

FE 290

FE 290

Diagram 1218-2 & 294-2

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey .. Field Examination

Field No. HFP-5-1-86

Registry No. FE-290

LOCALITY

State Delaware--New Jersey

General Locality Delaware Bay

Sublocality Vicinity of Egg Island Point ..

..... and Fortescue Creek

19 86-87

CHIEF OF PARTY
LCDR. K.W. Perrin

LIBRARY & ARCHIVES

DATE May 8, 1989

47
247
12
234

INDEX

	Page
Hydrographic Title Sheet.....	1
Boatsheet Layout.....	2
A. Project.....	3
B. Area Surveyed.....	3
C. Sounding Vessel.....	4
D. Sounding Equipment and Corrections to Echo Soundings..	4
E. Hydrographic Sheets.....	5
F. Control Stations.....	5
G. Hydrographic Position Control.....	5
H. Shoreline.....	6
I. Crosslines.....	7
J. Junctions.....	7
K. Comparison with Prior Surveys.....	7
L. Comparison with The Chart.....	7
M. Adequacy of Survey.....	9
N. Aids to Navigation.....	9
O. Statistics.....	9
P. Miscellaneous.....	10
Q. Recommendations.....	10
R. Automated Data Processing.....	10
S. Reference to Reports.....	11
*Field Examination Field Sheets Plots.....	12
*Projection Parameters.....	20
*Field Tide/Water Level Notes.....	23
*Geographic Names List..... ^(Field)	28
*Abstract of Corrections to Echo Soundings - TC/TI.....	29
*Abstract of Corrections to Electronic Position Control....	64
List of Stations (Signal List).....	77
*Abstract of Positions.....	79
*Coast Pilot Report.....	81
*Chart Inspection Report.....	82
*User Evaluation Report.....	83
*Item/Dive Investigation Report..... ^(Pertinent user information is contained in the text of this report & in the Evaluation Report.)	84
Approval Sheet.....	111

* = Removed from the Descriptive Report and filed with the field records.

HYDROGRAPHIC TITLE SHEET

FE - 290 ✓

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.

HFP 5-1-86 ✓

State Delaware - - NEW JERSEY ✓

General locality DELAWARE BAY ✓

Locality Vicinity of EGG ISLAND POINT ^{And} FORTESCUE CREEK ✓

Scale 1:5,000 ✓ Date of survey 18 SEP. - 29 OCT., 1986 ✓

Instructions dated 15 APR., 1986 ✓ Project No. OPR D219-HFP-86 ✓

Vessel 1017, 0520 ✓

Chief of party LCDR K. W. PERRIN ✓

Surveyed by HFP-4 - J.H. Maddox ✓

Soundings taken by echo sounder, hand lead, pole ✓

Graphic record scaled by J.^{H.} MADDOX, E.^{L.} MARTIN, D.^{M.} BRYANT, M.^{J.} BRISCOE, D.^{W.} DAVIS ✓

Graphic record checked by J.M. E.M. D.B. M.B. D.D. ✓

Protracted by E.M. ✓ Automated plot by DP-3 (Field Sheets) Synetics 1201 Plotter (Amc) ✓

Verification by AMC - N/66243 Hydrographic Surveys Branch ✓

Soundings in MMMX feet at MLLW ✓

REMARKS:

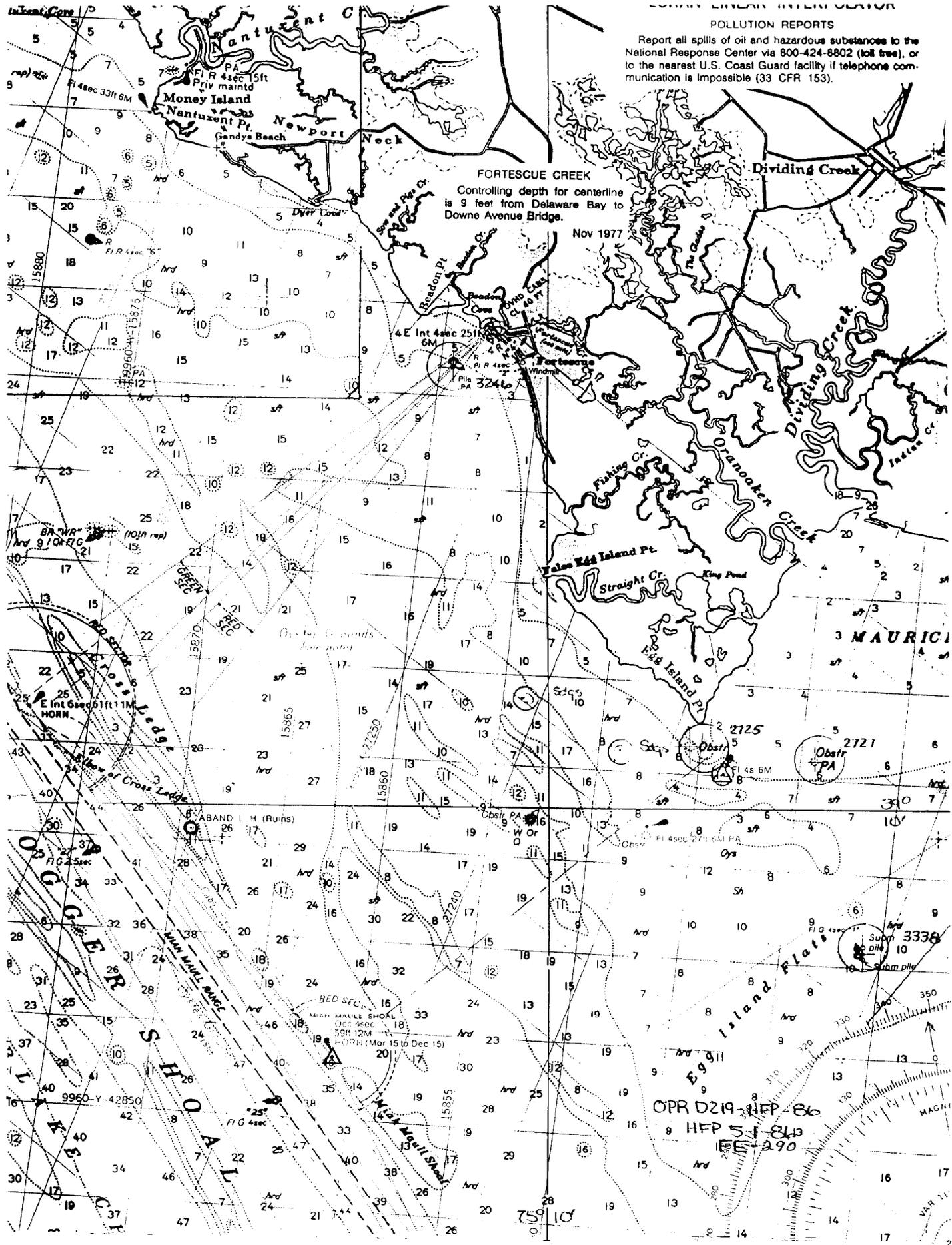
CHANGE NO. 1 21 APR., 1986 ✓

CHANGE NO. 2 4 JUN., 1986 ✓

CHANGE NO. 3 8 AUG., 1986 ✓

Scanned
20 AUG 15 1997

AW015 SURF 7/89 503



POLLUTION REPORTS
 Report all spills of oil and hazardous substances to the National Response Center via 800-424-8802 (toll free), or to the nearest U.S. Coast Guard facility if telephone communication is impossible (33 CFR 153).

FORTESCUE CREEK
 Controlling depth for centerline is 9 feet from Delaware Bay to Downe Avenue Bridge.

Nov 1977

GREEN SEC
RED SEC
MAURICE SHOALS
CRASS LLEDGE
MAH MALE SHOAL
ISLAND FLATS

OPR D219 HEP 86
 HEP 54-843
 15-290
 3338
 2725
 2721
 3338
 330
 350
 320
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 300
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 270
 260
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 180
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DESCRIPTIVE REPORT
TO ACCOMPANY
HYDROGRAPHIC SURVEY
FE-290 ✓
HFP-5-1-86 ✓

Scale: 1:5,000 ✓

Chief of Party: Lt. Cdr. Kenneth W. Perrin ✓
Officer in Charge: Lt. (jg) Jason H. Maddox ✓
Hydrographic Field Parties Section ✓
Hydrographic Field Party 4 ✓
Launch 1017, 0520 ✓

A. PROJECT

This survey was conducted under Project Instructions OPR-D219-HFP-86, Delaware Bay, Delaware, dated April 15, 1986 and amended by Change No. 1, dated April 21, 1986; Change No. 2 dated June 4, 1986; and Change No. 3 dated August 8, 1986.

The purpose of this survey was to resolve items which were recommended for additional work during verification of H-10167 (1984).

B. AREA SURVEYED

The area surveyed was the eastern shore of Delaware Bay in the area of Fortescue Creek, Fortescue, New Jersey at a scale of 1:5,000. The actual boundaries of the survey are as follows:

LAT. 39°15'00" N.
LONG. 75°11'15" W.

LAT. 39°15'00" N.
LONG. 75°09'30" W.

LAT. 39°14'00" N.
LONG. 75°11'15" W.

LAT. 39°14'00" N.
LONG. 75°09'30" W.

An additional work was done on AWOIS items as prescribed by Change No. 3 dated August 8, 1986, that incorporates an area from Fortescue Creek southward to Egg Island Flats in the Delaware Bay. This area was covered by a sheet drawn at a scale of 1:10,000 with the following boundaries:

LAT. 39°12'10" N.
LONG. 75°13'10" W.

LAT. 39°14'50" N.
LONG. 75°11'15" W.

LAT. 39°08'00" N.
LONG. 75°06'15" W.

LAT. 39°10'15" N.
LONG. 75°03'45" W.

This survey was conducted from September 18, 1986 to October 29, 1986 (DN 261 and DN 302 respectfully).

C. SOUNDING VESSEL

All soundings were obtained from NOAA Launch 1017, a 29-foot Jensen Type 1 survey launch and NOAA Launch 0520, a 21-foot Monark. All survey records are annotated with the vessel number.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

All soundings obtained by NOAA Launch 1017 were by a Raytheon DSF 6000N, S/N A110N. Soundings obtained by NOAA Launch 0520 were done by a Raytheon DE719B, S/N 10271. *Also leadline soundings were obtained.*

Martek cast data were collected on a weekly basis to compute the sound velocities by utilizing program RK 530. The velocities were entered into VELTAB to recompute the velocity correction at even intervals of 0.2 feet. Cast data were examined and compared to each other for similarities and trends. If the velocity correction varied less than 0.2 feet from the previous cast they were averaged to produce a final velocity table used for plotting. Three velocity tables were generated for this survey (Velocity Tables 8, 16, and 17 respectfully). Velocity Table "8" is a single cast which was collected during hydrographic operations for NOAA Launch 0520 for DN 261, September 18, 1986. This was the only day launch 0520 ran hydrography for this survey. The other two tables "16" and "17" were computed by means written above for NOAA Launch 1017. No unusual abnormalities were observed.

All velocity tables, graphs, and computations are appended at the end of this text.

Bar checks were taken in conjunction with the Martek casts. The data collected from bar checks were not for the purpose of velocity correction but for the sole intention of determining instrument error. The instrument error is applied via TC/TI tape and appended at the end of this text.

All data obtained by the DSF 6000N were at a high frequency setting of AUTO, low frequency setting of "1". For depths shoaler of five feet the high frequency gain setting was "6" to reduce the possibility of losing the trace at those depths. All bar check depths at the depth of five feet were recorded at this high frequency setting and show no significant difference in instrument error.

A static transducer depth of 1.6 feet was applied to all DSF 6000N soundings via the corrector tape. The transducer depth was measured by party personnel on July 25, 1986 (DN 206). *Settlement and squat tests were run on June 25, 1985 (DN 161) and August 12, 1986 (DN 204) at Greenwich Boatworks Marina, Greenwich, New Jersey. The second

** data found with survey H-10217*

settlement and squat test was ran due to a change of a propeller on launch 1017. A settlement and squat test for launch 0520 was conducted on May 12, 1986 (DN 132) at the same location. Correctors for settlement and squat are applied via TC/TI tape. All data pertaining to the fore mentioned corrections to soundings are appended at the end of this text.

A minor problem occurred on July 28, 1986 (DN 209) and continued for the duration of the survey. Two dark lines appeared on the fathogram with exaggerated foot lines just above each dark line. Nothing was done to correct the dark lines and are believed to have caused no change in the acquired soundings for the survey.

Bar check lines were measured at the beginning and end of this project. No corrections are to be applied to the bar check lines.

All data were plotted using predicted tides furnished by the Tide Tables 1986.

E. HYDROGRAPHIC SHEETS

All field sheets were prepared by HFP-4 personnel using Digital PDP8/e computer and a Houston DP-3 Complot plotter. Boatsheets, rough plots, overlays, blowups, and final field sheets are included with this survey.

F. CONTROL STATIONS

All horizontal control stations were historic Third-order, Class 1 horizontal control stations or new stations established by N/MOA222. All stations are referred to the North American 1927 Datum and are listed in the appendix of this report. *See also section 2.a. of the Evaluation Report.*

G. HYDROGRAPHIC POSITION CONTROL *See also section 2.a. of the Evaluation Report.*

The positioning control system for this survey was the Motorola Mini-Ranger Falcon 484 positioning system.

The electronic equipment used for this survey follows:

Mini-Ranger

Launch 1017

	<u>S/N</u>
Range Processing Unit	E0141
Control Display Unit	F0188
Master R/T Unit	E2967

Mini-RangerS/N

Launch 0520

Range Processing Unit	D0004
Control Display Unit	E0002
Master R/T Unit	E2919

Shore Stations

Remote Unit Code 5	E2959
Remote Unit Code 6	E2922
Remote Unit Code 7	E2909
Remote Unit Code 8	E2890

Other electronic Equipment

HP 3810B	1929A00411
Nikon NT-20 Theodolite	031005

All Mini-Ranger Falcon units were baselined once each month. Critical system checks were performed every day by means of an HP 3810B calibration

The standard forms were copied onto paper tape and were included as part of all printout headers.

There were no problems encountered for any of the critical system checks.

H. SHORELINE

Shoreline for this survey was transferred to the final field sheet from registered shoreline maps and revision prints. The following shoreline map revision print was used:

Shoreline MapScale

TP-00124

1:10,000

All shoreline features were verified within the project limits of this survey no gross discrepancies were observed. All minor revisions to shoreline have been marked in red on the final field sheet. *Only in Fortescue Creek - nothing pertaining to Egg Island Point.*

Due to the amount of traffic and swift currents that was observed during hydrography in the Fortescue area, some of the new piers were not positioned by electronic control devices. These have been placed on the final field sheet as dotted red lines for minor revision. *See the 1987 work.*

I. CROSSLINES

Crosslines comprise 0.3 miles or 12 % of the mainscheme hydrography. All crosslines agree within one foot or less of the mainscheme hydrography. - See section 3. a. of the Evaluation Report.

J. JUNCTIONS

~~This survey junctions with H-10167, a 1:20,000 scale, 1984 basic survey.~~

See section 5. of the Evaluation Report.

~~The junction agrees very well with all soundings agreeing within one foot or less of each other.~~

K. COMPARISON WITH PRIOR SURVEYS

~~Not applicable~~ *See section 6. of the Evaluation Report.*

L. COMPARISON WITH THE CHART - *See section 7. of the Evaluation Report.*

Comparison was made with Chart 12304, 1:80,000 scale, 30th Edition, dated March 16, 1985.

All presurvey review items were investigated. A copy of the item investigation forms are appended at the end of this text.

All soundings were compared within the areas surveyed. Ninety-five percent of these soundings agree within one foot or less of each other.

AWOIS item # 2725 is an obstruction located at lat. 39°10' 43.4"N., long. 075°08'12.6"W. The investigation of this obstruction occurred on several days. On October 17, 1986 (DN 290), a star pattern development took place on an eight-foot obstruction located by the NOAA Ship PEIRCE in 1984. On October 22, 1986 (DN 295), a development of the charted location of the Egg Island Flats Lighthouse took place. Then on October 29, 1986 (DN 302), a diver investigation was conducted for least depth purposes. It was observed that a least depth of 1.6 feet exists at the above position and the diver investigation verified that the lighthouse ruins was at that position. Another obstruction was located at lat. 39°10'34.1"N., long. 075°08'20.0"W. This obstruction was found to have a least depth of eight feet and is believed to be the wreck of the oyster boat "Darlene". *See section 7. a. 7) of the Evaluation Report.* *Not See the 1987 work* *SRB* *Concur* *(Sheet 8 of 9)* *See section of the Eval. R.*

~~diver investigation was made to verify this due to strong currents. Recommend that the above positions be charted with the inscription "obstruction".~~

AWOIS item # 2727 was an airplane wreckage located in the approximate position of lat. 39°10'28"N., long. 075°06'52"W. A

Fathometer search was conducted at the charted location of this item resulting in a negative report. Historical data refer that the aircraft crashed in 14 feet of water in 1943. The depth observed at the charted position of this item is seven feet which is considered a great difference in what was reported. Mr. Joe Dobarro, N.J. Shellfisheries Bureau, Bivalve, N.J., was contacted for further information about this wreck. He stated that to his best of knowledge there isn't any wreck at this location and the many locals who work the oyster beds in that area confirm Mr. Dobarro's information. No further investigation was attempted. ~~Recommend delete obstruction PA from chart.~~ *Do not concur. See section 7.a.6) of the Evaluation Report.* (Sheet 7 of 9) ✓

AWOIS item # 3246 was reported as a pile PA located at lat. 39° 14'12"N., long. 075°11'06"W. A full 200x Fathometer search at 25 meters apart was conducted on October 14, 1986 (DN 287). A small mound was observed on this day and was investigated by divers on the following day. The mound was observed as a pile of oyster shells and not the AWOIS item. Mr. Ed Hood, Harbor Master Fortescue, Pennsylvania Ave., Fortescue, N.J. 08321, (609) 447-3115, was contacted for further information on this item. He stated that there had been a marker to guide mariners through the channel, but it was a seasonal daymarker made of a two to three-inch diameter pole with a red triangle. There had never been a permanent pile just the temporary channel guides that would sway with the seas. No further investigation was conducted. ~~Recommend pile PA be deleted from chart.~~ *Do not concur. See section 7.a.5) of the Evaluation Report.* (Sheet 6 of 9) ✓

AWOIS item # 3338 was reported as an obstruction located at lat. 39°08'36"N., long. 075°06'18"W., lat. 39°09'42.2"N., long. 075°06'17.3"W., lat. 39°08'42.4"N., long. 075°06'19.1"W., and lat. 39°08'41.9"N., long. 075°06'17.7"W. On October 17, 1986 (DN 290), a Fathometer investigation was conducted at each location with negative results. On October 20, 1986, chain drag operations were conducted at each location exceeding the 50-meter radius requirement. The chain hung at lat. 39°08'33.6"N., long. 075°06'17.1"W. and a diver investigation was conducted on the following day. The divers observed a large cement block about three feet high and six feet wide lying on the bottom. A lead line depth was taken and plotted with the above position. No piling was found. The cement block is considered not a hazard to navigation and has no meaning for charting purposes. ~~Recommend submerged pile, at all the locations above, be deleted from chart.~~ *Concur. See section 7.a.3) of the Evaluation Report.* (Sheet 4 of 9) ✓

The following shoal soundings which originate with H-10167 (1984) were developed:

- a. Four-foot sounding (obstruction) in lat. 39°11'20"N., long. 075°10'13"W.
- b. Seven-foot sounding in lat. 39°11'19.6"N., long. 075°10'12.6"W.
- c. Three-foot sounding (obstruction) in lat. 39°10'36"N., long. 075°09'16"W.

A full 25-meter line spaced development was conducted over the above positions and star patterns conducted on October 7, 1986 (DN 280). The seven-foot shoal was the only sounding observed and the shoal was developed to its full extension. The four-foot and three-foot obstructions were not located during this investigation. All the personnel of this hydrographic field party studied the information supplied for this investigation and an unanimous decision was made that the soundings was a cause of high frequency noise. This decision was made by the observation of a double echo trace seen on the supplied information. Recommend charting the seven-foot shoal with the data supplied by this investigation. ^{Concur} ~~Recommend ignoring the three-foot and four-foot soundings found in survey H-10167.~~ *Do not concur See sections 7.a.4) & 8) of the Evaluation Report.*

M. ADEQUACY OF SURVEY

This survey is complete and adequate to supersede the presently charted soundings and prior surveys.

N. AIDS TO NAVIGATION

The following landmarks and fixed aids which are visible from the survey area are also triangulation stations:

- (1) East Point Light, 1927
- (2) Egg Island Point Light, 1984
- (3) Elbow of Cross Ledge Light, 1933
- (4) Fortescue Navigational Light, 1984
- (5) Miah Maull Shoal Light, 1933

All floating aids within the 1:5,000-scale survey were located and their characteristics compared to the Light List (Vol. I, 1986). All aids were found to be adequately described and charted for the purpose of which they were intended.

O. STATISTICS

VESNO 1017	<u>TOTAL</u>
Days of production (days at sea)	11
Total number of positions	762
Nautical miles of sounding lines	63.3
Square miles of hydrography	1.0
Detached positions	14
AWOIS item investigations	7
Tide gage stations	3
Martek Casts	4

	<u>TOTAL</u>
VESNO 0520	
Days of production (days at sea)	1
Total number of positions	66
Nautical miles of sounding lines	2.5
Nautical miles of cross lines	0.3
Square miles of hydrography	0.1
Detached positions	4
Martek Casts	1

P. MISCELLANEOUS

There were no bottom sample requirements for this survey. *- Do not concur. See section 6.7 of the Project Instructions.*

Strong currents of three to four knots were observed in the survey limits at max. ebb and at max. flood. Caution should be taken into consideration when navigating in Fortescue Creek.

No local magnetic disturbances were observed in the survey area.

Q. RECOMMENDATIONS

Specific recommendations can be found in Sections K and L of this report.

R. AUTOMATED DATA PROCESSING

Programs used for the field processing of this survey are as follows:

PROGRAMS	DESCRIPTIONS	VERSION

RK112	Range-Range Real Time Plot	04/23/84
RK116	Range-Azimuth Real Time Plot	10/01/84
RK201	Grid, Signal, Lattice Plot	04/18/75
RK211	Range-Range Non-real Time Plot	02/13/84
RK212	Visual Station Load and Plot	04/01/74
RK216	Range-Azimuth Non-Real Time Plot	02/09/81
RK300	Utility Computations	02/05/76
RK330	Reformat and Data Check	05/04/76
RA362	RK330 & AM602 Combined	08/20/84
RK407	Geodetic Inverse/Direct Comp.	09/25/81
AM500	Predicted Tide Generator	11/10/72
RK530	Velocity Correction Comp.	05/10/76
AM602	ELINORE	12/08/82

S. REFERENCE TO REPORTS

The following reports for Project OPR-D219-HFP-86 have been submitted:

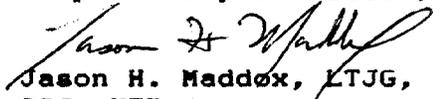
Reports

Horizontal Control
Coast Pilot Report
User Evaluation Report
Chart Inspection Report
Descriptive Report, H-10217
Current Observation Report

Submitted

N/MOA222, AMC
N/CG243
N/CG243
N/CG243
Verification, AMC
N/CG243

Respectfully Submitted,


Jason H. Maddox, LTJG, NOAA
OIC, HFP-4

SIGNAL TAPE LISTING

OPR D219-HFP-86

HFP 5-1-86

FE-290

175	6	39	11	44286	075	01	39678	250	0000	000000	EAST POINT LIGHT, 1921 ✓
200	6	39	07	35526	075	12	32583	139	0000	000000	MAH MAULL SHOAL LIGHT, 1933 ✓
211	6	39	10	20261	075	07	56383	250	0000	000000	EGG ISLAND POINT LIGHT, 1984 ✓
300	6	39	14	32542	075	10	24490	250	0000	000000	FORTES, 1984 ✓
301	6	39	14	36165	075	10	13383	250	0000	000000	FORTES AZ, 1984 ✓
302	6	39	14	34111	075	10	39097	250	0000	000000	FORTESCUE NAV AID, 1983 ✓

✓

SIGNAL TAPE LIST

FORTESCUE CREEK .NEW JERSEY

OPR D219-HFP-86

HFP 5-1-86

FE-290

300	6	39	14	32542	075	10	24490	250	0000	000000	-FORTES.1984 ✓
301	6	39	14	36165	075	10	13383	250	0000	000000	-FORTES AZ.1984 ✓
302	6	39	14	34111	075	10	39097	250	0010	000000	-FORTESCUE DIR. LT.1984 ✓

APPROVAL SHEET

For

FE-290

(1986 work)

The hydrographic records transmitted with this survey are complete and adequate to supersede prior surveys for charting with no additional field work recommended.

No direct supervision was given by me during the field work.

Approved and forwarded.

Kenneth W. Perrin
Kenneth W. Perrin
LCDR, NOAA
Chief, Hydrographic Field Parties Section

1987 Work

INDEX

	PAGE
A. Project.....	1
B. Area Surveyed.....	1
C. Sounding Vessel.....	1
D. Sounding Equipment and Corrections to Echo Soundings.....	1
E. Hydrographic Sheets.....	2
F. Control Stations.....	2
G. Hydrographic Position Control.....	2
H. Shoreline.....	3
I. Crosslines.....	3
J. Junctions.....	3
K. Comparison with Prior Surveys.....	3
L. Comparison with the Chart.....	3
M. Adequacy of Survey.....	4
N. Aids to Navigation.....	4
O. Statistics.....	4
P. Miscellaneous.....	4
Q. Recommendations.....	5
R. Automated Data Processing.....	5
S. Reference to Reports.....	5
*Field Examination Field Sheet Plots.....	6
*Projection Parameters.....	9
*Field Tide Notes.....	10
*Abstract of Corrections to Echo Soundings - TC/TT.....	16
*Abstract of Corrections to Electronic Position Control.....	26
List of Stations (Signal List).....	27
*Abstract of Positions.....	28
*Dive Investigation/Item Investigation Report.....	29
Approval Sheet.....	33

* = Removed from the Descriptive Report and filed with the field records.

(Portmunt user information is contained in the text of this report & in the Evaluation Report)

1987 Work

ADDENDUM TO DESCRIPTIVE REPORT
TO ACCOMPANY
HYDROGRAPHIC SURVEY FE-290
HFP-5-1-86

Scale: 1:5,000 ✓
Chief of Party: Lt. Cdr. Kenneth W. Perrin ✓
Officer in Charge: Lt. (jg) Jason H. Maddox ✓
Hydrographic Field Party Section ✓
Hydrographic Field Party 4 ✓
Launch 0520 ✓

A. PROJECT

This addendum survey was conducted under Project Instructions OPR-D219-HFP-87, Delaware Bay, Delaware, dated April 15, 1986 and amended by Change No. 1, dated April 21, 1986; Change No. 2, dated June 4, 1986; Change No. 3, dated August 8, 1986; Change No. 4, dated March 6, 1987; Change No. 5, dated April 9, 1987; Change No. 6, dated April 19, 1987; and Change No. 7, dated October 9, 1987.

The additional work was ^{required by} ~~recommended in accordance with~~ change No. 4 to the project instructions ~~dated April 15, 1986.~~

B. AREA SURVEYED

The area surveyed was specifically requested by the ^{Hydrographic Surveys} ~~Verification~~ Branch, AMC, N/MOA23~~x~~, dated August 13, 1987.

C. SOUNDING VESSEL

Soundings were obtained from NOAA Launch 0520, a 21-foot MonArk. All survey records are annotated with the vessel's hull number.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

All soundings were obtained by a Raytheon DE-719/B Fathometer, S/N 7727, throughout this survey.

All bar check data obtained in this survey pertains to the hydrography conducted in Fortesque Creek and the Appoquinimink River. The bar check data was used for the velocity correction for the period of time of September 29, 1987 (DN 272), and October 27, 1987 (DN 300), for these two items only. All other sounding information was obtained by lead line and diver investigation.

Velocity table I is appended at the end of this text.

A static transducer depth of 1.2 feet was applied to all Fathometer DE-719/B soundings via the corrector tape. ✓

A Klein Side Scan Sonar, S/N 249, was used for item investigations during this survey. Confidence checks were obtained prior to its use on AWOIS items. Insufficiencies do exist on some coverages for the AWOIS items investigated during this survey. One channel on the Side Scan instrument was observed to be functioning improperly. Though this channel was picking up contacts, it seemed masked in the details that were observed on the other channel. Also, a lack of knowledge towards the acquisition and processing of the side scan material on the items investigated for disapproval. This was due to not having the Provisional Side Scan Sonar Manual that was made available to the party after the survey. The party misinterpreted that the Side Scan Sonar Training Manual, written by Klein Associates, was the only manual on side scan. *No side scan sonar records were submitted with this survey.* ✓

A Settlement and squat test was run on June 10, 1987 (DN 161) at Greenwich Boatworks Marina, Greenwich, New Jersey. Correctors for settlement and squat are applied via TC/TI tape. All data pertaining to the aforementioned corrections to soundings are appended at the end of this text. ✓

Bar check lines were measured at the beginning and end of this project. No corrections are to be applied to the bar check lines. ✓

All ^{field} data were plotted using predicted tides furnished by the Tide Tables 1987. ✓

E. HYDROGRAPHIC SHEETS

All field sheets were prepared by HFP-4 personnel using a Digital PDP8/e computer and a Houston DP-3 Complot plotter. Boatsheets, and final field sheets are included with this survey. ✓

F. CONTROL STATIONS

All horizontal control stations were historic Third-order, Class 1 horizontal control stations or new stations established by N/MOA222. All are referred to the North American 1927 Datum and are listed in the appendix of this report. *See^{iso} section 2.a. of the Evaluation Report.*

G. HYDROGRAPHIC POSITION CONTROL - *See also section 2.a. of the Evaluation Report.*

The positioning control system for this survey was the Motorola Mini-Ranger Falcon 484 positioning system.

The electronic equipment used for this survey follows:

1987 Work

Mini-Ranger

Launch 0520	DN 216-DN 278	S/N
	Range Processing Unit	E0019
	Control Display Unit	G0253
	Master R/T Unit	F3404
	DN 297-END	S/N
	Range Processing Unit	D0018
Shore Stations		
	Remote Unit Code 4	E2911
	Remote Unit Code 7	F3244

Other electronic Equipment

HP-3810B	1929A00411
----------	------------

All Mini-Ranger Falcon units were baselined at the beginning and ending of this investigation.

Critical system checks were performed every day by means of fixed point and HP-3810B calibrations. All calibrations were recorded in the vessel's sounding volume.

There were no problems encountered for any of the critical system checks.

H. SHORELINE

Refer to main text.

I. CROSSLINES

Refer to main text.

J. JUNCTIONS

Refer to main text.

L. COMPARISON WITH THE CHART

Additional work was accomplished in the Fortesque Creek area upon the request of the ^{Hydrographic Survey} Verification Branch, AMC, N/MOA232. All requested lines of hydrography and detached positions were obtained.

See section 7.a.2) of the Evaluation Report.

1987 Work

An investigation was conducted to determine the least depth on an 8-foot obstruction at lat. 39°10'33.9"N, long. 75°08'19.7"W (position determined by sextant fix). An arc was run by the launch heading eastward set at station 305, Port Mahon Leipsic River Lt. "2", to steer the launch to the obstruction. An anchor was dropped on the obstruction as soon as it was observed on the fathogram. Divers followed the anchor line to what was observed as wood and metal debris in a 15-foot radius around the anchor. A lead line depth of 14.2-feet (uncorrected) was achieved and a sextant fix was taken (position 80, volume 1, page 23). Recommend submerged wreck dangerous to surface navigation be charted at the observed position. *Concur - See section 7.a.7) of the Evaluation Report.*

On October 7, 1987 (DN 280), See-Field-Sheet operations were conducted in the Appoquinimink River. An eight hour bubbler tide gage was placed at the Odessa bridge. The gage was in operation from October 7 to October 8, 1987. One centerline line of hydrography was completed observing no shoal sounding close to two-feet. ~~Recommend depths observed in the Appoquinimink River be charted from the data obtained in this investigation.~~ *Do not concur. See section 7.a.1) of the Evaluation Report.*

Reconnaissance hydrography in the Blackbird Creek was not accomplished due to weather and other priority items in this additional work.

M. ADEQUACY OF SURVEY

Refer to the main text.

N. AIDS TO NAVIGATION

A sextant fix was accomplished on the landmark "TOWER". The position was verified and no NOAA Form 76-40 will be submitted. Recommend retaining "TOWER" as charted. *Concur*

O. STATISTICS

Days of Production (Days at Sea)	4
<u>VESNO 0520</u>	<u>TOTAL</u>
Total Number of Positions	81
Nautical Miles of Sounding Lines	6.0
Square Miles of Hydrography	1.0
Bottom Samples	0
Tide Gage Stations	4
Martek Casts	0

P. MISCELLANEOUS

Refer to the main text.

Q. RECOMMENDATIONS

Specific recommendations can be found in Sections L of this report.

R. AUTOMATED DATA PROCESSING

Refer to the main text.

S. REFERRAL TO REPORTS

Refer to the main text.

Respectfully Submitted,

Robert Snow for

Jason H. Maddox, LTJG, NOAA
OIC, HFP-4

1987 Work

SIGNAL TAPE LISTING

OPR D219-HFP

FE-290

001	4	39	23	19403	075	25	44615	139	0000	000000	ARNOLD USE, 1981
003	3	39	22	38734	075	30	56920	139	0000	000000	DELAWARE USE, 1981
042	6	39	21	05800	075	26	13000	243	0000	000000	DELAWARE BAY MARL CH. LT. 42", 1981
200	6	39	07	35526	075	12	32583	139	0000	000000	MANN MULL SIGNAL LIGHT, 1933
211	6	39	10	20261	075	07	56383	139	0000	000000	EGG ISLAND POINT LIGHT, 1984
220	5	39	10	55596	075	16	07717	250	0000	000000	ELBOW OF CROSS LEDGE LIGHT, 1985
301	6	39	14	36165	075	10	13383	139	0000	000000	FORTES AZ, 1984
302	6	39	14	34111	075	10	39097	250	0000	000000	FORTESCUE NAV RID, 1985
305	3	39	14	45189	075	24	40881	250	0000	000000	Port MANOU, LEIPSIC RIVER LIGHT, 1985

APPROVAL SHEET

For

ADDENDUM

FE-290

(1987 Work)

The hydrographic records transmitted with this survey are complete and adequate to supersede prior surveys for charting with no additional field work recommended.

No direct supervision was given by me during the field work.

Approved and forwarded.

Robert Snow for

David D. Waltz
LCDR, NOAA
Chief, Hydrographic Field Parties Section



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
 NATIONAL OCEAN SERVICE

ATLANTIC MARINE CENTER
 439 West York Street
 Norfolk, VA 23510-1114

DEC. 21 1988

TO: Commander (oan)
 Fifth Coast Guard District
 Federal Building
 431 Crawford Street
 Portsmouth, VA 23705-5004

FROM: Ray E. Moses, Rear Admiral, NOAA
 Director, Atlantic Marine Center

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number: FE-290
 State: Delaware--New Jersey
 General Locality: Delaware Bay
 Sublocality: Vicinity Egg Island Point and Fortesque Creek
 Project Number: OPR-J217, NOAA Hydrographic Field Party No.4

The following items were discovered during the office processing:

1. The charted centerline controlling depth of 9 feet in Fortesque Creek from Delaware Bay to Downe Avenue Bridge was not confirmed. Shoaling up to 3 feet at MLLW (actual tides) was found in the creek and up to 2 feet at MLLW (actual tides) on the centerline. Mariners should exercise caution and local knowledge is necessary in navigating Fortesque Creek to the Downe Avenue Bridge.

Affected nautical chart:

Chart Number	Edition No. Date	Reported Depth	Charted Horz Datum	Geographic Position Lat. Long.
12304	31 12/26/87	2-3 ft.	NAD 27	vic.39°14.6'N 75°10.7'W

2. Shoaling to 7 feet at MLLW (actual tides) in presently charted depths of 10 feet.

Affected nautical chart:

Chart Number	Edition No. Date	Reported Depth	Charted Horz Datum	Geographic Position Lat. Long.
12304	31 12/26/87	7 ft.	NAD 27	vic.39°11.3'N 75°10.1'W

Questions concerning this report should be directed to the Atlantic Marine Center, Hydrographic Surveys Branch at telephone (804) 441-6746 or FTS (804) 827-6746.

Attachment
 BCC: N/CG221



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

TIDE NOTE FOR HYDROGRAPHIC SHEET

DATE: January 6, 1987

Marine Center: Atlantic

OPR: D219

Hydrographic Sheet: EE-290

Locality: Egg Island Point to Fortescue Creek, NJ

Time Period: September 18 - October 29, 1986

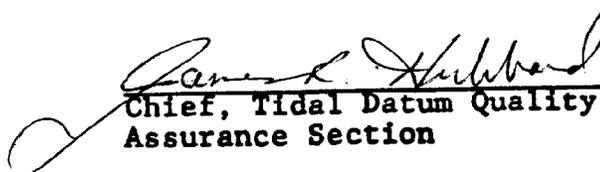
Tide Station Used: 855-4399 Mahon River Entrance, DL

Plane of Reference (Mean Lower Low Water): 3.26 Ft.

Height of Mean High Water Above Plane of Reference: 5.8 Ft.

Remarks: Recommended Zoning:

1. Zone Direct.


Chief, Tidal Datum Quality
Assurance Section

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: February 18, 1988

MARINE CENTER: Atlantic

OPR: D219

HYDROGRAPHIC SHEET: FE-290

LOCALITY: Fortescue, New Jersey

TIME PERIOD: September 29 - October 27, 1987

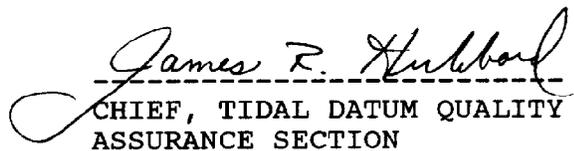
TIDE STATION(S) USED: 855-4399 Mahon River Entrance, DL

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 3.17 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 5.8 ft.

REMARKS: RECOMMENDED ZONING

1. For Items in Delaware Bay apply a - 0 hr 10 minute time correction and a X1.06 range ratio to all heights.
2. In Fortescue Creek, apply a X1.09 range ratio to all heights.


CHIEF, TIDAL DATUM QUALITY
ASSURANCE SECTION

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: March 1, 1988

MARINE CENTER: Atlantic

OPR: D219

HYDROGRAPHIC SHEET: FE-290

LOCALITY: Appoquinimink River, Delaware

TIME PERIOD: October 6-7, 1987

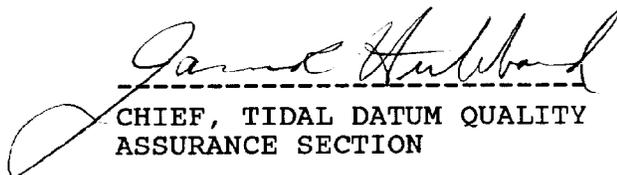
TIDE STATION(S) USED: 853-7614 Artificial Island, NJ

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 3.86 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 6.1 ft.

REMARKS: RECOMMENDED ZONING

1. In Appoquinimink River, from the river entrance west to longitude 75 36.0', zone direct.
2. West of longitude 75 36.0' to 75 37.0', apply a -0hr 30 minute time correction and a X0.96 range ratio to all heights.
3. West of longitude 75 37.0' to 75 38.0', apply a -0hr 45 minute time correction and a X0.93 range ratio to all heights.
4. West of longitude 75 38.0' to 75 39.0', apply a -1hr 00 minute time correction and a X0.89 range ratio to all heights.
5. West of longitude 75 39.0' to 75 40.0', apply a -1hr 30 minute time correction and a X0.84 range ratio to all heights.



CHIEF, TIDAL DATUM QUALITY
ASSURANCE SECTION

GEOGRAPHIC NAMES

FE-290SS

Name on Survey	A ON CHART NO. 12304 B ON PREVIOUS SURVEY NO. 12311 C ON U.S. QUADRANGLE MAPS D FROM LOCAL INFORMATION E ON LOCAL MAPS F P.O. GUIDE OR MAP G RAND McNALLY ATLAS H U.S. LIGHT LIST K										
	APPOQUINIMINK RIVER	X									
DELAWARE (Title)	X										2
DELAWARE BAY	X										3
DELAWARE RIVER	X										4
EGG ISLAND FLATS	X										5
EGG ISLAND POINT	X										6
FORTESCUE CREEK	X										7
NEW JERSEY (Title)	X										8
											9
											10
											11
											12
											13
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											21
											22
											23
											24
											25

Approved:

Charles E. Harrington

Chief Geographer - NS/CG 2x5

OCT 18 1988

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NO.: FE-290

Number of positions	842
Number of soundings	3335
Number of control stations	11

	<u>TIME-HOURS</u>	<u>DATE COMPLETED</u>
Preprocessing Examination	29	12 DEC 1986
Verification of Field Data	303	31 AUG 1988
Quality Control Checks	147	
Evaluation and Analysis	185	21 DEC 1988
Final Inspection	8	16 DEC 1988
TOTAL TIME	643	
Marine Center Approval		22 DEC 1988

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

MOA23-46-89

LETTER TRANSMITTING DATA

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

ORDINARY MAIL AIR MAIL

REGISTERED MAIL EXPRESS

GBL (Give number) _____

TO:

Chief, Data Control Branch, N/CG243
Room 151, WSC-1
Hydrographic Surveys Branch
National Ocean Service
Rockville, MD 20852

DATE FORWARDED

21 April 1989

NUMBER OF PACKAGES

two (2)

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.

FE-290 (HFP-5-1-86)

OPR-D219, DELAWARE--NEW JERSEY, DELAWARE BAY

Pkg. 1: (Box)

- 1 Accordion Folder containing original field records for the following Year Days: 280 (1987), 300 (1987), 287(1986), and 272 (1987).
- 1 Envelope containing Corrections to Echo Soundings.
- 1 Envelope containing Miscellaneous Data Removed From The Original Descriptive Report and Addendum.
- 1 Envelope containing Nine (9) Smooth Position Overlays.
- 1 Envelope containing Eight (8) Smooth Excess Sounding Overlays
- 1 Envelope containing the Supplemental Data Listings Removed From The Printouts.
- 1 Envelope containing Electronic Control Correctors and Control Station Data.
- 2 Sounding Volumes
- 1 Cahier containing the Final Position Listing, the Final Control File Listing, and the Final Sounding Listing.

Page #1 of 2.

FROM: (Signature)

Maurice B. Hickson, III
Maurice B. Hickson, III

RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

Chief, Hydrographic Surveys Branch,
N/MOA23
Atlantic Marine Center
439 W. York Street
Norfolk, VA 23510-1114

REFERENCE NO.

LETTER TRANSMITTING DATA

MOA23-46-89

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

ORDINARY MAIL AIR MAIL

REGISTERED MAIL EXPRESS

GBL (Give number) _____

TO:

Chief, Data Control Branch, N/CG243
Room 151, WSC-1
Hydrographic Surveys Branch
National Ocean Service
Rockville, MD 20852

DATE FORWARDED

21 April 1980
NUMBER OF PACKAGES

two (2)

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.

FE-290 (HFP-5-1-86)

OPR-D219, DELAWARE--NEW JERSEY, DELAWARE BAY

Pkg. 2: (Envelope)

- 1 Original Descriptive Report and Addendum and Nine (9) Smooth Sheets.

Page #2 of 2.

FROM: (Signature)

Maurice B. Hickson III

Maurice B. Hickson, III

RECEIVED THE ABOVE

(Name, Division, Date)

Return receipted copy to:

Chief, Hydrographic Surveys Branch,
N/MOA23
Atlantic Marine Center
439 W. York Street
Norfolk, VA 23510-1114

ATLANTIC MARINE CENTER
EVALUATION REPORT

SURVEY NO.: FE-290

FIELD NO.: HFP-5-1-86

Delaware--New Jersey, Delaware Bay, Vicinity of Egg Island Point and Fortescue Creek

SURVEYED: September 18 through October 29, 1986 and
September 29 through November 14, 1987

SCALE: 1:5,000 & 1:20,000

PROJECT NO.: OPR-~~E609~~-RU/HE-87 ^{D219-HFP-86/87}

SOUNDINGS: RAYTHEON DSF-6000N Echosounder RAYTHEON
DE-719B Echosounder, and Leadline

CONTROL: MOTOROLA Falcon 484 Mini-Ranger, Theodolite, &
Sextant (Range/Range, Range/Azimuth, & Visual)

Chief of Party.....K. W. Perrin

Surveyed by.....J. H. Maddox
.....E. L. Martin
.....D. M. Bryant
.....M. J. Briscoe
.....D. W. Davis

1. INTRODUCTION

a. The purpose of this survey is adequately defined in the Descriptive Report, the Addendum to the Descriptive Report, and the Project Instructions.

b. Significant portions of the field data for this survey are missing as they were lost in the daily refuse and were not recovered. The decision was made to complete the processing of the entire survey in spite of the lost data. All data is contained in the digital data files (except the Appoquinimink River, Smooth Sheet #1 of 9, which is all "see field sheet" hydrography) and is reflected on the smooth plots. This survey was verified only to the extent possible considering the lost portion of the field records. Some of the charting recommendations and evaluations made are without the benefit of substantiating field data. It is possible that some undetected errors exist in this completed survey.

c. Eight smooth plots at 1:5,000 scale and one smooth plot at 1:20,000 scale of the areas investigated by this survey and their accompanying excess sounding and smooth position overlays were generated during processing. These plots are considered the final plots or smooth sheets for this survey. The nine smooth plots are attached to this

report. The accompanying excess sounding overlays and smooth position overlays are filed with the field records.

d. Corrections and notes made by the evaluator to the Descriptive Report are denoted in red ink.

2. CONTROL AND SHORELINE

a. Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1927. Office processing of this survey is based on these values. All geographic positions listed from other sources are on the North American Datum of 1927 unless otherwise noted. The smooth plots of this survey have been annotated with ticks showing the computed mean shift between the survey datum (NAD 1927) and NAD 1983. To place this survey on the North American Datum of 1983, move the projection lines 0.417 seconds (12.9 meters) south in latitude and 1.340 seconds (32.2 meters) west in longitude.

The horizontal control stations listed in the Signal Tape Listings of this survey are of Third Order, Class I accuracy or better. Nine of the eleven control stations listed are field positions. Positioning systems are adequately discussed in the Descriptive Report. Positioning methods were not noted in the Descriptive Report. The survey records reveal that the range-range and range-azimuth methods of horizontal position control were used. Calibration methods are adequately discussed in the Descriptive Report and adequate calibration data is recorded in the field records.

All of the controlled hydrography of this survey is at the scale of 1:5,000. Range-range controlled hydrography will rarely (this survey is not the exception) meet the required standards of positional accuracy for surveys conducted at the 1:5,000 scale. See section 4.4.3.2.2. of the HYDROGRAPHIC MANUAL and AMC OORDER 86. The positional accuracy for the range-range controlled areas on the present survey is considered to meet the positional accuracy requirements of a 1:10,000 scale survey. This concern of positional accuracy is not a issue in applying this survey to the chart (#12304) since the chart is at the scale of 1:80,000.

b. Shoreline for Appoquinimink River, Smooth Sheet #1 of 9, was drawn entirely from Chart 12311, 31st Ed., Sept. 10, 1983. Shoreline Manuscript TP-00253 covers this river east of Longitude 75°35'30" but was not used since the shoreline is intended for orientation only and it is not considered necessary for chart application of these survey data.

Shoreline for Fortescue Creek, Smooth Sheet#2 of 9, was drawn from Shoreline Manuscript TP-00124 Revision Print from 1982 photography (Blueprint #122253). Changes noted by the hydrographer to alongshore features are shown in red on the smooth sheet.

Shoreline was within the limits of Smooth Sheets #6 & 8 of 9 but was not drawn on the smooth plots since the hydrography does not extend to the shoreline.

Shoreline is not within the limits of Smooth Sheets #3,4,5,7, & 9 of 9.

3. HYDROGRAPHY

a. Soundings at crossings are in good agreement in the items investigated where crosslines were run.

b. Depth curves were drawn at the standard intervals except in areas where insufficient hydrography was collected to properly draw the depth curves. Supplemental depth curves and dashed curves were added in areas where the bottom topography is not adequately depicted by the standard depth curves.

c. The development of the bottom configuration and investigation of features and least depths is considered adequate except:

1) In the vicinity of Latitude 39°14'36"N, Longitude 75°10'43"W where the natural channel of Fortescue Creek was not defined. See section 7.a.2) of this report for recommendations.

2) In the vicinity of Latitude 39°14'34"N, Longitude 75°10'26"W where the soundings are sparse and there is the possibility of the encroachment of a shoal. See section 7.a.2) of this report for recommendations.

3) In the vicinity of Latitude 39°14'35"N, Longitude 75°10'15"W where there is a small holiday. See section 7.a.2) of this report for recommendations.

4. CONDITION OF SURVEY

The smooth sheets and accompanying overlays, hydrographic records, and reports adequately conform to the applicable requirements. The only deficiencies noted in this report are those which impact charting recommendations or affect the accuracy, adequacy, or interpretation of this survey. See sections 3.c. & 7.a. of this report.

5. JUNCTIONS

An adequate junction has been effected between the present reconnaissance hydrography in the Appoquinimink River and survey H-10200 (1986). The present survey does not junction with any other contemporary surveys. (Survey H-10167 is considered a prior survey. See section 6.a. of this report.)

6. COMPARISON WITH PRIOR SURVEYS

a. HYDROGRAPHIC SURVEYS

H-1504b (1881) 1:10,000
H-1581 (1882-85) 1:20,000
H-1679 (1885) 1:20,000
H-10167 (1984) 1:20,000

Prior survey H-1504b (1881) is common to the present survey only at the confluence of the Appoquinimink River and the Delaware River (present survey Smooth Sheet #1 of 9). The horizontal datum for this prior survey is not noted; therefore, the datum shift to NAD 1927 could not be plotted for comparison purposes. Comparing the present and prior hydrography within the common area gives the appearance that the navigable entrance or natural channel at the mouth of the Appoquinimink River has migrated approximately 200 meters south in the 106 years between the surveys. Some of the apparent migration may be due to the horizontal datum differences. The present survey is adequate to supersede this prior survey within the common area.

Prior survey H-1581 (1882-85) is common to the present survey from the entrance to Fortescue creek to west of Egg Island Point. The horizontal datum for this prior survey is not noted; therefore, the datum shift to NAD 1927 could not be plotted for comparison purposes. Present survey Smooth Sheets #2, 5, 6, & 9 of 9 are common to this prior survey. This prior survey, being at the 1:20,000 scale, lacks the sounding density for a comprehensive comparison. Survey H-10167 (1984) supersedes this prior survey within their common areas. But a complete comparison between this prior survey and the present survey was made since the hydrography from H-10167 (1984) was not charted until 1987 and meaningful insights into the nature of this area is gained in this comparison.

For present survey Smooth Sheets #2 & 6 of 9, this prior survey compares generally very well with the present survey soundings being 1-foot shoaler to 1-foot deeper than prior hydrography. No wrecks, rocks, obstructions were found by either the present or shown on the prior survey within the common area. The entrance to Fortescue Creek has apparently changed significantly during the 101+ years between the present and prior surveys. It appears that the

shoreline forming the entrance of Fortescue Creek has eroded. The mouth of Fortescue Creek is approximately 300 meters northeast and approximately 50 to 75 meters inland of the prior survey shoreline. Some of this apparent shoreline change may be due to the horizontal datum differences.

For present survey Smooth Sheet #5 of 9, this prior survey compares generally well with the present survey soundings being from 0 to 2 feet deeper. No wrecks, rocks, obstructions were found by either the present or the prior survey within the common area.

For present survey Smooth Sheet #9 of 9, the present soundings range from 2 feet deeper to 4 feet shoaler than prior hydrography. The structure of the bottom in this area has changed. A 7-foot isolated shoal extending from approximately Latitude 39°11'14"N, Longitude 75°09'50"W to approximately Latitude 39°11'21"N, Longitude 75°10'16"W has built up over the many years between the surveys. No wrecks, rocks, or obstructions were found by either the present or shown on this prior survey within the common area. The 4-foot obstruction plotted on this Smooth Sheet is from survey H-10167 (1984).

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

Prior survey H-1679 (1885) is common to the present survey in the areas of Egg Island Point and Egg Island Flats. The horizontal datum for this prior survey is not noted; therefore, the datum shift to NAD 1927 could not be plotted for comparison purposes. Present survey Smooth Sheets #3, 4, 5, 7, & 8 of 9 are common to this prior survey. This prior survey, being at the 1:20,000 scale, lacks the sounding density for a comprehensive comparison. Survey H-10167 (1984) supersedes this prior survey within their common areas. But a complete comparison between this prior survey and the present survey was made since the hydrography from H-10167 (1984) was not charted until 1987 and meaningful insights into the nature of this area, particularly around Egg Island Point, is gained in this comparison.

For present survey Smooth Sheet #3 of 9, this prior survey compares very well with the present survey soundings being within 1-foot of prior hydrography. The two obstructions found by the present survey and plotted on the Smooth Sheet were not shown on the prior survey. No wrecks, rocks, obstructions, or shoals were found by this prior survey within the common area.

For present survey Smooth Sheet #4 of 9, this prior survey compares very well with the present survey soundings being within 1-foot of prior hydrography. No wrecks, rocks, obstructions, or significant shoals were

found by either the present or shown on this prior survey within the common area.

This prior survey is common to only about one-third of present survey Smooth Sheet #5 of 9. Present soundings are from 0 to $2\frac{1}{2}$ feet deeper than prior hydrography. No wrecks, rocks, obstructions, or significant shoals were found by either the present or shown on this prior survey within the common area.

For present survey Smooth Sheet #7 of 9, this prior survey is consistently 2 feet shoaler than present hydrography within the common area. No wrecks, rocks, obstructions, or significant shoals were found by either the present or shown on this prior survey within the common area.

The area covered by present survey Smooth Sheet #8 of 9 is significantly different from what existed over 100 years ago as evidenced by this prior survey. Approximately one-half of the area covered by Smooth Sheet #8 of 9 was ashore (land) on prior survey H-1679. Apparently a tremendous amount of erosion has occurred. Where land was previously, there is now water from 3 to 12 feet deep. Two fixed aids to navigation plotted on this prior survey are no longer in existence. EGG ISLAND LIGHTHOUSE, 1882, plotted in Latitude $39^{\circ}10'44.1''N$, Longitude $75^{\circ}08'13.1''W$ (datum unknown), was found as a submerged obstruction by the present survey in Latitude $39^{\circ}10'43.31''N$, Longitude $75^{\circ}08'12.74''W$ (approximately 23 meters south-southeast of the prior position). EGG ISLAND LIGHT, plotted in Latitude $39^{\circ}10'35.2''N$, Longitude $75^{\circ}08'20.0''W$ (datum unknown), is believed to be where the present survey found the submerged wreckage of the vessel "DARLENE" in Latitude $39^{\circ}10'33.91''N$, Longitude $75^{\circ}08'19.73''W$ (approximately 38 meters south-southeast of the prior position). These positional differences may be due to the horizontal datum differences. No other wrecks, rocks, obstructions, or significant shoals were found or indicated by this prior survey within the common area. Charting recommendations for these obstructions are made in section 7.a.7) of this report.

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

Prior survey H-10167 (1984) is common to the entire present survey with the exception of the present reconnaissance hydrography accomplished in the Appoquinimink River (Smooth Sheet #1 of 9) and the interior of Fortescue Creek (part of Smooth Sheet #2 of 9). This survey was considered a prior survey rather than a junctional survey because the present survey's purpose was to resolve items not resolved by this prior survey. The larger scale

(1:5,000 versus 1:20,000), the greater sounding density, and the slightly irregular bottom in some of the investigated areas were factors considered in classifying H-10167 a prior survey. The common areas investigated (Smooth Sheets #2 - 9 of 9) are:

Smooth Sheet #2 of 9 is a survey of Fortescue Creek and its approaches. In this area, this prior survey is common to the present survey only from the creek entrance to seaward. This prior survey originally surveyed the entire creek to the Downe Avenue Bridge but all the hydrography in Fortescue Creek had to be rejected (control problems). Only minor (1-foot) differences exist between present and prior hydrography within the common area. Prior soundings which were considered necessary to define the bottom configuration have been brought forward to the present survey. No wrecks, rocks, or obstructions were found by either the present or prior survey within the common area of this smooth sheet.

Smooth Sheet #3 of 9 is part of the investigation of AWOIS Item #3338 (see also Smooth Sheet #4 of 9). This prior survey is common all of this investigation. The two submerged pilings being sought by the present survey on this smooth sheet originated with this prior survey (a 4-foot sounding in Latitude 39°08'42.45"N, Longitude 75°06'19.07"W and a 6-foot sounding in Latitude 39°08'41.96"N, Longitude 75°06'17.75"W). These two submerged pilings have been disproved by chain drag by the present survey. Two previously undetected submerged obstruction were found by the present survey within the common area. These two submerged obstructions are addressed in section 7.a.3) of this report. The present and prior hydrography agrees very well (within 1-foot). See also section 7.a.3) of this report.

Smooth Sheet #4 of 9 is part of the investigation of AWOIS Item #3338 (see also Smooth Sheet #3 of 9). This part of AWOIS Item originated from advance information from this prior survey as Chart Letter #1623 of 1984. The present survey searched for this submerged piling by fathometer search and by chain drag. The present survey did not find this obstruction or any other obstructions within the common area. This part of AWOIS Item #3338 is considered disproved. The present and prior hydrography agrees very well (within 1-foot). See also section 7.a.3) of this report.

Smooth Sheet #5 of 9 is the investigation of a charted 3-foot obstruction. This obstruction originated from a suspicious echogram trace on this prior survey (H-10167). This obstruction was searched for on the present survey by echosounder search but was not searched for by chain drag. This obstruction is not considered disproved.

The present and prior hydrography agrees very well (within 1-foot). A 3-foot obstruction was brought forward to supplement the present survey. See also section 7.a.4) of this report.

Smooth Sheet #6 of 9 is the investigation of AWOIS Item #3246, a charted submerged pile. No Wrecks, rocks, obstructions were found by either the present or this prior survey within the common area. There is good agreement (within 2 feet) between present and prior hydrography. See also section 7.a.5) of this report.

Smooth Sheet #7 of 9 is the investigation of AWOIS Item #2727, a dangerous sunken wreck. This prior survey is common to all of this investigation. No wrecks, rocks, obstructions, or unusual shoals were found by either the present or this prior survey within the common area. There is good agreement (within 1-foot) between present and prior hydrography. See also section 7.a.6) of this report.

Smooth Sheet #8 of 9 is the investigation of AWOIS Item #2725, a dangerous submerged obstruction. This prior survey is common to all of this investigation. No wrecks, rocks, or obstructions were found by this prior survey; but, the present survey did locate one wreck (wreckage) and two obstructions. Present hydrography ranges from 0 to 7 feet deeper than prior hydrography with the most noticeable differences being nearer Egg Island Point. The reason(s) for these significant differences are unknown. Since the obstructions on the present survey are in relatively good agreement with the prior positions of the destroyed fixed aids to navigation, the present survey horizontal control is considered good. See also section 7.a.7) of this report.

Smooth Sheet #9 of 9 is the investigation of two charted obstructions originating as suspicious echogram traces on this prior survey. Prior hydrography is from 0 to 3 feet deeper than present hydrography (except for the 4-foot obstruction sounding). The 7-foot sounding turned out to be a significant 7-foot isolated shoal. The 4-foot obstruction was not found and was not disproved by the present survey. (See also the comparison in this report of this Smooth Sheet with prior survey H-1581.) This 4-foot obstruction has been brought forward to the present survey. No wreck, rocks, or other obstructions or other significant shoals were found by either the present or this prior survey within the common area. See section 7.a.8) of this report for charting recommendations pertaining to these two charted obstructions.

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

An 8 ft OBSTR, originating with prior survey in Lat. 39° 10' 32.7" N, Long. 15° 08' 27" W, was neither verified nor disproved and has been brought forward to the present survey.

b. TOPOGRAPHIC MANUSCRIPT
Sheet No. T-4668 (1931) 1:10,000-approximate

Sheet No. T-4668 is a compilation of aerial photographs taken in 1931 and plotted in 1932. The scale of this sheet is approximate and there is no Latitude/Longitude grid plotted. This sheet is a collection of the compilation of seven photographs of which plot no. 7 is common to the present survey investigation of Fortescue Creek (Smooth Sheet #2 of 9). The comparison between present and prior shoreline data reveals some rather dramatic changes. At the entrance of Fortescue Creek, the north shore has eroded and the south shore has been preserved with bulkheads, riprap, and a jetty. Inside Fortescue Creek, two tributaries no longer exist and one tributary has narrowed significantly. A marsh island that extended from approximately Latitude 39°14'35"N, Longitude 75°10'15"W to approximately Latitude 39°14'43"N, Longitude 75°10'33"W no longer exists. The only pier shown on this prior sheet within the common area is a small pier in approximately Latitude 39°14'37"N, Longitude 75°10'34"W where presently several piers exist. This prior shoreline sheet provides no chartable information. No prior shoreline data was brought forward to the present survey. The present survey is adequate to supersede this topographic sheet within the common area.

7. COMPARISON WITH CHARTS 12304 (30th Ed., Mar. 16, 1985)
12304 (31st Ed., Dec. 26, 1987)
12311 (31st Ed., Sept. 10, 1983)

a. HYDROGRAPHY

The charted hydrography originates with the previously addressed prior surveys supplemented by information from the U. S. Coast Guard, the U. S. Army Corps of Engineers, and miscellaneous sources not readily ascertainable. The previously addressed prior surveys require no further consideration. Attention is directed to the following:

1) The investigation of the Appoquinimink River (assigned Item D, labeled Smooth Sheet #1 of 9) to determine the controlling depths from the river's confluence with the Delaware River to Odessa, Delaware was assigned by Change #5 to the Project Instructions. The charted controlling depth of the Appoquinimink River from the entrance to Odessa is 4 feet with an additional note of reported shoaling to 2 feet in the vicinity of Latitude 39°26.9'N, Longitude 75°36.2'W. The present survey ran single line hydrography from the river entrance to the highway #229 fixed bridge crossing the river. The hydrography is "see field sheet" hydrography and is considered reconnaissance. The shoalest sounding obtained by the present survey is 5 feet at MLLW in Latitude 39°26'53.4"N, Longitude 75°35'51.6"W. Since this investigation is limited and is reconnaissance in nature,

there is no implication that the bottom configuration is adequately defined. Shoaler depths than found by this investigation may exist. The charted controlling depth of 4 feet is recommended to be retained on the chart. The charted "shl to 2 ft rep" is not indicated by the present reconnaissance investigation except at the creek entrance. The source of this reported shoaling to 2 feet is recommended to be researched. Unless the additional research provides stronger evidence of this shoaling, it is recommended that the charted "shl to 2 ft rep" note be deleted from the chart. It is recommended that a note be placed on the chart stating that local knowledge is recommended for navigation of this river. The present survey soundings are not recommended to be charted. Some charted alongshore features such as overhead power cables were not addressed by the hydrographer. These unverified and unaddressed features are recommended to be retained as charted. No additional field work is recommended on Appoquinimink River.

2) The investigation of Fortescue Creek and its approaches (Smooth Sheet #2 of 9) was originally accomplished during survey H-10167 (1984) but was rejected due to control problems. The present survey investigated this creek in 1986 and 1987. Presently the only useable information for comparison with the present survey for Fortescue Creek is the charted note concerning the controlling depth. Unless this creek is to be charted differently, the only charting recommendation necessary from this survey pertains to a revised controlling depth. If the chart scale is changed or an inset is schemed for Fortescue Creek, then the results of the present survey (the shoreline features verified and the shoreline changes noted, the hydrography, and the hazards to navigation) are recommended to be charted. The present survey did not adequately develop the bottom configuration of Fortescue Creek, as noted in section 3.c. of this report. The controlling depth of Fortescue Creek (charted as 9 feet) can be considered to be no more than 3 feet until additional work is accomplished. The centerline of the creek shoals to 2 feet or less in places. It is recommended that the charted note pertaining to the controlling depth of Fortescue Creek be deleted from the chart and the note "shoaling reported, 1986" be charted. Additional field work is necessary to make this investigation complete and basic and is recommended in the areas noted in section 3.c. of this report. Some charted alongshore features such as overhead power cables were not addressed by the hydrographer. These unverified and unaddressed features are recommended to be retained as charted.

3) AWOIS Item #3338, charted dangerous submerged piles in Latitude 39°08'42.45"N, Longitude 75°06'19.07"W and Latitude 39°08'41.96"N, Longitude 75°06'17.75"W, originated

with Local Notice to Mariners No. 9 of 1983, revised by Chart Letter #1623 of 1984 (provided the erroneous position of Latitude 39°09'42.2"N, Longitude 75°06'17.3"W), and later revised by survey H-10167 (1984). This item is identified as the remains of MAURICE RIVER ENTRANCE LIGHT 1 which was destroyed by ice in 1981. The investigation of this item is portrayed on Smooth Sheets #3 & 4 of 9 of this survey. These charted submerged piles were searched for by chain drag in conformance with the requirements listed in the AWOIS Listing for this Project. Also these submerged piles were searched for by echosounder development of the area. These charted submerged piles were not found and have been disproved. These charted submerged piles are recommended to be deleted from the chart and no further field work is recommended on these piles.

Two uncharted submerged obstructions were found during this investigation. One of these submerged obstructions was found on Latitude 39°08'33.56"N, Longitude 75°06'17.19W and was identified as a concrete block, 4-6 feet in diameter, extending 2-3 feet off the bottom. A least depth was taken but was not used since it conflicts with the other information provided. (This concrete block lies in present survey depths of 10 feet and extends 2-3 feet off the bottom which indicates a least depth of 7-8 feet. The reduced least depth is 10.2 feet.) This concrete block is identified as an old navigation light base. It is recommended that this concrete block be charted in the position determined by the present survey as a dangerous submerged obstruction. Additional field work is recommended to establish an accurate least depth on this obstruction.

(77 Reported) SR13
The other uncharted submerged obstruction, a 7-foot depth in Latitude 39°08'48.57"N, Longitude 75°06'17.05W, is a 7-foot sounding on a suspicious trace or spike on the echogram of a sounding line which was detected during the verification of this survey. This obstruction was not investigated by the field. This 7-foot sounding is recommended to be charted in the position determined by the present survey as a dangerous submerged obstruction with a depth of 7 feet. Additional field work is recommended to either prove or disprove the existence of this obstruction and, if found, to identify and provide an accurate position and least depth.

4) A charted submerged obstruction with a depth of 3-feet in Latitude 39°10'36"N, Longitude 75°09'16"W originated from a spike on an echogram of survey H-10167 (1984). This charted obstruction was investigated by the present survey and the results are portrayed on Smooth Sheet #5 of 9. This item was searched for by echosounder development of the area. No indication of an obstruction was found. This obstruction is not disproved by the present survey and is recommended to be retained as presently

charted. Additional field work is recommended to either prove or disprove the existence of this obstruction and, if found, to identify and provide an accurate position and least depth. It is recommended that a chain drag or a wire drag be employed for any additional work on this obstruction.

5) AWOIS Item #3246, a charted submerged pile, PA, in Latitude 39°14'12"N, Longitude 75°11'06"W originated with Local Notice to Mariners No. 36 of 1979 as a pile with a red triangular daymark attached (called FORTESCUE CREEK LIGHT 2), bearing 3 feet at MHW. This item was revised to a submerged pile based upon a visual search (negative results) by survey H-10167 (1984) and information that the pile was destroyed by ice from the Fortescue Harbormaster. This item was investigated by the present survey and the results are portrayed on Smooth Sheet #6 of 9. This item was searched for by echosounder development of the area. No indication of a submerged pile was found. The requirement for disproval of this item is a bottom drag investigation for a minimum radius of 100 meters. The investigation by the present survey is not sufficient to disprove this charted item since a bottom drag was not accomplished. The combination of the present survey work and the information obtained from the Fortescue Harbormaster (see section L. of the Descriptive Report) is sufficient to change the status of this submerged pile to "ED". It is recommended that this item be retained on the chart as a dangerous submerged pile, ED. Additional field work (bottom drag) is recommended to either prove or disprove the existence of this item.

6) AWOIS Item #2727, a charted dangerous submerged obstruction, PA, in Latitude 39°10'28"N, Longitude 75°06'52"W originated with Chart Letter #70 of 1953 and identified as airplane wreckage. This item was investigated by the present survey and the results are portrayed on Smooth Sheet #7 of 9. This item was searched for by echosounder development of the area. No indication of a sunken wreck was found. From the results of the present survey and the information provided in The AWOIS Listing about this wreck, it is reasonable to assume the charted position is in error. However, the present survey is not sufficient to disprove this item. The area searched is a roughly rectangular area approximately 90-95 meters wide by approximately 850 meters long. The survey requirements for this item were "Limited" in the AWOIS Listing. This item is not disproved by this survey and is recommended to be retained on the chart but with the notation "PD". Additional field work is recommended to either prove or disprove the existence of this charted item.

Revised to Full
Investigation.
7-89-583

7) AWOIS Item #2725, a charted dangerous submerged obstruction in Latitude 39°10'36"N, Longitude 75°08'21"W originated with Chart Letter #347 of 1950 and was revised by

Notice to Mariners No. 22 of 1950 and survey H-10167 (1984). This item was identified as the remains of EGG ISLAND LIGHTHOUSE. This item was investigated by the present survey and the results are portrayed on Smooth Sheet #8 of 9. The submerged ruins of EGG ISLAND LIGHTHOUSE, 1882 was found in Latitude 39°10'43.31"N, Longitude 75°08'12.74"W by the present survey and a least depth of 1-foot was obtained. It is recommended that these submerged ruins be charted in the position determined by the present survey as a dangerous submerged obstruction with a least depth of 1-foot. The wreckage of a vessel (believed to be the oyster boat "DARLENE") was found in Latitude 39°10'33.91"N, Longitude 75°08'19.73"W by the present survey and a shoalest sounding of 7 feet was obtained. It is believed that part of this wreckage is the submerged ruins of EGG ISLAND LIGHT. It is recommended that this wreckage be charted in the area determined by the present survey as dangerous submerged wreckage with a shoalest sounding of 7 feet. No additional field work is recommended on either of these hazards to navigation. A 6-foot sounding on a possible obstruction plotted on this smooth sheet in Latitude 39°10'46.43"N, Longitude 75°08'11.73"W originated with a suspicious trace on the echogram being considered a possible hazard during verification. Further examination of the raw records are not possible since they were lost (see section 1.b. of this report). It is recommended that this sounding be charted in the position determined by the present survey as a 6-foot sounding on a dangerous submerged obstruction. Additional field work is recommended to either prove or disprove the existence of this obstruction and, if found, to identify and provide an accurate position and least depth.

8) Two charted dangerous submerged obstructions in Latitude 39°11'20"N, Longitude 75°10'13"W originated with survey H-10167 (1984) as a 4-foot obstruction from a spike on an echogram and an adjacent 7-foot shoal sounding. This item was investigated by the present survey and the results are portrayed on Smooth Sheet #9 of 9. These items were searched for by echosounder development of the area. No indication of a 4-foot obstruction was found. A long, isolated 7-foot shoal was discovered extending from approximately Latitude 39°11'14"N, Longitude 79°09'50"W to approximately Latitude 39°11'21"N, Longitude 79°10'16"W. The 4-foot obstruction has been brought forward to the present survey from prior survey H-10167 (1984). It is recommended that the 4-foot obstruction be retained as presently charted. It is recommended that the 7-foot shoal be charted as found by this survey.

b. Aids To Navigation

Nine fixed aids to navigation are listed in section N. and the Signal Tape Listings in the Descriptive Report. All of these fixed aids to navigation are horizontal control

stations. Five of these fixed aids are also noted by the hydrographer as landmarks. These fixed aids to navigation appear to be adequately charted and serve their intended purpose. Three floating aids to navigation were located by this survey. These floating aids to navigation appear to be properly charted and serve their intended purpose.

8. COMPLIANCE WITH INSTRUCTIONS

This survey adequately complies with the Project Instructions except as noted in sections 2. 3. and 7. of this report and as follows:

a. Compliance of this survey with sections 3.1.2.-3.1.4., and 5. of the Project Instructions were not considered since other NOS elements are responsible for the accuracy and adequacy of the required data.

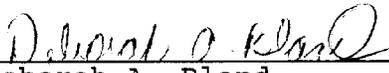
b. Compliance of this survey with sections 6.12.3., 6.14., 8., 9., and 10. of the Project Instructions were not considered since compliance or noncompliance has no impact on the accuracy, adequacy, or interpretation of the data collected and does not affect the charting recommendations made in this report.

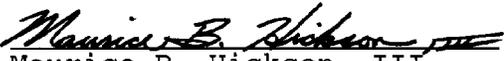
c. Bottom characteristics were not determined for any of the areas surveyed or shoals found by this survey. See section 6.7 of the Project Instructions.

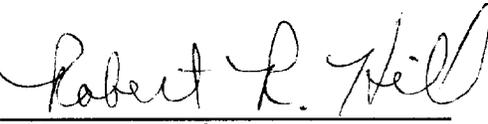
d. No Dangers to Navigation Report was found appended to the Descriptive Report as required by section 6.13 of the Project Instructions. A letter reporting the dangers to navigation identified during the processing of this survey has been sent to the U. S. Coast Guard and a copy is attached to the Descriptive Report.

9. ADDITIONAL FIELD WORK

Except as noted in this report, this is an adequate field examination. Additional field work is addressed in section 7.a. of this report.


Deborah A. Bland
Cartographic Technician
Verification of Field Data


Maurice B. Hickson, III
Cartographer
Evaluation and Analysis


Robert R. Hill
Senior Cartographic
Technician
Verification Check

INSPECTION REPORT
FE-290

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disapproval 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

FOR 

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



William A. Wert, LCDR, NOAA
Chief, Hydrographic Surveys Branch

Approved: 22 December 1988



Ray E. Moses, RADM, NOAA
Director, Atlantic Marine Center

75° 39'

75° 38'

75° 37'

75° 36'

75° 35'

39° 28'

DE STATION

pier w piles & ramp
fixed bridge (Hwy 229)
(bridge fender in ruins)
(concr bkhd each side)

75° 38' 00"

39° 27' 00"

NAD 83
XYNETICS 1201
DAB 8-18-88

Fixed bridge (Hwy 9)

FE-290
DELAWARE -- NEW JERSEY
DELAWARE RIVER
APPOQUINIMINK RIVER
OCT 7, 1987
SCALE 1:20,000
SOUNDINGS IN FEET AT MLLW
HORIZONTAL DATUM NAD 1927
SHEET 1 OF 9
ITEM D

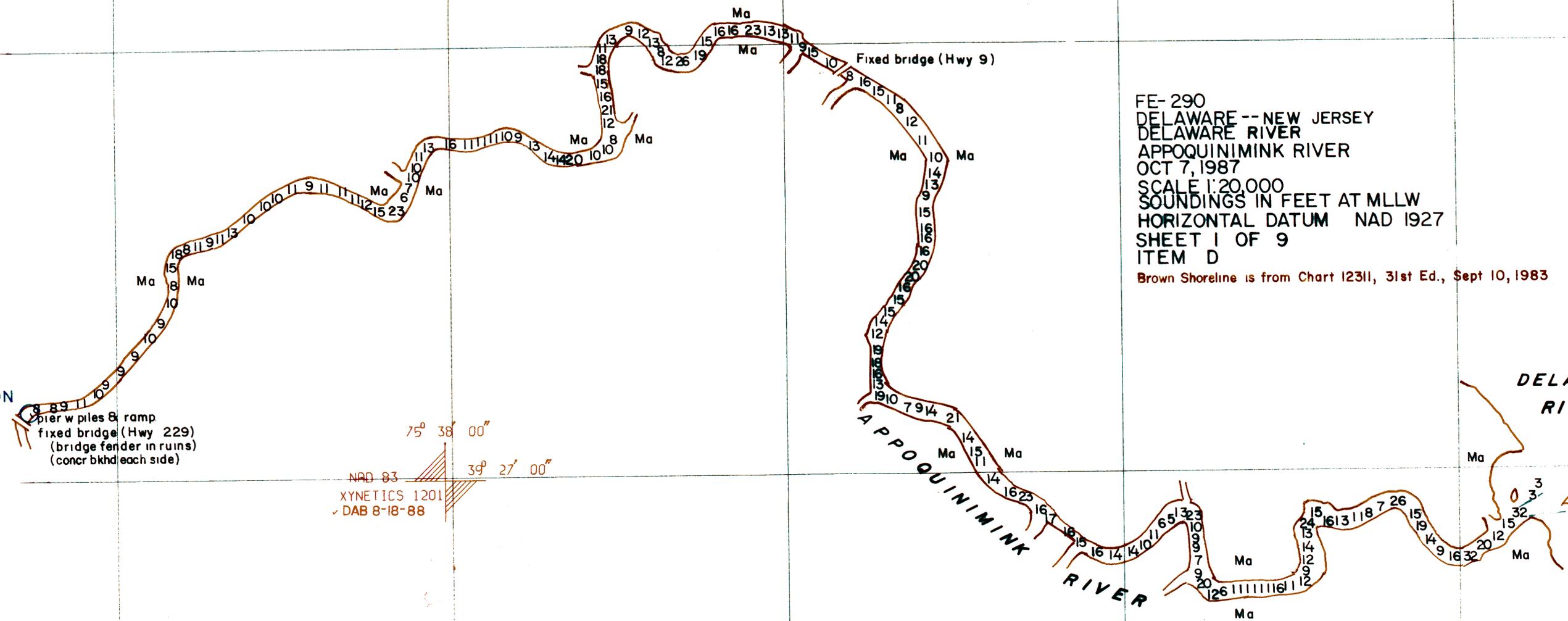
Brown Shoreline is from Chart 12311, 31st Ed., Sept 10, 1983

DELAWARE RIVER

39° 27'

ADJOINS H-10200(1986)

APPOQUINIMINK RIVER



75° 11' 00"

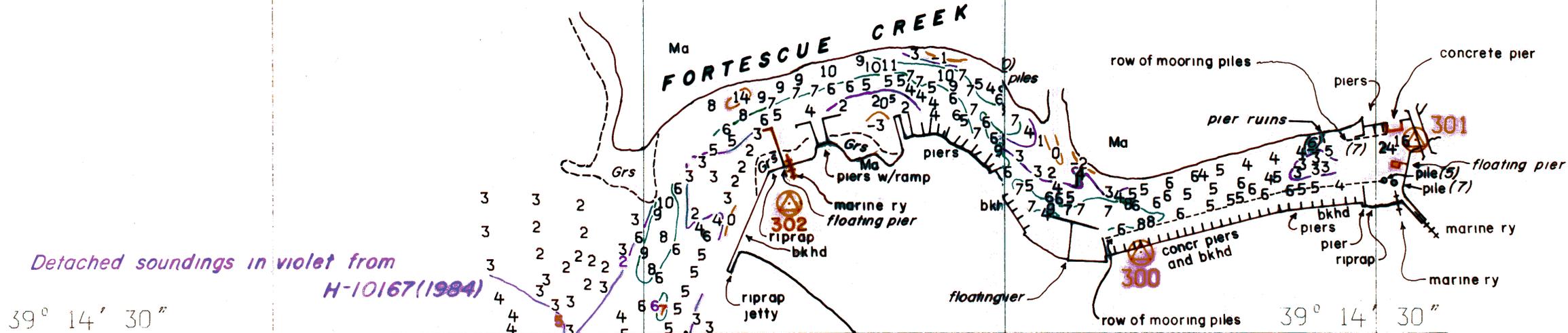
75° 10' 45"

75° 10' 30"

39° 14' 45"

39° 14' 45"

- 300** FORTES, 1985
(Field Position)
- 301** FORTES AZ, 1985
(Field Position)
- 302** FORTESCUE NAV AID, 1985
(Fortescue Directional Light)
(Field Position)



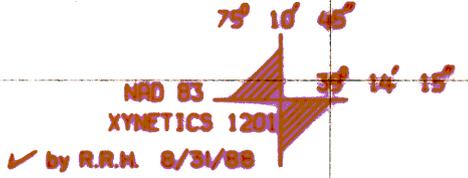
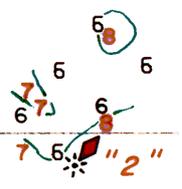
39° 14' 30"

39° 14' 30"

DELAWARE BAY

FE-290
 DELAWARE--NEW JERSEY
 DELAWARE BAY
 FORTESCUE CREEK
 SEPT. 18 and OCT. 14, 1986, SEPT. 29, 1987
 SCALE 1: 5,000
 SOUNDINGS IN FEET AT MLLW
 HORIZONTAL DATUM: NAD 1927
 SHEET 2 OF 9

JOINS FE-290(1986-87), SHEET 6 OF 9



39° 14' 15"

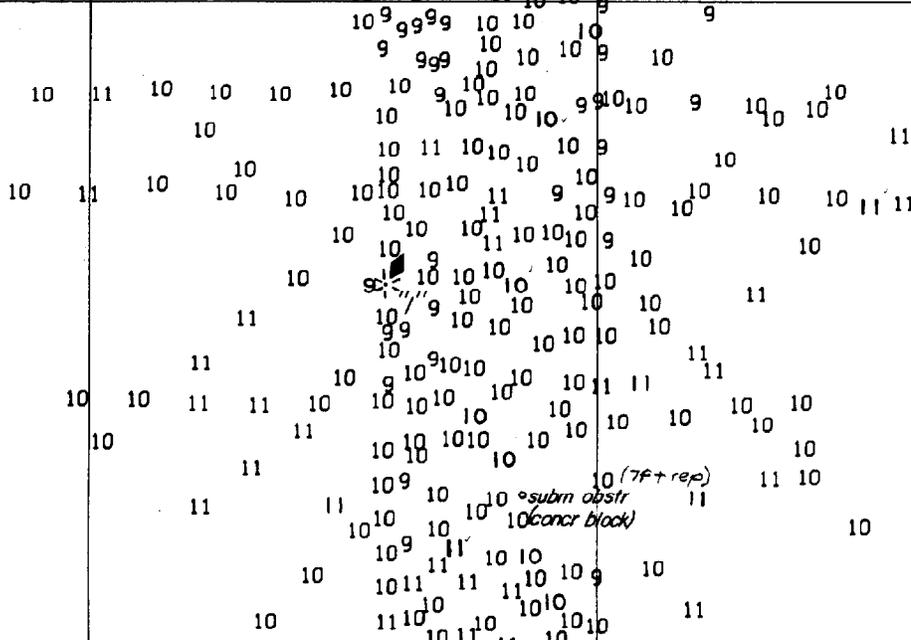
75° 11' 00"

75° 10' 45"

75° 10' 30"

EGG ISLAND FLATS

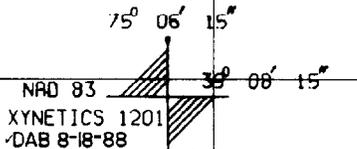
39° 08' 45"



39° 08' 30"

DELAWARE BAY

FE-290
 DELAWARE--NEW JERSEY
 DELAWARE BAY
 EGG ISLAND FLATS
 OCT 17- 21, 1986
 SCALE 1:5,000
 SOUNDINGS IN FEET AT MLLW
 HORIZONTAL DATUM NAD 1927
 SHEET 3 OF 9
 ITEM 3338



75° 06' 30"

75° 06' 15"

39° 08' 15"

75° 06' 00"

NRD 83
 XYNETICS 1201
 DAB 8-18-88

39° 10' 00"

39° 10' 00"

EGG ISLAND FLATS

39° 09' 45"

75° 05' 00"

NAD 83
XYNETICS 1201
DAB 8-19-88

39° 09' 45"

39° 09' 30"

39° 09' 30"

DELAWARE
BAY

FE-290
DELAWARE-- NEW JERSEY
DELAWARE BAY
EGG ISLAND FLATS
OCT 17-21, 1986
SCALE 1:5,000
SOUNDINGS IN FEET AT MLLW
HORIZONTAL DATUM NAD 1927
SHEET 4 OF 9
ITEM 3338

75° 06' 30"

75° 06' 15"

75° 06' 00"

75° 11' 15"

75° 11' 00"

75° 10' 45"

75° 10' 30"

FORTESCUE CREEK

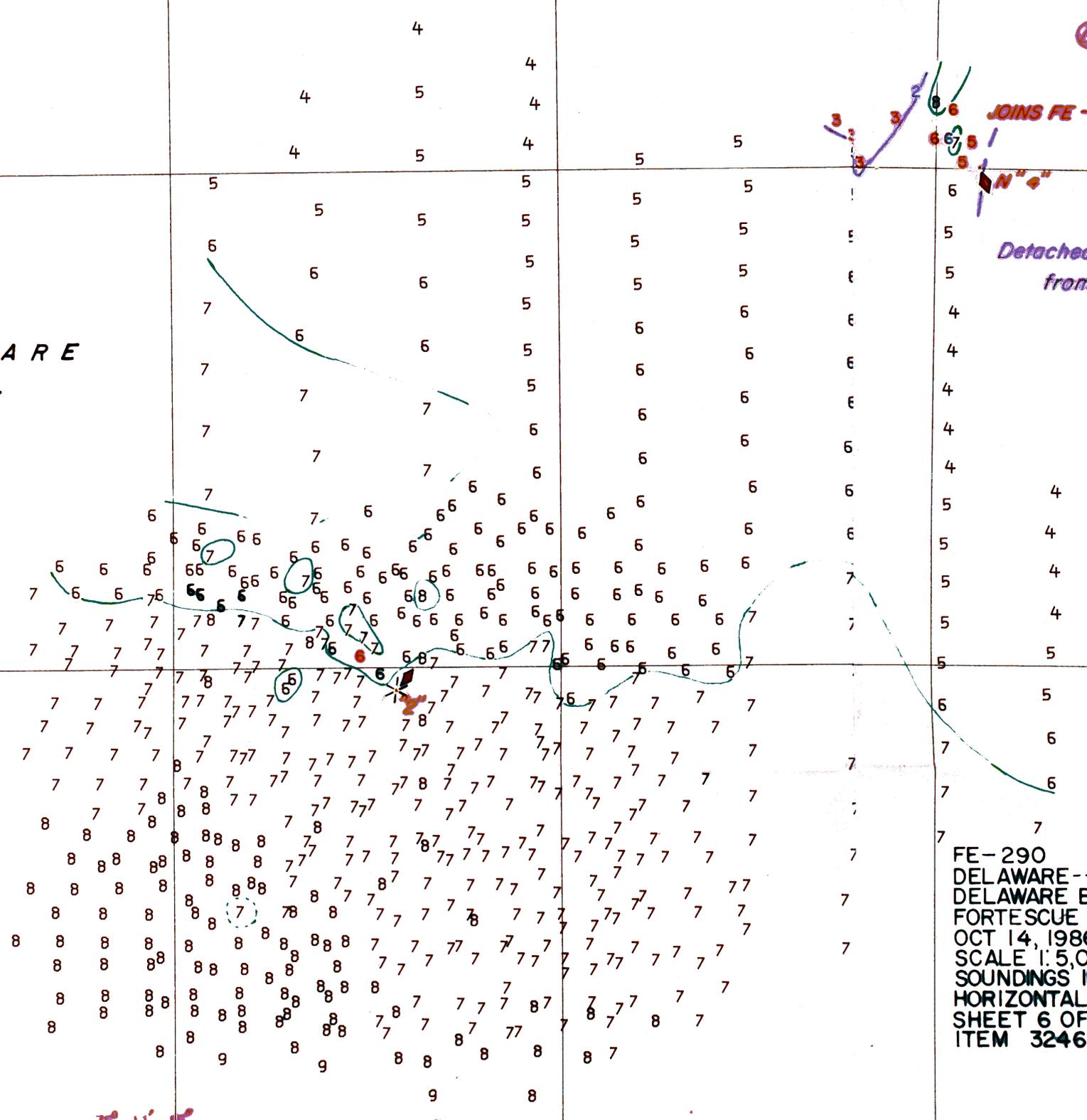
302 FORTESCUE NAV AID, 1985
(Fortescue Directional Light)
(field position)

JOINS FE-290(1986-87), SHEET 2 OF 9

39° 14' 30"

Detached soundings in violet
from H-10167(1984)

DELAWARE
BAY



39° 14' 15"

FE-290
DELAWARE--NEW JERSEY
DELAWARE BAY
FORTESCUE CREEK AREA
OCT 14, 1986
SCALE 1:5,000
SOUNDINGS IN FEET AT MLLW
HORIZONTAL DATUM NAD 1927
SHEET 6 OF 9
ITEM 3246

75° 11' 15"
39° 14' 00"
NAD 83
XYNETICS 1201
DAB 8-19-88

39° 14' 00"

75° 07' 00"

75° 06' 45"

6

75° 06' 45"

39° 10' 45"

NAD 83
XYNETICS 1201
DAB 8-18-88

FE-290
DELAWARE--NEW JERSEY
DELAWARE BAY
EGG ISLAND FLATS
OCT 29, 1986
SCALE 1:5,000
SOUNDINGS IN FEET AT MLLW.
HORIZONTAL DATUM NAD 192
SHEET 7 OF 9
ITEM 2727

39° 10' 30"

EGG
ISLAND
FLATS

DELAWARE
BAY

39° 10' 15"

8
7
8
8
8

75° 10' 15"

75° 10' 00"

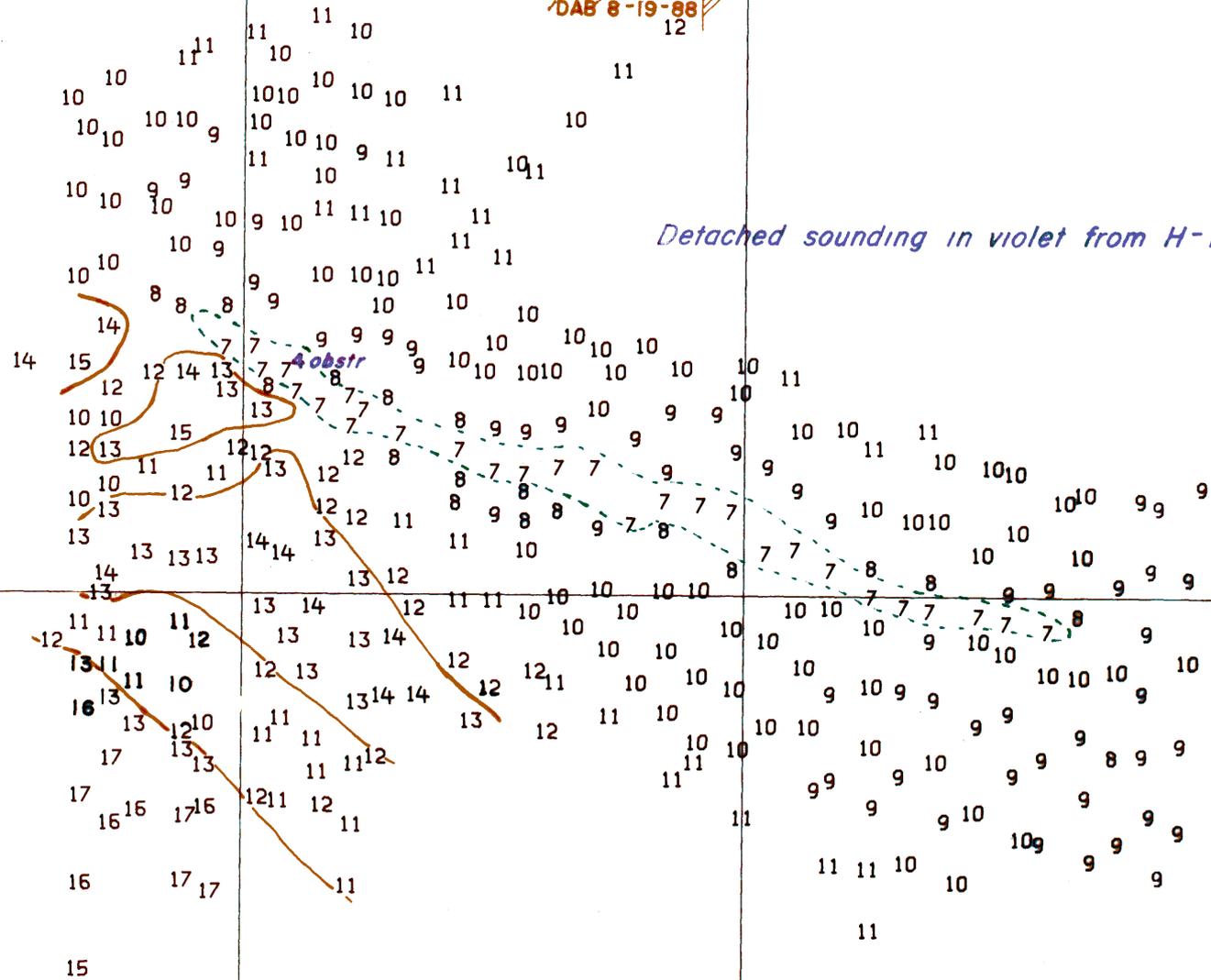
75° 09' 45"

75° 10' 00"

39° 11' 30"

39° 11' 30"

NAD 83
XYNETICS 1201
DAB 8-19-88
12



Detached sounding in violet from H-10167 (1984)

**EGG
ISLAND
FLATS**

39° 11' 15"

DELAWARE BAY

FE-290
DELAWARE--NEW JERSEY
DELAWARE BAY
EGG ISLAND FLATS
OCT 7, 1986
SCALE 1:5,000
SOUNDINGS IN FEET AT MLLW
HORIZONTAL DATUM NAD 1927
SHEET 9 OF 9
ITEM - CHARTED 4 FT & 7 FT
OBSTRUCTIONS

39° 11' 00"

