

H-10671

NOAA FORM 76-35A	
U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL OCEAN SERVICE	
DESCRIPTIVE REPORT	
Type of Survey	HYDROGRAPHIC/ SIDE SCAN SONAR
Field No.	WH-10-3-96
Registry No.	H-10671
LOCALITY	
State	SOUTH CAROLINA
General Locality	NORTH ATLANTIC OCEAN
Sublocality	5 NM SE OF RATTLESNAKE SHOAL
19 96	
CHIEF OF PARTY CDR M. R. Kenny, NOAA	
LIBRARY & ARCHIVES	
DATE	DEC 21 1996

H-10671

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:

WH-10-3-96

State: South Carolina  
 General locality: <sup>NORTH</sup> Atlantic Ocean  
 Locality: 5.0 NM Southeast of Rattlesnake Shoal, SC  
 Scale: 1: 10,000 Date of survey: April 5 to May 19, 1996  
 Instructions dated: March 5, 1996 and CH No. 1 dated March 13, 1996 Project Number: OPR-G342-WH  
 Vessel: NOAA Ship WHITING (S-329)  
 Chief of Party: CDR Maureen R. Kenny, NOAA  
 Surveyed by: M.R. Kenny, A.L. Beaver, P.A. Gruccio, J. Fikulsky, C.E. Parrish, E.J. Sipos, G. Garte, U.L. Gardner, M.M. Cisternelli, K. Shaver, E.R. Cruz

Soundings taken by echo sounder, hand lead-line, or pole: DSF 6000N fathometer  
 Graphic record scaled by: WHITING personnel  
 Graphic record checked by: WHITING personnel  
 Reduced by: N/A Automated plot by: HP 7959, Bruning (FIELD) *ENCAD NOAA JOT TO PLOTTER (AMB)*

Verification by: \_\_\_\_\_  
 Soundings in: Feet:  Fathoms: ~~Meters~~ at MLW: MLLW: (\*)

Remarks: 200 % Side Scan Sonar Coverage

Time zones used: 0 (UTC)

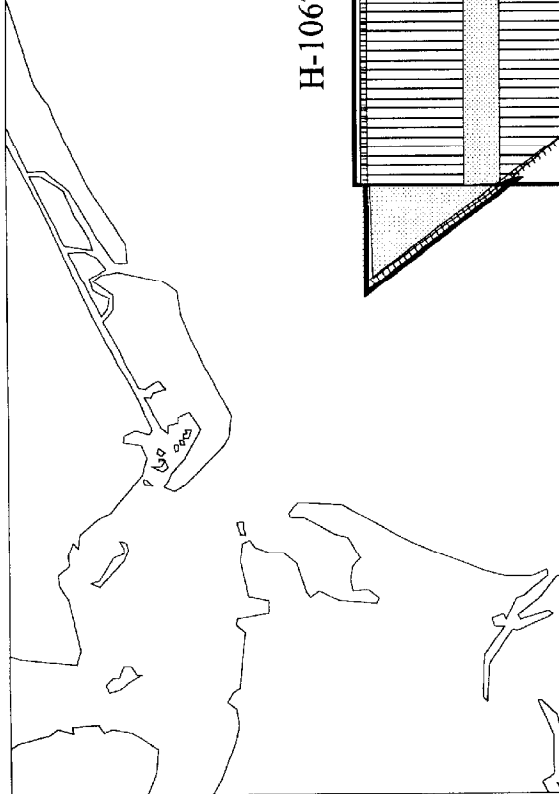
Horizontal Datum used: NAD 83

NOTES IN THE DESCRIPTIVE REPORT WERE MADE IN RED DURING OFFICE PROCESSING

DEC 21 1996 *LC*

*AWD(S) Surf ✓ 12/18/96 by MBH*

PROGRESS SKETCH - MAY 1996  
 OPR-G342-WH-96  
 Approaches to Charleston, SC  
 NOAA Ship WHITING  
 CDR Maureen R. Kenny, CMDG.



H-10670 H-10671 H-10669 H-10674

Accomplished	April	May
LNM Hydro	132	271
LNM SSS	1789	694
Sq NM Surveyed	69	26
AWOIS Items	0	8
Dives	11	40
Bottom Samples	15	58

DownTime Hrs	April	May
Weather	67	62
Electronics	22	3
Mechanical	0	0

Reg No	Started	Completed	Complete	Submitted
H-10669	4/4/96	5/09/96	100%	
H-10670	4/5/96	5/23/96	100%	
H-10671	4/5/96	5/19/96	100%	
H-10674	4/10/96	5/19/96	100%	

▨▨▨▨ April (2-30)  
 ▨▨▨▨ May (1-19,23)

**DESCRIPTIVE REPORT TO ACCOMPANY  
HYDROGRAPHIC SURVEY  
OPR-G342-WH  
H-10671**

**NOAA Ship WHITING  
CDR Maureen R. Kenny, NOAA  
Commanding Officer**

**A. PROJECT**

Project OPR-G342-WH is being conducted to provide contemporary hydrographic survey data with 200% side scan sonar coverage for the approaches to Charleston, South Carolina. This project was requested by the Charleston Pilots Association. Project OPR-G342-WH consists of four survey sheets. This survey was assigned sheet letter "B", field sheet number WH-10-3-96, and registry number H-10671. Survey Operations were conducted in compliance with Hydrographic Project Instructions OPR-G342-WH, dated March 5, 1996 and change number 1 dated March 13, 1996.

**B. AREA SURVEYED**

Hydrographic survey H-10671 is located 5 NM southeast of Rattlesnake Shoal, South Carolina. This survey is registered as a 1:10,000 scale survey. All data acquired meets the accuracy requirements for a 1:10,000 scale survey. The area surveyed is bounded by the following positions:

<u>Position</u>	<u>Latitude</u>	<u>Longitude</u>
1	32° 43' <del>25</del> <sup>42</sup> " N	079° 37' 49" W
2	32° 43' <del>25</del> <sup>42</sup> " N	079° 42' 40" W
3	32° 36' 45" N	079° 42' 40" W
4	32° 36' 45" N	079° 37' 49" W

Survey operations commenced on April 5, 1996 (DN 096), and were completed on May 19, 1996 (DN 140).

**C. SURVEY VESSELS**

NOAA Ship WHITING (VESNO 2930) was used to conduct mainscheme echosounder, side scan sonar, holidays, bottom samples, sound velocity casts, and crosslines. Dive investigations, echosounder splits, side scan sonar, and detached positions were conducted on launch 1014

(VESNO 2932). No unusual problems or equipment configurations were encountered.

#### **D. AUTOMATED DATA ACQUISITION AND PROCESSING *SEE ALSO EVALUATION REPORT***

Survey data acquisition and processing were accomplished using the standard HDAPS software, dated March 28, 1996. Sound velocity corrections were determined using *CAT* version 2.00 and *VELOCITY* version 2.11. The DGPS station was checked using *MONITOR* version 1.2. The *DAILYDQA* program ensured the proper functioning of the MOD 3 diver least depth gauge. There were no nonstandard automated acquisition or processing methods used.

#### **E. SIDE SCAN SONAR EQUIPMENT**

Side scan sonar (SSS) operations were conducted using an EG&G model 260 slant-range corrected SSS recorder and an EG&G 272-TH dual-channel, dual frequency towfish. The towfish was operated on the 100 kHz frequency and configured with a 20° beam depression. The following sonar equipment was used throughout the survey:

<u>VESNO</u>	<u>Type</u>	<u>S/N</u>	<u>DN</u>
2930	Towfish	011908	096-127
2930	Recorder	016946	096-139
2930	Towfish	016630	128-140
2930	Recorder	016942	140
2932	Towfish	010823	096-107
2932	Recorder	016669	096-107
2932	Towfish	011904	108-140
2932	Recorder	016673	108-140

On WHITING, the SSS towfish was deployed from a Reuland winch using one of two armored cables in conjunction with an A-frame mounted on the stern of ship. The armored cable was connected to the side scan recorder via a slip ring assembly. On launch 1014, the side scan sonar towfish was deployed using a Superwinch in conjunction with an adjustable davit arm on the port quarter of the launch. The launches' towfish was towed with vinyl-coated Kevlar cable and was connected to the recorder by a slip ring assembly.

The SSS towfish was maintained at a height off the bottom between 8 to 20 percent of the range scale in use. SSS operations were limited to a speed-over-ground between four and six knots. Adequate coverage was determined by generating two 100% coverage swath plots (A and B) and determining whether any holidays existed. This coverage was achieved by running north-south mainscheme lines with 80-meter line spacing at the 100-meter range scale. The overlap required in Field Procedures Manual, section 7.3.2.2 was met. Confidence checks

were obtained by observing changes in linear bottom texture that extended to the outer limits of the sonargram, and by passing aids to navigation.

All potentially significant targets were measured off the sonargram and entered into the contact table. Contacts appearing significant were entered into the HDAPS contact utility program. Information calculated from HDAPS utility program determines further side scan sonar and diver investigations. Least depths were determined by divers utilizing the MOD III diver least depth gauge and pneumatic depth gage. All detached positions taken during diving operations were completed by launch 1014 (VESNO 2932).

A review of mainscheme SSS records showed patches of thermocline noise (seen as dark blotches at the 50-meter mark and beyond on the SSS trace) clustered in two areas. In order to ensure that the thermocline did not prevent the detection of significant contacts, these areas were covered with an additional 100% SSS coverage using the 100-meter range scale with 160-meter line spacing. The thermocline was not present when this third 100% coverage (fixes 753-851) was run and no contacts were detected.

## F. SOUNDING EQUIPMENT

Raytheon Digital Survey Fathometer (DSF-6000N) echo sounders were used to measure bottom depths during the survey. The DSF-6000N produced a graphic record of the high frequency (100 kHz) and low frequency (24 kHz) depths. Digital depths from the high frequency and low frequency beams were recorded by the HDAPS acquisition system. High frequency depths were selected as the primary depths and are shown on the sounding plots. All echograms were carefully reviewed for significant features and any significant features on the graphic record that were not selected as primary soundings were manually inserted. Electronic technicians performed accuracy checks and preventive maintenance on all of the DSF-6000 echosounders used during data collection.

The following echosounders were used during this survey:

<u>Vessel</u>	<u>S/N</u>
2930	C076N
2932	A105N

## G. CORRECTIONS TO SOUNDINGS

Sound velocity profiles of the water column were determined using a Seacat Conductivity, Temperature and Depth (CTD) profiler (model SBE 19, S/N 286). The profiler was calibrated on January 10, 1996. Corrector tables were generated for the ship (vessel number 2930) and launch 1014 (vessel number 2932) each time a velocity cast was taken. Additional sound

velocity casts were taken to ensure a uniform water column over the project area. When shallow water casts yielded the same information as deeper casts. Only the deeper casts were used. There were no variations in instrument initials. The following table shows the dates, locations and the depths of each velocity cast that was applied to data in this survey area:

<u>DN</u>	<u>VESNO</u>	<u>Vel.Table #</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Least Depth</u>
095	2930	01	32° 36' 32"N	079° 34' 55"W	23.6 M
108	2930	02	32° 36' 56"N	079° 38' 33"W	18.9 M
122	2930	08	32° 33' 20"N	079° 38' 36"W	23.5 M
122	2932	09	32° 33' 12"N	079° 40' 11"W	23.7 M
138	2930	18	32° 33' 20"N	079° 38' 36"W	23.5 M
138	2932	19	32° 33' 20"N	079° 38' 36"W	23.5 M

After the CTD cast, programs *CAT 2.00* and *VELOCITY 2.11* were used to process the data, select significant data points, and create a corrector table. The velocity correctors were manually entered into an HDAPS velocity table. The correctors were applied to both high and low frequency beams during acquisition.

Data Quality Assurance (DQA) for the Seacat CTD profiler was performed by using a hydrometer and a thermometer to measure the density and temperature of a surface water sample taken during the CTD cast. The program *CAT* compared these values to the CTD surface values and confirmed that the velocity probe was working properly throughout project.

On April 22, 1996 (DN 113) a bar check was performed on launch 1014. No corrections to the DSF-6000 digitized readings were needed. Bar check results are included in Separates, section IV.\*

On April 22, 1996 a leadline comparison was performed on WHITING while in the Charleston working grounds. Leadlines used were calibrated on December 14, 1995, and the calibration confirmed that the leadline error was negligible. Weather and sea conditions were calm and proved ideal for performing the leadline comparison. The results showed excellent agreement with DSF-6000N high frequency depths averaging 0.04 meters deeper than the leadline depths. Leadline comparisons are included in Separates, section IV.\*

The correction for the static draft for launch 1014 is 0.55 meters (Offset Table 2)\* measured July 28, 1993. WHITING's static draft correction of 3.2 meters (Offset Table 9)\* was checked by divers on May 11, 1995. This value was taken with the MOD 3 Diver Least Depth Gauge. The measured draft of the transducer was determined to be within 0.04 meters of the historical value used during this survey.

WHITING settlement and squat measurements were conducted on March 26, 1996. Settlement and squat measurements were taken for launch 1014 on March 25, 1996. The correctors for WHITING, and launch 1014 were entered in offset tables 9, and 2, respectively, then applied

\* DATA FILED WITH ORIGINAL SURVEY RECORDS

on line throughout the survey. Offset tables are included in Separates, section II.★

The DAILYDQA program, in conjunction with the ship's barometer, was used daily to assure that the MOD 3 least depth gauge was working properly. Velocity casts were also taken during diving operations for use in the SMLGAUGE program when calculating least depths on contacts.

For data collected on WHITING, heave correctors were applied using a Heave, Roll and Pitch Sensor (S/N 19109-C). On launch platform 1014 heave correctors were applied during post processing by manually scanning the echograms and making the appropriate corrections.

All soundings and least depths for this project were reduced to Mean Lower Low Water using predicted tides. The operating tide station at Charleston, South Carolina (866-5530), served as the reference station for predicted tides. Time and height correctors used for this survey (tidal zone #2) are as follows:

<u>Time Correction</u>	<u>Height Ratio</u>
- 0 hr 24 min	X 0.95

Tidal data used during data acquisition were taken from Table 2 of the East Coast of North and South America Tide Tables and were applied on-line to the digital data using HDAPS software. The tidal data, in digital form, was received on floppy disk from N/CS33, Hydrographic Surveys Branch. The Charleston tide station is maintained by the Atlantic Operation Section (N/OES2130). A request for smooth tides was submitted to Product Services Branch, Datum Section, N/OES231 on June 14, 1996. *APPROVED TIDES & ZONING WERE APPLIED DURING OFFICE PROCESSING*

#### H. CONTROL STATIONS *SEE ALSO SECTION H. OF THE EVALUATION REPORT*

The horizontal datum for this project is the North American Datum of 1983 (NAD 83). The source of differential correctors was a USCG maintained Differential GPS station at Charleston, South Carolina. Additionally, WHITING used the USCG maintained Differential GPS station at Fort Macon, North Carolina, for performance checks. The position of the USCG Beacons were obtained from USCG reference listing.

<u>Station</u>	<u>Latitude</u>	<u>Longitude</u>
Charleston, South Carolina	34° 45.45357'N	079° 50.57225'W
Fort Macon, North Carolina	34° 41.84333'N	076° 40.98706'W

WHITING used *MONITOR* version 1.2 to verify the station positions and to check for multipath in the area. The digital data obtained from the *MONITOR* 1.2 program will be forwarded to N/CS31 in July 1996. Monitor Program printout included in Separates, section III.

*X DATA FILED WITH ORIGINAL SURVEY RECORDS.*



## I. HYDROGRAPHIC POSITION CONTROL

A Differential Global Positioning System (DGPS) was used as the navigation system for this survey. Both WHITING and launch 1014 used an Ashtech Sensor GPS receiver with CSI MBX1 beacon receiver which supplied correctors for DGPS navigation. Ashtech receivers were initialized by HDAPS; the CSI MBX1's were preset to the appropriate station frequency.

DGPS positioning was accomplished in accordance with the Field Procedures Manual (FPM), section 3.4. Horizontal Dilution of Precision (HDOP) limits were computed as required in section 3.4.2 of the FPM. The HDOP limit for a 1:10,000-scale survey using the USCG Beacon is 3.75. No position flyers were encountered. All suspect positions (high HDOP, DR'ed positions, high EPE) were examined for reliability. Questionable positions were either smoothed or rejected.

The serial numbers of the Ashtech Sensor, LRD-1 receivers used are as follows:

<u>VESNO #</u>	<u>Device</u>	<u>Serial Number</u>
2930	Ashtech Sensor CSI MBX1	700417B1203 A003789
2932	Ashtech Sensor CSI MBX1	700417B1055 A003790

DGPS performance checks on WHITING were determined using SHIPDIM version 2.1. The position determined using correctors from the Charleston DGPS tower was compared to the position determined using correctors from the Fort Macon DGPS beacon using two independent DGPS systems. SHIPDIM version 1.2 routinely showed the positions given by the two systems to be within 2-3 meters of each other.

DGPS performance checks for launch 1014 were conducted with the launch secured in WHITING davits. All platforms used correctors from the Charleston DGPS tower. Simultaneous HDAPS positions were compared between WHITING and the launch. An offset in distance and azimuth was then calculated between the ship and launch. A summary of the DGPS performance checks are in the Separates, section III.\* All DGPS performance checks confirmed that the equipment was working properly.

DGPS antenna offsets and laybacks were measured on April 2, 1996, for launch 1014 and on March 19, 1993, for WHITING. Offsets and laybacks were measured using the high frequency echosounder transducer as the reference. Antenna heights were also measured on the same date using the water line as the reference. Correctors were verified on April 5, 1996.

All Offset, layback, and height data has been applied by HDAPS on-line. Correctors from offset table 2 were applied to all data acquired on launch 1014. Correctors from offset table 9

were applied to all data acquired aboard WHITING. A minimum of four satellites were used during survey H-10631 (1:10,000), providing altitude unconstrained positioning.

#### **J. SHORELINE**

There is no shoreline within the limits of survey H-10671.

#### **K. CROSSLINES**

A total of 74.3 nautical miles of crosslines were run on H-10671. This constitutes 9% of the total linear nautical miles of main-scheme lines run. Crossline and main-scheme agreement was adequate. A majority of the soundings agree within 0.2 meters. Differences were randomly shoal and deep with no noticeable trends.

#### **L. JUNCTIONS *SEE ALSO EVALUATION REPORT***

Comparisons were made with surveys H-10670, H-10674, and H-10669. Agreement with all surveys is adequate with soundings agreeing within 0.3 meters. The largest difference between all three surveys was 0.5 meters. Depth contours were continuous at all junctions. Differences at all junctions were randomly shoal and deep with no discernible trends.

#### **M. COMPARISONS WITH PRIOR SURVEYS *SEE ALSO EVALUATION REPORT***

Prior surveys H-7172 (1946-47, 1:40,000), H-3216 (1910, 1:80,000), and FE-202 (1964, 1:40,000) were available for comparison with H-10671. The datum shift between NAD 83 and NAD 27 (used in priors) was calculated by using CORPSCON (version 2.1) software and determined to be insignificant (0.5 mm @ 1 : 40,000). No datum shift was applied in the comparisons and comparisons were made in feet.

Comparisons with all prior surveys agreed within 2 feet. The greatest discrepancies found were investigated and developed (see sections N.2, N.3, and N.4). On average, soundings from H-10671 were deeper than those from H-7172 and H-3216. FE-202 is a wire drag survey. Comparisons were consistent with the results from the wire drag survey. No depths from H-10671 were shoaler than the cleared depths from FE-202.

## N. ITEM INVESTIGATIONS

The following items were investigated by WHITING during this survey. Depths of features and surrounding depths are corrected to predicted MLLW.

### N.1 AWOIS 7579 (side scan sonar contact # 84.16P)

AWOIS 7579 is a 65-foot steel pilot boat which sank in the anchorage north of the entrance to Charleston Harbor and reported at position 32°42'36.63"N, 079°42' 53.28"W. The reported position is located on survey H-10670. The search radius of 2000 meters extends into the northwest quadrant of survey H-10671. The 2000 meter search radius area was investigated with 200% side scan sonar coverage. Divers found a wreck matching AWOIS 7579's description (fix # 3002) at a depth of 8<sup>485</sup> meters on H-10671. WHITING recommends that the charted wreck (PD) at position 32° 42'36.63"N, 079° 42'53.28"W be removed from the chart and that a submerged wreck be charted as listed below. *CONCUR*

Surveyed Latitude:	32°43'18.5 <sup>485</sup> "N
Surveyed Longitude:	079°42'27.9 <sup>10</sup> "W
Least Depth:	28 feet

*The dive report stated that the wreck is 65 ft. long and is lying upside-down. MBH*  
*CHART 28WK*

This item was sent in as a danger to navigation (see Appendix I). *DATA FILED WITH FIELD RECORDS*

### N.2 AWOIS 9662

AWOIS 9662 is a reported shoal ranging in depths between 35.5 to 37.7 feet in the vicinity of 32°39'36"N, 079° 39'48"W. The 1500 meter search radius was investigated with 200% side scan sonar coverage. WHITING conducted echosounder splits at 40 meter spacing to investigate the reported shoal. In addition, line spacing was reduced to 10 meters over the shoalest area. A depth of 37 feet was found in the vicinity of 32°39'40<sup>43</sup>"N, 079° 40'08<sup>43</sup>"W. WHITING recommends representative soundings from this survey be charted. *CONCUR*

*DELETE NOTATION 35 REP (1994)*

### N.3 AWOIS 7821

AWOIS 7821 is a charted shoal of 29 feet reported at 32°40'18"N, 079° 41'54"W. Two hundred percent side scan sonar coverage was completed in the vicinity in addition to 40 meter echosounder splits. The least depth found in the vicinity of the reported shoal was 34 feet. WHITING recommends the 29-foot shoal be removed from the chart and that representative soundings from this survey be charted. *CONCUR*

*DELETE NOTATION 29 REP 1988*

### N.4 AWOIS 7822

AWOIS 7822 is a 35-foot shoal reported in the vicinity of 32°40'39.64"N, 079°42'02.28"W. Two hundred percent side scan sonar coverage was completed in the vicinity in addition to 40

meter echosounder splits. A least depth of <sup>5</sup>34 feet was found at 32°41'07"N, 079°42'30"W, 0.5 nautical miles northwest of the reported shoal. WHITING recommends 35-foot shoal be removed from the chart and representative soundings from this survey be charted. CONCUR  
 DELETE NOTATION 35 REP 1989

**O. COMPARISON WITH THE CHART SEE ALSO EVALUATION REPORT**

Chart 11523 (15th ed., 25 Jun 94, 1:20,000), and 11521 (21st ed., 5 Feb 94, 1:80,000) were compared with H-10671 at a 1:10,000 scale. There is good agreement between survey H-10671 and the charted soundings and features. H-10671 soundings are generally deeper than the charted soundings from both charts. All charted reported shoal areas were investigated by echosounder splits at 40 meter spacing. For details of these investigations refer to sections N.2, N.3, and N.4 of this report.

**P. ADEQUACY OF SURVEY SEE ALSO EVALUATION REPORT**

The area surveyed is complete and adequate to supersede all prior surveys in the common area.

**Q. AIDS TO NAVIGATION**

All aids to navigation were visually verified during the survey and appear adequate to serve their intended purpose. On May 19, 1996 three detached positions on the three floating aids in the survey area were recorded on launch 1014. Two were located at positions which differ from their charted positions on charts 11523 and 11521. The Coast Guard was notified and given the following information:

<u>ATON</u>	<u>Surveyed Position</u>	<u>Charted Position</u>
Mo(A) "C" Structure Buoy, State of South Carolina	32°39'38.3 <sup>74</sup> "N 079°40'51.0 <sup>12</sup> "W	32°39'40.0"N 079°40'53.0"W
Y "B" Nun Buoy, State of South Carolina	32°37'54.0 <sup>74</sup> "N 079°41'25.2 <sup>159</sup> "W	32°38'00.0"N 079°41'30.0"W
'2" lighted	32° 40' 15.457 79° 41' 48.716	

**R. STATISTICS**

Number of Positions	5913
Main-scheme Sounding Lines (Nautical Miles)	676
Crosslines (Nautical Miles)	74
Square Nautical Miles Surveyed	28.1
Days of Production	23

Detached Positions	5
Bottom Samples	26
Tide Stations Installed	None
Current Stations	None
Number of CTD Casts	4
Magnetic Stations	None

**S. MISCELLANEOUS** *SEE AISU EVALUATION REPORT*

No anomalies in either tides or currents and/or unusual magnetic variations were encountered in the survey area. No unusual submarine features were discovered. Bottom samples were submitted to the Smithsonian Institution.

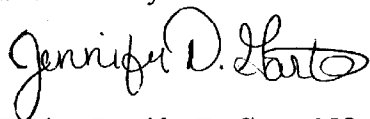
**T. RECOMMENDATIONS** *SEE ALSO SECTION P. OF EVALUATION REPORT.*

No additional fieldwork is required.

**U. REFERRAL TO OTHER REPORTS** *SEE AISU EVALUATION REPORT*

A Chart User Evaluation/Inspection Report was submitted in June 1996 as part of OPR-G342-WH. A Coast Pilot Report was submitted in July 1996.

Submitted by:



Ensign Jennifer D. Garte, NOAA  
NOAA Ship WHITING

## HORIZONTAL CONTROL STATIONS

**Station:** Charleston Coast Guard Beacon

Latitude: 32° 45.45357' N  
Longitude: 079° 50.57225' W  
Frequency: 298 MHZ  
Station ID (Antennae A): 016  
Transmission Rate: 100 BPS

**Station:** Fort Macon Coast Guard Beacon

Latitude: 34° 41.84333' N  
Longitude: 076° 40.98706' W  
Frequency: 294 MHZ  
Station ID (Antennae A): 014  
Transmission Rate: 100 BPS

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GEOGRAPHIC NAMES

Name on Survey	A CHART NO. 11521, 11520, 11488 B ON PREVIOUS SURVEY 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											
	NORTH ATLANTIC OCEAN	X		X								
RATTLESNAKE SHOAL (title)	X											2
SOUTH CAROLINA (title)	X		X									3
												4
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Approved

*Quintin C. Coy*  
Chief Geographer

OCT 1 1996



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SERVICE  
Office of Ocean and Earth Sciences  
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: June 14, 1996

HYDROGRAPHIC SECTION: Atlantic

HYDROGRAPHIC PROJECT: OPR-G342-WH

HYDROGRAPHIC SHEET: H-10671

LOCALITY: 5 Nautical Miles Southeast of Rattlesnake Shoal, S.C.

TIME PERIOD: April 5 - May 19, 1996

TIDE STATION USED: 866-5530 Charleston, S.C.  
Lat. 32° 46.9'N Lon. 79° 55.5'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 2.49 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 5.5 ft.

REMARKS: RECOMMENDED ZONING

Apply a -24 minute correction to times and a X0.95 range ratio to heights using Charleston, S.C. (866-5530).

Note: Times are tabulated in Greenwich Mean Time.

  
CHIEF, DATUMS SECTION






APPROVAL SHEET  
HYDROGRAPHIC SURVEY  
OPR-G342-WH  
1996  
WH-10-3-96  
H-10671

The data for this survey was acquired and checked under my daily supervision. Position and sounding accuracy meet the requirements specified in the Project Instructions, Hydrographic Manual, Hydrographic Survey Guidelines, and the Field Procedures Manual for Hydrographic Surveying. This survey is complete and adequate for the intended purpose of delineating bottom topography, determining depths, and identifying all potential dangers to navigation. No final field sheets were prepared for this survey. The survey data and accompanying records are complete for the preparation of the smooth sheet.

Approved By:

  
Commander Maureen R. Kenny, NOAA  
Commanding Officer, NOAA Ship WHITING

10/30/96

HYDROGRAPHIC SURVEY STATISTICS  
REGISTRY NUMBER: H-10671

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	5486
NUMBER OF SOUNDINGS	32506

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	33	06/21/96
VERIFICATION OF FIELD DATA	10	08/09/96
QUALITY CONTROL CHECKS	0	
EVALUATION AND ANALYSIS	24	
FINAL INSPECTION	5	08/30/96
COMPILATION	52	10/24/96
TOTAL TIME	124	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		09/05/96

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**ATLANTIC HYDROGRAPHIC BRANCH  
EVALUATION REPORT FOR H-10671 (1996)**

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  
AUTOCAD, Release 12  
QUICKSURF, version 5.1  
MicroStation, version 5.0  
I/RAS B, version 5.01

The smooth sheet was plotted using an ENCAD NovaJet III 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 0.702 seconds (21.620 meters or 2.16 mm at the scale of the survey) north in latitude, and 1.056 seconds (27.512 meters or 1.05 mm at the scale of the survey) east in longitude.

**L. JUNCTIONS**

H-10669 (1996) to the west  
H-10670 (1996) to the east  
H-10674 (1996) to the south

Standard junctions were effected between the present survey and surveys H-10669 (1996), H-10670 (1996), and H-10674 (1996).

There are no junctional surveys to the north. Charted depths to the north are in good general harmony with present survey depths.

**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.

- O. COMPARISON WITH CHARTS 11523 (15<sup>th</sup> Edition, June 25/94)  
11521 (21<sup>st</sup> Edition, Feb 5/94)**

**Hydrography**

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

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

**P. ADEQUACY OF SURVEY**

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

**S. 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.

**WHITING Processing Team**

*Franklin L. Saunders*

Franklin L. Saunders  
Cartographic Technician

*Norris A. Wike*

Norris A. Wike  
Cartographer

APPROVAL SHEET  
H-10671

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 disproof 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.

Robert G. Roberson Date: 5 SEPTEMBER 1996  
Robert G. Roberson  
Chief, Cartographic Section

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

Nicholas E. Perugini Date: 5 September 1996  
Nicholas E. Perugini  
Commander, NOAA  
Chief, Atlantic Hydrographic Branch

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Final Approval:

Approved: Andrew A. Armstrong Date: Dec 20, 1996  
Andrew A. Armstrong, III  
Captain, NOAA  
Chief, Hydrographic Surveys Division

10/30/96

HYDROGRAPHIC SURVEY STATISTICS  
REGISTRY NUMBER: H-10671

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	5486
NUMBER OF SOUNDINGS	32506

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	33	06/21/96
VERIFICATION OF FIELD DATA	10	08/09/96
QUALITY CONTROL CHECKS	0	
EVALUATION AND ANALYSIS	24	
FINAL INSPECTION	5	08/30/96
COMPILATION	52	10/24/96
TOTAL TIME	124	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		09/05/96

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

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10671

**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
11523	10/11/96	<i>[Signature]</i>	Full <del>Part Before</del> After Marine Center Approval Signed Via <i>FULL APPLICATION</i> Drawing No. <i>OF SOUNDINGS FROM SMOOTH SHEET</i>
11521	10/24/96	<i>[Signature]</i>	Full <del>Part Before</del> After Marine Center Approval Signed Via <i>FULL APPLICATION</i> Drawing No. <i>OF SOUNDINGS THRU 11523</i>
11480	3/17/97	<i>Travis Newman</i>	Full <del>Part Before</del> After Marine Center Approval Signed Via Drawing No. <i>42 Appd thru 11521</i>
11520	12-15-97	<i>Peerce Hunt</i>	Full <del>Part Before</del> After Marine Center Approval Signed Via Drawing No. <i>51 Appd thru 11521</i>
11531	4-3-97	<i>David Emery</i>	Full Part Before <input checked="" type="radio"/> After Marine Center Approval Signed Via Drawing No. <i>Appd in field</i>
			Full Part Before After Marine Center Approval Signed Via Drawing No.
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