

H11016

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic/Multibeam

Field No. _____

Registry No. H11016

LOCALITY

State Virginia

General Locality North Atlantic Ocean

Locality Northeast Approach to
Chesapeake Bay

2000

CHIEF OF PARTY

Lcdr. James S. Verlaque, NOAA

LIBRARY & ARCHIVES

DATE

October 3, 2001

H11016

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 NO.

N/A

State Virginia

General locality North Atlantic Ocean

Locality Northeast Approach to Chesapeake Bay

Scale 1:10,000

Date of survey November 7 - 9, 2000

Instructions dated October 27, 2000

Project No. OPR-D324-RU

Vessel NOAA Ship RUDE s590, EDP# 9040

Chief of party LCDR James S. Verlaque, NOAA

Surveyed by LCDR J. Verlaque, LT J. Crocker, ENS K. Slover, ENS B. Evans

Soundings taken by: (echo sounder, hand lead, pole) Reson Seabat 9003 SWMB, Innerspace 448 SBES

Graphic record scaled by RUDE Personnel

Graphic record checked by RUDE Personnel

Protracted by N/A

Automated plot by HP Design Jet 2500 CP
~~N/A~~ Plotter

Verification by Atlantic Hydrographic Branch Personnel

Soundings in (~~fathoms~~, feet, or ~~meters~~ at ~~MLW~~ or MLLW) FEET at MLLW

REMARKS: Hydrographic Survey. All times recorded in UTC.

Soundings corrected with verified tides.

Hand written notes in the Descriptive Report were made during office processing

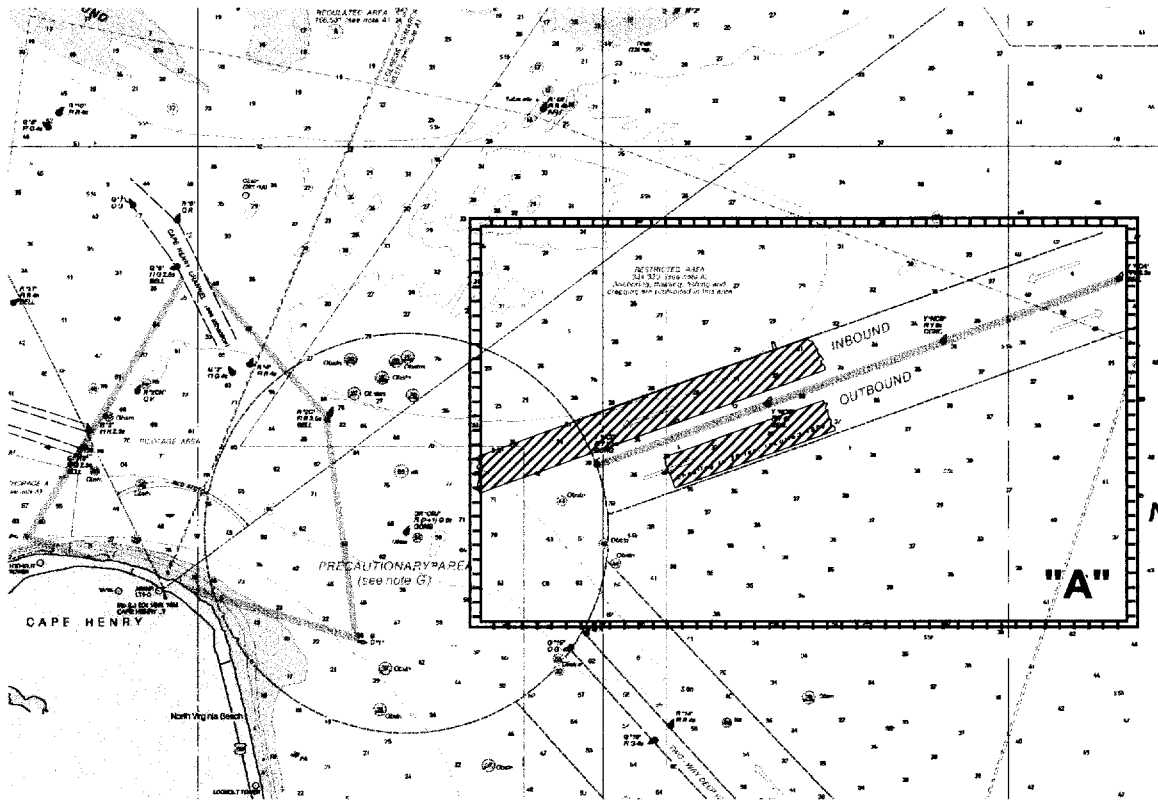
AW015/SURP 9/25/01 SSV

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	DATA ACQUISITION AND PROCESSING REPORT *	
	VERTICAL AND HORIZONTAL CONTROL REPORT *	

* Data filed with the original Field Records

**Descriptive Report to Accompany Hydrographic Survey
H11016
Scale: 1:10,000
NOAA Ship RUDE S590
LCDR James S. Verlaque, NOAA**



A. AREA SURVEYED

- A.1.** This survey was conducted in accordance with Hydrographic Survey Letter Instructions for OPR-D324-RU, Northeast Approach to Chesapeake Bay, Virginia, dated October 27, 2000.
- A.2.** This survey was conducted per request from the Association of Maryland Pilots and the Virginia Pilots Association. Possible shoaling to 26 feet in the outbound lane of the Northeast Approach was reported in July 1999, and National Ocean Service Surveys have indicated significant southerly migration of shoals into the inbound lane.
- A.3** Full bottom coverage with multi-beam sonar was accomplished in the crosshatched regions in the figure above. These regions, covering the area of southerly shoal encroachment in the inbound lane and AWOIS Item #10791 in the outbound lane, were identified in the Project Instructions as highest priority. On December 11, 2000, verbal instructions received by telephone from Mr. Steven J.

Verry, Operations Branch, Hydrographic Surveys Division, National Ocean Service Office of the Coast Survey, directed RUDE not to acquire additional data on H11016, and to submit the data which had been acquired up to that point as a completed hydrographic survey. RUDE was informed that NOAA Ship WHITING would complete coverage of the survey area in the Spring of 2001.

B. DATA ACQUISITION AND PROCESSING *See Also Evaluation Report*

B.1 EQUIPMENT

- B.1a** All hydrographic data acquisition for this survey was conducted from NOAA Ship RUDE (S-590, EDP #9040). RUDE is 90 feet in length, with a 22-foot beam, and a 7-foot draft.
- B.1b** Vertical-beam echo-sounding data were acquired on RUDE with an Odom Echo-Trac dual-beam echo sounder (24 and 200 kHz) (S/N 9641). RUDE vertical-beam data was only used to compare depths with multi-beam data and was not included in the final data set.
- B.1c** Single frequency (455kHz) multi-beam data were acquired with a Reson SeaBat 9003 (S/N 10496-447020) shallow water sonar system. The 9003's combined transmit and receive beams yield forty (40) soundings per ping, each formed from a 3° cross-track by 1.5° along-track bottom footprint.
- B.1d** Heave, pitch, and roll data for RUDE were acquired using a Seatex Seapath Motion Reference Unit (MRU-5, S/N 0544).
- B.1e** All positions for this survey were obtained from the NAVSTAR Global Positioning System (GPS) augmented with the U.S. Coast Guard Differential GPS service. GPS signals were acquired on RUDE with a SeaPath 200GPS receiver (S/N 0347) and differential correctors were acquired using a Starlink DNAV-212G differential receiver (S/N 848).
- B.1f** Sounding velocity data throughout the water column was acquired using a SeaBird SBE19 Seacat Profiler (S/N 196721-1991). Sound velocity casts were taken every four hours, or normally when surface velocity as measured by an Odom Digibar Pro DB1200, (S/N 98013), had changed by more than two meters per second.

B.2 QUALITY CONTROL

- B.2a** A total of 3.1 nautical miles of cross-lines were acquired during the survey, equating to 1.8% of the total nautical miles of hydrography. Cross-lines were accomplished according to NOS Specifications and Deliverables guidelines.

A visual inspection of all intersections of cross and mainscheme lines was conducted in Mapinfo. Comparison of sounding data from multi-beam

mainscheme lines and multi-beam crosslines yielded excellent results, with discrepancies of not more than one foot observed. In addition, a quality control report generated in CARIS-HIPS yielded satisfactory results. A copy of this report is included in Appendix V, Supplemental Survey Records and Correspondence, filed with the original survey records.

B.2b There are no contemporary junctions with this survey.

B.2c Multi-beam quality control checks were accomplished on-line by comparing mutli-beam soundings to single-beam soundings using the Bathymetry Confidence program within ISIS. Differences of 0.2 to 0.5 meters were observed during data acquisition. A further comparison of fully processed single-beam and multi-beam crossline data was conducted visually in Mapinfo, yielding sounding differences of 0 to 2 feet.

B.3 DATA REDUCTION

B.3a No deviations from the prescribed method for data reduction were used during this survey.

C. VERTICAL AND HORIZONTAL CONTROL

C.1 VERTICAL CONTROL

Tidal zoning for this survey is consistent with the Survey Letter Instructions. During data acquisition, the tide station at the Chesapeake Bay Bridge Tunnel, Virginia (863-8863) was used as the reference station to acquire preliminary unverified tides.

Zone correctors were applied to the verified tidal data from the Chesapeake Bay Bridge Tunnel tide station generating tide correctors. These correctors were applied to all multi-beam data within CARIS-HIPS and single-beam crossline data in HPS.

NOTE: Verified smooth tidal values and correctors may be applied to multi-beam data within HPS, as "line by line" binning was chosen when multi-beam data was imported into the CARIS-HIPS workfile. Note that only verified tides have been applied to all submitted data.

C.2 HORIZONTAL CONTROL *See Also Evaluation Report*

The horizontal reference station for this survey is the North American Datum of 1983 (NAD83). Geodesy parameters during data collection entailed the use of Universal Transverse Mercator (UTM) Zone 18, WGS 84, Northern Hemisphere. No horizontal control stations were used for this survey.

The following USCG reference station beacon was used:

USCG DGPS Radio Beacon Broadcast Site						
Site	Freq.	Tran Rate (BPS)	Lat (N)	Long (W)	Range	Beacon ID
Driver, VA	289	100	36° 57.5'	076° 33.4'	130	806

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

D.1.a Five charts are affected by this survey. All were corrected through the dates of hydrography (Weekly and Local Notice to Mariners 45/00).

Chart Affected	Edition	Date	Chart Scale
Chart 12205 SC	25 th Ed.	20 November 1999	1:80,000
Chart 12208	7 th Ed.	5 December 1998	1:50,000
Chart 12221	71 st Ed.	5 August 2000	1:80,000
Chart 12222	40 th Ed.	27 November 1999	1:40,000
Chart 12280	1 st Ed.	25 May 1996	1:200,000

D.1.b The area surveyed exhibits a flat, gently sloping bottom. There are no wrecks, obstructions, or other features charted within this area and no significant bottom features or contacts were located during the project. *Concur*

The first priority of H11016 was to locate the 30-foot contour in the inbound traffic lane of the Chesapeake Bay Northeast Approach. The 30-foot contour was found to have migrated approximately 190 meters to the southwest of its charted position. The new contour encroaches roughly half way across the inbound traffic lane. *Concur*

Of equal importance was investigation of reports of shoaling to depths as shallow as 26 feet in the outbound traffic lane (AWOIS Item #10791). As further discussed below, 100% multi-beam sonar coverage of the assigned search area failed to show any depths less than 33 feet. The hydrographer recommends the removal of the "Shoaling Reported" label from all affected charts. *Concur*

A comparison of present survey soundings and features with the NOS charts tabulated above revealed moderate shoaling in both traffic lanes of the Chesapeake Bay Northeast Approach. Current depths are one to three feet shallower than charted depths across both traffic lanes. The only exception was the 32 foot sounding charted in latitude 36°56'59"N, longitude 075°53'57"W on Charts 12205 SC, 12208, and 12221. Current data show depths of 34 to 35 feet at this position. *Concur*

Shoaling was less apparent at the southwestern end of the project where the traffic lanes enter the Precautionary Area. In this region, current soundings agreed well with those charted, with depth differences of one foot or less.

The hydrographer recommends that soundings from H11016 supersede all previous data in the common area. *Concur*

- D.1.c** Nine AWOIS items are contained within the survey limits, however only two fall within the actual limits of hydrography. Of these two items, one is assigned and one is informational. Complete information on these investigations follows:

D.1.c.i AWOIS 10791

ITEM DESCRIPTION: Shoaling to 26 feet reported in outbound traffic lane of Northeast Approach to Chesapeake Bay in vicinity of Buoy "NCC".

SOURCE: CL1178/99, LNM33/99

AWOIS POSITION: 36°56'59.64" N, 075°53'16.08"W

REQUIRED INVESTIGATION: S2, SWMB

CHARTS AFFECTED: 12205 SC, 12208, 12221, 12280

INVESTIGATION

DATE (S) / DN (S): November 7-9, 2000 / 312-314

LINE/POSITION: 005-007, 303-332, 900-922 / 4274-4798, 6054-7385, 7446-7672

INVESTIGATION USED: 100% SWMB

POSITION DETERMINED BY: DGPS

INVESTIGATION SUMMARY:

RUDE began survey operations in the AWOIS Item #10791 search area on November 7, 2000 (DN 312) and completed 100% multi-beam sonar coverage on November 9, 2000 (DN 314). Results of this survey indicate a flat bottom gently sloping down to the southwest with depths of 33 to 36 feet. No evidence of shoaling to the reported 26-foot depth was found.

CHARTING RECOMMENDATION:

The hydrographer recommends removing the "Shoaling to 26 feet reported 1999" label in latitude 36°56'57.35" N, longitude 075°53'07.10"W from Charts 12205 SC, 12208, and 12221, and the "Shl to 26ft rep 1999" label in latitude 36°56'57.35" N, longitude 075°53'07.10"W from Chart 12280. The hydrographer further suggests that the common area of the affected charts be updated with the present survey soundings. *Concur*

RECOMMENDED POSITION: N/A

RECOMMENDED LEAST DEPTH: N/A

COMPILATION NOTES:

D.1.c.ii AWOIS 7538

ITEM DESCRIPTION: Shoaling to 30 feet reported in inbound traffic lane of Northeast Approach to Chesapeake Bay in vicinity of Buoy "NCC".

SOURCE: CL1137/87

AWOIS POSITION: 36°57'42.52" N, 075°52'46.73"W

REQUIRED INVESTIGATION: INFORMATION

CHARTS AFFECTED: 12205 SC, 12208, 12221, 12280

INVESTIGATION

DATE (S) / DN (S): November 7-8, 2000 / DNs 312, 313

LINE/POSITION: 367/866, 909/5667

INVESTIGATION USED: SWMB

POSITION DETERMINED BY: DGPS

INVESTIGATION SUMMARY:

RUDE began survey operations in the vicinity of AWOIS Item #7538 on November 7, 2000 (DN 312) and completed 100% multi-beam sonar coverage of the area on November 8, 2000 (DN 313). Results of this survey indicate a flat bottom gently sloping down to the southwest with depths of 30 and 31 feet surrounding the position of AWOIS Item #7538.

CHARTING RECOMMENDATION:

The hydrographer recommends that the common area of the affected charts be updated with the present survey soundings.

Concur

RECOMMENDED POSITION: N/A

RECOMMENDED LEAST DEPTH: N/A

COMPILATION NOTES:

D.1.d There are no Danger to Navigation Reports generated in conjunction with H11016.

D.2 ADDITIONAL RESULTS

D.2.a Current soundings were visually compared with data from the following prior surveys:

Registry Number	Survey Scale	Year Surveyed	Survey Platform
H9919	1:20,000	1980-81	NOAA Ship PEIRCE
H10343	1:10,000	1990	NOAA Ship WHITING
H10356	1:10,000	1990	NOAA Ship HECK
H10372	1:10,000	1990	NOAA Ship HECK

H9919 covers the northeastern portion of the area surveyed in H11016, from Buoy "NCC" to the eastern edge of the survey. While the general bathymetric characteristics of the area remain unchanged, current depths in both the inbound and outbound lane of Chesapeake Bay Northeast Approach are two to three feet shoaler than observed in 1980-81.

H10343, H10356, and 10372 junction to cover the entire area of the present survey. Depths across the survey area have shoaled by an average of approximately 0.5 meters since 1990. Shoaling is most apparent on the north side of the Northeast Approach to Chesapeake Bay inbound traffic lane in the vicinity of Buoy "NCC", where current soundings are as much as a full meter less than previously observed. At the far southwestern end of the survey area in depths greater than 20 meters, there is little evidence of shoaling, as current soundings agree well with the prior surveys.

This report and accompanying field sheets are respectfully submitted.

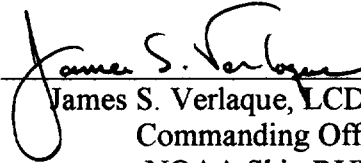


Benjamin K. Evans, ENS, NOAA
Junior Officer
NOAA Ship RUDE

E. APPROVAL SHEET**APPROVAL SHEET****LETTER OF APPROVAL****REGISTRY NO. H11016**

Field operations contributing to the accomplishment of this hydrographic navigable area survey were conducted under my direct supervision with frequent personal checks of progress and adequacy. All field sheets and reports were reviewed in their entirety and all supporting records were checked.

This survey is more than adequate to supersede ALL prior surveys in common areas. This survey, in the area where data was acquired, is considered complete and adequate for nautical charting.


James S. Verlaque, LCDR, NOAA
Commanding Officer
NOAA Ship RUDE

GEOGRAPHIC NAMES

H-11016

Name on Survey	A		B		C		D		E		F		G		H		K	
	ON CHART NO.	12221	ON PREVIOUS SURVEY NO.	12222	CON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND McNALLY ATLAS	U.S. LIGHT LIST								
CHESAPEAKE BAY (title)	X		X															1
NORTH ATLANTIC OCEAN	X																	2
VIRGINIA (title)	X		X															3
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~~Report~~
Chris Clay
 Chief Geographer
 JAN 23 2001



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: April 24, 2001

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: OPR-D324-RU-2000
HYDROGRAPHIC SHEET: H11016

LOCALITY: Northeast Approach to Chesapeake Bay, VA
TIME PERIOD: November 7 - 9, 2000

TIDE STATION USED: 863-8863 Chesapeake Bay Bridge Tunnel, VA
Lat. 36° 58.0'N Lon. 76° 6.8'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.829 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: ATL724 & ATL725

Refer to attachments for zoning information.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time.

Thomas V. Mero 4/24/01

CHIEF, REQUIREMENTS AND DEVELOPMENT DIVISION



LETTER TRANSMITTING DATA

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

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

DATE FORWARDED 08/31/2001

NUMBER OF PACKAGES 1

TO:

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

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.

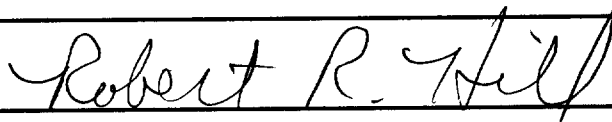
H11016

VIRGINIA, NORTH ATLANTIC OCEAN, NORTHEAST APPROACH TO CHESAPEAKE BAY

ONE TUBE CONTAINING THE FOLLOWING:

- 1 SMOOTH SHEET FOR SURVEY H11016
- 1 ORIGINAL DESCRIPTIVE REPORT
- 1 DRAWING HISTORY FORM (NOAA FORM #76-71) FOR NOS CHART 12222
- 1 DRAWING HISTORY FORM (NOAA FORM #76-71) FOR NOS CHART 12208
- 1 RECORD OF APPLICATION TO CHART FORM (NOAA FORM #75-96)
- 1 H-DRAWING ON MYLAR FOR NOS CHART 12222
- 1 H-DRAWING ON MYLAR FOR NOS CHART 12208
- 1 COMPOSITE DRAWING ON PAPER FOR CHART 12222
- 1 COMPOSITE DRAWING ON PAPER FOR CHART 12208

FROM: (Signature)



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]

08/31/2001

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H11016

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	6788
NUMBER OF SOUNDINGS	6788

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	16.0	01/09/2001
VERIFICATION OF FIELD DATA	311.0	06/27/2001
QUALITY CONTROL CHECKS	12.0	
EVALUATION AND ANALYSIS	38.5	
FINAL INSPECTION	12.0	06/27/2001
COMPILATION	72.0	08/30/2001
TOTAL TIME	461.5	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		08/20/2001

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H11016 (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.

B. AUTOMATED DATA ACQUISITION AND PROCESSING

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

CARIS HIPS/SIPS
Hydrographic Processing System (HPS)
MicroStation 95, version 5.05
SiteWorks, version 2.01
NADCON, version 2.10
I/RAS B, version 5.01

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

C. CONTROL STATIONS

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). 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 datum, move the projection lines 0.530 seconds (16.33 meters or 1.63 mm at the scale of the survey) north in latitude and 1.265 seconds (31.29 meters or 3.13 mm at the scale of the survey) east in longitude.

**D. COMPARISON WITH CHARTS 12208 (7th Edition, Dec. 05/98)
12222 (41st Edition, Dec. 16/00)**

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section D1. of the Descriptive Report.

The present survey is adequate to supersede the charted hydrography in the common area, except as noted in this report.

ADEQUACY OF SURVEY

This is an adequate hydrographic survey and should supersede all prior surveys within the common area with the exception of those items noted above.

MISCELLANEOUS

Chart compilation using the present survey data was done by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compiled data will be forwarded to Marine Chart Division, Silver Spring, Maryland. The following NOS charts were used for compilation of the present survey:

12208 (7th Edition, Dec 05/98)
12222 (41st Edition, Dec 16/00)

Marilyn Schlüter

Marilyn L. Schlüter

Cartographic Technician
Verification of Field Data
Evaluation and Analysis

APPROVAL SHEET
H11016

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 R. Hill Jr.

Date: 8-20-01

Robert R. Hill Jr.
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 S. Verlaque

Date: 8/24/2001

~~for~~ James S. Verlaque,
LCDR, NOAA
Chief, Atlantic Hydrographic Branch

Final Approval:

Approved: Samuel P. De Bow Dated: October 3, 2001

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

