

FINAL CRUISE INSTRUCTIONS

FOCI

NOAA Ship *MILLER FREEMAN*, Cruise MF-04-04
April 6 – April 22, 2004
Chief Scientist – Carol L. DeWitt, 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-04-04

1.2.2 **FOCI Number** – 2MF04

1.3 **Cruise Dates**

1.3.1 **Departure** – Depart Kodiak, Alaska, at 1500 on Tuesday, April 6, 2004

1.3.2 **Touch-n-Go** – Disembark one scientist in Seward, Alaska, on Saturday, April 10, 2004.

1.3.3 **Arrival** – Arrive Dutch Harbor, Alaska, on Thursday, April 22, 2004.

1.4 **Operating Area** – Gulf of Alaska and Bering Sea.

2.0 CRUISE OVERVIEW

2.1 **Cruise Objectives** – Fisheries-Oceanography Coordinated Investigations (FOCI) is an effort by National Oceanic and Atmospheric Administration (NOAA) and associated academic scientists. 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.

The primary objective of the cruise will be the recovery and deployment of moorings in the Gulf of Alaska and Bering Sea. The second objective will be physical oceanographic property sampling at and near the mooring locations.

2.2 **Participating Organizations**

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

2.3 Personnel

2.3.1 Chief Scientist

Name	Gender	Affiliation	E-mail Address
Carol L. DeWitt (206) 526-6808	Female	PMEL	Carol.DeWitt@noaa.gov

2.3.2 Participating Scientists

Name	Gender	Affiliation	E-mail Address
Carol L. DeWitt	Female	PMEL	Carol.DeWitt@noaa.gov
William J. Floering	Male	PMEL	William.Floering@noaa.gov
Calvin W. Mordy	Male	PMEL	Calvin.W.Mordy@noaa.gov
Earl Roskie	Male	PMEL	Earl.Roskie@noaa.gov
Stephen Smith	Male	PMEL	Stephen.A.Smith@noaa.gov
Jennifer Key	Female	CWU	_____
Stephen Slaughter	Male	CWU	_____
Laura Brezinsky	Female	Teacher at Sea	_____

2.4 Administrative

2.4.1 Ship Operations

Marine Operations Center, Pacific
1801 Fairview Avenue East, Seattle, Washington 98102-3767
Telephone: (206) 553-4548
Facsimile: (206) 553-1109

Commander Michele G. Bullock, NOAA
Chief, Operations Division (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

2.4.2 Scientific Operations

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

3.0 OPERATIONS

3.1 Data To Be Collected

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 – Less than 10,000 pounds of equipment – subject to space availability – will be loaded onto the ship prior to its departure from Seattle, Washington, on Tuesday, March 16, 2004. The remaining equipment will be shipped to Kodiak, Alaska, and loaded aboard the ship, beginning on Sunday, April 4, 2004. See [Section 9.1 Cruise MF-04-04 Equipment Inventory](#) for a complete equipment inventory. The scientific party will be responsible for arranging vehicles for moving their equipment from the airport and/or to the ship.

3.3 De-staging Plan – Upon completion of Cruise MF-04-05, FOCI personnel will arrange for shipping equipment back to Seattle, Washington. The scientific party will be responsible for arranging vehicles for moving their equipment from the ship to the airport and/or docks and coordinating with the ship any equipment that will be left on the vessel for upcoming cruises.

3.4 Cruise Plan – The ship will depart Kodiak, Alaska, on Tuesday, April 6, 2004 in time to complete mooring operations at Chiniak Bay mooring site during daylight hours. We will utilize the stern platform as well as the port deck crane during mooring operations. A standard mooring site operation will include a Conductivity, Temperature, and Depth (CTD) cast prior to a mooring recovery and a CTD cast following a mooring deployment.

- **Chiniak Bay** – One mooring will be recovered and redeployed at Chiniak Bay,
- **Marine Mammals** – One marine mammal mooring (http://cet.uscd.edu/equipment/arp/equipment_arp.php) will be recovered at 56° 57.016' N, 150° 59.806 W (depth 802 m),
- **GLOBEC** – There are six (6) mooring sites along the GLOBEC line. A drifter will be deployed after the second CTD at each mooring site. GLOBEC site 3 (GB-3) has two moorings including a surface mooring; all other GLOBEC sites have one subsurface mooring. At site 3, the surface mooring deployed last fall broke free; therefore dragging operations will be conducted at the site,
- **Kayak Island** – Deploy two drifters,
- **Seward** – Touch-and-go to disembark one scientist,
- **Gore Point** – Mooring operations will be conducted at the three sites along the Gore Point line,
- **Shelikof Strait** – Three moorings will be recovered and redeployed along Line 8 in Shelikof Strait. The Line 8 CTDs (seven CTDs) will be completed,
- **Pavlof Bay** – One mooring will be recovered and redeployed, and
- **Unimak Pass** – Deploy one drifter.

As time allows we will proceed as follows:

- **FOCI Bering Sea Site 6** – A mooring will be recovered at Site 6,
- **Samalga Pass** – CTD/nutrient lines will be completed in the Samalga Pass area. Five moorings will be recovered at Samalga Pass,

- **Alaska Stream** – A line of CTDs will be completed across the Alaska Stream. The three shallowest CTDs will include nutrient sampling. Two drifters will be deployed along the CTD line. Four moorings will be recovered at the Alaska Stream area. An Argo float will be deployed at the most offshore CTD station or mooring recovery (deployment must be in water deeper than 2,000 meters),
- **Amukta Pass** – Four moorings will be recovered at Amukta Pass, and
- **Bering Sea Deep CTD Line** – The Bering Sea CTD “dog leg” – consisting of seventeen CTDs – will be completed.

The cruise will end in Dutch Harbor, Alaska, on Thursday, April 22, 2004.

3.5 Station Locations – See [Section 9.4 Cruise MF-04-04 Itinerary](#) and [Section 9.5 Cruise 9.5 Route Chartlet](#).

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), and
- Chlorophyll Sampling Operations (SOI 3.2.10).

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

3.9 Small Boat Operations – Weather permitting, the small boat may be needed for mooring operations to recover the surface mooring.

4.0 FACILITIES

4.1 Equipment and Capabilities Provided by Ship

- Oceanographic winch with 0.322" electro-mechanical cable with slip rings terminated for CTD operations,
- A-Frame(s),
- Ability to connect a PAR and Fluorometer, provided by the project, to the CTD,
- Provide termination kits and ship support personnel to do the terminations,
- Wire speed indicators and readout for winches,
- Electrical connection between winch and Deck computer system,

- Sea-Bird Electronics' SBE 911*plus* CTD system with dual sensors, carousel, stand, deck unit, and weights,
- Sixteen sampling bottles for use with rosette (11 plus 5 spares),
- Refrigerator and freezer space for storage of chemical samples, +4° C (4-cft) for nutrients and -20° C (~12-16-cft) for chlorophyll and aerosol collection substrates samples, respectively,
- RD Instruments' ADCP written to disk,
- For meteorological observations: Anemometers, calibrated air thermometer (wet-and dry-bulb) and a calibrated barometer and/or barograph, interfaced to the data logger if possible,
- Bench space for PCs, monitor, and printer,
- Laboratory space with exhaust hood, sink, lab tables, and storage space,
- Sea-water hoses and nozzles to wash nets and recovered mooring equipment at CTD stations,
- Adequate deck lighting for night-time operations,
- Navigational equipment including GPS and radar,
- Safety harnesses for working on quarterdeck and fantail,
- Ship's crane(s) used for loading and/or deploying,
- (2) Hand-held radios for scientific/winch/bridge communications,
- VHF radio with external antenna at CTD computer station,
- Thermosalinograph and fluorometer interfaced with the data logger,
- Continuous uncontaminated Seawater sampling system with debubbler piped from bow into labs,
- EdgeTech 8011AT deckbox and transducer (hull-mounted),
- Capability to transfer ship's data to CD-ROM disks, and
- Capability to transfer ship's data to Iomega Zip disks or CD-ROM.

4.2 Equipment and Capabilities Provided by Scientists

- Sea-Bird Electronics' SBE 911*plus* CTD system with dual sensors,
- Photosynthetically Active Radiation (PAR) and Fluorometer to be mounted on CTD,
- CTD stand,
- CTD carousel sampler,
- Debubbler for the fluorometer,
- (1) Surface mooring (FOCI biophysical platforms),
- 14 Subsurface moorings,
- Benthos acoustic release deck-set and transducer,
- EdgeTech acoustic release deck-set and transducer,
- 14 railroad wheel sets to be used as anchors,
- Chain, wire rope, rope, assorted hardware for moorings,
- 11 ARGOS satellite tracked drifter buoys,
- (2) Hand held grapple hooks,
- Mooring drag gear for 7/16" winch wire,
- (2) Hand-held radios for scientific/winch/bridge communications,
- Miscellaneous scientific sampling and processing equipment,
- PMEL CTD Weather Observation Logs,
- CTD Cast Information/Rosette Log,
- High volume aerosol collector, with 0.5 hp pump drawing 5 A at 115 VAC,

- Sector sampling system (weather vane with data logger),
- Spectrometer with Liquid Waveguide Capillary Cell (LWCC), and
- Portable laminar flow hood (3 ft.).

5.0 DISPOSITION OF DATA AND REPORTS

5.1 The following data products will be provided by the ship and included in the data package at the end of the cruise:

- Calibration Sheets for all ship's instruments used,
- SCS files,
- ADCP Iomega Zip and/or recordable compact diskette (CD),
- SCS Event Logs, and
- ADCP Log Sheets.

5.2 The following data products will be completed by the scientific party:

- CTD Cast Information/Rosette Log, and
- Mooring logs.

5.3 **Pre- and Post-cruise Meetings** – A pre-cruise meeting between the ship's representative and the Chief Scientist will be held before the start of the cruise. Its purpose is to identify the day-to-day requirements of the project in order to best utilize shipboard personnel resources and to identify overtime requirements. A brief meeting of all scientific personnel, the ship's officers, deck and marine tech departments, and other relevant ship's personnel should be held before the vessel reaches the operations area for the purposes of:

1. Introducing new scientific personnel to ship's procedures, proper channels, etc.
2. Discuss operating procedures for deploying various pieces of sampling equipment.
3. Coordinating scientific watch assignments.

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

6.3.1 Collection of Atmospheric Aerosols and On-Board Quantification of Fe(II) and Fe(III) in the Aerosol – The high volume aerosol collector will be running continuously except for periods when collection substrates have to be changed (max. twice a day) and when the wind comes from out of sector (this is controlled with the weathervane and data logger). During periods of rain or heavy fog, the collector will have to be turned off manually. After sample retrieval, extraction with Formate buffer and subsequent complexation with FerroZine® will allow for Fe (II) determination in the lab in a laminar flow hood using the Liquid Waveguide Capillary Cell (LWCC). Hydroxylamine will be added to one aliquot to determine the readily reducible Fe (III) employing the same ferrozine technique. The remainder of collection substrates will be stored in freezers for further analysis upon return from the cruise. The purpose of this part of the study is to determine the bioavailable iron fraction in atmospheric aerosol. This will involve approximately six hours of intense lab work everyday involving two people.

7.0 HAZARDOUS MATERIALS

7.1 HAZMAT Inventory – See [Section 9.2 Cruise MF-04-04 HAZMAT Inventory by Instrument](#) and [Section 9.3 Cruise MF-04-04 HAZMAT Inventory](#).

7.2 Material Safety Data Sheet (MSDS) – All MSDSs can be found on the ***OERD HAZMAT Emergency Guidelines – MSDS*** compact diskette dated January 15, 2003, supplied to the ship.

8.0 COMMUNICATIONS – For scientific projects, the Chief Scientist, or their designated representative, may have access to the ship's communications systems on a cost reimbursable basis.

8.1 Satellite Communications – INMARSAT (voice and facsimile) communications are available aboard ship and may be used for personal or business related calls. Arrangements to pay for the calls must be made before calling. Credit card calls are the preferred method of payment. INMARSAT calls can be extremely expensive and the exact cost may not be known until you receive your bill.

8.2 Electronic Mail (E-mail) – FOCI requests that **NOAA Ship MILLER FREEMAN** transmit e-mail at least twice a day. Each embarked personnel will have an e-mail account and address established in their name by the ship.

8.3 Receiving Scientific Status Reports – The Chief Scientist may anticipate the need for daily reports on the position of satellite drifters in the study area and on the status of biophysical mooring(s). These will be sent either by facsimile from PMEL over INMARSAT, IRIDIUM phone (PMEL provided), or over the Internet via email from PMEL.

8.4 Use of Radio Transceivers – Because it is sometimes necessary for the scientific staff to communicate with other research vessels, commercial vessels, and shore based NOAA facilities, the Chief Scientist or designee may request the use of radio transceivers aboard the vessel.

8.5 Important Telephone and Facsimile Numbers and E-mail Addresses

8.5.1 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`

8.5.2 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)

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)

8.5.3 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-04-04 Equipment Inventory

Equipment	Quantity	Weight	Total Weight
Currently On Board The Vessel:			
Acoustic Release	27	111 lbs	3,000 lbs
Box, ARGOS Drifter	11	200 lbs	2,200 lbs
Buoy, ARGOS CTD	2	100 lbs	200 lbs
Mooring Drag Gear		500 lbs	500 lbs
Deckset, 8011A Acoustic Release	1		
Items Shipped to Kodiak, Alaska, To Be Loaded April 4-6, 2004:			
Box, Acoustic Release, Empty	15	20 lbs	300 lbs
Box, Current Meter, Empty	21	17 lbs	357 lbs
Current Meter	23	70 lbs	1,600 lbs
Buoy, Surface	1	1,500 lbs	1,500 lbs
Tower, Buoy, Surface	1	300 lbs	300 lbs
Box, Chain. Buoy, Surface	1	4,000 lbs	4,000 lbs
Tote, Shipping, Plastic	3	400 lbs	1,200 lbs
Basket, Wire, w/Cages	1	1,000 lbs	1,000 lbs
Pallet, w/Current Meter	3	1,000 lbs	3,000 lbs
Box, Tool	1	150 lbs	150 lbs
Box, 75-kHz ADCP, Empty	7		
Box, 300-kHz ADCP, Empty	3		
Basket, Wire, Glass Float, Empty	2		
Box, Tool	1	300 lbs	300 lbs
Tote, Shipping	1	800 lbs	800 lbs
Foot Locker	1	500 lbs	500 lbs
Spool, Mooring	10	250 lbs	2,500 lbs
Anchors			
04-CB-1A	1	1,600 lbs	1,600 lbs
04-GB-1A	1	1,800 lbs	1,800 lbs

Equipment	Quantity	Weight	Total Weight
04-GB-2A	1	1,800 lbs	1,800 lbs
04-GB-4A	1	1,800 lbs	1,800 lbs
04-GBM-3A	1	4,200 lbs	4,200 lbs
04-GBP-3A	1	2,200 lbs	2,200 lbs
04-GBP-5A	1	1,900 lbs	1,900 lbs
04-GBP-12A	1	1,900 lbs	1,900 lbs
04-GP-32A	1	1,600 lbs	1,600 lbs
04-GP-34A	1	1,600 lbs	1,600 lbs
04-GPP-36A	1	1,600 lbs	1,600 lbs
04-SSP-1A	1	1,600 lbs	1,600 lbs
04-SSP-2A	1	1,600 lbs	1,600 lbs
04-SSP-3A	1	1,700 lbs	1,700 lbs
Pavlof Bay	1	1,600 lbs	1,600 lbs
TOTAL WEIGHT:			51,907 lbs

9.2 Cruise MF-04-04 HAZMAT Inventory by Instrument

Instrument	Battery Type	Manufacturer	Cell Type	Req. Cells	Total Instr.	Spares	Total Cells	Contact Person
RCM-7	Lithium, Bromine Chloride	Leclanche	D-cell	2	10	0	20	Floering
SeaCat (w/Fluor & pump)	Lithium, Bromine Chloride	Wilson Greatbatch	D-cell	9	4	9	45	DeWitt
SeaCat (Seagauge)	Lithium, Bromine Chloride	Wilson Greatbatch	DD-cell	3	4	0	12	DeWitt
MicroCat	Lithium		9-volt	6	20	6	126	DeWitt
MTR	Alkaline		9-volt	1	15	2	17	DeWitt
SBE-39	Lithium	UltraLife	9-volt	1	16	4	20	DeWitt
APEX Float	Lithium	Wilson Greatbatch	DD-cell	8	1	0	8	DeWitt

9.3 Cruise MF-04-04 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	Mordy	PMEL	200-g	1	0	0	General	Not regulated		9085	5,000 LBS	1
Battery, Alkali	mix	DeWitt	PMEL	17-cells				General	Not regulated				
Battery, Lithium	mix	DeWitt	PMEL	114-cells	2	2	3	General	9	II	3090		
Brij	9002-92-0	Mordy	PMEL	30-ml	0	1	0	General	Not regulated				2
Chloroform	67-66-3	Mordy	PMEL	200-ml	2	0	0	Health	6.1	III	1888	52 L	3
Cupric Sulfate, Pentahydrate	7758-99-8	Mordy	PMEL	40-g	2	0	0	Hazardous Waste	9	III	3077	400 LBS	4
FerroZine®	69898-45-9	Key	CWU	1.2-g				General	Not regulated				
Sodium Formate Buffer	mix	Key	CWU	12.0-l	2	0	0	General	Not regulated				
Hydrochloric Acid	7647-01-0	Mordy	PMEL	2.0-l	3	0	2	Corrosive	8	II	1789	5,000 LBS	5
Hydroxylamine Hydrochloride	5470-11-1	Key	CWU	0.12-g	3	1	1	Corrosive	8 & 6.1	III	2923	2.5 KG	6
Imidazole	288-32-4	Mordy	PMEL	300-g	2	1	1	Corrosive	8	III	3263	5 KG	6
Iodine Lugols, Concentrate	mix	Mordy	PMEL	1.0-l				General	Not regulated				
Methanol	67-56-1	Key	CWU	1.0-l	3	3	1	Flammable	3	II	1230	350 LBS	3
N-1-Naphthylethylenediamine Dihydrochloride	1465-25-4	Mordy	PMEL	8-g	2	1	1	General	Not regulated				7
Potassium Nitrate	7757-79-1	Mordy	PMEL	7-g	1	0	3	Reactive	5.1	III	1486	100 KG	6
Sulfanilamide	63-74-1	Mordy	PMEL	80-g	0	1	1	General	Not regulated				1
Tributyltin Oxide	56-35-9	DeWitt	PMEL	30-pairs				Poison	6.1	II	3020		8

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: 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 4: 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 5: 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 6: 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 7: 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 8: Stop the leak, if possible. Ventilate the space involved. Absorb, sweep up, and place in container for disposal. Shut off or remove all ignition sources. Prevent waterway contamination. Construct a dike to prevent spreading. Collect run-off (water) and transfer to drums or tanks for later disposal.

9.4 Cruise MF-04-04 Itinerary

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart Date/Time
Depart Kodiak	57° 45.00' N	152° 29.60' W							4/6/2004 15:00
CTD CB-1	57° 43.35' N	152° 17.65' W	6.6	10	0.7	183	0.5	4/6/2004 15:39	4/6/2004 16:09
Recover 03CB-1B	57° 43.35' N	152° 17.65' W	0.0	10	0.0	183	1	4/6/2004 16:09	4/6/2004 17:09
Deploy 04CB-1A	57° 43.35' N	152° 17.65' W	0.0	10	0.0	183	2	4/6/2004 17:09	4/6/2004 19:09
CTD CB-1	57° 43.35' N	152° 17.65' W	0.0	10	0.0	183	0.5	4/6/2004 19:09	4/6/2004 19:39
Recover Marine Mammals mooring	56° 57.02' N	150° 59.81' W	62.5	10	6.3	802	8	4/7/2004 1:54	4/7/2004 9:54
CTD at GBP-12	58° 41.02' N	148° 50.86' W	124.6	10	12.5	201	9	4/7/2004 22:22	4/8/2004 7:22
Recover 03GBP-12B	58° 41.02' N	148° 50.86' W	0.0	10	0.0	201	1	4/8/2004 7:22	4/8/2004 8:22
Deploy 04GBP-12A	58° 41.02' N	148° 50.86' W	0.0	10	0.0	201	2	4/8/2004 8:22	4/8/2004 10:22
CTD at GBP-12	58° 41.02' N	148° 50.86' W	0.0	10	0.0	201	0.5	4/8/2004 10:22	4/8/2004 10:52
Drifter at GBP-12	58° 41.02' N	148° 50.86' W	0.0	10	0.0	201	0.2	4/8/2004 10:52	4/8/2004 11:04
CTD at GBP-5	59° 02.53' N	148° 41.60' W	22.0	10	2.2	194	0.5	4/8/2004 13:16	4/8/2004 13:46
Recover 03GBP-5B	59° 02.53' N	148° 41.60' W	0.0	10	0.0	194	1	4/8/2004 13:46	4/8/2004 14:46
Deploy 04GBP-5A	59° 02.53' N	148° 41.60' W	0.0	10	0.0	194	2	4/8/2004 14:46	4/8/2004 16:46
CTD at GBP-5	59° 02.53' N	148° 41.60' W	0.0	10	0.0	194	0.5	4/8/2004 16:46	4/8/2004 17:16
Drifter at GBP-5	59° 02.53' N	148° 41.60' W	0.0	10	0.0	194	0.2	4/8/2004 17:16	4/8/2004 17:28
CTD at GB-4	59° 07.66' N	148° 45.65' W	5.5	10	0.6	146	0.5	4/8/2004 18:01	4/8/2004 18:31
Recover 03GB-4B	59° 07.66' N	148° 45.65' W	0.0	10	0.0	146	1	4/8/2004 18:31	4/8/2004 19:31
Deploy 04GB-4A	59° 07.66' N	148° 45.65' W	0.0	10	0.0	146	2	4/8/2004 19:31	4/8/2004 21:31
CTD at GB-4	59° 07.66' N	148° 45.65' W	0.0	10	0.0	146	0.5	4/8/2004 21:31	4/8/2004 22:01
Drifter at GB-4	59° 07.66' N	148° 45.65' W	0.0	10	0.0	146	0.2	4/8/2004 22:01	4/8/2004 22:13
Kayak Island drifter (Depth Dep.)	59° 47.00' N	144° 20.00' W	140.6	10	14.1	100	0.2	4/9/2004 12:17	4/9/2004 12:29
Kayak Island drifter	59° 48.00' N	144° 17.50' W	1.6	10	0.2	100	0.2	4/9/2004 12:39	4/9/2004 12:51
CTD at GB-3	59° 17.91' N	148° 57.80' W	145.2	10	14.5	186	0.5	4/10/2004 3:22	4/10/2004 3:52
Drag at site 03GBM-3B	59° 17.91' N	148° 57.80' W	0.0	10	0.0	186	4	4/10/2004 3:52	4/10/2004 7:52
Deploy 04GBM-3A	59° 17.91' N	148° 57.80' W	0.0	10	0.0	186	4	4/10/2004 7:52	4/10/2004 11:52
Recover 03GBP-3B	59° 17.02' N	148° 57.52' W	0.9	10	0.1	185	1	4/10/2004 11:57	4/10/2004 12:57
Deploy 04GBP-3A	59° 17.02' N	148° 57.52' W	0.0	10	0.0	185	1	4/10/2004 12:57	4/10/2004 13:57
CTD at GB-3	59° 17.02' N	148° 57.52' W	0.0	10	0.0	185	0.5	4/10/2004 13:57	4/10/2004 14:27
Drifter at GB-3	59° 17.02' N	148° 57.52' W	0.0	10	0.0	185	0.2	4/10/2004 14:27	4/10/2004 14:39
Touch-and-go at Seward	60° 06.50' N	149° 26.50' W	51.6	11	4.7	1	3	4/10/2004 19:21	4/10/2004 22:21

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart Date/Time
CTD at GB-2	59° 32.02' N	149° 10.99' W	35.4	10	3.5	212	6.2	4/11/2004 1:53	4/11/2004 8:05
Recover 03GB-2B	59° 32.02' N	149° 10.99' W	0.0	10	0.0	212	1	4/11/2004 8:05	4/11/2004 9:05
Deploy 04GB-2A	59° 32.02' N	149° 10.99' W	0.0	10	0.0	212	2	4/11/2004 9:05	4/11/2004 11:05
CTD at GB-2	59° 32.02' N	149° 10.99' W	0.0	10	0.0	212	0.5	4/11/2004 11:05	4/11/2004 11:35
Drifter at GB-2	59° 32.02' N	149° 10.99' W	0.0	10	0.0	212	0.2	4/11/2004 11:35	4/11/2004 11:47
CTD at GB-1	59° 41.68' N	149° 19.90' W	10.7	10	1.1	228	0.5	4/11/2004 12:51	4/11/2004 13:21
Recover 03GB-1B	59° 41.68' N	149° 19.90' W	0.0	10	0.0	228	1	4/11/2004 13:21	4/11/2004 14:21
Deploy 04GB-1A	59° 41.68' N	149° 19.90' W	0.0	10	0.0	228	2	4/11/2004 14:21	4/11/2004 16:21
CTD at GB-1	59° 41.68' N	149° 19.90' W	0.0	10	0.0	228	0.5	4/11/2004 16:21	4/11/2004 16:51
Drifter at GB-1	59° 41.68' N	149° 19.90' W	0.0	10	0.0	228	0.2	4/11/2004 16:51	4/11/2004 17:03
CTD at GP-32	59° 06.03' N	150° 59.40' W	61.9	11	5.6	165	10	4/11/2004 22:40	4/12/2004 8:40
Recover 03GP-32B	59° 06.03' N	150° 59.40' W	0.0	10	0.0	165	1	4/12/2004 8:40	4/12/2004 9:40
Deploy 04GP-32A	59° 06.03' N	150° 59.40' W	0.0	11	0.0	165	1.5	4/12/2004 9:40	4/12/2004 11:10
CTD at GP-32	59° 06.03' N	150° 59.40' W	0.0	10	0.0	165	0.5	4/12/2004 11:10	4/12/2004 11:40
CTD at GP-34	58° 57.78' N	150° 55.98' W	8.4	11	0.8	140	0.5	4/12/2004 12:26	4/12/2004 12:56
Recover 03GP-34B	58° 57.78' N	150° 55.98' W	0.0	10	0.0	140	1	4/12/2004 12:56	4/12/2004 13:56
Deploy 04GP-34A	58° 57.78' N	150° 55.98' W	0.0	11	0.0	140	1.5	4/12/2004 13:56	4/12/2004 15:26
CTD at GP-34	58° 57.78' N	150° 55.98' W	0.0	10	0.0	140	0.5	4/12/2004 15:26	4/12/2004 15:56
CTD at GPP-36	58° 45.02' N	150° 52.01' W	12.9	11	1.2	181	0.5	4/12/2004 17:07	4/12/2004 17:37
Recover 03GPP-36B	58° 45.02' N	150° 52.01' W	0.0	10	0.0	181	1	4/12/2004 17:37	4/12/2004 18:37
Deploy 04GPP-36A	58° 45.02' N	150° 52.01' W	0.0	10	0.0	181	1.5	4/12/2004 18:37	4/12/2004 20:07
CTD at GPP-36	58° 45.02' N	150° 52.01' W	0.0	10	0.0	181	0.5	4/12/2004 20:07	4/12/2004 20:37
CTD at 03SSP-3B	57° 29.02' N	154° 48.45' W	116.6	12	9.7	191	0.5	4/13/2004 11:23	4/13/2004 11:53
Recover 03SSP-3B	57° 29.02' N	154° 48.45' W	0.0	10	0.0	191	1	4/13/2004 11:53	4/13/2004 12:53
Deploy 04SSP-3A	57° 29.02' N	154° 48.45' W	0.0	10	0.0	191	1.5	4/13/2004 12:53	4/13/2004 14:23
CTD at 03SSP-3A	57° 29.02' N	154° 48.45' W	0.0	10	0.0	191	0.5	4/13/2004 14:23	4/13/2004 14:53
CTD at 03SSP-2A	57° 37.12' N	155° 04.49' W	11.8	11	1.1	249	0.5	4/13/2004 15:57	4/13/2004 16:27
Recover 03SSP-2B	57° 37.12' N	155° 04.49' W	0.0	10	0.0	249	1	4/13/2004 16:27	4/13/2004 17:27
Deploy 04SSP-2A	57° 37.12' N	155° 04.49' W	0.0	10	0.0	249	1.5	4/13/2004 17:27	4/13/2004 18:57
CTD at 03SSP-2B	57° 37.12' N	155° 04.49' W	0.0	10	0.0	249	0.5	4/13/2004 18:57	4/13/2004 19:27
CTD at 03SSP-1A	57° 41.07' N	155° 12.20' W	5.7	11	0.5	295	0.6	4/13/2004 19:59	4/13/2004 20:35
Recover 03SSP-1B	57° 41.07' N	155° 12.20' W	0.0	10	0.0	295	1	4/13/2004 20:35	4/13/2004 21:35
Deploy 04SSP-1A	57° 41.07' N	155° 12.20' W	0.0	10	0.0	295	1.5	4/13/2004 21:35	4/13/2004 23:05
CTD at 03SSP-1B	57° 41.07' N	155° 12.20' W	0.0	10	0.0	295	0.6	4/13/2004 23:05	4/13/2004 23:41

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart Date/Time
CTD at Line 8, Station 61	57° 43.20' N	155° 15.60' W	2.8	10	0.3	181	0.5	4/13/2004 23:57	4/14/2004 0:27
CTD at Line 8, Station 60	57° 41.00' N	155° 10.00' W	3.7	10	0.4	289	0.6	4/14/2004 0:50	4/14/2004 1:26
CTD at Line 8, Station 59	57° 38.50' N	155° 04.20' W	4.0	10	0.4	252	0.5	4/14/2004 1:50	4/14/2004 2:20
CTD at Line 8, Station 58	57° 36.30' N	155° 00.50' W	3.0	10	0.3	238	0.5	4/14/2004 2:37	4/14/2004 3:07
CTD at Line 8, Station 57	57° 33.10' N	154° 52.50' W	5.4	10	0.5	228	0.5	4/14/2004 3:39	4/14/2004 4:09
CTD at Line 8, Station 56	57° 30.90' N	154° 47.00' W	3.7	10	0.4	205	0.5	4/14/2004 4:32	4/14/2004 5:02
CTD at Line 8, Station 55	57° 28.50' N	154° 42.00' W	3.6	10	0.4	60	0.4	4/14/2004 5:23	4/14/2004 5:47
CTD at Pavlof Bay	55° 10.87' N	161° 41.19' W	269.9	11	24.5	100	0.4	4/15/2004 6:19	4/15/2004 6:43
Recover 03-PAVLOF	55° 10.87' N	161° 41.19' W	0.0	10	0.0	100	1	4/15/2004 6:43	4/15/2004 7:43
Deploy 04PA-01	55° 10.87' N	161° 41.19' W	0.0	10	0.0	100	1	4/15/2004 7:43	4/15/2004 8:43
CTD at Pavlof Bay	55° 10.87' N	161° 41.19' W	0.0	10	0.0	100	0.4	4/15/2004 8:43	4/15/2004 9:07
Unimak Pass drifter deployment	54° 26.51' N	165° 27.40' W	137.7	10	13.8	101	0.2	4/15/2004 22:53	4/15/2004 23:05
CTD at 03BSP-6A	53° 24.34' N	168° 51.22' W	135.1	10	13.5	996	1.1	4/16/2004 12:36	4/16/2004 13:42
Recover 03BSP-6A	53° 24.34' N	168° 51.22' W	0.0	10	0.0	996	1	4/16/2004 13:42	4/16/2004 14:42
CTD at 03SG-3	53° 01.30' N	168° 59.89' W	23.6	10	2.4	107	0.5	4/16/2004 17:04	4/16/2004 17:34
Recover 03SG-3B	53° 01.30' N	168° 59.89' W	0.0	10	0.0	107	0.5	4/16/2004 17:34	4/16/2004 18:04
CTD/nuts	53° 05.00' N	169° 00.00' W	3.7	10	0.4	120	0.5	4/16/2004 18:26	4/16/2004 18:56
CTD/nuts	52° 59.00' N	169° 09.50' W	8.3	10	0.8	120	0.5	4/16/2004 19:46	4/16/2004 20:16
CTD/nuts across Samalga Pass	52° 50.80' N	169° 23.00' W	11.6	10	1.2	120	0.5	4/16/2004 21:25	4/16/2004 21:55
CTD/nuts across Samalga Pass	52° 50.80' N	169° 28.00' W	3.0	10	0.3	260	0.6	4/16/2004 22:13	4/16/2004 22:49
CTD/nuts across Samalga Pass	52° 50.80' N	169° 33.00' W	3.0	10	0.3	260	0.6	4/16/2004 23:08	4/16/2004 23:44
CTD/nuts across Samalga Pass	52° 50.80' N	169° 38.00' W	3.0	10	0.3	120	0.5	4/17/2004 0:02	4/17/2004 0:32
CTD at 03SG-2	53° 01.73' N	169° 32.07' W	11.5	10	1.1	119	5.5	4/17/2004 1:41	4/17/2004 7:11
Recover 03SG-2A	53° 01.73' N	169° 32.07' W	0.0	10	0.0	119	0.5	4/17/2004 7:11	4/17/2004 7:41
CTD/nutrients at 03SGP-1	52° 50.74' N	169° 27.32' W	11.4	10	1.1	232	0.5	4/17/2004 8:49	4/17/2004 9:19
Recover 03SGP-1B	52° 50.74' N	169° 27.32' W	0.0	10	0.0	232	0.5	4/17/2004 9:19	4/17/2004 9:49
CTD at 03SG-4	52° 41.36' N	169° 34.49' W	10.3	10	1.0	111	0.5	4/17/2004 10:51	4/17/2004 11:21
Recover 03SG-4A	52° 41.36' N	169° 34.49' W	0.0	10	0.0	111	0.5	4/17/2004 11:21	4/17/2004 11:51
CTD at 03SG-5	52° 43.60' N	169° 23.32' W	7.1	10	0.7	102	0.4	4/17/2004 12:34	4/17/2004 12:58
Recover 03SG-5B	52° 43.60' N	169° 23.32' W	0.0	10	0.0	102	0.5	4/17/2004 12:58	4/17/2004 13:28
CTD/nuts	52° 42.40' N	169° 22.00' W	1.4	10	0.1	120	0.5	4/17/2004 13:36	4/17/2004 14:06
CTD/nuts	52° 41.00' N	169° 09.50' W	7.7	10	0.8	120	0.5	4/17/2004 14:52	4/17/2004 15:22
CTD/nuts (Depth Dep.)	52° 47.00' N	168° 55.00' W	10.6	10	1.1	50	0.4	4/17/2004 16:26	4/17/2004 16:50
CTD/nuts (Depth Dep.)	52° 45.00' N	168° 53.00' W	2.3	10	0.2	120	0.5	4/17/2004 17:04	4/17/2004 17:34

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart Date/Time
Alaska Stream drifter	52° 45.00' N	168° 53.00' W	0.0	10	0.0	120	0.2	4/17/2004 17:34	4/17/2004 17:46
CTD/nuts (Depth Dep.)	52° 42.00' N	168° 50.00' W	3.5	10	0.4	350	0.6	4/17/2004 18:07	4/17/2004 18:43
CTD/nuts	52° 40.43' N	168° 47.60' W	2.1	10	0.2	1017	1.1	4/17/2004 18:56	4/17/2004 20:02
Alaska Stream drifter	52° 09.93' N	168° 12.37' W	37.3	10	3.7	120	0.2	4/17/2004 23:46	4/17/2004 23:58
CTD/nuts	52° 32.73' N	168° 36.20' W	27.1	10	2.7	2850	1.4	4/18/2004 2:40	4/18/2004 4:04
CTD/nuts	52° 23.23' N	168° 26.60' W	11.2	10	1.1	3340	1.4	4/18/2004 5:11	4/18/2004 6:35
CTD/nuts	52° 09.93' N	168° 11.50' W	16.2	10	1.6	4348	1.4	4/18/2004 8:12	4/18/2004 9:36
Deploy APEX float (Must Be > 2,000m)	52° 09.93' N	168° 12.37' W	0.5	10	0.1	4350	0.2	4/18/2004 9:40	4/18/2004 9:52
Recover 03GSP-9A	52° 09.93' N	168° 12.37' W	0.0	10	0.0	4348	3	4/18/2004 9:52	4/18/2004 12:52
Recover 03GSP-8A	52° 23.23' N	168° 27.47' W	16.2	10	1.6	3340	2.5	4/18/2004 14:29	4/18/2004 16:59
Recover 03GSP-7A	52° 32.73' N	168° 36.95' W	11.1	10	1.1	2850	2	4/18/2004 18:05	4/18/2004 20:05
Recover 03GSP-6A	52° 40.43' N	168° 48.45' W	10.4	10	1.0	1017	1	4/18/2004 21:08	4/18/2004 22:08
CTD at 03AMP-1	52° 26.22' N	171° 27.19' W	97.5	10	9.8	421	3.7	4/19/2004 7:53	4/19/2004 11:35
Recover 03AMP-1B	52° 26.22' N	171° 27.19' W	0.0	10	0.0	421	0.7	4/19/2004 11:35	4/19/2004 12:17
CTD at 03AMP-2	52° 25.00' N	171° 39.96' W	7.9	10	0.8	459	0.7	4/19/2004 13:04	4/19/2004 13:46
Recover 03AMP-2B	52° 25.00' N	171° 39.96' W	0.0	10	0.0	459	0.7	4/19/2004 13:46	4/19/2004 14:28
CTD at 03AMP-3	52° 24.00' N	171° 54.99' W	9.2	10	0.9	308	0.6	4/19/2004 15:24	4/19/2004 16:00
Recover 03AMP-3B	52° 24.00' N	171° 54.99' W	0.0	10	0.0	308	0.7	4/19/2004 16:00	4/19/2004 16:42
CTD at 03AMP-4	52° 22.98' N	172° 07.22' W	7.5	10	0.8	365	0.6	4/19/2004 17:27	4/19/2004 18:03
Recover 03AMP-4B	52° 22.98' N	172° 07.22' W	0.0	10	0.0	365	0.7	4/19/2004 18:03	4/19/2004 18:45
CTD (max cast depth = 1500 m)	53° 22.00' N	168° 42.00' W	137.2	11	12.5	340	0.6	4/20/2004 7:13	4/20/2004 7:49
CTD (max cast depth = 1500 m)	53° 31.00' N	168° 55.00' W	11.9	11	1.1	1500	1.4	4/20/2004 8:54	4/20/2004 10:18
CTD (max cast depth = 1500 m)	53° 36.00' N	169° 04.00' W	7.3	11	0.7	1800	1.6	4/20/2004 10:58	4/20/2004 12:34
CTD (max cast depth = 1500 m)	53° 47.00' N	169° 16.00' W	13.1	11	1.2	1575	1.5	4/20/2004 13:45	4/20/2004 15:15
CTD (max cast depth = 1500 m)	54° 02.00' N	169° 34.00' W	18.4	11	1.7	1850	1.7	4/20/2004 16:56	4/20/2004 18:38
CTD (max cast depth = 1500 m)	54° 20.00' N	169° 50.00' W	20.3	11	1.8	1900	1.7	4/20/2004 20:28	4/20/2004 22:10
CTD (max cast depth = 1500 m)	54° 40.00' N	169° 12.00' W	29.8	11	2.7	985	1.1	4/21/2004 0:53	4/21/2004 1:59
CTD (max cast depth = 1500 m)	54° 58.00' N	168° 45.00' W	23.8	11	2.2	300	0.6	4/21/2004 4:08	4/21/2004 4:44
CTD (max cast depth = 1500 m)	55° 07.00' N	168° 29.00' W	12.8	11	1.2	1000	1.1	4/21/2004 5:54	4/21/2004 7:00
CTD - Shelf Break (1,000m) (Depth Dep.)	55° 20.50' N	168° 15.20' W	15.6	11	1.4	1000	1.1	4/21/2004 8:26	4/21/2004 9:32
CTD - Shelf Break (500m) (Depth Dep.)	55° 22.30' N	168° 10.50' W	3.2	11	0.3	500	0.7	4/21/2004 9:49	4/21/2004 10:31
CTD - Shelf Break (200m) (Depth Dep.)	55° 25.70' N	168° 04.40' W	4.9	11	0.4	200	0.5	4/21/2004 10:58	4/21/2004 11:28
CTD - Outer Shelf Domain	55° 33.00' N	167° 46.00' W	12.7	11	1.2	120	0.5	4/21/2004 12:37	4/21/2004 13:07
CTD - Outer Shelf Domain	55° 39.00' N	167° 30.02' W	10.8	11	1.0	120	0.5	4/21/2004 14:06	4/21/2004 14:36

Activity	Latitude	Longitude	Dist. (nm)	Spd (kts)	Trans (hrs)	Approx Bott Depth (m)	On Sta (hrs)	Arrive (Local) Date/Time	Depart Date/Time
CTD - Outer Shelf Domain	55° 46.00' N	167° 10.00' W	13.3	11	1.2	120	0.5	4/21/2004 15:49	4/21/2004 16:19
CTD - Outer Shelf Domain	55° 54.00' N	166° 54.00' W	12.0	11	1.1	120	0.5	4/21/2004 17:24	4/21/2004 17:54
CTD	56° 03.00' N	166° 20.00' W	21.0	11	1.9	120	0.5	4/21/2004 19:49	4/21/2004 20:19
Arrive Dutch Harbor	53° 54.50' N	166° 30.90' W	128.7	11	11.7	69	0	4/22/2004 8:01	

9.5 Cruise MF-04-04 Route Chartlet

