

9700

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-20-2-77
Office No..... H-9700

LOCALITY

State New Jersey-Delaware
General Locality .. Delaware Bay Approach
Locality .. Southeast of Five Fathom Bank

1977

CHIEF OF PARTY
Carl W. Fisher

LIBRARY & ARCHIVES

DATE October 4, 1978

☆ U.S. GOV. PRINTING OFFICE: 1976-669-441

9700
0026

1219-2
1219-2
1219-2 (1000)
12300

HYDROGRAPHIC TITLE SHEET

H-9700

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-20-2-77

State New Jersey - Delaware

General locality ~~DELMARVANE~~ Delaware Bay Approach

Locality Delaware Bay Entrance southeast of Five Fathom Bank

Scale 1:20,000 Date of survey 23 May thru 24 Sept., 1977

Instructions dated 18 January, 1977 Project No. OPR-516-PE-77

Vessel NOAA Ship PEIRCE (S-328)

Chief of party Carl W. Fisher, CDR NOAA
CDR C. Fisher, CDR C. Molyneaux, LCDR K. Schneble, LTJG T.

Surveyed by Lillestolen, LTJG D. Minkel, Ens McGrath, Ens Cox, Ens Hussey,
Ens R. McCann

Soundings taken by echo sounder, ~~XXXXXXXXXX~~ Ross, model 5000

Graphic record scaled by Digital Echo Sounder / CWF, KJS, CM, TIL, DHM, PM, KC, DAH, RXM

Graphic record checked by KJS, CM, RXM

Protracted by N. A. Automated plot by CALCOMP-618 Plotter

Verification by Doug Mason

Soundings in fathoms ~~feet~~ at MLW ~~XXXXX~~

REMARKS: All time records in this survey are Greenwich Mean Time.

app'd. to Std. 1-10-79 WJT

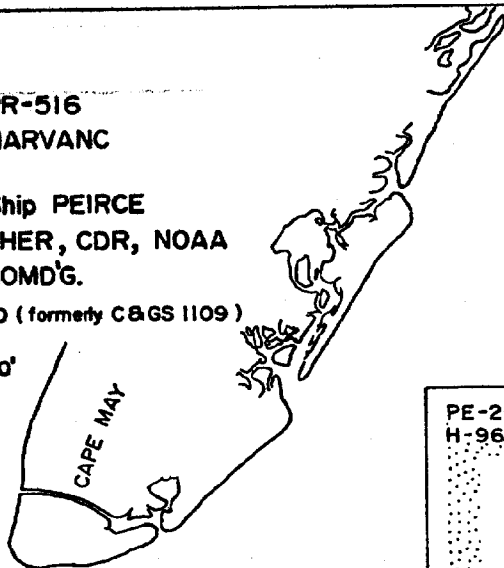
OPR-516
DELMARVANC

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

From Chart 12200 (formerly C&GS 1109)

075° 00'
39° 00'

074° 30'
39° 10'



PE-20-1-77
H-9699

APRIL

MAY - JUNE

SEPT

JULY

AUG

H-9700
PE-20-2-77

OCTOBER

074° 30'
38° 40'

Cape Henlopen

AUG

PE-20-4-77

Ocean City

DESCRIPTIVE REPORT
TO ACCOMPANY
HYDROGRAPHIC SURVEY H-9700
Field Number PE-20-2-77

A. PROJECT

This survey is part of the DELMARVANC Project OPR-516-PE-20-2-77. 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:

Change No. 2	-----	2 March 1977
Change No. 6	-----	22 March 1977
Change No. 7	-----	21 April 1977
Change No. 8	-----	3 May 1977

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

B. AREA SURVEYED

This survey covers the area near the entrance to Delaware Bay between Cape May, New Jersey, and Cape Henlopen, Delaware and specifically the eastern (seaward) end of the Five Fathom Bank to Cape Henlopen Traffic Lanes. The limits of hydrography are:

1. From $38^{\circ}44'$ north latitude to $38^{\circ}53'$ north latitude.
2. From $74^{\circ}21'$ west longitude to $74^{\circ}41'$ west longitude.

Hydrography commenced on 23 May 1977, and was completed on 24 September 1977.

C. SOUNDING VESSEL

Hydrography was entirely conducted using the NOAA Ship PEIRCE. The ship is equipped with a hydroplot system and a Ross digital echo sounder (Model 5000).

The vessel number assigned in this survey is NOAA Ship PEIRCE (S-328), vessel number 2830.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

The recorded depths in this survey ranged from 26' to 144'.

The following is a list of the sounding equipment used in this survey.

<u>Vessel No.</u>	<u>Julian Day</u>	<u>Echo Sounder</u>
2830	143-144 159-267	Ross Model 5000, S/N 1078
2830	144-159	Ross Model 5000, S/N 1055

- (1) The velocity of sound through water was determined by measurement of salinity and temperature at preselected depths through periodic Nansen casts as follows:

<u>Nansen Casts</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Julian Day</u>
2	38°49'03" N	74°23'30" W	143
3	38°47'93.58"N	74°20'21.51"W	191
4	38°46'20.0"N	74°21.00.0"W	222
5	38°46'32.28"N	74°21'30.08"W	258

The velocity corrections were scaled at 0.2 foot intervals from the table output of RK 530. A leadline comparison was taken on 10 August 1977 (Julian Day 222) at latitude 38°56.3'N, longitude 74°48.5' W. The results were in good agreement with the velocity correctors.

The rail to water height was measured at the beginning and end of each two week trip. This height was subtracted from the rail to transducer height of 20.55 feet which was determined in the shipyard on 12 January 1976. The resultant values were graphed linearly and each day's draft was scaled.

- (2) All echo sounders were maintained at zero initial. No problems were encountered with the echo sounders which would require additional corrections or effect the survey's accuracy.
- (3) Settlement and Squat corrections for the Ship PEIRCE were determined on 16 May 1977 at Craney Island, Norfolk, Virginia with two type 1 Jensen launches aboard, and on 4 November 1975 at Floyd Bennet Field, Long Island, New York, without launches aboard.

Speed changes were noted in the daily statistics sheet. Settlement and squat corrections were tabulated using the TRA corrections abstracts.

Copies of the velocity tables, TC/TI tapes and TRA Correction Abstracts are appended to this report. Other abstracts and graphs are included in the field records of this survey.

E. HYDROGRAPHIC SHEETS

The field sheet is scaled at 1:20,000, the dimensions are 36" X 60", oriented east-west and composed of two plotter sheets which were projected and plotted using the ship's Hydroplot System and complot Roll-Bed Plotter. Sheet 1 covers the northern portion of the field sheet and sheet 2 covers the southern portion.

The field data is presented on four plotter sheets; the mainscheme lines, crosslines, and splits are shown on two of the plotter sheets. The developments and bottom samples are shown on the other two sheets.

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 stations were used to control this survey. The datum used is North American 1927. These stations were located by the Operations Division, Atlantic Marine Center, using third-order traverse procedures. Geodetic abstracts and computations regarding these stations are available from AMC. A list of geographic positions for each station is also appended (Signal List).

<u>Station No.</u>	<u>Name</u>	<u>Reference</u>
001	(H-3-77-NJ) Avalon, N.J.	Atlantic Marine Center
002	(H-1-77-DL) Lewes, Del.	Atlantic Marine Center

G. HYDROGRAPHIC POSITION CONTROL

Sounding line position control used in this survey was Raydist in the Range/Range mode.

The following electronic positioning equipment was used during this survey:

<u>Equipment</u>	<u>S/N</u>	<u>Location</u>	<u>Remarks</u>
Hazlow Navigation	200588	VesNo. 2830	
Raydist	120	Station 001	J.D. 143-J.D. 187 only
Raydist	68	Station 001	J.D. 187-J.D. 217 only
Raydist	120	Station 001	J.D. 217-J.D. 267 only
Raydist	121	Station 002	
Digital Computer	0211131	VesNo. 2830	
Hydroplot Controller	0700003	VesNo. 2830	
Raydist Navigator	69	VesNo. 2830	
Raydist, Master Transmitter	39	VesNo. 2830	

The Raydist was calibrated and partial lane correctors were determined by three-point sextant fixes with check angles (on known shore objects and computed using Program RK 561, Geodetic Calibration). A list of signals and an abstract of partial lane correctors used are appended.

The Raydist whole lane count was checked and reset in the Hydroplot Controller only at a taut-moored "calibration" buoy. Three (3) such buoys were utilized during this survey. The buoys are referred to in the field records as buoys numbered 2, 3, and 4. Note that partial lane

correctors were determined only by shoreside sextant fixes, never by passes on the buoy and the Raydist counters were reset only at this time.

Occasionally, the Raydist whole lane count was checked by Del Norte readings. These comparisons were acquired using Del Norte stations in use on survey H-9699 and via real time hydroplot Program RK 561. Results of these calibrations and lane checks are included with the field records.

Whenever it was difficult to maintain Raydist lane count due to atmospheric conditions, such as electrical storms, 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.

H. SHORELINE

There was no shoreline included within the limits of the survey.

I. CROSSLINES

Crosslines amounted to 12.9% of the total miles of sounding lines run (excepting for developments). Sounding on crosslines were in good agreement (+ 1 to 2 foot) with the observed soundings in the main-scheme lines.

J. JUNCTIONS

This survey junctions with the following surveys:

<u>Survey</u>	<u>Scale</u>	<u>Date</u>	<u>Position</u>
H-9699	1:20,000	1977	Northern junction
H-9622	1:40,000	1976	Eastern junction
H-9639	1:40,000	1976	Southern junction
H-9723	1:20,000	1977	Western junction
H-9312	1:20,000	1972	N.W. junction

Comparisons at the junctions were very good, being within 1 to 2 foot.

K. COMPARISON WITH PRIOR SURVEYS

The following presurvey review items were investigated in this survey:

wrk charted from N to M 45/1956 (pos. item 83 ft boat sunk in 55 ft)
PSR #15 (obtained from presurvey review sheet dated 4-1-77) "PD" Applied
ckts
12214
12300
12300
 Wreck of 86½ schooner MELFRED, "PA" at (position approximate) 38° 48.1' N
 74° 38.1' W, which sank in 1956 in 565 feet of water. Both east-west and
 north-south lines were run over the site at 50 meter spacings. Position
 numbers were 3218-3320. No sign of the wreck appeared on the fathogram.
 It is suggested that a "PD" (Position Doubtful) notation be charted with
 the wreck symbol. *concur ✓*

wrk charted from N to M 26/1956
PSR #16 (obtained from presurvey review sheet dated 4-1-77)
 Wreck of 110' wooden barge #9, 7' vertical relief, "PA" at (position
 approximate) 38° 51.6' N, 74° 37.1' W, which sank in 1956 in 44 feet of
 water. Both east-west and north-south lines were run over the site at "PD" Applied
To Ckts.
12214
12300
12200
 50 meter spacings. Position numbers were 2734-2822. No sign of the
 wreck appeared on the fathogram. It is suggested that a "PD" (Position
 Doubtful) notation be charted with the wreck symbol. *concur ✓*

The following presurvey review items were obtained from presurvey review
 sheet (dated 4-1-77) identified as dashed, circled items and were devel-
 oped as follows:

<u>Development</u>	<u>Latitude/ Longitude</u>	<u>Development Position No.</u>	<u>Remarks</u>
A	38°50.2' N 74°38.4' W	2131-2185 2216-2298 3037-3045	Southern shoal area (1.3 NM diameter) of Five Fathom Bank with least depth of 20' at Pos. No. 2293 + 2 in surrounding depth of 50'. ✓ concur RPS
<i>Charted least depth - 22 ft. - pres. survey least depth 24 ft. chart pres. survey depths.</i>			
B	38°48.6' N 74°39.0' W	2518-2557 3046-3067	Shoal (.2 NM X 1.3 NM) with least depth of 38' at Pos. No. 3060 + 3 in surrounding depth of 45'. ✓ concur RPS
<i>Charted least depth - 37 ft. Pres. survey least depth - 38 ft. chart pres. survey depths.</i>			
F	38°49.5' N 74°27.9' W	2463-2476	The Northeast corner of a shoal (.25 NM X 1.5 NM). This corner of the shoal had a least depth of 57' ✓ concur RPS at Pos. No. 508 + 5 (from mainscheme lines in surro- ounding depths of 81' <i>nearby</i>
<i>Charted least depth 57 ft. Pres. survey least depth 56 ft. chart depths on pres. survey.</i>			

This is ON/LINE Plot of DEVELOPMENT
WHICH WAS RUN SEARCHING FOR PDR # 16

7

32

68

48

45

35

48

35

35

33

38:52'

28

36

44

PDR # 16
(35 # 16)

34

57

27

23

35

36:31'

5

35

6

36

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18

36:10'

G 38°49.0'N 2396-2462 The southwest corner
 74°28.9'W of the same shoal
 (.25 NM x 1.5 NM)
 in development "F".
 This corner of the
 shoal had a least
 depth of 56' at
 Pos. No. 2459 + 1.5
 ~~in a surrounding~~
 ~~depth of 81'.~~ ✓
 concur
 7/5

P. 38°47.8'N 3144-3180 Shoal (1.1 NM x .2 NM)
 74°27.5'W with least depth
 of 57' at Pos. Nos. ✓
 3179 + 4 and 3176 + 7,
 ~~in surrounding depths~~
 ~~of 89' on west end~~
 ~~of shoal, and 119' e~~
 ~~on the east end.~~
 Charted least depth 55 ft, —
 Pres. survey least depth 56 ft.
 Chart pres. survey depths.

Two prior surveys were available for comparison in the field:

<u>Survey</u>	<u>Scale</u>	<u>Date</u>
H-6264	1:40,000	1937
H-6345	1:80,000	1938

Prior survey H-6345 covers the eastern part of the survey area while H-6264 covers the northwest part of the survey area. The bottom half of H-6264 (covering the eastern part of the survey area) was not available at the time of this report. ~~Requests for the missing section of H-6264 had been made personally on 12 August through Operations Division, Atlantic Marine Center and again by a phone call on 16 August by LCDR Schnebele, NOAA Ship PEIRCE to LCDR Suloff of Marine Surveys and Maps (C 351), Rockville, Maryland.~~

Agreement between prior surveys and this survey was in general, very good usually within one to two feet. Some areas showed significant enough change to be noted as follows:

<u>Prior Survey</u>	<u>Plotting Sheet</u>	<u>Latitude/ Longitude</u>	<u>Change</u>
H-6264 <i>28' - least depths on pres. survey</i>	1 of 2	38°51.2' N 74°37.8' W	23' to 27' shoal has deepened by about 7'. <i>contains 715</i>
H-6264 <i>least depth on pres. survey is 24ft.</i>	1 of 2	38°50.2' N 74°38.3' W	22' 22' shoal has deepened by about 2' 2'.
H-6345	1 of 2	38°51.8' N 74°24.5' W	90' sounding has deepened by 20' 10'.

As a result of the observed changes, believed to be due primarily to the bottom composition (sand as observed from bottom samples), it is recommended that the prior surveys be updated by the results of this survey.

chart depths from present survey in common areas.

L. COMPARISON WITH THE CHART

This survey was compared to Chart 12214 (formerly C & GS 1219), Cape May to Fenwick Island Light, 30th edition, 17 January 1977. scale 1:80,000. Agreement was very good, usually between one to three feet with one exception.

~~48~~ ^{43 39-41 ft.} foot soundings ^{were} obtained at a charted 58 foot depth. The position is as follows:

<u>Plotting Sheet</u>	<u>Latitude</u>	<u>Longitude</u>
1 of 2	38°51. 8 ¹⁶ N	74°36. 7 W ✓

Comparison of this survey with prior survey H-6264 (1937, 1:40,000) gives depths within one to two feet of surveyed depths at this position. Therefore, it appears that distortion during enlargement of the chart to the scale of this survey for comparison purposes may have resulted in the shifting of the 58 foot sounding 0.5 nautical miles to the northwest.

58 ft. sdg. is a 38 ft. sdg. on H-6264 - compilation mistake - 38' sdg. charted as 58' sdg.

An extensive investigation developing shoalings, strays and newly found features was performed. These 22 developments are divided among the sheets as follows:

<u>Sheet</u>	<u>Developments</u>	<u>No. of Development</u>
1 of 2	A to K	11
2 of 2	L to V	11

<u>Development</u>	<u>Latitude/ Longitude</u>	<u>Development Position No.</u>	<u>Remarks</u>
A	38°50.2' N 74°38.4' W	2131-2185 2216-2290 3037-3045	See section K
B	38°48.6' N 74°39.0' W	2518-2557 3046-3067	See section K
C	38°50.6' N 74°34.8' W	2538-2557	Small shoal (.2 NM X .5 NM) with least depth of ⁶⁹ 71' at Pos. No. 2538 + 4 in surrounding depth of 84'. ✓
D	38°50.5' N 74°32.2' W	2329-2360	Small shoal (.3 NM X .5 NM) with least depth of ⁶² 72' at Pos. No. 976 + 5 (from main-scheme lines) in surrounding depth of 72'. ✓

66' charted as prior survey least depth 69'

between charted sdgs of 67-69 ft.

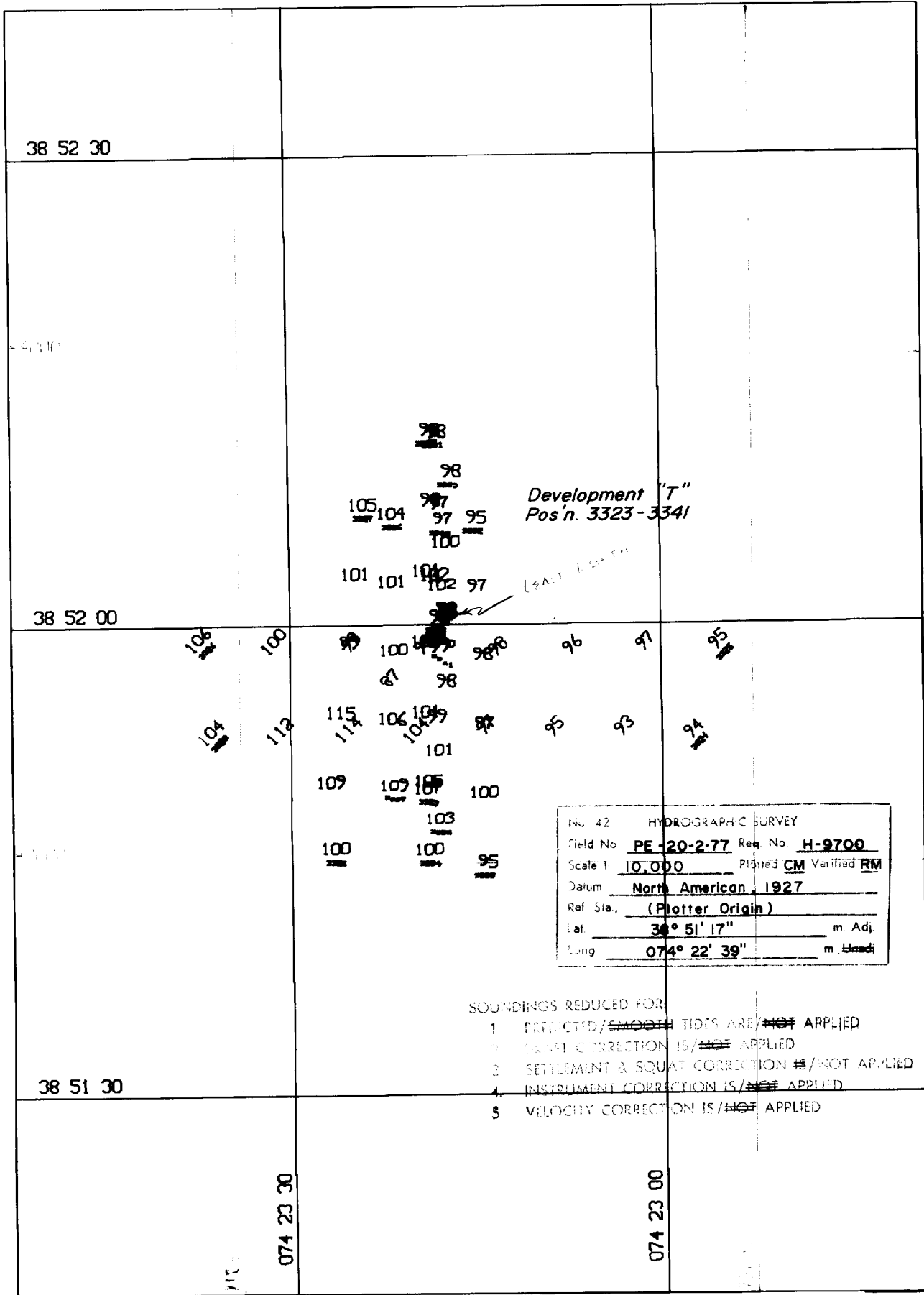
E	38°50.6'N 74°29.8'W <i>pres survey - 57 ft. least depth - charted least depth 58 ft.</i>	2361-2395	Shoal (1.2 NM X .8 NM) with least depth of 59' at Pos. No. 2387 + 3 in surrounding depth of 68'.
F	38°49.5'N 74°27.9'W	2463-2476	See Section K ✓
G	38°49.0'N 74°28.9'W	2396-2462	See Section K ✓
H	38°48.8'N 74°26.8'W	2477-2484	Small shoal (.6 NM X .1 NM) with least depth of 72' ¹ at Pos.No. 940 + 1 (from Main- scheme lines) in surrounding depth of 81'.
I	38°48.7'N 74°22.2'W	2645-2662	Shoal (.2 NM X .8 NM) with least depth of 100' ^{92'} at Pos. ✓ No. 2652 ²⁶⁵² + 2 in surrounding depth of 118'.
J	38°51.4'N 74°23.3'W	2558-2579	Shoal (.3 NM X .8 NM) with least depth of 88' at Pos. ✓ No. 2561 + 6 in surrounding depth of 107'.
K	38°50.5'N 74°23.3'W	2663-2668	Small shoal (.55 NM X .3 NM) with least depth of 92' at ✓ Pos. No. 2668 ²⁶⁶⁸ + 5 in sur- rounding depth of 105'.
L	38°47.5'N 74°37.7'W	2968-3000	Small shoal (.6 NM X .3 NM) with least depth of 48' at Pos. No. 1664 + 1 from ✓ mainscheme lines) in sur- rounding depth of 55'.
M	38°46.9'N 74°31.1'W	3088-3105	Small shoal (.3 NM X .2 NM) with least depth of 69' ⁸ at ✓ Pos. No. 3102 + 4 in sur- rounding depth of 75'.
N	38°45.7'N 74°33.8'W	3069-3087	Small shoal (.5 NM X .4 NM) with least depth of 73' at ✓ Pos. No. 1807 + 2 (from mainscheme lines) in sur- rounding depth of 80'
O	38°45.6'N 74°28.5'W	3106-3117	Small shoal (.5 NM X .4 NM) with least depth of 74' at ✓ Pos. No. 1815 + 4 (from mainscheme lines) in

surrounding depth of 79'.

P	38°47.8' N 74°27.5' W	3144-3180	See section K.
Q	38°46.6' N 74°27.8' W	3118-3143	Shoal (.9 NM X .1 NM) with least depth of 74' at Pos. No. 1371 + 5 (from mainscheme lines) in surrounding depth of 95'.
R	38°46.8' N 74°24.9' W	3181-3205	Small shoal (.3 NM X .6 NM) with least depth of 98' at Pos. No. 1259 + 6 (from mainscheme lines) in surrounding depth of 105'.
S	38°47.0' N 74°33.8' W	3206-3217	Charted 59' wire drag depth. Least depth of 87' at Pos. No. 1915 + 3½ (from mainscheme lines) in surrounding depth of 89'.

In addition to the above developments, three charted wrecks were developed as follows:

T	38°51.95' N 74°23.20' W	3323-3341	Charted wreck cleared to 65' by wire drag. The wreck was found, with a least depth of 78' at Pos. No. 3338 + 3 in surrounding depth of 100'. A 1:10,000 scale enlargement of this development is included in this report.
U	38°49.10' N 74°31.30' W	3342-3355	Charted wreck cleared to 60' by wire drag. The mainscheme was split and north-south lines were run at 90m spacing. No trace of the wreck was found. Recommend it remain as charted.
V	38°52.4' N 74°25.0' W	2689-2733	Non-dangerous charted wreck with a least charted depth of 90'. Both east-west and north-south lines were run at 50 meter spacing. No trace of the wreck was found. Recommend it remain as charted.



M. ADEQUACY OF SURVEY

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

N. AIDS TO NAVIGATION

Two buoys were located within the limits of this survey. Detached positions were recorded at both buoy positions and the observed Raydist rates were used to determine geographic positions via computer program RK 300 (Utility Computations), then entered into computer program RK 407 (Geodetic Direct and Inverse Computations) to obtain metric distances and azimuths relative to Light List positions.

The position of Delaware Bay entrance buoy "F" was determined to be: latitude $38^{\circ}47'19.89''$ North and longitude $74^{\circ}34'30.5''$ West. The Light List number for this buoy is 118, with a position of; latitude $38^{\circ}47.3'$ North; longitude $74^{\circ}34.6'$ West. The charted position is the same as the light list position for this buoy. Conversations with the Commanding Officer of the Coast Guard Cutter Hornbeam, which services this buoy, indicated that this buoy has a 5:1 scope. Since it is anchored in ~~750~~ ⁷⁵⁰ feet of water, this buoy appears to be "on station" as reported in the Light List. concur JPS

The position of Five Fathom Bank South buoy "4FB" was determined to be latitude $38^{\circ}49'45.458''$ North and longitude $74^{\circ}36'44.388''$ West. The light list number for this buoy is 116, with a position of; latitude $38^{\circ}49.7'$ North, longitude $74^{\circ}36.8'$ West. The charted position is the same as the light list position for this buoy. This buoy is a distance of 140.9 meters on a bearing of $218^{\circ}02'3.9''$ True from it's Light List position. concur JPS

Both buoy "F" and "4FB" are adequately positioned to serve their intended purpose. concur JPS

O. STATISTICS

<u>Category</u>	<u>VesNo. 2830</u>	<u>Total</u>
Positions	3355	3355
Nautical Miles of Sounding Line	1358	1358
Square Natutical Miles of Hydro	136	136
Nansen Casts	3	3
Bottom Samples	136	136
Temporary Tide Stations	2	2
	.12.	

P. MISCELLANEOUS

Deep draft commercial traffic to and from Delaware Bay routinely cross the eastern portion of sheet PE-20-2-77, either prior to arrival at or after departure from buoy "F" which marks the eastern end of the Five Fathom Bank to Cape Henlopen Traffic Lane. Therefore, this portion of the survey was considered an extension to an entrance to harbor situation, and line spacing was reduced by one-half ($\frac{1}{2}$) in accordance with section 5.4 of Project Instructions for OPR-516-PE-77.

Safe navigation of the ship required that the PEIRCE adhere whenever possible to the vessel traffic system established at the entrance to Delaware Bay. Since the Five Fathom Bank to Cape Henlopen traffic lanes are included within the limits of this sheet the mainscheme was designed so that the ship would proceed in the proper direction in these lanes. Therefore the left about and right about turns were not to adjacent lines. However the final result was a mainscheme at the required line spacing. The records have been annotated to indicate the actual progression of survey lines.

Q. RECOMMENDATIONS

Specific recommendations regarding charted features are made in sections K and L of this report.

R. AUTOMATED DATA PROCESSING

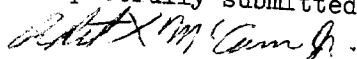
The following programs were used in acquiring and processing data:

<u>Program No.</u>	<u>Program Name</u>	<u>Version</u>
RK 111	Range/Range Real Time Hydroplot	01/30/76
NRK 201	Grid, Signal and Lattice Plot	04/18/75
RK 211	Range/Range Non Real 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 Direct and Inverse Computations	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:



Robert X. McCann Jr.
Ensign, NOAA

APPROVAL SHEET

The field work on survey H-9700 (PE-20-2-77) 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 reviewed by me and are approved. The survey is complete and adequate to supercede prior surveys.

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

VELOCITY TAPE LISTING
H-9700

TABLE NO. 1 (2830)

000130 0 0000 0001 000 283000 200377
000224 0 0002
000316 0 0004
000408 0 0006
000526 0 0008
000770 0 0010
001036 0 0012
001326 0 0014
999999 0 0016

TABLE NO. 2 (2830)

000105 0 0000 0002 000 283000 200377
000160 0 0002
000210 0 0004
000265 0 0006
000320 0 0008
000370 0 0010
000425 0 0012
000482 0 0014
000645 0 0016
000800 0 0018
000960 0 0020
001120 0 0022
001280 0 0024
999999 0 0026

TABLE NO. 3 (2830)

000021 0 0004 0003 000 283000 200277
000248 0 0006
000288 0 0008
000328 0 0010
000366 0 0012
000406 0 0014
000446 0 0016
000486 0 0018
000526 0 0020
000565 0 0022
000605 0 0024
000642 0 0026
000805 0 0028
000926 0 0030
001048 0 0032
001170 0 0034
001292 0 0036
001412 0 0038
999999 0 0040

TABLE NO. 4 (2830)

000229 0 0004 0004 000 283000 200277
000275 0 0006
000322 0 0008

VELOCITY TAPE LISTING
H-9720

TABLE NO. 4 ---CONTINUED

000369	0	0010
000416	0	0012
000462	0	0014
000509	0	0016
000556	0	0018
000602	0	0020
000650	0	0022
000697	0	0024
000744	0	0026
000791	0	0028
000838	0	0030
000890	0	0032
000953	0	0034
001013	0	0036
001076	0	0038
001138	0	0040
001199	0	0042
001261	0	0044
999999	0	0046

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

Field Tide Note H-9700

Field tide reduction was based on predicted tides from Lewes, Delaware. Tides were zoned to the working area for PE-20-2-77 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.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
NOAA SHIP PEIRCE (S-328)
439 West York Street
Norfolk, Virginia 23510

3 November 1977

TO: Chief, Tides and Water Levels Branch (C331)
FROM: *Carl W. Fisher*
Carl W. Fisher, CDR., NOAA
Commanding Officer
NOAA SHIP PEIRCE (S-328)

SUBJECT: Request for Verified Hourly Heights of Tides

Please provide hourly heights of tides and values of MLW on the tide staff for the following periods of hydrography on surveys H-9700 and H-9723, OPR-516.

H-9700

H-9723

Period of hydro: 0900 23 May - 1100 8 June	1500 - 2000 14 Sept.
0600 10 July - 1000 14 July	1800 24 Sept. - 1600 29 Sept.
1200 4 Aug. - 0700 11 Aug.	1900 5 Oct. - 2300 12 Oct.
0700 8 Sept. - 1700 15 Sept.	0900 19 Oct. - 2100 20 Oct.
1100 20 Sept.-1800 24 Sept.	0900 - 1300 24 Nov.

All times are EST.

Control Station: Lewes, Delaware (855-7380)

Supplementary Stations: Wild Wood Crest, N.J. (853-5875)
Bethany Beach, Delaware (855-9208)

Please forward the requested information directly to the Atlantic Marine Center, Attn: CAM 33.



March 28, 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

Tide Station Used (NOAA Form 77-12): 853-5875 Wildwood Crest, N.

Period: May 23 - September 24, 1977

HYDROGRAPHIC SHEET: H-9700

OPR: 516

Locality: Offshore, east of Cape Henlopen, Delaware

Plane of reference (mean ~~XXXXX~~ low water): 4.12 ft.

Height of Mean High Water above Plane of Reference is
4.3ft. - Wildwood Crest

Remarks: Recommended zoning:

Apply-20 minute time correction and range ratio x0.91.

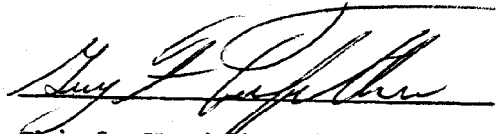
Don Spillman
Chief, Tides Branch

APPROVAL SHEET
FOR
SURVEY H- 9700

- 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: 8/29/78

Signed:



Title: Chief, Verification Branch

HYDROGRAPHIC SURVEY STATISTICS

H-9700

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		1	BOAT SHEETS & PRELIMINARY OVERLAYS 4- Boat Sheets, 1- pos. & 1- Excess over.		4 5	
DESCRIPTIVE REPORT		1	SMOOTH OVERLAYS: POS, ARC, EXCESS		2	
DESCRIP- TION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/ SOURCE DOCUMENTS
ENVELOPES	1		1			1- misc. DATA
CAHIERS	1 with corrector Pd's					
VOLUMES	2					
BOXES						

T-SHEET PRINTS (List) CHART BLOWUP (2-PARTS) 1-CHART 1224, 1-CALIBRATION NOTEBOOK, 1-BUNDLE OF SAUTOUTY
SPECIAL REPORTS (List) 1-SECTION STAIR RECORDS

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS		
	PRE- VERIFICATION	VERIFICATION	TOTALS
POSITIONS ON SHEET			3491
POSITIONS CHECKED		250	
POSITIONS REVISED		0	
SOUNDINGS REVISED		400	
SOUNDINGS ERRONEOUSLY SPACED		0	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)			
VERIFICATION OF CONTROL		1	
VERIFICATION OF POSITIONS		26	
VERIFICATION OF SOUNDINGS	3	64	
COMPILATION OF SMOOTH SHEET		57	
APPLICATION OF TOPOGRAPHY		0	
APPLICATION OF PHOTOBATHYMETRY		0	
JUNCTIONS		4	
COMPARISON WITH PRIOR SURVEYS & CHARTS		25	
VERIFIER'S REPORT		5	
OTHER			
TOTALS	3	182	185

Pre-Verification by K. Ainsley	Beginning Date 12/22/77	Ending Date 12/22/77
Verification by S. Kelley, F. Saunders, D. Mason	Beginning Date 01/15/78	Ending Date 08/15/78
Verification Check by G. Trefethen	Time (Hours) 4	Date 08/22/78
Marine Center Inspection by Hydrographic Inspection Team (AMC)	Time (Hours) 8	Date 08/24/78
Quality Control Inspection by F.S. SAULSBURY	Time (Hours) 1/5	Date 11-2-78
Requirements Evaluation by J.B. [Signature]	Time (Hours) 3	Date Nov 30 1978

Cons. GR/Maped 11/7/78 1 Per.

REGISTRY NO. H-9760

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 REQUIRED _____ INITIALS _____

REMARKS:

REGISTRY 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 REQUIRED _____ INITIALS _____

REMARKS:

ATLANTIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO. H-9700

FIELD NO. PE-20-2-77

New Jersey - Delaware, Delaware Bay Approach, Southeast of
Five Fathom Bank

SURVEYED: May 23 through September 24, 1977

SCALE: 1:20,000

PROJECT NO.: OPR-516

SOUNDINGS: Ross Model 5,000

CONTROL: Raydist
(Range-Range)

Chief of Party	C. Fisher
Surveyed by	C. Molyneaux
.....	K. Schnebele
.....	T. Lillestolen
.....	D. Minkel
.....	P. Mcgrath
.....	K. Cox
.....	D. Hussey
.....	R. McCann
Automated Plot by	CALCOMP-618 Plotter (AMC)
Verified and Inked by	D. V. Mason
	August 14, 1978

1. Introduction

a. No unusual problems were encountered during the veri- ✓
fication of the survey.

b. The red changes in the Descriptive Report were made by ✓
the verifier.

2. Control and Shoreline

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

b. There is no shoreline in the survey area. ✓

3. Hydrography

a. Depths at crossings are in good agreement. ✓

b. The standard depth curves were adequately delineated, ✓
with the inclusion of a 90-foot brown curve and a 42-foot brown
curve to further define the bottom configuration.

Soft curve is required since it is a charted curve.

c. The development of bottom configuration and the investigation of least depths are considered adequate. ✓

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, except: ✓

The ship used two plotter sheets which resulted in overlapping bottom samples. Half of these bottom samples were deleted during verification. ✓

5. Junctions

Adequate junctions were effected with the following surveys:

H-9699 (1977) to the north
 H-9622 (1976) to the east
 H-9639 (1976) to the south
 H-9723 (1977) to the west
H-9312 (1972) NW corner

6. Comparison With Prior Surveys

a. H-6345 (1938) 1:80,000
 H-6264 (1937) 1:40,000
 H-6344 (1938) 1:40,000

A comparison between the above prior surveys and the present survey revealed relatively minor to significant differences in depths. Different methods of sounding and position control were used on the above prior surveys, and in part, differences with the findings of the present survey may be attributed to the methods. However, a detailed comparison with each survey revealed the following:

H-6344 - Depths from this prior survey are 0 to 2 feet shoaler.

H-6264 - Depths from this prior survey are 0 to 7 feet shoaler. These differences can be attributed to differences in survey equipment, methods, position control, and bottom configuration. Three soundings from the prior survey were investigated and are listed under Section K of the Descriptive Report. These three soundings are listed below: (All from Chart 12214)

<u>Charted Depth</u>	<u>Location</u>	<u>Present Depth</u>
23'	38°51.2', 74°37.8'	30'
27'	38°51.3', 74°38.2'	28' 400m to the S
22'	38°50.2', 74° 38.3'	24' 200m to the W

H-6345 - Depths from this prior survey are one to two feet shoaler. These differences can be attributed to differences in survey methods, position control, and bottom configuration. One sounding, a 90-foot depth listed under Section J of the Descriptive Report, is considered plotted wrong and the 19-fathom sounding at the charted position, latitude 38° 51.8', longitude 74° 24.5', agrees with the 19-fathom sounding from the above prior survey. ✓

The present survey is adequate to supersede all of the above prior surveys in the common areas. CONCUR 7AS

b. F.E. No. 1 WD 1951 1:40,000

The sunken wreck charted at latitude 38° 52.00', longitude 74° 23.25~~8~~ was cleared at ~~50.5~~ feet. This wreck was investigated and the least depth found is 78 feet at latitude 38° 52.00', longitude 74° 23.28' and is considered part of the wreck. The charted wire drag clearance depth of 65 feet should be retained as charted and the 6~~8~~⁶-foot hang depth has been brought forward to the present survey. ✓

The 60-foot clearance depth over the reported sunken wreck, SATARTRIA, charted at latitude 38° 49.2', longitude 74° 31.3' was investigated and the least depth found is 64 feet. The 60-foot wire drag clearance depth should be retained as charted. The existence of the wreck has not been verified or disproved by this survey *nor by F.E. No. 1 WD (1951)* CONCUR 7AS

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

a. Hydrography

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

Two Presurvey Review Items were investigated and are listed under Section K of the Descriptive Report. It is recommended that these wrecks remain charted at their present charted positions and a "PD" (Position Doubtful) notation be charted with the wreck symbol. CONCUR 7AS

The charted cleared wire drag depth of 59 feet at latitude 38° 47.0', longitude 74° 33.8' was investigated and the shoalest sounding found was 88 feet. The source for the above 59-foot depth cannot be found by this verifier. It is considered that the item is not verified or disproved by the present survey. The 59-foot sounding should remain charted at its present charted location. *Charted 59-foot depth - (computer note)*

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

b. Aids to Navigation

There are two floating aids to navigation; buoys "4FB and F", located on the present survey, are in substantial agreement with their charted positions and adequately serve the purposes intended. *concur FPS*

8. Compliance With Instructions

This survey complies with the Project Instructions.


9. Additional Field Work

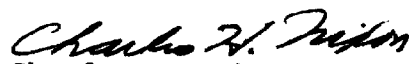
This is an excellent basic survey and no additional field work is recommended. *concur FPS.*

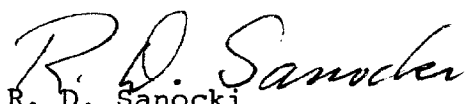
Inspection Report
H-9700

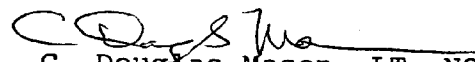
Any verification errors regarding procedures and presentation of survey data detected during inspection by the Hydrographic Inspection Team have been corrected before submission for administrative approval. HIT comments regarding quality of field work, compliance with instructions, and adequacy of the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


Examined and Approved:
Hydrographic Inspection Team
Date:


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

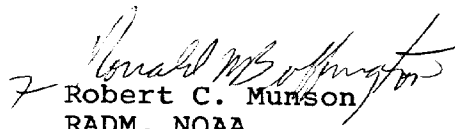

Charles H. Nixon, CAPT, NOAA
Chief, Operations Division


R. D. Sanocki
Technical Assistant
Processing Division


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


Guy F. Trefethen
Team Leader
Verification Branch

Approved/Forwarded


7 Robert C. Munson
RADM, NOAA
Director, Atlantic Marine Cent.



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

C352/FPS

November 2, 1978

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

THRU: Chief, Quality Control Branch

FROM: F. P. Saulsbury *F. P. Saulsbury*
Quality Evaluator

SUBJECT: Quality Control Report for H-9700 (1977), New Jersey-Delaware,
Delaware Bay Approach, Southeast of Five Fathom Bank

A quality control inspection of H-9700 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. In general, it 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. The real values of three-digit soundings as plotted on the smooth sheet are not easily read by the survey user. A skewed plot of three-digit soundings would have facilitated sounding identification and eliminated any confusion as to the soundings' correct values.
2. The junctions on the north with H-9699 (1977), on the south with H-9639 (1976), and on the west with H-9723 (1977) are adequate. Overlapping depth curves were made coincidental during quality control inspection. The junction on the northwest with H-9312 (1972) was not mentioned by the hydrographer and the verifier. An adequate junction was effected during quality control inspection.

An examination of the junction on the east with H-9622 (1976), contrary to the verifier's statement of adequacy, revealed depth differences of plus or minus 1 to 9 feet. A portion of H-9622 was superseded by the present survey and the remaining overlapping curves were made coincidental during quality control inspection. The two junction notes on the present survey were annotated in two different colors and as H-9722 instead of H-9622. Revisions were made during quality control inspection.



3. The 66-foot hang depth in latitude $38^{\circ}52.00'$, longitude $74^{\circ}23.25'$ from F.E. No. 1 (1951) was originally brought forward as 68 feet, 40 meters west of its correct position. Depth and position were corrected during quality control inspection.

4. The comparison with H-9294 W.D. (1970), a partially verified survey, was not mentioned by the hydrographer and verifier. Two verified hangs of 72 feet were brought forward to the present survey. An unverified drag strip of 46 feet in the vicinity of latitude $38^{\circ}48.38'$, longitude $74^{\circ}38.00'$ is in conflict with present survey depths. Present depths as shoal as 42 feet now occupy this area. Shoaling is attributed to bottom change in this sandy area. With the exception of the aforementioned 72-foot depths, chart soundings as shown on the present survey.

5. No comparison was made with H-6342 W.D. (1938) because the survey was unavailable.

cc:
C35
C351

FISH TRAP AREAS

Boundary lines of fish trap areas are shown thus:
Submerged piling may exist in these areas.

