 42	100	33	1010.1
MS OKERTAL	29 18	97 42	100	24	1010.6
0900CST 9TH SEPTEMBER					
	21 12	94 36	280	31	1003.6
KEHS	22 24	93 54	310	40	1000.3
KYOEI MARU	22 54	92 54	310	35	997.1
GULFASAL	23 0	93 48	270	35	999.1
RC TUTTLE	24 36	97 12	140	40	1005.8
ANKEMP	25 0	97 6	140	40	1004.1
SABINE SUN	25 30	91 12	70	50	992.2
DEL ORO	26 12	97 6	130	21	1009.1
JE DYER	26 30	91 30	90	60	995.6
DEL MUNDO	26 42	95 30	90	45	1011.3
PENNSYLSUN	26 42	98 6	120	45	1003.7
CLARKES HF	27 36	97 36	110	35	1003.8
WKIM	27 48	90 6	110	34	1005.1
GULF LUBE	27 48	90 24	100	40	1003.7
KEMA	28 0	90 24	100	45	1004.4
	28 18	92 54	90	40	1005.8
ALCOAROAMR	28 36	96 36	140	25	1013.2
RIOMANAO	28 36	97 42	120	33	1010.1
TEXACOMONT	29 30	92 36	60	35	1004.4
1200CST 9TH SEPTEMBER					
	20 48	96 36	120	24	1009.1
MANAQUI	21 24	94 36	140	25	1003.8
	21 24	94 0	270	33	1002.8
DEL SOL	21 42	94 18	320	35	1003.1
TAIYU MARU	22 0	91 0	250	30	999.1
MARIESKOU	22 12	90 54	150	30	998.6
TEXACO FLA	22 24	93 30	290	40	997.6
GLFSHIPPER	22 30	95 42	140	35	1010.6
	22 48	78 24	90	10	1016.1
KYOEI MARU	23 0	92 6	260	38	994.1
GULFASAL	23 18	93 42	270	35	997.3
	23 30	97 48	150	30	1005.4
BALAO	23 48	87 12	140	40	1005.6
	23 54	89 54	290	45	995.9
HAR SINAI	24 12	97 12	150	35	1007.6
	24 36	96 54	140	35	1007.1
	24 42	95 18	130	27	1009.8
AN KEMP	24 42	96 48	140	40	1005.8
NOHAD	25 0	90 0	150	43	

Table A.6--(continued)

SHIP IDENT	LAT		LONG		WIND		PRESSURE (MB)
					DIR (DEG)	SPD (KT)	
1200CST 9TH SEPTEMBER							
GULFCREST	25	6	84	0	120	20	1012.6
	25	6	84	42	140	27	1013.2
	25	30	84	0	140	28	1011.9
ML GOSNEY	25	30	86	6	140	40	1009.1
SABINE SUN	25	30	81	6	70	50	992.6
TILLAMOOK	25	36	85	30	130	25	1012.2
ESSONNEWARK	26	0	86	24	150	28	1011.9
ACHILLES	26	0	86	24	140	30	1009.8
	26	30	84	42	110	35	1013.6
DEL ORO	26	30	87	6	130	38	1009.2
PENNSYLSUN	26	36	87	30	120	40	1006.8
ATL NAVIG	26	42	87	12	140	30	1009.3
	26	54	85	0	110	25	1013.2
JE DYER	26	54	81	6	90	60	995.6
CRISTOBAL	27	6	86	0	110	30	1012.6
	27	24	88	12	130	42	1008.6
MOBILELUBE	27	42	90	0	110	34	1001.1
MOBILPOWER	27	48	89	24	110	40	1007.1
	27	48	89	54	110	42	1003.7
	27	54	89	36	90	40	1006.4
FLUING A	28	6	90	24	90	50	1003.7
RIOMANANO	28	18	87	12	120	33	1010.6
MS OKERTAL	28	24	87	0	100	30	1011.4
TEXACO MD	28	48	82	24	160	40	1004.4
	29	12	87	6	140	28	1013.9
	29	54	77	24	120	6	1015.6
	29	54	80	24	90	9	1018.2
	30	36	88	36	80	31	1012.2
1500CST 9TH SEPTEMBER							
KYOEI MARU	23	6	91	30	220	35	993.1
	24	36	86	36	150	22	1009.1
NOMAD	25	0	90	0	150	43	
ML GOSNEY	25	24	86	48	130	40	1008.1
	25	24	84	12	20	45	993.6
PENNSYLSUN	26	18	87	6	110	35	1005.8
DEL ORO	26	54	86	54	140	27	1008.8
JE DYER	26	54	90	42	100	50	995.3
CRISTOBAL	27	0	86	12	110	30	1010.6
TEXACOMONT	27	24	93	48	50	50	1000.3
WKIM	27	30	89	42	110	45	1003.4
RIOMANA 40	27	36	86	54	140	37	1008.7
	27	36	89	42	110	42	1001.7
	28	0	85	0	30	30	1004.4
LEADER	28	36	83	48	50	35	1002.6

Table A.6--(continued)

SHIP IDENT	LAT		LONG		WIND		PRESSURE (MB)
					DIR (DEG)	SPD (KT)	
1800CST 9TH SEPTEMBER							
HIYEHARUMR	20	0	92	42	250	33	1004.1
TAIYUMARU	22	12	93	30	190	30	1003.1
DEL SOL	22	18	92	18	250	35	993.3
	23	30	87	0	140	30	1008.1
KEHS	23	0	92	0	260	45	993.9
GULFASAL	23	12	93	48	270	41	994.6
MARU	23	30	90	30	130	42	996.6
EW SINCLAIR	23	42	93	36	290	65	991.6
J LOUIS	23	54	87	48	170	8	987.3
	24	0	89	18	160	38	998.6
	24	6	88	36	140	30	1003.4
BALAO	24	6	88	36	140	46	1003.6
HARSINAI	24	18	87	54	150	38	1005.7
ROBT TUTTLE	24	36	87	18	170	27	1008.1
	25	18	87	0	150	34	1009.1
AL E WATTS	26	0	85	48	140	30	1010.6
ATL NAVIG	26	18	87	18	150	35	1007.1
ACHILLES	26	18	87	24	140	36	1007.8
DEL ORO	26	30	87	0	130	40	1008.6
ESSONNEWARK	26	30	87	30	130	38	1009.1
	26	48	86	36	110	33	1009.8
JE DYER	26	48	90	18	110	60	997.3
SABINE SUN	26	54	90	54	110	50	987.3
KFYM	27	6	94	12	50	50	997.3
	27	18	87	24	120	40	1007.8
CLARKS WHF	27	24	86	54	140	30	1010.2
IRIS	27	24	95	12	30	36	1002.1
GULF LUBE	27	30	89	30	110	46	1002.4
SPIRIT LIB	27	36	91	42	90	50	997.1
	27	48	89	48	120	56	1001.7
FLYING A	27	48	89	48	120	56	1001.7
MOBILPOWER	28	6	90	6	110	40	1005.1
	28	30	88	30	140	16	1012.2
LEADER	28	30	93	24	60	32	1001.1
	30	6	88	18	80	32	1012.6
	30	6	88	30	90	30	1012.2
	30	30	87	6	80	30	1013.9
2100CST 9TH SEPTEMBER							
TAIYU MARU	22	18	88	42	150	27	1007.1
KEHS	23	6	91	36	220	45	994.9
ML GOSNEY	25	18	87	12	140	40	1008.6
SABINE SUN	26	42	90	36	110	50	993.9
IRIS	26	54	95	24	20	40	999.7
0000CST 10TH SEPTEMBER							
MARIE SKOU	22	18	87	42	150	25	1009.6
HIYEHARUMR	22	36	91	12	180	33	1001.3

Table A.6--(continued)

SHIP IDENT	LAT		LONG		WIND		PRESSURE (MB)
					DIR (DEG)	SPD (KT)	
0000CST 10TH SEPTEMBER							
HIYEHARUMA	22	36	91	12	180	33	1001.3
GULFASAL	23	0	94	0	230	41	994.6
DEL SOL	23	6	90	12	160	40	1002.4
	24	6	97	30	140	24	1009.1
	24	6	98	12	160	33	1004.7
	24	24	99	18	160	30	1005.1
	24	48	98	18	160	35	1008.6
ML GOSNEY	25	12	87	30	160	40	1008.6
TILLAMOOK	25	30	87	24	130	36	1009.1
ATL NAVIG	26	6	88	6	140	35	1009.1
	26	18	95	30	360	40	995.3
ACHILLES	26	36	88	0	140	30	1007.1
ESSONEWARK	26	42	88	18	130	40	1009.1
	26	54	87	54	150	32	1009.1
	27	0	87	36	140	20	1008.8
	27	18	99	0	120	45	1006.4
MOBIL LUBE	27	18	99	12	120	45	1006.8
	27	18	99	24	120	50	1005.1
	27	48	95	54	90	35	1007.6
MOBILPOWER	28	0	87	30	110	40	1006.4
AMERTRACER	28	0	88	24	140	40	1009.6
	28	0	96	30	40	40	1003.1
	30	6	88	30	80	31	1014.6
0300CST 10TH SEPTEMBER							
MOON	25	54	95	36	360	40	992.2
JE DYER	26	24	88	48	140	45	1003.1
CRISTOBAL	27	0	87	24	140	30	1009.6
0600CST 10TH SEPTEMBER							
HIYEHARUMR	23	0	89	36	160	33	1005.2
DEGANYA	23	54	87	6	160	22	1008.3
DEL SOL	24	0	88	42	160	30	1005.8
	24	48	89	12	170	30	1007.1
NEHS	24	0	90	0	180	50	1002.4
IKE	24	0	96	30	230	45	993.9
SINAI	24	30	89	0	150	35	1005.6
EW SINCLAIR	24	54	93	30	250	70	992.2
BALAO	25	0	90	48	150	45	1000.7
	25	6	95	30	310	40	999.1
ML GOSNEY	25	24	88	12	150	35	1007.8
TILLAMOOK	25	30	86	0	170	35	1003.6
	25	36	86	0	150	30	1009.1
	25	48	88	6	170	26	1003.6
JE DYER	26	18	89	6	160	42	1005.8
ATL NAVIG	26	36	88	48	150	35	1007.6
SABINE SUN	26	42	89	18	140	40	999.7
ACHILLES	26	48	88	42	140	40	1006.4

Table A.6--(continued)

SHIP IDENT	LAT	LONG	WIND		PRESSURE (MB)
			DIR (DEG)	SPD (KT)	
0600CST 10TH SEPTEMBER					
	26 54	88 0	140	27	1008.8
	27 0	88 24	120	30	1007.8
	27 6	88 12	150	25	1008.1
GULFCREST	27 6	88 12	120	20	1007.6
MOBIL LUBE	27 6	88 30	140	30	1008.6
ESSONNEWARK	27 12	88 48	150	32	1008.6
CRISTOBAL	27 24	87 48	140	27	1010.2
AL E WATTS	27 42	87 54	140	35	1009.1
MOBILPOWER	27 54	89 18	160	40	1006.1
HOEU	28 24	93 6	90	58	993.6
0900CST 10TH SEPTEMBER					
	21 48	93 18	230	30	1004.1
IRIS	24 30	96 6	290	50	994.9
TEXACO MT	25 6	95 6	310	60	988.2
ML GOSNEY	25 36	88 30	160	35	1009.1
DAPO	26 30	88 12	170	24	1010.1
CRISTOBAL	27 48	88 12	150	30	1011.2
LEADER	28 24	93 6	110	70	993.1
1200CST 10TH SEPTEMBER					
	22 42	88 12	130	27	1009.6
	23 0	89 6	160	25	1008.6
GULFASAL	23 18	92 18	160	28	1002.4
DEL SOL	24 0	87 0	110	30	1010.6
IRIS	24 0	95 54	270	40	997.6
ALMIRANTE	24 30	87 0	160	20	1012.6
SCHROEDER	24 30	88 42	170	28	1008.7
ENSINCLAIR	24 30	93 18	200	65	999.9
	24 36	87 18	140	28	1012.2
J LOUIS	24 42	89 36	170	33	1008.1
	25 0	89 30	150	45	1006.4
NOMAD	25 0	90 0	150	43	973.9
BALAO	25 12	91 6	150	50	1001.6
ALLOBROGIA	25 24	96 30	300	45	995.1
DEGANYA	25 30	87 54	160	34	1009.3
TILLAMOOK	25 36	88 42	160	35	1007.6
ML GOSNEY	26 0	88 48	160	30	1007.6
MOBIL LUBE	26 24	87 18	150	30	1010.8
	26 24	89 48	140	40	1000.3
	26 30	87 6	140	22	1011.9
	27 12	89 42	160	24	1009.1
	27 18	89 12	140	30	1011.9
ACHILLES	27 18	89 12	140	40	1007.1
ATL NAVIG	27 18	89 30	150	35	1007.1
DEL ORO	27 24	89 54	170	25	1011.2
ESSONNEWARK	27 30	89 36	170	35	1008.1
AMERICASUN	27 36	89 0	190	25	1008.8

Table A.6--(continued)

SHIP IDENT	LAT		LONG		WIND		PRESSURE (MB)
					DIR (DEG)	SPD (KT)	
1200CST 10TH SEPTEMBER							
GULFCREST	27	36	89	36	150	40	1006.4
MOBILPOWER	23	0	89	18	150	30	1009.1
CRISTOBAL	23	12	88	30	150	30	1010.2
LEADER	23	24	93	13	110	70	989.6
1500CST 10TH SEPTEMBER							
HIYEHARUNR	22	18	87	24	140	20	1008.6
LEONHARDT	22	48	92	12	180	37	1001.8
TEXACO FLA	24	12	88	48	170	40	1006.4
HARSINAI	25	12	90	0	150	30	1004.6
JE DYER	25	54	88	6	150	30	1008.6
ML GOSNEY	26	12	89	12	150	35	1007.1
ESSO BOSTON	26	24	87	30	150	27	1010.8
LEADER	28	24	93	30	110	70	986.6
1800CST 10TH SEPTEMBER							
MOBILPOWER	20	6	90	12	150	33	1006.8
ALLOBROGIA	22	12	97	42	140	15	1001.1
LEONHARDT	23	0	91	42	190	30	1003.1
GULFASAL	23	36	90	42	150	21	1004.7
IRIS	23	42	94	36	250	35	998.6
ENSINCLAIR	24	24	91	42	230	50	1002.4
BALAO	24	48	91	24	150	45	1001.6
TEXACOMONT	24	48	93	36	230	60	993.6
J LOUIS	25	18	89	54	170	9	1007.1
ALLOBROGIA	25	30	96	6	260	46	990.6
ATL NAVIG	27	42	90	0	150	35	1007.1
ESSONNEWARK	27	42	90	24	150	38	1006.8
GULFCREST	28	0	90	36	150	40	1004.1
LEADER	28	24	93	30	110	75	980.7
2100CST 10TH SEPTEMBER							
IRIS	23	18	94	30	240	27	1001.4
SSOVERO	24	42	91	6	130	37	1006.6
ALLOBROGIA	25	24	95	48	210	40	993.6
DAON	25	30	90	18	140	28	1006.2
SSOVERO	24	42	91	6	130	37	1006.6
0000CST 11TH SEPTEMBER							
ENSINCLAIR	24	36	91	0	150	35	1005.8
BALAO	25	0	91	36	130	40	1003.6
SSOVERO	25	6	90	48	100	30	1007.2

Table A.6--(continued)

SHIP IDENT	LAT		LONG		WIND		PRESSURE (MB)
					DIR (DEG)	SPD (KT)	
0000CST 11TH SEPTEMBER							
ALLOBROGIA	25	18	95	30	210	40	996.6
TILLAMOOK	26	36	90	12	140	30	1006.4
GULFCREST	27	54	90	36	160	40	1005.4
ATL NAVIG	28	12	90	54	140	30	1007.6
MOBILPOWER	28	18	91	6	140	33	1007.1
0300CST 11TH SEPTEMBER							
NOON	23	54	93	48	190	32	1000.1
0600CST 11TH SEPTEMBER							
SS TOTECO	29	30	96	36	140	15	1000.7
HARSINAI	25	0	90	0	140	30	1006.6
BALAO	25	48	92	19	150	45	1001.6
TILLAMOOK	27	0	90	48	170	35	1005.8
ML GOSNEY	27	54	90	12	130	35	1007.6
ESSONNEWARK	28	0	91	42	160	42	1005.8
GULFCREST	23	12	90	42	130	40	1006.4
MOBILPOWER	28	36	92	0	140	35	1004.1
0900CST 11TH SEPTEMBER							
SCHROEDER	27	24	90	42	140	30	1007.6
ALOHASTATE	27	24	91	0	160	28	1007.1
ML GOSNEY	27	48	90	12	140	30	1007.8
1200CST 11TH SEPTEMBER							
NOMAD	25	0	90	0	140	43	978.7
J LOUIS	26	0	91	6	140	32	1003.1
BALAO	26	12	93	12	150	50	1001.6
	27	30	90	0	140	22	1008.8
ALOHASTATE	27	36	91	24	160	33	1007.1
ML GOSNEY	27	42	90	12	140	30	1007.8
TILLAMOOK	27	42	91	24	130	37	1007.1
SCHROEDER	23	0	91	0	140	32	1007.1
AMERICASUN	23	0	91	42	140	25	1006.4
ESSONNEWARK	23	18	92	18	170	38	1005.1
GULFCREST	23	24	91	24	160	33	1005.4
MOBILPOWER	23	48	92	30	140	40	1003.4

Table A.6--(continued)

SHIP IDENT	LAT	LONG	WIND DIR (DEG)	SPD (KT)	PRESSURE (MB)
1500CST 11TH SEPTEMBER					
IRIS	24 18	92 12	150	24	1002.4
TUTTLE	25 30	92 48	150	25	1004.1
1800CST 11TH SEPTEMBER					
IRIS	25 18	91 24	150	22	1003.4
ATLANTICLN	25 36	90 0	130	45	1008.1
SYLVALYKES	25 42	90 24	140	30	1006.8
	26 0	90 0	150	25	1010.2
J LOUIS	26 6	91 42	270	8	1005.6
HARSINAI	26 30	90 54	150	35	1006.6
AL E WATTS	27 36	90 24	140	35	1008.1
BALAO	27 36	92 18	150	50	1001.6
DIAN	28 0	91 30	140	36	1004.1
GULFCREST	28 6	91 36	150	40	1004.7
TILLAMOOK	28 12	92 6	150	40	1005.1
LEADER	28 12	94 12	170	65	994.1
ESSONEWARK	28 18	92 18	150	34	1005.1
MOBILPOWER	28 36	92 6	150	40	1003.4
0000CST 12TH SEPTEMBER					
ATLANTICLN	25 42	90 48	140	30	1008.1
SYLVALYKES	26 18	91 6	140	33	1007.1
ESSO LINA	27 24	90 0	150	27	1010.2
BALAO	27 48	91 30	150	50	1001.6
GULFCREST	27 48	91 48	150	35	1005.8
ML GOSNEY	27 54	91 30	150	30	1007.6
ACHILLES	28 0	91 36	150	30	1007.8
MOBILPOWER	28 36	92 12	140	30	1007.1
TILLAMOOK	28 42	93 12	130	42	1003.1
ESSONEWARK	28 42	93 36	150	40	1003.7
0600CST 12TH SEPTEMBER					
MAMOS	25 0	90 0	140	43	979.2
NOON	25 48	92 42	150	23	1004.4
SYLVALYKES	27 18	92 12	150	33	1006.1
ESSO LINA	27 48	91 0	150	35	1008.6
TILLAMOOK	28 0	93 54	150	40	1001.1
MOBIL OIL	28 12	91 18	150	23	1009.1
ML GOSNEY	28 18	92 30	150	35	1006.1
AL E WATTS	28 24	92 6	150	40	1005.1
GULFCREST	28 36	92 30	150	35	1007.1
ACHILLES	28 36	93 18	170	36	1003.7

Table A.6--(concluded)

SHIP IDENT	LAT		LO G		WIND DIR SPD (DEG) (KT)		PRESSURE (MB)
1200CST 12TH SEPTEMBER							
ATLANTICLN	26	12	93	48	140	22	1006.4
	27	48	90	42	140	32	1009.1
ESSO LINA	28	0	91	18	160	35	1010.2
ML GOSNEY	28	30	92	54	160	35	1006.4
GULFCREST	29	0	92	54	160	30	1005.8
MOBIL OIL	29	18	92	36	150	27	1008.1

1. The first part of the document discusses the importance of maintaining accurate records. It emphasizes that proper record-keeping is essential for ensuring the integrity and reliability of the data collected. This section also outlines the various methods used to collect and analyze the data, highlighting the challenges faced during the process.

2. The second part of the document focuses on the results of the study. It presents a detailed analysis of the data, showing the trends and patterns observed. The findings indicate that there is a significant correlation between the variables studied, which supports the hypothesis of the research.

3. The third part of the document discusses the implications of the study. It explores the potential applications of the findings and the limitations of the research. The authors conclude that the study provides valuable insights into the subject matter and suggests further research to be conducted in this area.

4. The final part of the document provides a summary of the key points discussed. It reiterates the importance of the study and the need for continued research in this field. The authors express their gratitude to the funding agencies and the participants who made the study possible.

5. The document concludes with a list of references and a bibliography. It includes citations to the works of other researchers in the field, as well as the sources of the data used in the study. The references are listed in alphabetical order and provide a comprehensive overview of the literature related to the study.

6. The document also includes a section on the acknowledgments, where the authors thank the individuals and organizations that provided support and assistance throughout the study. This section is a testament to the collaborative nature of the research process and the contributions of all involved.

7. Finally, the document includes a section on the contact information for the authors. This section provides the names, addresses, and phone numbers of the researchers, allowing for further communication and collaboration. It is a key element of the document that facilitates the dissemination of knowledge and the advancement of the field.



(Continued from inside front cover)

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