FINAL CRUISE INSTRUCTIONS
FOCI

NOAA Ship *MILLER FREEMAN*, Cruise MF-04-05
April 24 – May 7, 2004
Chief Scientist – William J. Floering, NOAA/PMEL

1.0 FINAL CRUISE INSTRUCTIONS

1.1 Cruise Title – Fisheries-Oceanography Coordinated Investigations (FOCI).

1.2 Cruise Numbers:

1.2.1 Cruise Number – MF-04-05

1.2.2 FOCI Number – 3MF04

1.3 Cruise Dates

1.3.1 Departure – Depart Saturday, April 24, 2004, at 1300 hours, Dutch Harbor, Alaska.

1.3.2 Arrival – Arrive Friday, May 7, 2004, at 0900 hours, Dutch Harbor, Alaska.

1.4 Operating Area – Bering Sea, Pribilof Islands, and Aleutian Islands.

2.0 CRUISE OVERVIEW

2.1 Cruise Objectives – To Recover and deploy oceanographic instrumentation moorings, both surface and subsurface. To complete CTD casts and CalVET and Plankton tows at designated locations.

2.2 Applicability – These instructions, with ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN***, present complete information for this cruise.

2.3 Participating Organizations

NOAA – Pacific Marine Environmental Laboratory (PMEL)
7600 Sand Point Way N.E., Seattle, Washington 98115-6439

NOAA – Alaska Fisheries Science Center (AFSC)
7600 Sand Point Way N.E., Seattle, Washington 98115-0070

University of Alaska – Fairbanks (UAF)
Institute of Marine Science
200 O'Neill, Fairbanks, Alaska 99775-1080

Scripps Institute of Oceanography (SIO)
8602 La Jolla Shores Drive
La Jolla, California 92037

2.4 Personnel

2.4.1 Chief Scientist

Name	Gender	Affiliation	E-mail Address
William J. Floering (206) 526-6480	Male	PMEL	William.Floering@noaa.gov

2.4.2 Participating Scientists

Name	Gender	Affiliation	E-mail Address
William J. Floering	Male	PMEL	William.Floering@noaa.gov
Carol L. DeWitt	Female	PMEL	Carol.DeWitt@noaa.gov
Earl Roskie	Male	PMEL	Earl.Roskie@noaa.gov
Stephen A. Smith	Male	PMEL	Stephen.A.Smith@noaa.gov
Sarah Thornton	Female	UAF	sarahjt@imsuaf.edu
Lisa Munger	Female	SIO	lmunger@ucsd.edu
Kevin Hardy	Male	SIO	
David P. Wisegarver	Male	PMEL	David.Wisegarver@noaa.gov

2.5 Administration

2.5.1 Ship Operations

Marine Operations Center, Pacific
1801 Fairview Avenue East, Seattle, Washington 98102-3767
Telephone: (206) 553-4548
Fax: (206) 553-1109
Commander Michele G. Bullock, NOAA
Chief, Operations Division, Pacific (MOP1)
Telephone: (206) 553-8705
Cellular: (206) 390-7527
E-mail: Michele.Bullock@noaa.gov

Larry Mordock
Deputy Chief, Operations Division (MOP1x1)
Telephone – Work: (206) 553-4764
Home: (206) 365-3567
Cellular: (206) 465-9316
E-mail: Larry.Mordock@noaa.gov

2.5.2 Scientific Operations

Dr. Phyllis J. Stabeno, PMEL
Telephone: (206) 526-6453
E-mail: Phyllis.Stabeno@noaa.gov

Dr. Jeffrey M. Napp, AFSC
Telephone: (206) 526-4148
E-mail: Jeff.Napp@noaa.gov

3.0 OPERATIONS

3.1 Data To Be Collected – In addition to the standard suite of SCS integrated instruments, we will deploy the SeaBird 911 CTD system and the SeaBird SBE 25 Bongo/SeaCat combination.

3.1.1 Scientific Computer System (SCS) – The ship's SCS shall operate throughout the cruise, acquiring and logging data from navigation, meteorological, oceanographic, and fisheries sensors. See ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN*** (SOI 5.2) for specific requirements.

3.2 Staging Plan – Cruise MF-04-05 is in some respects a continuation of Cruise MF-04-04. As requested in the MF-04-04 Cruise Instructions, approximately 10,000 lbs of equipment were loaded on **NOAA Ship *MILLER FREEMAN*** prior to departure from Seattle, Washington, at the start of the field season. The remaining equipment for MF-04-05 will be shipped to Dutch Harbor, Alaska, and loaded on board during the scheduled inport between April 22 and April 24, 2004. Equipment and supplies will be brought alongside on a flatbed truck or trailer and loaded aboard **NOAA Ship *MILLER FREEMAN*** using the ships aft cranes. The Chief Scientist will coordinate loading with the vessel personnel and the shipping agent.

3.3 De-staging Plan – At the conclusion of Cruise MF-04-05, all PMEL equipment and supplies will be offloaded during the scheduled May 7 through May 9, 2004, Dutch Harbor, Alaska, inport. The Chief Scientist will make the necessary arrangements with the shipping agent for equipment off loading and shipment to Seattle, Washington.

3.4 Cruise Plan – Section 9.3 Cruise MF-04-05 Station Locations lists the planned activities in the order currently anticipated. Unfinished work presently scheduled for Cruise MF-04-04 will be completed on Cruise MF-04-05. As noted in Table 1 we have planned CTD and Bongo tows around moorings BS-2 and BS-4. At each of the four stations surrounding Mooring BS-2 & BS-4, we will complete a 20-cm and a 60-cm Bongo tow, and one CTD cast with chlorophyll samples taken at 0, 10, 20, 30, 40, and 50 meters.

At the center station of mooring site BS-2 we will complete a 20-cm and a 60-cm Bongo tow, three CalVET tows, and one CTD cast with chlorophyll samples taken at 0, 12(x3), 24(x3), 30, 40, and 50 meters. Triplicate samples will be taken at the depths of the fluorometers.

At the center station of mooring site BS-4 we will complete a 20-cm and a 60-cm Bongo tow, three CalVET tows, and one CTD cast with chlorophyll samples taken at 0, 11(x3), 20, 30, 40, and 50 meters. Triplicate samples will be taken at the depth of the fluorometer.

Four CTD casts will be completed between Site 2 and Site 4 along the 70-m isobath. Six additional CTD casts will be completed, following the 70-m isobath from Site 4 northwest up to St. Matthew's Island. At each of these six CTD sites northwest of Site 4, nutrients will be taken at 0, 10, 20, 30, 40, and 50 meters.

At each of the Pribilof Island moorings, we will complete a 20 cm and a 60 cm bongo tow, and one CTD cast with chlorophyll and nutrient samples taken (triplicate samples taken at the depth of the fluorometer). The sampling scheme will be as follows:

- **PI-6** – 0, 11(x3), 20, 30, 40, 50 meters, one sample at maximum fluorescence, and one sample 3 meters below the mixed layer.
- **PI-5** – 0, 11(x3), 20, 30, 40, 50 meters.
- **PI-3** – 0, 11(x3), 20, 30, 40, 50 meters, nutrients only at 75 and 10 meters above the bottom.
- **PI-2** – 0, 11(x3), 20, 30, 40, 50 meters, nutrients only at 75 and 10 meters above the bottom.
- **PI-1** – 0, 11(x3), 20, 30, 40, 50 meters, one sample at maximum fluorescence, and one sample 3 meters below the mixed layer.
- **PI-4** – 0, 11(x3), 20, 30, 40, 50 meters, nutrients only at 75 and 10 meters above the bottom
- **PI-7** – 0, 10, 20, 30, 40, 50 meters, nutrients only at 75, 100, 150, and 10 meters above the bottom
- **PI-8** – 0, 10, 20, 30, 40, 50 meters, Nutrients only at 75, 100, 150, and 10 meters above the bottom.

Following all of the mooring work, and depending on time, we will complete a CTD transect running from BS-2 to the southwest in the shape of an 'L'.

Again, depending on the success of Cruise MF-04-04 we may deploy several satellite tracked drifter buoys during MF-04-05.

3.5 **Station Locations** – Section 9.3 Cruise MF-04-05 Station Locations lists the events by position and in the approximate order we intend to follow. The final order of events will remain flexible due to the nature of the operations, potential weather delays, and dependency on daylight hours for certain mooring activities. Section 9.2 Cruise MF-04-05 Chartlet is a map of the proposed station locations.

3.6 **Station Operations** – The following are operations to be conducted on this cruise. The procedures for these operations are listed in the ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN*** (SOI). Operations not addressed in the SOI and changes to standard procedures are addressed below.

- CTD/Water Sample Operations (SOI 3.2.1),
- MARMAP Bongo Tows (SOI 3.2.2),
- Bongo Larval Condition Tows (SOI 3.2.3),
- Live Zooplankton Net Tows (SOI 3.2.4),
- CalVET Net Tows (SOI 3.2.6),
- Chlorophyll Sampling Operations (SOI 3.2.10), and
- ARGOS Satellite Tracked Drifter Buoy Deployments (SOI 3.2.11).

3.7 Underway Operations – The following are underway operations to be conducted on this cruise. The procedures for these operations are listed in the ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN*** (SOI). Operations not addressed in the SOI and changes to standard procedures are addressed below.

- Acoustic Doppler Current Profiler (ADCP) Operations (SOI 3.2.13),
- Radiometer Operations (SOI 3.2.14),
- Scientific Computer System (SCS) data acquisition (SOI 5.2),
- Fluorometer monitoring (SOI 5.3), and
- Thermosalinograph monitoring (SOI 5.3).

3.8 Applicable Restrictions – None anticipated.

3.9 Small Boat Operations – There are not any plans to use the small boat at this time. One surface mooring is scheduled for deployment only; there are no surface mooring recoveries on this cruise.

4.0 FACILITIES

4.1 Equipment and Capabilities Provided by Ship

- Oceanographic winch with slip rings and 3-conductor cable terminated for CTD,
- Manual wire-angle indicator,
- Oceanographic winch with slip rings and 3-conductor cable terminated for the SBE SEACAT, for net tow operations,
- Sea-Bird Electronics' SBE 911*plus* CTD system with stand. Each CTD system should include underwater CTD, weights, and pinger. There should be one deck unit for the two systems,
- Niskin sampling bottles for use with rosette (10 plus 4 spares),
- Conductivity and temperature sensor package to provide dual sensors on the CTD (primary),
- AUTOSAL salinometer, for CTD field corrections,
- Sea-Bird Electronics' SBE-19 SEACAT system,
- Meter block for plankton tows,
- 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,
- SIMRAD EQ-50 echosounder,
- JRC JFV-200R color sounder recorder,
- RD Instruments' ADCP newly installed system,
- Bench space in DataPlot for PCs, monitor, printer,
- Use of PC in DataPlot for data analysis,
- Scientific Computer System (SCS),
- Electrical connection between Rowe winch and DataPlot,
- Removable 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 quarterdeck and fantail, and
- Ship's crane(s) used for loading and/or deploying.

4.2 Equipment and Capabilities Provided by Scientists

- Sea-Bird Electronics' SBE 911*plus* CTD system,
- Sea-Bird Electronics' SBE-19 SEACAT system,
- PMEL PC with SEASOFT software for CTD data collection and processing,
- Fluorometer and light meter to be mounted on CTD,
- CTD stand modified for attachment of fluorometer,
- Conductivity and temperature sensor package to provide dual sensors on the CTD (backup),
- CTD rosette sampler,
- IAPSO standard water,
- 60-cm Bongo sampling arrays,
- 20-cm Bongo arrays,
- Spare wire angle indicator,
- CalVET net array,
- One Surface mooring (FOCI biophysical platforms),
- Subsurface moorings,
- Trawl Resistant ADCP Platforms (TRAP),
- ARGOS tracked drifter buoys with optical sensors,
- Miscellaneous scientific sampling and processing equipment,
- Sorting tables and baskets for processing trawl catches,
- Scientific ultra-cold freezer, and
- Cruise Operations Database (COD) forms.

5.0 DISPOSITION OF DATA AND REPORTS

5.1 The following data products will be included in the cruise data package:

5.1.1 Completed and provided by ship:
- **NOAA Form 77-13d - *Deck Log - Weather Observation Sheets***,
- SCS Event Log,
- SCS backup – compact diskette (CD),
- Calibration Sheets for all ship's instruments used,
- Autosalinometer Logs,
- ADCP Log Sheets,
- ADCP Iomega Zip and/or recordable compact diskette (CD-RW), and
- Ultra-cold Freezer Temperature Daily Log (SOI 5.4).

5.1.2 Completed and provided by scientists:
- CTD Cast Information/Rosette Log,
- Cruise Operations Database (COD) forms.

5.2 **Pre- and Post-cruise Meetings** – Cruise meetings may be held in accordance with ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN*** (SOI 5.5).

6.0 ADDITIONAL PROJECTS

6.1 **Definition** – Ancillary and piggyback projects are secondary to the objectives of the cruise and should be treated as additional investigations. The difference between the two types of secondary projects is that an ancillary project does not have representation aboard and is accomplished by the ship's force.

6.2 **Ancillary Projects** – Any ancillary work done during this project will be accomplished with the concurrence of the Chief Scientist and on a not-to-interfere basis with the programs described in these instructions and in accordance with the ***NOAA Fleet Standing Ancillary Instructions***.

6.3 **Piggyback Projects** – None

7.0 HAZARDOUS MATERIALS

7.1 **Inventory** – See Section 9.4 Cruise MF-04-05 HAZMAT Inventory for a complete listing of HAZMATs.

7.2 **Material Safety Data Sheet (MSDS)** – All MSDSs can be found on the ***OERD HAZMAT Emergency Guidelines – MSDS*** compact diskette supplied to the ship.

8.0 MISCELLANEOUS

8.1 **Communications** – Specific information on how to contact **NOAA Ship *MILLER FREEMAN*** and all other fleet vessels can be found at:

http://www.pmc.noaa.gov/phone.htm

8.2 **Important Telephone and Facsimile Numbers and E-mail Addresses**

8.2.1 **Pacific Marine Environmental Laboratory (PMEL)**:

FOCI – Ocean Environmental Research Division (OERD2):
- (206) 526-4700 (voice)
- (206) 526-6485 (fax)

Administration:
- (206) 526-6810 (voice)
- (206) 526-6815 (fax)

E-Mail: FirstName.LastName@noaa.gov

8.2.2 Alaska Fisheries Science Center (AFSC):

FOCI – Resource Assessment and Conservation Engineering (RACE):

- (206) 526-4171 (voice)
- (206) 526-6723 (fax)

E-Mail: FirstName.LastName@noaa.gov

8.2.3 NOAA Ship *MILLER FREEMAN* – Telephone methods listed in order of increasing expense:

Homeport – Seattle, Washington:

- (206) 553-4589
- (206) 553-4581
- (206) 553-8344

United States Coast Guard – Kodiak, Alaska:

- (907) 487-9752
- (907) 487-9753
- (907) 487-4397
- (907) 487-4398

Cellular:

- (206) 660-7167

INMARSAT Mini-M:

- 011-872-761-267-346 (voice/PBX)
- 011-872-761-267-347 (voice)
- 011-872-761-267-348 (fax)

INMARSAT B:

- 011-872-330-394-120 (voice)
- 011-872-330-394-121 (fax)

E-Mail: NOAA.Ship.Miller.Freeman@noaa.gov (mention the person's name in SUBJECT field)

8.2.4 Marine Operations Center, Pacific (MOP):

Operations Division (MOP1)

- (206) 553-4548 (voice)
- (206) 553-1109 (facsimile)

E-Mail: FirstName.LastName@noaa.gov

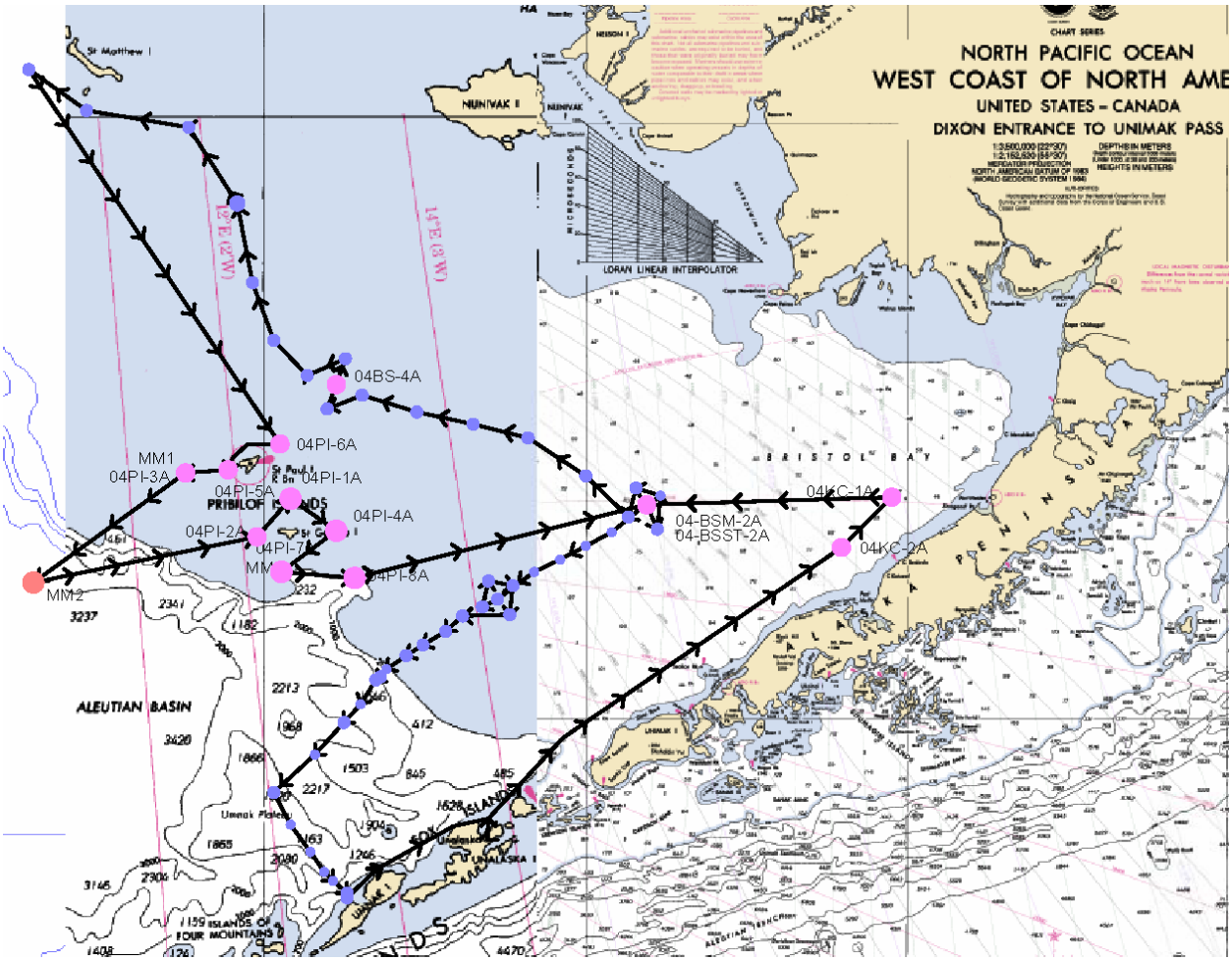
E-Mail to Radio Room: Radio.Room@noaa.gov

9.0 APPENDICES

9.1 Cruise MF-04-05 Equipment Inventory

Equipment	Quantity	Weight	Total Weight
Marine Mammal	3	500 lbs	1,500 lbs
Surface Mooring	1	1,500 lbs	1,500 lbs
Tower	1	400 lbs	400 lbs
Chain Box	1	4,000 lbs	4,000 lbs
Mooring Spool	7	250 lbs	1,750 lbs
Wire Basket, w/Cage	2	800 lbs	1,600 lbs
48" Tote	2	600 lbs	1,200 lbs
Current Meter	5	50 lbs	250 lbs
300 kHz ADCP	7	40 lbs	280 lbs
Sampling Cage	1	100 lbs	100 lbs
Steel Float	16	100 lbs	1,600 lbs
		Subtotal	14,180 lbs
Anchors			
04KC-2A	1	650 lbs	650 lbs
04KC-1A	1	650 lbs	650 lbs
04BSM-2A	1	4,110 lbs	4,110 lbs
04BS-4A	1	1,600 lbs	1,600 lbs
04BSST-2A	1	1,600 lbs	1,600 lbs
04BSP-2A	1	1,600 lbs	1,600 lbs
04PI-6A	1	1,325 lbs	1,325 lbs
04PI-5A	1	1,325 lbs	1,325 lbs
04PI-4A	1	1,325 lbs	1,325 lbs
04PI-3A	1	1,325 lbs	1,325 lbs
04PI-2A	1	1,325 lbs	1,325 lbs
04PI-1A	1	1,600 lbs	1,600 lbs
04PI-8A	1	1,600 lbs	1,600 lbs
04PI-7A	1	1,600 lbs	1,600 lbs
		Subtotal	21,635 lbs
		TOTAL WEIGHT:	**35,815 lbs**

9.2 Cruise MF-04-05 Chartlet



9.3 Cruise MF-04-05 Station Locations

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date / Time	Depart (Local) Date / Time
Depart Dutch Harbor	53° 53.70' N	166° 31.52' W							04/24/2004 13:00
CTD at 03KC-2	56° 29.90' N	160° 59.92' W	245.3	10	24.5	50	0.4	04/25/2004 13:31	04/25/2004 13:54
Recover 03KC-2	56° 29.90' N	160° 59.92' W	0	10	0.0	50	1.0	04/25/2004 13:54	04/25/2004 14:54
Deploy 04KC-2A	56° 29.90' N	160° 59.92' W	0	10	0.0	50	1.0	04/25/2004 14:54	04/25/2004 15:54
CTD at 03KC-1	56° 56.04' N	160° 12.97' W	36.7	11	3.3	25	0.4	04/25/2004 19:15	04/25/2004 19:36
Recover 03KC-1	56° 56.04' N	160° 12.97' W	0	10	0.0	25	1.0	04/25/2004 19:36	04/25/2004 20:36
Deploy 04KC-1A	56° 56.04' N	160° 12.97' W	0	10	0.0	25	1.0	04/25/2004 20:36	04/25/2004 21:36
CTD 03BSP-2B	56° 52.02' N	164° 03.02' W	125.7	10	12.6	72	0.5	04/26/2004 10:10	04/26/2004 10:40
Recover 03BSP-2B	56° 52.02' N	164° 03.02' W	0	10	0.0	72	1.0	04/26/2004 10:40	04/26/2004 11:40
Recover 03BS-2B	56° 52.02' N	164° 03.02' W	0	10	0.0	72	1.0	04/26/2004 11:40	04/26/2004 12:40
Deploy 04BSM-2A	56° 52.02' N	164° 03.02' W	0	10	0.0	72	4.0	04/26/2004 12:40	04/26/2004 16:40
Deploy 04BSST-2A	56° 52.02' N	164° 03.02' W	0	10	0.0	72	1.5	04/26/2004 16:40	04/26/2004 18:10
CTD at 04BS-2A, (chlor at: 0, 12(x3), 24(x3), 30, 40, 50-m)	56° 52.02' N	164° 03.02' W	0	10	0.0	72	0.4	04/26/2004 18:10	04/26/2004 18:35
Bongo at BS-2	56° 52.02' N	164° 03.02' W	0	10	0.0	72	0.7	04/26/2004 18:35	04/26/2004 19:17
CalVET at BS-2	56° 52.02' N	164° 03.02' W	0	10	0.0	72	1.0	04/26/2004 19:17	04/26/2004 20:17
CTD/Bongo at BS2 south (chlor at: 0, 10, 20, 30, 40, 50-m)	56° 40.00' N	163° 52.00' W	13.5	10	1.3	72	1.2	04/26/2004 21:38	04/26/2004 22:50
CTD/Bongo at BS2 east (chlor at: 0, 10, 20, 30, 40, 50-m)	56° 56.50' N	163° 50.01' W	16.5	10	1.7	72	1.2	04/27/2004 00:29	04/27/2004 01:41
CTD/Bongo at BS2 north (chlor at: 0, 10, 20, 30, 40, 50-m)	57° 01.00' N	164° 13.00' W	13.3	10	1.3	72	1.2	04/27/2004 03:01	04/27/2004 04:13
CTD/Bongo at BS2 west (chlor at: 0, 10, 20, 30, 40, 50-m)	56° 46.00' N	164° 20.00' W	15.5	10	1.5	72	1.2	04/27/2004 05:46	04/27/2004 06:58
CTD - 70-m isobath	57° 07.00' N	165° 00.00' W	30.3	10	3.0	70	0.4	04/27/2004 10:00	04/27/2004 10:24
CTD - 70-m isobath	57° 25.03' N	165° 52.00' W	33.4	10	3.3	69	0.4	04/27/2004 13:45	04/27/2004 14:09
CTD - 70-m isobath	57° 32.00' N	166° 44.00' W	28.8	10	2.9	69	0.4	04/27/2004 17:02	04/27/2004 17:27
CTD - 70-m isobath	57° 38.02' N	167° 37.00' W	29	10	2.9	71	0.4	04/27/2004 20:21	04/27/2004 20:46
CTD/Bongo 04-BS4 east (chlor at: 0, 10, 20, 30, 40, 50-m)	57° 46.00' N	168° 28.00' W	28.4	10	2.8	65	1.2	04/27/2004 23:36	04/28/2004 00:48

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date / Time	Depart (Local) Date / Time
CTD/Bongo at BS4 south (chlor at: 0, 10, 20, 30, 40, 50-m)	57° 39.20' N	169° 01.20' W	19	10	1.9	72	1.2	04/28/2004 02:42	04/28/2004 03:54
CTD/Bongo at BS-4 (chlor at: 0, 11(x3), 20, 30, 40, 50-m)	57° 51.11' N	168° 52.20' W	12.8	10	1.3	72	1.2	04/28/2004 05:11	04/28/2004 06:23
CalVET at BS-4	57° 51.11' N	168° 52.20' W	0	10	0.0	72	1.0	04/28/2004 06:23	04/28/2004 07:23
Recover 03BS-4B	57° 51.18' N	168° 52.18' W	0.1	10	0.0	72	1.0	04/28/2004 07:24	04/28/2004 08:24
Deploy 04BS-4A	57° 51.18' N	168° 52.18' W	0	10	0.0	72	1.2	04/28/2004 08:24	04/28/2004 09:36
CTD/Bongo at BS4 north (chlor at: 0, 10, 20, 30, 40, 50-m)	58° 04.00' N	168° 43.80' W	13.6	10	1.4	72	1.2	04/28/2004 10:57	04/28/2004 12:09
CTD/Bongo 04-BS4 west (chlor at: 0, 10, 20, 30, 40, 50-m)	57° 55.60' N	169° 19.30' W	20.6	10	2.1	65	1.2	04/28/2004 14:13	04/28/2004 15:25
CTD - 70-m isobath (nuts at: 0, 10, 20, 30, 40, 50-m)	58° 13.00' N	169° 51.00' W	24.2	10	2.4	70	0.4	04/28/2004 17:50	04/28/2004 18:14
CTD - 70-m isobath (nuts at: 0, 10, 20, 30, 40, 50-m)	58° 41.00' N	170° 11.00' W	29.9	10	3.0	70	0.4	04/28/2004 21:14	04/28/2004 21:38
CTD - 70-m isobath (nuts at: 0, 10, 20, 30, 40, 50-m)	59° 19.00' N	170° 24.00' W	38.6	10	3.9	70	0.4	04/29/2004 01:30	04/29/2004 01:54
CTD - 70-m isobath (nuts at: 0, 10, 20, 30, 40, 50-m)	59° 54.00' N	171° 10.00' W	42	10	4.2	70	0.4	04/29/2004 06:07	04/29/2004 06:31
CTD - 70-m isobath (nuts at: 0, 10, 20, 30, 40, 50-m)	60° 02.00' N	172° 46.00' W	48.7	10	4.9	70	0.4	04/29/2004 11:23	04/29/2004 11:48
CTD - 70-m isobath (nuts at: 0, 10, 20, 30, 40, 50-m)	60° 24.00' N	173° 40.00' W	34.7	10	3.5	70	0.4	04/29/2004 15:16	04/29/2004 15:41
Deploy 04PI-6A	57° 21.70' N	169° 44.50' W	219.1	10	21.9	67	2.0	04/30/2004 13:36	04/30/2004 15:36
CTD/Bongo at 04PI-6A (chlor & nuts at: 0, 11(x3), 20, 30, 40, 50-m, Fmax, 3<mixed)	57° 21.70' N	169° 44.50' W	0	10	0.0	67	1.2	04/30/2004 15:36	04/30/2004 16:48
Deploy 04PI-5A	57° 08.50' N	170° 33.50' W	29.6	10	3.0	67	2.0	04/30/2004 19:45	04/30/2004 21:45
CTD/Bongo at 04PI-5A (chlor & nuts at: 0, 11(x3), 20, 30, 40, 50-m)	57° 08.50' N	170° 33.50' W	0	10	0.0	67	1.2	04/30/2004 21:45	04/30/2004 22:57
Deploy 04PI-3A	57° 07.00' N	171° 13.00' W	21.5	10	2.1	100.6	2.0	05/01/2004 01:06	05/01/2004 03:06
CTD/Bongo at 04PI-3A (chlor & nuts at: 0, 11(x3), 20, 30, 40, 50-m, nuts only at: 75 & 10m>bottom)	57° 07.00' N	171° 13.00' W	0	10	0.0	100.6	1.2	05/01/2004 03:06	05/01/2004 04:18
Deploy MM1	57° 07.00' N	171° 13.00' W	0	10	0.0	100.6	2.0	05/01/2004 04:18	05/01/2004 06:18

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date / Time	Depart (Local) Date / Time
Deploy MM2	57° 12.00' N	173° 36.00' W	77.7	10	7.8	100.6	2.0	05/01/2004 14:05	05/01/2004 16:05
Deploy 04PI-2A	56° 34.80' N	170° 06.50' W	120.3	10	12.0	100.6	2.0	05/02/2004 04:06	05/02/2004 06:06
CTD/Bongo at 04PI-2A (chlor & nuts at: 0, 11(x3), 20, 30, 40, 50-m, nuts only at: 75 & 10m>bottom)	56° 34.80' N	170° 06.50' W	0	10	0.0	100.6	1.2	05/02/2004 06:06	05/02/2004 07:18
Deploy 04PI-1A	56° 54.50' N	169° 35.00' W	26.2	10	2.6	67	2.0	05/02/2004 09:56	05/02/2004 11:56
CTD/Bongo at 04PI-1A (chlor & nuts at: 0, 11(x3), 20, 30, 40, 50-m, Fmax, 3<mixed)	56° 54.50' N	169° 35.00' W	0	10	0.0	67	1.2	05/02/2004 11:56	05/02/2004 13:08
Deploy 04PI-4A	56° 38.20' N	168° 52.50' W	28.4	10	2.8	100.6	2.5	05/02/2004 15:58	05/02/2004 18:28
CTD/Bongo at 04PI-4A (chlor & nuts at: 0, 11(x3), 20, 30, 40, 50-m, nuts only at: 75 & 10m>bottom)	56° 38.20' N	168° 52.50' W	0	10	0.0	100.6	1.2	05/02/2004 18:28	05/02/2004 19:40
Deploy 04PI-7A	56° 17.10' N	169° 42.60' W	34.8	10	3.5	200	3.0	05/02/2004 23:09	05/03/2004 02:09
CTD/Bongo at 04PI-7A (chlor & nuts at: 0, 10, 20, 30, 40, 50-m, nuts only at: 75, 100, 150, 10-m>bottom)	56° 17.10' N	169° 42.60' W	0	10	0.0	200	1.5	05/03/2004 02:09	05/03/2004 03:39
Deploy MM3	56° 17.10' N	169° 42.60' W	0	10	0.0	200	2.0	05/03/2004 03:39	05/03/2004 05:39
Deploy 04PI-8A	56° 14.00' N	168° 35.00' W	37.7	10	3.8	200	3.0	05/03/2004 09:25	05/03/2004 12:25
CTD/Bongo at 04PI-8A (chlor & nuts at: 0, 10, 20, 30, 40, 50-m, nuts only at: 75, 100, 150, 10-m>bottom)	56° 14.00' N	168° 35.00' W	0	10	0.0	200	1.5	05/03/2004 12:25	05/03/2004 13:55
CTD - BS-2 (M2)	56° 52.54' N	164° 03.33' W	154.6	10	15.5	69	0.4	05/04/2004 05:23	05/04/2004 05:47
CTD - Cross-shelf	56° 37.82' N	164° 36.00' W	23.2	10	2.3	79	0.4	05/04/2004 08:06	05/04/2004 08:31
CTD - Cross-shelf	56° 30.63' N	165° 00.00' W	15.1	10	1.5	81	0.4	05/04/2004 10:02	05/04/2004 10:27
CTD - Cross-shelf	56° 23.54' N	165° 23.17' W	14.6	10	1.5	89	0.4	05/04/2004 11:55	05/04/2004 12:21
CTD - Cross-shelf	56° 16.48' N	165° 46.32' W	14.6	10	1.5	96	0.4	05/04/2004 13:49	05/04/2004 14:15
CTD - site 3/middle	56° 02.94' N	166° 20.30' W	23.3	10	2.3	127	0.5	05/04/2004 16:35	05/04/2004 17:03
CTD (site 3/west)	55° 59.00' N	166° 35.00' W	9.1	10	0.9	120	0.5	05/04/2004 17:58	05/04/2004 18:26
CTD (site 3/north)	56° 12.50' N	166° 30.00' W	13.8	10	1.4	120	0.5	05/04/2004 19:49	05/04/2004 20:17
CTD (site 3/east)	56° 10.00' N	166° 06.00' W	13.6	10	1.4	120	0.5	05/04/2004 21:38	05/04/2004 22:06
CTD (site 3/south)	55° 55.00' N	166° 10.00' W	15.2	10	1.5	120	0.5	05/04/2004 23:37	05/05/2004 00:05
CTD - Outer Shelf Domain	55° 54.00' N	166° 54.00' W	24.7	10	2.5	120	0.5	05/05/2004 02:33	05/05/2004 03:01
CTD - Outer Shelf Domain	55° 46.00' N	167° 10.00' W	12	10	1.2	120	0.5	05/05/2004 04:13	05/05/2004 04:41

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date / Time	Depart (Local) Date / Time
CTD - Outer Shelf Domain	55° 39.00' N	167° 30.02' W	13.3	10	1.3	120	0.5	05/05/2004 06:01	05/05/2004 06:29
CTD - Outer Shelf Domain	55° 33.00' N	167° 46.00' W	10.8	10	1.1	120	0.5	05/05/2004 07:34	05/05/2004 08:02
CTD - Shelf Break (200-m) **Depth Dep.**	55° 25.70' N	168° 04.40' W	12.7	10	1.3	120	0.5	05/05/2004 09:19	05/05/2004 09:47
CTD - Shelf Break (500-m) **Depth Dep.**	55° 22.30' N	168° 10.50' W	4.9	10	0.5	500	0.7	05/05/2004 10:16	05/05/2004 10:59
CTD - Shelf Break (1,000-m) **Depth Dep.**	55° 20.50' N	168° 15.20' W	3.2	10	0.3	1000	1.1	05/05/2004 11:18	05/05/2004 12:23
CTD	55° 07.00' N	168° 29.00' W	15.6	10	1.6	1735	1.4	05/05/2004 13:57	05/05/2004 15:21
CTD	54° 58.00' N	168° 45.00' W	12.8	10	1.3	2067	1.4	05/05/2004 16:38	05/05/2004 18:02
CTD	54° 40.00' N	169° 12.00' W	23.8	10	2.4	1730	1.4	05/05/2004 20:24	05/05/2004 21:48
CTD	54° 20.00' N	169° 50.00' W	29.8	10	3.0	1900	1.4	05/06/2004 00:47	05/06/2004 02:11
CTD	54° 02.00' N	169° 34.00' W	20.3	10	2.0	1840	1.4	05/06/2004 04:13	05/06/2004 05:37
CTD	53° 47.00' N	169° 16.00' W	18.4	10	1.8	1575	1.4	05/06/2004 07:27	05/06/2004 08:51
CTD	53° 36.00' N	169° 04.00' W	13.1	10	1.3	1870	1.4	05/06/2004 10:10	05/06/2004 11:34
CTD	53° 31.00' N	168° 55.00' W	7.3	10	0.7	1825	1.4	05/06/2004 12:17	05/06/2004 13:41
CTD	53° 24.36' N	168° 51.23' W	7	10	0.7	1020	1.1	05/06/2004 14:24	05/06/2004 15:29
CTD	53° 22.00' N	168° 42.00' W	6	10	0.6	700	0.9	05/06/2004 16:05	05/06/2004 16:57
Arrive Dutch Harbor	53° 54.50' N	166° 30.90' W	84.2	10	8.4			05/07/2004 01:22	

9.4 Cruise MF-04-05 HAZMAT Inventory

Chemical	CAS Number	Respondee	Org.	Qty	H	F	R	Storage Color Code	Hazard Class	Packing Group Number	UN	Reportable Quantity	Response Indices
Ammonium Chloride	12125-02-9	Wisegarver	PMEL	98.0-g	1	0	0	General	Not reg.		9085	5,000 LBS	1
Battery, Lithium	mix	Thornton	UAF	6.6-kg	2	2	3	General	9	II	3090	None	None
Brij	9002-92-0	Wisegarver	PMEL	100-ml	0	1	0	General	Not reg.			None	2
Cadmium	7440-43-9	Thornton	UAF	20-g	1	0	0	Toxic	4.1	III	3178	None	3
Chloroform	67-66-3	Wisegarver	PMEL	50-ml	2	0	0	Health	6.1	III	1888	52 L	4
Cupric Sulfate, Pentahydrate	7758-99-8	Wisegarver	PMEL	45.0-g	2	0	0	Hazardous Waste	9	III	3077	400 LBS	5
Ethanol	64-17-5	Floering	PMEL	3-gal	3	4	2	Flammable	3	II	1170	5,000 LBS	4
Formalin	mix	Floering	PMEL	5-gal	3	2	2	Flammable	3 & 8	III	1198	100 LBS	4

Chemical	CAS Number	Respondee	Org.	Qty	H	F	R	Storage Color Code	Hazard Class	Packing Group Number	UN	Reportable Quantity	Response Indices
Hydrochloric Acid	7647-01-0	Thornton	UAF	500-ml	3	0	2	**Corrosive**	8	II	1789	5,000 LBS	6
Imidazole	288-32-4	Wisegarver	PMEL	272.0-g	2	1	1	**Corrosive**	8	III	3263	5 KG	7
Iodine Lugols, Concentrate	mix	Wisegarver	PMEL	200-ml	2	0	1	**General**	Not reg.				
N-1-Napthylethylenediamine Dihydrochloride	1465-25-4	Wisegarver	PMEL	7.5-g	2	1	1	**General**	Not reg.			None	8
Potassium Nitrate	7757-79-1	Thornton	UAF	2.0-g	1	0	3	**Reactive**	5.1	III	1486	100 KG	7
Sodium Nitrite	7632-00-0	Thornton	UAF	0.3-g	2	0	3	**Reactive**	5.1 & 6.1	III	1500	100 LBS	9
Sulfanilamide	63-74-1	Wisegarver	PMEL	65.0-g	0	1	1	**General**	Not reg.			None	1

Spill Response 1: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. Place material in closed container.

Spill Response 2: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Contain and recover liquid when possible. Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as sawdust. Do not flush to sewer!

Spill Response 3: Evacuate area. Wear Self-Contained Breathing Apparatus (SCBA), rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use. Sweep up, place in bag and hold for waste disposal. Ventilate area and wash spill site after material pickup is complete. Avoid raising dust.

Spill Response 4: Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e.g., vermiculite, dry sand, or earth), and place in a chemical waste container. Do not use combustible materials, such as sawdust. **Do not flush to sewer!** If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. U.S. Regulations (CERCLA) requires reporting spills and releases to soil, water, and air in excess of reportable quantities. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.

Spill Response 5: Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate personal protective equipment. Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust. U.S. Regulations (CERCLA) requires reporting spills and releases to soil, water, and air in excess of reportable quantities. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.

Spill Response 6: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e.g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as sawdust. **Do not flush to sewer!** U.S. Regulations (CERCLA) requires reporting spills and releases to soil, water, and air in excess of reportable quantities. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.
Spill Response 7: Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment. Clean up spills in a manner, that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.
Spill Response 8: Ventilate area of leak or spill. Wear appropriate personal protective equipment. Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.
Spill Response 9: Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment. Clean up spills in a manner, that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. U.S. Regulations (CERCLA) requires reporting spills and releases to soil, water, and air in excess of reportable quantities. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.