**UNITED STATES DEPARTMENT OF COMMERCE**
National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
Marine Operations Center
439 W. York Street
Norfolk, VA 23510-1114

MEMORANDUM FOR: Commander David A. Score, NOAA
Commanding Officer, NOAA Ship *Gordon Gunter*

FROM: Captain Michael S. Devany, NOAA
Commanding Officer, NOAA Marine Operations Center – Atlantic

SUBJECT: Cruise Instruction for GU-10-DWH
Sub-Surface Oil Monitoring Survey

Attached are final cruise instructions for GU-10-DWH, which is scheduled aboard NOAA Ship *Gordon Gunter* during the period of May 27 – June 4, 2010. Acknowledge receipt of these instructions via e-mail to OpsMgr.MOA@noaa.gov at Marine Operations Center – Atlantic.

Attachment

cc:
MOA1

# Final Project Instruction

**Date Submitted:** 25 May 2010

**Platform:** NOAA Ship *Gordon Gunter*

**Cruise Number:** GU-10-DWH

**Project Title:** Sub-Surface Oil Monitoring Survey

**Cruise Dates:** 27 May – 4 June 2010

Prepared by: _____ Dated: _____
Russell Brown
Chief Scientist
Northeast Fisheries Science Center

Approved by: _____ Dated: _____
Dr. Bonnie Ponwith
Center Director
Southeast Fisheries Science Center

Approved by: _____ Dated: 26 May 10
Captain Michael S. Devany, NOAA
Commanding Officer
Marine Operations Center - Atlantic

# *Sub-Surface Oil Monitoring Cruise*

Commanding Officer
NOAA Ship *Gordon Gunter*

CRUISE PLAN
NOAA Ship *Gordon Gunter* Cruise GU-10-DWH

## I. Overview

A. Cruise Period: May 27, 2010 – June 4, 2010

B. Operating Area: Gulf of Mexico – Boundaries of the oil wellhead

C. Summary of Objectives:

1. ***Primary Objectives***
   a. Validate the use of acoustics using EK-60 to detect sub-surface oil plumes.
      i. Characterize the vertical and horizontal distribution of subsurface oil plume near the oil wellhead.
      ii. Identify oil particle size distribution and changes in oil characteristics as the plume is transported.
   b. Collect water samples in likely "target" areas to confirm the acoustic backscatter profile from the EK-60 are oil patches.
   c. Collect temperature, dissolved oxygen, fluoromity profiles in the vicinity of the plume
   d. Assess the occurrence, abundance and distribution of the early life stages of spawning fish in the boundary areas around the oil plume.
2. ***Secondary Objectives***
   a. Assess bluefin tuna larval abundance and distribution within the loop current, in relation to the oil plume.

D. Participating Institutions:

National Marine Fisheries Service
- Pascagoula Laboratory
- Miami Laboratory
- Stennis Laboratory
- Woods Hole Laboratory

Monterey Bay Aquarium Research Institute
University of New Hampshire
Woods Hole Oceanographic Institution
University of South Florida
United States Coast Guard

E. Personnel (Science Party)

| Name | Title | Sex | Organization | Citizenship |
|---|---|---|---|---|
| **LEG 1 (May 25 – June 8, 2010)** | | | | |
| Russell Brown | FPC | M | NOAA, NEFSC | USA |
| Tom Weber | EK60 Biologist | M | Univ New Hampshire | USA |
| Sam Greenaway | EK60 Biologist | M | NOAA, OMAO | USA |
| Charles Thompson | EK60 Biologist | M | NOAA, MS | USA |
| Hans Thomas | AUV Group Leader | M | MBARI | USA |
| Yanwu Zhang | AUV Research Specialist | M | MBARI | USA |
| Erich Rienecker | AUV Technician | M | MBARI | USA |
| Glenn Zapfe | Plankton Biologist | M | NOAA, SEFSC | USA |
| Aki Shiroza | Plankton Biologist | M | NOAA, SEFSC | USA |
| Dr. Andrew Remsen | SIPPER Project Leader | M | Univ. South Florida | USA |
| Robert Nelson | Water Chemistry Specialist | M | WHOI, Woods Hole | USA |
| Shailer Cummings | Water Chemistry Specialist | M | OAR/AOML | USA |
| Dan Hahn | | M | NOAA/NRDAUSA | |
| Tom Moore | | M | NOAA/NRDAUSA | |
| Charles Varela | USGS Strike Team | M | U.S. Coast Guard | USA |
| Stephan Fournet | | M | ENTRIX | USA |

F. Administrative:

1. Points of Contact:

   Field Party Chief: Russell Brown, NOAA Fisheries, NEFSC
   Russell.brown@noaa.gov
   Operations Officer: LT Kent Stein/ ENS Adrienne Hopper; NOAA Ship *Gordon Gunter*, 151 Watts Ave, Pascagoula, MS 39567; (228)327-7905; OPS.Gordon.Gunter@noaa.gov

2. Diplomatic Clearances: No diplomatic clearances are required.

3. Licenses and Permits:
   This cruise will be conducted under the following permits:
   Florida State Permit, Alabama State Permit, Mississippi State Permit, Louisiana State Permit, Texas State Permit, Southeast NMFS Regional Permit, Sea Turtle Permit, Marine Mammal Permit

## II. Operations

A. Cruise Plan/Itinerary:
Itinerary:

| Leg | Date | Location |
|---|---|---|
| 1 | May 27, 2010 | Depart Pascagoula, MS |
| | June 4, 2010 | Arrive Pascagoula, MS |

B. Staging and Destaging: PASCAGOULA/PASCAGOULA

C. Primary Operational Systems/Capabilities

Acoustics – Simrad EK60 operations:
- Backscatter
- 3-D and 4-D images
- Bathymetry

Expendable BathyThermograph (XBT)
- Temperature Profiles to 800 or 1200 meters (temperature dependent)

Rosette Water Sampling (Teflon Bottles for sampling oiled waters)
- Discrete depth water sampling

MOCNESS Multiple Opening/Closing Net System
- Discrete depth sampling of zooplankton and larval fish

Spanish Neuston Net
- Quantitative sampling of larval fish and zooplankton integrated across shallow depths

MBARI Gulper Autonomous Underwater Vehicle (AUV)
- Operations to 1500 meters with 12 hour endurance
- Up to 10 controlled water samples
- CTD and Fluorometer sensors
- Deepwater transmissionometer

Shadowed Image Particle Profiling and Evaluation Recorder (SIPPER) Towed Body
- High resolution information on the distribution of zooplankton, phytoplankton, larval fish and abiotic material (including oil droplets) to 350 m
- CTD and fluorometer
- Transmissionometer

C. Operations to be conducted:
Operational Plans:

NOAA Ship *Gordon Gunter* will depart Pascagoula, Mississippi on May 27, 2010 to conduct a survey to characterize the vertical and horizontal characteristics of the oil plume. The 8-day cruise will be conducted in one Leg. The operational objectives of this project are extremely dynamic and the proposed operating area includes area within the exclusion zone at the Deepwater Horizon spill site. It is critical that the Commanding Officer and Chief Scientist work together, remain flexible, and adjust the operational plan as necessary to safely meet mission objectives. The Commanding Officer is ultimately responsible for the safety of all personnel and has final authority on when and where the ship conducts operations.

Acoustics (EK60 Sampling)
NOAA Ship *Gordon Gunter* will collect acoustic backscatter profiles on the oil plume using the EK-60. It is anticipated that characteristic signatures of subsurface plumes can be identified at frequencies <30 kHz. Validation of the acoustic backscatter profiles will be conducted using water samples from Niskin bottles sampling at the depth of the backscatter profiles. A rosette using Teflon-coated Niskin bottles will be deployed to collect water samples, vertical temperature profiles, and other relevant environmental information. A CTD will not be used due to damage to sensors from immersion in oil.

Sampling with the EK-60 will be conducted using line transects beginning at 5 nm from the oil wellhead and conducted in a 360 degree arc around the well to allow tracking of oil in all directions from the source. **Given that the objective of this sampling is to detect and measure a gradient of oil flow trajectories, the closer proximity to the wellhead (if permissible) would increase the effectiveness and value of our sampling.** We plan to coordinate with Unified Command contacts in real time, noting that the exclusion zone expands or contracts depending on mitigation activities.

Transects will continue until the edges of the plume are identified and should be continued slightly past the edge of the plume to provide a picture of unperturbed vs. perturbed environments. If plumes of higher oil concentrations are observed, sampling will be conducted to attempt to follow these plumes beyond the search area, if necessary. At a minimum, five transects will be conducted and Niskin water bottle and/or CTD samples will be taken every 15 miles on each transect. University of New Hampshire Joint Hydrographic Center scientists will process EK-60 transect data in real-time onboard the Gunter and will produce three-dimensional maps of backscatter density distribution.

MBARI AUV Sampling
In situ water samples will be collected with the MBARI Upper Ocean Autonomous Underwater Vehicle ("Gulper") to assist in calibrating the EK-60. A Sonardyne Ultra Short Baseline (USBL) system will be used to track the AUV and an acoustic modem will be used to communicate with the vehicle. In areas where deeper acoustic patterns are detected, the MBARI AUV will be deployed to undulate above, through and below target depths, while collecting water samplings from above, within and below the target depths. The AUV will be configured to sample to 1500 m depths and has endurance for twelve hour missions.

Water samples will be collected in surface mixed layer (below surface to thermocline), for whole and dissolved polyaromatic hydrocarbons, volatiles, dispersant compounds and products of combustion. oil/sheen samples for fingerprinting and oil droplet size at transects across areas of known or suspected dispersed oil (from aerial application and subsurface injection) and areas of controlled burn. Samples will be taken to test for the presence of dispersed oil and droplet size. Water samples will be collected at four depths: just below the surface, mid mixed-layer (between thermocline/pycnocline and surface), just above the thermocline, and just below the thermocline, using a conventional hydrowire with 5 L Go Flow Bottles and a rosette sampling array with pre-programmed sampling depths.

Water samples will be tested for microbial analysis using a vacuum filtration and cryovial preservation techniques. This analysis will allow extraction of DNA to evaluate microbes in plume vs. non-plume waters. Oil fluorescence will be tested using the Cyclops 7 configured in a pH meter mode that can test fluorescence of water samples in wide mouth jars.

XBT Sampling

Expendable BathyThermograph (XBT) will be also deployed to obtain thermal information of the full water column. These probes measure temperature to depths of about 850m (Deep Blue) or 1200m (Fast Deep). These probes will be critical in case the CTD casts cannot be performed due to damage to the sensors after submergence in oil. Temperature observations can be used to identify water masses from their temperature signature. In addition, the structure of the subsurface temperature (isotherm slopes) can be used to determine surface and subsurface currents. Observations from XBTs will provide critical information that will not be obtained with any other platform. Note that satellite observations provide only information on surface dynamics; XBT and CTD data will help identify subsurface thermal and dynamical conditions. While CTD casts are performed, we propose to deploy XBTs in between CTD casts. If CTD casts are not being performed, we propose to deploy XBTs in place of these casts (where Niskin or Go-Flow samples are still being taken). There is no need for additional personnel to add XBT deployments.

In addition, surface drifters will be used to estimate surface currents (direction and speed). Surface drifters are also equipped with sea surface temperature sensors. Their data are transmitted in real-time to NOAA for quality control and immediate distribution to the GTS and data centers. Data from drifters are valuable because they help validate model and satellite estimates of surface currents. Their deployment is simple and only a few minutes of training is required.

SIPPER Sampling

Oil droplets will also be measured using the Shadowed Image Particle Profiling and Evaluation Recorder (SIPPER), a towed, suspended particle imaging system. Results will be used to ground truth shipboard interpretations of EK-60 backscatter. The SIPPER system will also collect high resolution information on the distribution of zooplankton, phytoplankton, larval fish and detritus within a 100 $cm^2$ sampling area as it moves through the water. The SIPPER will also be used to determine the composition of scattering layers and their vertical extent. The SIPPER will be towed horizontally and vertically to determine the zooplankton and part of the icthyoplankton response to water possibly affected by the spill. The SIPPER towbody is outfitted with a SBE-

19 plus CTD, SBE 43 Oxygen sensor, a Wetlabs Chl a and backscatter ECO fluorometer, a Wetlabs Wetstar transmissometer and a Wetlabs ECO CDOM fluorometer. SIPPER can deploy with all the sensors but a decision will need to be made whether to run with the transmissometer or the CDOM fluorometer as the CTD can only handle four external sensor inputs.

MOCNESS Sampling:
Plankton samples will be taken with the Multiple Opening and Closing Environmental Sampling System (MOCNESS) immediately beyond the margin of the plume but will not be conducted in any oiled areas. The MOCNESS tows will provide plankton collections for RNA analyses, and may serve as a proxy for likely biota within the adjacent waters within the plume area.

Upon completion of the characterization of subsurface oil plumes, adaptive sampling for bluefin tuna larvae will be conducted in areas identified as having surface or subsurface oil. Satellite imagery and acoustic backscatter profiles will be used to identify ichthyoplankton stations based upon a current larval bluefin habitat model. These stations will be sent to the ship along with the satellite imagery each day. Each station will consist of a CTD to 500 meters, a 10 minute subsurface neuston tow using the 505 mesh net, and a standard 10 minute neuston tow. The subsurface nesuton net will be towed from the surface to a maximum depth of 20 meters, and then returned to the surface. This pattern will be repeated for 10 minutes. Flow meter reading will be recorded for the tow. At selected stations the MOCNESS will be deployed to sample at 10 meter increments from 50 meters to the surface. All samples will be preserved in 95% ethanol in accordance with standard SEAMAP protocols

Communication between the deck sampling teams and the bridge on station will be accomplished via hand held radios. During rough weather, the watch leader with consultation from the ship's crew will determine if all sampling gear can be deployed safely. The Field Party Chief should be notified of any delays to sampling due to mechanical, medical or weather issues as well. The Chief Engineer should also be made aware of expected time of arrival at the first station so the salt water pumps can be turned on and ready for net washdown.

D. Sampling Methods

XBT Deployments
NOAA/AOML currently will provide 200 Deep Blues and 12 Fast Deeps to be used for the mapping of the subsurface temperature field. The advantage of these probes is that they can be deployed with the ship stationary or moving (up to 20 knots). Temperature profiles will be transmitted in real-time via email to AOML and inserted into the GTS for immediate analysis and to assimilate into numerical models.

Surface Drifters
Surface drifters are best deployed underway (at speeds above 2 knots). AOML plans to send six surface drifters for deployment on this cruise. The location of deployment will be in regions where the characterization of surface dynamics show potential for a larger spreading of the oil. Observations obtained from these drifters will be critical to validate numerical model output and satellite estimates of surface currents.

Niskin Bottles

Water samples will be collected using a rosette with 6-12 Teflon-coated Niskin bottles. The Niskin bottles will be lowered to the depth of the acoustic backscatter profile and samples collected at depths determined by the profile. A subset of the samples will be preserved according to NRDA chain of custody protocols for chemical analysis. A subsample of water samples will be placed in a wide mouth jar and tested for real time analysis for presence/absence of oil using the Cyclops 7 configured as a pH meter.

MOCNESS Sampling

The Southeast Fisheries Science Center (SEFSC) will provide the 1 m MOCNESS and associated electronic equipment to record the environmental data. The MOCNESS will be deployed from the stern with the MOCNESS winch at the same location as the Niskin bottle collections. Prior to deployment, the ship speed should be maintained at 2 kt. However, once the MOCNESS is lowered into the water, the props should be disengaged to avoid damage by the ship's prop wash. The props can be reengaged once the watch leader has relayed to the bridge that the nets are at a safe depth. Once deployed, a series of 9 nets (0.505 mm mesh) can be opened independently at specific depths to obtain a discrete sample of that depth. For the oil plume characterization survey, depths will be determined based on the acoustic backscatter profile obtained by the EK-60. For the bluefin tuna larval survey, the MOCNESS will be deployed to sample at 10 meter increments from 50 meters to the surface. The depth may be modified depending on the acoustic backscatter profile at the sampling station. Winch and ship speed will be manipulated by the watch leader through communication with the deck and bridge in order to filter a target volume of 250 $m^3$ for each net. The watch leader will let the bridge know when to disengage the props as the nets reach the surface during retrieval. After retrieval, samples will be rinsed into cod ends with seawater before bringing the MOCNESS on deck. Each oblique sample (surface to maximum depth) will be initially preserved in 10% formalin and transferred to 95% ETOH after 36 hours. The remaining nets will be initially preserved in 95% ETOH and transferred to fresh 95% ETOH after 24 hours. A subset of the samples will be preserved according to NRDA chain of custody protocols chemical analysis.

MBARI Upper Ocean Autonomous Underwater Vehicle ("Gulper")

The "Gulper" will be deployed using the crane on the Gunter off the port side of the vessel. The "Gulper" will be programmed for collecting water samples at discrete depths. Communication and tracking of the "Gulper" will be as follows:

The frequencies used for the Sonardyne USBLE and Benthos Acoustic Modems are Sonardyne WSM USBL Beacon HPR Channel H01 (also B01) with a reply frequency for H01 of 29.762kHz. This frequency can be easily changed if that particular channel is being used. The beacon receives the pulse from the ship transceiver at 20.492 kHz. The Benthos ATM-885 Modem is in the 9-14 kHz (2-6 km) range.

Shadowed Image Particle Profiling and Evaluation Recorder (SIPPER)

The SIPPER will be towed horizontally and vertically to determine the zooplankton and part of the icthyoplankton response to water possibly affected by the spill. The SIPPER will be deployed on the Gunter's CTD cable to its maximum depth of 350 m in search of subsurface oil and possibly detect it visually, through its DO meter, CDOM sensor or

transmissometer/backscatter sensors.. The SIPPER will be deployed off the Gunter with standard 0.322" conducting (3 conductor) cable and a slip ring. The system will be towed through the water at speeds between 1-4 knots and willn sample down to depths of 350 m. SIPPER tows require at least an hour per 100 m depth. The SIPPER system will conduct multiple tows in both impact and pre-impact waters at least 6 hours per/day. Exact station locations will be adaptively selected.

Cyclops 7

The Turner Design Cyclops 7 will be configured as a pH meter and will be used on the deck to analyze water samples for oil fluorescence. A subset of water samples from Niskin bottles and the "Gulper" will be placed in wide mouth jars. The Cyclops 7 probe will be inserted into the jar to obtain a fluorescence reading.

Microbial Analysis

100-250 mil of water samples will be filtered through 0.22um pore size 25mm or 47mm diameter filters by standard vacuum filtration. The filter will be rolled into a labeled cryovial and frozen. DNA will be extracted from these filters to identify microbes present in plume and non-plume waters.

Neuston Sampling for Bluefin Tuna Larvae

The neuston net is a 1 x 2 m frame outfitted with a 505 mm mesh net. Each neuston tow will be conducted for 10 minutes. The neuston net will be towed from the surface to a maximum depth of 20 meters, and then returned to the surface. If necessary, the ship should steam forward in a wide arc to keep the neuston net (mouth opening) out of the influence of the prop wash. The duration of a neuston tow may be shortened up to five minutes when there are high concentrations of jellyfish, ctenophores, Sargassum, floating weed and/or debris. After retrieval, plankton is rinsed into cod end with seawater while net hangs over side (if windy, watch leader may request net to be brought directly on board and rinsed on deck). Samples will be preserved in 95% ETOH initially and transferred to new 95% ETOH after 24 hours. A subset of the samples will be preserved according to NRDA chain of custody protocols for chemical analysis.

## III. Equipment

A. Equipment and Capabilities Provided by the Ship:

1. Electronics Technician to provide support for the Scientific Computing System (SCS) to populate the Fishery Scientific Computing System (FSCS), an Electronics Technician is imperative.

2. Hydrographic winch with wire and meter readout to accomplish Niskin bottle cast. Spare slip rings for each winch. Fully functional wire readouts for each winch.
3. ADCP
4. Refrigeration for approximately 400 1 liter amber glass jars for 400 40 ml for volatiles (or about 100 at a time).
5. Storage for 8 coolers and freezer space for blue ice for maintaining sample temperature while in transit.
6. The SIPPER was developed for operation on most oceanographic vessels that carry standard 3 conductor 0.322" hydro-wire used for CTD and trawl operations. It utilizes

two conductors to operate a digital subscriber line (DSL) connection between the SIPPER and a personal computer on board the ship. We've operated on cable lengths up to 10 km long. Typically this hydro-wire is terminated with female Impulse RMG-2-FS connector or a female Impulse IE2F-5/8 connector. We have the capability to connect to either. If the cable is terminated differently, we can either re-terminate the cable or build an adapter pigtail with the correct connectors. A winch with a payout speed and wire out indicator is preferred but not necessary.

7. The ship would need an A-frame that can lift a 250 lb tow-body and a block that could handle a 400 lb. dynamic load and clearance to lift a 3' wide, 5' long and 2' high tow-body. A working deck area at least 10' wide and long would be necessary for safely deploying and recovering the system.
8. The SIPPER is operated remotely through DSL link to a desktop computer on the ship. We would need space for an operator and computer as well as 120V AC to power the computer, DSL modem and other accessories. This space should be in proximity to the slip-ring conductors or a remote junction box. Additionally, as SIPPER is powered via battery, we would require a 3' by 2' area for a battery charging station and another 120V AC outlet.
9. One (1) Primary SBE 9plus CTD configured as follows;
    a. Unit should be mounted horizontally and mounted in the water sampling frame. The frame should be examined to ensure it is in good physical condition and there are no breaks present in any of the welds supporting the frame.
    b. The standard 12 position SBE 32 Carousel should be properly mounted in the water sampler section of the frame and tested to ensure that all 12 bottle positions are working properly and respond to software requests for firing.
    c. The internal Digiquartz pressure sensor should be in good working order and have a calibration/service date not to exceed 365 days.
    d. The primary sensor suite should be installed and consist of the following (the sensors should have a calibration date as recent as possible, not to exceed 365 days):
        i. One (1) SBE 3 Premium Temperature sensor
        ii. One (1) SBE 4 Conductivity sensor
        iii. One (1) SBE 43 Dissolved Oxygen sensor
        iv. One (1) "Y" air bleeder valve. Valve should be checked to ensure it is not clogged.
        v. One (1) Wetlabs Wetstar pumped fluorometer
        vi. One (1) SBE 5T pump that has been checked by Seabird within the last 365 days for proper operation.
        vii. One (1) Wetlabs C-Star transmissometer
        viii. Proper plumbing. Tubing should be checked to ensure it meets Seabird's recommended method of plumbing and is free from cracks and holes.
    f. The unit should be properly terminated and connected to a properly functioning SBE 11 Deck Unit. The deck unit should be connected to allow the following:
        i. Proper control of the SBE Water Sampler Carousel via the SEASAVE application.

ii. Integration of a proper NMEA signal from a GPS unit.

10. SIPPER Requirements: Lab space near the junction box for the winch slip ring conductors will be required to operate a personal computer and the DSL modem to connect with the ship cable conductors. Additional space on the ship for a processing computer (desktop) and battery charging station (in a seabox approximately 4’ by 2’ by 2’ would be appreciated nearby as well as space for the following items somewhere in the ship. All these items probably take up a space 8’ long, 3’ wide and 3’ high at most.

Scientific Computing System (SCS) Requirements:
The SCS system should be fully operational for the duration of the survey. A listing of any sensors that will not be functional for the survey should be provided prior to sailing to the Field Party Chief, taking into consideration that event templates will have to be checked by the Shipboard System Specialists to ensure there will be no impact or an alternative sensor can be selected.

- NorthStar 952X
  - UTC time
  - Latitude
  - Longitude
  - Speed over ground
  - Course over ground
- Furuno GP-90 GPS
  - Latitude
  - Longitude
  - Speed over ground
  - Course over ground
- Sperry speed log
  - Speed through the water
  - Speed over ground
- EQ50 and EK60 depth in meters
- Gyro-heading
- Air temperature (°C)
- Corrected barometric pressure
- True wind speed
- True wind direction
- SIMRAD ITI Trawl System (Temperature and Depth only)
- Information should be passed to the Rotating ET to ensure the following:
  - The Automatic Logger Control on the SCS Server must be enabled anytime ACQ is started and should use the default of 0:00:00 (Midnight GMT).
  - The contents of the Eventdata folder should be allowed to remain present for the duration of the survey (they should not be deleted between legs). This will ensure that event IDs do not restart for the respective events during the survey.

SEASAVE SOFTWARE
Prior to sailing, the proper .CON files should be built in SEASAVE. The software should be set to look for the proper .CON file for the respective instrument.

It is also highly desirable that the ASCII Out function be allowed to feed CTD data into SCS via serial cable.

**B. Equipment and Capabilities Provided by the Scientists:**

NOAA Fisheries - Mississippi Laboratory

1. Flowmeters (6)
2. 1 m MOCNESS frame, (9) 0.505 mm nets, and electronic equipment
3. Conducting wire (5/8-in) and corresponding block for MOCNESS tows
4. Plankton sampling supplies box
5. Plankton preserving jars, lids and labels
6. Turner Designs 10-AU benchtop Fluorometer
7. Chemical transfer pumps
8. Formalin and ethyl alcohol
9. Triton (R) X-100
10. Methanol and filters
11. 6 Niskin bottles
12. 4 Garden hoses for washing down nets, nozzles, and hose repair parts
13. Plankton transfer table
14. 5 gallon buckets
15. Various clerical supplies
16. SIMRAD ITI Temperature/Depth Sensor
17. Spare batteries for the SBE 19 Seacat profilers
18. Supplies/equipment for RNA analysis (Joanne to coordinate)

Monterey Bay Aquarium Research Institute AUV (Gulper Sampler)

1. 2 SBE25 boardsets
2. 2 SBE3 temperature sensors
3. 2 SBE4 conductivity sensors
4. Paroscientific pressure sensor (UCB4000)
5. SBE43 dissolved oxygen sensor
6. HobiLabs hydroscat 2 (fluorometer)
7. WetLabs ECO-CDOM Puck fluorometer
8. 10 – 1.8 liter water samplers

NOAA/AOML

1. 200 Deep Blue (800m) XBTs
2. 12 Fast Deep (1200m) XBTs
3. 6 Surface Drifters

University of South Florida (SIPPER Sampler)

1. Computer carrying seabox
2. Toolbox
3. Spare cables box
4. Spare hardware box
5. Small box containing spare alkaline batteries
6. 2 boat poles for recovery
7. Small pelican case with additional fluorometers
8. 5 gallon bucket with trim weights

9. Wooden Pallet for resting SIPPER on deck

## IV. Hazardous Materials

### A. Policy and Compliance

The Chief Scientist is responsible for complying with MOCDOC 15, Fleet Environmental Compliance #07, Hazardous Material and Hazardous Waste Management Requirements for Visiting Scientists, released July 2002. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.
By Federal regulations and NOAA Marine and Aviation Operations policy, the ship may not sail without a complete inventory of all hazardous materials by name and the anticipated quantity brought aboard, MSDS and appropriate neutralizing agents, buffers, and/or absorbents in amounts adequate to address spills of a size equal to the amount of chemical brought aboard. The amount of hazardous material arriving and leaving the vessel shall be accounted for by the Chief Scientist.

### B. Radioactive Isotopes

Not Applicable to this Project

### C. Inventory

Formalin
Ethyl Alcohol
Triton (R) X-100
Methanol

## V. Additional Projects

### A. Supplementary ("Piggyback") Projects

Not Applicable to this Project

### B. NOAA Fleet Ancillary Projects

Not Applicable to this Project

## VI. Disposition of Data and Reports

### A. Pre and Post Project Meeting

Pre-Project Meeting: Prior to departure, the Chief Scientist will conduct a meeting of the scientific party to train them in sample collection and inform them of cruise objectives. Some vessel protocols, e.g., meals, watches, etiquette, etc. will be presented by the ship's Operations Officer.
Post-Project Meeting: Upon completion of the cruise, a meeting will normally be held at 0830 (unless prior alternate arrangements are made) and attended by the ship's officers, the Chief Scientist and members of the scientific party, the Vessel Coordinator and the Port Captain to review the cruise. Concerns regarding safety, efficiency, and suggestions for improvements for future cruises should be discussed. Minutes of the post-cruise meeting will be distributed to all participants by email, and to the Commanding Officer and Chief of Operations, Marine Operations Center.

### B. Ship Operation Evaluation Report

Within seven days of the completion of the cruise, a Ship Operation Evaluation form is to be completed by the Chief Scientist. The preferred method of transmittal of this form is via email to OMAO.Customer.Satisfation@noaa.gov . If email is not an option, a hard copy may be forwarded to:

Director, NOAA Marine and Aviation Operations
NOAA Office of Marine and Aviation Operations
8403 Colesville Road, Suite 500
Silver Spring, MD 20910

## VII. Miscellaneous

### A. Meals and Berthing

Meals and berthing are required for up to 16 scientists. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the cruise, and ending two hours after the termination of the cruise. Since the watch schedule is split between day and night, the night watch may often miss daytime meals and will require adequate food and beverages (for example a variety of sandwich items, cheeses, fruit, milk, juices) during what are not typically meal hours. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the survey (e.g., Chief Scientist is allergic to fin fish).

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Chief Scientist. The Chief Scientist and Commanding Officer will work together on a detailed berthing plan to accommodate the gender mix of the scientific party taking into consideration the current make-up of the ship's complement. The Chief Scientist is responsible for ensuring the scientific berthing spaces are left in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Chief Scientist is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the cruise and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Chief Scientist will ensure that all non NOAA or non Federal scientists aboard also have proper orders. It is the responsibility of the Chief Scientist to ensure that the entire scientific party has a mechanism in place to provide lodging and food and to be reimbursed for these costs in the event that the ship becomes uninhabitable and/or the galley is closed during any part of the scheduled project.

All persons boarding NOAA vessels give implied consent to comply with all safety and security policies and regulations which are administered by the Commanding Officer. All spaces and equipment on the vessel are subject to inspection or search at any time. All personnel must comply with OMAO's Drug and Alcohol Policy dated May 7, 1999 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

### B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, Revised: 08/08) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist or

the NOAA website at http://www.omao.noaa.gov/medical/NHSQ_Final_wi_Instructions_fill.pdf The completed form should be sent to the Regional Director of Health Services at Marine Operations Center . The participant can mail, fax, or scan the form into an email using the contact information below. The NHSQ should reach the Health Services Office no later than 4 weeks prior to the cruise to allow time for the participant to obtain and submit additional information that health services might require before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of the NHSQ. Be sure to include proof of tuberculosis (TB) testing, sign and date the form, and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.
Contact information:

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone 757.441.6320
Fax 757.441.3760
E-mail MOA.Health.Services@noaa.gov

Prior to departure, the Chief Scientist must provide a listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: name, address, relationship to member, and telephone number.

**C. Shipboard Safety**

Wearing open-toed footwear or shoes that do not completely enclose the foot (such as sandals or clogs) outside of private berthing areas is not permitted. Steel-toed shoes are required to participate in any work dealing with suspended loads, including CTD deployments and recovery. The ship does not provide steel-toed boots. Hard hats are also required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

**D. Communications**

A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various modes of communication, the ship is able to maintain contact with the Marine Operations Center on an as needed basis. These methods will be made available to the Chief Scientist upon request, in order to conduct official business. Due to a new directive from Marine Operations Center, the ship must charge the science party for all calls made on the cell or sky-cell telephone. INMARSAT, Sky Cell and cellular communication costs shall be reimbursed to the ship for telephone calls made by all scientific personnel. Currently, Sky Cell and cellular telephone services are about $0.89 per minute and INMARSAT Mini-M is around $1.68 per minute for voice. These charges will be assessed against the program after the ship receives the bill. There is generally a three-month delay receiving the bill for review. The Chief Scientist will be required to keep a log of all calls made by the science party.

**E. IT Security**

Any computer that will be hooked into the ship's network must comply with the *NMAO Fleet IT Security Policy* prior to establishing a direct connection to the NOAA WAN. Requirements include, but are not limited to:

(1) Installation of the latest virus definition (.DAT) file on all systems and performance of a virus scan on each system.

(2) Installation of the latest critical operating system security patches.

(3) No external public Internet Service Provider (ISP) connections.

Completion of these requirements prior to boarding the ship is preferable.

Non-NOAA personnel using the ship's computers or connecting their own computers to the ship's network must complete NOAA’s IT Security Awareness Course within 3 days of embarking.

**F. Foreign National Guests**

No Foreign National Guest are anticipated on this Project