

9727

Diag. Cht. No. 1219-2

NOAA FORM 76-35A

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

**DESCRIPTIVE REPORT**  
(HYDROGRAPHIC)

Type of Survey ..... Hydrographic  
Field No. .... PE-20-5-77  
Office No..... H-9727

**LOCALITY**

State ..... Delaware  
General Locality ..... Southeast Approach to  
Delaware Bay  
Locality .. Delaware Bay Entrance

1977

CHIEF OF PARTY  
Carl W. Fisher

**LIBRARY & ARCHIVES**

DATE ..... March 14, 1979

12216

Area 2 & 1  
CHT  
12214  
12200  
13003

## HYDROGRAPHIC TITLE SHEET

H-9727

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.

PE-20-5-77

State DelawareGeneral locality DELMARVANC Southeast Approach to Delaware BayLocality Delaware Bay EntranceScale 1:20,000Date of survey 10 Oct. thru 6 Nov., 1977Instructions dated <sup>21</sup>~~18~~ January, 1977Project No. OPR-516-PE-77Vessel NOAA Ship PEIRCE (S-328)Chief of party Carl W. Fisher, CDR NOAACDR C. Fisher, CDR C. Molyneaux, LT. P. Chelgren, LTJG D. Minkel,Surveyed by LTJG K. Cox, ENS P. McGrath, ENS R. McCann, ENS G. DaSilvaSoundings taken by echo sounder, ~~hand lead, pole~~ Ross model 5000Graphic record scaled by Digital Echo Sounder / CWF, CM, PS, DM, KC, PM, FM, GD, CM, EM, FLGraphic record checked by CM, PS, GD Verification Branch (AMC)Protracted by \_\_\_\_\_ Automated plot by Xynetics 1200 Plotter (AMC)Verification by L.G. CrumSoundings in ~~XXXXXX~~ feet at MLW ~~XXXXXX~~REMARKS: All times are in GMT.Changes in red made during verification by the  
Verifier!Misc. data filed with field recordsApplied to stds 7-26-79  
[Signature]

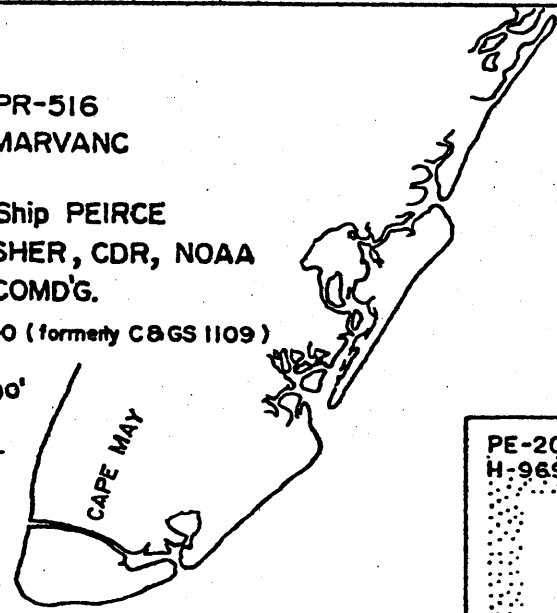
OPR-516  
DELMARVANC

NOAA Ship PEIRCE  
CARL W. FISHER, CDR, NOAA  
COMD'G.

From Chart 12200 (formerly C&GS 1109)

074° 30'  
+  
39° 10'

075° 00'  
+  
39° 00'



PE-20-1-77  
H-9699

APRIL

PE-20-3-77  
H-9723

SEPT

MAY - JUNE

JULY

AUG H-9700  
PE-20-2-77

OCT

NOV

H-9727  
PE-20-5-77

Cape Henlopen

AUG

H-9714  
PE-20-4-77

074° 30'  
+  
38° 40'

Ocean City

DESCRIPTIVE REPORT  
TO ACCOMPANY  
HYDROGRAPHIC SURVEY H-9727  
Field Number PE-20-5-77

A. PROJECT

This survey is part of the DELMARVANC Project OPR-516-PE-77. It was conducted according to instructions dated 18 January 1977 from Chief, Operations Division, Atlantic Marine Center (copy appended to this report) and Project Instructions dated 21 January 1977 to include the area at the entrance to Delaware Bay. Changes which affect this survey include the following:

<u>Change Number</u>	<u>Date</u>
6	22 March 1977
7	21 April 1977
8	3 May 1977
12	9 September 1977

This survey was conducted primarily in support of the National Ocean Survey nautical charting program.

B. AREA SURVEYED

Survey sheet H-9727 (PE-20-5-77) covers an area which begins approximately 7.5 nm east of Rehoboth Beach and extends another 11.0 nm east of the beach. There are no land masses within or adjoining the survey area. The northern boundary junctions with sheet PE-20-3-77. The boundaries are as follows:

North	38° 43.0'N	East	74° 40.5'W
South	38° 34.9'N	West	74° 54.9'W

The hydrography was conducted from 10 October 1977 to 6 November 1977.

C. SOUNDING VESSEL ✓

All hydrography was performed by the NOAA Ship PEIRCE (S-328), VesNo. 2830, equipped with a Hydroplot system and Ross Digital Echo Sounder, Model No. 5000.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS ✓

The following sounding equipment was used throughout the survey:

<u>VesNo</u>	<u>Echo Sounder</u>	<u>Depths</u>
2830	Ross 5000, S/N 1078	32' - 100'

Corrections for velocity were computed graphically from measurements of salinity and temperature at predetermined depths resulting from Nansen casts, as follows:

<u>Nansen Cast</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Julian Day</u>
1	38°44'26"	74°55'02"	280
2	38°44'01"	74°54'31"	292
3	38°44'14"	74°55'15"	308

Nansen cast information and thermometer calibration data are included in the survey records. Velocity corrections were scaled at 0.2 foot intervals from the table output of computer program RK 530. The Ross fathometer was maintained at zero initial and routine phase checks were performed. Draft of the PEIRCE (VesNo 2830) was determined by measuring the rail-to-water distance and subtracting this value from the transducer-to-rail height of 20.55 feet. The transducer-to-rail height was measured and computed by ship's personnel in the shipyard on 12 January 1976 and duly recorded in the ship's draft log. Rail-to-water measurements were made at the beginning and end of each trip. These values were graphed (straight line) and each day's draft was scaled. A leadline comparison of the ship's Ross fathometer, taken on 25 October 1977 showed no apparent error. The fathogram used in this comparison has been submitted with the rest of the survey data.

<u>Velocity Table</u>	<u>VesNo</u>	<u>Julian Day</u>
I	2830	257-286
II	2830	292-300
III	2830	308-310

SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS (Continued)

Settlement and squat correctors were determined for the ship on 16 May 1977. Speed changes were noted in the daily statistics sheet and settlement and squat correctors were tabulated using the TRA Corrections Abstract (appended). Also appended are the Velocity Tables and TC/TI Tapes.

E. HYDROGRAPHIC SHEETS ✓

The field sheets were plotted aboard the PEIRCE by the ship's PDP 8/E computer and Complot Roll-Bed Plotter. Field data is presented on two plotter sheets (scale 1:20,000) labeled 1 of 2 (North Sheet, Skew 0) and 2 of 2 (South Sheet, Skew 0). Both sheets were surveyed by the PEIRCE (VesNo 2830). One set of overlays contains mainscheme and crossline hydrography; the second set includes bottom sample locations, developments and detached positions.

The field records will be transmitted to the Atlantic Marine Center for smooth plotting and verification. The field sheet parameter tape listings and the smooth sheet projection parameters are appended.

F. CONTROL STATIONS ✓

Two Raydist stations were used to provide electronic control for this survey. They are as follows:

<u>Station No.</u>	<u>Name</u>	<u>Reference</u>
001	H-3-77-NJ at Avalon, New Jersey	AMC
002	H-1-DL-77 at Lewes, Delaware	AMC

The datum used is North American 1927. Stations were third order stations established by AMC Operations Division. A list of geographic positions for each station is included in the signal list. Copies of abstracts for the stations will be submitted with the field records.

G. HYDROGRAPHIC POSITION CONTROL ✓

Sounding line position control for this survey was Raydist used in the Range/Range mode aboard the PEIRCE. The following electronic positioning and related equipment were used in this survey.

HYDROGRAPHIC POSITION CONTROL (Continued) ✓

<u>Equipment</u>	<u>S/N</u>	<u>Location</u>
Hazlow Navigation Interface	200588	2830
Raydist	120	Station 001
Raydist	121	Station 002
Digital Computer PDP-8E	0211131	2830
Hydroplot Controller	0700003	2830
Raydist Navigator	69	2830
Raydist Master Transmitter	85	2830

The Raydist signal was compared with DelNorte readings aboard the PEIRCE in order to correct the whole number lane count or verify the reliability of the signal. Three point sextant fixes with check angles were used to obtain partial lane correctors. Both comparisons were acquired via the real time hydroplot program RK561, Geodetic Calibration. Results of the calibrations are included with the field records.

Raydist positioning occasionally showed discrepancies which are believed to be weather related. Frequent lane jumping occurred during local thunderstorms. When it was difficult to maintain Raydist lane count, hydrography was broken off until conditions improved and any suspect positions were rejected. Therefore, no data was included in the survey records which was questionable due to the loss of Raydist lane count. A list of signals and an abstract of partial lane correctors are appended.

H. SHORELINE ✓

No shoreline was included within the survey limits.

I. CROSSLINES ✓

Crosslines constitute 10.2% of the miles of electronic hydrography conducted. In all cases the soundings on the crosslines compare within one or two feet of the mainscheme hydrography. *Concur*

J. JUNCTIONS

This survey junctions with five other contemporary surveys as follows:

<u>Survey Registry No.</u>	<u>Scale</u>	<u>Date</u>	<u>Postion</u>
H-9723	1:20,000	1977	Northern Boundary
H-9639	1:40,000	1976	Eastern Boundary
H-9578	1:20,000	1975	Southern Boundary
H-9136	1:20,000	1970	Western Boundary
H-9175	1:10,000	1970	Northern Boundary

Comparisons of the field sheet soundings were very good. Agreement was within one or two feet revealing an adequate junction with the surveys listed.

K. COMPARISON WITH PRIOR SURVEYS

The following pre-survey review un-numbered items were investigated during this survey. They were obtained from the pre-survey review supplement dated 1 April 1977. There were three dashed-circle items and two wire-drag survey items developed as follows:

<u>Development</u>	<u>Latitude/ Longitude</u>	<u>Position No.</u>	<u>Description</u>
✓ C	38° 42.5' N 74° 43.2' W 38° 41.1' N 74° 46.5' W	2072-2162	Dashed-circle item to develop a ridge (3.0 X 0.8 nm) with a <sup>origin</sup> charted least depth of 30'. A <sup>H-6272 (1937)</sup> least depth of 32' was observed at Pos. No. 38+4 (Crosslines) in a surrounding depth of 56' * in Lat 38° 41' 17.92" Long 74° 45' 51.88"
	Chart present 31' depth in lat. 38° 41.31' long. 74° 45.85'		
	See Q/C item 3		
✓ G	38° 40.6' N 74° 44.4' W	1986-1994 2163-2165	Development of dashed-circle <sup>origin</sup> item with a 33' charted depth. <sup>H-6272 (1937)</sup> A least depth of 37' was observed at Pos. No. 159+5 (Mainscheme) in surrounding depths of 85' to the East and 49' to the West. * in Lat 38° 40' 37.86" Long 74° 45' 06.57"
	Chart present survey depths See page 8 Dev. G.		
✓ K	38° 38.7' N 74° 49.2' W	1904-1959 2037-2071	Dashed-circle item to develop a 34-35-37 charted shoal and prior survey depths. Least depth was 36' at Pos. No. <del>3067+4</del> (Mainscheme). <sup>2067+4 (crossline) in</sup> Lat 38° 39' 41.47" Long 74° 48' 20.34"
	34' From H-4164 (1920) 35' From H-6272 (1937) 37' From C/L 1451 (1975) BP. 93078		
	Chart present survey depths.		



COMPARISON WITH PRIOR SURVEYS (Continued)

<u>Development</u>	<u>Latitude/ Longitude</u>	<u>Position No.</u>	<u>Description</u>
✓ K (Cont'd)			A 71' prior survey depth at <sup>from H-4164</sup> 38°39.1'N, 74°48.5'W was developed in an area of general depth of 59'. A 71' sounding was observed about 0.1 nm to the NW.* A 70' prior survey depth at 38°39.4'N, 74°49.7'W was developed in a general depth of 80'. A 70 <sup>**</sup> sounding was observed about 0.2 nm to the NE.* in lat 38°39'07.15" long 74°48'44.25" <sup>** in lat 38°39'27.10" long 74°49'22.87"</sup>
			<i>Chart present depths</i>
✓ M	38°38.0'N 74°50.8'W	2205-2210 Origin H-9295 WD (1971-72)	Investigated 69' wire drag on wreck. Three East-West lines were run at 180 meter spacing. No trace of the wreck was found. <del>fast depth</del> 73' obtained at Lat. 38°37'56.01" Long 74°50'58.12"
			<i>Retain as charted</i>
✓ P	38°34.8'N 74°45.0'W	2199-2204 Origin H-9295 WD (1971-72)	Investigation of wreck with a 54' wire drag depth. Three East-West lines were run with 180 and 90 meter spacing. No trace of the wreck was found. <del>nearest depth 62'</del> Lat 38°34'58.06" Long 74°44'53.07" <sup>62' obtained at</sup>
			<i>Retain as charted</i>

Three prior survey soundings were also developed as follows:

<u>Development</u>	<u>Latitude/ Longitude</u>	<u>Position No.</u>	<u>Description</u>
✓ B	38°42.6'N 74°48.0'W	2166-2171	Development of a <sup>52' H-6272 (1937)</sup> 57' prior survey depth. Surveyed depths in this area were 63 to 66'. However, depths in the 57 to 58' range were observed 0.1 nm NNW of the prior survey depth. <b>A</b> least depth of 47' was observed at <sup>*</sup> Pos. No. 552 (Mainscheme) in surrounding depths of 48' <sup>Lat 38°42'45.50" Long 74°47'58.40"</sup>
			<i>Chart present depths</i>
✓ I	38°39.1'N 74°44.5'W	1977-1985 Origin H-4094 (1919-1920)	Small development (0.2 X 0.5 nm) of 82' and 84' prior survey depths and 60' contour. Surveyed depths in this sand and pebble bottom are 58' to 62', indicating a <sup>52'</sup> shallowing of 22' to 29' from the prior survey depths. The nearest corresponding depths were observed 0.7 and 0.9 nm to the N. <b>A</b> Least Depth of 56' was observed at <sup>52'</sup> Pos. No. 945+2 (Main-scheme) in surrounding depths of 65' <sup>* Lat 38°39'15.31" Long 74°43'40.80"</sup>
			<i>Chart present depths</i>

COMPARISON WITH PRIOR SURVEYS (Continued)

<u>Development</u>	<u>Latitude/ Longitude</u>	<u>Position No.</u>	<u>Description</u>
✓ J	38°39.7'N 74°45.7'W	1966-1969 <i>Origin</i> H-4094 (1919-20)	Small development (0.1 X 0.2 nm) of a 69' prior survey depth. Surveyed depths in this sand and pebble bottom are 79' to 82'. However, 69' soundings were observed 0.2 nm NW of the prior survey depth. $\bar{A}$ Least Depth of 76' was observed at Pos. No. 345+6 (Mainscheme) in a surrounding <sup>332+1</sup> depth of 78' $\bar{J}$ <small>Lat 38° 39' 56.57 Long 74° 45' 55.99</small>

*Chart present depths.*

There were two prior surveys available for comparison in the field:

<u>Survey</u>	<u>Scale</u>	<u>Date</u>
H-6272	1:40,000	1937
H-4164	1:40,000	1920

Agreement between this survey and the 1937 survey, H-6272, was fair. Soundings were within 1' to 4' in depths up to 50' and within 8' in depths over 50' (with the exception of a 14' and an 18' difference on the South Sheet). Agreement with the 1920 survey, H-4164, was poor. Soundings agreed within 3' in depths less than 37' and were up to 9' deeper in depths over 37'. In depths over 48', the prior survey depths agreed within 13', except for one 84' sounding (Development I) that was 24' deeper. The prior survey depths that were more than 3' shaller than present survey soundings agreed with soundings within the proximity of 0.1 to 0.2 nm. *See Verifier's Report*

L. COMPARISON WITH THE CHART *See Verifier's Report*

This survey was compared to chart 12214 (formerly C&GS 1219), Cape May to Fenwick Island Light, 30th edition, March 1977, scale 1:80,000. Agreement was very good, usually within 1 to 3 feet with four exceptions:

<u>Sheet</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Description</u>
1 Dev. C	38°42.7'N <i>Origin F.E. 9 (1950)</i> <i>see QC. sheets</i>	74°44.4'W	The charted depth of 33' was within a dashed-circle presurvey review item. A Least Depth of 38' (Main-scheme) was observed at Pos. No. 573+3. * Lat 38°42' 39.97" Long 74°44' 21.75" <i>Chart present survey depths.</i>

COMPARISON WITH THE CHART (Continued)

<u>Sheet</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Description</u>
✓ 1 Dev. L.	38°40.5'N See page 9. Origin H-6272 (1937)	74°48.4'W	The charted depth of 50' was investigated by Development L. A Least Depth of 56' was observed at Pos. No. 183+7 (Mainscheme). * Lat 38°40' 31.12 Long 74°48' 48.70" } Chart present survey depths.
✓ 1 Dev. G.	The present survey obtained a least depth of 37 ft on shoal area in vicinity. Chart present survey depths. See page 5. Dev. G.	38°40.8'N 74°44.9'W	The charted depth of 33' was a dashed-circle presurvey review item identified in this survey as Development G. The Least Depth observed was 38' at Pos. No. 145+2 (Mainscheme) in the same location as the charted depth. * Lat 38°40' 43.16 Long 74°44' 52.13" - Origin H-6272 (1937)
✓ 1	38°42.5'N Origin H-6272 (1937)	74°42.9'W	A charted depth of 51', was investigated. Soundings of 54' to 56' were observed in the vicinity and no shoaler depth was found. Chart present survey depths.

An extensive investigation developing shoalings, strays, and newly found features was performed. These special investigations are summarized as follows:

<u>Development</u>	<u>Latitude/ Longitude</u>	<u>Position No.</u>	<u>Description</u>
✓ A	38°42.2'N 74°51.6'W Chart present survey depths.	2172-2181 Origin H-6272 (1937)	Small area (0.3 X 0.3 nm) developed searching for a 51' charted depth. A Least Depth of 54' was observed at Pos. No. 639 (Mainscheme) in surrounding depths of 59'. * Lat 38°42' 20.84" Long 74°51' 20.68"
✓ E	38°42.8'N 74°42.4'W Chart present survey depths.	2182-2187 Origin H-6272 (1937)	Small development (0.2 X 0.3 nm) of 62' charted depth. Surveyed depths in this sand pebble bottom were 67' to 78'. However 62' depths were observed only 0.1 nm to W.
✓ H	38°40.0'N 74°45.0'W Chart present survey depths.	1970-1975+5 Origin H-6272 (1937)	A small development (0.2 X 0.3 nm) of 71' charted depth. Surveyed depths in this sand and pebble bottom were 82' to 86'. However, 71' depths were observed 0.4 nm to NW. [A Least Depth of 81' at Pos. No. 353+5 (Mainscheme) was observed in surrounding depths of 84'. The area has deepened by 10' to 12'] * Lat 38° 39' 50.50 Long 74° 45' 07.95"

COMPARISON WITH THE CHART (Continued)

<u>Development</u>	<u>Latitude/ Longitude</u>	<u>Position No.</u>	<u>Description</u>
✓ L	38°40.5'N 74°48.3'W	1960-1965	A small development (0.2 X 0.3 nm) of 50' charted depth. A Least Depth of 50' was observed at Pos. No. 184+5 and 210 (both in Mainscheme lines) in surrounding depths of 59'. * Lat 38°40'31.93" Long 74°48'24.39"
	Chart present survey depths. See page 8. Origin # - 6272 (1937)		
✓ N	38°36.5'N 74°45.0'W	2188-2198	A small shoal (0.3 X 0.6 nm) with a charted least depth of 47' was developed. The Least Depth observed was 47' at Pos. No. <sup>2194+215</sup> <del>1662+7</del> (Main <sup>1 mi to east</sup> scheme) in surrounding depths of 55' to the N and 71' to the S. * Lat 38°36'31.63" Long 74°44'51.76"
	Chart present survey depths. Origin # - 6272 (1937)		
✓ O	38°38.3'N 74°53.3'W	2211-2217	Development of a 5' spike rising from the bottom observed during Mainscheme hydrography. A Least Depth of 67' was observed at Pos. No. 1170+7 (Mainscheme). No further evidence of the spike was observed. Lat 38°38'22.16" Long 74°53'15.27"
	Chart present survey depths.		- stray, disregard.

M. ADEQUACY OF SURVEY / See Verifier's Report

This survey is complete and adequate to supercede prior surveys for charting purposes.

N. AIDS TO NAVIGATION

The lighted whistle buoy "DB" Mo(A)W on the Cape Henlopen to Delaware traffic lane was located. The charted position corresponds to that published in the Light List (38°38.2'N, 74°52.2'W). The surveyed position (38°38.2'N, 74°52.28'W) is 118 meters from its charted position, bearing 297°T. However, the buoy adequately serves its intended purpose of marking the Separation Zone.

O. STATISTICS

Positions - - - - - 0001-2218  
Nautical Miles of Sounding Line - - - - - 968  
Square Nautical Miles of Hydrography - - - - - 90  
Nansen Casts - - - - - 3  
Bottom Samples - - - - - 77  
Tide Stations - - - - - 3

P. MISCELLANEOUS

None

Q. RECOMMENDATIONS

Specific recommendations regarding charted features are included in Sections K and L of this report.

R. AUTOMATED DATA PROCESSING

The following programs were used in acquiring and processing data:

<u>Program No.</u>	<u>Program Name</u>	<u>Version</u>
RK 111	Range/Range Real Time Hydroplot	01/30/76
RK 201	Grid, Signal, and Lattice Plots	04/18/75
RK 211	Range/Range NonReal Time Plot	01/15/76
RK 300	Utility Computations	02/05/76
RK 330	Reformat and Data Check	05/04/76
PM 360	Electronic Corrector Abstract	02/02/76
RK 407	Geodetic Inverse/Direct Computation	10/23/75
AM 500	Predicted Tide Generator	11/10/72
RK 530	Layer Corrections for Velocity	05/10/76
RK 561	H/R Geodetic Calibration by 3 Point Fix	02/19/75
AM 602	ELINORE (Extended Line Oriented Editor)	05/20/75

S. REFERENCES TO REPORTS

None.

All data and field records are transmitted as part of this report.

Respectfully submitted for approval:



for

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Gregory A. DaSilva  
ENS, NOAA

Field Tide Note H-9727

Field tide reduction was based on predicted tides from Lewes, Delaware. Tides were zoned to the working area for PE-20-5-77 using correctors furnished with the project instructions. The predicted tides were interpolated at 0.2 foot intervals using program AM 500, version dated 11/10/72.

It is recommended that smooth tide zoning for this sheet be based on tides observed at Wildwood Crest, N.J. and Bethany Beach, Delaware. Verified hourly heights have been requested from the Tides and Water Levels Branch, National Ocean Survey ( see attached copy ). The tide gage at Bethany Beach was continued in operation from the 1976 field season. The gage at Wildwood Crest was reinstalled on 19 April 1977 by personnel from Tides Branch, AMC and the NOAA Ship PEIRCE. Tide station reinstallation records have been forwarded to the Tides and Water Levels Branch, Oceanographic Division, National Ocean Survey.

SIGNAL TAPE LISTING

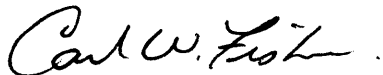
001 0 39 06 16671 074 42 27120 250 0000 329649  
H-3-77-NJ

002 0 38 47 16190 075 05 54727 250 0000 329649  
H-1-DL-77



APPROVAL SHEET

The field work on survey H-9727 (PE-20-5-77) was carried out under my immediate daily supervision which included participation in data acquisition, processing and checking. This report, the field sheet and all accompanying field records have been reviewed by me and are approved. The survey is complete and adequate to supercede prior surveys.



Carl W. Fisher  
CDR, NOAA  
Commanding Officer  
NOAA Ship PEIRCE (S-328)

CALIBRATION SIGNAL LISTING with descriptions

OPR-516-PE-77 DELMARVANC

003 0 39 06 22554 074 42 49631 139 0000 329649  
AVALON STANDPIPE, 1928 - '62

007 0 39 00 18103 074 47 48913 139 0000 329649  
NORTH WILDWOOD NORTH STANDPIPE, 1928 - '62

008 0 38 59 32638 074 48 50112 139 0000 329649  
WILDWOOD STANDPIPE, 1928 - '37

009 0 38 58 26258 074 50 21996 139 0000 329649  
WILDWOOD LARGE STANDPIPE, 1932

010 0 38 56 58112 074 52 02428 139 0000 329649  
LORAN "C" TOWER

011 0 38 56 46897 074 53 35483 139 0000 329649  
CAPE MAY C. G. WATER TANK

013 0 38 56 13558 074 54 55986 139 0000 329649  
CAPE MAY MUNICIPAL WATER TANK, 1936 - '62

014 0 38 55 58383 074 57 38759 139 0000 329649  
CAPE MAY LIGHTHOUSE, 1859 - 1957

015 0 39 02 22138 074 46 09783 139 0000 000000  
STONE HBR. C. G. STATION CUPOLA, 1928 - '61

016 0 38 55 58315 074 54 30757 254 0000 000000  
EAGLE

018 0 38 48 51827 075 05 33975 139 0000 000000  
HARBOR OF REFUGE LIGHTHOUSE, 1927 - '62

020 0 38 47 17313 075 05 42839 139 0000 000000  
FT. MILES OBSERVATION TOWER #8, 1962

021 0 38 46 53555 075 07 00110 139 0000 000000  
LEWES W. OIL FACTORY CHIMNEY, 1962

022 0 38 46 07942 075 05 12236 139 0000 000000  
FT. MILES USN WATER TANK, 1962

023 0 38 44 57432 075 04 53845 139 0000 000000  
GORDON (REHOBETH BEACH N. OBS. TOWER), 1962

VELOCITY TAPE LISTING

H-9727

TABLE NO. 1 (2830)

J.D. 283-285

00000	000242	0	0004	0001	000	283000	020577
00000	000297	0	0006				
	000348	0	0008				
	000403	0	0010				
	000457	0	0012				
	000511	0	0014				
	000567	0	0016				
	000620	0	0018				
	000674	0	0020				
	000729	0	0022				
	000783	0	0024				
	000840	0	0026				
	000899	0	0028				
	000955	0	0030				
	001013	0	0032				
	001071	0	0034				
	001130	0	0036				
	001190	0	0038				
	001249	0	0040				
	001302	0	0042				
	001361	0	0044				
	001420	0	0046				
	999999	0	0048				

VELOCITY TABLE LISTING (continued)

H-9727

TABLE NO. 2 (2830) J.D. 293-300

000200 0 0002 0002 000 283000 020577  
000274 0 0004  
000346 0 0006  
000418 0 0008  
000490 0 0010  
000562 0 0012  
000634 0 0014  
000708 0 0016  
000780 0 0018  
000852 0 0020  
000922 0 0022  
000996 0 0024  
001068 0 0026  
001140 0 0028  
001212 0 0030  
999999 0 0032

TABLE NO. 3 (2830) J.D. 308-310

000204 0 0002 0003 000 283000 020577  
000280 0 0004  
000360 0 0006  
000436 0 0008  
000514 0 0010  
000590 0 0012  
000667 0 0014  
000745 0 0016  
000820 0 0018  
000898 0 0020  
000975 0 0022  
001050 0 0024  
001130 0 0026  
001208 0 0028  
999999 0 0030

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21 (10-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANOGRAPHIC SURVEY
<b>VELOCITY CORRECTIONS</b>	
Ship <u>NOAA SHIP PEIRCE (S 328)</u>	
Comdg. <u>CARL W. FISHER, COB NOAA</u>	
These corrections are to be used between <u>257</u> and <u>286</u> in the locality <u>DELMARVANC</u> <u>DELAWARE BAY ENTRANCE</u> for hydrographic surveys Nos. <u>H-9723</u> <u>(PE-20-3-77)</u>	

DRAFT = 11.0 FT

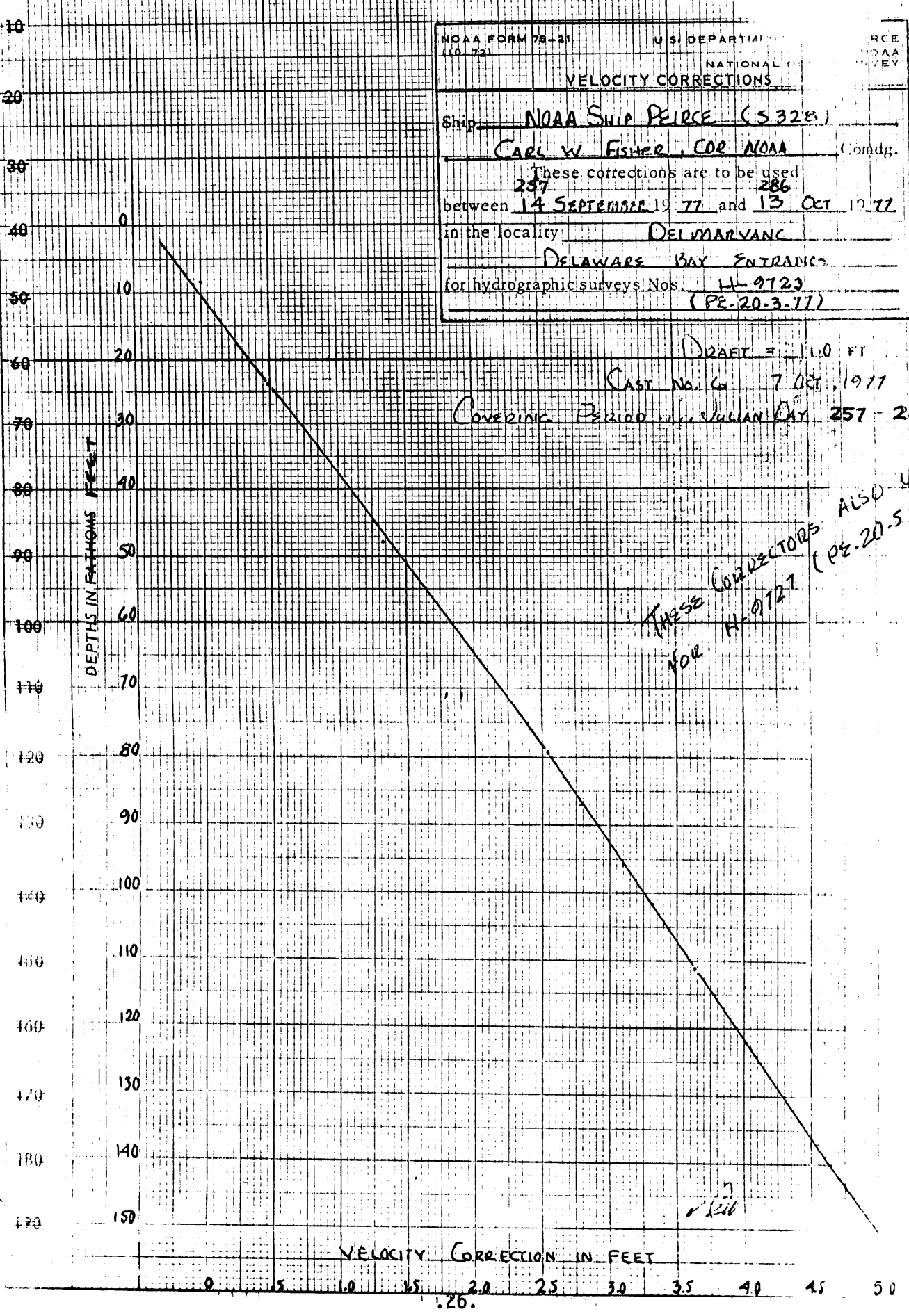
CAST No. 6 7 OCT, 1977

COVERING PERIOD JULIAN DAY 257 - 286

THESE CORRECTIONS ALSO USE:  
FOR H-9727 (PE-20-5-77)

2  
r/211

(For deep w) add a 0 to these figu



CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21  
(10-72)

U.S. DEPARTMENT OF COMMERCE  
NOAA  
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship PEIRCE (S328)  
Capt. W. FISHER, CDR NOAA Comdg  
 These corrections are to be used  
 between 292 19 OCTOBER 19 77 and 300 27 OCT 19 77  
 in the locality DELMARVANC  
DELAWARE BAY ENTRANCE  
 for hydrographic surveys Nos. H-9723 & H-9727  
(PE-20-3-77 & PE-20-5-77)

DRAFT = 11.0 FT.

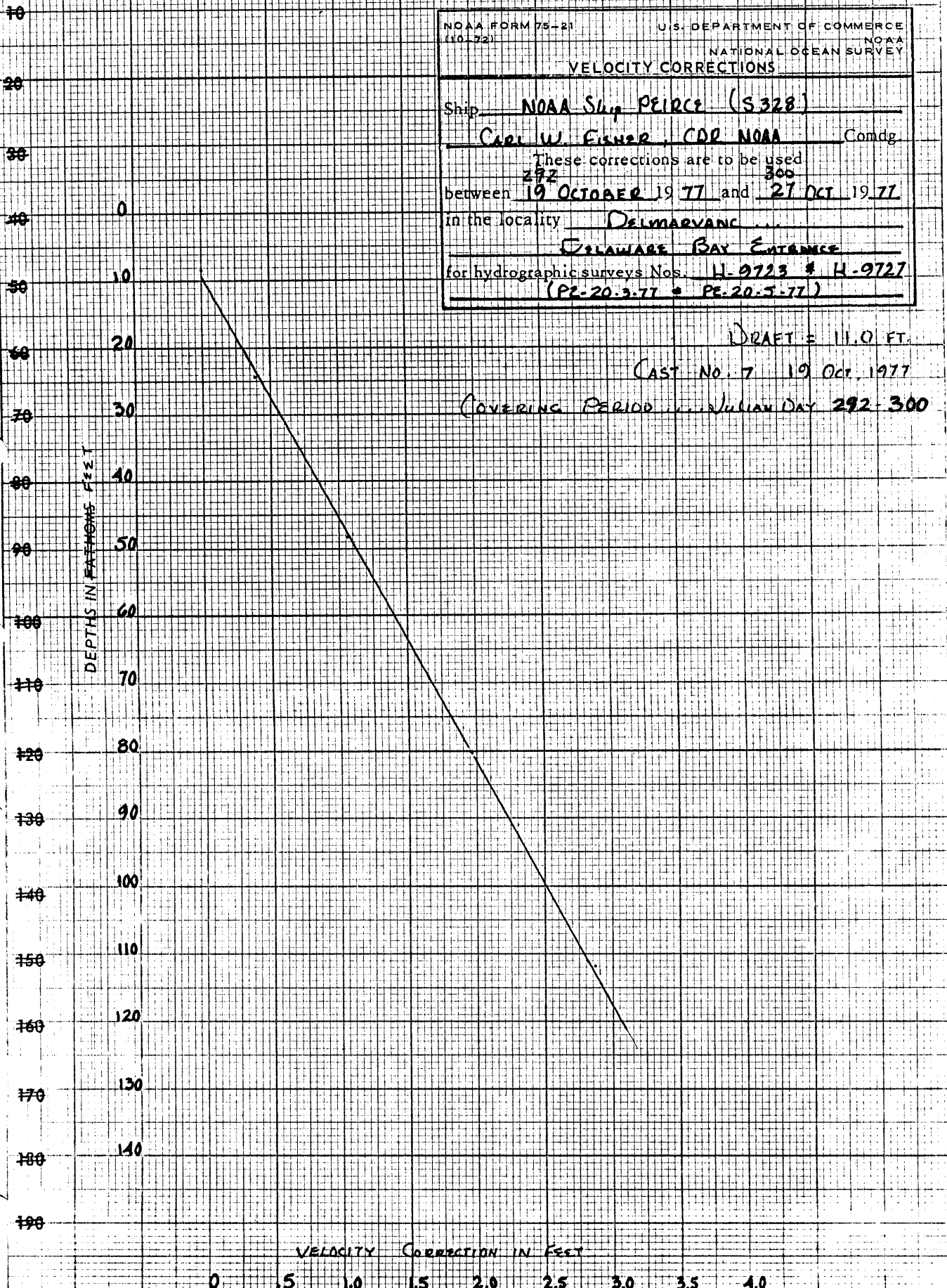
CAST No. 7 19 Oct. 1977

COVERING PERIOD Julian Day 292-300

(For deep wa) dd a 0 to these figur

DEPTHS IN FATHOMS FEET

VELOCITY CORRECTION IN FEET



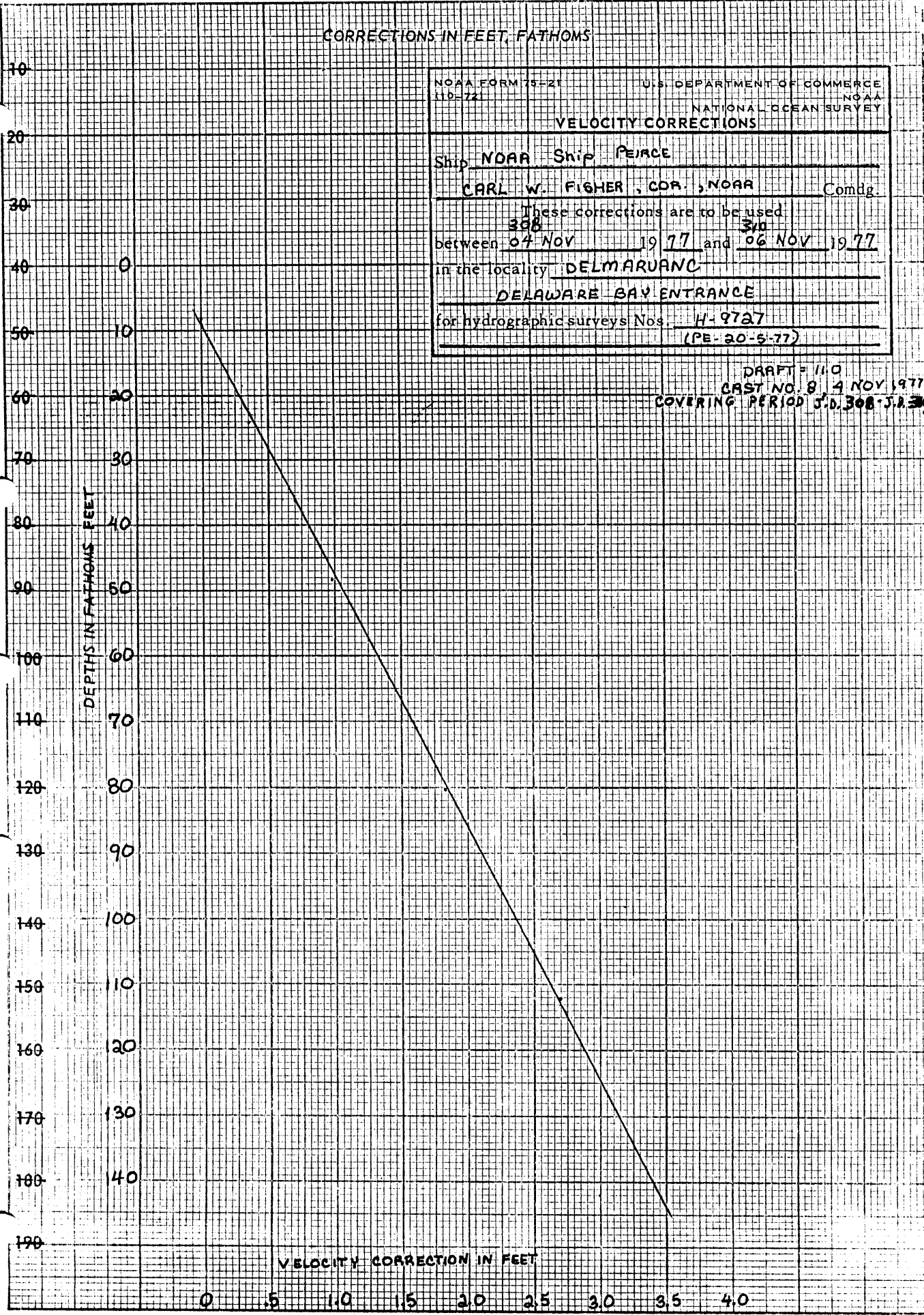
(Let 1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal.)

### CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21 (10-72)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY
<b>VELOCITY CORRECTIONS</b>	
Ship <u>NOAA Ship PEACE</u>	
Comdg. <u>CARL W. FISHER, COX., NOAA</u>	
These corrections are to be used between <u>04 NOV 1977</u> and <u>06 NOV 1977</u> in the locality <u>DELMARVANC</u>	
for hydrographic surveys Nos. <u>H-9727</u> <u>(PE-20-5-77)</u>	

DRAFT = 11.0  
 CAST NO. 8, 4 NOV 1977  
 COVERING PERIOD 3.0.308-3.2.30

(For deep water) add a 0 to these figure



July 5, 1978

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center:

Hourly heights are approved for Form 362

Tide Station Used (NOAA Form 77-12): 855-9208 Bethany Beach, De.

Period: October 10 - November 6, 1977

HYDROGRAPHIC SHEET: H-9727

OPR: 516

Locality: Offshore, east of Rehoboth Beach, Delaware.

Plane of reference (mean ~~lower~~ low water): 7.9 ft.

Height of Mean High Water above Plane of Reference is  
3.6 ft.

Remarks: Recommended zoning:

1. West of 74°50' apply range ratio x1.08.
2. East of 74°50' apply -10 minute time correction and range ratio x1.06.

Don M. Spillane  
Chief, Tides Branch



GEOGRAPHIC NAMES

H-9727

Name on Survey	<div style="display: flex; justify-content: space-between;"> <span>A ON CHART NO.</span> <span>B ON PREVIOUS SURVEY NO.</span> <span>C ON U.S. QUADRANGLE MAPS</span> <span>D FROM LOCAL INFORMATION</span> <span>E ON LOCAL MAPS</span> <span>F P.O. GUIDE OR MAP</span> <span>G RAND McNALLY ATLAS</span> <span>H U.S. LIGHT LIST</span> <span>K</span> </div>												
	DELAWARE BAY (TITLE)												1
												2	
												3	
												4	
												5	
												6	
												7	
												8	
												9	
												10	
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												12	
												13	
												14	
												15	
												16	
												17	
												18	Approved:
												19	
												20	<i>Chris E. Harrison</i>
												21	Chief Geographer - CBFS
												22	4 May 1979
												23	
												24	
												25	

APPROVAL SHEET  
FOR  
SURVEY H-9727 (1977)

- A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position printout has/~~has not~~ been made. A new final sounding printout has/~~has not~~ been made.
- B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Hydrographic Manual. Exceptions are listed in the Verifier's Report.

Date:

3/24/77

Signed:



Title:

Chief, Verification Branch



Reg. No. 9727

The Computer and Excess Sounding cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey the following shall be completed:

CARDS CORRECTED

DATE \_\_\_\_\_ TIME REQ'D \_\_\_\_\_ INITIALS \_\_\_\_\_

REMARKS:

Reg. No. \_\_\_\_\_

The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE \_\_\_\_\_ TIME REQ'D \_\_\_\_\_ INITIALS \_\_\_\_\_

REMARKS:

ATLANTIC MARINE CENTER  
VERIFIER'S REPORT

REGISTRY NO. H-9727

FIELD NO. PE-20-5-77

Delaware, Southeast Approach to Delaware Bay, Delaware Bay  
Entrance

SURVEYED: 10 October through 6 November 1977

SCALE: 1:20,000

PROJECT NO.: OPR-516

SOUNDINGS: Ross Digital  
Echo Sounder

CONTROL: Raydist  
(Range-Range)

Chief of Party ..... C. Fisher  
Surveyed by ..... C. Fisher  
..... C. Molyneaux  
..... P, Chelgren  
..... D. Minkel  
..... K. Cox  
..... P. McGrath  
..... R. McCann  
..... G. DaSilva  
Automated Plot by ..... XYNETICS 1200 Plotter (AMC)  
Verified and Inked by ..... L. G. Cram  
February 8, 1979

1. Introduction

a. No unusual problems were encountered on this survey.

b. One non-standard procedure was observed on this survey. The smooth sheet was plotted with less than the 7.5cm margin as specified under Sections 7.2.3 p. 7-2 in the Hydrographic Manual.

c. Numerous notes and amendments were made in red ink in the Descriptive Report by the verifier.

2. Control and Shoreline

a. The source of control is adequately described in Sections F. and G. of the Descriptive Report.

b. No shoreline is shown on this survey.

3. Hydrography See Q.C Report

a. The agreement at crossings on this survey is adequate; they agree with the one unit as prescribed by Sections 6.3.4.3 of the Hydrographic Manual.

b. The standard depth curves are drawn in their entirety. The charted 90 ft. curve was added in brown for better delineation of the basic bottom configuration as was the 36 ft. ~~supplemental~~ curve and a brown 42 ft curve. *Additional random brown curves added.*

c. This survey is considered adequate to delineate the basic bottom configuration and least depths. This statement is made in conjunction with the requirements of the Pre-survey update and supplement dated April 1977, and the Pre-survey Review dated April 29, 1976.

#### 4. Condition of Survey

The smooth sheet and accompanying overlays, hydrographic records and reports comply with the requirements of the Hydrographic Manual, with exceptions noted in the Q.C. Report.

#### 5. Junctions See Q.C. Report

Adequate junctions were made with the following surveys:

H-9136 to the southeast ✓ ok  
 H-9175 to the northeast ✓ ok  
 H-9578 to the southwest ✓ ok  
 H-9639 to the west and southeast ✓ ok  
 H-9723 to the north ✓ ok

These surveys need the following work by Quality Control Branch to complete the junctions. H-9723 (1977) ink curves and junctional note, H-9639 (1976) revise some curves and ink note and curves, H-9578 (1975), revise curves and ink note, H-9136 (1970) ink junctional note and curves, H-9175 (1970) revise curves and ink curves and junctional note. These smooth sheets are all at headquarters, it was hard to determine what surveys had junctional curves and notes inked and what was in pencil. One further problem was encountered. A 56 ft. junctional depth in latitude 38°36'19.61", longitude 74°45'43.50" from H-9578 (1975) is in disagreement with present survey depths of 73 feet. However, this depth was brought through to the present survey because it falls in an area where large sand waves occur, previously described in H-9578 (1975). *56 ft rejected in QC*

#### 6. Comparison with Prior Surveys See Q.C. Report

	H-4094	1:120,000	1919-20
a.	H-4093	1:40,000	1919
	H-4164	1:40,000	1920
	H-6272	1:40,000	1937
	FE. No. 9 (1950)	1:40,000	

Taken together the above prior surveys provide the most recent coverage of the present survey area. ~~A comparison with the present survey reveals prior survey depths to be from 1 foot deeper to 13 foot shallower than the present survey.~~ Particularly H-6272 which covers about 95% of the <sup>present</sup> prior survey area.

*and to shifting in bottom shoals.*

The present survey is generally 1 to 4 ft. deeper than the prior surveys. This is attributed to the relatively narrow transducer beam of the echo sounder used by the present survey which portrays a less generalized bottom profile in the area of somewhat irregular bottom. Attention is directed to the 34 foot depth in latitude  $38^{\circ}39'59.9''$ , longitude  $74^{\circ}47'55.0''$  originating with H-4164 (1970) which falls in depths of 41 feet on H-6272 (1937) and in depths of 40 to 43 feet in the present survey. The existence of this depth is considered doubtful and should be disregarded.

Considering the improved sounding and control methods the present survey is adequate to supersede the above prior surveys in the common area.

b.	H-6342	W.D. ✓	(1938)	1:40,000
	H-9295	W.D. ✓	(1971)-72)	1:20,000

There are no conflicts with the maximum effective depths of the above wire-drag surveys and the present survey depths. Two hang depths on wrecks located by H-9265 W.D. 1971-72 were not found by the present survey. These depths a 70 ft. hang in latitude  $38^{\circ}37'58''$ , longitude  $74^{\circ}50'49''$  and a 55 ft. hang in latitude  $38^{\circ}34'50''$ , longitude  $74^{\circ}44'55''$  were brought forward to supplement the present survey. The wreck located in latitude  $38^{\circ}34'50''$ , longitude  $74^{\circ}44'55''$  has a hang depth of 55 ft. and a cleared depth of 54 feet. The wreck located in latitude  $38^{\circ}37'58''$ , longitude  $74^{\circ}50'49''$  has a hang depth of 70 ft. and a cleared depth of 69 ft.

#### 7. Comparison With Chart #12214 (30th Edition, March 19, 1977)

##### a. Hydrography See Q.C. Report

~~All of the charted hydrography comes from the previously discussed prior surveys and wire drag survey. An adequate discussion is included in Sections L. of the Descriptive Report for this survey.~~ This survey is adequate to supersede the charted information with the retention of the charted cleared depths on the wrecks discussed under Sections 6.b of this report.

##### b. Aids to Navigation

One aid to navigation exists in the survey area and adequately marks the feature intended.

#### 8. Compliance with Instructions

This survey adequately complies with the Project Instructions.

9. Additional Field Work See Q.C. Report.

This is an excell<sup>e</sup>nt basic survey; no additional field work is necessary.





Inspection Report


H- 9727


Any verification errors regarding procedures and presentation of survey data detected during inspection by the Hydrographic Inspection Team have been corrected before submission for administrative approval. HIT comments regarding quality of field work, compliance with instructions, and adequacy of the survey have been incorporated within the Verifier's Report.

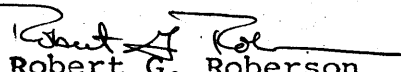
Examined and Approved:  
Hydrographic Inspection Team  
Date: February 22, 1979

  
Robert A. Trauschke, CDR, NOAA  
Chief, Processing Division

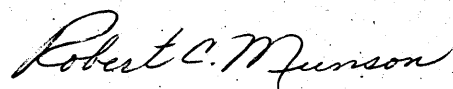
  
Carl W. Fisher, CDR, NOAA  
Chief, Operations Division, *hs*

  
R. D. Sanocki  
Technical Assistant  
Processing Division

  
C. Douglas Mason, LT, NOAA  
Chief, Electronic Data  
Processing Branch

  
Robert G. Roberson  
Team Leader  
Verification Branch

Approved/Forwarded

  
Robert C. Munson  
RADM, NOAA  
Director, Atlantic Marine Center



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL OCEAN SURVEY  
Rockville, Md. 20852

OA/C352:RWD

April 24, 1979

TO: *A. J. Patrick*  
A. J. Patrick  
Chief, Hydrographic Surveys Division

THRU: Chief, Quality Control Branch

FROM: R. W. DerKazarian *R.W. DerKazarian*  
Quality Evaluator

SUBJECT: Quality Control Report for H-9727 (1977), Delaware, Southeast Approach to Delaware Bay, Delaware Bay Entrance

A quality control inspection of H-9727 was accomplished to monitor the survey for obvious deficiencies with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, smooth plotting, decisions and actions taken by the verifier, and the cartographic presentation of data. Revisions and additions to the smooth sheet, plus helpful comments made to the verifier, are identified on a one-half scale copy of the survey to be furnished the verifier. In general, the survey was found to conform to the National Ocean Survey's standards and requirements except as stated in the Verifier's Report, the HIT Report, and as follows:

1. Section 4 of the Verifier's Report is supplemented by the following:
  - a. The fathometer initial setting was not properly maintained. In several cases a + 0.2- to + 0.4-foot adjustment should have been made. This did not affect soundings inasmuch as they are automatically digitized; however, the fathogram is considered a valid record of the bottom trace. These analog depth records are often found necessary to review during processing.
  - b. Frequent erratic digital return values of soundings were noted in the master tape printout. These soundings had been check scanned by the field. This malfunction should be corrected.
  - c. Errors in the field check scanning of the fathograms was frequent and had obviously been undetected during verification. When averaging the jagged profile attributed to chop, soundings were randomly read 1 to 2 feet deeper than considered appropriate, and in some cases 4 to 5 feet; but these errors were probably caused by misinterpreting the sounding position on the graph.



d. Extensive rescanning of fathograms to change soundings by a few tenths in order to smooth curves has been criticized in recent reports; however, this does not apply to soundings in junctional areas where agreement is necessary or to determine a least depth on a significant feature. In the general vicinity of latitude  $38^{\circ}41.5'$ , longitude  $74^{\circ}45.5'$  several soundings were rescanned to better delineate the 36-foot curve and show least depths. A 33-foot sounding was rescanned to 31 feet, a least depth, during quality control.

2. Section 5 of the Verifier's Report is supplemented by the following:

Adequate junctions had been effected with all the junctional surveys as outlined in the Verifier's Report. However, it was determined during quality evaluation that most of the changes necessary to effect an adequate junction with surveys H-9175 (1970), H-9578 (1975), and H-9639 (1976) were made on the present survey. Several sounds were rescanned and some junctional depths transferred in order to properly delineate depth curves on the present survey. Soundings that were 1 to 4 feet deeper on the present survey were easily rescanned to bring them into 0- to 2-foot agreement with the junctional surveys.

The 56-foot sounding from H-9578 (1975) in latitude  $38^{\circ}36'19''$ , longitude  $74^{\circ}45'43''$  and the entire sounding line on which it falls have been rejected during the quality evaluation of the present survey. It has been determined that crossing inconsistencies between this line and present hydrography are mainly attributed to an apparent control problem; sea conditions and sand waves of 2 to 4 feet had little effect on these differences. The 56-foot sounding falls on the major feature probably 200 to 300 meters east. A Special Investigation (1977) in the nearby vicinity developed an area approximately 1,000 meters by 1,400 meters which showed a range of depths to be 13 feet over the entire area; however, the differences from sounding to sounding only vary 2 to 4 feet. The conclusions arrived at by this investigation stated in the Verifier's Report of H-9578 (1975), paragraph 3.a, is considered misleading.

3. Section 6 of the Verifier's Report is supplemented by the following:

A few isolated differences of  $\pm 13$  feet exist between the prior and present survey depths. These differences are attributed to the inaccuracies of the prior sounding methods and equipment rather than bottom change.

F.E. No. 9 (1950) WD

A very small portion of this prior wire-drag survey common in area with the present survey is a sounding development, which is in good agreement

with the present survey. A charted 33-foot depth (dashed circled item, part of development "c" on the present survey) in latitude  $38^{\circ}42.65'$ , longitude  $74^{\circ}44.35'$  was erroneously shown on this prior survey. The 33-foot depth is actually 38 feet.

4. Section 7 of the Verifier's Report is supplemented by the following:

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys stated in the Descriptive Report, paragraphs K and L; the Verifier's Report, paragraph 6; and paragraph 3 above which require no further consideration, supplemented by CL/1451 (1975), Bp-93078. A charted 37-foot depth (circled Presurvey Review item) in latitude  $38^{\circ}39.7'$ , longitude  $74^{\circ}48.63'$  from this information should be deleted from the chart; an actual tide corrector had not been applied to this depth.

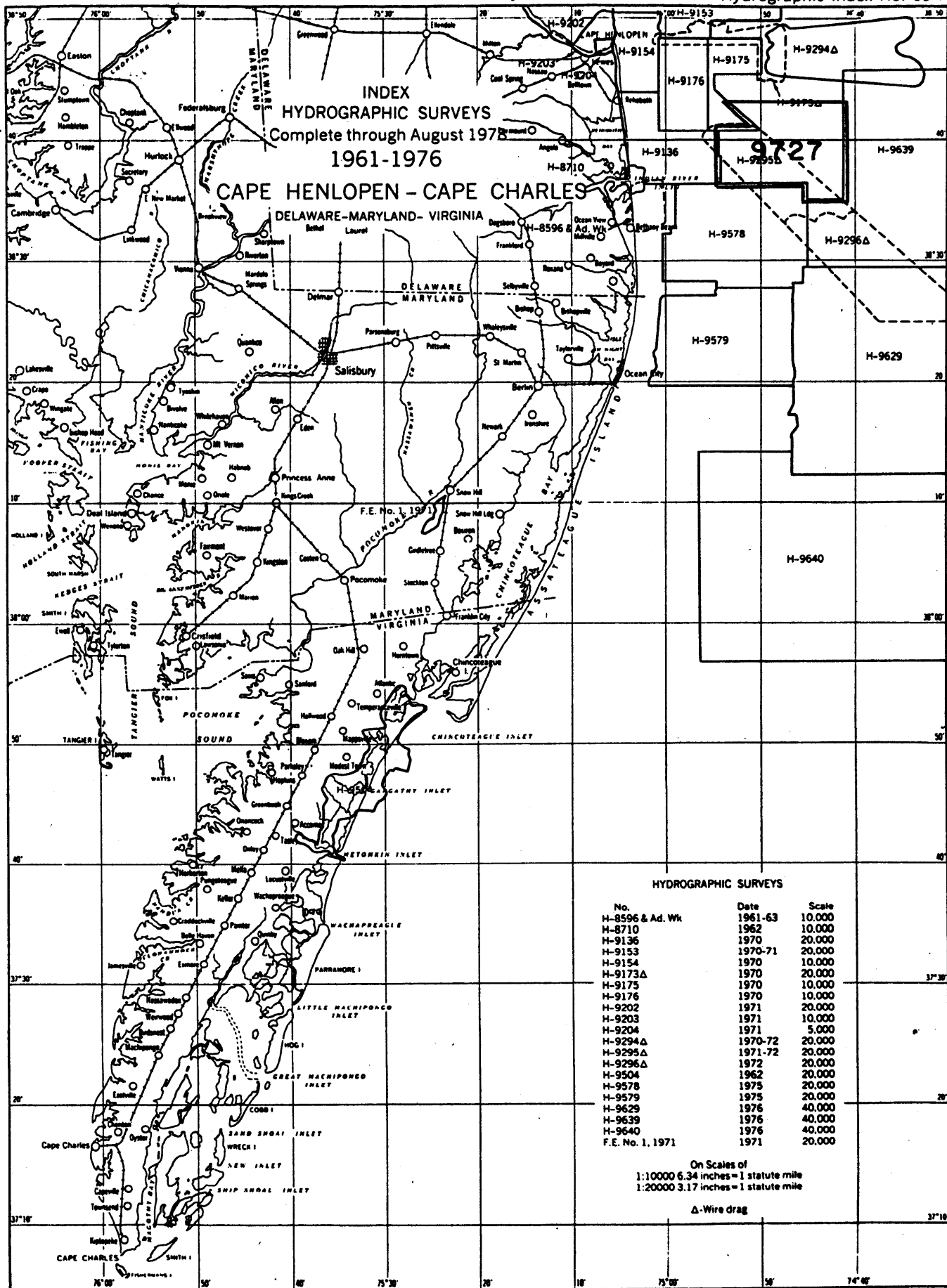
5. Section 9 of the Verifier's Report is supplemented by the following:

The present survey was very well developed and should be considered an excellent basic survey; however, due to relaxed scanning, check scanning, and verification procedures, the present survey is considered adequate.

cc:  
OA/C35  
OA/C351

DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Ocean Survey  
Rockville, Maryland

Hydrographic Index No. 69 K



INDEX  
HYDROGRAPHIC SURVEYS  
Complete through August 1978  
1961-1976

CAPE HENLOPEN - CAPE CHARLES

DELAWARE-MARYLAND-VIRGINIA

HYDROGRAPHIC SURVEYS

No.	Date	Scale
H-8596 & Ad. Wk	1961-63	10,000
H-8710	1962	10,000
H-9136	1970	20,000
H-9153	1970-71	20,000
H-9154	1970	10,000
H-9173Δ	1970	20,000
H-9175	1970	10,000
H-9176	1970	10,000
H-9202	1971	20,000
H-9203	1971	10,000
H-9204	1971	5,000
H-9294Δ	1970-72	20,000
H-9295Δ	1971-72	20,000
H-9296Δ	1972	20,000
H-9504	1962	20,000
H-9578	1975	20,000
H-9579	1975	20,000
H-9629	1976	40,000
H-9639	1976	40,000
H-9640	1976	40,000
F.E. No. 1, 1971	1971	20,000

On Scales of  
1:10000 6.34 inches = 1 statute mile  
1:20000 3.17 inches = 1 statute mile

Δ-Wire drag

