FINAL CRUISE INSTRUCTIONS
ECO-FOCI

NOAA Ship *MILLER FREEMAN*, Cruise MF-06-10 Leg II
25 September - 10 October, 2006
Chief Scientist – Wm. Floering, NOAA/PMEL/AFSC

1.0 DRAFT CRUISE INSTRUCTIONS

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

1.2 **Cruise Numbers:**

1.2.1 **Cruise Number** – MF-06-10 Leg II

1.2.2 **Eco-FOCI Number** - N/A

1.3 **Cruise Dates:** 25 September - 10 October, 2006

1.3.1 **Departure** - Dutch Harbor, AK. 25 Sept., 2006 3:00 pm Local Time

1.3.2 **Touch-and-go** – St. Paul Island, AK. 4 October, 2006 8:00 am Local Time

1.3.3 **Arrival** - Dutch Harbor, AK. 10 October, 2006 8:00 am Local Time

1.4 **Operating Area** - Bering Sea, Unimak Pass to St. Lawrence Island

2.0 CRUISE OVERVIEW

2.1 **Cruise Objectives** - To recover and deploy surface and subsurface oceanographic instrumentation moorings at several locations in the Bering Sea. To complete CTD casts and plankton tows at sampling stations in and around the mooring locations and along the 70 meter isobath. To collect data on the physical, chemical and biological parameters at each sampling station.

2.2 **Applicability** - These instructions, with ***FOCI Standard Operating Instructions for NOAA Ship MILLER FREEMAN***, dated March 1, 2005, 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

2.4 Personnel

2.4.1 Chief Scientist

Name	Gender	Affiliation	E-mail Address
Wm. Floering	M	PMEL	william.floering@noaa.gov

2.4.2 Other Participating Scientists

Name	Gender	Affiliation	E-mail Address
Carol Dewitt	F	PMEL	carol.dewitt@noaa.gov
Peter Proctor	M	PMEL	peter.proctor@noaa.gov
Sarah Thornton	F	UAF	sarahjt@ims.uaf.edu
Dave Kachel	M	PMEL	Dave.kachel@noaa.gov
Hendrick Miller	M	PMEL	Hendrick.v.miller@noaa.gov
Tony Jenkins	M	PMEL	Antonio.jenkins@noaa.gov
Annette Dougherty	F	AFSC	Annette.dougherty@noaa.gov
Matt Brooks	M	FWS	

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 Pickett, NOAA
Chief, Operations Division, Pacific (MOP1)
Telephone: (206) 553-1857
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E-mail: Mark.Pickett@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 - We will record the full suite of SCS sensors to include but not limited to, fluorometer, thermosalinograph, wind, air temperature, barometer, gps, corrected depth, bongo/seacat and CTD data.

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 - All mooring and associated sampling equipment for this cruise will be shipped via container to Dutch Harbor in care of FTS (Factory Trawler Systems). FTS will unload the container, store the equipment until the ship arrives and transport the equipment to the Miller Freeman on a flatbed truck.

3.3 De-staging Plan - This is the last cruise of the season, leaving only the steam to Seattle upon completion of MF-06-13. It is our intention to secure all samples and equipment aboard the Miller Freeman to be transported to and offloaded upon arrival in Seattle.

3.4 Cruise Plan - All mooring and sampling equipment will be loaded and secured on deck before departing Dutch Harbor on Sept. 24, 2006. Upon departure the Miller Freeman will steam for PMEL mooring site BS-2.

3.4.1 Bering Sea Site 2: At site BS-2 there are 3 moorings to recover including the "Peggy" surface mooring. Following the recoveries we will deploy 2 subsurface moorings at this site. Following the mooring deployments sampling at 4 corner stations and the center station will consist of a CTD cast (nutrients and chlorophylls), a 60/20 cm bongo tow and triplicate CalVet tows. Depending on the number of samples required a second CTD cast may be necessary. The ship will transit from mooring site BS-2 to mooring site BS-4 along the 70 meter isobath. A CTD/Bongo sampling station will be completed.

3.4.2 Bering Sea Site 4: There are two subsurface moorings to recover and two subsurface moorings to deploy at site BS-4. Due to approaching ice the BS-4 moorings were deployed approximately 3 miles south of there historical location. We will deploy the new BS-4 moorings back on the original historical location. Following the

mooring operations we will sample the 4 corner stations and the center station. A CTD cast, a 60/20 Bongo tow and triplicate CalVet tows will complete the sampling at each of the 5 stations. The ship will transit from mooring site BS-4 to mooring site BS-5. Again, we will follow the 70 meter isobath stopping to conduct a 60/20 Bongo tow and a CTD approximately every 9 miles.

3.4.3 **Bering Sea Site 5**: There are two subsurface moorings to recover and two subsurface moorings to deploy at this station. Chemical, physical and biological sampling will take place at the 4 corner stations around the mooring site and at the center station. A CTD cast, a 60/20 cm bongo tow and triplicate CalVet tows will complete the sampling at the five stations near mooring site BS-5. The ship will follow the 70 meter isobath as we transit from mooring site BS-5 to mooring site BS-8. En route we will complete a CTD cast and a 60/20 cm bongo tow at stations approximately 9 miles apart.

3.4.4 **Bering Sea Site 8**: Two subsurface moorings will be recovered and two will be deployed at site BS-8. As with the previous sites a CTD, a 60/20 cm bongo and triplicate CalVet tows will take place at each of the 4 corner stations around BS-8 and at the center station. The scheduling of operations following the work at BS-8 will be dictated by the time remaining in the cruise.

3.4.5 U-Tow trawls traveling south along the 70 meter isobath and the CTD "L" near Unimak Pass are two potential activities if time allows.

3.5 **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)
- CalVET Net Tows (SOI 3.2.6)
- Chlorophyll Sampling Operations (SOI 3.2.10)
- ARGOS Satellite Tracked Drifter Buoy Deployments (SOI 3.2.11)
- SIMRAD EK 500 Scientific Echosounder Monitoring (SOI 3.2.12)
- U-Tow transects along the 70 meter isobath

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.

- Scientific Computer System (SCS) data acquisition (SOI 5.2),
- Fluorometer monitoring (SOI 5.3),
- Thermosalinograph monitoring (SOI 5.3).

3.8 **Applicable Restrictions** - None Anticipated

3.9 **Small Boat Operations** - Small boat operations to assist in recovery of the surface mooring and the remote possibility of assisting with subsurface mooring recoveries.

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, Rowe, and Marco winches,
- For meteorological observations: 2 anemometers (one R. M. Young system interfaced to the SCS), calibrated air thermometer (wet-and dry-bulb) and a calibrated barometer and/or barograph,
- Freezer space for storage of biological and chemical samples (blast and storage freezers, indicate desired temperatures),
- SIMRAD EQ-50 echosounder,
- JRC JFV-200R color sounder recorder,
- RD Instruments' ADCP,
- 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 multi conductor cable and slip rings for U-Tow,
- Electrical connection between Rowe winch and DataPlot,
- Removable stern platform installed,
- 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,
- Ship's crane(s) used for loading and/or deploying,
- Internet access on ship's computers.

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,
- Argos tracked drifter buoy,
- Holy sock drogue for radar tracked drifter buoy,
- Surface mooring recovery only,
- Subsurface moorings deploy and recover,
- Miscellaneous scientific sampling and processing equipment,
- Scientific ultra-cold freezer,
- Cruise Operations Database (COD).

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,
- Calibration Sheets for all ship's instruments used,
- CTD Cast Information/Rosette Log,
- Autosalinometer Logs,
- Bongo/Seacat logs,
- 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***.

6.3 **Piggyback Projects** - None

7.0 HAZARDOUS MATERIALS

7.1 Inventory

Refer to Appendix 9.2.

7.2 Material Safety Data Sheet (MSDS)

Submitted separately.

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 A partial inventory of equipment follows below. A full inventory will be provided when it is available.

Equipment	Quantity	Weight (lbs)	Total wt. (lbs)
Railroad wheel anchors	6	1600	9600
Railroad wheel anchors	1	2000	2000
Railroad wheel anchors	1	2400	2400
Railroad wheel anchors	1	2500	2500

Mooring chain spool	4	450	1800
		Total	**18300**

It is estimated that this partial inventory will make up at least two-thirds of the total equipment by weight.

9.2 HAZMAT Inventory

- 25 - SBE-39 (9-V lithium battery)
- 9 - MTR (9-V alkaline battery)
- 8 - Microcats (a pack of 6 lithium battery sticks and anti-fouling on conductivity cells)
- 4 - Seacat (9 D lithium battery pack (42 AH, 10.8 V) and antifouling cylinders on conductivity cells)
- 4 - ECO-fluorometer (a pack of 6 9-V lithium batteries)
- 1 - hazmat can with 6 lithium battery sticks (not in a pack), 6 9-V lithium batteries, 3 9-V alkaline batteries)

All battery packs and batteries are installed in the instruments. See also Table 1 included below.

9.3 Figures

9.4 Tables

User: Peter Proctor **Cruise: MF06-10** **Cruise Dates: September 25 to October 10**

Spill Response

			Container Information					Spill Response Materials		Shipboard Use			Degree of Hazard				
Common Name of Material	Chemical Composition	UN Identification Number	Type	Size	Qty	MSDS	Storage Hazard	Type	Qty Loaded	Stored Location	Used	Amount Offloaded	Health	Flammability	Reactivity	Special	
Manganous Chloride	100%		g	600	2												
Sodium Iodide	100%		g	600	2												
Sodium Hydroxide	100%		g	320	2												
Starch	100%		g	10	2												
Sodium Thiosulfate	100%		g	35	2												
Potassium Iodate	100%		g	0.4	4												
Sodium Azide	100%		g	33	2												
Phenol			ml	500	1												
Sodium Citrate			g	140	10												
Sodium Nitroprusside			g	0.5	5												
Ammonium Chloride			g	0.05	5												
Ammonium Chloride			5	14	4												

Ammonium Molybdate	100% ammonium molybdate tetrahydrate	Not regulated	g	10.8	8	x	None Specified	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				2	0	1	2	Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.
Ammonium Molybdate	100% ammonium molybdate tetrahydrate	Not regulated	g	7.1	5	x	None Specified	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				2	0	1	2	Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.
Brij	98-100% Ethoxylated Dodecyl Alcohol	Not regulated	ml	100	2	x	None Specified	Paper Towels	6 rolls				1	0	0	0	Absorb material with dri-zorb, kitty litter, or paper towels
Cadmium	100% Cd	UN2930	g	26	2	x	Flammable	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				3	3	1	1	Use non-sparking equipment and collect in ziplock
Copper Sulfate	100% Cupric Sulfate	UN3077	g	20	2	x	None Specified	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				2	0	0	2	Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.
Dowfax	47% Benzene, 1,1-oxybis, tetrapropylene derivatives, sulfonated, sodium salts; 1% sodium sulfate; 3% sodium chloride; water balance	Not regulated	ml	100	2	x	None Specified	Paper Towels	6 rolls				2	0	1	1	Absorb material with dri-zorb, kitty litter, or paper towels

Hydrazine Sulfate	99-100% Hydrazine, Sulfate	UN3260	g	10	5	x	Health	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				3	1	2	3	Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.
Imidazole	90-100% Imidazole	UN3263	g	13.6	5	x	Corrosive	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				3	1	0	3	Remove all sources of ignition. Use non-sparking equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.
Imidazole	90-100% Imidazole	UN3263	g	27.2	4	x	Corrosive	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				3	1	0	3	Remove all sources of ignition. Use non-sparking equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.
N-1-Naphthylethylenediamine Dihydrochloride	90-100% N-1-Naphthylethylenediamine Dihydrochloride	Not regulated	g	1	5	x	None Specified	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				2	1	1	2	Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.
Potassium Nitrate	99-100% Potassium Nitrate	UN 1486	g	3.8	3	x	Reactive	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				2	0	3	2	Use non-sparking equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.

Potassium Phosphate	99-100% Potassium Phosphate Monobasic	Not regulated	g	0.32	3	x	None Specified	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				1	0	0	1	Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.
Sodium Fluorosilicate	100% Sodium Fluorosilicate	UN2674	g	0.5	3	x	Keep away from food	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				3	1	1	1	Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.
Sodium Nitrite	99-100% Sodium Nitrite	UN1498	g	0.05	5	x	Reactive	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				1	0	3	1	Use non-sparking equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container.
Stannous Chloride	98-100% Stannous Chloride	Not regulated	g	25	5	x	None Specified	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				2	0	2	2	Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.
Sulfanilamide	90-100% Sulfanilamide	Not regulated	g	10	5	x	None Specified	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				0	1	1	1	Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.
Tartaric Acid	100% Tartaric Acid	Not regulated	g	150	5	x	None Specified	Dustpan, plastic bag	1 dustpan, 150 ziplok bags				0	1	0	1	Pick up and place in a suitable container for reclamation or disposal, using a method that does not generate dust.

Sodium Hydroxide 10N	410g Sodium Hydroxide 1 liter of water	UN1824	ml	1000	1	x	Store Separately	kitty litter, 10% HCl, dustpan, plastic bag, plastic tote	20 lbs kitty litter, 10 liters 10% HCl, 1 dustpan, 50 garbage bags				3	0	2	4	Contain and recover liquid when possible. Residues from spills can be diluted with water, neutralized with dilute acid such as acetic, hydrochloric or sulfuric. Absorb neutralized caustic residue on clay, vermiculite or other inert substance and package in a suitable container for disposal.
Hydrochloric Acid (Conc)	35% Hydrogen Chloride, 65% water	UN1789	ml	500	6	x	Corrosive	Soda ash, kitty litter, plastic bags, dustpan, plastic totes	20 lbs kitty litter, 10 liters 10% HCl, 1 dustpan, 50 garbage bags				3	0	2	4	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 saw dust. Do not flush to sewer

Nitric Acid 20%	20% Nitric Acid, 80% water	UN2031	ml	1000	0	x	Corrosive	Soda ash, kitty litter, plastic bags, dustpan, plastic totes	20 lbs kitty litter, 10 liters 10% HCl, 1 dustpan, 50 garbage bags				3	0	3	4	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 saw dust. Do not flush to sewer
Sulfuric Acid (wrong MSDS)	95-98% Sulfuric Acid	UN2796	ml	500	3	x	Corrosive	Soda ash, kitty litter, plastic bags, dustpan, plastic totes	20 lbs kitty litter, 10 liters 10% HCl, 1 dustpan, 50 garbage bags				2	0	1	3	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 saw dust. Do not flush to sewer

Methanol	100% Methanol	UN1230	ml	500	1	x	Flammable	kitty litter, dustpan, plastic bag, plastic tote	20 lbs kitty litter, 1 dustpan, 50 garbage bags				3	3	1	3	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, spill x-s solvent absorber), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer!
Isopropanol	100% Isopropanol	UN1219	ml	500	1	x	Flammable	kitty litter, dustpan, plastic bag, plastic tote	20 lbs kitty litter, 1 dustpan, 50 garbage bags				3	3	2	3	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, spill x-s solvent absorber), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do

																not flush to sewer!