

# 10400

Diagram No. 1117-2

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SERVICE

## DESCRIPTIVE REPORT

Type of Survey ... Hydrographic/Side Scan Sonar

Field No. .... WH-10-3-91

Registry No. .... H-10400

### LOCALITY

State ..... Texas

General Locality ... Gulf of Mexico

Sublocality ..... 13 NM East Southeast

..... of Port Aransas

.....  
19 91

CHIEF OF PARTY

..... CDR R.P. Floyd

### LIBRARY & ARCHIVES

DATE ..... August 27, 1993

☆ U.S. GOV. PRINTING OFFICE: 1987-756-980

# 10400

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7-3  
7-07  
300  
411

HYDROGRAPHIC TITLE SHEET

H-10400

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

WH-10-03-91

State TEXAS

General locality GULF OF MEXICO

Locality 13 NM EAST SOUTHEAST OF PORT ARANSAS, TEXAS

Scale 1:20,000 Date of Survey Aug. 14 - Nov. 7, 1991

Instructions dated May 28, 1991 Project No. OPR-K220-WH-91

Vessel NOAA Ship WHITING S-329 EDP # 2930

Chief of party Commander Richard P. Floyd

*R. Floyd, B. Greenawalt, N. Crews, R. Fletcher, K. McNitt, K. Taggart*

Surveyed by D. Bixby, E. Berkowitz, J. Seitz, F. Cruz, E. Myers, R. Harris

Soundings taken by echo sounder DSF 6000N

Graphic record scaled by WHITING survey personnel

Graphic record checked by WHITING survey personnel

Protracted by N/A Automated plot by HP 7959B, Bruning (FIELD)

*XYMETRICS RØI PLOTTER (AHS)*

Verification by ATLANTIC HYDROGRAPHIC SECTION PERSONNEL

Soundings in MLLW Meters

REMARKS: Change No. 1 dated August 23, 1991

Change No. 2 dated October 1, 1991

Surveyed by 1:20,000-scale standards, plotted at 1:10,000

Field number erroneously indicates 1:10,000 survey

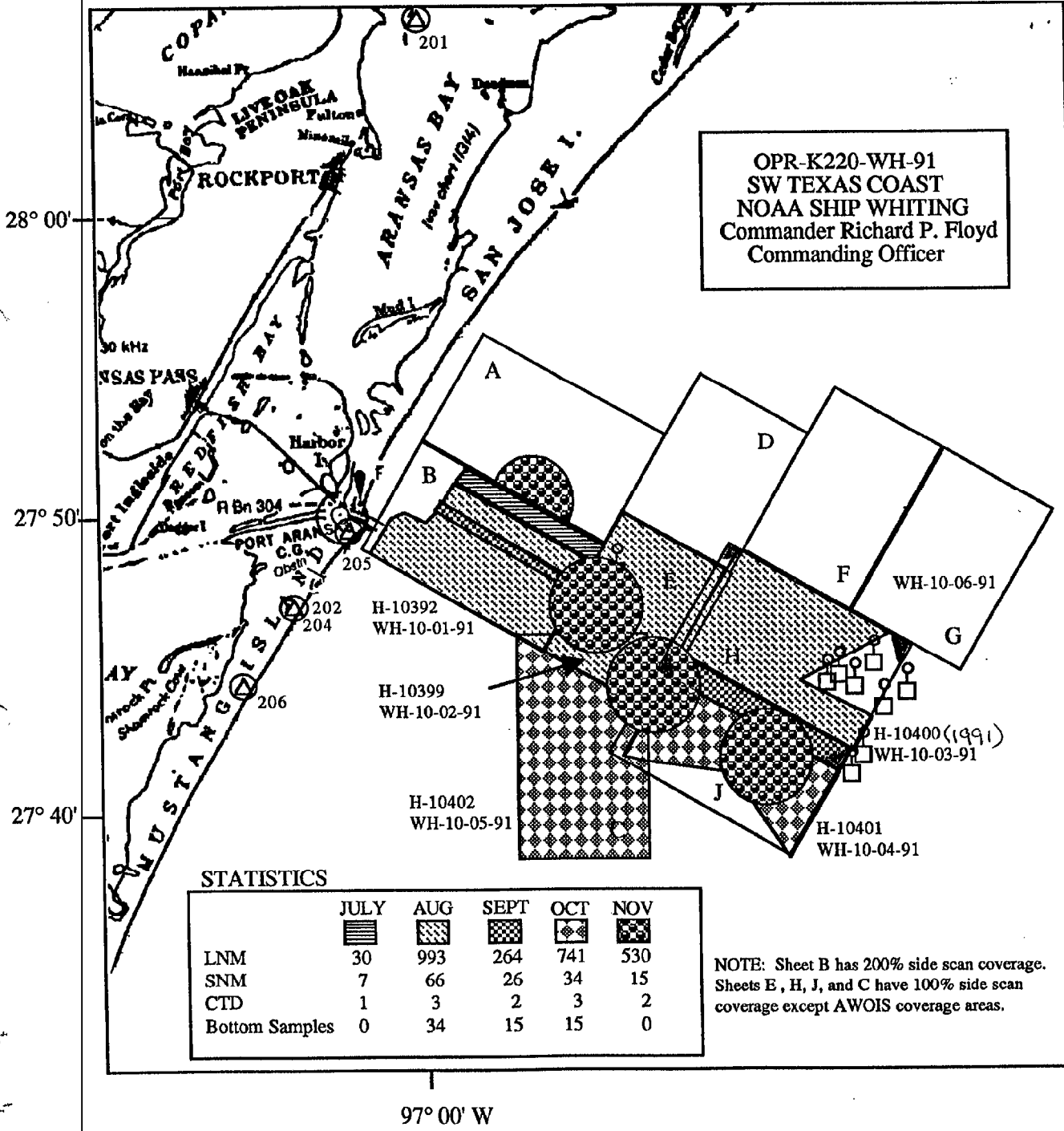
Junctions with H-10399 and H-10401

NOTES IN THE DESCRIPTIVE REPORT WERE MADE DURING OFFICE PROCESSING.

*AWOIS/SURFV 9/14/93 55*

*RWW 8/8/94*

# PROGRESS SKETCH NOAA SHIP WHITING NOVEMBER 1991



DESCRIPTIVE REPORT TO ACCOMPANY  
HYDROGRAPHIC SURVEY  
OPR-K220-WH  
FIELD NUMBER WH-10-03-91  
REGISTRY NUMBER H-10400  
NOAA SHIP WHITING

Cdr. Richard P. Floyd, Commanding Officer

A. PROJECT

Project OPR-K220-WH is a basic hydrographic survey with side scan sonar (SSS) bottom coverage of the approaches to Corpus Christi, Texas. The survey was required for maintenance and revision of existing nautical charts.

The survey area is of interest because Port Ingleside, on the north shore of Corpus Christi Bay, is being planned as a major strategic home port for the United States Navy. The area also supports a significant sport and commercial fishing industry.

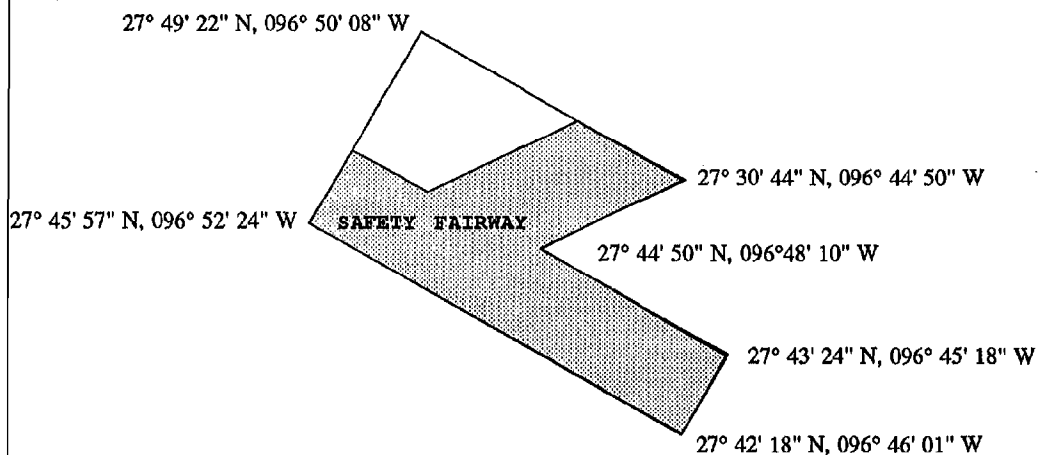
Survey operations were conducted in accordance with the May 28, 1991 Hydrographic Project Instructions OPR-K220-WH, S.W. Texas Coast, Texas. Change Number 1 to these instructions (August 14, 1991) approved WHITING's proposed sheet layout and reduced the required SSS bottom coverage to 100% in water depths greater than 20 meters. Change Number 2 (October 1, 1991) required observation of a new LORAN-C chain in the Gulf of Mexico.

Project OPR-K220-WH was divided into nine survey sheets, five of which were completed during WHITING's 1991 field season. The survey described in this report was designated as "H" Sheet and assigned field sheet number WH-10-03-91 and registry number H-10400.

B. AREA SURVEYED

The center of survey H-10400 lies approximately 13 nautical miles east southeast of Port Aransas Texas, encompassing a portion of the safety fairway and the Aransas Pass anchorage.

The survey area was bound by the following limits:



Survey operations began on August 14, 1991, day of year (DOY) 226, and ended on November 7, 1991 (DOY 311). Survey operations on "H" sheet were sporadic due to rough weather, equipment failures, operations on other sheets, and scheduled inports. Data were acquired on the following days:

<u>Gregorian Date:</u>	<u>DOY:</u>
14 August	226
26-30 August	238-242
12 September	255
19 September	262
23 September	266
5 October	278
22-23 October	295-296
7 November	311

#### C. SURVEY VESSEL

NOAA ship WHITING, vessel identification number 2930, was the platform for all data acquisition during survey H-10400.

#### D. AUTOMATED DATA ACQUISITION AND PROCESSING

The Hydrographic Data Acquisition and Processing System (HDAPS) was used to collect and process data for survey H-10400. A listing of the program titles and version numbers can be found in Appendix VII. DATA FILED WITH FIELD RECORDS.

Program NADCON (version 1.01 for IBM compatible computer) calculated the datum shift from the North American Datum (NAD) of 1983 to NAD 27 for comparisons with prior surveys.

Program CALIB (version 2.0 for MicroVax computer) recomputed ARGO partial lane correctors using Falcon Mini-Ranger ranges and ARGO rates recorded during the original calibrations. Recomputation of the partial correctors was necessary due to a position error in two of the Mini-Ranger stations.

The HDAPS program RECOMP (version 1.04) used the recomputed ARGO partial lane correctors to recalculate hydrographic positions of data acquired from DOY 238 to DOY 262.

The HDAPS program POINT (version 2.03) used the recomputed ARGO partial lane correctors to recalculate bottom sample positions.

Sound velocity corrections were determined using version 1.0 of program CAT and version 1.11A of program VELOCITY.

#### E. SIDE SCAN SONAR EQUIPMENT

Data acquisition involved towing an EG&G model 272-T dual-channel SSS towfish astern of WHITING at a speed of 5 to 6 knots. The operating frequency of the SSS was 100 KHz and the range scale was 100 meters to both port and starboard, resulting in a 200-meter swath width. One of two interchangeable EG&G model 260 image correcting SSS recorders received data from the towfish and created a continuous sonagram of the bottom. Recorders were exchanged frequently to minimize the interruption of survey operations for maintenance. The following table lists the serial numbers and dates of use for all SSS equipment aboard WHITING:

<u>Type</u>	<u>S/N</u>	<u>DOY</u>
Towfish	011901	262, 266
Towfish	011904	238, 239, 240, 241, 242, 255, 266, 267, 295, 296, 311
260 Recorder	0012102	238, 239, 240, 241, 262, 266, 267, 295, 311
260 Recorder	0012106	241, 242, 255, 295, 296

Sounding lines were originally offset by 175 meters to obtain 100% bottom coverage. On DOY 241 WHITING reduced the line spacing to 165 meters to eliminate holidays caused by steering errors. Splits were run through areas where the outer side scan trace was questionable and over holidays caused by imperfect steering.

WHITING achieved 100% coverage of the bottom throughout the survey, with 200% coverage for contact investigations and for investigation of an Automated Wreck and Obstruction Information (AWOIS) item.

Confidence checks confirmed the reliability and range of the side scan trace. A trench across the southeastern portion of the sheet provided sonar returns for the majority of the confidence checks of survey H-10400. Other confidence checks were made by towing the SSS fish between 80 and 100 meters off a buoy. A minimum of two confidence checks were acquired during each day of survey operations.

Sonargrams were thoroughly examined by WHITING personnel. Data were rejected if the background trace threatened to obscure possible returns. The HDAPS Contact Utility Program used measurements of contacts to compute their locations and true heights off the bottom. Contacts were considered significant if they had a height of at least 10% of the water depth or a notable shape or pattern. WHITING ran additional lines normal to the main-scheme lines for contacts which warranted further investigation, excluding one, which was not investigated further due to time limitations. Recommendations for future development are included in Section N.

#### F. SOUNDING EQUIPMENT

A Raytheon Digital Survey Fathometer (DSF, s/n A111N) 6000N echo sounder produced an analog record of low frequency (24 KHz) and high frequency (100 KHz) depths, which were digitized and then recorded by the HDAPS acquisition system. Echograms were carefully reviewed for significant features directly beneath the SSS towfish, none of which were found.

Electronics technicians performed daily accuracy tests and preventive maintenance of the DSF 6000N for assurance of data quality.

#### G. CORRECTIONS TO SOUNDINGS

Sound velocity profiles of the water column were determined using a Seacat Conductivity, Temperature and Depth (CTD) profiler (model SBE-19, s/n 286). The profiler was calibrated on DOY 024 during WHITING's winter inport. Calibration coefficients were applied via program VELOCITY and can be found in the calibration folder submitted with this survey.

The CTD, mounted on a rosette, was lowered through the water column. Program VELOCITY processed the data, selected significant data points, and created a corrector table which was then manually entered into an HDAPS velocity table. The corrections were applied to soundings either on-line or in post processing. Cast data are included in Separate IV. DATA FILED WITH FIELD RECORDS.

Data Quality Assurance (DQA) for the Seacat was performed by using a salt water hydrometer and a thermometer to determine the density

of a surface water sample taken during the CTD cast. The Seacat program CAT compared these values to the CTD surface values and confirmed that the velocity probe was working properly.

A summary of sound velocity casts follows:

DOY	Vel. Table#	Latitude	Longitude	Depth
232 <sup>218</sup>	3 <sup>2</sup>	27°48'05" N	96°53'54" W	24.0 m
238	4	27°45'59" N	96°44'22" W	29.4 m
252	5	27°45'06" N	96°44'54" W	29.5 m
261 <sup>276</sup>	6	27°45'09" N	96°45'06" W	35.3 m
289	8	27°45'06" N	96°44'54" W	30.3 m
306	9	27°49'09" N	96°48'21" W	39.2 m

Settlement and Squat correctors were determined on DOY 217 in Corpus Christi Channel, Cut "A" range by making several runs with the ship at various speeds past an observer. The observer recorded level readings of a stadia rod on the ship during each pass and at-rest readings between runs to eliminate tidal affects. Average correctors were determined for various ship speeds and entered into an HDAPS offset table. Relevant data are included in Separate IV. DATA FILED WITH FIELD RECORDS.

The HDAPS data acquisition computer received data from a Heave, Roll, and Pitch sensor (HIPPIY, s/n 19109-C), and corrected soundings for vessel heave.

Tidal datum for project OPR-K220-WH was mean lower low water. Predicted tides from NOAA Tide Tables, Galveston, Texas (station number 877-1450) were used as a reference for this project. The operating tide stations at Corpus Christi, Texas (877-5870) and Fort Isabel, Texas (877-9770) will be used as control for datum determination. Mr. Larry Nieson of the Atlantic Operations Group (N/OMA1213) confirmed the proper operation of the stations during the survey. Time and height correctors for the project were as follows:

	<u>Time Correction:</u>	<u>Height Ratio:</u>
High Water:	-1 hr 30 min	x1.28
Low Water:	-1 hr 30 min	x1.28

Contours of the preliminary sounding plots revealed discrepancies of up to 0.6 meter between survey lines and splits. The contours are expected to "smooth out" after application of actual tides; however, the effect of steady winds on coastal tides may differ from the effect on the tide gauge, which is located well inshore at the head of Corpus Christi Bay. APPROVED TIDES APPLIED DURING OFFICE PROCESSING.

Attempted depth comparisons between the DSF 6000N and a calibrated leadline were unsuccessful due to difficulties measuring the leadline depth over an extremely soft bottom.



Excellent agreement was found between water depth determined by the DSF 6000N and that of a 3D Instruments pneumatic depth gauge (s/n 138921-30). The following observations were recorded simultaneously on DOY 301 while WHITING was moored alongside the Naval Station Ingleside pier:

<u>pneumatic gauge</u>	<u>DSF 6000N</u>
47.4 ft	11.2 m
47.6 ft	11.2 m
47.5 ft	11.2 m
47.4 ft	11.2 m
47.4 ft	11.2 m
47.4 ft	11.2 m
47.4 ft	11.2 m
47.4 ft	11.2 m
47.4 ft	11.1 m
47.4 ft	11.2 m
Average depth = 47.4 ft	11.2 m
<u>x.3048 m/ft</u>	<u>+3.2 m</u> (WHITING draft)
=14.4 m	=14.4 m

The correction for WHITING's static draft was 3.2 meters, a historical value which WHITING divers confirmed by the pneumatic depth gauge on DOY 301. The Transducer Depth Determination Report is included in Separate IV.\*

The pneumatic gauge was calibrated on DOY 058. Systems checks were completed in accordance with Hydrographic Survey Guideline number 55. These data are included in the Transducer Depth Determination Report.\*

Sounding corrections were applied in post processing to the high frequency depths of the DSF 6000N.

H. CONTROL STATIONS SEE ALSO SECTION 2.9. OF THE EVALUATION REPORT.

All geodetic positions were referenced to NAD 83.

Six horizontal control stations were used during survey H-10400: three occupied by Falcon Mini-Ranger receiver/transponders (RT's), and three occupied by Automatic Ranging and Grid Overlay (ARGO) towers. Geographic positions (GP's) of the occupied stations were verified to third-order, class I standards. Station descriptions and GP's are included in Appendix III.\*

Two of the control stations were located on water tanks. Offsets were computed from the center of the tanks to the rail where the Mini-Ranger RT was secured. The original measurements did not adhere to 3rd order class I standards. Offset positions were re-surveyed to 3rd order class I standards in early September, and \* DATA FILED WITH FIELD RECORDS.

the following errors were noted:

Port Aransas Tank Eccentric (station 205)  
Erroneous position: 27° 49' 47.531" N    097° 03' 49.421" W  
Corrected Position: 27° 49' 47.566" N    097° 03' 49.371" W  
Error: 1.7 meters                                 7                                 φ

Port Aransas Mustang Tank Eccentric (station 206)  
Erroneous position: 27° 45' 06.430" N    097° 07' 29.160" W  
Corrected position: 27° 45' 06.889" N    097° 07' 28.929" W  
Error: 15.34 meters                                 6                                 3

These position errors affect ARGO calibrations conducted on or before DOY 262. The calibrations and their subsequent hydrographic positions were corrected before submission of this survey.

I. HYDROGRAPHIC POSITION CONTROL SEE ALSO SECTION 2.4. OF THE EVALUATION REPORT.

The DM-54 ARGO system, operated in the range-range mode, was the primary positioning system used during survey H-10400. The Falcon Mini-Ranger 484 short range positioning system was used to calibrate the ARGO stations. A hybrid mix of the two was used occasionally during data acquisition.

ARGO positioning equipment included the following components:

<u>Station</u>	<u>RPU</u>	<u>ALU</u>
WHITING	R1083662	C1083309
Goose (201)	R047844	A047853
Sharkys (202)	R0680312	A047858
Mata (203) (before DOY 233)	R1085755	A0783640
Mata (203) (after DOY 233)	R0682566	A0980304

Problems were experienced with station 203, resulting in the replacement of the range processing unit (RPU), antenna loading unit, and power supply on DOY 233.

The Falcon Mini-Ranger network consisted of the shipboard RPU (s/n D0004) and an RT (s/n E2960) as well as the three shore based RT's:

<u>Station</u>	<u>Code</u>	<u>Serial #</u>
204	7	E2917
205	A	G2571
206	C	F3296

Mini-Ranger baseline calibrations were performed on DOY 212 and 214 at the Naval Station Ingleside, Texas, in accordance with AMC OPORDER 86 and the Field Procedures Manual 3.1.3.2. The "true" baseline distance was measured with a Hewlett Packard model 3810B

Electronic Distance Measuring Instrument (s/n 1929A00355). HDAPS recorded and processed Mini-Ranger range data across the baseline, and correctors for each combination of RT and RPU were entered into an HDAPS C-O (corrected minus observed) table before survey operations began. An abstract of baseline calibration correctors can be found in Separate III. DATA FILED WITH FIELD RECORDS.

Ship positions were computed by the intersection of multiple lines of position (LOP's) from the shore-based stations. Positioning busts appeared on the track plot as fliers. If reliable positions existed on both sides of the flier, the questionable position was "smoothed" during post processing. Formal documentation of daily critical and noncritical systems checks was unnecessary; the HDAPS on-line computer screen included a graphic display of position geometry, residuals, and radius of the 95% error circle (ECR). The residual and ECR were recorded for each selected sounding. Survey data were plotted at a scale of 1:10,000, but collected to 1:20,000-scale accuracy standards. Persistent ECR's greater than 30 meters or residuals greater than 10 meters were cause for data rejection.

Flooding during unusually high tides in late September caused ARGO station GOOSE to drop off the air. This forced WHITING to run with only two lines of position (LOP's) on the following days:

<u>DOY</u>	<u>Fix #'s</u>
266	1798 - 1809
267	1810 - 1816

The closing calibration conducted on September 24, 1991 (DOY 267) at 1200Z, differed by 24 meters from the opening calibration conducted on September 23, 1991 (DOY 266) at 1956Z. The difference normally should not exceed 10 meters. All of this data was acquired as splits simply to insure 100% SSS coverage. WHITING obtained verbal approval from Commander Christopher Lawrence, Chief Atlantic Hydrographic Section, to accept the data and apply average correctors (average of opening and closing calibrations). The data (fix numbers 1798 to 1816) were repositioned with average correctors using the HDAPS program RECOMP. Output listings from program RECOMP are included with the survey data.

ARGO signals were calibrated at the beginning of each survey leg and whenever the maximum residuals persistently exceeded the tolerance of 0.5 mm at the scale of the survey. The HDAPS primary verses secondary method was used for calibration. The ship was positioned at the calibration site using Falcon as the primary positioning system and the ARGO stations as the secondary system. The HDAPS system provided a comparison of the Falcon position with each ARGO station. The ARGO whole and partial lane correctors for each station were displayed on the computer screen. Ten comparisons were obtained by performing a screen dump when the

Falcon maximum residuals were less than 10 meters and the signal strengths were greater than 15. The ARGO whole and partial lane correctors were averaged for the ten observations and applied using the delta range function in the ARGO control display unit.

The ARGO calibrations affected by erroneous positioning of Mini-Ranger stations described in Section H were recomputed off-line via the MicroVax program CALIB. New ARGO partial correctors were computed and the affected survey data were repositioned using HDAPS programs RECOMP or POINT. Commander Christopher Lawrence granted verbal approval to perform the position recomputation. A summary of the original and recomputed ARGO partial lane correctors can be found in Separate IV.\* Listings from programs RECOMP and POINT are also included with the survey data.

A side effect of the position recomputation was a general increase in the residuals when compared to the data collected on-line. Program RECOMP calculated the best position possible using the Houtonbous algorithm, but only a portion of the data available on-line is logged. After recomputation, the residuals in some areas exceeded the tolerance of 0.5mm at the scale of the survey, due to fewer data being used in the calculation of residuals. This is not necessarily an indication of less accurate positions.

Offsets for positioning and survey equipment on the WHITING were obtained from historical data and verified before the start of survey H-10400, then entered into the HDAPS offset table. A diagram and table of offsets is included in Separate III.\*

J. SHORELINE SEE SECTION 2.B. OF THE EVALUATION REPORT

Not applicable; no shoreline was present in the survey area.

K. CROSSLINES SEE ALSO SECTION 3.A. OF THE EVALUATION REPORT.

A total of 13.9 nautical miles of crosslines were surveyed on H-10400, equalling 5.4% of main-scheme lines; prior to development. Crosslines equalled 4.0% of survey lines upon completion of all splits and investigations. The 174 sounding comparisons showed superlative agreement, well within Hydrographic Manual guidelines. The average difference between crossline and main-scheme soundings was 0.0 meter. The standard deviation was 0.1 meter. No sounding comparisons exceeded 0.4 meter.

L. JUNCTIONS SEE ALSO SECTION 5. OF THE EVALUATION REPORT.

The western edge of survey H-10400 junctioned with the contemporary WHITING survey H-10399, "E" sheet. Both surveys had 100% SSS coverage. Depth curves at the junction showed excellent agreement between soundings. H-10400 averaged 0.1 meter deeper than H-10399.

\* DATA FILED WITH FIELD RECORDS.

The southern edge of survey H-10400 junctioned with the contemporary WHITING survey H-10401, "J" sheet. Both surveys had 100% SSS coverage. Depth curves at the junction showed excellent agreement between soundings. H-10400 averaged 0.1 meter shallower than H-10401.

Summaries of junction comparisons can be found in the supplemental data cahier submitted with this survey.

M. COMPARISONS WITH PRIOR SURVEYS SEE ALSO SECTION 6. OF THE EVALUATION REPORT.

Soundings were compared with two prior surveys. Both prior surveys were referenced to NAD 27. For comparison purposes, a datum shift was applied to H-10400 in accordance with the Field Procedures Manual for Hydrographic Surveying.

Survey H-6402, scale 1:40,000, was completed in 1938 with Mean Low Water being the tidal datum. This survey encompassed all of the area surveyed on H-10400. Forty-six soundings from H-6402 were compared with those from H-10400, and showed excellent agreement. The average difference between soundings was 0.3 meter with a standard deviation of 0.2 meter. The average depth difference was 1.2 percent of the average depth.

Survey D-107, scale 1:40,000, was completed in 1989 with Mean Lower Low Water being the tidal datum. This survey covered the approximate southern half of the area surveyed on H-10400. Eighteen soundings from H-10400 were compared with soundings from D-107 and showed excellent agreement. The average difference was 0.3 meter with a standard deviation of 0.2 meter. The average depth difference was 1.1 percent of the average depth.

The soundings from survey H-10400 were consistently deeper than both prior surveys, only 2 out of 64 soundings were shallower. CONCUR

The area surveyed was fairly flat. A slight slope was found with the shallowest water on the northwest end of the sheet and deepening to the southeast. This agreed with all prior surveys. CONCUR

N. COMPARISON WITH THE CHART SEE ALSO SECTION 7.9. OF THE EVALUATION REPORT.

Survey H-10400 was compared with chart 11300, 29th ed., September 29/90; scale 1:460,732. Chart 11300 covers all of H-10400 and had four soundings in the survey area. The charted soundings were found to be 0.4, 0.5, 1.1 and 1.3 meters shallower than those of H-10400. The large discrepancies can be attributed to the vast scale differences between chart 11300 and the survey.

Survey H-10400 was compared with an enlargement (1:10,000) of chart 11307, 30th ed., Nov. 12/88; scale 1:80,000. Chart 11307 covers the inshore third of H-10400 and had 11 soundings in the

survey area. All were compared and showed excellent agreement. The average difference was 0.3 meter (all soundings from H-10400 being deeper) with a standard deviation of 0.1 meter. The average depth difference was 1.2 percent of the average depth.

One platform, "PH-MU-754-A", charted at position 27°44'57" N, 096°46'07", was present on H-10400 and chart 11300. A geographic position (GP) for the platform was obtained by maneuvering WHITING near the platform and simultaneously recording WHITING's position, a visual bearing, and a radar range to the leading edge of three sides of the platform. A position (fix 1821) for the fourth edge of the platform was also recorded at this time; however, it was necessary to reject this fix due to a system error which occurred when the data file (fix numbers 1817 to 1826) was made active. The GP for each of the three passes was computed by applying the DIRECT function of program NAVUTL (version 6.0, March 22, 1989). The INVERSE function of program NAVUTL was applied to the two opposing positions to determine the width of the platform. This distance was then divided in half and added to the three radar ranges to attain the true measurement to the center of the platform. The DIRECT function was then applied using these ranges to compute a position for the center of the platform. The average of these three positions differed from the charted position by 37 meters, 0.08 mm at the scale of the chart. WHITING recommends that no change be made to the charted position. The platform positioning data is included in the supplemental cahier submitted with this survey. CONCUR SEE ALSO SECTION I.D. OF THE EVALUATION REPORT.

The east northeast portion of the search radius for AWOIS item 7906\* (unnamed 28-ft pleasure craft reported to have burned to the water line and sunk in the vicinity of 27°45' N, 96°50' W) extends into the southwest corner of H-10400. This area was investigated with 200% SSS coverage. No significant contacts were identified. The search radius also falls on contemporary WHITING surveys H-10399, H-10401, and H-10402. A chart recommendation will be made when H-10399 is submitted. CONCUR  
\* A CHARTED NON-DANGEROUS SUNKEN WRECK, PA,

The northeast portion of the search radius for AWOIS item 4155\*\* (INEZ G, fishing vessel reported sunk at approximate position 27° 43' N, 096° 50' W) extends into the southern edge of H-10400. No contacts were identified from the initial 100% SSS coverage. WHITING acquired the second 100% SSS coverage for this AWOIS item in conjunction with survey H-10401. No significant contacts were identified. WHITING recommends that the non-dangerous wreck charted for this item be removed from chart 11300. CONCUR  
\*\* A CHARTED NON-DANGEROUS SUNKEN WRECK, PA,

WHITING recommends further investigation of contact 2281.26 at position 27°45'37.8" N, 096°46'39.8" W. This position is just to the east of the safety fairway. The contact has a distinct, irregular shadow with a computed height of 8.0 meters in 28 meters of water. A Danger to Navigation Report will be submitted for this contact. SEE ALSO SECTION 7.9. OF THE EVALUATION REPORT.

WHITING found 27 SSS contacts within the survey area. One contact, described above, is recommended for further investigation. CONCUR

O. ADEQUACY OF SURVEY SEE ALSO SECTION 9. OF THE EVALUATION REPORT.

This survey is a complete basic hydrographic survey, adequate to supersede prior surveys of the area. No part of this survey is considered to be substandard.

P. AIDS TO NAVIGATION

No fixed or floating aids to navigation existed within the survey limits of H-10400. One platform exists, as previously mentioned.

Q. STATISTICS

Number of Positions.....	2448
Nautical Miles of Main-scheme Sounding Lines.....	349
Nautical Miles of Crossline Sounding Lines.....	14
Square Nautical Miles Surveyed.....	20
Days of Production.....	7
Detached Positions.....	1
Bottom Samples.....	18
Tide Station.....	877-1450 Galveston
Current Stations.....	0
Number of CTD Casts.....	6
Magnetic Stations.....	0

R. MISCELLANEOUS

Eighteen bottom samples from H-10400 were collected in accordance with the project instructions. All samples were submitted to the Smithsonian Institution. Documentation is included in Separate II.

Side scan sonar operations were limited to a speed of 6 knots or slower. WHITING's main engines were not designed to run for prolonged periods under such a light load, resulting in excessive engine wear and a heavy build up of oil in the exhaust piping, which increases the chance of stack fire. For this reason, WHITING suspended side scan operations twice daily to run the engines under full load. This time was used to run crosslines, repair equipment, or transit between survey areas.

S. RECOMMENDATIONS SEE ALSO SECTION 9. OF THE EVALUATION REPORT.

Some of the copies of prior surveys supplied to the WHITING were not to scale. Careful reproduction, to scale, would greatly facilitate the process of conducting comparisons with prior surveys. CONCUR

Considerable field time and logistics are involved in setting up and operating an ARGO and Falcon network. Time is spent recovering stations, establishing new control, setting up and dismantling towers, conducting calibrations, and keeping the systems operating. There is no question that use of a satellite positioning system is the most productive and cost effective solution. CONCUR

Numerous problems and suggested improvements were noted for the HDAPS system. A separate memorandum on this subject will be forwarded to the Hydrographic Surveys Branch.

T. REFERRAL TO OTHER REPORTS

The following reports have been or will be submitted as part of OPR-K220-WH.

Horizontal Control Report forwarded to N/CG244 on  
December 20, 1991.

Electronic Control Report forwarded to N/CG244 on  
December 20, 1991.

Chart Agent Visit Report forwarded to N/CG33 on  
November 17, 1991.

Chart User and Evaluation Report forwarded to N/CG243 on  
December 4, 1991.

Coast Pilot Report will be forwarded.



Submitted By:



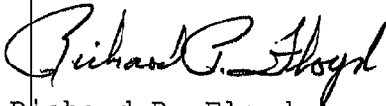
Kelly G. Taggart  
Lieutenant junior grade, NOAA  
Junior Officer

Reviewed By:



Nancy L. Crews  
Lieutenant, NOAA  
Operations Officer

Approved By:



Richard P. Floyd  
Commander, NOAA  
Commanding Officer





**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**Office of NOAA Corps Operations**  
**NOAA Ship WHITING S-329**  
**439 W. York Street**  
**Norfolk, VA 23510-1114**

February 20, 1992

Commander  
Eighth U.S. Coast Guard District  
501 Magazine  
New Orleans, LA 70130

Dear Sir:

Between August 14 and November 7, 1991, the NOAA ship WHITING conducted a hydrographic survey of the approaches to Corpus Christi Bay, Texas. The WHITING discovered an uncharted obstruction east of the safety fairway.

The obstruction was discovered with a side scan sonar system. A diver investigation has not been conducted, but measurements from the side scan record indicate the obstruction is approximately 8 meters (26.2 feet) above the bottom. The surrounding bottom is flat and approximately 28 meters (91.8 feet) deep. The approximate least depth is 20 meters (65.6 feet) at Mean Lower Low Water (MLLW). The obstruction's position is latitude 27°45'37"N, longitude 96°46'39"W.

The following chart is affected:

Chart 11300, Mississippi to Galveston  
Edition: 29th Edition, September 29, 1990  
Corrected through NM 43/91  
Horizontal Datum: NAD 83

I recommend issuing a "Notice to Mariners" for the obstruction, with an approximate least depth of 65 feet, at the following position:

<u>Latitude</u>	<u>Longitude</u>
27°45'37"N,	96°46'39"W



The information in this letter has also been forwarded to the following offices:

Director, DMAHTC, DMA  
Chief, Nautical Charting Division, NOAA  
Chief, Atlantic Hydrographic Section, NOAA

Questions concerning this report should be directed to the Chief, Atlantic Hydrographic Section, at (804)441-6746.

Sincerely,



Commander Richard W. Floyd, NOAA  
Commanding Officer

Attachments

**DANGER TO NAVIGATION REPORT**

REPORTING UNIT: NOAA Ship WHITING, S329

SURVEY REGISTRY NUMBER: H-10400 (WH-10-03-91)

SURVEY LOCALITY: STATE: Texas

GENERAL LOCALITY: Gulf of Mexico

SUBLOCALITY: 15.5 NM south southeast of  
Port Aransas, Texas

PROJECT NUMBER: OPR-K220-WH

The following was discovered during hydrographic operations

An obstruction that is in 28 meters (91.8 feet) of water at Mean Lower Low Water (MLLW). The approximate dimensions are as follows:

Height - 8 meters  
Least Depth - 20 meters (65.6 feet)

AFFECTED NAUTICAL CHART:

Chart 11300, Mississippi to Galveston

Edition: 29th Edition, September 29, 1990

Corrected through NM 43/91

Horizontal Datum: NAD 83

GEOGRAPHIC POSITION: Observed: latitude 27°45'37"N  
longitude 96°46'39"W

97

50

40

30

20

10

Chart 11313

OBSTRUCTION

SAFETY FAIRWAY

SAFETY FAIRWAY

SAFETY FAIRWAY

SAFETY FAIRWAY

SAFETY FAIRWAY

SAFETY FAIRWAY

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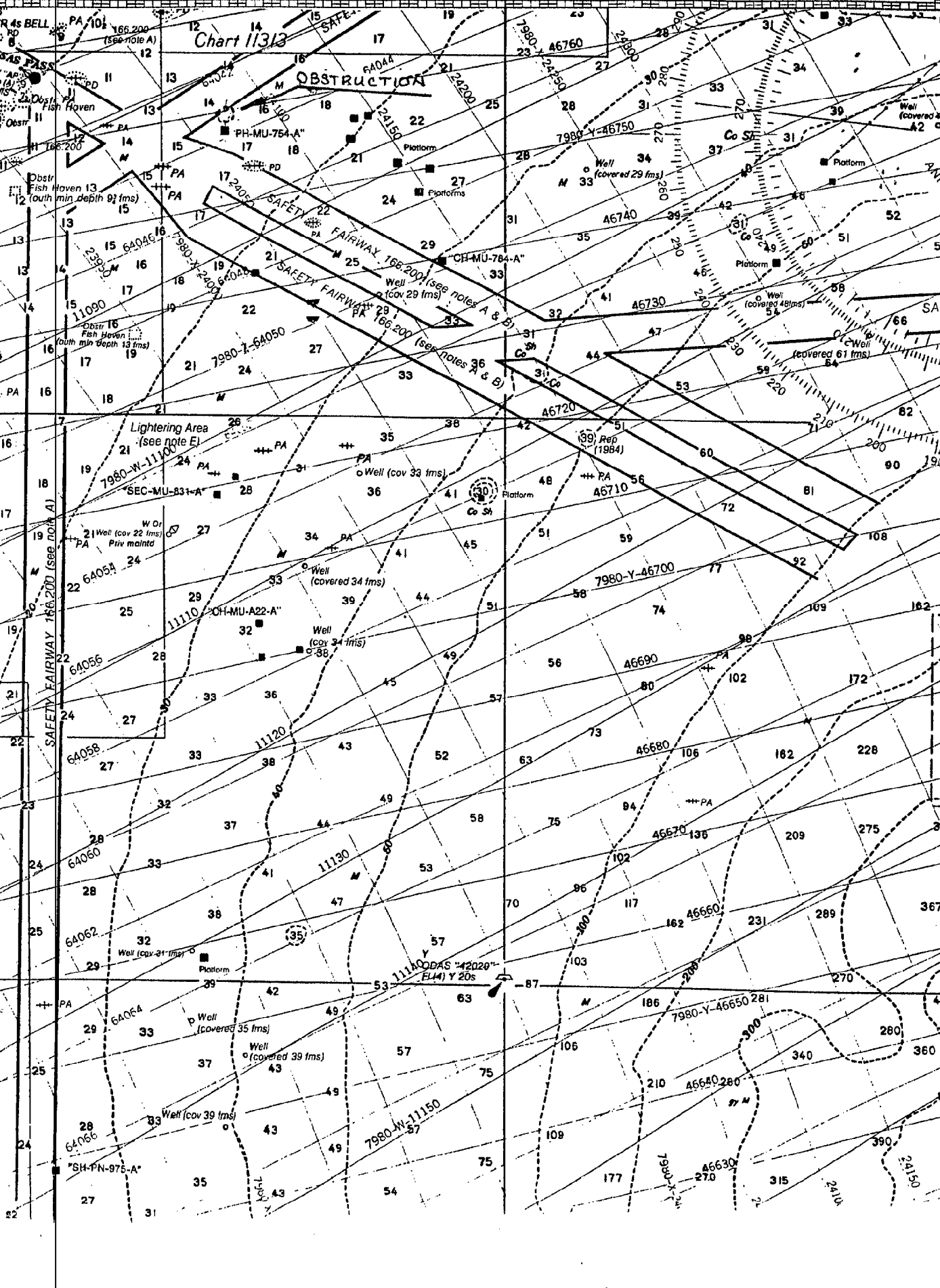
SAFETY FAIRWAY

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SAFETY FAIRWAY



APPROVAL SHEET  
HYDROGRAPHIC AND  
SIDE SCAN SONAR SURVEY  
OPR-K220-WH-91  
H-10400

This combined hydrographic and side scan sonar survey was conducted in accordance with the project instructions for OPR-K220-WH-91, the Hydrographic Manual (through change #3), AMC OPORDERS, Hydrographic Survey Guidelines (through #69), the Side Scan Sonar Manual, and the Field Procedures Manual for Hydrographic Surveying. The survey and reports were completed under daily supervision. All boat sheets and final transmitted sheets were reviewed in their entirety, and all supporting records were checked as well.

This survey is complete for the intended purposes of identifying items requiring further investigation by a different field unit.



Richard P. Floyd, Cdr., NOAA  
Commanding Officer  
NOAA Ship WHITING



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Office of Ocean and Earth Sciences  
Rockville, Maryland 20852

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE:** February 6, 1992

**MARINE CENTER:** Atlantic

**OPR:** K220-WH

**HYDROGRAPHIC SHEET:** H-10400

**LOCALITY:** Gulf of Mexico, Southwest Texas Coast

**TIME PERIOD:** August 13 - November 7, 1991

**TIDE STATION USED:** 877-5870 Corpus Christi (Bob Hall Pier), Texas  
Lat. 27° 34.8'N Lon. 97° 13.0'W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 20.58 ft.

**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 1.6 ft.

**REMARKS:** RECOMMENDED ZONING

Times and heights are direct on Corpus Christi (Bob Hall Pier), Texas (877-5870).

Note: Times are tabulated in Central Standard Time.

*for Brent H. Carr*  
CHIEF, DATUMS SECTION





GEOGRAPHIC NAMES

H-10400

Name on Survey	Source of Name											
	A	B	C	D	E	F	G	H	K			
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND McNALLY ATLAS	U.S. LIGHT LIST				
MEXICO, GULF OF (title)												1
PORT ARANSAS (title)												2
TEXAS (title)												3
												4
												5
												6
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Approved:

*Charles E. Hammett*  
Chief Geographer - N/C6283

MAR 10 1993

08/23/93

HYDROGRAPHIC SURVEY STATISTICS  
REGISTRY NUMBER: H-10400

NUMBER OF CONTROL STATIONS		6
NUMBER OF POSITIONS		2414
NUMBER OF SOUNDINGS		17000
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	77	05/22/92
VERIFICATION OF FIELD DATA	105	03/19/93
ELECTRONIC DATA PROCESSING	63	
QUALITY CONTROL CHECKS	22	
EVALUATION AND ANALYSIS	67	08/18/93
FINAL INSPECTION	5	08/17/93
TOTAL TIME	339	
ATLANTIC HYROGRAPHIC SECTION APPROVAL		08/23/93

**COAST AND GEODETIC SURVEY  
ATLANTIC HYDROGRAPHIC SECTION  
EVALUATION REPORT**

SURVEY NO.: H-10400

FIELD NO.: WH-10-3-91

Texas, Gulf Of Mexico, 13 NM East Southeast of Port Aransas

SURVEYED: 14 August through 7 November 1991

SCALE: 1:20,000

PROJECT NO.: OPR-K220-WH-91

SOUNDINGS: RAYTHEON DSF-6000N Fathometer, EG&G Model 260 Side Scan Sonar

CONTROL: CUBIC WESTERN DM-54 ARGO/MOTOROLA Falcon 484 Mini-Ranger (Range/Range)

Chief of Party.....R. P. Floyd

Surveyed by.....C. B. Greenawalt  
.....N. L. Crews  
.....R. A. Fletcher  
.....D. E. Bixby  
.....K. A. McNitt  
.....K. G. Taggart  
.....E. W. Berkowitz  
.....J. A. Seitz  
.....F. R. Cruz  
.....E. A. Myers  
.....R. L. Harris

Automated Plot by.....XYNETICS 1201 Plotter (AHS)

1. INTRODUCTION

a. This is a combined basic hydrographic/side scan sonar survey. Side scan sonar was operated simultaneously with the fathometer during survey operations. Side scan sonar contacts located by the present survey during hydrographic operations were not investigated by the present survey. In cases where the side scan sonar was used to determine the estimated depth of a feature, the item is shown on the present survey with the upper case letter 'A' in parenthesis. This note is shown on the present survey smooth sheet in proximity to the title block. See also memorandum titled, "Showing Estimated Side Scan Sonar Depths on Smooth Sheets", dated 23 February 1989, for an explanation of the note shown on the survey smooth sheet. Depths on these obstructions were estimated by scaling heights off the bottom from side scan sonar records. Positions were determined by computing offsets from the vessel's track.

b. During office processing a problem with the hydrographic position control for this project became

apparent. When two adjacent lines of hydrography provided two positions for the same contact, the positions differed by 20 to 35 meters. Contacts that were noted on one line would not be seen on adjacent lines at the anticipated location. The following situations associated with the ARGO positioning system are probable causes for the contact position irregularities.

1) The site for station MATA was on the mainland. Signal attenuation may have been created by the signal from the station first passing over a body of water, the Intracoastal Waterway, then over a barrier island, and finally back over the water. This situation may have caused resultant range errors.

2) The ground plane for station GOOSE flooded during high tide. This situation may have caused undetectable phase shifts during survey operations.

Atlantic Hydrographic Section personnel thoroughly examined the field data in order to determine the origin and magnitude of the positional error. The discrepancies exist regardless of the factors used in the algorithm used for position computations. Examination of the residuals from multiple line of position (LOP) fixes yielded no evidence of positional problems; however, there were some areas where the geometry for fix computation was poor. A positioning problem exists; however, the exact cause(s) and magnitude could not be determined.

In order to determine the applicability of this survey to the nautical chart the following specifications were considered:

▶ Section 1.2.3. of the HYDROGRAPHIC MANUAL states, "The survey scale is generally twice as large as that of the largest scale chart published or proposed for the area."

▶ PART A., Section I.1. of the International Hydrographic Bureau (1968) Special Publication 44 states, "The scale adopted should never be smaller than that of the intended chart."

▶ Section 1.B.1.5 of the International Hydrographic Organization (IHO) Special Publication No. 44, 3rd Edition, 1987, states, "The position of soundings, dangers, and all other significant features should be determined from field observations, relative to shore control, or directly using satellite positioning such that there is a 95 percent

probability that the true position, lies within a circle of radius 1.5 mm at the scale of the survey about the determined position."

Considering the specifications quoted from IHO Special Publication No. 44, the maximum allowable error for a 1:20,000 scale survey is 30 meters. Since the maximum positional discrepancy for side scan sonar contacts located by the field unit and shown on the present survey is approximately 35 meters, it is concluded that this survey does not meet the criteria for a 1:20,000 scale survey. Based on this conclusion it is felt that the survey data from this survey is suitable only for charts at scales of 1:40,000 or smaller.

c. Notes in the Descriptive Report were made in red during office processing.

## 2. CONTROL AND SHORELINE

a. Control is adequately discussed in sections H., I., and T. of the Descriptive Report.

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). Office processing of this survey is based on these values. The smooth sheet has been annotated with ticks showing the computed mean shift between the survey datum and the North American Datum of 1927 (NAD 27).

To place this survey on the NAD 27 datum move the projection lines 1.101 seconds (33.89 meters or 1.7 mm at the scale of the survey) north in latitude, and 0.937 seconds (25.67 meters or 1.28 mm at the scale of the survey) west in longitude.

b. There is no shoreline within the limits of the present survey.

## 3. HYDROGRAPHY

a. Soundings at crossings are in agreement and comply with the criteria found in sections 4.6.1 and 6.3.4.3. of the HYDROGRAPHIC MANUAL.

b. The standard depth curves were drawn in their entirety.

c. The development of the bottom configuration is considered adequate.

4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records and reports conform to the requirements of the HYDROGRAPHIC MANUAL, FIELD PROCEDURES MANUAL, and SIDE SCAN SONAR MANUAL.

5. JUNCTIONS

H-10399 (1991) to the west  
H-10401 (1991) to the south

Adequate junctions were effected between the present survey and surveys listed above. Present survey depths are in harmony with the charted hydrography to the north and east.

6. COMPARISON WITH PRIOR SURVEYS

a. Hydrographic

H-6402 (1938) 1:40,000  
D-107 (1988) 1:40,000

The two prior surveys listed above cover the present survey in its entirety.

Prior survey depths from H-6402 (1938) are generally 0 to 1 feet ( $0^2$  to  $0^4$  m) shoaler than present survey depths. There are some scattered depths from prior survey H-6402 (1938) that are 2 ft ( $0^6$  m) shoaler than present survey soundings.

Prior survey depths from D-107 (1988) are generally 1 foot ( $0^3$  m) shoaler than present survey depths.

The differences between the above prior surveys and the present survey depths can be attributed to natural causes, improved hydrographic surveying methods and equipment, and to subsidence due to the withdrawal of gas and oil from the region.

The present survey is adequate to supersede the above prior survey depths within the common area.

7. COMPARISON WITH CHART 11300 (29<sup>th</sup> Edition, Sept 29/90)  
11307 (31<sup>st</sup> Edition, March 16/91)  
11313 (19<sup>th</sup> Edition, June 30/90)

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys and requires no further consideration. The hydrographer makes an adequate chart comparison in section N., pages 10-12, of the Descriptive Report. The following should be noted:

An uncharted obstruction with an estimated depth of 20<sup>3</sup> m (66 ft), in Latitude 27°45'37.0"N, Longitude 96°46'39.0"W (11fms) was located by the present survey. The position and height of the contact were scaled from the side scan sonograms. Surrounding depths range from 91 ft (27<sup>9</sup> m) to 93 ft, (28<sup>4</sup> m). It is recommended that this obstruction be charted in accordance with Cartographic Order 004/89, dated July 3, 1989. This obstruction has been assigned to the NOAA Ship HECK for final disposition.

The present survey is adequate to supersede the charted hydrography within the common area. See also section 1.b. of this report.

b. Dangers to Navigation

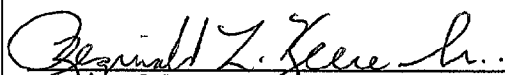
The hydrographer identified one danger to navigation and submitted information for inclusion into a Local Notice to Mariners, to the Commander (oan), Eighth U. S. Coast Guard District, New Orleans, Louisiana. A copy of the letter was forwarded to Chart Information Section, N/CG222, Rockville, Maryland. After office processing it is recommended that the information be retained. A copy of the danger to navigation report has been appended to the Descriptive Report.

8. COMPLIANCE WITH INSTRUCTIONS

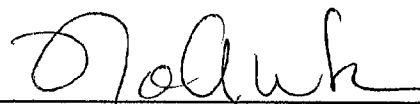
This survey complies with the Project Instructions except as noted elsewhere in this report.

9. ADDITIONAL FIELD WORK

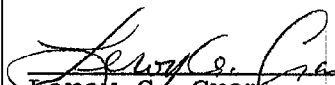
This is an adequate hydrographic/side scan sonar survey. Additional work is required to investigate items discussed in section 7.a. of this report.



Reginald L. Keene, Sr.  
Cartographic Technician  
Verification of Field Data



Norris A. Wike  
Cartographer  
Evaluation and Analysis



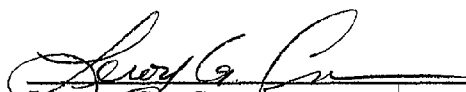
Leroy G. Cram  
Supervisory Cartographic Technician  
Verification Check



APPROVAL SHEET  
H-10400

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing have been entered in the magnetic tape record for this survey. Final control, position, and sounding printouts of the survey have been made. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.



Lerdy G. Cram  
Chief, Hydrographic Processing Team B  
Atlantic Hydrographic Section

Date: 08/18/93

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.




Nicholas E. Perugini, LCDR, NOAA  
Chief, Atlantic Hydrographic Section

Date: 8/23/93

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Final Approval:

Approved: \_\_\_\_\_

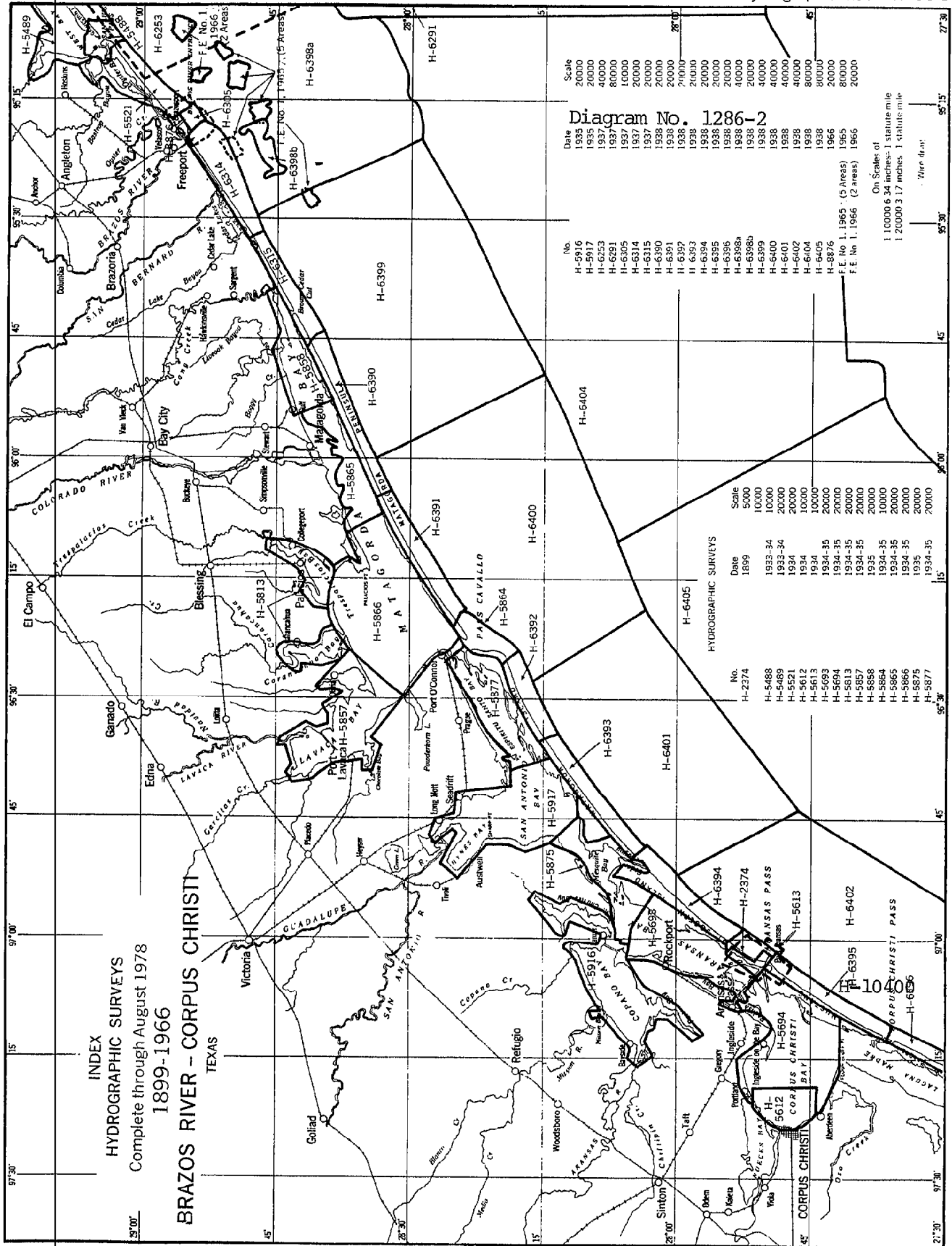


J. Austin Yeager  
Rear Admiral, NOAA  
Director, Coast and Geodetic Survey

Date: 8/8/94

DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Ocean Survey  
Rockville, Maryland

Hydrographic Index No. 90 C



MARINE CHART BRANCH  
**RECORD OF APPLICATION TO CHARTS**

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10400

**INSTRUCTIONS**

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
11300	9/22/91	Dan Hock	Full <del>Part</del> Before After Marine Center Approval Signed Via Drawing No. 46 CRITICAL APPLIC.
411	2-1-94	Jimmy Schumacher	Full <del>Part</del> Before After Marine Center Approval Signed Via Drawing No. 65 App'd to full EXAM NC - 3E AREA
11313	4/1/94	Ray Schiff	Full <del>Part</del> Before After Marine Center Approval Signed Via Drawing No. 40
11307	4/2/94	Ray Schiff	Full <del>Part</del> Before After Marine Center Approval Signed Via Drawing No. 42
11300	8/10/94	L. Ahrens	Full <del>Part</del> Before After Marine Center Approval Signed Via Drawing No. 47
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
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