

FE00428

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

FIELD EXAMINATION

Type of Survey

Field No. **WH-10-9-96**

Registry No. **FE-428**

LOCALITY

State **NORTH CAROLINA**

General Locality **NORTH ATLANTIC OCEAN**

Sublocality **SW. OF FRYING PAN SHOALS**

.....
19 96-97
.....

CHIEF OF PARTY

..... **CDR M. R. KENNY, NOAA**

LIBRARY & ARCHIVES

DATE **MAR 11 1998**

REGISTRY NUMBER:

FE-428 SS

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-10-9-96

State: North Carolina

General locality: North Atlantic Ocean

Locality: Southwest of Frying Pan Shoals

Scale: 1: 10,000

Date of survey: August 2, 1996 to May 23, 1997

Instructions dated: May 03, 1996, chg #1-Feb 25, 1997, chg #2-Apr 11, 1997

Project Number: OPR-G309-WH

Vessel: NOAA Ship WHITING S-329

Chief of Party: CDR Maureen R. Kenny

Surveyed by: M.R. Kenny, A.L. Beaver, P.A. Gruccio, J. Pikulsky, Emily Christman, Harold Orlinsky, Eric Sipos, C.E. Parrish, R.C. Jones, J.D. Garte, U.L.

Gardner, P.G. Lewit, K.B. Shaver, E.R. Cruz, Brad Armbruster, Danielle Pattison and Parran Keane

Soundings taken by echo sounder, hand lead-line, or pole: DSE-6000N fathometer

Electronic record scaled by: WHITING personnel

Electronic record checked by: WHITING personnel

Protracted by: N/A

ENCAD NOAA SET III PLOTTER (AHB)
Automated plot by: Zeta 936 Plotters & HP PLT 750C Plotter (field)

Verification by: Hydrographic Surveys Branch

Soundings in: Feet: Fathoms: Meters: at MLW: MLLW: (*)

Remarks: Basic Hydrographic and 200% Side Scan Sonar.

Electronic Data Processing (EDP) vessels numbers involved in data acquisition: 2930 and 2932

Time zones used: UTC

Horizontal Datum NAD 83

** Notes in The Descriptive Report were made in Red during Office Processing.*

AWOIS + SURF ✓ 3/98 PWD

**DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-G309-WH
WH-10-9-96
FE-428 SS**

**NOAA SHIP WHITING
CDR Maureen Kenny, NOAA
Commanding Officer**

A. PROJECT

The purpose of this project is to update charted hydrography in the approaches to Wilmington, North Carolina. The project is being conducted in response to requests from the United States Coast Guard (USCG), the United States Army Corps of Engineers (USACE), the North Carolina State Ports Authority, and the Wilmington-Cape Fear Pilots Association. Project OPR-G309-WH consists of twelve survey sheets. The survey described in this report was designated as field sheet number WH-10-9-96 and registry number FE-428 SS and consists of AWOIS items 536, 9682 and 9692. Survey operations were conducted in compliance with the Hydrographic Project Instructions OPR-G309-WH dated May 3, 1996.

B. AREA SURVEYED

Hydrographic survey FE-428 SS is located southwest of Frying Pan Shoals, North Carolina. The limits of hydrography for each AWOIS item are bounded by the following positions:

	<u>536</u>	<u>9682</u>	<u>9692</u>
Northern Limit:	33° 31' 24" N	33° 30' 36" N	33° 36' 00" N
Southern Limit:	33° 29' 24" N	33° 27' 36" N	33° 33' 00" N
Eastern Limit:	077° 55' 18" W	078° 08' 24" W	077° 53' 24" W
Western Limit:	077° 58' 18" W	078° 11' 24" W	077° 56' 24" W

Survey operations commenced on August 2, 1996 (DN 215), and concluded on May 23, 1997 (DN 143).

C. SURVEY VESSELS

NOAA Ship WHITING (vessel number 2930) and launch 1014 (vessel number 2932) were used to conduct main scheme sounding data acquisition, side scan sonar, cross lines, sound velocity casts, main scheme echosounder splits, AWOIS investigations, and dive operations. 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 HDAPS system with the standard HDAPS software dated March 28, 1996, HYPACK version 6.4 for Windows, Hydrographic Processing System (HPS) and MAPINFO version 4.1. Sound velocity corrections were determined using *CAT* version 2.00 and *VELOCITY* version 2.11. The Differential GPS station was checked using *MONITOR* version 1.2. The MOD III Diver Least Depth Gauge was checked using the *DAILYDQA* program. 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 towfish. The towfish was operated on the 100 kHz frequency and configured with a 20° beam depression. The following SSS equipment was used:

<u>Vessel</u>	<u>Type</u>	<u>S/N</u>	<u>DN</u>
2930	Towfish	0011904, 16697	215, 295, 309-310, 329-330, 111-113, 138-140, 143
	Recorder	016946	215, 295, 309-310, 329-330, 111-113, 138-140, 143
2932	Towfish	11591	087
	Recorder	016669	087

On NOAA Ship WHITING, the SSS towfish was deployed from a Reuland winch using one of two armored cables in conjunction with an A-frame on the stern. The armored cable was connected to the SSS recorder by a slip-ring assembly. On launch 1014, the SSS towfish was deployed using a Superwinch in conjunction with an adjustable davit arm on the stern.

The SSS towfish was towed with a vinyl-coated Kevlar cable and was connected to the recorder by a slip-ring assembly.

Disproval of the AWOIS items required 200% side scan sonar coverage. Proper coverage was achieved by running mainscheme lines with either 80-meter line spacing at the 100-meter range scale, 55-meter line spacing at the 75-meter range scale or 40 meter line spacing at the 50-meter range scale. Weather conditions dictated which range scale was used. This line spacing provided for proper overlap as required by Field Procedures Manual, section 7.3.2.2. Adequate coverage was ensured by plotting alternate mainscheme lines on 'A' and 'B' swath plots and verifying 100% coverage on each plot.

The towfish was maintained at a height off the bottom of 8-20 percent of the range scale. Side scan operations were limited to a speed-over-ground of 4-6 knots. Confidence checks were performed by noting changes in linear bottom features extending to the outer edges of the sonargram.

Contacts were measured off the sonargram and entered into an HDAPS and HPS contact table. Using the contact utility program, WHITING hydrographers determined contact heights, positions, and correlations to other contacts. Contacts appearing significant were further investigated by SSS development and then by divers if deemed necessary. Least depths were determined by a MGD III Diver Least Depth Gauge (S/N 68332) and final positioning of significant items was determined by taking detached positions on diver-placed buoys.

F. SOUNDING EQUIPMENT

Raytheon Digital Survey Fathometer (DSF-6000N) echosounders were used to measure water depths during the survey. The DSF-6000N produced a graphic record of the high frequency (100 kHz) and low frequency (24 kHz) depths. The high and low frequency digital depths were recorded by the HDAPS and HYPACK acquisition system. The high frequency depths were selected as the primary depths and were used for plotting. All echograms were scanned for significant features and any significant features that were not selected as primary soundings were manually inserted.

The following fathometers were used:

<u>Vessel</u>	<u>S/N</u>	<u>DN</u>
2930	B046N	215, 295, 309-310, 329-330, 111-113, 138-140, 143
2932	A018N	087

Electronic technicians performed accuracy checks and preventive maintenance on all of the DSF-6000N echosounders used.

Least depths on diver investigations in the survey area were acquired using the MOD III Diver Least Depth Gauge.

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 and S/N 1060). The CTD profilers were calibrated on January 10, 1996 and January 10, 1997. The Seacat calibration records are included in the Separates, section IV. *

A corrector table was generated for the ship (vessel number 2930) for each velocity cast taken. Additionally, a corrector table was generated for the launch 1014 (vessel number 2132). The following table shows the dates, locations and the table depths of each velocity cast that was applied to the data acquired in this survey area:

<u>DN</u>	<u>Velocity Table #</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Depth</u>
214	19 (ship)	33° 34' 78" N	078° 10' 28" W	25.2 m
294	39 (ship)	33° 32' 40" W	077° 57' 10" W	31.3 m
309	41 (ship)	33° 30' 54" N	078° 00' 48" W	31.0 m
324	50 (ship)	33° 33' 00" N	079° 59' 18" W	26.1 m
087	59 (ship)	33° 23' 54" N	077° 42' 06" W	28.5 m
087	60 (launch)	33° 23' 54" N	077° 42' 06" W	28.5 m
105	74 (ship)	33° 34' 06" N	078° 15' 24" W	23.2 m
112	77 (ship)	33° 29' 45" N	078° 09' 16" W	30.8 m
138	88 (ship)	33° 29' 54" N	078° 15' 01" W	30.9 m
138	89 (launch)	33° 29' 54" N	078° 15' 01" W	30.9 m

Each cast was processed and corrector tables generated using *CAT* version 2.00 and *VELOCITY* version 2.11. The velocity correctors were manually entered into an HDAPS and HPS velocity table where correctors were applied to both the high and low frequency beams during data acquisition. Velocity profile data are included in the Separates, section IV. *

Data Quality Assurance (DQA) for the Seacat CTD profilers 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 *CAT* program compared these values to the Seacat's surface values and confirmed that the Seacat was working properly.

WHITING hydrometers were calibrated on March 25, 1996 and March 3, 1997. Correctors were applied to the readings taken from the hydrometer.

* DATA Filed with Field Records

There were no variations in instrument initials.

The *DAILYDQA* program used in conjunction with the ship's barometer was used to assure that the MOD III Diver Least Depth Gauge was working properly. Daily results fell within specified operating ranges. CTD casts were used in the *SMLGAUGE* program to calculate least depth measurements.

Bar checks were performed on launch 1014 on November 16, 1996 (DN 321) and April 24, 1997 (DN 114). No corrections to soundings were needed. Copies of the bar check data are included in the Separates, section IV. *

Leadline comparisons were performed on WHITING while in the project area on November 18, 1996 (DN 323) and April 3, 1997 (DN 093). Leadlines used were calibrated on November 17, 1996 (DN 322) and February 15, 1997 (DN 046), and the calibrations confirmed that the leadline error was negligible. Weather and sea conditions were calm and proved ideal for performing the leadline comparisons. The results showed excellent agreement with DSF-6000N high frequency depths averaging 0.04 meters deeper than leadline depths. Copies of the leadline comparison data are included in the Separates, section IV. *

The correction for the static draft for launch 1014 is 0.55 meters and was measured on July 28, 1993. The corrector was entered into Offset Table 2. * The correction for static draft for WHITING is 3.2 meters, a historical value which WHITING divers confirmed with a MOD III Diver Least Depth Gauge on May 11, 1995. The corrector was entered into Offset Table 9. * Static draft correctors were applied to the sounding data in real time for each survey platform.

Settlement and squat values for launch 1014 were determined on March 25, 1996 and March 10, 1997, and were entered into Offset Table 2. * Settlement and squat values for WHITING were determined on March 26, 1996, and were entered into Offset Table 9. * The settlement and squat correctors were applied to the sounding data in real time for each survey platform. Offset tables are included in the Separates, section II. *

Heave correctors for launch 1014 were applied during post processing by manually scanning the echograms and making the appropriate corrections (DN 215-330). For the data acquired by launch 1014 using HYPACK (DN 083-143), the data acquisition computer logged and applied in real time, heave data from a TSS Heave Compensator (S/N 002068). For data acquired by WHITING, the HDAPS and HYPACK data acquisition computer logged and applied, in real time, heave data from a heave, roll and pitch sensor in 1996 (HIPPY, S/N 19109-C) and a TSS Heave Compensator in 1997 (S/N 002066).

The tidal datum for this project was Mean Lower Low Water (MLLW). The operating tide station at Springmaid Pier, South Carolina (866-1070), served as the reference station for predicted tides. Tidal data used during data acquisition were based on Table 2 of the East Coast of North and South America Tide Tables.

* DATA filed with Field Records.

Digital tidal data were received on floppy disk from N/CS33, Hydrographic Surveys Branch and were applied to the digital data during acquisition by HDAPS. Tidal data were zoned as specified in the project instructions.

A subordinate tide station for the project was installed at Yaupon Beach, North Carolina (865-9182). The station was installed on May 15, 1996, and leveled on September 7, 1996, November 18, 1996, March 6, 1997, April 5, 1997 and June 11, 1997. A request for smooth tides was submitted to Product and Services Branch, Datum Section, N/OES231, on ^{Sept. 25} July 7, 1997. *Approved Tides and zoning were applied during office processing.*

H. CONTROL STATIONS *See also Evaluation Report.*

The horizontal datum for this project is the North American Datum of 1983 (NAD 83). The source of differential correctors used was a USCG maintained Differential GPS station at Charleston, South Carolina. In addition, WHITING used a USCG maintained Differential GPS station at Fort Macon, North Carolina, for performance checks. Positions obtained from USCG reference listings are:

<u>Station</u>	<u>Latitude</u>	<u>Longitude</u>
Charleston USCG DGPS Beacon	32° 45.45357' N	079° 50.57225' W
Fort Macon USCG DGPS Beacon	34° 41.84333' N	076° 40.98706' W

WHITING used *MONITOR* 1.2 to verify station positions and to check for multipath in the area. The digital data obtained from the *MONITOR* 1.2 program was forwarded to N/CS31 in July 1996 and March 11, 1997. Printouts from the *MONITOR* program are included in the Separates, section III. *

I. HYDROGRAPHIC POSITION CONTROL

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

DGPS positioning was accomplished in accordance with the Field Procedures Manual, section 3.4. The HDOP limit for a 1:10,000 scale survey using the Charleston station is 3.2. 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.

** DATA filed with Field Records*

The serial numbers of the Ashtech Sensor and CSI MBX1 receivers on the data acquisition platforms are as follows:

<u>Vessel</u>	<u>Device</u>	<u>Serial Number</u>
2930	Ashtech Sensors CSI MBX1	700417B1203 A003789
2932	Ashtech Sensor CSI MBX1	700417B1055 X-1079

DGPS performance checks on NOAA Ship WHITING were determined by 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* 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 the WHITING davit and with both platforms using correctors from the Charleston DGPS tower. Simultaneous HDAPS positions (1996) and HYPACK positions (1997) were compared between WHITING and the launch. An offset in distance and azimuth was then calculated between the ship and the launch system. A summary of the DGPS performance checks is included in the Separates, section III.*All DGPS performance checks confirmed that the equipment was working properly.

The DGPS antenna offset was measured on March 19, 1996, and February 1997, for WHITING. Offsets and laybacks were measured using the high-frequency echosounder transducer as the reference. DGPS antenna were reinstalled directly over the echosounders transducers on April 2, 1996, for launch 1014. Antenna heights were also measured on the same respective dates shown above, using the water line as the reference. The offsets and laybacks were applied by the HDAPS and HYPACK on-line. A minimum of four satellites was used during survey FE-428 SS providing altitude unconstrained positioning.

Offset, layback, and height corrections for the launch's SSS aft towing boom were measured on February 1997. All offset, layback, and height data were applied by HDAPS and HYPACK on-line. Correctors from Offset Table 2* were applied to all data acquired from launch 1014.

Offset, layback, and height for WHITING's SSS towfish A-frame were measured on July 27, 1992, and February 1997, using the forward high frequency transducer as the reference. Correctors were entered into Offset Table 9.*

* DATA Filed with Field Records.

J. SHORELINE *See Also Evaluation Report.*

No shoreline exists within the limits of survey FE-428 SS.

K. CROSSLINES

No crosslines were run within the limits of survey FE-428 SS.

L. JUNCTIONS *See Also Evaluation Report.*

There are no junctions within the limits of survey FE-428 SS.

M. COMPARISONS WITH PRIOR SURVEYS *See Also Evaluation Report.*

No comparisons were made with prior surveys.

N. ITEM INVESTIGATIONS

Divers found two of the three AWOIS items during their investigations. The following is a list of the AWOIS items found, along with their positions, least depths and descriptions. Depths of these features are corrected to ~~predicted~~ MLLW.

Approved

N1.1 AWOIS Item 536 *PLOT 1 of 3*

Contact No.:	6004.59
Detached Position:	44 6009
Least Depth:	14.9 m (48.9 ft) 15.4 m (50.5 ft)
Time of Least Depth:	1755 UTC
Position of Least Depth:	Lat: 33° 32' 30.180" N Long: 077° 56' 53.831" W
Description:	Divers investigated this AWOIS item, a charted wreck on chart 11520 on March 28, 1997 (DN 087) and found the wreck scattered over several hundred feet in the vicinity of the Loran rates given in the AWOIS listing. The bow and stern were clearly evident. The least depth was taken from the highest point of the bow section.

Recommendation: This wreck is currently charted at latitude 33° 31' 00" N and longitude 077° 57' 01" W. It is recommended that it be removed from its current charted position and charted as a wreck at latitude 33° 32' 30.180" N and longitude 77° 56' 53.831" W with a least depth of 49 feet. *CONCUR WITH CLARIFICATION CHART WK "RARIAN" 50 CHART 50 FT WK ON CHART 11536 - RETAIN AS CHARTED ON CHART 11536*

AWOIS Item 536 was submitted as a danger to navigation (See Appendix I).

✓ N1.2 AWOIS Item 9682 *Plot 2 of 3*

This wreck is currently charted at latitude 33° 29' 30.0" N and longitude 078° 10' 00" W. An extensive search of the survey area with 200% side scan sonar coverage, over a 2500 meter search radius, found no significant contacts. It is recommended that the wreck charted at the position above be removed from the chart. *CONCUR*

N1.3 AWOIS Item 9692 *Plot 3 of 3*

Contact No.: 6003.27
 Detached position: *47 6019*
 Least Depth: ~~21.3 m (69.9 ft)~~ *20.1 m (65.9 feet)*
 Time of Least Depth: 1458 UTC
 Position of Least Depth: Lat: 33° 24' 18.679" N
 Long: 077° 42' 42.998" W
 Description: Divers investigated this AWOIS item on March 28, 1997 (DN 087) and found ruins of an old wreck in the vicinity of the Loran rates given in the AWOIS listing. In the center of the wreck is a metal structure standing in the upright position; the least depth was taken from the highest point of this metal structure.
 Recommendation: This wreck is not currently charted. It is recommended that a wreck be charted at latitude 33° 24' 18.679" N and longitude 077° 42' 42.998" W with a least depth of 70 feet. *CONCUR CHART WK "City of Houston" 66*

GKH 3-9-98

O. COMPARISON WITH THE CHART

Comparisons were made between survey FE-428 SS and chart 11536 (13th ed., Mar 15/97, 1:80,000). * Comparisons were made in feet. Due to the small area, comparisons with charted *also chart 11520 36th Ed., NOV. 16/96*

soundings were limited. In general, agreement is adequate with charted depths agreeing with survey soundings within 2 feet. Charting recommendations are made under Section N.

A Danger to Navigation Report (see Appendix I) was submitted on May 7, 1997 for this survey and discussed in Section N1.1.

P. ADEQUACY OF SURVEY *see also Evaluation Report.*

This survey is a complete and adequate investigation of AWOIS items 536, 9682 and 9692.

Q. AIDS TO NAVIGATION

There are no aids to navigation within the survey limits.

R. STATISTICS

Number of Soundings	6870
Main-scheme Sounding Lines (Nautical Miles)	183 NM
Cross lines (Nautical Miles)	0
Square Nautical Miles Surveyed	7.9 NM
Days of Production	15
Detached Positions	2
Bottom Samples	0
Tide Stations Installed	1
Current Stations	0
Number of CTD Casts	8
Magnetic Stations	0

S. MISCELLANEOUS

No anomalies in either tide or current and/or unusual magnetic variations were encountered in the survey area. No unusual submarine features were discovered.

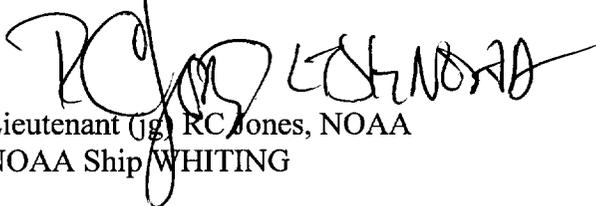
T. RECOMMENDATIONS

No additional field work is required. There are no current plans for construction or dredging in the survey area.

U. REFERRAL TO OTHER REPORTS

A Chart User Evaluation Report was submitted in February 1997 as part of OPR-G309-WH.
A Coast Pilot Report was submitted in December 1996.

Submitted by:

A handwritten signature in black ink, appearing to read "RC Jones", with a long horizontal flourish extending to the right.

Lieutenant (jg) RC Jones, 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



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

May 7, 1997

Commander, Fifth Coast Guard District
Federal Building
431 Crawford Street
Portsmouth, Virginia 23704-5004

Dear Sir:

The NOAA Ship WHITING, while conducting hydrographic survey operations in the approaches to Wilmington, North Carolina, located two features which are dangers to navigation. Our findings are summarized below.

<u>Feature</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Depth</u>
Obstruction	33° 51' 08.3" N	078° 06' 34.0" W	18.4 feet (3.0 fathoms)
Wreck	33° 32' 30.2" N	077° 56' 53.8" W	48.9 feet (8.1 fathoms)

In addition, NOAA Ship WHITING located the following uncharted floating aids to navigation (ATON):

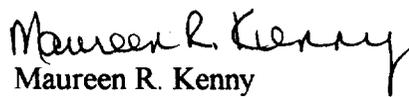
<u>Floating ATON</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Date Located</u>
Y, Round "AR 425"	33° 53' 03.7" N	078° 06' 32.8" W	April 16, 1997
Y, Round "AR 420"	33° 50' 24.4" N	078° 07' 14.3" W	April 21, 1997

Differential GPS was used to determine the survey positions the dangers to navigation and ATONS listed above. Positions are referenced to NAD 83. All depths are referenced to MLLW using predicted tides. Charts 11536 (12th edition) and 11537 (29th edition) are affected by this report.

A copy of this letter has been forwarded to the following offices:

Chief, Marine Charting Division, NOAA
Chief, AMC Operations Division, NOAA
Chief, Atlantic Hydrographic Branch, NOAA
Director, Defense Mapping Agency
Hydrographic/Topographic Agency
President, Wilmington Cape Fear Pilots Association

Sincerely,


Maureen R. Kenny
Commander, NOAA
Commanding Officer



**APPROVAL SHEET
HYDROGRAPHIC SURVEY
OPR-G309-WH
WH-10-9-96
FE-428-SS**

The data for this survey were 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~~



TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: October 3, 1997

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: OPR G309-WH

HYDROGRAPHIC SHEET: FE-428

LOCALITY: North Atlantic Ocean

TIME PERIOD: October 20 - November 25, 1996
and April 21 - May 23, 1997

TIDE STATION USED: 865-9182 Yaupon Beach, N.C..
Lat. 33° 54.1'N Lon. 78° 4.9'W

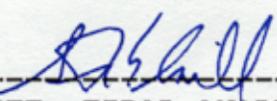
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 m
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.512 m

REMARKS: RECOMMENDED ZONING

Use zone(s) identified as: SEC99, SEC101, SEC102 & SEC103

Refer to attachment(s) for zoning information.

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



CHIEF, TIDAL ANALYSIS BRANCH



GEOGRAPHIC NAMES

FE-428

Name on Survey	CHART NO. 11520, 11536 ON PREVIOUS SURVEY CON U.S. QUADRANGLE MAPS FROM LOCAL INFORMATION ON LOCAL MAPS P.O. GUIDE OR MAP GRAND McNALLY ATLAS U.S. LIGHT LIST										
	A	B	C	D	E	F	G	H	K		
FRYING PAN SHOALS (title)	X		X								1
NORTH ATLANTIC OCEAN	X		X								2
NORTH CAROLINA (title)	X		X								3
											4
											5
											6
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Approved:

Charles C. Coy
Chief Geographer

SEP 9 1997

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR FE-428 (1997)**

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 95, version 5.05
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 0.643 seconds (19.811 meters or 1.98 mm at the scale of the survey) north in latitude, and 1.053 seconds (27.156 meters or 2.71 mm at the scale of the survey) east in longitude.

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 CHART 11520 (36st Edition, Nov. 16/96)
11536 (13st Edition, Mar. 15/97)

Hydrography

The charted hydrography originates with prior surveys and miscellaneous sources and requires no further consideration. The hydrographer makes adequate chart comparisons in sections N. and 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 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

Robert Snow

Robert Snow
Cartographic Technician
Verification of Field Data
Evaluation and Analysis

APPROVAL SHEET
FE-428

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: OCTOBER 20, 1997
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: October 20, 1997
Nicholas E. Perugini
Commander, NOAA
Chief, Atlantic Hydrographic Branch

Final Approval:

Approved: Gerald B. Mills Date: March 9, 1998
for Andrew A. Armstrong, III
Captain, NOAA
Chief, Hydrographic Surveys Division

77° 57' 00"

77° 56' 30"

33° 33' 00"

33° 32' 30"

⁵⁰
Wk "RARITAN"

FE-428
NORTH CAROLINA
NORTH ATLANTIC OCEAN
SW OF FRYING PAN SHOALS
AUG. 2 - MAY 23, 1997
SCALE: 1:10,000
SOUNDINGS IN FEET AT MLLW
SHEET 1 OF 3
AWOIS ITEM #536

77° 57' 00" W

NAD 27  33° 32' 00" N

33° 32' 00"

CHECKED BY: RS
7/30/97

77° 57' 00"

77° 56' 30"

78° 12' 00"

78° 11' 00"

78° 10' 00"

78° 09' 00"

78° 08' 00"

33° 30' 00"

33° 29' 00"

78° 08' 00" W

NAD 27 33° 30' 00" N

CHECKED BY: RS
7/30/97

33° 29' 00"

78° 12' 00"

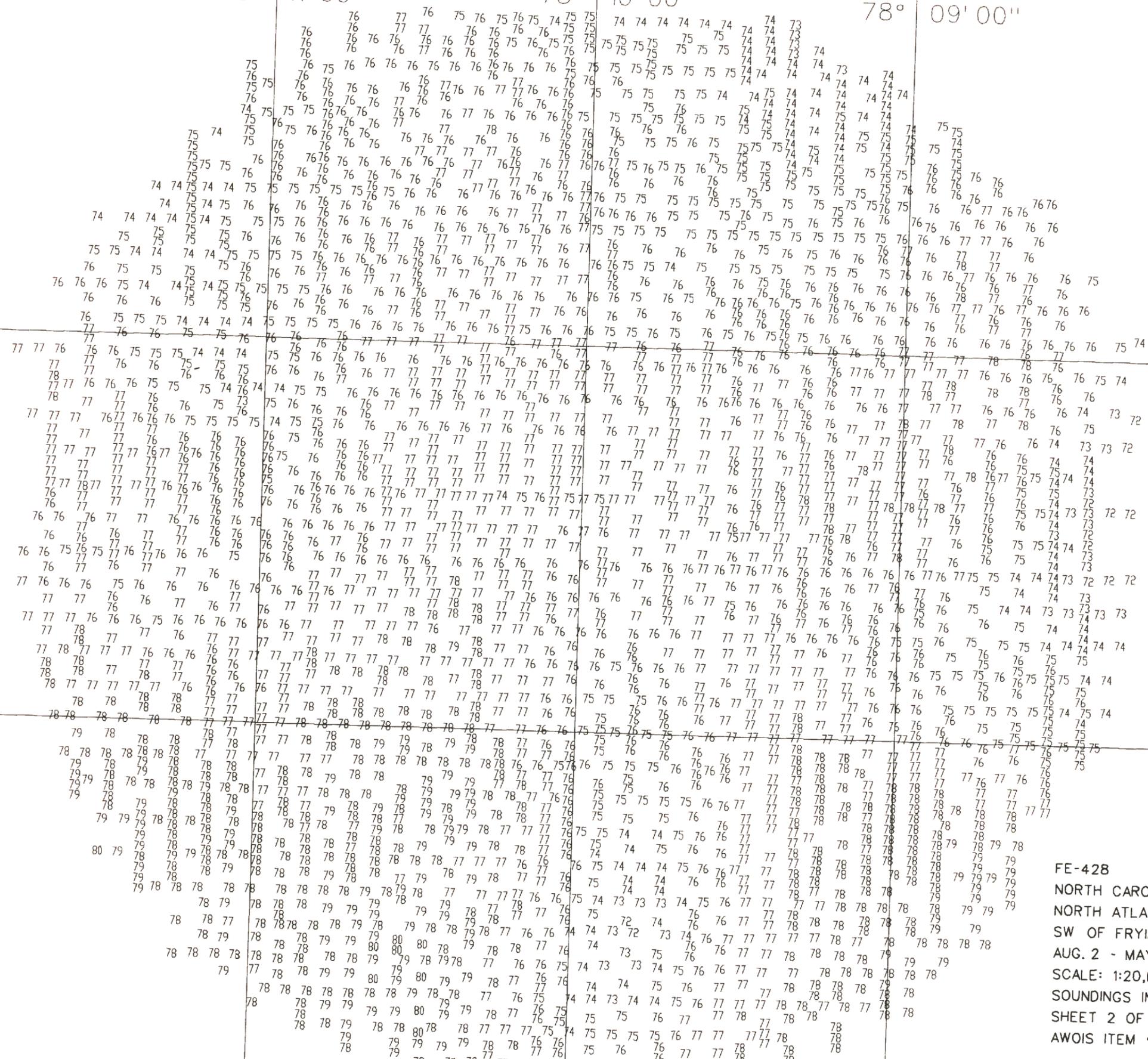
78° 11' 00"

78° 10' 00"

78° 09' 00"

78° 08' 00"

FE-428
NORTH CAROLINA
NORTH ATLANTIC OCEAN
SW OF FRYING PAN SHOALS
AUG. 2 - MAY 23, 1997
SCALE: 1:20,000
SOUNDINGS IN FEET AT MLLW
SHEET 2 OF 3
AWOIS ITEM *9682



77° 43' 00"

77° 42' 30"

33° 25' 00"

33° 24' 30"

66 Wk "CITY OF HOUSTON"

FE-428
NORTH CAROLINA
NORTH ATLANTIC OCEAN
SW OF FRYING PAN SHOALS
AUG. 2 - MAY 23, 1997
SCALE: 1:10,000
SOUNDINGS IN FEET AT MLLW
SHEET 3 OF 3
AWOIS ITEM *9692

33° 24' 00"

77° 43' 00" W
NAD 27  33° 24' 00" N

CHECKED BY: RS
7/30/97

77° 43' 00"

77° 42' 30"

