

10402

10402

Diagram No. 1286-2

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey ... Hydrographic
Field No. WH-10-5-91
Registry No. H-10402

LOCALITY

State Texas
General Locality ... Gulf of Mexico
Sublocality 10 NM SSE of Port Aransas

1991

CHIEF OF PARTY
CDR R.P. Floyd

LIBRARY & ARCHIVES

DATE August 24, 1993

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

CP-5
11307
11300
411

HYDROGRAPHIC TITLE SHEET

H-10402 ✓

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-10-05-91 ✓

State TEXAS ✓

General locality GULF OF MEXICO ✓

Locality 10 NM SOUTH SOUTHEAST OF PORT ARANSAS, ~~TEXAS~~

Scale 1:20,000 ✓ Date of Survey Sept. 12 - 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

Surveyed by R. Floyd, B. Greenawalt, N. Crews, R. Fletcher, K. McNitt, K. Taggart, D. Bixby, E. Berkowitz, J. Seitz, F. Cruz, A. 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) XYNETICS 1201 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

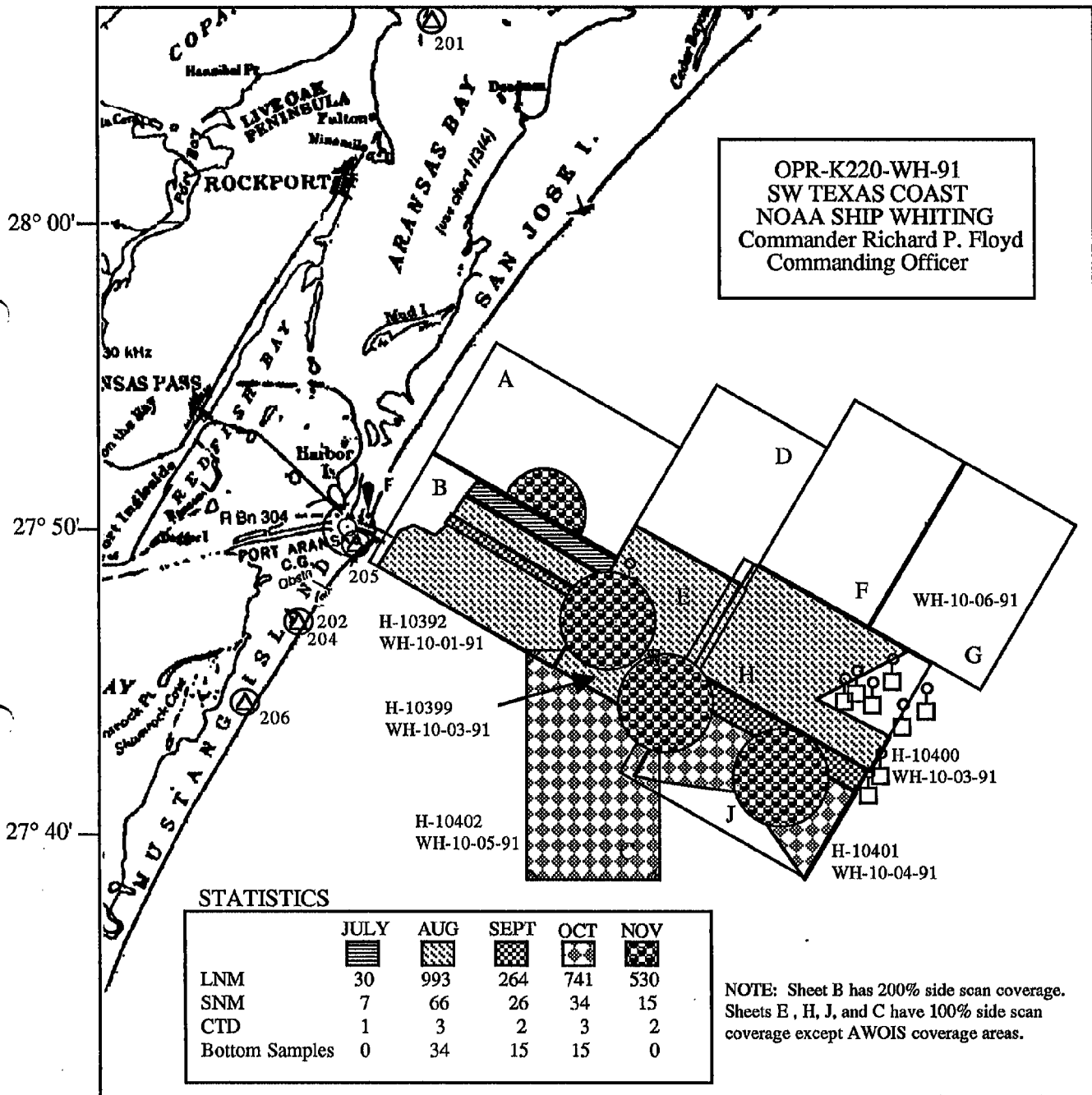
Junctions with H-10392, H-10399, and H-10401

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

AWOIS/SURPV 9/13/93, SJV

JMM 8/8/94

PROGRESS SKETCH NOAA SHIP WHITING NOVEMBER 1991



97° 00' W

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-K220-WH
FIELD NUMBER WH-10-05-91
REGISTRY NUMBER H-10402
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.

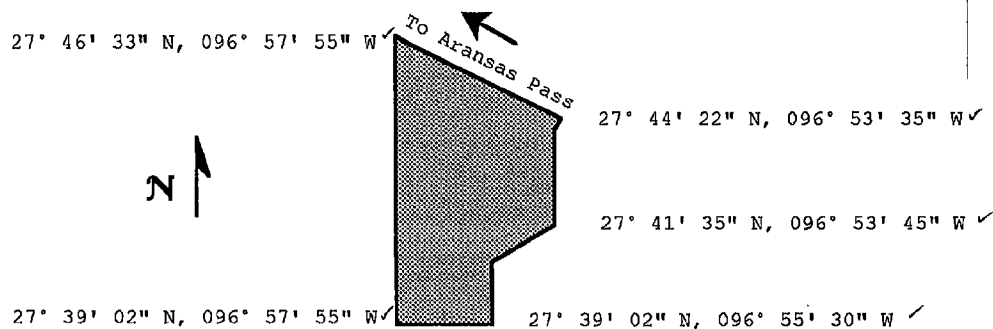
The survey area is of interest because Port Ingleside, on the north shore of Corpus Christi Bay, is being planned as a major strategic home port for the United States Navy. The area is also economically significant because of the sport and commercial fishing industries.

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 deeper 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, field sheet WH-10-05-91, was designated "C Sheet" and assigned registry number H-10402.

B. AREA SURVEYED

The center of survey H-10402 lies approximately 10 nautical miles south-southeast of Port Aransas, Texas, in the southern approach to Aransas Pass. The survey area was bound by the following limits:



WHITING acquired data during the following days:

<u>Gregorian Date:</u>	<u>Day-of-Year (DOY):</u>
12-13 September	255-256
19 September	262
9-10 October	282-283
16-17 October	289-290
19-20 October	292-293
23 October	296
02 November	306
07 November	311

Port calls, operations on other sheets, rough weather, and various hardware problems were responsible for this seemingly sporadic schedule.

C. SURVEY VESSEL

The NOAA ship WHITING, vessel identification number 2930, was the platform for all data acquisition during survey H-10402. ✓

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The Hydrographic Data Acquisition and Processing System (HDAPS) was used to collect and process data for survey H-10402. A listing of the program titles and version numbers can be found in Appendix VII..*

The IBM program NADCON (version 1.01) calculated the datum shift from the North American Datum (NAD) of 1983 to NAD 27 for comparisons with prior surveys. - See also section 2.9. of the Evaluation Report.

The MicroVax program CALIB (version 2.0) 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 one of the Mini-Ranger stations.

The HDAPS program RECOMP (version 1.04) used the recomputed ARGO partial lane correctors to recalculate hydrographic positions.

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 (serial number 0011904) astern of the WHITING at a maximum speed of 6 knots. The operating frequency of the SSS was 100 kHz and the range scale was 100 meters port and starboard, resulting in a 200-meter swath width. An alternate

2

* Data removed from the Descriptive Report; filed with field records.

towfish (s/n 0011901) was used on Days 289, 306, and 311, and approximately 33 survey hours were lost when both towfish were inoperative.

Sounding lines were originally offset by 150 meters to obtain the required bottom coverage with enough overlap to compensate for steering errors. On DOY 289 the persistence of noise along the outer edges of the sonargram reduced the effective swath width and forced WHITING to change the line spacing to 100 meters for the remainder of the survey.

WHITING achieved 100% coverage of the bottom throughout the survey, with 200% coverage in the northeastern corner for investigation of an Automated Wreck and Obstruction Information (AWOIS) item. The project instructions required 200% SSS coverage in water less than 20 meters deep. The requirement for 200% coverage was not met in the northwest corner of the sheet for an area approximately 500 meters wide and 2,000 meters long where the depths are between 18 and 20 meters.

One of two interchangeable EG&G model 260 image correcting SSS recorders received data from the towfish and created a continuous sonargram of the bottom. Recorders were exchanged frequently to minimize the interruption of survey operations for maintenance. Recorder number 0012106 was used on Days 255, 262, 282-283, 292 and 296. Recorder number 0012102 was used on Days 282, 289-290, 292-293, 306, and 311.

Confidence checks confirmed the reliability and range of the side scan trace. An underwater pipeline across the southern end of the sheet and abundant trawl scours throughout the survey area provided enough targets to achieve at least one confidence check for every full-length main-scheme line of survey H-10402. This is well within the requirement of two confidence checks per day.

Sonargrams were thoroughly examined by WHITING personnel. Data were rejected if the background trace threatened to obscure contacts that might have been significant. The HDAPS Contact Utility Program used measurements of contacts to compute their location and true height off the bottom. Contacts with a height of at least 10% of the water depth or those with a notable shape were considered significant and thus worthy of further investigation.

In accordance with the project instructions, WHITING did not develop or investigate contacts discovered during survey H-10402. This work is scheduled for another ship. Significant contacts are listed in Separate V;* recommendations for future development are included in Section N.

F. SOUNDING EQUIPMENT

A Raytheon Digital Survey Fathometer (DSF) 6000N echo sounder produced an analog record of low frequency (24 Khz) and high frequency (100 Khz) depths, the latter of which were digitized and then recorded by the HDAPS acquisition system. Echograms were carefully reviewed for significant features beneath the SSS towfish, none of which were found. Electronics technicians performed accuracy tests and preventive maintenance of the DSF 6000N for daily assurance of data quality.

*Separates removed from the Descriptive Report; filed with field records.

On DOY 292 fix numbers 1278-1300 and 1488-1527 were inadvertently acquired with the DSF 6000N in low frequency digitize mode. These data were corrected via the HDAPS program PRIMARY, which selects the high frequency depths (also digitized during acquisition) as the primary depths.

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 last calibrated on DOY 024. 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 to the bottom. Program VELOCITY processed the data, selected significant data points, and created a corrector table which was manually entered into the HDAPS system for real-time corrections to soundings. Cast data are included in Separate IV.

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

<u>DOY</u>	<u>Table</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Depth</u>
252	5	27° 45'06"N	096° 44'54"W	29.5 m
261	6	27° 45'09"N	096° 45'06"W	35.3 m
276	7	27° 41'44"N	096° 45'46"W	28.3 m
289	8	27° 45'06"N	096° 44'54"W	30.3 m
306	9	27° 49'09"N	096° 48'21"W	30.2 m

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

Settlement and Squat correctors were determined on DOY 217 in Corpus Christi Channel, Cut "A" range by driving the ship at various speeds past an observer. The observer recorded level readings of a stadia rod on the ship during each run 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.*

The HDAPS data acquisition computer received data from a Heave, Roll, and Pitch sensor (HIPPY, 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

* Removed from Descriptive Report; filed with field records.

a reference for this project. 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

The operating tide stations at Corpus Christi, Texas, (877-5870) and Port Isabel, Texas, (877-9770) will be used as control for actual datum determination. Mr. Larry Nieson, of the Atlantic Operations Group (N/OMA1213), confirmed proper station operation during the survey. There were no leveling requirements for this survey.

Contours of the preliminary sounding plots revealed discrepancies of up to 0.6 meter between some adjacent survey lines. 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. ~~Some~~ *Approved tides* and zoning have been applied during office processing.

Several attempted depth comparisons between the DSF 6000N and a calibrated leadline were unsuccessful because of difficulties measuring the 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
x.3048	<u>+3.2 m (WHITING draft)</u>
=14.4 m	=14.4 m

The pneumatic gauge was calibrated on DOY 058. A copy of the calibration report is included in the calibration folder submitted with this survey. Systems checks were completed in accordance with Hydrographic Survey Guideline number 55. These data are included in the Transducer Depth Determination Report.

H. CONTROL STATIONS - See also section 2.2. of the Evaluation Report.

All geodetic positions were referenced to NAD 83.

Six horizontal control stations were used during survey H-10402: 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 determined or 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 each tank 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 the following errors were discovered:

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

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

These position errors affect ARGO calibrations conducted before DOY 261. The calibrations and their subsequent hydrographic positions were corrected before submission of this survey.

I. HYDROGRAPHIC POSITION CONTROL - See also section 2.2. of the Evaluation Report.

The DM-54 ARGO system, operated in the range-range mode, was the primary positioning system used during survey H-10402. 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:

Station	RPU	ALU
WHITING	R1083662	C1083309
201	R047844	A047853
202	R0680312	A047858
203	R1085755	A0783640

Ship's positions were computed analytically by the intersection of multiple lines of position (LOP's) from the shore-based stations. Positioning busts appeared on the track plot as fliers. These were easily corrected during post processing by "smoothing" between adjacent reliable positions. 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), and the residual and ECR were recorded for each selected sounding. H-10402 was a 1:20,000-scale survey. Persistent ECR's greater than 30 meters or residuals greater than 10 meters were cause for data rejection.

On DOY 283, one of the ARGO stations (station 202, SHARKEYS 1991) went off the air for some unknown reason. Five hours of data were rejected (fix numbers 337 - 418) because WHITING was surveying with only two LOP's, and the closing calibration did not agree within 10 meters of the opening calibration.

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 ship was positioned at the calibration site using Mini-Ranger 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.

On DOY 296 and 308, WHITING performed ARGO calibrations using an "offshore method" described in the Field Procedures Manual for Hydrographic Surveying, section 3.3.1.2. This method involved steering the ship along a range between two oil platforms and calibrating at specific points along the range. Documentation of the initial calibration points and subsequent ARGO lane recovery at these points can be found in the calibration binder included with the supplemental data of this survey.

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 (crosslines and bottom samples) were repositioned using HDAPS programs RECOMP or POINT. Commander Christopher Lawrence, Chief, Atlantic Hydrographic Section, granted verbal permission 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.

The Falcon Mini-Ranger network consisted of the shipboard range processing unit (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	E2915
205	A	G3571
206	C	3296

Mini-Ranger baseline calibrations were performed on DOY 212 and 214 at Naval

* Removed from the Descriptive Report; filed with field records.

Station Ingleside, Texas, in accordance with AMC OORDER 86 and the Field Procedures Manual 3.1.3.2. Actual distance was measured with an Electronic Distance Measuring Instrument (EDMI). HDAPS recorded and processed Mini-Ranger range data, and correctors for each combination of RT and RPU were entered into an HDAPS C-O (corrected minus observed) table before survey operations began. Baseline calibration data can be found in Separate III.

All offsets for positioning and survey equipment on the WHITING were verified from historical data by WHITING personnel before the start of survey H-10402 and entered into the HDAPS offset table. A diagram and table of offsets is included in Separate III.

J. SHORELINE

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

K. CROSSLINES - *See also section 3.2. of the Evaluation Report.*

A total of 18 nautical miles of crosslines were surveyed perpendicular to the axis of the safety fairway. This equaled 5.5% of the 333 linear nautical miles of main-scheme lines surveyed.

Crossline soundings were compared to their overlapping main-scheme soundings with excellent results.

L. JUNCTIONS - *See also section 5 of the Evaluation Report.*

The western end of the northern edge of survey H-10402 junctioned with contemporary WHITING survey H-10392 (B Sheet), which had 200% SSS coverage. There were no holidays in the coverage and depth curves agreed along the junction. Thirty H-10402 soundings were compared with soundings from H-10392. Excellent agreement was found. The average difference was 0.10 meter, the maximum difference was 0.4 meter, and the standard deviation was 0.18 meter.

The remainder of the northern edge of survey H-10402 junctioned with contemporary WHITING survey H-10399 (E Sheet), which had 100% SSS coverage. There were no holidays in the coverage and depth curves agreed along the junction. Fifty-two H-10402 soundings were compared with soundings from H-10399. Very good agreement was found. The average difference was 0.02 meter, the maximum difference was 0.8 meter, and the standard deviation was 0.23 meter.

The eastern edge of survey H-10402 junctioned with contemporary WHITING survey H-10401 (J Sheet), which had 100% SSS coverage. There were no holidays in the coverage and depth curves agreed along the junction. Sixty-five H-10402 soundings were compared with soundings from H-10401. Excellent agreement was found. The average difference was 0.14 meter, the maximum difference was 0.4 meter, and the standard deviation was 0.12 meter.

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 three prior surveys. All prior surveys used NAD 27, so a datum shift was applied to H-10402 for comparison purposes in accordance with the Field Procedures Manual For Hydrographic Surveying.

Survey H-6402, scale 1:40,000 was completed in 1938. Seventy-eight soundings from H-10392 were compared with soundings from H-10402. Agreement was good: the average difference between soundings was 0.24 meter, the maximum difference was 0.8 meter, and the standard deviation was 0.25 meter.

Survey D-107, scale 1:40,000 was completed in 1989. Seventy-eight soundings from D-107 were compared with soundings from H-10402. Agreement was good: the average difference between soundings was 0.06 meter, the maximum difference was 0.8 meter, and the standard deviation was 0.65 meter.

Survey H-10205, scale 1:20,000 was completed in 1985. Ten soundings from H-10205 were compared with soundings from H-10402. Agreement was very good; the average difference between soundings was 0.31 meter, the maximum difference was 0.6, and the standard deviation was 0.17 meter.

N. COMPARISON WITH THE CHART - See also section 7. a. of the Evaluation Report.

Survey H-10402 was compared with an enlargement (1:10,000) of chart 11307, 30th ed., Nov. 12/88; scale 1:80,000. Of 56 charted soundings in the survey area, most showed good agreement with survey H-10402. The average difference was 0.4 meter (H-10402 was deeper), the maximum difference was 0.7 meter, and the standard deviation was 0.5 meter. The average depth difference was 2.7 percent of the average depth.

Eight notable contacts were discovered during survey H-10402. Two are not considered significant but they deserve mention because of their unusual returns on the sonargram. Both had long, distinct shadows perpendicular to the towfish track, with circular contacts on both the inboard and outboard ends of the shadow. Contact 126.24S, located at 27° 39' 06" N, 096° 56' 13" W consisted of one such return. Contact 892.44S, position 27° 41' 07" N, 096° 56' 11" W consisted of two identical returns, parallel to each other. WHITING does not recommend further investigation of these insignificant contacts. *Do not concur**

WHITING discovered three depressions at approximate position 027° 44' 21" N, 096° 54' 01" W which appear to be the remains of a previous oil platform. Dark returns appeared in the center of two of the depressions, suggesting that pieces of the rig structure may still remain. Because the depressions absorbed the sound around the dark returns, it was impossible to determine their exact height off the bottom. The maximum possible height of the most distinct contact, 1820.71S, was 1.7 meters. WHITING recommends a diver investigation of this area to determine least depths. - *Do not concur - insignificant - Surrounding depths range from 23⁷ meters to 24¹ meters. 32.78*
Contact 691.78P at position 027° 40' 55"₁₉ N, 096° 57' 33" W appears to be a sunken barge. The computed height off the bottom was 2.9 meters in 23.8 meters of water (observed depth). It is located near the western edge of the

* Chart Contact 892.44S in accordance with Cartographic order 004/89. Showings 23² Obetz (A) on the present survey. (per telcon - Robert Snow, CG244 and Steve Verry, CG24) Add. WK rec.

safety fairway, but does not pose a threat to vessel traffic. However, since this apparent wreck is not charted, a danger to navigation report was submitted in accordance with Hydrographic Survey Guideline number 66. This was perhaps the most impressive SSS trace obtained during the 1991 field season. WHITING recommends a diver investigation and future charting of this contact. - Concur. Chart in accordance with Cartographic Order $\phi\phi 4/89$. Shown as 2 ϕ^9 wk (A) on the present survey.

Contact 730.58S at position 027° 46' 13" N, 096° 57' ^{.36}45" W consisted of a dark semicircular return with a dramatic shadow and what appears to be a trail of smaller returns leading to the larger contact from the inboard side. The computed height off the bottom was 1.3 meters in 16.1 meters of water (observed depth). WHITING recommends a diver investigation and least depth determination. - Concur. Shown as 17^B Obstr (A) on the present survey. Chart in accordance with Cartographic Order $\phi\phi 4/89$.

Contact 944.07S was a faint return, 15 meters across, with an equally faint shadow at 027° 45' ^{21.1}37" N, 096° 56' 04" W. The computed height off the bottom was 1.0 meter in 17.6 meters of water (observed depth). This could be an old ship wreck that has decomposed and been partially covered with sand. ✓ WHITING recommends diver investigation and least depth determination of this contact. - Do not concur. No further investigation necessary.

Contacts 1237.76S and 1243.07S, located at 027° 45' 03" N, 096° 57' 45" W represent what appears to be debris on the bottom; something without much detail. WHITING recommends a diver investigation and least depth determination.

No AWOIS items were located in the survey area, but the search radius for AWOIS 7906^{*}, located on adjacent survey, H-10399, extended into the northeast corner of survey H-10402. The area was covered with 200% SSS, and no contacts were found except for the depressions mentioned previously. ✓ No chart recommendation concerning AWOIS items is made at this time. ✓

O. ADEQUACY OF SURVEY - See also section 9. of the Evaluation Report.

This hydrographic survey is adequate to supersede prior surveys of the area. No part of this survey is considered to be substandard except for the area mentioned in section E, where only 100% SSS coverage was achieved in depths less than 20 meters.

P. AIDS TO NAVIGATION - See also section 7. b of the Evaluation Report

No fixed or floating aids, platforms, or buoys existed within the survey limits of H-10402.

* AWOIS Item # 7906 is a charted, non-dangerous wreck, in latitude 27° 45' 19.10" N, Longitude 96° 53' 24.94" W, originating with local Notice to Mariners 16 of 1986.

Q. STATISTICS

Number of Positions.....	2165
Nautical Miles of Main-scheme Sounding Lines.....	333
Nautical Miles of Crossline Sounding Lines.....	18
Square Nautical Miles Surveyed.....	20
Days of Production.....	7
Detached Positions.....	0
Bottom Samples.....	15
Tide Station.....	877-1450 Galveston
Current Stations.....	0
Number of CTD Casts.....	5
Magnetic Stations.....	0

R. MISCELLANEOUS

Side scan sonar contacts recommended for further investigation are included in Separate V.*

Bottom samples from H-10402 were collected every 10 cm at the scale of the survey (20 cm at the scale of the plots submitted) in accordance with the project instructions. Samples were submitted to the Smithsonian Institution, as directed by the project instructions. 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; resultant excessive engine wear and a heavy build up of oil in the exhaust piping 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

The current chart layout for Aransas Pass is poorly organized. Our survey operations required the use of four charts. There isn't a single large-scale chart that covers the whole area, and the price deters mariners from buying numerous charts. WHITING suggests the creation of one 1:80,000-scale chart, with Aransas Pass centered on the left side, for use by fishermen and merchant vessels approaching Corpus Christi.

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, cost effective solution.

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

* Removed from the Descriptive Report, filed with field records.

T. REFERRAL TO OTHER REPORTS

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

Coast Pilot Report will be forwarded

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

Submitted by:



Katharine A. McNitt
Lieutenant junior grade, NOAA
Junior officer, NOAA Ship WHITING

Reviewed by:



Nancy L. Crews
Lieutenant, NOAA
Operations Officer

Approved by:



Richard P. Floyd
Commander, NOAA
Commanding Officer

APPENDICES

- I. Danger to Navigation Reports
- II. Non-Floating Aids and Landmarks for Charts
- III. List of Horizontal Control Stations
- IV. Geographic Names
- V. Tides and Water Levels
- VI. Supplemental Correspondence
- VII. HDAPS Software Listing
- VIII. Approval Sheet

I. DANGER TO NAVIGATION REPORTS



UNITED STATES 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

January 13, 1992

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

Dear Sir:

Between July 27 and November 17, 1991, the NOAA ship WHITING conducted a hydrographic survey of the approaches to Corpus Christi Bay, Texas. On October 10, 1991, WHITING discovered what appears to be a sunken barge in the safety fairway.

The barge was discovered with a side scan sonar system. A diver investigation has not been conducted, but measurements from the side scan record indicate the barge's approximate dimensions. It appears to be 16 meters (52.5 feet) long, 11 meters (36.1 feet) wide and rises approximately 2.9 meters (9.5 feet) above the bottom. The surrounding bottom is flat and approximately 23.8 meters (78.0 feet) deep. The approximate least depth is 20.9 meters (68.5 feet) at Mean Lower Low Water (MLLW). The sunken barge's position is latitude 27°40'55.20"N, longitude 96°57'32.78"W.

The following charts are affected:

Chart 11307, Aransas Pass to Baffin Bay
Edition: 31st Edition, March 16, 1991
Corrected through NM 52/91
Horizontal Datum: NAD 83

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

I recommend charting a dangerous wreck, with an approximate least depth of 68 feet, at the following position:

<u>Latitude</u>	<u>Longitude</u>
27°40'55.20"N	96°57'32.78"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 P. Floyd, NOAA
Commanding Officer

Attachments

DANGER TO NAVIGATION REPORT

REPORTING UNIT: NOAA Ship WHITING, S329

SURVEY REGISTRY NUMBER: H-10402 (WH-10-05-91)

SURVEY LOCALITY: STATE: Texas

GENERAL LOCALITY: Gulf of Mexico

SUBLOCALITY: 10 NM south southeast of
Port Aransas, Texas

PROJECT NUMBER: OPR-K220-WH

The following was discovered during hydrographic operations on
October 10, 1991:

An object that appears to be a sunken barge in 23.8 meters (78.0
feet) of water at Mean Lower Low Water (MLLW). The approximate
dimensions are as follows:

Length - 16 meters
Width - 11 meters
Height - 2.9 meters
Least Depth - 20.9 meters (68.5 feet)

AFFECTED NAUTICAL CHARTS:

Chart 11307, Aransas Pass to Baffin Bay

Edition: 31st Edition, March 16, 1991

Corrected through NM 52/91

Horizontal Datum: NAD 83

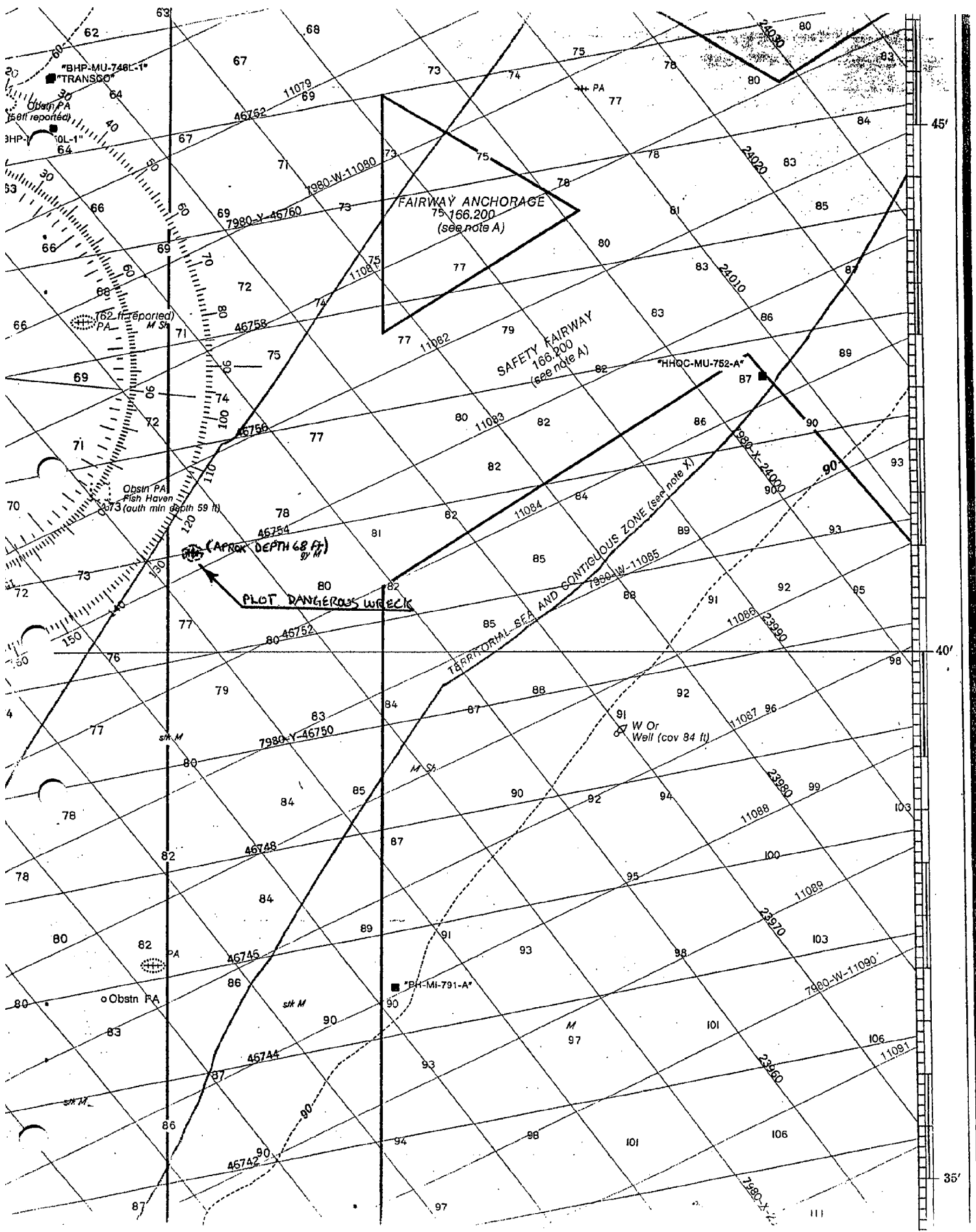
Chart 11300, Mississippi to Galveston

Edition: 29th Edition, September 29, 1990

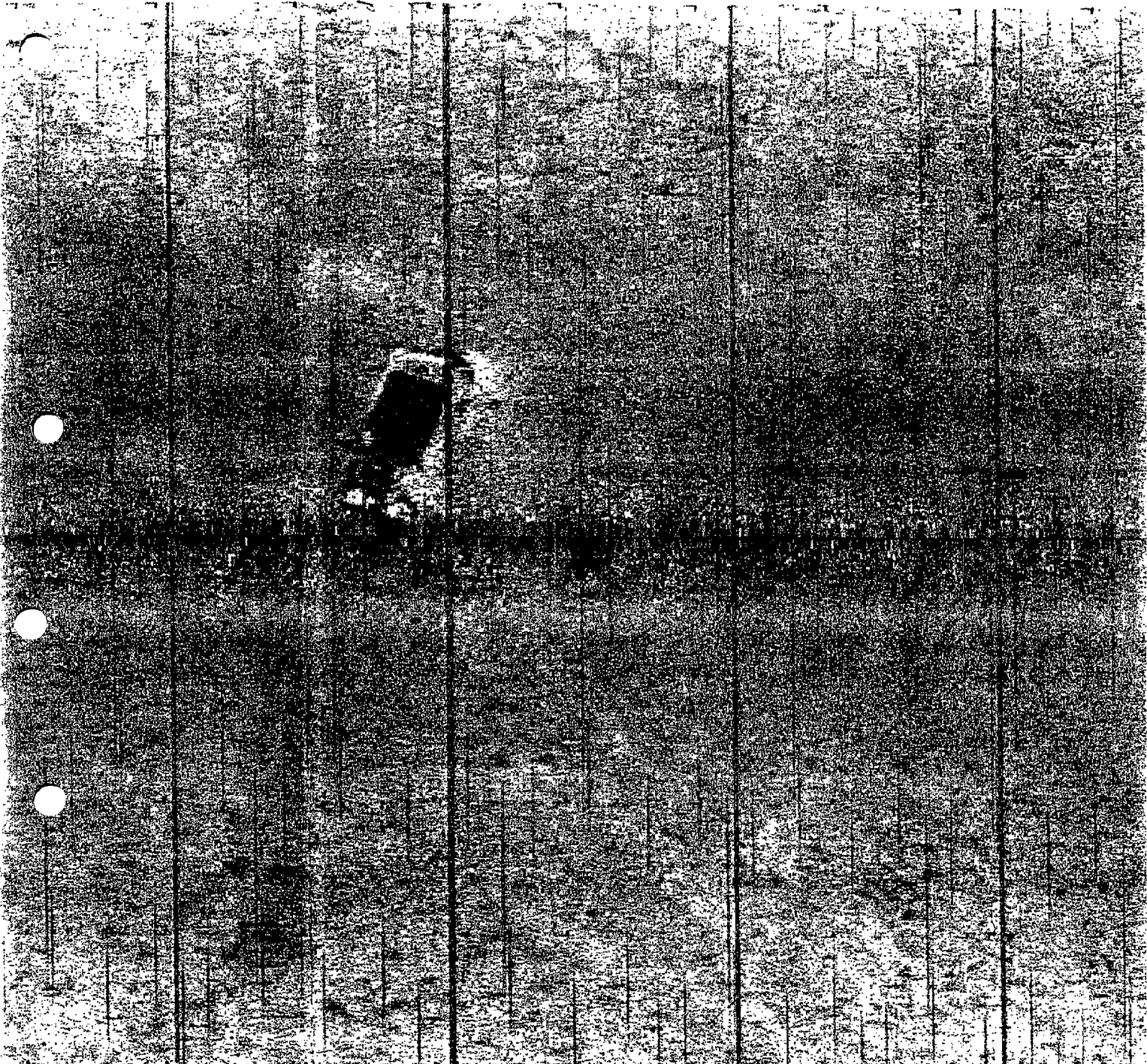
Corrected through NM 43/91

Horizontal Datum: NAD 83

GEOGRAPHIC POSITION: Observed: latitude 27°40'55.20"N
longitude 97°57'32.78"W



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20:45:27 692

20:45:12

III. LIST OF HORIZONTAL CONTROL STATIONS

Horizontal Control Station Data

Station No.	Latitude	Longitude	Antenna Elev. (m)	Carto Code	Station Name	Year Established	Seaward of HWL?	Station Source	Quad
201	28/07/31.118	096/58/52.429	N/A	250	Goose	1987	No	Published	N280954
202	27/47/32.060	097/05/13.451	N/A	250	Sharkys	1991	No	Published	N270971*
203	28/35/55.276	095/58/34.815	N/A	250	Mata	1991	No	Published	N270971
204	27/47/33.070	097/05/14.862	7	250	Knoll	1934	No	Published	N280963
205	27/49/47.566	097/03/49.371	38	250	Port Aransas Tank Ecc.		No	Field Position (3rd Order Class 1)	N270971
206	27/45/06.889	097/07/28.929	43	250	Port Aransas Mustang Tank Ecc.		No	Field Position (3rd Order Class 1)	N270971

*QSN is 1040; Other QSN's unavailable

VI. SUPPLEMENTAL CORRESPONDENCE



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
NOAA Ship WHITING 5-329
439 W. York Street
Norfolk, VA 23510-1114

July 2, 1991

Commander, Eighth Coast Guard District
Aids To Navigation Branch
Hale Boggs Federal Building, 500 Camp Street
New Orleans, Louisiana 70130-3396

Dear Sir:

Please include the following in your next Local Notice to Mariners:

TEXAS SEACOAST - HYDROGRAPHIC SURVEY

The NOAA Ship WHITING (Hull No. S329) will be conducting hydrographic survey operations off the Texas coast, commencing July 14, 1991, and lasting until mid November. Operations will include towing a side scan sonar unit, and the ship will have difficulty maneuvering. The survey area encompasses the safety fairway areas and anchorages in the approaches to Corpus Christi Bay.

Affected nautical charts: 411, 11300, 11307, 11309, 11313.

WHITING is 163 feet long with a white hull and superstructure. The ship's call sign is WTEW. VHF channels 16 and 13 are monitored continuously, as well as HF channel 2182. All vessels approaching within 1 nautical mile are requested to contact WHITING on VHF radio.

For further information contact the Atlantic Marine Center - Operations Division, Norfolk, Virginia, at (804)441-6206.

Sincerely,

Richard P. Floyd, CDR, NOAA
Commanding Officer





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
NOAA Ship WHITING 6-329
439 W. York Street
Norfolk, VA 23510-1114

July 3, 1991

MEMORANDUM FOR: Lieutenant Commander Maureen R. Kenny, NOAA
Chief, Operations Section

THRU: Commander Christopher B. Lawrence, NOAA
Chief, Atlantic Hydrographic Section

FROM: *Richard P. Floyd*
Commander Richard P. Floyd, NOAA
Commanding Officer, NOAA Ship WHITING

SUBJECT: Request for Revision of Sheet Layout, Project
OPR-K220-WH, SW Texas Coast, Texas

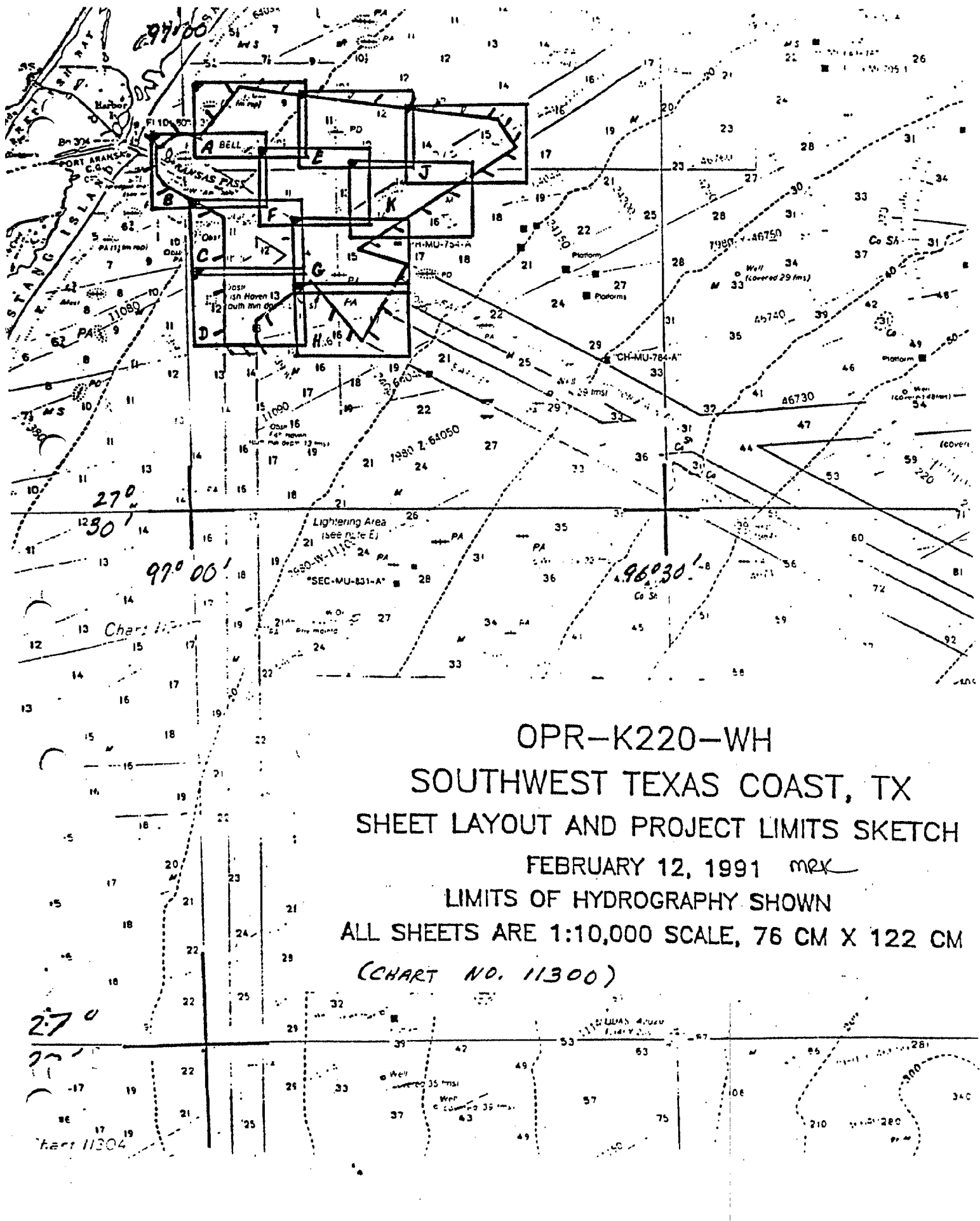
The NOAA Ship WHITING requests revision of the current sheet layout for Hydrographic Project OPR-K220-WH. Attached are copies of the WHITING's proposal and the original layout, dated February 12, 1991.

The revised layout, if accepted, will consist of nine surveys. Efficiency and safety will increase substantially with the revision because fewer turns will be required and the main-scheme lines will run parallel to the flow of traffic in the approaches to Corpus Christi Bay.

Please respond as soon as possible: we are planning to begin operations in mid-July.

Arg. Götter
cc: N/CG24 ~~Commander~~ Seidel

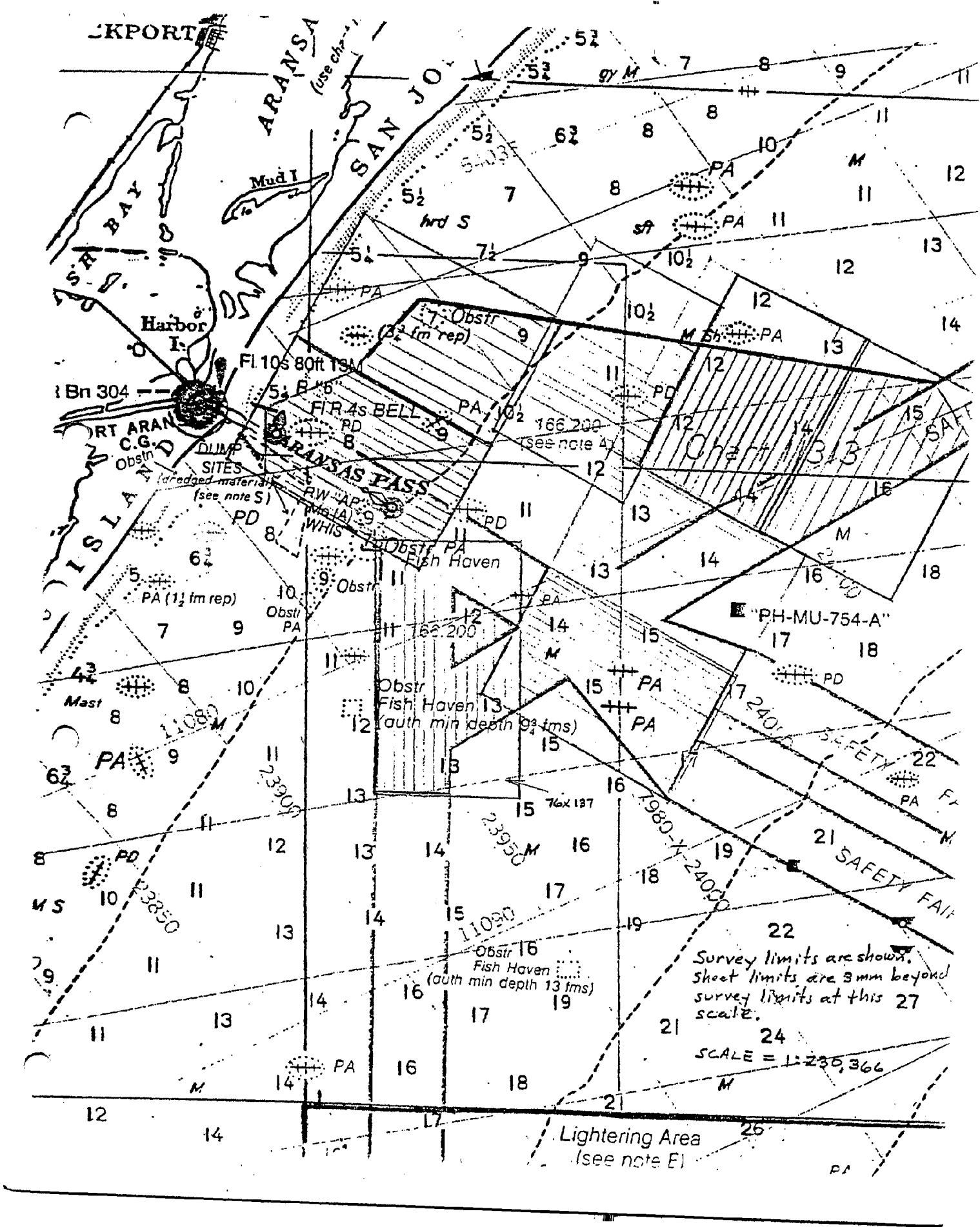




OPR-K220-WH
 SOUTHWEST TEXAS COAST, TX
 SHEET LAYOUT AND PROJECT LIMITS SKETCH
 FEBRUARY 12, 1991 mex
 LIMITS OF HYDROGRAPHY SHOWN
 ALL SHEETS ARE 1:10,000 SCALE, 76 CM X 122 CM
 (CHART NO. 11300)

27°
 30'

Chart 11304



Survey limits are shown.
 Sheet limits are 3mm beyond
 survey limits at this
 scale.
 SCALE = 1:235,366

Lighting Area
 (see note E)



UNITED STATES 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

July 7, 1991

Mr. Stormy Reeves
Park Superintendent
Goose Island State Park
Star Route 1, Box 105
Rockport, TX 78382

Dear Mr. Reeves:

Thank you for allowing us to position our ARGO tower in Goose Island State Park. Our operations will continue through November, and we will send electronics technicians to check on the tower and the fence periodically.

Our sailing schedule is enclosed. Should you need to reach us for any reason, our telephone number at Naval Station Ingleside is (512) 776-4287 or 776-4288. Beginning August 1 our operations area will be the entrance to Corpus Christi Bay. At that point you can reach us by cellular phone. To do so, dial the access number: (512) 850-3000. If that number doesn't put you through, try (512) 877-7626. When you hear the second dial tone, dial (713) 651-4712.

Again, thank you for your generosity.

Sincerely,

Katharine McNeill LTJG, NOAA
- for -

LT Nancy Crews, NOAA
Field Operations Officer,
NOAA Ship WHITING





UNITED STATES 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

September 6, 1991

MEMORANDUM FOR: Captain Fidel T. Smith, NOAA
Chief, Field Photogrammetry Section

FROM: *for Brian Greenawald*
Commander Richard P. Floyd, NOAA
Commanding Officer

SUBJECT: Horizontal Control for OPR-K220-WH-91

As per Lieutenant Crews' conversation with James Dunford on September 3, WHITING personnel performed geodetic observations to position Mini-Rangers located on Port Aransas Tank and Port Aransas Mustang Tank. Enclosed are horizontal directions, zenith distances and EDM1 distances to allow positions to be computed.

Also enclosed are recovery notes for all stations observed and a recovery note for station GOOSE, which WHITING personnel recovered and verified on July 2. This station is currently being used as a site for an ARGO tower.

If you have any questions concerning these data, please contact Lieutenant Nancy Crews on (512) 776-4287. Thank you for your continued support.

Enclosures



RECEIVED
SEP 25 1991



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Coast and Geodetic Survey
Rockville, Maryland 20852

SEP 17 1991

REVIEWED BY: (Init.)

CO	
XO	
FOC	

NOAA SHIP WHITING

MEMORANDUM FOR: Rudolph D. Sanocki
Chief, Hydrographic Processing Unit
FROM: *George H. Mastrogiannis*
George H. Mastrogiannis
Chief, Data Control Section
SUBJECT: Assignment of Registry Numbers

The following hydrographic registry numbers, H-10401, and H-10402 are assigned in accordance with the information listed below:

<u>Registry No.</u>	<u>Field No.</u>	<u>Locality</u>	<u>Project No.</u>
H-10401	WH-10-4-91 (Sheet J)	TEXAS GULF OF MEXICO FOURTEEN NAUTICAL MILES SOUTHEAST OF PORT ARANSAS	OPR-K220
H-10402	WH-10-5-91 (Sheet C)	TEXAS GULF OF MEXICO TEN NAUTICAL MILES SOUTH SOUTHEAST OF PORT ARANSAS	OPR-K220

cc: N/CG24x2 - K. Wellman
N/CG241 - M. Riddle
N/CG244 - C. Lawrence
N/CG245 - D. Herlihy
AMC1 - R. Matsushige
PMC1 - J. Humphrey
AMC-WH - C.O. ✓



VIII. APPROVAL SHEET

APPROVAL SHEET
HYDROGRAPHIC AND
SIDE SCAN SONAR SURVEY
OPR-K220-WH-91
H-10402

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

08/18/93

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10402

NUMBER OF CONTROL STATIONS	6
NUMBER OF POSITIONS	2035
NUMBER OF SOUNDINGS	15138

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	79	05/22/92
VERIFICATION OF FIELD DATA	85	06/30/93
ELECTRONIC DATA PROCESSING	51	
QUALITY CONTROL CHECKS	29	
EVALUATION AND ANALYSIS	48	07/13/93
FINAL INSPECTION	27	08/04/93
TOTAL TIME	319	
ATLANTIC HYROGRAPHIC SECTION APPROVAL		08/12/93



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-10402

LOCALITY: Gulf of Mexico, Southwest Texas Coast

TIME PERIOD: September 12 - November 7, 1991

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

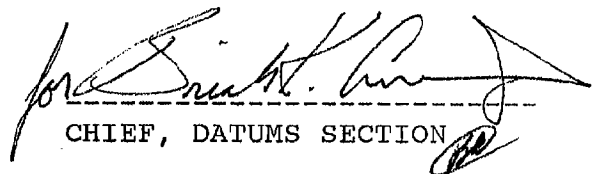
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 20.58 ft.

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.


CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

H-10402

Name on Survey											
	A	B	C	D	E	F	G	H	K		
MEXICO, GULF OF (title)											1
PORT ARANSAS (title)											2
TEXAS (title)											3
											4
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Approved:

Charles E. Harrington
Chief Geographer - N/CG205

MAR 10 1993

OFFICE OF CHARTING AND GEODETIC SERVICES
ATLANTIC HYDROGRAPHIC SECTION
EVALUATION REPORT

SURVEY NO.: H-10402

FIELD NO.: WH-10-5-91

Texas, Gulf Of Mexico, 10 NM SSE of Port Aransas

SURVEYED: 12 September 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 cases 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 25 to 50 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 50 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 1.11 seconds (34.3 meters or 1.72 mm at the scale of the survey) north in latitude, and 0.94 seconds (25.9 meters or 1.30 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-10392 (1991) to the northwest
 H-10399 (1991) to the northeast
H-10401 (1991) to the east

Standard junctions were effected between the present survey and junctional surveys.

6. COMPARISON WITH PRIOR SURVEYSHydrographic

D-107 (1988) 1:40,000
 H-6402 (1938) 1:40,000
H-10205 (1985) 1:20,000

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

Prior survey depths from D-107 (1988) generally vary ± 1 foot ($\pm 0^3$ m) from present survey depths.

Prior survey depths from H-6402 (1938) are generally 0 to 2 feet (0^1 to 0^6 m) shoaler than present survey depths.

Prior survey depths from H-10205 (1985) are generally 1 foot (0^3 m) shoaler than present survey depths.

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

7. COMPARISON WITH CHART 11300 (29th Edition, Sept. 29/90)
11307 (31st Edition, March 16/91)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 9-10, of the Descriptive Report.

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

b. Aids to Navigation

There are no fixed or floating aids within the survey area.

c. Dangers to Navigation

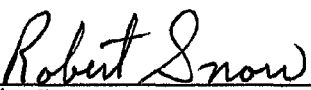
The hydrographer identified one danger to navigation and submitted information for inclusion into a Local Notice to Mariners, to Commander (oan), Eighth Coast Guard District, New Orleans, Louisiana. A copy of the letter was forwarded to Chart Information Section, N/CG222, Rockville, Maryland. A copy of the letter is appended to the Descriptive Report. No additional dangers were noted during office processing.

8. COMPLIANCE WITH INSTRUCTIONS

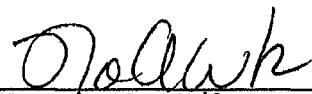
This survey complies with the Project Instructions except as noted elsewhere in this report.

9. ADDITIONAL FIELD WORK

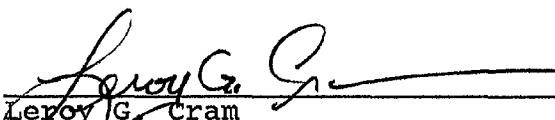
This is an adequate hydrographic/side scan sonar survey. Additional work is required to investigate items discussed in section N., pages 9-10, of the Descriptive Report.



Robert Snow
Cartographic Technician
Verification of Field Data



Norris A. Wike
Cartographer
Evaluation and Analysis



Leroy G. Cram
Senior Cartographic Technician
Verification Check

APPROVAL SHEET
H-10402

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 disapproval 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.

Robert G. Roberson

Date: 12 August 1993

Robert G. Roberson
Chief, Processing Team A
Atlantic Hydrographic Section

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

Date: August 12, 1993

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

Final Approval:

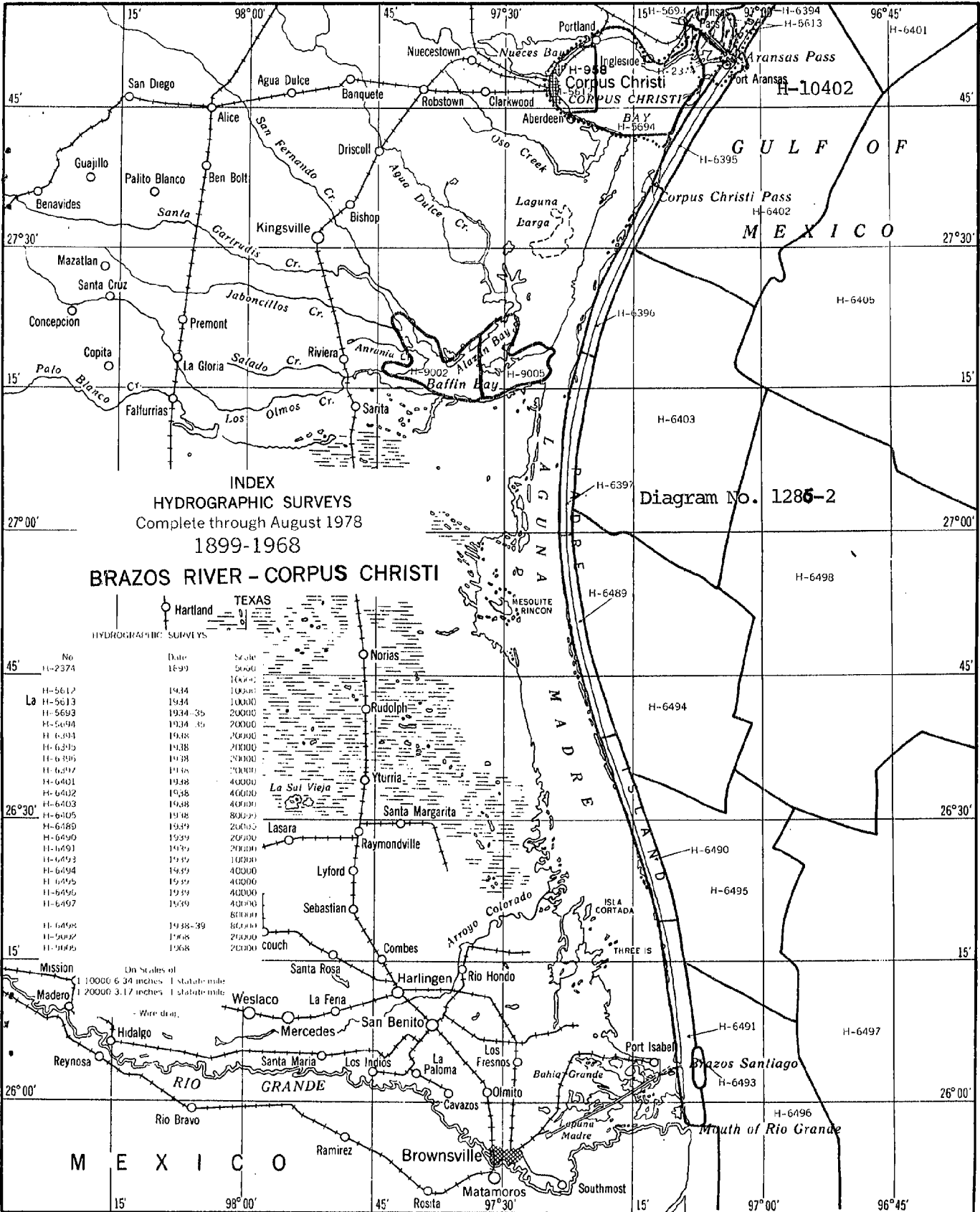
Approved: J. Austin Yeager

Date: 8/8/94

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

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

Hydrographic Index No. 91 C



MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10402

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	9-20-93	<i>Jerry Schumacher</i>	Full Part Before After Marine Center Approval Signed Via Exam for crit only NC Drawing No. 46
411	2-1-94	<i>Jerry Schumacher</i>	Full Part Before After Marine Center Approval Signed Via Drawing No. 65 App'd on full EXAM NC 3E AREA
11307	3/2/94	<i>Randy Schliff</i>	Full Part Before After Marine Center Approval Signed Via Drawing No. 42
11300	8/10/94	<i>L. Arkner</i>	Full Part 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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SUPERSEDES C&GS FORM 6352 WHICH MAY BE USED.