FINAL CRUISE INSTRUCTIONS
FOCI

NOAA Ship MILLER FREEMAN, MF01-11
September 21 – October 3, 2001
Nancy Kachel, Chief Scientist

ENDORSEMENTS:

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Marine Operations Center-Pacific
Seattle, WA 98102

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Dr. Eddie N. Bernard, Director
Pacific Marine Environmental Laboratory
Seattle, WA 98115

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Seattle, WA 98115

August 24, 2001

FINAL CRUISE INSTRUCTIONS
NOAA Ship MILLER FREEMAN

Cruise No: MF-01-11
FOCI No: 5MF01

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

Area: Gulf of Alaska

Itinerary: September 21, 2001: Kodiak, Alaska
September 28, 2001: Kodiak, Alaska
October 3, 2001: Seattle, Washington

Participating organizations:
NOAA - Pacific Marine Environmental Laboratory (PMEL)
NOAA - Alaska Fisheries Science Center (AFSC)
University of Alaska, Fairbanks (UAF)

CRUISE DESCRIPTION:

1.1 PROGRAM JUSTIFICATION.
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, a NOAA Coastal Ocean Program project: Southeast Bering Sea Carrying Capacity, and a Steller Sea Lion Research Program. FOCI also supports associated projects, such as the 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.

1.2 CRUISE OBJECTIVES:

1. Recover moorings in the Steller Sea Lion study areas east of Kodiak Island (4).
2. Recover and deploy the FATE moorings (2).
3. Recover and deploy GLOBEC moorings on the Seward Line (11) and at Gore Point (3).
5. Complete CTDs as designated by the Chief Scientist.

1.3 APPLICABILITY
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.

The order of recoveries and deployments of the moorings may be changed by the chief scientist or by the chief mooring technician (Bill Floering) at their discretion due to weather or to the successfulness of recovedry operations.

1.4 Operating Area

Continental shelf and slope region of the Gulf of Alaska between Kodiak Island and Middleton Island. Appendix 9.1

1.5 Participating Organizations

a) NOAA/Pacific Marine Environmental Laboratory (PMEL)
7600 Sand Point Way NE
Seattle, WA 98115-6439

b) NOAA/Alaska Fisheries Science Center (AFSC)
7600 Sand Point Way NE
Seattle, WA 98115-6439

1.6 Personnel

Chief Scientist:

Nancy B. Kachel	F	PMEL
nkachel@pmel.noaa.gov		
206-526-6780		

Participating Scientists

Nancy Kachel	F	PMEL
William Floering	M	PMEL
Carol Dewitt	F	PMEL
Calvin Mordy	M	PMEL
David Weisgarver	M	PMEL
Rick Miller	M	PMEL
Pat McLain	M	PMEL
John Bumgardner	M	PMEL
Allen Macklin	M	PMEL

1.7 Administrative

NOAA Marine Operations Center-Pacific Contact:
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2.0. OPERATIONS

We request the ship depart Kodiak at 1000 on September 21st in order to complete transits during night time hours, thus maximizing the number of daylight hours available for mooring operations. Operations will be conducted 24 hours per day. Recovery and deployment operations will usually take place during

daylight hours. Five technicians and engineers plus 2-3 scientists from PMEL, as well as the deck department will be involved in various aspects of the mooring recovery, instrument turn-around, and redeployment operations. It is expected that the survey department will also participate in these operations. The CTD watches will consist of a winch operator, 1-2 scientists and a Survey Tech. At most of our CTD stations, 12 water bottles will be fired to sample salinity, and nutrients. Stations will be sampled to within 5m of the bottom, or to 1500m depth depending on which is deeper.

SUMMARY OF ACTIVITIES:
The operations during Cruise-MF01-11 will consist of a combination of mooring recoveries, mooring deployments, CTD casts. Ten –twelve drifting Buoys will be deployed during the cruise at the discretion of the Chief Scientist.

Mooring Operations:

Barnabus Canyon	Recover 2 moorings	
FATE	Recover 2 moorings	Deploy 2 moorings
Seward Line	Recover 7 moorings	Deploy 11 moorings
Gore Point	Recover 3 moorings	Deploy 3 moorings
Chiniak Bay	Recover 2 moorings	

During the nights not needed for long transits, and in the event that conditions prohibit mooring deployments/ recoveries, operations will focus on CTD lines to be selected by the Chief Scientist.

2.1 Data to be collected:
Measurements will be collected with shipboard sensors including the ADCP and the Flow-through system with a flourometer. PMEL has supplied a CTD profiler with water bottles, fluorometer, and PAR sensors and user-supplied mast-mounted radiometers. Satellite-tracked drifting buoys will be launched.

2.1.1: SCS will be configured to record the following:

Navigation - GPS and differential position, time, COG, SOG and data-quality parameters; Ring-Laser-Gyro heading; ADU position, time, COG, SOG, heading, pitch, roll and data-quality parameters; bottom depth;

Flow-through sampler Thermosalinograph temperature, conductivity and salinity; fluorescence.

Meteorological - Solar radiation, relative and absolute wind speed and direction, barometric pressure, air temperature and humidity, precipitation.

2.1.2: The ADCP will be configured according to the Chief Scientist's specifications. It should receive position input from a GPS receiver with DGPS input as a backup and heading from the Ring-Laser Gyro and the ADU. Data will be stored on 100 MB Zip disks.

2.1.3: CTD cast data will be collected using a SeaBird 911+ system. CTD casts will be taken to calibrate mooring data and during night operations on the cruise. 6-12 10-liter water samples will be taken on most casts.

2.1.4: It is requested that the Ship's technician run the AutoSal to compare salinities with CTD values. Usually two samples will be taken per cast, one at depth and one in the surface mixed layer. This could be relaxed to one sample per cast taken near-bottom.

2.1.5: The ship will maintain a Marine Operations Abstract (MOA) on paper giving the date, time and location of significant events such as CTD casts, buoy deployments, etc.

2.2 STAGING PLAN:
Some gear is already aboard. The rest will be shipped and loaded on 20 September 2001. To that end, Bill Floering and three engineers will arrive in Kodiak prior to the ship's arrival to make arrangements and to assemble moorings. All participants, including the chief scientist will join the ship by the evening of Sept. 19, 2001.

2.3 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.

CTD/Water samples (SOI 2.2.1)
Chlorophyll samples (SOI 2.2.10)
Satellite tracked drifter buoy (SOI 2.2.11)
ADCP (SOI 2.2.13)
Radiometer (SOI 2.2.14)

2.3.1 Mooring recoveries/ deployments (Mooring diagrams will be provided to the ship by 31AUG)

Mooring calibration CTDs will be completed at the site of each mooring.

The water structure of temperature, salinity, nutrients, fluorescence, irradiance and pigments will be surveyed with CTD sections. Currents will be observed from ADCP transects and drifting-buoy trajectories.

2.3.2: Nutrient and chlorophyll samples will be taken and analyzed aboard ship. Chlorophyll samples will be taken, filtered and frozen for analysis at AFSC.

2.3.3 Drifters deployed near the shelf edge of a GOA eddy will permit tracking of on-shelf flow of nutrient-rich waters from the deep sea onto the continental shelf.

2.4 WAYPOINTS:
Figure 1 shows a map of the Mooring sites. Other CTD lines over Amatouli Trough will be occupied as time permits. CTD survey sites may be occupied as identified during the cruise and as discussed in section 2.0.

		Lat.			Lon.			Dist.	Spd	Transit	Wat.	CTD	CTD Time	Add. on	Arrive Local	Depart
Name	Site	Deg.	Min	H	Deg.	Min.	H	nm	kt	hr	Dep. m	Z (m)	min	stn. min	Date / Time	Date / Time
	Kodiak ls	57	40.000	N	152	25.000	W								21-Sep 10:00	21-Sep 10:00
bc1	bc-1A (100m)	56	54.160	N	152	24.120	W	45.8	11	4.2	0	-10	14	30	21-Sep 14:10	21-Sep 14:54
bc2	BCP-1A w/o ctd	56	49.020	N	152	36.230	W	8.4	10	0.8	140	130	23	45	21-Sep 15:44	21-Sep 16:52
Big mooring FATE	FATE-M1A (2200m)	58	15.230	N	147	41.014	W	180.3	11	16.4	0	-10	14	780	22-Sep 09:16	22-Sep 22:30
	FATE-P1A (2200m)	58	16.786	N	147	40.575	W	1.6	11	0.1	0	-10	14	120	22-Sep 22:39	23-Sep 00:53
pickup	GBM-3A	59	16.400	N	148	57.920	W	71.8	11	6.5	0	-10	14	110	23-Sep 07:25	23-Sep 09:29

pickup	GBP-3A-adcp	59	16.720 N	148	57.520 W	0.4	11	0.0	0	-10	14	20	23-Sep 09:32	23-Sep 10:06
depl	GP10 or wait	59	9.600 N	149	7.800 W	8.9	11	0.8	0	-10	14	16	23-Sep 10:54	23-Sep 11:25
depl	GBM-3A	59	16.400 N	148	57.920 W	8.5	11	0.8	200	190	27	150	23-Sep 12:11	23-Sep 15:07
depl	GBP-3A-adcp-plus	59	16.720 N	148	57.520 W	0.4	11	0.0	0	-10	14	45	23-Sep 15:09	23-Sep 16:09
	GAK 8	58	47.50 N	148	29.4 W	32.6	10	3.3	294	284	32	0	23-Sep 19:24	23-Sep 19:57
ctd & drifter	GAK7i	58	52.90 N	148	33.6 W	5.8	10	0.6	304	294	33	0	23-Sep 20:32	23-Sep 21:05
	GAK7	58	58.35 N	148	37.72 W	5.9	10	0.6	245	235	29	0	23-Sep 21:40	23-Sep 22:09
ctd & drifter	GAK6i	59	2.50 N	148	42 W	4.7	10	0.5	182	172	26	0	23-Sep 22:37	23-Sep 23:03
	GAK 6	59	7.00 N	148	46.2 W	5.0	10	0.5	155	145	24	0	23-Sep 23:33	23-Sep 23:57
ctd & drifter	GAK 5	59	15.70 N	148	54.5 W	9.7	10	1.0	170	160	25	0	24-Sep 00:55	24-Sep 01:20
ctd & drifter	GAK 4	59	24.50 N	149	2.9 W	9.8	10	1.0	204	194	27	0	24-Sep 02:18	24-Sep 02:45
	GAK 3	59	33.20 N	149	11.3 W	9.7	10	1.0	214	204	27	0	24-Sep 03:43	24-Sep 04:11
	GAK 2	59	41.50 N	149	19.6 W	9.3	10	0.9	230	220	28	0	24-Sep 05:07	24-Sep 05:35
	GAK 1	59	50.70 N	149	28 W	10.1	10	1.0	290	280	32	0	24-Sep 06:36	24-Sep 07:08
pickup/re-deploy	GB-1A	59	41.500 N	149	22.260 W	9.6	10	1.0	153	143	24	160	24-Sep 08:06	24-Sep 11:09
pickup/re-deploy	GB-2A	59	34.200 N	149	11.740 W	9.0	10	0.9	153	143	24	160	24-Sep 12:04	24-Sep 15:07
deploy cm & drifter	GB-7	59	46.000 N	148	58.500 W	13.6	11	1.2	150	140	24	25	24-Sep 16:21	24-Sep 17:10
deploy cm & drifter	GB-8	59	39.000 N	148	38.500 W	12.3	11	1.1	150	140	24	25	24-Sep 18:17	24-Sep 19:05
deploy cm & drifter	GB9	59	9.600 N	149	7.800 W	33.0	11	3.0	0	-10	14	30	24-Sep 22:05	24-Sep 22:50
ctd	Amatouli B1	59	9.744 N	148	31.065 W	18.8	11	1.7	125	115	22	0	25-Sep 00:32	25-Sep 00:54
ctd	Amatouli B2	59	4.47 N	148	34.006 W	5.5	10	0.5	240	230	29	0	25-Sep 01:27	25-Sep 01:56
ctd	Amatouli B3	58	59.196 N	148	36.94 W	5.5	10	0.5	266	256	31	0	25-Sep 02:29	25-Sep 03:00
ctd	Amatouli B4	58	53.922 N	148	39.866 W	5.5	10	0.5	273	263	31	0	25-Sep 03:33	25-Sep 04:04
ctd	Amatouli B5	58	48.648 N	148	42.785 W	5.5	10	0.5	243	233	29	0	25-Sep 04:37	25-Sep 05:06
ctd	Amatouli B6	58	43.374 N	148	45.696 W	5.5	10	0.5	220	210	28	0	25-Sep 05:39	25-Sep 06:07
ctd	Amatouli B7	58	38.1 N	148	48.6 W	5.5	10	0.5	153	143	24	0	25-Sep 06:40	25-Sep 07:04
pickup	GB-6a	58	55.480 N	148	34.040 W	18.9	11	1.7	0	-10	14	90	25-Sep 08:47	25-Sep 10:31
pickup	GB 5a	59	2.560 N	148	41.560 W	8.1	10	0.8	0	-10	14	30	25-Sep 11:20	25-Sep 12:04

pickup	GB-4A	59	7.680 N	148	47.210 W	5.9	10	0.6	0	-10	14	90	25-Sep 12:39	25-Sep 14:24
depl	GP10	59	9.600 N	149	7.800 W	10.7	11	1.0	0	-10	14	16	25-Sep 15:22	25-Sep 15:53
depl	GB-4A	59	7.680 N	148	47.210 W	10.7	11	1.0	200	190	27	75	25-Sep 16:51	25-Sep 18:33
depl	GB 5a	59	2.560 N	148	41.560 W	5.9	11	0.5	200	190	27	30	25-Sep 19:05	25-Sep 20:02
depl	GB-6a	58	55.480 N	148	34.040 W	8.1	11	0.7	200	190	27	30	25-Sep 20:46	25-Sep 21:42
ctd	Amatouli B1	59	9.744 N	148	31.065 W	14.3	11	1.3	125	115	22	0	25-Sep 23:00	25-Sep 23:22
ctd	Amatouli B2	59	4.47 N	148	34.006 W	5.5	10	0.5	240	230	29	0	25-Sep 23:55	26-Sep 00:24
ctd	Amatouli B3	58	59.196 N	148	36.94 W	5.5	10	0.5	266	256	31	0	26-Sep 00:57	26-Sep 01:28
ctd	Amatouli B4	58	53.922 N	148	39.866 W	5.5	10	0.5	273	263	31	0	26-Sep 02:01	26-Sep 02:32
ctd	Amatouli B5	58	48.648 N	148	42.785 W	5.5	10	0.5	243	233	29	0	26-Sep 03:05	26-Sep 03:34
ctd	Amatouli B6	58	43.374 N	148	45.696 W	5.5	10	0.5	220	210	28	0	26-Sep 04:07	26-Sep 04:35
ctd	Amatouli B7	58	38.1 N	148	48.6 W	5.5	10	0.5	153	143	24	0	26-Sep 05:08	26-Sep 05:32
Gore Pt	GP-34A (142m)-R	58	57.300 N	150	55.500 W	68.5	11	6.2	0	-10	14	45	26-Sep 11:45	26-Sep 12:45
Gore Pt	GP-32A(153)R+D	59	6.000 N	150	59.400 W	8.9	11	0.8	153	143	24	90	26-Sep 13:33	26-Sep 15:27
Gore Pt	GP-34A (142m)D	58	57.810 N	150	55.920 W	8.4	11	0.8	142	132	23	60	26-Sep 16:13	26-Sep 17:36
Gore Pt	GPP-36A (185m)?	58	45.000 N	150	52.000 W	13.0	11	1.2	185	175	26	120	26-Sep 18:47	26-Sep 21:12
GP_CTD	GP1	59	6 N	150	59.38 W	21.3	10	2.1	172	162	25	0	26-Sep 23:20	26-Sep 23:45
ctd & drifter	GP2	59	0.64 N	150	57.64 W	5.4	10	0.5	160	150	24	0	27-Sep 00:18	27-Sep 00:42
GP_CTD	GP3	58	57.01 N	150	55.8 W	3.8	10	0.4	144	134	23	0	27-Sep 01:04	27-Sep 01:28
ctd & drifter	GP4	58	52.8 N	150	53.98 W	4.3	10	0.4	166	156	25	0	27-Sep 01:54	27-Sep 02:18
GP_CTD	GP5	58	49.2 N	150	52.81 W	3.7	10	0.4	192	182	26	0	27-Sep 02:40	27-Sep 03:06
GP_CTD	GP6	58	44.93 N	150	51.96 W	4.3	10	0.4	188	178	26	0	27-Sep 03:32	27-Sep 03:58
GP_CTD	GP7	58	35.3 N	150	47.93 W	9.9	10	1.0	184	174	26	0	27-Sep 04:57	27-Sep 05:22
GP_CTD	GP8	58	25.71 N	150	43.68 W	9.8	10	1.0	79	69	19	0	27-Sep 06:22	27-Sep 06:41
GP_CTD	GP9	58	16.01 N	150	39.47 W	9.9	10	1.0	67	57	18	0	27-Sep 07:40	27-Sep 07:59
elbow pt.	10	58	6.2381 N	150	35.194 W 1	10.0	10	0.998	90	165	155	24.5	27-Sep 08:59	27-Sep 11:58
Chiniak	CB-3A (140m)	57	30.900 N	151	26.500 W	44.7	11	4.1	0	-10	14	45	27-Sep 16:02	27-Sep 17:01
Chiniak	CB-2A (120m)	57	27.600 N	151	34.500 W	5.4	10	0.5	120	110	22	30	27-Sep 17:34	27-Sep 18:25

Chiniak Canyon ctds	57	27.600 N	151	34.500 W	0.0	10	0.0	120	110	22	700	27-Sep 18:25	28-Sep 06:27
ARRIVE Kodiak Is	57	40.000 N	152	25.000 W	29.8	11	2.7	140	130	23		28-Sep 09:09	28-Sep 09:32

2.5 Station operations:
CTD operations will proceed 24 hours per day in the study area. The CTD will be deployed with 10-liter bottles on its rosette, a flash fluorometer, and an altimeter.

2.5.1: A standard station will consist of the following:
CTD profile to ~10 m above the sea floor with a SeaTech fluorometer on the package to measure ***in vivo*** fluorescence and an altimeter to ascertain the location of the equipment relative to the bottom. Discrete 10-L samples will be obtained at selected depths with Niskin bottles on the rosette. Nutrient analysis will require 50 ml and the remaining water sample will be available for chloroplyll and salinity samples. Chlorophyll samples will be filtered and frozen for storage. After filtering, the filters need to be stored in a freezer (-20 F or colder, at least 10 cu. ft.).

Each standard station should take no more than 1.0 hr to conduct. CTD casts will be collected to within 10 m of the bottom depth over the continental shelf, or to a depth of 1500m at FATE. Discrete samples will be frozen for nutrient analysis at PMEL. Chlorophyll samples will be filtered and frozen for later analysis.

We request that the ship provide ~30 AutoSal salinity determinations to calibrate the salinity data.

2.9 DE-STAGING PLAN:

Most gear and hazardous chemicals will be off-loaded from the ship after it returns to PMC in October.

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,
- Wire-angle indicator and readout for oceanographic winch,
- Sea-Bird 911 Plus CTD system to be used with PMEL stand (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,
- 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),
- RDI ADCP written to Iomega Zip drive,
- Use of Pentium PC in DataPlot for data analysis,
- SCS (Scientific Computer System),

- Stern platform in place,
- Laboratory space with exhaust hood, sink, lab tables and storage space,
- Seawater hoses and nozzles to wash equipment (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.

3.2 Equipment to be Provided by the Project

- Sea Bird 911 plus CTD system with stand,
- 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 primary CTD,
- CTD rosette sampler,
- IAPSO water,
- Drifting Buoys,
- Surface moorings (FOCI bio-physical platforms),
- Subsurface moorings,
- Miscellaneous scientific sampling and processing equipment,
- Scientific ultra-cold freezer (already aboard)

3.3 Scientific 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 PROJECTS

There are no piggy-back projects planned for this cruise.

6.0 HAZARDOUS MATERIALS

6.1 Policy/Compliance: MILLER FREEMAN will operate in full compliance with all NOAA hazardous materials (HAZMAT) requirements. All hazardous materials and substances needed to carry out the objectives of the embarked science mission, including ancillary tasks, are the direct responsibility of the embarked designated Chief Scientist, whether or not that Chief Scientist is using them directly. The ship's Environmental Compliance Officer will work with the Chief Scientist to ensure that this management policy is properly executed.

6.1.1: All hazardous materials require a Material Safety Data Sheet (MSDS). Copies of all MSDSs shall be forwarded to the ship at least two weeks prior to sailing. The Chief Scientist shall have copies of each MSDS available when the hazardous materials are loaded aboard. HAZMAT for which the MSDS is not provided will not be loaded aboard.

6.1.2: The Chief Scientist will provide the Commanding Officer with an inventory indicating the amount of each hazardous material brought onboard, and for which the Chief Scientist is responsible. This inventory shall be updated at departure, accounting for the amount of material being removed, as well as the amount consumed in science operations and the amount being removed in the form of waste.

6.1.3: The scientific party, under supervision of the Chief Scientist, shall be prepared to respond fully to emergencies involving spills of any mission HAZMAT. This includes providing properly trained personnel

for response, as well as the necessary neutralizing chemicals and clean-up materials. Ship's personnel are not first responders and will act only in a support role in the event of a spill. The Chief Scientist shall provide a list of science party members that are properly trained to respond in the event of a HAZMAT spill.

6.1.4: The Chief Scientist is directly responsible for the handling, both administrative and physical, of all scientific party hazardous wastes. No liquid wastes shall be introduced into the ship's drainage system. No solid waste material shall be placed in the ship's garbage.

6.1.5: The embarking Chief Scientist will work with the departing Chief Scientist and the ship's Environmental Compliance Officer to ensure proper tracking of inherited hazardous materials.

6.2 INVENTORY:

Chemical Inventory

Chloroform (20ml)
Copper Sulfate (2 x 20g)
Hydrochloric Acid (2 x 500ml, 1 liter total)
N-1-Naphthylethylenediamine Dihydrochloride (7 x 1g, 7 g total)
Potassium Nitrate (7 x 0.5gm)
Sulfanilamide (7 x 10g, 70g)

6.3 MATERIAL SAFETY DATA SHEETS (MSDS): Hardcopies have been sent to the ship

7.0 RADIOACTIVE ISOTOPES

There will be no radioactive isotope work on this cruise

8.0 COMMUNICATIONS

8.1 Important phone numbers, fax numbers and e-mail addresses:

PMEL

OERD2 (FOCI):
206-526-4700 (voice)
206-526-6485 (fax)

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

E-Mail: stabeno@pmel.noaa.gov

MILLER FREEMAN (telephone methods listed in order of increasing expense)

Home port (Seattle, WA):
206-553-4589, 4581, 8344

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

Kodiak roamer	907-528-7626
Dutch Harbor roamer	907-391-7626
Ship's cellular number	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

011-872-330-394-113 (voice)
011-872-330-394-114 (fax)
E-Mail: NOAA.Ship.Miller.Freeman@noaa.gov (mention person in SUBJECT field)

Marine Operations Center, Pacific
Voice 206-553-4548
E-Mail: FirstName.LastName@noaa.gov
E-Mail to radio room: Radio.Room@noaa.gov

9.0. APPENDICES

9.1 Map of Mooring Locations

9.2 Mooring diagrams –To be delivered by August 31, 2001.

Appendix 9.1- Map of Mooring Locations