FINAL CRUISE INSTRUCTIONS
ECO-FOCI

NOAA Ship *MILLER FREEMAN*, Cruise MF-06-06
May 8 – May 19, 2006
Chief Scientist – Janet Duffy-Anderson, NOAA/AFSC

1.0 FINAL CRUISE INSTRUCTIONS

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

1.2 Cruise Numbers

1.2.1 Cruise Number – MF-06-06

1.2.2 Eco-FOCI Number – 3MF06

1.3 Cruise Dates

1.3.1 Departure – Depart Dutch Harbor, Alaska, at 1500 hours on Monday, May 8, 2006.

1.3.2 Arrival – Arrive Dutch Harbor, Alaska, at 0800 hours on Friday, May 19, 2006.

1.4 Operating Area – Southeast Bering Sea.

2.0 CRUISE OVERVIEW

2.1 Cruise Objectives – We will conduct an ichthyoplankton survey in the Bering Sea in the vicinity of Unimak Island, Alaska. This work is needed to describe larval fish and zooplankton assemblages in the Bering Sea – basin, slope, outer shelf, middle shelf – in spring. In particular, this area is a known spawning ground for walleye pollock, northern rocksole, Greenland halibut, and Alaska plaice, and abundances of larvae at this time of year are high. Data on physical characteristics of the water column will also be collected. Satellite tracked drifters may be released in the Unimak Island and/or Bering canyon vicinities to study depth-discrete current trajectories.

2.2 Applicability – These instructions, with ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN***, dated March 23, 2006 present complete information for this cruise.

2.3 Participating Organizations

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

2.4 Personnel

2.4.1 Chief Scientist

Name	Gender	Affiliation	E-mail Address
Janet T. Duffy-Anderson (206) 526-6465	Female	AFSC	Janet.Duffy-Anderson@noaa.gov

2.4.2 Participating Scientists

Name	Gender	Affiliation	E-mail Address
Jennifer Lanksbury	Female	AFSC	Jennifer.Lanksbury@noaa.gov
Michael Canino	Male	AFSC	Mike.Canino@noaa.gov
Miriam Doyle	Female	AFSC	Miriam.Doyle@noaa.gov
Susan J. Picquelle	Female	AFSC	Susan.Picquelle@noaa.gov
Deborah M. Blood	Female	AFSC	Debbie.Blood@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 Mark P. Ablondi, NOAA
Chief, Operations Division, Pacific (MOP1)
Telephone: (206) 553-8705
Cellular: (206) 390-7527
E-mail: Mark.Ablondi@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 Napp, AFSC
Telephone: (206) 526-4148
E-mail: Jeff.Napp@noaa.gov

3.0 OPERATIONS

3.1 Data To Be Collected – A goal of the Eco-FOCI program is to identify the physical and biological factors that underlie ecosystem change and to understand how those factors interact. One focus is the effects of perturbations at lower trophic levels. We will collect ichthyoplankton using 60-cm Bongo nets (60BON) and zooplankton using 20-cm Bongo nets (20BON), and a Neuston net. We will also employ a Multiple Opening/Closing Net and Environmental Sensing System (MOCNESS) at selected locations over the slope and shelf. CTD casts will be made at selected stations to collect physical data as well as data on nutrients, microzooplankton, and chlorophyll concentrations.

We may spend one to two days continuing to test the ship's Continuous Underway Fish Egg Sampler (CUFES). Testing may include comparison of sampling with the CUFES and ground-truthing CUFES egg density data with MOCNESS tows in the same locale. We will collect data on the physical environment using the Sea-Bird Electronics SBE 19 SEACAT Profiler to relate larval assemblage structure to environmental variables – temperature and salinity.

We also anticipate running the SIMRAD EK 500 Scientific Echosounder Monitoring system to collect ancillary data on adult fish aggregations during the entire cruise.

3.2 Data To Be Collected

3.2.1 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.

3.3 Staging Plan – The majority of the equipment necessary for the cruise was loaded onto **NOAA Ship *MILLER FREEMAN*** before the ship's departure from Seattle, Washington. We request that we be allowed to set up equipment, including the MOCNESS hardware and MOCNESS termination (if the new termination for the U-Tow is not suitable), on Sunday, May 7, 2006. We anticipate sending two scientists (Lanksbury and Duffy-Anderson) the evening of Saturday, May 6, 2006, for this purpose, and we request that these persons be allowed to stay on board the ship on the evenings of May 6 and May 7, 2006, if space is available. We request that some support personnel from the ship – a survey technician and someone from the deck department – be available the morning of Sunday May 7, 2006, to assist the scientists in the setup of the MOCNESS. It would be of considerable help if, prior to our arrival, the ship's ET could check out: 1) the continuity of the cable for the MOCNESS (Is the cable good? Could the ET cut off the end of the cable as part of checking the continuity?), and 2) determine whether the signal can be received in DataPlot. We will also need to have the cable run down to the rough lab so we can work on it on Sunday May 7. We will use the chemistry lab, the rough lab, and the slime lab for sample and equipment preparation and request as much counter and cabinet space as possible. We will also be using DataPlot for CTD, MOCNESS, CUFES, and SEACAT operations.

3.4 De-staging Plan – Samples and gear will remain on board the ship until the completion of MF-06-07 and offloaded then. Additional sampling equipment will remain on board, in the hold, for use during Cruise MF-06-12.

3.5 **Cruise Plan** – The cruise will depart from Dutch Harbor, Alaska, at 1500 hours on Monday, May 8, 2006, and occupy a series of approximately 100 stations from the Bering Sea FOCI grid. Stations will also include Unimak Pass. See Section 9.2 MF-06-06 Chartlet and Section 9.3 MF-06-06 Station Locations for details.

At every station, a Sameoto Neuston net will be deployed first to collect fish larvae in the surface layer. Samples from the Neuston net gear will be preserved in 1.8% buffered formaldehyde.

Following completion of the Neuston tow, a Marine Assessment Monitoring and Prediction (MARMAP) Bongo tow (SOI 3.2.2) will be conducted. The SBE 19 SEACAT, the 20-cm Bongo net with 0.150-mm mesh netting and the 60-cm Bongo net with 0.505-mm mesh on Nets 1 and 2 will be mounted together for this tow. Bongo tows will be to a depth of 300 meters, or to 10 meters off bottom, whichever is shallower. The sample from 60BON Net 1 will be preserved in its entirety in 1.8% buffered formaldehyde. The sample from 60BON Net 2 will be sorted for Greenland halibut (GH) larvae and northern rock sole (NRS) larvae. GH larvae and NRS larvae will be preserved in EtOH, and the remainder of the sample will be discarded. The sample from 20BON Net 1 will be preserved in its entirety in 1.8% buffered formaldehyde; the sample from Net 2 will be discarded.

A series of MOCNESS tows – 0.505-mm mesh – will be performed at selected stations over the basin, slope, and outer shelf to determine vertical distribution of GH larvae. Stations to be determined at sea at the discretion of the Chief Scientist and the Commanding Officer. CTDs will be conducted prior to each MOCNESS tow to collect physical data, as well as cholorphyll and microzooplankton information.

The CUFES system may be tested over a period of one to three days. Specific days of testing will be determined at sea at the discretion of the Chief Scientist and Commanding Officer. In this system, water is continuously pumped at ca. 600-700 liters per minute from 4-m depth to the concentrator. Particles are concentrated by an oscillating net – 500 micron Nitex mesh – in approximately 3% of the flow. The filtrate is discharged overboard. The concentrate passes to the sample collector where particles are retained over sequential sampling intervals (e.g. 5-30 min) on a cod end of the same size mesh as used in the concentrator. Fish eggs will be counted at sea prior to preserving the sample. The sample will be preserved in formalin. Simultaneously, ancillary data are continuously collected for date, time, position, temperature, salinity, and chlorophyll *a* fluorescence.

Groundtruthing of CUFES system with the MOCNESS may occur. In this case, the CUFES system will sample eggs over a discrete time interval – 15 minutes or 30 minutes – and then a MOCNESS tow will follow in approximately the same locale to determine whether eggs are being effectively sampled by the CUFES. The time and place for these comparisons will be decided at sea at the discretion of the Chief Scientist and the Commanding Officer.

3.6 **Station Locations** – See Section 9.3 Cruise MF-06-06 Station Locations.

3.7 **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),
- Chlorophyll Samples (SOI 3.2.10),
- MARMAP Bongo Tows (SOI 3.2.2),
- MOCNESS Tows (SOI 3.2.5),
- ARGOS Satellite Tracked Drifter Buoy Deployments (SOI 3.2.11), and
- SIMRAD EK 500 Scientific Echosounder Monitoring (SOI 3.2.12).

3.7.1 Neuston Net Tows

3.7.1.1 Description – Neuston nets are used for sampling the upper few centimeters of the water column. There are many frame styles that may be used; however, we use a Sameoto sampler made of stainless steel. The mouth opening is 30-cm x 50-cm, and is designed to fish half in and half out of the water.

3.7.1.2 Rates/Fishing – The vessel should be moving slowly ahead, about 1.5 to 2.0 knots so that the net is fishing half in and half out of the water. The exact speed is a learning process and may vary with sea conditions. Lower the Neuston net to the surface and pay out 10 to 15 meters of wire. It may be necessary to adjust the ship's speed to maintain the proper skimming action. Start the stopwatch when the net starts to fish and tow the net for approximately 9.5 minutes, unless otherwise instructed. After 9.5 minutes, the vessel should decrease speed so that the net can be hauled in. Advise winch operator when time is nearly up and retrieve when ready. Read and record flow meter revolutions, time of tow, and any comments.

3.7.1.3 Preservation – The Neuston sample should be preserved immediately, as specified in the ***FOCI Field Manual*** or sample collection request forms.

3.7.1.4 Maintenance – Check net for holes and fill flowmeter with water.

3.8 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.

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

3.8.1 Continuous Underway Fish Egg Sampler (CUFES)

3.8.1.1 Description – The CUFES is used to map the distribution of fish eggs in the surface waters. In the Southeast Bering Sea, most pollock eggs are believed to be in the upper 10 meters of the water column and the CUFES system may be an important tool to examine abundance, transport, and interannual variability. The intake of the CUFES system on the **NOAA Ship *MILLER***

FREEMAN is about four meters below the surface. Particles are concentrated into a 0.505-mm mesh cod end.

3.8.1.2 **Methods** – The Chief Scientist will work with the ship's command to establish a track line in the area of high abundance of fish eggs and larvae. We will attempt to take a new sample every 15 minutes – every 4.6 km or 2.5 nm. The ship speed should be at 10 knots (18.5 km/hr). The sampling frequency may need to be modified depending on the amount of plankton retained by the mesh. During the sampling, the Data Acquisition System (DAS) will acquire time and GPS position from the ship's GPS signal fed to the DAS.

3.8.1.3 **Preservation** – Each CUFES egg sample will be preserved immediately with 1.8% formaldehyde.

3.8.1.4 **Maintenance** – The sample cups should be checked after each use for holes. In addition the shaker apparatus should be checked frequently for clogging.

3.9 **Applicable Restrictions** – None.

3.10 **Small Boat Operations** – None.

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 and tape recorder for the two systems,
- 10-liter 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 and Rowe winches,
- For meteorological observations: 2 anemometers (one R. M. Young system interfaced to the SCS), calibrated air thermometer (wet-and dry-bulb) and a calibrated barometer and/or barograph,
- Freezer space for storage of biological and chemical samples (blast and storage freezers, indicate desired temperatures),
- SIMRAD EQ-50 echosounder,
- Bench space in DataPlot for PCs, monitor, printer and VCR to fly MOCNESS,
- Use of Pentium PC in DataPlot for data analysis,
- Scientific Computer System (SCS),

- Aft Rowe winch with single conductor cable and slip rings for MOCNESS,
- Electrical connection between Rowe winch and DataPlot,
- Removable stern platform (removed),
- 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,
- 60-cm Bongo sampling arrays,
- 20-cm Bongo arrays,
- Spare wire angle indicator,
- Neuston frame and nets,
- Bridle for neuston net,
- MOCNESS,
- ARGOS tracked drifter buoys with optical sensors,
- Miscellaneous scientific sampling and processing equipment,
- Scientific ultra-cold freezer,
- Cruise Operations Database (COD), and
- CUFES EDAS, computer, software, sample cups.

5.0 DISPOSITION OF DATA AND REPORTS

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

- **NOAA Form 77-13d, *Deck Log – Weather Observation Sheets***,
- Electronic Marine Operations Abstracts,
- SCS backup - recordable compact diskette (CD-RW),
- Calibration Sheets for all ship's instruments used,
- PMEL CTD Weather Observation Logs,
- CTD Cast Information/Rosette Log,
- Autosalinometer Logs, and
- Ultra-cold Freezer Temperature Daily Log (SOI 5.4).

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***.

Piggyback Projects – None

7.0 HAZARDOUS MATERIALS

7.1 **Inventory** – See Section 9.4 Cruise MF-06-06 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 25, 2005, supplied to the ship. A copy of all required MSDS will also be delivered with the chemicals when ship is loaded.

8.0 MISCELLANEOUS

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

http://www.moc.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) 790-7594

Iridium:

- (808) 659-5684

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

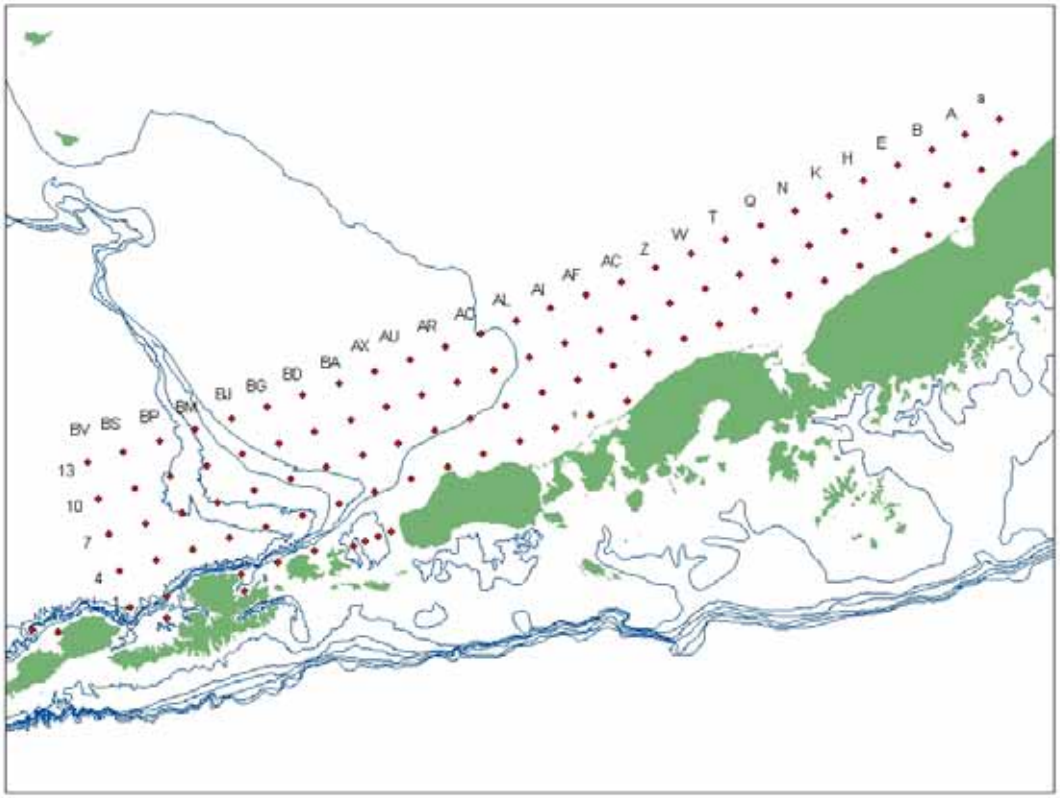
E-Mail to Radio Room: Radio.Room@noaa.gov

9.0 APPENDICES

9.1 Equipment Inventory

Equipment	Quantity	Dimension	Weight		Total Weight	
Larval Supply Trunks	1	20"x22"x36"	80	lbs	80	lbs
Microzooplankton Supply Trunks	2	20"x22"x36"	90	lbs	180	lbs
Formaldehyde Containers	3	20-L	40	lbs	120	lbs
Carboy, 95% Reagent Alcohol	1	20-L	40	lbs	40	lbs
Miscellaneous Gear Trunks	4	20"x22"x36"	80	lbs	320	lbs
60-cm Bongo Frame	1	8"x26"x60"	50	lbs	50	lbs
20-cm Bongo Frame	1	8"x14"x16"	35	lbs	35	lbs
MOCNESS Frame	1	45”x120”	250	lbs	250	lbs
Cases, Glass Jars, 32-oz	30	8"x12"x15"	50	lbs	1,500	lbs
Cases, Glass Jars, 8-oz	10	4"x6" 8"	8	lbs	80	lbs
			TOTAL:		**2,655**	**lbs**

9.2 MF-06-06 Chartlet



9.3 MF-06-06 Station Locations

Operation	LatDeg	LatMin	LongDeg	LongMin	DecLat	DecLong
Depart Dutch	53	54.50	-166	30.90	53.9083	-166.5150
NRS1	53	22.20	-168	43.80	53.3700	-168.7300
NRS2	53	23.40	-168	26.40	53.3900	-168.4400
BV1	53	39.18	-167	43.39	53.6530	-167.7231
BV4	53	52.37	-167	55.50	53.8728	-167.9250
BV7	54	5.56	-168	7.67	54.0926	-168.1279
BV10	54	18.75	-168	19.92	54.3124	-168.3320
BV13	54	31.93	-168	32.23	54.5322	-168.5371
BS13	54	39.09	-168	9.78	54.6516	-168.1630
BS10	54	25.91	-167	57.43	54.4318	-167.9572
BS7	54	12.72	-167	45.16	54.2120	-167.7526
BS4	53	59.53	-167	32.94	53.9921	-167.5490
BS1	53	46.34	-167	20.80	53.7723	-167.3466
NRS3	53	37.80	-167	18.60	53.6300	-167.3100
BP4	54	6.69	-167	10.32	54.1115	-167.1720
BP7	54	19.88	-167	22.57	54.3313	-167.3762
BP10	54	33.07	-167	34.88	54.5511	-167.5814
BP13	54	46.26	-167	47.26	54.7709	-167.7877
BM13	54	53.42	-167	24.68	54.8903	-167.4114
BM10	54	40.23	-167	12.27	54.6705	-167.2045
BM7	54	27.04	-166	59.92	54.4507	-166.9986
BM4	54	13.85	-166	47.63	54.2308	-166.7939
BM1	54	0.66	-166	35.42	54.0110	-166.5903
BJ1	54	7.82	-166	12.62	54.1304	-166.2104
BJ4	54	21.01	-166	24.88	54.3502	-166.4147
BJ7	54	34.20	-166	37.20	54.5700	-166.6200
BJ10	54	47.39	-166	49.58	54.7898	-166.8264
BJ13	55	0.58	-167	2.04	55.0096	-167.0340
BG13	55	7.74	-166	39.33	55.1290	-166.6555
BG10	54	54.55	-166	26.84	54.9092	-166.4473
BG7	54	41.36	-166	14.41	54.6894	-166.2402
BG4	54	28.17	-166	2.06	54.4695	-166.0343
BG1	54	14.98	-165	49.77	54.2497	-165.8295
Unimak Pass A	54	19.78	-165	24.43	54.3297	-165.4072
Unimak Pass C	54	22.29	-165	17.06	54.3715	-165.2843
Unimak Pass E	54	24.90	-165	9.01	54.4150	-165.1502
Unimak Pass G	54	27.64	-165	0.83	54.4607	-165.0138
BD4	54	35.33	-165	39.17	54.5889	-165.6529
BD7	54	48.52	-165	51.56	54.8087	-165.8594
BD10	55	1.71	-166	4.02	55.0285	-166.0670
BD13	55	14.90	-166	16.55	55.2483	-166.2758
BA13	55	22.06	-165	53.71	55.3677	-165.8951
BA10	55	8.87	-165	41.14	55.1479	-165.6857
BA7	54	55.68	-165	28.64	54.9281	-165.4774
BA4	54	42.49	-165	16.22	54.7082	-165.2703

Operation	LatDeg	LatMin	LongDeg	LongMin	DecLat	DecLong
AX4	54	49.65	-164	53.19	54.8276	-164.8865
AX7	55	2.84	-165	5.66	55.0474	-165.0943
AX10	55	16.03	-165	18.19	55.2672	-165.3032
AX13	55	29.22	-165	30.80	55.4870	-165.5133
AU13	55	36.38	-165	7.81	55.6064	-165.1302
AU10	55	23.19	-164	55.18	55.3866	-164.9196
AU7	55	10.01	-164	42.60	55.1668	-164.7100
AU4	54	56.82	-164	30.10	54.9469	-164.5016
AR4	55	3.98	-164	6.94	55.0663	-164.1156
AR7	55	17.17	-164	19.48	55.2861	-164.3246
AR10	55	30.36	-164	32.09	55.5059	-164.5348
AR13	55	43.54	-164	44.77	55.7257	-164.7461
AO13	55	50.71	-164	21.65	55.8451	-164.3608
AO10	55	37.52	-164	8.93	55.6253	-164.1488
AO7	55	24.33	-163	56.28	55.4055	-163.9380
AO4	55	11.14	-163	43.70	55.1856	-163.7284
AL4	55	18.30	-163	20.40	55.3050	-163.3400
AL7	55	31.49	-163	33.02	55.5248	-163.5503
AL10	55	44.68	-163	45.70	55.7446	-163.7617
AL13	55	57.87	-163	58.46	55.9644	-163.9743
AI13	56	5.03	-163	35.20	56.0838	-163.5867
AI10	55	51.84	-163	22.40	55.8640	-163.3734
AI7	55	38.65	-163	9.68	55.6442	-163.1613
AI4	55	25.46	-162	57.02	55.4243	-162.9504
AF4	55	32.62	-162	33.58	55.5437	-162.5597
AF7	55	45.81	-162	46.27	55.7635	-162.7712
AF10	55	59.00	-162	59.03	55.9833	-162.9839
AF13	56	12.19	-163	11.87	56.2031	-163.1979
AC13	56	19.35	-162	48.47	56.3225	-162.8079
AC10	56	6.16	-162	35.60	56.1030	-162.5930
AC7	55	52.97	-162	22.79	55.8829	-162.3799
Z7	56	0.13	-161	59.24	56.0020	-161.9870
Z10	56	13.32	-162	12.08	56.2220	-162.2010
Z13	56	26.51	-162	25.00	56.4420	-162.4170
W13	56	33.67	-162	1.46	56.5610	-162.0240
W10	56	20.48	-161	48.50	56.3410	-161.8080
W7	56	7.29	-161	35.62	56.1220	-161.5940
T7	56	14.45	-161	11.92	56.2410	-161.1990
T10	56	27.64	-161	24.85	56.4610	-161.4140
T13	56	40.83	-161	37.84	56.6810	-161.6310
Q13	56	47.99	-161	14.15	56.8000	-161.2360
Q10	56	34.80	-161	1.12	56.5800	-161.0190
Q7	56	21.62	-160	48.15	56.3600	-160.8030
N7	56	28.78	-160	24.31	56.4800	-160.4050
N10	56	41.97	-160	37.31	56.6990	-160.6220
N13	56	55.15	-160	50.39	56.9190	-160.8400

Operation	LatDeg	LatMin	LongDeg	LongMin	DecLat	DecLong
K13	57	2.32	-160	26.56	57.0390	-160.4430
K10	56	49.13	-160	13.43	56.8190	-160.2240
K7	56	35.94	-160	0.38	56.5990	-160.0060
H7	56	43.10	-159	36.48	56.7180	-159.6080
H10	56	56.29	-159	49.55	56.9380	-159.8260
H13	57	9.49	-160	2.73	57.1580	-160.0460
E13	57	16.65	-159	38.90	57.2780	-159.6480
E10	57	3.45	-159	25.67	57.0580	-159.4280
E7	56	50.26	-159	12.60	56.8380	-159.2100
B7	56	57.42	-159	-11.28	56.9570	-158.8120
B10	57	10.61	-159	1.79	57.1770	-159.0300
B13	57	23.81	-159	15.07	57.3970	-159.2510
A13	57	30.97	-158	51.24	57.5160	-158.8540
A10	57	17.77	-158	37.91	57.2960	-158.6320
a10	57	24.93	-158	14.03	57.4160	-158.2340
a13	57	38.13	-158	27.41	57.6360	-158.4570

9.4 MF-06-06 HAZMAT Inventory

Chemical	CAS Number	Respondee	Org	Qty	H	F	R	Storage Color Code	Hazard Class	Packing Group Number	UN	Reportable Quantity	Response Indices
Ethanol	64-17-5	Duffy-Anderson	AFSC	20-L	3	4	2	Flammable	3	II	1170	5,000 LBS	1
Formaldehyde	50-00-0	Duffy-Anderson	AFSC	60-L	3	2	2	Flammable	3 & 8	III	1198	100 LBS	1
Sodium Borate	1330-43-4	Duffy-Anderson	AFSC		1	0	0	General	Not regulated				2

Spill Response 1: 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 saw dust. **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 2: 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.