H10834

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey	Hydrographic\ Multibeam\ Side Scan Sonar
Field No.	B
Registry No.	H10834

LOCALITY

State	Louisiana
General Locality	Gulf Of Mexico
Locality	12 Miles SW of Calcasieu Pass

1998-99

CHIEF OF PARTY
Art Kleiner

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
	HYDROGRAPHIC TITLE SHEET	H10834
Instructions: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.		**FIELD NUMBER:** Sheet B

State: Louisiana

General Locality: Gulf of Mexico

Locality: 12 MILES SW of Calcasieu Pass

Scale: 1:20,000 Date of Survey: August 27, 1998 - February 20, 1999

Instructions Dated: October 23, 1997 Project Number: OPR-K171-KR

Vessel: *M/V Inez McCall*

Chief of Party: Art Kleiner, HYDROGRAPHER IN CHARGE

Surveyed by: P. Devall, J. McCullogh, P. Melancon, H. Langill, K. Buffitt, S. Alleman, D. Warren J. Chance, M. LeGros, S. Melancon, B. Herpin, G. Ellett, C. Smith , J. Petterson, J. Boles

Soundings taken by echosounder, hand lead line, or pole: Simrad EM3000 Multibeam Echosounder

Graphic record scaled by: N/A

Graphic record checked by: N/A

Protracted by: N/A Automated plot by: HEWLETT PACKARD DESIGN JET 2500CP ~~HP 755 Plotter~~

Verification by: ~~C&C Technologies Personnel~~ ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL

Soundings in: Feet: X Fathoms: _____ Meters: _____ at MLW: _____ MLLW: X

Remarks: Multibeam Hydrographic Survey of Sheet B
Data collection in meters, later converted into feet, referenced to MLLW
200% Side Scan Sonar coverage. UTC time was used exclusively
Tidal Zone: G315
Tidal Stations: 877-1081, 877-5110
Bottom sediment samples were taken
HAND WRITTEN NOTES IN THE DESCRIPTIVE REPORT WERE MADE DURING OFFICE PROCESSING

NOAA FORM 77-28 SUPERSEDES FORM C & GS - 537

AWOIS ✓ & SURF ✓ 9-25-01 by MBH

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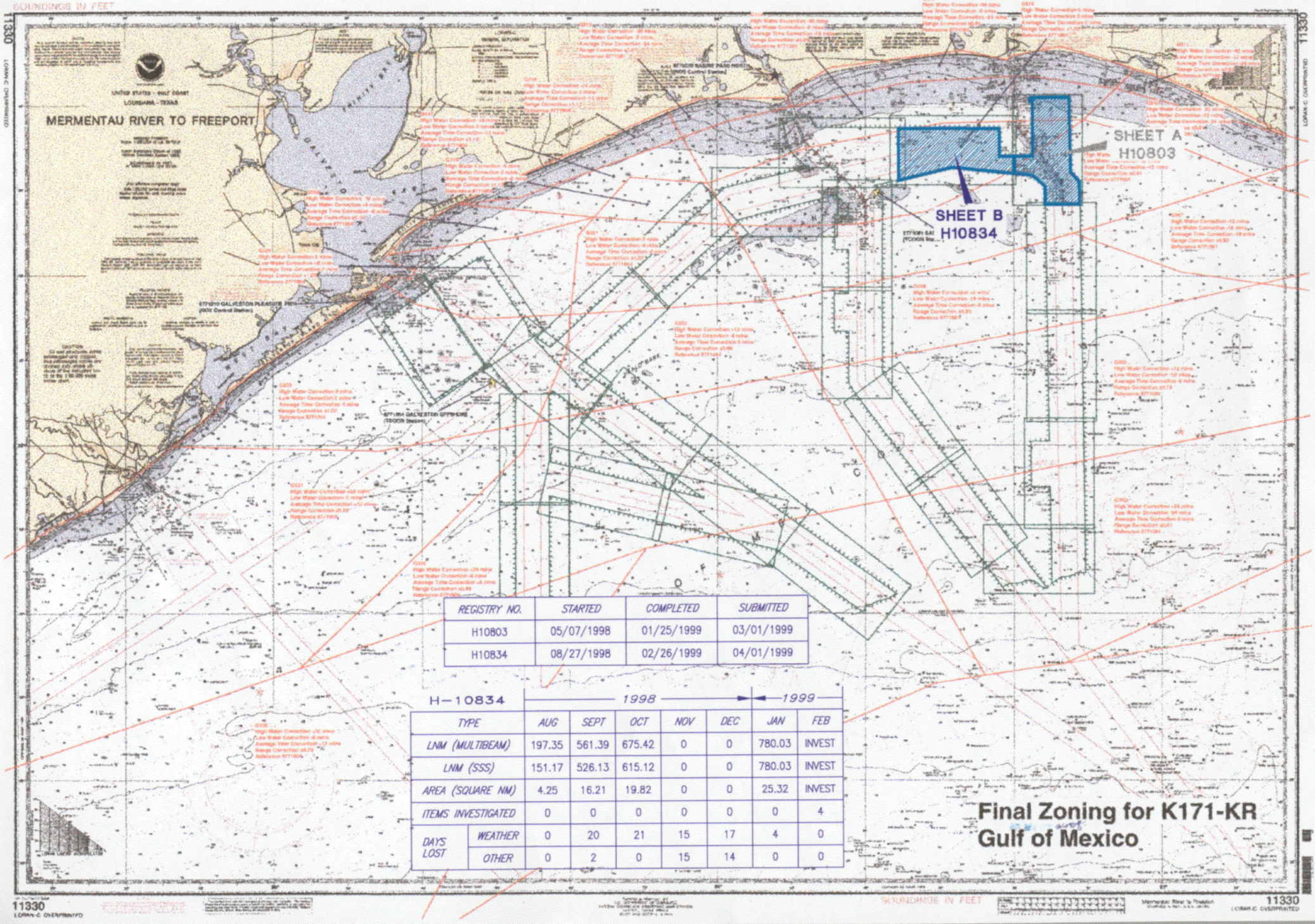
APPENDICES

SEPARATES

* DATA FILED WITH ORIGINAL FIELD RECORDS



REGISTRY NO.	STARTED	COMPLETED	SUBMITTED
H10803	05/07/1998	01/25/1999	03/01/1999
H10834	08/27/1998	02/26/1999	04/01/1999

H-10834		1998					1999	
TYPE		AUG	SEPT	OCT	NOV	DEC	JAN	FEB
LNM (MULTIBEAM)		197.35	561.39	675.42	0	0	780.03	INVEST
LNM (SSS)		151.17	526.13	615.12	0	0	780.03	INVEST
AREA (SQUARE NM)		4.25	16.21	19.82	0	0	25.32	INVEST
ITEMS INVESTIGATED		0	0	0	0	0	0	4
DAYS LOST	WEATHER	0	20	21	15	17	4	0
	OTHER	0	2	0	15	14	0	0

Final Zoning for K171-KR
Gulf of Mexico

A. PROJECT

A.1 Project Number: OPR-K171-KR
Sheet B
Contract No.: 50-DGNC-8-90024 October 27, 1997
Task Order: 56-DGNC-8-23002 August 26, 1998
Date of Changes: Amendment 0001 February 17, 1999

A.2 The purpose of this contract is to provide NOAA with modern, accurate hydrographic survey data acquired using shallow water multibeam and side scan sonar technology with which to update the nautical charts of the assigned area. Numerous obstructions have been reported in this area. Side scan sonar shall be used to locate these obstructions and a shallow water multibeam sonar system shall be used to determine the least depth over the obstructions as well as determine the depths over the entire project area.

B. AREA SURVEYED

B.1 Sheet B, shown on the INDEX OF SHEETS, is located 12 miles southwest of Calcasieu Pass, Louisiana in the Gulf of Mexico.

B.2 The area was bounded by the following survey limits.

Latitude (°N)	Longitude (°W)
29.536158	93.333275
29.571041	93.333862
29.570977	93.367270
29.625844	93.366737
29.626435	93.596499
29.523055	93.596499
29.548538	93.475276
29.536158	93.333275

B.3 Data collection was performed between August 27, 1998 (J.D. 239) and February 20, 1999 (J.D. 51). An Abstract of Times of Hydrography is included in Appendix E. DATA FILED WITH ORIGINAL FIELD RECORDS.

C. SURVEY VESSELS

C.1 The *M/V Inez McCall* was leased from Cameron Offshore Boats, Inc. by C & C Technologies for the duration of the survey. A vessel diagram is included as part of Appendix G. DATA FILED WITH ORIGINAL FIELD RECORDS.

C.2 The *M/V Inez McCall* was used for all survey operations including multibeam soundings, side scan sonar operations, sound velocity casts, positioning, on-board processing, grab sampling, and interim deliverable production.

C.3 Vessel Description

Registration Number	638285
Length (feet)	110
Beam (feet)	25
Tonnage	
Gross	92
Net	62

C.4 Unusual vessel configuration: None

D. AUTOMATED DATA ACQUISITION AND PROCESSING SEE ALSO THE EVALUATION REPORT

D.1 Hydrographic data were collected and processed using C & C Technologies' proprietary HydroMap software run on a SUN Sparc Ultra2/2170 workstation. HydroMap was used to collect data from the survey instruments and record it on high speed AIT tape drives. All data were time tagged and recorded to file in their raw form. No subsampling was performed. Data collected by HydroMap include Simrad EM3000D, POS/MV, Trimble GPS, Satloc DGPS, Endeco YSI Sound Velocity Probe, Seabird CTD sensor, and Echotrac echosounder.

D.2 Two Endeco/YSI conductivity-temperature probes were mounted at the multibeam echosounder transducers to provide real-time sound velocity measurements at the transducer location. The sensor data were integrated with the EM-3000D to provide corrections for beam pointing angles during data collection.

Two Seabird SEACAT SBE 19 Profilers were used simultaneously to measure the water column sound velocity during hydrographic operations. The profilers were deployed to a minimum of 95% of the maximum water depth in the survey area to be covered. The sound velocity data from the casts were applied to the multibeam data at the time of collection.

D.3 Processing was performed in the following manner. Details of the processing steps are provided in Appendix I.*

1) For each survey line, processing involved the following steps:
   a) Extraction of generic vessel navigation data
   b) Performance of time correlation and georeferencing
   c) Data binning
   d) Data editing

2) Merging of data

3) Generation of smooth sheet

4) Generation of back-trace data

D.4 EG&G 260 side scan sonar data were collected and processed using the Triton Elics Isis software, run on a Windows 95 PC. Side scan data were recorded digitally together with time and position data, fed from HydroMap, and saved in QMIPS format to 8mm AIT tapes. The data were later converted to .xtf format in the C & C Technologies office.

D.5 The ISIS software was used to process the side scan data. Sonar targets and positions were recorded using this software.

D.6 A list of software and version numbers used for data collection and processing are given in Appendix K.*

E. SIDE SCAN SONAR

E.1 Side scan sonar data were collected using two EG&G 260 towfish, S/N 018400 and S/N 022162. Data were recorded using Isis software. Digital data were saved to Magneto Optical Disks and to 8 mm AIT tapes and analog data was printed in real-time on an EPC 1086 recorder.

The side scan sonar towfish was towed from the stern of the survey vessel. The towpoint was 16.14 meters astern of the navigation center. The dual frequency fish was operated at a frequency of 100 kHz for the duration of the survey.

E.2 Side scan data were collected across the survey area in water depths of 10 to 12 meters. A range of 75 meters per channel was used throughout the survey. The towfish were configured with a 20° depression angle. The towfish altitude was maintained between 6 and 7 meters. A 65 meter line spacing was used to adequately provide the required 200 % coverage with the side scan sonar.

* DATA FILED WITH ORIGINAL FIELD RECORDS

E.3 Fix marks (shot points) were recorded and annotated at an interval of 150 meters for all main scheme and rerun lines. All shot points were annotated with line name, date, time, fish position (easting and northing), event number, and layback.

E.4 Side scan sonar confidence checks were performed daily during survey operations. When possible, features seen during normal survey operations such as drag scars, canholes, or platforms were used as the target for the confidence checks. On several occasions, it was necessary to break line and find a known target to use for the confidence check. Each time a confidence check was performed it was annotated as such on the analog records and was noted in the survey log. The survey logs are included with the data and are submitted as Separates. *

E.5 Both the analog and digital copies of the side scan data were reviewed in the field. All measurements and positions were taken from the digital records using the ISIS software. The digital data were reviewed first and then the analog data were reviewed to make sure that all of the proper annotations had been made. All features and targets that were tagged on the digital records were also annotated appropriately on the analog records.

E.6 Fix files extracted from the HydroMap digital data were used to establish proof of coverage. The fix files were edited to exclude any areas for which the data were rejected. A hatching subroutine in AutoCAD was then used to show the swath width on either side of the trackline. Alternate lines were chosen for the first 100% coverage and the remaining lines were used to make up the second 100% coverage.

E.7 Due to the presence of temporary jack up rigs in the area at the time of the survey, it was not possible to achieve total 200% side scan sonar coverage. At two such locations there are gaps in 200% coverage, although 100% coverage exists at both of these locations. At one additional location, a large vessel was anchored during survey operations. There is a small gap in the 200% side scan coverage at this location as well, although 100% coverage exists. The side scan coverage plots are included as Separates. *

E.8 Three significant contacts were observed in the survey area. All three of these contacts are depicted on the smooth sheet.

Two are referenced in the Danger to Navigation Reports and Gulf of Mexico Local Notice to Mariners 42/98 and 07/99. One of the significant contacts was not reported because it was already charted.

Other targets, which were tagged and are listed in the sonar contact list, consist mainly of gas and oil field platforms. Several contacts interpreted to be insignificant debris were also tagged. Targets were measured online using the

* DATA FILED WITH ORIGINAL FIELD RECORDS

ISIS software. Each time a target was tagged, a file was created containing the target type, position, measurements, time and other relevant information. These target locations and types were then plotted in AutoCAD so correlations could be made between contacts seen on adjacent lines. A sonar contact list was made of all tagged targets. The sonar contact list is included as a separate* with the side scan sonar data. * DATA FILED WITH ORIGINAL FIELD RECORDS

F. SOUNDING EQUIPMENT

F.1 A Simrad EM-3000D dual-head multibeam sonar system, S/N 138, was used for all hydrographic operations. This system operates at a frequency of 300 kHz with 127 receive beams for each transducer.

F.2 A 200 kHz Echotrac 3200 MK II single beam echosounder, S/N 9555, was used as a continuous real-time check of the multibeam echosounder depth readings. Heave compensation was accomplished by corrections provided by the POS/MV motion sensor.

F.3 A draft tube was installed to measure changes in the vessel static draft. A valve was installed in the vessel hull and a clear plastic tube was attached to the valve. The tube was calibrated with a relative scale and daily measurements of the static draft were taken and entered into the multibeam echosounder as the "water level down" (draft) value.

F.4 Daily lead line measurements were taken as an additional check of the single beam and multibeam echosounder depth readings. The lead line was marked off at 10-centimeter intervals using a cloth metric tape measure. An average of several readings was taken as the depth value.

F.5 All of the above mentioned equipment was used during the entire survey and in all water depths.

G. CORRECTIONS TO SOUNDINGS

G.1 Two Endeco/YSI conductivity-temperature probes, model number 600R, were mounted at the multibeam echosounder transducers to provide real-time sound velocity measurements at the transducer location. The sensor data was integrated with the EM-3000D to provide corrections for beam pointing angles during data collection.

Two Seabird SEACAT SBE 19 Profilers were used simultaneously to measure the water column sound velocity during hydrographic operations. The profilers were deployed to a minimum of 95% of the maximum water depth in the survey area to

be covered. The sound velocity data from the casts were applied to the multibeam data at the time of collection prior to the commencement of the next survey line. Appendix J* contains a list of sound velocity profiles, dates, times, positions, and the survey lines to which each profile was applied. Below is a table of dates and locations of all casts used for sound speed corrections.

During times of severe spatial fluctuation in the sound velocity profile, multiple profiles were utilized during the survey. To accomplish this, profiles were taken at different locations within the survey area and were uploaded into the multibeam echosounder as required (see: Appendix J).*

Date	Latitude (°N)	Longitude (°W)	Date	Latitude (°N)	Longitude (°W)
08/28/98	29.59275	93.38424	10/01/98	29.63593	93.43681
08/28/98	29.62309	93.36885	10/02/98	29.55341	93.45271
08/28/98	29.53718	93.41404	10/02/98	29.62322	93.45618
08/28/98	29.55579	93.39412	10/08/98	29.61094	93.45783
08/28/98	29.62358	93.41220	10/08/98	29.54760	93.45824
08/28/98	29.61381	93.37643	10/09/98	29.54674	93.46780
08/29/98	29.59104	93.37540	10/09/98	29.62496	93.47213
08/29/98	29.56967	93.36094	10/10/98	29.62496	93.47258
08/29/98	29.54697	93.33730	10/10/98	29.62391	93.47957
08/29/98	29.54102	93.33463	10/10/98	29.54916	93.47870
08/29/98	29.57486	93.35809	10/11/98	29.54676	93.48950
08/30/98	29.54529	93.34575	10/12/98	29.54651	93.49552
08/30/98	29.56633	93.35056	10/12/98	29.62104	93.49283
08/30/98	29.56759	93.35576	10/13/98	29.62419	93.49591
08/30/98	29.79403	93.32388	10/13/98	29.62359	93.50004
08/30/98	29.56628	93.35735	10/13/98	29.54430	93.49981
08/31/98	29.57703	93.36459	10/13/98	29.58019	93.50422
08/31/98	29.54690	93.37407	10/14/98	29.54551	93.50815
09/04/98	29.65120	93.36153	10/14/98	29.62447	93.51033
09/04/98	29.61495	93.37597	10/15/98	29.54432	93.51834
09/05/98	29.61580	93.37925	10/15/98	29.55383	93.52392
09/05/98	29.54639	93.36976	10/15/98	29.53885	93.54215
09/05/98	29.61031	93.37625	10/15/98	29.54878	93.53302
09/06/98	29.61444	93.36803	10/15/98	29.56924	93.59435
09/06/98	29.54437	93.37680	10/15/98	29.58922	93.59172
09/20/98	29.69726	93.35947	10/15/98	29.61418	93.58987
09/21/98	29.61732	93.37224	01/11/99	29.54325	93.51904
09/21/98	29.55336	93.38346	01/11/99	29.54327	93.51907
09/21/98	29.55466	93.37511	01/12/99	29.62468	93.51485
09/21/98	29.58131	93.37623	01/12/99	29.55032	93.51624
09/21/98	29.53003	93.38718	01/12/99	29.58513	93.51623

* DATA FILED WITH ORIGINAL FIELD RECORDS.

09/22/98	29.62164	93.39059	01/13/99	29.54354	93.52940
09/22/98	29.62997	93.39833	01/13/99	29.58129	93.52583
09/23/98	29.62417	93.40442	01/14/99	29.59188	93.52783
09/23/98	29.61828	93.40753	01/14/99	29.56019	93.53097
09/23/98	29.59626	93.40475	01/14/99	29.61773	93.53326
09/24/98	29.62363	93.41580	01/15/99	29.54866	93.53921
09/24/98	29.60466	93.42021	01/16/99	29.54312	93.55238
09/25/98	29.52884	93.43972	01/16/99	Unknown	Unknown
09/25/98	29.55252	93.43456	01/17/99	29.56477	93.56054
09/25/98	29.56419	93.49706	01/19/99	29.79491	93.32470
09/26/98	29.57520	93.46526	01/20/99	29.55367	93.59089
09/26/98	29.60676	93.47946	01/25/99	29.60371	93.51246
09/30/98	29.61838	93.43206	01/25/99	29.54618	93.51601
09/30/98	29.54979	93.43085	01/27/99	29.57114	93.60054
10/01/98	29.62284	93.43863	01/28/99	29.53481	93.52921
10/01/98	29.54841	93.43861			

Two sound velocity profiles were taken and used during the investigation work on February 19 and 20, 1999.

Date	Latitude (°N)	Longitude (°W)
02/19/99	29.589606	93.441781
02/19/99	29.532990	93.645886

Two Seabird sound velocity profilers were used for the survey. Seabird S/N 1730 was the primary and S/N 1174 was the secondary profiler. Following, are the calibration dates of the Seabirds that were used during the survey. The calibration records of the profilers are included in Appendix G. DATA FILED WITH ORIGINAL FIELD RECORDS.

Seabird Serial Number	Date of Calibration
1730	April 10, 1998
1174	April 22, 1998

G.2 No instrument corrections were necessary for the multibeam or single beam echosounders.

G.3 An Echotrac 3200MK II single beam echosounder, S/N 9555, was run continuously throughout the survey for validation of the multibeam depth data. Heave compensation for the single beam echosounder was accomplished using the POS/MV motion sensor. The mean sound velocity taken from each sound velocity profile was entered into the single beam echosounder to correct for water column sound speed. A lead line reading was performed once a day as an additional check of depth readings. Readings from the draft tube were used to determine static draft.

G.4 Readings of the draft tube were taken daily to ensure that the proper static draft value was entered into the multibeam and single beam echosounders. In addition to the daily measurements, readings were also taken each time the vessel departed the dock and anytime changes in fuel and water loads were made.

G.5 A squat test was performed aboard the M/V Inez McCall on April 27, 1998. Three lines were run at RPM values ranging from 0 to 1800. The amount of squat was measured for eight different RPM values for each line. The results of the squat test revealed that the greatest change over the entire RPM range was less than 20 centimeters. The squat test log and results are included in Appendix G. *

The multibeam data were corrected for squat during post processing. Three survey speeds were used during data collection: 4.5 knots for main scheme lines, 6.5 knots for cross lines, and 8 knots for multibeam-only reruns. The lines were processed in groups according to survey speed and the corresponding squat was added to the depth readings as an elevation offset.

G.6 An Applied Analytics, Inc. POS/MV 320 motion sensor was integrated with the multibeam echosounder to provide real-time heave, pitch, and roll corrections. This system, which has an internal GPS receiver, was used in conjunction with SATLOC differential corrections for primary navigation throughout the survey and was used to determine heave, pitch, and roll offsets during the patch tests.

SATLOC is based upon technology developed by NASA for space docking, which requires accuracy and reliability at a great distance from the Reference Site (RS). SATLOC computes a unique correction for each receiver based upon a variety of GPS conditions from horizon to horizon. This technique is referred to as a State Space Model (SSM). From a cold start-up, SATLOC determines its location using its integral GPS then calculates a line of sight to each satellite in view. Next it receives the SSM and applies the ionosphere model to correct for GPS signal delays, orbital correctors, and clock correctors. The output solution is a differential correction message unique to your exact location.

G.7 Prior to the survey, a standard patch test procedure was performed at the work site to determine correctors for roll, pitch, yaw, and system latency. "Can hole" depressions created by a jack-up rig were used as targets for determining and verifying alignment correctors in the following manner. Procedures for a standard patch test are outlined below and patch test results are included in Appendix G. *

Roll:
Iterations of linear regression were performed upon the mean differences from eight pairs of collinear reciprocal lines to verify the roll mounting angles for each transducer head and to compute the roll corrector value applied by the POS/MV.

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Pitch:
Two pairs of collinear reciprocal lines were run at the lowest practical survey speed over the calibration target to calculate the offsetting pitch corrector value applied by the EM-3000. The following formula was used: cp = atan (dt / (2 x water depth), where cp = pitch corrector value and dt = target offset distance.

Latency:
Two pairs of collinear reciprocal lines were run at the highest practical survey speed over the calibration target to calculate the offsetting latency corrector value applied by the EM-3000. The following formula was used: dl = dt / (2 x velocity), where dl = latency corrector value and dt = target offset distance.

Yaw:
One pair of reciprocal lines with approximately 25% overlap was run over the calibration target. No offset was required, so a zero (0) misalignment value was entered into the POS/MV. The following formula is used for this calculation: cy = atan (dt / (2 x offset from track line)), where cy = yaw corrector value and dt = target distance offset.

G.8 The tidal datum used for the survey was Mean Lower Low Water (MLLW). Tidal corrections were applied in real-time using the predicted tides derived from MicroNautics WorldTide software. During post-processing, tidal data from the Sabine Pass offshore tidal station (877-1081) and the Galveston Pleasure Pier tidal station (877-1510) were used with correction offsets for tide zone 315. The tidal zone, stations, and offsets used during post-processing are given in the table below.

Tidal Zone	Tide Station	Time Correction			Height Correction
		HW	LW	Ave	
G315	877-1081	0	0	0	1.00
G315	877-5110	0	-6	-6	1.17

The Sabine Pass station was the primary tidal station but for the period between September 10, 1998 and October 1, 1998, the tide station was out of order and therefore tide data from the Galveston Pleasure Pier tidal station were used.

The northwestern and southeastern edges of the survey area cross the boundary of tidal zones G310 and G309. However since such a small area lies outside of zone G315, the entire job was processed using tide correctors for zone G315. Appendix F* contains the correspondence in which the request was made and permission granted for the job to be processed entirely in the one tidal zone.
APPROVED TIDES AND ZONES WERE APPLIED DURING FIELD PROCESSING.

* DATA FILED WITH ORIGINAL FIELD RECORDS.

H. CONTROL STATIONS SEE ALSO THE EVALUATION REPORT

H.1 The horizontal datum used for the survey was NAD83 (North American Datum of 1983).

H.2 No horizontal control stations were established for this survey. Existing land based stations used for SATLOC and Coast Guard beacon are listed in Appendix C. *

H.3 Results of the 24-hour monitoring of the SATLOC differential signal are shown in Appendix H. Results of the test are as follows:

A fix was taken every second totaling 94,682 position values (26.3 hours).
The average PDOP value was 1.20.
The difference between control point LCG25 and average DGPS position:
Northing = 0.12 meters
Easting = 0.87 meters

A scatter-plot of the mean radial position error, with the mean HDOP annotated on the plot, is included in Appendix H. *

I. HYDROGRAPHIC POSITION CONTROL

I.1 This survey was conducted using a Trimble 4000SSi 9-channel GPS receiver, a SATLOC Trimble DSM 12 channel GPS receiver, and a POS/MV inertial navigation unit embedded with two NovAtel GPS receivers. All units were integrated with differential GPS (DGPS) corrections. Data were continuously recorded from all three GPS units throughout the survey. The real-time positional solutions were projected on the real-time coverage display during survey operations.

I.2 The DGPS integration included the following checks and settings to ensure that all requirements as specified in the Statement of Work were met:

- All GPS receivers were set to have at least an 8-degree elevation mask; typically an 11-degree elevation mask was used.
- The audio alarm was set to sound each time a GPS position that was not differentially corrected was received.
- A PDOP value of 7 was used to ensure that at least 4 satellites were being received at all times.

I.3 The accuracy requirements, as specified in the Statement of Work, were met. Both DGPS systems used for this survey met the 95% confidence level and did not exceed the 10-meter limit as specified in the Statement of Work. The

* DATA FILED WITH ORIGINAL FIELD RECORDS

Horizontal Dilution of Precision (HDOP) was monitored by HydroMap data collection software during data collection. When the HDOP value exceeded the allowable limit of 2.5, survey operations were suspended until DGPS performance improved. If positioning quality degraded beyond acceptable limits while on line, the data were automatically rejected by HydroMap software.

I.4 No difficulties that would have degraded the expected positional accuracy were encountered.

I.5 Positioning equipment utilized during this project, identified by manufacturer, model, and serial number are:

Unit 1:
Trimble 4000-SSi
S/N 3507A09641
Firmware Version: 7.22v
MBX2 USCG DGPS Receiver
Unit # 212

Unit 2:
Trimble DSM
S/N not available (board)
Satloc Receiver (C&C)
Unit # 0047

Unit 3:
POS/MV unit # 011
(2) NovAtel 3151ROEM
S/N not available (board)
Firmware Version: 3.33
Satloc Receiver (C&C)
Unit # 0047

I.6 The DGPS positioning system does not require calibrations. A comparison of each of the three positioning systems was performed for each line of data and can be found in Appendix H. DATA FILED WITH ORIGINAL FIELD RECORDS.

I.7 There were no unusual methods used to calibrate or operate the electronic positioning equipment.

I.8 There were no equipment malfunctions or substandard operations that would have affected the positioning equipment.

I.9 The USCG DGPS Receivers, which were used as the corrections for the secondary positioning system, can be affected by atmospheric conditions such as

thunderstorms. The Radio link from the tower site can be cut off temporarily by this atmospheric condition, but in no way is the data quality damaged. The HydroMap software was configured to provide an audio warning and automatically reject the data if a DGPS signal was not received within 20-second timeframes as specified in the Statement of Work.

I.10 No poor geometric configurations were encountered during this survey.

I.11 No systematic errors that required adjustments were detected.

I.12 Antenna offset and layback corrections were measured using conventional methods by two different procedures. These conventional methods involved the employment of tape measures, a hand level, and a plum bob.

The first method was to take the measurements twice by two different personnel. The second method was to measure incrementally such that the sums and differences of the measures could be used to check the overall dimensions.

All distances were referenced to the navigation center, which is the POS/MV IMU. A list and diagram of the determined measurements are provided in Appendix G. *

J. SHORELINE

"Not Applicable"

K. CROSS LINES

HydroMap contains a tool that compares data from a main line with data from cross lines. The comparison calculates the mean difference and noise level as a function of cross-track position. The measurements are used for quantitative quality assurance system accuracy and ray-bending analysis. All cross line statistical results are included as Separates II. *

K.1 Reference Data

In general, cross lines, which consisted of a minimum of 5 percent of the main scheme lines, were used to produce reference data. The reference data are considered to be an accurate representation of the bottom. Since the data are collected from an orthogonal direction, the errors should be independent.

The cross lines were processed to produce the best possible data. Frequent sound velocity profiles were taken to minimize any possible ray-bending. Further, the

* DATA FILED WITH ORIGINAL FIELD RECORDS.

swath was restricted to a width that ensured that there were no measurable ray-bending or roll errors. In this case, the swath was restricted to an angular sector of 10 degrees, producing a swath width of less than 2 meters. The data were binned and thinned using a median filter. The data were then edited carefully to ensure that there were no remaining outliers. The cross line data were maintained in files for each line.

K.2 Test line

The line to be evaluated, the test line, was processed to produce a trace file. Trace files are comprised of binned soundings that have not been thinned. They contain extra data in addition to x, y, and z, which are used for analysis. Processing parameters were set to include all beams.

K.3 Cross Analysis

To perform the cross analysis, each line of the reference data set was analyzed and the results were "stacked" to produce more significant statistics.

The following operations were performed for each line of the reference data:

Optionally remove tidal effects:

Residual tidal effects were removed by eliminating the difference between the reference line data and the near-nadir beams of the test line. The beams of the test line that fall within a small (operator settable) angular sector from nadir were subtracted from the corresponding soundings of the reference data. The average difference was used to temporarily offset all of the test line soundings for comparison to this reference line.

Difference all soundings and Bin the results:

Each sounding of the test was subtracted from the sounding in the corresponding bin of the reference line. The resulting differences were used to accumulate statistics based on an operator settable across-track binning criteria. The across-track binning may be based upon across-track distance, beam number, or angle from nadir. The bin size is also settable by the operator.

K.4 Results From All Reference Lines Stacked

The accumulated statistics of all test line soundings as compared to all reference lines were processed to produce four across-track profiles. The profiles represent the mean difference, standard deviation, root-mean-square difference, and

percentile confidence interval. The data are provided in graphical form in Separates II. DATA FILED WITH ORIGINAL FIELD RECORDS.

K.5 Interpretation

Ray-bending:

The effects of ray-bending were measured by observing the values of the mean difference curve. Ray-bending produces a mean difference that curves upward or downward at the outer edges of the swath in a symmetric pattern around nadir. The value of the difference at a given across-track distance indicates the amount of vertical error being introduced by incorrect ray-bending corrections.

Residual ray-bending errors occur when the sound velocity profile loaded into the sonar does not match the real world. The errors will normally be reduced if a new sound velocity profile is recorded and loaded into the sonar unit.

Errors in sound velocity at the sonar head cause the sonar to miscalculate the beam pointing angles and result in a symmetric mean difference curve that closely resembles the error due to incorrect sound velocity profiles.

Procedure

At the end of each line, beam analysis was run to measure the ray-bending at the outer edge of the intended usable swath. If the ray-bending exceeded the allowable tolerance, another sound velocity cast was taken.

When the ray-bending appeared to be variable along the line, the survey was segmented into smaller sub-areas.

When the sound velocity changed so quickly in time and space that the specified accuracy could not be met, a narrower swath was used in that area.

Vertical accuracy:

The vertical accuracy of the system is reflected by the RMS difference and the confidence interval.

The 90% confidence interval must be below 0.25 meters when measured beam-by-beam.

Roll Error:

Residual roll error was measured by determining the slope of the mean difference curve with the data being analyzed in terms of cross-track distance. With cross lines, the slope directly indicates the roll bias. With reciprocal lines, the slope will indicate approximately twice the roll bias.

K.6 Each main line was compared to all the cross lines that had overlapping data. A graph was produced for each main line showing the mean difference, RMS difference, and confidence interval for each beam. The graphs showed the multibeam data to be repeatable with 90% of the soundings within 5 to 10 centimeters across the entire swath.

The dominating sources of errors in the final soundings were the final smooth tides. The tide correctors compensated for the majority of the tidal variation, but left a residual error of as much as 20 to 25 centimeters. These tidal errors are visible as line-to-line mismatches, particularly between lines that were run several hours apart; the effects are characterized on the smooth sheet as deviations on contour lines oriented in the direction of the survey lines.

L. JUNCTIONS SEE ALSO THE EVALUATION REPORT

This survey junctions with Gulf of Mexico hydrographic surveying projects H10803, Sheet A [1998], which is 11 miles SSE of Calcasieu Pass and H10851, Sheet C [1999], which is 9 miles SE of Sabine Pass. The survey in adjoining Sheet A is complete while the survey of Sheet C is ongoing.

A review of the junction with Sheet A, based upon corrected tides for both sheets, reveals a close general agreement of soundings (one foot or less) within the junctioning area. An evaluation of the junction with Sheet C has not been performed.

M. COMPARISON WITH PRIOR SURVEYS SEE ALSO THE EVALUATION REPORT

Comparison with prior surveys was not required under this contract. See Section N for comparison to the nautical charts.

N. COMPARISON WITH THE CHART SEE ALSO THE EVALUATION REPORT

N.1 The following nautical charts were used for comparison for this survey. It should be noted that the majority of the charts were released after the Work Order was effected. Therefore, later chart editions than those indicated in Attachment #3 of the Statement of Work are reflected.

Chart Number	Scale	Edition	Edition Date
11330	1:250,000	12	August 8, 1998
11341	1:80,000	37	October 25, 1997

All Local Notices to Mariners that applied to the survey area were also taken into consideration for the chart comparison.

N.2 A comparison with the chart revealed a close agreement of charted depths with survey depths over a majority of the chart. The survey depths are generally deeper than the charted depths by 1 to 2 feet.

Minor disagreements exist along the northern edge of the survey area:

A charted sounding of 37 feet, located at approximately 29^0 37' 20"N, 93^0 30' 50"W, is 1 to 2 feet deeper than the survey depth.

A charted sounding of 33 feet, located at approximately 29^0 37' 20"N, 93^0 26' 45"W, is 3 feet shoaler than the survey depth.

SOUNDING 33

N.3 A shoal measuring ~~34~~ feet, which appears to be the termination of an anchor drag, exists at approximately 29^0 33.~~04~~82' N, 93^0 35.~~67~~40' W. It is recommend that the depth be charted as depicted on Smooth Sheet. CONCUR

N.4 Nine charted items lie within the survey area. This table identifies each of the charted items. A description and chart comparison follows. All of the following charted items appear on nautical chart 11341 (1:80,000).

Charted Item	Description	Position		Charted Depth (feet)	Survey Depth (feet)
		Latitude (N)	Longitude (W)		
1	Wreck PD (AWOIS 7019)	29° 36' 30"	93° 35' 00"	30	36
2	Wreck PA (AWOIS 8947)	29° 36' 00"	93° 34' 00"	-	37
3	Wreck PD (AWOIS 8946)	29° 37' 02"	93° 32' 13"	-	36
4	Obstruction PA (AWOIS 7020)	29° 37' 18"	93° 27' 42"	-	36
5	Obstruction (Rep 1990)	29° 36' 14"	93° 26' 12"	35	~~37~~ 35
6	Obstruction (AWOIS 8941)	29° 35' 56"	93° 25' 31"	31	38
7	Obstruction (Rep 1990)	29° 36' 12"	93° 25' 17"	36	37

8	Wreck PA (AWOIS 8942)	29° 36' 31"	93° 25' 01"	-	37
9	Obstruction (Rep 1990)	29° 37' ~~28~~ 19"	93° 25' ~~01~~ 00"	34	36

N.5 The locations of AWOIS items were plotted on the trackline plots in the field so that those locations could be easily correlated with the appropriate side scan sonar lines and shot points. The following table lists side scan sonar lines and the corresponding shot points that were run over the reported AWOIS locations.

AWOIS Item	Position		Side Scan Lines	Shot Points
	Latitude (N)	Longitude (W)		
8941	29°35'55.90"	93°25'31.00"	188,190,192	58 – 59
8947	29°36'00.00"	93°34'00.00"	448,453,455	59 – 60
7019	29°36'30.00"	93°35'00.00"	476,478,480	65 – 66
8942	29°35'30.80"	93°25'00.60"	135,138,140	65 – 66
8946	29°37'01.80"	93°32'12.60"	393,395	72 – 73
7020	29°37'18.00"	93°27'42.00"	240,242,244	75 – 76

Each AWOIS Item was investigated by employing procedures outlined in Amendment/Modification number 56-DGNC-8-23002, dated August 26, 1998, which specifies 200% side scan sonar coverage with a line spacing "such that the distance between the portions of the [multibeam] swath that meet accuracy requirements in SOW Paragraph 4.3 does not exceed 50 meters". This method is denoted as "200% side scan and multibeam". Item #5 was investigated with 400% side scan sonar and 100% multibeam.

Charted Item 1
Item Type: **Wreck PD**
AWOIS Number: 7019
Charted Position: 29° 36' 30" N, 93° 35' 00" W
Charted Depth: Cleared 30 feet 1975
Method of Investigation: 200% side scan and multibeam
Survey Results: No evidence of the wreck was found during the survey. Survey depths were 6 feet deeper than the charted depths.
Recommendation: Remove from chart. CONCUR - DELETE ~~PA~~ PD
(CLEARED 30 ft 1975)

Charted Item 2
Item Type: **Wreck PA**
AWOIS Number: 8947
Charted Position: 29° 36' 00" N, 93° 34' 00" W
Charted Depth: --
Method of Investigation: 200% side scan and multibeam

Survey Results: No evidence of the wreck was found during the survey. Survey depths at the location are 37 feet.
Recommendation: Remove from chart. CONCUR - DELETE '44' PA

Charted Item 3 SEE ALSO ADDENDUM TO THIS REPORT (ITEM B2, Pg 2)
Item Type: **Wreck PD**
AWOIS Number: 8946
Charted Position: 29° 37' 01.80" N, 93° 32' 12.60" W
Charted Depth: --
Method of Investigation: 200% side scan and multibeam
Survey Results: No evidence of the wreck was found during the survey. Survey depths at the location are 36 feet.
Recommendation: Remove from chart.

Charted Item 4 SEE ALSO ADDENDUM TO THIS REPORT (ITEM B1, Pgs. 1&2)
Item Type: **Obstruction PA**
AWOIS Number: 7020
Charted Position: 29° 37' 18" N, 93° 27' 42" W
Charted Depth: --
Method of Investigation: 200% side scan and multibeam
Survey Results: No evidence of the obstruction was found during the survey. Survey depths at the location are 36 feet.
Recommendation: Remove from chart.

Charted Item 5 (Item of Investigation #1)
Item Type: **Obstruction Rep 1990**
AWOIS number not assigned
Charted Position: 29° 36' 14" N, 93° 26' 12" W
Charted Depth: 35 feet
Method of Investigation: 400% side scan 100% multibeam
Survey Results: This obstruction was seen with both side scan and multibeam during the investigation work. A least depth of ~~37~~ 35 feet (~~11.28~~ 10.87 meters) was determined.
Recommendation: Retain as charted. CONCUR WITH CLARIFICATION - REVISE POSITION OF '35' OBSTN TO 29°36'13.76"N, 093°26'10.47"W - DELETE NOTATION OBSTN REP (1990)

Charted Item 6
Item Type: **Obstruction ~~Rep 1990~~**
AWOIS 8941
Charted Position: 29° 35' 56" N, 93° 25' 31" W
Charted Depth: 31 feet
Method of Investigation: 200% side scan and multibeam
Survey Results: No evidence of the obstruction was found during the survey. Survey depths are 7 feet deeper than charted depths.
Recommendation: Remove from chart. CONCUR - DELETE '31' OBSTN

Charted Item 7
Item Type: **Obstruction Rep 1990**
AWOIS number not assigned
Charted Position: 29° 36' 12" N, 93° 25' 17" W
Charted Depth: 36 feet
Method of Investigation: 200% side scan and multibeam
Survey Results: No evidence of the obstruction was found during the survey. Survey depths are 1 foot deeper than charted depths.
Recommendation: Remove from chart. CONCUR - DELETE 36 OBSTN REP (1990)

Charted Item 8
Item Type: **Wreck PA**
AWOIS Number: 8942
Charted Position: 29° 36' 30.80" N, 93° 25' 00.60" W
Charted Depth: --
Method of Investigation: 200% side scan and multibeam
Survey Results: No evidence of the wreck was found during the survey. Survey depths are 37 feet at this location.
Recommendation: Remove from chart. CONCUR – DELETE ~~11~~ PA

Charted Item 9
Item Type: **Obstruction Rep 1990**
AWOIS number not assigned
Charted Position: 29° 37' ~~28~~ 19" N, 93° 25' ~~01~~ 00" W
Charted Depth: 34 feet
Method of Investigation: 200% side scan and multibeam
Survey Results: No evidence of the obstruction was found during the survey. Survey depths are 2 feet deeper than the charted depth.
Recommendation: Remove from chart. CONCUR – DELETE 34 OBSTN rep (1990)

N.6 Four Items of Investigation were surveyed in February 1999. The first is a charted item; the last three are uncharted items.

Item of Investigation #1 (Charted Item #5)
AWOIS number not assigned
Position: 29° 36' ~~14.04~~ 13.76" N and 93° 26' ~~12.20~~ 10.47" W
Survey Depth: 11.28 meters (37 feet)
Method of Investigation: 400% side scan and 100% multibeam
Survey Results: The obstruction was identified with the side scan sonar and the multibeam echosounder.
Recommendation: Retain as charted. SEE SECTION N.5, CHARTED ITEM 5, Pg. 18 FOR CHARTING RECOMMENDATION.

Item of Investigation #2
(Reported as Danger to Navigation #2) .84
Position: 29° 36' 42.~~44~~" N and 93° 32' 44.~~80~~" W
Survey Depth: ~~10.06~~ meters (~~33~~ feet)
Method of Investigation: 400% side scan and 100% multibeam
Survey Results: The obstruction was identified with the side scan sonar and the multibeam echosounder.
Recommendation: Chart as depicted on Smooth Sheet. CONCUR – CHART 32 OBSTN

Item of Investigation #3
(Reported as Danger to Navigation #3)
Position: 29° 33' 14.03" N and 93° 25' 12.96" W
Survey Depth: 11.89 meters (39 feet)
Method of Investigation: 400% side scan and 100% multibeam
Survey Results: The obstruction was not located with side scan sonar or the multibeam echosounder. A letter was sent to the U.S. Coast Guard requesting its removal from the Local Notice to Mariners (see Appendix A). APPENDED TO THIS REPORT
Recommendation: The item was disproved. Chart as depicted on Smooth Sheet. CONCUR – DELETE 36 OBSTN PA – SEE N.7 DANGER TO NAVIGATION #3

Item of Investigation #4 2459.94
Position: 29° 36' 02.~~73~~" N and 93° ~~25' 00.42~~" W Charted Depth:
Survey Depth: 10.~~97~~ meters (~~36~~ feet)
Method of Investigation: 400% side scan and 100% multibeam
Survey Results: Identified with the side scan sonar and the multibeam echosounder. Determined ~~not~~ to be a Significant Contact.
Recommendation: Chart as depicted on Smooth Sheet. CONCUR – CHART 35 OBSTN

N.7 Three Dangers to Navigation were discovered and reported during the survey. The Danger to Navigation Reports, accompanying letters, and the corresponding Notices to Mariners are included in Appendix A. APPENDED TO THIS REPORT

Danger to Navigation #1 OBSTN
Object discovered: ~~Unknown~~ 20.94 48.18
Geographic Position: 29° 34' ~~.21~~" N and 93° 23' ~~48~~" W
Chart Datum: NAD 83 35.95
Reported Depth: ~~11.17~~ meters (~~36.65~~ feet) 10.96 REVISE POSITION TO PRESENT SURVEY

Danger to Navigation #2 (Item of Investigation #2)
Object discovered: Unknown
Geographic Position: 29° 36' 42" N and 93° 32' 43" W
Chart Datum: NAD 83
Reported Depth: 10.00 meters (32.8 feet) SEE N.6 ITEM OF INVESTIGATION #2

Danger to Navigation #3 (Item of Investigation #3)
Object discovered: Unknown
Geographic Position: 29° 33' 14" N and 93° 25' 13" W
Chart Datum: NAD 83
Reported Depth: 11.03 meters (36.2 feet)
During investigation work, the obstruction was not located with side scan sonar or the multibeam echosounder. The least depth was determined to be 11.89 m (39 feet). A letter was sent to the U.S. Coast Guard requesting its removal from the Local Notice to Mariners (see Appendix A). APPENDED TO THIS REPORT - SEE N.6 ITEM OF INVESTIGATION #3

N.8 Four charted pipelines lie within the survey area. However, the positions were not confirmed or disproved by the side scan sonar or multibeam echosounder data. It is recommended that these pipeline locations be maintained as charted.

N.9 Four charted platforms lie within the survey area. It is recommended that the platforms be charted as depicted on the smooth sheet. SEE ALSO THE ~~ELD~~ EVALUATION REPORT

N.10 No evidence of the privately maintained buoy designated "Priv" was found during the survey. It is recommend that the buoy be removed from the chart. CONCUR - 29° 33' 00" N, 093° 28' 00" W

O. <NOT USED BY CONTRACTOR>

P. AIDS TO NAVIGATION

P.1 No aids to navigation lie within the survey area.

Q. STATISTICS

Lineal nautical miles of sounding lines (Side scan and multibeam)	2218.93 nm
Lineal nautical miles of sounding lines (Multibeam only)	122.33 nm
Square nautical miles (100% multibeam and 200% side scan coverage)	65.6 nm^2
Number of velocity casts (applied to data)	95
Number of supplemental tide stations	0
Number of horizontal control stations occupied/established	0

Number of items investigated 4

R. MISCELLANEOUS SEE ALSO THE EVALUATION REPORT

R.1 The "Histogram of Selected Soundings by Beam Number" is dominated by peaks at the outer edges of the swath. The raw soundings have the highest variability at the outer edges of the swath due to residual roll error, residual ray bending, and high grazing angles. The selected soundings are the shoalest of the processed, thinned soundings and tend to be populated with noisiest soundings due to the extremely flat topography of the area.

The gap at the center of the histogram does not represent an absence of data. It is the result of the Simrad EM-3000D internal beam numbering and reflects overlap between the two transducer heads. Extremely dense data exists at nadir, which is centered at beams 110 to 120 and 140 to 150.

R.2 A multibeam coverage map is included as part of the Separates.* A 150 meter along track gap in multibeam coverage is present at 29° 33' 40.88" N, 93° 33' 25.18" W. Full side scan sonar coverage was achieved at this location and no obstructions or sonar contacts were seen in this area.

S. RECOMMENDATIONS

None

T. REFERRAL TO REPORTS

* DATA FILED WITH ORIGINAL FIELD RECORDS.

APPENDIX A

DANGER TO NAVIGATION REPORT

Commander (OAN)
Eighth Coast Guard District
Hale Boggs Federal Building
New Orleans, LA 70130-3396

Dear Sir:

While conducting hydrographic survey operations in the West Cameron Area of the Gulf of Mexico, C & C Technologies, Inc. discovered an uncharted obstruction measuring approximately 4m x 4m x 1.27m. Attached is the Danger to Navigation Report and a section of chart number 11341 indicating the position of this danger.

Differential GPS, side scan sonar, and multibeam sonar were used to determine the position and depth. These data are preliminary and subject to office review.

Sincerely,
C & C Technologies, Inc.

Frank Lipari, PE, PLS

Enclosures: report
Copy: COTR

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: H10834

State: Louisiana

General Locality: Gulf of Mexico

Sublocality: West Cameron Area

Project Number: OPR-K171-KR

The following item was found during hydrographic survey operations:

Object Discovered: Unknown

Covered 36.5 feet corrected to Mean Lower Low Water using predicted tides.

Chart Number	U. Edition		Reported Depth	Charted Horiz. Datum	Geographic Position	
	No.	Date			Latitude	Longitude
11341 11330 11340	37 11 57	Oct 25/97 Sept 30/95 Sept 24/94	36.5 ft.	NAD 83	29-34-21	93-23-48

U.S. Department of Transportation
United States Coast Guard

Commander
Eighth Coast Guard District
Hale Boggs Federal Building

501 Magazine Street
New Orleans, LA 70130-3396
Staff Symbol: oan
Phone: 504 589-6277
FAX: 504 589-6654

16600
October 16, 1998

C&C Technologies
Survey Services
Attn: Mr. Frank Lipari, PE, PLS
730 E. Kaliste Saloom Road
Lafayette, LA 70508

Dear Mr. Lipari:

Thank you for your recent letter concerning an uncharted shoal. We will update this information in the Gulf of Mexico Local Notice to Mariners 42/98.

Again, thank you for your interest in ensuring the Local Notice to Mariners publication contains accurate and up to date information. We welcome any future comments or questions.

Sincerely,

D. P. LEDET, SR.
Chief, Marine Information Section
Aids to Navigation Branch
U.S. Coast Guard
By direction of the District Commander

DANGER TO NAVIGATION REPORT

Commander (OAN)
Eighth Coast Guard District
V. Hale Boggs Federal Building
New Orleans, LA 70130-3396

Dear Sir:

While conducting hydrographic survey operations in the area between Calcasieu Pass and Sabine Pass, Louisiana, C & C Technologies, Inc. discovered an uncharted obstruction. Attached is the Danger to Navigation Report and a section of chart 11341 indicating the position of this danger.

Differential GPS, side scan sonar, and multibeam sonar were used to determine the position and depth. These data are preliminary and subject to office review.

Sincerely,
C & C Technologies, Inc.
J. McCullogh
Jennifer McCullogh
Geophysicist

Enclosures: report
Copy: COTR

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: H10834

State: Louisiana

General Locality: Gulf of Mexico

Sublocality: 12 Miles SW of Calcasieu Pass

Project Number: OPR-K171-KR

The following item was found during hydrographic survey operations:

Object Discovered: Unknown

Covered 32.81 feet corrected to Mean Lower Low Water using preliminary unverified tides.

Chart Number	W. Edition		Reported Depth	Charted Horiz. Datum	Geographic Position	
	No.	Date			Latitude	Longitude
11341 11330	37 12	Oct 25/97 Aug 8/98	32.8 ft. 2	NAD 83	29-36-42	93-32-43 4

DANGER TO NAVIGATION REPORT

Commander (OAN) February 9, 1999
Eighth Coast Guard District
X. Hale Boggs Federal Building
New Orleans, LA 70130-3396

Dear Sir:

While conducting hydrographic survey operations in the area between Calcasieu Pass and Sabine Pass, Louisiana, C & C Technologies, Inc. discovered an uncharted obstruction. Attached is the Danger to Navigation Report and a section of chart 11341 indicating the position of this danger.

Differential GPS, side scan sonar, and multibeam sonar were used to determine the position and depth. These data are preliminary and subject to office review.

Sincerely,
C & C Technologies, Inc.

Jennifer McCullogh
Geophysicist

Enclosures: report
Copy: COTR

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: H10834

State: Louisiana

General Locality: Gulf of Mexico

Sublocality: 12 Miles SW of Calcasieu Pass

Project Number: OPR-K171-KR

The following item was found during hydrographic survey operations:

Object Discovered: Unknown

Covered 36.2 feet corrected to Mean Lower Low Water using verified tides.

Chart Number	Y. Edition		Reported Depth	Charted Horiz. Datum	Geographic Position	
	No.	Date			Latitude	Longitude
11341 11330	37 12	Oct 25/97 Aug 8/98	36.2 ft.	NAD 83	29-33-14	93-25-13

U.S. Department of Transportation
United States Coast Guard

Commander
Eighth Coast Guard District
Hale Boggs Federal Building

501 Magazine Street
New Orleans, LA 70130-3396
Staff Symbol: oan
Phone: 504 589-6277
FAX: 504 589-6654

16600
12 February 1999

C&C Technologies
Survey Services
Attn: Mrs. Jennifer McCullogh
730 E. Kaliste Saloom Road
Lafayette, LA 70508

Dear Mrs. McCullogh:

Thank you for your recent letter concerning uncharted obstructions. We have updated this information in the Gulf of Mexico Local Notice to Mariners 07/99 and will update our charts.

Again, thank you for your interest in ensuring the Local Notice to Mariners publication contains accurate and up to date information. We welcome any future comments or questions.

Sincerely,

D. P. LEDET, SR.
Chief, Marine Information Section
Aids to Navigation Branch
U.S. Coast Guard
By direction of the District Commander

Commander (OAN)
Eighth Coast Guard District
X. Hale Boggs Federal Building
New Orleans, LA 70130-3396

March 10, 1999

Dear Sir,

I am writing in reference to a report of a danger to navigation submitted on February 9, 1999 and reported in Notice to Mariners 07/99. The reported location of the obstruction was 29°33'14" N and 93°25'13"W. Upon further investigation of this target, 400% side scan coverage and 100% multibeam coverage, the presence of the target was disproved. It is recommended that the obstruction be removed from the Notice to Mariners.

Sincerely,

for Jennifer McCullogh
Geophysicist

730 E. Kaliste Saloom Road • Lafayette, Louisiana 70508 USA • Phone 318-261-0660 • Fax 318-261-0192

H10834

NOAA FORM 76-35A
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

ADDENDUM TO DESCRIPTIVE REPORT

Type of Survey: Hydrographic Multibeam & 200% Sidescan

Field No. : Sheet B

Registry No. : H10834

LOCALITY

State: Louisiana

General Locality: Gulf of Mexico

Sublocality: 12 miles SW of Calcasieu Pass

2000

CHIEF OF PARTY
Art Kleiner

LIBRARY & ARCHIVES

DATE:

NOAA FORM 77-28 (11-72)

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

REGISTRY NUMBER: H10834

HYDROGRAPHIC TITLE SHEET

Instructions: This is an addendum to the original descriptive report and should be viewed in conjunction with that report and with the original smooth sheet.

FIELD NUMBER: Sheet B

State: Louisiana

General Locality: Gulf of Mexico

Locality: 12 Miles SW of Calcasieu Pass

Scale: 1:20,000 Date of Survey: ~~March 2000~~ MARCH 4-6, 2000

Instructions Dated: February 21, 2000 Project Number: OPR-K171-KR

Vessels: R/V *Coastal Surveyor*

Chief of Party: Art Kleiner, HYDROGRAPHER IN CHARGE

Surveyed by: S. Melancon, H. Langill, L. Theriot, D. Aucoin

Soundings taken by echosounder, hand lead line, or pole: Simrad EM3000 Multibeam Echosounder

Graphic record scaled by: N/A

Graphic record checked by: N/A

HEWLETT PACKARD DESIGN JET 2500CP

Protracted by: N/A Automated plot by: ~~HP 755 Plotter~~

Verification by: ~~C&C Technologies Personnel~~ ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL

Soundings in: Feet: X Fathoms: _____ Meters: _____ at MLW: _____ MLLW: X

Remarks: Addendum to descriptive report to accompany H10834
Investigation of AWOIS items 7020 and 8946
200% side scan sonar coverage
UTC time was used exclusively

NOTES HAND WRITTEN IN THE DESCRIPTIVE REPORT WERE MADE DURING OFFICE PROCESSING

NOAA FORM 77-28 SUPERSEDES FORM C & GS - 537

Project Number: OPR-K171-KR
Sheet B
Registry Number: H10834
Contract Number: 50-DGNC-8-90024
Task Order Number: 56-DGNC-0-23005

On March 4, 5, and 6, 2000, a survey crew aboard the R/V *Coastal Surveyor* performed two item investigations for items that lay within the Sheet B survey limits. The investigation consisted of the completion of a 200% side scan sonar survey of the 2000 meter search radius around each of the charted items. Side scan coverage plots are included as Appendix I. *

C & C's 42 foot vessel, R/V *Coastal Surveyor* was used for all survey operations. A brief vessel description is given here and a vessel diagram is included as Appendix II. *

Official Number	999206
Length	42 feet
Beam	13 feet
Tonnage Gross	16
Net	13

Survey equipment utilized for the survey include an EG&G 260 side scan sonar system, a POS/MV dynamic motion sensor and positioning system, and a Hydrotrac single beam echosounder. Positioning was accomplished using a Trimble GPS receiver with SATLOC differential corrections. A Coast Guard Beacon was also used as a secondary source of differential corrections.

Hydrographic and positioning data were collected and processed using C&C Technologies proprietary HydroMap software. The sidescan data were collected and processed using Triton-Elics ISIS software.

Survey logs for the investigation work are included in Appendix III. *

Item B-1

B-1 (AWOIS 7020) is a charted obstruction PA located at 29°37'18.~~80~~00"N, 93°27'42.~~8~~00"W. The item was not detected in the original survey however the survey did not cover the entire 2000 m search radius. In order to be able to remove the item from the chart the entire search radius needs to be covered. This investigation consisted of a 200% side scan sonar survey of the portion of the search radius that was not covered during the initial survey.

The investigation of item B-1 consisted of forty-four east-west lines (lines ss1 to ss44) spaced at 40 m. Several of the lines had to be rerun due to poor weather conditions.

* DATA FILED WITH ORIGINAL FIELD RECORDS.

These reruns of the poor lines are named ss45, ss46, and ss74 to ss79. The side scan sonar was operated at a range scale of 50 m per channel throughout the investigations.

No evidence of the charted obstruction was seen during the investigation. It is recommended that this item be removed from the chart and that the AWOIS listing be updated to reflect the results of this survey. CONCUR - DELETE PA

Item B-2

B-2 (AWOIS 8946) is a charted wreck PD located at 29°37'18.80"N, 93°27'42.6"W. The item was not detected in the original survey however the survey did not cover the entire 2000 m search radius. In order to be able to remove the item from the chart the entire search radius needs to be covered. This investigation consisted of a 200% side scan sonar survey of the portion of the search radius that was not covered during the initial survey.

The investigation of item B-2 consisted of twenty east-west lines (lines ss47 to ss73) spaced at 40 m. The side scan sonar was operated at a range scale of 50 m per channel throughout the investigations.

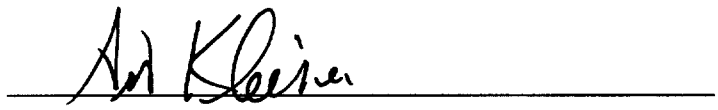
No evidence of the charted wreck was seen during the investigation. It is recommended that this item be removed from the chart and that the AWOIS listing be updated to reflect the results of this survey. CONCUR - DELETE PD

LETTER OF APPROVAL

REGISRY NO. H10834

This report and the accompanying smooth sheet are respectfully submitted.

Field operations contributing to the accomplishment of survey H10834 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and smooth sheets have been closely reviewed and are considered complete and adequate as per the Statement of Work.



Art Kleiner
Hydrographer
C & C Technologies, Inc.
April, 1999

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10834

Name on Survey	A CHART NO. 1541	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
CALCASIEU PASS (title)	X		X							1
GULF OF MEXICO	X		X							2
LOUISIANA (title)	X		X							3
										4
										5
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[redacted]

AUG 17 1999

NOAA FORM 76-155 SUPERSEDES C&GS 197

NOAA FORM 61-29
(12-71)

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

REFERENCE NO.
N/CS33-51-01

LETTER TRANSMITTING DATA

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY (Check)

☐ ORDINARY MAIL ☐ AIR MAIL
☐ REGISTERED MAIL ☒ EXPRESS
☐ GBL (Give number)_____

TO:

CHIEF, DATA CONTROL GROUP, N/CS3x1
NOAA / NATIONAL OCEAN SERVICE
STATION 6815, SSMC3
1315 EAST-WEST HIGHWAY
SILVER SPRING, MARYLAND 20910-3282

DATE FORWARDED 09/20/2001

NUMBER OF PACKAGES 2

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

H10834

Louisiana, Gulf Of Mexico, 12 Miles SW Of Calcasieu Pass

ONE BOX CONTAINING:

1 ORIGINAL DESCRIPTIVE REPORT

ONE TUBE CONTAINING THE FOLLOWING:

1 SMOOTH SHEET PROVIDED BY THE CONTRACTOR FOR SURVEY H10834
1 SMOOTH SHEET FOR H10834
1 ORIGINAL DESCRIPTIVE REPORT
1 RECORD OF APPLICATION TO CHART FORM (NOAA FORM #75-96)
1 H-DRAWING ON MYLAR FOR CHART 11341
1 COMPOSITE DRAWING ON PAPER

FROM: (Signature) Richard Blurns

RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

NOAA \ NATIONAL OCEAN SERVICE
ATLANTIC HYDROGRAPHIC BRANCH N/CS33
439 WEST YORK STREET
NORFOLK, VA. 23510-1114

NOAA FORM 61-29 SUPERCEDES FORM C AND GS 413 WHICH MAY BE USED.

• U.S. GOVERNMENT PRINTING OFFICE: 1988 - 554-006-61309

09/20/2001

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H10834

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	34866
NUMBER OF SOUNDINGS	34866

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	102.0	04/05/2000
VERIFICATION OF FIELD DATA	50.0	06/26/2001
QUALITY CONTROL CHECKS	37.0	
EVALUATION AND ANALYSIS	9.0	
FINAL INSPECTION	12.0	11/20/2000
COMPILATION	51.0	09/12/2001
TOTAL TIME	261.0	

ATLANTIC HYDROGRAPHIC BRANCH APPROVAL 09/07/2001

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H10834 (1998)

This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

Additional field work was conducted on items noted by the hydrographer and Atlantic Hydrographic Branch (AHB) personnel. The addendum to the Descriptive Report describes the work.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The following software was used to process data at the Atlantic Hydrographic Branch:

Caris/Hips/Sips
NADCON, version 2.10
MicroStation 95, version 5.05
I/RAS B, version 5.01

The smooth sheet was plotted using an Hewlett-Packard DesignJet 2500CP plotter.

H. CONTROL STATIONS

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 NAD 83 and the North American Datum of 1927 (NAD 27).

To place this survey on the NAD 27, move the projection lines 0.831 seconds (25.591 meters or 1.28 mm at the scale of the survey) north in latitude, and 0.570 seconds (15.346 meters or 0.77 mm at the scale of the survey) west in longitude.

L. JUNCTIONS

H10803 (1998-99) to the east
H10851 (1999) to the west

A standard junction was effected between the present survey and H10803 (1998-99) and H10851 (1999). There are no junctional surveys to the north and south. Present survey depths are in harmony with the charted hydrography to the

north and south.

M. COMPARISON WITH PRIOR SURVEYS

A comparison with prior surveys was not done during office processing in accordance with section 4. of the memorandum titled "Changes to Hydrographic Survey Processing," dated May 24, 1995.

N. COMPARISON WITH CHART 11330 (12th Edition, Apr 21/01) 11341 (38th Edition, Mar 10/01)

Hydrography

The charted hydrography originates with the prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section N. of the Descriptive Report.

N.7 Dangers to Navigation

Three separate Danger to Navigation reports were submitted to Commander (oan), Eight Coast Guard District, New Orleans, Louisiana for inclusion in the Local Notice to Mariners and to the Marine Chart Division, N/CS3x1, Silver Spring, Maryland. Copies of these reports are appended to the descriptive report.

N.9

1) The hydrographer located four platforms within the survey area. Three of the platforms located by the hydrographer are currently charted and are located in the following positions:

Latitude (N)	Longitude (W)
29°33'01.66"	93°28'23.28"
29°33'19.34"	93°27'35.68"W
29°37'18.16"	93°22'54.82"W

No change in charting status is recommended unless other information indicates otherwise.

The fourth platform located by the hydrographer is in Latitude 29°36'12"N, Longitude 093°33'40"W. This platform is not shown on the latest editions of charts 11330 and 11341.

It is recommended that this platform be charted as in accordance with Marine Chart Division policy.

2) A charted platform, in Latitude 29°33'28.74"N, 093°27'58.83"W was neither verified nor disproved by the hydrographer. It is recommended that this platform be retained as charted unless other information indicates otherwise.

The present survey is adequate to supersede the charted hydrography within the common area.

R. MISCELLANEOUS

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

The following NOS Chart was used for compilation of the present survey:

11341 (38th Ed., Mar 10/01)

Robert Snow

Robert Snow
Cartographic Technician
Verification of Field Data
Evaluation and Analysis

APPROVAL SHEET
H10834

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 digital data for this survey. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Richard W. Blevins Date: 04 SEPT 2001

Richard W. Blevins
Cartographer
Atlantic Hydrographic Branch

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.

Robert J. Rob Date: 7 SEPTEMBER 2001

James S. Verlaque
Lieutenant Commander, NOAA
Chief, Atlantic Hydrographic Branch

****

Final Approval:

Approved: Samuel P. de Bow Jr. Date: January 4, 2002

Samuel P. De Bow, Jr.
Captain, NOAA
Chief, Hydrographic Surveys Division

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H10834

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
11341	09/12/01	Richard Bleu...	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			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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			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.