

# FE269

## WIRE DRAG

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 ..Wire Drag.....

Field No. .... R/H-20-19-84 .....

Registry No. ...FE-269WD.....

#### LOCALITY

State ..... Rhode Island .....

General Locality Rhode Island Sound .....

Sublocality ..... South of Point Judith .....

19 84

CHIEF OF PARTY  
LCDR R.K. Norris

#### LIBRARY & ARCHIVES

DATE ..... October 25, 1989 .....

☆U.S. GOV. PRINTING OFFICE: 1985-566-054

**FE269**  
**WIRE DRAG**

GP

CRS

13218

13015 app'd thru NM 190 5/22/90 EB

12300

13205

13003 NR  
13006 NR

**HYDROGRAPHIC TITLE SHEET**

FE-269 WD ✓

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.

R/H 20-19-84 ✓

State RHODE ISLAND ✓

General locality ~~SOUTHERN NEW ENGLAND COAST~~ RHODE ISLAND SOUND ✓

Locality ~~NORTHVILLE CORRIDOR, POINT 2 TO 071-30'W~~ SOUTH OF POINT JUDITH ✓

Scale 1:20,000

✓ Date of survey 4 JULY 84-7 SEPT 84 ✓

Instructions dated APRIL 12, 1984

✓ Project No. OPR-B660-Ru/He-84 ✓

Vessel NOAA SHIPS RUDE(9040) & HECK(9140) ✓

Chief of party LCDR ROBERT K. NORRIS COMDG. ✓

Surveyed by R.K. NORRIS, N.G. MILLETT ✓

Soundings taken by echo sounder, <sup>wire drag, & side scan sonar</sup> ~~hand lead, pole~~ SONAR S/N's 088,249 FATHO S/N's A116N, B051N ✓

Graphic record scaled by T.G.C., E.M.C., W.J.A. ✓

Graphic record checked by R.K.N., N.G.M., T.G.C., E.M.C., W.J.A. ✓

Protracted by Ship's Personnel ✓ Automated plot by Xynetics 1201 Plotter ✓

Limited Verification by Evaluation and Analysis Group, Atlantic Hydrographic Section ✓

Soundings in fathoms feet at MLW ~~MLLW - PREDICTED TIDES~~ ✓

REMARKS: All times are recorded in UTC.

*AWOIS / SURF MSM 10/31/89*

*Scanned 7/16/97 JEF*

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\* = Data removed from the Descriptive Report and filed with the field records.

DESCRIPTIVE REPORT TO ACCOMPANY  
HYDROGRAPHIC SURVEY  
FE-269WD (FIELD NO. R/H 20-19-84)  
SCALE 1:20,000 ✓  
1984 ✓  
NOAA SHIPS RUDE AND HECK  
LCDR. ROBERT K. NORRIS COMDG.

A. Project Authority

This project was conducted in accordance with Hydrographic Project Instructions OPR-B660-RU/HE-84, Southern New England Coast, dated April 12, 1984. There were two amendments to the project instructions, change No. 1, dated 21 May, 1984 and change No. 2, dated 30 November, 1984. The purpose of this project, in order of priority, was to provide side scan sonar and wire-drag clearance of the Northville Industries Corporation oil tanker route, to provide clearance depths over selected wreck sites and to verify or disprove certain submerged wrecks along the south coast of New England. ✓

B. Characteristics and Limits of Survey

This report contains that area of the one mile wide tanker route that junctions with R/H 20-20-84 at Corridor Point 2, latitude 41-16-11 N, longitude 071-21-35 W, to the junction with R/H 20-18-84 at longitude 071-30-00 W. The survey consisted of an initial side scan sonar investigation with 100% sonar coverage of the corridor, utilizing 150 meter track spacing operating the sonar recorder at the 200 meter range scale. The report also includes ship wire drag operations for wire drag Area 1, south of Point Judith, at approximate latitude 41-17-00 N, longitude 071-27-00 W. This wire drag section includes the area bounded by the charted 90-foot depth curve to a northern limit of latitude 41-17-45 N, and to the charted cable as the eastern limit. ✓

C. Survey Vessels

All operations on this survey were conducted by the NOAA Ships RUDE, Vesno 9040, and HECK, Vesno 9140. ✓

D. Hydrographic Sheets (*Field Sheets*)

The hydrographic sheets used in this survey were made of mylar and were constructed with the Digital PDP 11/34 computer and the Houston Instruments roll-bed plotter aboard the Ship RUDE. ✓

The field sheets R/H 20-19-84 were plotted at a scale of 1:20,000 and were used to hand plot the towing vessel's position while on line for ship drag and side scan sonar operations. A smooth sheet was also plotted aboard the RUDE using the same equipment as described above. This smooth sheet was used to ✓

machine plot the towing vessel's position during the side scan sonar operations. The positions of the side scan sonar contacts were hand plotted on the smooth sheet. The dashed line on the smooth sheet indicates an area of boulder and rock concentration. ✓

The drag strips for JDs 212, 215, 216, 219, 222, 229, 249, and 251 of 1984 are plotted on a scale of 1:20,000. The drag strips were overlaid and hand plotted to produce the Area and Depth (A & D) sheet R/H 20-19-84. <sup>(FE-269WD)</sup> The A & D sheet R/H 20-19-84 <sup>(FE-269WD)</sup> was plotted at a scale of 1:20,000 and contains all the ship drag clearance of the Area 1 for 1984, and the detached positions of the wire drag hangs. The depths on the A & D sheet represent the maximum cleared depths for wire drag conducted in opposing directions. All drag strips need to be reviewed for the minimum clearance data to be applied to the final A & D sheet. ✓

## E. Equipment and Techniques

### (1) Survey Operations

The ship drag work was performed using standard wire drag equipment and techniques. The drags were tested often from the ships' Sisu launches. ✓

All side scan sonar coverage was accomplished with the Klein side scan sonar systems. Two Klein systems were provided for this survey by the Atlantic Marine Center. Each system consisted of a Model 521 recorder, serial number (S/N) 088 issued to the RUDE, and S/N 249 on the HECK, a 100 KHz towfish, a K-Wing depressor and a towcable. ✓

The two recorders have initial and maximum gain controls with numerical settings. This allowed for annotation of the sonargrams with a value for the initial and maximum gain settings at the start of the day and annotation of any changes in the settings that occurred during the day. ✓

One hundred per cent (100%) side scan sonar coverage was required for this section of the corridor. The recorders were operated on the 200 meter scale for 150 meters track spacing, to accomplish this requirement. *See section 1.b. of the Addendum to the Descriptive Report.* ✓

Del Norte rates obtained on fixes were recorded with the Eaton Model 7000+ serial printers during this survey. These printers worked fairly well considering the fact that they were not designed to be operated in a marine environment. The printers would often print out a line of meaningless characters or rates from the previous fix before the current fix was recorded. The printer records were annotated such that these meaningless characters and extraneous rates were lined out leaving the correct fix rates clearly displayed. ✓

Two Raytheon model DSF 6000N echo sounders, S/N B051N onboard the Ship RUDE and S/N A116N installed on the Ship HECK, were operated and annotated during all wire drag and side scan sonar operations in 1984. The gain control settings for the high and low frequencies were set on "MANUAL" during all operations. This procedure eliminated any rebounding of the high frequency from small objects and fish in the water column. It is recommended that the gain controls of this echo sounding system be manually tuned and operated at a paper speed of 30mm/min, ✓

during operations in water shoaler than 100 feet, for optimum results. - Do not concur - Manual tuning of the echo sounder may adversely affect accuracy. ✓

Although it is not anticipated that these sounding records will be used for charting purposes, the settlement and squat data for the RUDE and HECK, obtained in Norfolk Harbor on 25 January, 1983, is included in this report. No velocity corrections or settlement and squat determinations were actually conducted within or during this project. The draft of the transducers on both vessels is 7.0 feet. ✓

## (2) Diving Operations

A total of six (6) dives were conducted on three (3) wire drag hangs in Area 1. The hangs were encountered on JDs 215, 219 and 222. All of the hangs were on large rocks or boulders in Area 1. The obstructions were located, on an initial dive, by the divers descending the closest upright to the obstruction and proceeding along the ground wire to the obstruction. The obstructions were marked with a buoyed float line. The divers on a second dive acquired ~~three~~<sup>the</sup> least depth and maximum depth pneumofathometer readings on the obstructions. ✓

The obstruction located on JD 215 was the largest of the boulders which were located during this survey and has a least depth corrected for ~~predicted~~<sup>smooth</sup> tides of 61.0 feet MLLW. The position of the obstruction is latitude 41-17-39.27 N, longitude 071-27-09.36 W. The hang was between buoys 1 and 2. The divers descended on the upright of buoy 2 to the ground wire. The divers swam along the ground wire to the obstruction on a compass bearing of 048 degrees true for a distance of 275 feet. This boulder measured 47 feet at the base and was slightly greater in circumference about 1.8 feet off the bottom. The boulder had a measured height of 10.5 feet. A marker buoy line was secured to the base of the boulder and the divers ascended to the launch. The least and maximum depth reading were obtained by the divers on the second dive using the pneumofathometer. A pneumofathometer corrector of +1.0 feet and a ~~predicted~~<sup>smooth</sup> tide corrector of -3.5<sup>2</sup> feet were applied to the least depth reading for a corrected least depth of 61.0<sup>6</sup> feet MLLW. <sup>62 feet plotted</sup> The boulder was the only significant feature noted by the divers with a topographic relief greater than 10% of the depth. The visibility on the bottom during this dive was excellent up to 50 feet horizontally and vertically. ✓

On JD 219 the second obstruction was hung at the position latitude 41-17-48.27 N, longitude 071-28-42.19 W. The hang occurred between buoys 6 and 7, and has a least depth corrected for ~~predicted~~<sup>smooth</sup> tides of 68.9 feet MLLW. The divers followed the same procedure as above locating a tabular rock approximately 3 feet by 5 feet, and 55 feet from the upright on buoy 6. The least and maximum depth readings were acquired on the second dive with the pneumofathometer. With a pneumofathometer corrector of +1.5 feet and a tide corrector of -2.0<sup>8</sup> feet applied to the readings, the least depth corrected for ~~predicted~~<sup>smooth</sup> tides was 66.9 feet at MLLW. The visibility on these dives was excellent, providing clear visibility for 40-50 feet horizontally and vertically. ✓

The final set of dives for this survey were conducted on JD 222. At the detached position latitude 41-17-38.11<sup>94</sup> N, longitude 071-28-31.43<sup>96</sup> W the divers located another tabular rock 3.5 feet long. This hang was between buoys 6 and 7 at a distance of 80 feet on the ground wire from buoy 6. The position was marked with the buoyed marker line after the least and maximum depth readings were recorded and a least depth corrected for predicted tides was 71.0 feet at MLW. See also the Journal for JD 222. *see also the Addendum*

Detailed drawings, item investigation sheets, and dive logs for these obstructions can be found in Appendix F.

#### F. Control Stations

Two electronic control stations were used for this section of the survey. The stations were:

Station Name	Position	Elev.
BLOCK ISLAND NORTH LIGHTHOUSE (1874)	41-13-39.081N 071-34-34.864W	17.68m
POINT JUDITH LIGHTHOUSE (1839)	41-21-39.323N 071-28-54.826W	19.81m

All stations were located by NGS and the adjusted positions for these stations were obtained from published NGS horizontal control data. All stations are of Third-order, Class I control accuracy or better. The station positions are based on the North American Datum of 1927.

#### G. Calibration and Position Control

Vessel positioning for all work was accomplished with the Del Norte 520 series electronic positioning equipment operated at a frequency of 9400 MHz in the range-range mode. A listing of DMU and master units used by the vessels during this survey are listed by Julian day in Appendix A. Remote unit, serial number 2986 was installed at BLOCK ISLAND NORTH LIGHTHOUSE (1874), station 01 and was coded 78 for JDs 186 thru 229 when the code was changed to 88. Code 74, serial number 3003, was installed at POINT JUDITH LIGHTHOUSE, (1839), station 02 for JDs 186 thru 193. Remote unit, serial number 3004, was also installed at Station 02, POINT JUDITH LIGHTHOUSE, (1839), as code 76 for JDs 194 thru 229 when the code was changed to 86.

The changes in coding for these remote units was due to other users operating Del Norte 520 equipment with similar coding concurrently during this survey.

A total of six (6) baseline calibrations were performed during this survey. Baseline calibration distances were determined by the HP 3800A electronic distance measuring instrument, serial number 0987A00157. The following is a list of the baseline calibrations, as measured by the HP 3800A:

09 June, 1984	Belle Terre Beach to	2601.1m
JD 161	Port Jefferson W. Jetty Lt.	

*Note: Calibrations were not verified during this limited processing.*

16 June, 1984 JD 168	Belle Terre Beach to Port Jefferson W. Jetty Lt.	2601.1m	
23 June, 1984 JD 175	Belle Terre Beach to Port Jefferson W. Jetty Lt.	2601.1m	
21 July, 1984 JD 203	Newport Naval Pier 2 to Gould Island, S.E. Pier	1933.2m	✓
31 August, 1984 JD 244	Newport Naval Pier 2 to Gould Island, S.E. Pier	1933.2m	
28 September, 1984 JD 272	Newport Naval Pier 2 to Gould Island, S.E. Pier	1933.2m	

Daily calibrations were conducted in the vicinity of the entrance to Narragansett Bay using either three point sextant fixes or circle calibrations about BRENTON REEF LIGHT, (1962). The three point sextant fix method was only used when fog, haze and drizzle attenuated the signal from BLOCK ISLAND LIGHTHOUSE and did not allow this signal to be received at BRENTON REEF LIGHT. These calibration correctors and the circle calibration data were computed using a HP 9815A computer, S/N 1825A02388, and the Hydro Cal Package-800730 and Geodetic Package-800610.

The visual control utilized for three point sextant fix calibrations were:

ID #	Station Name	Position
25	POINT JUDITH LIGHTHOUSE ✓ (1839) ✓	41-21-39.323 N ✓ 071-28-54.826 W ✓
28	BLOCK ISLAND NORTH LIGHTHOUSE ✓ (1874) ✓	41-13-39.081 N ✓ 071-34-34.864 W ✓
29	POINT JUDITH TANK ✓ (1940) ✓	41-23-23.534 N ✓ 071-29-01.461 W ✓
30	HAZARD TOWER ✓ (1912) ✓	41-24-55.201 N ✓ 071-27-26.972 W ✓
31	BRENTON REEF LIGHT ✓ (1962) ✓	41-25-35.071 N ✓ 071-23-21.970 W ✓
32	BEAVERTAIL LIGHTHOUSE ✓ (1869) ✓	41-26-57.348 N ✓ 071-23-59.693 W ✓

On JD 192 a visual systems check calibration was conducted using number 25 as left object, 30 center, 32 right and 31 as right check. The weather on JD 193 attenuated the R2 signal from BLOCK ISLAND NORTH LIGHTHOUSE on both the opening and closing calibrations resulting in rejection of all data collected on this julian day. The RUDE was unable to open calibrate on JD 199. On JD 200 the Rude used number 25 as left, 30 center and 31 for

right object in their three point sextant fix and the HECK used 29 for left, 30 as center, 32 right and 31 for a right check object in the systems check calibration. The HECK was required to open calibrate using number 25 for left object, 30 at center, 31 right and 32 for right check object on JD 201. JD 206 was the last day requiring visual calibration the left being 25, center 30, right 31 and right check was 32.

All daily calibrations correctors were within accuracy tolerances for a survey of this scale. Therefore only the baseline calibration data should be applied to the raw position data during final processing. See Appendix A. for baseline calibration data.

The pneumofathometer was calibrated on 18 June, 1984, JD 170, off MT. Misery Shoal and north of the Port Jefferson East Jetty prior to commencing diving operations on this survey. An additional calibration was performed on 30 August, 1984, JD 243, 2.5 NM NW of Block Island. All depths determined by this survey have been corrected for instrument error determined in Appendix E.

#### H. Dates of Survey

The survey began on 04 July, 1984 (JD 186) and was completed on 07 September, 1984 (JD 251).

#### I. Reduction and Processing of Data

Data collected during ship drag operations was manually entered in the wire drag volumes while on line. The position data was also entered in the Digital PDP 11/34 computer while on line. The programs used were the R/H Double Precision Wire Drag programs. The drag strips were then smooth plotted with the Houston Instruments roll-bed plotter. Effective depths from the reduced data were then drawn on the drag strips in colored pencil, each strip being done in the same color. Each day's strips were applied to the A&D sheet of the area in that day's color.

Test data was applied to the drags in a manner which differs slightly from the Wire-Drag Manual. This method has been used aboard the drag boats for the past several years and is a more conservative method. If the amount of lift increased during a drag when uprights remained unchanged, this decreased drag depth was applied back to a time halfway between the time of the earlier test with less lift and time of the later test with the greater lift.

Predicted tide correctors were then applied to the drag depths obtained. These predicted tide correctors were generated onboard with the ship's Digital PDP 11/34 computer and predicted tide tapes for 1984. These tide tapes were supplied to the ships by MOA 231. Hardcopy printouts of the predicted tide correctors used during this survey are included in the data file.

The changes in effective depth that occurred during a drag were applied at the exact time of change. Fix interval for the drag work was five minutes, therefore some changes in effective depth occurred between fixes. When this occurred the

*In the verified drags, lift was computed and applied in accordance with the Wire Drag Manual.*

*Smooth tides were applied to the verified strips*

*Strip subdivision was accomplished in accordance with the Wire Drag Manual for the strips that were verified.*

time was interpolated and drawn in appropriately.

All side scan sonar data was initially recorded in NOAA Form 77-44, Sounding Volumes. All header data, position numbers, time, and position control data were recorded in the appropriate columns in the volumes. The remarks column was used to record all line information, vessel rpms, length of towcable (measured from the waterline to the towfish), vessel heading, and any other unusual or noteworthy remarks. The towfish layback was computed by adding the length of towcable out the stern plus the stern to antenna distance. ✓

The computation of the towfish layback is not an exact determination of the layback but is an adequate method of plotting contacts. It is realized that there are two minor errors in using the length of towcable out the stern as a measurement. First the towfish is not directly astern of the towing vessel. Secondly, the actual horizontal component is less than the entire length of towcable deployed due to the depressing effect of the K-Wing on the towfish. This amount of error is insignificant when plotted at a scale of 1:20,000. There was good agreement between the plots of the same contact as observed on adjacent lines run in opposite directions. ✓

Position data from the side scan sonar was entered in the Digital PDP 11/34 computer with a modified version of the R/H Double Precision Wire-Drag program. Rates for just one vessel were entered in this program and a single vessel position plot was generated with the Houston Instruments roll-bed plotter. ✓

Side scan sonar coverage was computed and listed on the Side Scan Sonar Coverage Abstract. The required 100% side scan sonar coverage was obtained throughout the entire corridor. ✓

The sonargrams from the side scan sonar work were examined while on line and then again at the end of the day. All notable contacts were flagged during each examination. These flagged contacts were then logged in the Side Scan Sonar Target Abstract for the field sheet. The Target Abstract was then completed and the contacts were plotted on the smooth field sheet containing the vessel position plots. The towfish layback was computed by adding the length of towcable out plus the stern to antenna distance (17.7m). The layback and range to target values from this abstract were the distances used to plot the contact positions. All values of towcable length on the sonargrams and in the sounding volumes refer only to the amount of cable from the waterline to the towfish. The Side Scan Sonar Target Lists were then compiled from the Target Abstracts and from the contact plots. The Del Norte rates of the contact positions were determined using a grid and arc overlay. These rates were then used to determine the latitude and longitude of the contact with the HP 9815 computer and the Geodetic Package program. ✓

#### J. Junctions and Splits

Field sheet R/H 20-19-84, which contains the wire drag work and side scan sonar operations for 1984, junctions with field sheet R/H 20-20-84 to the south of Corridor Point 2, at latitude 41-16-11 N, longitude 071-21-35 W. The west boundary of the tanker corridor covered by field sheet R/H 20-19-84 ✓

FE-265WD

FE-269WD

FE-270WD  
junctions with R/H 20-18-84 at longitude 071-27-00 W. There is adequate overlap with these contemporary surveys.

Side scan sonar coverage was computed and listed on the Side Scan Sonar Coverage Abstract Form, see Appendix L. A well established thermocline was observed in portions of Rhode Island Sound during this survey. This well established thermocline reduced the effective scanning range below the 200m range scale being used over portions of the eastern section of the survey area. In order to determine the actual effective scanning range, two separate sonar coverage abstract computations were conducted. The first abstract was computed assuming no thermocline effect and the theoretical coverage for those areas where no thermocline was observed. The second abstract was then computed for the thermocline influence. One split was required in order to completely satisfy the 100% coverage requirement. The split was conducted on JD 206; fixes 686-711. All areas of the corridor between point 2 and longitude 071-30-00 W received 100% side scan sonar coverage between adjacent search tracks. *See the Addendum to the Descriptive Report.*

#### K. Comparison with Prior Survey

FE-269WD  
The side scan sonar and wire drag operations for field sheet R/H 20-19-84 were compared with prior surveys H-6444 (1939) and H-6443 (1939), which are plotted at a scale of 1:40,000. The prior surveys were used to determine the reduced depth over the side scan sonar contacts and are documented in the Side Scan Sonar Target List. The height of the target was subtracted from the prior survey depth at the target location to determine the least depth over the target.

The side scan sonar contacts observed for the tanker corridor had heights that were less than 10% of the recorded prior depths. The shoalest reduced depth was 76.0 feet for contact 54, located at the position latitude 41-17-08.55 N, longitude 071-26-44.0 W. This contact was subsequently cleared by wire drag in the opposite direction to an effective depth of 69.0 feet on JDs 212 and 229.

The comparison of wire drag operations for Area 1 to the prior survey only indicates discrepancies at two hang positions. The boulder located at position latitude 41-17-39.27 N, longitude 071-27-09.36 W has a least depth of 61.0 feet corrected for predicted tides where the shoalest adjacent prior recorded depth was 69 feet. The second hang at position 41-17-48.27 N, longitude 071-28-42.19 W was a tabular rock having a least depth, corrected for predicted tides, of 68.9 feet where the prior survey indicated an adjacent sounding of 76 feet.

FE-241WD  
The Descriptive Report for OPR-B660-RU/HE-82 was reviewed in connection with a temporary hang experienced on JD 249 during wire drag operations in Area 1 for OPR-B660-RU/HE-84. The temporary hang was consistent with the boulder surveyed in 1982 at position latitude 41-17-45.094 N and longitude 071 27-50.306 W with a reduced least depth of 52.0 feet in 67.0 feet of water.

#### L. Comparison with the Charts — *See the Addendum to the Descriptive Report*

A comparison was made with NOS chart 13218, 26th Ed.,

Jan. 8/83, 1:80,000 scale, which is the largest scale chart of the survey area. The soundings that appear on the chart within the survey area are from prior surveys H-6444 (1939) and H-6443 (1939). A comparison was made with this prior survey in the previous section of the report. ✓

There was good agreement between the charted depths and the depths observed during the side scan sonar and wire drag operations. ✓

Review of the Descriptive Report for OPR-B660-RU/HE-82 (FE-241WD) indicate two boulders, for which the RUDE and HECK established a reduced least depth in 1982. The boulders are currently charted with symbol 4, Submerged rocks (depth unknown), Dotted line emphasizes danger to navigation. It is recommended that the boulders be charted with symbol 5, Shoal sounding on isolated rock, for the charted position latitude 41-18-50.914 N longitude 071-28-19.474 W, with a reduced least depth of 48.5 feet, and at the position latitude 41-17-45.094 N longitude 071-27-50.306 W, with a reduced least depth of 52 feet. - See the Evaluation Report for FE-241 WD (1982) ✓

Regarding non-sounding features, the following recommendations are offered. The "stk" abbreviation for the quality of the bottom, located at latitude 41-17.20 N, longitude 071-29.75 W, should be changed to "rky", Rocky, as depicted on page 15, number 11 of NAUTICAL CHART SYMBOLS AND ABBREVIATIONS, SEVENTH EDITION, JANUARY 1979. The side scan sonar survey indicates a concentration of rocks from latitudes 41-17-22 N to 41-16-42 N and longitudes 071-28-40 W to 071 29 50 W. In addition a symbol for shoal sounding on isolated rock with a least depth sounding corrected for ~~predicted~~ <sup>smooth</sup> tides, of 61<sup>2</sup> feet should be charted at latitude 41-17-39.27 N, longitude 071-27-09.36<sup>7</sup> W, as indicated on page 13 number 5 under the heading of DANGERS in NAUTICAL CHART SYMBOLS AND ABBREVIATIONS, SEVENTH EDITION, JANUARY 1979. - See the Addendum to the Descriptive Report, ✓

An additional concentration of rocks was observed on the sonargrams within the area bordered by latitudes 41-16-23 N and 41-15-57 N, longitudes 071-24-12 W and 071-25-28 W. The rocks are consistent with the currently charted abbreviation of "hrd" at position latitude 41-15-54 N, longitude 071-26-18 W. ✓

One floating aid to navigation was contained within the limits of this field sheet, POINT JUDITH LIGHTED WHISTLE BUOY 2, light list number 799. The buoy was positioned by Del Norte on JD 212 at latitude 41-19-16.11 N, longitude 071-28-31.99 W., which agrees with the charted position. ← not verified ✓

There is no shoreline within the limits of the survey for the corridor or wire drag Area 1. All presently charted landmarks in the vicinity of this section of the corridor were visually verified from offshore and are suitable as charted. No additional landmarks or aids to navigation were noted in the area as suitable for charting. ✓

#### M. Adequacy of Survey

The survey is considered complete and adequate for charting. ✓

As required in the Project Instructions, Area 1 was completely cleared in opposing directions by ship wire drag. The ✓

section of Area 1 contained within the limits of the corridor was cleared to an minimum effective depth of 68 feet. This area of the corridor is clear of obstructions that would be a concern for deep draft tanker traffic. The northern section of Area 1 adjacent to the tanker route corridor, centered about latitude 41-17.24 N and longitude 071-27.40 W, could only be cleared to a minimum effective depth of 61 feet. This section of Area 1, north of the corridor, contains numerous boulders and this should be avoided by deep draft tanker traffic.

#### N. Incomplete Items

There are no incomplete items contained within this survey.

#### O. Hangs and Groundings

Three hangs occurred during wire drag operations on JDs 215, 219, 222. All three hangs were investigated by divers. The obstructions were located, marked with buoyed lines for positioning and least depths readings acquired. The underwater visibility was excellent on all these dives and the divers were able to identify the hung obstructions as significant topographical features.

The ~~A~~ complete descriptions of these hangs are contained in subsection (2) Diving Operations, of section E., Equipment and Techniques, and Appendix F.

The HECK experienced an extreme course deviation between fixes 179 and 180 during wire drag operations on JD 249, which was determined to be a temporary hang on the boulder described in the Descriptive Report for OPR-B660-RU/HE-82. This boulder was located by the RUDE and HECK, in 1982, at the position latitude 41-17-45<sup>4.96</sup>094 N, longitude 071-27-50<sup>3.106</sup>306 W, with a reduced least depth of 52.0 feet in a surrounding depth of 67 feet of water. A full description of this boulder appears in the 1982 report on page 59 in the discussion of ITEM 3. - See FE-241WD (1982)

#### P. Currents and Winds

Tidal currents were closely monitored during the course of this survey, since ship drag operations had to be run with the predominate current flow to result in satisfactory lift data. Comparisons were made with the Tidal Current Tables 1984, Atlantic Coast of North America for stations 2226, 2231 and The Race. In general, the times and strengths of maximum flood and ebb and times of slack water at the surface agreed with the predicted times and strengths under normal conditions. The currents in the eastern section of the survey are influenced by Narragansett Bay and may be rotary in nature.

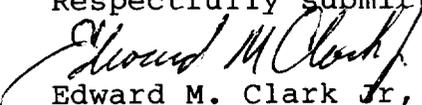
#### Q. Personnel

The officers participating in this survey were LCDR Robert K. Norris, LT Neal G. Millett, LT Edward M. Clark, and LTJG Thomas G. Callahan.

R. General Notes

The format of this report is a composite of the Descriptive Report formats contained in the Wire Drag and Hydrographic Manuals. This format is the optimum composite of the pertinent sections of the two reports and is more applicable to the surveys currently being conducted by the RUDE and HECK. ✓

Respectfully submitted

  
Edward M. Clark Jr, LT. NOAA

S. Approval Sheet

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. ✓

  
Robert K. Norris, LCDR, NOAA

Commanding Officer  
NOAA Ships RUDE and HECK

### C. HORIZONTAL CONTROL

No new stations were established for this survey. See Appendix D., Signal List for a complete listing of all stations used on this survey. ✓

**D. SIGNAL LIST**

~~WESTBROOK CONG.  
CHURCH SPIRE (1934)~~

~~Not Used~~

~~ID NBR 2  
LAT 411718.86  
LON 722788.61  
FILE 2~~

~~NORTH DUMPLING~~

~~LIGHT HOUSE (1874)~~

~~ID NBR Not Used 26  
LAT 411715.932  
LON 720111.084  
FILE 26~~

✓ BRENTON REEF LIGHT  
(1962) ✓

ID NBR 31  
LAT 412535.071 ✓  
LON 712821.978 ✓  
FILE 31

~~WESTBROOK TANK  
(1934)~~

~~Not Used~~

~~ID NBR 2  
LAT 411654.61  
LON 722816.481  
FILE 2~~

~~RACE ROCK~~

~~LIGHT HOUSE (1882)~~

~~ID NBR Not Used 27  
LAT 411436.152  
LON 720251.414  
FILE 27~~

✓ BEAVERTAIL  
LIGHTHOUSE (1869) ✓

ID NBR 32  
LAT 412657.348 ✓  
LON 712359.693 ✓  
FILE 32

✓ BLOCK IS NORTH  
LIGHTHOUSE (1874) ✓

ID NBR 28  
LAT 411339.881 ✓  
LON 713434.864 ✓  
ELEV'N 18.97 M  
17.68  
FILE 28

~~TOWER (1972)~~

~~(Mt. Prospect)~~

~~Not Used~~

~~ID NBR 33  
LAT 411528.647  
LON 720035.158  
ELEV'N 49.88 M  
FILE~~

~~WATCH HILL  
LIGHTHOUSE (1873)~~

~~Not Used~~

~~ID NBR 24  
LAT 411813.646  
LON 715132.552  
ELEV'N 18.68 M  
FILE 24~~

✓ POINT JUDITH TANK  
(1940) ✓

ID NBR 29  
LAT 412323.534 ✓  
LON 712901.461 ✓  
FILE 29

✓ POINT JUDITH  
LIGHTHOUSE (1839) ✓

ID NBR 25  
LAT 412139.323 ✓  
LON 712854.826 ✓  
ELEV'N 19.81 M  
FILE 25

✓ HAZARD TOWER (1912) ✓

ID NBR 36  
LAT 412455.281 ✓  
LON 712726.972 ✓  
FILE 36

**F. DIVING REPORT**

ITEM INVESTIGATION

DATE: 2 August, 1984 JD 215

SHIP/LAUNCH: RUDE & HECK / Launch 20

LOCATION: NORTHVILLE CORRIDOR PTS. (2-3)

DIVE MASTER LT. Edw. M. Clark Jr.

TIMES (UTC)

DIVERS: LT. Edw. M. Clark Jr.

IN WATER 1701 & 1736

LTJG Thomas Callahan

UNDER WATER 1703 & 1740

ON SURFACE 1713 & 1758

IN BOAT 1716 & 1804

MAXIMUM DEPTH Not to exceed 70 feet

DIVE DURATION Not to exceed 50 min.

PNEUMOFATHOMETER NO. 784996

ITEM Boulder

POSITION Lat. 41°17'39.<sup>8.67</sup>27" N

Long. 71°27'09.<sup>4</sup>36" W

LEAST DEPTH

TIME (UTC) DEPTH

1. <u>1744</u>	<u>63.5</u>	
2. <u>1745</u>	<u>64.0</u>	64.0 Pneumo reading
3. <u>1745</u>	<u>64.0</u>	+1.0 Pneumo corr.
		65.0
		-3.5 Tide corr.
		61.5

BOTTOM

TIME (UTC) DEPTH

1. <u>1747</u>	<u>72.0</u>	Least depth corrected for <sup>smooth</sup> predicted tide
2. <u>1747</u>	<u>72.5</u>	
3. <u>1748</u>	<u>72.5</u>	

61.0 feet MLLW

ITEM \_\_\_\_\_

POSITION \_\_\_\_\_

LEAST DEPTH

TIME (UTC) DEPTH

1. _____	_____
2. _____	_____
3. _____	_____

BOTTOM

TIME (UTC) DEPTH

1. _____	_____
2. _____	_____
3. _____	_____

ITEM \_\_\_\_\_

POSITION \_\_\_\_\_

LEAST DEPTH

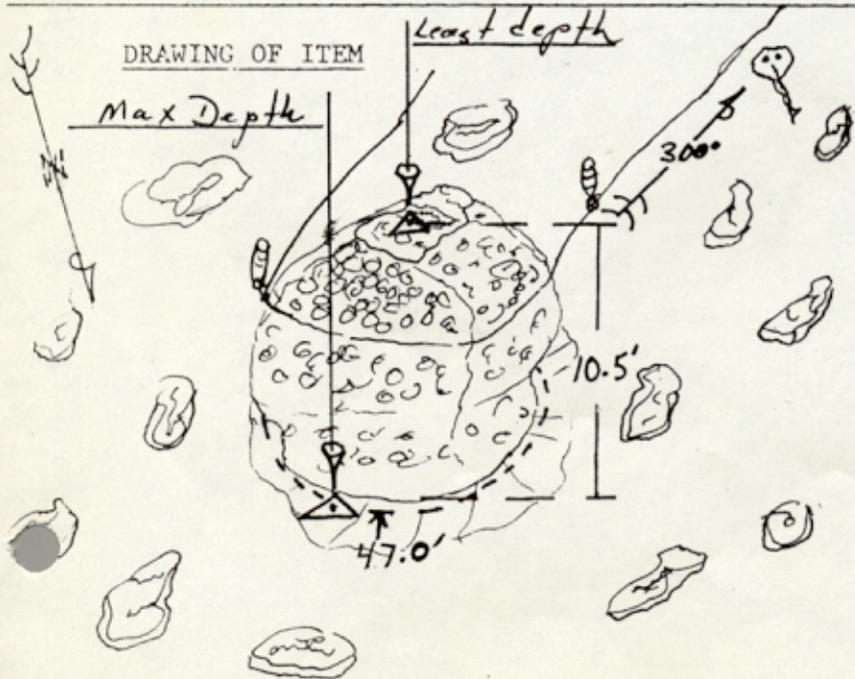
TIME (UTC) DEPTH

1. _____	_____
2. _____	_____
3. _____	_____

BOTTOM

TIME (UTC) DEPTH

1. _____	_____
2. _____	_____
3. _____	_____



DESCRIPTION OF ITEM

The hang is a boulder that measures 47 feet at the base and is slightly greater in circumference about 1.8 feet off the bottom, Then the boulder decreases in size to the top. The boulder is 10.5 feet high. It is of a granite composition and is covered with sea anemone. The boulder is the only topographical relief noted by the divers which is greater than 10% of the depth on the 275 feet of ground wire that was traveled.

DIVING OPERATIONS

Date: 2 August, 1984 JD 215 Unit: RUDE & HECK / Launch 20

Divemaster: LT. Edw. M. Clark Jr. Lead diver: LT. Edw. M. Clark Jr.

Purpose of Dive: Identify a hang on the wire drag of Northville Corridor between Pts. 2-3 and to acquire a least and max depth reading on the obstruction. Standard line pull signals to be used with the pneumofathometer; 1 (on the job, stop and OK); 2 (slack the line); 3 (take up the slack on the line); 4 (haul up the line); 2-2 (purge the hose and take three least depth readings); 3-3 Purge the hose and take three max depth readings).

Equipment: Standard scuba (open circuit) with wet suits and accessory equipment as prescribed by the NOAA Diving Regulations.

Planned Depth: Not to exceed 70 feet Planned Duration: Not to exceed 50 min.

Divers	IN Pressure	Out Pressure	Pressure	In Time (UTC)	Out Time	Time	Depth	Comments
Callahan	3150	1100	2050	1703	1713	10	70	
Clark	3100	1000	2150	1703	1713	10	70	
Callahan	3100	650	2400	1740	1758	18	70	
Clark	3000	500	2500	1740	1758	18	70	

Post dive comments: The obstruction was located on the first dive approximately 275 feet between buoys 2 and 3 of the drag. The obstruction is a large boulder of granite composition covered with sea anemone. The boulder is 47 feet at the base and has a height of approximately 10.5 feet. The boulder is the only topographic relief that was greater, than 10% of the depth, which the divers observed while swimming the ground wire for 275 feet. The visibility was about 40 feet on the bottom, and the current was slightly greater than at the surface.

*Edw. M. Clark Jr.*  
Divemaster Signature

*Edw. M. Clark Jr.*  
Lead Diver Signature

CONTACT #1 on JD 215

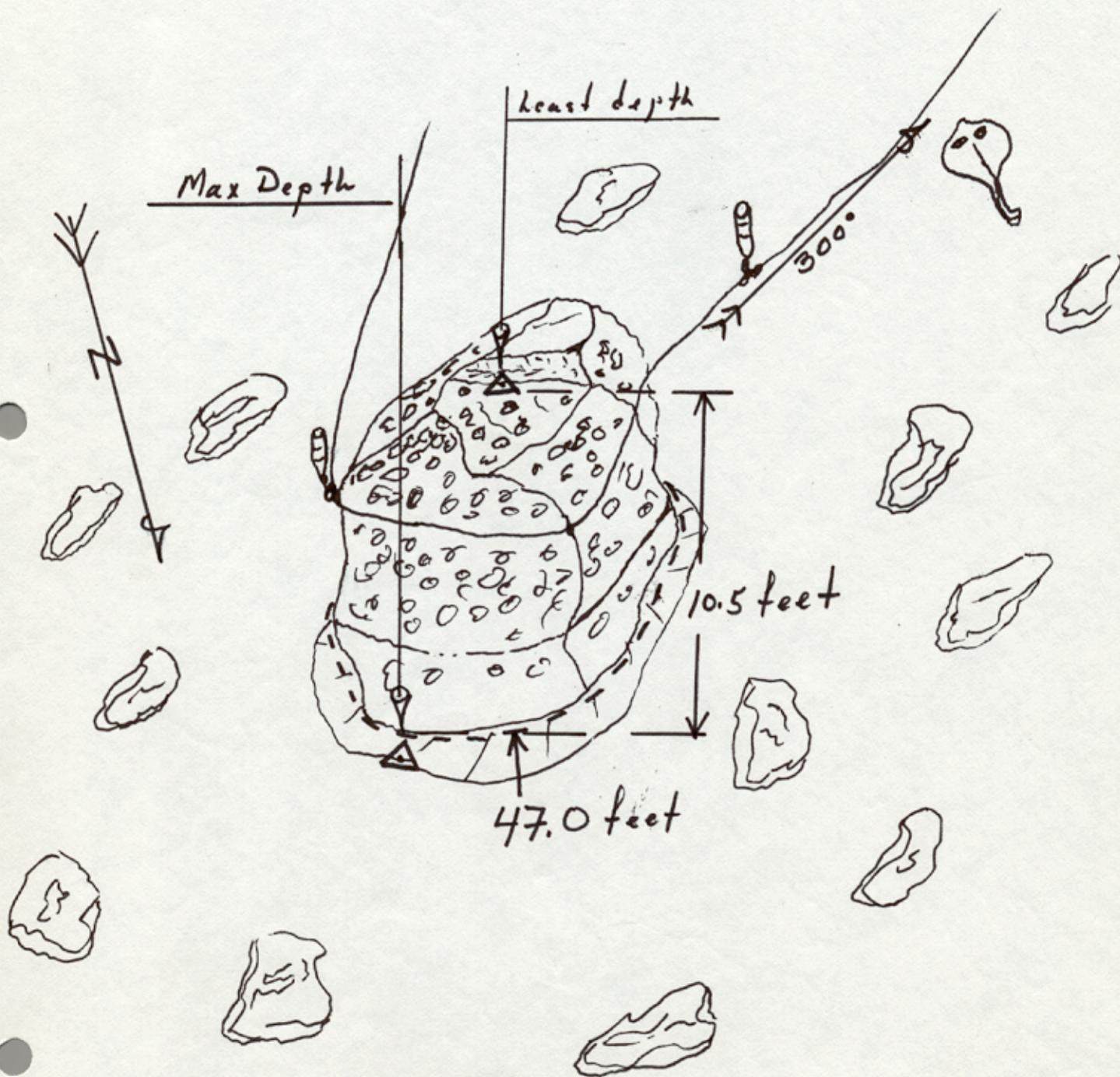
Granite boulder 47 feet at the base

Position: Latitude  $41^{\circ}17'39''27$ N

Longitude  $76^{\circ}27'39''36$ W

Least depth corrected for predicted tide

61.2 feet at MLLW



ITEM INVESTIGATION

DATE: 6 AUGUST, 1984 JD 219

SHIP/LAUNCH: RUDE & HECK / Launch 25

LOCATION: NORTHVILLE CORRIDOR PTS. (2-3)

DIVE MASTER LT. Edw. M. Clark Jr.

TIMES (UTC)

DIVERS: RET George Smith

IN WATER 1628 1720

EMS. Thomas Callahan

UNDER WATER 1630 1723

ON SURFACE 1647 1736

IN BOAT 1651 1740

MAXIMUM DEPTH 80 feet

DIVE DURATION Not to exceed 40 min.

PNEUMOFATHOMETER NO. 784996

ITEM Boulder

ITEM \_\_\_\_\_

ITEM \_\_\_\_\_

POSITION Lat. 41°17'48"<sup>7.58</sup>27N  
Long. 71°28'42"<sup>3.6</sup>19W

POSITION \_\_\_\_\_

POSITION \_\_\_\_\_

LEAST DEPTH \_\_\_\_\_

LEAST DEPTH \_\_\_\_\_

LEAST DEPTH \_\_\_\_\_

TIME(UTC)	DEPTH	REMARKS
1. 1728	69.25'	+1.5 pneumo corr.
2. 1728	69.25'	70.75
3. 1729	69.50'	-2.0 tide corr.

TIME(UTC)	DEPTH
1. _____	_____
2. _____	_____
3. _____	_____

TIME(UTC)	DEPTH
1. _____	_____
2. _____	_____
3. _____	_____

BOTTOM

BOTTOM

BOTTOM

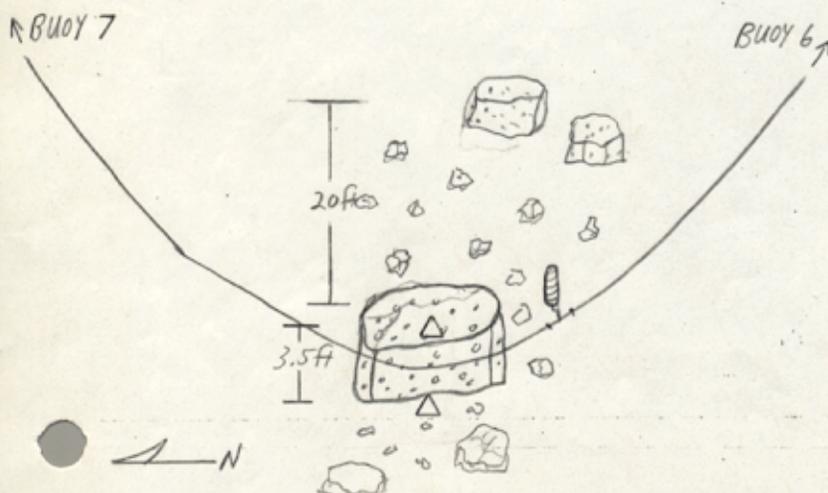
TIME(UTC)	DEPTH	REMARKS
1. 1729	72.0'	68 feet at MLLW
2. 1730	72.0'	68.9
3. 1730	72.5'	

TIME(UTC)	DEPTH
1. _____	_____
2. _____	_____
3. _____	_____

TIME(UTC)	DEPTH
1. _____	_____
2. _____	_____
3. _____	_____

DRAWING OF ITEM

DESCRIPTION OF ITEM



The obstruction was a tabular rock 3.5 to 4.0 feet high. The upper surface was observed to be 3 x 5 feet. The divers noted two additional rocks of the same size inside the bite of the wire. The divers also surveyed the remaining distance of the ground wire to buoy 6 and located another rock, which was smaller in size about 125 feet from buoy 6.

DIVING OPERATIONS

Date: 6 AUGUST, 1984 JD 219 Unit: RUDE & HECK / Launch 25

Divemaster: LT. Edw. M. Clark Jr. Lead diver: RET George Smith

Purpose of Dive: Identify hang on wire drag of the Northville Corridor between points 2-3.

Acquire a least and max depth reading on the hung obstruction using the pneumofathometer #784996. Standard line pull signal are: 1 ( on the job, stop, OK); 2 ( slack the line); 3 ( take up the slack on the line); 4 ( haul up the line); 2-2 ( purge the hose and take three least depth readings); 3-3 ( purge the hose and take three max depth readings)

Equipment: Standard open circuit scuba with wet suit and accessory equipment as prescribed by the NOAA Diving Regulations.

Planned Depth: 80 feet Planned Duration: Not to exceed 40 min.

Divers	IN Pressure	Out Pressure	Pressure	In Time (UTC)	Out Time	Time	Depth	Comments
ENS. Callahan	3000	700	2300	1630	1647	17	80'	
RET. Smith	3000	550	2450	1630	1647	17	80'	
ENS. Callahan	3000	1100	1900	1723	1736	13	80'	
RET. Smith	3000	900	2100	1723	1736	13	80'	

Post dive comments: The obstruction was located on the first dive approximately 300 feet between buoys 7 and 6 of the drag. The obstruction was tabular in nature and about 3.5 to 4 feet high. The upper surface was observed to be about 3 x 5 feet. The divers also noted two other boulders of the same approximate size inside the bite of the wire. On the second dive a least and max depth pneumo readings were acquired. The divers also surveyed the remaining distance of the ground wire to buoy 6 and located another rock somewhat small about 125 feet from buoy 6.

Edw. M. Clark Jr.  
Divemaster Signature

George E. Smith  
Lead Diver Signature

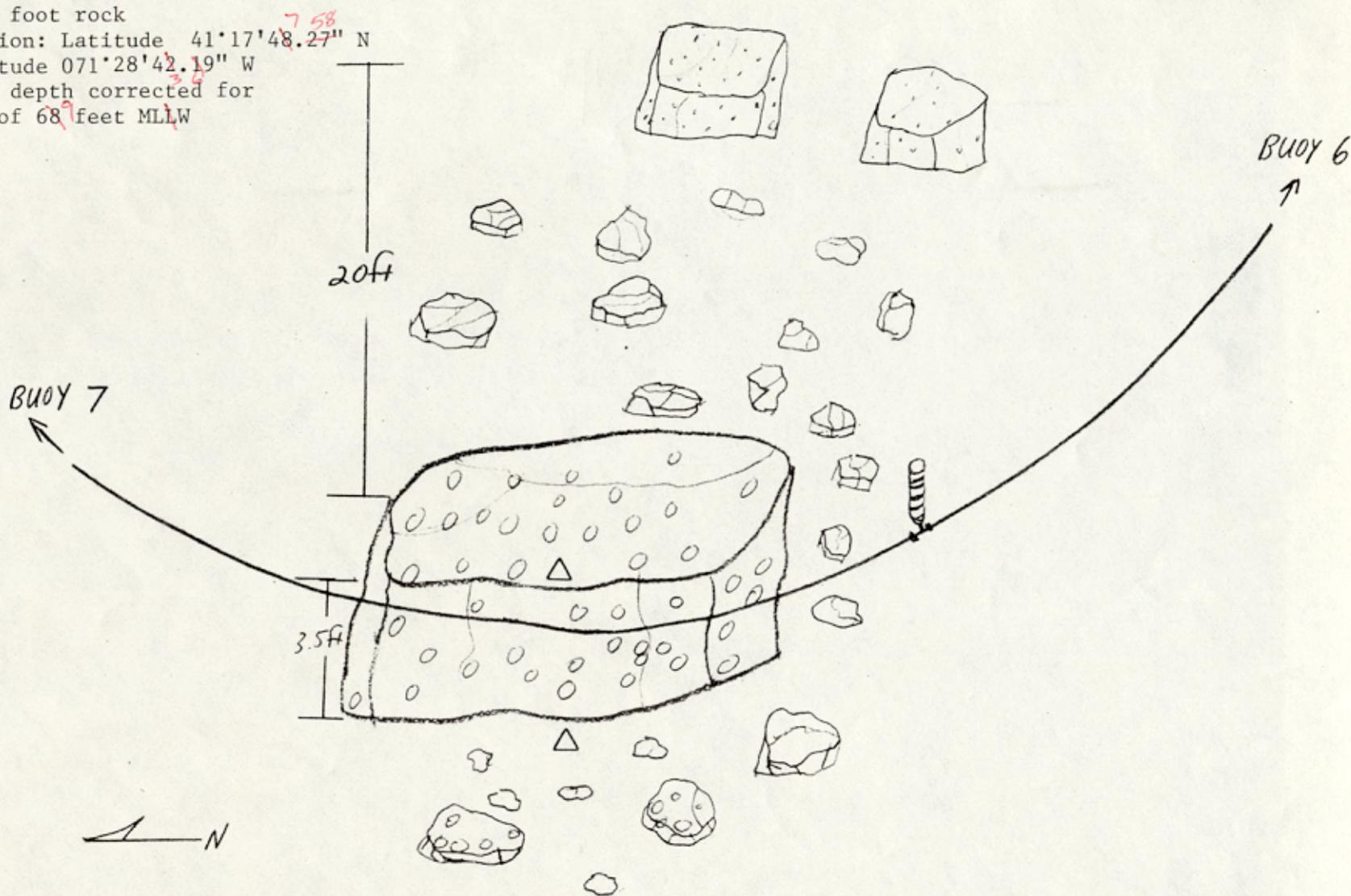
CONTACT #1 on JD 219

3 x 5 foot rock

Position: Latitude  $41^{\circ}17'48.27''$  N

Longitude  $071^{\circ}28'42.19''$  W

Least depth corrected for  
tide of 68.9 feet MLLW



ITEM INVESTIGATION

DATE: 09 AUGUST, 1984 JD 222

SHIP/LAUNCH: RUDE & HECK / Launch 25

LOCATION: NORTHVILLE CORRIDOR PTS. (2-3)

DIVE MASTER LT. Edw. M. Clark Jr.  
 DIVERS: RET George Smith  
LT. Edw. M. Clark Jr.

TIMES (UTC)			
IN WATER	1652	---	1738
UNDER WATER	1652	1709	1738
ON SURFACE	1704	1717	1748
IN BOAT	---	1720	1750

MAXIMUM DEPTH Not to exceed 80 Feet

DIVE DURATION Not to exceed 40 min.

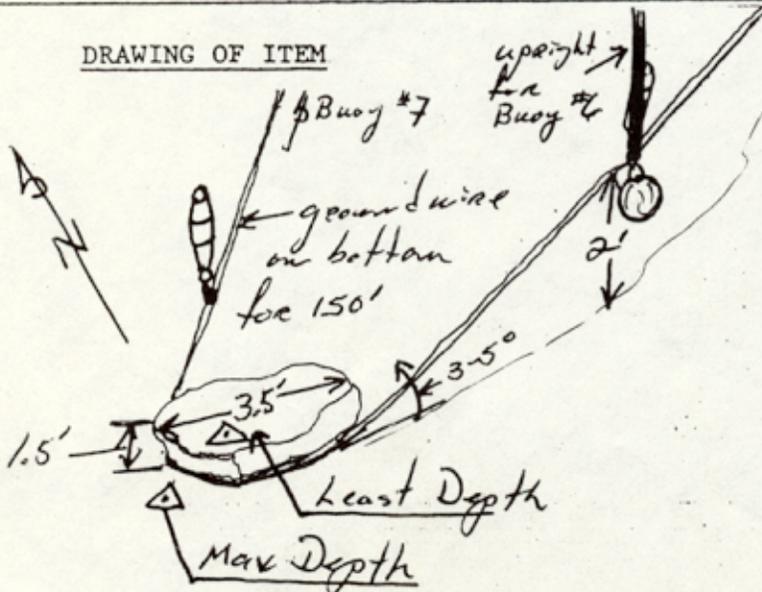
PNEUMOFATHOMETER NO. 784996

ITEM Rock  
 POSITION Lat. 41°17'38.11" N  
Long. 071°28'31.43" W  
 LEAST DEPTH \_\_\_\_\_  
 TIME (UTC) DEPTH  
 1. 1741 69.0 69.5 Pneumo reading  
 2. 1741 69.5 +1.5 Pneumo Corr.  
 3. 1741 69.25 71.0 <sup>7 94</sup>  
 -0.0 Tide corr. <sub>90</sub>  
 BOTTOM 71.0 Feet  
 TIME (UTC) DEPTH  
 1. 1743 70.5 Least depth corrected  
 2. 1743 70.5 for predicted tide  
 3. 1743 70.5 71.0 feet MLLW

ITEM \_\_\_\_\_  
 POSITION \_\_\_\_\_  
 LEAST DEPTH \_\_\_\_\_  
 TIME (UTC) DEPTH  
 1. \_\_\_\_\_  
 2. \_\_\_\_\_  
 3. \_\_\_\_\_  
 BOTTOM \_\_\_\_\_  
 TIME (UTC) DEPTH  
 1. \_\_\_\_\_  
 2. \_\_\_\_\_  
 3. \_\_\_\_\_

ITEM \_\_\_\_\_  
 POSITION \_\_\_\_\_  
 LEAST DEPTH \_\_\_\_\_  
 TIME (UTC) DEPTH  
 1. \_\_\_\_\_  
 2. \_\_\_\_\_  
 3. \_\_\_\_\_  
 BOTTOM \_\_\_\_\_  
 TIME (UTC) DEPTH  
 1. \_\_\_\_\_  
 2. \_\_\_\_\_  
 3. \_\_\_\_\_

DRAWING OF ITEM



DESCRIPTION OF ITEM

The divers located the hang, which was a tabular rock of irregular shape approx. 3.5 feet in length. The ground wire was on the bottom in the direction of Bouy #7 for approximately 150 ft. and was at an incline of about 3 to 5 degrees towards Bouy #6. The divers swam the ground wire between Buoy 5 and 6 and no hangs were encountered. Visibility was 30 ft. horizontal and 60 ft. vertical.

DIVING OPERATIONS

Date: 09 AUGUST, 1984 JD222

Unit: RUDE & HECK / LAUNCH 25

Divemaster: LT. Edw. M. Clark Jr.

Lead diver: LT. Edw. M. Clark Jr.

Purpose of Dive: Identify a hang on the wire drag of Northville Corridor between Pts. 2-3 and to acquire a least and max depth reading on the obstruction. Standard line pull signals to be used with the pneumofathometer; 1 (on the job, stop and OK); 2 (slack the line); 3 (take up the slack on the line); 4 (haul up the line); 2-2 (purge the hose and take three least depth readings); 3-3 Purge the hose and take three max depth readings.

Equipment: Standard scuba (open circuit) with wet suits and accessory equipment as prescribed by the NOAA Diving Regulations.

Planned Depth: Not to exceed 80 feet

Planned Duration: Not to exceed 40 min.

Divers	IN Pressure	Out Pressure	Pressure	In Time (UTC)	Out Time	Time	Depth	Comments
Clark	3000	1900	1100	1652	1704	12	80	
Smith	2900	1850	1050	1652	1704	12		
Clark	1900	500	1400	1709	1717	08	80	
Smith	1850	400	1450	1709	1717	08	80	
Clark	3050	1700	1350	1738	1748	10	80	
Smith	3000	1600	1400	1738	1748	10	80	

Post dive comments: See Item Investigation Sheet JD 222.

*Ed Clark*

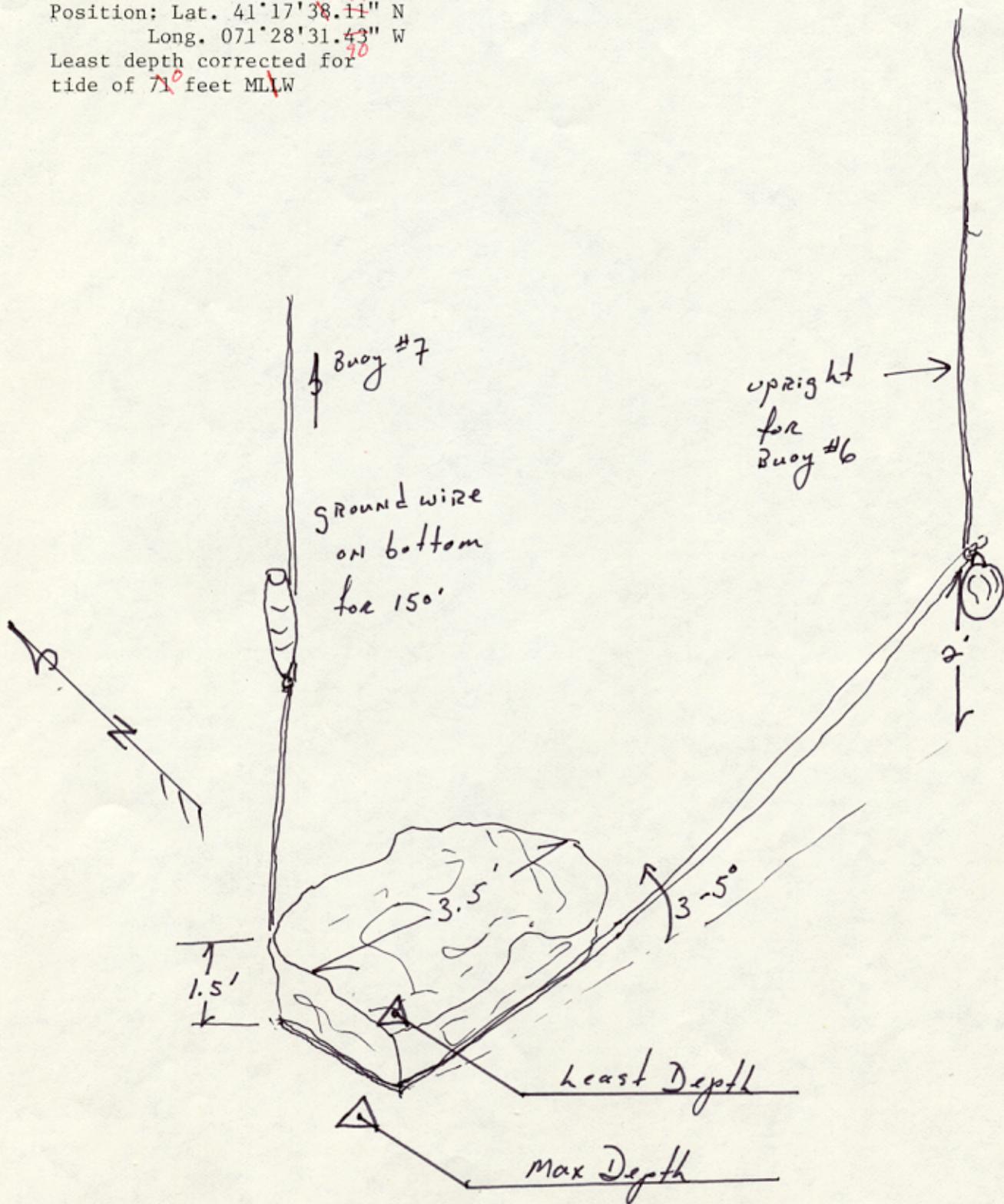
Divemaster Signature

*Ed Clark*

Lead Diver Signature

CONTACT #1 on JD 222

Position: Lat.  $41^{\circ}17'38.11''$  N  
Long.  $071^{\circ}28'31.43''$  W  
Least depth corrected for  
tide of  $71^{\circ}$  feet MLLW



H. LOCAL NOTICE TO MARINERS REPORT



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NOAA SHIPS RUDE & HECK  
439 WEST YORK ST.  
NORFOLK, VA 23510

AUGUST 6, 1984

To: Commander, First Coast Guard District  
150 Causeway Street  
Boston, Mass. 02114  
*Robert K. Norris*  
From: LCDR Robert K. Norris  
Commanding Officer

Subj: Notice to Mariners

Survey operations by the NOAA Ships RUDE and HECK in the vicinity of lighted buoy, R"2", Fl R 4 sec, WHISTLE, light list #799, has identified, using NOAA divers, a boulder of granite composition 47 feet around at the base at latitude 41°17'39"27N, longitude 71°27'09"36W. The least depth, determined by NOAA divers, over this boulder was 61 feet at MLLW, reduced for predicted tides. This obstruction is not presently charted.

Reference Contact #1 JD 215



**J. DANGERS TO NAVIGATION REPORT**

SEE APPENDIX H. NOTICE TO MARINERS



L. SIDE SCAN SONAR COVERAGE ABSTRACT -  
TARGET ABSTRACT - TARGET LIST

Sonar Coverage Abstract

OPR-B660-RV/HE-84  
R/H 20-19-84

Item No.

Search Track Number	Range Scale (m)	Minimum Towfish Height (m)	Minimum Effective Scanning Range (m)	Search Track Number	Range Scale (m)	Minimum Towfish Height (m)	Minimum Effective Scanning Range (m)	Maximum Track Spacing (m)	Coverage Analysis
622-634*	200m	15	148	621-609*	200m	16	158	210 m	100% ✓
632-640*	200m	18	178	284-276*	200m	17	168	240	100% ✓
638-648*	200m	17	168	661-672*	200m	27	200	250	100% ✓
621-609*	200m	16	158	257-270	200m	27	*200	215	100% ✓
*284-277*	200m	17	168	*268-275	200m	18	*178	200m	100% ✓
661-672*	200m	26	<del>200</del> 258	660-649*	200m	26	<del>200</del>	255	<sup>100</sup> 200% ✓
257-268*	200m	15	*148	192-204*	200m	16	<sup>200</sup> 158*	225	100% ✓
266-275*	200m	15	*148	205-215*	200m	15	<sup>135</sup> 148*	240	100% ✓
660-649✓	200m	26	<sup>200</sup> <del>258</del>	214-225*	200m	25	<del>200</del>	175	200%
192-204*	200m	15	148	256-245*	200m	17	168	190	100% ✓
207-213*	200m	17	* <sup>130</sup> 168	245-240*	200m	18	*178	200	100% ✓
212-225*	200m	23	*200 228	238-226*	200m	26	* <sup>180</sup> <del>200</del>	210	<sup>100</sup> 200% ✓
256-245*	200m	17	168	84-73*	200m	17	* <sup>135</sup> 168	190	100% ✓
246-240*	200m	17	168	28-21*	200m	17	* <sup>135</sup> 168	175	100% ✓
238-226*	200m	24	* <sup>200</sup> <del>258</del>	22-07*	200	24	* <sup>200</sup> <del>200</del>	200	100% ✓
84-73*	200m	17	* <sup>135</sup> 168	85-97*	200m	18	* <sup>90</sup> 178	225	100% ✓ e
28-07*	200m	17	* <sup>135</sup> 168	96-116*	200m	22	<del>200</del>	200	100% ✓

A-100



## SIDE SCAN TARGET ABSTRACT

DATE \_\_\_\_\_

OPR- B660-RU/HE-84

ITEM # \_\_\_\_\_

J.D. \_\_\_\_\_

R/4 20-19-84

SHIP \_\_\_\_\_

Prior Survey Depths

TARGET NUMBER	J.D. TIME UCT	FIX #	COMPUTED RATES	TOW SPEED	LENGTH OF TOW (M)	REDUCED DEPTH (FT)	CHARTED DEPTH (FT)	HEIGHT OF FISH R1 (M)	R2 (M)	R3 (M)	R4 (M)	HEIGHT OF TARGET (M/FT)	RANGE OF TARGET (M)	WIDTH OF TARGET (M/FT)	TOWFISH LAYBACK (M)
01	192 174227	16-17	R <sub>1</sub> 16390 R <sub>2</sub> 12415	220 RPM	15.24m 50'	122.8	124 <sup>126</sup>	25.0	70.0	72.0	73.0	0.34m	65.51m	2.13m	32.92m
02	192 175215	19-20	R <sub>1</sub> 15150 R <sub>2</sub> 11565	220 RPM's	15.24m 50'		126 <sup>127</sup>	26.0	63.0	120.0	*	*	57.38	59.76m	32.92m
03	194 153334	81-82	R <sub>1</sub> 9565 R <sub>2</sub> 8625	220 RPM's	15.24m 50'	121.2	126 <sup>124</sup>	29.0	55.0	57.0	60.0	1.45	47.4	2.30m	32.92m
04	194 153506	82-83	R <sub>1</sub> 9350 R <sub>2</sub> 9315	220 RPM's	15.24m 50'	118.8	126 <sup>126</sup>	33.0	40.0	42.0	45.0	2.20	25.52	3.03m	32.92m
05	194 153575	82-83	R <sub>1</sub> 9425 R <sub>2</sub> 9435	220 RPM's	15.24m 50'	120.4	123 <sup>124</sup>	33.0	80.0	82.0	84.0	.79	73.23	2.18m	32.92m
06	194 162708	87-88	SEE #4	220 RPM's	15.24m 50'	123.2	126 <sup>126</sup>	33.0	109.0	112.0	115.0	.86	104.15	3.14m	32.92m
07	194 162809	87-88	R <sub>1</sub> 9405 R <sub>2</sub> 9250	220 RPM's	15.24m 50'	123.5	126 <sup>127</sup>	31.0	80.0	81.0	83.0	.75	74	1.08m	32.92m
08	194 163534	88-89	R <sub>1</sub> 9800 R <sub>2</sub> 9202	220 RPM's	15.24m 50'	123.9	110 <sup>121</sup>	28.0	84.0	86.0	88.0	.64	79.42	2.11	32.92
09	194 171804	104-105	SEE #2	220 RPM's	15.24m 50'		126 <sup>127</sup>	30.0	33.0	79 80.0	*	*	15.06	59.36	32.92
10	194 155705	527-528	R <sub>1</sub> 13797 R <sub>2</sub> 11580	180 RPM's	15.24 50'		125 <sup>125</sup>	27.0	73.0	123.0	*	*	68.07	52.07	32.92
11	194 153820	528-529	R <sub>1</sub> 13860 R <sub>2</sub> 11800	180 RPM's	15.24 50'	114	118 <sup>122</sup>	28.0	86.0	88.0	92.0	1.22	81.72	2.10	32.92
12	194 162014	535-536	R <sub>1</sub> 16090 R <sub>2</sub> 13185	180 RPM's	15.24 50'	117.5	121 <sup>121</sup>	27.0	47.0	49.0	51.0	1.06	39.19	2.38	32.92
13	194 163800	541-542	R <sub>1</sub> 17810 R <sub>2</sub> 14530	180 RPM's	15.24 50'	115.4	124 <sup>124</sup>	27.0	36.0	37.0	41.0	2.63 1.85	26.50 87.16	1.34 1.04	32.92
14	194 163843	541-542	R <sub>1</sub> 17985 R <sub>2</sub> 14550	180 RPM's	15.24 50'	122.2	125 <sup>125</sup>	27.0	91.0	92.0	95.0	.85	87.16	1.04	32.92
15	194 165440	546-547	R <sub>1</sub> 19600 R <sub>2</sub> 15905	180 RPM's	15.24 50'	117.5	125 <sup>124</sup>	28.0	98.0	101.0	110.0	2.29	94.57	3.11	32.92

\* No shadow on sonagram. No height computation.

A-102

SIDE SCAN TARGET ABSTRACT

DATE \_\_\_\_\_

OPR-8060-RWHE-84

ITEM # R/H 20-19

J.D. \_\_\_\_\_

SHIP \_\_\_\_\_

*Prior Survey Depths*

A-103

TARGET NUMBER	J.D. TIME UCT	FIX #	COMPUTED RATES	TOW SPEED	LENGTH OF TOW (M)	REDUCED DEPTH (FT)	CHARTED DEPTH (FT)	HEIGHT OF FISH R1 (M)	R2 (M)	R3 (M)	R4 (M)	HEIGHT OF TARGET (M/FF)	RANGE OF TARGET (M)	WIDTH OF TARGET (M/FF)	TOWFISH LAYBACK (M)
16	195	120-	R <sub>1</sub> 9448	220	15.24m	106.9	130	27.0	79.0	81.0	54.0	0.95	74.59	2.12	32.92
	143550	121	R <sub>2</sub> 9070	RPM'S	50'		110								
17	195	122-	R <sub>1</sub> 10048	240	15.24m	104.0	120	24.0	45.0	48.0	52.0	1.85	39.17	3.41	32.92
	144050	123	R <sub>2</sub> 9105	RPM'S	50'		110								
18	195	134-	R <sub>1</sub> 14550	240	15.24m		121	28.0	48.0	120.0	*	*	38.99	77.7	32.92
	151714	135	R <sub>2</sub> 11380	RPM'S	50'										
19	195	157-	R <sub>1</sub> 15250	240	15.24m		128	28.0	00.0	80.0	*	*	0.0	74.94	32.92
	163000	158	R <sub>2</sub> 12010	RPM'S	50'										
20	195	158-	R <sub>1</sub> 14950	240	15.24m		128	28.0	52.0	92.0	*	*	41.42	46.21	32.92
	163210	159	R <sub>2</sub> 11810	RPM'S	50'										
21-R	195	159-	R <sub>1</sub> 14500	240	15.24m		121	28.0	00.0	86.0	*	*	0.0	81.31	32.92
	163545	160	R <sub>2</sub> 11410	RPM'S	50'										
21-L	195	159-	R <sub>1</sub> 14500	240	15.24m		121	28.0	00.0	87.0	*	*	0.0	82.37	32.92
	163545	160	R <sub>2</sub> 11410	RPM'S	50'										
22	195	160-	R <sub>1</sub> 14100	240	15.24m		128	28.0	44.0	76.0	*	*	33.94	36.71	32.92
	163825	161	R <sub>2</sub> 11200	RPM'S	50'										
23	195	160-	R <sub>1</sub> 14125	240	15.24m		128	28.0	72.0	96.0	*	*	46.33	25.49	32.92
	163840	161	R <sub>2</sub> 11075	RPM'S	50'										
24	195	172-	R <sub>1</sub> 9450	240	15.24m	126.4	131	27.0	68.0	70.0	73.0	1.11	62.88	2.16	32.92
	171452	173	R <sub>2</sub> 9180	RPM'S	50'		130								
25	195	173-	R <sub>1</sub> 9240	240	15.24m	134.6	131	26.0	109.0	115.0	117.0	.44	105.94	6.16	32.92
	171622	174	R <sub>2</sub> 9200	RPM'S	50'		136								
26	195	178-	R <sub>1</sub> 9150	240	15.24m	132.7	131	29.0	46.0	48.0	52.0	2.23	37.41	2.42	32.92
	173650	179	R <sub>2</sub> 9225	RPM'S	50'		130								
27	195	189-	R <sub>1</sub> 13760	240	15.24m		130	27.0	40.0	85.0	*	*	31.41	49.9	32.92
	180910	190	R <sub>2</sub> 11155	RPM'S	50'								29.51	72.64	
28	195	189-	R <sub>1</sub> 13820	240	15.24m		130	27.0	00.0	42.0	*	*	0.0	33.92	32.92
	180920	190	R <sub>2</sub> 11115	RPM'S	50'										
29-R	195	189-	R <sub>1</sub> 14035	240	15.24m		127	27.0	00.0	34.0	*	*	0.0	23.29	32.92
	181054	190	R <sub>2</sub> 11335	RPM'S	50'										

\* No shadow on sonagram. No height computation.

## SIDE SCAN TARGET ABSTRACT

DATE \_\_\_\_\_

OPR- \_\_\_\_\_

ITEM # R/4 20-19-84

J.D. \_\_\_\_\_

SHIP \_\_\_\_\_

*Prior Survey Depths*

TARGET NUMBER	J.D. TIME UCT	FIX #	COMPUTED RATES	TOW SPEED	LENGTH OF TOW (M)	REDUCED DEPTH (FT)	CHARTED DEPTH (FT)	HEIGHT OF FISH R1 (M)	R2 (M)	R3 (M)	R4 (M)	HEIGHT OF TARGET (M/FT)	RANGE OF TARGET (M)	WIDTH OF TARGET (M/FT)	TOWFISH LAYBACK (M)
29-L	195 181050	189- 190	R <sub>1</sub> 14035 R <sub>2</sub> 11335	240 RPM'S	15.24m 50'		129	27.0	00.0	150.0	* *	*	0.0	147	32.92
30-R	195 181148	190- 191	R <sub>1</sub> 14178 R <sub>2</sub> 11375	240 RPM'S	15.24m 50'		129	28.0	00.0	41.0	* *	*	0.0	29.95	32.92
30-L	195 181148	190- 191	R <sub>1</sub> 14178 R <sub>2</sub> 11375	240 RPM'S	15.24m 50'		129	28.0	00.0	45.0	* *	*	0.0	35.23	32.92
31-R	195 182245	190- 191	R <sub>1</sub> 14352 R <sub>2</sub> 11500	240 RPM'S	15.24m 50'		129	28.0	00.0	56.0	* *	*	0.0	48.5	32.92
31-L	195 181245	190- 191	R <sub>1</sub> 14352 R <sub>2</sub> 11500	240 RPM'S	15.24m 50'		129	28.0	00.0	50.0	* *	*	0.0	41.42	32.92
32	199 154818	195- 194	R <sub>1</sub> 9795 R <sub>2</sub> 8300	240 RPM'S	15.24m 50'	120.3	123	25.0	56.0	58.0	60.0	0.83	50.52	2.21	32.92
33	199 172237	221- 222	R <sub>1</sub> 18398 R <sub>2</sub> 13775	240 RPM'S	15.24m 50'	116.5	120	27.0	77.0	96.0	100.0	1.08	72.51	19.93	32.92
34	199 172548	221- 222	R <sub>1</sub> 18612 R <sub>2</sub> 13875	240 RPM'S	15.24m 50'	117.6	120	27.0	25.0	36.0	57.0	0.73	23.13	1.49	29.87
35	201 143712	242- 243	R <sub>1</sub> 13550 R <sub>2</sub> 10075	240 RPM'S	12.192m 40'	92.1	97	22.0	40.0	41.0	44.0	1.50	34.35	1.16	29.87
36	201 150933	253- 254	R <sub>1</sub> 9540 R <sub>2</sub> 8502	240 RPM'S	12.192m 40'	116.9	123	28.0	54.0	56.0	60.0	1.87	47.26	2.27	29.87
37	201 143837	253- 254	R <sub>1</sub> 9400 R <sub>2</sub> 8525	240 RPM'S	12.192m 40'	121.7	126	30.0	63.0	65.0	68.0	1.32	56.10	2.24	29.87
38	201 152508	258- 259	R <sub>1</sub> 9448 R <sub>2</sub> 8130	240 RPM'S	12.92m 40'	127.5	131	30.0	80.0	81.0	84.0	1.07	74.59	1.07	29.87
39	201 155850	269- 270	R <sub>1</sub> 13350 R <sub>2</sub> 9600	240 RPM'S	12.192m 40'	86.6	93	20.0	62.0	65.0	72.0	1.94	59.31	3.13	29.87
40	201 150550	564- 565	R <sub>1</sub> 13575 R <sub>2</sub> 11320	180 RPM'S	12.192m 50'		128	30.0	39.0	100.0	* *	*	27.09	68.89	29.87
41	201 150748	564- 565	R <sub>1</sub> 13862 R <sub>2</sub> 11460	180 RPM'S	12.192m 50'		128	30.0	94.0	150.0	* *	*	89.72	66.79	29.87

A-104

SIDE SCAN TARGET ABSTRACT

DATE \_\_\_\_\_

OPR- \_\_\_\_\_

ITEM # R/4 20-19-84

J.D. \_\_\_\_\_

SHIP \_\_\_\_\_

*Prior Survey Depths*

A-105

TARGET NUMBER	J.D. TIME UCT	FIX #	COMPUTED RATES	TOW SPEED	LENGTH OF TOW (M)	REDUCED DEPTH (FT)	CHARTED DEPTH (FT)	HEIGHT OF FISH R1 (M)	R2 (M)	R3 (M)	R4 (M)	HEIGHT OF TARGET (M/FT)	RANGE OF TARGET (M)	WIDTH OF TARGET (M/FT)	TOWFISH LAYBACK (M)
42	201 151115	564-567	R <sub>1</sub> 14285 R <sub>2</sub> 11775	180 LPM'S	15.24m 50'		128	29.0	600.0	620.0	* *	* *	52.53	63.92	32.92
43	201 151818	568-569	R <sub>1</sub> 14820 R <sub>2</sub> 12100	180 RPM'S	15.24m 50'		124	28.0	000.0	120.0	* *	* *	0.0	116.69	32.92
44	201 154320	576-577	R <sub>1</sub> 18501 R <sub>2</sub> 15005	180 RPM'S	15.24m 50'	115.2	121	28.0	44.0	45.0	48.0	1.75	35.31	1.24	32.92
45	201 154408	577-578	R <sub>1</sub> 18745 R <sub>2</sub> 15038	180 RPM'S	15.24m 50'	117.6	122	27.0	72.0	75.0	78.0	1.04	67.14	3.21	32.92
46-L	201 162543	570-591	R <sub>1</sub> 14865 R <sub>2</sub> 11975	200 RPM'S	15.24m 50'		126	29.0	00.0	150.0	* *	* *	0.0	147.37	32.92
46-R	201 162540	590-591	R <sub>1</sub> 14865 R <sub>2</sub> 11975	200 RPM'S	15.24m 50'		126	29.0	000	1020	* *	* *	0.0	98.09	32.92
47	201 162610	590-591	R <sub>1</sub> 14720 R <sub>2</sub> 12000	200 RPM'S	15.24m 50'		125	30.0	36.0	93.0	* *	* *	20.98	66.99	32.92
48-L	201 169205	591-592	R <sub>1</sub> 14300 R <sub>2</sub> 11635	200 RPM'S	15.24m 50'		129	30.0	00.0	79.0	* *	* *	0.0	73.50	32.92
48-R	201 169158	591-592	R <sub>1</sub> 14300 R <sub>2</sub> 11635	200 RPM'S	15.24m 50'		129	30.0	60.0	1020	* *	* *	52.55	45.25	32.92
49-L	201 163245	592-593	R <sub>1</sub> 13850 R <sub>2</sub> 11370	200 RPM'S	15.24m 50'		129	30.0	00.0	85.0	* *	* *	0.0	79.91	32.92
49-R	201 163156	592-593	R <sub>1</sub> 13850 R <sub>2</sub> 11370	200 RPM'S	15.24m 50'		129	30.0	00.0	96.0	* *	* *	23.32	67.87	32.92
50-L	201 163342	592-593	R <sub>1</sub> 13650 R <sub>2</sub> 11215	200 RPM'S	15.24m 50'		129	30.0	00.0	113.0	* *	* *	0.0	108.94	32.92
50-R	201 163338	592-593	R <sub>1</sub> 13650 R <sub>2</sub> 11215	200 RPM'S	15.24m 50'		129	30.0	00.0	96.0	* *	* *	0.0	91.19	32.92
51	201 142920	619-620	SEE #38	240 RPM'S	12.79m 40'	123.9	131	29.0	85.0	86.0	93.0	2.18	80.66	1.05	29.87
52	201 144650	625-626	R <sub>1</sub> 10422 R <sub>2</sub> 7950	210 RPM'S	12.79m 40'	94.1	98	21.0	320	330	350	1.20	25.14	1.26	29.87

SIDE SCAN TARGET ABSTRACT

DATE \_\_\_\_\_

OPR- \_\_\_\_\_

ITEM # R/H 20-19-84

J.D. \_\_\_\_\_

SHIP \_\_\_\_\_

*Prior Survey Depths*

A-106

TARGET NUMBER	J.D. TIME UCT	FIX #	COMPUTED RATES	TOW SPEED	LENGTH OF TOW (M)	REDUCED DEPTH (FT)	CHARTED DEPTH (FT)	HEIGHT OF FISH R1 (M)	R2 (M)	R3 (M)	R4 (M)	HEIGHT OF TARGET (M/FT)	RANGE OF TARGET (M)	WIDTH OF TARGET (M/FT)	TOWFISH LAYBACK (M)
53	202 144856	626- 627	R <sub>1</sub> 10698 R <sub>L</sub> 8000	240 RPM'S	12.49m 40'	87.4	90 <sup>92</sup>	19.0	45.0	46.0	48.0	0.79	41.15	1.09	29.87
54	202 150445	631- 632	R <sub>1</sub> 12725 R <sub>2</sub> 8890	240 RPM'S	12.19m 40'	76.0	81 <sup>82</sup>	17.0	27.0	30.0	33.0	1.55	22.14	3.57	29.87
55	202 124920	683- 684	SEE # 19	240 RPM'S	15.24m 50'		128	30.0	45.0 50.0	138.0	*	*	32.24	102.80	32.92
56L	202 175421	684- 685	SEE # 46	240 RPM'S	15.24m 50'		126	30.0	54.0 50.0	147.0	*	*	45.89	98.32	32.92
56R	202 175426	684- 685	SEE # 20	240 RPM'S	15.24m 50'		128	30.0	48.0 30.0	97.0	*	*	38.64	54.08	32.92
57-	202 175451	684- 685	R <sub>1</sub> 14598 R <sub>2</sub> 11760	240 RPM'S	15.24m 50'		127	30.0	78.0 30.0	158.0	X	*	72.62	62.41	32.92
58	206 155751	703- 704	R <sub>1</sub> 16125 R <sub>2</sub> 13310	220 RPM'S	15.24m 50'	117.2 116.2	121	26.0	42.0	43.0	45.0	1.14	35.84	1.23	32.92
59	206 155852	704- 705	R <sub>1</sub> 16310 R <sub>2</sub> 13400	220 RPM'S	15.24m 50'	118.4	121	26.0	94.0	95.0	98.0	0.80	90.54	1.04	32.92

OPR-B660-RU/HE-84

SHEET R/H 20-19-84

*Prior Survey Depths*

SIDE SCAN SONAR TARGET LIST



A-107

TARGET NUMBER	CHARTED DEPTH (FT)	REDUCED DEPTH (FT)	HEIGHT OF TARGET (FT)	WIDTH OF TARGET (FT)	POSITION	FURTHER INVESTIGATION			REMARKS
						TYPE	DATE	RESULTS	
01	124 <sup>126</sup>	<del>122.8</del> <sup>125</sup>	1.12 ✓	6.98	L 41-16-22.80 λ 71-23-25.17				* No shadow on
02,09	128 <sup>127</sup>		* ✓	196.06	L 41-16-25.56 λ 71-24-22.70				Sonagram. No height
03	126 <sup>124</sup>	<del>121.2</del> <sup>119</sup>	4.76 ✓	7.54	L 41-17-00.52 λ 71-29-22.54				computation
04	126 <sup>124</sup>	<del>118.8</del> <sup>119</sup>	7.22 ✓	9.94	L 41-16-37.60 λ 71-29-10.32				
05	123 <sup>124</sup>	<del>120.4</del> <sup>120</sup>	2.59 ✓	7.15	L 41-16-33.54 λ 71-29-02.54				
06	126 <sup>124</sup>	<del>123.2</del> <sup>123</sup>	2.82 ✓	10.30	L 41-16-37.60 λ 71-29-10.32				
07	126 <sup>127</sup>	<del>123.5</del> <sup>124</sup>	2.46 ✓	3.54	L 41-16-39.68 λ 71-29-09.41				
08	110 <sup>121</sup>	<del>123.9</del> <sup>123</sup>	2.10 ✓	6.92	L 41-16-41.06 λ 71-28-49.84				
10			* ✓	170.83	L 41-16-02.96 λ 71-25-13.81				
11	118 <sup>122</sup>	<del>114</del> <sup>118</sup>	4.00 ✓	6.88	L 41-15-57.04 λ 71-25-08.36				
12	121 <sup>121</sup>	<del>117.5</del> <sup>117</sup>	3.48 ✓	7.80	L 41-15-51.02 λ 71-23-26.32				
✓13	124 <sup>124</sup>	<del>115.4</del> <sup>115</sup>	8.62 ✓	4.40	L 41-15-42.18 λ 71-22-07.58				
✓14	125 <sup>125</sup>	<del>122.2</del> <sup>122</sup>	2.78 ✓	3.41	L 41-15-45.71 λ 71-22-00.90				
✓15	125 <sup>124</sup>	<del>117.5</del> <sup>116</sup>	7.51 ✓	10.20	L 41-15-37.41 λ 71-20-47.85				
16	127 <sup>130</sup>	<del>123.9</del> <sup>127</sup>	3.12 ✓	6.96	L 41-16-45.64 λ 71-29-13.02				
17	110 <sup>120</sup>	<del>104</del> <sup>114</sup>	6.06 ✓	11.18	L 41-16-44.39 λ 71-28-39.94				
18			* ✓	254.92	L 41-16-20.88 λ 71-24-47.86				

19<sup>20</sup> 128

\* ✓

OPR- B660-Ru/He-84  
 SHEET R/H 20-18-84

SIDE SCAN SONAR TARGET LIST

*Prior Survey Depths*

A-108

TARGET NUMBER	CHARTED DEPTH (FT)	REDUCED DEPTH (FT)	HEIGHT OF TARGET (FT)	WIDTH OF TARGET (FT)	POSITION	FURTHER INVESTIGATION			REMARKS
						TYPE	DATE	RESULTS	
21		<sup>121</sup>	* ✓	270.24	L 41-16-19.12 λ 71-24-49.30				* No shadow on sonargram
22		<sup>128</sup>	* ✓	120.44	L 41-16-19.21 λ 71-25-07.66				No height computation
23		<sup>128</sup>	* ✓	83.62	L 41-16-23.42 λ 71-25-08.62				
24	130	<sup>131</sup> <del>126.4</del>	3.64 ✓	7.08	L 41-16-41.94 λ 71-29-09.22				
⊗ 25	136	<sup>131</sup> <del>134.6</del>	1.44 ✓	20.20	L 41-16-41.72 λ 71-29-20.31				⊗ A contact was seen between 24525 - missed by the field - ht. = 5.9 ft in 131 ft depths - not significant
26	130	<sup>131</sup> <del>122.7</del>	7.32 ✓	7.94	L 41-16-41.13 λ 71-29-24.60				
27		<sup>130</sup>	* ✓	163.71	L 41-16-15.50 λ 71-25-21.41				
28		<sup>130</sup>	* ✓	111.28	L 41-16-17.60 λ 71-25-19.70				
29		<sup>130</sup>	* ✓	482.28	L 41-16-14.07 λ 71-25-08.12				
30		<sup>130</sup>	* ✓	115.58	L 41-16-15.04 λ 71-25-02.06				
31		<sup>129</sup>	* ✓	159.12	L 41-16-13.92 λ 71-24-53.60				
32	123	<sup>121</sup> <del>120.3</del>	2.72 ✓	7.25	L 41-17-11.03 λ 71-29-21.59				
✓33	120	<sup>121</sup> <del>116.5</del>	3.54 ✓	65.38	L 41-16-24.00 λ 71-21-55.48				
✓34	120	<sup>122</sup> <del>117.6</del>	2.40 ✓	4.88	L 41-16-26.10 λ 71-21-46.72				
35	97	<sup>98</sup> <del>92.1</del>	4.92 ✓	3.80	L 41-16-44.86 λ 71-25-47.48				
36	123	<sup>123</sup> <del>116.9</del>	6.14 ✓	7.44	L 41-17-04.94 λ 71-29-29.07				
37		<sup>123</sup> <del>119</del>	4.33 ✓	7.34	L 41-17-04.82 λ 71-29-37.03				

OPR-B660-Ru/He-84

SHEET R/H 20-19-84

## SIDE SCAN SONAR TARGET LIST

TARGET NUMBER	CHARTED DEPTH (FT)	REDUCED DEPTH (FT)	HEIGHT OF TARGET (FT)	WIDTH OF TARGET (FT)	POSITION	FURTHER INVESTIGATION			REMARKS
						TYPE	DATE	RESULTS	
39	93	86.6	6.36	10.26	L 41-16-55.96 λ 71-26-04.22				* No shadow on sonargram.
40	128		*	226.0	L 41-16-07.82 λ 71-25-26.15				No height computation
41	128		*	219.12	L 41-16-07.62 λ 71-25-12.98				
42	128		*	209.71	L 41-16-04.28 λ 71-24-52.29				
43	124		*	382.84	L 41-16-02.83 λ 71-24-27.54				
✓ 44	121	<sup>117</sup> <del>123</del> 115.2	5.74	4.06	L 41-15-42.00 λ 71-21-37.18				
✓ 45	121	<sup>118</sup> <del>122</del> 117.6	4.23	10.53	L 41-15-47.10 λ 71-21-27.90				
46L, 56L	126		*	483.50	L 41-16-07.58 λ 71-24-27.50				
46R	126		*	321.82	L 41-16-07.58 λ 71-24-27.50				
47	125		*	219.48	L 41-16-04.30 λ 71-24-32.66				
48	129		*	241.14	L 41-16-08.90 λ 71-24-53.66				
49	129		*	262.17	L 41-16-10.22 λ 71-25-14.74				
50	129		*	357.41	L 41-16-12.09 λ 71-25-24.78				
51, 38	131	<sup>119</sup> <del>124</del> 123.9	7.15	3.44	L 41-17-19.46 λ 71-29-53.05				
52	98	<sup>95</sup> <del>99</del> 94.1	3.94	4.13	L 41-17-21.63 λ 71-28-58.04				
53	90	<sup>87</sup> <del>92</del> 87.4	2.59	3.57	L 41-17-20.21 λ 71-28-40.88				
54	81	<sup>77</sup> <del>82</del> 76.0	5.08	11.71	L 41-17-08.55 λ 71-26-44.00				

A-109

Prior Survey Depths



DATE: 12/19/84

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Marine Center: Atlantic

OPR: B660

Hydrographic Sheet: R/H 20-19-84

Locality: Block Island Sound

Time Period: July 4-September 7, 1984

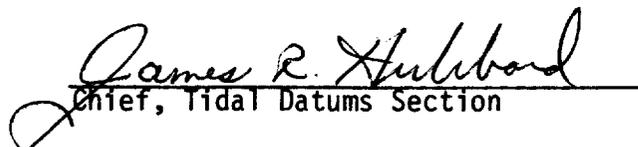
Tide Station Used: 845-2660 Newport, R.I.

Plane of Reference (Mean ~~lower~~ Low Water): 1.81 ft

Height of Mean High Water Above Plane of Reference: 3.5 ft

Remarks: Recommended Zoning:

For Area 1 apply X 0.82 range ratio to all heights

  
Chief, Tidal Datums Section

## ADDENDUM TO ACCOMPANY SURVEY FE-269WD

### 1. INTRODUCTION

In accordance with the memorandum from CDR Russell C. Arnold, Chief, Hydrographic Surveys Branch, N/CG24, dated December 27, 1988, a modified approach to marine center processing of this survey was undertaken. Processing was limited to the following:

a. The verification of the least depths obtained by pneumatic depth gauge and the detached positions determined on the rocks found by wire drag on this survey. The least depth (70 feet) found on a rock (detached position #124) in Latitude  $41^{\circ}17'37.94''N$ , Longitude  $71^{\circ}28'31.90''W$  was hung by wire drag at an effective depth of 61 feet. This hang was cleared by an effective depth of 60 feet. The 70-foot least depth is not considered valid. In this case the hang and clearance strips have been verified. Side Scan Sonar was not run in the area of this survey where these three least depths and detached positions were taken. See also section 2.b. of this addendum.

b. The examination of the sonar records to ensure that within the area covered by this survey, no significant contacts exist other than the contacts flagged and addressed by the hydrographer. The side scan sonargrams, in general, do not appear to provide reliable coverage beyond approximately 90-100 meters in both port and starboard channels. This is attributed to thermoclines and lack of receiver sensitivity. However, the line spacing of this survey nearly provided 100% coverage despite the reduced effective range. It is believed that any obstruction that would be a hazard to surface navigation or would be a significant hydrographic feature would have been detected.

c. Charting recommendations based upon findings from the limited survey processing and a comparison with the latest largest scale chart of the area.

d. Only the wire drag strips (hang and clearance) concerning the rock found on Year Day 222 with a diver determined least depth of 70 feet in Latitude  $41^{\circ}17'37.94''N$ , Longitude  $71^{\circ}28'31.90''W$  were processed (see section 1.a. of this addendum). The field wire drag strips were compared to the field side scan sonar data and the prior data (both hydrography and wire drag) within the common area. There are no conflicts between the field reduced wire drag effective depths and the field computed reduced depths on the side scan sonar contacts within the common area. There are no conflicts, except the three hangs and one temporary hang, between the field wire drag effective depths and prior surveys H-6444 (1939), H-6443 (1939), and H-4005WD (1917-19) within the common area.

### 2. CHARTING RECOMMENDATIONS FOR CHART 13218, 29th ED., May 9, 1987

Eight least depths are plotted on the smooth sheets for this survey. Three are diver taken pneumatic depth gauge least depths on rocks hung by wire drag. The other five are estimated depths on contacts made by

scaling heights off the bottom from side scan sonar records. These eight least depths are:

a. A rock was hung by wire drag at an effective depth of 63 feet in Latitude  $41^{\circ}17'38.67''N$ , Longitude  $71^{\circ}27'9.34''W$  (position #60). This rock was diver verified and a least depth of 62 feet was obtained by pneumatic depth gauge. This rock was cleared by 62 feet in opposing directions. The present survey did not collect side scan sonar data in the area of this rock. This rock is presently charted as dangerous submerged rock with a least depth of 61 feet from advance information from the present survey. It is recommended that this charted rock be revised to reflect the verified position and least depth determined by this survey.

b. A rock was hung by wire drag at an effective depth of 61 feet in Latitude  $41^{\circ}17'37.94''N$ , Longitude  $71^{\circ}28'31.90''W$  (position #124). This rock was diver verified and a least depth of 70 feet was obtained by pneumatic depth gauge. This conflict indicates either an error in the wire depth, the pneumatic depth gauge, a recording error, or a shoaler feature was hung and was not found by the divers. This hang was cleared by an effective depth of 61 feet in one direction and 60 feet in the opposing direction. The present survey did not collect side scan sonar data in the area of this rock. It is recommended that this rock be charted in the position determined by the present survey as a dangerous submerged rock (the rock symbol surrounded by a dotted danger curve and blue tint No. 1) with a note in parentheses: (cleared 60 feet).

c. A rock was hung by wire drag at an effective depth of 69 feet (no lift in the hang section at the time of hang) in Latitude  $41^{\circ}17'47.58''N$ , Longitude  $71^{\circ}28'43.69''W$  (position #100). This rock was diver verified and a least depth of 69 feet was obtained by pneumatic depth gauge. This hang was not cleared. The present survey did not collect side scan sonar data in the area of this rock. It is recommended that this rock be charted in the position determined by the present survey as a 69-foot sounding on a rock (69 Rk).

d. An apparent temporary hang occurred on Year Day 249. An effective depth was not determined for this temporary hang because it appears from the behavior of the drag that the temporary hang occurred in the end vessel's towline. This temporary hang is in the vicinity of a rock found and investigated during the investigation of Item #3 on FE-241WD (1982). This rock was found in Latitude  $41^{\circ}17'44.96''N$ , Longitude  $71^{\circ}27'50.51''W$  and has a least depth of 52 feet. This rock was plotted on the present survey smooth sheet #1 of 1 from FE-241WD (1982). This temporary hang is considered to be on this rock and is therefore not considered further since this rock is adequately addressed in the Evaluation Report of FE-241WD (1982). This temporary hang is not smooth plotted.

e. A side scan sonar contact (#35) found in Latitude  $41^{\circ}16'45''N$ , Longitude  $71^{\circ}25'48''W$  has an estimated least depth of 93 feet in prior depths of 98 feet. This contact is most likely a rock but is smooth plotted as an obstruction. This contact was cleared by an effective depth of 69 feet. This ~~sounding~~ is not recommended to be charted.

*Obstruction*

++1  
AW015  
# 7903

AW015  
# 7904

deleted 12300

77.8  
42.0

AW015  
# 7905

AW015  
# 7902

f. A side scan sonar contact (#39) found in Latitude 41°16'56"N, Longitude 71°26'04"W has an estimated least depth of 86 feet in prior depths of 93 feet. This contact is most likely a rock but is smooth plotted as an obstruction. This contact was cleared by an effective depth of 70 feet. This ~~sounding~~ *Obstruction* is not recommended to be charted. 6  
K

g. A side scan sonar contact (#52) found in Latitude 41°17'22"N, Longitude 71°28'58"W has an estimated least depth of 95 feet in prior depths of 99 feet. This contact is most likely a rock but is smooth plotted as an obstruction. This contact was cleared by an effective depth of 69 feet. This ~~sounding~~ *Obstruction* is not recommended to be charted. X  
K

h. A side scan sonar contact (#53) found in Latitude 41°17'21"N, Longitude 71°28'41"W has an estimated least depth of 89 feet in prior depths of 92 feet. This contact is most likely a rock but is smooth plotted as an obstruction. This contact was cleared by an effective depth of 71 feet. This ~~sounding~~ *Obstruction* is not recommended to be charted. X  
K

i. A side scan sonar contact (#54) found in Latitude 41°17'09"N, Longitude 71°26'44"W has an estimated least depth of 77 feet in prior depths of 82 feet. This contact is most likely a rock but is smooth plotted as an obstruction. This contact was cleared by an effective depth of 70 feet. This contact is presently charted as a dangerous submerged obstruction cleared to 69 feet. Since only one aspect of this contact was seen by side scan sonar, it is recommended that this contact remain as presently charted but with a clearance depth of 70 feet. 7520  
K 9

There are 53 other side scan sonar contacts that are not smooth plotted but are addressed in the Target Lists and Abstracts in the Descriptive Report (Appendix L.). These contacts all have an estimated depth in excess of 100 feet and are not considered significant from a charting standpoint. The height above the bottom for these contacts range from no discernible height to approximately 8½ feet.

Bottom depths used for computing estimated depths on contacts were obtained from prior surveys H-6444 (1939) and H-6443 (1939). These two prior surveys are common to the entire present survey and are the source of most of the charted hydrography within the common area. Where contacts do not fall directly on a prior sounding, the bottom depth was determined by interpolating between the surrounding prior soundings. Contact positions were determined by computing offsets from the vessels' tracks. These soundings, determined from side scan sonar contact heights, are suitable for charting only as reported soundings. These reported soundings may be used to supplement prior hydrography within the common area if considered appropriate.

The bottom topography within the common area is remarkable only in the vicinity of Latitude 41°17'N, Longitude 71°29'W where an area of rocks or boulders exists. This area is of particular interest since it is the shoalest area within the surveyed area and at the northern edge of the corridor. This rocky area could affect deep draft tanker traffic. The charted data within this area does not indicate a rocky bottom. The only bottom characteristic charted in this area is a "stk" in Latitude 41°17.2'N, Longitude 71°29.6'W. The hydrographer drew an

outline of this rocky area on the field sheet. This outline has been transferred to the smooth sheet. It is recommended that the charted bottom characteristics in this area be changed to reflect a rocky bottom.

3. RECOMMENDATIONS FOR ADDITIONAL WORK

No additional field work is recommended. It would be advantageous in the future to define the extent of the rocky area that was found to encroach into the present survey area in the vicinity of Latitude 41°17'N, Longitude 71°29'W.

Verification and  
Recommendations by,

Maurice B. Hickson, III  
Maurice B. Hickson, III  
Cartographer  
Evaluation & Analysis Group

10/13/89

HYDROGRAPHIC SURVEY STATISTICS  
REGISTRY NUMBER: FE-269WD

NUMBER OF CONTROL STATIONS		6
NUMBER OF POSITIONS		958
NUMBER OF SOUNDINGS		8
	TIME-HOURS	DATE COMPLETED
* PREPROCESSING EXAMINATION	0	/ /
VERIFICATION OF FIELD DATA	9	04/28/89
QUALITY CONTROL CHECKS	0	
EVALUATION AND ANALYSIS	108	10/04/89
FINAL INSPECTION	8	09/29/89
TOTAL TIME	125	
MARINE CENTER APPROVAL		10/06/89

\*Preprocessing time is not considered as part of total survey time.

REFERENCE NO.

N/CG244-88-89

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

19 October 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-269WD (R/H-20-19-84)  
OPR-B660, RHODE ISLAND, RHODE ISLAND SOUND

Pkg. 1: (Box)

- ✓ Envelope containing Side Scan Sonograms for (1984) Year Days 192, 193, 194, 195, 199, 201, 202, & 206.
- ✓ "WIRE DRAG" Volumes.
- ✓ "SOUNDINGS" Volumes.
- ✓ Accordion Folder containing original field records (echograms, printouts, tender tester records, and strip data) for (1984) Year Days 192, 193, 194, 195, 199, 201, 202, 206, 208, 212, 215, 216, 219, 222, 229, 249, & 251.
- ✓ Envelope containing various printouts (hourly heights, smooth tides, positions, soundings, P-file, C-file, TCTI file, and position & calibration computations).
- ✓ Envelope containing the Smooth Position/Contact Number Overlay to accompany Sheet #1 of 1.

DO NOT DISCARD ANY OF THIS DATA.

Page #1 of 2.

FROM: (Signature) *Maurice B. Hickson*  
Maurice B. Hickson, III

RECEIVED THE ABOVE  
(Name, Division, Date)

Return receipted copy to:

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

*D. S. Clark*  
*10/24/89*

REFERENCE NO.

N/CG244-88-89

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

19 October 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-269WD (R/H-20-19-84)

OPR-B660, RHODE ISLAND, RHODE ISLAND SOUND

Pkg. 1: (Box) - continued

- ✓ Envelope containing data removed from the Descriptive Report.
- ✓ Envelope containing eight (8) field wire drag strips (office verified), one (1) field A & D sheet, one (1) office verified A & D sheet, and one (1) field smooth sheet (track plot & contact overlay).

Pkg. 2: (Envelope)

- ✓ Original Descriptive Report containing one (1) Smooth Sheet.

DO NOT DISCARD ANY OF THIS DATA.

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

INSPECTION REPORT  
FE-269WD

The completed wire drag survey has been examined with regards to presentation of survey results. The survey complies with National Ocean Service requirements except as noted in the Addendum to the Descriptive Report. This survey is not to be considered a basic hydrographic survey and is not approved as such. Only the data that has been verified, smooth plotted, and addressed in the Addendum to the Descriptive Report is approved for charting.

Inspected

  
\_\_\_\_\_  
R. D. Sanocki  
Chief, Hydrographic Surveys  
Processing Unit  
Atlantic Hydrographic Section

Approved October 6, 1989

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

71° 30'

71° 29'

71° 28'

71° 27'

71° 26'

71° 25'

(A) Depths on these rocks were estimated by scaling heights off the bottom from side scan sonar records. Positions were determined by computing offsets from the vessel's track.

41° 18'

41° 18'

IGNORE PENCIL  
COMPILER NOTES  
THEY ARE NOT PART  
OF ORIGINAL  
DOCUMENT

IGNORE COMPILER  
NOTES THEY ARE  
NOT PART OF  
ORIGINAL  
DOCUMENT

from FE-241 WD (1982)

69 Rk

52 Rk

62 Rk

(Cleared by 60 ft)

95 Obstr (A)

89 Obstr (A)

rky

77 Obstr (A)  
(Cleared by 70 ft)

86 Obstr (A)

93 Obstr (A)

41° 17'

41° 17'

FE-269WD  
RHODE ISLAND  
RHODE ISLAND SOUND  
SOUTH OF POINT JUDITH  
4 JULY TO 7 SEPT 1984  
SCALE = 1:20,000  
N A 1927 DATUM  
SOUNDINGS IN FEET AT MLW  
SHEET 1 OF 1

IGNORE PENCIL COMPILER  
NOTES THEY ARE NOT  
PART OF THE ORIGINAL  
DOCUMENT

41° 16'

41° 16'

71° 30'

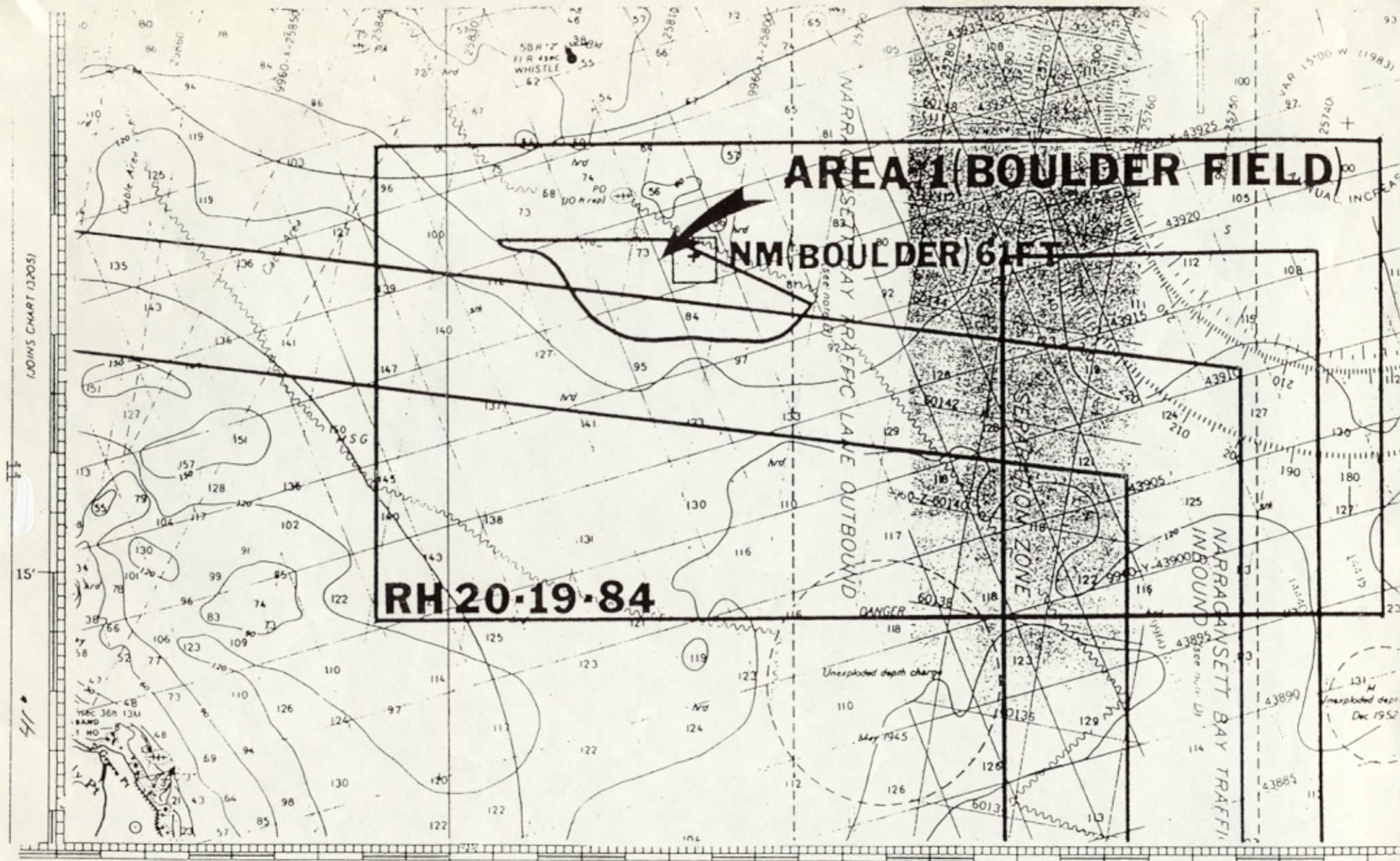
71° 29'

71° 28'

71° 27'

71° 26'

71° 25'



**AREA 1 (BOULDER FIELD)**

**NM BOULDER 6 FT**

**RH 20-19-84**

JOINS CHART 12205

14

15

15

71° 30'

25'

(CONTINUED ON CHART 12300)

20'

27th Ed. Dec 10/83

**13218**

**LORAN-C OVERPRINTED**

**CAUTION**

This chart has been corrected from the Notice to Mariners published weekly by the Defense Mapping Agency Hydrographic/Topographic Center and the Local Notice to Mariners issued periodically by each U.S. Coast Guard district. The print date shown in the lower-left hand corner.



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

Hydrographic Index No. 62 R

INDEX  
HYDROGRAPHIC SURVEYS  
Complete through August 1978  
1960-1972

NEW HAMPSHIRE, MASSACHUSETTS  
AND RHODE ISLAND COASTS

NEW HAMPSHIRE  
MASSACHUSETTS-RHODE ISLAND

