

FE367

Diagram No. 1210-4

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey .. Side Scan Sonar

Field No. RU-20-1-91

Registry No. FE-367SS

LOCALITY

State Rhode Island

General Locality .. Rhode Island Sound

Sublocality Approach to Narragansett

Bay

19 91

CHIEF OF PARTY

..... LCDR N.E. Perugini

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DATE July 8, 1993

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Exam, N/CC, 9/7/92, CA

HYDROGRAPHIC TITLE SHEET

FE-367SS

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.

RU-20-1-91

State Rhode Island

General locality Rhode Island Sound

Locality Approach to Narragansett Bay

Scale 1:20,000 Date of survey October 9 - Nov ⁵ 4, 1991

Instructions dated March 11, 1991 Project No. OPR-B660-RU-91

Vessel NOAA Ship RUDE (9040)

Chief of party LCDR Nicholas E. Perugini

Surveyed by N.E. Perugini, P.L. Schattgen, M.J. Oberlies, J.A. Illg
D.E. Williams

Soundings taken by echo sounder, hand lead, pole

Graphic record scaled by NEP, PLS, MJO, JAI, DEW

Graphic record checked by NEP, PLS, MJO, JAI, DEW

Protracted by NA Automated plot by NA ^{SYNETICS 1201 PLOTTER} (AHS)

Verification by NA *Atlantic Hydrographic Section Personnel*

Soundings in meters at MLLW

REMARKS: All times recorded in UTC

Notes in red were made during office processing.

*AWOIS & SURF check 8/24/93
MCR*

K.W.W. 7/19/94

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A. PROJECT

A.1 This survey was conducted in accordance with Hydrographic Project Instructions OPR-B660-RU-91, Southern New England Coast, Connecticut and New York.

A.2 The original date of the instructions is March 11, 1991.

A.3 The following changes to the original instructions are relevant to this survey:

Change # 1	August 8, 1991
Change # 2	September 3, 1991
Change # 3	October 11 ² , 1991

A.4 A sheet letter was not specified in the project instructions.

A.5 Project OPR-B660-RU-91 responds to requests from the Northeast Marine Pilots, Inc., of Newport, Rhode Island to disprove or verify and provide least depths for certain wrecks and obstructions in Long Island, Block Island, and Rhode Island Sounds. Also, the U.S. Navy, as well as state and local governments have requested updated bathymetric and hydrographic survey data of this area for use in proposed studies and in the construction of new charts.

B. AREA SURVEYED

B.1 This survey is located East of Point Judith, Rhode Island and South of Brenton Point, Rhode Island in the approach to Narragansett Bay. Existing depths in this survey area are between 90² and 110³ feet (27⁸ to 33.5⁴ meters). The project area consists of two dumping grounds, one obstruction (PA) and one wreck cleared by wire drag.

The primary traffic in the area is tug-and-barge transports, transiting between Long Island Sound and points to the East (Buzzard's Bay and Boston). Small pleasure craft are also abundant in the area.

B.2 The items are identified on the pre-survey review chart, extending from approximately latitude 41° 20.6⁸' to 41° 23.3' North and from longitude 071° 18.0^{17.6}' to 071° 22.2⁹' West.

B.3 Data acquisition began on October 9, 1991 (DOY 282) and concluded on November 4⁵, 1991 (DOY 308).

C. SURVEY VESSELS

C.1 The following vessels were used during this project:

<u>VESSELS</u>	<u>ELECTRONIC DATA PROCESSING NUMBER</u>	<u>PRIMARY FUNCTION</u>
NOAA Ship RUDE (S590)	9040	Hydrography/ Side Scan Operations
RUDE Launch (RU3)	1290	Diving Operations
RUDE Skiff (RU1)	N/A	Diving Operations

C.2 No unusual vessel configurations or problems were encountered.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

D.1 Survey data acquisition and processing were accomplished using the HDAPS system with the following software versions:

Program	Version	Dates Used
SURVEY	6.03	Oct 9 - Nov 4
DAS_SURV	6.04	Oct 9 - Nov 4
POSTSUR	5.14	Oct 9 - Nov 4

D.2 Other software includes VELOCITY 1.11 dated March 9, 1990 used to generate sound velocity corrector tables, and MTEN (dated between 1985 and 1986) for horizontal control verification and establishment.

D.3 There were no nonstandard automated acquisition or processing methods used.

E. SONAR EQUIPMENT

E.1 Side scan sonar operations were conducted using an EG&G Model 260 slant range corrected side scan sonar recorder and either a Model 272-T (single frequency) or ~~272-TD (dual frequency)~~ towfish. All side scan operations were conducted from the RUDE (vessel # 9040). The following list shows equipment serial numbers and corresponding dates used:

Equipment Type	Serial Number	Dates Used
Recorder	0012105	Entire Survey
Towfish	0011908 (Single Freq)	Entire Survey

E.2 The side scan sonar towfish was configured with a 20° beam depression, which is the normal setting and which yields the best beam correction.

E.3 The 100 Khz frequency was used throughout this survey.

E.4 a) The 100 meter range scale was used for all main scheme side scan coverage. The 50 meter range scale was used for contact development, as it yields a higher resolution trace.

The depth of water encountered throughout the survey area usually exceeded 20 meters, allowing excellent imagery on the 100 meter range scale.

b) Daily confidence checks were obtained by either towing the fish past a previously located feature, or by noting recognizable bottom characteristics at the edges of the sonar range scale in use.

c) Refer to section "N", the individual AWOIS descriptions, for side scan sonar coverage.

d) No other factors effected side scan sonar operations.

e) The towfish was deployed from the stern during the entire survey.

E.5 Significant contacts that were suspected of being the object of the AWOIS investigation were investigated by echosounder development and multiple side scan sonar passes. There were no diver investigations conducted in conjunction with this survey.

E.6 Overlap was checked on-line using the real-time plot and the edited swath plot for holidays. All holidays were reconciled by running additional side scan sonar lines.

F. SOUNDING EQUIPMENT

F.1 All hydrographic soundings were acquired using a Raytheon 6000N digital survey fathometer (DSF). One DSF 6000N was used during the entire survey: S/N A106N.

F.2 No other sounding equipment was used for this survey.

F.3 There were no faults in soundings equipment that affected the accuracy/quality of the data.

F.4 Both the high (100 kHz) and the low (24 kHz) frequency sounding data were recorded during data acquisition. Only high frequency soundings were selected for plotting.

G. CORRECTIONS TO SOUNDINGS

G.1 a) The velocity of sound through water was determined using a Digibar Sound Velocity Probe (S/N 169), made by Odom. A Data Quality Assurance Test was conducted before each velocity cast to ensure the meter was within tolerance.

All data were processed using Velocity 1.11 software. The computed velocity correctors were entered into the HDAPS sound velocity tables and applied on-line to both high and low frequency soundings. Sound velocity correctors applied to this survey were obtained on the following dates:

Cast Number	Date	Latitude	Longitude	HDAPS Table #	Applied to Days
15	10-03-91	41°23.4' N	71°23.6 W	15	282-283*
17	10-21-91	41°22.7' N	71°19.1 W	17	294-298*
18	11-04-91	41°22.4 N	71°19.9 W	18	308-309

* No survey activities during these gaps.

b) There was no variation in the DSF-6000N instrument initial.

c) No instrument correctors to the DSF-6000N were required.

d) Two dual lead line comparisons with the DSF-6000N were made:

April 25, 1991	at	41° 35.6'N	71° 21.3'W	(25 ft depths)
July 22, 1991	at	41° 20.9'N	71° 29.1'W	(35 ft depths)

The greatest variation between leadline and DSF soundings was less than 0.2 meters for both comparisons. Considering the ship's motion and the scope in the leadline from current, this is excellent agreement and provides an adequate check that the echosounder was functioning properly. Also, comparisons between diver determined least depth by pneumatic depth gauge and DSF soundings over particular items (with prominent features) were normally within 0.5 meters after being reduced for correctors. Data from these comparisons are found in SEPARATE IV.

e) All sounding correctors were applied to both the narrow (100 kHz) and wide (24 kHz) beams.

f) During the winter 1988 dry dock period, an exact vertical measurement was taken from the DSF transducer to a fixed point on the bridge wing. After the ship was re-floated, the height above the waterline was determined for this point. The ship's static draft was thereby calculated to be exactly 2.26 meters (7.4 feet). This draft value was applied to the sounding data via the HDAPS offset table.

g) Settlement and squat correctors for the RUDE were determined on the Elizabeth River, Norfolk, Virginia on March 13, 1991. An observer, stationed with a level on a pier, measured changes in relative height by sighting to a staff held at the longitudinal position of the ship's transducer. The ship steamed directly toward and then away from the observer. The toward and away runs were averaged and applied to soundings through the HDAPS offset table.

h) Heave data were acquired by a Datawell heave, roll and pitch sensor (S/N 19128-C), and were applied to soundings in real time. Only the heave corrections were applied to the plotted soundings.

See SEPARATE IV for data records.

G.2 The HDAPS program "Reapply" was used for the first time this season to reapply corrector tables to soundings. An evaluation of the most appropriate tables for each day's data was made, and compared to the tables actually used. New tables were then applied to those days which differed.

G.3 As stated in paragraph G.2, corrector tables were reapplied to soundings during processing, so that the most relevant correctors were applied to plotted soundings. Offset table number 3 was used for the entire survey, so these correctors were not reapplied. Special correctors were not applied to any soundings.

G.4 Pneumatic depth gauges were not used for this survey.

G.5 Generally, sea conditions greater than one meter affected the fathogram, creating a trace of constant peaks and deeps. But the application of heave correctors to raw echo soundings appeared to accurately represent true depths.

G.6 a) The tidal datum for this project is mean lower low water. The operating tide station at Newport, Rhode Island (845-2660) served as direct control for datum determination. This station also served as the reference station for predicted tides. Data for Newport tides were provided on floppy magnetic disk before the start of the project.

b) The height and time correctors listed below were taken from Table 2 of the East Coast of North and South America Tide Predictions, and applied to the digital tide data using the HDAPS software:

NO.	PLACE	TIME		HEIGHT	
		High water	Low water	High water	Low water
1191	Point Judith Harbor of Refuge	-10 min	+17 min	* 0.88	* 0.86

Tidal correctors were applied on-line using the HDAPS predicted tide tables.

c) Zoning for this project is consistent with the project instructions.

A request for smooth tides was mailed on December 6, 1991.

Approved Tides were applied during office processing.

H. CONTROL STATIONS *See also section 2.a of the Evaluation Report*

H.1 The horizontal datum for this project is the North American Datum of 1983 (NAD 83).

H.2 The list of Horizontal Control Stations is located in Appendix III.

H.3 Newly established horizontal control stations were surveyed using standard NGS approved surveying techniques; primarily the Geodetic Direct and Resection procedures. These data were then entered into the NGS software "MTEN", which produced the Latitude and Longitude of the new station using the NAD 83 ellipsoid.

Existing stations were verified by comparing observed horizontal angles and distances (to known stations) with angles and distances provided by inverse computations using "MTEN".

All horizontal control stations used during this survey are Third-order, Class I.

H.4 These surveying methods were used throughout the survey area as defined in section "B.2". All are referenced to the NAD 83 Horizontal Datum.

H.5 Refer to the Horizontal Control Report (submitted to N/CG 233 under separate cover) for specific procedures and sites surveyed by the RUDE.

H.6 There are no photogrammetric problems, positioning problems or unconventional survey methods pertinent to this survey.

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

I.1 Two different systems were used for vessel positioning during the survey; Falcon Mini-Ranger and GPS. A detailed discussion of GPS navigation is contained in Section "I.4". Very rarely was a single positioning system used exclusively on a given day. Often times it was necessary to switch between the two systems because one or the other would be unacceptable due to some reason, be it weather which obscured the Mini-Ranger signal or electrical/mechanical problems which incapacitated GPS. The flexibility to switch between the established Falcon network and GPS often made continuing surveying operations possible where it otherwise would not have been.

I.2 At no time during this survey did the maximum residual consistently exceed 5 meters (0.5 mm at the survey scale) nor did the 95% confidence error circle radius consistently exceed 15 meters (1.5 mm at the survey scale).

I.3 Control Equipment:

Sextants:

Two "Tamaya & Co." Marine Surveying Sextants were used, S/N's T2966 and T3000.

Mini-Ranger:

Falcon 484 by Motorola Inc.
Serial Numbers:

RPU	F-0246	
R/T	F-3409	
R/S:	E-2969	F-3244
	F-3241	F-3297
	E-2907	F-3242
	E-2926	F-3217

GPS:

Both by Magnox: MX 4200D Differential GPS Receiver
S/N 199
MX 50R DGPS Receiver (correctors)
S/N 036

I.4 Calibration descriptions for each of the two positioning systems follow:

Falcon:

As stated in section 3.1.3.3 of the Field Procedures Manual for Hydrographic Surveying, a continuous critical system check is obtained "when data are acquired with three or more LOP's and ECR and maximum residual criteria are being met as required in section 3.1.3.1" (of the same manual). RUDE routinely conducted survey operations using at least three LOP's, and all other positioning criteria were met as required (see section I.2).

A pre-project baseline calibration of the Mini-Ranger system was conducted at the Atlantic Marine Center on March 6, 1991. Two more baseline calibrations were conducted in Bristol, RI on June 2 and July 14, 1991. See the Electronic Control Report submitted under separate cover for the data records of the calibrations.

GPS

As stated in section 6.2 of the Project Instructions (change No. 2 dated 3 September 1991), "Differential GPS ... can be used for this project as the primary positioning system" with the following 1:10,000 scale accuracy requirements:

1. As a DGPS system check, at least one Falcon range is to be recorded twice daily in a static mode, and must agree within 5 meters of the DGPS position.
2. During data acquisition, at least one Falcon range must be recorded and the computed residual must be less than 10 meters.
3. Survey operations may not be conducted when the HDOP exceeds 3.0.
4. Four satellites must be used for the DGPS position computation.

Prior to this, verbal authorization was received permitting the use of DGPS under the above guidelines. This source of position control was first used on DOY 220, August 8, 1991, and then used sporadically throughout the survey as needed. Since this is the first survey conducted using DGPS as the primary positioning system, extreme care was taken by the RUDE to insure the above requirements were met. The following are some points on the acquisition procedures and actual performance of the DGPS system:

1. The HDOP, and the number of satellites visible and tracked was manually recorded at the top of the raw data printout at the start of every survey line. The printout and daily abstract was also annotated to make it clear that GPS was the primary means of position control.
2. Generally, three Falcon ranges were recorded simultaneously with all data acquired when DGPS was the primary positioning system. There were times when only one or two Falcon ranges were recorded for a selected sounding. However, these periods were of a very short duration. The maximum residual of these ranges was recorded on the raw data printout (as well as electronically), and scanned off-line for residuals greater than 10 meters. Normally, the maximum residual was below 5 meters and never consistently exceeded 10 meters, so the 5-meter static agreement check was accomplished during data acquisition.
3. Survey operations were suspended when the HDOP value exceeded 3.0. Generally, whenever this value exceeded 2.5 the position would begin to deteriorate. High HDOP value

was not a significant problem, as the duration was relatively short (several seconds) and the condition would correct itself.

4. Whenever less than four satellites were being tracked by the DGPS unit, the HDOP would normally rise above 3.0, the residuals would climb, and the position would generally degrade. Normally, 5 to 6 satellites were visible and the same number were used in the position solution. Too few satellites never caused a substantial problem.

5. Overall, it was obvious when the DGPS position was in error, because any (usually several) of the following conditions would occur: the position would jump, the HDOP would climb, the residuals would climb, the number of satellites would drop below four, or the DGPS system would switch from "NAV" (navigating) to "TRK" (tracking). However, these conditions were not common, and rarely did a positioning problem with this system cause substantial "downtime". Whenever poor DGPS positioning was persistent, the Falcon system was selected as primary or operations were suspended until the DGPS system was operational.

Also, never did the DGPS system fail and not independently warn the operator that the position was in error or the system was not functioning. The residuals between the Falcon ranges and the DGPS position would rise as well when the DGPS position was bad, but these residuals were not usually the "flag" that DGPS was down.

See SEPARATE III for all positioning calibration data.

Filed with the original field data
I.5 Only the Falcon system required calibration data to be applied to raw ranges. The range corrector and minimum acceptable signal strength (MASS) for each Mini-Ranger Reference Station was entered into the HDAPS system using the Pre-Survey C-0 Table. These tables provided the mechanism by which HDAPS automatically applies the proper range corrector and removes from the position computation those LOP's with signal strengths below MASS.

Overall, calibration data applied to the raw Mini-Ranger ranges was adequate and effective.

I.6 a. See section I.4 for DGPS operating procedures and adequacy standards.

b. There were no occurrences of equipment malfunctions or substandard operation.

c. There were no occurrences of unusual atmospheric conditions that may have affected data quality.

d. There were no occurrences of weak signals or poor

geometric configurations of a duration to significantly compromise data quality.

e. No systematic errors were detected that required adjustments.

f. Antenna positions were corrected for offset and layback, and referenced to the position of the DSF 6000N transducer. These correctors were located in the HDAPS Offset table, and applied on-line to the positioning algorithm. Refer to SEPARATE III* for a copy of offset table 3, which was the only table used during this survey.

g. Offset and layback distances for the A-frame (tow point) were located in the HDAPS Offset table and applied on-line. These offsets, along with the cable length, towfish height, and depth of water, were used by the HDAPS system to compute the position of the towfish. Refer to SEPARATE III* for offset table 3.

** Filed with the original field data.*

J. SHORELINE *See also section 2.6. of the Evaluation Report*

No field sheets encompassed any shoreline.

K. CROSSLINES

K.1 The percentage of mainscheme lines as compared to crosslines is as follows:

AWOIS 7885-this obstruction (PA) saw 200% side scan sonar coverage completed for generally equal proportions of mainscheme and cross lines.

AWOIS 7287-this dumping ground was subjected to echosounder development in a mainscheme direction. Three crosslines were also completed with 850 meter spacing to give a crossline coverage of 9%.

AWOIS 1882-this wreck was found outside the search radius during the second 100% of mainscheme side scan sonar coverage. It was then developed by echosounder with a series of mainscheme lines to delineate the extent of the wreck.

AWOIS 7286-this dumping ground was subjected to echosounder development in a mainscheme direction. Three crosslines were also completed with 500 meter spacing to give a crossline coverage of 11%.

K.2 A general evaluation of crossline/mainscheme agreement was completed. AWOIS 7885 which underwent 200% side scan sonar coverage and therefore exhibited a depth plot with abundant opportunities for comparison was used. Also, the two dumping grounds investigated by echosounder each had three crosslines which permitted comparisons between soundings. Each crossline sounding was compared to mainscheme soundings within a 1 cm radius on a 1:10,000 or 1:5,000 scale depth plot. All crossline soundings agreed with the majority of surrounding mainscheme soundings within 1.0 meter in depth. Allowing for differences in the positions between soundings, the results of these comparisons demonstrate an acceptable level of crossline/mainscheme agreement.

K.3 No significant differences in crossings were noted.

K.4 The same sounding equipment was used to run both the mainscheme and crosslines.

L. JUNCTIONS *See section 5. of the Evaluation Report.*

L.1 This survey does not junction with any current surveys.

M. COMPARISON WITH PRIOR SURVEYS

See also section 6. of the Evaluation Report.

M.1 Applicable prior surveys are:

Hydrographic Survey No. 6444
East of Block Island
Approaches to Narragansett Bay
May - September 1939
Scale 1:40,000

M.2 AWOIS item investigations are discussed in Section "N".

M.3 Soundings from this survey were compared to the above prior survey, and the findings are as follows: no disagreements over 0.5 meters were discovered; in approximately half of the comparisons the soundings and depths agreed within 0.2 meters. The quality of agreement between the soundings from this survey and the depths of chart 13218 was excellent. No significant differences between the soundings and depths were noted.

M.4 No evidence of shoaling, deepening or other topographical bottom trends was noted during this survey. The bottom profile appears to be little changed from what is currently charted.

M.5 This is addressed in Section "~~M~~" since there are no bottom features worthy of further attention, excluding the AWOIS items themselves.

M.6 Other than the AWOIS items discussed in Section "N", there are no features or significant depths from prior surveys that have been disproved and are subsequently recommended for removal from the chart.

M.7 No contemporary non-NOS surveys are known to be available for comparison.

N. COMPARISON WITH THE CHART

See also Section 7. of the Evaluation Report

AWOIS 7287

Sheet 41

N.1 Item Description

The object of this investigation was a discontinued dumping ground one square mile in size.

N.2 Item Location

Geographic position provided was: 41° 21' 14.37" N
71° 21' 03.18" W

N.3 Source of Item

Corp of Engineers Survey Map of Providence River and Harbor.

N.4 Largest Scale Chart Affected

Chart 13218, scale 1:80,000, edition 30 dated July 7, 1990.

N.5 Investigation Procedures

Survey requirements called for full investigation by echosounder to determine a least depth. If an obstruction was found, side scan sonar and diver investigation was to be used to obtain a least depth and description. The search area was in fact investigated by echosounder development in a North-South direction with 85 meter line spacing. This was followed by three East-West lines spaced 850 meters apart.

N.6 Investigation Results

No obstructions were found within the search area (dumping ground). The bottom is relatively flat with depths varying by no more than ~~three~~ ^{two} meters.

N.7 Explanation for Position Difference

No position difference noted.

N.8 Least Depth Information

Not applicable.

N.9 Charting Recommendation

Delete the dumping ground charted in this location and supersede the presently charted depths with the soundings from this survey. *Concur*

N.10 Danger to Navigation Report

This item was not reported as a danger to navigation.

N.11 See section "M" for discussion on comparisons between depths of this survey and prior surveys.

N.12 A comparison of this survey with prior surveys and a discussion of crossline agreement is addressed in sections "M" and "K" respectively. *See section 6. of the Evaluation Report*

N.1 Item Description

The object of this investigation was a sunken crane boom. It is presently charted as an obstruction (PA) reported in 1990.

N.2 Item Location

Geographic position provided was: 41° 21' 13.50" N
71° 21' 51.00" W

N.3 Source of Item

Local Notice to Mariners 14/90

N.4 Largest Scale Chart Affected

Chart 13218, scale 1:80,000, edition 30 dated July 7, 1990.

N.5 Investigation Procedures

Survey requirements called for 200% side scan sonar coverage in conjunction with echosounder development in a 1000 meter radius search area. A diver investigation was also required, if appropriate. Two hundred percent side scan sonar coverage, with 170 meter line spacing, was completed on this item. There was no echosounder development since the item was not found with side scan sonar.

N.6 Investigation Results

This item is a disproval. Nothing resembling a crane boom either in profile or in size was found on either the first 100% or second 100% of side scan sonar coverage. *Concur*

N.7 Explanation for Position Difference

Not applicable.

N.8 Least Depth Information

Not applicable.

N.9 Charting Recommendation

Delete the obstruction PA^(rep 1990) symbol from the chart. *Concur*

N.10 Danger to Navigation Report

This item was not reported as a danger to navigation.

N.11 See section "M" for discussion on comparisons between depths of this survey and prior surveys. *See also section 6. of the Evaluation Report.*

N.12 A comparison of this survey with prior surveys and a discussion of crossline agreement is addressed in sections "M" and "K" respectively.

N.1 Item Description

The object of this investigation was a wreck that was cleared by wire drag to 85 feet. This item is identified as the fishing vessel DORIS. After a wire drag survey in 1964 this item was considered disproved in its then charted position and recommended for removal from the chart. However, the survey did find a wreck more than one mile away. This was considered to be the DORIS and subsequently recommended for charting. Many years later, the submarine L-8 was reported to be in that same position by a local sport diver, Mr. Richard Taracka of Greenwich, CT. He provided Loran rates for the 165 foot long submarine which was sunk in 1926.

N.2 Item Location

Geographic position provided was: 41° 23' 12.97" N
71° 22' 16.78" W

N.3 Source of Item

For the fishing vessel DORIS, Notice to Mariners 29/49. For the submarine L-8, Mr. Richard Taracka, a local sport diver. *For the presently charted position and clearance depth, FE-194WD (1963)*

N.4 Largest Scale Chart Affected

Chart 13218, scale 1:80,000, edition 30 dated July 7, 1990.

N.5 Investigation Procedures

Survey requirements called for 200% side scan sonar coverage in conjunction with echosounder development in a 200 meter radius search area. A diver investigation was also required, if appropriate. Nothing was found after the first 100% of coverage with 170 meter line spacing. The second 100% of coverage was progressing when the survey team realized that while outside the search area and setting up for their next line, that RUDE was very close to the Loran position reported by Mr. Taracka. Because of this, the sensors were activated early in the chance that the object might be found in the previously reported Loran position. This is in fact what happened. Further investigation within the search radius was abandoned. The item was subjected to more side scan sonar passes (50 meter range scale) that day and intensive echosounder development on a subsequent day.

N.6 Investigation Results

A least depth was determined for this item by echosounder.

Least depth information for the item is as follows:

FIX-	24.1 51
LATITUDE-	41° 23' 11. ⁷⁵ 64 " N
LONGITUDE-	71° 22' ^{30.87} 31.35 " W
LEAST DEPTH (MLLW)-	29.8 meters (97.8 feet)

N.7 Explanation for Position Difference

Difference may be explained by a possible unreliable position being originally reported for the wreck and/or the greater accuracy of positioning systems now in use.

N.8 Least Depth Information

See section "N.6".

N.9 Charting Recommendation

Chart a wreck (least depth known by sounding only) ^{with a 29⁸⁴} symbol and (98 foot) depth based on the above survey information. This should supersede the currently charted 85 foot wreck. *Concur Chart as 29.8 WR. See sheet 3 of 3.*

N.10 Danger to Navigation Report

This item was not reported as a danger to navigation.

N.11 See section "M" for discussion on comparisons between depths of this survey and prior surveys.

N.12 A comparison of this survey with prior surveys and a discussion of crossline agreement is addressed in sections "M" and "K" respectively. *See also section 6.6. of the Evaluation Report*

N.1 Item Description

The object of this investigation was a discontinued dumping ground one square mile in size.

N.2 Item Location

Geographic position provided was: 41° 22' 19.37" N
71° 18' 33.17" W

N.3 Source of Item

CL1828/67

N.4 Largest Scale Chart Affected

Chart 13218, scale 1:80,000, edition 30 dated July 7, 1990.

N.5 Investigation Procedures

Survey requirements called for full investigation by echosounder to determine a least depth. If an obstruction was found, side scan sonar and diver investigation was to be used to obtain a least depth and description. The search area was in fact investigated by echosounder development in a North-South direction with 90 meter line spacing. This was followed by three East-West lines spaced 500 meters apart.

N.6 Investigation Results

No obstructions were found within the search area (dumping ground). The bottom is relatively flat with depths varying by no more than two meters. *Concur*

N.7 Explanation for Position Difference

No position difference noted.

N.8 Least Depth Information

Not applicable.

N.9 Charting Recommendation

Delete the dumping ground charted in this location and supersede the presently charted depths with the soundings from this survey. *Concur*

N.10 Danger to Navigation Report

This item was not reported as a danger to navigation.

N.11 See section "M" for discussion on comparisons between depths of this survey and prior surveys. *See also section L. of the Evaluation Report*

N.12 A comparison of this survey with prior surveys and a discussion of crossline agreement is addressed in sections "M" and "K" respectively.

O. ADEQUACY OF SURVEY

O.1 All items have been resolved as described in section "N".

O.2 There are no parts of the survey that are considered incomplete or substandard.

P. AIDS TO NAVIGATION

P.1 The RUDE conducted no correspondence with the U.S. Coast Guard regarding floating aids to navigation.

P.2 No aids to navigation, either floating or fixed, were located within the boundaries of this survey. However, buoy "NB" was established near the survey area while this survey was in progress. Notice to Mariner 51/91 carried the following note regarding the newly established buoy:

Add Buoy "NB" RW, Fl 4s
HORN RACON (-...)
41°23'00" N 71°23'19" W

*(#16246 in the 1992 Light List)
"NAFRAGANSETT Bay
ENTRANCE Lighted Horn
Buoy NB"*

While in the area RUDE got within 20 meters of the buoy and recorded the following detached position for it:

Detached Position: 55¹¹
Latitude: 41°22'59.09' N
Longitude: 71°23'21.85" W
₆

P.3 No other aids were located during the survey.

P.4 No bridges, overhead cables or overhead pipelines not presently charted were located during this survey.

P.5 No submarine cables, pipelines or ferry routes are located within the survey area.

P.6 No ferry terminals are located within the survey area.

Q. STATISTICS

Q.1	a. number of positions	536
	b. lineal nautical miles of sounding lines	
	-nautical miles of survey with the use of the side scan sonar	30.1
	-nautical miles of survey without the use of the side scan sonar	75.2
Q.2	a. square nautical miles of hydrography	N/A
	b. days of production	8
	c. detached positions (For a position on new buoy "NB")	1
	d. bottom samples	0
	e. tide stations	1
	f. current stations	0
	g. velocity casts	2
	h. magnetic stations	0
	i. XBT drops	0

R. MISCELLANEOUS

R.1 There is no other information of scientific or practical value resulting from this survey that has not been covered in previous sections.

R.2 Bottom samples were not required for this project.

S. RECOMMENDATIONS

S.1 No survey inadequacies have been noted.

S.2 RUDE is aware of no construction or dredging that will affect results of this survey.

S.3 There are no recommendations for further investigations of unusual features or sea conditions.

T. REFERRAL TO REPORTS

RUDE Electronic Control Report - 1991 Field Season
(submitted to N/CG244 concurrent with this survey)

Horizontal Control Report - 1991 Field Season
(submitted by N/CG23322)

APPENDIX VII. APPROVAL SHEET

LETTER OF APPROVAL

REGISTRY NO. FE-367SS

Field operations contributing to the accomplishment of this survey were conducted under my supervision with frequent personal checks of progress and adequacy. This report and field sheets have been closely reviewed and are considered complete and adequate for charting.

Nicholas E. Perugini

Nicholas E. Perugini, LCDR NOAA
Commanding Officer
NOAA Ship RUDE

Station No	Type	Lat	Lon	H	Cart	Freq	Vel	Code	MM/DD/YY	
120	F	041:21:39.717	071:28:52.946	20	250	0.0	0	8	09/27/91	P
121	F	041:26:57.711	071:23:57.797	20	250	0.0	0	4	09/27/91	B
122	F	041:27:43.708	071:21:46.539	12	250	0.0	0	6	09/30/91	C
		000:00:00.000	000:00:00.000	0	0	0.0	0		03/01/91	
125	F	041:27:42.566	071:10:22.144	12	250	0.0	0	2	10/21/91	W
		000:00:00.000	000:00:00.000	0	0	0.0	0		03/01/91	
		000:00:00.000	000:00:00.000	0	0	0.0	0		03/01/91	

120 POINT JUDITH LIGHT OFFSET 3 - 1991 FIELD POSITION

121 BEAVERTAIL LIGHT OFFSET - 1991 FIELD POSITION

122 CASTLE HILL LIGHT OFFSET - 1991 FIELD POSITION

125 WARREN OFFSET - 1991 FIELD POSITION



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: March 14, 1992

MARINE CENTER: Atlantic

OPR: B660-RU-91

HYDROGRAPHIC SHEET: FE-367SS

LOCALITY: Rhode Island, Rhode Island Sound, Approach to
Narragansett Bay

TIME PERIOD: October 9 - November 5, 1991

TIDE STATION USED: 845-2660 Newport, Rhode Island
Lat. $41^{\circ} 30.3'N$ Lon. $71^{\circ} 19.6'W$

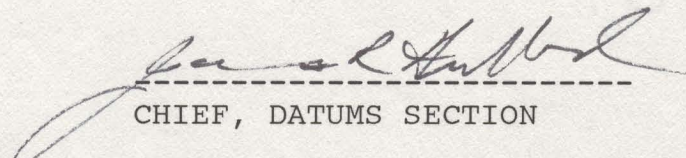
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 1.67 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.7 ft.

REMARKS: RECOMMENDED ZONING

Apply a -6 minute time correction and a x0.85 height ratio to
Newport, Rhode Island (845-2660).

Note: Times are tabulated in Eastern Standard Time.


CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

Name on Survey	Source of Name											
	A	B	C	D	E	F	G	H	K			
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND McNALLY ATLAS	U.S. LIGHT LIST				
NARRAGANSETT BAY (title)												1
RHODE ISLAND (title)												2
RHODE ISLAND SOUND (title)												3
												4
												5
												6
												7
												8
												9
												10
												11
												12
												13
												14
												15
												16
												17
												18
												19
												20
												21
												22
												23
												24
												25

Approved:

Charles E. Harrington
Chief Geographer - N/CG2x5

APR 26 1993

06/17/93

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: FE-367SS

NUMBER OF CONTROL STATIONS	4
NUMBER OF POSITIONS	522
NUMBER OF SOUNDINGS	2208

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	54	03/17/92
VERIFICATION OF FIELD DATA	42	04/27/92
ELECTRONIC DATA PROCESSING	19	
QUALITY CONTROL CHECKS	49	
EVALUATION AND ANALYSIS	31	04/30/93
FINAL INSPECTION	16	06/16/93
TOTAL TIME	211	
ATLANTIC HYDROGRAPHIC SECTION APPROVAL		06/16/93

REFERENCE NO.

N/CG244-72-93

LETTER TRANSMITTING DATA

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

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

TO:

NOAA/National Ocean Service
 Chief, Data Control Branch
 N/CG243, Station 6813, SSMC3
 1315 East-West Highway
 Silver Spring, MD 20910

DATE FORWARDED

17 June 1993

NUMBER OF PACKAGES

1 Box

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-367SS

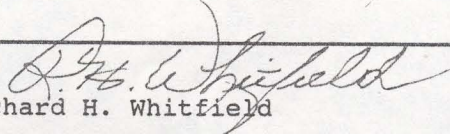
Rhode Island, Rhode Island Sound, Approach to Narragansett Bay

1 Box containing:

- ~~1~~ Envelope with the Original Descriptive Report with 3 page size plots (smooth sheets) for FE-367SS
- ~~1~~ Cahier with Sounding, Position Printouts and Control File
- ~~1~~ Envelope containing Appendices and Separates removed from the original Descriptive Report
- ~~2~~ Envelope containing original position overlays and sounding excess levels
- ~~1~~ Envelope containing sounding correctors
- ~~1~~ Envelope containing data abstracts
- ~~1~~ Accordion File with fathograms, side scan sonargrams and field printouts for: sheet 41 JD's 294, 295, 297, 298, and 308
sheet 42 JD's 294
sheet 43 JD's 282

FROM: (Signature)

Richard H. Whitfield

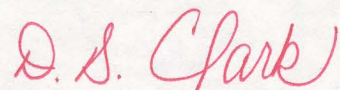


RECEIVED THE ABOVE

(Name, Division, Date)

Return received copy to:

Atlantic Hydrographic Section, N/CG244
 439 W. York Street
 Norfolk, VA 23510-1114



JUN 21 1993

COAST AND GEODETIC SURVEY
ATLANTIC HYDROGRAPHIC SECTION
EVALUATION REPORT

SURVEY NO.: FE-367SS

FIELD NO.: RU-20-1-91

Rhode Island, Rhode Island Sound, Approach to Narragansett Bay

SURVEYED: October 9 through November 5, 1991

SCALE: 1:20,000

PROJECT NO.: OPR-B660-RU-91

SOUNDINGS: EG&G Model 260 Side Scan Sonar and RAYTHEON DSF
6000N Fathometer

CONTROL: MOTOROLA Falcon 484 Mini-Ranger (Range/Range), and
MAGNAVOX MX4200D Satellite Receiver/MAGNAVOX MX50R
Beacon Receiver (Differential Global Positioning
System)

Chief of Party.....N. E. Perugini

Surveyed by.....P. L. Schattgen
.....M. J. Oberlies
.....J. A. Illg
.....D. E. Williams

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

1. INTRODUCTION

a. This is primarily a side scan sonar survey. A RAYTHEON DSF-6000N fathometer was operated concurrently with the side scan sonar. The hydrography acquired by this survey is considered suitable for charting. A fathometer development was conducted to search for the only significant feature found on the sonargrams. The fathometer data was used in positioning and in determining the least depth of the feature.

b. Three 1:20,000 scale page size smooth plots with accompanying overlays were generated during office processing. These plots are considered the smooth sheets for this survey. The accompanying position overlays and excess sounding overlays are filed with the original field records.

c. Corrections and notes made by the evaluator in the Descriptive Report are in red ink.

2. CONTROL AND SHORELINE

a. Control is adequately discussed in Section H. and I. of the Descriptive Report.

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83). Office processing of this survey is based on these values. The smooth sheet has been annotated with ticks showing the computed mean shift between the North American Datum of 1983 (NAD83) and the North American Datum of 1927 (NAD27).

To place the smooth plots on the NAD27 move the projection lines 0.374 seconds (11.54 meters or 0.58 mm at the scale of the survey) north in latitude and 1.824 seconds (42.39 meters or 2.12 mm at the scale of the survey) east in longitude.

All geographic positions listed in this report are on NAD 83 unless otherwise specified.

b. There is no shoreline within the limits of the smooth plots for this survey.

3. HYDROGRAPHY

a. Where crossings occur in the areas investigated, there is adequate agreement.

b. No standard depth curves were drawn on the smooth sheets. Brown curves have been drawn in the investigated area of AWOIS item #7286 to better delineate bottom relief.

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

4. CONDITION OF SURVEY

The smooth plots and accompanying overlays, survey records, and reports adequately conform to the requirements of the HYDROGRAPHIC MANUAL, the FIELD PROCEDURES MANUAL, and the SIDE SCAN SONAR MANUAL.

5. JUNCTIONS

There are no junctional requirements for this survey. Present survey depths are in harmony with the charted hydrography. There is good harmony between the present survey depths and the contemporary hydrography shown on H-10404 (1991).

6. COMPARISON WITH PRIOR SURVEYS

a. Hydrographic Surveys

H-6444 (1939) 1:40,000

Prior survey H-6444 (1939) covers the present survey in its entirety. The prior hydrography within the common area generally agrees within 2 feet (0⁶m) with the present hydrography. The prior hydrography is consistently shoaler where differences exist. The differences are attributed to a far more detailed and sophisticated present survey. The present survey is adequate to supersede this prior survey within the common area. No additional field work is recommended.

It should be noted that a charted 92-ft sounding (28 m) originating with prior survey H-6444 (1939) in Latitude 41°23'17"N, Longitude 71°22'03"W (NAD27) is shoaler than adjacent prior survey soundings by 11 to 12 feet (3⁴ to 3⁷m). This sounding is slightly outside the investigated area of AWOIS #1882 (sheet 3 of 3) and was not investigated. If an opportunity exists, it would be advantageous to investigate this prior sounding.

The present survey is adequate to supersede the prior survey in the common areas.

b. Wire Drag Surveys

H-4005WD (1917) 1:40,000

H-4006WD (1917) 1:20,000

H-7029WD (1948) 1:20,000

FE-194 (1963) 1:20,000, 1:40,000, and 1:80,000

1) Prior survey H-4005WD (1917) is common to the present survey in the areas of AWOIS items #7287 and #7885 (sheet 2 of 3) and AWOIS item #7286 (sheet 1 of 3). No hangs or groundings are within the common areas. No conflicts exist between the present survey and the prior survey effective depths.

2) Prior survey H-4006WD (1917) is common to the present survey in the area of AWOIS item #1882 (sheet 3 of 3). No hangs or groundings are within the common areas. No conflicts exist between the present survey and the prior survey effective depths.

3) Prior survey H-7029WD (1948) is common to the

present survey in the areas of AWOIS Item #1882 (sheet 3 of 3) and AWOIS item #7286 (sheet 1 of 3). No hangs or groundings are within the common areas. No conflicts exist between the present survey and the prior survey effective depths.

4) Prior survey FE-194WD (1963) is common to the present survey in the areas of AWOIS item #1882 (sheet 3 of 3) and AWOIS item #7885 (sheet 2 of 3). Comparison with the prior survey shows one hang that falls within the survey limits of sheet 3 of 3. This hang is AWOIS item #1882. An adequate discussion and charting recommendation for AWOIS item #1882 is in section N., pages 21 and 22, of the Descriptive Report. No other hangs or groundings are within the common areas. No other conflicts exist between the present survey and the prior survey effective depths.

It should be noted that a dive investigation was not conducted on AWOIS item #1882, thus the identity of the wreck has not been confirmed. The length of the wreck, approximately 54 meters (177 ft), was obtained from the side scan sonargrams. It appears most likely that this is the wreck of the submarine "L-8".

7. COMPARISON WITH CHART 13218 (30th Edition, July 7, 1990)

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys and requires no further consideration. Charting recommendations concerning AWOIS items #1882, #7286, #7287 and #7885 are adequately discussed in section N. of the Descriptive Report.

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

b. Aids to Navigation

There are no fixed aids to navigation within the limits of this survey. One floating aid to navigation (*Narragansett Bay Entrance Lighted Horn Buoy NB*) was located by the hydrographer. This floating aid was established while the present survey was being conducted. This new aid to navigation is charted on the 31st Edition of Chart 13218 and is listed in the 1992 Edition of the Light List. This aid to navigation, shown on the present survey appears adequate to serve its intended purpose. See sheet 3 of 3.

8. COMPLIANCE WITH INSTRUCTIONS

This survey adequately complies with the Project Instructions.

9. ADDITIONAL FIELD WORK

This is an adequate side scan sonar survey. Additional field work is not recommended.

Frank L. Saunders
Frank L. Saunders
Cartographic Technician
Verification of Field Data

Maurice B. Hickson, III
Maurice B. Hickson, III
Cartographer
Evaluation and Analysis

APPROVAL SHEET
FE-367SS

Initial Approvals:

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

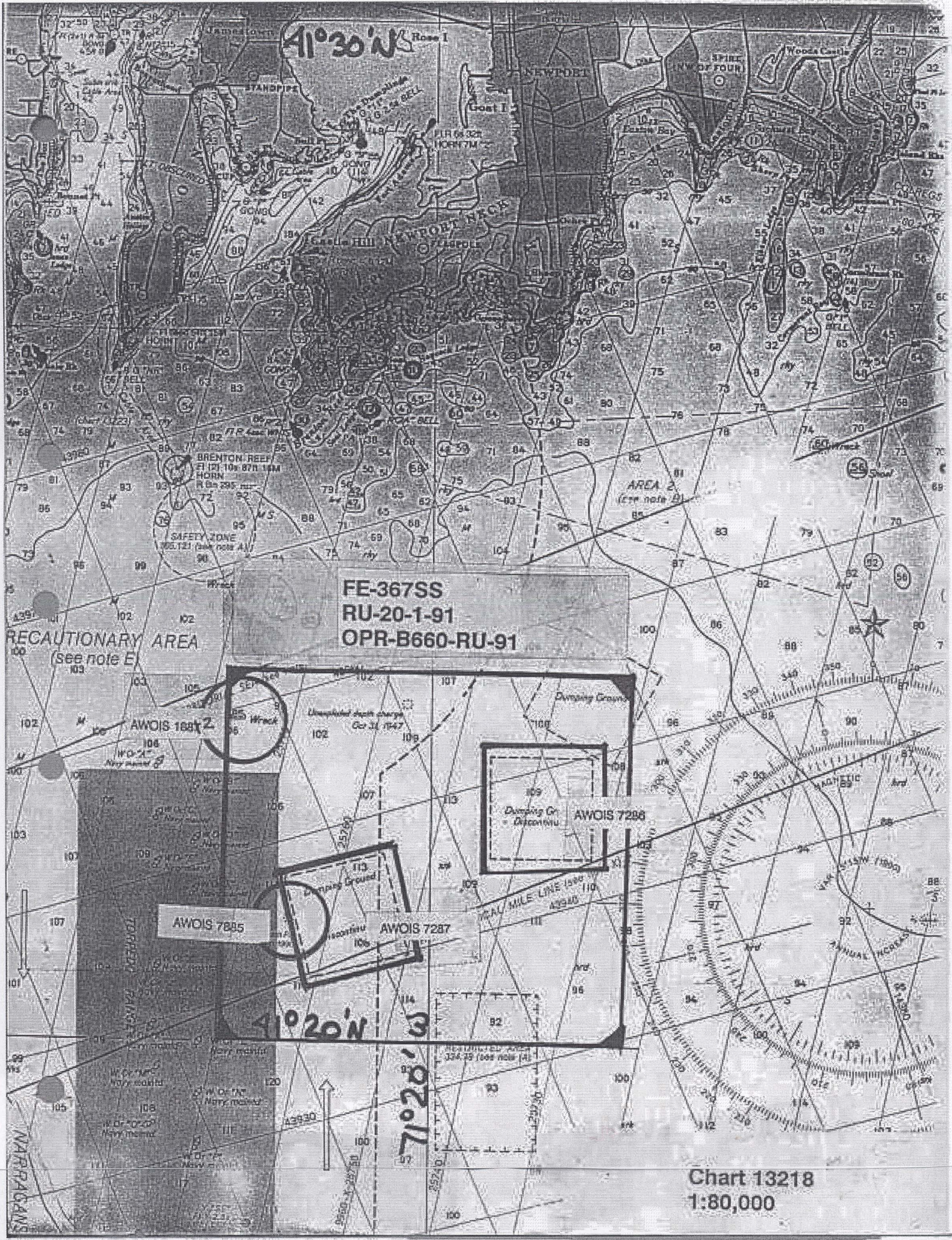
Richard H. Whitfield Date: JUNE 16, 1993
Richard H. Whitfield
Cartographer, Atlantic Hydrographic Section

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Nicholas E. Perugini Date: JUNE 16, 1993
Nicholas E. Perugini, LCDR, NOAA
Chief, Atlantic Hydrographic Section

Final Approval:

Approved: J. Austin Yeager Date: 7/18/94
J. Austin Yeager
Rear Admiral, NOAA
Director, Coast and Geodetic Survey



41°30'N

CAUTIONARY AREA
(see note E)

FE-367SS
RU-20-1-91
OPR-B660-RU-91

AWOIS 1882

AWOIS 7885

AWOIS 7287

AWOIS 7288

41°20'N

71°20'W

Chart 13218
1:80,000

DEPARTMENT OF COMMERCE
 Environmental Science Services Administration
 U.S. Coast and Geodetic Survey
 Washington, D.C.

Hydrographic Index No. 62 Q

