

10464

Diagram No. 1219-3

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-20-1-93 ..
Registry No. H-10464 ..

LOCALITY

State New Jersey ..
General Locality .. Atlantic Ocean ..
Sublocality 17 NM SE of Cape May ..

1993

CHIEF OF PARTY
CDR A.A. Armstrong

LIBRARY & ARCHIVES

DATE December 6, 1993 ..

10464

10484

10484

EXAMINED FOR NM

Exam. r/c 2/14/84 LA

CP-3
12214
12300
12200

13003 N.C.

HYDROGRAPHIC TITLE SHEET

H-10464

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

WH-20-1-93

State NEW JERSEY

General locality ATLANTIC OCEAN
~~APPROACHES TO DELAWARE BAY~~

Locality 17 NM SOUTHEAST OF CAPE MAY, NEW JERSEY

Scale 1:20,000 Date of Survey Mar. 25 - May 21, 1993

Instructions dated FEBRUARY 23, 1993 Project No. OPR-D368-WH

Vessel NOAA Ship WHITING S-329 EDP # 2930

Chief of party Commander Andrew A. Armstrong, III

Suveyed by A.A. Armstrong, C.B. Greenawalt, J.S. Verlaque, J.G. Clayton, J.L. Riley, N.O. Silverman, M.P. Zipperer
J.A. Seitz, F.R. Cruz, E.A. Myers, S.R. Parker

Soundings taken by echo sounder DSF-6000N

Graphic record scaled by WHITING survey personnel

Graphic record checked by WHITING survey personnel

Protracted by N/A Automated plot by HP 7959B, Bruning (FIELD)

Verification by ATLANTIC HYDROGRAPHIC SECTION PERSONNEL

Soundings in MLLW Meters

REMARKS: Registered as a 1:20,000 scale survey. The data meets the accuracy standards for a

1:10,000 scale survey and are plotted at 1:10,000 scale

200% side scan sonar coverage

Time zone used, 0 (UTC)

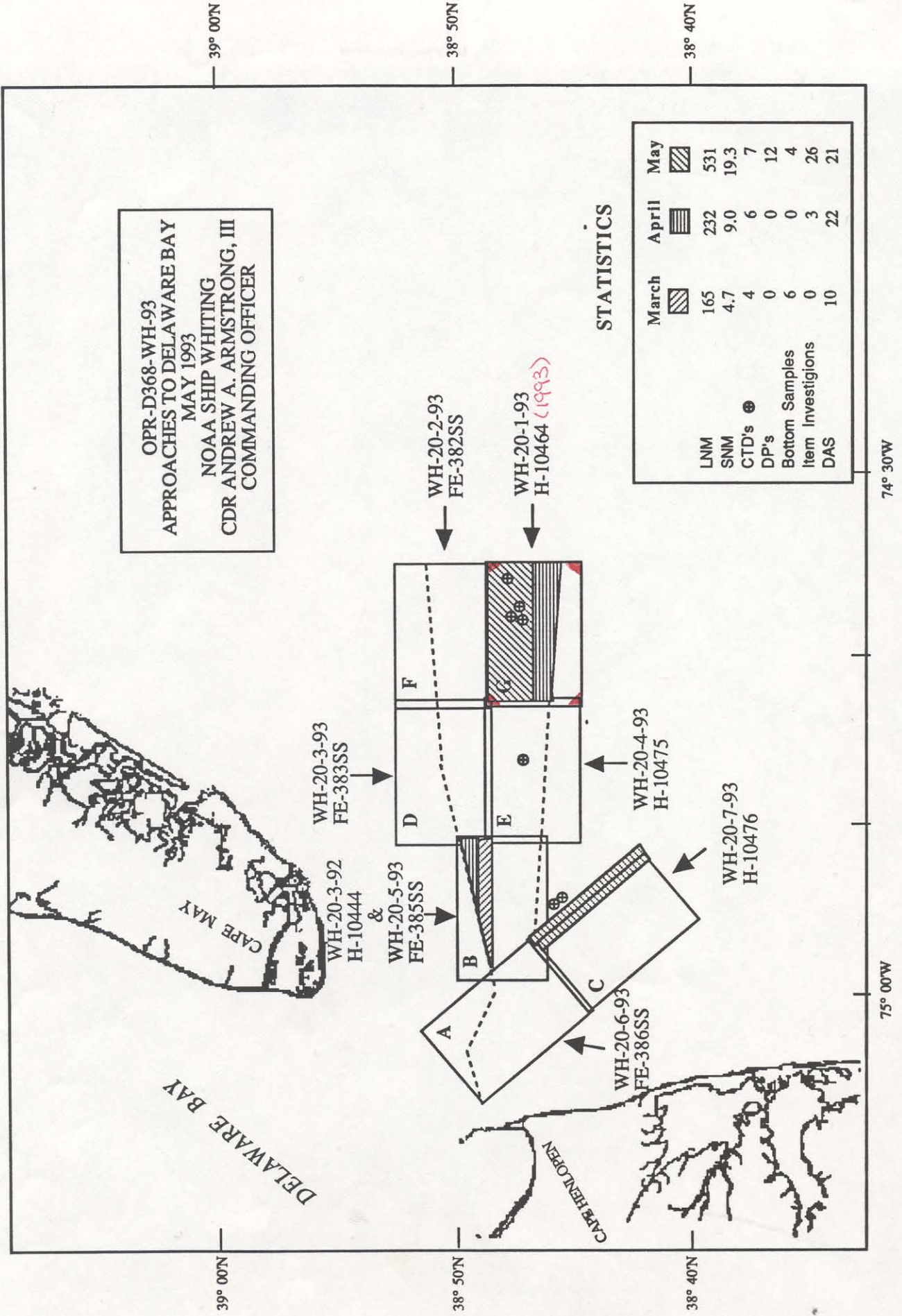
Junctions with H-10439

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

AWOIS/SURFV 12/3/93 SJ

SC-17-97
KWW. 1/27/94

NOAA SHIP WHITING PROGRESS SKETCH



OPR-D368-WH-93
APPROACHES TO DELAWARE BAY
MAY 1993

NOAA SHIP WHITING
CDR ANDREW A. ARMSTRONG, III
COMMANDING OFFICER

STATISTICS

| | March | April | May |
|---------------------|-------|-------|------|
| LNMs | 165 | 232 | 531 |
| SNMs | 4.7 | 9.0 | 19.3 |
| CTD's | 4 | 6 | 7 |
| DP's | 0 | 0 | 12 |
| Bottom Samples | 6 | 0 | 4 |
| Item Investigations | 0 | 3 | 26 |
| DAS | 10 | 22 | 21 |

DELAWARE BAY

CAPE MAY

CAPE HENLOPEN

WH-20-3-93
FE-383SS

WH-20-3-92
H-10444

WH-20-5-93
FE-385SS

&

WH-20-6-93
FE-386SS

WH-20-2-93
FE-382SS

WH-20-1-93
H-10464 (1993)

WH-20-4-93
H-10475

WH-20-7-93
H-10476

39° 00'N

38° 50'N

38° 40'N

75° 00'W

74° 30'W

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-D368-WH
1993
WH-20-1-93
H-10464

NOAA SHIP WHITING
CDR Andrew A. Armstrong, III, NOAA
Commanding Officer

A. PROJECT

Project OPR-D368-WH is a basic hydrographic survey with 200-percent side scan sonar (SSS) bottom coverage of the approaches to Delaware Bay.

The purpose of this project is to update the existing nautical charts and to locate any wrecks and obstructions in or near the approaches to Delaware Bay. Specifically, this project is in response to a request by the Fifth Coast Guard District to survey the approaches to Delaware Bay in order to realign the eastern approach of the traffic separation scheme.

Survey operations were conducted in accordance with Hydrographic Project Instructions OPR-D368-WH dated February 23, 1993, and Change No. 1, dated May 13, 1993. Although this survey is registered as a 1:20,000 scale survey, all data acquired meet the accuracy requirements for a 1:10,000 scale survey.

Project OPR-D368-WH was divided into seven survey sheets. The survey described in this report was designated "G" Sheet, and assigned field sheet number WH-20-1-93 and registry number H-10464.

B. AREA SURVEYED

Hydrographic survey H-10464 is 17 nautical miles southeast of Cape May, New Jersey. The survey covers the eastern end of the outbound Cape Henlopen to Five Fathom Bank Traffic Lane and adjacent separation zone. The survey area is bounded by the following limits:

| <u>Latitude</u> | <u>Longitude</u> |
|---------------------------|----------------------------|
| 38°44'40"N | 074°41'50"W |
| 38°47' ³⁸ 28"N | 074°41'50"W |
| 38°44'24"N | 074°33' ²⁶ 36"W |
| 38°47' ³¹ 28"N | 074°33' ² 36"W |

Survey operations began on March 25, 1993 (DOY 084) and ended on May 21, 1993 (DOY 141). Data were acquired on the following days:

| <u>DOY</u> | <u>Date</u> |
|------------|---------------------------|
| 084 | March 25, 1993 |
| 098-099 | April 8-9, 1993 (omitted) |
| 103-104 | April 13-14, 1993 |
| 110 | April 20, 1993 |
| 115 | April 25, 1993 |
| 125-132 | May 5-12, 1993 |
| 140-141 | May 20-21, 1993 |
| 090 | MARCH 31, 1993 |

C. SURVEY VESSEL

NOAA Ship WHITING, vessel identification number 2930, was used for all side scan sonar and sounding data acquisition. Launch 1021 was used as a dive platform for least depth determination and for acquiring a position on two wreck investigations conducted on May 9 and May 10, 1993.

No unusual vessel configurations were used nor were any problems encountered.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Survey data acquisition and processing were accomplished using the HDAPS system with the following software:

| <u>PROGRAM NAME</u> | <u>VERSION</u> | <u>DATE INSTALLED</u> |
|---------------------|----------------|-----------------------|
| AUTOST | 3.00 | 24-Sep-92 |
| BACKUP | 2.00 | 24-Sep-92 |
| BASELINE | 1.13 | 24-Sep-92 |
| BIGABST | 2.03 | 10-Nov-92 |
| BLKEDIT | 2.01 | 04-Nov-92 |
| CARTO | 2.05 | 03-Mar-93 |
| CONTACT | 2.02 | 04-Nov-92 |
| CONVERT | 3.52 | 04-Nov-92 |
| DAS_SURV | 6.33 | 02-Mar-93 |
| DIAGNOSE | 3.01 | 24-Sep-92 |
| DISC_UTIL | 1.00 | 24-Sep-92 |
| DP | 2.13 | 02-Mar-93 |
| EXCESS | 4.10 | 24-Sep-92 |
| FILESYS | 3.02 | 04-Nov-92 |
| FILESYS | 3.05 | 04-May-93 |
| GRAFEDIT | 1.01 | 02-Mar-93 |
| HIPSTICK | 1.01 | 24-Sep-92 |
| HPRAZ | 1.26 | 24-Sep-92 |

| <u>PROGRAM NAME</u> | <u>VERSION</u> | <u>DATE INSTALLED</u> |
|---------------------|----------------|-----------------------|
| INSTALL | 4.00 | 24-Sep-92 |
| INVERSE | 2.00 | 24-Sep-92 |
| LISTDATA | 1.00 | 24-Sep-92 |
| LOADNEW | 2.02 | 04-Nov-92 |
| LSTAWOIS | 3.02 | 04-Nov-92 |
| MAINMENU | 1.00 | 24-Sep-92 |
| MAN_DATA | 2.00 | 24-Sep-92 |
| NEWPOST | 6.00 | 24-Sep-92 |
| PLOTALL | 2.08 | 02-Mar-93 |
| POINT | 2.10 | 24-Sep-92 |
| PRESURV | 7.01 | 02-Mar-93 |
| PREDICT | 2.00 | 24-Sep-92 |
| PRINTOUT | 4.02 | 04-Nov-92 |
| QUICK | 2.03 | 02-Mar-93 |
| RAMSAVER | 1.01 | 24-Sep-92 |
| REAPPLY | 2.01 | 24-Sep-92 |
| RECOMP | 2.02 | 24-Sep-92 |
| SCANNER | 1.00 | 24-Sep-92 |
| SELPRINT | 2.02 | 24-Sep-92 |
| SHEETSPLIT | 1.02 | 04-Nov-92 |
| ZOOMEDIT | 2.11 | 04-Nov-92 |

SHIPDIM (Version 9-22-92 for the Gateway 2000 microcomputer) was also used for DGPS performance checks.

Sound velocity corrections were determined using version 2.00 of program CAT and version 2.00 of VELOCITY. All field sheets were made on board WHITING with automated Bruning 936 plotters driven by the HDAPS system. No final field sheets were prepared. All on-line plots for the surveyed area were transmitted to AHS. There were no irregularities in projection or scale during post processing of this survey. All field records and supporting data were sent to AHS per the Processing Partnership Agreement.

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-T dual-channel (single frequency) towfish. The towfish was operated on the 100 kHz frequency and was configured with a 20° beam depression. The following sonar equipment was used throughout the survey:

| <u>Type</u> | <u>S/N</u> |
|-------------|------------|
| Towfish | 11902 |
| Towfish | 16630 |
| Towfish | 11591 |

| <u>Type</u> | <u>S/N</u> |
|--------------|------------|
| 260 Recorder | 12104 |
| 260 Recorder | 11443 |

The towfish was deployed from a Reuland winch (model number 8377-XF5461A, s/n 814861A-1) on the stern of WHITING. The SSS towfish was towed with armored cable which was connected to the recorder cabling with a slip-ring assembly. The SSS towfish was maintained at a height off the bottom of 8 to 20 percent of the range scale. SSS operations were limited to a speed of 5 knots or slower.

Offsets and laybacks for the A-frame used to tow the SSS towfish were measured on July 27, 1992 using the forward 100 kHz (high frequency) transducer as the reference. The A-frame height was measured from the water line on the same date. All offset, layback, and height data were applied as required by the HDAPS Manual. These data are on file at the Atlantic Hydrographic Section (AHS). DATA FILED WITH FIELD RECORDS.

In order to acquire the required 200% SSS coverage, main-scheme lines were run at a spacing of 75 meters when using the 100-meter range scale. Adequate SSS coverage was determined by producing an 'A' and 'B' swath plot and ensuring 100% coverage on each plot.

Confidence checks were performed on a routine basis, primarily by noting changes in bottom texture on the outer edges of the sonargram. Confidence checks were also taken on buoys or wrecks when convenient.

F. SOUNDING EQUIPMENT

A Raytheon Digital Survey Fathometer (DSF) 6000N echo sounder was used to determine water depths during the survey. The DSF-6000N produced a graphic record of the high frequency (100 kHz) and low frequency (24 kHz) depth. The high and low frequency digital depths were recorded by the HDAPS acquisition system. The high frequency depths were selected as the primary depths as shown on the sounding plots. The following is a list of DSF-6000N fathometers used during this survey:

| <u>S/N</u> | <u>DOY</u> |
|------------|-----------------------|
| A122N | 084, 098-099, 103-104 |
| B053N | 110, 115, 125-129 |
| A111N | 129-132, 140-141 |

On DOY 104, the DSF-6000N, s/n A122N, malfunctioned when the chart drive speed varied erratically. On DOY 129, the DSF-6000N, s/n B053N, could not maintain a high frequency trace and was replaced

with the DSF-6000N, s/n A111N. There were no problems encountered for the remainder of the survey with DSF-6000N, s/n A111N.

Echograms were carefully reviewed for significant features along the track line. Any features on the graphic record that were not selected as primary soundings were manually selected. Electronic technicians performed daily accuracy checks and preventive maintenance on the DSF-6000N.

Diver determined least depths were measured with a pneumatic depth gauge. The WHITING's pneumatic depth gauge (S/N 13892130) is built according to Hydrographic Guidelines No. 55. The gauge was calibrated on January 25, 1993. System checks were performed prior to every dive to ensure the pneumatic depth gauge was within tolerance.

G. CORRECTIONS TO SOUNDINGS

All sounding corrections, except heave, were applied on-line to both the narrow (100 kHz) and wide (24 kHz) DSF-6000N beams. Heave corrections were applied in post-processing. On DOY 125 and 126, several "depth beyond depth" sounding corrector errors occurred as a result of the corresponding velocity cast not recording a deep enough depth. Program VELOCITY did not list correctors for the bottom 5 to 8 meters of the cast. Although this problem was supposedly rectified with a new version of program VELOCITY, it would appear a shortcoming still exists with the program. An additional cast was taken to verify that the corrector being applied to the depth beyond depth soundings was consistent. The results were satisfactory.

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 December 16, 1992 during WHITING's winter inport period.

The CTD, mounted in a cage, was lowered through the water column to obtain data for sound velocity corrections. Programs CAT and VELOCITY 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. Velocity profile data can be found in the supplemental data cahier submitted with this survey.

Data Quality Assurance (DQA) for the Seacat 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.

A summary of sound velocity casts follows:

| <u>DOY</u> | <u>Vel.Table#</u> | <u>Latitude</u> | <u>Longitude</u> | <u>Depth</u> |
|------------|-------------------|-----------------|------------------|--------------|
| 084 | 3 | 38°45'18"N | 074°38'00"W | 37.7m |
| 099 | 6 | 38°45'48"N | 074°37'57"W | 40.4m |
| 110 | 8 | 38°46'21"N | 074°36'34"W | 37.7m |
| 125 | 12 | 38°46'06"N | 074°36'54"W | 33.7m |
| 127 | 13 | 38°45'41"N | 074°37'42"W | 39.0m |
| 131 | 14 | 38°45'41"N | 074°37'42"W | 39.8m |
| 140 | 17 | 38°46'30"N | 074°34'27"W | 32.0m |

The correction for WHITING's static draft was 3.2 meters, a historical value that WHITING divers confirmed by pneumatic depth gauge on October 28, 1991. The Transducer Depth Determination Report is on file at AHS.*

New leadlines were made on April 10, 1993 and calibrations performed on April 26 confirmed the leadline error was negligible. A leadline comparison with the DSF-6000N was performed on April 23, 1993 (DOY) 113). The difference between the leadline and the high frequency reading was -0.07 meter and the difference between the leadline and the low frequency reading was -0.18 meter. These differences may be attributable to the soft mud bottom at the comparison site. No correction for this difference was applied to the survey.

Settlement and squat measurements were conducted and correctors determined on August 5, 1991. Correctors based on this determination were applied in real time throughout the survey. Settlement and squat correctors are on file at AHS.*

The HDAPS data acquisition computer logged, in real-time, heave data from a Heave, Roll, and Pitch sensor (HIPPY, s/n 19109-C). Heave correctors were applied in post-processing.

The tidal datum for this project was Mean Lower Low Water. The operating tide station at Breakwater Harbor (Lewes), Delaware (855-7380) served as direct control for datum determination. Mr. Larry Nieson, Atlantic Operations Group, N/OES213, confirmed the proper operation of the tide station during the survey. This station also served as the reference station for predicted tides. Time and height correctors for the project were as follows:

| | <u>Time Correction</u> | <u>Height Ratio</u> |
|-------------|------------------------|---------------------|
| High Water: | .-1 hr 00 min | x0.94 |
| Low Water: | -1 hr 00 min | x0.94 |

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, were received on floppy disk from N/CG24, Hydrographic Surveys Branch. Request for smooth tides was

* DATA FILED WITH FIELD RECORDS.

submitted to Sea and Lake Levels Branch N/OMA12 on ~~May 22~~^{JUNE 2}, 1993.
APPROVED TIDES WERE APPLIED DURING OFFICE PROCESSING.
 The tide station at Breakwater Harbor was leveled on March 8, 1993. The levels confirmed that the tide staff and marks were undisturbed.

H. CONTROL STATIONS *SEE ALSO SECTION 2.9. OF THE EVALUATION REPORT.*

The horizontal datum for this project is the North American Datum of 1983 (NAD 83). Two B-order horizontal control stations were used as DGPS reference stations for this survey; one at Cape Henlopen and one at Cape Henry. The adjusted NAD83 positions, computed by GPS methods, were provided by Lieutenant Jeffrey Ferguson of the Hydrographic Surveys Branch, N/CG24, on April 3, 1992. The positions are as follows:

| | <u>Latitude</u> | <u>Longitude</u> | <u>Frequency</u> |
|---------------|-----------------|------------------|------------------|
| Cape Henry | 36°55'37.580"N | 076°00'23.884"W | 289 kHz |
| Cape Henlopen | 38°46'36.421"N | 075°05'15.667"W | 298 kHz |

The horizontal control station list is on file at AHS. ~~DATA APPENDED TO THIS REPORT.~~

I. HYDROGRAPHIC POSITION CONTROL *SEE ALSO SECTION 2.9. OF THE EVALUATION REPORT.*

A Differential Global Positioning System (DGPS) was used as the primary navigation system for this survey. WHITING monitored two U.S. Coast Guard DGPS beacons: Cape Henlopen, Delaware and Cape Henry, Virginia. WHITING used two Ashtech Sensor GPS receivers for DGPS navigation with two Magnavox MX50R differential radio receivers supplying correctors to the Ashtech receivers. Both MX50R and Ashtech receivers were initialized by HDAPS, with only the primary receiver sending navigational output to HDAPS.

The serial numbers of the Ashtech Sensor and MX50R receivers were as follows:

| <u>Item</u> | <u>Serial Number</u> |
|-------------------|----------------------|
| Primary System: | |
| Ashtech Sensor | 700417B1055 |
| Magnavox MX50R | 168 |
| Secondary System: | |
| Ashtech Sensor | 700417B1129 |
| Magnavox MX50R | 169 |

Launch 1021 was used as the dive platform for two item investigations. A Magnavox 4200 DGPS receiver (s/n 537) with a Magnavox MX50R (s/n '060) differential radio receiver was used

for obtaining the positions on items investigated. Modified performance checks on launch 1021 were conducted by first acquiring a position on the least depth with the Cape Henlopen beacon and then another position with the Cape Henry beacon. The two positions were compared to ensure the inverse distance was within acceptable limits. Generally, the inverse distance was less than 5 meters between the two least depth positions.

Satellite coverage during this survey period allowed WHITING to operate in the non-altitude constrain mode continuously. One DGPS receiver system was used for acquisition at a time.

Horizontal Dilution of Precision (HDOP) limits were computed for each station as required in section 3.4.2 of the Field Procedures Manual (FPM) for Hydrographic Surveying. The HDOP limit for a 1:20,000-scale survey for the Cape Henlopen and Cape Henry beacons were 7.5 and 6.2, respectively. The HDOP limit for a 1:10,000-scale survey for the Cape Henlopen and Cape Henry beacons were 3.7 and 3.1, respectively. No data were acquired at HDOP values exceeding the 1:10,000 scale thresholds.

DGPS positioning was accomplished in accordance with the FPM, section 3.4. When the beacon signal was lost for more than 30 seconds, the survey line was broken and the line was rerun where control had been unacceptable.

Cape Henry was used as the check station when acquiring performance checks to ensure proper operation of the Cape Henlopen beacon. Performance checks were conducted on a Gateway 2000 386/33c microcomputer (S/N 402208) using program SHIPDIM. SHIPDIM uses the two reference station method as described in FPM section 3.4.5. All DGPS performance checks confirmed that the DGPS positioning systems were operating properly and accurately. A summary of the DGPS performance checks may be found in the Separates submitted with this survey.

DGPS antenna offsets and laybacks were re-measured on March 19, 1993 as WHITING converted from Magnavox to Ashtech receivers and antennas. Offsets and laybacks were measured using the forward 100 kHz (high frequency) echo-sounder transducer as the reference. Antenna heights were measured from the waterline on the same date. Offsets and laybacks were applied by HDAPS on line. All offset, layback and height data are on file at AHS.
DATA FILED WITH FIELD RECORDS.

L. SHORELINE SEE SECTION 2. b. OF THE EVALUATION REPORT.

There is no shoreline in this survey area.

K. CROSSLINES SEE ALSO SECTION 3.a. OF THE EVALUATION REPORT.

A total of 18 nautical miles of crosslines were run on H-10464. This amounted to 6.6 percent of the total linear nautical miles of main-scheme lines needed for 100 percent SSS coverage.

Crossline and main-scheme agreement was excellent. The maximum difference between crossline soundings and main-scheme soundings was 0.3 meters. Crossline soundings were generally about 0.2 meters shallower than main-scheme soundings.

L. JUNCTIONS SEE ALSO SECTION 5. OF THE EVALUATION REPORT.

H-10464 junctioned with H-10439 (WH-20-1-92) on the north. Junctions of contours and soundings agreed very well with the contemporary survey. The maximum difference between junction soundings was 0.2 meters. There were no other contemporary surveys that junctioned with H-10464.

M. COMPARISON WITH PRIOR SURVEYS SEE ALSO SECTION 6. OF THE EVALUATION REPORT.

As depicted on the prior surveys, the bottom in the area surveyed was generally smooth with minor shoals in the separation zone along the northern part of the survey area. Side scan sonar records showed a variety of bottom textures in the survey area. Survey H-10464 soundings were compared with prior surveys H-9294, H-9639, H-9700, and H-9723. All prior surveys were referenced to NAD 27. For comparison purposes, a datum shift was applied to H-10464 in accordance with section 7.4 of the FPM.

The survey area was covered fully by the wire drag survey H-9294. See section N for comparisons. SEE ALSO SECTION 6.b. OF THE EVALUATION REPORT.

The southern half of the survey area was covered by H-9639 (1976, scale 1:40,000, MLW). Bottom contours and soundings agree very well with H-10464. Depths from H-10464 were generally 0.3 meters deeper than those found on H-9639.

The majority of the northeastern portion of the survey area was covered by H-9700 (1977, scale 1:20,000, MLW). Present survey soundings agreed very well with H-9700 soundings. Depths from H-10464 were generally 0.3 meters ~~deeper~~ ^{SHOALER} than those found on H-9700.

The western portion of the survey area was covered by survey H-9723 (1977, scale 1:20,000, MLW). Sounding comparisons between present survey depths and H-9723 were excellent. Soundings throughout H-10464 were generally 0.3 meters deeper than those

found on H-9723.

For further comparisons for specific features on prior surveys see section N.

WHITING recommends that survey H-10464 supersede all hydrography from prior surveys in the common area.

N. ITEM INVESTIGATIONS SEE ALSO SECTION 7.9. OF THE EVALUATION REPORT.

Summary of items investigated:

| <u>AWOIS NO.</u> | <u>SECTION</u> | <u>STATUS</u> |
|------------------|----------------|---------------|
| 1126 | N1 | Disproved |
| 1127 | N2 | Disproved |
| 1128 | N3 | Located |
| 1132 | N4 | Located |
| 1138 | N5 | Located |
| 1139 | N6 | Disproved |
| 8234 | N7 | Disproved |
| 8235 | N8 | Disproved |

N1. AWOIS ITEM 1126

| | |
|---------------------|---------------------|
| Reported Latitude: | 38°44'30.13" N |
| Reported Longitude: | 74°37'43.46" W |
| Datum: | NAD83 |
| Depth: | Not listed |
| Feature: | Fishing Obstruction |

AWOIS item 1126 is listed as a fishing obstruction with no other descriptive information. Loran-A and Loran-C rates define the obstruction position.

The area of the item was covered by 200% side scan sonar insonification during the course of main scheme hydrography.

No requirements beyond those of main scheme hydrography were specified for this item. There was no indication of an existing obstruction within 500 meters of the reported position. No additional investigation was necessary.

Prior surveys contain no information on this AWOIS item.

The AWOIS item is not charted on 12214, 37th edition, 27 June 1992. WHITING recommends that this item not be charted. *CONCUR*

NO CHANGE IN CHARTING IS RECOMMENDED

N2. AWOIS ITEM 1127

Reported Latitude: 38°44'30.40" N
Reported Longitude: 74°37'48.57" W
Datum: NAD83
Depth: Not listed
Feature: Sunken Barge

AWOIS 1127, ^{CHARTED NON-DANGEROUS SUNKEN WRECK} is described as a barge sunk on March 7, 1927 with a positional accuracy of 1 nautical mile. It was reported raised by an unknown source. A later source identifies the obstruction as Northern Pacific 35 with Loran-C rates for position provided by a private individual.

The area of the item was covered by 200% side scan sonar insonification during the course of main scheme hydrography.

No requirements beyond those of main scheme hydrography were specified for this item. There was no indication of an existing obstruction within 500 meters of the reported position. No additional investigation was necessary.

Prior surveys contain no information on this AWOIS item.

The AWOIS item is charted as a sunken wreck, not dangerous to surface navigation (Chart No. 1: K, 29) on chart 12214, 37th edition, 27 June 1992. WHITING recommends that this wreck symbol be removed from the chart. *CONCUR*

N3. AWOIS ITEM 1128

Reported Latitude: 38°44'37.66" N
Reported Longitude: 74°36'39.25" W
Datum: NAD83
Depth: Not Listed
Feature: Fishing Obstruction

AWOIS item 1128 is listed as a fishing obstruction with no other descriptive information. Loran-A rates were given to define the obstruction position. Gary Gentile in Shipwrecks of Delaware and Maryland, 1990, lists a wreck at the same position as AWOIS 1128 and describes it as a wood and steel schooner barge which sunk in 1927 and later exploded by mines.

The area of the item was covered by 200% side scan sonar insonification during the course of main scheme hydrography.

No requirements beyond those of main scheme hydrography were specified for this item. A contact was found in the general location of the AWOIS listing and was further investigated.

Contact 286.58S was found on DOY 103, and side scan sonar imagery defined the object as a large sunken object. The item was diver investigated on May 9, 1993 (DOY 129). Divers found the wreck to be lying on its starboard side with the port side rising 9 to 10 feet above the bottom. The barge was measured to be 150 feet long, and it was made largely of wood and metal. A sweep search found the least depth on the wreck to be 28.9 meters (~~corrected using predicted tides~~) by pneumatic gauge on a pile of hawser debris on the port gunwale. The position of the least depth was determined by launch 1021 in latitude 38°44'33.480" N, longitude 074°35'38.645" W.

The position of this contact was 155 meters south-southeast from the reported position given in the AWOIS listing. See Separate VI of H-10464 for the dive report. *APPENDED TO THIS REPORT*

Prior surveys contain no information on this AWOIS item.

The AWOIS item is not charted on 12214, 37th edition, 27 June 1993. Based on these findings, WHITING recommends that this wreck be charted as a wreck with known least depth of 28.9 (95FT), 28'WK meters determined by diver at the position determined on this survey.

N4. AWOIS ITEM 1132

| | |
|---------------------|---------------------|
| Reported Latitude: | 38°44'56.92" N |
| Reported Longitude: | 74°35'55.67" W |
| Datum: | NAD83 |
| Depth: | Not Listed |
| Feature: | Fishing Obstruction |

AWOIS item 1132 is listed as ^{AN UNCHARTED} a fishing obstruction with no other descriptive information. Loran-C rates are given to define the obstruction position. A wreck in the same position as AWOIS 1132 is described in more detail by George Gentile in Shipwrecks of Delaware and Maryland; 1990. Mr. Gentile describes the wreck as a 295 foot long steel hulled freighter "Poseidon" that was sunk in 1918 by German gunboat.

The area of the item was covered by 200% side scan sonar insonification during the course of main scheme hydrography.

No requirements beyond those of main scheme hydrography were specified for this item. A contact was found in the general location of the AWOIS listing.

Contact 428.54S was found on DOY 103, and side scan sonar imagery defined the object as a wreck surrounded with debris. The item was diver investigated on May 10, 1993 (DOY 110). Divers found a wreck to be lying on its port side with stern

buried in sand and part of the superstructure exposed. A sweep search determined the least depth of 24.7 meters (corrected using predicted tides) by pneumatic gauge on the starboard railing. The position of the least depth was determined by launch 1021, in latitude 38°44'52.322" N, longitude 074°35'54.708" W.

The position of this contact was 139 meters from the reported position given in the AWOIS listing. See Separate VI of H-10464 for the dive report. *APPENDED TO THIS REPORT*

Prior surveys contain no information on this AWOIS item.

The AWOIS item is not charted on 12214, 37th edition, 27 June 1992. Based on these findings, WHITING recommends that this wreck be charted as a wreck known least depth of 24.7⁹ meters (82 FT) *24⁹ WK* determined by diver at the position determined on this survey. *CONCUR*

N5. AWOIS ITEM 1138 - *A CHARTED 59 FT DEPTH CLEARED BY WIRE DRAG*

| | |
|---------------------|----------------|
| Reported Latitude: | 38°47'04.41" N |
| Reported Longitude: | 74°33'47.56" W |
| Datum: | NAD83 |
| Depth: | Not listed |
| Feature: | Sunken wreck |

AWOIS 1138 is the wreck of the "City of Georgetown". It originates with NM 7 of 1913. A later source reported a cleared depth over the wreck of 59 feet. The wreck described by Gary Gentile in Shipwrecks of Delaware and Maryland; 1990, is a 4 masted schooner with dimensions 168 feet long, 36 feet beam, 599 tons. Mr. Gentile reports that the wreck is hardly recognizable, containing ribs and a hull that rise 5 feet above the bottom.

The survey requirements for this AWOIS item was 200% side scan sonar development in a 3000 meter radius around the reported position. If found to be significant, further investigation by diver or echosounder development was required.

A contact that resembled the dimensions of the wreck was found while conducting main scheme hydrography on H-10464. The position of this contact was 974 meters south-southeast from the reported position given in the AWOIS listing. Side scan imagery of contact 1787.86S indicated an outline of a hull approximately 50 meters long by 10 meters wide with a with some wreck debris surrounding the hull. Since the evidence strongly suggests that this wreck is AWOIS 1138, the 3000 meter search radius outside the sheet limits were not investigated. Echosounder development lines at 5-meter spacing was run along the longitudinal axis of the wreck to adequately determine the

least depth. Per the FPM, the maximum allowable line spacing for the development was 8 meters.

A least depth of ~~30.0~~^{29.8} meters (corrected using ~~predicted~~^{SMOOTH} tides) was determined at latitude 38°46'33.890" N, longitude 074°33'37.569" W. Surrounding depths range from 30.5 to 31.0 meters.

Prior surveys contain no information on this AWOIS item.

AWOIS 1138 is charted as a sunken danger with a cleared depth (swept) by wire drag (Chart No. 1: K, f) of 59 feet on chart 12214, 37th edition, 27 June 1992. WHITING recommends that the charted 59 feet cleared depth with surrounding danger line be removed from the chart and that a wreck with known depth of ~~30.0~~ meters by echosounder be charted at the surveyed position.

N6. AWOIS ITEM 1139

| | |
|---------------------|---------------------|
| Reported Latitude: | 38°47'10.03" N |
| Reported Longitude: | 74°37'28.51" W |
| Datum: | NAD83 |
| Depth: | Not Listed |
| Feature: | Fishing Obstruction |

AWOIS item 1139 is listed as a fishing obstruction with no other descriptive information. Loran-A rates were given to define the obstruction position.

The area of the item was covered by 200% side scan sonar insonification during the course of main scheme hydrography.

No requirements beyond those of main scheme hydrography were specified for this item. There was no indication of an existing obstructions or wrecks within 500 meters of the reported position. No additional investigation was necessary.

Prior surveys contain no information on this AWOIS item.

The AWOIS item is not charted on 12214, 37th edition, 27 June 1992. WHITING recommends that this item not be charted. *CONCUR*
NO CHANGE IN CHARTING IS RECOMMENDED

N7. AWOIS ITEM 8234

| | |
|---------------------|-----------------------|
| Reported Latitude: | 38°45'39.41" N |
| Reported Longitude: | 74°33'57.56" W |
| Datum: | NAD83 |
| Depth: | 52 feet |
| Feature: | Wire Drag Obstruction |

As CHARTED 52 FT DEPTH CLEARED BY WIRE DRAG
AWOIS 8234, originates ~~SS~~ with H-9294/70WD conducted in 1970. The item was an obstruction hung by wire drag at 72 feet and cleared at 52 feet (15.8 meters).

The survey requirements for this obstruction are 400% side scan sonar coverage in a 200 meter radius around the reported position. AWOIS 8234 was fully developed in conjunction with AWOIS 8235 as they were in proximity of one another. The first 200% was completed with main scheme for H-10464; the second 200% was completed by running lines orthogonal to the main scheme lines. Further investigation was not necessary as no obstructions or wrecks were located within 200 meters of the reported position. This item is disproved. *CONCOR*

A 52 FT SOUNDING
AWOIS 8234 is charted as ~~sunken danger~~ with a cleared depth (swept) by wire drag (Chart No. 1: K, f) of 52 feet on chart 12214, 37th edition, 27 June 1992. There were no obstructions or depths found that correspond to this item. WHITING recommends that ~~this obstruction~~ *AWOIS 8234* be removed from the chart and that depths from the present survey be charted in this area.

N8. AWOIS ITEM 8235

Reported Latitude: 38°45'48.41" N
Reported Longitude: 74°33'51.56" W
Datum: NAD83
Depth: 52 feet
Feature: Wire Drag Obstruction

AWOIS 8235 originates with H-9294/70WD conducted in 1970. The item was an obstruction hung by wire drag at 72 feet and cleared at 52 feet (15.8 meters).

The survey requirements for this obstruction are 400% side scan sonar coverage in a 200 meter radius around the reported position. AWOIS 8235 was fully developed in conjunction with AWOIS 8234 as they were in proximity of one another. The first 200% was completed with main scheme for H-10464; the second 200% was completed by running lines orthogonal to the main scheme lines. Further investigation was not necessary as no obstructions or wrecks were located within 200 meters of the reported position. This item is disproved.

A 52 FT SOUNDING
AWOIS 8235 is charted as ~~sunken danger~~ with a cleared depth (swept) by wire drag (Chart No. 1: K, f) of 52 feet on chart 12214, 37th edition, 27 June 1992. There were no obstructions or depths found that correspond to this item. WHITING recommends that ~~this obstruction~~ *AWOIS 8235* be removed from the chart and that depths from the present survey be charted in this area. *CONCOR.*

Chart 12214, 37th edition, 27 June 1992, is a 1:80,000 scale chart that covers the survey area. The current survey soundings agree very well with the charted soundings, contours, and features, except where discussed in Section N. Current survey soundings are generally 0.3 to 0.5 meters deeper than charted soundings. *CONCUR*

A charted bottom sample in the southwest part of the survey, listed as "P" for pebbles, originating from H-9723, did not agree with bottom samples taken on H-10464. WHITING acquired four additional bottom samples surrounding the charted "P" to verify the bottom sediment. Results are listed in Separate II attached to this survey. *DATA FILED WITH FIELD RECORDS.*

The Fifth Coast Guard District was notified on May 28, 1993 of a discrepancy between the charted buoy and actual characteristics of buoy "F" (LL#125 Volume II) found during this survey. The chart currently displays a super buoy symbol. The buoy on station is a skeleton buoy which corresponds to the Light List description. There have been no changes to the chart through the Notice to Mariners, NTM21/93, regarding this buoy.

P. ADEQUACY OF SURVEY *SEE ALSO SECTION 9. OF THE EVALUATION REPORT.*

This survey is a basic hydrographic survey, adequate to supersede all prior surveys of the common area.

Q. AIDS TO NAVIGATION *SEE ALSO SECTION 7.C. OF THE EVALUATION REPORT.*

There was one floating aid to navigation in the survey area, buoy Y"F". Several passes were made near the buoy while towing the SSS towfish. Two positions for the buoy anchor were entered into contact table 4. The two positions were averaged for a final buoy position. The final buoy position was compared to the position published in the Light List, Vol II Atlantic Coast (1992), corrected through NM 14/93.

The following surveyed positions were determined for the buoys:

| BUOY | SURVEY GP | | LIGHT LIST GP | |
|------|-----------------------------|-----------------------------|---------------|------------|
| | Latitude | Longitude | Latitude | Longitude |
| "F" | 38°47' ^{24"} .4' N | 74°34' ^{36"} .6' W | 38°47.3' N | 74°34.6' W |

Buoy "F" is a yellow structural buoy. Its characteristics were observed as Fl Y 2.5 sec. This does not agree with either the charted characteristics or the Light List description. This

buoy replaced a super buoy that was previously on this station. WHITING has notified the U.S. Coast Guard that the characteristics of the present buoy differ from those on the chart and in the Light List. *RECOMMEND THE BUOY BE CHARTED AS SHOWN ON THE PRESENT SURVEY*

R. STATISTICS

| | |
|--|------|
| Number of Positions..... | 2805 |
| Main-scheme Sounding Lines (Nautical Miles)..... | 541 |
| Crosslines (Nautical Miles)..... | 18 |
| Square Nautical Miles Surveyed..... | 20 |
| Days of Production..... | 17 |
| Detached Positions..... | 23 |
| Bottom Samples..... | 10 |
| Tide Stations Installed..... | None |
| Current Stations..... | None |
| Number of CTD Casts..... | 6 |
| Magnetic Stations..... | None |

S. MISCELLANEOUS

Adequate bottom samples were collected during a prior survey in 1977. Ten bottom samples, taken during this survey, confirmed that the bottom type has not changed since the prior survey, with the one exception listed in Section O. The oceanographic log sheet is included in the separates submitted with this survey. Bottom samples were not submitted to the Smithsonian Institution.

WHITING suspended side scan operations twice daily to run the engines under full load. This time was used to service equipment or transit between survey areas.

The currents encountered were in fair agreement with the predicted currents.

No unusual magnetic variations were encountered in the survey area.

T. RECOMMENDATIONS *SEE ALSO SECTION 9. OF THE EVALUATION REPORT.*

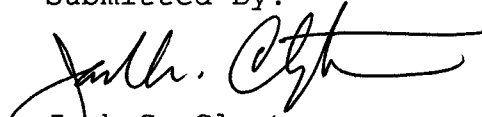
Recommendations concerning specific items are located in section N of this report. The data meets 1:10,000-scale accuracy requirements and can be used on charts requiring that accuracy.

U. REFERRAL TO OTHER REPORTS

The following reports will be submitted to N/CG244 and forwarded to N/CG243 as part of OPR-D368-WH-93:

Coast Pilot Report
Chart Inspection Report
Chart User Evaluation Report

Submitted By:



Jack G. Clayton
Lieutenant, NOAA

APPROVAL SHEET

**HYDROGRAPHIC AND
SIDE SCAN SONAR SURVEY
OPR-D368-WH
1993
WH-20-1-93
H-10464**

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

In accordance with section 6.14.1 of the Project Instructions, this survey is being processed under a partnership program with the Atlantic Hydrographic Section.

Approved By:



Andrew A. Armstrong, III
Commander, NOAA
Commanding Officer



NATIONAL OCEAN SERVICE
Coast and Geodetic Survey
Rockville, Maryland 20852

APR 3 1992

TO: Mike McKinney
FROM: Lieutenant Jeffrey Ferguson, NOAA
Operations Section
Hydrographic Surveys Branch

SUBJECT: Cape Henlopen DGPS reference position

The position of the GPS antenna mount at the Cape Henlopen beacon site is:

38° 46' 36.42091" N

75° 05' 15.66618" W

Ellipsoidal Height = -6.01 meters.

The position was determined by observing the vector between station GPS S 5 and the antenna mount with two Trimble 4000SST GPS receivers. As a data quality check, vectors were also observed between station GPS S 5 A and the antenna mount, and between station GPS S 5 and station GPS S 5 A. The three vectors formed a 7.9 km loop that closed to 0.027 meters.

GPS S 5 and GPS S 5 A were existing stations in the NGS data base, descriptions and positions of these stations are attached.

The manufacturer of the survey poles I used is,
Hixon Mfg. and Supply Company
1400 Webster Ave
Fort Collins, CO 80524
(303) 482-0111

They call the item the "Constant Height Global Positioning System Survey Pole".

If any additional information is needed please call me at
301-443-8752.



ITEM INVESTIGATION REPORT

SURVEY WH-20-1-93

Item Number 1128

Danger to Nav. Letter Issued (Y/N) N

Charted (Y/N) N

Chart No. (largest scale) 12214

Edition 27th

Date 6/27/92

DESCRIPTION/SOURCE: FISHING OBSTR.

HISTORICAL POSITION: Latitude 38° 44' 37.660" SSS **POSITION:** Lat 38° 44' 32.650" N
 Longitude 074° 36' 39.250" W 286.585 Long 074° 36' 38.450" W
 Datum NAD27 → NAD83 (38° 44.544' N)
 (74° 36.641' W)

SURVEY REQUIREMENTS: Information

METHOD OF INVESTIGATION:

Echosounder _____ Side Scan Diver Other (specify) _____

DIVE DATA: Divers RILEY, VERLAQUE

Time of Dive: Commenced 1210 Completed 1230

Current 0.3 F Visibility 10' VERT + HOR. Bottom Type SAND

RESULTS OF INVESTIGATION: DIVERS DESCENDED BUOY LOCATED NORTH OF CENTERLINE ON POINT GUNWHARF. WRECK ORIENTED 060°/240° PWC. NE END OF WRECK SLIGHTLY ROUNDED (BOW) LEAST DEPTH TAKEN ON ~~YELLOW~~ DIVE BUOY DIVERS DESCENDED (DP#1 CAPE MENLOPEN). LEAST DEPTH TAKEN ON NW EDGE OF WRECK OVER PILE OF HAWSER LINE ON POINT GUNWHARF. MAJORITY OF WRECK WAS METAL, SOME WOODEN PLANKING VISIBLE. NUMEROUS METAL DOWELS PROTRUDING UPWARD FROM WHERE DECK USED TO EXIST. HULL WAS METAL 9-10' OFF BOTTOM. GENERAL DEPTHS OVER WRECK 102'-103', WIDTH 9-10 METERS, WRECK RESTING ON STARBOARD SIDE, POINT SIDE OFF BOTTOM.

POSITION: Date (M/D/Y) 5/9/93 Time (UTC) 152744 Position No. DP#1

Latitude 38° 44.5580' N Longitude 074° 36.6441' W

LORAN-C: GRI (9960) W: 15700.3 X: 26983.3 Y: 42616.5 Z: 59291.9
S/N 480 950 890 740

LEAST DEPTH: Date (M/D/Y) 5/9/93 Time (UTC) 16252 Pos. # 286.410

Method of Least Depth: PNEUMO GAUGE LD 28.9

Measured Least Depth: 1. 97.9 2. 98.2 3. 98.6 Avg. 98.2 Units FT

Corrected Least Depth 28.9 Units M (predicted tides)

CHARTING RECOMMENDATION

Chart A WRECK, LEAST DEPTH KNOWN BY DIVER OF 28.9 METERS; Chart No. 1, ITEM 27.

DIVING OPERATIONS

RE: 6-SHEET

UNIT: WHITING

LOCATION: APPROACHES TO DELAINE BAY

DIVEMASTER: LT Verlaque

SCIENTISTS: _____

TENDERS: SS QUINN

DIVE PLAN: ~~DEPTA~~ ANCHOR OVER WIK IN

MAX. DEPTH: 110

Pos. 38/44.544'N, 74/36.641'W. DESCEND

MAX. TIME: 20

DOWN BUOY ALREADY DEPLOYED. SWEEP SEARCH WIK. LOCATE AND COMPLETE
LEAST DEPTHS OVER CENTER + NE END.

EQUIPMENT USED: OPEN CIRCUIT SCUBA

CONDITIONS:

WIND: 6 kts @ 190

VISIBILITY: 3-5

SEAS: calm / become 1-2'

AIR TEMP.: 12°

CURRENT: 0.3" F

WATER TEMP.: 10°

| DIVERS | SURFACE INTERVAL | GROUP | RESIDUAL NITROGEN | PRESSURE | | PRESSURE CHANGE | TIME | | BOTTOM TIME | DEPTH | GROUP |
|---|------------------|-------|-------------------|----------|-----|-----------------|------|-------|-------------|-------|-------|
| | | | | IN | OUT | | IN | OUT | | | |
| <i>WIK on 2865</i> RILEY | | | | 3100 | 500 | 2600 | 1210 | 1230 | 20 | 104' | G |
| VERLAQUE | | | | 3100 | 500 | 2600 | 1210 | 1230 | 20 | 104' | G |
| <i>BUOY on other TEST DIVE</i> RILEY | 2:00 | D | 20 | 3000 | 400 | 2400 | 1437 | 6:00 | 28 | 62 | J |
| VERLAQUE | 2:00 | D | 20 | 3000 | 500 | 2500 | 1437 | 12:50 | 28 | 62 | J |
| SEITZ | | A | - | 3000 | 500 | 2500 | 1437 | 13:30 | 28 | 62 | JEF |

POST DIVE COMMENTS:

At surface 30' ^{HORN} vertical WIS. @ 105' 10' HORN VERT. Large wreck 9-10m wide, predominantly metal. Least depth on north side just south of center over barrel tower.

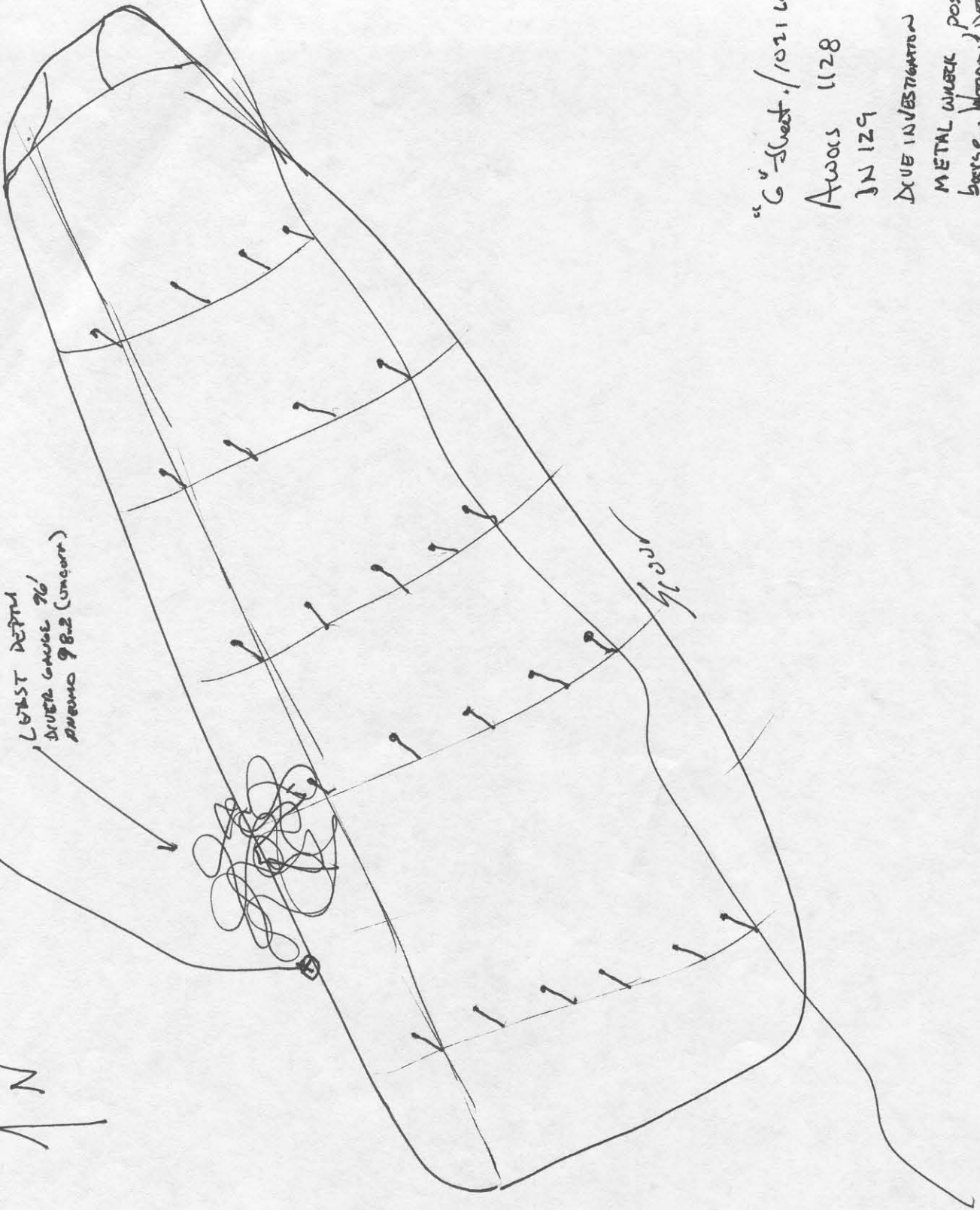
Some wooden planks visible. hull & generally metal. Bot of metal barrel. WIK tilted to south on skirt. 9-10' off bottom.

J. Verlaque

CHAMBER BART, MD 410-328-7814 (22 S. GARDEN ST)
CONTACTED OPERATIONAL / MIEMSS

N

LEAST DEPTH
DIVER GAUGE 76
DUEMS 98.2 (uncorr)



"G" Sheet / 1021 LANCH

AWOCS 1128

JN 129

DIVE INVESTIGATION

METAL WORK POSSIBLY
BURGE. WOODEN DECK.

DIVING OPERATIONS

RE: 428.54s

UNIT: NOAA'S WHITING

LOCATION: APPROACHES TO DEERHOLE BAY

DIVEMASTER: LT VERLAQUE

SCIENTISTS: _____

TENDERS: SS POBANN

DIVE PLAN: DROP BUOYS SW, CM, NE END

MAX. DEPTH: 110'

E/S SEARCH. DESCENDS NE END BUOY - SWEEP

MAX. TIME: 20 MIN

SEARCH - COMPARE LEAST DEPTHS. PNEUMO GAUGE WILL BE TAKEN AT 3 LEAST DEPTH POINTS (PNEUMO TAKEN BY DIVERS UPON DESCENT). SURFACE @ SW END BUOY. IF A NEW LEAST DEPTHS LOCATED - A YELLOW BUOY WILL BE DEPLOYED ON BOTTOM - LEAST DEPTH TAKEN. DP BUOY POSITIONS OVER LEAST DEPTHS

EQUIPMENT USED: OPEN CIRCUIT SCUBA

CONDITIONS:

WIND: calm

VISIBILITY: 8-10

SEAS: calm

AIR TEMP.: 12°

CURRENT: 0.5 E

WATER TEMP: 6°

| DIVERS | SURFACE INTERVAL | GROUP | RESIDUAL NITROGEN | PRESSURE | | TIME | | BOTTOM TIME | DEPTH | GROUP | |
|-----------------|------------------|-------|-------------------|-------------|------------|-------------|-------------|-------------|-----------|-----------|----------|
| | | | | IN | OUT | IN | OUT | | | | |
| <u>Riley</u> | | | | <u>3300</u> | <u>500</u> | <u>2800</u> | <u>1711</u> | <u>1732</u> | <u>21</u> | <u>98</u> | <u>G</u> |
| <u>Verlaque</u> | | | | <u>3300</u> | <u>500</u> | <u>2800</u> | <u>1711</u> | <u>1732</u> | <u>21</u> | <u>98</u> | <u>G</u> |
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POST DIVE COMMENTS: Vertical VLS on surface 30' - 100' VLS 15-20'
WK in NE; SW DIVE DESCENDED SLOW (OR NEAR SLOW) SOME 9' x 9' WINDOWS. ALL METAL
DECK PLATING PILED BACK ON STBD SIDE. PORT SIDE LAYING ON & SAYS - STBD SLIGHTLY UP.
TOWARD CENTER OF WHEEL, STACK LAYING ON BOTTOM PORT SIDE; RAILING PROTRUDING UP FROM
STACK TOWARD CENTER OF WHEEL UPWARD (LEAST DEPTH). TOWARD BOW IN FACT; ROUNDED &
RAISED OFF BOTTOM 9-10'. ASCENDED SW BUOY. DP & PNEUMOS ON LEAST DEPTH.
DIVEL GAUGE 825' DP'S ALSO TAKEN ON NE & SW END. LOGS ON LEAST DEPTH ALSO.
WK BOULED WEST APPROACHING BOW.

Verlaque

Chamber 410-328-7814
MILASS



CABLE
(ft)

DOWN
0.2

UP
0.2

5

5.6

5.6

10

10.2

10.5

15

15.2

15.6

20

20.4

20.4

25

25.2

24.9

30

30.0

30.2

35

34.8

35.8

40

39.6

40.0

45

44.9

44.4

50

50.0

50.0

55

54.8

54.2

60

59.6

59.2

65

64.4

65.5

70

68.5

69.2

75

73.5

74.2

80

78.9

78.8

85

83.8

83.8

90

88.8

88.5

95

93.6

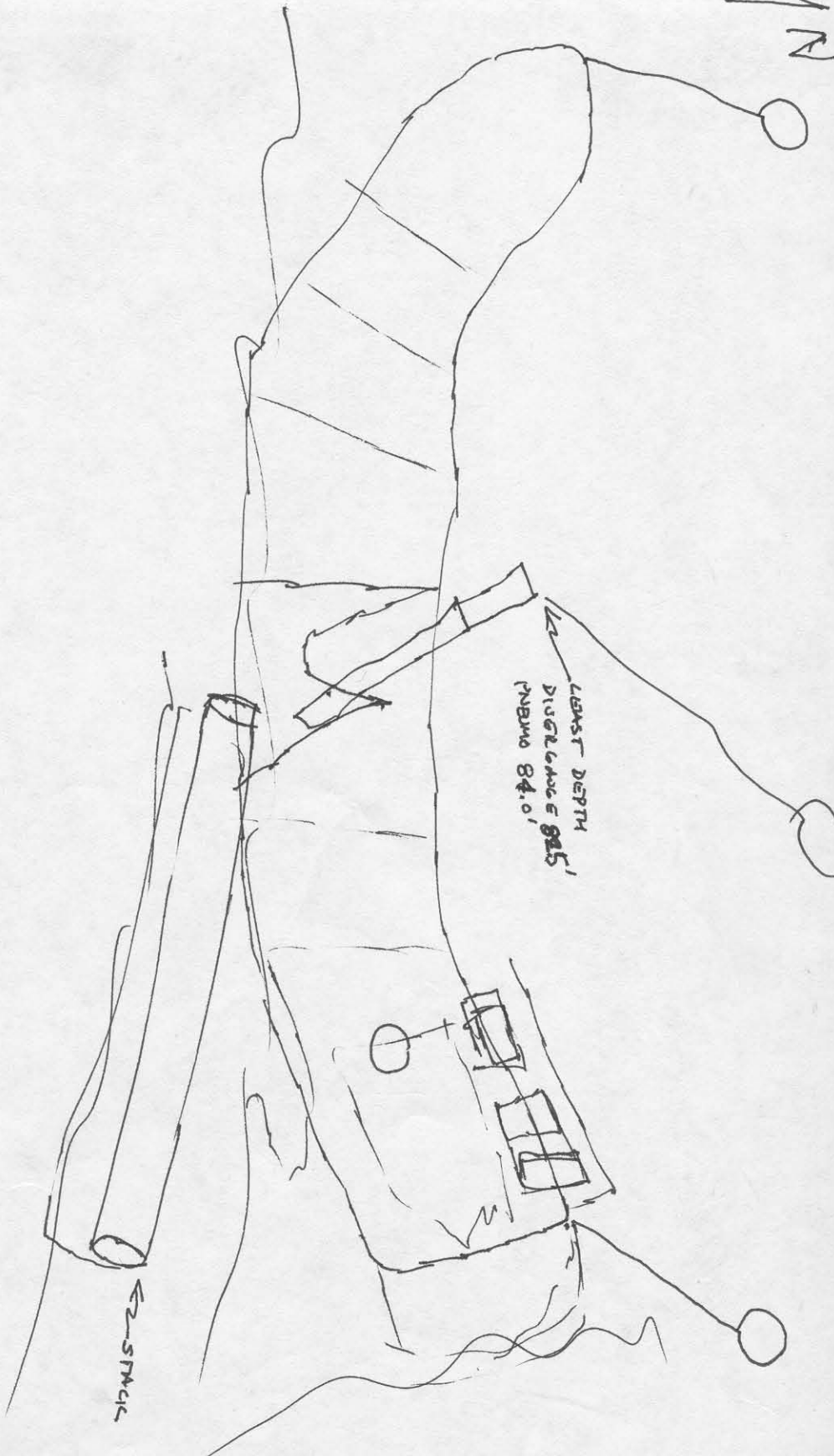
92.8

~~100~~

105

138
18
122

N



MINIMUM DEPTH
DIGIT 84.0'

STACK

Aug 11 1932

DN 130

5/10/93

DIVE INVESTIGATION - SUSPECT "ROSENBERG"

STEEL HULL; STACK; RIGHT SIDE IN SAND; STAD OFF BOTTOM
UPST PTH ON RML NEW CENTER OF WEIGHT.

11/30/93

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10464

| | | |
|--|------------|----------------|
| NUMBER OF CONTROL STATIONS | | 2 |
| NUMBER OF POSITIONS | | 3354 |
| NUMBER OF SOUNDINGS | | 27480 |
| | TIME-HOURS | DATE COMPLETED |
| PREPROCESSING EXAMINATION | 179 | 07/13/93 |
| VERIFICATION OF FIELD DATA | 109 | 10/28/93 |
| ELECTRONIC DATA PROCESSING | 88 | |
| QUALITY CONTROL CHECKS | 48 | |
| EVALUATION AND ANALYSIS | 63 | 11/30/93 |
| FINAL INSPECTION | 33 | 11/24/93 |
| TOTAL TIME | 520 | |
| ATLANTIC HYDROGRAPHIC SECTION APPROVAL | | 11/30/93 |



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: July 23, 1993

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-D368-WH

HYDROGRAPHIC SHEET: H-10464

LOCALITY: Approaches to Delaware Bay

TIME PERIOD: March 25 - May 20, 1993

TIDE STATION USED: 855-7380 Lewes (Ft. Miles), Breakwater Harbor,
Delaware Lat. $38^{\circ} 46.9'N$ Lon. $75^{\circ} 07.2'W$

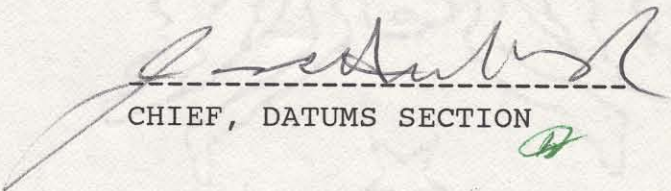
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 2.51 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.3 ft.

REMARKS: RECOMMENDED ZONING

Apply a -1 hr 00 min time correction and a x0.94 range ratio
to Lewes Breakwater Harbor, Delaware (855-7380).

Note: Times are tabulated in Eastern Standard Time.


CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

H-10464

| Name on Survey | Source of Name | | | | | | | | | | |
|------------------------|----------------|------------------------|-------------------------|------------------------|---------------|-------------------|---------------------|-----------------|---|--|----|
| | A | B | C | D | E | F | G | H | K | | |
| | ON CHART NO. | ON PREVIOUS SURVEY NO. | ON U.S. QUADRANGLE MAPS | FROM LOCAL INFORMATION | ON LOCAL MAPS | P.O. GUIDE OR MAP | GRAND McNALLY ATLAS | U.S. LIGHT LIST | | | |
| ATLANTIC OCEAN (title) | | | | | | | | | | | 1 |
| DELAWARE BAY (title) | | | | | | | | | | | 2 |
| MAY, CAPE | | | | | | | | | | | 3 |
| NEW JERSEY | | | | | | | | | | | 4 |
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Approved:

Charles C. Harrington
 Chief Geographer - 11/CG/2/85

JUN - 7 1993

**COAST AND GEODETIC SURVEY
ATLANTIC HYDROGRAPHIC SECTION
EVALUATION REPORT**

SURVEY NO.: H-10464

FIELD NO.: WH-20-1-93

New Jersey, Atlantic Ocean, 17 NM Southeast of Cape May

SURVEYED: 25 March through 21 May 1993

SCALE: 1:10,000

PROJECT NO.: OPR-D368-WH-93

SOUNDINGS: RAYTHEON DSF-6000N Fathometer, EG&G Model 260 Side Scan Sonar, and Pneumatic Depth Gauge

CONTROL: ASHTECH GPS Sensor/MAGNAVOX MX50R Beacon Receiver
Differential Global Positioning System, (DGPS),
MAGNAVOX 4200 GPS Receiver/MAGNAVOX MX50R Beacon
Receiver (DGPS)

Chief of Party.....A. A. Armstrong III

Surveyed by.....C. B. Greenawalt
.....J. S. Verlaque
.....J. G. Clayton
.....J. L. Riley
.....N. O. Silverman
.....M. P. Zipperer
.....J. A. Seitz
.....F. R. Cruz
.....E. A. Myers
.....S. R. Parker

Automated Plot by.....XYNETICS 1201 Plotter (AHS)

1. INTRODUCTION

a. This is a combined basic hydrographic/side scan sonar survey. The side scan sonar was operated concurrently with the fathometer during survey operations.

b. No unusual problems were encountered during office processing.

c. Notes in the Descriptive Report were made in red during office processing.

2. CONTROL AND SHORELINE

a. Control is adequately discussed in sections H. and I. of the Descriptive Report.

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

To place this survey on the NAD 27 move the projection lines 0.41 seconds (12.61 meters or 1.26 mm at the scale of the survey) north in latitude, and 1.43 seconds (34.43 meters or 3.44 mm at the scale of the survey) east in longitude.

b. There is no shoreline within the limits of the present survey.

3. HYDROGRAPHY

a. Soundings at crossings are in excellent agreement and comply with the criteria found in sections 4.6.1 and 6.3.4.3. of the HYDROGRAPHIC MANUAL.

b. The standard depth curves were drawn in their entirety.

c. The development of the bottom configuration and determination of least depths is considered adequate.

4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records and reports conform to the requirements of the HYDROGRAPHIC MANUAL, FIELD PROCEDURES MANUAL, SIDE SCAN SONAR MANUAL.

5. JUNCTIONS

H-10439 (1992) to the north
H-10475 (1993) to the west

A standard junction was not effected between the present survey and survey H-10439 (1992). The junctional survey is archived at National Ocean Service (NOS) Headquarters, Silver Spring, Maryland. Any adjustments to the depth curves in the junctional area will have to be made during compilation.

A standard junction was effected between the present survey and survey H-10475 (1993).

There are no junctional surveys to the south or east of the present survey. Present survey depths are in harmony with the charted hydrography to the south and east.

6. COMPARISON WITH PRIOR SURVEYS

a. Hydrographic

| | |
|----------------------|-----------------|
| H-9639 (1976) | 1:40,000 |
| H-9700 (1970) | 1:20,000 |
| <u>H-9723 (1977)</u> | <u>1:20,000</u> |

The prior surveys listed above cover the present survey area in its entirety.

Prior survey depths from H-9639 (1976) are in good agreement with the present survey depths. Prior survey soundings generally vary plus or minus (\pm) 0^1 to 0^3 meter (0 to 1 ft). Scattered prior soundings are 1 meter (3 ft) shoaler than present survey soundings.

Prior survey depths from H-9700 (1970) show a trend of being 0^2 - 0^6 m (1-2 ft) deeper than the present survey depths. Scattered prior survey soundings are 1 meter (3 ft) shoaler than present survey soundings.

Prior survey depths from H-9723 (1977) are in good agreement with the present survey with soundings varying $\pm 0^3$ meter (± 1 ft) from present survey depths.

The present survey is adequate to supersede the above prior surveys within the common areas.

b. Wire Drag

H-9294WD (1970) 1:20,000

Two hangs that originate with the prior survey fall within the area of the present survey. These hangs are charted Automated Wreck and Obstruction Information System (AWOIS) items #8234 and #8235. These items are adequately discussed in section N., pages 14 through 15, of the Descriptive Report and require no further discussion.

There are no conflicts between the prior survey effective clearance depths and present survey soundings.

7. COMPARISON WITH CHART 12214, (37th. Ed., 27 June 1992)

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys and requires no further consideration.

An adequate chart comparison is made in section N., pages 10 through 16, of the Descriptive Report.

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

b. Dangers to Navigation

There were no dangers to navigation submitted by the field unit. No dangers were noted during office processing.

c. Aids to Navigation

There is one floating aid to navigation shown on the present survey. This aid appears adequate to serve its intended purpose.


8. COMPLIANCE WITH INSTRUCTIONS

This survey complies with the Project Instructions.

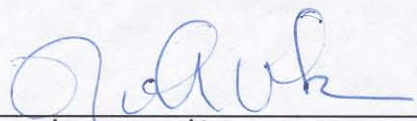
9. ADDITIONAL FIELD WORK

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

WHITING Processing Team
Verification and Evaluation and Analysis



Franklin L. Saunders
Cartographic Technician



Norris A. Wike
Cartographer

APPROVAL SHEET
H-10464

Initial Approvals:

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

Richard H. Whitfield Date: Nov 30, 1993
Richard H. Whitfield
Cartographer, Atlantic Hydrographic 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: Nov 30, 1993
Nicholas E. Perugini, LCDR, NOAA
Chief, Atlantic Hydrographic Section

Final Approval:

Approved: J. Austin Yeager Date: 12/20/93
J. Austin Yeager
Rear Admiral, NOAA
Director, Coast and Geodetic Survey

