

10476

10476

Diagram No. 1219-3

NOAA FORM 78-35A

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-20-7-93
Registry No. H-10476

LOCALITY

State Delaware
General Locality Atlantic Ocean
Sublocality 7 NM ESE of Rehoboth Beach

1993

CHIEF OF PARTY
CDR A.A. Armstrong

LIBRARY & ARCHIVES

DATE February 23, 1994

HYDROGRAPHIC TITLE SHEET

H-10476(1993)

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-20-7-93

State DELAWARE

General locality ATLANTIC OCEAN
APPROACHES TO DELAWARE BAY

Locality 7 NM ESE of Rehoboth Beach, Delaware

Scale 1:20,000 Date of Survey May 23-Aug. 13, 1993

Instructions dated FEBRUARY 23, 1993 Project No. OPR-D368-WH-93

Vessel NOAA Ship WHITING S-329 EDP #2930

Chief of party Commander Andrew A. Armstrong, III
A.A. Armstrong, C.B. Greenwalt, S.R. Barnum, J.S. Verlaque, J.G. Clayton, J.L. Riley,
N.O. Silverman, E.W. Berkowitz, M.P. Zipperer, J.A. Seitz, F.R. Cruz, E.A. Myers, S.R. Parker

Surveyed by _____

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)
XMETRES 1201 PLOTTER (AHS)

Verification by ATLANTIC HYDROGRAPHIC SECTION.
Meters _____

Soundings in MLLW _____

REMARKS: Registered as a 1:20,000 scale survey. The data meets the
accuracy standards for a 1:20,000 scale survey and are
plotted at 1:10,000 scale. Positions for wrecks and
obstructions meet 1:10,000 accuracy standards.
200% side scan sonar coverage
Time zone used, 0 (UTC)
Junctions with H-10444, H-10446
NOTES IN THE DESCRIPTIVE REPORT WERE MADE IN RED
DURING OFFICE PROCESSING.

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-D368-WH
1993
WH-20-7-93
H-10476

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. This survey is registered as a 1:20,000 scale survey, and all data meet 1:20,000 survey requirements.

Project OPR-D368-WH was divided into nine survey sheets. The survey described in this report was designated "C" Sheet, and assigned field sheet number WH-20-7-93 and registry number H-10476.

B. AREA SURVEYED

Hydrographic survey H-10476 is 7 nautical miles east-southeast of Rehoboth Beach, Delaware. The survey covers the northwestern end of the southeast approaches to Delaware Bay traffic lanes and corresponding separation zone. The survey area is bounded by the following limits:

<u>Latitude</u>	<u>Longitude</u>
38°42'00"N	074°51'30"W
38°38'30"N	074°56'00"W
38°44'00"N	075°01'00"W
38°45'30"N	074°57'00"W
46' 20"	56' 30"

Survey operations began on May 23, 1993 (DN 143) and ended on August 13, 1993 (DN 225). Data were acquired on the following days:

<u>DN</u>	<u>Date</u>
143-144	May 23-24, 1993
146	May 26, 1993
153-161	June 2-10, 1993
168-174	June 16-23, 1993
179-181	June 28-31, 1993
194	July 13, 1993
199	July 18, 1993
202	July 21, 1993
210-211	July 29-30, 1993
213	August 1, 1993
222	August 10, 1993
224-225	August 12-13, 1993

C. SURVEY VESSEL

NOAA Ship WHITING, vessel identification number 2930, was used for all side scan sonar and sounding data acquisition except on August 13, 1993 (DN 225) when launch 1014 was used for 1 item investigation. Launch 1014 used an incorrect vessel identification number of 1014 for the duration of the survey. Launch 1021, launch 1014, and launch 1015 were used as a dive platforms for least depth determination and for acquiring positions on ten item investigations from July 18, 1993 to August 12, 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>
BIGAUTOST	3.01	21-May-93
BACKUP	2.00	21-May-93
BASELINE	1.14	21-May-93
BIGABST	2.05	21-May-93
BLKEDIT	2.02	21-May-93
CARTO	2.06	21-May-93
CARTO	2.08	7-Jul-93
CARTO	2.09	26-Jul-93
CLASSIFY	1.00	26-Jul-93
CONTACT	2.04	21-May-93

<u>PROGRAM NAME</u>	<u>VERSION</u>	<u>DATE INSTALLED</u>
CONTACT	2.06	7-Jul-93
CONTACT	2.09	26-Jul-93
CONVERT	3.54	21-May-93
DAS SURV	6.341	21-May-93
DAS SURV	6.38	7-Jul-93
DAS SURV	6.42	26-Jul-93
DIAGNOSE	3.03	21-May-93
DISC UTIL	1.00	21-May-93
DP	2.14	21-May-93
EXCESS	4.11	21-May-93
FILESYS	3.05	21-May-93
FILESYS	3.08	7-Jul-93
FILESYS	3.10	26-Jul-93
GRAFEDIT	1.04	21-May-93
HIPSTICK	1.01	21-May-93
HPRAZ	1.26	21-May-93
INSTALL	4.02	21-May-93
INVERSE	2.01	21-May-93
LISTDATA	1.02	21-May-93
LOADNEW	2.04	21-May-93
LOADNEW	2.05	26-Jul-93
LSTAWOIS	3.03	21-May-93
LSTAWOIS	3.04	7-Jul-93
MAINMENU	1.01	21-May-93
MAINMENU	1.10	26-Jul-93
MAN DATA	2.01	21-May-93
NEWPOST	6.01	21-May-93
ONETIME	1.00	26-Jul-93
PLOTALL	2.11	21-May-93
PLOTALL	2.12	7-Jul-93
POINT	2.10	21-May-93
PREDICT	2.01	21-May-93
PRESURV	7.02	21-May-93
PRESURV	7.03	7-Jul-93
PRESURV	7.04	26-Jul-93
PRINTOUT	4.03	21-May-93
QUICK	2.03	21-May-93
QUICK	2.04	26-Jul-93
RAMSAVER	1.02	21-May-93
REAPPLY	2.03	21-May-93
RECOMP	2.02	21-May-93
SCANNER	1.00	21-May-93
SELPRINT	2.03	21-May-93
SHEETSPLIT	1.03	04-Nov-92
SYMBOLS	2.00	21-May-93
ZOOMEDIT	2.12	21-May-93

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	16630
Towfish	16835
<u>Type</u>	<u>S/N</u>
260-TH Recorder	16670
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. On DN 153 and 154 the line spacing was reduced to 40 meters using the 75-meter range scale due to severe refraction in

the water column. Continued refraction of the sonar signal caused reduced swath coverage throughout the entire survey area. Split lines were run at 38 meter and 18 meter line spacing to fill gaps in coverage. Adequate SSS coverage was determined by producing an 'A' and 'B' swath plot, and an 'A'/'B'/'C' split swath plot to ensure 200% coverage.

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

The printer head on the side scan recorder frequently became dirty and created lighter traces on the thermal paper. This problem occurred initially by creating 1mm gaps on the trace for short periods (DN 143, 157, and 164). This trace holiday was computed to be insignificant and would obscure contacts that had a height of less than 0.3 meters. Later side scan records suffered some degradation of the trace; data where unacceptable degradation of the trace occurred were rejected. Although the printer head was cleaned on a regular basis, it did not eliminate the problem. The thermal side scan recorder (260-TH) was replaced by a carbon paper recorder (260) for the data acquired on June 28-June 30, 1993 (DN 179-181).

On launch 1014 the towfish was deployed from a Superwinch Model W115 winch from an adjustable davit arm on the stern of the launch. The SSS towfish was towed with Kevlar cable 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.

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>DN</u>
A111N	143-144, 146, 153-156
A105N	156-161, 167-174, 179-181, 194
B053N	225

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. WHITING's two pneumatic depth gauges (S/N 13892130 and S/N 406714N) are built according to Hydrographic Guidelines No. 55. The gauges were calibrated on January 25, 1993. System checks were performed prior to every dive to ensure the pneumatic depth gauge used 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.

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. Depth data acquired on DN 167 before velocity cast 22 was conducted were corrected after acquisition using correctors from cast 22. Data acquired on DN 225 by launch 1014 was reapplied using velocity cast 27. Velocity cast 28 was done for reference only and was not applied to any data acquired.

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>DN</u>	<u>Vel. Table#</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Depth</u>
143	18	38°44'42"N	074°55'11"W	42.0 m
146	19	38°44'56"N	074°55'30"W	36.4 m
153	20	38°44'54"N	074°55'42"W	47.1 m
157	21	38°44'45"N	074°55'21"W	46.5 m
167	22	38°44'42"N	074°55'18"W	45.0 m
174	23	38°44'51"N	074°55'23"W	46.0 m
180	25	38°44'50"N	074°55'48"W	46.0 m
194	27	38°44'42"N	074°55'18"W	45.1 m
194	28	38°44'54"N	074°55'30"W	46.8 m

The correction for WHITING's static draft was 3.2 meters, a historical value that WHITING divers confirmed by pneumatic depth gauge on May 20, 1993 (DN 140). The Transducer Depth Determination Report is on file at AHS.*

New leadlines were made on April 10, 1993 and calibrations performed on April 26 on WHITING confirmed the leadline error was negligible. A leadline comparison with the DSF-6000N was performed on April 23, 1993 (DN 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 on WHITING 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 for WHITING are on file at AHS.*

Settlement and squat measurements on launch 1014 were conducted and correctors determined on August 15, 1993. These correctors were reapplied to the data acquired on August 13, 1993 (DN 225). Settlement and squat correctors for launch 1014 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) on WHITING. Heave correctors were applied in post-processing. Launch 1014 had no heave sensor, so no 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

*DATA FILED WITH FIELD RECORDS.

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:	-0 hr 45 min	x0.96
Low Water:	-0 hr 45 min	x0.96

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 submitted to Product and Services Branch, Datums Section, N/OES231 on August 24, 1993. APPROVED TIDES AND ZONING 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 2.2. 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 2.2. 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

On July 9, 1993, the Ashtech Sensor receivers were replaced with different Ashtech Sensor receivers, serial numbers as follows:

<u>Item</u>	<u>Serial Number</u>
Primary System:	700417B1193
Secondary System:	700417B1194

The Magnavox MX50R remained in the same configuration.

Launch 1021 was used as the dive platform for one item investigation on July 18, 1993 (DN 199). 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. A modified performance check on launch 1021 was 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. The inverse distance was 1.1 meters between the two least depth positions.

Launch 1015 was used as a dive platform for one item investigation on July 18, 1993 (DN 199). An Ashtech Sensor receiver (s/n 700417B1191) with a Magnavox MX50R (s/n 219) differential radio receiver linked to HDAPS was used for obtaining the positions on the items investigated. Performance checks for the launch's positioning system were done with the launch aboard in the davits by comparing an instantaneous HDAPS position of the launch with the WHITING's HDAPS position and calculating an offset in distance and azimuth between the two systems. This was conducted on a weekly basis with an error of no more than 3 meters.

Launch 1014 was used as a dive platform for eight item investigations. An Ashtech Sensor receiver (s/n 700417B1203) with a Magnavox MX50R (s/n 036) differential radio receiver linked to HDAPS was used for obtaining the positions on the items investigated. Performance checks for the launch's positioning system were done with the launch aboard in the davits by comparing an instantaneous HDAPS position of the

launch with the WHITING's HDAPS position and calculating an offset in distance and azimuth between the two systems. This was conducted on a weekly basis with an error no more than 4.6 meters. A LORAN-C unit was not installed on launch 1014 until July 30, 1993; therefore, dive positions using launch 1014 up to that date do not include LORAN-C time delays. Performance checks for launches 1014 and 1015 have been sent under separate transmittal to AHS.*

Satellite coverage during this survey period allowed WHITING to operate in the non-altitude constrain mode until June 6, 1993 (DN 157). Losses in productivity occurred from losing four satellite coverage intermittently for 30 minutes. On June 6 HDAPS was used to reinitialize the DGPS to continue surveying with 3 satellites with altitude constrained. On June 16, satellite coverage allowed WHITING, Launch 1014, and Launch 1015 to operate in non-altitude constrained mode again until the end of data collection. 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.

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 on WHITING 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 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.

DGPS antenna offsets and laybacks for launch 1014 were measured on July 28, 1993. 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.

In post-processing an HDAPS software deficiency was found that flagged positions as DR. This problem occurred primarily because DGPS was not reinitialized by HDAPS after DGPS positioning was interrupted. DR positions occur on every day of side scan sonar data collection except DN 161, and each time of DR was less than 2 seconds, most being less than 1 second. WHITING does not consider these DR positions to be compromised in accuracy.

J. SHORELINE SEE SECTION 2.10. OF THE EVALUATION REPORT.

There is no shoreline in this survey.

K. CROSSLINES SEE ALSO SECTION 3.9. OF THE EVALUATION REPORT.

A total of 29 nautical miles of crosslines were run on H-10476. This amounted to 8.4 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 deeper than main-scheme soundings.

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

H-10476 junctioned with H-104~~39~~⁴⁶ (WH-20-~~3~~⁴-92) on the north. Contours and soundings agreed very well at the junction. The maximum difference between junction soundings was 0.3 meters.

H-10476 junctioned with H-10444 (WH-20-3-92) on the northeast corner. Contours and soundings agreed very well at the junction. There were no differences in soundings between the two surveys. There were no other contemporary surveys that junctioned with H-10476. CONCUR

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 shoaling in the northwest part of the survey area, and a deep trough along the northeastern part of the survey area. Side scan sonar records showed a variety of bottom textures in the survey area. Survey H-10476 soundings were compared with prior surveys H-9136, H-9175, H-9176, H-9723, and H-9727. All prior surveys were referenced to NAD 27. For comparison purposes, a datum shift was applied to H-10476 in accordance with section 7.4 of the FPM.

The northwestern corner of the survey area was covered by H-9136 (1970, scale 1:10,000, MLW). Bottom contours and soundings agree well with H-10476. Depths from H-10476 were generally 0.3 meters deeper to 0.2 meters shoaler than those found on H-9136. ~~However in the area near 38°40'40"N 074°58'10"W, depths were up to 1.0 meters deeper than found on H-9136, and in the area of 38°43'45"N 075°00'45"W depths were up to 0.9 meters deeper than on H-9136.~~ *CONCUR*

The majority of the southern portion of the survey area was covered by H-9175 (1970, scale 1:10,000, MLW). Present survey soundings agreed well with H-9175 soundings. Depths from H-10476 were generally 0.3⁶ meters deeper than those found on H-9175. *CONCUR*

The majority of the northern and central portion of the survey area was covered by H-9176 (1970, scale 1:10,000, MLW). Present survey soundings agreed well with H-9176 soundings. Depths from H-10476 were generally 0.3 meters deeper than those found on H-9176, except in the region near 38°43'00"N 075°00'00"W where shoal soundings on the current survey are up to 0.3⁶ meters deeper than those on H-9176. *CONCUR*

A small northwestern 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 on H-10476 were generally 0.3 meters or less shoaler than those found on H-9723. *CONCUR*

The northeastern part of the survey was covered by survey H-9727 (1977, 1:20,000, MLW). Sounding comparisons between present survey depths and H-9727 were fair. Most soundings on H-10476 are up to 0.3⁵ meters shoaler than those on H-9727. *CONCUR*

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

WHITING recommends that survey H-10476 supersede all hydrography from prior surveys in the common area. *CONCUR*

N. ITEM INVESTIGATIONS

Summary of items investigated:

AWOIS ITEMS	SECTION	STATUS
1131	N1	Located
8352	N2	Disproved
8403	N3	Located

Significant contacts located on this survey:

CONTACT NO.	SECTION
719.28S	N4
1212.16S	N5
1965.50P	N6
2094.51P	N7
3254.73S	N8
3339.62S	N9
3567.37P	N10
5178.85S	N11

Contacts located on this survey but not deemed significant are recorded in the contact tables submitted with the survey data.

N1. AWOIS ITEM 1131

Reported Latitude: 38°44'55.48" N
Reported Longitude: 74°55'29.97" W
Datum: NAD83
Depth: Not listed
Feature: Fishing Obstruction

AWOIS item 1131 is listed as a fishing obstruction with no other descriptive information. LORAN-C rates are given for position of the obstruction.

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.

Contact #56.22 (DN 143) was found 338 meters NW of the AWOIS position and may be the fishing obstruction. The side scan sonar position was calculated to be latitude 38°45'01.00"N, longitude 074°55'42.07"W and had a ~~max~~ significant height of 1.4 meters in a surrounding depth of 44.1 meters^(146F). Due to the insignificance of the item, WHITING did not further investigate this item.

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*

N2. AWOIS ITEM 8352

Reported Latitude: 38°42'32.00" N
Reported Longitude: 74°57'18.00" W
Datum: NAD83
Depth: Not listed
Feature: Unknown

AWOIS item 8352 is listed as a wreck with an approximate position and no other descriptive information.

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 3000 meters of the reported position other than the sunken buoy and anchor (contact #3339.62S) listed below. No additional investigation was necessary.

Prior surveys contain no information on this AWOIS item.

The AWOIS item is charted on 12214, 37th edition, 27 June 1992 as a dangerous wreck with an approximate position. WHITING recommends that this wreck symbol be removed from the chart. *CONCUR* *DELETED*

N3. AWOIS ITEM 8403

Reported Latitude: 38°42'36.40" N
Reported Longitude: 74°59'46.63" W
Datum: NAD83
Depth: Not listed
Feature: Sunken Fishing Schooner

AWOIS 8403 is described as a fishing schooner sunk in September, 1941. This item was not assigned to this survey; however, WHITING found a sunken wreck in the charted position and deemed it significant for complete depth determination.

Contact #973.36P, believed to be a wreck, was found on DN 155 while conducting 200% side scan sonar insonification during the course of main scheme hydrography. The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix #6016 on DN 222) were determined during dive operations. Dive operations on this item were conducted on July 18, 1993 (DN 199) and again on August 10, 1993 (DN 222) to insure the entire wreck was fully investigated.

A submerged wreck was located in latitude 38°42'40.554"N, longitude 074°59'33.202"W with a pneumatic least depth of 12.3 meters (corrected for ~~predicted~~ tides). The wreck consisted of decayed wooden ribs and scattered debris. The least depth was acquired on what appeared to be anchor windless machinery that projected 2 meters above the bottom in surrounding depths of 14.0 meters, (46 FT).
RANGING FROM 12.9m (42 FT) TO

Prior surveys contain no information on this AWOIS item.

The AWOIS item is charted as a sunken wreck, not dangerous to surface navigation on chart 12214, 37th edition, 27 June 1992. ~~WHITING~~ ^{DELETED} recommends that the presently charted symbol be removed, and the wreck be charted as a wreck with depth determined by diver ^{CONCOR} in the position determined by this survey. ^{11.4m (37 FT), 11°WK, AND A DANGER CURVE,}

N4. Contact #719.28S

Reported Latitude:	38°39'29.82" N
Reported Longitude:	74°57'04.20" W
Datum:	NAD83
Depth:	15.4 meters
Feature:	Obstruction

Contact #719.28S (DN 154) was found by side scan sonar on main scheme during this survey. The contact height from side scan sonar was computed to be significant. Additional side scan investigation lines were run near the object at a reduced range scale to further develop the contact, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix #6011 on DN 211) were determined during dive operations.

A submerged rock was located in latitude $38^{\circ}39'30.003''$ ^{29.96}N, longitude $074^{\circ}57'04.168''$ W with a pneumatic least depth of 15.4 meters (corrected for predicted tides). The rock is oblong in shape, projecting 1 meter above the bottom in surrounding depths of 16.7 meters, (53 FT).
RANGE FROM 16m (52 FT), TO

WHITING recommends that this boulder be charted as a rock with least depth determined by diver at the position acquired on this survey. CONCLUDE 15m (50 FT), 15m (50 FT), AND A DANGER CORVE,

N5. Contact #1212.16S

Reported Latitude: $38^{\circ}38'39.48''$ N
Reported Longitude: $74^{\circ}55'24.78''$ W
Datum: NAD83
Depth: 17.0 meters
Feature: Obstruction

Contact #1212.16S (DN 155) was found by side scan sonar on main scheme during this survey. The contact height from side scan sonar was computed to be significant. Additional side scan investigation lines were run near the object at a reduced range scale to further develop the contact, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix #5999 on DN 210) were determined during dive operations.

A submerged rock was located in latitude $38^{\circ}39'39.625''$ ⁴N, longitude $074^{\circ}55'25.104''$ W with a pneumatic least depth of 20.1 meters (corrected for predicted tides). The item located is a boulder projecting 1 meter above the bottom in surrounding depths of 21.3 meters, (66 FT).
RANGING FROM 19m (65 FT), TO

WHITING recommends that this boulder ^{NOT} be charted as a rock with known depth in the position acquired on this survey.

N6. Contact #1965.50P

Reported Latitude: $38^{\circ}38'52.68''$ N
Reported Longitude: $74^{\circ}55'09.78''$ W
Datum: NAD83
Depth: 17.6 meters
Feature: Obstruction

Contact #1965.50P (DN 158) was found by side scan sonar on main scheme during this survey. The contact height from side scan sonar was computed to be significant. Additional side scan investigation lines were run near the object at a reduced range scale to further develop the contact, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix #5997 on DN 210) were determined during dive operations.

A submerged obstruction was located in latitude $38^{\circ}38'52.709''N$, longitude $074^{\circ}55'09.637''W$ with a pneumatic least depth of 19.9 meters (corrected for predicted tides). The item located is an apparently man-made stone boulder projecting 1.2 meters above the bottom in surrounding depths of 20.5 meters, (67 FT).

WHITING recommends that this item be charted as an obstruction with known depth in the position acquired on this survey. CONCOR ^{197m, (644FT), 197DBSTR, AND A DANGER CURVE,}

N7. Contact #2094.51S

Reported Latitude: $38^{\circ}39'00.42'' N$
Reported Longitude: $74^{\circ}55'02.28'' W$
Datum: NAD83
Depth: 18.2 meters
Feature: Obstruction

Contact #2094.51S (DN 158) was found by side scan sonar on main scheme during this survey. The contact height from side scan sonar was computed to be significant. Additional side scan investigation lines were run near the object at a reduced range scale to further develop the contact, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix #6018 on DN 224) were determined during dive operations.

A submerged rock was located in latitude $38^{\circ}39'01.098''N$, longitude $074^{\circ}55'02.485''W$ with a pneumatic least depth of 19.3^{20.1} meters (corrected for predicted tides). The item located is a rock projecting 1 meter above the bottom in surrounding depths of 20.3⁸ meters, (68 FT).

WHITING recommends that this item be charted as a rock with known depth in the position acquired on this survey. CONCOR ^{OF 20.1m, (66FT), 20.1RK,}

N8. Contact #3254.73S

Reported Latitude: 38°39'50.90" N
Reported Longitude: 74°54'01.90" W
Datum: NAD83
Depth: 21.4 meters
Feature: Obstruction

Contact #3254.73S (DN 167) was found by side scan sonar on main scheme during this survey. The contact height from side scan sonar was computed to be significant. Additional side scan investigation lines were run near the object at a reduced range scale to further develop the contact, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix #6008 on DN 211) were determined during dive operations. ✓

A submerged rock was located in latitude 38°39'50.665"N, longitude 074°54'02.127"W with a pneumatic least depth of 22.8 meters (corrected for predicted tides). The item located is a granite boulder projecting 1 meter above the bottom in surrounding depths of 24.0² meters, (77 FT).
RANGING FROM 23m (76 FT) TO

WHITING recommends that this boulder be charted as a rock with known depth in the position acquired on this survey. CONDUIT
OF 22.8m (75 FT), 22.8m

N9. Contact #3339.62S

Reported Latitude: 38°43'45.80" N
Reported Longitude: 74°57'38.60" W
Datum: NAD83
Depth: 15.2 meters
Feature: Sunken Buoy and Anchor

Contact #3339.62S (DN 168) was found by side scan sonar on main scheme during this survey. The contact height from side scan sonar was computed to be significant. Additional side scan investigation lines were run near the object at a reduced range scale to further develop the contact, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix #6014 on DN 213) were determined during dive operations.

A submerged obstruction was located in latitude 38°43'45.827"N, longitude 074°57'38.946"W with a pneumatic least depth of 17.2 meters (corrected for predicted tides). The item located is a sunken structure buoy laying on its side projecting 2 meters above the bottom in surrounding depths of 19.3 meters. 10 meters from the sunken buoy is an anchor block, but the anchor block was found to be less significant. ✓

WHITING recommends that this sunken buoy and anchor block be charted as a obstruction with least depth determined by diver in the position acquired on this survey. CONCUR
* OF 16.2m, (53 FT), 16² OBSTR, AND A DANGER CURVE,

N10. Contact #3567.37P

Reported Latitude: 38°39'26.82" N
Reported Longitude: 74°54'14.76" W
Datum: NAD83
Depth: 18.1 meters
Feature: Obstruction

Contact #3567.37P (DN 168) was found by side scan sonar on main scheme during this survey. The contact height from side scan sonar was computed to be significant. Additional side scan investigation lines were run near the object at a reduced range scale to further develop the contact, and a diver investigation was conducted.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth (fix #6019 on DN 224) were determined during dive operations. ✓

A submerged rock was located in latitude 38°39'27.557⁶"N, longitude 074°54'14.878"W with a pneumatic least depth of 20.4 meters (corrected for predicted tides). The rock projects 0.7 meters above the bottom in surrounding depths of 21.3 meters, (70 FT). RANGING FROM 21m, (69 FT) TO

WHITING recommends that this item be charted as a rock with known depth in the position acquired on this survey. CONCUR
20⁷m, (68 FT), 20⁷TRK,

N11. Contact #5178.85P

Reported Latitude: 38°42'27.00" N
Reported Longitude: 74°59'54.00" W
Datum: NAD83
Depth: 9.8 meters
Feature: Buoy anchor

Contact #5178.85P (DN 194) was found by side scan sonar while conducting a confidence check near buoy G"1HC" during this survey. Additional side scan investigation lines were run near the object at a reduced range scale to further develop the contact. The contact height from side scan sonar was computed to be most significant of several contacts (#5176.70S, #5176.71P, #5176.86S) found in the vicinity and a diver investigation was conducted. The other contacts in the area are suspected anchor blocks and sunken buoys.

The contact was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position was determined on July 18, 1993 (fix #5993 on DN 199), and the least depth was determined on July 21, 1993 (DN 202), both during dive operations.

A submerged obstruction was located in latitude $38^{\circ}42'27.144''N$, longitude $074^{\circ}59'54.300''W$ with a pneumatic least depth of 11.6³ meters (corrected for predicted tides). The item located is a large anchor block (2.5 m X 2.5m) projecting 1.2 meters above the bottom in surrounding depths of 12.7⁸ meters, (42 FT). ✓

RANGING FROM 11⁸m (38 FT) TO
WHITING recommends that this block be charted as an obstruction with least depth determined by diver in the position acquired on this survey. CONCUR
* OF 11.3³m (37 FT), 11⁸ OBSTR, AND A DANGER CURVE,

O. COMPARISON WITH THE CHART *SEE ALSO SECTION 7. OF THE EVALUATION REPORT.*

Chart 12214, 37th edition, 27 June 1992, is a 1:80,000 scale chart that covers the survey area. The current survey soundings agree moderately well with the charted soundings, contours, and features, except where discussed in Section N. Charted soundings originate from the prior surveys discussed in Section N.

Bottom samples listed on the chart were mostly carried from a 1920 leadline survey. As a result, WHITING acquired bottom samples over the survey area at a spacing of 11 cm to the scale of survey. Results are listed in Separate II attached to this survey.

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"DC". Several passes were made near the buoy while towing the side scan sonar. Two positions for the buoy anchor were entered into contact table 10. 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 position was determined for the buoy:

BUOY	SURVEY GP		LIGHT LIST GP	
	Latitude	Longitude	Latitude	Longitude
"DC"	38°43' ^{47.36"} 8" N	074°57' ^{28.90"} 5" W	38°43' ^{48"} 8" N	74°57' ^{36"} 6" W

Buoy "DC" is a yellow structure whistle buoy. Its characteristics were observed as Fl Y 2.5 sec. This agrees with both the charted characteristics and the Light List description.

R. STATISTICS

Number of Positions.....	5254
Main-scheme Sounding Lines (Nautical Miles).....	350
Crosslines (Nautical Miles).....	29
Square Nautical Miles Surveyed.....	28
Days of Production.....	31
Detached Positions.....	26
Bottom Samples.....	24
Tide Stations Installed.....	None
Current Stations.....	None
Number of CTD Casts.....	9
Magnetic Stations.....	None

S. MISCELLANEOUS

See section O for description of bottom sample coverage. 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.*

All sounding data meets 1:20,000 accuracy standards.
Positions determined for wrecks and obstructions meet 1:10,000 accuracy standards and can be applied to a chart of the same scale.

Recommendations concerning specific items are located in section N of this report.

U. REFERRAL TO OTHER REPORTS

The following reports have been submitted to N/CG244 and will be 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

N5. Contact #3509.48P

N12.

Reported Latitude: 38°44'47.4"N
 Reported Longitude: 074°57'32.4"W
 Datum: NAD 83
 Depth: 15.0m side scan sonar estimated depth
 Feature: dangerous ~~submerged obstruction~~ ^{SUNKEN WRECK} (15⁰ Wk (A)).

Contact #3509.48P originates with ~~prior survey H-10446 (1992)~~ ⁹³ and ~~is shown on the prior survey as a dangerous submerged wreck with a side scan sonar estimated depth of 15.0 meters, (15⁰ Wk (A)).~~

Survey requirements were to verify or disprove ~~a 15⁰ Wk (A)~~ ^{THE CONTACT} located during survey operations of prior survey H-10446 (1992).

Contact #3509.48P was investigated and echosounding was used to pinpoint the divers drop position. Once the item was located, a position and least depth were determined during dive operations.

A dangerous submerged wreck was located in latitude 38°44'47.4"N, longitude 074°57'32.4"W, with a pneumatic gauge least depth of ~~17.0~~ ^{17.0} meters (corrected for predicted tides). The divers located a metal wreck with a fish net suspended by a buoy in the water column. Divers cut the fish net flush with the wreck. The wreck stood approximately 2 meters to 3 meters off the bottom.

WHITING recommends that ~~the 15⁰ Wk (A) be deleted from the chart and a wreck with a known least depth by diver of 17.0 meters~~ ^{17.0} be charted at the position determined on this survey. CONCUR * (56 FT), 16⁰ Wk AND A DANGER CURVE,

~~O. COMPARISON WITH THE CHART~~

Chart#	Scale	Edition#	Date
12214	1:80,000	37	June 27, 1992

~~The charted hydrography originates with prior surveys previously discussed in the Evaluation Report for H-10444 (1992) and requires no further consideration.~~

~~There were no previously unknown dangers to navigation located during this survey.~~

ITEM INVESTIGATION REPORT

position *not used*
~~used~~ SITE RE-INVESTIGATED
 ON DN 222

SURVEY H-10476
 Item Number 8403 Danger to Nav. Letter Issued (Y/N) N
 Charted (Y/N) Y
 Chart No. (largest scale) 12214 Edition 37th Date 6/92

DESCRIPTION/SOURCE: 973.36 P (H-10476)
 "Harry S Fooks"
 wreck

HISTORICAL POSITION: Latitude 38° 42' 36.0" SSS POSITION: Lat 38° 42.675' N
 Longitude 074° 59' 45.0" Long 074° 59.557' W
 Datum NAD 83

SURVEY REQUIREMENTS:

METHOD OF INVESTIGATION:

Echosounder _____ Side Scan _____ Diver Other (specify) _____

921.82 P
 968.56 P
 5166.57 P
 5169.50 P
 Water depth = 12.1 m

DIVE DATA: Divers Riley / BERNKOWITZ
 Time of Dive: Commenced 1424 Completed 1502
 Current 0.4 Visibility 2.5 Bottom Type BROWN SAND SILT AND SHELLS

NOV 03
#8403
53V

RESULTS OF INVESTIGATION: DIVERS DESCENDED BUOY DROPPED AT ABOVE SSS POSITION AND LOCATED SUBMERGED METAL DEBRIS FROM A WRECK. DIVERS SWAM FROM SE END OF WRECK NW ALONG SCATTERED DEBRIS, LOCATING DECK MACHINERY PIPING, TRAWL NETTING AND A 6' DIAMETER PROP. PNEUMO LEAST DEPTH WAS TAKEN ON WHAT APPEARED TO BE AN ANCHOR WINDLASS. THE PROP WAS FAULTED WITH TRAWL NETTING A PORTION OF WHICH WAS ATTACHED TO A FLOAT WHICH EXTENDED TO A LEAST DEPTH OF 34' (DIVER LAUNCE). THE PROP WAS LOCATED AT THE NORTHERN MOST EDGE OF DEBRIS. ANCHOR WINDLASS WAS AT CENTRAL WEST CENTRAL SECTION OF DEBRIS. NO OTHER SIGNIFICANT DEPTHS WERE FOUND TO THE WEST OR EAST.

POSITION: Date (M/D/Y) 7-18-93 Time (UTC) 14259 Position No. 6016
 Latitude 38 42 19.5 Longitude 074 59 33.2
 LORAN-C: GRI (9960) W: 15793.6 X: 27108.2 Y: 42581.1 Z: 59213.4

LEAST DEPTH: Date (M/D/Y) 7-18-93 Time (UTC) 1438
 Method of Least Depth: PNEUMO
 Measured Least Depth: 1.39.8 2.37.8 3.39.8 Avg. 39.8 Units ft
 Uncorrected Depth 12.1 (meters) 39.8 ft
 Tide Corrector -0.5 Corrected Least Depth 11.6 (meters)
 (37 FT)

Recorder ELM Checked By JM

SEE ALSO SECTION 13, PAGE 15, OF THIS REPORT FOR CHARTING RECOMMENDATION.

ITEM INVESTIGATION REPORT

SURVEY H-10476

Item Number N/A

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

Charted (Y/N) N

Chart No. (largest scale) 12214 Edition 37th Date 6/92

DESCRIPTION/SOURCE: 719.28 S (H-10476)

E 14743.8

N 8326.5

HISTORICAL POSITION: Latitude _____
Longitude _____
Datum _____

SSS POSITION: Lat 38° 39.497' N
Long 074° 57.070' W

433.43 P
632.10 S Depth 13.3 m
44' (2)

SURVEY REQUIREMENTS:

5190.51 P
5187.80 P
5193.78 P

METHOD OF INVESTIGATION:

Echosounder _____ Side Scan _____ Diver Other (specify) _____

DIVE DATA: Divers Silverman, Verlaque

Time of Dive: Commenced 1910 Completed 1933

Current 0.5 F Visibility 1 FT Bottom Type SILT

RESULTS OF INVESTIGATION: DIVERS DESLENDED BUOY LINE DROPPED AT ABOVE SSS POSITION AND FOUND AN OBLONG ROCK 9 FT LONG 3 FT HIGH 3 FT WIDE IN 55 FT OF WATER. DIVER GAUGE LEAST DEPTH 52 FT

POSITION: Date (M/D/Y) 07/30/93 Time (UTC) 1927 Position No. 6003-JU
Latitude 38° 39' 29.95" N Longitude 074° 57' 04.42" W
LORAN-C: GRI (9960) W: 15781.9 X: 27087.3 Y: 42546.8 Z: 59206.3
905 307 819 856 589

LEAST DEPTH: Date (M/D/Y) 07/30/93 Time (UTC) 1927
Method of Least Depth: PNEUMO
Measured Least Depth: 1.52.8 2.53.2 3.53.1 Avg. 53.0 Units FT
Uncorrected Depth 16.2 (meters)
Tide Corrector -0.89 Corrected Least Depth 15.3 (meters)
(50 FT)

Recorder JN Checked By JU

SEE ALSO SECTION N4, PAGE 16 OF THIS REPORT FOR CHARTING RECOMMENDATION.

ITEM INVESTIGATION REPORT

SURVEY H-10476Item Number _____ Danger to Nav. Letter Issued (Y/N) N
Charted (Y/N) _____
Chart No. (largest scale) 12214 Edition 37th Date 6/92DESCRIPTION/SOURCE: 1212.16S (H-10476)

HISTORICAL POSITION: Latitude _____	SSS POSITION: Lat <u>38° 38.658' N</u>
Longitude _____	Long <u>074° 55.413' W</u>
Datum _____	<u>1277.89 S</u>
	<u>5196.63 S</u>
	<u>5199.59 S</u>

SURVEY REQUIREMENTS:

METHOD OF INVESTIGATION:
Echosounder _____ Side Scan _____ Diver Other (specify) _____DIVE DATA: Divers VERLAQUE, SILVERMAN
Time of Dive: Commenced 1803 Completed 1816
Current .25 F Visibility 3 FT Bottom Type SAND & SHELL WITH SILTRESULTS OF INVESTIGATION: DIVERS DESCENDED BUOY DROPPED AT ABOVE SSS POSITION AND FOUND A BOULDER 3' X 3' BY 4' HIGH IN 69 FT OF WATER. DIVER GAUGE L.D. 65 FT.POSITION: Date (M/D/Y) 07/28/93 Time (UTC) 184554 Position No. 5999
Latitude 38° 38' 39.625" N Longitude 074° 55' 25.164" W
LORAN-C: GRI (N/A) W: _____ X: _____ Y: _____ Z: _____LEAST DEPTH: Date (M/D/Y) 7-29-93 Time (UTC) 1410
Method of Least Depth: PNEUMO
Measured Least Depth: 1.66.2 2.66.1 3.66.4 Avg. 66.2 Units FT
Uncorrected Depth 20.2 (meters)
Tide Corrector -0.12 Corrected Least Depth 20.4 (meters)
(65 FT)Recorder JN Checked By JM

SEE ALSO SECTION NS., PAGE 16 OF THIS REPORT FOR CHARTING RECOMMENDATION.

ITEM INVESTIGATION REPORT

SURVEY H-10476Item Number N/A Danger to Nav. Letter Issued (Y/N) NCharted (Y/N) NChart No. (largest scale) 12214 Edition 37th Date 6/92DESCRIPTION/SOURCE: 1965.50 P (H-10476)

HISTORICAL POSITION: Latitude _____ SSS POSITION: Lat 38° 38.878' N
Longitude _____ Long 074° 55.163' W
Datum _____ 1987.37 P

E 17509
N 7180.5

SURVEY REQUIREMENTS:

5202.49 S
5204.58 S

METHOD OF INVESTIGATION:

Echosounder _____ Side Scan _____ Diver Other (specify) _____DIVE DATA: Divers SILVERMAN/VERLAQUETime of Dive: Commenced 1614 Completed 1631Current SLACK Visibility 2 Bottom Type SAND & ROCK

RESULTS OF INVESTIGATION: DIVERS DESLENDED BUOY DROPPED AT ABOVE SSS POSITION AND FOUND A 4 FT DIAMETER BOULDER 3.5 FT OFF THE BOTTOM. APPEARED TO BE MAN-MADE. OTHER ROCKS ABOUT 1/2 FT HIGH SURROUNDED THE BOULDER. DIVER GAUGE LEAST DEPTH 65 FT. DEPTH AROUND BOULDER 68 FT.

POSITION: Date (M/D/Y) 7-29-93 Time (UTC) 171648 Position No. 5997Latitude 38° 38' 52.769" N Longitude 074° 55' 09.657" W

LORAN-C: GRI () W: _____ X: _____ Y: _____ Z: _____

N/ALEAST DEPTH: Date (M/D/Y) 7-29-93 Time (UTC) 1628Method of Least Depth: PNEUMOMeasured Least Depth: 1.66.2 2.66.0 3.65.9 Avg. 66.0 Units FTUncorrected Depth 20.1 (meters)Tide Corrector -0.2 Corrected Least Depth 19.9 (meters)
(64 FT)Recorder JKL Checked By JKL

SEE ALSO SECTION NO. PAGE 17, OF THIS REPORT FOR CHARTING RECOMMENDATION.

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ITEM INVESTIGATION REPORT

711

SURVEY H-10476
Item Number N/A
Charted (Y/N) N
Chart No. (largest scale) 12214

Danger to Nav. Letter Issued (Y/N) N
Edition 37th Date 6/92

DESCRIPTION/SOURCE: 2094.51 P (H-10476)

HISTORICAL POSITION: Latitude _____ SSS POSITION: Lat 38° 39' 00.7" N
Longitude _____ Long 074° 55' 03.8" W
Datum _____

E 17690.7 17693
N 7440.3 N 7446.7 7454
2097.72 P Depth 18.2 m
5207.64 S
5210.66 S

SURVEY REQUIREMENTS:

METHOD OF INVESTIGATION:

Echosounder _____ Side Scan _____ Diver Other (specify) _____

DIVE DATA: Divers Silverman, Verlaque 8-12-93 VERLAQUE/CRESWELL
Time of Dive: Commenced 1819 1449 Completed 1835 1509
Current SLACK 0.3 E Visibility 3 FT 0 Bottom Type SLT SILT

RESULTS OF INVESTIGATION: DIVERS DEBROUDED BUOY & DROPPED AT ABOVE SSS POSITION CONDUCTED A 30m CIRCLE SEARCH. NO CONTACT WAS FOUND. 8-12-93 DIVERS DEBROUDED BUOY DROPPED AT EAST. 17693 NORTH. 7434. AND FOUND A OFF^{LONG} BOULDER 4FT WIDE 3-4 OFF THE BOTTOM IN 10 FT OF WATER. DIVER GAUGE LEAST DEPTH WAS 68 FT

POSITION: Date (M/D/Y) 8-12-93 Time (UTC) 152311 Position No. FIX 6009
Latitude 38° 39' 01.048" N Longitude 75° 07' 55.02485" W FIX 6018
LORAN-C: GRI (1960) W: 15981.9 X: 29587.3 Y: 42546.8 Z: 54256.3
SNR 8-12-93 15723.6 227075.0 805 624

LEAST DEPTH: Date (M/D/Y) 07/30/93 Time (UTC) 1506
Method of Least Depth: PNEUMO
Measured Least Depth: 1.67.6 2.67.8 3.67.6 Avg. 67.7 Units FT
Uncorrected Depth 20.6 (meters) 19.324.1
Tide Corrector -0.34.5 Corrected Least Depth 20.3 (meters) (66FT)

Recorder cup Checked By Jal

SEE ALSO SECTION NT.1, PAGE 17, OF THIS REPORT FOR CHARTING RECOMMENDATION.

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ITEM INVESTIGATION REPORT

SURVEY H-10476

Item Number N/A

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

Charted (Y/N) N

Chart No. (largest scale) 12214 Edition 37th Date 6/92

DESCRIPTION/SOURCE: 3254.73S (H-10476)

E 19148.5
N 8975.1

HISTORICAL POSITION: Latitude _____
Longitude _____
Datum _____

SSS POSITION: Lat 38° 39.850' N
Long 074° 54.084' W

4225.64 P Depth 21.4 m
5219.63 S 70'
5222.58 S (1)

SURVEY REQUIREMENTS:

METHOD OF INVESTIGATION:

Echosounder _____ Side Scan _____ Diver Other (specify) _____

DIVE DATA: Divers Silverman, Verlaque

Time of Dive: Commenced 1727 Completed 1740

Current 0.5 E Visibility 3 Bottom Type SILT

RESULTS OF INVESTIGATION: DIVERS DESCENDED 1500Y DROPPED AT ABOVE SSS POSITION AND FOUND A 8 FT DIAMETER ROCK: LOOKED LIKE GRANITE, 3 FT OFF BOTTOM IN 79 FT OF WATER. DIVER GAUGE LD. 76 FT. ORIENTATION OF BOULDER 060 - 240. L.D. AT 240 END.

POSITION: Date (M/D/Y) 07/30/93 Time (UTC) 175723 Position No. FIX 6008

Latitude 38° 39' 50.608" N Longitude 074° 54' 02.187" W

LORAN-C: GRI (9960) W: 15769.9 X: 27671.3 Y: 42552.7 Z: 59217.5
850 313 834 864 524

LEAST DEPTH: Date (M/D/Y) 07/30/93 Time (UTC) 1727 1734

Method of Least Depth: PNEUMO

Measured Least Depth: 1.757 2.760 3.769 Avg. 2.59 Units FT

Uncorrected Depth 2.31 (meters)

Tide Corrector -0.3 Corrected Least Depth 22.8 (meters)
(75 FT)

Recorder [Signature]

Checked By [Signature]

SEE ALSO SECTION 18., PAGE 18, OF THIS REPORT FOR CHARTING RECOMMENDATION.

ITEM INVESTIGATION REPORT

61'

SURVEY H-10476

Item Number _____ Danger to Nav. Letter Issued (Y/N) N
Charted (Y/N) _____
Chart No. (largest scale) 12214 Edition 37th Date 6/92

DESCRIPTION/SOURCE: 8339.62 S (H-10476)

HISTORICAL POSITION: Latitude _____ SSS POSITION: Lat 38°43.762'N
Longitude _____ Long 074°57.647'W
Datum _____

E: 13921.3
N: 16221.7
E: 13917.3
N: 16220.0

SURVEY REQUIREMENTS:

METHOD OF INVESTIGATION:
Echosounder _____ Side Scan _____ Diver Other (specify) _____

3293.40 S
4868.75 S
4261.87 PS
4970.28 P
5161.47 P
E/S → 4261+75

DAL # 9579-9588
DOL: 4017
E: 13921
N: 16215

DIVE DATA: Divers VERLAQUE/KEITZ
Time of Dive: Commenced 1300 Completed 1330
Current 0.25 E Visibility 0-1 Bottom Type SILT

RESULTS OF INVESTIGATION: DIVERS ~~DESCENDED~~ BUOY LINE
DROPPED AT ABOVE SSS. PHOTOGRAPH POSITION AND FOUND
AT A STRUCTURE BOOY, 30 FT LONG 5 FT OFF BOTTOM
IN 64 FT OF WATER. ORIENTATION NW-SE. DIVERS
ALSO FOUND AN ANCHOR BLOCK 30 FT TO THE SE
DIVER GAUGE LEAST DEPTH 56 FT, AT TOP END, NW END.
ANCHOR BLOCK STOOD 3 FT OFF BOTTOM

POSITION: Date (M/D/Y) 2-30-93 Time (UTC) 134636 Position No. _____
Latitude 38°43'45.827"N Longitude 074°57'38.926"W
LORAN-C: GRI (9960) W: 15786.5 X: 27100.0 Y: 42574.7 Z: 59224.4
900 920 900 740

FR# 6014

LEAST DEPTH: Date (M/D/Y) 8-1-93 Time (UTC) 1309
Method of Least Depth: PNEUMO
Measured Least Depth: 156.6 2. 56.6 3. 56.6 Avg. 56.7 Units FT
Uncorrected Depth 17.3 (meters) 16.2
Tide Corrector -0.1-1.1 Corrected Least Depth 17.7 (meters)
(53 FT)

Recorder YN Checked By JLL

SEE ALSO SECTION 19, PAGE 19, OF THIS REPORT FOR CHARTING
RECOMMENDATION.

C
70'
ITEM INVESTIGATION REPORT

SURVEY H-10476
Item Number _____ Danger to Nav. Letter Issued (Y/N) N
Charted (Y/N) _____
Chart No. (largest scale) 12214 Edition 37th Date 27 Jun 92

DESCRIPTION/SOURCE: 3567.37P rky boulder Depth 18.1
(4664.185, 5213.1655, 5217.675) E 18840.5 ¹⁸⁸³⁵
N 8229.8 ⁸²³⁵
HISTORICAL POSITION: Latitude _____ SSS POSITION: Lat 38° 39' 26.821" N
Longitude _____ Long 074° 54' 14.756" W
Datum _____

SURVEY REQUIREMENTS:

METHOD OF INVESTIGATION:
Echosounder _____ Side Scan _____ Diver X Other (specify) _____

DIVE DATA: Divers CRESWELL VERLAQUE
Time of Dive: Commenced 1511 Completed 1602
Current SLACK Visibility 5 FT Bottom Type ROCK/SHELL/PEBBLE AND SAND

RESULTS OF INVESTIGATION: DIVERS DESCENDED BOY DROPPED AT ABOVE EASTING NORTHING AND, CONDUCTED A 15M CIRCLE SEARCH AND FOUND A BOULDER/ROCK ARE APPROXIMATELY APPROXIMATELY 3FT ROUND ABOUT 2FT OFF THE BOTTOM. DIVERS CONDUCTED ANOTHER 15M CIRCLE SEARCH FROM THE BOULDER AND FOUND NO SHALDER DEPTHS, AREA COVERED WITH SMALL ROCKS AND PEBBLES. DIVER GUAGE LEAST DEPTH, 70 FT. DEPTH OF WATER AROUND BOULDER 73 FT

POSITION: Date (M/D/Y) 8-12-93 Time (UTC) 161747 Position No. FIX 6019
Latitude 38° 39' 27.587" N Longitude 074° 54' 14.873" W
LORAN-C: GRI (9900) W: 15710.7 X: 27071.7 Y: 42548.2 Z: 59215.0
SNR- 550 471 828 822 680

LEAST DEPTH: Date (M/D/Y) 8-12-93 Time (UTC) 1604
Method of Least Depth: PNEUMAL PNEUMO
Measured Least Depth: 1. 70.8 2. 70.8 3. 70.8 Avg. 70.8 Units FT
Uncorrected Depth 21.6 (meters) 20.8
Tide Corrector -0.2 -0.7 Corrected Least Depth 21.4 (meters) (68 FT)
-1.2

Recorder ESB Checked By JM

SEE ALSO SECTION NID, PAGE 19 OF THIS REPORT FOR CHARTING RECOMMENDATION.

ITEM INVESTIGATION REPORT

SURVEY H-10476

Item Number _____ Danger to Nav. Letter Issued (Y/N) N
 Charted (Y/N) N
 Chart No. (largest scale) 12214 Edition 37th Date 6/92

DESCRIPTION/SOURCE: 5178.85P most significant
anchor block near buoy "1HC."

HISTORICAL POSITION: Latitude _____ SSS POSITION: Lat 38°42.450" N
 Longitude _____ Long 074°59.903" W
 Datum _____ water depth = 9.8 m

SURVEY REQUIREMENTS:

METHOD OF INVESTIGATION:
 Echosounder _____ Side Scan _____ Diver X Other (specify) _____

DIVE DATA: Divers VELLAQUE / SILVERMAN
 Time of Dive: Commenced 1424 Completed 1449
 Current 0.5 E Visibility 5-6' Bottom Type SAND

RESULTS OF INVESTIGATION:

① DIVER FOUND AN ANCHOR BLOCK 8' X 8' SQUARE
STANDING 3-4' OFF BOTTOM. DIVER GAUGE 38'. BLOCK HAD 1' SCOUR
AROUND IT.

② DIVERS DESCENDED BUOY AGAIN ON 7/21/93 AND ACQUIRED
A PNEUMO DEPTH DIVER GAUGE ON 7/21; 40'.

POSITION: Date (M/D/Y) 7/8/93 Time (UTC) 153059 Position No. 5993
 Latitude 38°42.4524' N Longitude 74°59.9050' W
 LORAN-C: GRI (920) W: 15714.8 X: 27109.6 Y: 42578.3 Z: 59211.3
SNR 918 540 903 957 820

LEAST DEPTH: Date (M/D/Y) 7/8/93 Time (UTC) 1435 1635 ±
 Method of Least Depth: DIVER DEPTH GAUGE PNEUMO
 Measured Least Depth: 2.40.4 2.40.4 3.40.4 Avg. 2.40.4 Units FT
 Uncorrected Depth 12.32 (meters)
 Tide Corrector -0.79 Corrected Least Depth 11.6 (meters)
 (37 FT)

Recorder [Signature] Checked By [Signature]

SEE ALSO SECTION N11, PAGE 20 OF THIS REPORT FOR CHARTING RECOMMENDATION.

ITEM INVESTIGATION REPORT

FIX #4
DP #2

SURVEY C-SHEET

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

Charted (Y/N) Y

Chart No. (largest scale) 12218 Edition 37th Date 6/27/92

DESCRIPTION/SOURCE: H-10446; 3509.48P

HISTORICAL POSITION: Latitude 38° 44' 47.5th N SSS POSITION: Lat 38° 44' 47.30" N
Longitude 74° 57' 32.4" W 3509.48P Long 74° 57' 32.40" W
Datum 83 32.40"

SURVEY REQUIREMENTS: LEAST DEPTH

METHOD OF INVESTIGATION:

Echosounder Side Scan Diver ✓ Other (specify)

DIVE DATA: Divers Riley, Berkowice, Verlaque

Time of Dive: Commenced 1525 Completed 1555

Current 1/2 Knot Visibility 2+3 FT Bottom Type DK, BR, S, SH

RESULTS OF INVESTIGATION:

DIVERS DESCEND BUOY 1 TO STERN ON METAL WRECK. SINGLE SCUBA FEAT ON BOTTOM, LAYING SLIGHTLY ON PORT SIDE. DIVERS SUSPECT SEARCH WRECK TO THE EAST (BOW). FINDING NETTING AND ^{BUOY} BOW IDP INTO WATER COLUMN 20FT. SUSPECT THIS WAS SHADOW ON SONARGRAM RECORDS DIVER CUT NETTING FLUCT WITH WRECK. DIVER DEPTH GAGE (6) BT BOW AND STERN. LEAST DEPTH ON WRECK NEAR CENTER STARBOARD SIDE ON METAL BULWARK DIVER DEPTH GAGE 55 FT. EVIDENCE OF WHITE AND BLUE SCUBA ^{BUOY 2 (inflated)} & SPGLASS ON DECK. WRECK WAS 9 FT OF BOTTOM

POSITION: Date (M/D/Y) 5/23/93 Time (UTC) 162059 Position No. #2, 3 (DZ)
Latitude 38° 44' 47.5" N Longitude 074° 57' 32.4" W
LORAN-C: GRI (990) W: 5786.6 X: 27101.9 Y: 42606.4 Z: 57229.6
SWR 519 972 930 743

LEAST DEPTH: Date (M/D/Y) 5/23/93 Time (UTC) 1545
Method of Least Depth: PNEUMO 17.8 m
Measured Least Depth: 1. 58.2 2. 58.2 3. 58.4 Avg 58.25 Units FT
Corrected Least Depth 47.0 Units FT (predicted tides) (55 FT)
16.8

CHARTING RECOMMENDATION

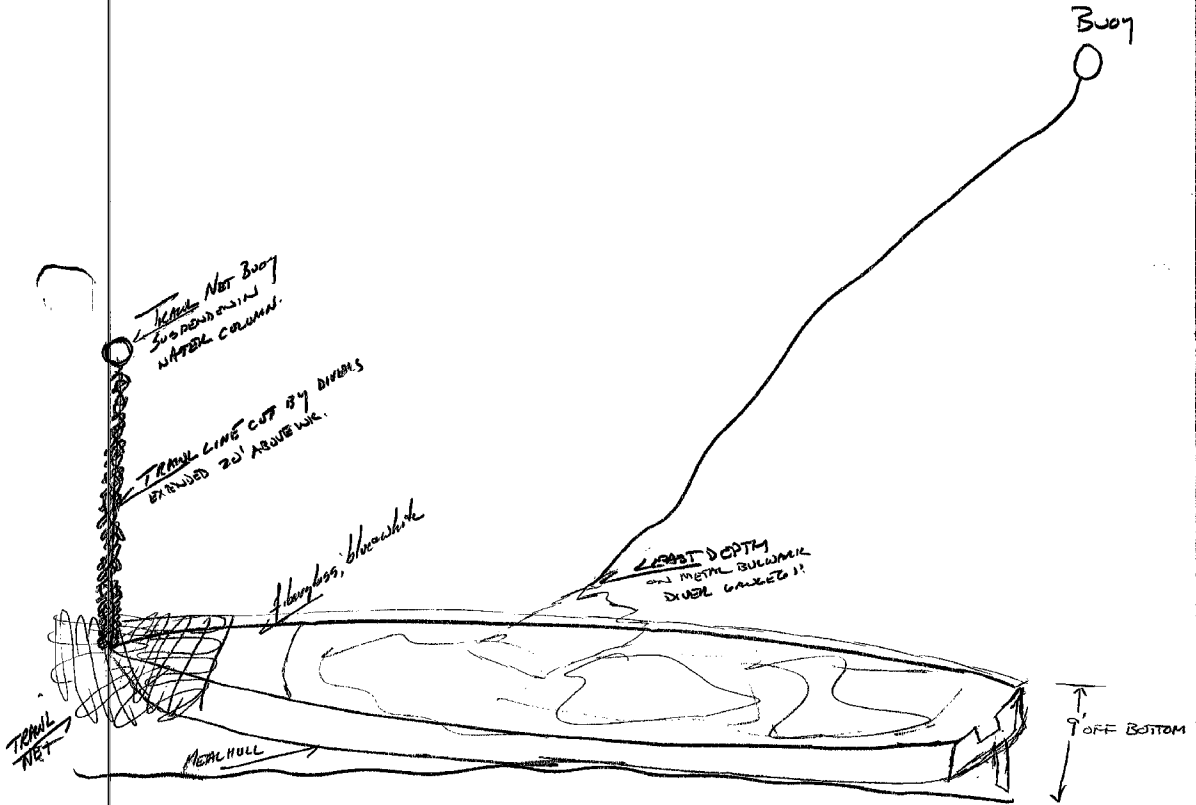
SEE SECTION N12., PAGE 23., OF THIS REPORT.

(33)

DIV 13
5/23/93

DIVE INVESTIGATION

DEPARTMENT OF NAVIGATION
WK
FROM H-10446,
3509.487



34


APPROVAL SHEET

HYDROGRAPHIC AND
SIDE SCAN SONAR SURVEY
OPR-D368-WH
1993
WH-20-7-93
H-10476

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

02/10/94

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10476

NUMBER OF CONTROL STATIONS		2
NUMBER OF POSITIONS		5018
NUMBER OF SOUNDINGS		40678
	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	215	10/22/93
VERIFICATION OF FIELD DATA	134	02/04/94
ELECTRONIC DATA PROCESSING	133	
QUALITY CONTROL CHECKS	63	
EVALUATION AND ANALYSIS	15	02/09/94
FINAL INSPECTION	13	02/09/94
TOTAL TIME	573	
ATLANTIC HYDROGRAPHIC SECTION APPROVAL		02/10/94



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: October 19, 1993

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-D368-WH

HYDROGRAPHIC SHEET: H-10476

LOCALITY: Approaches to Delaware Bay

TIME PERIOD: May 23 - August 13, 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 -0 hr 45 min time correction and a x0.96 range ratio
to Lewes Breakwater Harbor, Delaware (855-7380).

Note: Times are tabulated in Eastern Standard Time.

William M. Fisher
ACTING CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

Name on Survey	Source of Name											
	A	B	C	D	E	F	G	H	K			
	<small> A ON CHART NO. B ON PREVIOUS SURVEY NO. C ON U.S. QUADRANGLE MAPS D FROM LOCAL INFORMATION E ON LOCAL MAPS F P.O. GUIDE OR MAP G RAND McNALLY ATLAS H U.S. LIGHT LIST K </small>											
ATLANTIC OCEAN (title)												1
DELAWARE (title)												2
REHOBETH BEACH (title)												3
												4
												5
												6
												7
												8
												9
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												23
												24
												25

Approved:

[Signature]
Chief Geographer - N1G2x5

JAN 5 1994

COAST AND GEODETIC SURVEY
ATLANTIC HYDROGRAPHIC SECTION
EVALUATION REPORT

SURVEY NO.: H-10476

FIELD NO.: WH-20-7-93

Delaware, Atlantic Ocean, 7 NM ESE of Rehoboth Beach

SURVEYED: 23 May through 13 August 1993

SCALE: 1:10,000

PROJECT NO.: OPR-D368-WH-93

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

CONTROL: ASHTECH GPS Sensor/MAGNAVOX MX50R Beacon Receiver (DGPS)

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

Surveyed by.....C. B. Greenawalt
.....S. R. Barnum
.....J. S. Verlaque
.....J. G. Clayton
.....E. W. Berkowitz
.....M. P. Zipperer
.....J. L. Riley
.....N. O. Silverman
.....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. A RAYTHEON DSF-6000N fathometer was operated concurrently with side scan sonar. Significant side scan sonar contacts determined, were investigated during present survey operations. A pneumatic depth gauge was used to determine least depths during dive 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 datum move the projection lines 0.404 seconds (12.46 meters or 1.246 mm at the scale of the survey) north in latitude, and 1.378 seconds (33.32 meters or 3.332 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. Some dashed curves were added to better delineate the bottom configuration.

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, SIDE SCAN SONAR MANUAL, FIELD PROCEDURES MANUAL.

5. JUNCTIONS

H-10444 (1992-93) to the northeast
H-10446 (1992-93) to the north

A standard junction could not be effected with junctional surveys H-10444 (1992-93) and H-10446 (1992-93). The junctional surveys are archived at National Ocean Service (NOS) Headquarters, Silver Springs, Maryland. Any adjustments to the depth curves in the junctional areas will have to be made at headquarters on the chart during compilation.

There are no junctional surveys to the southeast, south, or west. Present survey depths are in harmony with the charted hydrography to the southeast, south and west.

6. COMPARISON WITH PRIOR SURVEYSa. Hydrography

H-9136	(1970)	1:20,000
H-9175	(1970)	1:10,000
H-9176	(1970)	1:10,000
H-9723	(1977)	1:20,000
H-9727	(1977)	1:20,000

The prior surveys listed above cover the present survey area in its entirety. These prior surveys are adequately discussed in section M., page 12 of the Descriptive Report and need no further discussion.

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

b. Wire Drag

H-9295WD (1971-72) 1:20,000

There are no hangs or groundings that originate with the prior survey within the common area of the present survey.

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

7. COMPARISON WITH CHART 12214, (37th. Ed., Jun 72/92)a. Hydrography

The charted hydrography originates with the previously discussed prior surveys and requires no further consideration. The hydrographer makes an adequate chart comparison in section N., pages 13-20, and 23-34, 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 aids 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



Robert Snow
Cartographic Technician




Norris A. Wike
Cartographer

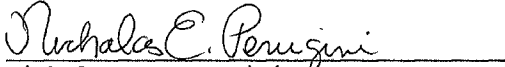
APPROVAL SHEET
H-10476

Initial Approvals:

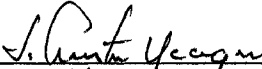
The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproof of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing have been entered in the 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.


Leroy G. Cram
Chief, Hydrographic Processing Team B
Atlantic Hydrographic Section
Date: 2/10/94

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, LCDR, NOAA
Chief, Atlantic Hydrographic Section
Date: 2-10-94

Final Approval:

Approved: 
J. Austin Yeager
Rear Admiral, NOAA
Director, Coast and Geodetic Survey
Date: 5/11/94

