

H10116

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey .. Hydrographic

Field No. WH-10-02-83

Registry No. H-10116

LOCALITY

State Virginia

General Locality .. Chesapeake Bay

Sublocality Tail of the Horseshoe

19 83

CHIEF OF PARTY
LCDR D.L. Suloff

LIBRARY & ARCHIVES

DATE April 9, 1986

DIAGRAM 1222-4



DIAGRAM

Charts

- 12222
- 12254
- 12221
- 12220
- 12200

HYDROGRAPHIC TITLE SHEET

H - 10116 ✓

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

FIELD NO.

WH - 10 - 2 - 83 ✓

State Virginia ✓

General locality Chesapeake Bay ✓

Locality Tail of the Horseshoe ✓

Scale 1 : 10,000 Date of survey 5 Oct. - ⁹10 Nov. 1983

Original Proj. Inst. dated 15 April 1983
Instructions dated Change No. 1 dated 5 Aug. 1983 Project No. OPR - D103 - WH - 83 ✓

Change No. 2 dated 23 Sept. 1983
Vessel Ship WHITING S329 (2930), Launch 1015 (2931), Launch 1014 (2930)

Chief of party LCDR. Donald L. Suloff ✓

Surveyed by PDW, MEH, TAW, PMK, IAF ✓

Soundings taken by echo sounder, hand lead, pole Ross Model 5000 Finline Echo Sounder ✓

Graphic record scaled by Ship Whiting Personnel

Graphic record checked by MEH, TAW, PMK, IAF, FRC, MF, JAZ

Protracted by - Automated plot by Hydroplot (WHITING)

Verification by Ship Whiting Personnel D.V. Mason & R.L. Keene (AMC)
XYNETICS 1241 Plotter (AMC)

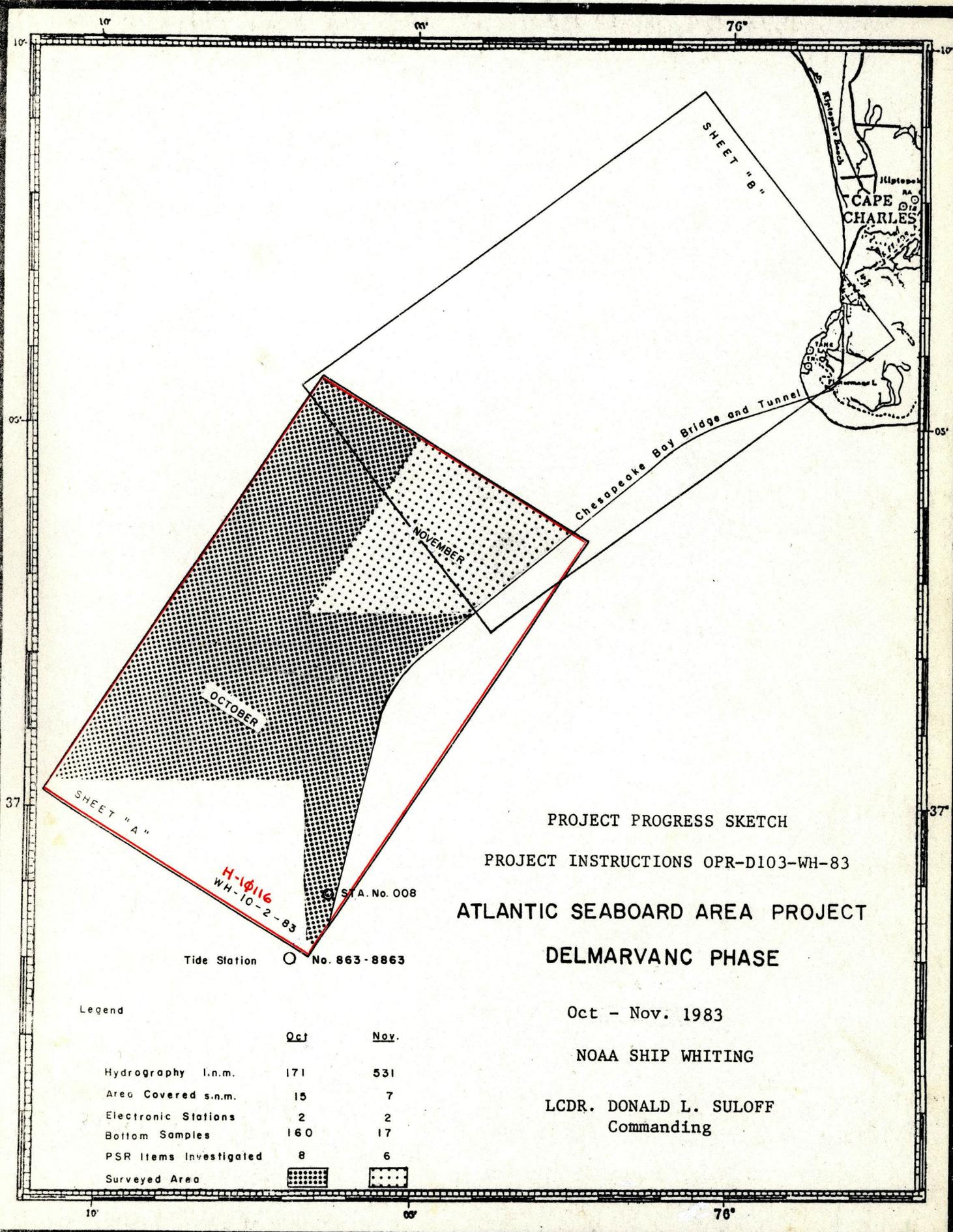
Soundings in ~~fathoms~~ feet ✓ at MLW MLLW

REMARKS:

Notes in the Descriptive Report were made in red during verification.

SC 4-15-97

SURF and AWOIS ✓ 4/89 sRB



PROJECT PROGRESS SKETCH
 PROJECT INSTRUCTIONS OPR-D103-WH-83
 ATLANTIC SEABOARD AREA PROJECT
 DELMARVANC PHASE

Oct - Nov. 1983

NOAA SHIP WHITING

LCDR. DONALD L. SULOFF
 Commanding

Legend

	Oct	Nov.
Hydrography l.n.m.	171	531
Area Covered s.n.m.	15	7
Electronic Stations	2	2
Bottom Samples	160	17
PSR Items Investigated	8	6
Surveyed Area		

Tide Station  No. 863-8863

STA. No. 008

H-10116
 WH-10-2-83

DESCRIPTIVE REPORT

TO ACCOMPANY

BASIC HYDROGRPHIC SURVEY ✓

(WH-10-2-83) ✓

H-10116 ✓

SCALE 1:10,000 ✓

SURVEYED 05 October - 09 November 1983 ✓

NOAA SHIP WHITING (S-329) ✓

LCDR DONALD L. SULLOFF, NOAA ✓

COMMANDING OFFICER

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A. PROJECT

Hydrographic Survey H-10116 was performed in accordance with Project Instructions OPR-D103-WH-83, Atlantic Seaboard Area Project (ASAP), DELMARVANC PHASE, dated 15 April 1983, as amended by Change No. 1, dated 05 August 1983, and supplemented by Change No. 2, dated 27²³ September 1983. The purpose of this project was to maintain and revise the existing nautical charts for the southern portion of Chesapeake Bay, west of the Chesapeake Bay Bridge and Tunnel.

B. AREA SURVEYED

The area surveyed is the southern portion of Chesapeake Bay, west of the Chesapeake Bay Bridge and Tunnel around the area known as Tail of the Horseshoe. The area surveyed is bounded by the following points west of the Bay Bridge and Tunnel:

37°05.6"N	76°06.6'W
37°03.5'N	76°02.5"W
36°58.6"N	76°06.7'W
37°00.0'N	76°11.0'W

This survey was divided into two sections - east and west. Survey H-10116 was conducted from 05 October until 09 November 1983, ~~Julian~~^{Year} Days 278-313.

C. SOUNDING VESSEL

The sounding vessels used throughout this survey were WHITING survey launches 1015 (EDP 2931) and 1014 (EDP 2932). The NOAA Ship WHITING (EDP 2930) was used for bottom samples on YD's 283, 284, 293 and 294. Each vessel was equipped with a Ross 5000 Fineline Echo sounder, along with standard hydrographic equipment. The Del Norte electronic positioning system was used for control on this project.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS - See sections 4.a, 4.b, 4.c, and 4.d. of the Evaluation Report

The sounding equipment used throughout this survey was the Ross 5000 Fineline Echo sounder. The following is a list of serial numbers:

<u>Vessel Number</u>	<u>Serial Number</u>	<u>Year</u> <u>Julian</u> Days
2930	1078	283-294
2931	1052	278-313
2932	1087	281-297
	1078	297-312

The blanking was set at either 5 or 10 feet in order to insure that the phase and initial were adjusted correctly. Phase checks were recorded routinely to double-check the initial setting. No problems were encountered with the echo sounders.

A Klein Side Scan Sonar System (s/n 249) was used on JD's 286-311 during the PSR Item investigations.

Depths on this survey varied between ~~4~~⁸ and 74 feet with an average depth of approximately 30 feet.

The following procedures were used to determine the corrections to echo soundings:

Velocity Corrections - Daily bar checks were performed on both launches to determine velocity corrections. At least one check was made daily, and two were made when weather conditions permitted. Bar check lines were measured against a steel tape on 14 October 1983. No errors were found. The data and resulting graphs are included in Attachment D. - See section 4.b of the Evaluation Report.

Draft Corrections - A standard launch draft correction of 1.5 feet and an instrument error correction of 0.0 feet was also applied to all plotted soundings.

On JD 297, the Ross echo sounder (s/n 1087) in Launch 2932 began to have a problem with the instrument initial fluctuating. The unit was replaced and all scanning for this day was adjusted to account for the variation in instrument initial.

Settlement and Squat - Trials were run for the WHITING launches on 06 June 1983. All tests were performed in 40 feet of water, at Prince George Wharf, Nassau, Bahamas. The correctors compared very well with data from the 1982 field season. All data are included in Attachment D. - See section 4.h. of the Evaluation Report

Predicted Tides - Tide correctors for the smooth field sheets were determined from logger tapes and tide tapes produced by WHITING personnel. The reference gage used was Hampton Roads, Virginia (863-8610). - Smooth tides applied to processed survey. See Tide Note attached to this report.

An abstract of correctors to echo soundings is included in Attachment D, along with printouts of the velocity and TC/VI tapes.

E. HYDROGRAPHIC SHEETS (FIELD SHEETS)

All field sheets were prepared by WHITING personnel using a Houston Instrument DP-3 Roll Plotter (s/n 5848-22). This survey was divided into two sheets, with a skew of 057 degrees, and the following origins:

East Sheet	36°57'54"N	76°06'48"W
West Sheet	36°59'00"N	76°09'00"W

The two sheets are bounded by the following points:

East	West
37°04'51.0"N 76°05'03.0"W	37°05'39.0"N 76°06'34.0"W
37°03'33.0"N 76°02'37.0"W	37°04'51.0"N 76°05'03.0"W
36°58'33.0"N 76°06'33.0"W	37°00'22.8"N 76°08'44.5"W
37°00'22.0"N 76°08'44.5"W	37°00'22.8"N 76°10'52.8"W

A total of 23 field sheets are submitted with this survey; 8 rough sheets, 4 boat sheets and 11 smooth sheets. The smooth sheets are broken down as follows: Two smooth sheets with mainscheme, 100% and 200% side scan development; two smooth sheets with crosslines, detached positions, bridge junction lines; two smooth sheets with bottom samples; two smooth sheets with 300% and 400% side scan development; two smooth contour overlays for the east sheet; and one side scan contact sheet. All plotted sheets and field records have been submitted to N/MOA23 for verification.

F. CONTROL STATIONS

The following signals were used as electronic positioning control stations, visual signals or fixed point calibration signals:

<u>Signal No.</u>	<u>Name</u>	<u>Year Est'd</u>
002	Thimble Shoal Lighthouse	1919
003	Radio Transmission Tower	1980
004	Little Creek Amphibious Base Tank Light	1952
005	Little Creek 1929	1929
006	Little Creek NAB Desert Cove Water Tank	1944
007	Little Creek Naval Amphibious Base Tank	1952
008	Bay Bridge Piling 1980	1980
009	H-55 VA	1980

These signals were all previously established stations. The positions for these stations were obtained from NOS Horizontal Control Data Quads and are based on NAD 1927. Stations #002 and #009 were used for electronic control stations. Station #008 was used as a fixed point calibration site. All other stations were used for visual calibration. Control sites were identified for the WHITING by AMC personnel.

The survey signal list is appended to this report in Attachment F.

G. HYDROGRAPHIC POSITION CONTROL - See section 4.k of the Evaluation Report.

Range/range control using the Del Norte positioning system was used throughout this survey for all vessels. Frequent problems were encountered with this system. Failures predominantly occurred in the DMU's which required continuous maintenance. The units were replaced as they malfunctioned and it is not felt the positioning accuracy was degraded beyond acceptable limits.

The following Del Norte components (listed by serial numbers) were used aboard launch 1014 (VESNO 2932):

<u>SD</u>	<u>DMU</u>	<u>Master</u>	<u>Left Remote</u>	<u>Right Remote</u>
281	230	162	262	251
282	230	162	262	251
283	395	162	262	251
284	395	162	262	251
285	230	162	262	251
286	230	162	262	251
291	395	169	262	251
292	295	169	262	251
296	395	169	262	251
297	395	169	262	251
299	172	169	262	251
301	172	169	262	251
305	172	169	262	217
306	172	169	262	217
307	172	169	262	217
309	172	169	262	217
311	172	169	262	217
312	172	169	262	217

The following Del Norte components and serial numbers were used aboard Launch 1015 (VESNO 2931):

<u>SD</u>	<u>DMU</u>	<u>Master</u>	<u>Left Remote</u>	<u>Right Remote</u>
281	298	281	262	251
282	298	281	262	251
285	298	281	262	251
286	298	281	262	251
291	298	281	262	251
291	172	912	262	251
292	298	281	262	251
296	172	281	262	251
297	298	219	262	251
299	298	281	262	251
301	298	281	262	251
305	298	281	262	217
306	298	281	262	217
307	298	281	262	217
309	298	281	262	217
310	298	281	262	217
311	298	281	262	217
312	298	281	262	217
313	395	281	262	217

The following Del Norte components were used aboard the NOAA Ship WHITING S-329 (VESNO 2930):

<u>SD</u>	<u>DMU</u>	<u>Master</u>	<u>Left Remote</u>	<u>Right Remote</u>
283	395	162	262	251
284	395	162	262	251
293	298	281	262	251
294	293	281	262	251

Slave unit stations were chosen so that intersection angles between the ranges were greater than 30° and no more than 150° . All range/range data for this survey was recorded in real time using RK112 and the launch computer systems. The ship and its on-line computer system was used to collect bottom samples on JD's 283, 284, 293 and 294.

Calibrations for the Del Norte system were computed in accordance with the Hydrographic Manual. All Del Norte equipment was calibrated over a measured baseline prior to each trip of the survey. The primary baseline was established between AMC and Hospital Point in Portsmouth. A secondary baseline was established along Shore Drive in Virginia Beach.

Field calibrations were performed twice daily by each launch using a fixed point on the Chesapeake Bay Bridge and Tunnel (Station #008). Closing calibrations were not performed for launch 1014 on JD's 291 and 307, and for launch 1015 on JD 282 when equipment malfunctions prevented their completion. On JD 291 the DMU in launch 1015 was replaced and work continued after the new equipment was calibrated. There was no closing calibration for the malfunctioning unit.

The WHITING collected bottom samples when weather conditions made launch operations impossible. On JD 284 visibility was so poor that an accurate visual calibration could not be performed. Calibrations for the previous day's work (JD 283) by the WHITING were used for bottom sample operations. However, a calibration was performed the following day when visibility had improved. On JD 294, a closing calibration could not be performed following bottom samples, again due to poor visibility.

On several occasions there appeared to be interference problems with the line of sight reception from Station #009 (H-55 VA) and the area behind the Bridge and Tunnel islands. No adequate explanation was ever found, since this was not a continuous problem. Reception would resume again at a later date for no apparent reason. These areas were surveyed during periods when reception was satisfactory. It was noted, however, that this problem sometimes occurred on extremely calm days when there was almost no wind or sea action.

The Del Norte equipment was plagued with electronic problems throughout the survey. This affected baseline calibrations since matched pairs of baseline calibrated units had to be swapped out as more and more components failed. Time constraints precluded baseline calibrating the remaining components as equipment failed. Since this was the case, average daily correctors were used by the hydrographer for all rough and smooth plotted field sheets.

An ANDIST corrector of zero was used during all fixed point and visual calibrations. During visual calibrations the observers were able to stand near the Del Norte master unit. During fixed point calibrations the master antenna was brought alongside the fixed point site at Station #008 (Bay Bridge Piling 1980). All values used on corrector tapes are shown on the Electronic Corrector Abstract in Attachment E. All raw calibration data are included in the supplemental data folder.

H. SHORELINE

There was no shoreline on this survey; however, the Chesapeake Bay Bridge and Tunnel was on the eastern survey limits. Three of the man-made Bridge and Tunnel islands were located within the survey limits. Survey lines were run parallel to the bridge on both the east and west sides, approximately 15 meters from the bridge pilings. Survey lines were also run around Bridge and Tunnel Islands No. 2, 3 and 4 (south to north) at a distance of 25 meters. It was found that these islands appear to be longer than presently depicted on the chart. Hydrographic survey lines around the Bridge and Tunnel islands show Island No. 2 extending further out into Thimble Shoal Channel and Islands 3 and 4 extending further out into Chesapeake Channel than Chart 12222, 29th Edition, 11 June 1983 indicates. The hydrographer recommends that the islands be delineated by photogrammetric methods.

Survey launches also noted numerous submerged rocks found in the immediate vicinity around all the islands. These rocks are from the foundation used to build up the islands. The islands are a popular place for local fishermen to bottom fish and the hydrographer found many sport fishermen around these islands on almost every day of the survey. These rocks could be hazardous to navigation for small boats not familiar with the area.

The hydrographer recommends that the area immediately adjoining the *charted* islands be noted on the applicable updated charts as *foul* with submerged rocks within 25 meters of the islands. *-concur Shown with a limit line*

I. CROSSLINES

29 miles of crosslines were run, which is 8% of the mainscheme. Generally agreement was excellent.

100% of the crosslines agreed within two feet and 97% of the crosslines agreed within one foot. This meets the criteria stated in the Hydrographic Manual, Section 4.6.1.

Both launches were used to run crosslines and mainscheme on both the east and west sheets. There appears to be no difference in agreement when crosslines were run by one launch and mainscheme by the other.

J. JUNCTIONS - *See section 5 of the Evaluation Report.*

This survey was junctioned with the following hydrographic surveys in accordance with Section 4.3.2 of the Hydrographic Manual:

<u>Registry Number</u>	<u>Scale</u>	<u>Year Surveyed</u>
H-9880	1:10,000	1980
H-9910	1:10,000	1980

This survey was junctioned with H-9880, on the eastern limits of the sheet along the Chesapeake Bay Bridge and Tunnel. Generally sounding comparisons were not good; however, this was expected due to the unique situation involving a bridge of this type. It was found that soundings were generally deeper on the present survey east of the bridge than those reported in H-9880. A trough phenomenon is developing along the bridge immediately east of the structure. This feature was further described by delineation lines run under the bridge. The echogram records of these lines distinctly show the trough. This trough formation was confirmed by Mr. Jean P. Bailey, Supervisor of Maintenance for the Chesapeake Bay Bridge and Tunnel District during a telephone conversation on 17 November 1983. Mr. Bailey informed the hydrographer that they have been monitoring the trough development since bridge construction was completed. As a result of the present survey, depth contours may require adjustment on the chart of the area along this feature.

This survey had an excellent junction on the southern limits with H-9910. All soundings agreed within one foot (99.3%) except one which agreed within two feet. This met the requirements in Section 1.1.2 of the Hydrographic Manual.

K. COMPARISON WITH PRIOR SURVEYS - See section 4.f. and 6. of the Evaluation Report.

The following PSR items originated from NOS sources and were investigated during this survey:

<u>Item No.</u>	<u>Description</u>	<u>Charted Position</u>	<u>Source</u>
0908	Wreck 12 foot sounding	37°00'46.12"N 76°09'55.48"W	FE No. 1/67 (FE-245WD, 1967)
0931	Obstruction 43 foot LD	37°03'21.12"N 76°04'58.30"W	CL 834/77 (FE-234WD, 1977)
3096	Obstruction 22 foot sounding (mushroom anchor)	37°01'34.00"N 76°06'37.00"W	CL 1960/78 (FE-222WD, 1978 UNPROCESSED)
3098 911	Obstruction 15 foot sounding	37°01'03.00"N 76°10'00.00"W	CL 433/82 (FE-234WD, 1977)
3099	Obstruction 15 foot sounding	37°00'54.00"N 76°10'21.00"W	CL 433/82 (FE-234WD, 1977)

PSR Item 0908 was reported to be a crane barge with a least depth of 12 feet. A full 400% side scan sonar investigation was conducted within a 0.5 NM radius. Evidence of the obstruction was found during side scan sonar operations and a dive was conducted on JD 312. Divers found the remains of a crane barge 30 feet long, extending approximately 3 feet off the bottom. A least depth of 18 feet was measured by divers at 171130 GMT (this depth reduced for tides was 18 feet). The hydrographer recommends revision of the charted symbol to show a least depth of 18 feet, and the charted position should be changed to agree with the surveyed position of 37°00'50.37"N, 76°09'57.48"W. - See sections 6.b.1) and 6.b.3) of the Evaluation Report.

6.77

PSR Item 0931 was reported as a mushroom anchor with a least depth of 43 feet. This obstruction was previously located by the RUDE and the HECK in 1977. Survey requirements were a full investigation consisting of 400% side scan sonar within a 250 meter radius. Sonargrams from JD 299 revealed strong evidence of an obstruction at the reported location. Dive operations were conducted on JD 307. Divers located an object which appeared to be shaped like an inverted bowl constructed of concrete with a steel skeleton exposed through the pitted base of a possible mushroom anchor. Visibility at the time of the dive was zero and divers could only estimate the size of the object by touch. They estimated the object to be 4-5 feet in diameter and 3 feet high. Swift currents at the time of the dive precluded the use of a lead line to obtain a least depth. The object was too small to obtain a trace using the echo sounder, although this was attempted several times to no avail. The Corps of Engineers had requested to be notified if this object was found. Del Norte rates were converted to a geographic position of $37^{\circ}03'01.5''$ ^{26.82}N, $76^{\circ}08'41.5''$ ^{4.66}W. The object was marked by a buoy and the Corps of Engineers was notified. The hydrographer recommends the charted symbol and least depth remain as is, but the charted position be revised to agree with the recently surveyed position given above. - See section 6.b.3) of the Evaluation Report.

PSR Item 3096 was identified as a mushroom anchor cleared by wire drag to 22 feet. A full investigation of the item was conducted using 400% side scan sonar coverage within a 0.5 NM radius. No evidence of this obstruction was found on either Ross or side scan sonargrams. The object may have been buried in the sediment or moved by swift bottom currents known to exist in the area. ~~Since this object had previously been located by the RUDE and the HECK in 1978, the hydrographer recommends the charted symbol be amended to wreck cleared to 22 feet, PA.~~ See section 6.b.2) of the Evaluation Report.

PSR Items ~~3098 and 3099~~ ^{was} ~~were both~~ identified as metal junk located by wire drag and cleared to 15 feet. A full 400% side scan sonar and echogram investigation was conducted ~~around each location~~ with a 250 meter radius. No evidence of ~~either~~ ^{the} obstruction was found. ~~As indicated by the Project Instructions, this side scan sonar search disproves the existence of the items, therefore, both items 3098 and 3099 should be removed from the chart.~~ See section 6.b.3) of the Evaluation Report.

The following prior surveys were compared with H-10116:

<u>Registry Number</u>	<u>Scale</u>	<u>Year Surveyed</u>
H-7750	1:40,000	1948-50
H-8218	1:25,000	1954
FE-205 WD	(various)	1967

The prior surveys were evaluated considering guidance given by sections 5.3.4.(k) and 6.3.7 of the Hydrographic Manual. Considering that H-7750 was surveyed almost 30 years ago and prior to construction of the Chesapeake Bay Bridge and Tunnel, comparisons were generally quite good. Many of the discrepancies can be attributed to sand wave formations and movements which tend to verify the dynamic nature of the bottom in the bay. On the west sheet 91% of the soundings agreed within 2 feet. The remainder of the soundings agreed within 4 feet. On the east sheet the differences were greater, with only 73% of the soundings agreeing within 2 feet. In the area north of the Bridge and Tunnel Island No. 4, due west of the Bridge, the

comparative soundings were as much as 4-20 feet deeper on the present survey (at approximately 37°03'12"N, 76°03'30"W). The comparative Soundings in Chesapeake Channel between Bridge and Tunnel Islands No. 3 and 4 (at approximately 37°02'03"N, 76°04'15"W) were generally 2-4 feet deeper on the present survey. In the channel immediately northwest of these islands, soundings were found to be from 3-12 feet deeper in the present survey (approximately at 37°02'50"N, 76°04'10"W). These greater depths can probably be attributed to scouring created by the strong currents running in these areas. On the north side of Chesapeake Channel soundings were found to be consistently 4-9 feet shallower in the present survey. This is an area of fairly steep grade which is noticeable on all echogram records, and contour lines parallel one another in a distinct pattern indicating this slope. The hydrographer suggests that sedimentation and filling in at the bottom of this steep grade can account for the shallower soundings all along the north side of the channel.

Sounding comparisons varied by as much as 20 feet deeper in the present survey immediately west of the Bridge in the approximate area of 37°02'05"N, 76°05'08"W. This would appear to follow the situation found north of Bridge and Tunnel Island No. 4. This does not continue to occur further south along the Bridge where sounding comparisons tend to agree within 4 feet; again the prior survey being shallower.

In the central portion of the east sheet, soundings generally varied by less than 5 feet and were found to be deeper on the present survey. Again this can be attributed to a dynamic bottom as typified by the numerous sand wave formations found in this area. Soundings on the east sheet from prior survey H-7750 should be superseded by survey H-10116.

The southern-most portion of this survey was compared with H-8218. Agreement between these two surveys was varied. This was expected since prior survey H-8218 was conducted before the construction of the Chesapeake Bay Bridge and Tunnel. It was found that the soundings from H-8218 were generally shallower in the area where the Bridge is now located. In some places the soundings are as much as 20 feet deeper, most probably due to scour action west of the Bridge. This is especially valid in the area north of Bridge and Tunnel Island No. 2. Further west of the Bridge the comparisons generally agree within 4 feet.

This survey was compared to FE-205 WD. The particular portion of the survey which is relevant to H-10116 is PSR Item 0893 which is discussed at length in section L. - See also Evaluation Report.

PSR Items 0908, 0931, ⁹¹¹~~3098~~ and 3099 were investigated but not compared to the corresponding wire drag surveys since these were unavailable and not included in the Project Instructions. - See also Evaluation Report.

An investigation of an obstruction located at 37°01'06"N, 76°10'15"W, due north of PSR Item 3099, was conducted. This item had no PSR number and was not assigned to this survey; however, it was just inside the survey limits. A full 400% side scan sonar and echogram investigation within a 250-meter radius was conducted. No evidence of an obstruction was found. ~~The hydrographer recommends that the symbol for an obstruction cleared by wire drag to 14 feet be removed from the chart.~~ See section 6.b.4) of the Evaluation Report.

L. COMPARISONS WITH THE CHART - See section 7.2. of the Evaluation Report.

The following PSR items originating from sources other than NOS, were compared with NOS Chart 12222, 29th Edition, 11 June 1983.

<u>Item No.</u>	<u>Description</u>	<u>Charted Position</u>	<u>Source</u>
0893	Wreck 11 foot sounding	36°59'45.00"N 76°06'07.00"W	CL 1390/66 (FE-245WD, 1967)
0916	Wreck, PA	37°02'00.00"N 76°07'00.00"W	LNM 46/74
0917	Wreck, PA	37°02'00.00"N 76°06'00.00"W	NM 37/66
0920	Wreck, PA	37°02'18.00"N 76°05'06.00"W	LNM 49/70
0923	Subm.Obst., PD	37°02'33.00"N 76°06'42.00"W	CL 281/67
2750	Pile, PA	36°58'55.38"N 76°06'52.94"W	CL 1679/80
3095	Shoal to 16 feet Rec. 1977	37°01'05.00"N 76°07'55.00"W	CL 2237/77

PSR Item 0893 was identified as a pile driver with a least depth of 13 feet and cleared by drag to 11 feet. This item was found using 400% side scan sonar coverage with a 250 meter radius. The obstruction was also noted several times on the Ross echo sounder. On JD 311 a dive was conducted by WHITING personnel in conjunction with divers from AMC. A least depth of 15 feet (at 132915 GMT) was recorded using a lead line. This depth reduced to 14³ feet with tides. A detached position was computed from Del Norte rates at 36°59'46.90"N, 76°06'05.71"W. The pile driver was found to extend 15 feet above the bottom with a 4 foot diameter pipe made of 2-1/2 inch thick steel. The crane barge itself extended approximately 2 feet above the bottom and was approximately 30 feet by 20 feet. The wreck is well known by local fishermen and is a popular fishing spot for small boats. The hydrographer recommends the wreck remain charted as is; however, the charted position should be changed to agree with the surveyed position of 36°59'46.⁸⁵88"N, 76°06'05.81"W. - See sections 4.m. and 6.b.1) of the Evaluation Report.

PSR Item 0916 was reported as a 19 foot cabin cruiser sunk in 35 feet of water. A full side scan sonar investigation was conducted to 400% coverage within a 0.5 NM radius. No trace of this wreck was found on any echogram or sonagram records. Considering the nature of the wreck, depth of water, area and the extent of the investigation, the hydrographer recommends the symbol for a wreck be removed from the chart. - See section 7.2.2) of the Evaluation Report.

PSR Item 0917 was reported as a 27 foot boat sunk in 34 feet of water. A full side scan sonar investigation was conducted to 400% coverage within a 0.5 NM radius. No trace of this wreck was found on any echogram or sonargram records. Considering the nature of the object, depth of water, area, and the extent of coverage, the hydrographer recommends the symbol for a wreck be removed from the chart. - See section 7.2.3) of the Evaluation Report.

PSR Item 0923 was reported as a submerged obstruction. A full 400% side scan sonar investigation was conducted within a 0.5 NM radius. No evidence of this obstruction was found during the investigation. The RUDE and the HECK also found no evidence of this obstruction during wire drag operations in 1978. Taking this into consideration, the hydrographer recommends removing the charted submerged obstruction, PD, from the chart. - See section 7.2.5) of the Evaluation Report.

PSR Item 0920 was reported as a 21 foot boat sunk in 27 feet of water. A full side scan sonar investigation to 400% coverage within a 0.5 NM radius was conducted. On JD 299, an irregular mark was found on the port side scan channel while on a line running 033°T. Another irregular mark with signs of scour was found on the port channel when the line turned right about. Evidence was again noted on the sonargrams on JD 310, when the investigation was continued to 400% coverage (no trace of the wreck was found on any echo sounder records). The position of the contact was estimated graphically, thus the position computed is not as accurate as desired. The approximate computed position of the contact is 37°02'^{09.75}N, 76°05'13.⁰²W. Time and weather constraints precluded a dive on the site. Due to the evidence of an apparent contact on the sonargram, the hydrographer recommends retaining the obstruction as charted. ~~Even though an exact position could not be determined from the side scan sonar investigation, the hydrographer recommends updating the charted position to include the computed position above.~~ See section 7.2.4) of the Evaluation Report.

PSR Item 2750 was reported to be a green and white pile protruding 8 feet above the water line at a 60 degree angle. It is charted as a pile, PA. A further description in the AWOIS listing leads one to believe this could possibly be a spar buoy established by the U.S. Army Corps of Engineers for use in dredging operations. A visual examination of the pile was made on JD 305 (213250 GMT) at which time the pile was positioned by Del Norte equipment. The computed position (corrected D.P. 1285) is 36°59'04.37"N, 76°07'02.32"W. The pile was found to be approximately 18" in diameter, leaning at a 60° angle, protruding 6 feet above the water, and painted black and white, not green and white as reported on the AWOIS listing. The hydrographer recommends removing the PA designation and charting the pile at the geographic position given above.

PSR Item 3095 was reported as an area of shoaling to 16 feet. The area was developed by echo sounder using 45 meter line spacing within a 0.5 NM radius. No 16 foot soundings are noted on the smooth sheet. Examination of the area around the investigation site shows that the shoaling appears to be expanding towards the southeast. The hydrographer recommends that the chart be revised to reflect the shoal movement in this area, and removal of the "shoal to 16 feet" note. - Concur - see section 7.2.6) of the Evaluation Report.

R. Sanecki recommends revising above black and white pile to green and white spar buoy as indicated on smooth sheet. The spar buoy located in lat. 36°58'55.39"N, long. 76°06'52.94"W on H-9110 is superseded and should not be charted.
Delete, Pile PA. SRB
charted

H-10116 was compared with NOS Chart 12222, 29th Edition, 11 June 1983. Generally the charted soundings appeared to follow the same trends that were found on prior survey H-7750. Soundings on the west sheet were consistently found to be 1-6 feet (average 2-3 feet) deeper on the present survey than those charted. This was also found to be the case on the east sheet except again in the area along the north side of Chesapeake Channel where present soundings were found to be as much as 9 feet shoaler.

The area noted on the chart as shoaling to 16 feet reported in 1977, was developed as PSR 3095. No 16 foot soundings were found. The shoalest depths found were 19 feet. The shoal area noted on the chart at 37°00.7'N, 76°07.5'W is now about 1 foot deeper on the south side. *See section 7.2.6) of the Evaluation Report.*

The southeast corner of the discontinued disposal area on the western limits of the sheet was developed with 50 meter spacing. No significant features were found.

Several minor developments were conducted on the west sheet where spike features were found. The locations and least depths are noted as follows:

<u>Geographic Position</u>	<u>Least Depth</u>
37°04'21"N 76°07'32"W	26 feet
37°03'42"N 76°08'09"W	25 feet
37°03'09"N 76°07'54"W	24 feet

A deep hole was found during hydrographic and side scan sonar operation at 37°02'10.3"N, 76°06'02.4"W. This deep was found to drop off to 54 feet in an area which is generally less than 40 feet deep. The hole is estimated to measure approximately 200 meters x 150 meters (information concerning this hole was passed to Dr. Stewart and Dr. Ludwick of Old Dominion University, for further development).

Several spikes were found under the Chesapeake Bay Bridge near Bridge and Tunnel Islands 2 and 3. These spikes generally rose from 10 to 25 feet off the bottom, and were found directly under the bridge in pairs. They were in approximately 45-60 feet of water, so they pose no danger to any vessel that would be able to navigate beneath the bridges. In a conversation with Jean P. Bailey, Supervisor of Maintenance for the Chesapeake Bay Bridge and Tunnel District on 17 November 1983, Mr. Bailey explained that these spikes were two rows of rock dikes put in after bridge construction to prevent scouring around the piles. Mr. Bailey was also questioned by the hydrographer concerning the deeper soundings on the east side of the bridge which were noted on examination of survey lines run under the bridge to junction with prior survey H-9880. He explained that a trough has developed all along the east side of the bridge since the bridge was built. They have been monitoring the trough development since construction was completed in 1968. - *Concur.*

Evidence of an obstruction was found during bottom sampling operations and a dive was conducted on JD 312. The wooden keel of a wreck was discovered at 1548 GMT with a least depth by lead line of 28 feet located at $37^{\circ}03'53.45''$ N, $76^{\circ}03'26.74''$ W. The least depth was reduced for tides to 25.4 feet. The keel ribs extend 4 feet off the bottom and measure about 30 feet by 40 feet. The hydrographer recommends this be located on the chart as a wreck at the surveyed position.

Survey depths in Chesapeake Channel were found to agree very well with those charted. No dangers to navigation were discovered during the course of this project.

M. ADEQUACY OF SURVEY

This survey was conducted in accordance with the Project Instructions and the Hydrographic Manual. The calibration problems discussed in section G and the following omissions are the only instances in which hydrography did not meet standards.

Line spacing exceeded the 100 meters required at $37^{\circ}01'27''$ N, $76^{\circ}05'42''$ W and $37^{\circ}04'57''$ N, $76^{\circ}06'35''$ W. These deficiencies were discovered after the ship left the working grounds. However, the hydrographer does not feel the integrity of the survey is degraded, since the surrounding areas appear to be areas of very gradual topographic change.

This survey is adequate to supersede all prior surveys except for the portion of OPR-515-RU/HE-77 related to PSR Item 0931 as noted in section K.

N. AIDS TO NAVIGATION - See sections 4.i. and 7.b. of the Evaluation Report.

Four buoys were located in the survey limits during this project, three of which were channel buoys in Chesapeake Channel. Surveyed positions are compared below to those charted on NOS Chart 12222, 29th Edition.

<u>Buoy Description</u>	<u>Surveyed Position</u>	<u>Charted Position</u>	<u>Difference</u>
R "12" Fl R 4 sec	$37^{\circ}03'41.4''$ N $76^{\circ}05'17.8''$ W 48.94	$37^{\circ}03'43''$ N $76^{\circ}05'13''$ W	127 meters
"11" Fl 4 sec BELL	$37^{\circ}03'26.2''$ N ✓ $76^{\circ}05'30.9''$ W ✓	$37^{\circ}03'28''$ N $76^{\circ}05'36''$ W	137 meters
"9" Fl 4 sec	$37^{\circ}02'26.2''$ N ✓ $76^{\circ}04'29.0''$ W ✓	$37^{\circ}02'25''$ N $76^{\circ}04'33''$ W	106 meters
BW Mo(A) BELL	$37^{\circ}01'19.2''$ N $76^{\circ}08'56.4''$ W 17.45 .28	$37^{\circ}01'19''$ N $76^{\circ}08'58''$ W	41 meters

Sextant fixes were attempted to verify positions of the privately maintained lights on the Chesapeake Bay Bridge and Tunnel islands. Only the Thimble Shoal aid was adequately verified. The distances involved at the Chesapeake Channel aids were too great to permit visual verification. The comparison between the surveyed position and the charted position of the Thimble Shoal aid is listed below. Note: This position should be considered only as a verification of the previously charted position.

<u>Description</u>	<u>Surveyed Position</u>	<u>Charted Position</u>	<u>Difference</u>
Thimble Shoal	36°58'50.3"N	36°58'50.303"N	2.2 meters
North Tunnel Light F R (Light List No. 2912)	76°06'25.1"W	76°06'25.011"W	

Presently described bridge clearances for the Chesapeake Bay Bridge and Tunnel are adequate (see Form 76-40, Attachment I).

No strobe lights were found on any aids to navigation in the survey area.

Redundant check fixes were taken at all floating aids and other detached positions to assure that readings were not erratic. Del Norte DMUS were observed at these times to be sure the observed rates were steady.

With the exception of the Chesapeake Bay Bridge and Tunnel, there were no landmarks within the survey area. It should be noted that the official title of this facility is the Chesapeake Bay Bridge and Tunnel, not the Chesapeake Bay Bridge-Tunnel as described in the United States Coast Pilot No. 3, 21st Edition, July 1983, page 145.

O. STATISTICS

	(VESNO)	<u>2931</u>	<u>2932</u>	<u>2930</u>	<u>Total</u>
Number of positions		2945	1809	206	4960
Lineal miles of hydrography		431	271	0	702
Square miles of hydrography		8	11	0	19
Lineal miles of side scan sonar		202	0	0	202
Square miles of side scan sonar		4.5	0	0	4.5
Bottom samples		1	16	160	177

P. MISCELLANEOUS

No Loran-C data was collected during this survey since the launches are not equipped with Loran-C receivers.

Bottom samples have been submitted to the Smithsonian Institute as per section 8.1 of the Project Instructions. No bottom samples were taken in areas requiring submittal to the Virginia Institute of Marine Science (VIMS). - *Outside the area of the present survey.*

Periodic field report submittal has been complied with as per section 9.0 of the Project Instructions and section 5.1 of the Hydrographic Manual.

Rough plotted field sheets reveal anomalous tidal conditions which appear to cause convoluting depth contour lines. Examination of the data reveals that this is caused by differences in alternating lines which were run on different days. On the rough boat sheet these lines were labeled by the Julian Day on which it was run, in order to help clarify differences in depths between lines run on different days. It was found that deeper soundings were recorded after days of severe weather (JDs 295, 298 and 300), when excessive winds and rain produced a storm surge resulting in unusually high tides. Smooth tides should alleviate this problem. In areas where this contour fluctuation is great, it was found that if east-west (123° - 303°) development lines were used to draw contours, the problem is not as great. This can be attributed to the fact that these lines were run on days when there were no severe storms. The contour lines in the central portion of the east sheet and the extreme eastern portion of the west sheet were drawn from east-west development hydrography to reflect general trends of the contours in this area. These contours are presented on an overlay only. Contours were not drawn in these areas on the mainscheme sheets since conflicting and densely plotted data would result in erratic and unrealistic depth contours. *Conditions was resolved during processing at AMC.*

Captain Robert Dozier of the Virginia Pilots Association, Norfolk, Virginia, was contacted on 17 October to discuss his group's opinion of NOS products such as charts, tide and current information, and the Coast Pilot. After discussion with all four of his pilots, Captain Dozier relayed back to the WHITING on 31 October that the current charts available were of adequate scale, and that all information contained on the charts was "absolutely trustworthy".

Captain Dozier reported that all of his people counted heavily on the tides and currents information of the Hampton Roads area, and that none of his pilots had any reason to question the data provided by NOAA and NOS.

An addendum is being forwarded to N/MOAll in reference to the Coast Pilot report dated 29 November 1983. It has come to the attention of the hydrographer that the correct name of the Chesapeake Bay Bridge and Tunnel is not the Chesapeake Bay Bridge-Tunnel as listed in the United States Coast Pilot No. 3, 21st Edition, July 1983, page 145. The official name is the Chesapeake Bay Bridge and Tunnel. This should be noted on the next edition of the Coast Pilot. - *Concur*

O. RECOMMENDATIONS

Survey H-10116 is adequate as presented and no further field work is recommended. See recommendations in sections K, L and M.

As recommended in section H, the hydrographer recommends that the delineation of the Bridge and Tunnel islands be updated by photogrammetric methods and that the waters surrounding the islands be noted as foul with submerged rocks for a distance of 25 meters from the islands.

As fully explained in section K, the hydrographer recommends that the charted least depth determined by the RUDE and HECK in 1977 remain as is for PSR Item 0931.

R. AUTOMATED DATA APROCESSING

<u>Program</u>	<u>Description</u>	<u>Version Date</u>
RK112	Range/Range Real-Time Hydroplot	08/04/81
RK201	Grid, Signal and Lattice Plot	04/18/81
RK211	Range/Range Non-Real Time Plot	02/02/81
RK300	Utility Computations	10/21/80
RK330	Data Reformat and Check	05/04/76
AM530	Layer Corrector For Velocity	05/10/76
RK561	Range/Range Geodetic Calibration	12/01/82
AM602	Extended Line Oriented Editor	12/08/82

S. REFERAL TO REPORTS

A field examination was conducted on Latimer Shoal, PSR Item 3094. Findings of this examination are included at the end of this report. These results were forwarded to the Chart Information Section, N/CG222, on 01 December 1983. - See section Survey H-10127 (1984)

A Coast Pilot Report was forwarded to N/MOA11 on 29 November 1983. An addendum to the Coast Pilot Report was forwarded to N/MOA11 on 05 December 1983.

No separate reports concerning currents or user-evaluation have been submitted. For relevant information concerning these matters refer to comments by Captain Dozier of the Virginia Pilots Association in the Coast Pilot Report previously mentioned and in section P of this report.

A copy of the Dive Report is included at the end of this report.

Respectfully Submitted:


 for Philip M. Kenul, Ensign, NOAA
 NOAA Ship WHITING S-329



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
NOAA Ship WHITING (S-329)
439 West York Street
Norfolk, VA 23510

DATE: 01 December 1983

TO: Norm Banks
Chart Information Section, N/CG222

FROM: *Donald L. Snyoff*
Donald L. Snyoff, LCDR, NOAA
Commanding Officer
NOAA Ship WHITING

SUBJECT: Preliminary Investigation of Latimer Shoal
PSR #3094

The enclosed information is being forwarded to provide the latest data on Latimer Shoal. Due to time and weather constraints, only one day was spent in the area. The data are unverified, but should be adequate for updating charted information over the shoal until a complete survey can be accomplished. The original records will remain aboard the WHITING until the PEIRCE begins work in the area in February 1984.

If additional information is needed, contact the WHITING at FTS-827-6322 or -6323.



INVESTIGATION OF LATIMER SHOAL

PSR ITEM #3094

A preliminary investigation of Latimer Shoal, near Fisherman's Island in Chesapeake Bay was conducted on 09 November 1983 (Julian Day 313). The investigation encompassed the southern tip of Latimer Shoal.

This investigation was performed to provide preliminary information on PSR Item #3094, reported as shoaling to 7 feet MLW, in the vicinity of 37°07'02" N, 75°59'37" W.

The Latimer Shoal investigation was done using WHITING survey launch WH-2 (EDP Number 2932). The positioning system was Del Norte and was calibrated at the beginning and the end of the investigation using a fixed calibration point at a piling on the Chesapeake Bay Bridge and Tunnel. The calibration correctors were as follows:

	<u>SLAVE 1</u>	<u>SLAVE 2</u>
Opening	- 0.6	+14.0
Closing	-10.6	+ 3.0
	- 6.0	+ 8.0

The average values of -6 and +8 were used for the final sheet.

Depths were recorded on a Ross 5000 Fineline echosounder (s/n 1087). A bar check was performed in the survey area to provide data for velocity corrections. Corrections for velocity were taken from the averaged data for bar checks done from 18 October 1983 (JD 291) to 09 November 1983 (JD 313). A draft correction of 1.5 feet was applied to all soundings plotted.

Soundings were taken at 20 second intervals with 50 meter spacing between sounding lines. The launch was operated at a constant speed of 2000 RPM, except in shoal areas of less than 6 feet, where speed was reduced to 1600 RPM.

The sheet was plotted using RK211 with corrections applied for velocity, draft and electronic correctors. Tide corrections were applied to the sheet through the use of a predicted tide tape generated from predicted tides for Hampton Roads (Sewells Point #863-8863).

This investigation indicated a definite growth of the shoal area with depths of less than 6 feet in areas currently charted at 14-15 feet on Chart 12222, 29th Edition, dated 23 June 1983.

In addition, the shoal had changed location and orientation so as to render the present obstruction buoy (red and black nun) located at 37°06'40" N, 75°59'30" W misleading. Due to time constraints and problems with the malfunctioning positioning system, this investigation was not as thorough as required by Section 1.4.3 of the Hydrographic Manual. The hydrographer recommends that a complete investigation of Latimer Shoal be carried out to determine the extent of shoaling in the area. In the interim, the data obtained by this investigation should be used to update the affected area of Charts 12221, 12222 and 12224.

DIVE REPORTI. Area of Investigation

A. Location: Chesapeake Bay

Sublocality: Tail of the Horseshoe

B. All positions were determined by using Del Norte electronic distance measuring equipment (DMU s/n 172, master receiver s/n 169). Remote units were located at Thimble Shoals Lighthouse (s/n 262) and H-55 VA (s/n 217). The latitude and longitude for each site was determined by conversion of the Del Norte rates using utility package RK300. The locations for each dive site are as follows:

<u>Dive Site</u>	<u>Latitude</u>	<u>Longitude</u>
1	37°03'01.00"N	76°02'44.79"W
2	36°59'46.90"N	76°06'05.71"W
3	37°03'53.45"N	76°03'26.74"W
4	37°00'49.81"N	76°09'57.42"W

C. All dives were conducted in support of Survey H-10116, Field Number WH-10-2-83.

II. Purpose

Dives 1, 2 and 4 were conducted as part of an investigation of Presurvey Review Items 0931, 0893, and 0908 respectively. Dive 3 was conducted to determine the exact location and least depth of an uncharted spike located using the Ross 5000 fineline echo sounder and confirmed with the Klein side scan sonar.

III. Survey Procedure

A. All dive sites were determined by using the Klein side scan sonar in conjunction with the Ross 5000 fineline echo sounder.

B. The search procedure used was a circle sweep using the anchor chain of the dive boat as the center of the search.

C. Each dive search area was an approximately 30 square meter circle centered on the dive boat's anchor chain. Depths covered on each dive were:

<u>Dive</u>	<u>Depth</u>
1	0 to 60 ft.
2	0 to 30 ft.
3	0 to 32 ft.
4	0 to 21 ft.

IV. Dive DataDive Number 1

- 1) Divers: LTJG Gardner (Divemaster), ST Owens, YS Lowery.
- 2) Time of dive: 1705 GMT 03 November 1983 (JD 307)
Duration : 20 minutes.
- 3) Depth : 30 feet.
- 4) Current : Approximately 1.5 knots ebb.
- 5) Visibility : 0 feet.
- 6) Horizontal & Vertical Control: Detached Position number 6653 was measured at 1705 GMT with a least depth of 47 feet estimated using the launch echo sounder. - *Reduced depth of 46 Feet in latitude $37^{\circ}03'24.82''N$, Longitude $76^{\circ}04'56.66''W$.*

Dive Number 2

- 1) Divers: LT Perrin, LTJG Gardner (Divemaster), YS Lowery.
- 2) Time of dive: 1830 GMT 07 November 1983 (JD 311).
Duration : 43 minutes.
- 3) Depth : 30 feet.
- 4) Current : 1.4 knots flood.
- 5) Visibility: 2 feet.
- 6) Horizontal & Vertical Control: Detached Position number 6654 was taken at 1830 GMT with a least depth of 15 feet measured using a lead line. *Reduced least depth of 13 Feet in latitude $36^{\circ}59'46.85''N$, longitude $76^{\circ}06'05.11''W$.*

Dive Number 3

- 1) Divers: LT Perrin, LTJG Gardner (Divemaster), YS Lowery.
- 2) Time of dive: 1548 GMT 08 November 1983 (JD 312)
Duration : 21 minutes.
- 3) Depth : 32 feet.
- 4) Current : 0.6 knots flood.
- 5) Visibility : 2 feet.
- 6) Horizontal & Vertical Control: Detached Position number 6655 was taken at 1548 GMT with a least depth of 28 feet measured using a lead line. *Reduced depth of 24 Feet in latitude $37^{\circ}03'52.84''N$, longitude $76^{\circ}03'25.95''W$.*

Dive Number 4

- 1) Divers: LT Perrin, (Divemaster), YS Lowery.
- 2) Time of dive: 1711 GMT 08 November 1983 (SD 312).
Duration : 15 minutes.
- 3) Depth : 21 feet.
- 4) Current : 0.4 knots flood.
- 5) Visibility : 4 feet.

6) Horizontal & Vertical Control: Detched Position number 6656 was taken at 1711 GMT with a least depth of 18 feet measured with a lead line. *Reduced least depth of 15 feet in latitude 37°44' 50.37"N, Longitude 76°49' 56.77"W. Position Found by FE-205WD (1967) - Latitude 37°44' 47"N, Longitude 76°49' 57"W.*

V. ResultsDive 1

A mushroom anchor as described by PSR Number 931 was found. Anchor has an estimated least depth of 47 feet.

Dive 2

Dive Number 2 found a pile driver with a 4 foot diameter, 2-1/2" thick pipe extending 15 feet from the bottom to a reduced least depth of 13.8 feet. This pipe is attached to a crane barge that extends approximately 2 feet off the bottom and is approximately ~~30~~⁷⁴ feet by ~~20~~¹⁵⁴ feet.

Dive 3

Dive Number 3 found the wooden ribs of a vessel. The ribs extend a maximum of 4 feet off the bottom for a reduced least depth of ~~25.8~~^{4.0} feet. The ribs are approximately 30 feet apart at the widest point and extend in an elliptical pattern east to west from the located position approximately 40 feet.

Dive 4

Dive Number 4 found a crane and barge extending 3 feet off the bottom for a least depth of ~~17.1~~¹⁵ feet. The barge and crane are approximately 30 feet by 23 feet and extend 1 to 2 feet off the bottom.

VI. Recommendations

Dive Number 1: Recommend that the anchor remain charted as is, but the charted position be revised to agree with the recently surveyed position. Use the formerly ascertained least depth.

Dive Number 2: Recommend that the pile driver remain charted as is, but the charted position be revised to agree with the surveyed position and the new least depth be applied.

Dive Number 3: Recommend that the wreck be charted as such.

Dive Number 4: Recommend revision of the charted symbol to show a least depth of ~~17~~¹⁵ feet (reduced for tides), and the charted position should be changed to agree with the surveyed position.



U.S. DEPARTMENT OF COMMERCE
National Ocean and Atmospheric Administration
NATIONAL OCEAN SURVEY
NOAA Ship WHITING (S-329)
439 West York Street
Norfolk, VA 23510

19 September 1983

Commander, Fifth Coast Guard District (oan)
Federal Building
431 Crawford Street
Portsmouth, VA 23705

Dear Sir:

The NOAA Ship WHITING (S-329) will conduct a hydrographic survey in the Chesapeake Bay, off the southwestern coast of Cape Charles, Virginia from 04 October 1983 until 10 November 1983. The area to be covered by this survey operation is detailed on the enclosed chartlet.

Please include this notice in your publications and announcements for the information of the mariners regularly plying in the area.

Sincerely,

Michael E. Henderson, LT, NOAA
Field Operations Officer





U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY

NOAA Ship WHITING S-329
439 West York Street
Norfolk, VA 23510

October 3, 1983

Commander
Fifth Coast Guard District
Aids to Navigation Branch
Federal Building
431 Crawford Street
Portsmouth, VA 23715

Dear Sir:

The NOAA Ship WHITING will be conducting hydrographic survey operations in Chesapeake Bay on the west side of the Bay Bridge Tunnel from October 5 to November 10, 1983. This project necessitates the use of Thimble Shoals Light as a site for our electronic positioning equipment. We would like to locate a Del Norte master unit at the Light powered by two twelve volt batteries. The master unit is 12" x 8" x 6" and will be installed in a temporary fashion for the duration of the project. The installation of the system will in no way interfere with the operation of the Light. We will exchange batteries approximately every three days.

This cooperation is greatly appreciated and will aid in the completion of this project.

Sincerely,

Donald L. Suloff, LCDR, NOAA
Commanding Officer
NOAA Ship WHITING S-329



ATTACHMENTS

F. LIST OF STATIONS

***** SIGNAL LIST DELMARVA PROJECT *****

~~* OLD POINT COMFORT LIGHTHOUSE~~~~001 7 37 00 05745 076 18 24519 250 0000 000000~~

* THIMBLE SHOAL LIGHTHOUSE (DEL NORTE)

002 7 37 00 51712 076 14 25075 250 0017 000000

* RADIO TRANSMISSION TOWER

003 7 36 55 48926 076 12 18828 250 0000 000000

* LITTLE CREEK AMPHIBIOUS BASE TANK LIGHT

004 7 36 55 06190 076 11 22544 250 0041 000000

* LITTLE CREEK 1929

005 7 36 55 57125 076 10 35961 250 0000 000000

* LITTLE CREEK NAB DESERT COVE WATER TANK

006 7 36 55 14382 076 09 42063 250 0043 000000

* LITTLE CREEK NAVAL AMPHIBIOUS BASE TANK

007 7 36 54 31740 076 08 53000 250 0000 000000

* BAY BRIDGE PILING 1980

008 7 36 59 51418 076 05 59162 250 0000 000000

* H-55 VA (DEL NORTE)

009 7 36 54 30144 076 05 51088 250 0008 000000

* NGS PUBLICATION

Source

✓
All

I. LANDMARKS FOR CHARTING

TYPE OF ACTION	RESPONSIBLE PERSONNEL	
	NAME	ORIGINATOR
OBJECTS INSPECTED FROM SEAWARD	NOAA Ship WHITING (S-329)	<input type="checkbox"/> PHOTO FIELD PARTY <input checked="" type="checkbox"/> HYDROGRAPHIC PARTY <input type="checkbox"/> GEODETIC PARTY <input type="checkbox"/> OTHER (<i>Specify</i>)
POSITIONS DETERMINED AND/OR VERIFIED		FIELD ACTIVITY REPRESENTATIVE
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES		OFFICE ACTIVITY REPRESENTATIVE
		<input type="checkbox"/> REVIEWER <input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'

(Consult Photogrammetric Instructions No. 64,

OFFICE

I. OFFICE IDENTIFIED AND LOCATED OBJECTS

Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object.

EXAMPLE: 75E(C)6042
8-12-75

FIELD

I. NEW POSITION DETERMINED OR VERIFIED

Enter the applicable data by symbols as follows:

F - Field	P - Photogrammetric
L - Located	Vis - Visually
V - Verified	
1 - Triangulation	5 - Field identified
2 - Traverse	6 - Theodolite
3 - Intersection	7 - Planetable
4 - Resection	8 - Sextant

A. Field positions* require entry of method of location and date of field work.

EXAMPLE: F-2-6-L
8-12-75

*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.

FIELD (Cont'd)

B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object.

EXAMPLE: P-8-V
8-12-75
74L(C)2982

II. TRIANGULATION STATION RECOVERED

When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery.

EXAMPLE: Triang. Rec.
8-12-75

III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH

Enter 'V-Vis.' and date.

EXAMPLE: V-Vis.
8-12-75

**PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.

RESPONSIBLE PERSONNEL		
TYPE OF ACTION	NAME	ORIGINATOR
OBJECTS INSPECTED FROM SEAWARD	NOAA Ship WHITING (S-329)	<input type="checkbox"/> PHOTO FIELD PARTY <input checked="" type="checkbox"/> HYDROGRAPHIC PARTY <input type="checkbox"/> GEODETIC PARTY <input type="checkbox"/> OTHER (Specify)
POSITIONS DETERMINED AND/OR VERIFIED		FIELD ACTIVITY REPRESENTATIVE
		OFFICE ACTIVITY REPRESENTATIVE
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES		<input type="checkbox"/> REVIEWER <input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'

(Consult Photogrammetric Instructions No. 64,

OFFICE

I. OFFICE IDENTIFIED AND LOCATED OBJECTS

Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object.

EXAMPLE: 75E(C)6042
8-12-75

FIELD

I. NEW POSITION DETERMINED OR VERIFIED

Enter the applicable data by symbols as follows:

F - Field	P - Photogrammetric
L - Located	Vis - Visually
V - Verified	
1 - Triangulation	5 - Field identified
2 - Traverse	6 - Theodolite
3 - Intersection	7 - Planetable
4 - Resection	8 - Sextant

A. Field positions* require entry of method of location and date of field work.

EXAMPLE: F-2-6-L
8-12-75

*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.

FIELD (Cont'd)

B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object.

EXAMPLE: P-8-V
8-12-75
74L(C)2982

II. TRIANGULATION STATION RECOVERED

When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery.

EXAMPLE: Triang. Rec.
8-12-75

III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH

Enter 'V-Vis.' and date.

EXAMPLE: V-Vis.
8-12-75

**PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.

J. APPROVAL SHEET

This hydrographic survey was conducted in accordance with the Project Instructions, as supplemented by Changes Number 1 and 2, and the Hydrographic Manual. During the survey period, I met daily with the Field Operations Officer and took an active part in determining day-to-day activities and in assessing the work remaining for completion. All boat sheets were examined daily. The final transmitted sheets were reviewed in their entirety; all background records were spot checked.

The calibration of positioning equipment for this survey fell short of accepted standards. The alarming failure rate of the Del Norte equipment and the regular need to rotate units to obtain an operating system necessitated such less-than-optimal procedures. It was determined by this Command that such procedures were required if we were to approach an acceptable level of productivity. Although these calibration short-comings undoubtedly reduce the absolute accuracy of the survey, the Command considers the survey complete and adequate for charting purposes. All previous surveys of the common area should be considered superseded with the single exception of the least depth for PSR Item Number 0931.

Comparisons with prior survey H-7750 along the northwest margin of our survey (H-10116) indicate no need to extend contemporary surveys in this direction.

Donald L. Suloff

Donald L. Suloff, LCDR, NOAA
Commanding Officer
NOAA Ship WHITING S-329

H-10116

GEOGRAPHIC NAMES

Name on Survey	Source of Name										
	A	B	C	D	E	F	G	H	K		
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	RAND McNALLY ATLAS	U.S. LIGHT LIST			
CHESAPEAKE BAY	X										1
CHESAPEAKE CHANNEL	X										2
TAIL OF THE HOESHOE	X										3
VIRGINIA (title)	X										4
											5
											6
											7
											8
											9
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											23
											24
											25

Approved:

Charles E. Harrington
Chief Geographer - N/CG 275

NOV 19 1985

February 13, 1984

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Marine Center: Atlantic

OPR: D 103

HYDROGRAPHIC SHEET: H - 10116

Locality: Tail of the Horseshoe, Chesapeake Bay

Time Period: October 8 - November 7, 1983

Tide Station Used: 863-8863, Chesapeake Bay bridge tunnel

Plane Of Reference (Mean Lower Low Water): 24.84 Ft.

Height Of Mean High Water Above Plane Of Reference: 2.7 Ft.

Remarks: Recommended Zoning:

- A) South of latitude $37^{\circ}06.0'$ to $37^{\circ}00.0'$
1. East of longitude, $76^{\circ}05.0'$ Zone direct
 2. West of longitude $76^{\circ}05.0'$ to $76^{\circ}11.0'$ apply + 15 minute time correction and x0.92 range ratio.
- B) South of latitude $37^{\circ}00.0'$ Zone direct

James R. Hubbard
Chief, Tidal Datum Section

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NO.: H-10116

Number of positions	4582
Number of soundings	25258
Number of control stations	8

	<u>TIME-HOURS</u>	<u>DATE COMPLETED</u>
Preprocessing Examination	23	6 JUNE 84
Verification of Field Data	553	6 JUNE 85
Quality Control Checks	120	
Evaluation and Analysis	98	19 DEC 85
Final Inspection		16 DEC 85
TOTAL TIME	834	
Marine Center Approval		20 DEC 85

Transmittal letter of survey and survey records will be included in the Descriptive Report to identify the records accompanying the survey.

NOAA FORM 61-29 (12-71) U. S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

LETTER TRANSMITTING DATA

TO: **CHIEF, DATA CONTROL SECTION
HYDROGRAPHIC SURVEYS BRANCH, N/CG243
NATIONAL OCEAN SERVICE, NOAA
ROCKVILLE, MD 20852**

REFERENCE NO. **MOA 23-30-86**

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

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

DATE FORWARDED **13 MARCH 86**

NUMBER OF PACKAGES **(4) TUBE, 3 BOXES**

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

**H-10116 (UPR-D103-WH-83, WH-10-2-83)
CHESAPEAKE BAY, VIRGINIA**

PKG #1 (TUBE)

- + Smooth Sheet
- + Smooth Position OVERLAY
- 2 Smooth EXCESS OVERLAYS
- + DESCRIPTIVE REPORT
- ~~8~~ FINAL FIELD SHEETS
- 7 PRELIMINARY FIELD SHEETS

PKG #2 (BOX)

- 3 SOUNDING VOLUMES
- + ACCORDIAN FILE CONTAINING FATHOGRAMS, FIELD PRINTOUTS, FOR FOLLOWING SD'S: VESNO 2931-281, 282, 285, 286, 291, 292, 296, 297, 299, 301, 305, 306, 309, 310, 311, 312, 313

FROM: (Signature) *David A. Wike*
FOR **CDR DAVID B. MacFARLAND, NOAA**

Return receipted copy to:

**ATLANTIC MARINE CENTER
HYDROGRAPHIC SURVEYS BRANCH (N/MOA23)
439 W. YORK STREET
NORFOLK, VIRGINIA 23510**

RECEIVED THE ABOVE
(Name, Division, Date)

**Dwayne S. Clark
April 9, 1986
N/CG243**

NOAA FORM 61-29 (12-71) U. S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION REFERENCE NO. MOA23-30-86

LETTER TRANSMITTING DATA

TO: CHIEF, DATA CONTROL SECTION
HYDROGRAPHIC SURVEYS BRANCH, N/CG243
NATIONAL OCEAN SERVICE, NOAA
ROCKVILLE, MD 20852

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY (Check):
 ORDINARY MAIL AIR MAIL
 REGISTERED MAIL EXPRESS
 GBL (Give number) _____

DATE FORWARDED: 13 MARCH 86

NUMBER OF PACKAGES: (4) 1 TUBE, 3 BOXES

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

H-10116 contg;
 PKG # 3 (Box) + CARRIER WITH BASELINE CALIBRATION DATA
 + CARRIER WITH FINAL POSITION PRINTOUT
 + CARRIER WITH FINAL SOUNDING & L-FILE PRINTOUTS
 PKG # 4 (Box)
 + ENVELOPE WITH DATA REMOVED FROM DESCRIPTIVE REPORT
 + ENVELOPE WITH SUPPLEMENTAL FIELD DATA
 + ENVELOPE WITH SUPPLEMENTAL DATA FROM PRINTOUTS
 3 ACCORDIAN FILES CONTAINING FATHOGRAMS, FIELD PRINTOUTS
 FOR FOLLOWING JD'S:
 VESNO 2930 - 283, 284, 293, 294
 VESNO 2931 - 306, 307, 309, 32, 313
 VESNO 2932 - 281, 282, 285, 286, 291, 292, 296
 297, 299, 301, 305, 306, 307

FROM: (Signature) Robert A. White
 for CDR DAVID B. MACFARLAND, NOAA

Return receipted copy to:
 ATLANTIC MARINE CENTER
 HYDROGRAPHIC SURVEYS BRANCH (N/MOA23)
 439 W. YORK STREET
 NORFOLK, VIRGINIA 23510

RECEIVED THE ABOVE
 (Name, Division, Date)
 Dwayne S. Clark
 April 9, 1986
 N/CG243

ATLANTIC MARINE CENTER
EVALUATION REPORT

SURVEY NO.: H-10116

FIELD NO.: WH-10-2-83

Virginia, Chesapeake Bay, Tail of the Horseshoe

SURVEYED: 5 October through 9 November 1983

SCALE: 1:10,000

PROJECT NO.: OPR-D103-WH-83

SOUNDINGS: ROSS Digital Echo
Sounder, Hand Lead

CONTROL: DEL NORTE (Range/
Range)

Chief of Party.....D. L. Suloff

Surveyed by.....P. D. Wheling
.....M. E. Henderson
.....T. A. Wolf
.....P. M. Kenul
.....I. A. Fergusson

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

1. INTRODUCTION

- a. No unusual problems were encountered during office processing.
- b. Notes in the Descriptive Report were made in red during office processing.

2. CONTROL AND SHORELINE

- a. Control is adequately discussed in sections F. and G. of the Descriptive Report.
- b. There is no photogrammetric shoreline for this survey, and no shoreline has been applied from miscellaneous sources.

3. HYDROGRAPHY

- a. Soundings at crossings are adequate 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 could not be delineated in their entirety. In areas around the bridge tunnel islands the standard curves were not defined because of vessel safety. The 36 foot curve is charted and was also drawn to show additional bottom relief. Brown and dashed curves were also used show bottom relief.

c. Development of the bottom configuration and determination of least depths is considered adequate except as noted below:

1) In the vicinity of Latitude $36^{\circ}02'30''$ N, Longitude $76^{\circ}04'15''$ W, the orientation of the sounding lines is parallel to the depth curves of some sand waves.

2) In the vicinity of Latitude $36^{\circ}03'00''$ N, Longitude $76^{\circ}03'45''$ W the orientation of the sounding lines is parallel to the depth curves at the southeast end of a feature.

In general the two (2) items above do not degrade the overall quality of the survey; however, the practice of running lines of hydrography parallel to depth curves or along the slope rather than up and down the slope of a feature does not provide adequate information for placement of the depth curves.

4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records and reports are adequate and conform to the requirements of the HYDROGRAPHIC MANUAL with the following exceptions:

a. The hydrographer did not take twice daily bar checks as required by sections 1.5.2. and 4.9.5.1.1. of the HYDROGRAPHIC MANUAL. Ten (10) out of a possible twenty-eight (28) bar checks were taken by launch 1015 (VESNO 2931), and fourteen (14) out of a possible thirty-six (36) bar checks were taken by launch 1014 (VESNO 2932).

b. The velocity graphs and tables submitted by the hydrographer were not correct. The velocity graphs and tables were corrected during office processing. The hydrographer also constructed the velocity tables using a one-tenth (0.1) of a foot interval; the HYDROGRAPHIC MANUAL requires a two-tenths (0.2) of a foot interval.

c. A separate velocity velocity graph and table should have been made for each echo sounder used on VESNO 2932. This vessel changed echo sounders during hydrographic operations. An examination of available data was made during office processing, and it was determined that the overall accuracy of the survey is not degraded by this situation.

d. Bar checks were the sole source for velocity corrections for this survey. The greatest bar check depth was 52 feet. The greatest survey depth in the survey area was 74 feet (reduced). Section 1.5.4. of the HYDROGRAPHIC MANUAL states, "Periodic measurements of temperature and salinity shall be made to compute velocity corrections to echo soundings (4.9.5.) except where satisfactory bar checks can be obtained down to at least 75% of the range depths sounded." The 52 foot

bar check is only 70% of the range of depths sounded. The 52 foot bar check depth was obtained on one (1) day by one (1) launch and was not used for corrector determinations. The second deepest bar check depth is 47 feet, and there were two (2) observations at this depth. These depths do not provide the 75% range requirement cited above.

e. The condition of the side scan records for this survey is considered very poor. The annotation of the records was insufficient. The "Records and Recordkeeping" section of the Provisional Side Scan Sonar Instructions, dated 12 April 1983, lists numerous items that are required on the sonargrams. In this case four (4) important notes required, tow cable length, gain settings for each channel, range setting, and paper speed were not appended to the records. Very few confidence checks were taken, or if check were made they were not annotated. Additionally, the side scan records should have been placed in large envelopes to prevent tearing of the records and to prevent degradation of the records due to exposure to ambient light.

f. The hydrographer did not discuss all of the Automated Wreck and Obstruction Information System (AWOIS) items in section K. of the Descriptive Report. The HYDROGRAPHIC MANUAL, section 5.3.4(K) requires discussion of Pre-Survey Review (AWOIS) items in the "COMPARISON WITH PRIOR SURVEYS" section of the Descriptive Report.

g. The field unit exceeded the criteria found in Table 4-14, page 4-85 of the HYDROGRAPHIC MANUAL for inserting soundings during check scanning. The survey was returned to the field unit and this problem was corrected.

h. The settlement and squat determinations for the launches were run in the Bahamas in June of 1983. The present survey was conducted in the Chesapeake Bay in October and November of 1983. The water columns are not the same in both areas; however, the overall quality of the survey is not considered significantly effected.

i. The hydrographer failed to comply with sections 4.2.2.2. and 4.2.2.4. of the Project Instructions. These sections address landmarks in the project area. The hydrographer is tasked with evaluating landmarks in the project area not just the survey area for their existence and accuracy in the first section referenced above. The proper method for reporting these landmarks is found in the second section referenced above.

j. The fixed aid to navigation, Thimble Shoal Tunnel North Light, referenced on the NOAA Form 76-40, "NONFLOATING AIDS OR LANDMARKS FOR CHARTS", submitted by the field unit for comparison is found in the U. S. Coast Guard Light List, Volume II, light list number 2912, page 316. The form does not have

to be submitted if the aid is correctly charted. The information is found in section N., page 15, of the Descriptive Report is more than adequate.

k. The hydrographer did not submit supporting data for the daily electronic control station calibrations. The daily calibration abstracts submitted provide the final correctors for each day, but these correctors have no supporting data. A thorough search of the survey records submitted by the field unit failed to find the daily calibration data records.

l. The spacing between the position fixes occasionally exceeded the criteria of five (5) centimeters found in sections 1.4.5.1. and 4.4.5. of the HYDROGRAPHIC MANUAL. The overall quality of the survey is not significantly effected by this situation.

m. The hydrographer failed to resolve the problem of the correct position of AWOIS item 00893. The dive position of the wreck as located by the divers on year day is Latitude $36^{\circ}59'46.85''N$, Longitude $76^{\circ}06'05.11''W$. The detached position taken by VESNO 2931 on year day 291 positions the wreck in Latitude $36^{\circ}59'46.13''N$, Longitude $76^{\circ}06'06.24''W$. The distance between these two (2) positions is 36 meters. The hydrographer did not thoroughly analyze the available information. The description of the wreck in the Descriptive Report is twenty (20) feet by thirty (30) feet. The distance between the two (2) positions exceed the dimensions provided by the divers. The "BIG D" was a pile driving rig used in the construction of the Chesapeake Bay Bridge and Tunnel. A telephone conversation with Mrs. Schwartz of the Chesapeake Bay Bridge and Tunnel Commission, (804) 464-3511, provided this office with the dimensions of the barge that transported the "BIG D". The dimensions of the barge are 70 feet wide and 150 feet long.

n. The quality of the final field sheets submitted by the field unit was excellent.

o. The hydrographer's contact with the Virginia Pilots Association for a user evaluation of nautical charts was well done.

5. JUNCTIONS

H-9880 (1980) to the east
H-9910 (1980) to the south
H-10127 (1983) to the northeast

An adequate junction was effected with survey H-10127 (1983) to the northeast.

Standard junctions could not be effected with surveys H-9880 (1980) and H-9910 (1980). These surveys have been forwarded to Headquarters in Rockville, Maryland.

There are no junctional surveys to the west; however, the charted hydrography in the junctional area is in harmony with the present survey.

6. COMPARISON WITH PRIOR SURVEYS

a. Hydrographic

H-7750 (1948-50) 1:40,000
H-8218 (1954) 1:25,000

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

H-7750 (1948-50) compares well with the present survey in the common area; plus or minus (+/-) one (1) to three (3) feet in general depths of eighteen (18) to fifty (50) feet. Exceptions are the areas adjacent to the Chesapeake Bay Bridge and Tunnel and a sandy ridge (Middle Ground) along the northeastern edge of Chesapeake Channel in the survey area.

In the area adjacent to the bridge and tunnel the present survey depths vary from forty-two (42) feet shoaler to fifty-one (51) feet deeper than the prior survey depths. These extreme differences can be attributed to the currents that eddy around the tunnel islands and piles that support the bridge trestles.

H-8218 (1954) compares well with the present survey in the common area: within plus or minus (+/-) one (1) to two (2) feet. An exception for the area adjacent to the bridge and tunnel where present survey depths vary from five (5) feet shoaler to twenty-six (26) feet deeper than prior survey depths. The extreme differences between present and prior survey adjacent to the trestles and islands can be attributed to sand transport around the piles and man made islands.

The present survey is considered adequate to supersede the prior surveys in the common area.

b. Wire Drag

FE-205WD (1967) Various Scales
FE-222WD (1978) UNPROCESSED 1:20,000
FE-234WD (1977) 1:20,000
H-7028WD (1944-45) & Ad. Wk. (1950) 1:40,000

1) A comparison between survey FE-205WD (1967) and the present survey shows two (2) hangs in the common area:

The first is the remains of the pile driving rig "BIG D". The present survey located the wreck in Latitude 36°59'46.85"N, Longitude 76°06'05.11"W with a least depth of thirteen (13) feet. The prior survey located the same pile driving rig in Latitude 36°59'45"N, Longitude 76°06'07"W hung at eleven (11) feet and was not cleared. The eleven (11) foot depth on this wreck was based upon a questionable hang depth from survey FE-205WD (1967). A least depth of twelve (12) feet was previously found on the wreck. This wreck is listed as AWOIS item 00893 in the Project Instructions. This wreck is presently charted as a dangerous submerged wreck with a depth of 11-ft. It is recommended that the wreck be retained as charted, and its position be revised to the present survey location.

A second wreck was found on the present survey, a crane and barge, in Latitude 37°00'50.37"N, Longitude 76°09'56.77"W with a lead line least depth of fifteen (15) feet. The prior survey located the body of a crane in Latitude 37°00'47"N, Longitude 76°09'57"W using visual control on charted objects. The wreck was cleared in two (2) directions by twelve (12) feet. This wreck is listed as AWOIS item 00908 in the Project Instructions. It is recommended that the wreck be charted in the present survey location as a dangerous submerged wreck with a depth of 15-ft, and the wreck, cleared by 12 feet, charted in Latitude 37°00'47"N, Longitude 76°09'57"W, be deleted from the chart.

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

2) A comparison between unprocessed survey FE-222WD (1978) and the present survey found two (2) hangs in the common area:

One item a sunken buoy was subsequently removed by the U. S. Coast Guard Cutter MADRONA in 1978.

The second hang found on the prior survey is a mushroom anchor projecting 4 1/2 feet from the bottom in Latitude 37°01'39"N, Longitude 76°06'37"W. A least depth, 28.4 feet (uncorrected), was obtained using a pneumatic air gage.. The anchor was cleared to a depth of 22 feet (uncorrected). This item was assigned AWOIS item 03096 in the Project Instructions. The anchor is presently charted as a dangerous submerged obstruction, cleared by 22 feet. It is recommended that the charted obstruction be revised to dangerous obstruction with a note in parentheses: (rep cleared 22 feet).

No effective depth diagrams were found; therefore, no comparison was made concerning conflicts between effective depths and the present survey depths. See also section 7.a. of this report.

3) A comparison between survey FE-234WD (1977) and the present survey found four (4) hangs in the common area:

The body of a crane was found on the prior survey in Latitude $37^{\circ}00'42.9''N$, Longitude $76^{\circ}09'58.5''W$. This position compares well with the location of a crane and barge found on the present survey in Latitude $37^{\circ}00'50.37''N$, Longitude $76^{\circ}09'56.77''W$. This item was assigned AWOIS item 00908 in the Project Instructions. See the comparison for the above prior survey FE-205WD (1967) for a charting recommendation. The recommendation to chart a sunken wreck, cleared by 12 feet, in the Evaluation Report for FE-234WD(1977) is considered superseded by the present survey.

An unidentified obstruction was hung at 19 feet in Latitude $37^{\circ}01'04.3''N$, Longitude $76^{\circ}09'58.5''W$. This hang was cleared by 15 feet. Present survey depths in the area are 20 feet. This obstruction was assigned AWOIS item ~~03098~~ in the Project Instructions. The 19 foot hang depth, cleared by 15 feet has been brought forward to supplement the present survey. The position of the charted obstruction with a wire drag clearance of 15 feet, in Latitude $37^{\circ}01'03''N$, Longitude $76^{\circ}10'00''W$, originating with Chart Letter 433 of 1982 should be disregarded, and the position obtained by survey FE-234WD (1967), in Latitude $37^{\circ}01'04.3''N$, Longitude $76^{\circ}09'59.0''W$, should be used for charting.

AWOIS item 03099, a charted dangerous submerged obstruction, described as a metal plate extending $1\frac{1}{2}$ feet of the bottom, was hung at 18 feet in Latitude $37^{\circ}00'54.0''N$, Longitude $76^{\circ}10'20.1''W$ by survey FE-234WD (1967). This hang was cleared by 16 feet. Present survey depths in the area are 20 to 21 feet. This hang depth of 18 feet on the obstruction cleared by 16 feet has been brought forward to supplement the present survey. It is recommended that the obstruction with a wire drag clearance depth of 16 feet remain as charted.

AWOIS item 00931, a large mushroom anchor extending 4 feet off the bottom, was located in Latitude $37^{\circ}03'21.1''N$, Longitude $76^{\circ}04'58.5''W$ by survey FE-234WD (1967). A 43.5-foot least depth was obtained using a pneumatic depth gage. The present survey found a mushroom anchor in Latitude $37^{\circ}03'20.82''N$, Longitude $76^{\circ}04'56.66''W$ with an echo sounder least depth of 46 feet. This anchor was assigned AWOIS item 00931 in the Project instructions. This anchor is charted as a submerged obstruction with a depth of 43 feet. It is recommended that the anchor be retained, but its charted position be revised to the present survey position.

There are no significant conflicts between the present survey depths and the effective depths on the prior survey. Differences between the present survey and effective depths are attributable to bottom change due to natural causes.

4) A comparison between survey H-7028WD (1944-45) and Ad. Wk. (1950) found two (2) hangs in the common area:

1) An unidentified obstruction was located in Latitude 37°01'06"N, Longitude 76°10'12"W. The obstruction was hung at 15 feet and cleared by 14.5 feet. Present survey depths in the area are twenty (20) to twenty-one (21) feet. This item was brought forward to supplement the present survey. It is recommended that this obstruction be retained as charted. ^{15ft on} cleared by _{FE234/11WD}

2) An unidentified obstruction was located in Latitude 37°01'12"N, Longitude 76°10'18"W. The obstruction was a ~~17~~15½ ft hang ~~feet sounding~~, cleared by 15 feet. Present survey depths are twenty (20) to twenty-one (21) feet. This item was brought forward to supplement the present survey. It is recommended that this obstruction be retained as charted.

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

7. COMPARISON WITH CHART 12222 (29th Edition, June 11/83)
12254 (31st Edition, Dec. 29/85)

a. Hydrography

The charted hydrography originates with the above prior surveys, BP64701-05 of 1963 (L1044/63), and miscellaneous sources. The following should be noted:

1) The hydrographer's description of AWOIS item 00893 on page 11 of the Descriptive Report states that the pile driver extends 15 ft above the bottom. The steel "spud" found by the divers is not a pile driver; it is a steel pile used to hold the pile driver in place while operating. See also section 6.b.1) of this report.

2) The side scan sonar search for AWOIS item 00916, a charted wreck, PA, in Latitude 37°02'00"N, Longitude 76°07'00"W, originating with Local Notice to Mariners 46 of 1974, produced negative results; however, the condition of the side scan sonar records submitted is of such poor quality that the wreck should be retained as charted.

3) AWOIS item 00917, a charted submerged wreck, PA, in Latitude 37°02'00"N, Longitude 76°06'00"W was searched for by the hydrographer with negative results. This wreck originates with Notice to Mariners 37 of 1966. The search performed by the field unit included 400% side scan sonar coverage of the area as required by the Project Instructions. The quality of the side scan sonar records was not deemed good enough to provide the 400% coverage claimed by the hydrographer. It is recommended that the charted wreck be retained as charted.

4) An uncharted 29-ft obstruction was found in Latitude 37°02'09.75"N, Longitude 76°05'13.02"W. The hydrographer's investigation of this area is discussed in section L., page 12 of the Descriptive Report. This obstruction is in the vicinity of AWOIS item 00920, the charted dangerous sunken wreck, PA, described as a 21 foot boat reported sunk in 27 feet in approximate position, Latitude 37°02'18"N, Longitude 76°05'06"W. This AWOIS item originates with Local Notice to Mariners 49 of 1970 (5th Coast Guard District). The echograms and side scan sonar records of the area of search were examined during office processing, and it was concluded that the object found was not a wreck. It is recommended that AWOIS item 00920, the dangerous sunken wreck, PA, be revised to existence doubtful.

5) AWOIS item 00923, charted as a dangerous submerged obstruction, PD, in Latitude 37°02'33"N, Longitude 76°06'42"W, was searched for by the hydrographer with negative result on the present survey. This item originates with Chart Letter 281 of 1968, minesweeping gear snagged on a submerged obstruction. The NOAA Ships RUDE and HECK investigated this submerged obstruction in 1978 with inconclusive results. The author of the Descriptive Report for survey FE-222WD (1978) speculates that the minesweeping gear may have hung on the mushroom anchor (AWOIS item 03036) which was found approximately one (1) nautical mile to the south [see also section 6.b.2) of this report]. The results of the 1978 RUDE and HECK investigation are found in the Descriptive Report for survey FE-222WD (1978). This field examination has not been processed at this time. Considering all of the pertinent facts presented in both the present and prior surveys, it is recommended that the charted dangerous submerged obstruction, PD, in Latitude 37°02'33"N, Longitude 76°06'42"W, be removed from the chart.*

6) AWOIS item 03095, a charted note, Shl to 16 ft rep 1977, in Latitude 37°01'05"N, Longitude 76°07'55"W, was searched for by the hydrographer with negative results. Depths in the 1/2 mile area developed by the hydrographer range from eighteen (18) to twenty-seven (27) feet. The shoalest sounding in the vicinity of the note is seventeen (17) feet and is approximately 1150 meters southeast of the AWOIS item. The bottom in the area has remained extremely stable since the latest prior survey. It is extremely doubtful that a 16-foot shoal exists in the charted location. It is recommended that the note be deleted from the chart.

7) The charted dangerous submerged obstruction, cleared by 15 feet, AWOIS item 03099, in Latitude 37°00'54.0"N, Longitude 76°10'20.1"W has been revised to a clearance depth of 16 feet on the 30th edition of chart 12222, dated June 8, 1985. This obstruction has been brought forward to supplement the present survey. No change in the present charting status is recommended. See also section 6.3.b) of this report.

* This recommendation superseded by recommendation in the modified evaluate reports for FE 222WD/78 (Teleco, 7/16/89, R. Robinson and S. Kerry (M06241))

8) The hydrographer discovered and subsequently investigated an uncharted wreck, in Latitude 37°03'52.80"N, Longitude 76°03'25.95"W. A lead line least depth of twenty-four (24) feet was obtained on the wreck. The diver's description of the wreck mentioned that the ribs protruded approximately four (4) feet off the bottom and is approximately thirty (30) feet long. It is recommended that the wreck be charted.

The present survey is adequate to supersede the charted hydrography within the common area except as noted above.

b. Aids to Navigation

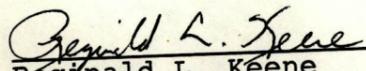
The hydrographer located four (4) floating aids and one (1) fixed aid in the survey area. These aids appear to be adequate for their intended purpose. Two (2) fixed aids that fall within the survey area were not located by the hydrographer (see page 15 of the Descriptive Report); these aids appear to be adequate to serve their intended purpose.

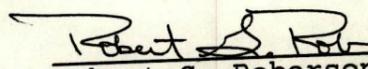
8. COMPLIANCE WITH INSTRUCTIONS

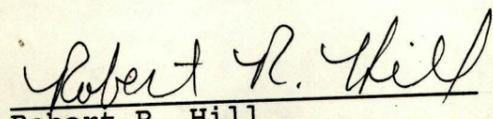
The present survey adequately complies with the Project Instructions except as noted in section 4. of this report.

9. ADDITIONAL FIELD WORK

This is a good basic survey; no additional field work is recommended.


Reginald L. Keene
Cartographic Technician
Verification of Field Data


Robert G. Roberson
Supervisory Cartographer
Evaluation and Analysis


Robert R. Hill
Senior Cartographic Technician
Verification Check

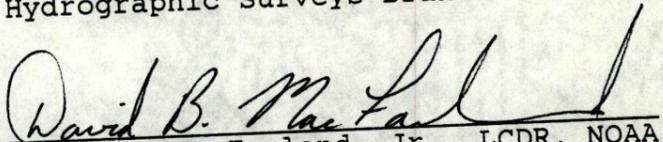
Inspection Report
H-10116

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

Inspected

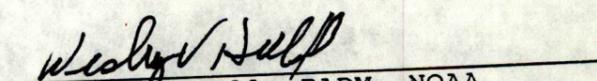


R. D. Sanocki
Chief, Hydrographic Surveys
Processing Section
Hydrographic Surveys Branch



David B. MacFarland, Jr., LCDR, NOAA
Chief, Hydrographic Surveys Branch

Approved: 19 December 1985



Wesley V. Hull, RADM, NOAA
Director, Atlantic Marine Center

