

FINAL CRUISE INSTRUCTIONS  
NOAA Ship *Miller Freeman*

Cruise No: MF-01-06  
FOCI No: none

Applicability: These instructions, with "FOCI Standard Operating Instructions for NOAA Ship *Miller Freeman*, 2001," present complete information for this cruise.

Area: Bering Sea

Itinerary: May 12, 2001: Dutch Harbor, Alaska  
~May 14, 2001: Dutch Harbor, Alaska, Touch and Go  
May 22, 2001: Dutch Harbor, Alaska

Participating organizations:

NOAA - Pacific Marine Environmental Laboratory (PMEL)  
University of Alaska Fairbanks (UAF)

CRUISE DESCRIPTION:

Fisheries-Oceanography Coordinated Investigations (FOCI) is an effort by NOAA and associated academic scientists. At present, FOCI consists of a Shelikof Strait (western Gulf of Alaska) walleye pollock project, and a NOAA Coastal Ocean Program project: Southeast Bering Sea Carrying Capacity. FOCI also supports associated projects, such as the Steller Sea Lion (SSL) Research Initiative, Arctic Research Initiative, U.S. GLOBEC, and NSF Inner Front Study, that address scientific issues related to FOCI's. FOCI's goal is to understand the effects of abiotic and biotic variability on ecosystems of the North Pacific Ocean and Bering Sea in order to discern the physical and biological processes that determine recruitment variability of commercially valuable finfish and shellfish stocks in Alaskan waters.

CRUISE OBJECTIVES:

1. Complete the CTD line between site #6 and site #3, extending toward site #2 if time permits.
2. Recover and deploy moorings at the FOCI study areas site #2 and site #4.
3. Recover and deploy AFSC moorings at the Bristol Bay CRAB study area.
4. Deploy moorings for the SSL project in the Aleutian Islands study areas.
5. Complete CTDs at mooring sites, along the 70-m isobath between sites #2 and #4, and other areas as designated by the Chief Scientist.

1.0. PERSONNEL

1.1. Chief Scientist:  
Allen Macklin M PMEL  
206-526-6798  
macklin@pmel.noaa.gov

The Chief Scientist has the authority to revise or alter the technical portion of the instructions as work progresses provided that, after consultation with the Commanding Officer, it is ascertained that the proposed changes will not: (1) jeopardize the safety of personnel or the ship; (2) exceed the overall time allotted for the project; (3) result in undue additional expenses; (4) alter the general intent of these project instructions.

## 1.2. Participating Scientists

Carol Dewitt	F	PMEL
William Floering	M	PMEL
Sonia Hamilton	F	PMEL
Susan Henrichs	F	UAF
Allen Macklin	M	PMEL
Nazila Merati	F	PMEL
Rick Miller	M	PMEL
Steve Smith	M	PMEL
Sarah Thornton	F	UAF
Dave Wisegarver	M	PMEL

## 1.3. NOAA Pacific Marine Center Operations Contact:

Larry Mordock  
NOAA/MOP (MOP1x4)  
1801 Fairview Ave. East  
Seattle, WA 98102-3767  
(206) 553 - 4764  
Larry.Mordock@noaa.gov

## 1.4. Program Contacts:

Dr. Phyllis Stabeno  
PMEL  
7600 Sand Point Way NE  
Seattle, WA 98115-6349  
(206) 526-6453  
stabeno@pmel.noaa.gov

Dr. Jeff Napp  
AFSC  
7600 Sand Point Way NE  
Seattle, WA 98115-6349  
(206) 526-4148  
jeff.napp@noaa.gov

## 2.0. OPERATIONS

A standard physical oceanographic watch will be utilized: a winch operator, a scientist and a Survey Tech on deck. A nutrient/chlorophyll scientist will participate as necessary. Mooring scientists and deck department personnel will be required for all mooring operations. Operations will occur 24 hours per day.

### 2.1. SUMMARY OF ACTIVITIES:

Operations during Cruise MF-01-06 will consist of a combination of mooring recoveries, mooring deployments, CTD casts, and plankton tows. Drifting buoys and Argo floats will be deployed during the cruise at the discretion of the Chief Scientist.

CTD lines are planned between site #6 and site #3, en route to site #4, and at the mooring locations of site #2, site #4 and the SSL mooring sites. Other CTDs may be completed at the discretion of the Chief Scientist. Water samples from standard FOCI depths will be collected on designated casts at stations bracketing the shelf break, on the transit from site #2 to site #4, and near moorings at sites 2 and 4. Otherwise, only salinity-calibration water samples are needed.

### Mooring Operations (see Appendices):

Bristol Bay	Recover two moorings; deploy two moorings.
Site # 2	Recover two moorings; deploy two moorings.
Site # 4	Recover one mooring; deploy one mooring.
Seguam Pass	Deploy two moorings.
Amukta Pass	Deploy four moorings.
Alaska Stream	Deploy five moorings.
Akutan Pass	Deploy two moorings.

In the event that conditions prohibit mooring deployments/recoveries, operations will focus on CTD lines to be selected by the Chief Scientist.

2.2. PROCEDURES FOR OPERATIONS: The following are operations to be conducted on this cruise. The procedures for these operations are listed in the FOCI Standard Operating Instructions (SOI). Operations not addressed in the SOI, and changes to standard procedures, are addressed below. Details and times of these operations are appended to these instructions. Chief Scientist will provide mooring diagrams to ship's personnel before the cruise.

- The CTD line between site #6 and site #3 will be the first cruise operation. This will allow the mooring personnel to arrive from the *Ron Brown* cruise scheduled to end in Seward on May 13 and be picked up during a touch and go by the ship in Dutch Harbor on May 14. If time permits, the CTD line will be extended from site #3 toward site #2, collecting nutrient and chlorophyll samples at 0, 10, 20, 30, 40, 50 m, with two or three samples deeper than 50 m. Radio communication will be maintained with *Ron Brown* to optimize timing for cessation of this operation.
- The Chief Scientist or his designate will deploy Argo floats and drifting buoys according to manufacturer's instructions.
- Mooring calibration CTDs will be completed before each mooring recovery and after each mooring deployment.
- Northeast of Unimak Pass, the Bristol Bay mooring operations will consist of the recovery and re-deployment of the two AFSC CRAB Program subsurface moorings. After completing the CRAB mooring work the ship will transit to site #2. At site #2, mooring recoveries (two subsurface), deployments (one surface, one subsurface), CTDs and a plankton tow (bongo or ring net) will be completed.
- On the way from site #2 to site #4, five CTDs will be conducted with water samples collected for nutrients and chlorophyll at 0, 10, 20, 30, 40, 50, and ~70 m.
- At site #4, one subsurface mooring will be recovered and deployed, and CTDs will be conducted at the mooring location.
- Upon completion of site #4 operations, the ship will proceed to the SSL study area.
- At Seguam Pass, two subsurface moorings will be deployed. Four ADCP subsurface moorings will be deployed at Amukta Pass. In the Alaska Stream, five subsurface moorings will be deployed. These moorings are in depths ranging from 1000 to 6000 m. A depth survey will be conducted prior to deployment in order to ascertain exact mooring line length.
- The last mooring set will be at Akutan Pass with two subsurface moorings to be deployed.

This will complete the planned operations for MF-01-06. For descriptions of operations, see:

CTD/Water samples (SOI 2.2.1)  
MARMAP Bongo Tow (SOI 2.2.2)  
Live Zooplankton Ring Net Tow (SOI 2.2.4)  
Chlorophyll samples (SOI 2.2.10)  
Satellite tracked drifter buoy (SOI 2.2.11)  
EK500 monitoring (SOI 2.2.12)  
ADCP (SOI 2.2.13)  
Radiometer (SOI 2.2.14)

### 3.0. FACILITIES AND EQUIPMENT

The following systems and their associated support services are essential to the cruise. Sufficient consumable, back-up units, and on-site spares and technical support must be in place to assure that operational interruptions are minimal. All measurement instruments are expected to have current calibrations, and all pertinent calibration information shall be included in the data package.

### 3.1. Equipment and Capabilities to be Provided by the Ship

- Oceanographic winch with slip rings and 3-conductor cable terminated for CTD,
- EK-500,
- Wire-angle indicator and readout for oceanographic winch,
- Oceanographic winch for bongo net (and other nets when used) with slip rings and 3-conductor cable terminated for the Seacat,
- Sea-Bird 911 plus CTD system to be used with PMEL stand (primary system). (The underwater CTD unit should have mounts compatible with the PMEL CTD stand; CTD system should include underwater CTD, weights, and pinger, and there should be one deck unit and tape recorder for the two systems),
- 10-liter sampling bottles for use with rosette (10 plus 4 spares),
- For CTD field corrections: AUTOSAL salinometer,
- Wire speed indicators and readout for quarterdeck, Rowe and Marco winches,
- For meteorological observations: 2 anemometers (one R. M. Young system interfaced to the SCS), calibrated air thermometer (wet-and dry-bulb) and a calibrated barometer and/or barograph,
- Freezer space for storage of biological and chemical samples (blast and storage freezers),
- Simrad EQ-50 echo sounder,
- JRC JFV-200R color sounder recorder,
- RDI ADCP written to SCS and Iomega Zip drives,
- Use of Pentium PC in DataPlot for data analysis,
- SCS (Shipboard Computer System),
- Stern platform in place,
- Laboratory space with exhaust hood, sink, lab tables and storage space,
- Sea-water hoses and nozzles to wash nets (quarterdeck and aft deck),
- Adequate deck lighting for night-time operations,
- Navigational equipment including GPS and radar,
- Safety harnesses for working on quarter deck and fantail.

### 3.2. Equipment to be Provided by the Project

- Sea-Bird 911 plus CTD system with stand (back up system),
- PMEL PC with SEASOFT software for CTD data collection and processing,
- Fluorometer, light meter, and chlorophyll absorbance meter (ChIAM) to be mounted on CTD,
- CTD stand modified for attachment of fluorometer,
- Conductivity and temperature sensor package to provide dual sensors on the primary CTD,
- CTD rosette sampler,
- Drifting buoys,
- Argo floats,
- IAPSO water,
- Surface mooring (FOCI biophysical platforms),
- Subsurface moorings,
- Miscellaneous scientific sampling and processing equipment, and
- COD software and forms.

### 3.3. Ship's Computer System (SCS)

The (SCS) shall operate throughout the cruise, acquiring and logging data from navigation, meteorological, oceanographic, and fisheries sensors. See FOCI Standard Operating Instructions for specific requirements.

### 4.0. DATA AND REPORTS

Data disposition, responsibilities and data requirements are listed in the FOCI Standard Operating Instructions.

## 5.0. ADDITIONAL INVESTIGATIONS AND PROJECTS

### 5.3. Piggyback projects:

None.

## 6.0. MISCELLANEOUS

### 6.5. Hazardous Materials:

The Chief Scientist shall be responsible for complying with NC Instruction 6280A, Hazardous Waste; policy, guidance, and training, dated February 4, 1991, paragraph 7.g and paragraph 9. By federal law, the ship may not sail without a complete inventory of MSDS, and appropriate neutralizing agents, buffers, and/or adsorbents in amounts adequate to address spills of a size equal to the amount aboard.

### INVENTORY:

Nutrient chemicals on board *Miller Freeman*

Brij (250 ml)

Copper Sulfate (40g)

Hydrochloric Acid (500 ml)

Imidazole (2 x 13.6g, 27.2g total)

N-1-Naphthylethylenediamine Dihydrochloride (3 x 1g, 3g total)

Potassium Nitrate (2 x 3.5g, 7g total)

Sulfanilamide (14 x 10g, 140g)

## 7.0. COMMUNICATIONS

Radio communication with *Ron Brown* during the first phase of this cruise will determine when operations will end to allow return to Dutch Harbor to pick up mooring scientists.

### 7.4. Important phone numbers, fax numbers and e-mail addresses:

PMEL/CARD Fax: (206) 526-6485

PMEL/ADMIN Fax: (206) 526-6815

AFSC/RACE Fax: (206) 526-6723

MILLER FREEMAN COMSAT (government account numbers): These are much cheaper than Inmarsat direct numbers and should always be used first.

800-678-0872, after voice prompt dial 330-394-113, after tone dial customer ID# (Voice)

800-678-0872, after voice prompt dial 761-267-348, after tone dial customer ID# (Fax)

PIs should establish their ID#s with their program.

Inmarsat (direct numbers)

011-872-330-394-113 (voice)

011-872-761-267-348 (fax)

### CELLULAR

SHIP: 206-660-7167

KODIAK ROAMER: 907-528-7626

DUTCH HARBOR ROAMER: 907-391-7626

(First dial the roamer, wait for dial tone, then dial cellular number.)

### E-MAIL

PMEL person: LastName@pmel.noaa.gov OR FirstName.LastName@noaa.gov

AFSC person: FirstName.LastName@noaa.gov

MOC-Pacific radio room: Radio.Room@noaa.gov

Direct to ship: NOAA.Ship.Miller.Freeman@noaa.gov and mention person in SUBJECT field

8.0. APPENDICES

8.1. Figure showing recommended order of operations (A through L) and designated mooring locations

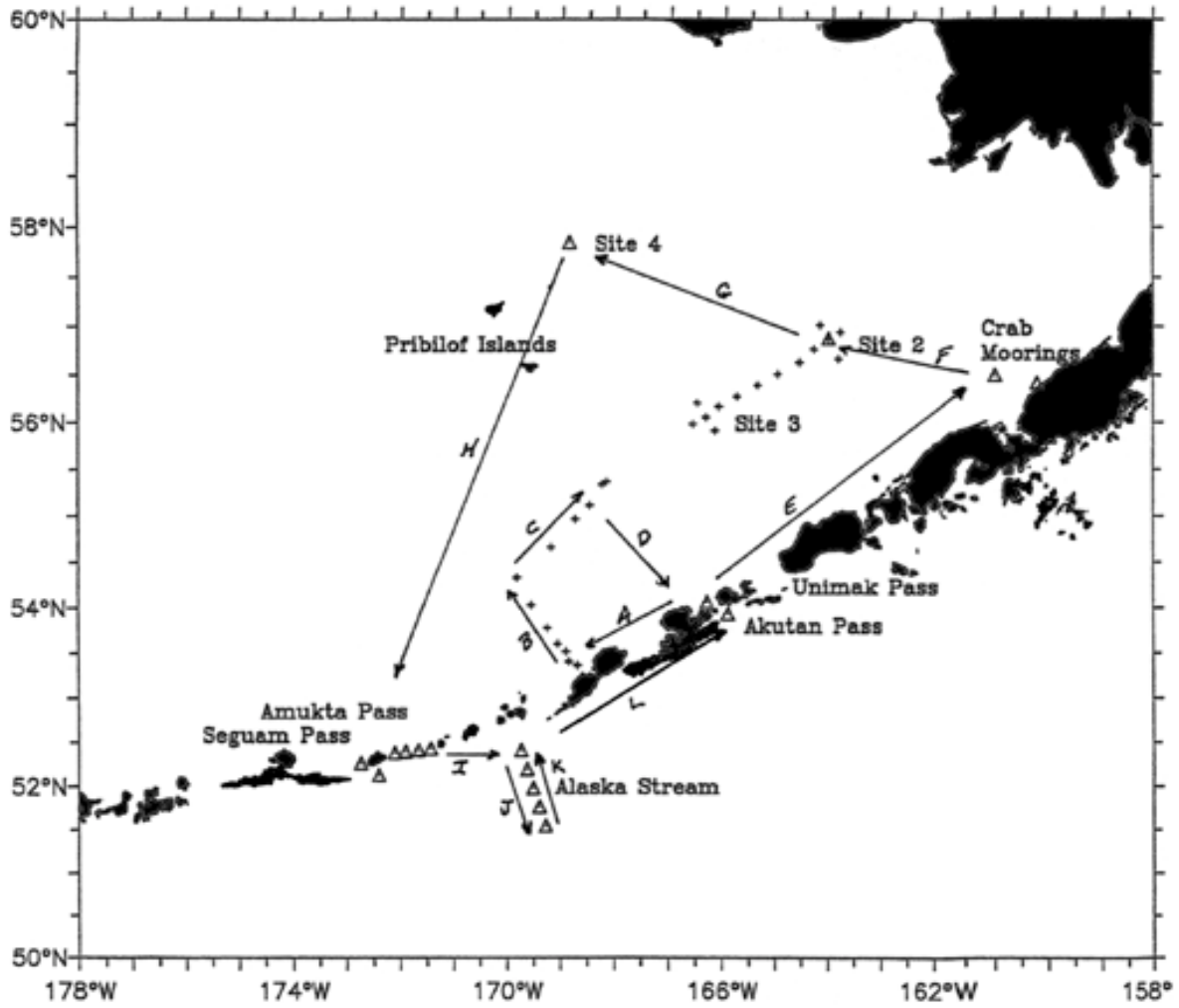


Figure 1. Recommended order of operations (A through L) and designated mooring locations for MF-01-06.

8.2. Table with projected cruise schedule, mooring locations.

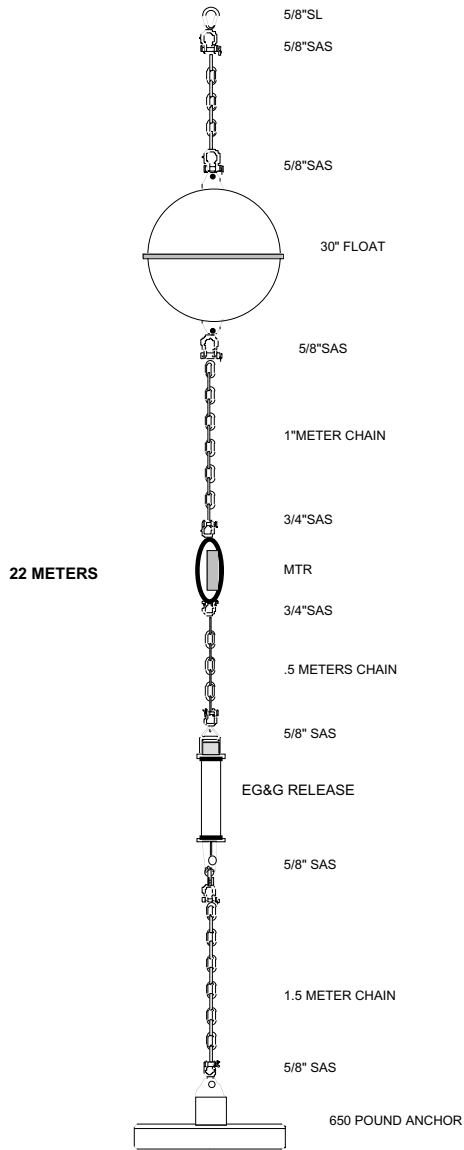
Activity	North Latitude (deg min)		West Longitude (deg min)		Distance (nm)	Ship Speed (kts)	Hours to Station	Hours on Station	Arrival Time	Departure Time
Depart Dutch Harbor	53	54.5	166	30.9						12-May 10:00
CTD Operations	53	24.0	168	51.0	88.5	11	8.0	24.0	12-May 18:02	13-May 18:02
CTD Operations	56	03.0	166	20.0	181.3	11	16.5	1.0	14-May 10:31	14-May 11:31
T&G Dutch Harbor	53	54.5	166	30.9	128.7	11	11.7	2.0	14-May 23:13	15-May 01:13
CTD/Recover 00KC-1 (25m)	56	25.0	160	13.0	263.0	11	23.9	1.0	16-May 01:07	16-May 02:07
Deploy 01KC-1/CTD (25m)	56	25.0	160	13.0	0.0	11	0.0	1.0	16-May 02:07	16-May 03:07
CTD/Recover 00KC-2 (60m)	56	29.9	160	59.9	26.4	11	2.4	1.0	16-May 05:31	16-May 06:31
Deploy 01KC-2/CTD (60m)	56	29.9	160	60.0	0.1	11	0.0	1.0	16-May 06:31	16-May 07:31
CTD/Recover 01BS-2B (73m)	56	52.9	164	03.5	103.4	11	9.4	1.5	16-May 16:55	16-May 18:25
Recover 01BSST-2S (71m)	56	52.8	164	03.5	0.1	11	0.0	1.0	16-May 18:26	16-May 19:26
Deploy F-01BSM-2A (72m)	56	52.8	164	03.5	0.0	11	0.0	6.0	16-May 19:26	17-May 01:26
Deploy 01BSST-2B/ CTD (72m)	56	52.8	164	03.5	0.0	11	0.0	1.5	17-May 01:26	17-May 02:56
CTD Operations en route to #4					0.0	11	0.0	2.5	17-May 02:56	17-May 05:26
CTD/Recover 00BS-4F (72m)	57	51.0	168	52.0	166.1	11	15.1	2.0	17-May 20:32	17-May 22:32
Deploy 01BS-4A/ CTD (72m)	57	51.0	168	52.0	0.0	11	0.0	2.0	17-May 22:32	18-May 00:32
Deploy 01SM-1A/ CTD (160m)	52	16.0	172	45.0	360.5	11	32.8	1.0	19-May 09:18	19-May 10:18
Deploy 01SMP-2A/ CTD (100m)	52	08.0	172	25.0	14.6	11	1.3	1.0	19-May 11:38	19-May 12:38
Deploy 01AMP-4A/ CTD (400m)	52	23.0	172	07.0	18.6	11	1.7	1.0	19-May 14:19	19-May 15:19
Deploy 01AMP-3A/ CTD (400m)	52	24.0	171	55.0	7.4	11	0.7	1.0	19-May 15:59	19-May 16:59
Deploy 01AMP-2A/ CTD (400m)	52	25.0	171	40.0	9.2	11	0.8	1.0	19-May 17:50	19-May 18:50
Deploy 01AMP-1A/ CTD (400m)	52	26.0	171	27.0	8.0	11	0.7	1.0	19-May 19:33	19-May 20:33
Survey Alaska Stream Line	52	25.0	169	45.0	62.2	11	5.7	1.0	20-May 02:13	20-May 03:13
Survey Alaska Stream Line	51	33.0	169	17.0	54.8	11	5.0	1.0	20-May 08:11	20-May 09:11
Deploy 01GS-5A/CTD (6000m)	51	33.0	169	17.0	0.0	11	0.0	5.0	20-May 09:11	20-May 14:11
Deploy 01GS-4A/CTD (4500m)	51	46.0	169	24.0	13.7	11	1.2	4.5	20-May 15:26	20-May 19:56
Deploy 01GS-3A/CTD (3000m)	51	59.0	169	31.0	13.7	11	1.2	3.5	20-May 21:11	21-May 00:41
Deploy 01GS-2A/CTD (2000m)	52	12.0	169	38.0	13.7	11	1.2	2.5	21-May 01:56	21-May 04:26
Deploy 01GS-1A/CTD (1000m)	52	04.0	169	45.0	9.1	11	0.8	2.0	21-May 05:15	21-May 07:15
Deploy 01AKP-2A/CTD (70m)	53	56.0	165	55.0	178.0	11	16.2	1.0	21-May 23:26	22-May 00:26
Deploy 01AKP-1A/CTD (70m)	54	04.0	166	18.0	15.7	11	1.4	1.0	22-May 01:52	22-May 02:52
Arrive Dutch Harbor	53	54.5	166	30.9	12.2	11	1.1	0.1	22-May 03:58	22-May 04:04

8.3. Table of CTD positions.


Transect	Station No.	North Latitude (deg min)		West Longitude (deg min)		Water Depth (m)	CTD Depth (m)
I	A	53	22.0	168	44.0	500	490
I	B (M6)	53	26.0	168	46.0	1090	1080
I	C	53	31.0	168	54.0	1793	1500
I	D	53	36.0	169	3.0	1500	1490
I	E	53	47.0	169	16.0	1700	1500
I	F	54	2.0	169	34.0	1800	1500
II	G	54	20.0	169	50.0	1800	1500
II	H	54	40.0	169	12.0	2000	1500
II	I	54	58.0	168	45.0	2000	1500
II	J	55	7.0	168	29.0	1500	1490
II	K	55	20.5	168	15.2	1000	990
II	L	55	22.3	168	10.5	500	490
II	M	55	25.7	168	4.4	200	190
II	N	55	33.0	167	46.0	140	130
II	O	55	39.0	167	30.0	130	120
II	P	55	46.0	167	10.0	120	110
II	Q	55	54.0	166	54.0	110	100
II	R	55	59.0	166	35.0	110	100
II	S (M3)	56	3.6	166	20.1	110	100
II	T	56	10.0	166	6.0	110	100
II	U	56	16.3	165	46.4	100	90
II	V	56	23.4	165	23.5	100	90
II	W	56	30.5	164	59.9	90	80
II	X	56	37.7	164	36.3	80	70
II	Y	56	46.0	164	20.0	70	60
II	Z (M2)	56	52.4	164	3.2	70	60
III	AA	57	7.0	165	0.0	70	60
III	AB	57	25.0	165	52.0	70	60
III	AC	57	32.0	166	44.0	70	60
III	AD	57	38.0	167	37.0	70	60
III	AE	57	46.0	168	28.0	70	60
III	AF (M4)	57	51.2	168	52.1	70	60

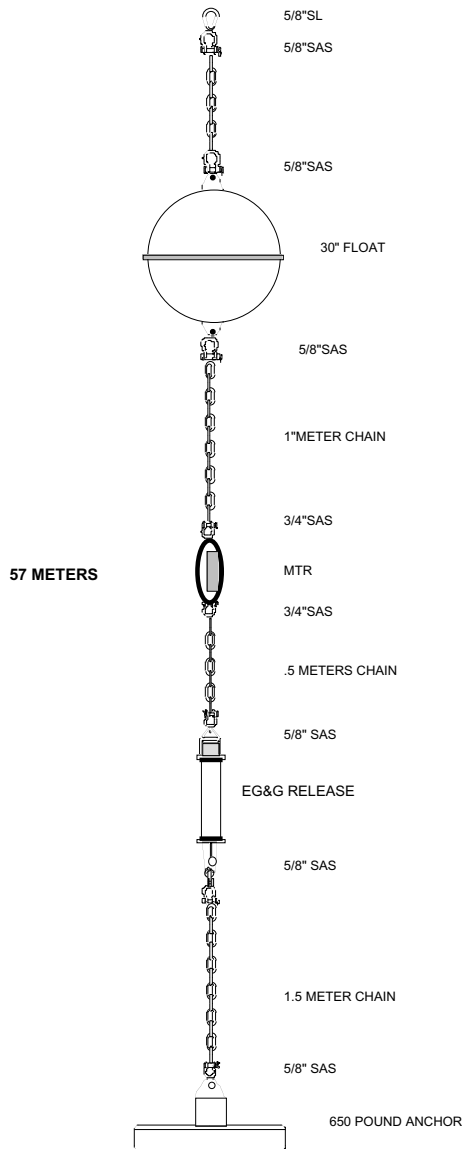


8.4. Mooring Diagrams  
 8.4.1. Crab moorings (2)




SUBSURFACE INSTRUMENTS		
DEPTH (M)	INST.	SER #
22M	MTR	
25M	BOTTOM	

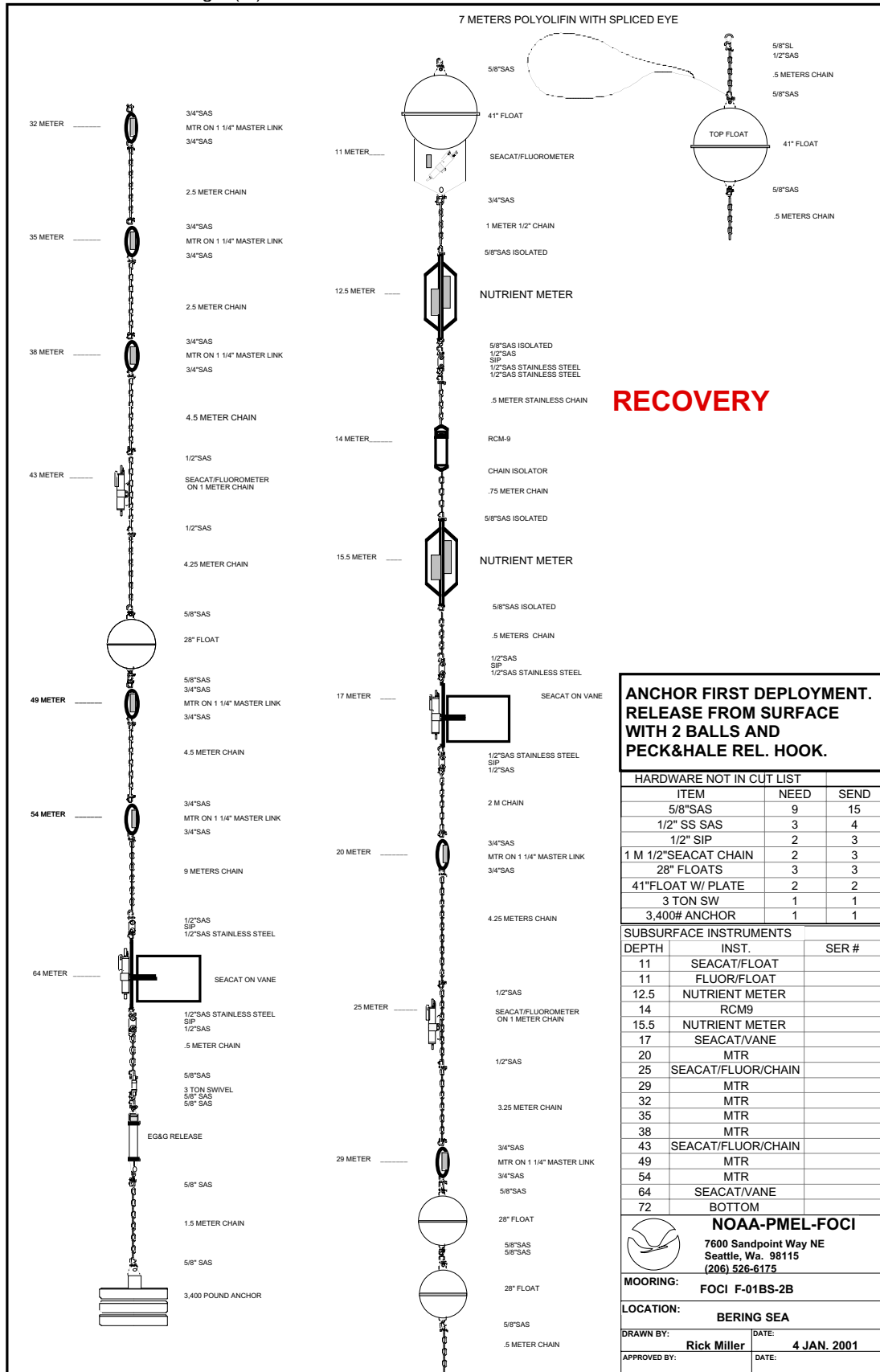
 <b>NOAA-PMEL-FOCI</b> 7600 Sandpoint Way NE Seattle, Wa. 98115 (206) 526-6175	
<b>LOCATION:</b> CRAB	
<b>DRAWN BY:</b> Rick Miller	<b>DATE:</b> 22 FEB.2001
<b>APPROVED BY:</b>	<b>DATE:</b>



SUBSURFACE INSTRUMENTS		
DEPTH (M)	INST.	SER #
57M	MTR	
60M	BOTTOM	

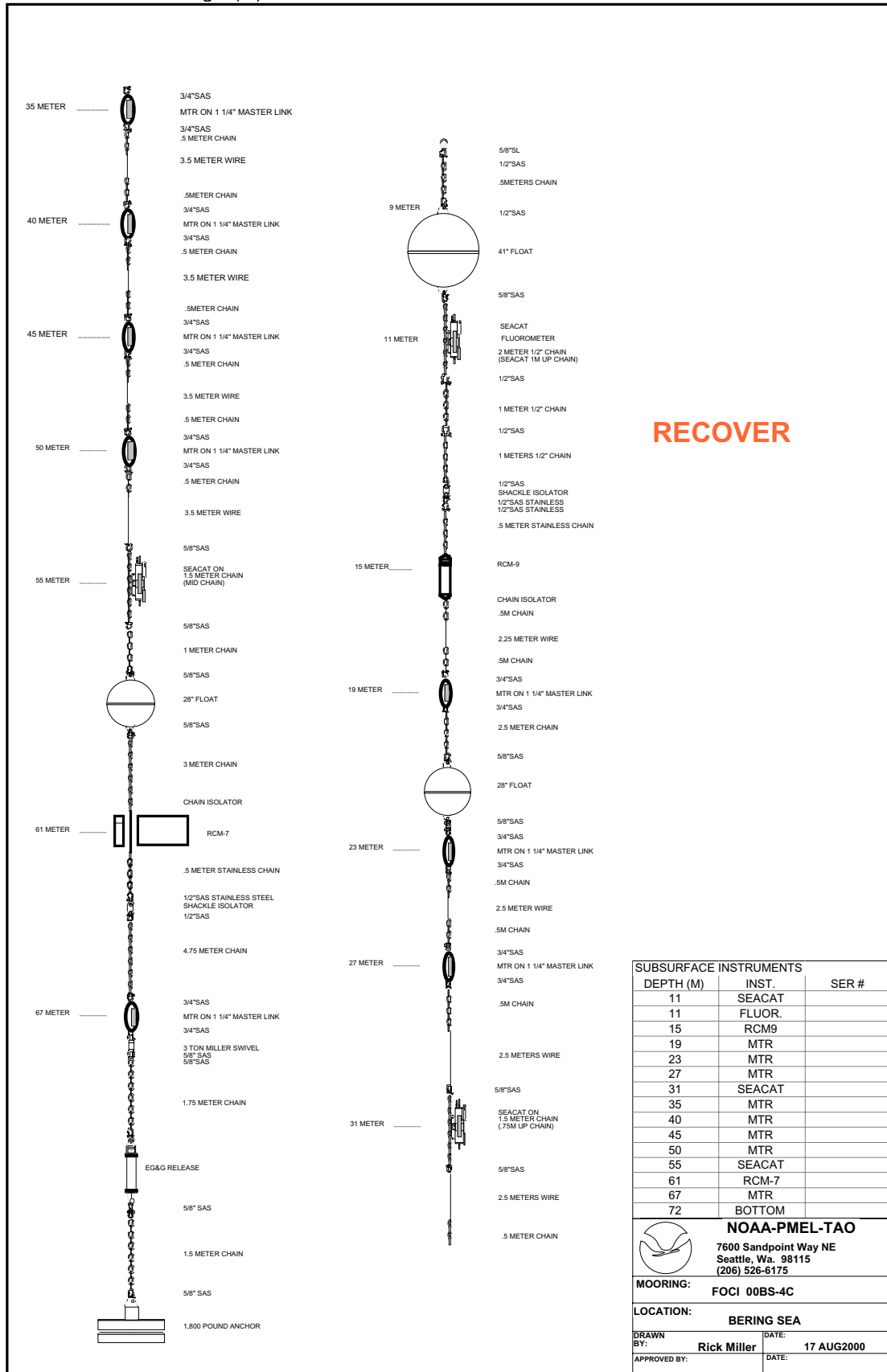
 <b>NOAA-PMEL-FOCI</b> 7600 Sandpoint Way NE Seattle, Wa. 98115 (206) 526-6175	
<b>LOCATION:</b>	
<b>DRAWN BY:</b> Rick Miller	<b>DATE:</b> 22 FEB 2001
<b>APPROVED BY:</b>	<b>DATE:</b>

8.4.2. Site #2 moorings (2)





### 8.4.3. Site #4 moorings (2)



SUBSURFACE INSTRUMENTS		
DEPTH (M)	INST.	SER #
11	SEACAT	
11	FLUOR.	
15	RCM9	
19	MTR	
23	MTR	
27	MTR	
31	SEACAT	
35	MTR	
40	MTR	
45	MTR	
50	MTR	
55	SEACAT	
61	RCM-7	
67	MTR	
72	BOTTOM	

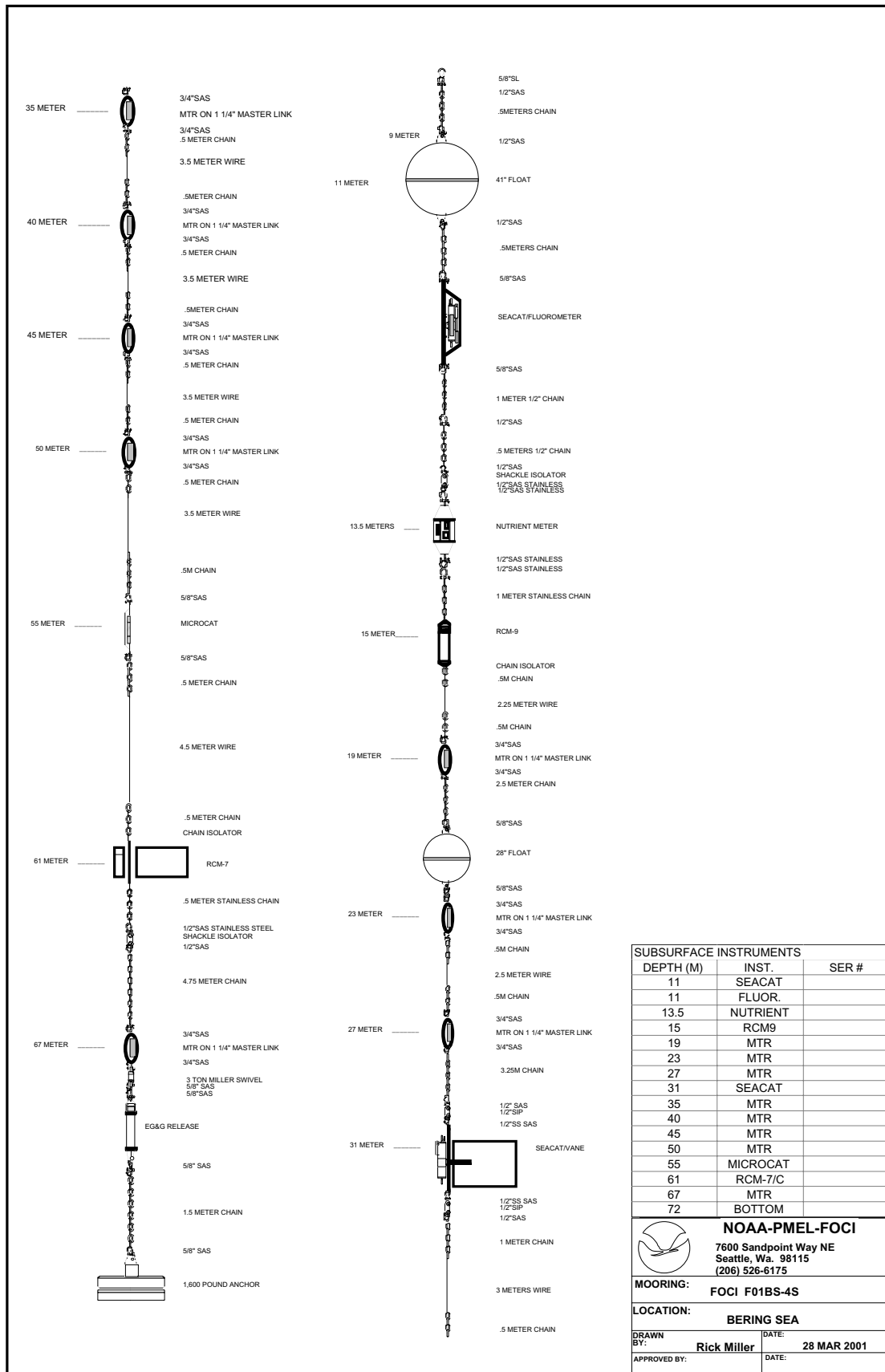
**NOAA-PMEL-TAO**  
 7600 Sandpoint Way NE  
 Seattle, Wa. 98115  
 (206) 526-6175

**MOORING:** FOCI 00BS-4C

**LOCATION:** BERING SEA

**DRAWN BY:** Rick Miller      **DATE:** 17 AUG2000

**APPROVED BY:** \_\_\_\_\_      **DATE:** \_\_\_\_\_



SUBSURFACE INSTRUMENTS		
DEPTH (M)	INST.	SER #
11	SEACAT	
11	FLUOR.	
13.5	NUTRIENT	
15	RCM9	
19	MTR	
23	MTR	
27	MTR	
31	SEACAT	
35	MTR	
40	MTR	
45	MTR	
50	MTR	
55	MICROCAT	
61	RCM-7/C	
67	MTR	
72	BOTTOM	

**NOAA-PMEL-FOCI**  
7600 Sandpoint Way NE  
Seattle, Wa. 98115  
(206) 526-6175

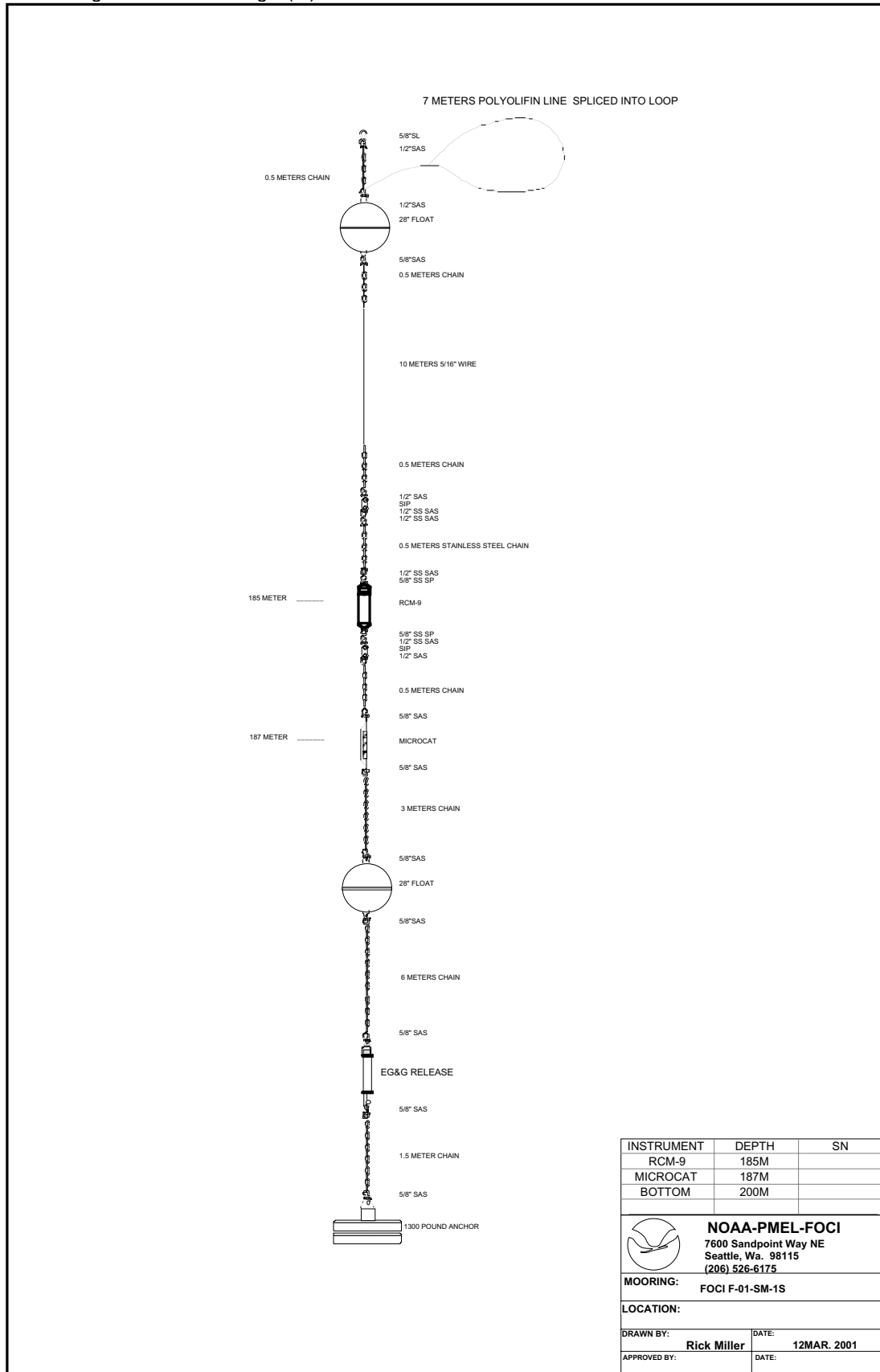
**MOORING:** FOCI F01BS-4S

**LOCATION:** BERING SEA

**DRAWN BY:** Rick Miller **DATE:** 28 MAR 2001


**APPROVED BY:** **DATE:**

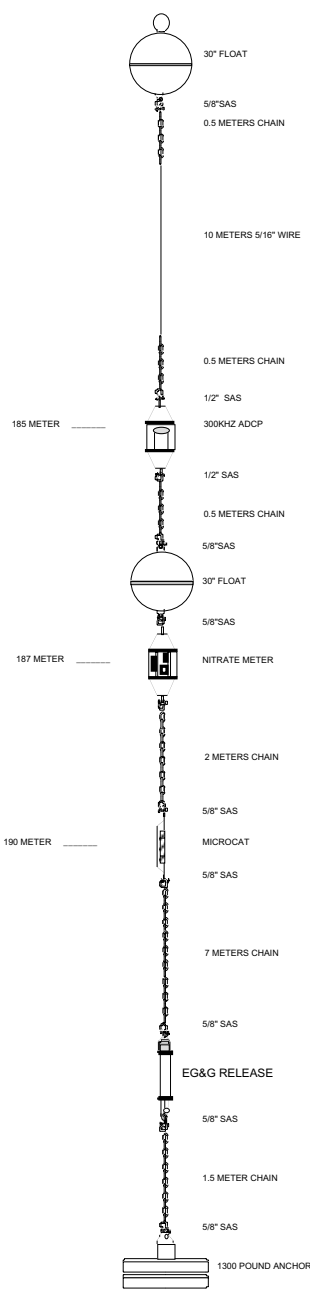
### 8.4.4. Seguam Pass moorings (2)



INSTRUMENT	DEPTH	SN
RCM-9	185M	
MICROCAT	187M	
BOTTOM	200M	


  

 <b>NOAA-PMEL-FOCI</b> 7600 Sandpoint Way NE Seattle, Wa. 98115 (206) 526-6175	
<b>MOORING:</b>	FOCI F-01-SM-1S
<b>LOCATION:</b>	
<b>DRAWN BY:</b>	<b>DATE:</b>
Rick Miller	12MAR. 2001
<b>APPROVED BY:</b>	<b>DATE:</b>



INSTRUMENT	DEPTH	SN
300KHZ ADCP	185M	
NITRATE	187M	
MICROCAT	190M	
BOTTOM	200M	

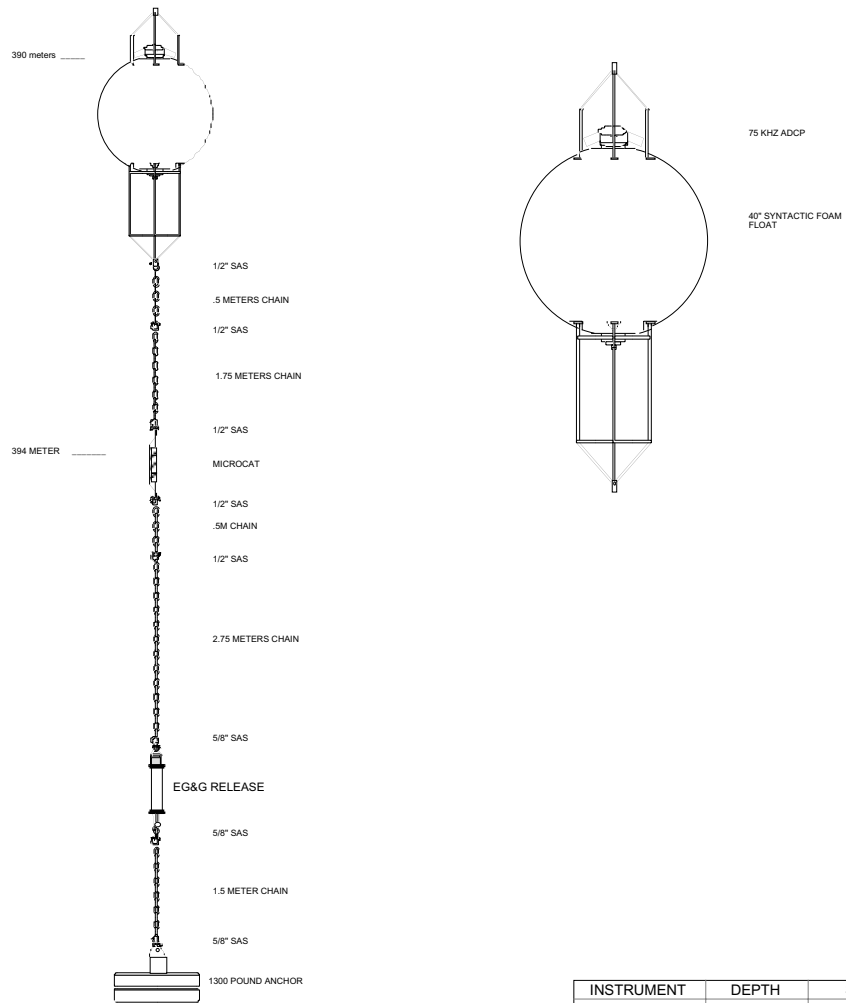
  

 <b>NOAA-PMEL-FOCI</b> 7600 Sandpoint Way NE Seattle, Wa. 98115 (206) 526-6175	
MOORING:	FOCI F-01-SMP-2S
LOCATION:	
DRAWN BY:	DATE:
Rick Miller	14MAR. 2001
APPROVED BY:	DATE:



8.4.5. Amukta Pass moorings (4 identical)

MAKE 4 MOORINGS



INSTRUMENT	DEPTH	SN
75 KHZ ADCP	390	
MICROCAT	394	
BOTTOM	400	

**NOAA-PMEL-FOCI**  
 7600 Sandpoint Way NE  
 Seattle, Wa. 98115  
 (206) 526-6175

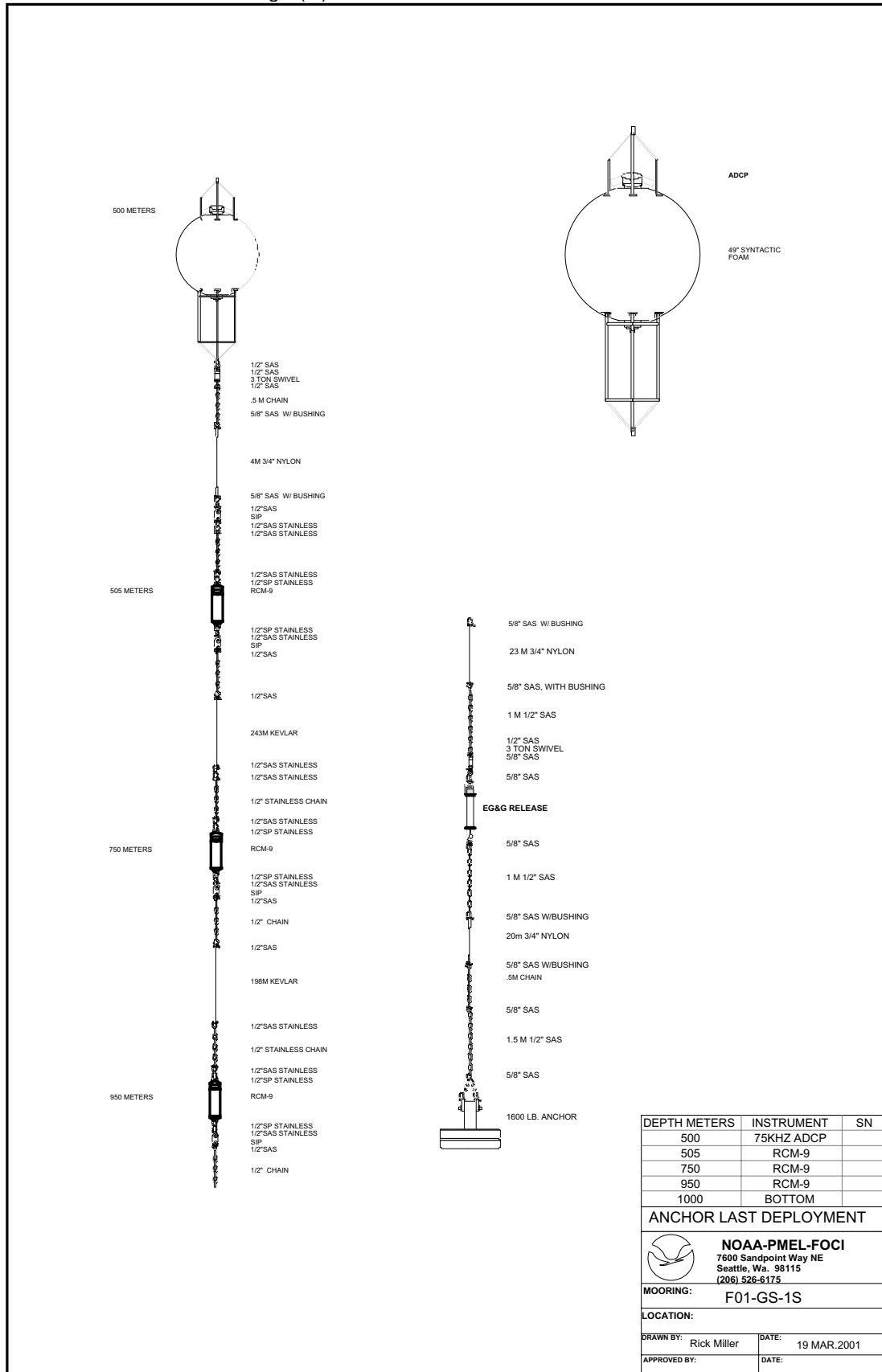
**MOORING:** FOCI F01-AMP-1S, 2S, 3S, 4S

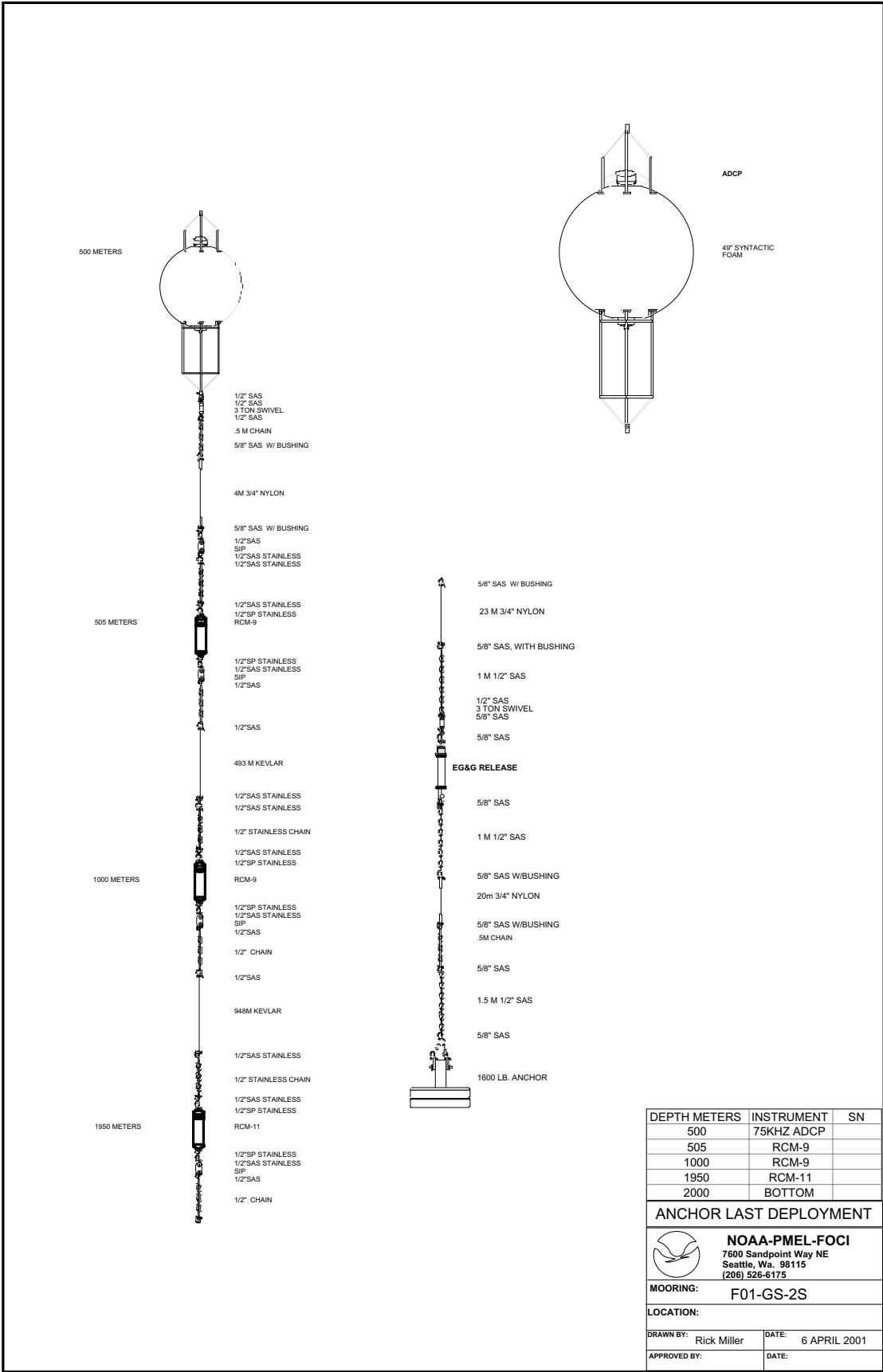
**LOCATION:**

**DRAWN BY:** Rick Miller **DATE:** 6 APRIL 2001

**APPROVED BY:** **DATE:**

### 8.4.6. Alaska Stream moorings (5)





DEPTH METERS	INSTRUMENT	SN
500	75KHZ ADCP	
505	RCM-9	
1000	RCM-9	
1950	RCM-11	
2000	BOTTOM	

**ANCHOR LAST DEPLOYMENT**

 **NOAA-PMEL-FOCI**  
7600 Sandpoint Way NE  
Seattle, Wa. 98115  
(206) 526-6175

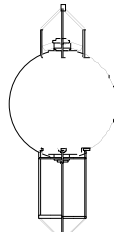
**MOORING:** F01-GS-2S

**LOCATION:**

**DRAWN BY:** Rick Miller **DATE:** 6 APRIL 2001

**APPROVED BY:** **DATE:**

500 METERS



1/2" SAS  
1/2" SAS  
3 TON SWIVEL  
1/2" SAS  
.5 M CHAIN  
5/8" SAS W/ BUSHING

4M 3/4" NYLON

5/8" SAS W/ BUSHING  
1/2" SAS  
SIP  
1/2" SAS STAINLESS  
1/2" SAS STAINLESS  
.5M SS CHAIN

505 METERS

1/2" SAS STAINLESS  
1/2" SP STAINLESS  
RCM-9

1/2" SP STAINLESS  
1/2" SAS STAINLESS  
SIP  
1/2" SAS

.5M CHAIN

1/2" SAS

493 M KEVLAR

1/2" SAS STAINLESS  
1/2" SAS STAINLESS

.5M SS CHAIN

1/2" SAS STAINLESS  
1/2" SP STAINLESS  
RCM-9

1000 METERS

1/2" SP STAINLESS  
1/2" SAS STAINLESS  
SIP  
1/2" SAS

.5M CHAIN

1/2" SAS

998M KEVLAR

1/2" SAS STAINLESS

.5M SS CHAIN

1/2" SAS STAINLESS  
1/2" SP STAINLESS  
RCM-11

2000 METERS

1/2" SP STAINLESS  
1/2" SAS STAINLESS  
SIP  
1/2" SAS

.5M CHAIN

1/2" SAS

948M KEVLAR

1/2" SAS STAINLESS

.5M SS CHAIN

1/2" SAS STAINLESS  
1/2" SP STAINLESS  
RCM-11

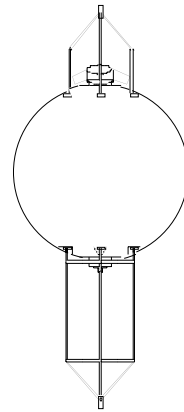
2950 METERS

1/2" SP STAINLESS  
1/2" SAS STAINLESS  
SIP  
1/2" SAS

.5M CHAIN

5/8" SAS, WITH BUSHING

ADCP



49" SYNTACTIC  
FOAM



EG&G RELEASE

23 M 3/4" NYLON

5/8" SAS, WITH BUSHING

1 M 1/2" SAS

1/2" SAS  
3 TON SWIVEL  
5/8" SAS

5/8" SAS

5/8" SAS

1 M 1/2" SAS

5/8" SAS W/BUSHING

20m 3/4" NYLON

5/8" SAS W/BUSHING

.5M CHAIN

5/8" SAS

1.5 M 1/2" SAS

5/8" SAS

1600 LB. ANCHOR

DEPTH METERS	INSTRUMENTS	SN
500	75KHZ ADCP	
505	RCM-9	
1000	RCM-9	
2000	RCM-11	
2950	RCM-11	
3000	BOTTOM	

ANCHOR LAST DEPLOYMENT



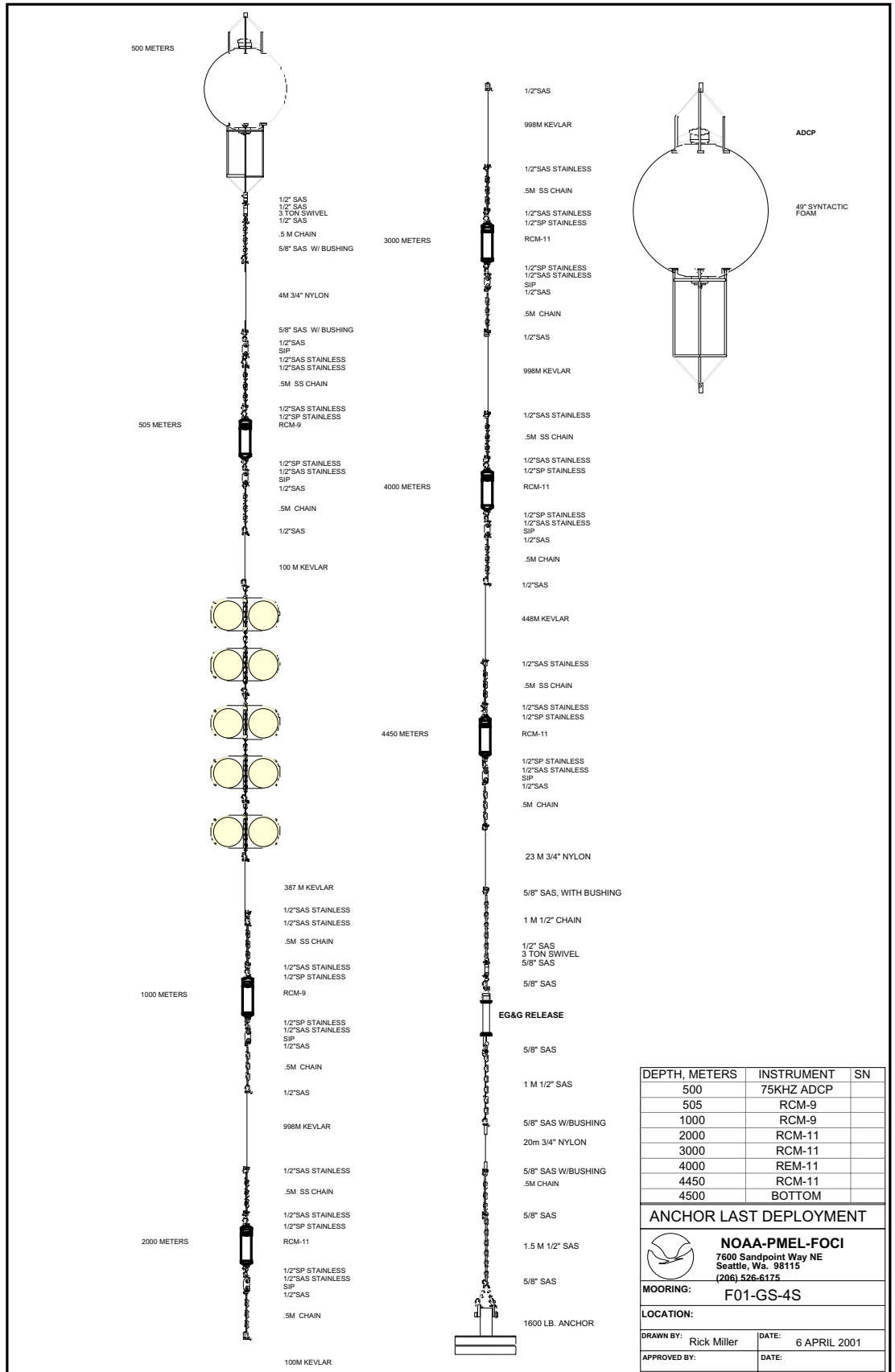
**NOAA-PMEL-FOCI**  
7600 Sandpoint Way NE  
Seattle, Wa. 98115  
(206) 526-6175

MOORING: F01-GS-3S

LOCATION:

DRAWN BY: Rick Miller DATE: 6 APRIL 2001

APPROVED BY: DATE:



DEPTH, METERS	INSTRUMENT	SN
500	75KHZ ADCP	
505	RCM-9	
1000	RCM-9	
2000	RCM-11	
3000	RCM-11	
4000	REM-11	
4450	RCM-11	
4500	BOTTOM	

**ANCHOR LAST DEPLOYMENT**

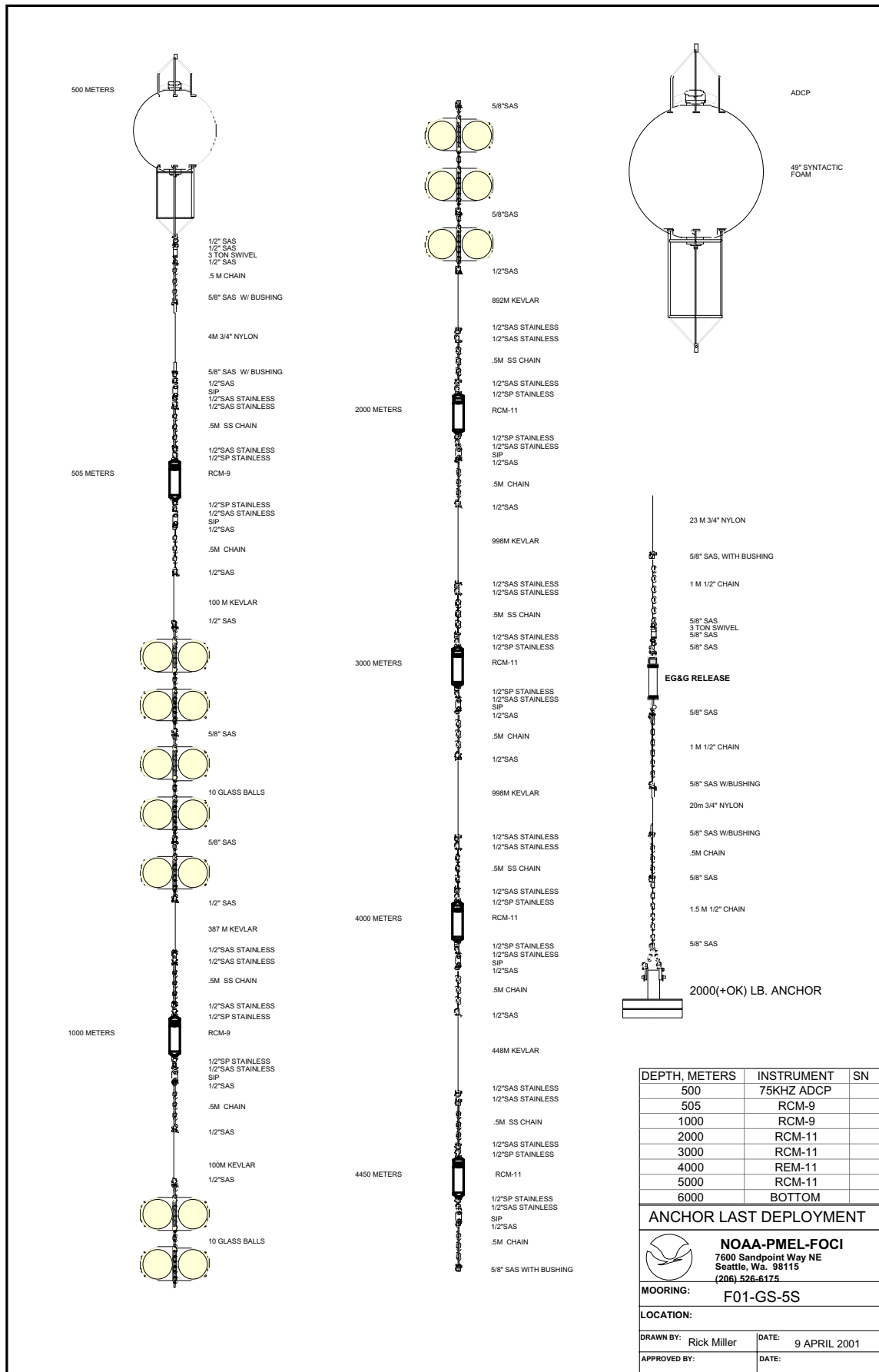
**NOAA-PMEL-FOCI**  
 7600 Sandpoint Way NE  
 Seattle, Wa. 98115  
 (206) 526-6175

**MOORING:** F01-GS-4S

**LOCATION:**

**DRAWN BY:** Rick Miller      **DATE:** 6 APRIL 2001

**APPROVED BY:**                      **DATE:**



DEPTH, METERS	INSTRUMENT	SN
500	75KHZ ADCP	
505	RCM-9	
1000	RCM-9	
2000	RCM-11	
3000	RCM-11	
4000	REM-11	
5000	RCM-11	
6000	BOTTOM	

**ANCHOR LAST DEPLOYMENT**

**NOAA-PMEL-FOCI**  
 7600 Sandpoint Way NE  
 Seattle, Wa. 98115  
 (206) 526-6175

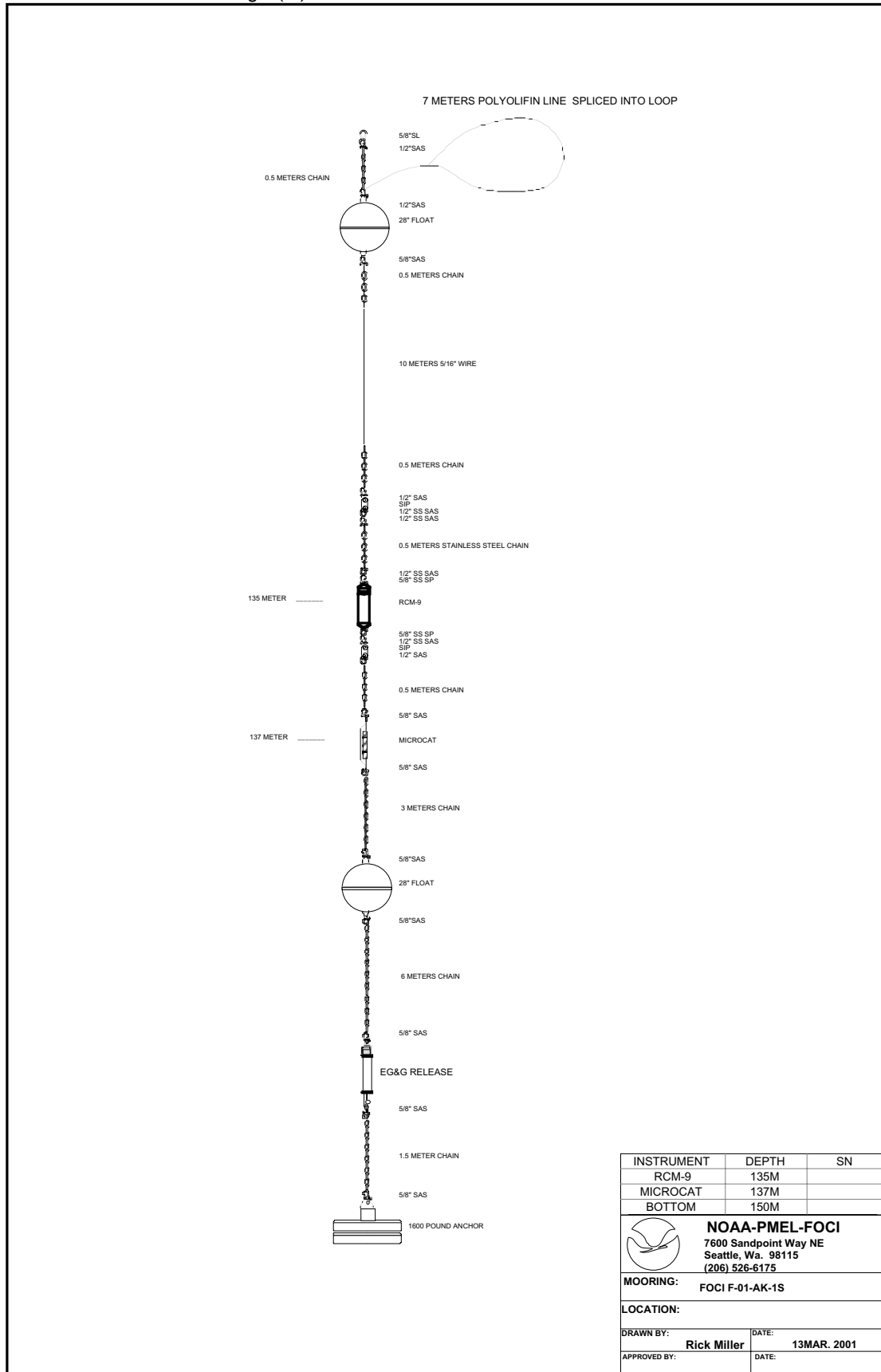
**MOORING:** F01-GS-5S

**LOCATION:**

**DRAWN BY:** Rick Miller **DATE:** 9 APRIL 2001

**APPROVED BY:** **DATE:**

8.4.7. Akutan Pass moorings (2)



INSTRUMENT	DEPTH	SN
RCM-9	135M	
MICROCAT	137M	
BOTTOM	150M	

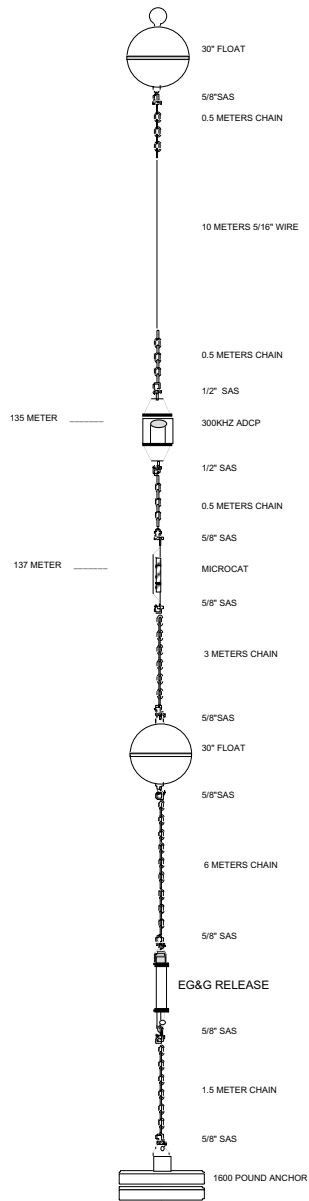
**NOAA-PMEL-FOCI**  
 7600 Sandpoint Way NE  
 Seattle, Wa. 98115  
 (206) 526-6175

MOORING: FOCI F-01-AK-1S

LOCATION:


DRAWN BY: Rick Miller DATE: 13MAR. 2001

APPROVED BY: DATE:



INSTRUMENT	DEPTH	SN
300KHZ ADCP	135M	
MICROCAT	137M	
BOTTOM	150M	

 <b>NOAA-PMEL-FOCI</b> 7600 Sandpoint Way NE Seattle, Wa. 98115 (206) 526-6175	
MOORING:	FOCI F-01-AK-2S
LOCATION:	
DRAWN BY:	DATE:
Rick Miller	13MAR. 2001
APPROVED BY:	DATE: