

H10458

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey . HYDROGRAPHIC/SIDE SCANN SONAR

Field No. RU-20-1-93

Registry No. H-10458

LOCALITY

State MASSACHUSETTS

General Locality . RHODE ISLAND SOUND

Sublocality 6.0 NM SW OF SOW AND

PIGS REEF

19 93

CHIEF OF PARTY

..... LCDR. D. R. HERLIHY, NOAA

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DATE JUL 19 1995

HYDROGRAPHIC TITLE SHEET

H-10458

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-20-1-93

State Massachusetts

General locality Rhode Island Sound

Locality 6.0 NM Southwest of Sow and Pigs Reef

Scale 1:20,000 Date of survey March 23 to August 30, 1993

Instructions dated 12 February 1992 Project No. OPR-B660-RU-93

Vessel NOAA Ship RUDE (9040)

Chief of party LCDR Daniel R. Herlihy, NOAA

Surveyed by D. R. Herlihy, T. A. Nichel, J. A. Illg, R. T. Brennan, T. A. Haupt, D. E. Williams

Soundings taken by echo sounder, ~~hand lead, pole~~ Pneumatic Depth Guage

Graphic record scaled by DRH, TAN, JAI, RTB, TAH, DEW

Graphic record checked by DRH, TAN, JAI, RTB, TAH, DEW

Protracted by N/A Automated plot by N/A ^{ENCAD NOVAJET III} Plotter

Verification by N/A Atlantic Hydrographic Branch Personnel

Soundings in ~~fathoms feet~~ at ~~MLW MLLW~~ meters at MLLW

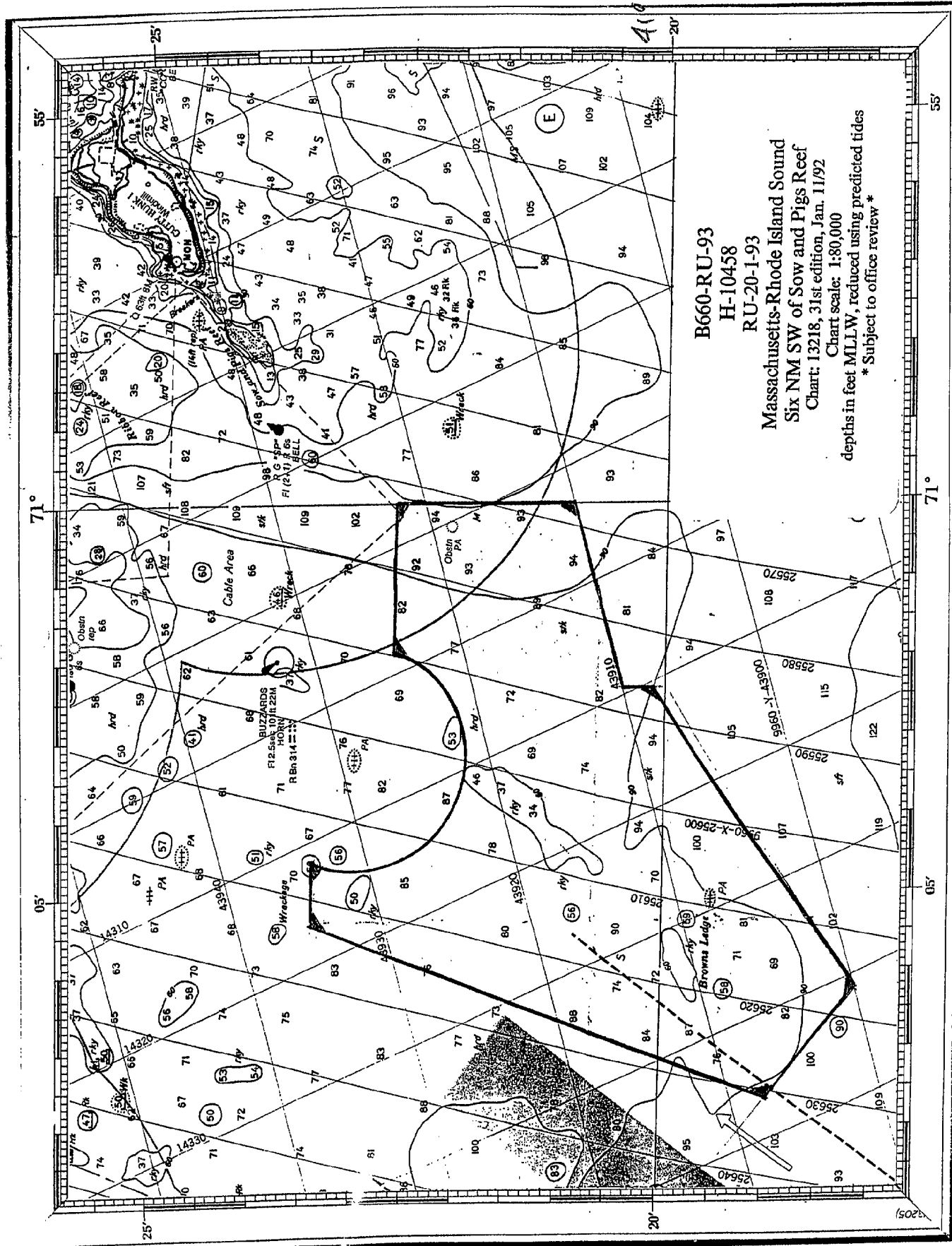
REMARKS: All times recorded in UTC

Notes in the Descriptive Report were made
in red, during office processing

AWOIS/SURF 2/28/96 MCR

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B660-RU-93
 H-10458
 RU-20-1-93

Massachusetts-Rhode Island Sound
 Six NM SW of Sow and Pigs Reef
 Chart: 13218, 31st edition, Jan. 11/92

Chart scale: 1:80,000
 depths in feet MLLW, reduced using predicted tides
 * Subject to office review *

A. PROJECT

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

A.2 The original date of the instructions is February 12, 1992.

A.3 The following changes are relevant to this project:

Change No. 1, dated April 2, 1992, updated the AWOIS printout dated March 1, 1991, to reflect additional work required for AWOIS item 1895, and authorized the implementation of the Pilot Partnership Processing Project. The AWOIS update is not directly related to this survey.

Change No. 2, dated April 14, 1992, states that all AWOIS item surveys shall be at the scale of 1:20,000 when the largest scale chart of the area is smaller than 1:20,000. When the largest scale chart of the area is 1:20,000 or larger, the scale of the survey shall be 1:10,000.

Change No. 3, dated June 12, 1992, updated the AWOIS printout dated March 1, 1991 to reflect additional work required for AWOIS items 1873 and 8276. This change is not directly related to this survey.

Change No. 4, dated June 30, 1992, amended the project instructions for a survey of three AWOIS items in New London Harbor. This change is not directly related to this survey.

Change No. 5, dated October 8, 1992, changed the objective of AWOIS 7882 from a field examination survey to a basic survey (H-10434). This survey junctions with the north edge of survey FE-378SS.

Change No. 6, dated February 3, 1993, assigned this basic survey (H-10458), scale 1:20,000, to be completed in the vicinity of Brown's Ledge, southwest of Cuttyhunk Island.

Change No. 7, dated August 6, 1993, states that in areas of water depths greater than 20 meters, an 800-meter grid system shall be used to delineate developments, and in areas of water depths shoaler than 20 meters, a 400-meter grid system shall be used. Each grid element will be inspected in order to identify the side scan sonar contact with the potential least depth. Once the feature is identified, it shall be developed appropriately. LORAN-C values observed at the locations of wrecks and significant obstructions will be included in section M or N of the Descriptive Report.

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

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

B. AREA SURVEYED

This survey encompasses Brown's Ledge, an area approximately 8.0 nautical miles southwest of Cuttyhunk Island. It junctions with survey FE-378SS to the north, which was conducted by the RUDE during the 1992 field season. The exact boundaries of this survey lie between the following coordinates, starting with the northern-most west corner and proceeding clockwise:

41°23'42"N 071°04'27"W

Follow search radius of AWOIS 2984 counter-clockwise about its center point to:

41°22'46"N 071°01'48"W

41°22'46"N 070°59'57"W

41°20'55"N 070°59'57"W

41°20'13"N 071°02'38"W

41°19'57"N 071°02'43"W

41°18'03"N 071°06'22"W

41°19'00"N 071°07'39"W

41°23'31"N 071°05'19"W

Commercial traffic in the area consists mostly of tugs and barges transiting between New York and Boston via the Cape Cod Canal. The controlling depth of the Cape Cod Canal is 32 feet. This is a critical depth with regards to the survey area since deeper-draft vessels would not typically be expected to transit these waters. During the summer months, numerous sailing vessels transit the area.

Data collection began on March 23, 1993 (DN 082) and concluded on August 30, 1993 (DN 242).

C. SURVEY VESSELS

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

Vessel	EDP Number	Primary Function
NOAA Ship RUDE (S590)	9040	Hydrography / Side Scan Operations
RUDE Launch (RU3)	1290	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
DAS_SURV	6.33	082-174
	6.38	175-242
POSTSUR	6.00	082-174
	6.01	175-242

D.2 Other software includes program **VELOCITY (version 2.00 - December 18, 1992)**, used to generate sound velocity corrector tables.

D.3 No non-standard automated acquisition or processing methods were used.

E. SONAR EQUIPMENT

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

NOAA Ship RUDE Descriptive Report Survey H-10458

Equipment Type	Serial Number	Dates Used
Recorder	10884	DN 082 - 159
Towfish	11901	DN 082 - 159

E.2 The side scan sonar towfish was configured with a 20° beam depression, the normal setting, 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 exclusively for this survey. Given the average depth of water in the survey area, this range scale was used to provided optimum contact resolution. There were areas where lobster pot floats caused the ship to steer off of the reference line, resulting in reduced coverage. These areas of reduced coverage were easily recognized because the on-line swath plot would leave "holidays", or areas with no over-lap. To compensate for this lack of coverage, holiday coverage was run to fill in these gaps. All side scan coverage was ultimately checked with a smooth plot to ensure proper overlap between consecutive lines.

The current Field Procedures Manual (FPM) specification was used to determine maximum line spacing with Differential GPS positioning:

$$LS_{max} = 2RS - 2EPE_{max}$$

where: LS_{max} = maximum allowable line spacing

RS = range scale (100 meters)

EPE = expected position error

For a 1:20,000-scale survey, a maximum EPE of 30 meters is allowed. However, from prior experience in this area on other surveys, we have found that the maximum EPE does not exceed 15 except when the HDOP is greater than 3.35. When the HDOP does exceed 3.35, a position "bust" occurs and that selected or fix needs to be rejected or smoothed in the post processing phase of the survey. Therefore, for this 1:20,000-scale survey, the RUDE used 1:10,000-scale survey accuracy. Using a value of 15 in the above equation, a maximum line spacing of 170 meters is authorized. Actual line spacing for the side scan sonar coverage of this survey was 160 meters.

b) Confidence checks were obtained by noting recognizable bottom characteristics at the edges of the sonar range scale in use. Features such as sand waves and trawl door scours were commonly used for this purpose.

c) Two hundred percent side scan sonar coverage was completed for this survey.

d) All side scan sonar records acquired during this survey were clear with excellent returns. There were several occasions when the side scan sonar towfish became entangled in lobster pot buoy lines, temporarily "whiting out" the sonagram. On these occasions, the towfish was brought on board, inspected and serviced if necessary, with all affected data subsequently being rejected.

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

E.5 Significant contacts were grouped into "developments" and were investigated by intensive echo sounder investigation. Due to the number of contacts in the survey area, a 400- or 800-meter area grid system was authorized via Change No. 7 to the project instructions. Change No. 7 states that in areas of water depths greater than 20 meters, an 800-meter grid system shall be used to delineate developments, whereas in areas of water depths shoaler than 20 meters, a 400-meter grid system shall be used. Each grid element was thoroughly inspected to identify the side scan sonar contact with the potential least depth. Features so identified were then appropriately developed.

Tight line spacing, at times as close as five meters, was used to conduct these investigations. Some contacts investigated by echo sounder justified a diver investigation. Nine diver investigations were conducted during this survey. The reports for these dives are located in Separate VII.*

* Filed with the Original Survey Data

E.6 Overlap was checked on line using the real-time plot, while the edited swath plot was employed to identify holidays.

F. SOUNDING EQUIPMENT

F.1 All hydrographic soundings were acquired using a Raytheon 600N Digital Survey Fathometer (DSF). Equipment serial numbers and the corresponding dates used are as follows:

Equipment Type	Serial Number	Dates Used
DSF 6000N	A106N	082-099
DSF 6000N	C0066	099
DSF 6000N	A107N	102-109
		111-242
DSF 6000N	B040N	109-111

F.2 When diver investigations were conducted, least depths were measured with a 3-D Instruments, Inc. precision direct drive pneumatic depth gauge:

0 - 70 fsw (feet salt water) S/N 201637 12

This gauge was checked each day it was used by comparing it with a leadline. Depths recorded by the leadline varied with that recorded from the pneumatic depth gauge at times by more than the allowed 0.5 feet. This disparity can be attributed to large wire angles in the leadline (approximately 10°), choppy sea states and significant currents on the days dive operations were conducted. Calibration and check documentation for this equipment is located in Separate IV. *

** Filed with the Original Field Records*

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

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

G. CORRECTIONS TO SOUNDINGS

G.1 a) The velocity of sound through water was determined using a Digibar Sound Velocity Probe (S/N 169). A Data Quality Assurance Test was conducted before each velocity cast to ensure the instrument was operating within tolerance. Generally, velocity casts were conducted weekly with few exceptions.

At the beginning of this field season, two #2 velocity casts were conducted on the same day. One was taken within the confines of survey H-10461 sheet C (OPR-B616), and the other within the confines of survey H-10458 (OPR-B660). The purpose of taking two casts was to determine if there was a difference between the inshore project area (B616) and the offshore project area (B660). The two #2 casts were found to be identical, therefore, only one cast was acquired per week, with the subsequent correctors being applied to both projects.

Casts #10 and #11 were also conducted in a similar manner. Cast #10 was taken within the inshore project (B616) and cast #11 was taken within the offshore project (B660). Upon comparing these two velocity casts, it was apparent that the inshore waters (B616) had become more homogenous with respect to the speed of sound than were the offshore waters (B660). This was visible in the amount of velocity corrections required for a given range of depths. As a result of this second set of comparative casts, it was decided to conduct individual velocity casts for each project from that point on. The velocity data from these casts were generally re-applied to the data acquired during a one week time frame.

All data were processed using program Velocity. Several data groups were entered into the Velocity program with an incorrect vessel draft of 2.23 rather than 2.26 meters. The correctors from these groups were re-calculated with the correct vessel draft and did not change. Therefore, the data were not re-entered. The velocity cast numbers this applies to are 16, 18, 21, 24, 26 and 28. Computed velocity correctors were entered into the HDAPS sound velocity tables and applied on line to both high and low frequency soundings. The sound velocity correctors applied to this survey are based on the casts conducted on the following dates:

Cast Number	Date	Latitude	Longitude	HDAPS Table #	Applied to Days
1	84	41°28'01"N	70°55'55"W	1	82-85
2	90	41°24'00"N	71°00'06"W	2	88
3	098	41°28.3'N	070°55.3'W	3	095-099
4	104	41°24.5'N	071°00.0'W	4	102-106
5	111	41°30.0'N	070°54.7'W	5	109-113 <i>Not used</i>
6	119	41°25.3'N	070°59.5'W	6	116-120 112-119

7	125	41°24.5'N	071°00.2'W	7	123-127
8	133	41°24.9'N	071°00.2'W	8	¹³³ 130-134
9	140	41°27.7'N	070°55.7'W	9	¹⁴⁰ 137-141
11	147	41°19.4'N	071°04.5'W	11	⁷ 144-148
12	153	41°19.6'N	071°01.5'W	12	¹⁵³⁻¹⁵⁴ 151-155
13	160	41°23.2'N	071°00.1'W	13	¹⁶⁰⁻¹⁶¹ 158-162
16	168	41°21.9'N	071°08.0'W	16	¹⁶⁸⁻¹⁶⁹ 165-169
18	175	41°19.4'N	071°03.0'W	18	¹⁷⁵ 172-176
20	180	41°18.9'N	071°01.4'W	20	¹⁸⁰⁻¹⁸³ 179-183
21	189	41°24.0'N	071°00.0'W	21	⁷ 186-190
22	195	41°19.8'N	071°03.4'W	22	193-197
24	203	41°18.2'N	071°03.5'W	24	200-204 ⁸
26	216	41°19.6'N	071°04.4'W	26	214-218 ⁷
28	224	41°19.1'N	071°04.0'W	28	221-225
30	231	41°19.4'N	071°04.1'W	30	⁹ 228-232 ⁶
32	242	41°22.6'N	071°07.2'W	32	235-239 ⁸

G.1 b) There was no variation in the DSF-6000N instrument initial.

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

d) A dual leadline comparison with the DSF-6000N was made in the project area:

DN 087 at 41°27.0'N and 070°54.0'W (37 ft depths)

The greatest variation between leadline and DSF soundings was 0.2 meters. Considering the ship's motion and the wire angle in the leadline due to the current (approximately 5°), this is excellent agreement and provides an adequate check that the echo sounder was functioning properly. Data from these comparisons are on file at the Atlantic Hydrographic Section in Norfolk, Virginia. *

Both of the leadlines used in the leadline to DSF 6000N comparison were calibrated by steel tape prior to the above comparison. An average leadline correction of -0.45 feet was applied in comparisons between the DSF-6000N and the ship's leadlines.

e) All sounding correctors were applied to both the narrow (100 kHz) and wide (24 kHz) DSF 6000N beams.

G.1 f) During the ship's 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 3, 1993. 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 the resulting correctors were applied to soundings via 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 There were no unusual or unique methods or instruments used for correcting echo soundings.

G.3 Generally, sound velocity correctors resulting from weekly velocity casts were re-applied to the data acquired during that entire week. Section G.1 a) lists the periods for which each velocity cast correctors were used.

* Filed with original field data

G.4 The ship's two pneumatic depth gauges were calibrated by Instruments East, Inc., Norfolk, VA on February 11, 1993. On April 22, 1993, gauge #20163712 was re-calibrated and adjusted due to a bent indicator needle. Corrector data from the calibration was not applied to measured depths because it was less than 0.1 meters.

A system check was performed each day the pneumatic gauge was employed, as a means of ensuring the validity of the gauge's measurements. These system checks are included in Separate IV. Hydrographic Survey Guideline No. 55 mandates that agreement between the leadline and observed gauge values must not exceed 0.5 feet. However, there were occasions during this survey when observed readings did exceed this limit. On these occasions, the observed wire angle of the leadline and pneumatic depth gauge hose was unavoidably excessive and, therefore, the comparison values were viewed with suspicion. As a result, no correctors were applied to measured pneumatic depth gauge values.

G.5 Generally, sea conditions greater than one meter affected the sounding record, creating a trace of constant peaks and deeps. 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 predicted tides were provided on floppy disk before the start of the project.

b) Tidal data used during data acquisition were obtained 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. The subordinate station for predicted tides was:

NO.	PLACE	POSITION	TIME		HEIGHT	
			High water	Low water	High water	Low water
1147	Sakonnet	41°28'N 071°12'N	-0 13	-0 01	*0.88	*0.86

Tidal correctors were applied on line using the HDAPS predicted tide tables numbers 3, 4, 5, 6, 7, and 8. Tide table 3 was used for the month of March, 4 for April, and so on.

Approved Tides and Zoning have been applied during office processing

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

A request for smooth tides was mailed on September 6, 1993.

H. CONTROL STATIONS *See also The Evaluation Report*

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

H.2 This survey was conducted exclusively using Differential GPS (DGPS) positioning, which precluded the need for shore-based horizontal control stations. *

* *A list of Horizontal Control Stations is appended to this Report*

H.3 No horizontal control stations were used or established for this survey.

H.4 No horizontal control stations were used or established for this survey.

H.5 Verification of horizontal control was not necessary since no land-based horizontal control stations were used.

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

I. HYDROGRAPHIC POSITION CONTROL

I.1 This survey was conducted exclusively using Differential GPS (DGPS) positioning.

I.2 Accuracy requirements were met as specified by the Hydrographic Manual and Field Procedures Manual (FPM). The Horizontal Dilution of Precision (HDOP) and Estimated Position Error (EPE) specified by the FPM were monitored during on-line data collection. When these values exceeded the allowable limits (HDOP = 3.35, EPE = 15), survey operations were suspended until DGPS performance improved. If the positioning degraded beyond acceptable limits while on line, the data were either smoothed or rejected, depending on the extent of the affected data.

I.3 Control Equipment:

DGPS

Unit A:

Ashtech GPS Sensor
S/N 700417B1083
Firmware Version: 1E06D-P
Magnavox MX50R DGPS Receiver S/N 078

Unit B:

Ashtech GPS Sensor
S/N 700417B1012
Firmware Version: 1E06D-P
Magnavox MX50R DGPS Receiver S/N 160

Correctors were received from the Montauk, New York and the Portsmouth, New Hampshire radio beacons for the entire survey.

I.4 The DGPS system requires no calibration from outside sources. However, to check the position accuracy of the DGPS system, a daily performance check was conducted. The Shipboard Data Integrity Monitor (version 1.2), or SHIPDIM, program was utilized to conduct these performance checks. For a DGPS performance check, section 3.4.5 of the FPM states that a DGPS performance check may be conducted using SHIPDIM when "two independent reference beacons are receivable, and two remote receivers are available on the ship. Each remote receives correctors from a different reference, then the computed positions are compared." The computed inverse between the check receiver and the reference receiver must not exceed delta P_{max} , where:

$$\text{delta } P_{max} = \text{SQRT} [(\text{EPE})^2 + (\text{ECR})^2]$$

delta P_{max} = Maximum allowable inverse distance between the DGPS and check position

EPE = Expected Position Error of the DGPS position

ECR = Error Circle Radius of the Check position

SHIPDIM compares four sample positions from both the check and reference receivers. Three of the four checks must be less than the delta P_{max} for a successful performance check.

I.5 No calibration data were required to be applied to the raw positioning data because DGPS was the primary positioning system.

I.6 a) There were no unusual methods used to calibrate or operate the electronic positioning equipment.

b) No shipboard DGPS malfunctions were experienced during the times of hydrography for this survey.

c) During times of heavy rains and/or thunderstorms, the ship would experience periods of intermittent service from either the Montauk, New York or the Portsmouth, New Hampshire radio beacons, depending on which station was experiencing degraded weather at the time. On these occasions, control would be switched to a reference beacon which was sending the strongest, most interference-free signal. If both the Montauk and Portsmouth beacons were experiencing periods of degraded weather, then survey operations were suspended until acceptable service from at least one of the beacons had resumed.

d) During those periods when local weather effected the DGPS radio beacons as described in section I.6.c, the on-line positioning would unexpectedly "drop out". These instantaneous outages were associated only with weather-related beacon interference. During times of poor satellite coverage or geometry, there would be a steady deterioration of the HDOP that could be continuously monitored. Such weather-related outages would occur often, sometimes every few minutes, making it difficult to either begin or complete a survey line. The duration of these outages ranged from half an hour to several hours.

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 HDAPS offset table #1. ✕

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 a copy of HDAPS offset table #1. ✕

J. SHORELINE

No shoreline is contained within the boundaries of this survey.

✕ Filed with the Original Field Data

K. CROSSLINES

A total of 13.8 nautical miles of crosslines were run for this survey, which represents 6.7% of the first 100% side scan mainscheme coverage.

An excessed plot of mainscheme soundings with crosslines superimposed was used to conduct mainscheme to crossline comparisons. Soundings at intersections were compared to all other soundings within a 5 mm (50 meter) radius. Based on this procedure, agreement between mainscheme and crossline soundings was found to be excellent, especially in areas of flat or slightly sloping relief. The greatest difference observed between soundings was 4 feet, with an average agreement one foot within a 1 mm (10 meter) radius.

L. JUNCTIONS *See also the Evaluation Report*

L.1 This survey junctions with survey FE-378SS (AWOIS 2984), scale 1:20,000, conducted by the RUDE during the 1992 field season. Survey FE-378SS lies to the north of this survey in the vicinity of the Buzzards Bay Entrance Light, and was run from September 3, 1992 to November 2, 1992.

L.2 A comparison between this survey (H-10458) and survey FE-378SS was completed to assess agreement between the two. For this purpose, a chart overlay was plotted with soundings from survey FE-378SS. All soundings from survey H-10458 within a 50-meter radius of each plotted sounding from survey FE-378SS were compared at the junction of the two surveys. Agreement between soundings was excellent. The greatest difference observed between soundings was 3 feet, with an average agreement of 2 feet.

L.3 No discrepancies at the junction with survey FE-378SS were apparent.

L.4 No recommendations for adjustments to soundings, features or depth curves are necessary.

M. COMPARISON WITH PRIOR SURVEYS *See the Evaluation Report*

A comparison with prior surveys will be performed by the Atlantic Hydrographic Section as part of the office verification process.

N. ITEM INVESTIGATION REPORTS

N.1.1 Area of Investigation

AWOIS 7201

Rhode Island Sound

Reported Position:

41°19'30.38"N

071°05'04.14"W

Datum: NAD83

Reported depths: item sank in 81 feet of water

Feature: wreck

N.2.1 Description and Source of Item

This item is listed as the wreck of the fishing vessel CHARLES E. BECKMAN, reported sunk in Notice to Mariners 11/69 in PA 41°19'30"N and 071°05'06"W. According to local authorities John P. Fish and H. Arnold Carr, owners of American Underwater Search and Survey LTD. and authors of numerous books on ship wrecks, AWOIS 7201 is possibly the wreck of the GEORGE S. TARBELL.

N.3.1 Survey Requirements

This item required 200% side scan sonar coverage over a 3000-meter search radius, echo sounder development and a diver investigation. Salvage documentation would be sufficient for disproval. A search radius of 3000 meters was designated about the provided position (41°19'30.38"N and 071°05'04.14"W), except in waters southeast of a line between positions 41°18'08"N / 071°06'18"W and 41°19'50"N / 071°02'57"W.

N.4.1 Method of Investigation

Two hundred percent side scan sonar coverage was achieved over the entire search radius for AWOIS 7201. Both first and second 100% side scan coverages were run concurrently (parallel to each other), with base courses of 090° and 270° True. Due to the overwhelming number of boulders in this area, it was decided to run 20-meter splits over the entire search area for AWOIS 7201. All significant contacts were investigated by echo sounder development, employing line spacing as close as 5 meters.

N.5.1 Results of Investigation

Following review of both the first and second 100% side scan coverage, no contacts were immediately recognizable as that of a wreck of a large fishing vessel. All contacts observed within the area of investigation displayed the signature of naturally occurring objects.

N.6.1 Comparison with Prior Surveys

A comparison with prior surveys will be performed by the Atlantic Hydrographic Section as part of the office verification process.

N.7.1 Comparison with Chart and Charting Recommendations

Largest scale chart of the survey area:

Chart 13218
"Martha's Vineyard to Block Island Sound"
31st ed. January 11, 1992
Scale: 1:80,000

AWOIS 7201, the wreck of the fishing vessel CHARLES E. BECKMAN, has been disproven. A review of the side scan sonar records and echo sounder trace associated with this item gives no indication that this wreck exists within the given search area investigated during this survey. In comparing the side scan information from this item with that of known wrecks, it is apparent that none of the contacts encountered in the search area are that of a wreck. All contacts in this area have the signature of naturally occurring features such as rocks, as opposed to the distinctly un-natural return cast by even a highly deteriorated wreck. It is the hydrographer's opinion that the boulders observed in this area pose a much greater threat to fishermen's nets or vessels anchoring than would a fishing vessel that has been sunk for 24 years.

Based on the results of this investigation, it is the opinion of the hydrographer that the non-dangerous wreck symbol and associated PA be deleted from position 41°19'30.38"N and 071°05'04.14"W. *Concur*

N.1.2 Area of Investigation

AWOIS 7487

Rhode Island Sound

Reported Position:

41°22'06.98"N

071°00'18.53"W

Datum: NAD83

Reported depths: item sank in 75 feet of water

Feature: unknown

N.2.2 Description and Source of Item

During the course of trawling operations, the NOAA Ship Albatross IV became hung fast on an object in position 41°22'06.6"N and 071°00'20.4"W (LORAN C rates: 9960-W 14291.2, 9960-X 25573.9, 9960-Y 43818.5, 9960-Z 60162.7), approximately 0.3 nautical miles north of the reported position of the wreck SEACONNET. This reported position was updated as 41°22'06.98"N and 071°00'18.53"W from survey CL-262/1989. The reported corrected least depth from the attached fathogram was 75 feet. The history of this AWOIS item also refers to AWOIS items 1881 and 7308 as possibly the same wreck reported in different locations. AWOIS 1881 is the wreck of the steamer SEACONNET reported sunk on May 1, 1923 in position 41°21'48.38"N and 071°00'10.13"W, approximately 0.38 nautical miles south southwest of AWOIS 7487, and within the boundaries of this survey. AWOIS 7308 states the SEACONNET's location in position 41°22'09.98"N and 070°59'03.52"W, approximately 0.80 nautical miles east of AWOIS 7487, and outside the boundaries of this survey.

N.3.2 Survey Requirements

This item required 400% side scan sonar coverage over a 700-meter search radius, echo sounder development and diver investigation. Salvage documentation would be sufficient for disproof. A search radius of 700 meters was to be conducted around the above LORAN C rates rather than the provided geographic position. If located, a diver investigation was required to identify the obstruction and obtain a least depth.

N.4.2 Method of Investigation

Two hundred percent side scan sonar coverage was achieved over the portion of the 700-meter search radius that falls within the boundaries of this survey. The wreck was immediately recognizable, therefore a diver investigation was conducted, with no further side scan or hydro investigations required. See dive number 239.2 (Separate VI)*for specific information on the dive investigation.

** Appended to this Report*

N.5.2 Results of Investigation

The SEACONNET was found during the first 100% side scan coverage (contact: 86.255S) in position:

41°22'09.59"N
071°00'22.97"W

The contact was readily recognizable as a wreck on the sonagram by its size and outline. This was later confirmed on August 27, 1993 during dive 239.2. The size of the ship was estimated to be approximately 200 feet by 50 feet, with a least depth of 21.6 meters (corrected with ~~predicted~~^{Approved} tides). The wreck lies upside down with most of its hull intact. A portion of the bow is separated from the rest of the ship and rises approximately 10 feet above the rest of the hull.

N.6.2 Comparison with Prior Surveys

A comparison with prior surveys will be performed by the Atlantic Hydrographic Section as part of the office verification process.

N.7.2 Comparison with Chart and Charting Recommendations

Largest scale chart of the survey area:

Chart 13218
"Martha's Vineyard to Block Island Sound"
31^{TS} ed. January 11, 1992
Scale: 1:80,000

AWOIS 7487, obstruction, has been resolved. AWOIS 1881 is the wreck of the 300-foot cargo steamer SEACONNET reported to lie approximately 0.38 nm south southwest of AWOIS 7487, and is referenced to AWOIS 7487 as possibly the same wreck. Due to the proximity of the two AWOIS items, correlating AWOIS histories, and lack of any other sizable contacts in this general area, AWOIS items 7487 and 1881 should be considered the same item. AWOIS 1881 is therefore also resolved.

Concur

Based on the detached position obtained following dive 239.2, the position of the wreck SEACONNET is updated as:

41°22'08.126"N
071°00'22.611"W

LORAN-C rates: 9960-W 14288.0
9960-X 25576.5
9960-Y 43923.7

Approved- The measured least depth of ^{69.2 (21.1 m)} ~~70.9~~ feet (corrected with predicted tides) poses no threat to the deep draft commercial traffic transiting the area. The wreck would, however, pose problems for the local fishing fleet if their nets were to become snagged on the remaining wreckage. Evidence of this was present on the wreck in the form of fishing net fragments and lobster pot buoy lines.

It is the opinion of the hydrographer that the danger circle and associated Obstn PA symbol be deleted from position 41°22'13.20"N and 071°00'17.40"W, and a non-dangerous wreck symbol with a least depth of ^{69.2} ~~70.9~~ feet, ^(21.1 m) determined by diver investigation, be charted in position ^{69.2} 41°22'08.126"N and 071°00'22.611"W. *Conicur. Chart as 21' WK (69.2) as shown on the present survey*

N.1.3 Area of Investigation

AWOIS 7839

Rhode Island Sound

Reported Position:

41°22'26.94"N

071°00'37.10"W

Datum: NAD83

Reported depths: item sank in 110 feet of water

Feature: wreck

N.2.3 Description and Source of Item

This item is the wreck of the 260-foot steel hull cargo steamer TROJAN, which sank on January 20, 1906 when she was rammed amidships in a dense fog by the passenger steamer NACOCHEE in position 41°22'26.94"N and 071°00'37.10"W (LORAN-C rates: 9960-W 14291.4, 9960-Y 43921.4). There has never been an attempt to salvage, due to the depth of water.

The TROJAN is greatly deteriorated; the decks have collapsed, the hull plating has rusted away and little remains of the ship's deck or pilot house. The wreck lies in 110 feet of water on a muddy bottom with the hull open in several places. She is fouled with several large pieces of nylon dragger and gill nets.

N.3.3 Survey Requirements

This item required 200% side scan sonar coverage over a 700-meter search radius, echo sounder investigation and diver investigation. Salvage documentation would be sufficient for disapproval.

N.4.3 Method of Investigation

Two hundred percent side scan sonar coverage was achieved over the portion of the 700-meter search radius that falls within the boundaries of this survey. The wreck was immediately recognizable, therefore a diver investigation was conducted following further hydrographic development. See dive 239.1 (Separate VI)* for specific information on the dive investigation. ** Appended to This Report*

N.5.3 Results of Investigation

The TROJAN was found during the first 100% side scan coverage (contact: 32.43S) in position:

41°22'29.680"N
071°00'38.021"W

The contact was readily recognizable as a wreck on the sonagram by its size and outline. This was later confirmed on August 26, 1993 during dive 239.1. The wreck was found to be badly deteriorated. A pneumatic least depth of 25.0' (82.3-ft) meters (corrected with ^{Approx.} predicted tides) was taken on what was believed to be the ship's boiler.

N.6.3 Comparison with Prior Surveys

A comparison with prior surveys will be performed by the Atlantic Hydrographic Section as part of the office verification process.

N.7.3 Comparison with Chart and Charting Recommendations

Largest scale chart of the survey area:

Chart 13218
"Martha's Vineyard to Block Island Sound"
31st ed. January 11, 1992
Scale: 1:80,000

AWOIS 7839, the ^{uncharted}wreck of the cargo steamer TROJAN, has been resolved. Based on the detached position obtained following dive 239.1, the position of the wreck TROJAN is updated to:

41°22'29.356"N
071°00'38.302"W

LORAN-C rates: 9960-W 14291.0
9960-X 25577.8
9960-Y 43921.6

The measured least depth of 82.³₀ ^(25.1 m) feet (corrected with predicted tides) poses no threat to the deep-draft commercial traffic transiting the area. The wreck would, however, pose problems for the local fishing fleet if their nets were to become snagged on the remaining wreckage. Evidence of this was present on the wreck in the form of fishing net fragments and lobster pot buoy lines.

It is the opinion of the hydrographer that a non-dangerous wreck symbol with a least depth of 82.³₀ ^(25.1 m) feet be charted in position 41°22'29.356"N and 071°00'38.302"W. ✓

Concur
Chart as 25'WK (82.3-ft) as shown on the present survey

Development Abstracts

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
1	308.25S, 312.10S, 312.235P, 318.085P, 318.10S, 320.20S, 320.24S	⁰⁵ 1552-1617 2105-2122 6712-6749	18.9 19.1*	6714.2	41°23'32.614"N 071°05'08.783"W	
2	305.115P, 309.38S, 311.22P, 311.395S, 315.14S	^{1606 1617} 1620-1663 6750-6765	16.87 *	6752.1 1620.2	41°23'25.004"N 071°04'44.040"W 43.403	Rock
3	271.10P, 271.175S, 283.07S, 289.56P, 290.12S	1967-2104 6822-6845	14.7	2003.3	41°23'00.568"N 071°05'02.815"W	Rock
4	267.075S, 271.37S, 272.07P, 272.09S, 295.025S, 300.58S	1664-1936 6766-6821	16.4	1999.1	41°22'59.691"N 071°05'06.537"W	Not shown on SS
5	258.14P, 258.35S, 263.345S, 327.015S, 327.39S	1937-1966 6846-6883	20.23 *	6876.1	41°22'46.005"N 071°05'06.201"W	Rock
6	394.445S, 401.20S, 406.585P	2123-2146	23.46 *	2125.3	41°22'03.895"N 071°04'54.606"W	Rock
7	444.27S, 450.565S	2147-2158	23.01 *	2155.3	41°21'43.794"N 071°05'03.194"W	Rock
8	463.31S	2159-2166	22.01 *	2159.1	41°21'38.348"N 071°05'09.208"W	Rock
9	727.10P, 736.065P	2167-2168 6584-6595	18.42 *	6570.3	41°21'49.653"N 071°03'49.110"W	Rock

* Changes due to smooth tide application

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
10	97.02S	2169-2174	21.31 * 7020.2	2173.2 7020.2	41°22'08.566"N 071°00'22.583"W	Rock
11	74.19S, 76.44S	2175-2184	26.01 *	2181.2	41°22'15.510"N 071°00'15.878"W	Not shown on SS
12	154.21P	2185-2192	25.78 *	2187.2	41°21'52.012"N 070°59'53.472"W	
13	22.53S, 36.04S, 46.12S, 48.09S, 58.42P	2193-2204 2215-2232	25.75 *	2223.1 2231.2	41°22'25.161"N 070°59'56.628"W 52.419	
14	34.185P	2205-2214	25.5	2209.2	41°22'33.963"N 070°59'49.891"W	Rock
15	62.12P	2233-2238	25.3	2233.1	41°22'17.835"N 070°59'58.159"W	Rock
16	89.09P, 108.04S, 110.04S	2239-2266	24.2	2243.1	41°22'08.212"N 070°59'57.270"W	
17	92.52S, 114.38S, 135.51P	2267-2282 2291-2310 6700-6711	21.54 *	6701.1	41°21'54.436"N 071°02'09.839"W	Rock
18	103.225P, 135.09P, 136.19P	2283-2290 2311-2385 6680-6699	17.43 *	2336.2	41°21'54.191"N 071°02'30.579"W	Rock
19	644.08S, 713.31P	2386-2395	21.2	2386.2	41°20'53.103"N 071°02'09.980"W	Rock
20	665.495S	2396-2401	23.8 *	2401.0 666.2	41°21'02.761"N 071°02'02.899"W 126	Rock

* Changes due to Smooth Tide Application 10.683

DEVELOPMENT ABSTRACT
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NOAA Ship RUDE
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DEV	Side Scan Contact Number (s)	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
21	168.03P, 168.055P, 170.59S, 182.52S, 197.03S, 197.05S	2402-2421 2428-2445 6650-6679	20.5	2404.3	41°21'34.019"N 071°02'14.213"W	Rock
22	167.32P	2422-2427	23.1 * 22.7	2422.2 167.2	41°21' ^{43.496} 42.819"N 071°02'05.982"W	Rock 01.1003
23	680.08S	2471-2476	27.3	2473.0	41°21'07.396"N 071°05'59.386"W	
24	600.285S	2477-2486	25.67*	2485.2	41°20'53.535"N 071°05'56.511"W	Rock
25	1460.18P, 1486.54P, 1491.21S	5256-5277 5849-5866	26.45*	5851.1 5123.2	41°18'28.062"N 071°06'24.218"W	.119
26	1393.09S	5280-5291	25.45*	5929.3 5292.3	41°18'40.898"N 071°06'39.088"W	Rock
27	1389.03S, 1433.29S	5292-5309	22.64*	5304.4	41°18'57.364"N 071°06' ⁷¹³ 53.908"W	56.641
28	1403.20P, 1412.49P, 1426.50S, 1432.07S	5310-5319 5336-5347	22.67*	5338.2 4828.5	41°18'40.169"N 071°05'59.662"W	Rock
29	1402.42P, 1413.24P, 1443.20S	5320-5335 5348-5357	19.5	5322.3	41°18'49.473"N 071°05'54.006"W	Rock
30	1454.53S, 1470.21S, 1472.16S	5358-5365 5867-5876	26.01*	5873.1	41°18'21.254"N 071°05'46.825"W	Rock
31	1375.56S, 1415.05S, 1417.26S, 1442.13P	5366-5381 5877-5884	26.78*	5881.2	41°18'33.386"N 071°05'16.876"W	Rock

* Changes due to Smooth Tide application

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DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth (m)	ID Pos	Geographic Position	Remarks
32	1321.37P, 1339.36P, 1340.31S, 1344.25S	5382-5389 5885-5898	23.1	5386.3	41°19'09.921"N 071°05'12.294"W	Rock
33	1295.44S, 1322.48P, 1338.22S	5390-5397 5417-5429	17.54 *	5417.2	41°19'09.938"N 071°05'46.601"W	Rock
34	1276.28S, 1305.28S, 1335.28P, 1347.13P, 1354.29S, 1365.56S	5430-5475	17.74 *	5430.3 4495.1	41°19'22.712"N 071°06'09.770"W ^{24.985} 6.821	Rock
35	1293.29S, 1307.19P, 1307.24S, 1311.45P, 1324.39P, 1336.24P, 1354.10S, 1366.18S	5476-5527	20.0 19.9 *	5485.4	41°19'00.958"N 071°06'41.088"W	
36	1310.19S, 1327.57P, 1368.02P, 1370.37P	5528-5566	23.9	5546.3	41°19'11.121"N 071°07'28.424"W	Rock
37	1228.21S	5567-5574	23.4	5569.4	41°19'32.778"N 071°06'45.220"W	Rock
38	1224.00P, 1228.55P, 1228.57S	5575-5594	16.4	5581.4	41°19'33.213"N 071°06'27.213"W	Rock
39	1229.48S, 1246.12S, 1269.11S	5595-5624	18.7	5617.2	41°19'30.793"N 071°06'03.188"W	
40	1222.47P, 1230.09P, 1268.31P, 1277.17P	5625-5658	17.77	5629.4 4357.7	41°19'35.363"N 071°05'51.772"W ⁴⁵⁰ 626	Rock
41	1255.13S, 1268.05S	5659-5674	18.9	5671.2	41°19'26.611"N 071°05'35.042"W	Rock

* Changes due to Smooth Tide application

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NOAA Ship RUDE
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DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
42	1192.30P, 1193.04P, 1202.59P, 1203.31P, 1220.00P, 1221.22P, 1231.39P, 1255.51P, 1257.12P	5675-5712	18.0 ¹ *	5701.4	41°19'41.702"N 071°05'17.184"W	Rock
43	1190.54S, 1233.22P, 1238.53S, 1242.34S, 1242.59P	5713-5734	26.5 ⁶ *	5719.3	41°19'30.101"N 071°04'34.480"W	Rock
44	1217.06P, 1233.57P	5735-5742	27.3	5739.5	41°19'35.568"N 071°04'02.052"W	Rock
45	1068.22S, 1090.03S, 1090.46P, 1111.48P	5743-5796	25.9	5747.5	41°20'03.198"N 071°03'57.776"W	Rock
46	1110.43S, 1123.09S, 1123.47S, 1138.30P, 1160.35P	5797-5838	20.6	5837.3	41°19'58.204"N 071°04'43.925"W	
47	1135.15P, 1135.26S, 1148.24S, 1148.36S, 1534.29P	5839-5848 5899-5906	16.8 ⁷ *	5901.1	41°19'53.438"N 071°05'08.822"W	Rock
48	1108.25P, 1134.27S, 1134.50S, 1148.59S, 1149.22S	5907-5932	14.2 ³ *	5909.1	41°19'55.009"N 071°05'35.832"W	
49	1099.12P, 1125.58S, 1126.06P, 1536.48P	5933-5958	13.8	5953.1	41°19'58.069"N 071°05'46.981"W	Rock
50	1150.32P	5959-5964	19.2 ² *	5959.1 4135.4	41°19'51.449"N 071°06'07.067"W	

* Changes due to Smooth Tide application

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
51	1000.01S, 1024.47S, 1051.12S	5965-5978	20.0 ¹ *	5973.1	41°20'19.948"N 071°06'08.265"W	
52	1105.52S, 1156.16P	5979-5994	20.6 ² *	5987.1 3976.2	41°19'59.925"N 071°06'31.228"W	Rock 32.619
53	971.50S, 998.34P	5995-6004 6185-6192	24.2	6001.1	41°20'22.315"N 071°06'46.588"W	Rock
54	903.05S, 920.105S, 930.515S, 961.47S, 1013.49P	6005-6044	21.6 ⁴ *	6027.1 3447.9	41°20'33.500"N 071°03'31.971"W 32.921	
55	902.50P, 920.385P	6045-6056	24.1	6049.1	41°20'37.188"N 071°03'00.318"W	
56	918.225S, 1014.54P, 1015.41P, 1031.49P	6057-6088	21.1 20.1 *	6081.1 934.1	41°20'34.226"N 071°04'07.465"W	Rock 06.576
57	905.32P	6089-6094	24.5 ⁶ *	6091.2	41°20'40.309"N 071°04'16.860"W	
58	917.26P, 935.05S, 1515.35S	6095-6112	14.1 12.3 *	6109.2 6100.6	41°20'38.187"N 071°04'39.090"W	Rock 41.096
59	975.16S, 989.45S	6113-6118	23.6 ⁷ *	6115.2	41°20'24.938"N 071°04'57.503"W	Rock
60	935.48P, 946.145P	6119-6132	20.9 18.8 *	6129.2 3467.7	41°20'32.652"N 071°04'52.936"W	49.083
61	893.435P, 907.40S	6133-6144	20.7 ⁸ *	6137.2	41°20'40.735"N 071°05'07.000"W	

* Changes due to Smooth Tide application

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DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
62	863.02S, 870.375P, 894.10S	6145-6172	15.97 *	6165.2 6100.5	41°20'47. ⁸⁰⁸ 666"N 071°05'14.884"W	Rock .80Z
63	895.31S, 938.35P	6173-6184	26.87 *	6177.2	41°20'42.415"N 071°06'03.540"W	
64	861.575S	6193-6200	16.95 *	6199.1 3172.7	41°20'52. ³²⁷ 285"N 071°04'40.519"W	.450
65	838.18S	6201-6210	14.1	6207.1	41°20'53.916"N 071°04'29.440"W	Rock
66	875.325S, 876.215S, 890.08S, 890.485S	6211-6228	21.10 *	6221.2 3279.6	41°20'43.199"N 071°03'14.302"W	.087
67	844.55P, 889.275S	6229-6240	21.2 20.1 *	6229.1 3185.4	41°20'49. ⁵⁰⁹⁴⁵ 903"N 071°03'03.794"W	04.194 03.94
68	555.095P, 558.16P, 572.55P	6312-6341	19.10 *	6328.2	41°21'18.928"N 071°02'44.374"W	Rock
69	242.00P, 540.27S, 820.43S, 821.16S	6342-6385	18.5	6356.2	41°21'10.570"N 071°03'05.835"W	Rock
70	825.02P	6386-6393	19.5 17.4 *	6386.5 815.1	41°21'06. ⁷⁵³⁴ 175"N 071°03'54.925"W	53.078
71	829.31P	6394-6399	17.9	6408.3	41°21'05.534"N 071°04'07.872"W	
72	243.55P, 244.16P, 815.40S	6400-6423	12.21 *	6398. 4	41°21'08.133"N 071°04'07.883"W	Rock
73	770.59P	6424-6431	12.4 11.9 *	6422.2 2834.2	41°21'21. ²⁰⁸²⁵ 859"N 071°03'59.993"W	04'02.815

* Changes due to Smooth Tide Application

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
74	792.56S	6432-6439	9.78 32.18 *	6434.2	41°21'21.362"N 071°03'51.249"W	Rock
75	243.33S	6440-6447	12.28 3 *	6440.1	041°21'18.970"N 071°03'49.925"W	
76	805.235S	6448-6455	13.0 12.9 *	6454.2	41°21'14.086"N 071°04'22.619"W	Rock
77	816.155P, 826.055S	6456-6471	12.8 12.0 *	6458.1 6100Z	41°21'04.020"N 071°04'26.505"W	Rock
78	581.285P, 591.08S	6472-6493	14.0 1 *	6484.2	41°20'58.056"N 071°04'41.124"W	Rock
79	683.48S	6494-6511	20.8	6508.2	41°20'57.839"N 071°04'51.479"W	
80	590.03P	6512-6527	22.1	6522.1	41°21'01.177"N 071°05'12.037"W	Rock
81	692.51S	6528-6537	23.8	6528.2	41°20'57.678"N 071°05'28.023"W	
82	522.29P	6538-6545	23.7	6538.1	41°21'10.932"N 071°04'48.761"W	
83	735.59P, 748.20P, 755.38S	6546-6573	10.72 134 *	6560.4 61000	41°21'36.518"N 071°03'41.744"W	Rock
84	729.455S	6574-6583	12.84 6578.1 *	6587.1	41°21'47.962"N 071°03'36.127"W	Rock
85	721.29P	6596-6601	10.7	6560.4	41°21'36.517"N 071°03'41.747"W	

* Changes due to smooth Tide application

DEV	Side Scan Contact Number(s)	Hydro Dev Positions	Least Depth (m)	LD Pos	Geographic Position	Remarks
86	761.33P	6602-6627	13.7 * 11.7 *	6614.3 2665.3	41°21'34. ⁹⁸⁹ 875"N 071°03'24.553"W	Rock 19.953
87	772.405S	6628-6635	12.85 *	6628.1 2751.1	41°21'28. ⁵⁰⁴ 567"N 071°03'31.674"W	Rock .717
88	754.37P	6636-6649	15.2 * 11.7 *	6646.3 2665.3	41°21'34. ⁹⁸⁷ 809"N 071°03'21.576"W	Rock 19.953
89	264.31S, 265.09S, 326.565S	6884-6911	16.43 *	6596.2	41°21'55.135"N 071°03'16.692"W	Rock

Changes due to Smooth Tide application

O. COMPARISON WITH THE CHART *See also the Evaluation Report*

O.1 Charts effected by this survey are:

Chart 13218
 "Martha's Vineyard to Block Island"
 31st ed. January 11, 1992
 Scale: 1:80,000

O.2 On August 18, 1993, a Danger to Navigation Report was sent to the Commander, First Coast Guard District outlining charted discrepancies found during this survey. The details of this report are outlined below. See Appendix I* for a complete copy of this report.

** Appended to This Report*

REPORT OF DANGER TO NAVIGATION

DEPTHS TO BE DELETED		
Chart 13218 (31st ed. 11 January 92)		
Chart Scale: 1:80,000		
**DEPTH (MLLW)	LATITUDE	LONGITUDE
45 ft	41°21'06.00"N	071°04'22.80"W
56 ft	41°20'50.40"N	071°05'15.00"W
48 ft	41°20'37.20"N	071°04'36.60"W
53 ft	41°19'54.00"N	071°05'36.00"W
48 ft	41°19'46.80"N	071°05'55.20"W

Concur

DEPTHS TO BE ADDED		
Chart 13218 (31st ed. 11 January 92)		
Chart Scale: 1:80,000		
*DEPTH (MLLW)(m)	LATITUDE	LONGITUDE
33 34 ft (10.2)	41°21'36.193"N	071°03'41.800"W
33 36 ft (10.2)	41°21'28.530"N	071°03'48.788"W
39 ft (12.0)	41°21'04.126"N	071°04'26.134"W
51 53 ft (15.7)	41°20'47.782"N	071°05'14.984"W
40 42 ft (12.3)	41°20'37.395"N	071°04'41.209"W
42 43 ft (12.9)	41°19'49.789"N	071°05'38.531"W
39 41 ft (12.1)	41°19'46.948"N	071°06'02.847"W

Concur

* Updated depths should be viewed as preliminary information, subject to office review.

** Depths reduced to MLLW using predicted tides.

0.3 The overall correlation between charted depths and survey soundings is excellent, with average differences of approximately 3 feet. This is excellent agreement considering the large number of point features located in this area.

The southwest portion of the survey area covers approximately 2.4 nautical miles of the north end of the inbound lane in the Buzzards Bay Traffic Scheme. There are five charted depths that are common to the traffic lane and the survey area. Correlation between these soundings was excellent, with a greatest difference observed between soundings and charted depths of 4 feet and an average agreement of 2 feet.

0.4 The correlation between charted shoal areas and corresponding soundings from this survey is excellent. The chart shows two shoal areas within this survey, Brown's Ledge and the shoal area approximately 1.5 nautical miles north of Brown's Ledge. The correlation between these charted shoal areas and soundings acquired during this survey is excellent, except for those areas addressed in Section 0.2 of this report.

0.5 The only recommended changes to chart 13218, 31st ed. January 11, 1992, are those already addressed in section N (Item Investigation Reports) and section 0.2 (see also Appendix I - Danger to Navigation Report)*of this report.

* Appended to This Report

P. ADEQUACY OF SURVEY see also The Evaluation Report

P.1 This survey is complete and adequate to supersede prior surveys.

P.2 This survey is complete and contains no substandard data.

Q. AIDS TO NAVIGATION

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

Q.2 There were no floating aids to navigation within the survey area.

Q.3 There were no aids to navigation within the boundaries of this survey listed in the light list, private or otherwise.

Q.4 No bridges, overhead cables or overhead pipelines are located within the survey area.

Q.5 No pipelines or ferry routes are located within the survey area. The southwest portion of the survey area covers approximately 2.4 nautical miles of the north end of the inbound lane of the Buzzards Bay Traffic Scheme. Traffic in these lanes consist mostly of commercial tugs and barges transiting between New York and Boston via the Cape Cod Canal. However, just to the northeast of this survey area, the cruise ship REGAL EMPRESS transits to the Cape Cod Canal from Vineyard Sound via Buzzards Bay. The track she follows around Cuttyhunk Island is between Buzzards Bay Light Tower and Sow and Pigs Reef buoy.

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

R. STATISTICS

R.1	a) Number of positions	7043
	b) Lineal nautical miles of sounding lines	
	- nautical miles of survey with the use of the side scan sonar	410.15
	- nautical miles of survey without the use of the side scan sonar	889.02
R.2	a) square nautical miles of hydrography	
	- per 100% of coverage	15.75
	b) days of production	55
	c) detached positions	30
	- 9 for diver investigations	
	- 2 for GPS system check	
	- 19 for bottom samples	
	d) bottom samples	19
	e) tide stations	1
	f) current stations	0
	g) velocity casts	18
	h) magnetic stations	0
	i) XBT drops	0

S. MISCELLANEOUS *See also the Evaluation Report*

S.1 a) No evidence of silting was found during this survey.

b) No evidence of unusual submarine features was found during this survey.

c) No evidence of anomalous tidal conditions was found during this survey.

d) Evidence of the predicted rotary currents in the vicinity of Brown's Ledge was observed during this survey. Crab angles, sometimes as large as 10°, were often required to keep the ship on the reference line. The corresponding directions of currents matched that of the predicted currents in the TIDAL CURRENTS book.

e) No evidence of magnetic anomalies was found during this survey.

S.2 Nineteen bottom samples were obtained during this survey. As directed in the project instructions, no bottom samples were submitted to the Smithsonian Institution.

T. RECOMMENDATIONS

T.1 See section 0.2 and Appendix I for dangers to navigation noted during this survey.

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

T.3 No further investigation of the survey area is recommended.

U. REFERRAL TO REPORTS

No reports have been published which are not part of this Descriptive Report.

APPENDIX III

LIST OF HORIZONTAL CONTROL STATIONS

No horizontal control stations were needed for this survey as Differential GPS was employed exclusively for all positioning control. The following are the geographic positions for the Differential GPS radio beacons used during this survey:

Portsmouth, N. H.	41°04'02.047"N	071°51'38.274"W
Montauk, N. Y.	41°04'15.064"N	070°42'36.805"W

APPENDIX II

NON-FLOATING AIDS AND LANDMARKS FOR CHARTS

NOAA Form 76-40 is not submitted since there are no non-floating aids or landmarks within the boundaries of this survey.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of NOAA Corps Operations
NOAA Ship RUDE S-590
439 W. York Street
Norfolk, VA 23510-1114

18 August 1993

Commander
First Coast Guard District
Aids To Navigation Office
408 Atlantic Avenue
Boston, Massachusetts 02110-3350

Dear Sir:

During the preliminary stages of NOAA Ship RUDE's hydrographic survey of Browns Ledge, near the entrance corridor to Buzzards Bay, several discrepancies were found in the depths on chart 13218 (31st ed. 11 Jan. 92). Soundings acquired during this survey have been found to be as much as 10 feet shoaler than the charted depths in this area. It is requested that information concerning these discrepancies be published in the Local Notice to Mariners.

Updated depths are outlined in this report as are the charted depths they are to supersede. These depths should be viewed as preliminary information subject to office review.

Enclosed you will find a chartlet of the area being surveyed, with the charted depths to be removed, highlighted. A chart overlay is also included showing the updated survey soundings. Photocopies of the fathograms which show these new depths are also enclosed.

The survey soundings were determined during preliminary hydro investigation using a Raytheon DSF-6000. The depths have been reduced to Mean Lower Low Water (MLLW) by applying predicted tide corrections. The horizontal datum is NAD 83.

This investigation was performed in support of the following hydrographic survey.

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number...H-10458
State.....Massachusetts
General Locality.....Rhode Island Sound
Locality.....Six NM SW of Sow and Pigs
Reef
Project Number.....OPR-B660
Surveyed by.....NOAA Ship RUDE



CHANGES TO CHART 13218

DEPTHS TO BE DELETED Chart 13218 (31 st ed., 11 Jan 92) Chart Scale 1:80,000		
DEPTH (MLLW)	LATITUDE	LONGITUDE
45 ft	41°-21'-06.00"N	071°-04'-22.80"W
56 ft	41°-20'-50.40"N	071°-05'-15.00"W
48 ft	41°-20'-37.20"N	071°-04'-36.60"W
53 ft	41°-19'-54.00"N	071°-05'-36.00"W
48 ft	41°-19'-46.80"N	071°-05'-55.20"W

CONTOUR

* UPDATED DEPTHS Chart 13218 (31 st ed., 11 Jan 92) Chart Scale 1:80,000		
**DEPTH (MLLW)(M)	LATITUDE	LONGITUDE
33 34 ft (10.2)	41°-21'-36.193"N	071°-03'-41.800"W
33 36 ft (10.2)	41°-21'-28.530"N	071°-03'-48.788"W
39 39 ft (12.0)	41°-21'-04.126"N	071°-04'-26.134"W
51 53 ft (15.7)	41°-20'-47.782"N	071°-05'-14.984"W
40 42 ft (12.3)	41°-20'-37.395"N	071°-04'-41.209"W
42 43 ft (12.9)	41°-19'-49.789"N	071°-05'-38.531"W
39 41 ft (12.1)	41°-19'-46.948"N	071°-06'-02.847"W

+

* Updated depths should be viewed as preliminary information, subject to office review.

** Depths reduced to MLLW using ^{Approved} predicted tides.

Contact either of the following personnel for further information.

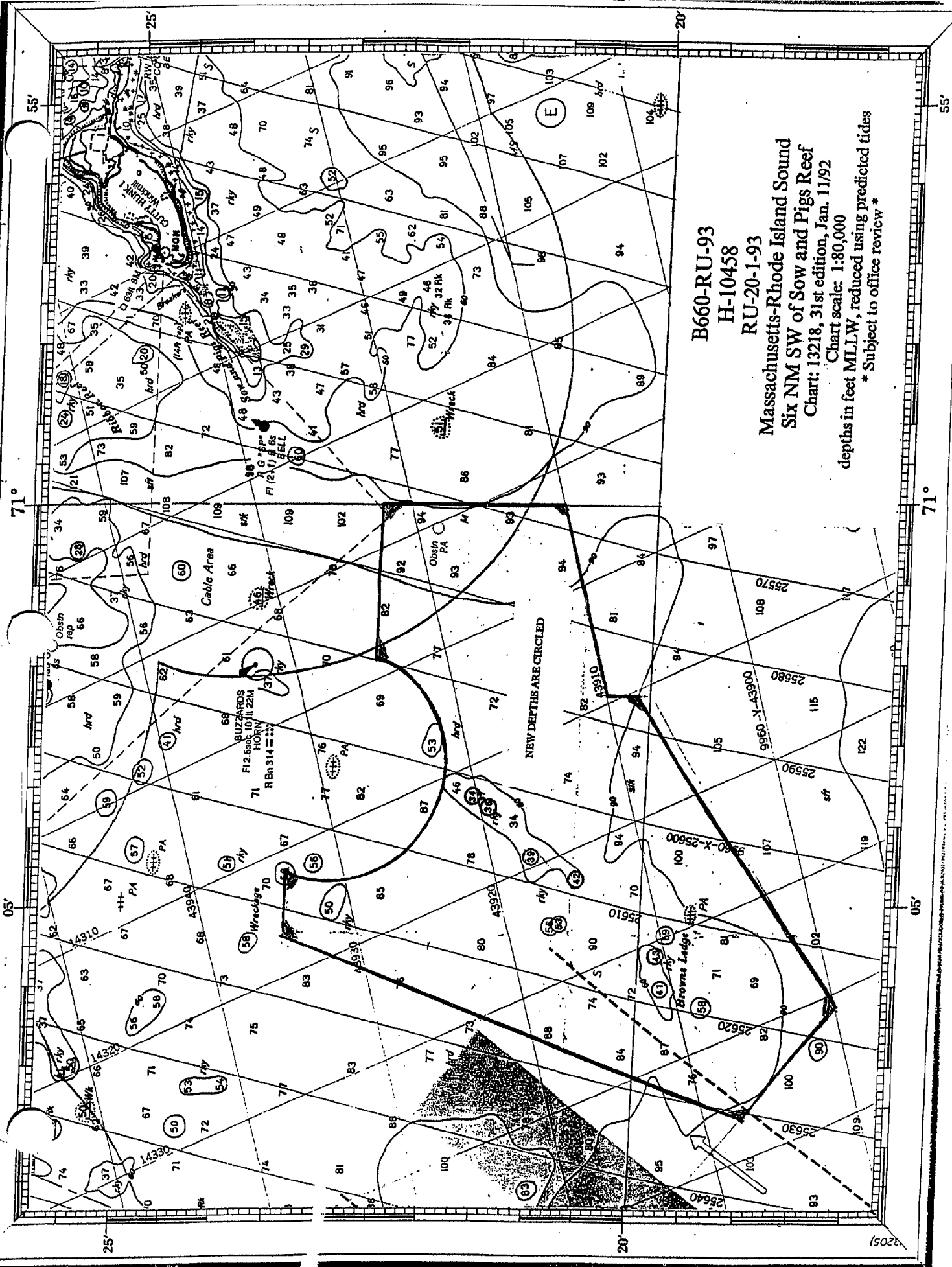
Commanding Officer
NOAA Ship RUDE
16 Sconticut Neck. Rd
#244
Fairhaven, MA. 02719
508-979-0600

Chief, Atlantic Hydrographic Section
Atlantic Marine Center
439 W. York St
Norfolk, VA. 23510
804-441-6746

Sincerely,

Daniel R. Herlihy

Daniel R. Herlihy
Lieutenant Commander, NOAA
Commanding Officer, NOAA Ship RUDE



B660-RU-93
 H-10458
 RU-20-1-93

Massachusetts-Rhode Island Sound
 Six NM SW of Sow and Pigs Reef
 Chart: 13218, 31st edition, Jan. 11/92

Chart scale: 1:80,000
 depths in feet MLLW, reduced using predicted tides
 * Subject to office review *

NEW DEPTHS ARE CIRCLED

2646

00 M

2647

00 M

2648

2649

34 FT
41-21-36103N
071-03-41500W

10 M

10 M

20 M

20 M

30 M

30 M

40 M

40 M

50 M

50 M

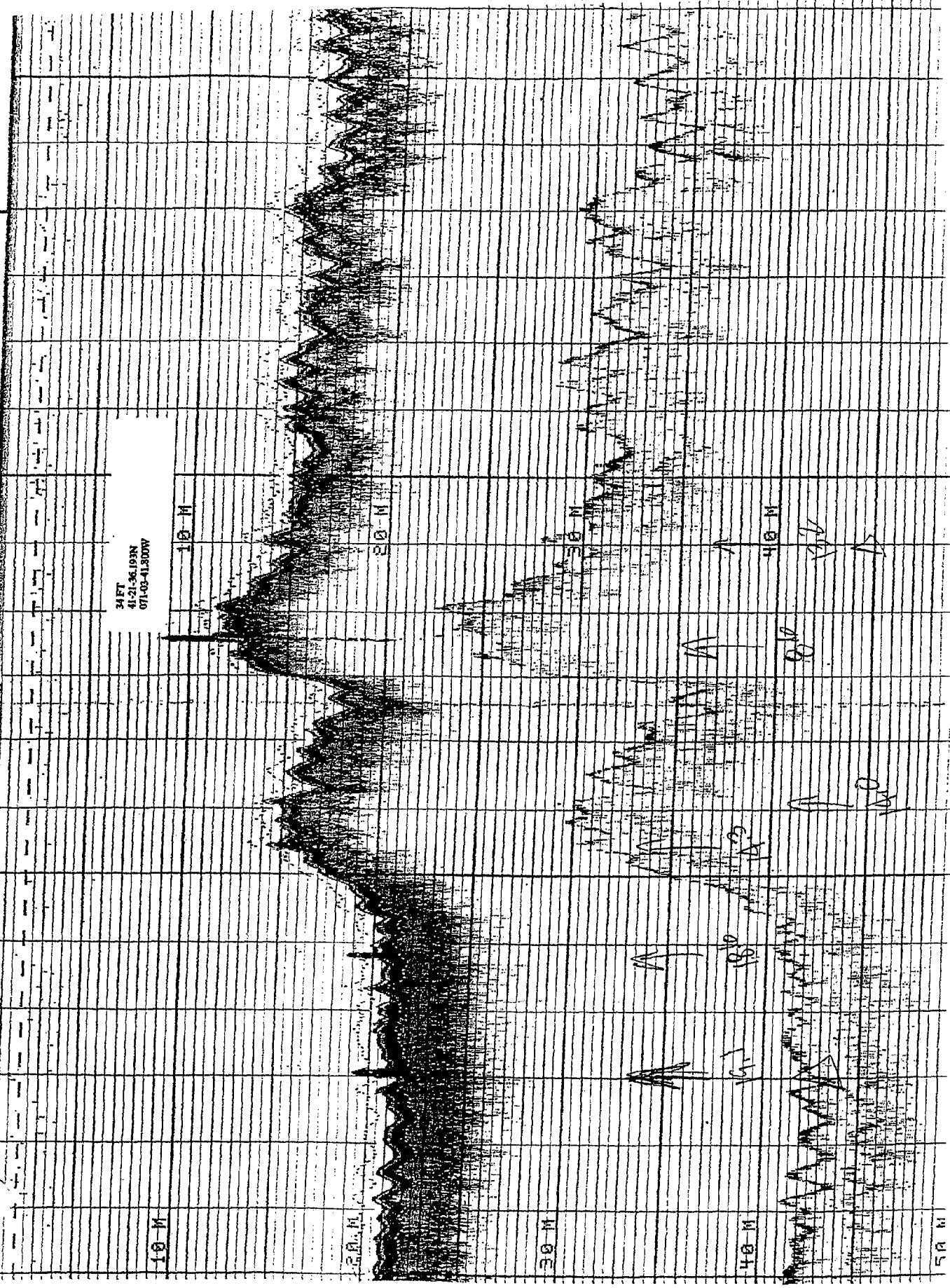
60 M

70 M

80 M

90 M

100 M

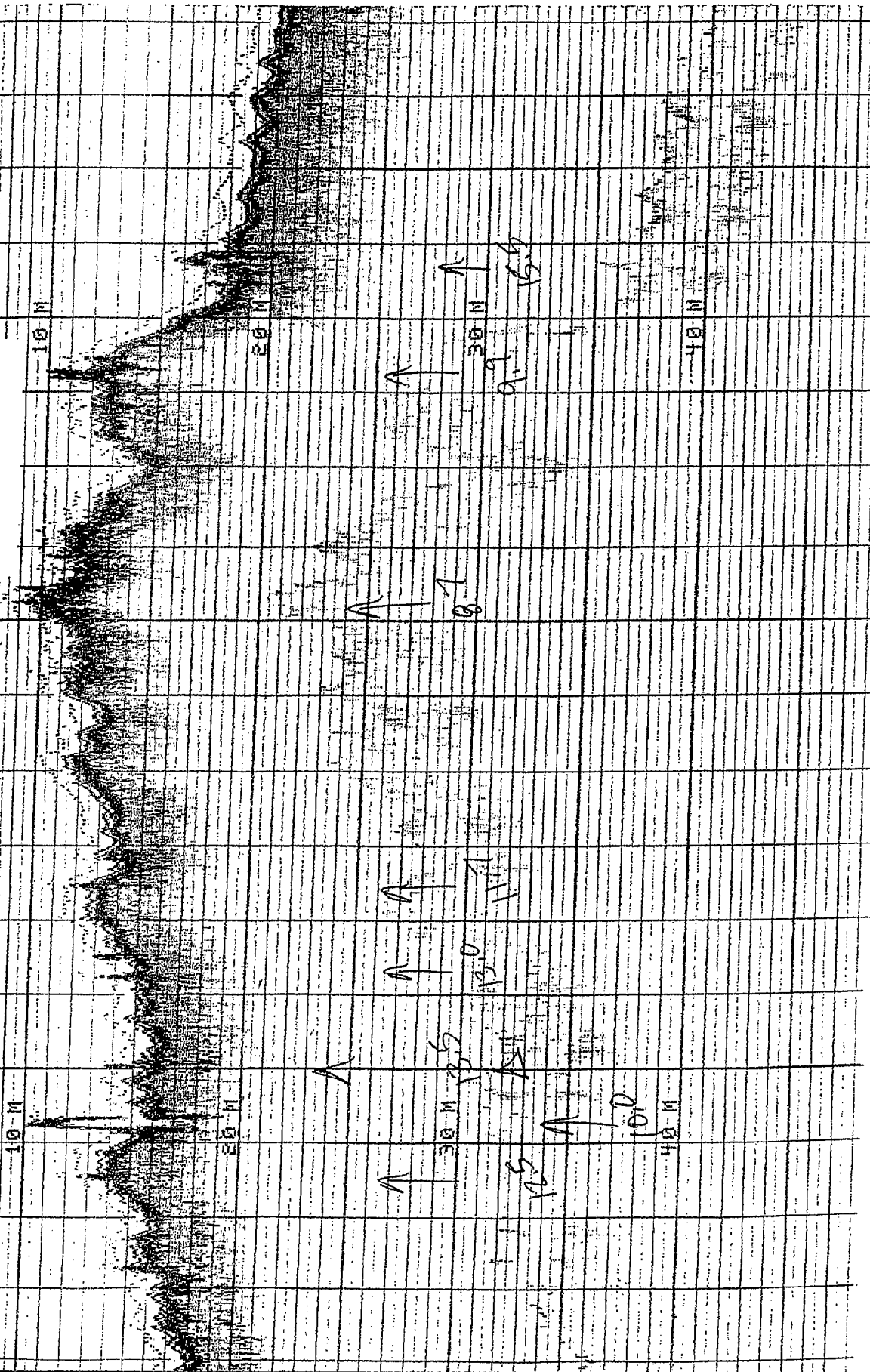


00 M 2752

753

00 M 2754

36 FT
41-21-28.530N
071-03-48.788Y



4044

00 M

00 M

39 FT
41-21-04128Y
071-04-26134W

10 M

10 M

20 M

10.0

10.0

10.0

10.0

30 M

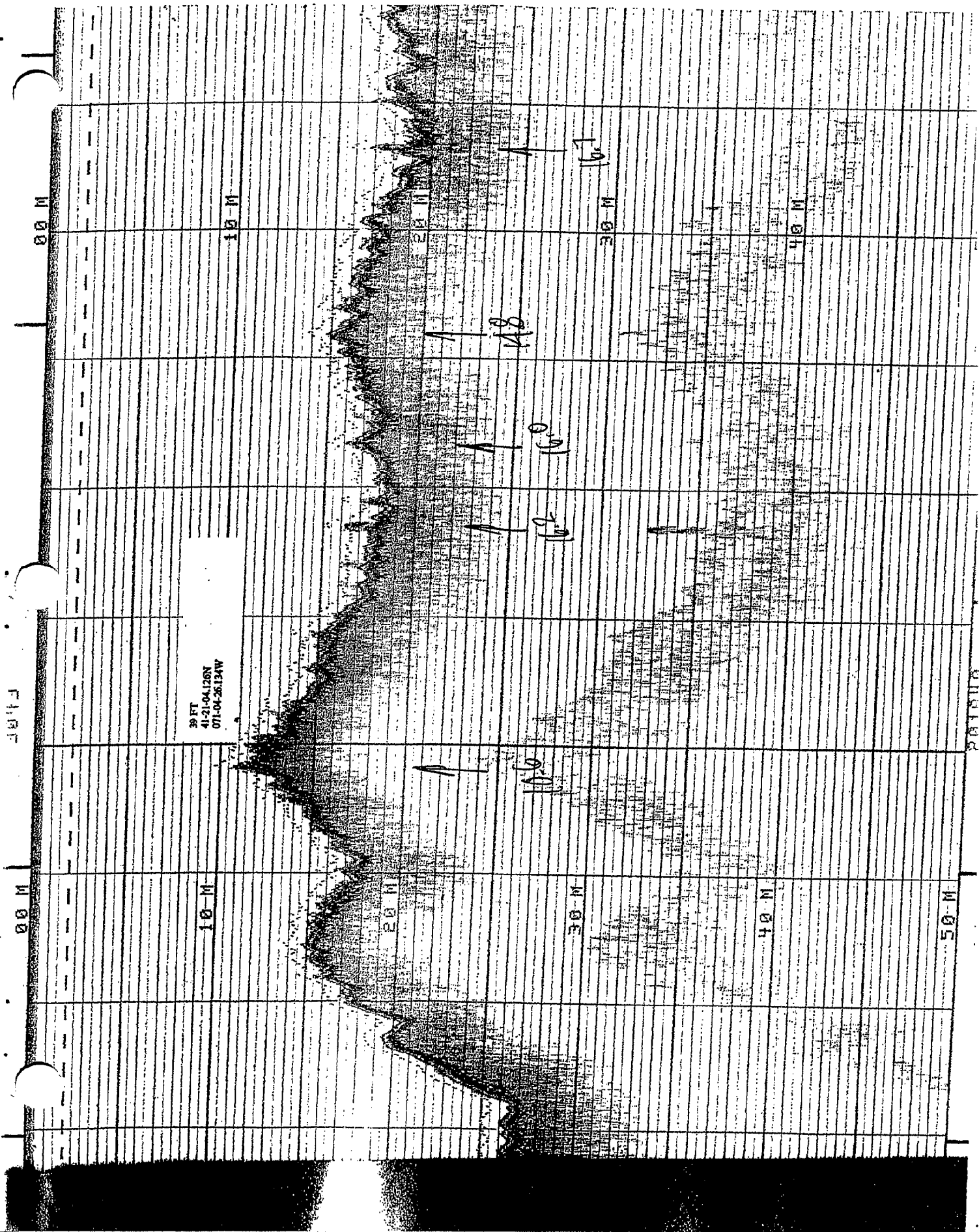
30 M

40 M

40 M

50 M

20110108



3224

M

10 M

30 M

40 M

50 M

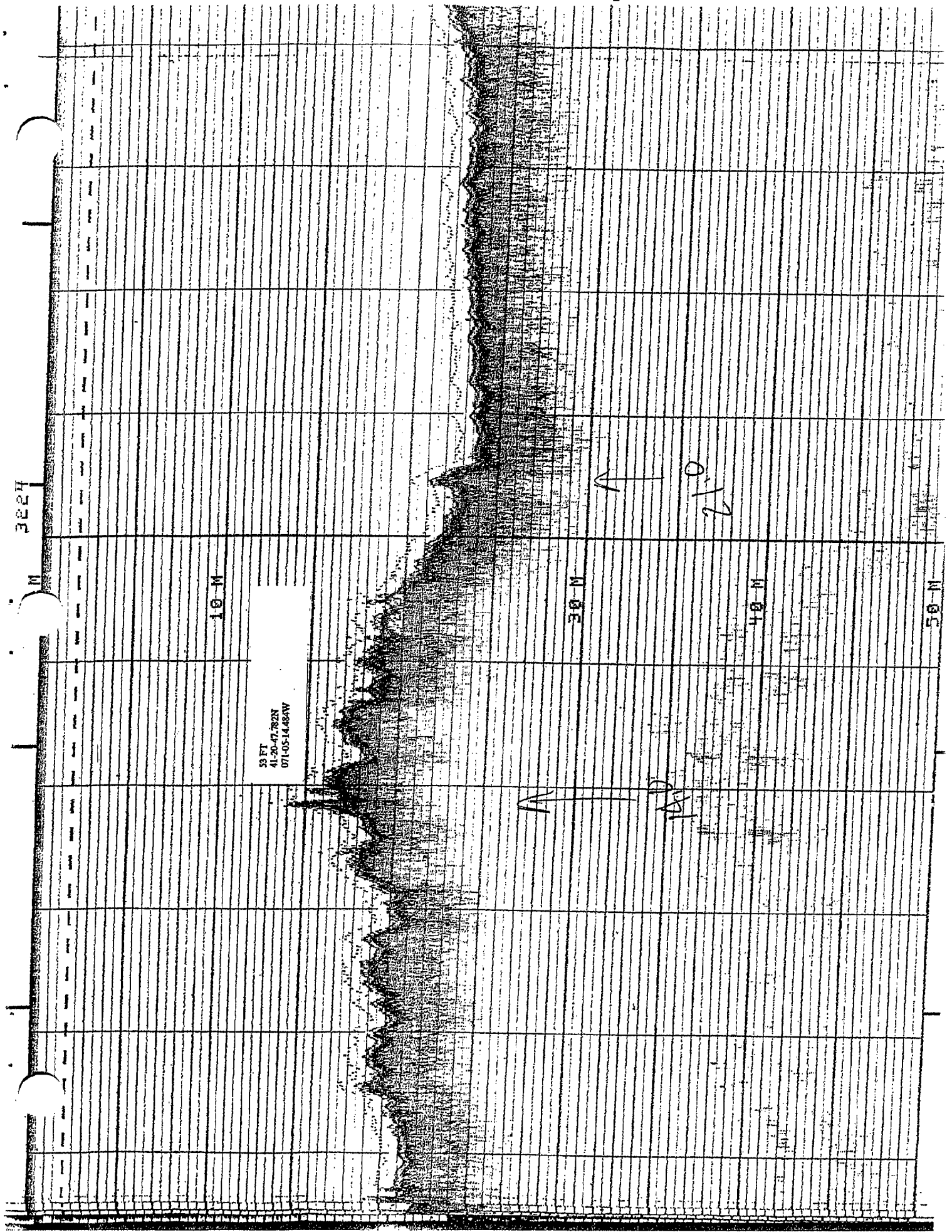
33 FT
41-20-47.282N
071405-14.468W

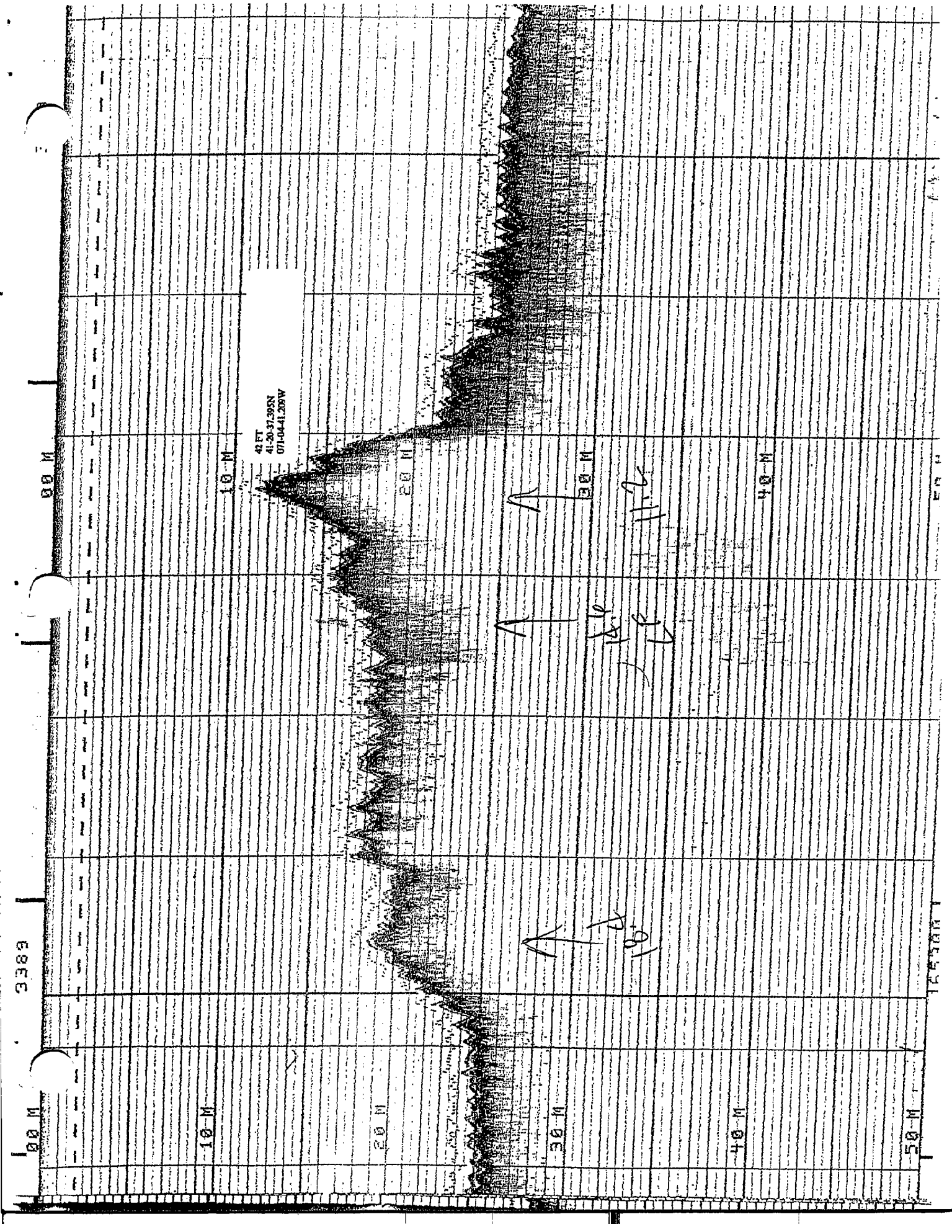
N

21.0
2

N

N





42 FT
41-20-37.395N
071-04-41.200W

00 M

10 M

20 M

30 M

40 M

50 M

g.H

g.L

g

3389

00 M

10 M

20 M

30 M

40 M

50 M

155001

1158

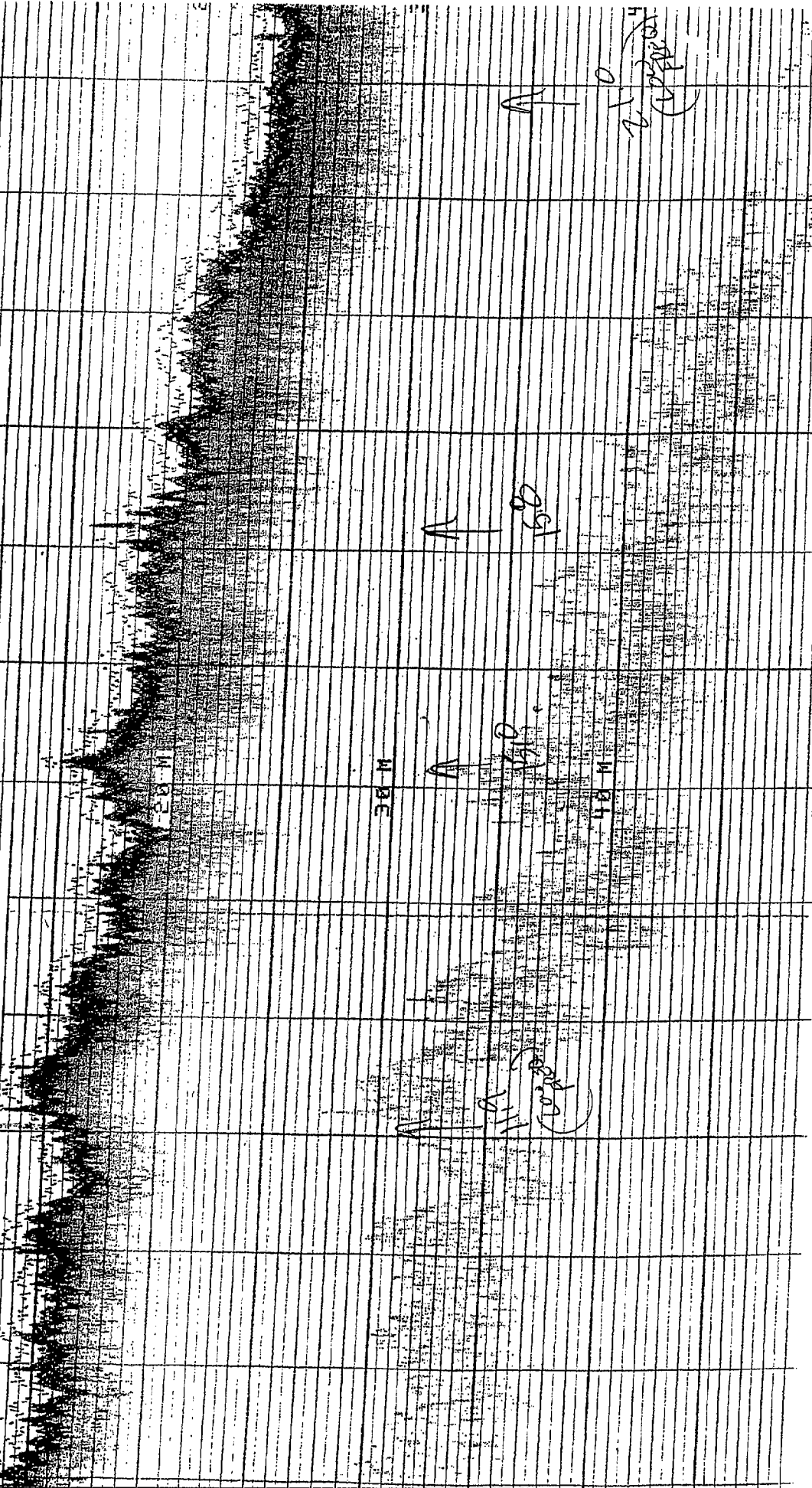
1159

43 FT
41-19-46.789N
071-05-38.531W

10 M

30 M

40 M



4195

4196

41 FT
41-10-45048Y
071-06-02.87W

10 M

20 M

30 M

40 M

50 M

1981

0 M

0 M

0 M

15.0

15.3

14.8

14.5

10.9

11.6

19.0

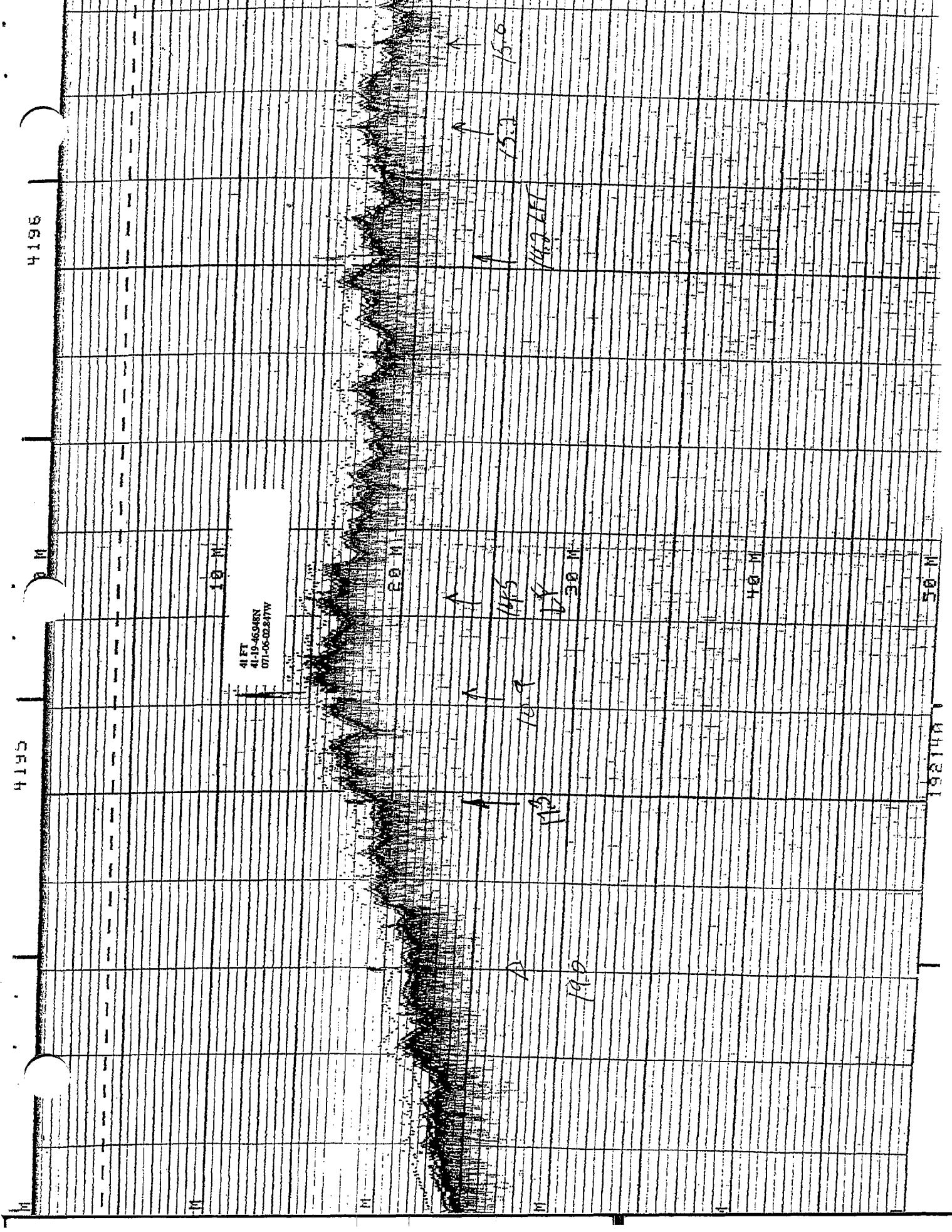
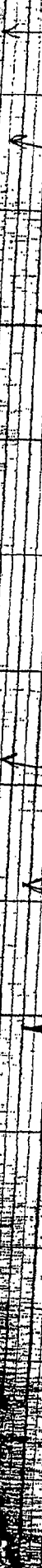
14.8

14.5

11.6

19.0

0 M



B660-RU-93
H-10458
DIVE INVESTIGATION REPORT
34-FOOT ECHO SOUNDER INVESTIGATION
DIVE 238.1

DATE: AUGUST 26, 1993 DN: 238

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT DIVERS - LT MOORE
COXSWAIN\TENDER - SS BRAWLEY - LTJG BRENNAN

VISIBILITY: 20 FEET CURRENT: 0.5 KT

MAXIMUM DEPTH: 15.2 METERS BOTTOM TIME: 11 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 61000 (*use Fix 6926 for position*)

EASTING: 172737.3 NORTHING: 262084.5

LATITUDE: 41°21'36.134"N LONGITUDE: 071°03'41.748"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 10.4 METERS

TIME OF READING: 1428 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

Smooth
~~PREDICTED~~ TIDAL ZONE CORRECTOR: *-0.2*
+2.0 METERS

LEAST DEPTH DETERMINED @MLLW 10.6₂ METERS

NARRATIVE REPORT: The object of this dive was a 34-foot sounding found during 20-meter splits run on the shoal area approximately 1.5 nautical miles north of Browns ledge. This item has been published by NOAA Ship RUDE in a Danger to Navigation Report dated August 18, 1993.

A dive buoy was dropped in position (E = 172736.1 and N = 262086.3), divers descended to the bottom and found the buoy anchors resting at the base of a 3-meter tall rock. A 5-meter circle search was conducted to ensure this was the rock in question. The bottom in this area was covered with small rocks measuring less than a meter in diameter with a base of medium to small cobbles. No other larger rocks were found during this search. A pneumatic least depth was taken on this rock and a detached position was later obtained by the ship.

B660-RU-93
H-10458
DIVE INVESTIGATION REPORT
36-FOOT ECHO SOUNDER INVESTIGATION
DIVE 238.2

DATE: AUGUST 26, 1993 DN: 238

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT DIVERS - LT MOORE
COXSWAIN\TENDER - SS BRAWLEY - LTJG BRENNAN

VISIBILITY: 20 FEET CURRENT: 0.5 KT

MAXIMUM DEPTH: 13.1 METERS BOTTOM TIME: 14 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 61001 (*use fix 6913 for position*)

EASTING: 172570.9 NORTHING: 261846.8

LATITUDE: 41°21'28.446"N LONGITUDE: 071°03'48.939"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 10.4 METERS

TIME OF READING: ⁵²14~~28~~ UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

Smooth
~~PREDICTED~~ TIDAL ZONE CORRECTOR: ^{-0.2}~~+2.0~~ METERS

LEAST DEPTH DETERMINED @MLLW 10.2 METERS

NARRATIVE REPORT: The object of this dive was a 36-foot sounding found during 20-meter splits run on the shoal area approximately 1.5 nautical miles north of Browns ledge. This item has been published by NOAA Ship RUDE in a Danger to Navigation Report dated August 18, 1993.

A dive buoy was dropped in HDAPS position 2753.1 (E = 172574.4 and N = 261849.4), divers descended to the bottom and conducted a 5-meter circle search. A large rock, approximately 2.5 meters tall, was found resting on a bottom that consisted of angular cobbles and bare patches of sand and broken shells. A pneumatic least depth of 10.2 meters (33.5 feet corrected with predicted tides) was measured, and later a detached position was obtained by the ship.

B660-RU-93
H-10458
DIVE INVESTIGATION REPORT
39-FOOT ECHO SOUNDER INVESTIGATION
DIVE 238.3

DATE: AUGUST 26, 1993 DN: 238

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT DIVERS - LT MOORE
COXSWAIN\TENDER - SS BRAWLEY - LTJG BRENNAN

VISIBILITY: 20 FEET CURRENT: 0.5 KT

MAXIMUM DEPTH: 14.6 METERS BOTTOM TIME: 15 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 61002 (*use Fix 6930 for location*)

EASTING: 171711.6 NORTHING: 261095.3

LATITUDE: 41°21'04.171"N LONGITUDE: 071°04'26.005"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 12.4 METERS

TIME OF READING: 1706 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

Smooth
PREDICTED TIDAL ZONE CORRECTOR: ~~-0.7~~ METERS

LEAST DEPTH DETERMINED @MLLW ~~11.7~~ METERS
12.0

NARRATIVE REPORT: The object of this dive was a 39-foot (*11.9 m*) sounding found during 20-meter splits run on the shoal area approximately 1.5 nautical miles north of Browns Ledge. This item has been published by NOAA Ship RUDE in a Danger to Navigation Report dated August 18, 1993.

A dive buoy was dropped in HDAPS position 3042.6 (E = 171708.6 and N = 261093.9), divers descended to the bottom and conducted circle searches of 5 and 10 meters. On the 10-meter search, a large rock, approximately 2-meters tall, was found lying in a field of smaller rocks (1 meter or less). A pneumatic least depth of ~~11.7~~^{12.0} meters (~~38.4~~^{39.0} feet corrected using predicted tides) was acquired and a detached position was later obtained by the ship.

B660-RU-93
H-10458
DIVE INVESTIGATION REPORT
53-FOOT ECHO SOUNDER INVESTIGATION
DIVE 238.4

DATE: AUGUST 26, 1993 DN: 238

PERSONNEL:

DIVEMASTER\TENDER - LTJG BRENNAN DIVERS - LCDR HERLIHY

COXSWAIN\TENDER - SS BRAWLEY - ENS HAUPT

VISIBILITY: 15 FEET CURRENT: 0.5 KT

MAXIMUM DEPTH: 20.7 METERS BOTTOM TIME: 12 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 61005

EASTING: 170578.7 NORTHING: 260587.2

LATITUDE: 41°20'47.808"N LONGITUDE: 071°05'14.802"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 16.4 METERS

TIME OF READING: 1832 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

Smooth
~~PREDICTED~~ TIDAL ZONE CORRECTOR: ~~-1.0~~ METERS

LEAST DEPTH DETERMINED @MLLW 15.4⁷ METERS

NARRATIVE REPORT: The object of this dive was a 53-foot sounding found during 20-meter splits run on the shoal area approximately 1.5 nautical miles north of Browns Ledge. This item has been published by NOAA Ship RUDE in a Danger to Navigation Report dated August 18, 1993.

The dive buoy was dropped in the position of side scan contact number 1958.35P (E 170580.9 and N 260586.3). The buoy's anchor was found resting approximately 3 meters northwest of a large, approximately 5-meter tall, angular rock. A least depth by pneumatic depth gauge of 16.4 meters was taken at the pinnacle of the rock and a detached position was later obtained by the ship. The visibility at the time of the dive was 15-20 feet. The surrounding bottom in this area was covered with smaller rocks and hard sand, with an average depth of 68 feet by diver's depth gauge. (20.7m)

B660-RU-93
H-10458
DIVE INVESTIGATION REPORT
42-FOOT ECHO SOUNDER INVESTIGATION
DIVE 238.5

DATE: AUGUST 26, 1993 DN: 238

PERSONNEL:

DIVEMASTER\TENDER - LTJG BRENNAN DIVERS - LCDR HERLIHY

COXSWAIN\TENDER - SS BRAWLEY - ENS HAUPT

VISIBILITY: 10 FEET CURRENT: 0.0 KT

MAXIMUM DEPTH: 17.4 METERS BOTTOM TIME: 11 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 61006 (*use fix 6955 for location*)

EASTING: 171363.2 NORTHING: 260274.3

LATITUDE: 41°20'37.592"N LONGITUDE: 071°04'41.096"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 13.2 METERS

TIME OF READING: 1921 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

Smooth -0.9

~~PREDICTED~~ TIDAL ZONE CORRECTOR: ³-1.1 METERS

LEAST DEPTH DETERMINED @MLLW 12.³ METERS

NARRATIVE REPORT: The object of this dive was a 42-foot (*12.8m*) sounding found during 20-meter splits run on the shoal area approximately 1.5 nautical miles north of Browns Ledge. This item has been published by NOAA Ship RUDE in a Danger to Navigation Report dated August 18, 1993.

The dive buoy was dropped in position E = 171360.6 and N = 260268.2. The buoy anchor was found resting approximately 4 meters east of a large rock. During a 10-meter circle search, several additional large rocks were found in the area, all angular in shape and approximately the same height off the bottom. The shoalest one, approximately 3-meters tall, was determined by diver's depth gauge, a least depth by pneumatic depth gauge of 13.2 meters was taken at the pinnacle of this rock, and a detached position was later obtained by the ship. The visibility at the time of the dive was 7-10 feet. The surrounding bottom in this area was covered with similar size rocks and smaller rocks, with an average depth of 57 feet by diver's depth gauge.

B660-RU-93
H-10458
DIVE INVESTIGATION REPORT
43-FOOT ECHO SOUNDER INVESTIGATION
DIVE 238.6

DATE: AUGUST 26, 1993 DN: 238

PERSONNEL:

DIVEMASTER\TENDER - LTJG BRENNAN DIVERS - LCDR HERLIHY

COXSWAIN\TENDER - SS BRAWLEY - ENS HAUPT

VISIBILITY: 12 FEET CURRENT: 0.5 KT

MAXIMUM DEPTH: 16.1 METERS BOTTOM TIME: 07 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 61007 (*use fix 6946 for location*)

EASTING: 170026.1 NORTHING: 258799.6

LATITUDE: 41°19'49.913"N LONGITUDE: 071°05'38.784"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 13.8 METERS

TIME OF READING: 2106 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

Smooth
~~PREDICTED~~ TIDAL ZONE CORRECTOR: *-0.9*
~~1.0~~ METERS

LEAST DEPTH DETERMINED @MLLW 12.8⁹ METERS

NARRATIVE REPORT: The object of this dive was a 43-foot sounding found during 20-meter splits run on Browns Ledge. This item has been published by NOAA Ship RUDE in a Danger to Navigation Report dated August 18, 1993.

The dive buoy was dropped in position E = 170032.0 and N = 258795.8. A large rock was found approximately 4 meters west of the buoy anchor. The rock had a large base, approximately 3 meters in diameter, and a pinnacle at the top. A least depth by pneumatic depth gauge of 13.8 meters was taken at the pinnacle, and a detached position was later obtained by the ship. The visibility at the time of the dive was 8-12 feet. The surrounding bottom in this area was covered with pebbles and sand, with an average depth of 53 feet by diver's depth gauge.

B660-RU-93
H-10458
DIVE INVESTIGATION REPORT
AWOIS 7839 "TROJAN" INVESTIGATION
DIVE 239.1

DATE: AUGUST 27. 1993 DN: 239

PERSONNEL:

DIVEMASTER\TENDER - ENS HAUPT DIVERS - LT MOORE
COXSWAIN\TENDER - SS BRAWLEY - LTJG BRENNAN

VISIBILITY: 20 FEET CURRENT: 0.5 KT

MAXIMUM DEPTH: 29.3 METERS BOTTOM TIME: 20 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 61003 (*use fix 6969 for location*)

EASTING: 176995.0 NORTHING: 263741.0

LATITUDE: 41°22'29.356"N LONGITUDE: 071°00'38.302"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 25.2 METERS

TIME OF READING: 1401 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

Smooth
~~PREDICTED~~ TIDAL ZONE CORRECTOR: ~~-0.2~~ METERS

LEAST DEPTH DETERMINED @MLLW 25.¹/₀ METERS

NARRATIVE REPORT: The object of this dive was AWOIS 7839, the wreck of the steamer TROJAN. The TROJAN sank after being rammed in a fog by the ship NACOOCHEE on January 20, 1906.

A dive buoy was dropped in HDAPS contact position 32.43S (E = 177001.5 and N = 263751.0) and divers descended onto what was believed to be the ship's boiler, a large cylindrical object lying on the center line of the ship. The search for the wreck's least depth was started to the north and ran along the forward end of the ship. Upon reaching the northern end of the ship, however, the diver's air was running low, so they returned to the site of the boiler. A pneumatic least depth of 25.¹/₀ meters (82.0 feet corrected with ^{approved} predicted tides) was taken at this point, since it was the shoalest encountered on the dive. The divers ascended to the surface and a detached position was obtained by the ship. A full hydro investigation of this wreck was later accomplished to supplement the findings of this dive.

B660-RU-93
H-10458
DIVE INVESTIGATION REPORT
AWOIS 1881 "SEACONNET" INVESTIGATION
DIVE 239.2

DATE: AUGUST 27, 1993 DN: 239

PERSONNEL:

DIVEMASTER\TENDER - LTJG BRENNAN DIVERS - LCDR HERLIHY

COXSWAIN\TENDER - SS BRAWLEY - ENS HAUPT

VISIBILITY: 10 FEET CURRENT: 0.5 KT

MAXIMUM DEPTH: 28.9 METERS BOTTOM TIME: 19 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 61004 (*see fix 7020.2*)

EASTING: 177362.1 NORTHING: 263087.4

LATITUDE: 41°22'08.126"N LONGITUDE: 071°00'22.611"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: N/A METERS

TIME OF READING: N/A

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

PREDICTED TIDAL ZONE CORRECTOR: N/A METERS

LEAST DEPTH DETERMINED @MLLW N/A METERS

NARRATIVE REPORT: The object of this dive was AWOIS 1881, the wreck of the steamer SEACONNET. The SEACONNET was reported sunk on May 1, 1923, approximately 1.0 nautical mile south or south southwest from the Vineyard Sound Light Ship.

A dive buoy was dropped at HDAPS position 7022.14 (E = 177353.5 and N = 263132.6), with the anchor coming to rest on the wreck of the SEACONNET near the stern. The wreck was lying upside down with the centerline in a northeast/southwest direction. The divers first swam to the stern and then worked their way forward. The wreck is a steel-hull vessel covered with marine growth, with it's bilge keels still visible. The keel lies in approximately 80 feet of water and her decks in approximately 90 feet of water.

Due to the depth of the dive and size of wreck, the decision was made to obtain a least depth by pneumatic depth gauge without transiting the whole wreck. After the reading was obtained and on their way to the surface, the divers quickly swam to the bow of the ship. Here, the divers discovered that the forward portion of the bow (approximately a 20 foot section), was cracked off and rising off the bottom further than where the pneumatic least depth was taken. The least depth of this bow section was 70 feet by diver's depth gauge. A comparison of the least depth of the hydro development of this area, and the diver's depth gauge least depth was made. The two depths were within one foot of each other. Therefore, the decision was made to use the hydro development least depth, position, predicted tide corrector, sound velocity corrector, heave corrector, and dynamic draft corrector instead of conducting another "deep" dive. The least depth by hydro development was computed as follows:

HDAPS POSITION: Fix 70 22.2 7022.14

RAW DEPTH:	18.7 M
TIDE CORRECTOR:	-0.1 M
HEAVE CORRECTOR:	+0.65 M
SOUND VELOCITY CORRECTOR:	+0.1 M
DRAFT CORRECTOR:	+2.3 M

CORRECTED LEAST DEPTH: 21.⁵₆ M

The bottom in this area was hard sand and generally flat, with an average surrounding depth of 95 feet by diver's depth gauge.

B660-RU-93
H-10458
DIVE INVESTIGATION REPORT
41-FOOT ECHO SOUNDER INVESTIGATION
DIVE 242.1

DATE: AUGUST 30, 1993 DN: 242

PERSONNEL:

DIVEMASTER\TENDER - LTJG BRENNAN DIVERS - LCDR HERLIHY

COXSWAIN\TENDER - SS BRAWLEY - ENS HAUPT

VISIBILITY: 15 FEET CURRENT: 1.0 KT

MAXIMUM DEPTH: 18.3 METERS BOTTOM TIME: 12 MIN.

METHOD OF POSITION DETERMINATION: DETACHED POSITION

HDAPS POSITION: FIX 61008 (*use Fix 6985 for location*)

EASTING: 169463.3 NORTHING: 258709.9

LATITUDE: 41°19'47.055"N LONGITUDE: 071°06'02.997"W

AVERAGE LEAST DEPTH BY PNEUMATIC DEPTH GAUGE: 12.4 METERS

TIME OF READING: 1530 UTC

PNEUMATIC DEPTH GAUGE CORRECTOR: 0.0

PREDICTED TIDAL ZONE CORRECTOR: ^{-0.3}
~~0.2~~ METERS

LEAST DEPTH DETERMINED @MLLW 12.¹/₂ METERS

NARRATIVE REPORT: The object of this dive was a 41-foot (12.5m) sounding found during 20-meter splits run on Browns Ledge. This item has been published by NOAA Ship RUDE in a Danger to Navigation Report dated August 18, 1993.

The dive buoy was dropped in HDAPS position 4195.2 (E = 169466.8 and N = 258706.6). A large boulder, shaped like a pyramid, with a small plateau on the north side near the top, was found approximately 4 meters southwest of the buoy anchor. The rock's base was approximately 8 feet wide tapering to 4 feet wide at the top. A least depth by pneumatic depth gauge of 12.4 meters was taken at the pinnacle, and later a detached position was obtained by the ship. The visibility at the time of the dive was 10-15 feet. The surrounding bottom in this area was covered with smaller boulders (1 - 1.5 meters tall), cobbles and hard sand, with an average depth of 60 feet by diver's depth gauge.

APPENDIX VII

APPROVAL SHEET

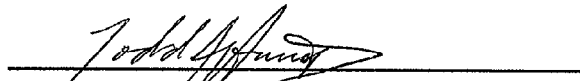
LETTER OF APPROVAL

REGISTRY NO. H-10458

This Descriptive Report and the accompanying field sheets are respectfully submitted.

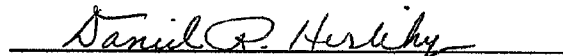


Richard T. Brennan, LT(jg), NOAA
Field Operations Officer
NOAA Ship RUDE



Todd A. Haupt, ENS, NOAA
Navigation Officer
NOAA Ship RUDE

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



Daniel R. Herlihy, LCDR, NOAA
Commanding Officer
NOAA Ship RUDE



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: November 12, 1993

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-B660

HYDROGRAPHIC SHEET: H-10458

LOCALITY: Massachusetts, Rhode Island Sound 6 N.M. SSW of
Sow and Pigs Reef

TIME PERIOD: March 23 - August 24, 1993

TIDE STATION USED: 845-0768 Sakonnet Yacht Club, R.I.
Lat. $41^{\circ} 27.9'N$ Lon. $71^{\circ} 11.6'W$

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 8.13 ft.
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.3 ft.

TIDE STATION USED: 845-2660 Newport, R.I.
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 +10 minute time correction and a X0.90 range ratio to all heights using Sakonnet Yacht Club, R.I. (845-0768).

When data for Sakonnet Yacht Club, R.I. is not available, times are direct, and apply a X0.82 range ratio to all heights using Newport, R.I. (845-2660).

Note: Times are tabulated in Eastern Standard Time.

William M. Fabian
CHIEF, DATUMS SECTION



GEOGRAPHIC NAMES

H-10458

Name on Survey	ON CHART NO. 13218										
	A	B	C	D	E	F	G	H	K		
	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				
BROWNS LEDGE	X										1
MASSACHUSETTS (title)	X										2
RHODE ISLAND SOUND (title)	X										3
SOW AND PIGS REEF (title)	X										4
											5
											6
											7
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											25

Approved:

Charles E. Harrington
Chief Geographer - N/CG-25

DEC - 9 1994

N/CG244-17-95

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 Section, N/CG243
NOAA/National Ocean Service
Station 6813, SSMC3
1315 East-West Highway
Silver Spring, Maryland

DATE FORWARDED

18 July 1995

NUMBER OF PACKAGES

one tube

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.

H-10458

MASSACHUSETTS, RHODE ISLAND SOUND, 6.0 NM SW OF SOW AND PIGS REEF

1 Tube:

- 1 Smooth Sheet
- 1 Original Descriptive Report

FROM: (Signature)

Robert R. Hill Jr.

RECEIVED THE ABOVE

(Name, Division, Date)

Return receipted copy to:

Atlantic Hydrographic Branch
N/CG244
439 West York Street
Norfolk, VA 23510-1114

07/18/95

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10458

NUMBER OF CONTROL STATIONS	0
NUMBER OF POSITIONS	0
NUMBER OF SOUNDINGS	0

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	362	02/02/95
VERIFICATION OF FIELD DATA	404	06/26/95
QUALITY CONTROL CHECKS	82	
EVALUATION AND ANALYSIS	54	
FINAL INSPECTION	12	06/22/95
COMPILATION	6	07/06/95
TOTAL TIME	921	
ATLANTIC HYDROGRAPHIC BRANCH APPROVAL		07/17/95

**ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H-10458 (1993)**

This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

The bottom throughout the survey area is very rocky, and the bottom characteristic "rky" is used extensively on the smooth sheet. Cartographic limitations prohibit labeling all rocks in the survey area. Rocks shown on the smooth sheet are considered the most significant identified during field and office processing.

H. CONTROL STATIONS

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). 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 NAD 83 and the North American Datum of 1927 (NAD 27).

To place the smooth plots on the NAD 27, move the projection lines 0.386 seconds (11.906 meters or 0.59 mm at the scale of the survey) north in latitude and 1.861 seconds (43.274 meters or 2.16 mm at the scale of the survey) east in longitude.

L. JUNCTIONS

FE-376SS	(1992)	to the north
FE-378SS	(1992)	to the north
<u>H-10548</u>	<u>(1994)</u>	<u>to the east</u>

A standard junction was effected between the present survey and survey H-10548 (1994).

The smooth sheets for surveys FE-376SS (1992) and FE-378SS (1992) are archived at National Ocean Service (NOS) headquarters, Silver Spring, Maryland and a standard junction could not be made. In this case, the note "ADJOINS" has been shown on the present survey. Depths are in adequate agreement. Any adjustments to the depth curves will have to

be made during chart compilation.

There are no contemporary surveys to the south of the present survey. Charted depths and present survey depths are in harmony to the south.

M. COMPARISON WITH PRIOR SURVEYS

M.1. Hydrographic

H-6445 (1939) 1:40,000

Prior survey H-6445 (1939) covers the present survey in its entirety. The present depths are generally in good agreement with the prior survey depths with scattered present survey depths up to 3 m (10 ft) shoaler than prior depths. The present survey shows significant differences in areas near rocky shoals where the bottom configuration is extremely irregular. These differences between the present and prior survey are also attributed to improved surveying methods and equipment.

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

M.2. Wire Drag

H-3668aWD (1914-17) 1:30,000

The prior wire drag survey listed above covers the northwestern half of the present survey. There are no hangs or groundings in the common area.

There are no conflicts between the prior effective clearance depths and the present survey depths.

O. COMPARISON WITH CHART 13218 (32nd Edition, Jun. 26/93)

The charted hydrography originates with the previously discussed prior survey and other sources not readily available and require no further consideration. Specific items

discussed in section N. of the Descriptive Report have charting recommendations that require no additional comments. The following should be noted:

During office processing, one danger to navigation was noted and submitted to Commander, First Coast Guard District (oan), Boston Massachusetts for inclusion in the Local Notice to Mariners, and to Mapping and Charting Branch, N/CG221, Silver Spring, Maryland. A copy of this report is appended to this report.

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


P. ADEQUACY OF SURVEY

This is an adequate hydrographic/side scan sonar survey. No additional work is recommended.

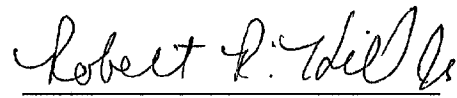
S. MISCELLANEOUS

Chart compilation using the present survey data was done by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded upon completion of the project.

RUDE Processing Team



Maxine Fetterly
Cartographic Technician
Verification of Field Data



Robert R. Hill Jr.
Cartographer
Evaluation and Analysis



National Oceanic and Atmospheric Administration
 Atlantic Marine Center
 Atlantic Hydrographic Section
 439 West York Street
 Norfolk, VA 23510-1114

April 7, 1994

Commander
 First Coast Guard District (oan)
 408 Atlantic Ave.
 Boston MA. 02110-3350

Dear Sir,

The following item was discovered during hydrographic survey operations and was considered a danger to navigation during office processing of the survey data:

REPORT OF DANGER TO NAVIGATION

Hydrographic Survey Registry Number...H-10458
 State.....Massachusetts
 General Locality.....Rhode Island Sound
 Locality.....Six NM SW of Sow and Pigs Reef
 Project Number.....OPR-B660-RU-93
 Surveyed by.....NOAA Ship RUDE

Object Addressed:

An uncharted dangerous underwater rock was found in the vicinity of Brown's Ledge in Rhode Island Sound at the following geographic position:


Latitude 41°21'21.36"N
 Longitude 71°03'51.25"W.

The least depth on this feature was determined to be 32 feet (9⁷ m) corrected to MLLW using predicted tides. Presently charted depths at this location are 34 to 37 feet.

Affected Nautical Chart:

Chart Number	Edition No. Date	Reported Depth	Datum	Latitude	Longitude
13218	32 26 JAN 93	9 ⁷ m / 32ft	NAD 83	41°21'21.36"N	71°03'51.25"W

Questions concerning this report should be directed to the Atlantic Hydrographic Section by calling 804-441-6746.

Sincerely,

 Nicholas Perugini, LCDR, NOAA
 Chief, Atlantic Hydrographic Section

Attachment



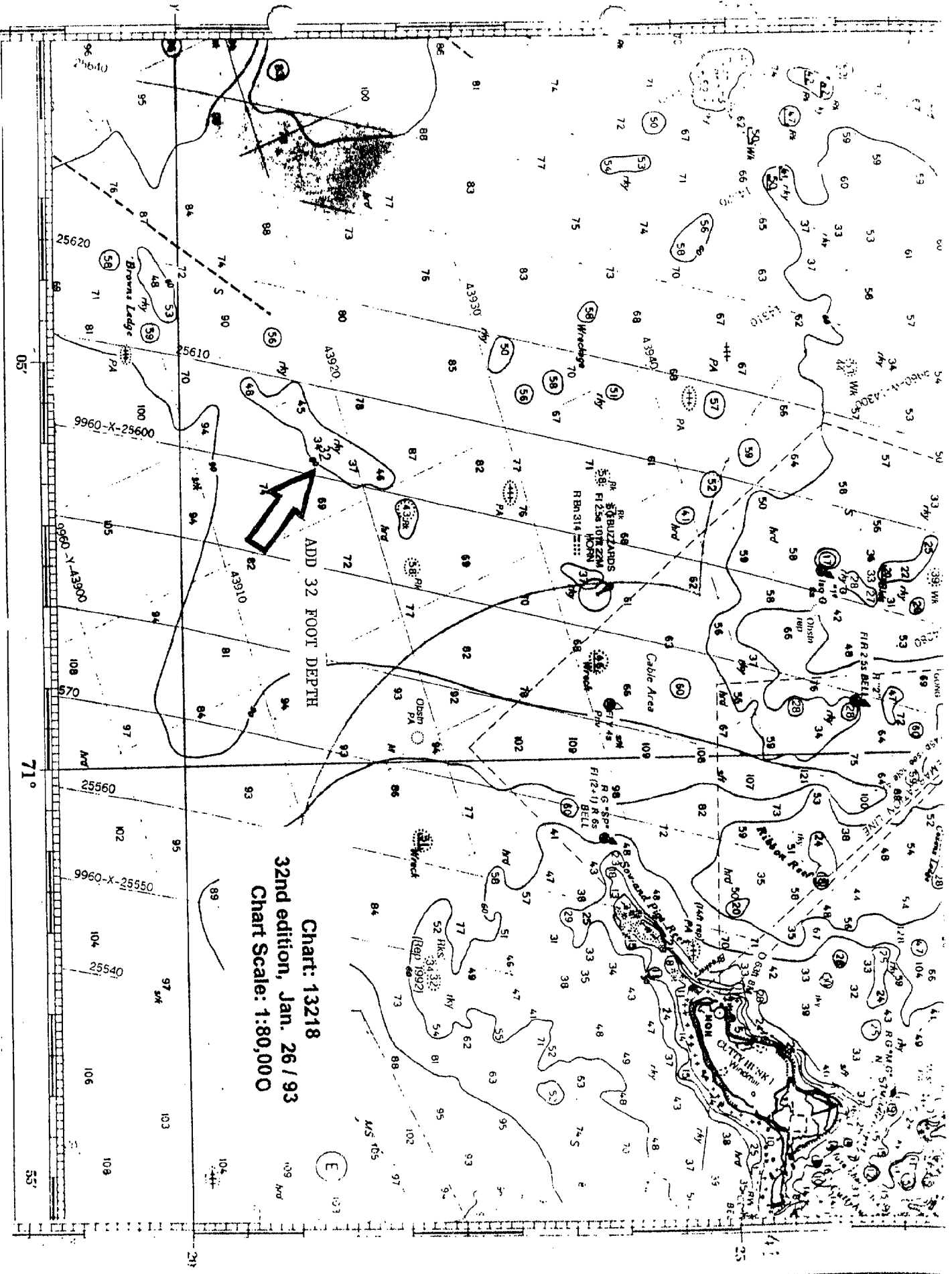


Chart: 13218
32nd edition, Jan. 26 / 93
Chart Scale: 1:80,000

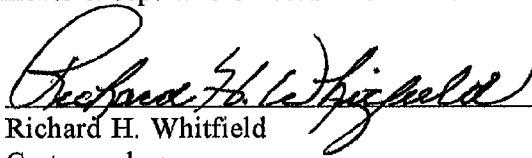
ADD 32 FOOT DEPTH

(E) 103

APPROVAL SHEET
H-10458

Initial Approvals:

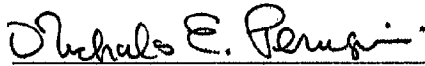
The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproof of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet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



Richard H. Whitfield
Cartographer
Atlantic Hydrographic Branch

Date: July 17, 1995

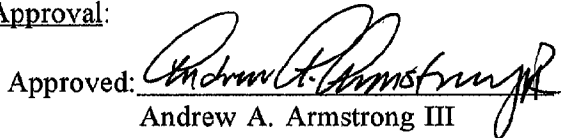
I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.



Nicholas E. Perugini, CDR, NOAA
Chief, Atlantic Hydrographic Branch

Date: July 17, 1995

Final Approval:

Approved: 

Andrew A. Armstrong III
Captain, NOAA
Chief, Hydrographic Surveys Division

Date: July 19, 1995

MARINE CHART BRANCH
RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10458

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

- 1. Letter all information.
- 2. In "Remarks" column cross out words that do not apply.
- 3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
13218	7/17/95	Robert Hill	Full Part Before After Marine Center Approval Signed Via Drawing No.
13218	7/27/95	L. Ankerman PS	Full Part Before After Marine Center Approval Signed Via Drawing No. 70
12300	9/1/95	L. Ankerman JB	Full Part Before After Marine Center Approval Signed Via Drawing No. 57
13200	9/1/95	L. Ankerman B	Full Part Before After Marine Center Approval Signed Via Drawing No. 39
13009	9/1/95	L. Ankerman	Full Part Before After Marine Center Approval Signed Via Drawing No. 42
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
			Full Part Before After Marine Center Approval Signed Via Drawing No.
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