10444

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-20-3-92

Registry No. H-10444

LOCALITY

State Delaware

General Locality Atlantic Ocean

Sublocality 9 NM East of Cape Henlopen

1992

CHIEF OF PARTY
CDR A.A. Armstrong

LIBRARY & ARCHIVES

DATE October 12, 1993

☆U.S. GOV. PRINTING OFFICE: 1987—756-980

10444

A/G

PROJS

CP3

80 12304

80 12214

12200

13003

NOAA FORM 77-28 (11-72)

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

HYDROGRAPHIC TITLE SHEET

REGISTER NOS.

H-10444

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-20-3-92

State: DELAWARE

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

Locality: 9 NAUTICAL MILES EAST OF CAPE HENLOPEN, DELAWARE

Scale: 1:20,000

Date of Survey: ~~Oct 8, - Oct. 29, 1992~~ 1992 – 20 JUNE 1993

Instructions dated: JULY 16, 1992

Project No.: OPR-D168-WH-92

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, R.A. Fletcher, D.E. Bixby, L.P. Henn, J.L. Riley

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: XYNETICS 1201 PLOTTER (AHS) HP 7959B, Bruning (FIELD)

Verification by: ATLANTIC HYDROGRAPHIC SECTION

Soundings in MLLW: Meters

REMARKS: Surveyed by 1:20,000-scale standards, plotted at 1:10,000

Junctions with H-10440 and H-10446

200% side scan sonar coverage

Time zone used, 0 (GMT)

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

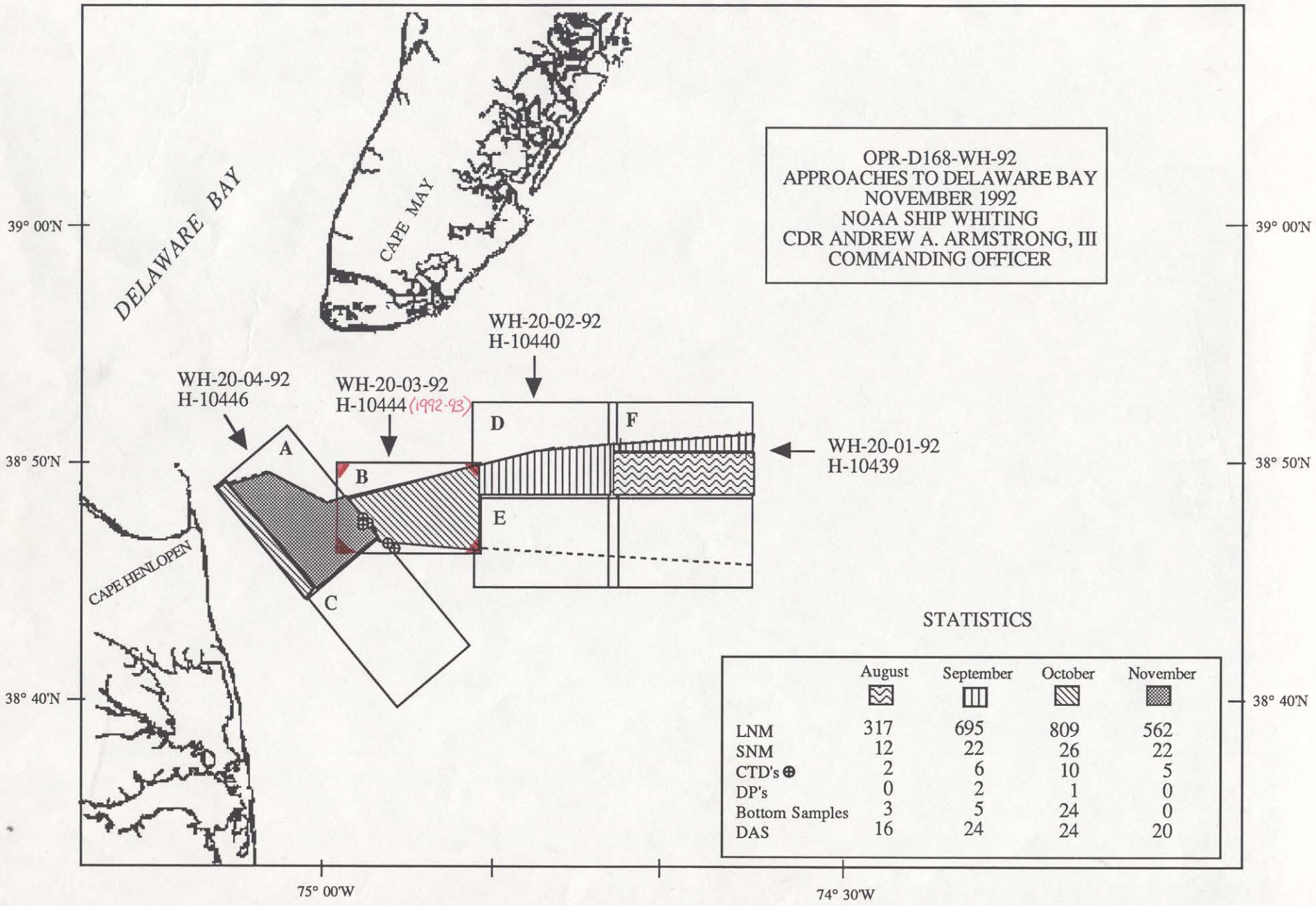
AWOIS/SURF ✓ 10/27/93, SJV

SC 12-13-96

KWW

NOAA FORM 77-28 SUPERSEDES FORM C & GS-537

NOAA SHIP WHITING
PROGRESS SKETCH



OPR-D168-WH-92
APPROACHES TO DELAWARE BAY
NOVEMBER 1992
NOAA SHIP WHITING
CDR ANDREW A. ARMSTRONG, III
COMMANDING OFFICER

STATISTICS

	August	September	October	November
LNM	317	695	809	562
SNM	12	22	26	22
CTD's ⊕	2	6	10	5
DP's	0	2	1	0
Bottom Samples	3	5	24	0
DAS	16	24	24	20

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-D168-WH
1992
WH-20-3-92
H-10444

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

A. PROJECT

Project OPR-D168-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-D168-WH dated July 16, 1992. No changes to the project instructions were issued. A change to the Automated Wreck and Obstruction Information System (AWOIS) listing dated August 5, 1992 was issued on October 5, 1992.

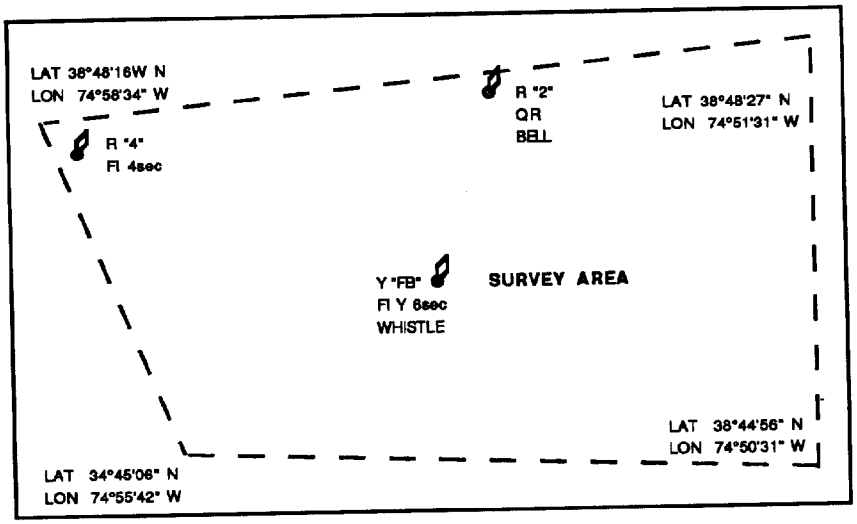
Project OPR-D168-WH was divided into seven survey sheets. The survey described in this report was designated "B" Sheet, and assigned field sheet number WH-20-3-92 and registry number H-10444.

B. AREA SURVEYED

Hydrographic survey H-10444 is nine nautical miles east of Cape Henlopen, Delaware. The survey covers a portion of the western ends of Five Fathom Bank to Cape Henlopen traffic lane, the Cape Henlopen to Five Fathom Bank traffic lane, and the separation zone between them, as well as a portion of the Precautionary Area at the entrance to Delaware Bay.

The survey area is shown in the following diagram:

H-10444 SHEET LIMITS



Survey operations began on October 8, 1992 (DOY 282) and ended on October 29, 1992 (DOY 303). Data were acquired on the following days:

DOY	Date
282-290	October 8-16
295-297	October 21-23
302	October 28
303	October 29

C. SURVEY VESSEL

NOAA Ship WHITING, vessel identification number 2930, was used for all data acquisition during survey H-10444.

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:

PROGRAM NAME	VERSION	VERSION DATE
AUTOST	3.00	24-Sep-92
BACKUP	2.00	27-Dec-90
BASELINE	1.13	09-Jul-92
BIGABST	2.03	11-Sep-92
BLKEDIT	2.00	15-Jun-92
BLKEDIT	2.01	29-Sep-92
CARTO	2.03	23-Sep-92
CARTO	2.04	21-Oct-92
CONTACT	2.01	23-Sep-92
CONTACT	2.02	03-Nov-92
CONTACT	2.03	09-Nov-92
CONVERT	3.51	11-Sep-92
CONVERT	3.52	21-Oct-92
DAS_SURV	6.32	16-Jul-92
DIAGNOSE	3.01	21-May-92
DISC_UTIL	1.00	03-Aug-92
DP	2.11	11-Jun-92
DP	2.12	01-Oct-92
EXCESS	4.10	23-Sep-92
FILESYS	3.01	09-Sep-92
FILESYS	3.02	20-Oct-92
GRAFEDIT	6.00	06-Jul-92
GRAFEDIT	6.00	09-Oct-92
HIPSTICK	1.01	28-Jul-92
HPRAZ	1.26	22-May-92
INSTALL	4.00	09-Jul-92
INVERSE	2.00	10-Jul-92
LISTDATA	1.00	03-Aug-12
LOADNEW	2.01	09-Sep-92
LOADNEW	2.02	29-Sep-92
LSTAWOIS	3.01	23-Sep-92
LSTAWOIS	3.02	07-Oct-92
MAINMENU	1.00	Jul-92
MAN_DATA	2.00	09-Jul-92
NEWPOST	6.00	not listed

PROGRAM NAME	VERSION	VERSION DATE
PLOTALL	2.06	22-Sep-92
PLOTALL	2.07	21-Oct-92
POINT	2.10	10-Jun-92
PRESURV	7.00	23-Sept-92
PREDICT	2.00	9-Jul-92
PRINTOUT	4.01	9-Sep-92
PRINTOUT	4.02	13-Oct-92
QUICK	2.00	20-Aug-92
QUICK	2.01	29-Sep-92
RAMSAVER	1.01	21-May-92
REAPPLY	2.01	10-Sep-92
RECOMP	2.02	3-Aug-92
SCANNER	1.00	10-Jul-92
SELPRINT	2.02	31-Aug-92
SHEETSPLIT	1.02	23-Sep-92
SHEETSPLIT	1.01	30-Sep-92
ZOOMEDIT	2.10	23-Sep-92
ZOOMEDIT	2.11	1-Oct-92

NADCON (version 1.01 for IBM compatible computer) was used to calculate the datum shift from the North American Datum of 1983 (NAD 83) to NAD 27 for comparisons with prior surveys.

NAVUTL (version 6.00 for the MicroVAX computer) was used to compute inverses for DGPS performance checks.

MAGDIM (Version 1.2 for the Gateway 2000 microcomputer, modified for HDAPS by Lieutenant Commander Dave Minkle aboard WHITING on October 2, 1992) was also used for DGPS performance checks.

Sound velocity corrections were determined using version 1.00 of program CAT and version 1.11 of VELOCITY.

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:

Type	S/N
Towfish	10823
260 Recorder	10884

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 acquisition computer 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, except where strong currents kept WHITING's minimum speed slightly higher.

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 waterline 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 or a spacing of 50 meters when using the 75-meter range scale. These lines were split or re-run in all areas where 200% coverage was questionable due to a degraded sonargram record.

Degraded sonargrams were usually caused by sea surface return. Some propeller wash noise was evident in the sonargram when WHITING ran over areas where the depth was less than 15 meters.

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 the only echo-sounding equipment used to determine water depth 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 use during this survey:

S/N	DOY
A122N	282-297
B050N	297
A122N	302-303

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.

One least depth, on a wreck reported as a danger to navigation, was determined by lead line and two Oceanic diver depth gauges. Agreement between the depth gauges and the leadline was excellent. See Appendix I for details.*

G. CORRECTIONS TO SOUNDINGS

Sound velocity profiles of the water column were determined using a Seacat Conductivity, Temperature and Depth (CTD) profiler (model SBE-19, s/n 286). The profiler was calibrated on January 29, 1992 during WHITING's winter inport period. A copy of the calibration report may be found in the supplemental data cahier submitted with this survey.

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:

DOY	Vel.Table#	Latitude	Longitude	Depth
281	8	38°47'12"	74°41'27"	18.0
282	9	38°45'33"	74°56'02"	37.2
285	10	38°46'43"	74°57'20"	35.1
288	11	38°45'24"	74°56'04"	40.8
295	12	38°44'48"	74°55'26"	40.7
301	15	38°46'00"	74°56'45"	36.4

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.*

* DATA FILED WITH FIELD RECORDS.

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. During work on survey H-10444, settlement and squat correctors were recomputed based on the August 5, 1991 measurements. The new correctors were applied to data acquired beginning DOY 295. Differences between correctors applied before DOY 295 and those applied after are insignificant. Settlement and squat correctors are on file at AHS. DATA FILED WITH FIELD RECORDS

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:

	Time Correction	Height Ratio
High Water:	00 hr 45 min	x0.96
Low Water:	00 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 Sea and Lake Levels Branch N/OMA12 on November 2, 1992. APPROVED TIDES APPLIED DURING OFFICE PROCESSING

The tide station at Breakwater Harbor was inspected and leveled on October 20, 1992. The inspection and levels confirmed that the station was working properly and was undisturbed.

All sounding corrections, except heave, were applied on-line to both the narrow (100 kHz) and wide (24 kHz) DSF-6000N beams. Heave corrctions were applied in post-processing. CONCUR

A leadline comparison with the DSF-6000N was performed on September 27, 1992 (DOY 271). The difference in the high frequency reading was 0.1 meter and the difference in the low frequency reading was -0.06 meter. This difference is attributable to the swell action at the time the comparison was performed. No correction for this difference was applied to the survey soundings.

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 (NAD83). 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:

	Latitude	Longitude	Frequency
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 can be found in Appendix III. DATA APPENDED TO THIS REPORT.

I. HYDROGRAPHIC POSITION CONTROL

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. Two Magnavox MX4200 DGPS satellite receivers were used to compute geographic positions and two MX50R beacon receivers were used to monitor the differential correctors.

The serial numbers of the Magnavox MX4200 and MX50R receivers were as follows:

Item	Part Number	Serial Number
Primary System:		
Magnavox MX4200D	707361-803	537
Magnavox MX50R	627188-1	060
Secondary System:		
Magnavox MX4200D	707361-803	681
Magnavox MX50R	627188-1	036

Magnavox MX4200D software was upgraded on March 25, 1992. The firmware revision was A1 REV_E/H D030/B030.

One DGPS receiver system was used for acquisition at a time. HDAPS initialized the MX50R to monitor the Cape Henlopen or Cape Henry beacon. WHITING operated in non-altitude constrain mode up to DOY 284. On DOY 284, WHITING changed to altitude constrain mode, entering an altitude of 22.1 meters (antenna height above sea level). Operating in the altitude constrain mode appeared to reduce the noise level in navigation. WHITING operated in the altitude constrain mode throughout the remainder of the survey.

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 the Cape Henlopen and Cape Henry beacons were 7.5 and 6.2, respectively. No data were acquired at HDOP values exceeding these thresholds.

DGPS positioning was accomplished in accordance with the FPM, section 3.4. Cape Henlopen was used as the primary station throughout the project. Cape Henry was used as a back-up when the Cape Henlopen signal was intermittent or erratic. When the beacon signal was lost for more than 45 seconds, the survey line was broken and the line was rerun where control had been unacceptable.

WHITING was unable to survey during a 1.5 hour window each day. During this period, there were not enough satellites in view. WHITING used this time to perform confidence checks and to run the engines under load.

Performance checks were conducted on a Gateway 2000 386/33c microcomputer (S/N 402208) using program MAGDIM. MAGDIM uses the two reference station method as described in FPM section 3.4.5. These performance checks used Cape Henlopen as the primary reference station and Cape Henry as the check station. 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 supplemental data cahier submitted with this survey.

DGPS antenna offsets and laybacks were measured on July 27, 1992 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

On DOY 295, positions 2423-2492 were acquired after improperly initializing the DGPS receiver. As a result, even though the recorded navigational data were accurate and adequate, the data abstract listing flagged every position as exceeding the maximum allowable HDOP limit. The affected data set is D023029522.

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

There was no shoreline in this survey area.

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

A total of 21.7 nautical miles of crosslines were run on H-10444. This amounted to 8.2 percent of the total linear nautical miles of main-scheme lines needed for 100 percent coverage.

Crossline and main-scheme agreement was excellent. The maximum difference was attributable to a crossline sounding being 0.6 meters deeper than the nearest main-scheme sounding. The average difference showed crossline soundings generally 0.2 meters deeper than main-scheme soundings.

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

H-10444 junctioned with H-10440 (WH-20-2-92) on the east and H-10446 (WH-20-4-92) on the west. Junctions of contours and soundings agreed well with both contemporary surveys. The maximum difference between junction soundings was 0.4 meters on H-10440 was 0.3 meters on H-10446.

There were no other contemporary surveys that junctioned with H-10444.

M. COMPARISONS 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 shoals along the northern edge of the survey area and minor shoals in the separation zone. SSS records showed a variety of bottom textures in the survey area. On the western edge of the survey area, a deep trench extends in a northwest to southeast direction along the full width of the survey sheet.

Survey H-10444 soundings were compared with prior surveys H-9153, H-9173 WD, H-9175, H-9176 and H-9723. All prior surveys were referenced to NAD 27. For comparison purposes, a datum shift was applied to H-10444 in accordance with section 7.4 of the FPM.

The northwest edge of the survey area was covered by H-9153 (1971, scale 1:20,000, MLW). There was excellent agreement between surveys. Present survey depths were generally 0.~~2~~3 meters (0.5) deeper than H-9153 survey depths. Four shoal areas on H-9153 were developed and disproved.

The following is a comparison between the prior survey soundings and the corresponding shoal soundings and position from H-10444:

Prior Depth	Present Depth	Latitude	Longitude
11.0 m	11.9 m	38°48'18.564"N	74°57'16.007"W
9.8 m	10.~~3~~5 m	38°48'17.440"N	74°56'17.452"W
11.3 m	12.~~11.9~~ m	38°47'56.993"N	74°57'27.388"W
12.2 m	12.~~6~~8 m	38°45'50.724"N	74°54'32.955"W

The northern edge of the survey area was covered by H-9173 WD (1970, scale 1:20,000, MLW). Three hangs from H-9173 WD corresponded to shoal areas on H-10444. Present survey depths on these shoal areas agreed well with the hangs depicted on H-9173.

The eastern portion of the survey area was covered by H-9175 (1970, scale 1:10,000, MLW). Present survey soundings agreed very well with H-9175 soundings. Depths from H-10444 were generally 0.5 meters deeper than those found on H-9175.

The western portion of the survey area was covered by survey H-9176 (1970, scale 1:10,000, MLW). Sounding comparisons between present survey depths and H-9176 were excellent. All features depicted on H-9176 were found during the survey. The contours in the trench located on the west edge of the sheet matched very well with H-9176. Soundings throughout H-10444 were generally 0.5 meters deeper than those found on H-9176. WHITING developed and confirmed one shoal sounding depicted on H-9176. The following is a comparison between the prior survey sounding and the corresponding shoal sounding and position from H-10444:

Prior Depth	Present Depth	Latitude	Longitude
12.5 m (H-9176)	12.5 m	38°45'37.168"N	74°55'20.125"W

OVER HALF THE NORTHEAST AND
~~A small area on the~~ southeast ~~corner~~ AREA of H-10444 was covered by survey H-9723 (1977, scale 1:20,000, MLW) There was general agreement between surveys. Present survey depths ~~were~~ generally *0.3 ~~to 0.7~~ meters VARIED (+/-) ~~deeper than depths found on H-9723.~~ FROM PRIOR SURVEY DEPTHS.

~~All features depicted on prior surveys were found during this survey. Throughout H-10444, soundings were generally 0.5 meters deeper than prior survey depths.~~

WHITING recommends survey H-10444 supersede all hydrography from prior surveys in the common area. CONCUR

N. COMPARISON WITH THE CHART SEE ALSO SECTION 7.9. OF THE EVALUATION REPORT.

This survey was compared with an enlargement (1:10,000) of chart 12214, 36th ed., February 24, 1990; scale 1:80,000, corrected through NM 50/91 and with chart 12214, 37th ed., June 27, 1992. There were no changes to the charted depths in the new edition. No Notices to Mariners had been issued affecting the survey area. All charted soundings in the survey area were compared and good agreement was found. The average difference showed survey soundings 0.4 meters deeper than the charted soundings.

WHITING recommends that present depths supersede all charted soundings in the common area. CONCUR

A CHARTED DANGEROUS SUNKEN WRECK, WITH A WIRE DRAG CLEARANCE DEPTH OF 41FT,
AWOIS item number 1133 was not assigned, but is probably a sonar contact found during survey operations. This item is described in chart letter 485/49 as the barge "J.R. Williams" reported at latitude 38°45'11.4"N, longitude 074°54'22.62"W. The sonar contact position calculated during this survey is latitude 38°45'09.4"W and longitude 74°54'24.1" W. The charted least depth is 40.5 feet. A depth of 48.6 feet (14.8 meters) was found in the area of the wreck by echosounder. A least depth of 43.6 feet (13.3 meters) was calculated from sonargram. ~~WHITING recommends no change to the chart until a diver investigation positively confirms the identification and determines the least depth.~~ SEE PAGES 43-44 OF THIS REPORT FOR CHARTING RECOMENDATION.

AWOIS item number 1137 was reported as an uncharted fishing obstruction* (hang). Although the item was not assigned, its reported position was located in the center of the survey area. The area around the hang was covered with 200 percent side scan coverage and no contacts were found. WHITING recommends no change, leaving the item off the chart.

* IN LATITUDE 38°46'36.39"N, LONGITUDE 74°53'06.36"W

A CHARTED DANGEROUS SUNKEN WRECK, ED, WITH A DANGER CURVE, IN LATITUDE 38°48'30.40"N, LONGITUDE 74°55'28.62"W
AWOIS item number 3079 was reported as the fishing vessel F.W. Schepper, charted as existence doubtful (ED). The portion of the 1000-meter search radius within the survey area was assigned. This area was covered with 200 percent side scan coverage and no significant contacts were found.** A position for the wreck (latitude 38°49'03.0"N, longitude 74°55'00.6"W) was provided by the University of Delaware. This recently reported position was confirmed by a member of the Delaware Pilot Association. This position is 1211 meters north-northeast of the AWOIS search radius center. WHITING recommends further investigation centered on the position provided by the University of Delaware.*** ~~WHITING recommends no change to the chart until further investigation is completed.~~

** SEE PAGE 88 OF THIS REPORT FOR CHARTING RECOMMENDATION.

A copy of the AWOIS Item Investigation Reports can be found in Appendix VII. DATA FILED WITH FIELD RECORDS.

*** SEE PAGE 88 OF THIS REPORT FOR CHARTING RECOMMENDATION.

An uncharted wreck was found at latitude 38°48'00.6"N longitude 75°58'~~46.5~~ 48.51"W. A diver investigation was conducted on October 14, 1992. A least depth of ~~49.2~~ 51.8 feet (~~14.9~~ 15.8 m), corrected to MLLW using ~~predicted~~ tides, was found using a leadline and diver depth gauge. A danger to navigation report was submitted on October 15, 1992. SEE PAGE 35 OF THIS REPORT FOR CHARTING RECOMMENDATION

A copy of the Danger to Navigation Report can be found ~~in Appendix I~~. APPENDED TO THIS REPORT.

The HDAPS Contact Utility Program was used to compute the location and approximate height of contacts depicted on the sonargrams. Contacts which have a height equal to or greater than 0.9 meter or a distinct shape were considered significant and are recommended for further investigation by WHITING. Each position listed below is the average position of the corresponding "Supporting Positions". The following list of contacts are recommended for further investigation:

Item	Reduced Least Depth	Position Latitude	Position Longitude	Supporting Positions
1	10.~~8~~ 9 m	38°48'11.2"N	74°56'51.~~7~~ 9"W	39.43P 85.24S 115.41S
SEE PAGES 59-60 FOR CHARTING RECOMMENDATION.				
~~2~~	~~9.3 m~~	~~38°48'18.7"N~~	~~74°54'15.1"W~~	~~141.42P~~ INSIGNIFICANT
3	13.~~8~~ 7	38°48'30.~~8~~ 5"N	74°52'16.~~7~~ 6"W	~~273.72S~~ 302.48S 1016.62S
SEE PAGES 63-64 FOR CHARTING RECOMMENDATION.				
4 *	~~11.8~~ 12.1 m	38°48'33.2'N	74°54'08.3"W	322.46S 2345.56P
5 *	~~13.2~~ 12.9 m	38°48'36.1"N	74°53'02.2"W	495.85P
6 *	11.~~7~~ 5 m	38°47'54.~~4~~ 6"N	74°55'34.~~1~~ 6"W	789.10S 824.58S
*SEE PAGE 31 OF THIS REPORT FOR CONTACT DISCUSSIONS.				
7 **	13.6 m	38°45'09.~~4~~ 2"N	74°54'~~24.1~~ 23.9"W	~~2611.17S~~ 2640.29S 2633.70S ~~2640.29S~~ 2611.17S 2668.38S 2772.15P
**SEE PAGES 43-44 OF THIS REPORT FOR CHARTING RECOMMENDATION.				
8*	12.9 m	38°45'23.8"N	74°53'38.1"W	2514.30P 2532.20S 2837.16S

The following list of suspected submerged buoys and buoy anchors were found during the survey. These submerged items are significant and are recommended for further investigation:

Suspected Item	Reduced Least Depth	Position Latitude	Position Longitude	Supporting Positions
Anchor	10.7 m	38°48'~~19.9~~20.0"N	74°55'10.1"W	~~174.11P~~ 468.89P ~~468.89P~~ 174.11P 1011.11P
SEE PAGES 60-61 OF THIS REPORT FOR CHARTING RECOMMENDATION.				
Anchor	11.1 m	38°48'21.8"N	74°55'12.2"W	1011.19S
SEE PAGE 61 OF THIS REPORT FOR CHARTING RECOMMENDATION.				
*Buoy	10.6 m	38°47'17.3"N	74°55'32.2"W	1249.40S 1284.75S 1302.07P 1779.89S 1782.58P (-45)
* Anchor	12.8 m	38°47'17.3"N	74°55'32.2"W	1284.74S 1302.09P 1780.02S 1782.57P
* Anchor	11.4 m	38°47'17.0"N	74°55'30.4"W	1284.65S 1302.17P 1782.58P (-87)

* SEE PAGES 42-43 OF THIS REPORT FOR CHARTING RECOMMENDATION.

Contacts identified as changes in bottom texture (CIBT) and contacts with little height or definition were labeled as insignificant by WHITING. CONCUR

The following contacts preliminarily labeled as insignificant are in an area for which no supporting sonargrams exist (see section O):

Item	Contact Name	Latitude	Longitude
1 **	658.18P	38°48'03.6"N	074°57'22.2"W
2 **	758.09P	38°47'57.4"N	074°52'41.6"W
3 **	758.30P	38°47'57.5"N	074°52'46.1"W
4 **	815.31P	38°47'52.4"N	074°52'39.4"W
5 **	817.05P	38°47'52.4"N	074°53'11.6"W
6 **	944.20S	38°47'44.3"N	074°57'52.5"W

** SEE PAGE 31 OF THIS REPORT FOR DISPOSION OF CONTACTS.

O. ADEQUACY OF SURVEY SEE SECTION 9. OF THE EVALUATION REPORT.

Supporting data (sonargrams and echograms) for the northern portion of the H-10444 were accidentally discarded after transmital to AHS. The digital data for this area are considered adequate to delineate depths in the survey area. Moreover, contact positions and heights were computed and digitally logged. However, since the graphic records for this area no longer exist, the northern portion of this survey is considered incomplete. With this exception, this survey is a basic hydrographic survey, adequate to supersede all prior surveys of the common area.

Any required investigations of significant contacts will be scheduled as separate field examinations.

P. AIDS TO NAVIGATION SEE ALSO SECTION 7.c. OF THE EVALUATION REPORT.

There were three floating aids to navigation in the survey area, buoys R"2", R"4", Y"FB". Several passes were made near each buoy while towing the SSS towfish. Multiple positions for each buoy anchor were entered into contact tables 1, 2, and 3, respectively. The multiple positions were averaged for a final buoy position. Buoy positions were compared to positions published in the Light List, Vol II Atlantic Coast (1992), corrected through NM 40.

The following surveyed positions were determined for the buoys:

	SURVEY GP		LIGHT LIST GP	
BUOY	Latitude	Longitude	Latitude	Longitude
R"2"	38°48'~~3'~~ 4.15" N	74°55'~~1'~~ 10.20" W	38°48.3'N	74°55.2'W
R"4"	38°48'~~1'~~ 01.80" N	74°58'~~5'~~ 28.40" W	38°48.1'N	74°58.5'W
Y"FB"	38°47'~~3'~~ 11.85" N	74°55'~~5'~~ 30.70" W	38°47.3'N	74°55.5'W

Calculations for buoy positions can be found in Appendix II. DATA FILED WITH FIELD RECORDS.

Buoy R"2" characteristics were observed as Q R, Bell. This verified both the charted and Light List characteristics.

Buoy "4" characteristics were observed as FL R 4sec. This agrees with the charted characteristics but does not correspond with the Light List description. WHITING recommends submitting a notice to the Coast Guard regarding this discrepancy. CONCUR

Buoy "FB" characteristics were observed as Fl Y 6sec, WHISTLE. This verified both the charted and Light List characteristics.

Q. STATISTICS

Number of Positions	2883
Main-scheme Sounding Lines (Nautical Miles)	526
Crosslines (Nautical Miles)	22
Square Nautical Miles Surveyed	19
Days of Production	10
Detached Positions	0
Bottom Samples	9
Tide Stations Installed	0
Current Stations	0
Number of CTD Casts	6
Magnetic Stations	0

R. MISCELLANEOUS

Adequate bottom samples were collected during a prior survey in 1977. Nine bottom samples, taken during this survey, confirmed that the bottom type has not changed since the prior survey. The oceanographic log sheet is included in the supplemental cahier 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 run crosslines, service equipment, or transit between survey areas.

With the exception of the wreck that was reported as a danger to navigation, WHITING ~~did not~~ develop or investigate contacts discovered during this survey.

High currents were encountered on the west end of the survey area. The currents encountered were in fair agreement with the predicted currents. The direction of currents in the area were as predicted but the speed of the current often exceeded those predicted. The current conditions combined with wind effects made steering on line difficult. WHITING sometimes steered 15° off course to stay on line.

No unusual magnetic variations were encountered in the survey area.

S. RECOMMENDATIONS SEE ALSO SECTION 9. OF THE EVALUATION REPORT.

Due to the lack of supporting sonargrams and echograms along the northern edge of the sheet, WHITING recommends acquiring 200% SSS coverage over that portion of the survey area (see section O). SEE ALSO PAGE 21 OF THIS REPORT FOR DISCUSSION OF AREA.

T. REFERRAL TO OTHER REPORTS

The following reports will be submitted to N/CG244 and forwarded to N/CG243 as part of OPR-D168-WH-92:

Coast Pilot Report
Chart Agent Visit Report
Chart Inspection Report
User Evaluation Report

Submitted By:

Richard A. Fletcher
Lieutenant, NOAA

Reviewed By:

James S. Verlaque
Lieutenant, NOAA
Operations Officer

ITEM INVESTIGATION REPORT

ITEM NO.: 1133

CHART NO.: 12214
EDITION: 37th Ed.
CHART DATE: June 27,1992

SURVEY: H-10444

SOURCE: CL-485/49

SOURCE POSITION: 38/45/11.40 N 074/54/22.62 W

BRIEF DESCRIPTION OF ITEM:

Barge "J.R. Williams" WD "Touched and cleared" to 40.5 feet (predicted).

METHOD OF INVESTIGATION: not assigned

Side Scan Sonar area survey with 200% coverage.

RESULTS OF INVESTIGATION:

Found during area survey.

Water depth of surounding area is 14.8 meters (48.6 ft). The height above bottom calculated from side scan sonargram was 1.5 meters (4.9 ft). The least depth is 13.7 meters (44.9 ft) corrected to predicted TIDES (MLLW).

WHITING recommends further diver investigation to get a more accurate least depth.

REDUCED ESTIMATED LEAST DEPTH	POSITION NO.	LATITUDE	LONGITUDE	DESCRIPTION
13.7 m (44.9FT)	2640.29S	38°45'09.20"N	74°54'23.90"W	
~~13.3 m (43.6ft)~~	~~2611.17S~~	~~38°54'09.5"N~~	~~74°54'24.2"W~~	Large dark Contact

SUPPORTING POSITION NO'S.
2633.70S
~~2640.29S~~ 2611.17S
2668.38S
2772.15P

CHARTING RECOMMENDATION:
SEE PAGES 43-44 OF THIS REPORT FOR CHARTING RECOMMENDATION.
~~WHITING recommends leaving as charted, no change.~~

ITEM INVESTIGATION REPORT

ITEM NO.: 1137

CHART NO.: 12214
EDITION: 37th Ed.
CHART DATE: June 27, 1992

SURVEY: H-10444

SOURCE: unknown

SOURCE POSITION: 38/46/34.39 N 074/53/06.36 W

BRIEF DESCRIPTION OF ITEM:

Fishing Obstruction. Old LORAN-C rates

METHOD OF INVESTIGATION: not assigned

Side Scan Sonar area survey with 200% coverage.

RESULTS OF INVESTIGATION:

Nothing found.

REDUCED LEAST DEPTH	POSITION NO.	LATITUDE	LONGITUDE	DESCRIPTION

SUPPORTING POSITION NO'S.

CHARTING RECOMMENDATION:

WHITING recommends not putting on chart, no change IN CHARTING. CONCUR

ITEM INVESTIGATION REPORT

ITEM NO.: 3079

CHART NO.: 12214
EDITION: 37th Ed.
CHART DATE: June 27, 1992

SURVEY: H-10444

SOURCE: USCG

SOURCE POSITION: 38/48/30.40 N 074/55/28.62 W

BRIEF DESCRIPTION OF ITEM:

Fishing vessel "F.W. Schepper II" 46' long

METHOD OF INVESTIGATION: Assigned; 200% SSS, Diver, SD, ##
1000 meter search radius, investigation not required outside of survey limits.

200 % side scan sonar coverage was completed over the southern half of the search radius. The northern half was not completed because it was outside the survey area.

RESULTS OF INVESTIGATION:
There were no significant contacts within the search radius, nothing found.

A list of wrecks frequently visited by divers and fisherman was provided to WHITING from the University of Delaware. The position provided for F.W. Schepper II was latitude 38°49'03.0"N longitude 74°55'00.6"W, 1211 meters north northeast of the position provided by the Coast Guard. The Delaware Pilots confirmed the position provided by the University of Delaware.

WHITING recommends further investigation centered on the position provided by the pilots.

SUPPORTING POSITION NO'S.

CHARTING RECOMMENDATION:
SEE PAGE 88 OF THIS REPORT FOR CHARTING RECOMMENDATION.
~~WHITING recommends no change in charted wreck.~~

ADDENDUM TO DESCRIPTIVE REPORT
FOR HYDROGRAPHIC SURVEY H-10444
NOAA SHIP WHITING
CDR Andrew A. Armstrong, III, NOAA
Commanding Officer

A. PROJECT

This addendum accompanies 200%-coverage side-scan sonar data acquired by WHITING for hydrographic survey H-10444. This data was collected during OPR-D368-WH to replace data accidentally discarded during the verification process at the Atlantic Hydrographic Section (AHS) in Norfolk, Virginia. Data collection consisted of the re-run mainscheme lines from the 1992 data, item investigations on contacts designated as significant in 1992, and investigations on newly discovered contacts identified in 1993. SEE ALSO SECTION 1.9. OF THE EVALUATION REPORT.
Survey operations were conducted in accordance with Hydrographic Project Instructions OPR-D368-WH dated February 23, 1993.

B. AREA SURVEYED

The re-surveyed area covers the northern one-third of H-10444 encompassing the Five Fathom Bank to Cape Henlopen traffic lane. The survey area is bounded by the following limits:

Latitude	Longitude
38°48'19"N	074°58'55"W
38°47'40"N	074°58'16"W
38°47'40"N	074°50'27"W
38°48'30"N	074°56'00"W
38°48'58"N	074°50'27"W

Item investigation lines were also run to locate AWOIS 3079 and AWOIS 2780. The survey area for these investigation lines is bounded by the following limits:

Latitude	Longitude
38°44'00"N	074°54'50"W
38°49'32"N	074°54'50"W
38°49'32"N	074°50'10"W
38°48'32"N	075°55'10"W

Survey operations began on March 24, 1993 (DOY 83) and ended on April 24, 1993 (DOY 114). Data were acquired on the following days:

DOY	Date
83	March 24
86	March 27
88-90	March 29-31
102	April 12
104	April 14
114-115	April 24-25

C. SURVEY VESSEL

NOAA Ship WHITING, vessel identification number 2930, was used for all side scan sonar and sounding data acquisition while re-surveying this area. Launch 1021 was used as a dive platform and for acquiring a check position on a wreck investigation conducted on April 14, 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:

PROGRAM NAME	VERSION	DATE INSTALLED
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
GRAFEDIT	1.01	02-Mar-93
HIPSTICK	1.01	24-Sep-92
HPRAZ	1.26	24-Sep-92
INSTALL	4.00	24-Sep-92
INVERSE	2.00	24-Sep-92

PROGRAM NAME	VERSION	DATE INSTALLED
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 1.2, dated 9-22-92, for the Gateway 2000 microcomputer, modified for HDAPS) was used for DGPS performance checks.

Sound velocity corrections were determined using version 2.00 of program CAT and version 2.00 of program 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 re-surveyed area were transmitted to AHS. An additional 1:10,000-scale track plot, plotter sheet 70, was made for investigating the F.W. Schepper II, AWOIS 3079. 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:

Equipment	S/N
Towfish	11591
Towfish	16630
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 acquisition computer 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, except where strong currents kept WHITING's minimum speed slightly higher.

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 for all echo-sounding data 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 use during this survey:

S/N	DOY
A122N	83-104
B053N	114-115

The digitized low frequency depth on the fathometer was intermittent on April 12 (DOY 102) and April 14 (DOY 104). There were no missed depths on the analog or digital data as a result of this problem. Annotations were made on the fathogram to indicate when the low frequency depth was not digitizing.

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.

One least depth, on a wreck reported as a danger to navigation, was determined by pneumatic depth gauge and compared with two Oceanic diver depth gauges. Agreement between the depth gauges was excellent. See Section N for details.

G. CORRECTIONS TO SOUNDINGS

Sound velocity profiles of the water column were determined using a Seacat Conductivity, Temperature and Depth (CTD) profiler (model SBE-19, s/n 286. The profiler was calibrated on December 16, 1992 during WHITING's winter inport period. A copy of the calibration report is on file at AHS. DATA FILED WITH FIELD RECORDS.

The CTD 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:

DOY	Vel.Table#	Latitude	Longitude	Depth
083	1	38°45'15"N	074°56'10"W	49.1
083	2	38°48'18"N	074°51'48"W	20.2
090	4	38°45'42"N	074°56'18"W	42.6
098	5	38°45'42"N	074°56'18"W	51.0
102	7	38°46'24"N	074°57'18"W	39.1
114	10	38°47'25"N	074°58'55"W	35.1

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.*

Settlement and squat measurements were conducted and determined on August 5, 1991. Settlement and squat correctors were recomputed during H-10444, based on the August 5, 1991 measurements. New 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:

	Time Correction	Height Ratio
High Water:	00 hr 45 min	x0.96
Low Water:	00 hr 45 min	x0.96

Tidal predictions 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 predictions, in digital form, were received on floppy disk from N/CG24, Hydrographic Surveys Branch. Request for smooth tides for the re-surveyed area was submitted to the Datums Section, Product and Services Branch N/OES231 on April 27, 1993. The Breakwater Harbor tide station was leveled on March 8, 1993. The levels confirmed the tide staff and marks were undisturbed.

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.

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 or the effect of sea action on the leadline

* DATA FILED WITH FIELD RECORDS.

readings. No correction for this difference was applied to the survey.

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 (NAD83). 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:

	Latitude	Longitude	Frequency
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.

I. HYDROGRAPHIC POSITION CONTROL

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:

Item	Serial Number
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 one item investigation. A Magnavox 4200 DGPS receiver (s/n 537) with a Magnavox MX50R (s/n 060) differential radio receiver was used for obtaining check positions.

Satellite coverage during this re-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. No data were acquired at HDOP values exceeding these thresholds.

DGPS positioning was accomplished in accordance with the FPM, section 3.4. Cape Henlopen was used entirely as the primary station during this re-survey. 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 supplemental data cahier 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.D. OF THE EVALUATION REPORT.

There is no shoreline in this survey area.

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

A total of 9.4 nautical miles of crosslines were run on the re-surveyed area for H-10444. This amounted to 7.8 percent of the total linear nautical miles of re-surveyed main-scheme lines needed for 100 percent coverage.

Crossline and main-scheme agreement was adequate. The crosslines were, however, consistently deeper than the mainscheme soundings. The maximum difference was noticeable on

the most western crossline where crossings differed by up to 0.7 meters. Comparison of the actual tides (provided by Mr. Larry Neeson, Operations Group) and predicted tides revealed a one-half meter discrepancy on March 24, 1993, the day the crosslines were run. With smooth tides applied, crossline and mainscheme agreement should be good. APPROVED TIDES APPLIED DURING OFFICE PROCESSING.

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

Junction comparisons were submitted with the Descriptive report to accompany H-10444.

M. COMPARISONS WITH PRIOR SURVEYS SEE ALSO SECTION 6. OF THE EVALUATION REPORT.
Comparisons with prior surveys were submitted with the descriptive report to accompany H-10444.

N. COMPARISON WITH THE CHART SEE ALSO SECTION 7. OF THE EVALUATION REPORT.
Comparisons with the chart for the areas of basic 200% SSS coverage were submitted with the descriptive report to accompany H-10444.

Significant contacts in close proximity to reported AWOIS positions were examined for shape and size to assist in correlating contacts with AWOIS items. Those contacts having characteristics associated with the AWOIS description and being in close proximity to the reported AWOIS position were labeled with the respective AWOIS number.

Contacts identified as changes in bottom texture (CIBT) and contacts with little height or definition were labeled as insignificant by WHITING.

AWOIS item number 3079, the wreck of the fishing vessel F.W. Schepper II, charted as existence doubtful (ED), was located by WHITING on DOY 104 by running three 250-meter lines on the 150-meter range scale over a position provided by an employee of the University of Delaware at latitude 38°49'03.0"N, longitude 74°55'00.6"W.* The survey position, latitude 38°49'00.174"N, longitude 074°54'53.811"W, was computed by averaging the three positions scaled from the side scan sonargram. This reported position was confirmed by a member of the Delaware Pilot Association. The pdsition as determined by this survey is 228 meters SE of the locally reported position. WHITING ran three additional investigation lines on the 75-meter range scale to develop the AWOIS item. A 1:10,000-scale inset was made to show the lines that developed the AWOIS item. Although the

* SEE PAGE 88 OF THIS REPORT FOR CHARTING RECOMMENDATION.

item located on side scan sonar was located slightly outside the AWOIS search radius, WHITING is confident the item is the F.W. Schepper II. The position obtained from local sources and the agreement of the AWOIS dimensions of the wreck match those tabulated from the side scan sonar image. WHITING will conduct a dive investigation on AWOIS 3079 to determine a least depth with position and submit it as a separate survey. A charting recommendation will be made with that survey. Based on the target height from sonar records, a Danger to Navigation report is not warranted at this time. SEE PAGE 88 OF THIS REPORT FOR CHARTING RECOMMENDATION.

The uncharted wreck found during the H-10444 survey in 1992 at latitude 38°48'00.6"N, longitude 75°58'46.5"W was re-investigated by divers On April 14, 1993 to re-determine a least depth by pneumatic depth gauge. A least depth of 49.6 feet (15.2m), corrected to MLLW using predicted tides, was determined on April 14, 1993 using a pneumatic depth gauge, s/n 13892130. A check position was obtained at the least depth location with Launch 1021. The check position and the re-measured depth agree with the previously reported depth and position. SEE PAGE 35 OF THIS REPORT FOR CHARTING RECOMMENDATION.

A copy of the Item Investigation Report and supporting data can be found in Separate VI submitted with the data cahier for the re-surveyed data.

The discussion below of side scan sonar contacts located and evaluated during OPR-D368-WH supersedes any discussion or recommendation relative to the same targets in the original OPR-D168-WH-92, H-10444 descriptive report.

Wrecks and obstructions were designated as significant or insignificant depending on their height, size, and return in conjunction with views of adjacent lines. Significant contacts located in 1992 and 1993 were further developed by running two side-scan sonar investigation lines approximately 40 meters on either side of the contact position at slow speed on the 75-meter range scale. Contact heights were recomputed from the investigation lines to determine if further investigation was necessary (FIN). All contacts located in 1993, other than derelict buoys and anchors, and anchors attached to floating buoys, were computed in contact table 1. Derelict buoys and anchors located in 1993 were computed in contact table 2. The anchor attached to floating buoy R"2" was computed in contact table 3. Contacts re-located on the investigation lines were computed in contact table 4 and are plotted on the on-line investigation plot. Contacts with heights of one meter or greater, in depths less than 20 meters were assigned as dive investigations. FIN contacts are listed in Carto Table 3 and plotted on the FIN plot. Contacts recommended for further investigation by AHS were cross-correlated and are tabulated in

carto table 4. These contacts are plotted in red on the contact plot. All contacts found during OPR-D368 are plotted in black.

Contacts that were recommended for further investigation by AHS from OPR-D168-WH-92 were investigated by additional SSS lines. Two passes were made 35-40 meters north and south of the item's reported position using the 75 meter range scale. The following is a list of items that were designated insignificant by WHITING as a result of these investigations: CONCUR

Item	Position Latitude	Longitude	Supporting Positions
273.72S	38°48'30.5"	74°52'16.6"	
322.46S	38°48'33.2"	74°54'08.3"	
495.85P	38°48'36.1"	74°53'02.2"	
658.18P	38°48'03.6"	74°57'22.2"	
758.09P	38°47'57.4"	74°52'41.6"	
758.30P	38°47'57.5"	74°52'46.1"	
789.10S	38°47'54.6"	74°55'34.6"	
815.31P	38°47'52.4"	74°52'39.4"	
817.05P	38°47'52.4"	74°53'11.6"	
944.20S	38°47'44.3"	74°57'52.5"	
2514.30P	38°45'23.9"	74°53'37.9"	

INSIGNIFICANT

Each item listed below was recommended for further investigation by AHS from OPR-D368-WH-93 and was also designated not significant:

Item	Position Latitude	Longitude	Supporting Positions
6475.55P	38°48'03.8"	74°54'44.3"	7007.83S
6496.07S	38°48'03.7"	74°57'29.4"	
6497.71P	38°48'10.1"	74°56'58.7"	6561.29S
6557.89P	38°48'13.8"	74°57'57.3"	6620.28S
6174.73S	38°47'47.7"	74°56'30.7"	6116.66P
6476.57S	38°48'06.8"	74°55'02.6"	

INSIGNIFICANT

Each position listed below is the average position of the corresponding "Supporting Positions". The following list of contacts found during the survey are significant. These submerged items will be diver investigated by WHITING and treated as separate field examinations:

Item	Reduced Least Depth	Position Latitude	Longitude	Supporting Positions
~~6561.65S~~ 39.43P	9.8	38°48'11.3"	74°56'51.4"	~~39.43P~~ 6561.65S 85.24S 6545.88S 7043.18P
SEE PAGES 59-60 OF THIS REPORT FOR CHARTING RECOMMENDATION.				
7016.52S	11.9	38°48'30.4"	74°52'19.3"	
SEE PAGES 63-64 OF THIS REPORT FOR CHARTING RECOMMENDATION.				
2640.29S ~~7060.63S~~	12.5	38°45'09.2"	74°54'23.9"	~~2640.29S~~ 7060.63S

SEE PAGES 43-44 OF THIS REPORT FOR CHARTING RECOMMENDATION.

WHITING compiled a listing of historical buoy positions from prior surveys and previous-edition charts as well as current buoy positions from the most recent chart edition in carto table 2. These positions were plotted on the contact plot and compared with contact positions located during the survey. The contacts in close proximity to the charted and historical buoy positions resembling a buoy or anchor block have been designated as derelict buoys or buoy anchors and were computed in contact table 2. Per telephone conversation on April 20, 1993 with Commander Christopher Lawrence, Chief, AHS, derelict buoys and buoy anchors are designated as requiring dive investigations if their contact height is one meter or greater in depths less than 22 meters (72 feet), the least depth of the contact is greater than 10% of the depth in depths greater than 22 meters, or the least depth over the contact is 13.7 meters (45 feet) or less.

Based on the above-mentioned criteria, the following list of suspected submerged buoys and buoy anchors found during the survey are significant. These submerged items will be diver investigated by WHITING and treated as separate field examinations:

Suspected Item	Reduced Least Depth	Position Latitude	Longitude	Supporting Positions
6476.04P	10.0	38°48'04.6"	74°54'52.0"	6444.40P 6505.01S 7007.37S
SEE PAGES 61-62 OF THIS REPORT FOR CHARTING RECOMMENDATION.				
6663.68S	8.9	38°48'20.0"	74°55'08.7"	6630.15P 6687.75S 6690.34S
SEE PAGES 62-63 OF THIS REPORT FOR CHARTING RECOMMENDATION.				
~~6687.55S~~ 1011.19S	9.5	38°48'22.1"	74°55'12.3"	~~1011.19S~~ 6687.55S 6663.85S 6690.10S 6724.42P
SEE PAGE 61 OF THIS REPORT FOR CHARTING RECOMMENDATION.				

Suspected Item	Reduced Least Depth	Position Latitude	Position Longitude	Supporting Positions
~~6687.67S~~ 468.89P	10.1	38°48'19.9"	74°55'10.2"	~~468.89P~~ 6687.67S 1011.11P 6663.77S 6690.22S
SEE PAGES 60-61 OF THIS REPORT FOR CHARTING RECOMMENDATION.				
7001.51S	8.1	38°47'17.0"	74°55'32.6"	1302.07p 6995.74P 6999.34P
SEE PAGE 44 OF THIS REPORT FOR CHARTING RECOMMENDATION.				
7001.55S	9.5	38°47'17.0"	74°55'32.0"	1780.02S 6995.80P 6999.30P
SEE PAGE 44-45 OF THIS REPORT FOR CHARTING RECOMMENDATION.				
~~7001.63S~~ 1284.65S	9.3	38°47'17.2"	74°55'30.4"	~~1284.65S~~ 7001.63S 6995.85P 6999.21P
SEE PAGES 42-43 OF THIS REPORT FOR CHARTING RECOMMENDATION.				

O. ADEQUACY OF SURVEY SEE ALSO SECTION 9. OF THE EVALUATION REPORT.

The re-survey of the northern portion of the H-10444 is considered adequate to identify potential dangers in the area for which data was accidentally discarded during the verification process. The re-survey combined with the data collected in 1992 for H-10444 makes this entire survey adequate to supersede all prior surveys of the common area.

~~Any required investigations of significant contacts will be conducted as separate field examinations~~.

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

There was one floating aid to navigation, R"2", in the re-surveyed area. Buoy R"2" was positioned during H-10444 in 1992, but based on the 1993 data, is believed to have been serviced and moved. While re-surveying the area, several passes were made by R"2" with the SSS towfish. Multiple positions for the anchor attached to buoy R"2" were entered into contact table 1. These multiple positions were averaged for a final buoy position which was entered into carto table 2. The buoy position for R"2" was compared to the position published in the Light List, Vol. I Atlantic Coast (1992), corrected through NM 14/93.

The following surveyed position was determined for buoy R"2":

Survey GP (1992)		Survey GP (1993)		Light List GP	
Latitude	Longitude	Latitude	Longitude	Latitude	Longitude
38°48'~~33'~~ 21.15" N	74°55'~~15'~~ 10.20" W	38°48'~~34'~~ 20.40" N	74°55~~22'~~ 13.20" W	38°48.3'N	74°55.2'W

Buoy R"2" is a structure buoy. Its characteristics were observed as Q R, Bell. This verified both the charted and Light List characteristics.

There is now an apparently derelict buoy anchor at the 1992 location of this buoy.

Q. STATISTICS

Number of Positions	1028
Main-scheme Sounding Lines (Nautical Miles)	223
Crosslines (Nautical Miles)	9
Square Nautical Miles Surveyed	8
Days of Production	9
Detached Positions	0
Bottom Samples	0
Tide Stations Installed	0
Current Stations	0
Number of CTD Casts	6
Magnetic Stations	0

R. MISCELLANEOUS

Appendices I, II, III, IV, VI have been submitted previously with OPR-D168-WH-92. Appendices V and VII will be submitted upon completion.

S. RECOMMENDATIONS SEE SECTION 9. OR THE EVALUATION REPORT.

None.

T. REFERRAL TO OTHER REPORTS

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

Coast Pilot Report
User Evaluation Report

Barge
JR Williams (FS)

ITEM INVESTIGATION REPORT

SURVEY L1-10444-WH-20-3-92; OPR-D368

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

Charted (Y/N) N

Chart No. (largest scale) 12214 Edition 37TH Date 92.6.27

DESCRIPTION/SOURCE: H-10444 (711.82 PS) -92' -

HISTORICAL POSITION: Latitude 38° 48' 00.4" N SSS POSITION: Lat 38° 48.006"

Longitude 074 58' 48.2" W (431.085) '93 Long 074 58' 48.8"

Datum NAD 83

SURVEY REQUIREMENTS:

METHOD OF INVESTIGATION:

Echosounder ____ Side Scan X Diver X Other (specify) ____

SWEEP SEARCH (10M) OVER WRECK, AFTER DESCENDING BUOY; 10M SWEEP SEARCH FROM WEST END OF WRECK ON 270° FOR OBST ON SSS. LEAST DEPTH DETERMINED PRIOR TO LOOKING FOR OBSTR WEST OF WRECK.

DIVE DATA: Divers RILEY - VELAQUEZ

Time of Dive: Commenced 2049 (UTC) Completed 2117

Current 0.5 F Visibility GOOD 15' VERT 8' HORT Bottom Type FINE SAND) SILT MUD AWAY FROM WRECK

RESULTS OF INVESTIGATION: METAL WRECK; E-W ORIENTATION. SUSPECT TRAWLER FRAMING FOR TRAWL ON S.W. CORNER WAS LEAST DEPTH OVERALL LENGTH OF WRECK 28-30 M; DECK PLATING NON-EXSISTENT. FRAMES ATHWARTSHIP IN TACT TURNING GEARS & SPROCKETS FOUND BELOW LEAST DEPTH; PILE OF LINE FOUND 30M WEST OF WEST END OF WRECK; PILE OF LINE 2' OFF BOTTOM; SCOUR AROUND WRECK; LEAST DEPTH 10' FROM BOTTOM IN SCOUR.

~~5 CSK 14/9/93~~ STET

POSITION: Date (M/D/Y) 4/14/93 Time (UTC) 21~~1~~46 Position No. ~~N/A~~ 2317

Latitude 38°48.~~009~~ N 00.54 Longitude 074°58.~~204~~W 48.54

LORAN-C: GRI (9960) W: 15793.2 X: 27116.5 Y: 42641.8 Z: 59240.5

LEAST DEPTH: Date (M/D/Y) 04.14.93 Time (UTC) 220700

Method of Least Depth: PNEUMO GAUGE 13892130

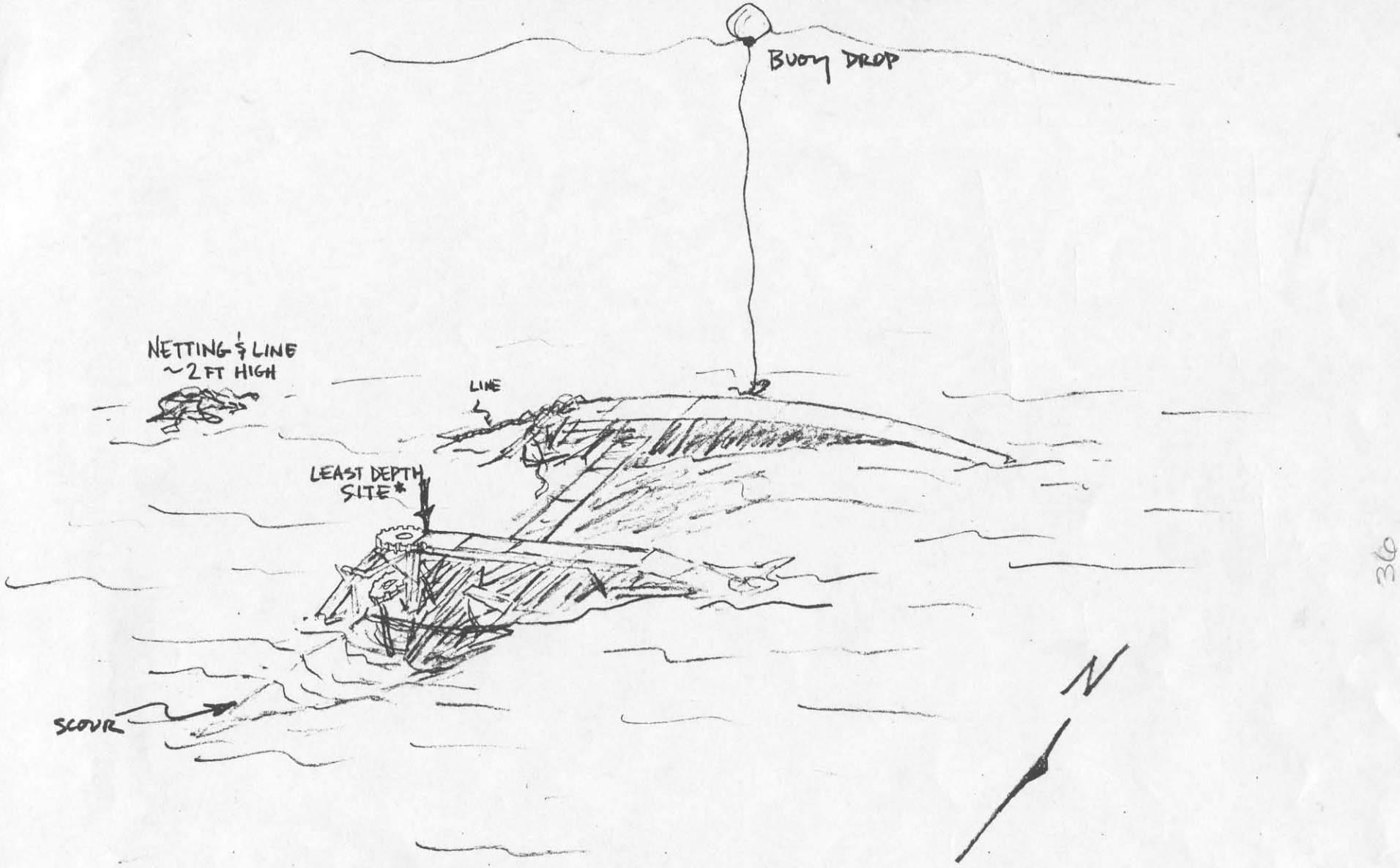
Measured Least Depth: 1. 52.6 2. 52.8 3. 52.6 Avg 52.6 Units FT

Corrected Least Depth ~~49.7~~ 52.5 Units FT (~~predicted~~ tides)

(16.0 m) (52FT)

CHARTING RECOMMENDATION

IT IS RECOMMEND THAT A DANGEROUS SUNKEN WRECK WITH A KNOWN DEPTH OF 16m, (52 FT), 16WK, AND A DANGER CURVE BE CHARTED AT PRESENT SURVEY LOCATION.



* SECOND BUOY DEPLOYED AT
LEAST DEPTH SITE, 52.6 FT (RAW)
APPROXIMATELY 10 FT OFF BOTTOM

AMC FORM DV-2

* MIEMSS / DEPT OF HYPER. MED.
~~202~~ 410-328-7814

DIVING OPERATIONS

EXHIBIT 2 Revised
AMC Directive 80-2
Revision 4
June 6, 1986

A

~~800-648-300~~
1800-468-5090 - HELO EVAC.

RE: #1 WKBY BUOY 4 UNIT: NOAA's WHITING

LOCATION: APPROACHES TO DELAWARE BAY

DIVEMASTER: LT J. VERLAQUE
TENDERS: CST SIETZ
SS LEWIS

SCIENTISTS: N/A

DIVE PLAN: WHITING RUN OVER WRECK DROP BUOY @ DOL 5706 DAL 12160 MAX. DEPTH: 60'
DEPLOY LAUNCH; ANCHOR LAUNCH UPWIND/UPCURRENT. MAX. TIME: 60 min
CALIBRATE PNEUMO; SUIT UP; DESCEND ANCHOR BUOY (RILEY/VERLAQUE). SWEEP/DEPTH GAUGE SEARCH.
LOCATE LEAST DEPTH - POP BUOY (RILEY) ASCEND BUOY LINE (VERLAQUE) - GRAB PNEUMO ORIFICE, DESCEND
BUOY LINE. HAND PNEUMO ORIFICE TO RILEY, PLACE ORIFICE OVER LEAST DEPTH; SIGNAL SURFACE (VERLAQUE); TRACE LEAST DEPTH
RELEASE ORIFICE, DIVER GAUGE/SWEEP SEARCH REMAINDER OF WK (SOUTH). ASCEND BUOY LINE,
AIR PROVIDING. BOATS LAUNCH. PULL ANCHOR. APPROACH BUOY FROM LEEWARD; WET POSITION &
GRAB BUOY LINE. CUT BUOY LINE. RETURN TO SHIP.

EQUIPMENT USED: OPEN CIRCUIT SCUBA.

CONDITIONS:
WIND: 3 kts @ 090
SEAS: calm; swells calm
CURRENT: 0.5 FL "

VISIBILITY: 8-10
AIR TEMP.: ~~42~~ 12°C
WATER TEMP: 7°C

DIVERS	SURFACE INTERVAL	GROUP	RESIDUAL NITROGEN	PRESSURE IN / OUT	PRESSURE CHANGE	TIME IN / OUT	BOTTOM TIME	DEPTH	GROUP
RILEY				3000 / 530		1649 / 1719	30	57	F
VERLAQUE				3000 / 300		1649 / 1719	30	~~47~~ 57	F

POST DIVE COMMENTS: WK LOCATED. GOOD VISIBILITY 8-10 Vertically.
Current 0.5 F, 0.3 E26. LEAST DEPTH LOCATED.

James L. Morgan
DIVEMASTER

DESCRIPTIVE REPORT TO ACCOMPANY
FIELD EXAMINATION SURVEY
OPR-D368-WH
1993
WH-20-5-93
FE-385~~SS~~

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

A. PROJECT

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

The purpose of this survey is to investigate and resolve contacts located by the NOAA Ship WHITING during hydrographic survey operations on H-10444 (1992) and H-10446 (1992).

B. AREA SURVEYED

Field Examination FE-385~~SS~~ is 9 nautical miles east of Cape Henlopen, Delaware at the eastern approaches to Delaware Bay.

Survey operations began on May 22, 1993 (DOY 142) and ended on May 23, 1993 (DOY 143).

C. SURVEY VESSEL

Launch 1021 was used as the dive platform for all least depth determinations and for acquiring positions on each item investigated.

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

D. AUTOMATED DATA ACQUISITION AND PROCESSING

Survey data processing was accomplished using the HDAPS system with the following software:

PROGRAM NAME	VERSION	DATE INSTALLED
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
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

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

There were no side scan sonar operations conducted on this survey.

F. SOUNDING EQUIPMENT

A RAYTHEON Digital Survey Fathometer (DSF) 6000N echo sounder was used to assist in locating the wrecks and obstructions which were dive investigated on this survey. There were no digital depths from the DSF-6000N recorded during this survey.

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 in tolerance.

G. CORRECTIONS TO SOUNDINGS

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:

	Time Correction	Height Ratio
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 submitted to Products and Services Branch, Datum Section, N/OES231 on May 28, 1993.
The tide station at Breakwater Harbor was leveled on March 8, 1993. The levels confirmed that the tide staff and marks were undisturbed.

New leadlines were made on April 10, 1993. Calibrations performed on April 26, 1993 confirmed the leadline error was negligible.

Depths were determined by pneumatic gauge on the dive investigations. The calibration reports for the pneumatic gauge are on file at AHS.* Predicted tide correctors were applied to the least depths. APPROVED TIDES WERE APPLIED DURING OFFICE PROCESSING.
* DATA FILED WITH FIELD RECORDS

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 NAD 83 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:

	Latitude	Longitude	Frequency
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

A Differential Global Positioning System (DGPS) was used on launch 1021 as the primary navigation system for this survey. A Magnavox 4200 DGPS receiver (S/N 537) with a Magnavox MX50R (S/N 060) differential radio receiver was used to obtain the positions on items investigated. 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 launch 1021 to operate in the non-altitude constrain mode continuously while acquiring detached positions.

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 is 3.7 and 3.1, respectively. No data were acquired at HDOP values exceeding the 1:10,000 scale thresholds.

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

There is no shoreline in the vicinity of the present survey.

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

There are no crosslines on this survey.

L. JUNCTIONS SEE ALSO SECTION 6. OF THE EVALUATION REPORT.

There are no junctional requirements for this survey.

M. COMPARISONS WITH PRIOR SURVEYS SEE ALSO SECTION 6.a. OF THE EVALUATION REPORT.
Comparison to prior surveys for items investigated, appear in section N of this report.

N. ITEM INVESTIGATIONS

Summary of items investigated:

H-10444

CONTACT NO.	SECTION	STATUS
1284.65S	N1	Located
2640.29S	N2	Located
7001.51S	N3	Located
7001.55S	N4	Located

H-10446

CONTACT NO.	SECTION	STATUS
~~* 3509.48P~~	~~N5~~	~~Located~~

* DATA INCORPORATED INTO SURVEY H-10476 (1993).

N1. Contact #1284.65S

Reported Latitude:	38°47'17.2$ N
Reported Longitude:	074°55'30.7$ W
Datum:	NAD 83
Depth:	11.4m side scan sonar estimated depth
Feature:	dangerous submerged obstruction (*Obstn (A)*)

Contact #1284.65S originates with ~~prior~~ survey H-10444 (1992)93 ~~and is shown on the prior survey~~ as a dangerous submerged obstruction with a side scan sonar estimated depth of 11.4 meters (11⁴ *Obstn (A)*).

Survey requirements were to verify or disprove 11⁴ *Obstn (A)* located during survey operations of ~~prior~~ survey H-10444 (1992)93.

Contact #1284.65S 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 obstruction was located in latitude 38°47'16.39"N, longitude 074°55'29.81"W with a pneumatic least depth of ~~12.2~~ 11.9 meters (corrected for ~~predicted~~ tides). The surrounding depths are 13.~~1~~3 meters to 13.6 meters. The item located is an anchor block (1.2m x 1.5m) with the chain stacked on top of the padeye.

WHITING recommends that the 11⁴ *Obstn (A)* be deleted and an obstruction with a known least depth by diver of ~~12.2~~ 11.9 meters, * be charted at the position determined on this survey. CONCUR
* (39 FT), 11⁹ OBSTN, AND A DANGER CURVE,

N2. Contact #2640.29S

Reported Latitude:	38°45'09.2~~4~~ N
Reported Longitude:	074°54'23.9~~6~~ W
Datum:	NAD 83
Depth:	13.7m side scan sonar estimated depth
Feature:	dangerous submerged wreck (*Wk (A)*)

Contact #2640.29S originates with ~~prior~~ survey H-10444 (1992)93 ~~and is shown on the prior survey~~ as a dangerous submerged wreck with a side scan sonar estimated depth of 13.7 meters, (13⁷ *Wk (A)*).

Survey requirements were to verify or disprove a 13⁷ *Wk (A)* located during survey operations of ~~prior~~ survey H-10444 (1992)93.

Contact #2640.29S 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°45'09.3~~4~~N, longitude 74°54'23.5~~6~~"W, with a pneumatic gauge least depth of ~~13.1~~ 12.9 meters (corrected for ~~predicted~~ tides). The surrounding depths are 14.~~4~~9 meters to 15.5 meters. The divers located scattered wreckage and the least depth was taken on rib framing (possibly the bow of the wreck) which stood 2.4 meters off the bottom.

WHITING recommends that the 13[7] *Wk (A)* be deleted and a wreck with a known least depth by diver of ~~13.1~~ 12.9 meters, be charted at the position determined on this survey CONCUR (42 FT), 129 WK, AND A DANGER CURVE,

N3. Contact #7001.51S

Reported Latitude:	38°47'17.1~~6~~ N
Reported Longitude:	074°55'32.7~~8~~" W
Datum:	NAD 83
Depth:	11.4m side scan sonar estimated depth
Feature:	dangerous submerged obstruction (*Obstn (A)*)

Contact #7001.51S originates with ~~prior~~ survey H-10444 (1992-93) ~~and is shown on the prior survey~~ as a dangerous submerged obstruction with a side scan sonar estimated depth of 11.4 meters, (11[4] *Obstn (A)*).

Survey requirements were to verify or disprove a 11[4] *Obstn (A)* located during survey operations of ~~prior~~ survey H-10444 (1992-93).

Contact #7001.51S 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 obstruction was located in latitude 38°47'16.~~4~~5"N, longitude 074°55'32.~~7~~6"W, with a pneumatic gauge least depth of 10.~~5~~4 meters (corrected for ~~predicted~~ tides). The surrounding depths are 13.~~1~~ meters to 13.6 meters. The item located is a submerged buoy approximately 3 meters off the bottom.

WHITING recommends that the 11[4] *Obstn (A)* be deleted and an obstruction with a known least depth by diver of 10.~~5~~4 meters,* be charted at the position determined on this survey. CONCUR *(34 FT), 104 OBSTN, AND A DANGER CURVE,

N4. Contact #7001.55S

Reported Latitude:	38°47'17.~~0~~0"N
Reported Longitude:	074°55'~~32.8~~31.9~~0~~"W
Datum:	NAD 83
Depth:	12.5 ~~11.4~~m side scan sonar estimated depth
Feature:	dangerous submerged obstruction (*Obstn (A)*)

Contact #7001.55S originates with ~~prior~~ survey H-10444 (1992) ~~and is shown on the prior survey~~ as a dangerous submerged obstruction with a side scan sonar estimated depth of ~~11.4~~ 12.5 meters, (~~114~~ 125 *Obstn (A)*).

Survey requirements were to verify or disprove a ~~114~~ 125 *Obstn (A)* located during survey operations of ~~prior~~ survey H-10444 (1992).

Contact #7001.55S was investigated and echosounding was used to pinpoint the drop position for the divers. Once the item was located, a position and least depth were determined during dive operations.

A dangerous submerged obstruction was located in latitude 38°47'16.~~9~~8"N, longitude 074°55'31.~~8~~9"W, with a pneumatic gauge least depth of 12.~~9~~6 meters (corrected for ~~predicted~~ tides). The surrounding depths are 13.~~1~~3 meters to 13.6 meters. The item located is an anchor block (.75 meters off the bottom, 1.2m x 1.5m) with a chain attached to a padeye leading to a rusted out nun buoy standing 0.5 meters off the bottom.

WHITING recommends that the ~~114~~ 125 *Obstn (A)* be deleted and an obstruction with a known least depth by diver of 12.~~9~~6 meters* be charted at the position determined on this survey. CONCUR *(41 FT), 12° OBSTN, AND A DANGER CURVE)

~~N5. Contact #3509.48P~~ DATA WAS INCORPORATED INTO SURVEY H-10476 (1993).

~~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 (Wk (A))~~

~~Contact #3509.48P originates with prior survey H-10446 (1992) and is shown on the prior survey as a dangerous submerged wreck with a side scan sonar estimated depth of 15.0 meters, (15° Wk (A)).~~

~~Survey requirements were to verify or disprove a 15° Wk (A) 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 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 15^{0} Wk (A) be deleted from the chart and a wreck with a known least depth by diver of 17.0 meters be charted at the position determined on this survey.~~

O. COMPARISON WITH THE CHART SEE ALSO SECTION 7.9. OF THE EVALUATION REPORT.

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. CONCUR

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

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

This survey is complete and adequate for the purpose of updating the charts of the survey area and for resolving four items assigned from survey H-10444 (1992) and one item assigned from survey H-10446 (1992).

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

There are no aids to navigation within the limits of the present survey.

R. STATISTICS

Number of Positions	5
Main-scheme Sounding Lines (Nautical Miles)	None
Crosslines (Nautical Miles)	None
Square Nautical Miles Surveyed	None
Days of Production	2
Detached Positions	5
Bottom Samples	None
Tide Stations Installed	None
Current Stations	None
Number of CTD Casts	None
Magnetic Stations	None

S. MISCELLANEOUS

No anomalies in either tide or current and/or unusual magnetic variations were encountered in the survey area. No bottom samples were taken.

T. RECOMMENDATIONS

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
User Evaluation Report

ITEM INVESTIGATION REPORT

SITE/ FIX #1 DP# 1+2 CHECK

Buoy1 WH-20-5-93

SURVEY ~~WH-20-5-92~~

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

Charted (Y/N) N

Chart No. (largest scale) 1221A Edition 37th Date 6/27/92

DESCRIPTION/SOURCE: H-10444 · 7001.515

HISTORICAL POSITION: Latitude 38° 47' 17.0" N (11.1 ✓) SSS POSITION: Lat 38° 47.283 (16.98 ✓)

1992 (1302.07P) Longitude 74° 55' 32.6" W ~~7001.515~~ ~~1302.07p~~ ~~6995.74p~~ 6999.34p + Long 74° 55.547 (32.82 ✓)

Datum NAD 83

SURVEY REQUIREMENTS: LEAST DEPTH

METHOD OF INVESTIGATION:

Echosounder ____ Side Scan ____ Diver ✓ Other (specify) ____

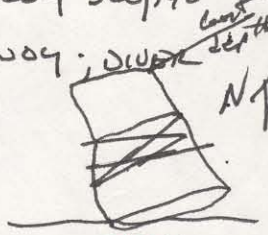
DIVE DATA: Divers RILEY, SEITZ

Time of Dive: Commenced 1545 Completed 1616

Current SLACK Visibility 4-5' Bottom Type BRS

RESULTS OF INVESTIGATION: BUOYS #1, #, 2, #3 DEPLOYED ON 7001.515, 7001.555, 7001.635 DIVERS DESCENDED BUOY #1 ONTO SUBMERGED STRUCTURE BUOY 320/140 ORIENTATION, LEAST DEPTH ON 320° END; TOP OF STRUCTURE BUOY; DIVER DEPTH GAUGE 36'. BUOY STOOD APPROX. 10' OFF BOTTOM.

BUOY #2



POSITION: Date (M/D/Y) 5/22/93 Time (UTC) 171247 Position No. ~~DP#1,2~~ SAD 1

Latitude ~~38° 47.2740~~ 16.45 Longitude 074° 55.~~5440~~ 32.65

LORAN-C: GRI (5960) W: 15779.6 X: 27096.4 Y: 42635.6 Z: 59247.4

908 S/NR 557 976 922 760

LEAST DEPTH: Date (M/D/Y) 5/22/93 Time (UTC) 15557

Method of Least Depth: PNEUMO

Measured Least Depth: 1. ~~36.4~~ 36 2. 36.4 3. 36.4 Avg. 36.4 Units FT

Corrected Least Depth ~~10.9~~ 10.8 Units METERS (predicted tides) (34FT)

11.1 (uncorrected) +

CHARTING RECOMMENDATION

SEE PAGE 44 OF THIS REPORT FOR CHARTING RECOMMENDATION.

~~DANGEROUS OBSTR.~~

VNAN

Buoy 2

ITEM INVESTIGATION REPORT

FIX #2
DP #3+4
CHKR

SURVEY WH-20-~~1~~-93 5
Item Number N/A
Charted (Y/N) N
Danger to Nav. Letter Issued (Y/N) N
Chart No. (largest scale) 12214 Edition 37th Date 6/27/92

DESCRIPTION/SOURCE: H-10444; 7001.555

HISTORICAL POSITION: Latitude 38°47'17.0"N
Longitude 74°55'32.8'W
Datum 83

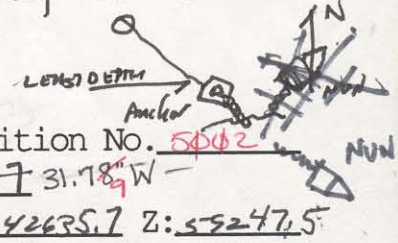
SSS POSITION: 1780.02S 6995.80P ~~6999.30P~~
Lat 38° 47.282'N 16.92
Long 074° 55.534'W 32.04

SURVEY REQUIREMENTS: LEAST DEPTH

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

DIVE DATA: Divers RILEY SEITZ
Time of Dive: Commenced _____ Completed _____
Current 0.3E Visibility 3-5' Bottom Type Br S.

RESULTS OF INVESTIGATION: BUOYS #1, #2, #3, DEPLOYED ON 7001.515, 7001.555, 7001.635 RESPECTIVELY. DIVERS DESCENDED ON BUOY #2 ON TO ANCHOR BLOCK LAYING FLAT 2½' OFF BOTTOM. PADEYE IN CENTER, CHAIN LEADING OFF PADEYE SE DIRECTION INTO SAND. ON HDG 120° CHAIN OUT OF SAND TO OLD NUN, BOTTOM RUSTED OUT. LEAST DEPTH ON ANCHOR BLOCK 4'X5'; NUN BUOY STOOD OFF BOTTOM 1'-1½'. DIVER DEPTH GAUGE 43'. DIVE #2



POSITION: Date (M/D/Y) 5/22/93 Time (UTC) 172433 Position No. 5002
Latitude 38°47.2810 16.86"N Longitude 074°55.5297 31.78"W
LORAN-C: GRI (9960 SNR) W: 15779.5 557 X: 27096.3 976 Y: 42635.7 922 Z: 55247.5 760

LEAST DEPTH: Date (M/D/Y) 5/22/93 Time (UTC) 1611Z ✓
Method of Least Depth: DIVER'S
Measured Least Depth: 1. 43.6 2. 43.6 3. 43.6 Avg. 43.6 Units FT
Corrected Least Depth 12.8 Units METERS (predicted tides) (41 FT)
13.3 (uncorrected) ✓

CHARTING RECOMMENDATION
SEE PAGES 44-45 OF THIS REPORT FOR CHARTING RECOMMENDATIONS.
~~DANGEROUS OBSTR~~

2 WNAW

AMC FORM DV-2 Site 1

Exhibit 2 Revised
AMC Directive 80-2
Revision 4
June 6, 1986

DIVING OPERATIONS

SITE: Approaches to Delaware Bay UNIT: Whiting

LOCATION: 1NM South of Buoy 2, 0.25NM East of Foxtrot Bravo (7001.515)

DIVEMASTER: LT Verlaque SCIENTISTS:
TENDERS: SS Quinn

DIVE PLAN: Deploy buoys on G.P.'s (7001.515, 7001.555, 7001.635) Descend Easternmost buoy line. Circle search acquire least depth and mark with buoy. Swim West to buoy 2, acquire least depth and mark with buoy.
Swim WSW to buoy 3 - acquire least depth and mark with buoy - Surface.

MAX. DEPTH:
MAX. TIME:

EQUIPMENT USED: Open Circuit SCUBA

CONDITIONS:
WIND: 8 kts @ 000°
SEAS: 1-2' @ 000°
CURRENT: 0.3 ..F
VISIBILITY: 8-10
AIR TEMP.: 14°C
WATER TEMP: 10°C

	DIVERS	SURFACE INTERVAL	GROUP	RESIDUAL NITROGEN	PRESSURE IN / OUT	PRESSURE CHANGE	TIME IN / OUT	BOTTOM TIME	DEPTH	GROUP
Dive #1	Riley				3000 / 700	2300	1427 / 1450	23	45	D
	Seitz				3000 / 1300	1700	1427 / 1450	23	45	D
Dive #2	Riley	:55	D	29	3000 / 1350	1650	1545 / ~~1555~~ 1616	31	45	~~E~~ H
	Seitz	:55	D	29	2850 / 1100	1750	1545 / ~~1555~~ 1616	31	45	H
Dive #3	Riley	:20	H	66	1350 / 500	850	1637 / 1649	12	45	J
	Seitz	:20	H	66	1300 / 500	850	1637 / 1649	12	45	J

POST DIVE COMMENTS:

1545
1430
55

J S Verlaque
DIVEMASTER

2

FIX #3 DP #5+6 CHECK

ITEM INVESTIGATION REPORT

SITE 1

WH-20-5-93

SURVEY ~~WH-20-3-92~~

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

Buoy 3 Charted (Y/N) N

Chart No. (largest scale) 12214 Edition 37th Date 6/27/92

DESCRIPTION/SOURCE: H-10444, 1284.65s

HISTORICAL POSITION: Latitude 38° 47' 17.2" N ✓ SSS POSITION: Lat 38° 47.2867' N 17.16"

Longitude 74° 55' 30.4" W ✓ ~~7001.63s~~ 6995.85p Long ~~74° 55.5067' W~~ 74° 55.5111 30.66"

Datum 83

SURVEY REQUIREMENTS: LEAST DEPTH

METHOD OF INVESTIGATION:

Echosounder ____ Side Scan ____ Diver ✓ Other (specify) ____

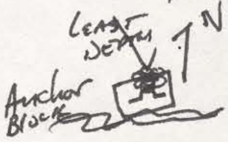
DIVE DATA: Divers RILEY, SEITZ

Time of Dive: Commenced 1637 Completed 1649

Current 0.4 E Visibility 1-2' Bottom Type B S

RESULTS OF INVESTIGATION: Buoys #1, #2, #3 DEPLOYED ON 7001.51s, 7001.55s, 7001.63s.

DIVE #3 DIVERS DESCENDED BUOY #3 ONTO ANCHOR BLOCK; PADEYE IN CENTER, LINKS OF CHAIN TOPPLED ATOP PADEYE, LEAST DEPTH OVER CHAIN BY DIVER GAUGE 39'. Anchor Block 4'x5'



POSITION: Date (M/D/Y) 5/22/93 Time (UTC) 173013 Position No. 5003

Latitude 38° 47.2764' 16.58"N ✓ Longitude 074° 55.4968' 29.82" W ✓

LORAN-C: GRI (9960 908) W: 15779.4 557 X: 27096.2 976 Y: 42635.6 922 Z: 58247.6 760

LEAST DEPTH: Date (M/D/Y) 5/22/93 Time (UTC) ~~1642~~ 1646Z ✓

Method of Least Depth: PNEUMO

Measured Least Depth: 1. 40.4 2. 40.8 3. 40.6 Avg. 40.6 Units FT

Corrected Least Depth ~~12.0~~ 11.9 ✓ Units METERS (~~predicted~~ tides) (39 FT)

12.4 (uncorrected) ✓

CHARTING RECOMMENDATION

SEE PAGES 42-43 OF THIS REPORT FOR CHARTING RECOMMENDATION.

~~DANGEROUS OBSTR~~

3 ✓NAW

S/722 FIX#5 #4
DP#4
DN 143

ITEM INVESTIGATION REPORT

SURVEY WH-20-5-93
Item Number ~~AWOIS~~ 1133 "JR WILLIAMS" Danger to Nav. Letter Issued (Y/N) N
Charted (Y/N) Y
Chart No. (largest scale) 12214 Edition 37th Date 6/27/92

DESCRIPTION/SOURCE: H-10444; 2640.29S

HISTORICAL POSITION: Latitude 38° 45' 09.2" N SSS POSITION: Lat 38° 45.155 (09.30")
Longitude 74° 54' 23.5" W 7060.63S Long 074° 54.398 (23.90")
Datum 83

SURVEY REQUIREMENTS: LEAST DEPTH

METHOD OF INVESTIGATION:
Echosounder___ Side Scan___ Diver ✓ Other (specify)___

DIVE DATA: Divers RILEY BERKOWITZ, VERLAQUE
Time of Dive: Commenced 1734 Completed 1804
Current 1/2 KNOTS Visibility 8 Bottom Type LT br S

RESULTS OF INVESTIGATION:
DIVERS DESCENDED BUOY 1 TO SCATTERED WRECKAGE. SWAM W-NW TO CENTER OF WRECKAGE. MOVED BUOY TO LEAST DEPTH SIGHT. AREA AROUND LEAST DEPTH WAS RIB FRAMING. POSSIBLY BOW OF WRECK. DIVER GUAGE DEPTH 42.5 FT CONTINUE SWIMMING W-NW TO END OF WRECK. POSSIBLY STERN OF WRECK (ROUNDED) DIVER DEPTH GUAGE. DEPTH 45.0 FT. DEPLOYED INFLATABLE BUOY 2 TO MARK EXTENSE OF WRECKAGE. SWAM NE FOUND small SCATTERED WRECKAGE. LEAST DEPTH AREA 8 FT OFF BOTTOM.

POSITION: Date (M/D/Y) 5/23/93 Time (UTC) ~~1856.27~~ 185627 Position No. ~~#4~~ 5005
Latitude 38° 45.1548 (09.30) Longitude 074° 54.3915 23.51" W 59241.1
LORAN-C: GRI (9960) W: 15773.8 (530) X: 27085.1 (980) Y: 42612.4 (890) Z: ~~59223.8~~ (760)
SNR

LEAST DEPTH: Date (M/D/Y) 5/23/93 Time (UTC) 1738 Z
Method of Least Depth: Pneumo
Measured Least Depth: 1. 43.2 2. 43.2 3. 43.2 Avg. 43.2 Units Ft
Corrected Least Depth ~~13.1~~ 12.8 Units Meters (predicted tides) (42 FT)
13.2 (uncorrected)

CHARTING RECOMMENDATION
SEE PAGES 43-44 OF THIS REPORT FOR CHARTING RECOMMENDATION.
~~Dangerous wk~~.

✓NAW

AMC FORM DV-2

EXHIBIT 2 Revised
AMC Directive 80-2
Revision 4
June 6, 1986

DIVING OPERATIONS

[DAT]E: 5/23/93 Day 143 UNIT: NOAA'S WHITING

LOCATION: Approaches to Delaware Bay 0.7NM N of "DC", Southern Approaches to Del Bay Separation Zone

DIVEMASTER:

TENDERS:

SCIENTISTS:

DIVE PLAN: Descend Buoy[illegible] PN from H-10446, [illegible] 3505.487; 3506.39's.

MAX. DEPTH: 70'

MAX. TIME: 50m.

EQUIPMENT USED: OPEN CIRCUIT SCUBA

CONDITIONS:

WIND: [illegible] @ 090

SEAS: 1-2' @ 090

CURRENT: 0.3 Fl

VISIBILITY: 8-10

AIR TEMP.: 14°

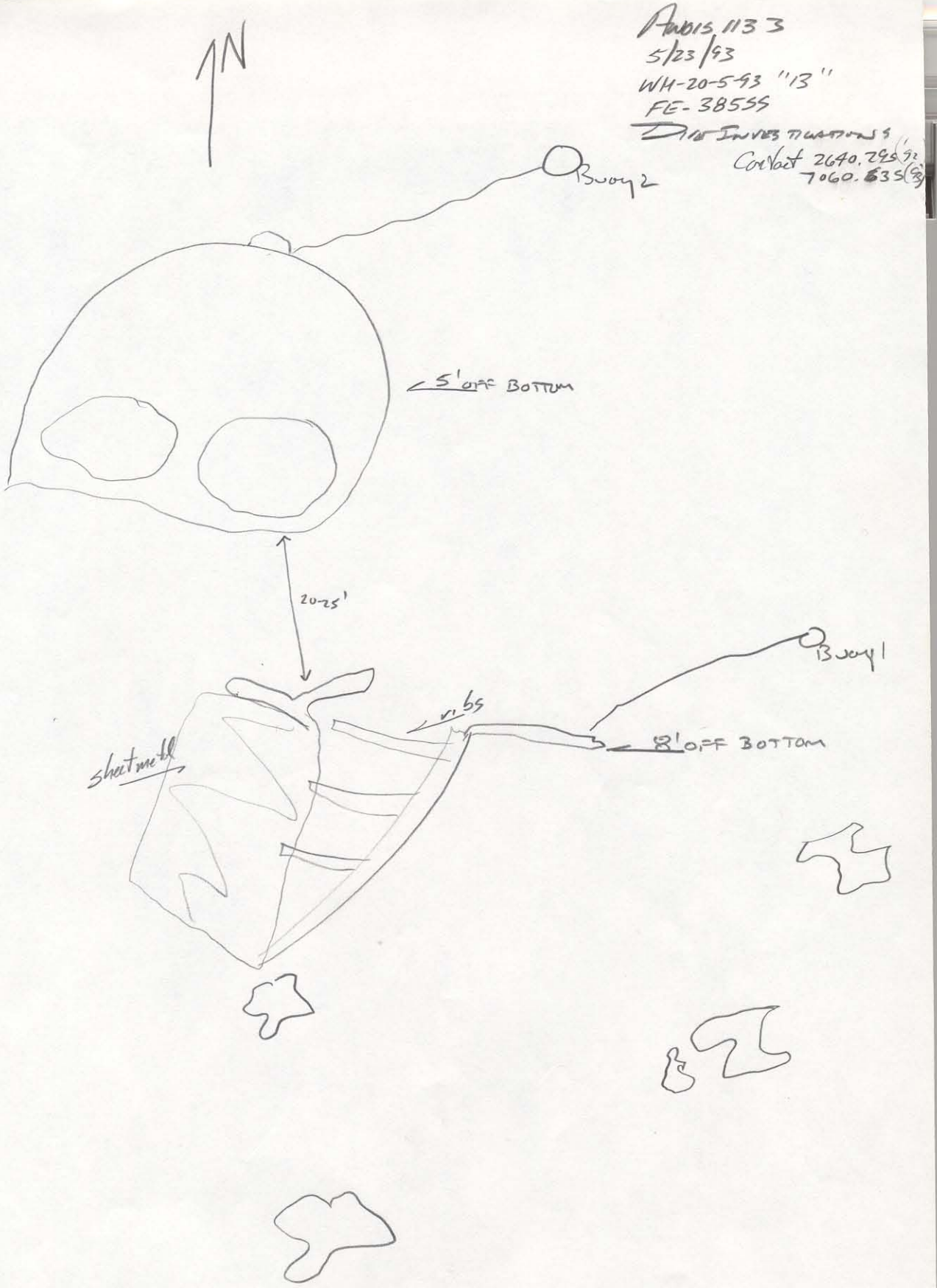
WATER TEMP: 10°.

	DIVERS	SURFACE INTERVAL	GROUP	RESIDUAL NITROGEN	PRESSURE IN / OUT	PRESSURE CHANGE	TIME IN / OUT	BOTTOM TIME	DEPTH	GROUP
#1	Riley				3300 / 500	2800	1525 / 1555	30	65	F
	Berkowitz				2900 / 500	2400	1525 / 1555	30	65'	F
	Verlaque				3100 / 500	2600	1525 / 1555	30	68	F
#2 (1730 1535)	Riley	D 1:30	D	30	3100 / 700	2400	1734 / 1804	30	50	G
	Berkowitz	D 1:30	D	30	2900 / 700	2200	1734 / 1804	30	50	G
	Verlaque	D 1:30	D	30	3200 / 500	2700	1734 / 1804	30	50	G

POST DIVE COMMENTS: #1 Poor Vis; current; WK found; steel hull; evidence of fiberglass (blue + white) on focsle. 20' line + net suspended in water column, cut free. 0.5 Fl to 0.3 Fl. Least depth on stbd-center.

#2 Good Vis; 0.5E; WK found Awois 1133 "JR Williams" Least depth on southern central end.

[signature]



AMOS 1133
5/23/93
WH-20-5-93 "13"
FE-38555
DIR INVESTIGATIONS
Contract 2640.295.92
7060.635(93)

DESCRIPTIVE REPORT TO ACCOMPANY
FIELD EXAMINATION SURVEY
OPR-D368-WH
1993
WH-20-8-93
FE-387~~SS~~

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

A. PROJECT

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

The purpose of this survey is to investigate and resolve contacts located by the NOAA Ship WHITING during hydrographic survey operations on H-10444 (1992) and (1993).

B. AREA SURVEYED

Field Examination FE-387~~SS~~ is 9 nautical miles east of Cape Henlopen, Delaware at the eastern approaches to Delaware Bay.

Survey operations began on May 24, 1993 (DOY 144) and ended on June 6, 1993 (DOY 157).

C. SURVEY VESSEL

Launch 1021 was used as the dive platform for least depth determination and for acquiring a position on each item investigated.

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

D. AUTOMATED DATA ACQUISITION AND PROCESSING

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

PROGRAM NAME	VERSION	DATE INSTALLED
AUTOST	3.01	18-May-93
BACKUP	2.00	24-Sep-92
BASELINE	1.14	18-May-93
BIGABST	2.05	18-May-93
BLKEDIT	2.02	18-May-93
CARTO	2.06	18-May-93
CONTACT	2.04	18-May-93
CONVERT	3.54	18-May-93
DAS_SURV	6.341	18-May-93
DIAGNOSE	3.03	18-May-93
DISC_UTIL	1.00	24-Sep-92
DP	2.14	18-May-93
EXCESS	4.11	18-May-93
FILESYS	3.05	04-May-93
GRAFEDIT	1.04	18-May-93
HIPSTICK	1.01	24-Sep-92
HPRAZ	1.26	24-Sep-92
INSTALL	4.02	18-May-93
INVERSE	2.01	18-May-93
LISTDATA	1.02	18-May-93
LOADNEW	2.04	18-May-93
LSTAWOIS	3.03	18-May-93
MAINMENU	1.01	18-May-93
MAN_DATA	2.01	18-May-93
NEWPOST	6.01	18-May-93
PLOTALL	2.11	18-May-93
POINT	2.10	24-Sep-92
PRESURV	7.02	18-May-93
PREDICT	2.01	18-May-93
PRINTOUT	4.03	18-May-93
QUICK	2.03	02-Mar-93
RAMSAVER	1.02	18-May-93
REAPPLY	2.03	18-May-93
RECOMP	2.02	24-Sep-92
SCANNER	1.00	24-Sep-92
SELPRINT	2.03	18-May-93
SHEETSPLIT	1.03	18-May-93
SYMBOL	2.00	18-May-93
ZOOMEDIT	2.12	18-May-93

All field records and supporting data were sent to AHS per the Processing Partnership Agreement.

E. SIDE SCAN SONAR EQUIPMENT

There were no side scan sonar operations conducted on this survey.

F. SOUNDING EQUIPMENT

A RAYTHEON Digital Survey Fathometer (DSF) 6000N echo sounder (S/N B053N) was used to assist in locating the wrecks and obstructions which were dive investigated on this survey. There were no digital depths from the DSF-6000N recorded during this survey.

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.

G. CORRECTIONS TO SOUNDINGS

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:

	Time Correction	Height Ratio
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 to all least depths. The tidal data, in digital form, were received on floppy disk from N/CG24, Hydrographic Surveys Branch. Request for smooth tides was submitted to Products and Services Branch, Datum Section, N/OES231 on June 14, 1993. APPROVED TIDES 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.

New leadlines were made on April 10, 1993. Calibrations performed on April 26, 1993 confirmed the leadline error was negligible.

Depths were determined by pneumatic gauge on the dive investigations. System checks were performed prior to every dive to ensure the pneumatic depth gauge was in tolerance. The gauge was calibrated on January 25, 1993. The calibration reports for the pneumatic gauge are on file at AHS. DATA FILED WITH FIELD RECORDS.

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 NAD 83 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:

	Latitude	Longitude	Frequency
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 IS APPENDED TO THIS REPORT.

I. HYDROGRAPHIC POSITION CONTROL

A Differential Global Positioning System (DGPS) was used on launch 1021 as the primary navigation system for this survey. A Magnavox 4200 DGPS receiver (S/N 537) with a Magnavox MX50R (S/N 060) differential radio receiver was used to obtain the positions on items investigated. 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, except on DN 154 when the Cape Henlopen beacon was not transmitting correctors. 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 launch 1021 to operate in the non-altitude constrain mode continuously while aquiring detched positions.

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, and 3.8 and 3.1 for a 1:10,000 scale survey. No data were acquired at HDOP values exceeding the 1:10,000 scale thresholds.

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

There is no shoreline in the vicinity of the present survey.

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

Crosslines were not required on this survey.

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

There are no junctional requirements for this survey.

M. COMPARISONS WITH PRIOR SURVEYS SEE ALSO SECTION 6. OF THE EVALUATION REPORT.
Comparison to prior surveys for items investigated, appear in section N of this report.

N. ITEM INVESTIGATIONS

Summary of items investigated:

CONTACT NO.	SECTION	STATUS
39.43P	N1	Located
468.89S	N2	Located
1011.19S	N3	Located
6476.04P	N4	Located
6663.68S	N5	Located
6896.04S	N6	Located
7016.52S	N7	Located
AWOIS #8133	N8	Located

N1. Contact #39.43P

Reported Latitude:	38°48'11.2"N
Reported Longitude:	074°56'51.8"W
Datum:	NAD 83
Depth:	10.9 m side scan sonar estimated depth
Feature:	dangerous submerged obstruction (*Obstn (A)*)

Contact #39.43P originates with ~~prior~~ survey H-10444 (1992) ~~and is shown on the prior survey~~ as a dangerous submerged obstruction with a side scan sonar estimated depth of 10.9 meters, (10⁹ *Obstn (A)*).

Survey requirements were to verify or disprove a 10⁹ *Obstn (A)* located during survey operations of ~~prior~~ survey H-10444 (1992).
Contact #39.43P 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 obstruction was located in latitude 38°48'10.~~9~~"N, longitude 074°56'51.~~4~~"W, with a pneumatic gauge least depth of 11.9 meters (corrected for ~~predicted~~ tides). The surrounding depths are 12.~~6~~ meters to ~~13.0~~ meters. The divers located an anchor block (1.2 m x 1.2 m, 0.3 meters off the bottom) with a padeye in the center and 0.9 meters of chain.

WHITING recommends that the 10⁹ *Obstn (A)* be deleted from the chart and an obstruction with a known least depth by diver of 11.9 meters, be charted at the position determined on this survey. CONCUR (39 FT), 11⁹ OBSTN, AND A DANGER CURVE,

N2. Contact #468.89S

Reported Latitude:	38°48'19.9" N
Reported Longitude:	074°55'11.2" W
Datum:	NAD 83
Depth:	10.6 m side scan sonar estimated depth
Feature:	dangerous submerged obstruction (*Obstn (A)*)

Contact #468.89S originates with ~~prior~~ survey H-10444 (1992) ~~and is shown on the prior survey~~ as a dangerous submerged obstruction with a side scan sonar estimated depth of 10.6 meters (10⁶ *Obstn (A)*).

Survey requirements were to verify or disprove a 10⁶ *Obstn (A)* located during survey operations of ~~prior~~ survey H-10444 (1992).

Contact #468.89S 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 obstruction was located in latitude 38°48' 19.~~8~~"N, longitude 074°55'10.~~3~~"W with a pneumatic least depth of 11.~~7~~ meters (corrected for ~~predicted~~ tides). The surrounding depths are 12.~~1~~ meters to 12.~~4~~ meters. The item located is an anchor block (1.5 m x 1.5 m, 0.6 m off the bottom).

WHITING recommends that the 10⁶ *Obstn (A)* be deleted and a dangerous obstruction with a known least depth by diver of 11.~~7~~ 5 meters be charted at the position determined on this survey. CONCUR (37 FT), 116 OBSTN, AND A DANGER CURVE,

N3. Contact #1011.19S

Reported Latitude:	38°48′21.8″ N
Reported Longitude:	074°55′12.2″ W
Datum:	NAD 83
Depth:	10.9 m side scan sonar estimated depth
Feature:	dangerous submerged obstruction *(Obstn (A))*

Contact #1011.19S originates with ~~prior~~ survey H-10444 (1992)93 ~~and is shown on the prior survey~~ as a dangerous submerged obstruction with a side scan sonar estimated depth of 10.9 meters, (*Obstn(A)*).

Survey requirements were to verify or disprove a 10⁹ *Obstn(A)* located during survey operations of ~~prior~~ survey H-10444 (1992)93.

Contact #1011.19S 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 obstruction was located in latitude 38°48′21.~~9~~81″N, longitude 074°55′12.~~2~~17″W, with a pneumatic gauge least depth of 11.~~2~~3 meters (corrected for ~~predicted~~ tides). The surrounding depths are 12.1 meters to 12.9 meters. The divers located an anchor block (1.7 m x 1.7 m, 0.3 m off the bottom) without a padeye.

WHITING recommends that the 10⁹ *Obstn(A)* be deleted and a dangerous obstruction with a known least depth by diver of 11.~~2~~3 meters* be charted at the position determined on this survey. CONCUR *(37 FT), 113 OBSTN, AND A DANGER CURVE,

N4. Contact #6476.04P

Reported Latitude:	38°48′04.7″ N
Reported Longitude:	074°54′52.1″ W
Datum:	NAD 83
Depth:	10.6 m side scan sonar estimated depth
Feature:	dangerous submerged obstruction *(Obstn (A))*

Contact #6476.04P originates with ~~prior~~ survey H-10444 (1992)93 ~~and is shown on the prior survey~~ as a dangerous submerged obstruction with a side scan sonar estimated depth of 10.6 meters, (10⁶ *Obstn (A)*).

Survey requirements were to verify or disprove a 10^6 *Obstn (A)* located during survey operations of ~~prior~~ survey H-10444 (1992).

Contact #6476.04P 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.

The sonar contact was located in latitude 38°48′04.~~5~~"N, longitude 074°54′52.~~8~~"W, with a pneumatic gauge least depth of 11.~~2~~ meters (corrected for ~~predicted~~ tides). The surrounding depths are ~~13.0~~ meters to ~~13.6~~ meters. The items located are clumps of trawl net and gill net (diameter of 3.0 meters, floating 2.4 meters off the bottom). They do not represent a danger to surface navigation. The nets are snagged on a cable (possibly a submerged phone cable) with a diameter of 0.1 meters.

This position is within a charted cable area. WHITING recommends that the 10^6 *Obstn (A)* be deleted and that no feature be charted at this location. CONCUR

N5. Contact #6663.68S

Reported Latitude:	38°48′19.9"N
Reported Longitude:	074°55′08.8"W
Datum:	NAD 83
Depth:	9.9 m side scan sonar estimated depth
Feature:	dangerous submerged obstruction (*Obstn (A)*)

Contact #6663.68S originates with ~~prior~~ survey H-10444 (1992) ~~and is shown on the prior survey~~ as a dangerous submerged obstruction with a side scan sonar estimated depth of 9.9 meters, (9^9 *Obstn (A)*).

Survey requirements were to verify or disprove a 9^9 *Obstn (A)* located during survey operations of ~~prior~~ survey H-10444 (1992).

Contact #6663.68S was investigated and echosounding was used to pinpoint the drop position for the divers. Once the item was located, a position and least depth were determined during dive operations.

A dangerous submerged obstruction was located in latitude 38°48′19.~~8~~"N, longitude 074°55′09.0"W, with a pneumatic gauge least depth of 11.6 meters (corrected for ~~predicted~~ tides). The surrounding depths are 12.~~3~~ meters to 12.~~6~~ meters. The item located is an anchor block (1.5 m x 1.5 m, .60 meters off the bottom).

WHITING recommends that the 9^{9} *Obstn (A)* be deleted and a dangerous obstruction with a known least depth by diver of 11.6 meters, *be charted at the position determined on this survey. CONCUR
*(38FT), 11⁶OBSTN, AND A DANGER CURVE,

N6. Contact# 6896.04S

Reported Latitude:	38°49′03.0″N
Reported Longitude:	074°55′00.6″W
Datum:	NAD 83
Depth:	12.4 m echosounder estimated depth
Feature:	dangerous submerged wreck

Contact #6896.04S originates with ~~prior~~ survey H-10444 (1992_{R}^{-93}).

Survey requirements were to verify or disprove a 12^{4} *Wk* located during survey operations of ~~prior~~ survey H-10444 (1992_{R}^{-93}).

Contact #6896.04S 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 obstruction was located in latitude 38°49′00.~~8~~″N, longitude 074°54′54.~~2~~″W, with a pneumatic gauge least depth of 12.~~2~~ meters (corrected for ~~predicted~~ tides). The surrounding depths are 12.7 meters to 13.0 meters. The divers located a sewage or drain pipe laying in an east/west direction (18.3 m x 0.9 m, 0.5 m to 0.6 m off the bottom). ~~This obstruction is suspected as being AWOIS #1151; a fishing obstruction located at latitude 38°48′54.6″, longitude 074°55′02.2″.~~

WHITING recommends that the 12^{4} *Wk* be deleted and an obstruction with a known least depth by diver of 12.~~2~~ meters, be charted at the position determined on this survey. CONCUR (40FT), 12³OBSTN, AND A DANGER CURVE,

N7. Contact #7016.52S

Reported Latitude:	38°48′30.4″N
Reported Longitude:	074°52′19.3″W
Datum:	NAD 83
Depth:	13.7 m side scan sonar estimated depth
Feature:	dangerous submerged obstruction (*Obstn (A)*)

Contact #7016.52S originates with ~~prior~~ survey H-10444 (1992_{R}^{-93}) ~~and is shown on the prior survey~~ as a dangerous submerged obstruction with a side scan sonar estimated depth of ~~13.7~~ 14.0 meters, (~~13~~ 14 *Obstn (A)*).

Survey requirements were to verify or disprove a 13^{7} *Obstn (A)* located during survey operations of ~~prior~~ survey H-10444 (1992_{R}^{-93}).

Contact #7016.52S 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.

The sonar contact was located in latitude 38°48'30.3~~5~~N, longitude 074°52'19.0~~5~~W, with a pneumatic gauge least depth of 14.2 meters (corrected for ~~predicted~~ tides). The surrounding depths are 14.7 meters to 15.0 meters. The divers located a rubber tire (diameter of 2.4 meters, 0.5 meters off the bottom) with an anchor chain wrapped around it. The tire does not represent a danger to surface navigation. CONCUR

WHITING recommends that the 13[7] *Obstn (A)* be deleted and that no feature be charted at this position. CONCUR

N8. AWOIS #8133

Reported Latitude:	38°50'47"N
Reported Longitude:	074°54'02"W
Datum:	NAD 83
Depth:	6 ft charted depth
Feature:	dangerous submerged wreck, PA

This item was not assigned for this survey, however WHITING concluded that this contact was significant and required further investigation. The item originated from Gene Hastings at Old Inlet Dive Shop in Rehoboth Beach, Delaware, who reported the wreck at the position given above.

This wreck 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°50'42.9~~4~~N, longitude 074°54'02.~~5~~~~8~~"W, with a pneumatic gauge least depth of 5.~~3~~[2] meters (corrected for ~~predicted~~ tides) which was taken on the yardarm above the superstructure. The surrounding depths are 11.0 meters to 12.1 meters. The divers located the wreck of a tugboat, (25.9 m x 4.6 m), resting on its port side. The superstructure is intact, but the deck plating is eroded. The divers did not locate a propeller or an anchor.

WHITING recommends that the 6 ft wreck, PA be deleted from the chart and a dangerous wreck with a known least depth by diver of 5.3[2] meters, be charted at the position determined on this survey. CONCUR (17FT), 5[2]WK, AND A DANGER CURVE,

O. COMPARISON WITH THE CHART SEE ALSO SECTION 7.9. OF THE EVALUATION REPORT.

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)~~ ON PAGES 10-11 OF THIS REPORT and requires no further consideration.

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

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

This survey is complete and adequate for the purpose of updating the charts of the survey area and for resolving items assigned from survey H-10444 (1992).

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

There are no aids to navigation within the limits of the present survey.

R. STATISTICS

Number of Positions	8
Main-scheme Sounding Lines (Nautical Miles)	None
Crosslines (Nautical Miles)	None
Square Nautical Miles Surveyed	None
Days of Production	4
Detached Positions	8
Bottom Samples	None
Tide Stations Installed	None
Current Stations	None
Number of CTD Casts	None
Magnetic Stations	None

S. MISCELLANEOUS

No anomalies in either tide or current and/or unusual magnetic variations were encountered in the survey area. No bottom samples were taken.

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
User Evaluation Report

#1

ITEM INVESTIGATION REPORT

WH-20-8-93

SURVEY ~~WH-20-3-92~~ ✓

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

Charted (Y/N) N

Chart No. (largest scale) 12214 Edition 37TH Date 6/27/92

DESCRIPTION/SOURCE: H-10494; 39.43P, 85.24S

HISTORICAL POSITION: Latitude 38°48.1867'N SSS POSITION: Lat 38°48.183
Longitude 74°56.8633'W 6561.65S Long 074°56.858
Datum 83 7093.18P

SURVEY REQUIREMENTS: ~~LEAST~~ DEPTH

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

DIVE DATA: Divers BERKOWITZ, SILVERMAN, VERLAGUE
Time of Dive: Commenced 1335 Completed 1350
Current SLACK Visibility 3-4 FT Bottom Type SAND BROWN

RESULTS OF INVESTIGATION: DIVERS DESCENDED BUOY ON PN from CONTACT 6561.65. DIVERS CONDUCTED 25' CIRCLE SEARCH ON BUOY POSITION. LOCATED ANCHOR BLOCK 4'x4'; 1' OFF BOTTOM WITH PADEYE IN CENTER & 3' OF CHAIN. LEAST DEPTH TAKEN ON PADEYE & CHAIN. DIVER GAUGE LEAST DEPTH 41'.

7305

POSITION: Date (M/D/Y) 6-4-93 Time (UTC) 140541 Position No. ~~33~~
Latitude ~~38°48.3813'N~~ 10.89 Longitude ~~74°56.8564'W~~ 51.39 FIX #5
LORAN-C: GRI (9960) W: 15785.3 (887) X: 27106.0 (242) Y: 42645.0 (863) Z: 55297.6 (887 470)

LEAST DEPTH: Date (M/D/Y) 6-4-93 155 Time (UTC) (1350)
Method of Least Depth: PNEUMO.
Measured Least Depth: 1. 42.2 2. 42.6 3. 42.4 Avg. ~~42.4~~ Units FT
Corrected Least Depth ~~42.4~~ 11.9 Units ~~M~~ meters (~~predicted~~ tides) (39 FT)
(uncorrected 12.92M)

CHARTING RECOMMENDATION
SEE PAGES 5960 OF THIS REPORT FOR CHARTING RECOMMENDATION.
~~DANGEROUS OBSTRUCTION~~

#42

ITEM INVESTIGATION REPORT

WH-20-8-93

SURVEY ~~WH-20-3-92~~

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

Charted (Y/N) N

Chart No. (largest scale) 12214 Edition 37TH Date 6/27/92

DESCRIPTION/SOURCE: H-10444; 468.89?

HISTORICAL POSITION: Latitude 38° 48' 19.9" N ✓ SSS POSITION: Lat 38° 48.332 ✓

Longitude 74° 55' 10.24" W ✓ (6687.675 TOH-Hp) Long 74° 55.171

Datum 83 6663.775 6650.225

SURVEY REQUIREMENTS: CLEAST DEPTH

METHOD OF INVESTIGATION:

Echosounder ____ Side Scan ____ Diver ✓ Other (specify) ____

DIVE DATA: Divers RILEY, BERKOWITZ

Time of Dive: Commenced 1606 Completed 1622

Current SLACK Visibility 15' HORIZON Bottom Type LT BR S

RESULTS OF INVESTIGATION: DIVERS DESCENDED BUOY 2 ON TO PN FROM SSS (6687.675). DIVERS LOCATED ANCHOR 5'x5', 2' HIGH (OFF BOTTOM); DIVER GAUGE 42'. POSITION ACQUIRED ON 6/3/93 (DN 154) FROM E/S PLACE. DIVE POSITION ON DAY 144 SHOWED ANCHOR BLOCK 3 METERS FROM BUOY DROP THAT DIVERS DESCENDED ON DAY 144. POSITION COULD NOT BE ACQUIRED ON DAY 144 DUE TO ELECTRONIC

POSITION: Date (M/D/Y) ~~5/24/93~~ 6/3/93 Time (UTC) 153824 Position No. ~~DP#1, DP#2~~ 7301

Latitude 38 48.3302 (19.82) ✓ Longitude 074 55.1711 (10.27) ✓

LORAN-C: GRI (9960) W: 15778.6 X: 27096.8 Y: 42647.7 Z: 55253.6

SNR 904 525 946 905 744

LEAST DEPTH: Date (M/D/Y) 144 5/24/93 ✓ Time (UTC) 16182 ✓ ~~Fix # 2~~

Method of Least Depth: PNEUMO

Measured Least Depth: 1. 41.2 2. 41.2 3. 41.2 Avg. 41.2 Units FT

Corrected Least Depth 11.75 Units meters ~~(predicted tides)~~ (37 FT)

uncorrected (12.56 m)

CHARTING RECOMMENDATION

SEE PAGES 60-61 OF THIS REPORT FOR CHARTING RECOMMENDATION.

~~DANGEROUS OBSTN.~~

ITEM INVESTIGATION REPORT

#3

WH-20-8-93

SURVEY ~~WH-20-3-93~~

Item Number N/A

Charted (Y/N) N

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

Chart No. (largest scale) 12214 Edition 37TH Date 6/27/92

DESCRIPTION/SOURCE: H-10444 ; 1011.1 95

HISTORICAL POSITION: Latitude 38° 48.3633 ✓ SSS POSITION: Lat 38° 48.365
Longitude 74° 55.2033 ✓ 6687.555 Long 074° 55.209
Datum 83 6690.10 S
6724.42 P
6663.855

SURVEY REQUIREMENTS: Least Depth

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

DIVE DATA: Divers BERKOWITZ, SILVERMAN, VERLANGIERI
Time of Dive: Commenced 1428 Completed 1439
Current O.Y.E Visibility 5-7 Bottom Type Sand

RESULTS OF INVESTIGATION:

DIVERS DESCENDED BUOY CONDUCTED 25' CIRCLE SEARCH. LOCATED ANCHOR BLOCK 5'½ x 5'½ x 1' OFF BOTTOM. NO PADEYE. DIVERS DRAGGED BUOY DROP ANCHOR TO ANCHOR BLOCK. DIVER GAVE LEAST DEPTH 38'.

POSITION: Date (M/D/Y) 6/3/93 Time (UTC) 150733 Position No. ~~DP#5 DP#6~~ 7304
Latitude 38° 48.3643 ✓ 21.9 Longitude 074° 55.2027 ✓ 12,17 Cape Henry
LORAN-C: GRI (9960 SNR 75) W: 15778.7 570 X: 27097.0 880 Y: 42648.1 927 Z: 59253.7 763

LEAST DEPTH: Date (M/D/Y) 15 6/3/93 Time (UTC) 1435 ✓ ~~FIX #4~~
Method of Least Depth: PNEUMO
Measured Least Depth: 1. 38.2 2. 38.6 3. 38.4 Avg. 38.4 Units FT
Corrected Least Depth 11.23 Units meters (~~predicted tides~~) (37 FT)
uncorrected (11.70 m)

CHARTING RECOMMENDATION

SEE PAGE 61 OF THIS REPORT FOR CHARTING RECOMMENDATION.
~~OBS - DANGEROUS.~~

MPB

EXHIBIT 2 Revised
AMC Directive 80-2
Revision 4
June 6, 1986

AMC FORM DV-2

DP's 5-8

DIVING OPERATIONS

DATE: 24 May 93 UNIT: Whiting

LOCATION: Buoy 2, Approaches to Delaware Bay

DIVEMASTER: LT Verlaine

SCIENTISTS: —

TENDERS: SSQUINN

DIVE PLAN: #1 Transit to Buoy "2" Drop Buoys 3, 2, 1 on SSS PN for contacts 663.85S, 663.77S, 663.68S respectively. Descend Buoy 1, circle search; acquire least depth; bounce 2 + 3, same. After [illegible] depths on all three buoys surface, boat DB

#2 Transit to SSS PN for contact 6476.04P, deploy buoy, circle search - least depth, surface boat DP.

MAX. DEPTH:

MAX. TIME:

EQUIPMENT USED: Open circuit SCUBA

CONDITIONS:

WIND: 16 kts 130°

VISIBILITY: 6-8

SEAS: 2-3' 310°

AIR TEMP.: 14°

CURRENT: 0.3F

WATER TEMP.: 12°

DIVERS	SURFACE INTERVAL	GROUP	RESIDUAL NITROGEN	PRESSURE IN / OUT	PRESSURE CHANGE	TIME IN / OUT	BOTTOM TIME	DEPTH	GROUP
Riley				3100 / 900	2200	1553 / 1622	29	45	
Berkowitz				2900 / 800	2100	1553 / 1622	29	45	
~~[illegible]~~									
Riley				3150 / 2200	950	1640 / 1658	18	45	
Berkowitz				3000 / 2200	800	1640 / 1658	18	45	

POST DIVE COMMENTS:

[signature]

DIVEMASTER SIGNATURE

EXHIBIT 2

DIVE SITE 2

ITEM INVESTIGATION REPORT

WH-20-8-93

SURVEY ~~WH-20-3-92~~

Item Number N/A

Charted (Y/N) N

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

Chart No. (largest scale) 12214 Edition 37th Date 6/27/92

DESCRIPTION/SOURCE: H-10444 ; 6476.04p

HISTORICAL POSITION: Latitude 38°48.078'N SSS POSITION: Lat 38°48.076
Longitude 74°54.868'W ✓ 7007.37s Long 074°54.878
Datum 83

SURVEY REQUIREMENTS: LEAST DEPTH

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

DIVE DATA: Divers BERKOWITZ, SILVERMAN, VERLENGIA
Time of Dive: Commenced 1318 GMT Completed 1355 GMT
Current 0.2 F Visibility 4-6 FT Bottom Type SANDY WITH SHELLS

RESULTS OF INVESTIGATION: DIVERS DESCENDED DOWN DROP FROM BUOY WITH A GILL NET EXTENDING 8 FT OFF THE BOTTOM THE NETS WERE SNAGGED ON WHAT APPEARS TO BE A CABLE POSSIBLY SUBMERGED PHONE CABLE. DIAMETER OF CABLE APPROXIMATELY 3 IN. DIAMETER OF NET ON BOTTOM, 10 FT. NO NAVIGATION BUOY OR ANCHOR FOUND AS SUSPECTED FROM SSS TRACES. DROP POSITION DIVERS SWAM 4.0 m WEST AND FOUND A TRAWL NET ALONG

POSITION: Date (M/D/Y) 6/3/93 Time (UTC) 1329 1352Z Position No. ~~D24~~ ~~D26~~ 4
Latitude ~~38°48.078'N~~ 44.47 Longitude 074°54.8795 ✓ 52.77
LORAN-C: GRI (9960 306) W: 15777.2 595 X: 27695 905 Y: 42645.0 925 Z: 59753.7 777

LEAST DEPTH: Date (M/D/Y) 154 ✓ 6/3/931 Time (UTC) (1324Z) ✓ ~~Fix # 3~~
Method of Least Depth: PNEUMO
Measured Least Depth: 1. 39.6 2. 39.6 3. 39.8 Avg. 39.6 Units FT
Corrected Least Depth 11.23 Units meters (~~predicted~~ tides) (37 FT)
Uncorrected (12.07 m)

CHARTING RECOMMENDATION

SEE PAGES 61-62 OF THIS REPORT FOR CHARTING RECOMMENDATION.

MKB

ITEM INVESTIGATION REPORT

WH-20-8-93

SURVEY ~~WH-20-3-93~~

Item Number N/A

Charted (Y/N) N

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

Chart No. (largest scale) 12214 Edition 37th Date 6/27/92

DESCRIPTION/SOURCE: H-10444; 6663.68s

HISTORICAL POSITION: Latitude 38° 48.3333'N ✓ SSS POSITION: Lat 38°48.329

Longitude 74° 55.1450'W ✓ 6687.75s Long 74° 55.150

Datum 83

SURVEY REQUIREMENTS: LEAST DEPTH

METHOD OF INVESTIGATION:

Echosounder _____ Side Scan _____ Diver ✓ Other (specify) _____

DIVE DATA: Divers RILEY, ~~SE~~ BORKOWITZ

Time of Dive: Commenced 1553 Completed 1605

Current ~~0-SLACK~~ Visibility 15' MOD-VIS Bottom Type GR S

RESULTS OF INVESTIGATION: DIVERS DESCENDED BUOY 1 ONTO PN FROM SSS (6687.75s) DIVERS LOCATED ANCHOR BLOCK 5'x5'; 2' MUCK. DIVER DEPTH GAUGE 42'.

POSITION ACQUIRED ON 6/3/93 (DN 154) FROM E/S TRACE. DIVE POSITION ON DAY 144. SHOWED ANCHOR BLOCK 3 METERS FROM BUOY DROP THAT ANCHOR DIVERS DESCENDED ON DAY 144. POSITION COULD NOT BE ACQUIRED ON DN 144 DUE TO ELECTRONIC MALFUNCTION; ANTENNA FAILED ON GPS.

POSITION: Date (M/D/Y) ~~5/24/93~~ 6/3/93 Time (UTC) 15545 Position No. ~~DP#3,4~~ 7302

Latitude 38 48.3296 N 49.01 ✓ Longitude 074 55.1500 W ✓ ~~FIX#~~

LORAN-C: GRI (9960 SNR 904) W: 15778.5 525 X: 27096.6 946 Y: 42647.6 905 Z: 59253.6 794

LEAST DEPTH: Date (M/D/Y) 144 5/24/93 Time (UTC) 1601 Z ~~FIX#~~ 1

Method of Least Depth: DIVER'S DEPTH GAUGE

Measured Least Depth: 1. 41.3 2. 41.2 3. 41.4 Avg. 41.3 Units FT

Corrected Least Depth 11.6 M Units meters (~~predicted~~ tides) (38 FT)

Uncorrected (12.59m)

CHARTING RECOMMENDATION

SEE PAGES 62-63 OF THIS REPORT FOR CHARTING RECOMMENDATION.

~~DANGEROUS OBSTR~~

AMC FORM DV-2

EXHIBIT 2 Revised
AMC Directive 80-2
Revision 4
June 6, 1986

DP's 1-4

DIVING OPERATIONS

DATE: 6/3/93 SN 154 UNIT: WHITING

LOCATION: APPROACHES TO DELAWARE BAY, BUOY "2"

DIVEMASTER: LT VERLAQUE
TENDERS: SS QUINN
AN3 WAGNER

SCIENTISTS:

DIVE PLAN: DEPLOY LAUNCH 1021 @ BUOY "2" MAX. DEPTH: 50'
(SITE 2 #1) LAUNCH DEPLOY BUOY @ DIVESITE 2 (6476.04P). DESCEND MAX. TIME: 70 MIN
BUOY W/ PNEUMO IN HAND. IF CONTACT NOT VISIBLE - 10 M CIRCLE SEARCH. CTR - SILV; MIDD - VERL; OUT - BERK
LOCATE - DRAG BUOY; PNEUMO - RELEASE; SURFACE. * IDENTIFY LONG OBJECT @ CHAIN OR NET.

(SITE 1 #2) DEPLOY BUOY @ #3 (1011.19S). DESCEND CIRCLE 10M. CTR. VERL; MIDD SILV; OUT BERK.
LOCATE DRAG BUOY; PNEUMO - RELEASE; SURFACE.

POSITION 468.87P & 6663.68S; ECHOSOUNDER TRACE IMPERATIVE.

EQUIPMENT USED:
OPEN CIRCUIT SCUBA.

CONDITIONS:
WIND: calm.
SEAS: calm
CURRENT: " "

VISIBILITY:
AIR TEMP.:
WATER TEMP:

DIVERS	SURFACE INTERVAL	GROUP	RESIDUAL NITROGEN	PRESSURE IN / OUT	PRESSURE CHANGE	TIME IN / OUT	BOTTOM TIME	DEPTH	GROUP
BERKOWITZ				3000 / 1500	1500	1318 / 1335	17	46	
SILVERMAN				2800 / 1400	1400	1318 / 1335	17	46	
VERLAQUE				3000 / 1700	1300	1318 / 1335	17	46	
				/		~~28~~ / 39			
BERKOWITZ				3300 / 2400	900	1428 / 39	9	40	
SILVERMAN				2700 / 1800	900	1428 / 39	9	40	
VERLAQUE				3000 / 2000	1000	1428 / 39	9	40	
				/		~~28~~ / 39			

POST DIVE COMMENTS:

J Berlaque
DIVEMASTER

1-410-328-7814

ITEM INVESTIGATION REPORT

SURVEY WH-20-8-93
Item Number ~~3079~~
Charted (Y/N) Y
Chart No. (largest scale) 12214 Edition 57th Date 6/27/92
Danger to Nav. Letter Issued (Y/N) N

DESCRIPTION/SOURCE: ~~F.W. Schepper II (ED)~~) ~~/WAD ; H-...~~ 6896.04

HISTORICAL POSITION: Latitude 38°49'03"N
Longitude 74°55'00.6"W
Datum NAD 83

SSS POSITION: Lat 38°49'00.174"N ✓
Long 74°54'53.811"W ✓
38°49.0029'N
74°54.8969'W

SURVEY REQUIREMENTS: LEAST DEPTH; POSITIVE I.D.

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

DIVE DATA: Divers BERKOWITZ, ~~Silverman~~ SEITZ, Verlaque
Time of Dive: Commenced 1507 Completed 1537
Current ⟵ Visibility 5' Bottom Type LT SAND

RESULTS OF INVESTIGATION: DIVERS DESCENDED BUOY FROM PN ABOVE (SSS). DIVERS LOCATED A SEWAGE/DREDGE PIPE LAYING IN AN E-W DIRECTION; 60' LONG, 3' WIDE 1½-2' OFF ~~OF~~ BOTTOM. D.P. TAKEN AT CENTER OF PIPE; LEAST DEPTH BY DIVER 43'.

THIS CONTACT WAS SUSPECTED AS THE F.W. SCHEPPER II.

POSITION: Date (M/D/Y) 6/6/93 Time (UTC) ~~E FZ~~ 155346 Position No. ~~DP#2~~ 7308 ~~Fix#8~~
Latitude 38°49.~~0026~~ 00.17 N ✓ Longitude 074°54.~~9085~~ 54.06 ✓
LORAN-C: GRI (9960) W: 15777.7 X: 27096.7 Y: 42655.5 Z: 59257.5
SNR 912 979 875 966 696

LEAST DEPTH: Date (M/D/Y) 6/6/93 Time (UTC) ~~157~~ 1512
Method of Least Depth: PNEUMO
Measured Least Depth: 1. 43.6 2. 43.4 3. 43.8 Avg. 43.6 Units FT
Corrected Least Depth 12.23 Units meters ~~(predicted~~ tides) (40 FT)
Uncorrected (13.29 m)

CHARTING RECOMMENDATION
SEE PAGE 63 OF THIS REPORT FOR CHARTING RECOMMENDATION.
~~OBSTR~~

MB

EXHIBIT 2 Revised
AMC Directive 80-2
Revision 4
June 6, 1986

AMC FORM DV-2

DIVING OPERATIONS

DATE: 6-6-93 UNIT: NOAA's WHITING

LOCATION: Approaches to Delaware Bay

DIVEMASTER: LT Verlaque SCIENTISTS: /

TENDERS: AB Wagner

DIVE PLAN: Descend Buoy 1; circle @ 3128.82 s; pneumo ~~swap to buoy 2 STA~~ ascend, swim to Buoy 2 descend; swept pneumo surface. MAX. DEPTH: 50 MAX. TIME: 70

— Transit to dive site 2 (Schepper) @ ... from H-10444.

EQUIPMENT USED: OPEN CIRCUIT SCUBA

CONDITIONS:
WIND: 295 @ 10kts VISIBILITY: 8-10
SEAS: — 330 @ 2-3' AIR TEMP.: 17.4
CURRENT: WATER TEMP: 15.0

DIVERS	SURFACE INTERVAL	GROUP	RESIDUAL NITROGEN	PRESSURE IN / OUT	PRESSURE CHANGE	TIME IN / OUT	BOTTOM TIME	DEPTH	GROUP
Berkowitz				2900 / 1250	1650	1507 / 1537	30	49	E
Seitz				3000 / 1100	1900	1507 / 1537	30	49	E
Verlaque				3100 / 400	2700	1502 / 1538	30	49	E
Ber	1:10	D	24	3000 / 700	2300	1654 / 1720	34	62'	J
Set	1:10	D	24	3000 / 500	2500	1654 / 1720	34	62'	J
Ver	1:10	D	24	3000 / 350	2650	1654 / 1720	34	62	J

POST DIVE COMMENTS: (1) 2 NM EAST OF "CH" RACON

(2) .75 NM NE of Buoy 2.

410-328-7814 ✓

AJ Verlaque
DIVEMASTER SIGNATURE

EXHIBIT 2

#2

ITEM INVESTIGATION REPORT

WH-20-8-93

SURVEY ~~WH-20-3-92~~

Item Number N/A

Charted (Y/N) N

Chart No. (largest scale) 12214 Edition 37th Date 6/27/92

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

DESCRIPTION/SOURCE: H-10444; 7016.525

HISTORICAL POSITION: Latitude 38° 48' 30.4" N
Longitude 74° 52' 19.3" W 7016.525
Datum 83

SSS POSITION: Lat 38° 48.507
Long 074° 52.322

SURVEY REQUIREMENTS: LEAST DEPTH

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

DIVE DATA: Divers BERKOWITZ, Silverman, Verlaque
Time of Dive: Commenced ___ Completed ___
Current 0.3 Visibility 4-5 FT Bottom Type SANDY

RESULTS OF INVESTIGATION:

DIVERS DESCENDED BUOY ON POSITION FROM CONTACT 7016.525. DIVER CONDUCTED CIRCLE SEARCH (25 FT RADIUS). DIVERS FOUND 4 FT DIAMETER TRACTOR TIRE EXTENDING 1½ FT ABOVE THE BOTTOM WITH A ~~AN~~ ANCHOR ~~FT~~ CHAIN WRAPPED AROUND AT ONE POINT. LEAST DEPTH TAKEN AT ANCHOR CHAIN ON TOP OF TIRE. DIVER GAUGE DEPTH 48'.

POSITION: Date (M/D/Y) 6-4-93 Time (UTC) 153723 Position No. ~~27344~~ 7 ~~Fix# 6~~
Latitude 38° 48. ~~352~~' N 30.33 Longitude 074° 52. ~~3174~~' W 19.05
LORAN-C: GRI (9960) W: 15766.8 X: 27081.1 Y: 42657.3 Z: 59263.2
SNR 909 300 378 899 550

LEAST DEPTH: Date (M/D/Y) 6-4-93 155 Time (UTC) (1513)
Method of Least Depth: PNEUMO
Measured Least Depth: 1. 48.2 2. 48.4 3. 48.6 Avg. 48.4 Units Ft
Corrected Least Depth 14.04 Units meters ~~(predicted tides)~~ (46 FT)
(Uncorrected 14.75 M)

CHARTING RECOMMENDATION ~~NON-DANGEROUS OBSTRUCTION~~

SEE PAGES 63-64 OF THIS REPORT FOR CHARTING RECOMMENDATION.

EXHIBIT 2 Revised
AMC Directive 80-2
Revision 4
June 6, 1986

AMC FORM DV-2

DIVING OPERATIONS

DATE: 6/4/93 UNIT: NOAA's WHITING

LOCATION: Approaches to Delaware Bay

DIVEMASTER: LT Verlaque SCIENTISTS: —

TENDERS: ES Quinn

AB Wagner

DIVE PLAN: Deploy launch @ PN from 3943? MAX. DEPTH: 50'

Deploy buoy @ PN. Descend buoy circle MAX. TIME: 70 min

#1 search locate contact; drag buoy int.; ?; surface; position

#2 Transit to PN from # 7016525; same as above.

Transit to c'mp. wk + e/s dev.

EQUIPMENT USED: OPEN CIRCUIT SCUBA

CONDITIONS:

WIND: Calm VISIBILITY: 1-3; 3-5

SEAS: Calm AIR TEMP.: 14°

CURRENT: 0; 0.5C WATER TEMP: 12°

DIVERS	SURFACE INTERVAL	GROUP	RESIDUAL NITROGEN	PRESSURE IN / OUT	PRESSURE CHANGE	TIME IN / OUT	BOTTOM TIME	DEPTH	GROUP
Berkowitz				2950 / 2050	900	1335 / 1350	18	43	
Silverman				3000 / 2000	1000	1335 / 1350	15	43	
Verlaque				3000 / 2000	1000	1335 / 1350	15	43	
Berkowitz				2000 / 1100	900	1503 / 1518	15	50'	
Silverman				2000 / 1700	300	1503 / 1506	3	50'	
Verlaque				2000 / 800	1200	1503 / 1518	15	50'	

POST DIVE COMMENTS: #1; 1.2 NM W of "2"

#2; 2.3 E of "2"

DIVEMASTER SIGNATURE

410-328-7814

EXHIBIT 2

ITEM INVESTIGATION REPORT

SURVEY WH-20-8-93
Item Number 8133 Danger to Nav. Letter Issued (Y/N) N
Charted (Y/N) Y
Chart No. (largest scale) 12214 Edition 37TH Date 6/27/92

DESCRIPTION/SOURCE: TUG SUNK IN 1985; 43' OF WATER / GOAT HASTINGS, OLD INLET

HISTORICAL POSITION: Latitude 38°50'47"N
Longitude 74°54'02"W
Datum NAD83

~~SSS POSITION~~: E/S TRACE Lat 38°50.7172'N
Long 74°54.0397'W

SURVEY REQUIREMENTS:

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

DIVE DATA: Divers BERKOWITZ, SILVERMAN, VELLAQUE
Time of Dive: Commenced 1738 Z Completed 1806 Z
Current 1 KT EBB Visibility 8-10 FT Bottom Type SAND SHELL

RESULTS OF INVESTIGATION: DIVERS DESCENDED MARKER BUOY. THE TUG WAS SEEN 10FT FROM MARKER BUOY ANCHOR. DIMENSIONS OF THE TUG ARE- 85'X15', IT IS LAYING ON ITS PORT THE SUPERSTRUCTURE WAS INTACT, DECK PLATING WAS ERODED. NO PROPELLER OR ANCHOR SEEN. THE TUG IS LAYING IN AN E-W DIRECTION WITH THE BOW TOWARDS THE WEST. DIVER GAUGE LEAST DEPTH WAS 17 FT, MEASURED AT THE TUG'S YARDARM.

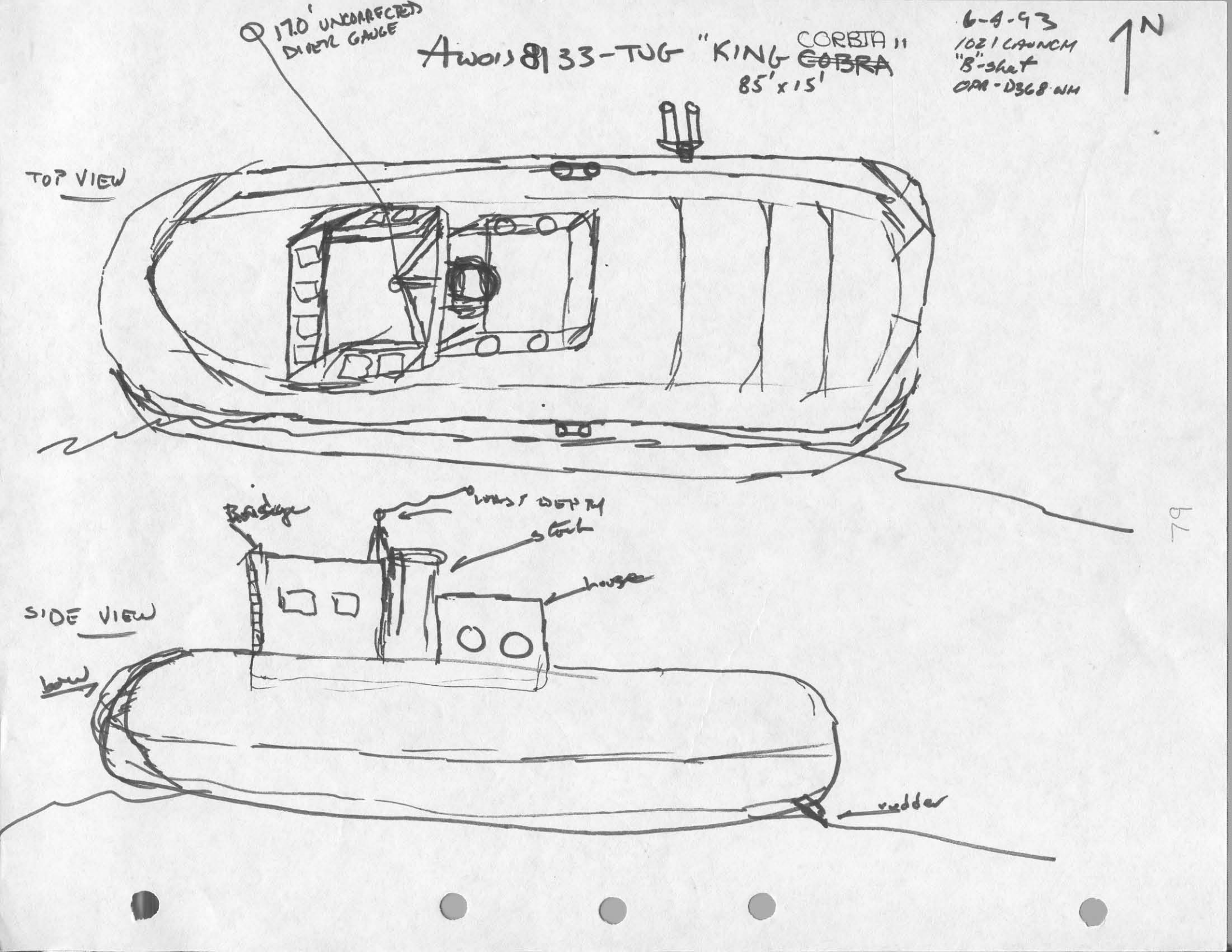
POSITION: Date (M/D/Y) ~~6/6/93~~ 6/4/93 Time (UTC) 182542 Position No. ~~DP5,6~~ 7307
Latitude 38 50.7155 ~~42.94~~ Longitude 074 54.0414 ~~02.49~~ Fix # 7
LORAN-C: GRI (9960) W: 15774.9 X: 27095.8 Y: 42676.0 Z: 59268.6
SNR 930 292 876 895 553

LEAST DEPTH: Date (M/D/Y) 155 ~~6/6/93~~ 6/4/93 Time (UTC) 1755
Method of Least Depth: PNEUMATIC
Measured Least Depth: 1. 16.9 2. 17.0 3. 17.1 Avg. 17.0 Units FT
Corrected Least Depth ~~5.32~~ 5.18 Units meters (~~predicted~~ tides) (TA)
(Uncorrected 5.18 m)

CC 763

CHARTING RECOMMENDATION

SEE PAGE 64 OF THIS REPORT FOR CHARTING RECOMMENDATION.


17.0' UNCORRECTED DIVER GAUGE
AWOIS 8133-TUG "KING CORBRA II
~~COBRA~~
85' x 15'
6-4-93
1021 CRUNCH
"B"-sheet
CAR-D368-WH
N
TOP VIEW
SIDE VIEW
bridge
lowest depth
stack
house
bow
rudder

AMC FORM DV-2

DIVING OPERATIONS

..ATE: 6-4-93

UNIT: NOAA'S WHITING

LOCATION: Approaches to DE Bay - McCrie Shoal

DIVEMASTER: Verlaque

SCIENTISTS: —

TENDERS: Quinn
Wagner

DIVE PLAN: Descend Buoy onto wreck, sweep, what depth, dimensions

MAX. DEPTH: 50'
MAX. TIME: 63'

EQUIPMENT USED: Open Circuit SCUBA

CONDITIONS:
WIND: calm
SEAS: calm 1-1.5 ft
CURRENT: [illegible]

VISIBILITY: —
AIR TEMP.: —
WATER TEMP.: —

DIVERS	SURFACE INTERVAL	GROUP	RESIDUAL NITROGEN	PRESSURE IN / OUT	PRESSURE CHANGE	TIME IN / OUT	BOTTOM TIME	DEPTH	GROUP
Berkowitz		F	37	2900 / 2400	500	1738 / 1813	36	40	
Silverman		F	37	2800 / 2200	600	1738 / 1812	36	40	
ERLAQUE		F	37	2700 / 900	1800	1730 / 1808	38	40	

POST DIVE COMMENTS: WK-TUG!

DIVEMASTER SIGNATURE

DESCRIPTIVE REPORT TO ACCOMPANY
FIELD EXAMINATION SURVEY
OPR-D368-WH
1993
WH-20-9-93
FE-388SS

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

A. PROJECT

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

The purpose of this survey is to disprove AWOIS item #3079.

B. AREA SURVEYED

Field Examination FE-388SS is 9 nautical miles east of Cape Henlopen, Delaware at the eastern approaches to Delaware Bay.

Survey operations began on June 9, 1993 (DOY 160) and ended on June 20, 1993 (DOY 171).

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 each item investigated.

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:

PROGRAM NAME	VERSION	DATE INSTALLED
AUTOST	3.01	18-May-93
BACKUP	2.00	24-Sep-92
BASELINE	1.14	18-May-93
BIGABST	2.05	18-May-93
BLKEDIT	2.02	18-May-93
CARTO	2.06	18-May-93
CONTACT	2.04	18-May-93
CONVERT	3.54	18-May-93
DAS_SURV	6.341	18-May-93
DIAGNOSE	3.03	18-May-93
DISC_UTIL	1.00	24-Sep-92
DP	2.14	18-May-93
EXCESS	4.11	18-May-93
FILESYS	3.05	04-May-93
GRAFEDIT	1.04	18-May-93
HIPSTICK	1.01	24-Sep-92
HPRAZ	1.26	24-Sep-92
INSTALL	4.02	18-May-93
INVERSE	2.01	18-May-93
LISTDATA	1.02	18-May-93
LOADNEW	2.04	18-May-93
LSTAWOIS	3.03	18-May-93
MAINMENU	1.01	18-May-93
MAN_DATA	2.01	18-May-93
NEWPOST	6.01	18-May-93
PLOTALL	2.11	18-May-93
POINT	2.10	24-Sep-92
PRESURV	7.02	18-May-93
PREDICT	2.01	18-May-93
PRINTOUT	4.03	18-May-93
QUICK	2.03	02-Mar-93
RAMSAVER	1.02	18-May-93
REAPPLY	2.03	18-May-93
RECOMP	2.02	24-Sep-92
SCANNER	1.00	24-Sep-92
SELPRINT	2.03	18-May-93
SHEETSPLIT	1.03	18-May-93
SYMBOL	2.00	18-May-93
ZOOMEDIT	2.12	18-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:

Type	S/N
Towfish	16630
260 Recorder	016670

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.

All side scan sonar data was collected using the 50- and 100-meter range scales and 100-Khz frequency.

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 (S/N B053N) 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 for sounding plot purposes.

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 in tolerance.

G. CORRECTIONS TO SOUNDINGS

Sound velocity profiles of the water column were determined using a Seacat Conductivity, Temperature and Depth (CTD) profiler (model SBE 19, s/n 286). The profiler was calibrated on December 16, 1992 during WHITING's winter inport period. A copy of the calibration report is on file at AHS. DATA FILED WITH FIELD RECORDS.

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 separates submitted with this survey. DATA FILED WITH FIELD RECORDS.

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:

DOY	Vel.Table#	Latitude	Longitude	Depth
157	21	38°44'45"	074°55'21"	53.1 m

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. A transducer depth determination conducted on May 20, 1993 confirmed the draft measurement of 3.2 meters. These data are on file at AHS.*

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:

	Time Correction	Height Ratio
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 submitted to Products and Services Branch, Datum Section, N/OES231 on July 2, 1993.

The tide station at Breakwater Harbor was leveled on March 8, 1993. The levels confirmed that the tide staff and marks were undisturbed.

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.

Leadlines were made on April 10, 1993. Calibrations performed on April 26, 1993 confirmed the leadline error was negligible. A leadline comparison with the DSF-6000N was performed on April 3, 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.

* DATA FILED WITH FIELD RECORDS.

Depths were determined by pneumatic gauge on the dive investigations. The calibration reports for the pneumatic gauge are on file at AHS.* Predicted tide correctors were applied to the least depths. APPROVED TIDES APPLIED DURING OFFICE PROCESSING. * DATA FILED WITH FIELD RECORDS.

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 NAD 83 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:

	Latitude	Longitude	Frequency
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

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:

Item	Serial Number
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 the item investigations. A Magnavox 4200 DGPS receiver (S/N 537) with a Magnavox MX50R (S/N 060) differential radio receiver was used to obtain 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 the 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. The Cape Henlopen DGPS receiver system was used for all data acquisition.

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 is 3.7 and 3.1, respectively. No data were acquired at HDOP values exceeding the 1:10,000 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 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.*

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

There is no shoreline in the vicinity of the present survey.

* DATA FILED WITH FIELD RECORDS.

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

Crosslines were not required.

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

This survey junctions with H-10444 (1992). There is no gap in the 200% side scan sonar coverage between the two surveys and soundings at the junction are in good agreement. Between H-10444 (1992) and this survey, the entire 1000 meter search radius for AWOIS item #3079 is covered.

M. COMPARISONS WITH PRIOR SURVEYS SEE ALSO SECTION 6. OF THE EVALUATION REPORT.
Soundings on this survey are in good agreement with prior surveys H-9173WD (1970) and H-9723 (1977). WHITING recommends that the hydrography for this survey supersede all hydrography from prior surveys in the common area.

N. ITEM INVESTIGATIONS

AWOIS #3079

Reported Latitude:	38°48'30.40" N
Reported Longitude:	074°55'28.62" W
Datum:	NAD 83

A CHARTED DANGEROUS SUNKEN WRECK, ED, AND A DANGER CURVE
AWOIS #3079, originates with CL 800/70 in which the 3rd U.S. Coast Guard District reported the 46-foot fishing vessel, F.W. SCHEPPER II, sunk at the above position.

Survey requirements were to verify or disprove the wreck with 200% side scan sonar coverage in a 1000-meter radius about the charted position. The complete search radius was investigated thoroughly by side scan sonar during H-10444 (1992) and FE-388SS by using the 50- and 100-meter range scales. Within the search radius no significant contacts were located on H-10444 (1992) and three contacts were located on the present survey. One contact was considered insignificant. The other two contacts (#34.26S and #66.05P) were investigated by divers.

As none of these contacts were the wreck of the F.W. SCHEPPER II, and no other contacts were detected, the charted wreck ED is disproved at the reported position. WHITING recommends that the wreck symbol, ED be removed from the chart. CONCUR

Echo-sounding was used on contacts #34.26S and #66.05P to pinpoint the divers drop position. Once the item was located, a position and least depth were determined during dive operations.

A. Contact #34.26S POSITION 8 (D)

The divers located a natural area of rocky bottom (12.2 m x 4.6 m with rocks rising about 0.6 m off the bottom) centered at latitude 38°48'47.15"N, longitude ~~075°01'10.0"W~~ 74°56'01.75"W, with a pneumatic least depth of 10.~~9~~8 meters (corrected for ~~predicted~~ tides).

WHITING recommends that a ROCK WITH A KNOWN DEPTH (35 FT) 10.~~9~~8-meter ~~sounding and the bottom characteristic Rky~~ be charted in the PRESENT survey position. CONCUR

B. Contact #66.05P

The divers located a marine-growth encrusted 55-gallon drum with both ends cut or rusted out in latitude 38°49'00.14"N, longitude 074°55'41.6~~5~~"W, with a pneumatic gauge least depth of 11.~~7~~6meters (corrected for ~~predicted~~ tides). The surrounding depths are 12.~~7~~6meters to ~~11.0~~ 12.8 meters.

WHITING recommends that this obstruction not be charted since it does not constitute a danger to navigation. CONCUR

O. COMPARISON WITH THE CHART SEE ALSO SECTION 7.9. OF THE EVALUATION REPORT.

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

The charted hydrography originates with prior surveys mentioned in section M, and requires no further consideration.

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

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

In conjunction with survey H-10444 (1992), this survey is complete and adequate to disprove AWOIS #3079, the charted wreck ED, and for updating the charts of the survey area.

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

There are no aids to navigation within the limits of the survey.

R. STATISTICS

Number of Positions	94
Main-scheme Sounding Lines (Nautical Miles)	15.7
Crosslines (Nautical Miles)	None
Square Nautical Miles Surveyed	0.6
Days of Production	3
Detached Positions	4
Bottom Samples	None
Tide Stations Installed	None
Current Stations	None
Number of CTD Casts	1
Magnetic Stations	None

S. MISCELLANEOUS

No anomalies in either tide or current and/or unusual magnetic variations were encountered in the survey area. No bottom samples were taken, but one bottom characteristic was determined by divers (see section N, subsection A).

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

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

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
User Evaluation Report

ITEM INVESTIGATION REPORT

SURVEY FE-388SS
Item Number N/A
Charted (Y/N) N
Chart No. (largest scale) 12214 Edition 37th Date 6/27/92

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

DESCRIPTION/SOURCE: FE-388SS (34.26S)

HISTORICAL POSITION: Latitude ~~_____~~
Longitude ~~_____~~
Datum ~~_____~~

SSS POSITION: (34.26S) 77.85P
Lat 38°48.7858'N ✓
Long 074°56.0183'W ✓

SURVEY REQUIREMENTS: LEAST DEPTH

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

DIVE DATA: Divers RILEY, VERLARQUE
Time of Dive: Commenced 210000 UTC Completed 213000 UTC
Current 0.75 KNOTS EBB Visibility 5-7' Bottom Type BROWN SAND/SHELL

RESULTS OF INVESTIGATION:
BOULDER/ROCK NATURAL FORMATION IN 40' WATER
ROCKS EXTENDED APPROXIMATELY 2' OFF BOTTOM COVERING
APPROXIMATELY 40'x15' AREA

POSITION: Date (M/D/Y) 6/10/93 Time (UTC) 215751 Position No. ~~81.10~~ 81Ø1 FIX: 101
Latitude 38° 48.7857'N (38° 48' 47.145") Longitude 074° 56.0183' W (074° 56' 01.098")
LORAN-C: GRI (9960) W: 15782.4 X: 27102.6 Y: 42652.4 Z: 59253.2
MASTER: 880 S/N: 449 910 942 736

LEAST DEPTH: Date (M/D/Y) 6/10/93 Time (UTC) 210800
Method of Least Depth: PNEUMO 37.5
Measured Least Depth: 1. ~~37.0~~ 2. ~~37.5~~ 3. 37.2 Avg. 37.2 Units FT
Corrected Least Depth ~~____~~ 10.98 Units meters (predicted tides) (35FT)
uncorrected (11.3m)

CHARTING RECOMMENDATION
SEE PAGE 89 OF THIS REPORT FOR CHARTING RECOMMENDATION.

VNB

ITEM INVESTIGATION REPORT

SURVEY FE-388S
Item Number N/A
Charted (Y/N) N
Chart No. (largest scale) 12214 Edition 37th Date 6/27/92

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

DESCRIPTION/SOURCE: FE-388S (66.05P)

HISTORICAL POSITION: Latitude ~~_____~~
Longitude ~~_____~~
Datum ~~_____~~

SSS POSITION: (66.05P) (48.06P)
Lat 38°49.0000'N 38°49'00.0"N
Long 074°55.6950'W 074°55'41.7"

SURVEY REQUIREMENTS: LEAST DEPTH

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

DIVE DATA: Divers Riley, ~~BERKOWITZ~~ SILVERMAN
Time of Dive: Commenced 1645 UTC Completed 1700 UTC
Current 1.5 kts Visibility 20-25 ft Bottom Type Sand SH

RESULTS OF INVESTIGATION: 55 gal Drum, encrusted with marine growth. Both ends were cut out. Gravel (4ft wide) extending west from drum @30ft long.

POSITION: Date (M/D/Y) 6/20/93 Time (UTC) 162113 Position No. Fix*100
38°49'00.18" Latitude 38-49.0022 Longitude ~~074-55-6938~~ 074°55'41.68"W
LORAN-C: GRI (9960) W: 15781.1 X: 27101.3 Y: 42654.9 Z: 59255.2

LEAST DEPTH: Date (M/D/Y) 6/20/93 Time (UTC) 1655
Method of Least Depth: pneumo
Measured Least Depth: 1. 39ft 2. 38.8 3. 39.2 Avg. 39.0 Units FT
Corrected Least Depth 11.7m Units meters (predicted tides) (38 FT)
uncorrected (11.9m)

CHARTING RECOMMENDATION
SEE PAGE 89 OF THIS REPORT FOR CHARTING RECOMMENDATION.

MPB

HDAPS Pre-Survey Program Version: 7.00 PRE-SURVEY: CONTROL STATION TABLE 10:07:04 2 Dec 1

Station No ?

No	Type	Lat	Lon	H	Cart	Freq	Vel Code	MM/DD/YY	Station Name
1	G	038:46:36.421	075:05:15.667	0	250	298.0	0	09/03/92	CAPE HENLOPEN (DGPS)
2	G	036:55:37.530	075:00:23.884	0	250	289.0	0	09/03/92	CAPE HENRY (DGPS)
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0	03/01/91	

Control Station Table saved to disk

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

October 15, 1992

Commander, Fifth Coast Guard District
Aids to Navigation Branch
Federal Building, 431 Crawford Street
Portsmouth, VA 23704-5004

Dear Sir:

While conducting hydrographic survey operations in the approaches to Delaware Bay, an uncharted wreck was discovered with side scan sonar near the edge of the precautionary area approximately 0.3 nautical miles southwest of Buoy "4". Attached, are a Danger to Navigation report and a chartlet indicating the location of the wreck.

Differential GPS was used to determine the wreck's position.

A copy of this letter and attachments have been forwarded to the following offices:

Chief, Nautical Charting Division, NOAA
Director, Defense Mapping Agency
Hydrographic/ Topographic Center

Sincerely,

Andrew A. Armstrong III
Commander, NOAA
Commanding Officer

Attachments

cc:N/CG2
DMAHTC

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: H-10444

State: Delaware

General Locality: Approaches to Delaware Bay

Sublocality: 9 NM East of Cape Henlopen

Project Number: OPR-D168-WH-92

The following item which is a potential danger to navigation was discovered during hydrographic survey operations by the NOAA Ship WHITING.

Object Discovered:

An uncharted wreck was found with side scan sonar having approximate dimensions 7x30 meters and laying in an east-west orientation. A diver investigation determined the least depth by leadline and diver depth gauge.

Covers/~~Uncovers~~/~~Bares~~ ~~49.2~~ 52.5 feet (~~15.0~~ 16.0 meters) corrected to MLLW using predicted tide correctors.

Affected Nautical Charts:

Chart Number	EDITION NO.	DATE	REPORTED DEPTH	CHART HOR. DATUM	GEOGRAPHIC POSITION LATITUDE	LONGITUDE
12200	40	5/9/92	~~49.2~~ 52.5 FT	NAD 83	38°48'00.~~6~~54"N	74°58'~~46.5~~48.54"W
12304	33	8/10/91	same	same	same	
12214	37	6/27/92	same	same	same	

Questions concerning this report should be directed to the Atlantic Marine Center in Norfolk, Virginia, at telephone number 804-441-6489.

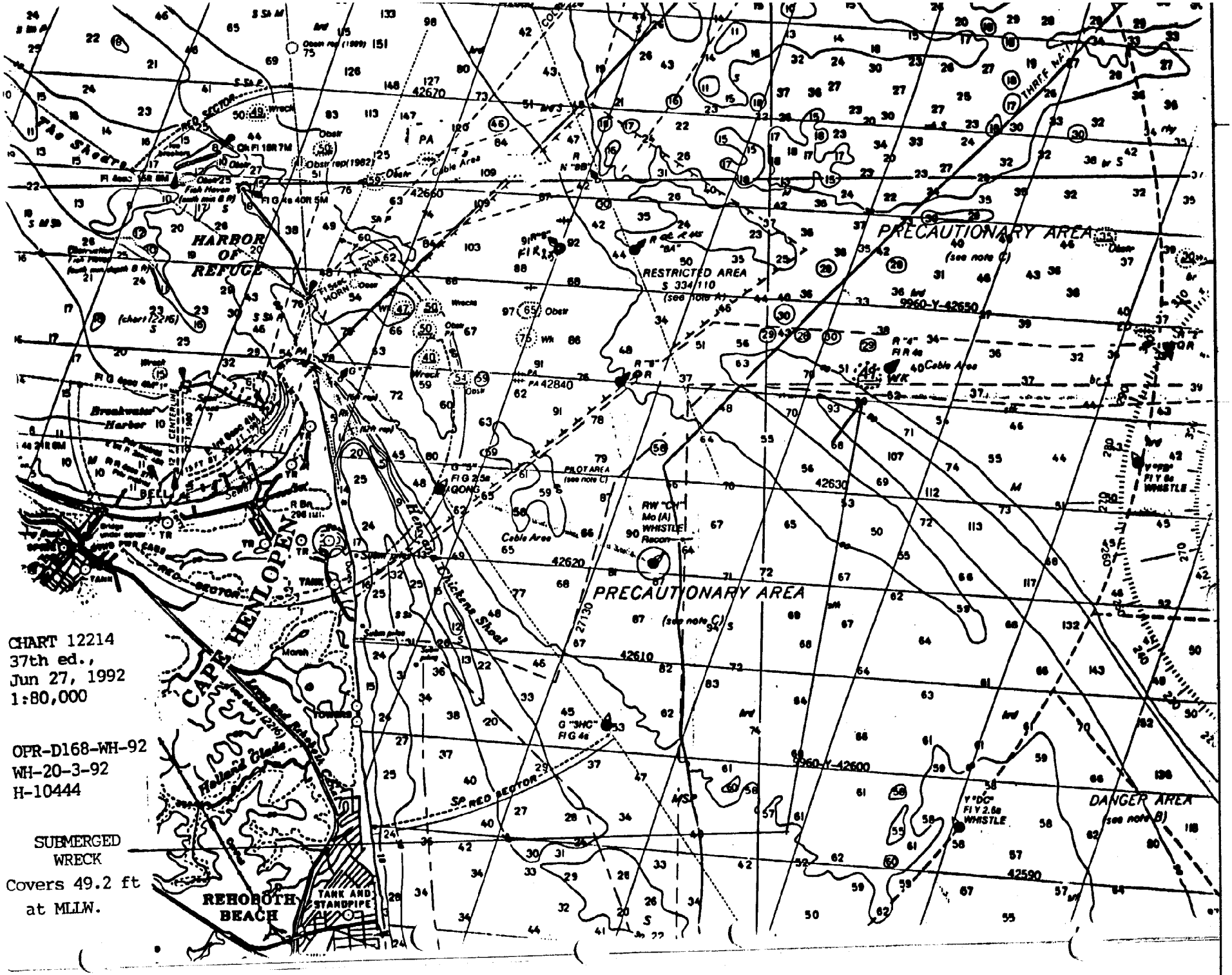


CHART 12214
37th ed.,
Jun 27, 1992
1:80,000

OPR-D168-WH-92
WH-20-3-92
H-10444

SUBMERGED
WRECK
Covers 49.2 ft
at MLLW.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Rockville, Maryland 20852

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: December 29, 1992

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-D168-WH

HYDROGRAPHIC SHEET: H-10444

LOCALITY: Delaware, Atlantic Ocean, 9 NM East of Cape Henlopen

TIME PERIOD: October 8 - October 28, 1992

TIDE STATION USED: 855-7380 Lewes (Ft. Miles), Breakwater Harbor, Delaware Lat. 38° 46.9'N Lon. 75° 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.

for _____
CHIEF, DATUMS SECTION

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: June 4, 1993

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-D368-WH

HYDROGRAPHIC SHEET: H-10444

LOCALITY: Delaware, Atlantic Ocean, 9 NM East of Cape Henlopen

TIME PERIOD: March 24 - April 25, 1993

TIDE STATION USED: 855-7380 Lewes (Ft. Miles), Breakwater Harbor, Delaware Lat. 38° 46.9'N Lon. 75° 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.

CHIEF, DATUMS SECTION

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, 1992

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-D368-WH

HYDROGRAPHIC SHEET: ~~FE-385SS~~ H-10444

LOCALITY: Approaches to Delaware Bay

TIME PERIOD: May 22 - 23, 1993

TIDE STATION USED: 855-7380 Lewes (Ft. Miles), Breakwater Harbor, Delaware Lat. 38° 46.9'N Lon. 75° 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.

CHIEF, DATUMS SECTION

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, 1992

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-D368-WH

HYDROGRAPHIC SHEET: ~~FE-387SS~~ H-10444

LOCALITY: Approaches to Delaware Bay

TIME PERIOD: May 24 - June 6, 1993

TIDE STATION USED: 855-7380 Lewes (Ft. Miles), Breakwater Harbor, Delaware Lat. 38° 46.9'N Lon. 75° 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.

CHIEF, DATUMS SECTION

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, 1992

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-D368-WH

HYDROGRAPHIC SHEET: ~~FE-388SS~~ H-10444

LOCALITY: Approaches to Delaware Bay

TIME PERIOD: June 9 - 20, 1993

TIDE STATION USED: 855-7380 Lewes (Ft. Miles), Breakwater Harbor, Delaware Lat. 38° 46.9'N Lon. 75° 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.

CHIEF, DATUMS SECTION

NOAA FORM 76-155
(11-72)

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

SURVEY NUMBER

H-10444

GEOGRAPHIC NAMES

Name on Survey	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	
ATLANTIC OCEAN (title)										1
DELAWARE (title)										2
DELAWARE BAY (title)										3
										4
										5
										6
										7
										8
										9
										10
										11
										12
										13
										14
										15
				Approved:						16
										17
				Charles E. Harrington						18
				Chief Geographer						19
				JUN - 7 1993						20
										21
										22
										23
										24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

10/01/93

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10444

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	2883
NUMBER OF SOUNDINGS	22356

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	323	04/15/93
VERIFICATION OF FIELD DATA	266	09/08/93
ELECTRONIC DATA PROCESSING	153	
QUALITY CONTROL CHECKS	37	
EVALUATION AND ANALYSIS	127	09/28/93
FINAL INSPECTION	18	09/28/93
TOTAL TIME	924	

ATLANTIC HYDROGRAPHIC SECTION APPROVAL 09/30/93

APPROVAL SHEET

HYDROGRAPHIC AND
SIDE SCAN SONAR SURVEY
OPR-D168-WH
1992
WH-20-3-92
H-10444

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 (but not fully investigating) all potential dangers to navigation. No final field sheets were prepared for this survey. The survey data and accompanying records are complete and adequate for the preparation of the smooth sheet. Due to the lack of supporting echograms and sonargrams in portions of the survey, this survey is not considered complete. Those areas for which no graphic data exists should be re-surveyed.

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. The investigation of any significant contacts will be assigned as a separate survey.

Approved By:

Andrew A. Armstrong III
Commander, NOAA
Commanding Officer

APPROVAL SHEET
H-10444

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.

Leroy G. Cram Date: 09/28/93
Leroy G. Cram
Chief, Hydrographic Processing Team B
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: 09/29/93
Nicholas E. Perugini, LCDR, NOAA
Chief, Atlantic Hydrographic Section

****

Final Approval:

Approved: for Andrew A. Armstrong Date: Oct 5, 1998
J. Austin Yeager
Rear Admiral, NOAA
Director, Coast and Geodetic Survey

COAST AND GEODETIC SURVEY
ATLANTIC HYDROGRAPHIC SECTION
EVALUATION REPORT

SURVEY NO.: H-10444 FIELD NO.: WH-20-3-92

Delaware, Atlantic Ocean, 9 NM East of Cape Henlopen

SURVEYED: 8 October 1992 through 20 June 1993

SCALE: 1:20,000 PROJECT NO.: OPR-D168-WH-92
OPR-D368-WH-93

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

CONTROL: MAGNAVOX MX4200 Satellite Receiver/MAGNAVOX MX50R Beacon Receiver (Differential Global Positioning System, (DGPS)), ASHTECH GPS Sensor/MAGNAVOX MX50R Beacon Receiver (DGPS)

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

Surveyed by.....S. R. Barnum
.....C. B. Greenawalt
.....J. S. Verlaque
.....J. G. Clayton
.....R. A. Fletcher
.....D. E. Bixby
.....L. P. Henn
.....J. L. Riley
.....N. O. Silverman
.....M. P. Zipperer
.....E. W. Berkowitz

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

1. INTRODUCTION

a. Under the authority of Project Instructions, OPR-D368-WH-93, dated 23 February 1993, additional work was conducted on this survey. Field examination surveys FE-385 (1993), FE-387 (1993), and FE-388SS (1993) were generated to verify or disprove contacts located by the present survey. These surveys have been incorporated into the present survey. The field examination numbers have been rescinded. All Descriptive Reports have been incorporated into the present survey Descriptive Report.

b. This is a combined basic hydrographic/side scan sonar survey. A RAYTHEON DSF-6000N was operated concurrently with the side scan sonar. A pneumatic depth gauge was used to determine least depths during dive operations.

SJV 11/2/93

H-10444 SJV 11/2/93

c. A 1:20,000 scale smooth sheet and one, 1:20,000 scale page size plot were generated during office processing. The 1:20,000 scale page size plot is attached to this report.

d. 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 (12.47 meters or 0.624 mm at the scale of the survey) north in latitude, and 1.380 seconds (33.30 meters or 1.665 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 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 and FIELD PROCEDURES MANUAL. The following should be noted:

The field unit verified but did not adequately locate three floating aids to navigation as required by section 4.2.1. of the Project Instructions.

5. JUNCTIONS

H-10440	(1992)	to the northeast
H-10446	(1992-93)	to the northwest
H-10475	(1993)	to the southeast
H-10476	(1993)	to the southwest

A standard junction was effected between the present survey and surveys H-10440 (1992) and H-10446 (1992).

A standard junction could not be effected with surveys H-10475 (1993) and H-10476 (1993). Junctional surveys H-10475 (1993) and H-10476 (1993) have not reached the sounding stage of office processing. Any adjustments to the depth curves in the junctional areas of the present survey will need to be made at headquarters on the chart during compilation.

Present survey depths are in harmony with the charted hydrography to the north and south.

6. COMPARISON WITH PRIOR SURVEYS

a. Hydrographic

H-9153	(1970-71)	1:10,000
H-9175	(1970)	1:10,000
H-9176	(1970)	1:10,000
H-9723	(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., pages 10 and 11 of the Descriptive Report and need no further discussion.

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

b. Wire Drag

FE-91	(1950)	1:40,000
H-9173WD	(1970)	1:20,000

1) A hang from prior survey FE-91WD (1950) falls in an area common to the present survey. The hang was assigned AWOIS item #1133 and is adequately discussed in section N.,

page 12, of the Descriptive Report, and requires no further discussion in this report.

In the vicinity of Latitude 38°45'12.0"N, Longitude 74°54'00.0"W, a conflict between prior survey FE-91WD (1950) effective clearance depths and present survey soundings is considered disproved by the present survey.

2) The following uncharted groundings, originating with prior survey H-9173WD (1970), fall in areas common to the present survey:

Groundings	Latitude (N)	Longitude (W)	Present survey Depths (M/FT)
37ft/11^2m	38°48'33.85"	74°55'30.00"	12/39
37ft/11^2m	38°48'31.50"	74°55'25.60"	12^3/40
41ft/12^5m	38°48'19.45"	74°54'09.00"	13^3/43
41ft/12^5m	38°48'29.00"	74°53'24.00"	13-13^3/42-43

The uncharted groundings were disproved by the present survey. No change in charting is recommended.

There are no conflict between prior survey effective clearance depths and the 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. The hydrographer makes an adequate chart comparison on pages 10 through 95 of the Descriptive Report.

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

b. Dangers to Navigation

The hydrographer identified one danger to navigation and submitted information for inclusion into a Local Notice to Mariners, to the Commander (oan), Fifth Coast Guard District, Portsmouth, Virginia. A copy of the letter was forwarded to Chart Information Section, N/CG222, Rockville, Maryland. After office processing it is recommended that the information be retained.

c. Aids to Navigation

There are three floating aids to navigation shown on the present survey. These aids appear adequate to serve their intended purpose.

8. COMPLIANCE WITH INSTRUCTIONS

This survey complies with the Project Instructions except as noted in section 4. of this report.

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

74° 54' 30"

74° 54' 00"

74° 54' 00"

38° 51' 00"

NAD 27

38° 51' 00"

XYNETICS 1201

✓F.S 8/28/1993

38° 51' 00"

7307

38° 50' 30"

H-10444

POSITION OVERLAY TO ACCOMPANY

SHEET 2 OF 2

38° 50' 00"

74° 54' 30"

74° 54' 00"

74° 54' 00"

38° 51' 00"

NAD 27

38° 51' 00"

XYNETICS 1201

✓F.S 8/28/1993

38° 51' 00"

5^2 Wk (tug) "KING CORBIA"

38° 50' 30"

H-10444
DELAWARE
DELAWARE BAY
9 NM EAST OF CAPE HENLOPEN
DATE OF SURVEY: 4 JUN 1993
SCALE: 1:10000
SOUNDINGS IN METERS AT MLLW
HORIZONTAL DATUM: NAD 1983
SHEET 2 OF 2

38° 50' 00"

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10444

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
12214	2/24/94	L. Arkwan	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 50
12304	3-10-94	RB Ross	Full Part Before After Marine Center Approval Signed Via
			Drawing No. 59 xdgs: App'd thru 12214
12200	3-11-94	John Barker	(Full) Part Before After Marine Center Approval Signed Via
			Drawing No. 55 App'd thru cht 12214
~~13003~~ 12300	4/1/95	RB Ross	(Full) Part Before After Marine Center Approval Signed Via
			Drawing No. 64. Area in 3E area No Con.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.