

H10891

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Hydrographic/

Type of Survey Side Scan Sonar / Multibeam

Field No. Sheet D

Registry No. H10891

LOCALITY

State Louisiana

General Locality Gulf of Mexico

Locality 24 NM SSE of Calcasieu Pass

1999-2000

CHIEF OF PARTY
Art Kleiner

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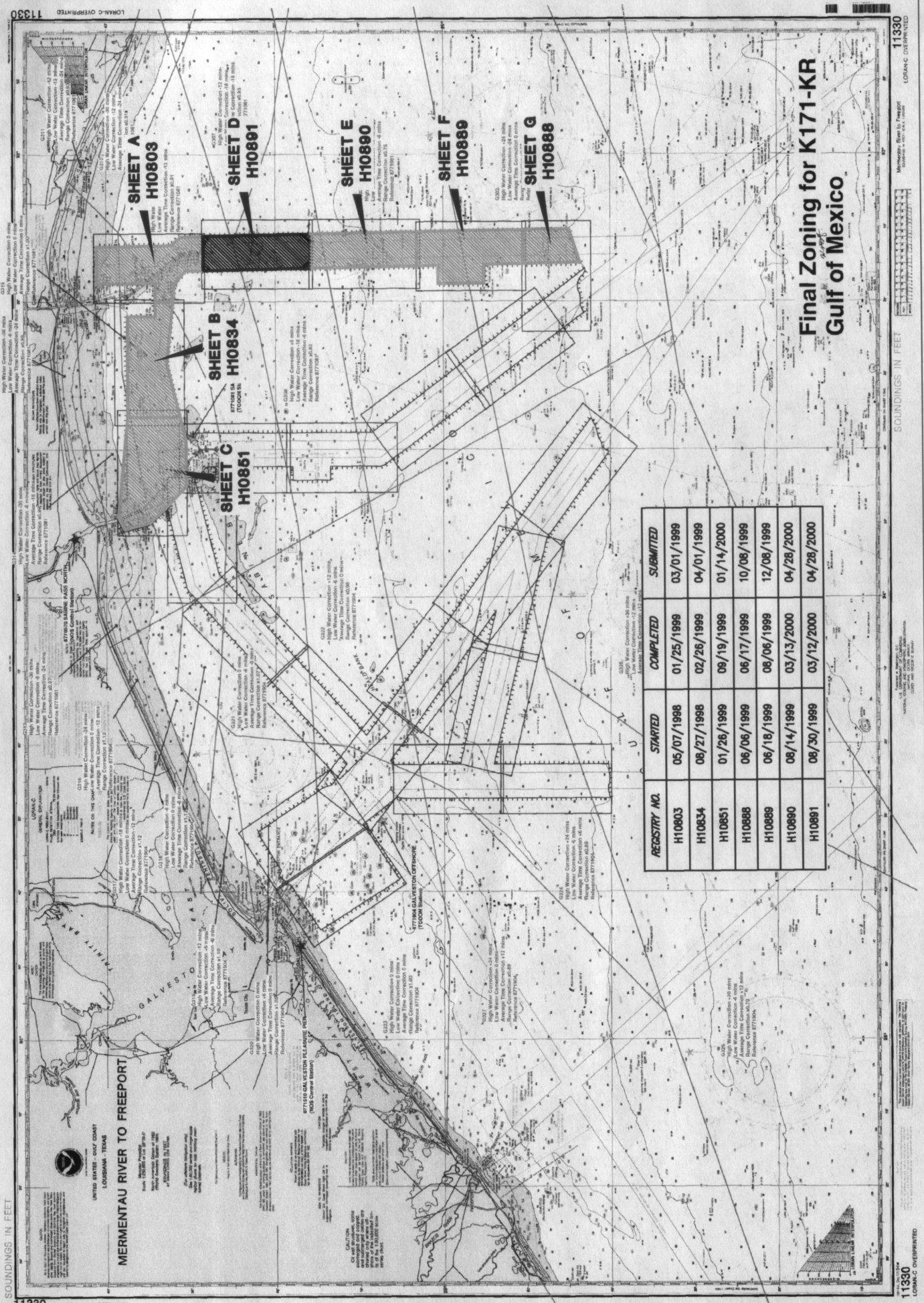
DATE FEB 15 2001

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER: H10891
HYDROGRAPHIC TITLE SHEET		
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 D
State: <u>Louisiana</u>		
General Locality: <u>Gulf of Mexico</u>		
Locality: ^{NAUTICAL} <u>24 Miles SSE of Calcasieu Pass</u>		
Scale: <u>1:20,000</u>	Date of Survey: <u>August to September, 1999</u> <i>FEBRUARY-MARCH 2000</i>	
Instructions Dated: <u>March 23, 1999</u>	Project Number: <u>OPR-K171-KR</u>	
Vessels: <u>M/V Inez McCall</u>		
Chief of Party: <u>Art Kleiner</u>		
Surveyed by: <u>P. Melancon, H. Langill, J. McCullogh, S. Melancon, T. MacEwen, D. Warren, S. Reichel, D. Aucoin, M. Stelly, S. Alleman, L. Theriot, T. Shannon</u>		
Soundings taken by echosounder, hand lead line, or pole: <u>Simrad EM3000 Multibeam Echosounder</u>		
Graphic record scaled by: <u>N/A</u>		
Graphic record checked by: <u>N/A</u>		
Protracted by: <u>N/A</u>	Automated plot by: <u>DESIGNJET 2500CP HP 755 Plotter</u>	
Verification by: <u>C&C Technologies Personnel ATLANTIC HYDROGRAPHIC PERSONNEL</u>		
Soundings in: Feet: <u>X</u> Fathoms: _____ Meters: _____ at MLW: _____ MLLW: <u>X</u>		
Remarks: <u>Multibeam Hydrographic Survey of Sheet D</u> <u>Data collection in meters, later converted into feet, referenced to MLLW</u> <u>200% side scan sonar coverage</u> <u>UTC time was used exclusively</u> <u>Tidal Zones: G308 and G309</u> <u>Tidal Station: 877-1081</u>		

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

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

AWOIS ✓ ≠ SURF ✓ 2-1-01 by MBA



Final Zoning for K171-KR Gulf of Mexico

REGISTRY NO.	STARTED	COMPLETED	SUBMITTED
H10803	05/07/1998	01/25/1999	03/01/1999
H10834	08/21/1998	02/26/1999	04/01/1999
H10851	01/26/1999	09/19/1999	01/14/2000
H10888	06/06/1999	06/17/1999	10/06/1999
H10889	06/16/1999	08/06/1999	12/06/1999
H10890	08/14/1999	03/13/2000	04/28/2000
H10891	08/30/1999	03/12/2000	04/28/2000

SOUNDINGS IN FEET

11330

LORAN-C OVERPRINTED

SOUNDINGS IN FEET

11330

LORAN-C OVERPRINTED

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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 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 extended triton format (.xtf) to 8mm AIT tapes.

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 is given in Appendix K. *

* DATA FILED WITH ORIGINAL FIELD RECORDS

E. SIDE SCAN SONAR

E.1 Side scan sonar data aboard the M/V *Inez McCall* were collected using a Klein 5500 multi-beam side scan sonar. An EG&G 260 towfish was kept on the survey vessel as a backup. Data were recorded using Isis software. Digital data were saved to 8 mm AIT tapes.

The side scan sonar towfish was towed from the stern of the M/V *Inez McCall*. The towpoint was 17.36 meters astern of the navigation center. The Klein side scan operates at a frequency of 455 kHz.

Aboard the R/V *Coastal Surveyor* side scan sonar data were collected using two EG&G 260 towfish, S/N 24536 and S/N 18400. Data were recorded using ISIS software. Digital data were saved to 8-mm AIT tapes. Analog data were printed in real-time on an EPC 1086 recorder.

The side scan sonar towfish was towed from the stern of the R/V *Coastal Surveyor*. The tow point was 3.66 meters astern of the navigation center. The dual-frequency fish were 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 all water depths. A range of 100 meters per channel was used with the Klein 5500 aboard the M/V *Inez McCall* and a range of 50 meters per channel was used with the EG&G 260 aboard the R/V *Coastal Surveyor*. A 90 meter line spacing aboard the M/V *Inez McCall* and a 40 meter line spacing aboard the R/V *Coastal Surveyor* were used to adequately provide the required 200 % coverage with the side scan sonar.

E.3 Fix marks (shot points) were recorded and annotated at an interval of 150 meters for all lines. All shot points were annotated with line name, date, time, 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, dredged channels, 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 All side scan data were reviewed in the field. All measurements and positions were taken from the digital records using the ISIS software. Due to the fast data collection speed of the Klein 5500, analog records for this data were not required.

Analog records from the R/V *Coastal Surveyor* were reviewed in the field and annotated appropriately. Again with this data, all measurements and positions were taken from the digital data using the ISIS software.

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 Fourteen significant contacts were seen in the survey area. Three of the significant contacts did not correspond to previously charted items. The first of these contacts was seen on three side scan lines (255/100626P, 255/094745P, 260/184841P) and one multibeam line. The contact showed a relief of between 1.4 m and 1.5 m with a least depth of 11.95 m (39.20 ft) at a location of 29°21'29.43"N, 93°11'42.72"W. The contact is shown on the sonar contact plot and is depicted on the smooth sheet as a 39 foot obstruction.

The second of these contacts was seen on numerous side scan and multibeam and during a dive investigation. The contact corresponds to the remains of a sunken barge. A danger to navigation report was issued for this contact. The contact is shown on the sonar contact plot and is depicted on the ~~smooth~~ *field* sheet as a 37 foot obstruction at 29° 26' 40.78"N, 93° 14' 07.55"W.

The third of these significant contacts was seen on two side scan lines (255/225144S, 256/001618S) and one multibeam line. The target is a relatively hard contact with a rectangular edge. The contact is shown on the smooth sheet and is depicted on the smooth sheet as a 44 foot obstruction at 29° 22' 29.95"N, 93° 11'37.49"W.

One of the significant contacts corresponds to item of investigation D-1. The item was seen on two side scan lines (060/104708P, 060/111059P). A dive investigation of the target was performed and the item was described as a piece of 10" well casing (pipe) with an attached riser clamp. A least depth over the target as determined by the divers is 53.1 feet.

Another corresponds to item of investigation D-2. The item was seen on two side scan lines (255/213628S, 255/223645S) but lay between the original multibeam lines. A multibeam investigation of the target revealed a least depth of 13.34 m (43.77 ft) over the target at a location of 29° 22' 25.48"N, 93° 11' 26.12"W. The contact is shown on the sonar contact plot and is depicted on the smooth sheet as a 44 foot obstruction.

Five of the significant contacts were seen in the area surrounding AWOIS item 8767. Each of the significant contacts, their location and the corresponding least depth as determined by the multibeam are listed in the table below.

Contact Numbers	Position		Least Depth (m (feet))	Height (m)
	Latitude (N)	Longitude (W)		
255/095958P, 255/095417P, 061/051008P, 061/044057S	29° 21' 29.20"	93° 10' 40.48"	14.57 (47.80)	~ 1.0
255/095945S, 061/045655S, 061/042706S	29° 21' 37.84"	93° 10' 24.62"	14.71 (48.26)	~ 1.1
061/021512S	29° 21' 29.20"	93° 10' 40.48"	14.71 (48.26)	0.95 – 1.2
061/040912S, 061/042826S	29° 21' 36.80"	93° 10' 36.98"	14.13 (46.36)	1.2 – 1.3
061/044030S, 061/045649S	29° 21' 31.09"	93° 10' 39.33"	14.69 (47.90)	0.9 – 1.0

Each of these contacts is shown on the sonar contact plot and is depicted on the smooth sheets as obstructions at the locations shown in the table.

During the investigation of this area, many circular targets were seen and tagged. After review of the previous survey FE347, the targets were interpreted to be tires. It is believed that the pile of tires as described as contact 1791.31P in survey FE347 has since dispersed and that now the tires are scattered to the west and southwest of the previous location. None of these targets are considered to be dangers to navigation.

The remaining three significant contacts were seen in the area surrounding two charted 45 foot obstructions. Each of the significant contacts, their location and the corresponding least depth as determined by the multibeam are listed in the table below.

port head, for the investigation work. The transducer was mounted to point straight down.

- 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 daily 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** Periodic 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 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 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.

Date	Latitude (N)	Longitude (W)	Date	Latitude (N)	Longitude (W)
08/30/99	29° 15' 32.26"	93° 10' 22.40"	09/13/99	29° 24' 28.05"	93° 11' 31.30"
08/30/99	unknown	unknown	09/14/99	29° 25' 26.19"	93° 11' 25.71"
08/30/99	29° 20' 03.16"	93° 13' 56.01"	09/14/99	29° 28' 07.78"	93° 14' 23.83"
08/30/99	29° 16' 02.27"	93° 15' 07.64"	09/14/99	29° 24' 24.13"	93° 15' 22.84"
08/30/99	29° 16' 48.33"	93° 11' 16.56"	09/14/99	29° 25' 16.53"	93° 12' 00.10"
09/09/99	29° 16' 52.33"	93° 15' 17.05"	09/15/99	29° 25' 36.35"	93° 15' 42.46"
09/09/99	29° 15' 58.23"	93° 11' 53.30"	09/15/99	29° 26' 01.42"	93° 11' 20.44"
09/09/99	29° 17' 53.70"	93° 15' 19.92"	09/15/99	29° 26' 42.73"	93° 13' 02.15"
09/10/99	29° 18' 46.24"	93° 15' 32.22"	09/16/99	29° 27' 35.22"	93° 11' 32.26"
09/10/99	29° 19' 01.54"	93° 15' 35.67"	09/16/99	29° 28' 23.94"	93° 14' 04.60"
09/10/99	29° 19' 51.45"	93° 11' 08.82"	09/17/99	29° 25' 46.56"	93° 11' 19.25"
09/11/99	29° 20' 42.01"	93° 14' 53.68"	02/28/00	29° 22' 38.68"	93° 11' 20.29"
09/11/99	29° 24' 36.89"	93° 12' 51.21"	02/29/00	29° 19' 56.81"	93° 12' 05.07"
09/11/99	29° 20' 51.28"	93° 15' 08.23"	02/29/00	29° 21' 22.25"	93° 10' 46.16"
09/12/99	29° 21' 30.87"	93° 15' 24.90"	03/01/00	29° 22' 31.58"	93° 10' 40.94"
09/12/99	29° 22' 39.17"	93° 15' 27.63"	03/01/00	29° 26' 29.17"	93° 14' 08.02"
09/13/99	29° 23' 31.92"	93° 11' 21.20"			

Two Seabird sound velocity profilers, S/N 1730 and S/N 1174, were used on the *M/V Inez McCall*. Following are the calibration dates for each of the Seabirds used during the survey. The calibration records are included in ^{*}Appendix G.

Seabird Serial Number	Date of Calibration
1730	March 26, 1999
1174	March 25, 1999

Two Seabird profilers were used aboard the *R/V Coastal Surveyor*. Following are the calibration dates and for each of the Seabirds employed. Calibration records are included in ^{*}Appendix G. **DATA FILED WITH ORIGINAL FIELD RECORDS*

Seabird Serial Number	Date of Calibration
2645	May 7, 1999
2791	June 15, 1999

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

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. Procedures for a standard patch test are outlined below and patch test results are included in Appendix G. *DATA FILED WITH ORIGINAL FIELD RECORDS*

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.

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: $cp = \text{atan} (dt / (2 \times \text{water depth}))$, 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: $dl = dt / (2 \times \text{velocity})$, 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: $cy = \text{atan} (dt / (2 \times \text{offset from track line}))$, 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). During post-processing, tidal data from the Sabine Pass offshore tidal station (877-1081) were used with correction offsets for tide zones 308 and 309. 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	
G308	877-1081	+6	-18	-6	0.83
G309	877-1081	-6	-12	-12	0.91

VERIFIED TIDES AND ZONES FROM NOS-COOPS WEB SITE HAVE BEEN APPLIED TO THE SURVEY DATA.

A small portion of the survey falls in tidal zone G307. However, since it is such a small area, the job was processed only using tidal zones G308 and G309. The correspondence in which the request was made and permission granted to ignore this tidal zone is included in Appendix F.

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 Positioning aboard the M/V *Inez McCall* was achieved 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.

Positioning aboard the R/V *Coastal Surveyor* was achieved using a combination of two separate GPS receivers interfaced with two different differential correction receivers. Primary positioning was provided by a POS/MV inertial navigation unit embedded with two NovAtel GPS receivers and integrated with SATLOC differential corrections. Secondary positioning was provided by a Trimble 4000SSi 9-channel GPS receiver integrated with SATLOC differential

* DATA FILED WITH ORIGINAL FIELD RECORDS

corrections. For backup, both GPS receivers were integrated with an MBX receiver providing USCG differential corrections. Data were continuously recorded from both GPS receivers throughout the survey. Positional solutions were projected on the real-time coverage display during survey operations.

Positioning aboard the M/V *Mr. Jim* was accomplished using a Trimble GPS receiver with Coast Guard Beacon differential corrections. Winfrog software was used for navigation.

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 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 V.3
(2) NovAtel 3151ROEM
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*

While computing the comparisons between each of the positioning systems it was discovered that the Version 3 upgrade to the POS/MV was not incrementing the date correctly each day at midnight UTC. This error resulted in the first two digits of the year incrementing instead of the two-digit day of the month.

This problem did not affect the data processing. The Simrad EM3000 time synchronizes once on startup and then again every second unless the time difference between itself and the POS vary by greater than five seconds. Consequently, at midnight on the first night the Simrad did not synchronize to the POS. However, the Simrad date and time remained correct and accurate because it continues to set the second on the one pulse per second.

In Hydromap processing, the time in the Simrad datagrams is used to apply all corrections, in particular the tide corrections.

In order to correlate the dates prior to performing the positioning system comparisons, the correct dates were extracted from the Trimble data by matching up the times (time of day) in the GGA strings. We have included the corrected POS/MV navigation files as part of the deliverables.

- 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 to provide the corrections for the secondary positioning system, can be affected by atmospheric conditions such as

The cross lines were processed to produce the best possible data. Frequent sound velocity profiles were taken to minimize any possible ray-bending. The swath was restricted to an angular sector of 10 degrees, resulting in a swath width of less than 2 meters to ensure that there were no measurable ray-bending or roll errors. The data were binned and thinned using a median filter. The data were then carefully edited to ensure that there were no remaining outliers.

K.2 Test line

The line to be evaluated, the test line, was processed to produce a trace file. Trace files were comprised of binned soundings that had not been thinned. Processing parameters were set to include all beams.

K.3 Cross Analysis

To perform the cross analysis, all lines of the reference data set were utilized 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 fell 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 was based upon across-track distance, beam number, and angle from nadir. The bin size was 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. 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 the velocity of sound at the sonar head cause the sonar to miscalculate the beam pointing angles, which result in a symmetric mean difference curve that closely resembles the error due to incorrect sound velocity profiles.

Evaluation 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 RMS difference and the confidence interval reflect the vertical accuracy of the system. The 90% confidence interval must be below 0.25 meters when measured beam-by-beam.

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

N.2 A comparison of the survey selected soundings versus the charted soundings reveal that there is a strong agreement between the two with depths varying no more than 2 feet.

In general the survey depths are 1 to 2 feet deeper than the charted depths. In the southern end of the survey area, the survey depths and charted depths match exactly.

There are five soundings that do not follow the trend described above. In these cases the survey depths are actually shoaler than the charted depths.

Position		Charted Depth (ft)	Survey Depth (ft)
Latitude (N)	Longitude (W)		
29° 22' 40.80"	93° 15' 18.00"	38	37
29° 21' 10.20"	93° 15' 00.00"	50	49
29° 19' 25.20"	93° 12' 12.00"	55	54-55
29° 18' 00.00"	93° 11' 24.00"	57	55-56
29° 16' 09.00"	93° 10' 48.00"	59	57

N.3 Of the seven AWOIS items that lie within the survey limits, three (6973, 6976, and 3728) have already been disproved and therefore will not be further discussed. ^{CONCUR} The remaining four (6974, 8767, 8737, 8738) were all investigated and are discussed below. Each of these items was detected during investigations. In addition to charting recommendations, it is recommended that the AWOIS list be updated to reflect the results of this survey. *CONCUR*

N.4 Additional investigations were performed for seven items within this survey area.

Item D-1

Item D-1, AWOIS item 6974, is a charted dangerous obstruction (pipe) located at 29° 19' 54.86"N, 93° 12' 02.56"W. The item which has been described as a visible pipe (well casing with stub) with light and fog horn was reported in 1979. A search for the target yielded negative results in 1990, however a suspicious contact was seen during C&C's original survey so an item investigation was recommended.

The investigation consisted of a 200% side scan survey of a 750 m search radius centered on the charted location. During this portion of the survey the item was detected and several multibeam lines were run over the target. A subsequent dive investigation of the item was also performed.

The item was too small to be detected in the multibeam data.

A dive investigation revealed a 15 foot long section of a 10" well casing (pipe) with an attached clamp. The least depth of 53.1 feet (16.18 m) was measured on top of the clamp near the middle of the riser at a location of 29° 19' 44.75"N, 93° 12' 00.44"W.

It is recommended that the charted obstruction be removed from the chart and that the item be charted as a 53 foot obstruction at 29° 19' 44.75"N, 93° 12' 00.44"W. *CONCUR*
It is further recommended that the AWOIS listing be updated to reflect the results of this survey. *CONCUR WITH CLARIFICATION*
DELETE (O) PIPE *FEATURE INSIGNIFICANT*
CHART DEPTHS

Item D-2

D-2 is an item that was detected during the original survey. The item was detected on two side scan sonar lines (255/213628S, 255/22345S) but lay between the multibeam swaths. The target, which showed a relief of 1 to 1.2 m, was located at 29° 22' 26"N, 93° 11' 26"W.

The investigation consisted of running orthogonal multibeam lines over the location of the side scan contacts.

The multibeam detected the target and a least depth of 43.77 feet (13.34 m) was seen at 29° 22' 25.48"N, 93° 11' 26.12"W.

It is recommended that the item be charted as a 44 foot obstruction at 29° 22' 25.48"N, 93° 11' 26.12"W. *CONCUR*
CHART (44) OBSTN

Item D-3

D-3, AWOIS item 8737, is a 45 foot charted dangerous ~~obstruction~~ *WRECK* located at 29° 22' 38.40"N, 93° 11' 15.66"W described as 1m x 1m x 1.2m metal wreckage. The item was detected on two side scan lines (256/014413P, 256/013346P) but lay between the multibeam swaths.

The investigation consisted of running orthogonal multibeam lines over the location of the side scan contacts.

The multibeam detected the target and a least depth of 45.31 feet (13.81 m) was seen at 29° 22' 38.79"N, 93° 11' 15.98"W.

It is recommended that the charted 45 foot dangerous obstruction located at 29° 22' 38.40"N, 93° 11' 15.66"W be ~~removed~~ and that the item be charted as a 45 *REVISED*

foot obstruction at 29° 22' 38.79"N, 93° 11' 15.98"W. It is further recommended that the AWOIS listing be updated to reflect the results of this survey. *SEE ALSO EVALUATION REPORT SEC. N.1*

Item D-4

DELETE (45) WK
Add (45) OBSTNS

D-4, AWOIS item 8738, is a 45 foot^{WA} charted dangerous obstruction located at 29° 22' 38.43"N, 93° 11' 16.81"W described as a 5 foot cubed concrete block rising 0.75 m of the seafloor. The item was detected on two side scan lines (256/014418P, 256/013340P) but lay between the multibeam swaths.

The investigation consisted of running orthogonal multibeam lines over the location of the side scan contacts.

The multibeam detected the target and a least depth of 45.70 feet (13.93 m) was seen at 29° 22' 38.76"N, 93° 11' 17.08"W.

It is recommended that the charted 45 foot dangerous obstruction located at 29° 22' 38.43"N, 93° 11' 16.81"W be removed* and that the item be charted as a 45 foot obstruction at 29° 22' 38.76"N, 93° 11' 17.08"W. It is further recommended that the AWOIS listing be updated to reflect the results of this survey

** ITEM NOT PRESENTLY CHARTED*

*** CONCUR W/CLARIFICATION*

Item D-5

SEE ALSO THE EVALUATION REPORT

SEC. N.1

Item D-5 is an additional survey area located outside of the original survey area, encompassing two charted 45 foot dangerous obstructions. The additional area was defined by the following coordinates:

29° 22' 49.80"N, 93° 10' 59.53"W
29° 22' 49.80"N, 93° 10' 24.49"W
29° 22' 16.60"N, 93° 10' 59.53"W
29° 22' 16.60"N, 93° 10' 24.49"W

Side scan and multibeam data were collected in the additional area. Additional multibeam lines were also run over any side scan or multibeam targets.

Three multibeam targets were seen within the additional survey area. These contacts along with the corresponding side scan contacts are listed in the table below.

Descriptive Report to Accompany Hydrographic Survey H10891

Sheet D, Gulf of Mexico, LA

Survey Scale = 1:20,000

C & C Technologies, Inc.

Hydrographer: Art Kleiner

M/V Inez McCall, R/V Coastal Surveyor,

August 1999 to March 2000

DSV Mr. Jim

Position		Least Depth (feet (m))	Side Scan Sonar Contact Number
Latitude (N)	Longitude (W)		
29°22'24.52"	93°10'44.61"	45.63 (13.91)	061/114917P, 061/120657P, 061/121726S, 255/213213S
29°22'39.38"	93°10'37.02"	45.60 (13.90)	061/110055P, 061/103213S, 061/104941S
29°22'30.98"	93°10'34.02"	44.42 (13.54)	061/101902S, 061/100547S

* DELETE (45) OBSTNS Add dangerous OBSTNS NOTED ABOVE @ SURVEY POSITIONS
It is recommended that these items be charted as depicted on the smooth sheet.

*CONVERT w/ CHARACTER
AS NOTED ABOVE*

Item D-6

D-6 is an item that was detected during the original survey at a location of 29° 26' 40.61"N, 93° 14' 07.67"W.

The additional investigation consisted of several multibeam lines over the location and a dive survey.

The multibeam detected a least depth of ³⁵ ~~36.25~~ feet (^{10.74} ~~11.05~~ m) at a location of 29° 26' 40.87"N, 93° 14' 7.30"W. There was a sounding with a depth of 10.05 m, however it was interpreted to be noise and was not deemed to be the accurate least depth over the target.

The dive survey revealed that the item appears to be one half of a sunken barge that is open on the eastern face. The debris is 35 feet by 20 feet with relief ranging from 2.25 m at the northwestern end to 2.99 m at the southeastern end. A least depth of 37.2 feet (11.34 m) was measured by the divers at a location of 29° 26' 40.78"N, 93° 14' 07.55"W.

It is recommended that the item be charted as a 37 foot dangerous wreck at 29° 26' 40.78"N, 93° 14' 07.55"W. Do NOT CONCUR

RECOMMEND CHARTING MULTIBEAM LD (35) WOK

Item D-7

AT LAT 29° 26' 40.9" N Lon 93° 14' 07.8" W

Delete :28: OBSTN (Chart 11347)

D-7, AWOIS item 8767, is described as a small outcropping of rock and debris rising 0.7 m off the bottom with a least depth of 45 feet at 29° 21' 28.09"N, 93° 10' 40.28"W. The item lies outside of the original survey limits but side scan coverage extended beyond the limits and several contacts were seen in the area surrounding the charted item.

The additional investigation consisted of running 200% side scan encompassing a 500 m search radius centered about the charted location of the obstruction. Multibeam lines were then run directly over all side scan contacts in the area.

Ten multibeam contacts were seen within the 500 m search radius with heights ranging from about 0.3 to 1.3 m. Each of the multibeam contacts along with the corresponding side scan contacts are listed in the table below.

Position		Least Depth (feet (m))	Height as Determined by Multibeam (m)	Side Scan Sonar Contact Number
Latitude (N)	Longitude (W)			
29° 21' 44.43"	93° 10' 51.56"	46.65 (14.22)	0.57	061/062247P
29° 21' 33.82"	93° 10' 45.26"	47.01 (14.33)	1.20	061/055413S, 061/052547P
29° 21' 29.20"	93° 10' 40.48"	47.80 (14.57)	1.30	061/051009P
29° 21' 31.58"	93° 10' 38.44"	48.26 (14.71)	0.95	061/045655S, 061/042706P
<i>* USE: LAT/LONG</i> 29° 21' 31.09"	93° 10' 39.33"	47.90 (14.60)	0.91	061/045649S, 061/044030S
29° 21' 36.80"	93° 10' 36.98"	46.36 (14.13)	1.30	061/042826S, 061/040912S
29° 21' 37.84"	93° 10' 24.62"	48.26 (14.71)	1.10	061/021512S
29° 21' 29.93"	93° 10' 24.58"	49.08 (14.96)	0.55	061/023017S, 061/021704S
29° 21' 39.47"	93° 10' 26.67"	49.14 (14.98)	0.45	061/023938P
29° 21' 38.66"	93° 10' 26.81"	49.57 (15.11)	0.30	061/025806S, 061/023950P

ADD:

46: Obstrn

47: Obstrns

48: Obstrns

*

46: Obstrn

48: Obstrns

49: Obstrn

It is recommended that the area be charted as a debris zone with a least depth of 46 feet. *DO NOT CONCUR Chart only the 6 (six) features noted above*

N.5 Two significant contacts that do not correspond to the above described items of investigation was detected during the survey. The first contact was seen on three side scan lines (255/100626P, 255/094745P, 260/184841P) and one multibeam line. The contact showed a relief of between 1.4 m and 1.5 m with a least depth of 11.95 m (39.20 ft) at 29°21'29.43"N, 93°11'42.74"W. The contact is shown on the sonar contact plot and is depicted on the smooth sheet as a 39 foot obstruction. *CONCUR Chart 39: Obstrn*

The second of these significant contacts was seen on two side scan lines (255/225144S, 256/001618S) and one multibeam line. The target is a relatively hard contact with a rectangular edge. The contact is shown on the smooth sheet and is depicted on the smooth sheet as a 44 foot obstruction at 29° 22' 29.95"N, 93° 11'37.49"W. *CONCUR Chart 44: Obstrn*

P. AIDS TO NAVIGATION *SEE ALSO THE EVALUATION REPORT*

P.1 Three charted navigation markers were seen during the survey. The CC buoy located in Pilot Boarding Area 4 was positioned at 29° 20' 00.41"N, 93° 13' 19.24"W. Green buoy 1A and red buoy 2A were positioned at 29° 22' 49.84"N, 93° 13' 26.61"W and 29° 22' 51.48"N, 93° 13' 14.70"W respectively.

Q. STATISTICS

Lineal nautical miles of sounding lines (Side scan and multibeam)	1330.92 nm
Lineal nautical miles of sounding lines (Multibeam only)	59.15 nm
Square nautical miles (multibeam and 200% side scan coverage)	51.60 nm ²
Number of velocity casts (applied to data)	34
Number of supplemental tide stations	0
Number of horizontal control stations occupied/established	0
Number of items investigated	7

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 and small humps near nadir. The outer swath peaks are centered on beams 32 and 222. The nadir humps are centered near beams 100 and 170.

The selected soundings are shoal selected. Therefore, beams that tend to have the most residual noise or shoal bias after processing are over-represented.

In addition to biases and noise, representation in the selected soundings is also a result of data thinning. Specifically, outer beams are favored in the histogram due to the EM3000D's characteristically reduced data density and an "edge effect", which is created when bins do not fall completely within the multibeam swath.

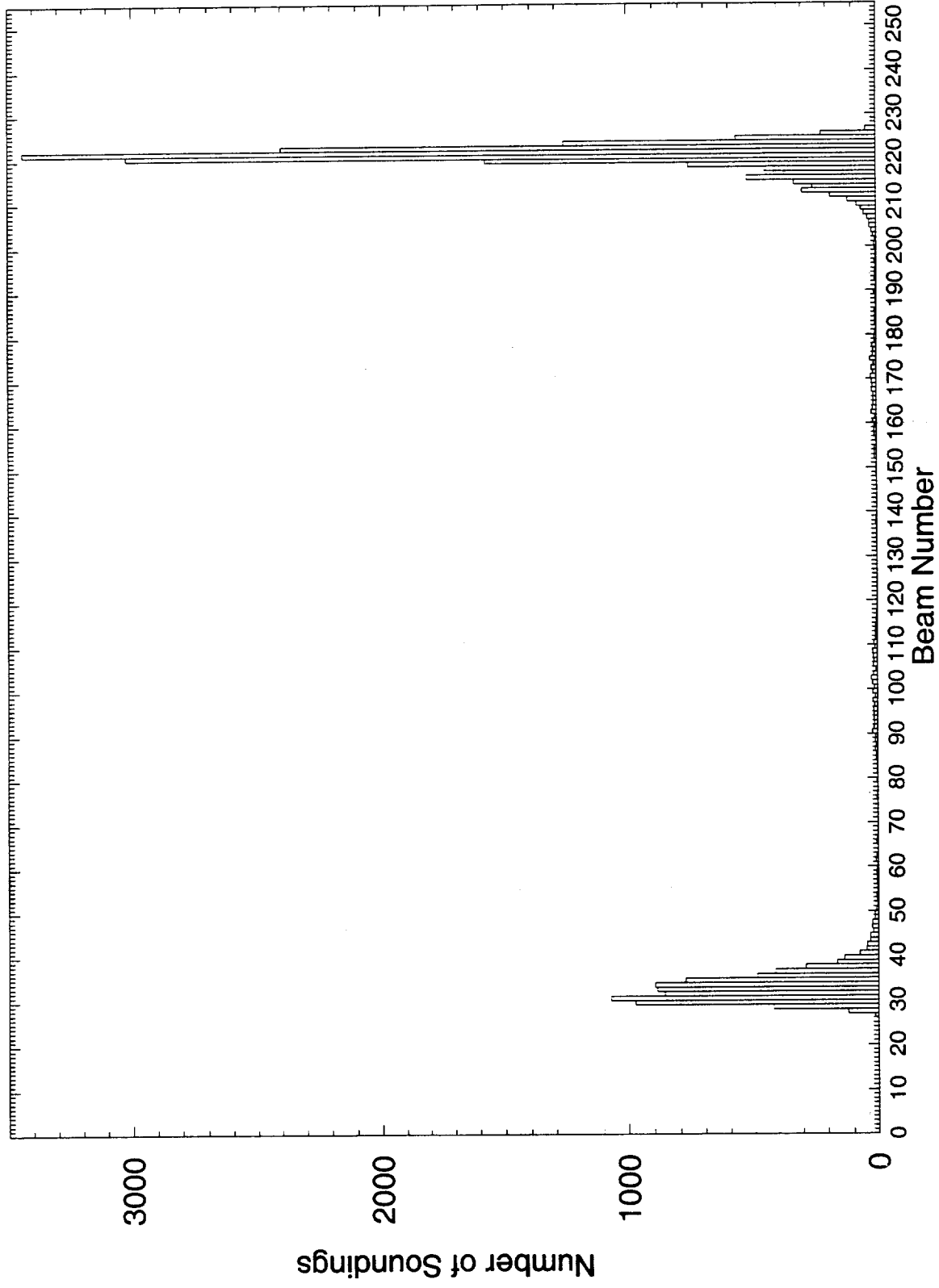
Because the beam distribution of the EM3000-D is FFT and the heads overlap, the data density in the outer part of the swath is only about 5% of the data density near nadir. This results in less data thinning in the outer beams and thus over-representation of the outer beams by a factor of approximately 20.

Due to an "edge effect", bins that fall on the edge of the swath may contain as few as fifteen soundings. Data thinning exacerbates the over-representation of these beams.

The gap at the center of the histogram does not represent an absence of data. It is the result of the Simrad EM3000D's 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.

Histogram of Selected Soundings by Beam Number

Sheet D



S. RECOMMENDATIONS

None

T. REFERRAL TO REPORTS

None

APPENDIX A



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE, Office of Coast Survey
Atlantic Hydrographic Branch
439 W. York Street
Norfolk, VA 23510-1114

September 20, 1999

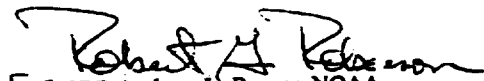
Commander (OAN)
Eighth Coast Guard District
Hale Boggs Federal Building
New Orleans, LA 70130-3396

Dear Sir:

While conducting hydrographic survey operations for NOAA Project OPR-K171, Survey H10891, in the approaches to Calcasieu Pass, Louisiana, NOAA Contractor, C&C Technologies, Inc. discovered an uncharted obstruction. Attached is the Danger to Navigation Report and a section of NOS Chart 11344 indicating the position of this danger.

The obstruction was located using side scan sonar, shallow water multibeam echosounder, and differential GPS. The least depth was obtained using shallow water multibeam echosounder in accordance with NOAA hydrographic specifications and standards and corrected to MLLW using preliminary NOS tidal data.

Sincerely,


LCDR Andrew L. Beaver, NOAA
Chief, Atlantic Hydrographic Branch

Cc: C&C Technologies, Inc.
Calcasieu Pilot's Association
NOAA Hydrographic Survey Division
NOAA Marine Chart Division
NIMA



REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: H-10891

State: Louisiana

General Locality: Gulf of Mexico

Sublocality: 24 miles SSE of Calcasieu Pass

Project Number: OPR-K171-KR

The following item was found during hydrographic survey operations:

Date/Time discovered: 15 September 1999, 2227 UTC

Object Discovered: unknown, approximately 20-ft wide, 60-ft long, and 15-ft tall, rectangular shape. Surrounding depths are approximately 44 feet MLLW.

Least Depth over object: 28.471 feet obtained using shallow water beam echo sounder in accordance with NOAA specifications and standards, corrected to Mean Lower Low Water using preliminary NOS tidal data.

Chart Number	Edition		Reported Depth	Charted Horiz. Datum	Geographic Position	
	No.	Date			Latitude	Longitude
11330	12	8/8/98	28.471 ft.	NAD 83	29-26-40.61	93-14-7.67
11344	33	7/11/98				

Charting Recommendation: Chart a 28 ft OBSTR at 29-26-40.61 N, 93-14-07.67 W.

DANGER TO NAVIGATION

NOS SURVEY: H10891

Located on: September 15, 1999 2227 UTC

**Positioned at: 29-26-40.61 N 93-14-07.67W (NAD83)
using DGPS.**

**Least Depth: 28.417 ft (rounds to 28 ft) (corrected to MLLW using
NOS preliminary tidal data)**

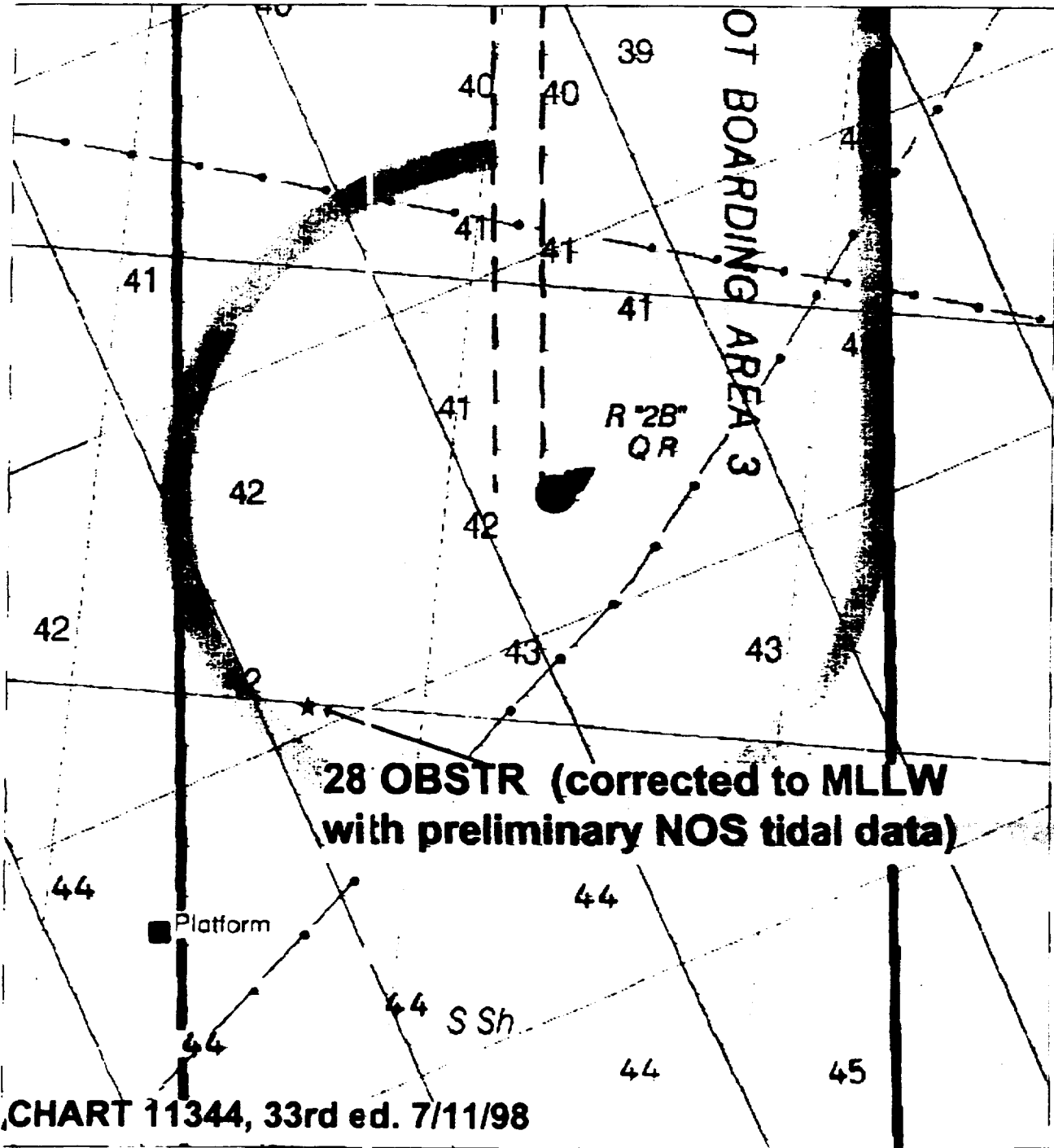


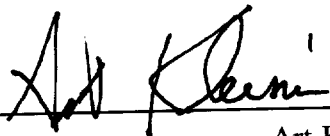
CHART 11344, 33rd ed. 7/11/98

LETTER OF APPROVAL

REGISTRY NO. H10891

This report and the accompanying smooth sheet are respectfully submitted.

Field operations contributing to the accomplishment of survey H10891 were conducted under my direct supervision with frequent personal checks of progress and adequacy. This report and smooth sheet have been closely reviewed and are considered complete and adequate as per the Statement of Work.

 4-28-00

Art Kleiner
Hydrographer
C & C Technologies, Inc.
April, 2000

GEOGRAPHIC NAMES

H-10891

Name on Survey	A ON CHART NO. 11330, 11344		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	X		X															1
GULF OF MEXICO	X		X															2
LOUISIANA (title)	X		X															3
																		4
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Dennis Roseburg
NOV 14 2000

LETTER TRANSMITTING DATA

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

- ORDINARY MAIL
- REGISTERED MAIL
- GBL (Give number) _____
- AIR MAIL
- EXPRESS

TO:

[NOAA / National Ocean Service
Chief, Data Control Group, N/CS 3x1
SSMC3, Station 6826
1315 East-West Hwy.
Silver Spring, MD 20910-3282]

DATE FORWARDED 01/26/2001

NUMBER OF PACKAGES 1

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.

H10891

Louisiana
Gulf of Mexico, 24 nm SSE of Calcasieu Pass

- 1 Descriptive Report / Evaluation Report
- 1 Mylar final AHB Smooth Sheet
- 1 Paper Composite plot for Nos chart 11344
- 1 Mylar H-Drawing for NOS chart 11344

Contractor Plots:

- 1 Mylar sounding plot
- 1 Paper sounding plot
- 5 Miscellaneous plots

FROM: (Signature)



RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

[Maxine Fetterly
Atlantic Hydrographic Branch
439 W. York St.
Norfolk, VA 23510]

03/08/2001

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H10891

NUMBER OF CONTROL STATIONS		2
NUMBER OF POSITIONS		27530
NUMBER OF SOUNDINGS		27530
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	44.0	05/22/2000
VERIFICATION OF FIELD DATA	75.0	12/05/2000
QUALITY CONTROL CHECKS	30.0	
EVALUATION AND ANALYSIS	13.0	
FINAL INSPECTION	6.0	11/30/2000
COMPILATION	103.5	12/29/2000
TOTAL TIME	271.5	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		12/11/2000

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H10891 (1999-2000)**

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.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

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

Hydrographic Processing System
NADCON, version 2.10
MicroStation 95, version 5.05
I/RAS B, version 5.01
AutoCAD release 12
CARIS HIPS/SIPS

The smooth sheet was plotted using a 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 0.856 seconds (26.351 meters or 1.32 mm at the scale of the survey) north in latitude, and 0.562 seconds (15.166 meters or 0.76 mm at the scale of the survey) west in longitude.

L. JUNCTIONS

H10803 (1998) to the north
H10890 (1999-2000) to the south

A standard junction was effected between the present survey and H10803 (1998) and H10890 (1999-2000). There are no junctional surveys to the east, or to the west. Present survey depths are in harmony with the charted hydrography to the east and to the west.

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, Aug. 8/98)
11344 (33rd EDITION, July 11/98)
11347 (32rd EDITION, Nov. 4/00)**

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. Attention is directed to the following:

1. Automated Wreck and Obstruction Information System (AWOIS) Item #8738, wreckage with a depth of 45 feet (13⁷ m) in Latitude 29°22'38.43"N, Longitude 93°11'16.81"W, originates with FE347 (1990). This feature is presently uncharted due to the close proximity to AWOIS Item #8737, a charted dangerous wreck with a depth of 45 feet (13⁷ m), in Latitude 29°22'38.40"N, Longitude 93°11'15.66"W. AWOIS Item #8737 also originates with FE347 (1990). Both features were investigated and located by the hydrographer. It is recommended that the charted dangerous wreck be revised to dangerous Obstructions with a depth of 45 feet (13⁷ m) and charted in Latitude 29°22'38.79"N, Longitude 93°11'15.98"W, as shown on the present survey.

2. The following charted platforms were not observed in their charted positions. It is recommended that data from the Eighth Coast Guard District, New Orleans, Louisiana be consulted for proper disposition.

<u>Feature</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>
platform	29°26'02"	93°14'38"
platform	29°24'30"	93°11'39"
platform	29°23'47"	93°10'58"
platform	29°23'27"	93°14'35"
platform "EREC-WC-181-2"	29°21'49"	93°14'33"
platform "EREC-WC-180-A"	29°21'56"	93°10'57"

platform	29°21'21"	93°10'41"
platform	29°20'24"	93°12'02"
platform "SENECA-WC-182-A"	29°20'53"	93°15'39"

3. The charted platform with the notation "IP-WC-172-16", in the vicinity of Latitude 29°23'43"N, Longitude 93°12'01"W, was located by the field unit. A temporary jackup rig was located in 29°23'43.20"N, Longitude 93°12'00.99"W. It is recommended that data from the Eighth Coast Guard District, New Orleans, Louisiana be consulted for proper disposition of this feature.

4. The charted platform with the notation EQUITABLE-100-13, in Latitude 29°17'26.05"N, Longitude 93°15'30.25"W, was located by the field unit. It was noted that the notation is now "WC-197-E". It is recommended that data from the Eighth Coast Guard District, New Orleans, Louisiana be consulted for proper disposition of this feature.

5. Two charted obstructions originate with unknown sources. These features were neither verified nor addressed by the hydrographer. These features are considered disproved because of 200% side scan sonar and 200% multibeam coverage in the area.

<u>Depth</u> <u>(ft/m)</u>	<u>Latitude(N)</u>	<u>Longitude (W)</u>
45/13 ⁷	29°22'02"	93°11'10"
46/14	29°22'18"	93°11'12"

It is recommended that these features be deleted from the chart.

Dangers to Navigation

One Danger to Navigation report was submitted to Commander(oan), Eighth Coast Guard District, New Orleans, Louisiana for inclusion in the Local Notice to Mariners. A copy of this report are appended to the Descriptive Report.

Except as noted above, the present survey is adequate to supersede the charted hydrography within the common area.

P. AIDS TO NAVIGATION

The hydrographer located three (3) floating aids to navigation. These aids appear adequate to serve their intended purpose. The following charted buoys were neither located nor addressed by the hydrographer.

<u>Buoy</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>
1	29°21'47"	93°13'23"
2	29°21'48"	93°13'13"
2B	29°27'18"	93°13'18"

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:

11344 (33rd Edition, July 11/98)
11347 (32nd Edition, November 4/00)

ADEQUACY OF SURVEY

This is an adequate hydrographic/side scan sonar/multi-beam survey. No additional work is recommended.

H10891

Robert Snow

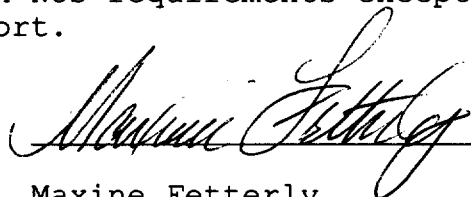
Robert Snow

Cartographic Technician
Verification of Field Data
Evaluation and Analysis

APPROVAL SHEET
H10891

Initial Approvals:

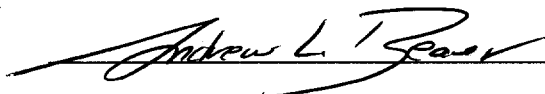
The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disapproval of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet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



Date: 12/8/00

Maxine Fetterly
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.



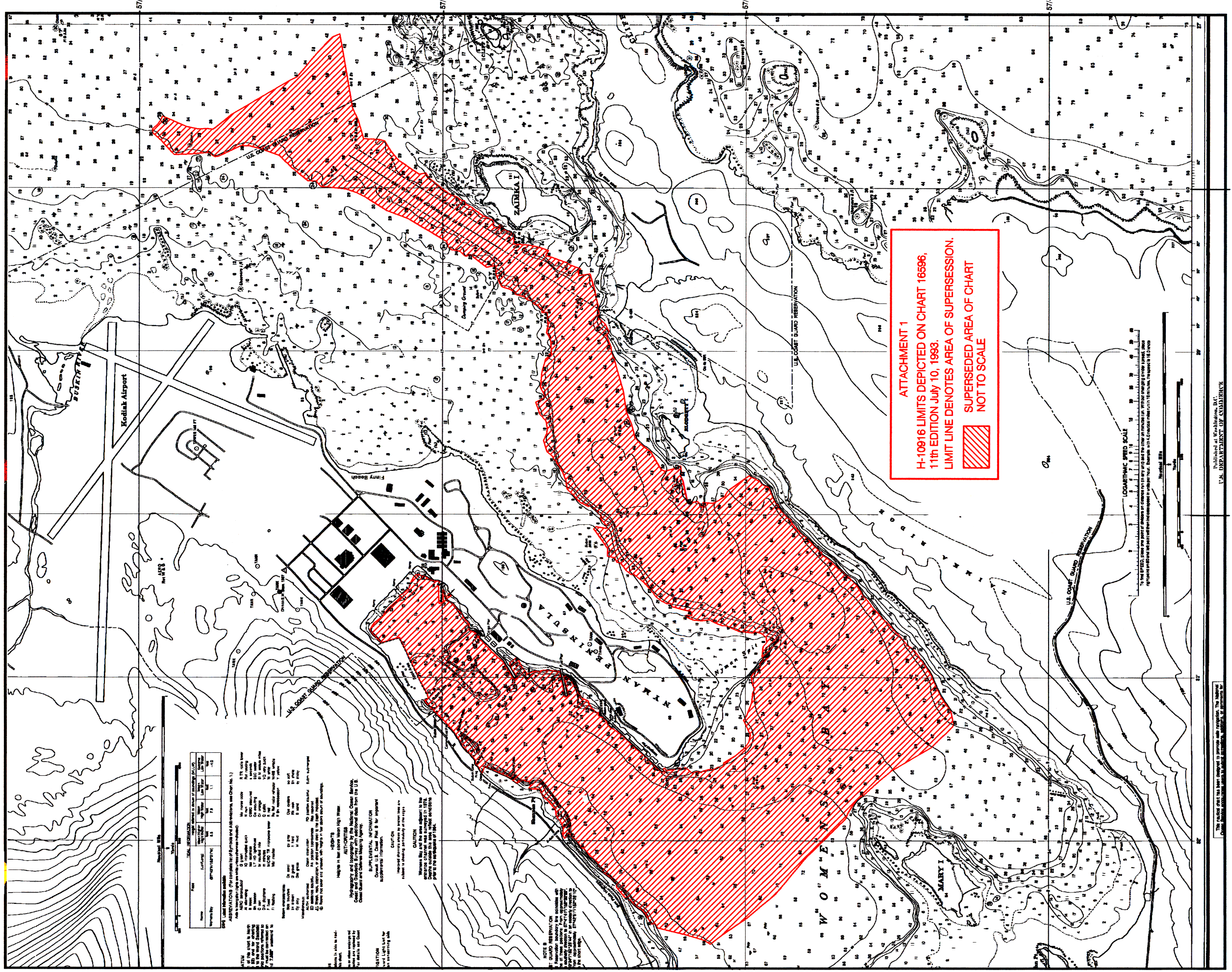
Date: 12/11/00

Andrew L. Beaver
Lieutenant Commander, NOAA
Chief, Atlantic Hydrographic Branch

Final Approval:

Approved:  LCDR, NOAA Date: 15 Feb 2001

for Samuel P. DeBow, Jr.
Captain, NOAA
Chief, Hydrographic Surveys Division



Kodiak Airport

Ferry Beach

ZAIKA I

W O M E N S I S L A N D

MARY I

U.S. COAST GUARD RESERVATION

U.S. COAST GUARD RESERVATION

TIDE INFORMATION			
Port	High Water	Low Water	Mean Low Water
57°45'N	157°15'W	157°15'W	157°15'W

NOTE: All soundings are in fathoms unless otherwise indicated. For information on the use of this chart, see the back cover of this edition of the chart. For information on the use of this chart, see the back cover of this edition of the chart.

CAUTION: This chart is not to be used for navigation purposes. It is intended for reference only. For information on the use of this chart, see the back cover of this edition of the chart.

ATTACHMENT 1
H-10916 LIMITS DEPICTED ON CHART 16596,
11th EDITION JULY 10, 1993.
LIMIT LINE DENOTES AREA OF SUPERSESSION.



NOT TO SCALE

