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# Woods Hole

# Oceanographic Institution



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## CRUISE REPORT

CHAIN 112, LEGS I and II

6 March - 5 April, 1973

By

R. Heinmiller, Chief Scientist

August 1973

## TECHNICAL REPORT

*Prepared for the Office of Naval Research  
under Contract N00014-66-CO241; NR 083-004.*

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Woods Hole, Massachusetts 02543

August 1973

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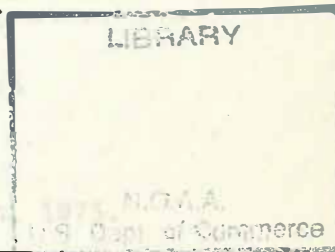
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TECHNICAL REPORT

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Ferris Webster

Ferris Webster, Acting Chairman  
Department of Physical Oceanography

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W6  
no.73-51

## Cruise Report

CHAIN 112, Legs I and II  
R. Heinmiller, Chief Scientist

The W.H.O.I. portion of the MODE I array was to be installed on the first two legs of CHAIN 112, along with other work to be done at Site D. The original schedule called for the ship to leave Woods Hole on the 6th of March and return on the 20th. After a two-day layover in Woods Hole, Leg II was scheduled for 22 March through 2 April, terminating in Bermuda.

Objectives of the cruises were:

- Setting of sixteen intermediate moorings and one surface mooring at the MODE Site (centered at  $28^{\circ}$  N.,  $69^{\circ}$  40'W.). See Figure 4.
- Recovery of two MODE-Site maintenance moorings
- Recovery of three intermediate moorings in the vicinity of Site D ( $39^{\circ}$  10'N.,  $70^{\circ}$  00'W.).
- Setting of three new intermediate moorings at Site D. These were to be set by a faking-box technique, rather than the conventional method
- CTDs at each new mooring
- Bathymetry and meteorological observations
- Gravity section, Woods Hole to MODE area and return

### Leg I

R/V CHAIN left Woods Hole at 1840R on the 6th of March, 1973.

We spent several hours in Vineyard Sound calibrating the radio direction finder, using a transmitter on the W.H.O.I. dock. After a CTD on the Continental Shelf, the ship proceeded south, following the 70th meridian to facilitate a gravity section. On the morning of 9 March, just inside the northern edge of the MODE area, we stopped for a series of

acoustic anchor release test lowerings which lasted seven hours. All releases checked out without problems.

Early on the morning of the 10th we arrived at the site of Station 474, which had been set in December, 1972 as a long-term site-maintenance mooring, and which was close to the proposed site of MODE moorings #1 and #25. After a check of the release on 474 we proceeded to set the surface mooring (#25) about three miles north, designated Station 480. This mooring used an experimental float and wire terminations but had no release or backup recovery glass ball section. It was intended primarily as a navigation marker. Station 474 was then recovered before launching MODE mooring #1, Station 481. Normal launch procedure for both surface and subsurface moorings is to drop the flotation and pay out the mooring line and instruments while the ship steams at about two knots. The anchor is attached and dropped and allowed to freefall to the bottom. The transponder in the anchor release is tracked until the anchor bottoms. All moorings are shown as set in the figures. Release checks were completed and the ship underway by 2300R on the 10th. The ship moved to a site three miles north of 481 for a CTD.

Early on the morning of the 11th we recovered Station 473, the other site-maintenance mooring set in December. After a bathymetric survey we set Station 482, MODE #8. This mooring had to be towed about two miles at the end of the launch to get the proper depth due to set from a surface current estimated at one and one-half knots. A CTD was taken three miles away.

The CHAIN then proceeded to the site of MODE #15, the first of the moorings in the outer ring of six. This mooring was set as

Station 483 on the morning of the 12th. Moorings #16 (Station 484), #11 (Station 485), and #12 (Station 486) in quick succession. In each case a bathymetric survey was done before setting and a CTD was done after launch about three miles away. During the setting of Station 486 a large tanker passed astern, between the second and third clusters of glass balls. However, the vessel apparently did not come in contact with the mooring line.

We arrived at the site of MODE mooring #13 at 2230R on 14 March. Since the bottom was flat no survey was done. The mooring was launched without difficulty and the anchor dropped. However, after descending to a depth of about 3,000 meters the acoustic transponder began coming back up. The radio was still on the surface. The mooring string was recovered and it was found that the twenty-meter nylon tagline had parted at the splice just below the release. This aborted mooring was designated Station 487. After a CTD the mooring was reset as Station 488 on the morning of the 15th.

Station 489 (MODE #14) was set without difficulty early on the 16th and after a CTD the ship proceeded north towards Site D. CHAIN arrived at Site D on the morning of the 18th in steadily worsening weather. It was decided to leave all the Site-D moorings until Leg II. The ship docked in Woods Hole at 1100R on 19 March. The ship's track in the MODE array on Leg I is shown in Figure 1.

## Leg II

Work scheduled for Leg II now included, besides the originally planned eight moorings, all three of the Site-D moorings. CTDs, bathymetry, and meteorological observations were to be continued.

The scheduled sailing date of 22 March was first postponed one day due to bad weather. On the morning of the 23rd an auxiliary generator breakdown forced an additional delay. CHAIN eventually left Woods Hole at 1540R on 25 March. Discussions were held with the MODE Ship Committee and an extension until 4 April was tentatively granted.

Upon arrival at the location of Station 479 early on the 26th two releases were tested. Shortly after, Station 479 was released and recovered.

Station 490, the replacement mooring, was set from the faking box in steadily deteriorating weather. In this launch technique the entire mooring is assembled and laid out in an especially-designed box on the fantail. The anchor is dropped and the mooring allowed to run out freely with the ship steaming slowly. Launch took ten minutes and anchor bottoming another twenty. There appeared to be fouling in the middle glass-ball section.

By the time the ship had arrived at Station 477 and we had released the mooring the weather had worsened. Recovery of the mooring was difficult and several glass balls were broken during the operation. Station 491, the replacement mooring, was set in the afternoon. Due to heavy seas the mooring did not pay out of the faking box smoothly and some minor fouling was observed.

By the time we reached Station 478, the last of the Site-D moorings to be replaced, the weather was too rough to allow any work. The ship jogged into the wind all night of the 26th and all day the 27th. The faking box suffered some damage on the fantail.

By the time the weather had moderated on the afternoon of the 28th it had been decided, in view of the condition of the faking box and the fouling problems on earlier launches, to launch the final Site-D mooring by the conventional method.

At 1830R on the 28th Station 478 was released and hauled without difficulty. A release test was done late in the evening and Station 492 was launched in the early hours of March 29. Moorings in the Site-D area are shown in Figure 2. The ship proceeded south towards the MODE area.

Shortly after entering the MODE area on the 30th we did a series of release lowerings and a test CTD, and continued south. After checking Station 489 (MODE #14) we arrived at the proposed site of mooring #6 at noon on March 31. After a brief bottom survey the mooring was launched as Station 493, followed by a CTD which revealed several problems with the CTD winch. The wire and winch were to give continual trouble for the rest of Leg II.

Station 494 (MODE #5) was set early on the 1st of April, followed by a CTD. While steaming towards the site of MODE #10 the CTD wire was streamed over the side and rewound in an effort to improve the lay on the drum and the level winding. While the wire was streamed, the ship passed close by a buoy which was later identified as a drift buoy belonging to the Atlantic Oceanographic and Meteorological Laboratory.

The launch of Station 495 (MODE #10) went smoothly but the setting of MODE #9 was delayed several hours into the early hours of April 2, by computer difficulties which prevented final calculation of the shot lengths. Launch was finally begun just before 0500Q and the anchor was dropped at 0624Q. However, about an hour later, at a depth of

approximately 3,000 meters, the transponder began indicating decreasing ranges. The mooring was picked up and it was found that the nylon anchor tag line had been cut about three meters below the release, in a manner very similar to Station 487 on Leg I. The aborted station was 496. The gear was reset successfully as Station 497. The ship moved several miles away for a CTD and a test of an AMF depth telemetering pinger on the CTD wire.

After Station 498 (MODE #4) was set, the release on the central mooring, Station 481, was checked before proceeding to the surface mooring. The 2398 kc radio beacon on the surface float had failed sometime earlier. A party was sent aboard in an attempt to repair it. However, it was found that the well containing the transmitter had leaked and the electronics had been damaged. The transmitter and keyer package was removed from the float.

MODE moorings #3 (Station 499), #2 (Station 500), and #7 (Station 501) were set in quick succession, each followed by a CTD.

The ship left the site of Station 501 at 0930Q on 4 April and arrived in St. Georges, Bermuda at 1035Q on the 5th. Figure 3 shows the ship's track in the MODE array on Leg II.

Subsequent inspection of the parted anchor tag lines from Stations 487 and 496 indicated that the probable cause of failure was tangling of the tag line in the acoustic release.



Experiments Initiated and/or Completed  
and Date Collected  
on CHAIN 112, Legs I and II

- Recovery of MODE site maintenance moorings (473 and 474) - Schmitz
- Initiation of MODE I array (480, 481, 482, 483, 484, 485, 486, 488, 489, 493, 495, 496, 497, 498, 499, 500 and 501) - Schmitz, Fofonoff, Webster, Wunsch
- Continuation of long-term mooring array on the Slope near Site D (replaced 477, 478, and 479 with 490, 491 and 492) - R. Thompson
- Test of Alden surface buoy (480) - Walden
- Gravity section - Dean
- Exposure of plastic samples (498) - W. Vachon, Draper Lab.
- Test of AMF depth telemetering pinger - W. Coburn, AMF
- Thirteen CTDs - Volkmann
- Bathymetry - MODE Council
- Meteorological measurements - MODE Council
- Exposure of corrosion samples (recovered on 474 and reset on 482) - Dexter

Personnel

	<u>Leg I</u>	<u>Leg II</u>
Robert Heinmiller	X	X
James Gifford	X	X
George Tupper	X	X
David Simoneau	X	X
John Scharff	X	X
Roderique LaRochelle	X	X
Harold Armstrong	X	X
Avron Zwilling		X
William Horn	X	X
Joseph Poirier		X
Robert Jordan		X
Alan Bruen	X	X
Robert Walden	X	
Paul Stimson		X
William Schmitz	X	X
Robert Millard	X	
Gordon Volkmann		X
Douglas Moore	X	
Stephen Dexter	X	
Stanley Hayes		X
Edward Anderson		X
Michael Parke	X	X
Susan Tarbell	X	X
Caroline Harlow	X	
Jerry Dean	X	
Nancy Bauchmann	X	X
Frederic Schneider		X
Susan Ashton (M.I.T.)		X
Dallas Abbott (M.I.T.)		X
Richard Shepard (M.I.T./Draper Lab.)		X
Robert Reid (M.I.T./Draper Lab)	X	
Glenn Flierl (Harvard)	X	
Adam Giffard (Centre Films)	X	
James O'Sullivan (Student)	X	

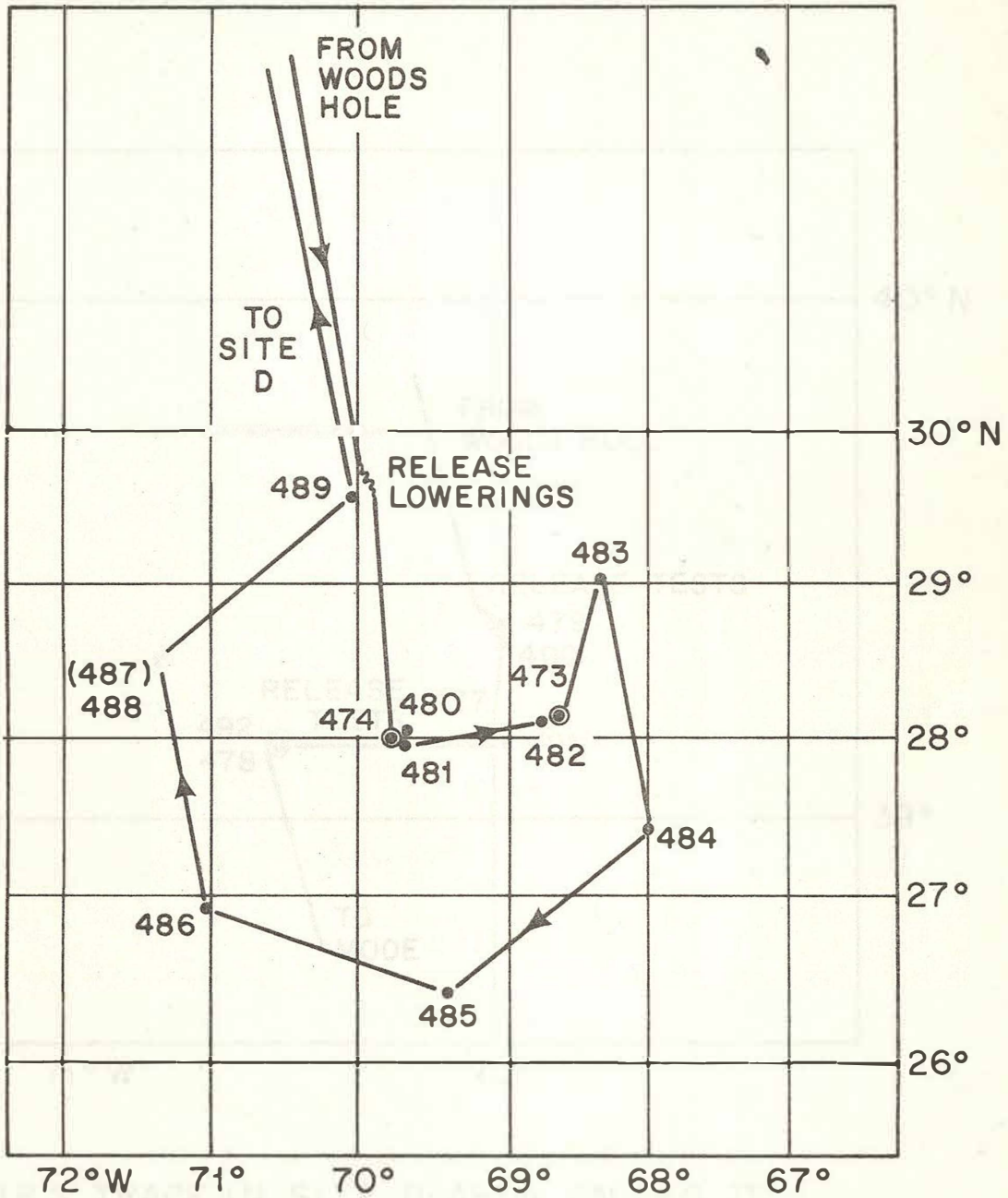
SHIP'S TRACK ON LEG I

→ SETTING

→ RECOVERY

↑ INDICATING ADDED

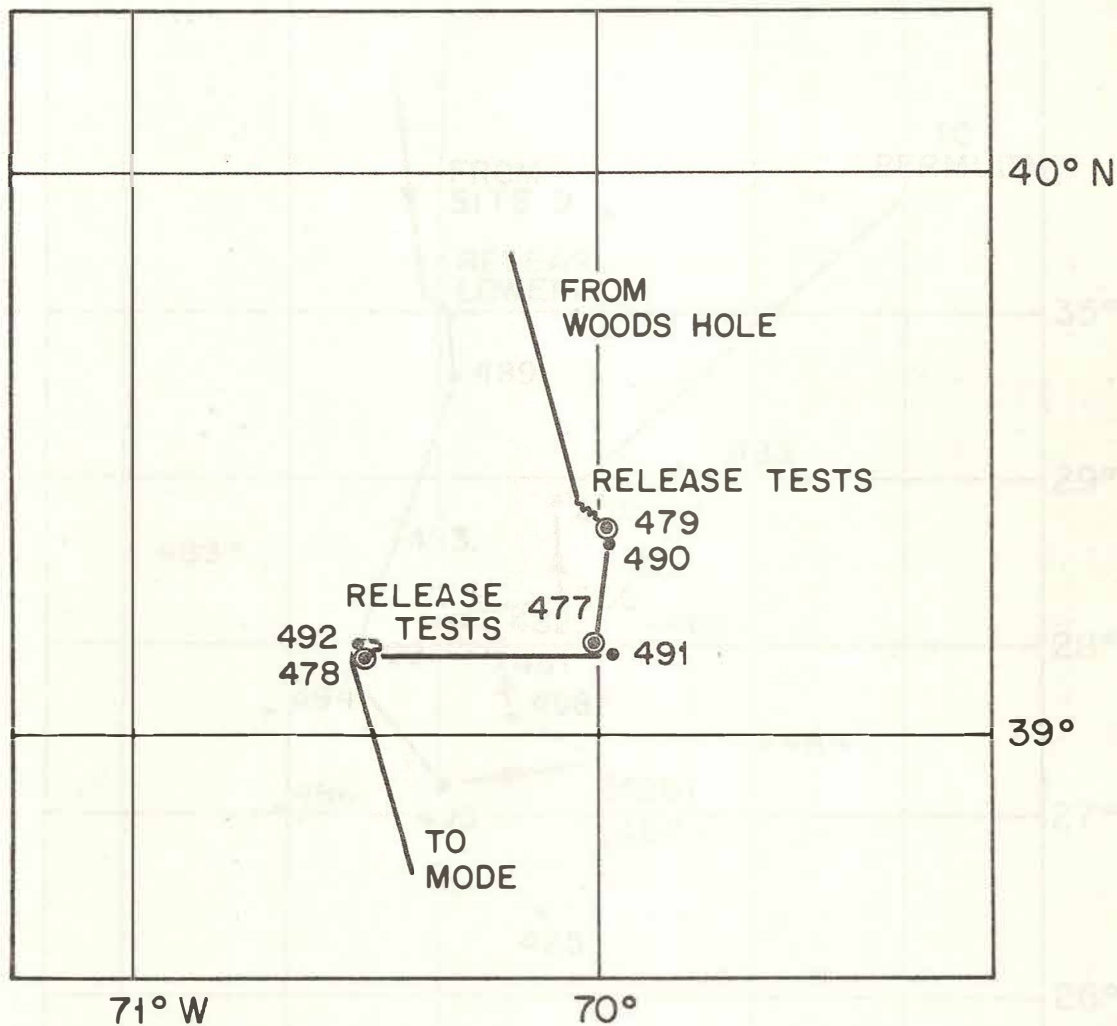
FIG. 1



SHIP'S TRACK ON LEG I

- SETTING
- ⊙ RECOVERY
- ( ) MOORING ABORTED

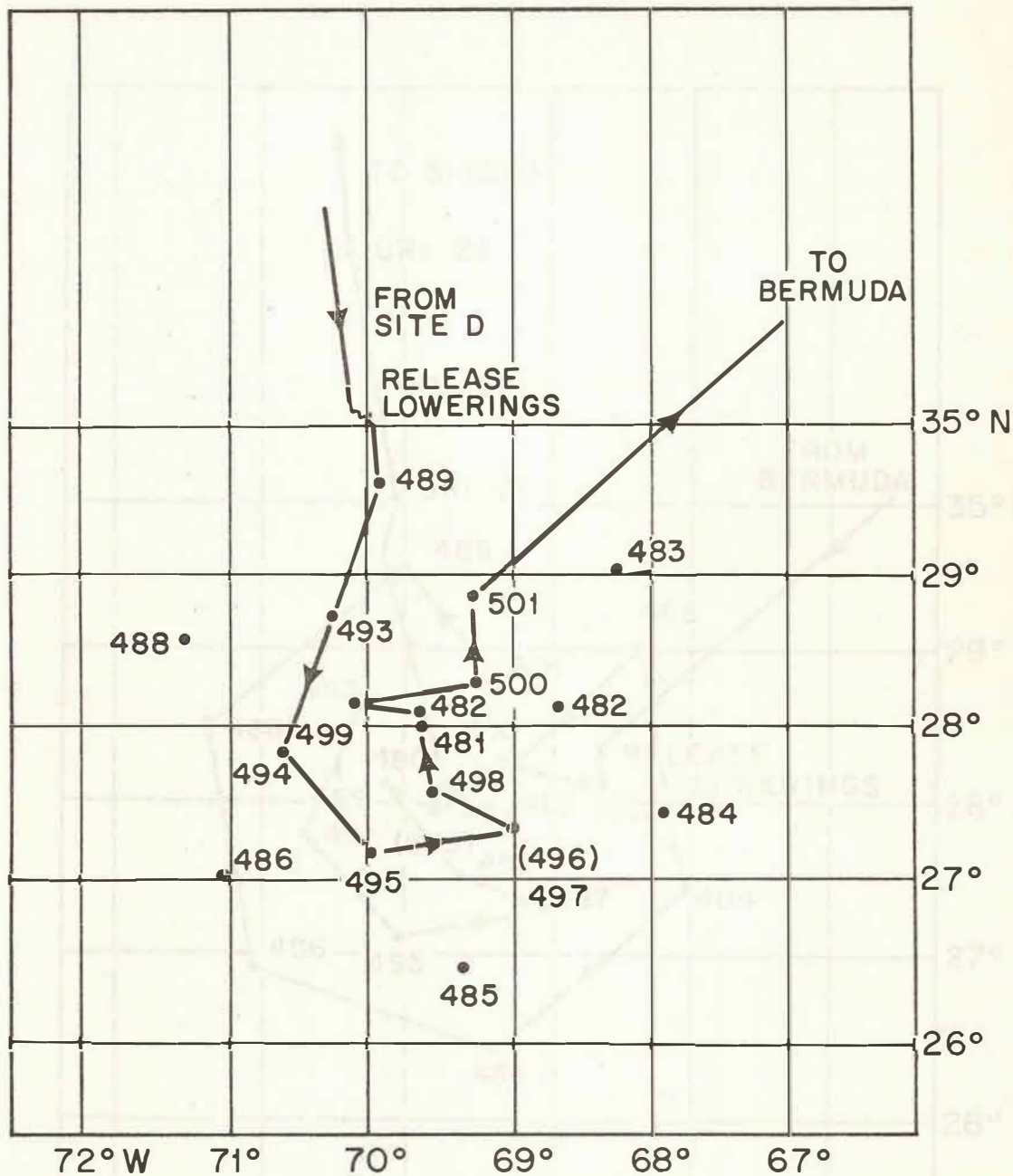
FIG. 1



SHIP'S TRACK IN SITE D AREA ON LEG II

- SETTING
- ◎ RECOVERY

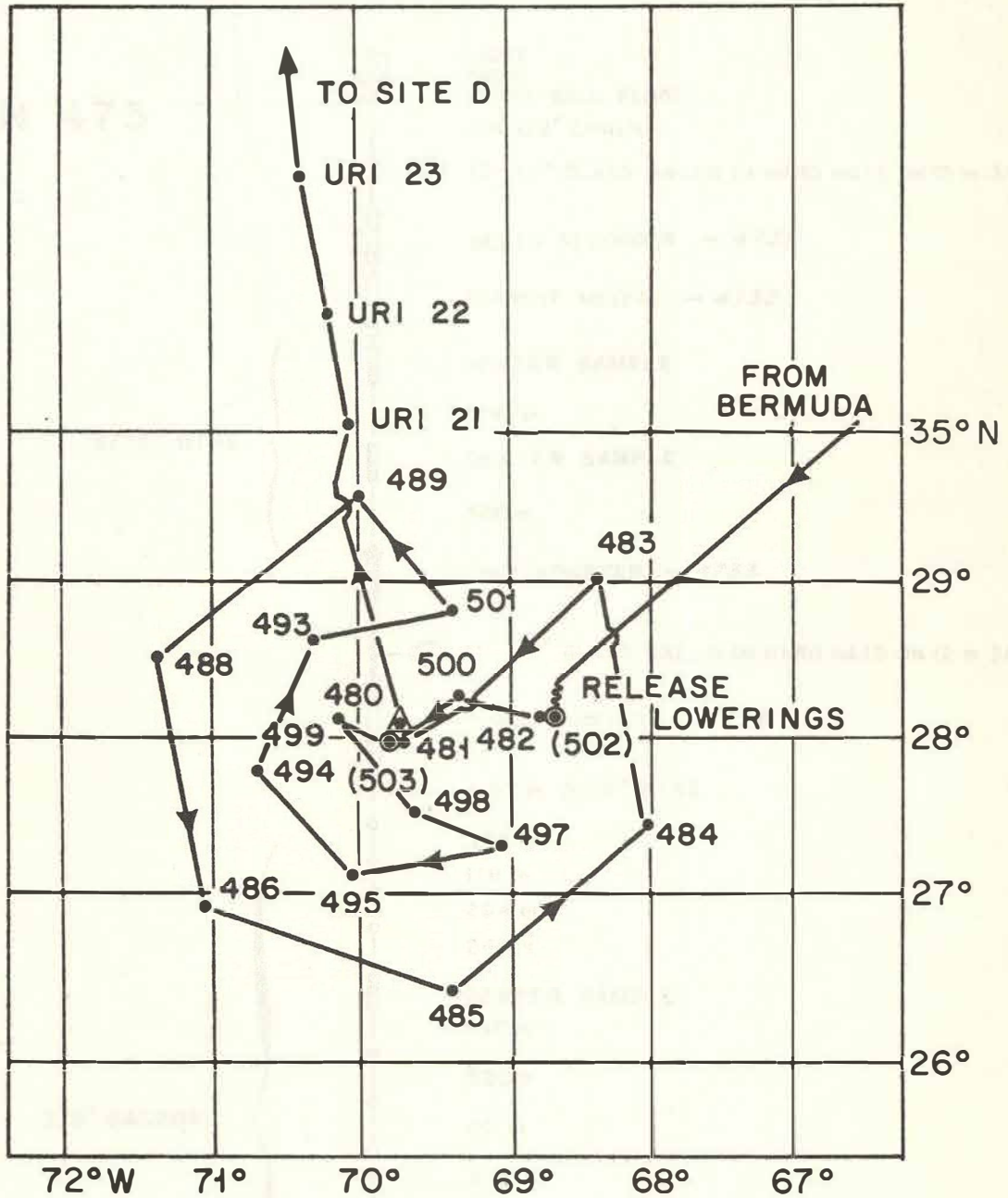
FIG. 2



SHIP'S TRACK ON LEG II

- SETTING
- ( ) MOORING ABORTED

FIG. 3



SHIP'S TRACK IN MODE AREA

- ⊙ ( ) MOORINGS SET
- MOORINGS RECOVERED
- ▲ MOORING LOST

FIG. 4 - LEGS I & II, CHAIN 112

STATION 473



349 m

LIGHT  
RADIO  
GLASS BALL FLOAT  
2 m 1/2" CHAIN

13 17" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

DEPTH RECORDER - 4731

CURRENT METER - 4732

DEXTER SAMPLE

500 m

DEXTER SAMPLE

500 m

INCLINOMETER - 4733

3/16" WIRE

11 17" GLASS BALLS IN HARD HATS ON 12 m 3/8" CHAIN

CURRENT METER - 4734

500 m 3/16" WIRE

382 m

118 m

204 m

246 m

DEXTER SAMPLE

180 m

320 m

20 m

430 m

CURRENT METER - 4735

500 m

420 m

80 m

250 m

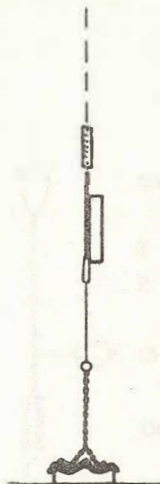
3/8" DACRON

12 17" GLASS BALLS IN HARD HATS ON 12 m 3/8" CHAIN

CONTINUED

CONTINUED

STATION 473



DEXTER SAMPLE

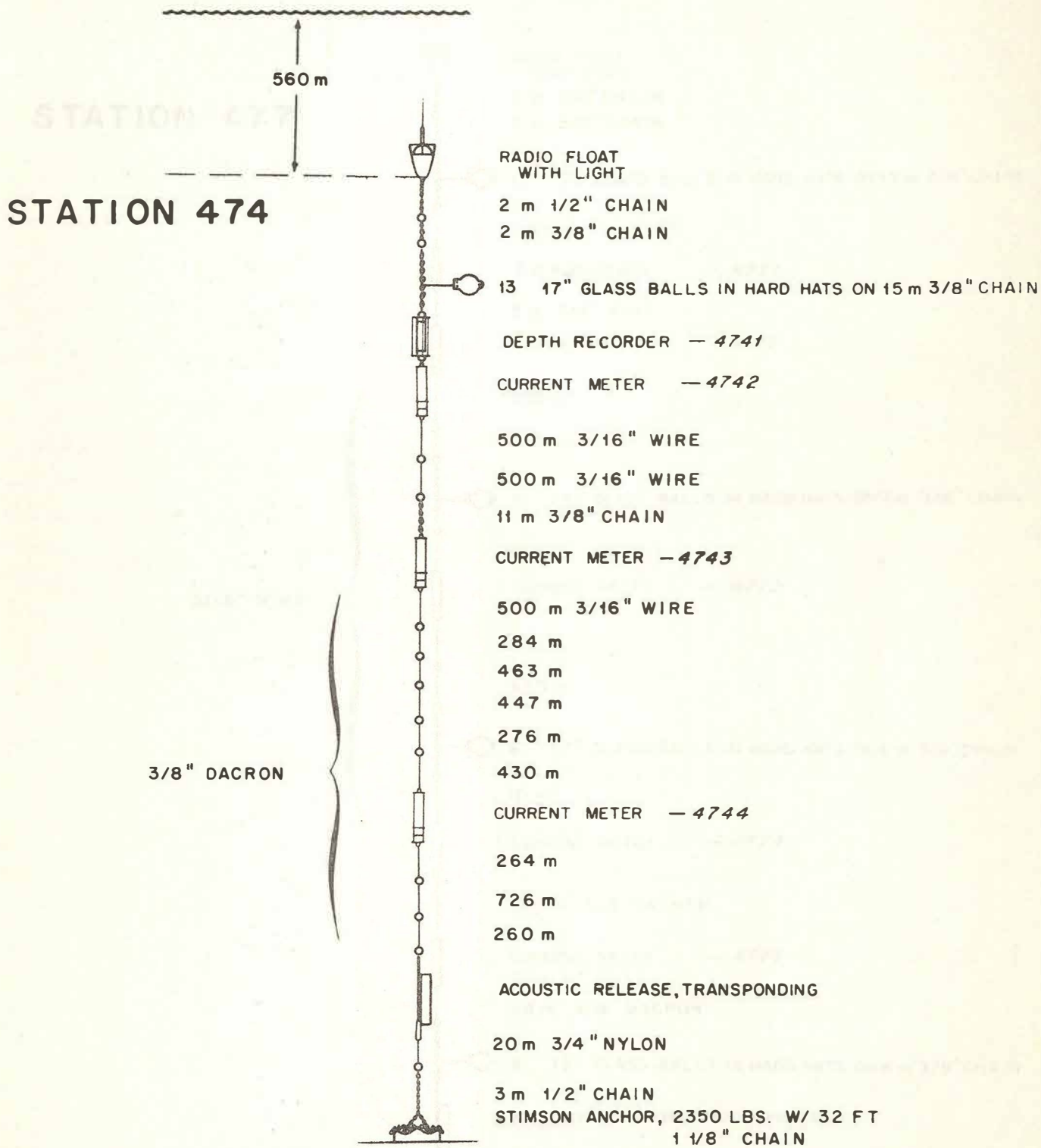
ACOUSTIC RELEASE, TRANSPONDING

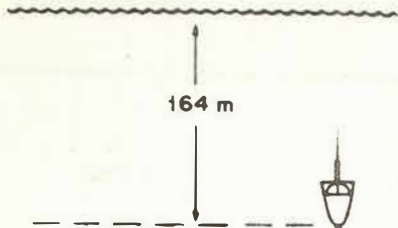
20 m 3/4" NYLON

3 m 1/2" CHAIN

STIMSON ANCHOR, 2600 LBS. W/ 32 FT.  
1 1/8" CHAIN







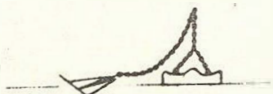
STATION 477

STATION 477

3/16" WIRE

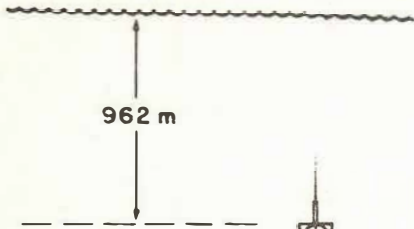


- RADIO FLOAT WITH LIGHT
- 2 m 1/2" CHAIN
- 2 m 3/8" CHAIN
- 15 17" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN
- 10 m 3/16" WIRE
- THERMOGRAPH - 4771
- 5 m 3/4" WIRE
- CURRENT METER - 4772
- 500 m
- 285 m
- 7 17" GLASS BALLS IN HARD HATS ON 7 m 3/8" CHAIN
- 10 m
- CURRENT METER - 4773
- 500 m
- 480 m
- 6 17" GLASS BALLS IN HARD HATS ON 6 m 3/8" CHAIN
- 10 m
- CURRENT METER - 4774
- 516 m 3/8" DACRON
- CURRENT METER - 4775
- 63 m 3/8" DACRON
- 6 17" GLASS BALLS IN HARD HATS ON 6 m 3/8" CHAIN
- ACOUSTIC RELEASE, TRANSPONDING
- 20 m 5/8" NYLON
- 3 m 1/2" CHAIN
- STIMSON ANCHOR, 2500 LB.



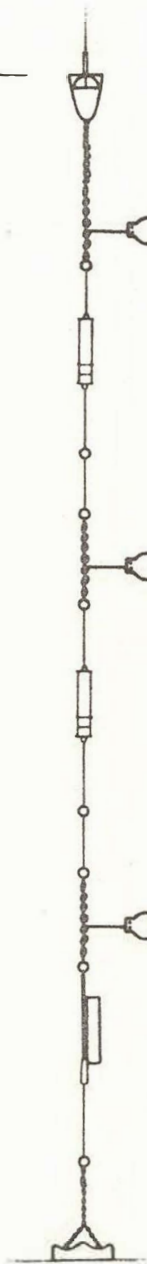
15 FT. CHAIN WITH 65 LB. DANFORTH

# STATION 478



3/16 " WIRE

3/8" DACRON



RADIO FLOAT  
WITH LIGHT

2 m 1/2" CHAIN

2 m 3/8" CHAIN

14 17" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

10 m

CURRENT METER — 4781

500 m

480 m

7 17" GLASS BALLS IN HARD HATS ON 7 m 3/8" CHAIN

10 m

CURRENT METER — 4782

500 m

177 m

6 17" GLASS BALLS IN HARD HATS ON 6 m 3/8" CHAIN

ACOUSTIC RELEASE, TRANSPONDING

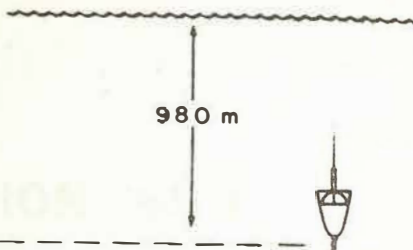
20 m 5/8" NYLON

3 m 1/2" CHAIN

STIMSON ANCHOR 2,500 LBS

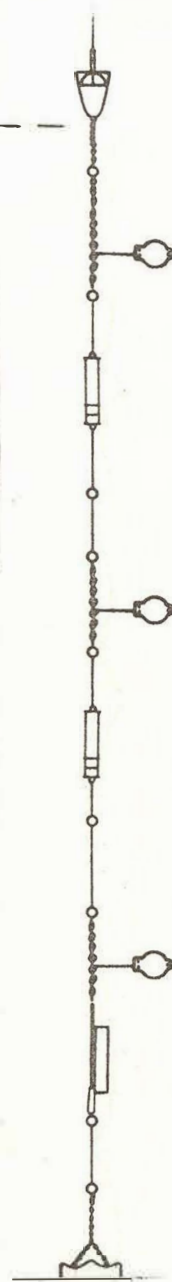
STATION

# STATION 479



3/16" WIRE

3/8" DACRON



RADIO FLOAT WITH LIGHT

2 m 1/2" CHAIN

2 m 3/8" CHAIN

14-17" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

10 m

CURRENT METER — 4791

500 m

500 m

7 17" GLASS BALLS IN HARD HATS ON 7 m 3/8" CHAIN

10 m

CURRENT METER — 4792

10 m

460 m

6 17" GLASS BALLS IN HARD HATS ON 5 m 3/8" CHAIN

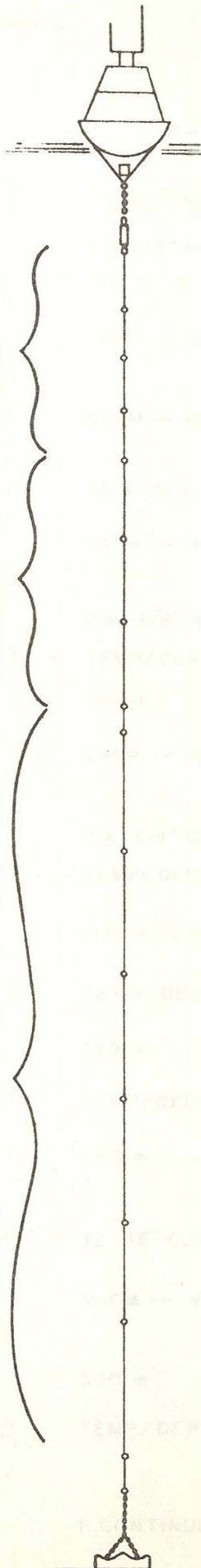
ACOUSTIC RELEASE, TRANSPONDING

20 m 5/8" NYLON

3 m 1/2" CHAIN

STIMSON ANCHOR, 2,500 LBS

# STATION 480



- LIGHT
- CB BEACON
- HF BEACON
- RADAR TRANSPONDER
- NOVA TRANSPONDER
- WIND RECORDER — 4801

TELEM. TENSION CELL

10 m 1/2" CHAIN

SWIVEL

100 m

100 m

100 m

100 m

500 m

3/8" 3x19 WIRE ROPE

5/16" " " "

500 m

500 m

22 m

515 m

502 m

529 m

5/8" NYLON

512 m

480 m

589 m

20 m 3/4" NYLON

3 m 1/2" CHAIN

STIMSON ANCHOR, 5850 LBS.

STATION 481

476 m



RADIO FLOAT WITH LIGHT

1 m 1/2" CHAIN

20 m 16" GLASS BALLS IN HARD HATS ON 20 m 3/8" CHAIN

VACM — 4811

VACM — 4812

96 m 3/16" WIRE

VACM — 4813

2 m 3/8" CHAIN

TEMP/DEPTH RECORDER — 4814

196 m

VACM — 4815

2 m 3/8" CHAIN

TEMP/DEPTH RECORDER — 4816

198 m 3/16" WIRE

TEMP/DEPTH RECORDER — 4817

199 m

TEMP/DEPTH RECORDER — 4818

280 m

12 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM — 4819

500 m

TEMP/DEPTH RECORDER — 481,10

3/16" WIRE

( CONTINUED )

# STATION 481

( CONTINUED )

3/8" DACRON

6 m

470 m

TEMP/DEPTH RECORDER — 481,11

12 m

458 m

10K 16" GLASS BALLS IN HARD HATS ON 10 m 3/8" CHAIN

VACU — 481,12

2 m 1/2" DACRON

TEMP/DEPTH RECORDER — 481,13

20 m

455m

3/8" DACRON

TEMP/DEPTH RECORDER — 481,14

18 m

455 m

5 16" GLASS BALLS IN HARD HATS ON 5 m 3/8" CHAIN

CURRENT METER — 481,15

2 m 1/2" DACRON

TEMP/DEPTH RECORDER — 481,16

376 m

3/8" DACRON

TEMP/DEPTH RECORDER — 481,17

4.42 m

456 m

CURRENT METER — 481,18

2 m 1/2" DACRON

TEMP/DEPTH RECORDER — 481,19

55 m 3/8" DACRON

( CONTINUED )

STATION 481

( CONTINUED )



15 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

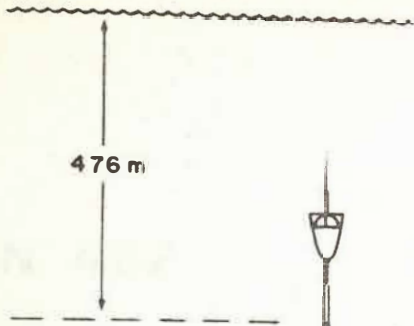
ACOUSTIC RELEASE, TRANSPONDING

20 m 3/4" NYLON

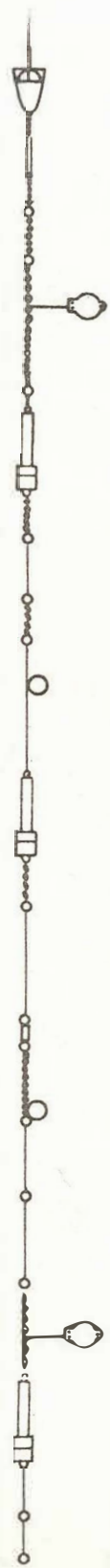
3 m 1/2" CHAIN

STIMSON ANCHOR, 2500 LBS





STATION 482



RADIO FLOAT WITH LIGHT

CONICAL FLOAT  
2 m 1/2" CHAIN  
2 m 3/8" CHAIN

14 16" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

CORROSION LINK  
VACM - 4821

2 m 3/8" CHAIN

96 m 3/16" WIRE

2 m 3/8" CHAIN

TEMP/DEPTH RECORDER - 4822

196 m 3/16" WIRE

VACM - 4823

2 m 3/8" CHAIN

198 m 3/16" WIRE

CORROSION SAMPLE

2 m 3/8" CHAIN

TEMP/DEPTH RECORDER - 4824

199 m 3/16" WIRE

280 m 3/16" WIRE

10 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM - 4825

500 m 3/16" WIRE

45 m 3/8" DACRON

( CONTINUED )

( CONTINUED )

STATION 482

456 m

457 m

6 16" GLASS BALLS IN HARD HATS ON 6 m 3/8" CHAIN

VACM — 4826

CORROSION SAMPLE  
38 m

459 m

455 m

VACM — 4827

170 m

457 m

457 m

CURRENT METER — 4828

57 m

17 16" GLASS BALLS IN HARD HATS ON 17 m 3/8" CHAIN

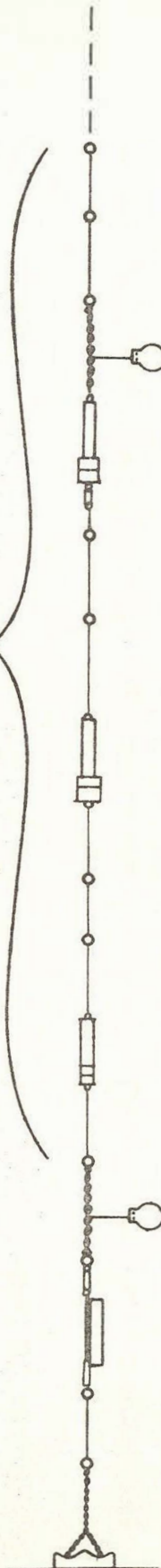
CORROSION SAMPLE  
ACOUSTIC RELEASE

20 m 3/4" NYLON

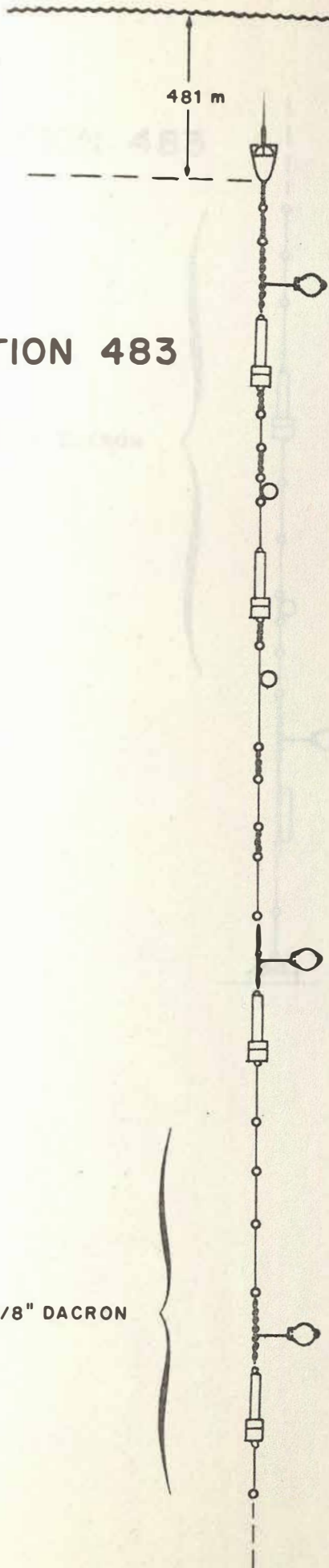
3 m 1/2" CHAIN

STIMSON ANCHOR .2550 LBS.

3/8" DACRON



# STATION 483



RADIO FLOAT  
WITH LIGHT  
2 m 1/2" CHAIN  
2 m 3/8" CHAIN

12 17" GLASS BALLS IN HARD HATS ON 12 m 3/8" CHAIN

VACM — 4831

2 m 3/8" CHAIN

96 m 3/16" WIRE

3 m 3/8" CHAIN

TEMP/DEPTH RECORDER — 4832

196 m 3/16" WIRE

VACM — 4833

2 m 3/8" CHAIN

TEMP/DEPTH RECORDER — 4834

198 m 3/16" WIRE

1 m 3/8" CHAIN

199 m 3/16" WIRE

1 m 3/8" CHAIN

280 m 3/16" WIRE

8 17" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM — 4835

500 m 3/16" WIRE

38 m

458 m

458 m

5 17" GLASS BALLS IN HARD HATS ON 5 m 3/8" CHAIN

VACM — 4836

11 m

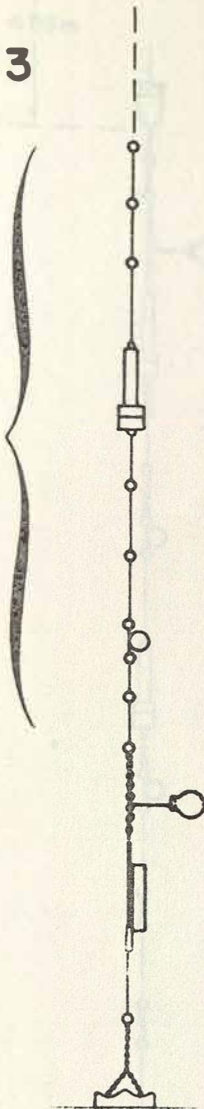
( CONTINUED )

3/8" DACRON

# STATION 483

( CONTINUED )

3/8" DACRON



30 m

457 m

458 m

VACM — 4837

141 m

458 m

457 m

TEMP/DEPTH RECORDER — 4838

8 m

47 m

14 17" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

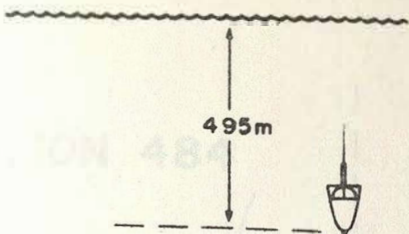
ACOUSTIC RELEASE, TRANSPONDING

20 m 3/4" NYLON

3 m 1/2" CHAIN

STIMSON ANCHOR, 2450 LBS.

# STATION 484



495m

RADIO FLOAT  
WITH LIGHT  
2 m 1/2" CHAIN  
2 m 3/8" CHAIN

12 17" GLASS BALLS IN HARD HATS ON 12 m 3/8" CHAIN

VACM - 4841

2 m 3/8" CHAIN

96 m 3/16" WIRE

3 m 3/8" CHAIN

TEMP/DEPTH RECORDER - 4842

196 m 3/16" WIRE

VACM - 4843

2 m 3/8" CHAIN

TEMP/DEPTH RECORDER - 4844

198 m 3/16" WIRE

1 m 3/8" CHAIN

199 m 3/16" WIRE

1 m 3/8" CHAIN

280 m 3/16" WIRE

8 17" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM - 4845

500 m 3/16" WIRE

42 m

456 m

456 m

5 17" GLASS BALLS IN HARD HATS ON 5 m 3/8" CHAIN

VACM - 4846

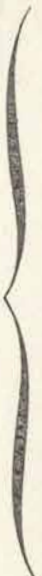
3/8" DACRON

(CONTINUED)

# STATION 484

(CONTINUED)

3/8" DACRON



46 m

457 m

453 m

VACM - 4847

148 m

455 m

456 m

13 17" GLASS BALLS IN HARD HATS ON 13 m 3/8" CHAIN

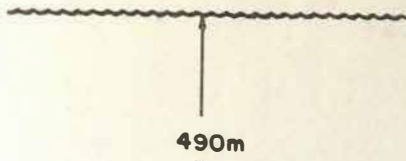
ACOUSTIC RELEASE, TRANSPONDING

20 3/4" NYLON

3 m 1/2" CHAIN

STIMSON ANCHOR, 2450 LBS.





# STATION 485

3/16" WIRE

3/8" DACRON



RADIO FLOAT  
WITH LIGHT  
2 m 1/2" CHAIN  
2 m 3/8" CHAIN

13 17" GLASS BALLS IN HARD HATS ON 13m 3/8" CHAIN

VACM - 4851

2 m 3/8" CHAIN

96 m 3/16" WIRE

3 m 3/8" CHAIN

TEMP/DEPTH RECORDER - 4852

196 m 3/16" WIRE

VACM - 4853

2 m 3/8" CHAIN

198 m

TEMP/DEPTH RECORDER - 4854

199 m

TEMP/DEPTH RECORDER - 4855

280 m

8 17" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM - 4856

500 m

TEMP/DEPTH RECORDER - 4857

10 m

16 m

457 m

TEMP/DEPTH RECORDER - 4858

8 m

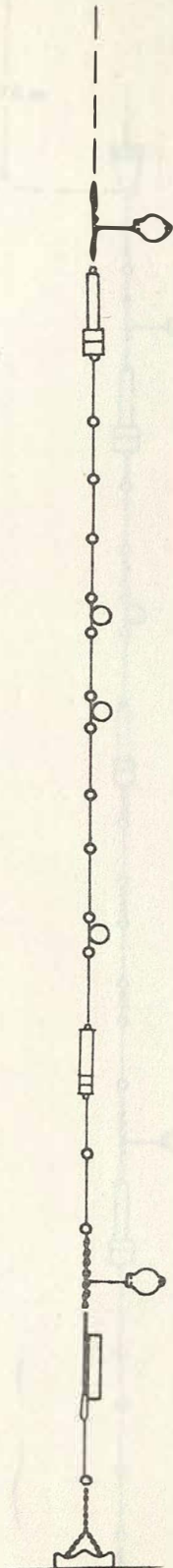
458 m

(CONTINUED)

# STATION 485

(CONTINUED)

3/8" DACRON



8 17" GLASS BALLS IN HARD HATS ON 8 m 3/8" CHAIN

VACM — 4859

25 m

12 m

464 m

459 m

TEMP/DEPTH RECORDER — 485,10

374 m

TEMP/DEPTH RECORDER — 485,11

37 m

413 m

429 m

TEMP/DEPTH RECORDER — 485,12

2 m 1/2" DACRON

CURRENT METER — 485,13

19 m 3/8" DACRON

36 m 3/8" DACRON

14 17" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

ACOUSTIC RELEASE, TRANSPONDING

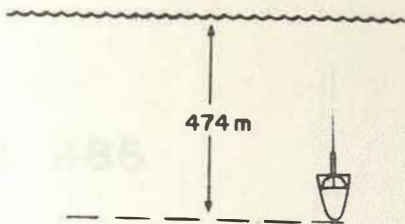
20 m 3/4" NYLON

3 m 1/2" CHAIN

STIMSON ANCHOR, 2450 LBS.



# STATION 486



RADIO FLOAT  
WITH LIGHT  
2m 1/2" CHAIN  
2m 3/8" CHAIN

12 17" GLASS BALLS IN HARD HATS ON 12m 3/8" CHAIN

VACM. - 4861

2m 3/8" CHAIN

96m 3/16" WIRE

3m 3/8" CHAIN

TEMP/ DEPTH RECORDER - 4862

196m 3/16" WIRE

VACM - 4863

2m 3/8" CHAIN

198m 3/16" WIRE

1m 3/8" CHAIN

199m 3/16" WIRE

1m 3/8" CHAIN

280m 3/16" WIRE

8 17" GLASS BALLS IN HARD HATS ON 15m 3/8" CHAIN

VACM - 4864

500m 3/16" WIRE

37m

457m

457m

5 17" GLASS BALLS IN HARD HATS ON 5m 3/8" CHAIN

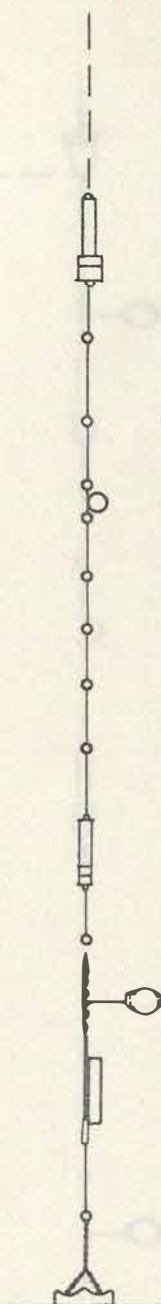
3/8" DACRON

(CONTINUED)

STATION 486

(CONTINUED)

3/8" DACRON



VACM - 4865

41 m

458 m

457 m

TEMP / DEPTH RECORDER - 4866

3 m

71 m

339 m

455 m

448 m

CURRENT METER - 4867

55 m

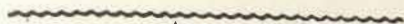
13 17" GLASS BALLS IN HARD HATS ON 13 m 3/8" CHAIN

ACOUSTIC RELEASE, TRANSPONDING

20 m 3/4" NYLON

3m 1/2" CHAIN

STIMSON ANCHOR 2650 LBS.



489m

RADIO FLOAT  
WITH LIGHT  
2m 1/2" CHAIN

2m 3/8" CHAIN

12 17" GLASS BALLS IN HARD HATS ON 12m 3/8" CHAIN

VACM - 4881

2m 3/8" CHAIN

96m 3/16" WIRE

3m 3/8" CHAIN

TEMP/DEPTH RECORDER - 4882

196m 3/16" WIRE

VACM - 4883

2m 3/8" CHAIN

198m 3/16" WIRE

1m 3/8" CHAIN

199m 3/16" WIRE

1m 3/8" CHAIN

280m 3/16" WIRE

8 17" GLASS BALLS IN HARD HATS ON 15m 3/8" CHAIN

VACM - 4884

500m 3/16" WIRE

458m

458m

35m

3/8" DACRON

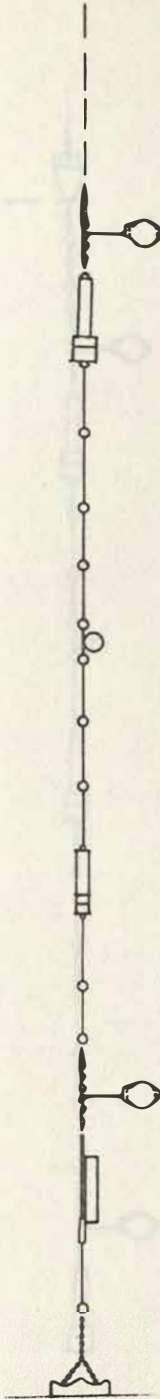
(CONTINUED)

STATION 488

STATION 488

(CONTINUED)

3/8" DACRON



5 17" GLASS BALLS IN HARD HATS ON 5m 3/8" CHAIN

VACM - 4885

455 m

456 m

34 m

11 m

TEMP/ DEPTH RECORDER - 4886

457 m

458 m

260 m

CURRENT METER - 4887

42 m

13 m

13 17" GLASS BALLS IN HARD HATS ON 13m 3/8" CHAIN

ACOUSTIC RELEASE, TRANSPONDING

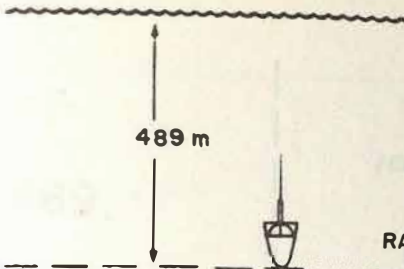
20 m 3/4" NYLON

3m 1/2" CHAIN

STIMSON ANCHOR , 2400 LBS.

(CONTINUED)

# STATION 489



RADIO FLOAT  
WITH LIGHT  
2 m 1/2 CHAIN

2 m 3/8" CHAIN

12 17" GLASS BALLS IN HARD HATS ON 12 m 3/8" CHAIN

VACM — 4891

2 m 3/8" CHAIN

96 m 3/16" WIRE

3 m 3/8" CHAIN

TEMP/DEPTH RECORDER — 4892

196 m 3/16" WIRE

VACM — 4893

2 m 3/8" CHAIN

198 m 3/16" WIRE

1 m 3/8" CHAIN

199 m 3/16" WIRE

1 m 3/8" CHAIN

280 m 3/16" WIRE

8 17" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM — 4894

500 m 3/16" WIRE

44 m

454 m

453 m

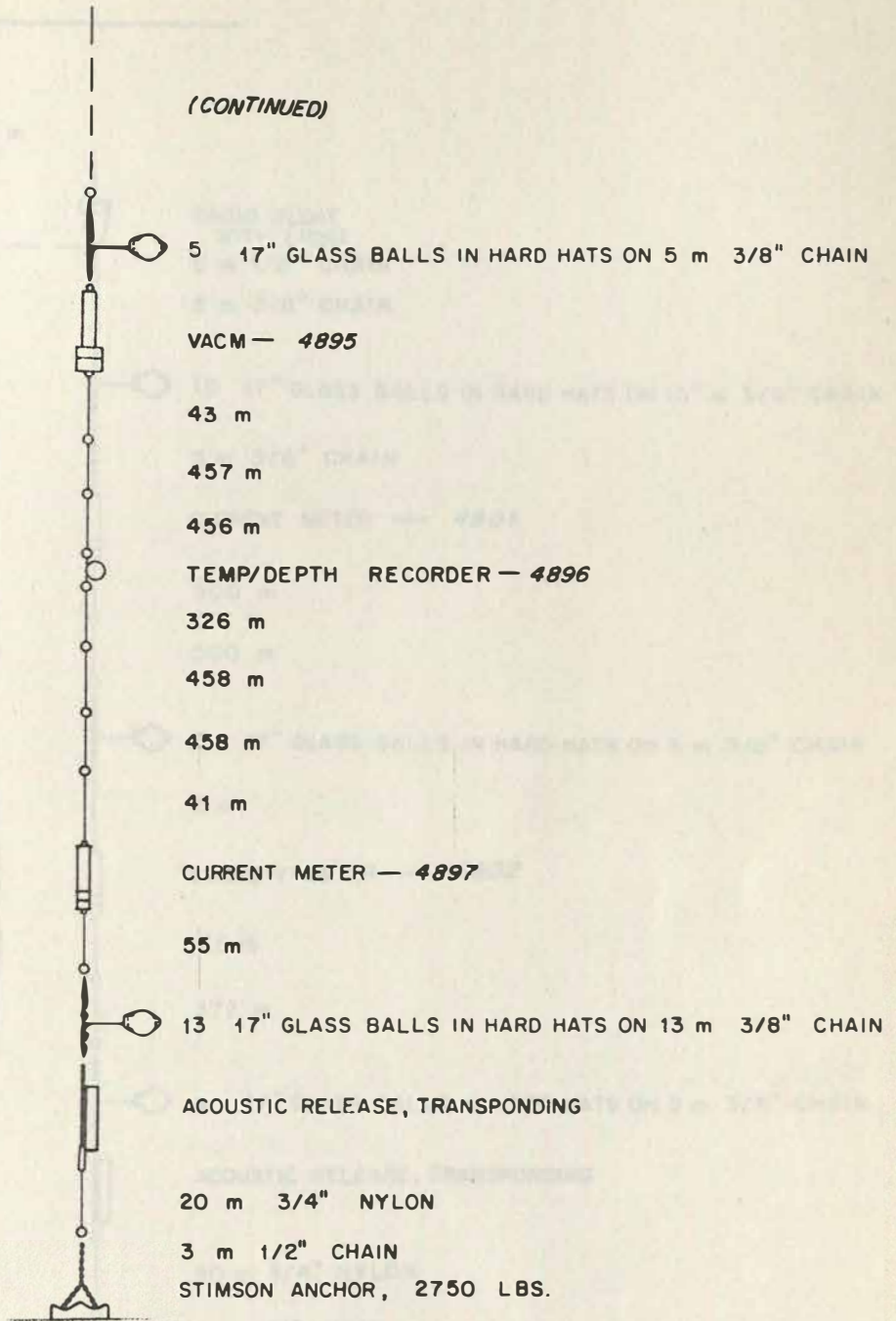
3/8" DACRON

(CONTINUED)

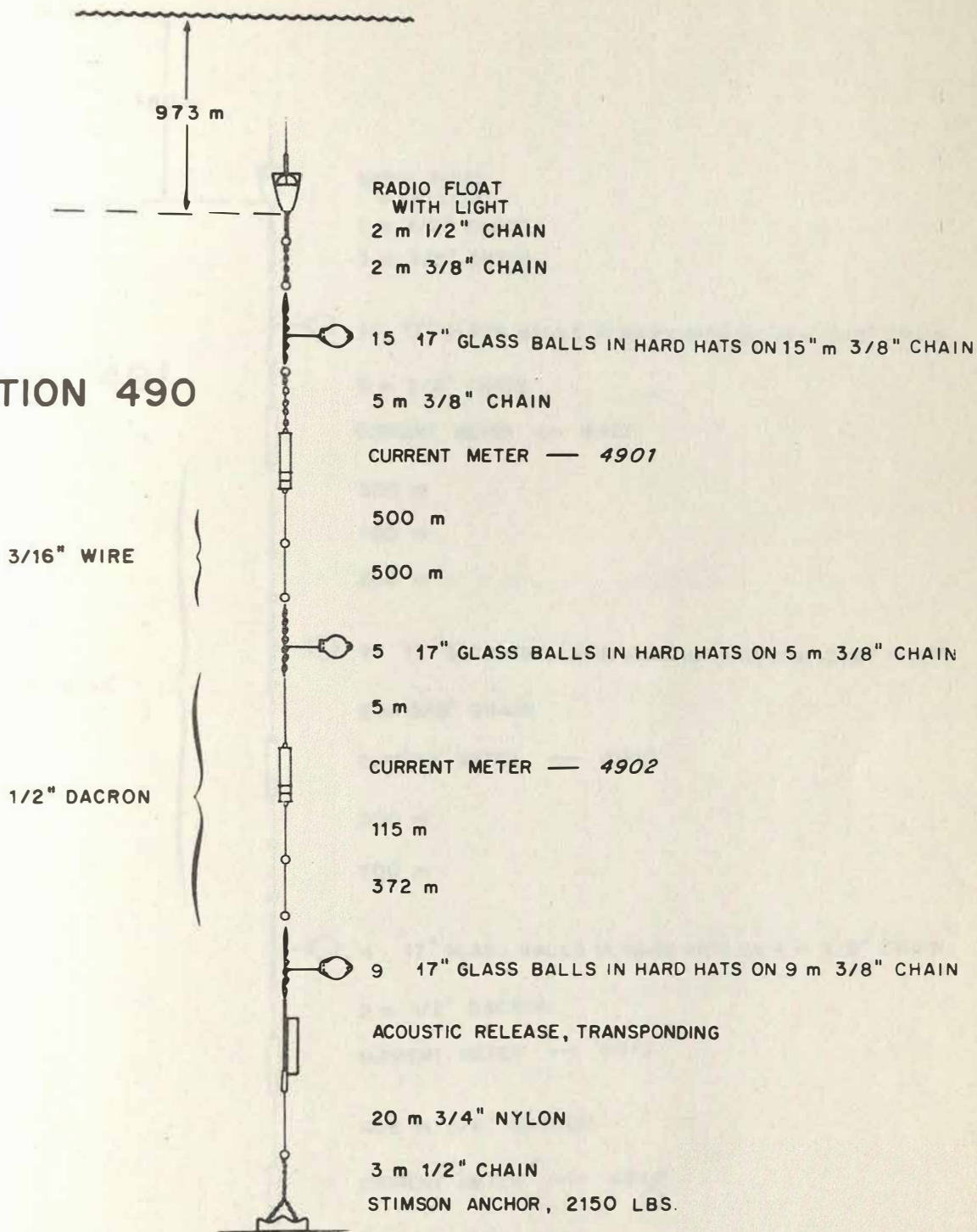
# STATION 489

(CONTINUED)

3/8" DACRON

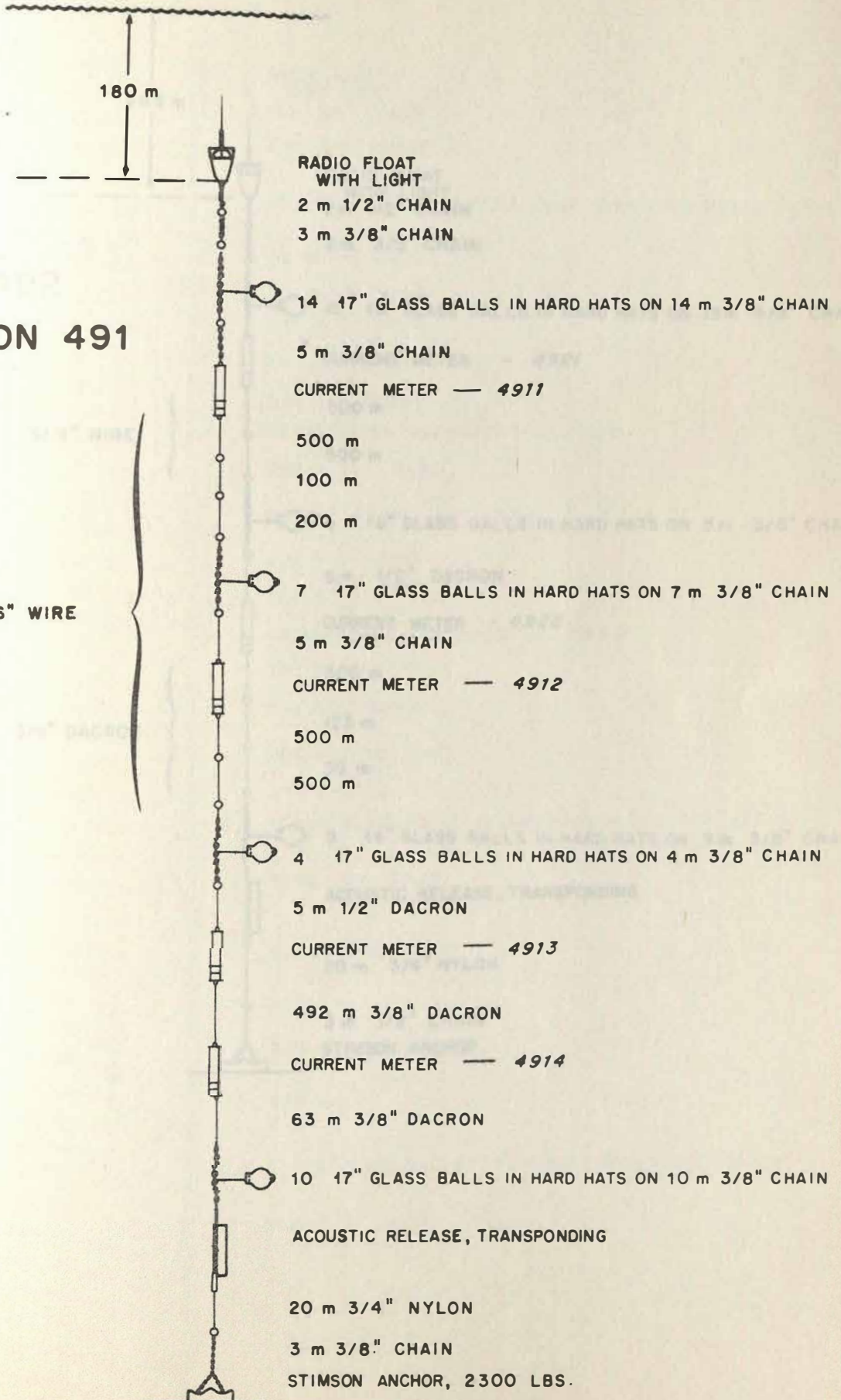


# STATION 490



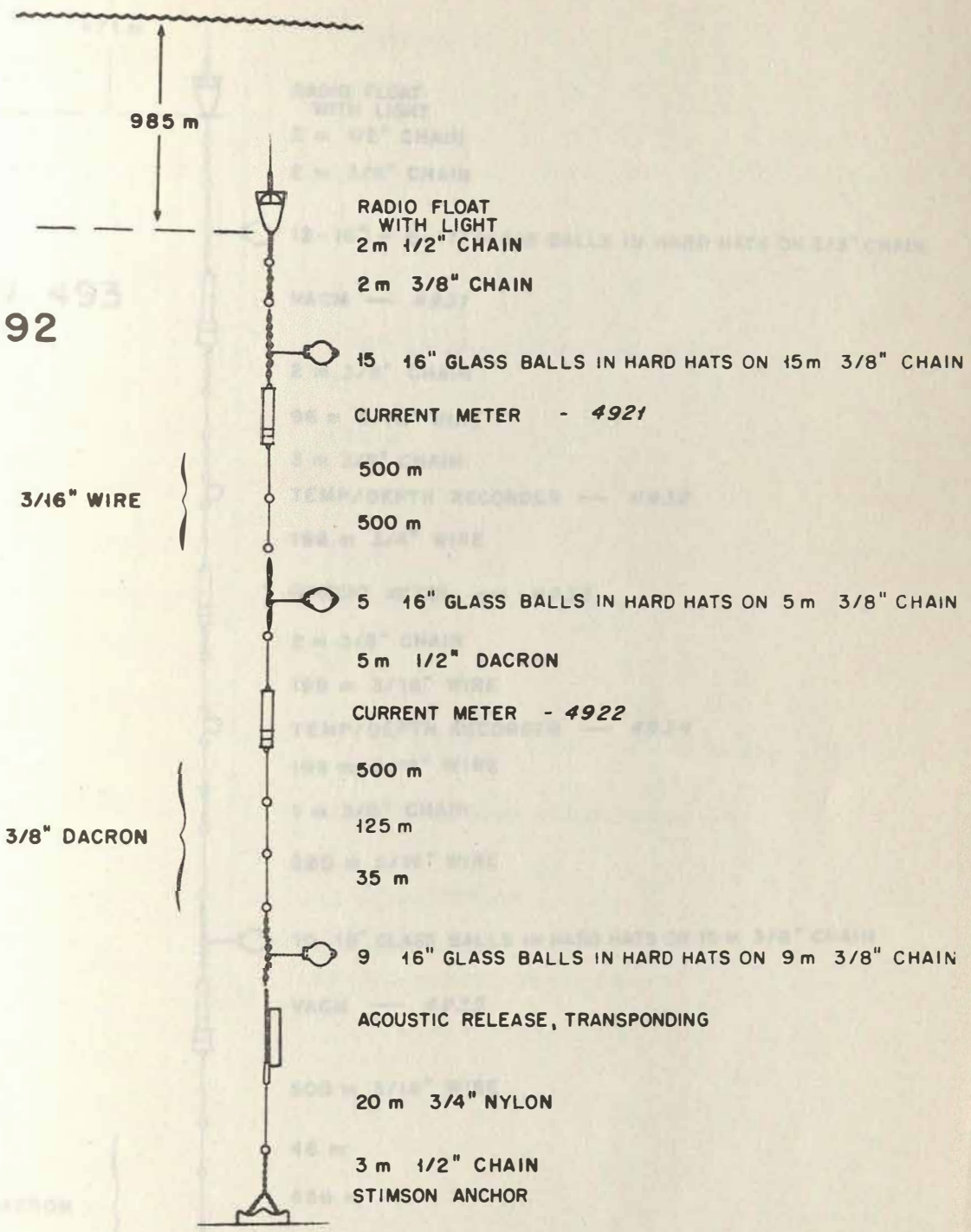
**STATION 491**

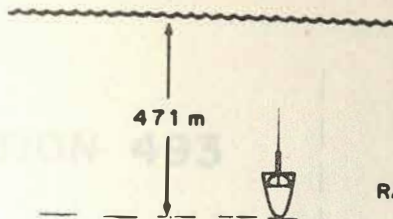
3/16" WIRE



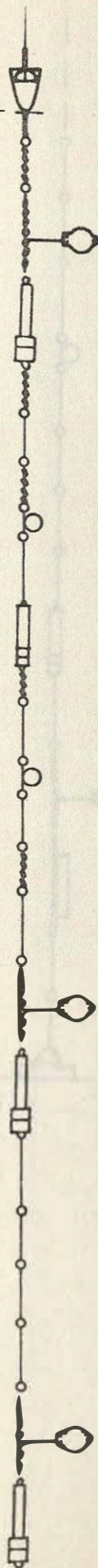


STATION 492





# STATION 493



RADIO FLOAT  
WITH LIGHT  
2 m 1/2" CHAIN  
2 m 3/8" CHAIN

12-16" + 2-17" GLASS BALLS IN HARD HATS ON 3/8" CHAIN

VACM — 4931

2 m 3/8" CHAIN

96 m 3/16" WIRE

3 m 3/8" CHAIN

TEMP/DEPTH RECORDER — 4932

196 m 3/4" WIRE

CURRENT METER — 4933

2 m 3/8" CHAIN

198 m 3/16" WIRE

TEMP/DEPTH RECORDER — 4934

199 m 3/16" WIRE

1 m 3/8" CHAIN

280 m 3/16" WIRE

10 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM — 4935

500 m 3/16" WIRE

46 m

456 m

457 m

5 16" GLASS BALLS IN HARD HATS ON 5 m 3/8" CHAIN

VACM — 4936

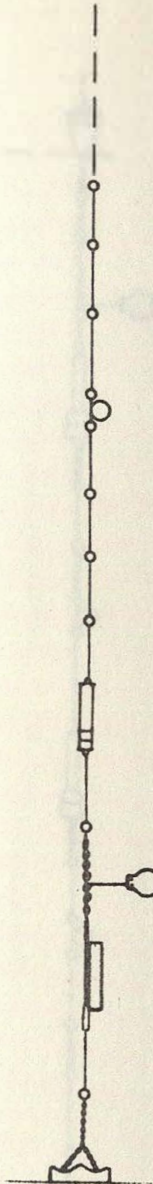
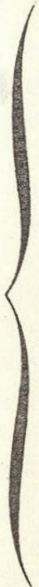
3/8" DACRON

( CONTINUED )

# STATION 493

( CONTINUED )

3/8" DACRON



52 m

454 m

454 m

TEMP/DEPTH RECORDER — 4937

337 m

456 m

456 m

43 m

CURRENT METER — 4938

57 m

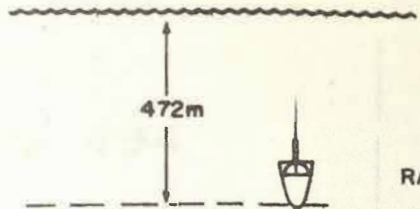
15 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

ACOUSTIC RELEASE, TRANSPONDING

15 m 3/4" NYLON

3 m 1/2" CHAIN

STIMSON ANCHOR, 2350 LBS.



# STATION 494

RADIO FLOAT  
WITH LIGHT  
2 m 1/2" CHAIN  
2 m 3/8" CHAIN

12-16" + 2-17" GLASS BALLS IN HARD HATS ON 14 m CHAIN

VACM - 4941

2 m 3/8" CHAIN

96 m 3/16" WIRE

3 m 3/8" CHAIN

TEMP/DEPTH RECORDER - 4942

196 m 3/16" WIRE

VACM - 4943

2 m 3/8" CHAIN

198 m 3/16" WIRE

TEMP/DEPTH RECORDER - 4944

199 m 3/16" WIRE

1 m 3/8" CHAIN

280 m 3/16" WIRE

10 16" GLASS BALLS IN HARD HATS ON 10 m 3/8" CHAIN

5 m 3/8" CHAIN

VACM - 4945

500 m 3/16" WIRE

52 m

454 m

453 m

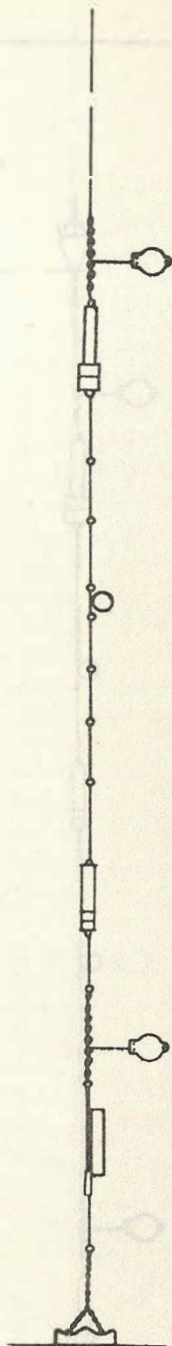
3/8" DACRON

(CONTINUED)

STATION 494

(CONTINUED)

3/8" DACRON



5 16" GLASS BALLS IN HARD HATS ON 5m 3/8" CHAIN

VACM - 4946

54 m

453m

453m

TEMP/DEPTH RECORDER - 4947

45 m

340 m

454 m

455 m

CURRENT METER - 4948

57 m

15 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

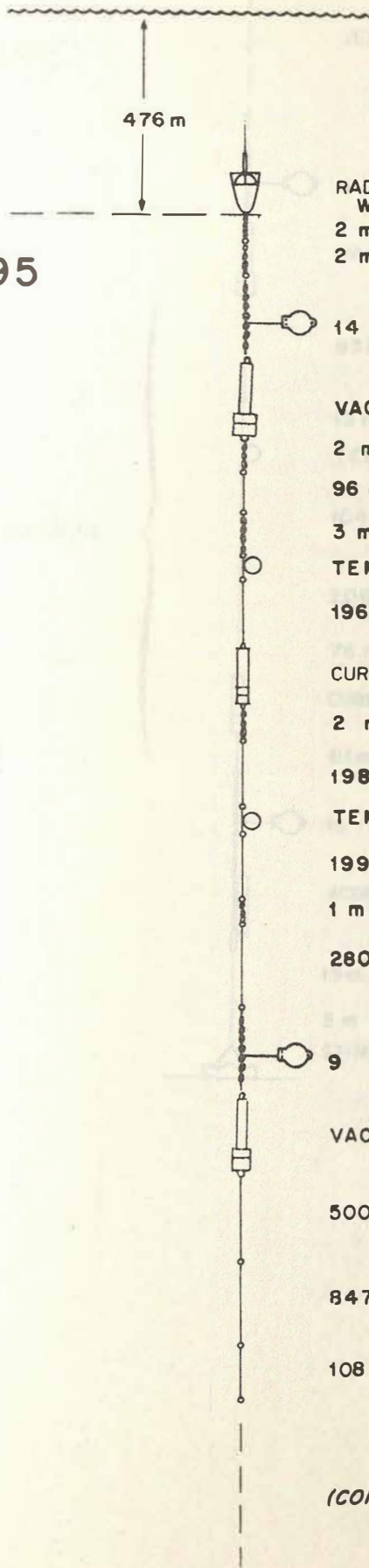
ACOUSTIC RELEASE, TRANSPONDING

15m 3/4" NYLON

3m 1/2" CHAIN

STIMSON ANCHOR, 2400 LBS.

STATION 495



RADIO FLOAT  
WITH LIGHT  
2 m 1/2" CHAIN  
2 m 3/8" CHAIN

14 16" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

VACM - 4951

2 m 3/8" CHAIN

96 m 3/16" WIRE

3 m 3/8" CHAIN

TEMP/DEPTH RECORDER - 4952

196 m 3/16" WIRE

CURRENT METER - 4953

2 m 3/8" CHAIN

198 m 3/16" WIRE

TEMP/DEPTH RECORDER - 4954

199 m 3/16" WIRE

1 m 3/8" CHAIN

280 m 3/16" WIRE

9 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM - 4955

500 m 3/16" WIRE

847 m 3/8" DACRON

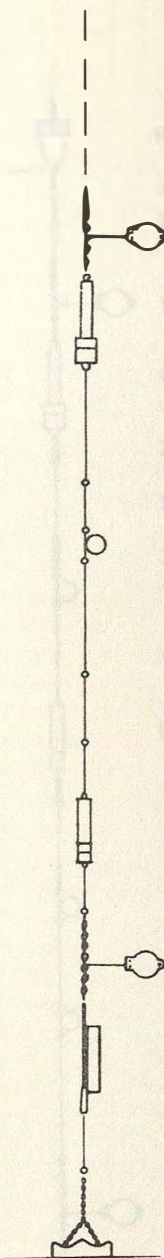
108 m 3/8" DACRON

(CONTINUED)

STATION 495

(CONTINUED)

3/8" DACRON



6 16" GLASS BALLS IN HARD HATS ON 6m 3/8" CHAIN

VACM - 4956

937 m

15 m

TEMP/DEPTH RECORDER - 4957

1044 m

206 m

76 m

CURRENT METER - 4958

61m

15 16" GLASS BALLS IN HARD HATS ON 15m 3/8" CHAIN

ACOUSTIC RELEASE, TRANSPONDING

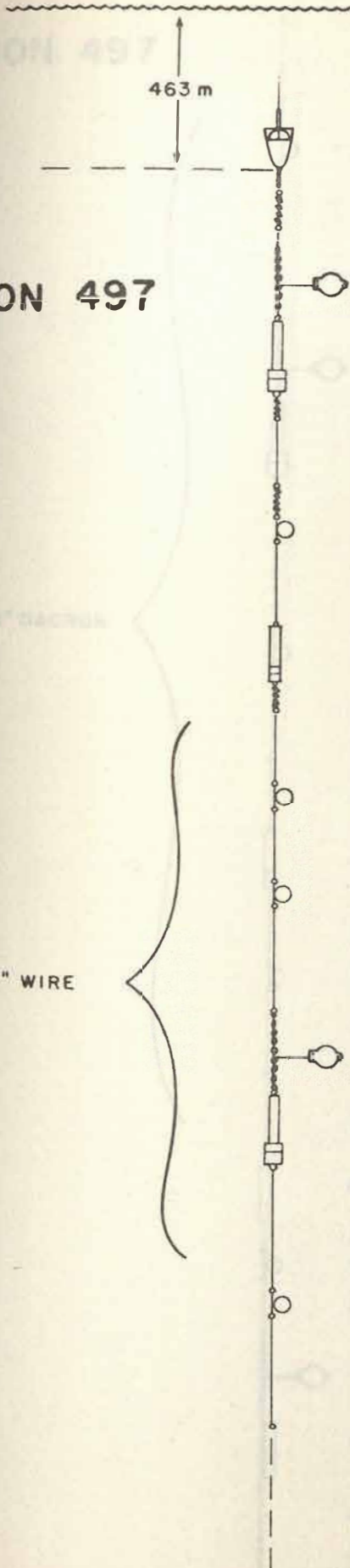
15m 3/4" NYLON

3m 1/2" CHAIN

STIMSON ANCHOR, 2450 LBS.

( CONTINUED )

# STATION 497



463 m

RADIO FLOAT  
WITH LIGHT  
2 m 1/2" CHAIN  
2 m 3/8" CHAIN

13 17" GLASS BALLS IN HARD HATS ON 13 m 3/8" CHAIN

VACM — 4971

2 m 3/8" CHAIN

96 m 3/16" WIRE

3 m 3/8" CHAIN

TEMP/DEPTH RECORDER — 4972

196 m 3/16" WIRE

CURRENT METER — 4973

2 m 3/8" CHAIN

198 m

TEMP/DEPTH RECORDER — 4974

199 m

TEMP/DEPTH RECORDER — 4975

280 m

8 17" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM — 4976

500 m

TEMP/DEPTH RECORDER — 4977

456 m 3/8" DACRON

3/16" WIRE

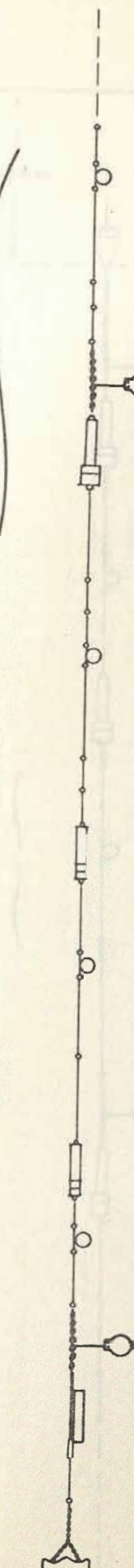
( CONTINUED )



( CONTINUED )

# STATION 497

3/8" DACRON



23 m  
TEMP / DEPTH RECORDER — 4978

455 m  
11 m  
16 m

8 17" GLASS BALLS IN HARD HATS ON 8 m 3/8" CHAIN

VACM — 4979

455 m  
11 m  
11 m  
TEMP / DEPTH RECORDER — 497,10

457 m  
10 m  
8 m  
CURRENT METER — 497,11

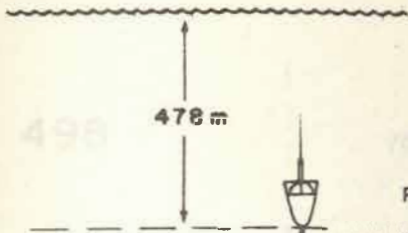
379 m  
TEMP / DEPTH RECORDER — 497,12  
456 m

316 m  
CURRENT METER — 497,13

2 m 1/2" DACRON  
TEMP / DEPTH RECORDER — 497,14  
57 m 3/8" DACRON

15 17" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN  
ACOUSTIC RELEASE, TRANSPONDING

20 m 3/4" NYLON  
3 m 1/2" CHAIN  
STIMSON ANCHOR, 2400 LBS.



STATION 496

STATION 498

RADIO FLOAT  
WITH LIGHT  
2 m 1/2" CHAIN + PLASTIC SAMPLE  
2 m 3/8" CHAIN

14 16" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

VACM — 4981  
2 m 3/8" CHAIN  
96 m 3/16" WIRE

3 m 3/8" CHAIN  
TEMP/DEPTH RECORDER — 4982 + PLASTIC SAMPLE  
196 m 3/16" WIRE

VACM — 4983  
2 m 3/8" CHAIN  
198 m

3/16" WIRE

TEMP/DEPTH RECORDER — 4984  
199 m  
1 m 3/8" CHAIN

280 m 3/16" WIRE

9 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN  
+ PLASTIC SAMPLE

VACM — 4985

500 m 3/16" WIRE

45 m 3/8" DACRON

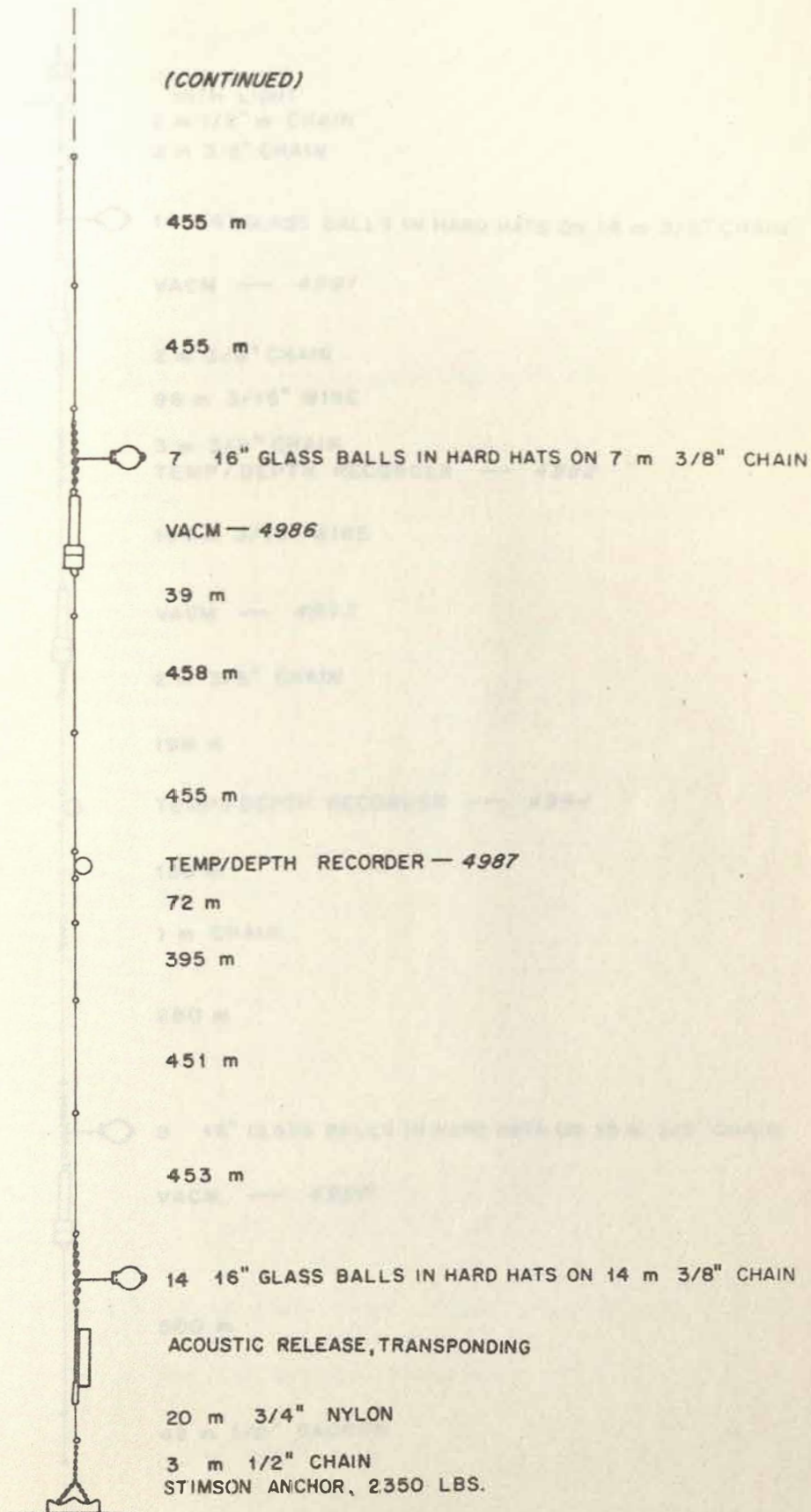
(CONTINUED)

STATION 498

(CONTINUED)

STATION 499

3/8" DACRON



455 m 16" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

VACM - 4987

455 m CHAIN

99 m 3/8" WIRE

7 16" GLASS BALLS IN HARD HATS ON 7 m 3/8" CHAIN

VACM - 4986

39 m

458 m

455 m

TEMP/DEPTH RECORDER - 4987

72 m

395 m

451 m

453 m

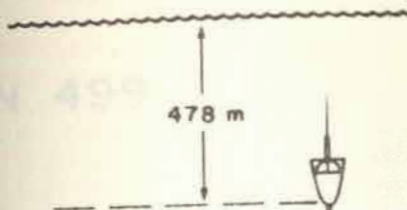
14 16" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

ACOUSTIC RELEASE, TRANSPONDING

20 m 3/4" NYLON

3 m 1/2" CHAIN

STIMSON ANCHOR, 2350 LBS.



STATION 499

RADIO FLOAT  
WITH LIGHT  
2 m 1/2" CHAIN  
2 m 3/8" CHAIN

14 16" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

VACM — 4991

2 m 3/8" CHAIN

96 m 3/16" WIRE

3 m 3/8" CHAIN  
TEMP/DEPTH RECORDER — 4992

196 m 3/16" WIRE

VACM — 4993

2 m 3/8" CHAIN

198 m

TEMP/DEPTH RECORDER — 4994

199 m

1 m CHAIN

280 m

3/16" WIRE

9 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM — 4995

500 m

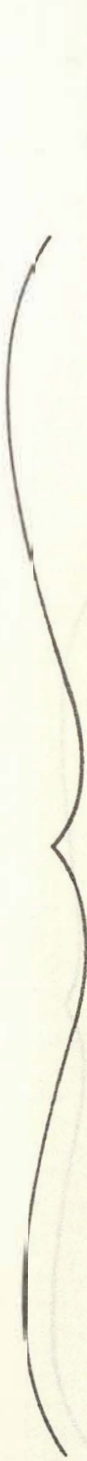
42 m 3/8" DACRON

( CONTINUED )

# STATION 499

(CONTINUED)

3/8" DACRON



RADIO FLOAT  
WITH LIGHT  
2 x 3/8" CHAIN  
2 x 3/8" CHAIN

455 m 16" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

VACM - 3007

456 m 1/2" CHAIN

7 16" GLASS BALLS IN HARD HATS ON 7 m 3/8" CHAIN

VACM - 4996  
TEMP/DEPTH RECORDER - 3007

41 m

455 m

2 x 3/8" CHAIN

456 m

TEMP/DEPTH RECORDER - 4997

2 x 3/8" CHAIN

387 m

16" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

456 m

VACM - 3007

456 m

30 m

67 m

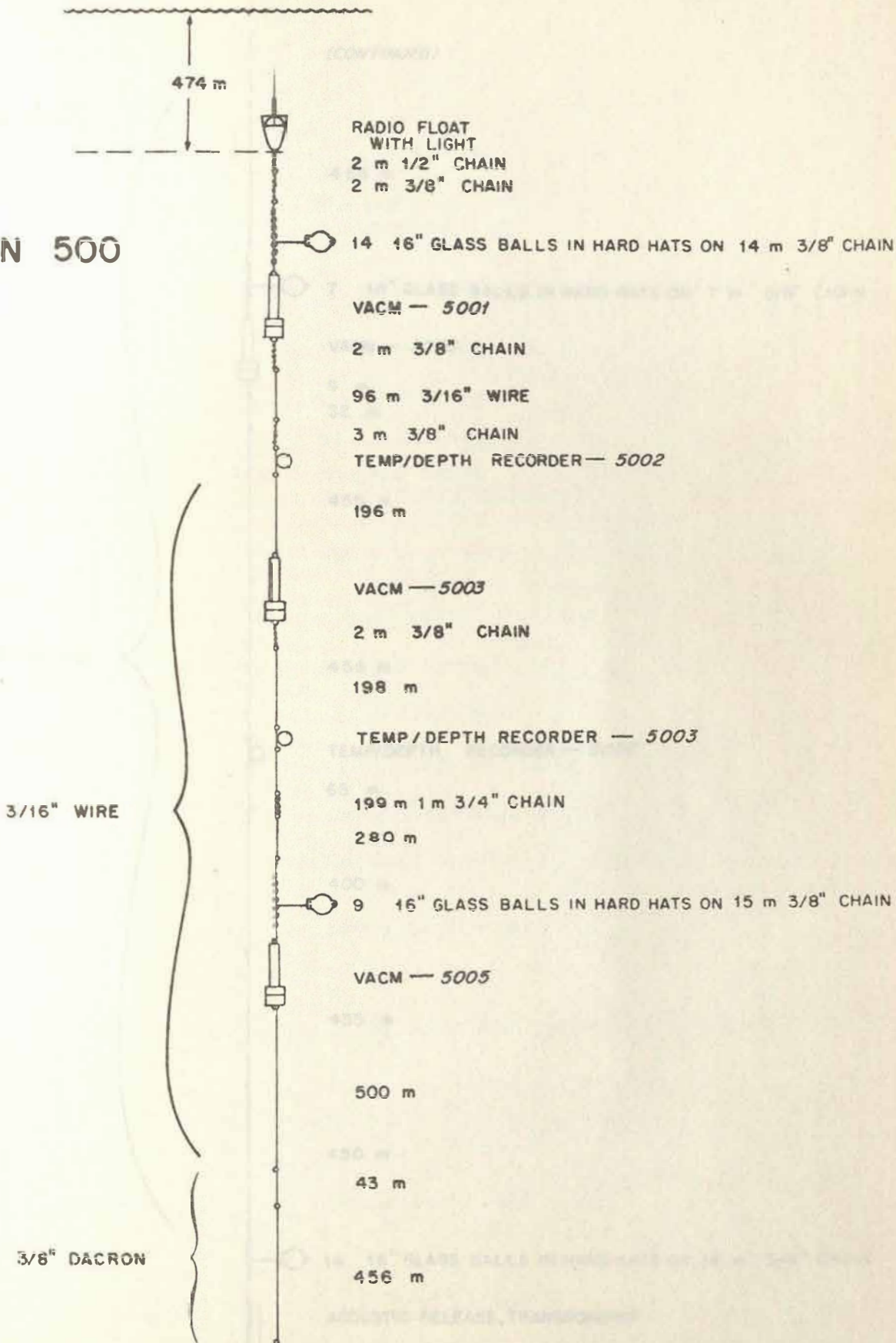
14 16" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

ACOUSTIC RELEASE, TRANSPONDING

20 m 3/4" NYLON

3 m 1/2" CHAIN  
STIMSON ANCHOR, 2450 LBS.

STATION 500



(CONTINUED)

474 m

RADIO FLOAT WITH LIGHT  
2 m 1/2" CHAIN  
2 m 3/8" CHAIN

14 16" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

VACM — 5001  
2 m 3/8" CHAIN  
96 m 3/16" WIRE

3 m 3/8" CHAIN  
TEMP/DEPTH RECORDER — 5002

196 m

VACM — 5003  
2 m 3/8" CHAIN

198 m

TEMP/DEPTH RECORDER — 5003

199 m 1 m 3/4" CHAIN  
280 m

3/16" WIRE

9 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM — 5005

500 m

43 m

3/8" DACRON

456 m

(CONTINUED)

(CONTINUED)

STATION 500

3/8" DACRON

456 m

7 16" GLASS BALLS IN HARD HATS ON 7 m 3/8" CHAIN

VACM - 5006

9 m

32 m

455 m

456 m

TEMP/DEPTH RECORDER - 5007

65 m

400 m

455 m

450 m

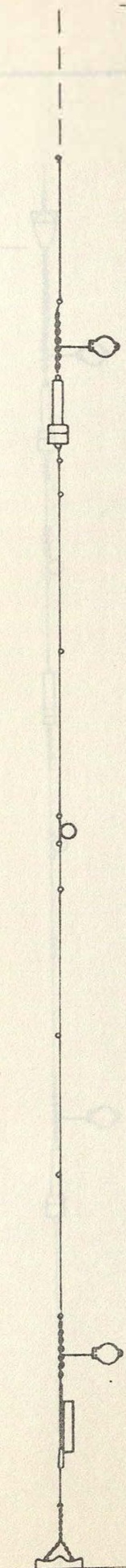
14 16" GLASS BALLS IN HARD HATS ON 14 m 3/8" CHAIN

ACOUSTIC RELEASE, TRANSPONDING

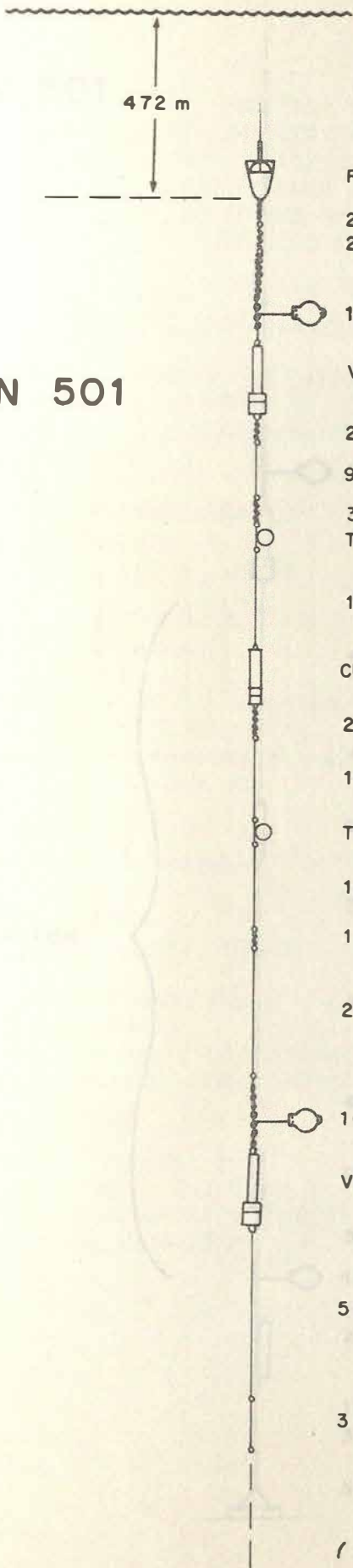
20 m 3/4" NYLON

3 m 1/2" CHAIN

STIMSON ANCHOR, 2300 LBS.



# STATION 501



RADIO FLOAT  
WITH LIGHT  
2 m 1/2" CHAIN  
2 m 3/8" CHAIN

12 - 16" + 2 - 17" GLASS BALLS IN HARD HATS ON 14 m  
3/8" CHAIN

VACM — 5011

2 m 3/8" CHAIN

96 m 3/16" WIRE

3 m 3/8" CHAIN  
TEMP/DEPTH RECORDER — 5012

196 m 3/16" WIRE

CURRENT METER — 5013

2 m 3/8" CHAIN

198 m 3/16" WIRE

TEMP/DEPTH RECORDER — 5014

199 m 3/16" WIRE

1 m 3/8" CHAIN

280 m 3/16" WIRE

10 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

VACM — 5015

500 m 3/16" WIRE

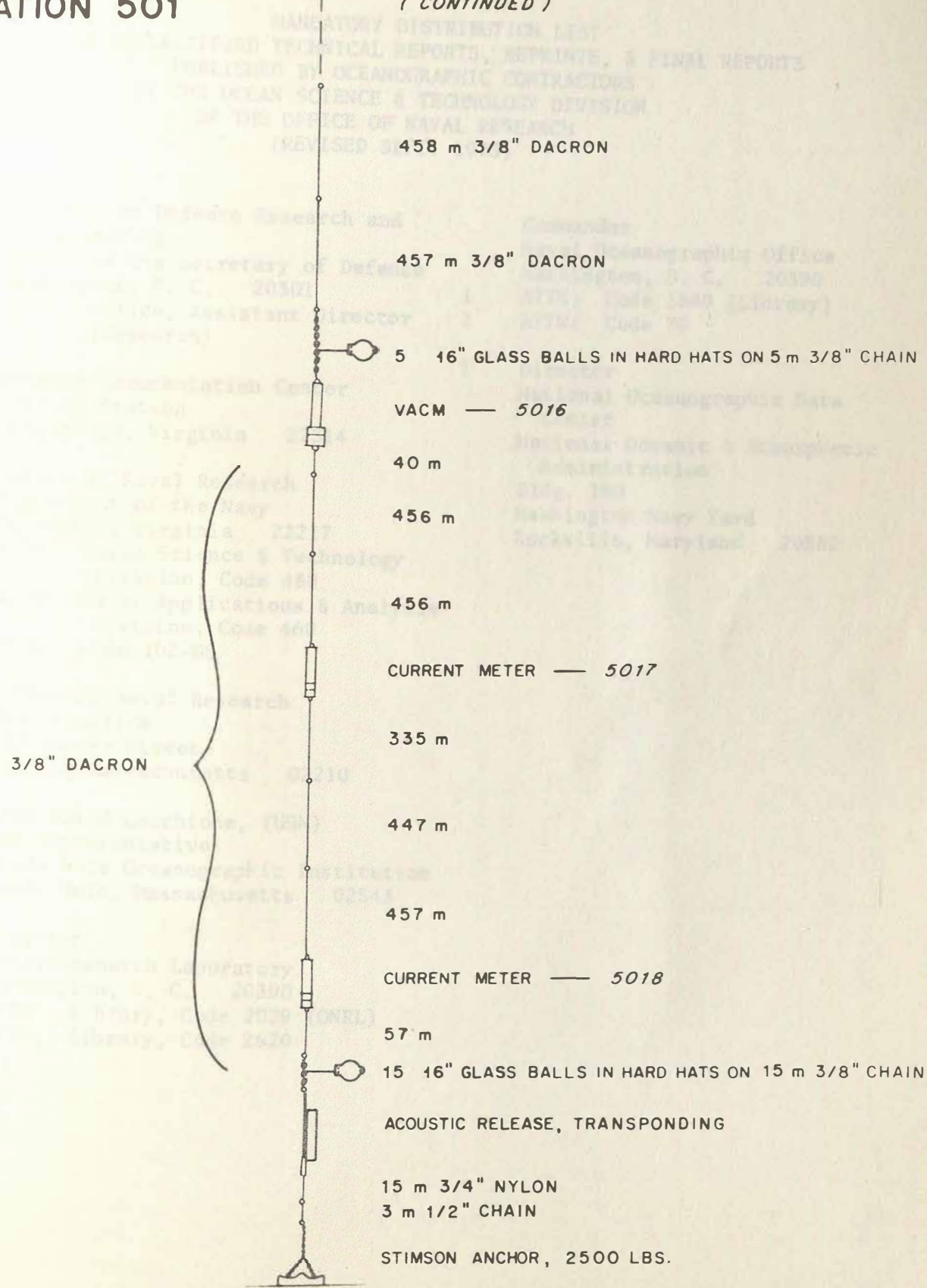
35 m 3/8" DACRON

( CONTINUED )



# STATION 501

( CONTINUED )



458 m 3/8" DACRON

457 m 3/8" DACRON

5 16" GLASS BALLS IN HARD HATS ON 5 m 3/8" CHAIN

VACM — 5016

40 m

456 m

456 m

CURRENT METER — 5017

335 m

447 m

457 m

CURRENT METER — 5018

57 m

15 16" GLASS BALLS IN HARD HATS ON 15 m 3/8" CHAIN

ACOUSTIC RELEASE, TRANSPONDING

15 m 3/4" NYLON

3 m 1/2" CHAIN

STIMSON ANCHOR, 2500 LBS.

3/8" DACRON

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Scientist. 8 Pages, 28 Figures. August 1973.  
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and five recovered. All work was done near the 70th meridian  
at Site D (vicinity of 39°10'N., 70°00'W) and the MODE Site  
(vicinity of 28°N., 69°40'W.).

1. Moorings
2. Ocean Currents
3. MODE

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