



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Fisheries Science Center
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Final Project Instructions

Date Submitted: March 4, 2016
Platform: NOAA Ship *Oscar Elton Sette*
Project Number: SE-16-02 (OMAO)
Project Title: AS RFS (American Samoa Reef Fish Surveys)
Project Dates: April 13, 2016 to May 31, 2016 (HST)

Prepared by: Kevin C. Lino Dated: 03/10/16

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Approved by: Michael P. Seki Dated: 3/14/16

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Commander Matthew J. Wingate, NOAA
Commanding Officer
Marine Operations Center – Pacific Islands



I. Overview

A. Brief Summary and Project Period

The NOAA Ship *Oscar Elton Sette* will be engaged as support for a Pacific Islands Fisheries Science Center (PIFSC), National Marine Fisheries Service (NMFS), NOAA project from 13 April to 31 May 2016 for a total of 49 days at sea. In many respects, SE-16-02 is a supplement of the reef fish survey component of the Pacific Reef Assessment and Monitoring Program (RAMP) performed by the PIFSC aboard the NOAA ships *Hi'ialakai* and *Oscar Elton Sette*.

The Pacific RAMP is an integrated coral reef ecosystem assessment led by the Coral Reef Ecosystem Program (CREP) of the Pacific Islands Fisheries Science Center (PIFSC) involving multi-disciplinary coral reef surveys in ~ 40 U.S.-affiliated Pacific Islands. Pacific RAMP is sponsored by NOAA's Coral Reef Conservation Program (CRCP), a partnership between the National Marine Fisheries Service, National Ocean Service, and other NOAA agencies with the objective of improving understanding and management of coral reef ecosystems. SE-16-02 is supported by funds from NOAA PIFSC, and is intended to gather additional data necessary for assessing the status and trends of managed coral reef fish populations in the islands of American Samoa (AS) and the Pacific Remote Islands Marine National Monument areas.

The *Oscar Elton Sette* will serve as the platform for operations involving small boats conducting dive operations to gather fishery independent survey data as well as assessing coral reef bleaching events via benthic surveys; oceanographic investigation and benthic sampling. The project will be broken into two legs with Leg I focusing on underwater visual surveys performed by divers on Open Circuit Scuba (OCS) and Closed Circuit Rebreathers (CCR) to survey fish assemblages around the island of Tutuila; Manu'a Island Group (Ta'u, Ofu & Olosega) and Rose Atoll. Concurrently, divers will conduct rapid visual assessments of the benthic composition as well as examine the potential impacts of divers' presence on counts of mobile roving coral reef fish species. The majority of effort aboard *Oscar Elton Sette* will be engaged in CREP Pacific RAMP Rapid Ecological Assessment (REA) fish surveys and at Rose Atoll conducting benthic bleaching survey operations. One small boat will be engaged in deploying and monitoring divers on rebreathers for a portion of the project. Leg II will focus on coral reef bleaching research at Jarvis Island via OCS scientific diving. In addition to the fish and benthic surveys, there will also be water sampling; instrument deployments and several benthic collection techniques expanding upon existing

research conducted by the CREP and Woods Hole Oceanographic Institute (WHOI) at Jarvis Island. The *Oscar Elton Sette* will be needed to support both small boat dive operations and ship based research.

Supplementary projects at Rose Atoll and Jarvis Island will be conducted to investigate coral bleaching events and advanced technologies for assessing reef fish assemblages. The *Oscar Elton Sette* will serve as the platform for all launches, diving units and as the communication and control center for instrument deployments and for small vessel operations.

B. Days at Sea (DAS)

Of the 49 DAS scheduled for this project, 49 DAS are funded by Office of Marine and Aviation Operations (OMAO). This project is estimated to exhibit a High Operational Tempo.

C. Operating Area

The area of operations will be largely weather-dependent but will encompass near shore waters off Tutuila; Manu'a Islands Group (Ta'ū, Ofu & Olosega); Jarvis Island and Rose Atoll (see Appendix 1).

D. Summary of Objectives

Leg I scientific objectives of the project are:

1. Collect data on shallow-water (0-30m deep) reef fish assemblages and reef habitat via non-extractive methods, including:
 - a. CREP RAMP REA OCS fish surveys (conducted from the *OES* and CREP small boats) at all locations
 - b. CREP REA CCR fish surveys (conducted from CREP small boats) at all locations
2. CREP RAMP REA shallow-water (0-30m deep) benthic surveys (conducted from the *OES* and CREP small boats) at Rose Atoll
3. BLOS instrument retrievals (conducted from the *OES* and CREP small boats) at Fagatele Bay
4. CREP RAMP nearshore plankton tows (conducted from the *OES* and CREP small boats) at Tutuila and Rose Atoll
5. PIFSC algae sampling (conducted from the *OES* and CREP small boats) at Rose Atoll

Leg II scientific objectives of the project at Jarvis Island are:

1. Collect data on shallow-water (0-30m deep) coral bleaching events via non-extractive methods, including:
 - a. CREP RAMP REA benthic surveys (conducted from the *OES* and CREP small boats)
 - b. WHOI benthic surveys (conducted from the *OES* and CREP small boats)
2. WHOI suite of coral reef bleaching investigation operations:
 - a. Water sampling underway/on route (surface, 50, 100, 150m) and onsite (surface, on corals)
 - b. Instrument package deployments at two stations (conducted from the *OES* and CREP small boats)
 - c. Plankton tows
 - i. Nearshore sampling (conducted from the *OES* and CREP small boats)
 - ii. Video Plankton Recorder transect deployments (conducted from *OES*)
 - d. POM sampling (conducted from the *OES* and CREP small boats)
 - e. Porites coring and staining (conducted from the *OES* and CREP small boats)
3. CREP RAMP REA shallow-water (0-30m deep) fish surveys (conducted from the *OES* and CREP small boats)
4. CREP PIFSC Baited Remote Underwater Video (BRUV) deployments

E. Participating Institutions

- Joint Institute for Marine and Atmospheric Research (JIMAR)
- NOAA Pacific Islands Fisheries Science Center:
 - Scientific Operations
 - Coral Reef Ecosystem Program (CREP)
 - Fisheries Biology and Stock Assessment Branch (FBSAB)
- NOAA Diving Program (NDP)
- Woods Hole Oceanographic Institute (WHOI)
- Department of Marine & Wildlife Resources (DMWR)
- Bigelow Laboratory for Ocean Sciences (BLOS)
- USFWS & NPS
- Hawaii Institute of Marine Biology (HIMB)
- Florida Museum of Natural History, University of Florida

F. Personnel / Science Party:

Name (Last, First)	Title	Embark	Disembark	Gender	Affiliation	Nationality
Akridge, Michael	Data Manager	4/14/2016	5/6/2016	Male	CREP/JIMAR	USA
Ayotte, Paula	Fish REA Diver	4/8/2016	5/31/2016	Female	CREP/JIMAR	USA
Bailey, Hatsue	Benthic REA Diver	4/25/2016	5/31/2016	Female	CREP/JIMAR	USA
Barkley, Hannah	OCC Diver	5/9/2016	5/31/2016	Female	WHOI	USA
Barlow, Jamie	Coxswain	4/8/2016	5/31/2016	Male	PIFSC	USA
Boland, Ray	Fish REA/CCR Diver	4/14/2016	5/6/2016	Male	PIFSC	USA
Caldwell, Zachary	Fish REA Diver	4/25/2016	5/6/2016	Male	TNC	USA
Clark, Jeanette	OCC Lead Diver	5/9/2016	5/31/2016	Female	CREP/JIMAR	USA
Davis, Cabell	OCC Team	5/9/2016	5/31/2016	Male	WHOI	USA
Drenkard, Liz	OCC Diver	5/9/2016	5/31/2016	Female	WHOI	USA
Giuseffi, Louise	Fish REA Diver	4/8/2016	5/31/2016	Female	PIFSC	USA
Gorospe, Kelvin	Fish REA Diver	4/14/2016	5/6/2016	Male	CREP/JIMAR	USA
Gray, Andrew	Fish REA/CCR Diver	4/8/2016	4/22/2016	Male	CREP/JIMAR	USA
Driessen, Damon	BRUV Team	5/9/2016	5/31/2016	Male	UWA/CU	Australia

Hansen, John	Chamber Operator	5/9/2016	5/31/2016	Male	RCUH/JIMAR	USA
Heenan, Adel	Fish REA Diver	4/14/2016	5/6/2016	Female	CREP/JIMAR	UK
Honisc, Brittney	Fish REA Diver	4/14/2016	4/25/2016	Female	BLOS	USA
Hunter, Susan	Terrestrial Survey Team	5/9/2016	5/31/2016	Female	USFWS	USA
Kropidlowski, Stefan	Terrestrial Survey Team Lead	5/9/2016	5/31/2016	Male	USFWS	USA
Lawrence, Alice	Fish REA Diver	4/14/2016	5/6/2016	Female	DMWR	UK
Lichowski, Frances	Benthic REA Diver	4/25/2016	5/31/2016	Female	CREP/JIMAR	USA
Lino, Kevin	Project Lead/Fish REA/Ops Lead	4/8/2016	5/31/2016	Male	CREP/JIMAR	USA
Luu, Victoria	OCC Team	5/9/2016	5/31/2016	Female	WHOI	USA
McCoy, Kaylyn	Fish REA Diver	4/14/2016 5/9/2016	4/25/2016 5/31/201	Female	CREP/JIMAR	USA
McGuire, Kimberly	Fish REA Diver	4/14/2016	4/25/2016	Female	DMWR	USA
Nadon, Marc	Fish REA Diver	4/14/2016	4/25/2016	Male	PIFSC	Canada
Rose, Julia	Fish REA Diver	4/14/2016	4/25/2016	Female	CREP/JIMAR	USA
Schumacher, Brett	Benthic REA Diver	4/25/2016	5/31/2016	Male	CREP/JIMAR	USA

Stamoulis, Kosta	Fish REA Diver	4/25/2016	5/6/2016	Male	RCUH/JIMAR	USA
Trick, Kevin	Data Manager	5/6/2016	5/31/2016	Male	RCUH/JIMAR	USA
Vaeoso, Motusaga	Fish REA Diver	4/14/2016	4/25/2016	Female	DMWR	USA
Vargas-Angel, Bernardo	Benthic REA Diver/Chief Scientist	5/6/2016	5/31/2016	Male	CREP/JIMAR	USA
Wester, Tate	Fish REA Diver	4/14/2016	5/6/2016	Male	UH	USA
Williams, Ivor	Fish REA Diver	4/25/2016	5/6/2016	Male	CREP/PIFSC	USA

G. Administrative

1. Points of Contact

Leg I Project Leader* & Leg II Operations Lead*:

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Leg II Chief Scientist*:

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Ship Operations Officer:

LT Anthony Imberi
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NOAA Ship *Oscar Elton Sette*
1897 Ranger Loop, Ford Island, Bldg. #184
Honolulu, HI 96818
808-389-5695 (cell)

Agent – for Port of Pago Pago, American Samoa; to be determined
Agent – for Port of Apia, Independent Samoa; to be determined

* The Project Leader, Operations Lead and Chief Scientist are the designated program points of contact for all project planning and pre-departure correspondence with the ship.

2. Diplomatic Clearances

None

3. Licenses and Permits

The Project Leader will ensure the appropriate authorizations are secured for all planned scientific operations prior to the start of the project. These authorizations include:

NEPA: Environmental Assessment for Research Activities Conducted by CREP, FONSI dated May 7, 2010 (PIFSC-20100901)

ESA: Section 7 consultation for the collection of eight ESA-listed coral species, PIRO PRD Biological Opinion (in consultation)

Navigable Waters: Nationwide Permit No. 5 for the installation and maintenance of scientific measurement devices and structures authorized

under U.S. Army Corps of Engineers verification letter dated 18 March 2014 (approved: POH-2009-00083).

National Park: Scientific Research and Collecting Permit in the National Park of American Samoa, NPS permit (submitted)

Sanctuary: Research Permit in the American Samoa National Marine Sanctuary, ONMS permit (submitted)

Sanctuary: BLOS Research Permit in the American Samoa National Marine Sanctuary, ONMS permit (approved: FBNMS-2014-003)

Refuge: WHOI Special Use Permit for research at Pacific Remote Islands National Marine Monument, USFWS permit (amending)

American Samoa: Department of Marine and Wildlife Resources (DMWR), Scientific Study and Collection Permit (submitted)

Monuments: Scientific exploration and research conducted in the Pacific Remote Islands (Jarvis) and Rose Atoll Marine National Monuments by DOC/NOAA/NMFS is exempt from permitting per Presidential Proclamations 8336 and 8337, respectively.

A copy of these research permits will be provided to the Command prior to commencing scientific operations.

II. Operations

The Project Leader & Chief Scientist are responsible for ensuring the scientific staff are trained in planned operations and are knowledgeable of project objectives and priorities. The Commanding Officer is responsible for ensuring all operations conform to the ship's accepted practices and procedures.

A. Project Itinerary

Weather, equipment failures, and scheduling problems are unpredictable. As such, the following intended itinerary should be considered as only a guide for survey progression. In particular, the order in which survey areas are worked within a single island area or among islands within close proximity may be altered as appropriate based on weather, sea conditions, or the progress of the survey. Transit estimates have been calculated based on a ship's speed of 9.7 knots westbound, 9.2 knots north and southbound, and 8.7 knots eastbound.

In addition, the dates below reflect the schedule for our maximum project of 49 DAS.

Pre-Project

- Feb 15-19 Ship loading. Craning of small boats, gear and hand carry items. Connect and test dive compressors.
- April 8 Project Lead & 2 staff embark in Apia, Samoa.
- April 9-12 Pre Cruise staging of SE-16-02 gear, familiarization and testing of portable hyperbaric chamber, compressors, vessels, etc. If possible conduct at sea small boat launches and recovery training for scientific coxswains and crew.
- April 13 Depart Apia, Samoa for Pago Pago, American Samoa (~75 nmi).

Leg I:

- April 14 Arrive Pago Pago Harbor: Embark all scientific personnel at Command's discretion. Anticipate early afternoon departure from Pago Pago. Conduct pre dive neurological exams, vessel familiarization, drills and welcome aboard meetings. If possible conduct at sea small boat launches and recovery training for scientific coxswains and crew.
- April 15 Conduct daytime small boat & dive operations in Tutuila Area A. Afternoon departure, begin transit to Ta'u Area D (~66 nmi).
- April 16-18 Arrive at Ta'u Island. Conduct daytime small boat & dive operations daily in Ta'u Areas A, B, C, D or E.
- April 19 Conduct daytime small boat & dive operations Ta'u. Depart for Tutuila Area B (~70 nmi).
- April 20-24 Arrive at Tutuila Island. Conduct daytime small boat & dive operations in Tutuila Areas A, B, C, D, E & F.
- April 25 Arrive Pago Pago Harbor: Begin refueling small boat fuel. Disembark several scientists. Embark all new scientific personnel. Conduct pre dive neurological exams, vessel

- familiarization, drills and welcome aboard meetings at Command's discretion.
- April 26 Conduct daytime small boat & dive operations in Tutuila Area G. Depart from Pago Pago en route to Ofu & Olosega Islands Area C (~60 nmi).
- April 27-29 Arrive at Ofu & Olosega Islands. Conduct daytime small boat & dive operations in Areas A, B, C, D & E.
- April 30 Conduct daytime small boat & dive operations in Ofu & Olosega Areas A, E or D. Depart for Rose Atoll (~ 90 nmi).
- May 1-4 Arrive at Rose Atoll. Conduct daytime small boat & dive operations in Areas A, B, C and D.
- May 5 Conduct daytime small boat & dive operations at Rose Atoll. Depart for Tutuila (~ 150 nmi).
- May 6 Arrive at Pago Pago Harbor: Disembark Leg 1 scientists. End of Leg I.
- Leg II:**
- May 9-10 Embark all new scientific personnel.
- May 11-15 Depart Pago Pago Harbor in route to Jarvis Island (~1,050 nmi): Conduct pre dive neurological exams, vessel familiarization, drills and welcome aboard meetings at Command's discretion.
- May 16-24 Arrive at Jarvis Island. Conduct daytime ship based technology deployments, small boat & dive operations in Areas A, B, C and D.
- May 25 Conduct daytime technology deployments, small boat & dive operations at Jarvis Island. Depart Jarvis Island for Honolulu, HI (~1,300 nmi).
- May 31 Arrive at Pearl Harbor. Disembark all scientists. End of Project
- June 1-2 Conduct offload of all scientific gear.

B. Staging and Destaging

Staging: Staging of large scientific gear and equipment will begin the week of February 15th, or as otherwise coordinated with the Command. Assistance from the ship's personnel for crane services for large gear and vessels; loading small boat fuel (pumped from truck to ship); connecting and testing dive compressors and staging of gear will be necessary. Hand carried items will be loaded and stowed out of the way in the Bosun's locker and lab areas prior to departure in conjunction with SE-16-02 equipment and needs.

The Project Leader and 2 other science party members will arrive in Apia, Samoa on April 8th to begin staging dive gear for SE-16-02 and stowing SE-16-01 gear. The remaining scientific party will embark at Pago Pago Harbor, American Samoa on April 14th.

Leg I Personnel Swap and Refueling: It is anticipated that the ship will be able to support dive operations while being tied to the pier at Pago Pago Harbor during personnel swaps on April 25th. Support from ship's personnel will be necessary to facilitate the logistics of refueling while at the pier. Newly embarked scientists will use the remainder of the day to attend the welcome aboard meeting and drills.

Leg II Personnel Swap and Refueling: Support from ship's personnel will be necessary to facilitate the logistics of refueling while in port at Pago Pago Harbor between May 7-10. Newly embarked scientists will use May 11-15 transit days to attend welcome aboard meeting and drills.

De-staging: Full off-load of all program-provided gear and small boats will occur, in coordination with the Command, once the *Oscar Elton Sette* returns to Pearl Harbor, and should be completed by June 2nd.

C. Operations to be Conducted

The Project Leader and Chief Scientist have 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, and (4) alter the general intent of the Project Instructions. In addition, the Project Leader must notify the Office of the Science Director of the Pacific Islands Fisheries Science Center at the earliest opportunity prior to making (1) deviations from the general project track or area of operations noted in the project instructions, (2) changes or additions of research operations to those specified in

the project instructions, or (3) port calls not specifically identified in the project instructions.

Scientific Operations

The ship will support assessment and monitoring operations within the project Operations Areas. Specifically, the ship will support Rapid Ecological Assessments (REA) and the continuation of long-term monitoring operations of reef fish and the accompanying reef ecosystems of the region including Stationary Point Count (SPC); oceanographic water sampling; benthic collections and instrument deployment and retrievals. An auxiliary technologies project will also be supported by the ship during Leg II at Jarvis Atoll but specifics are still to be determined.

Research and monitoring efforts will require extensive diving operations (both OCS and CCR) to be supported by the ship. Up to four small boats will be operating simultaneously during daylight hours to maximize productivity daily. The ship's *Northwind* (SE-4), 19' Inflatable *Achilles* (SE-2), as well as two program-provided 19-ft SAFE Boats (*Steel Toe* and *The Rubber Duck*) will be required to support the dive teams on a daily basis. The *Sette* will be requested to provide 2 coxswains to operate the ship's vessels and the scientific staff will coxswain the two program-provided vessels every operational day.

The REA surveys will include monitoring of species composition, abundance, size distribution, and spatial distribution of reef fishes and related habitats of the region and will further ground-truth shallow-water benthic habitat maps. The water sampling, coral coring collections and instrument deployments will contribute towards existing data sets in regards to coral bleaching impacts and climate impacts on a near pristine coral reef ecosystem. .

Snorkeling Operations

All snorkeling operations shall be conducted in accordance with the NOAA Scientific Diving Manual (Section 4.13).

Small Boat Operations

Per OMAO Supplement to the NOAA Small Boat Standards and Procedures Manual, March 2010, Section 4.03a2, a program certified Operator in Charge (OIC) must "earn the full confidence of both the Commanding Officer (CO) and Designated Examiner (DE) and has successfully completed the shipboard training requirements." As part of any OIC evaluation, it is understood that a small boat

OIC will be designated to accompany and evaluate an OIC-in-training. This may limit the number of small boats the ship can deploy during this evaluation period, but every effort will be made to limit any impact to operations. An OIC-in-training is not guaranteed to be qualified by the CO and DE during a project.

Small boat deployment and recovery operations from a ship at sea are inherently dangerous. Experience levels of all personnel involved and environmental conditions are limiting factors regarding the decision to proceed with said operations. Proficiency levels of deck officers, deck department, or small boat crews may impact operations. All small boat crewmembers must have the full confidence of the CO and DE. At any time, the CO may call for a halt to boat deployment and recovery operations. If indicated, a Safety Stand Down, extra training or practice may be required to begin operations again. This is especially true when the ship has been in port or when program personnel have not been aboard for an extended period of time, as well as when boat operations are called for within 48 hours of departure.

While it is intended to conduct small boat and diving operations each day of the project, a rotational 'rest' day system will be implemented for divers to not work more than 10 consecutive days on a small boat. This method allows for divers to choose when they need to rest and for multiple days if needed.

While minimizing impact to science operations, ship's diver/coxswain training and proficiency regulations may require the use of a ship's small boat during an extended project. The CO will work with the Project Leader or Chief Scientist to plan and minimize impacts to fulfill such requirements.

D. Dive Plan

All dives are to be conducted in accordance with the requirements and regulations of the NOAA Diving Program (<http://www.ndc.noaa.gov/dr.html>) and require the approval of the ship's Commanding Officer.

The Dive Plans encompassing Legs I-II of SE-16-02 are presented in *Appendix 3* (attached file).

Rebreather Dive Operations

All rebreather dives shall be conducted in accordance with the NOAA Scientific Diving Manual.

E. Applicable Restrictions

Conditions which preclude normal operations: Poor weather and sea conditions, equipment failure, safety concerns, and/or unforeseen circumstances, may alter or prohibit operations as planned. At these times, the Project Leader and Commanding Officer will determine the appropriate plan of action.

NMFS employees are not exempt from the requirements of the Marine Mammal Protection Act (MMPA) or the Endangered Species Act (ESA). PIFSC has developed mitigation measures for its fisheries and ecosystem research projects to avoid take and to comply with the Lecky, Murawski, and Merrick guidance. A copy of these documents is available at <https://sites.google.com/a/noaa.gov/pifsc-science-operations/nepa-permits/protected-species-mitigation-measures> and on the ship's bridge.

1. "Take" of Protected Species

- a. Under the MMPA and ESA it is unlawful to take a protected species. The MMPA defines take as "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." The ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." An incidental take is one that is incidental to, but not the purpose of, otherwise lawful activities.
- b. In the event of an incidental take of a marine mammal or federally listed threatened or endangered species during the project, the Project Leader will report the incident to the ship's Commanding Officer then the PIFSC Director and Deputy Director IMMEDIATELY via IRIDIUM, INMARSAT, and email. Samples should not be collected from any incidentally taken marine mammals, sea turtles, or seabirds.

III. Equipment

A. Equipment and Capabilities Provided by the Ship

1. **Equipment:** To successfully meet the project objectives, the scientific complement aboard will need the ship to provide the items listed below. Prior to sailing, the ship's crew will inspect these items to ensure they are in proper working order for the project:

A-frame

Boat deck and Aft deck cranes
Northwind launch, SE-4
Achilles launch, SE-2
SCUBA compressor (back up to program provided compressors)
Wet and Hydro Lab faucets and drains
Scientific Computer System (SCS)
Adequate fresh water for gear and small boat wash-down
Iridium phone
VHF radios for ship's small boats
Global Positioning System (GPS) for ship's small boats
Depth sounders for ship's small boats
'Hip' Tanks for small boat gasoline storage

2. **Capabilities:** It is requested that the ship provide the following:
- a. Assistance from the Command and ship's Deck Department in conducting small boat launch checkouts for program personnel.
 - b. Permission for Scientists to ready scientific work spaces (e.g., set up computer server) during the week prior to project.
 - c. Assistance from the ship's Deck Department in craning and staging large gear during loading and off loading.
 - d. Support from the Engineering and Deck departments prior to sailing to transfer program-provided gasoline into the ship's fuel tanks to be used as outboard engine fuel. The gasoline will be delivered by truck and may be pumped directly into the deck tank.
 - e. SE-4 & SE-2 will be required to support the program's dive teams on a daily basis. The ship should plan to provide coxswains for the SE-4 & SE-2 during all days of diving operations [except for April 25th].
 - f. Support from the medical officer and deck department to conduct neurological exams, boat familiarization and station walkthroughs for new divers. To be conducted prior to operations in collaboration with welcome aboard meetings and drills.
 - g. Mid-project support from the Command is requested for a personnel transfer and refueling at Pago Pago Harbor on April 25th during Leg I of the project.

- h. Support from the deck department will be necessary to conduct refueling operations during in port between May 7-10 for small boat fuel.
- i. Operable Wet & Hydro Lab facilities, specifically wet lab space and storage, running water and sinks, as well as drying areas are necessary to support the cleaning of field equipment.
- j. Use of the ship's science freezer in conjunction with SE-16-01 samples.
- k. To be consistent with the mission objectives, the ship and its complement of small boats will employ all methods feasible to minimize damage to coral reef habitats during any anchoring operations if ever required.

B. Equipment and Capabilities Provided by the Scientists

- 1. **Equipment:** The program's full equipment list is presented in *Appendix 4* (attached file).
- 2. **Capabilities:** In addition to scientific expertise, the program will provide coxswains and routine maintenance for program-provided boats.

IV. Hazardous Materials

A. Policy and Compliance

The Project Leader and Chief Scientist are responsible for complying with FEC 07 Hazardous Materials and Hazardous Waste Management Requirements for Visiting Scientific Parties (or the OMAO procedure that supersedes it). 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 quantity, MSDS, appropriate spill cleanup materials (neutralizing agents, buffers, or absorbents) in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and chemical safety and spill response procedures. Documentation regarding those requirements will be provided by the Chief of Operations, Marine Operations Center, upon request.

Per OMAO procedure, the scientific party will include with their project instructions and provide to the CO of the respective ship 30 days before departure:

- List of chemicals by name with anticipated quantity
- List of spill response materials, including neutralizing agents, buffers, and absorbents
- Chemical safety and spill response procedures, such as excerpts of the program's Chemical Hygiene Plan or SOPs relevant for shipboard laboratories
- For bulk quantities of chemicals in excess of 50 gallons total or in containers larger than 10 gallons each, notify ship's Operations Officer regarding quantity, packaging and chemical to verify safe stowage is available as soon as chemical quantities are known.

Upon embarkation and prior to loading hazardous materials aboard the vessel, the scientific party will provide to the CO or their designee:

- An inventory list showing actual amount of hazardous material brought aboard
- An MSDS for each material
- Confirmation that neutralizing agents and spill equipment were brought aboard sufficient to contain and cleanup all of the hazardous material brought aboard by the program
- Confirmation that chemical safety and spill response procedures were brought aboard

Upon departure from the ship, scientific parties will provide the CO or their designee an inventory showing that all chemicals were removed from the vessel. The CO's designee will maintain a log to track scientific party hazardous materials. MSDS will be made available to the ship's complement, in compliance with Hazard Communication Laws.

Scientific parties are expected to manage and respond to spills of scientific hazardous materials. Overboard discharge of hazardous materials is not permitted aboard NOAA ships.

B. Inventory of Hazardous Materials

See Appendix 5.

C. Chemical safety and spill response procedures

See Appendix 6.

D. Radioactive Materials

No Radioactive Isotopes are planned for this project.

V. Additional Projects

Supplementary (piggyback) and ancillary projects are secondary to the objectives of the project 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.

A. Supplementary ("Piggyback") Projects

1. Leg I

- a. Plankton Tows: In order to expand upon Pacific RAMP monitoring of the coral reef community, a partnership with the Florida Museum of Natural History at the University of Florida has requested the sampling of the nearshore plankton community. The samples collected will go towards genetic diversity and distribution research of the Pacific marine malacology community.
 - i. Using short plankton nets towed for 5 minutes from small vessels between research dives, up to 10 tows around each island will be conducted. Samples will be fixed in alcohol and stored in the ship's freezer.
- b. Instrument Retrieval: In conjunction with BLOS, several instruments deployed during HA-15-01 in Fagatele Bay, Tutuila, AS and will be retrieved during SE-16-02.
 - i. Two scientific dives will be required to take place to retrieve 2 oceanographic monitoring devices and several small calcification accretion units (CAUs) that are to be stored in the ship's freezer.
- c. Algae Sampling: Algae are one of the most understudied communities in coral reef community. In order to expand on existing data, sampling of macroalgae, epiphytes and cyanobacteria and an initial collection of crustose corallines which will become the first voucher specimens of these species at Rose Atoll.
 - i. Samples will be collected by hand or hand and chisel at Rose Atoll. No more than 1 small bucket of samples are intended for collection and will be stored in the ship's freezer.

2. Leg II

- a. Video Plankton Recorder (VPR): Nutrient and plankton enrichment of the upper water column, due to some sort of upwelling, either from Ekman forcing, internal waves, or currents impinging on topography, like the Equatorial Undercurrent, causes enhanced growth of corals in terms of

both tissue thickness and skeletal growth, and helps them be more resistant to bleaching and acidification. WHOI VPR sampling at stations along a line from offshore to next to the reef will show any upwelling and the response of the plankton in terms of diatom and copepod abundances as well as marine snow. The plankton sampling during this cruise on upstream and downstream sides of the island would give insights into the biological-physical characteristics of the system. These data sets would better interpret the coral growth and water chemistry in terms of water column hydrography and plankton taxa in this key area during this strong El Niño year.

- i. Using a winch and j-frame/davit the intent is to drift with wind on ship's bow, pushing ship away from VPR slowly. A non-conducting cable is sufficient as the VPR is battery operated. Sampling would range to 200m depth at a cable in/out rate of ~10m/minute, which will take about 1h depending on wire angle/ship drift. 4 lifting straps with shackle will be requested for attachment to conduct a vertical haul like a CTD cast.
- b. **Baited Remote Underwater Video (BRUV) stations:** Depth limitations; diver attraction and aversion all limit visual estimations conducted by fish survey divers. The BRUVs are capable of greater depths (<200m) and diver autonomy while collecting stereo video imagery of reef fish assemblages. The videos are later analyzed for species size, diversity and abundance and can be compared to diver generated assessments.
 - i. BRUVs use a weighted frame mounting for 2 high definition cameras attached to a surface marker line and float. Deployments coincide with previous fish REA sites and last no more than 1 hour per deployment. Multiple stations can be deployed from a small boat throughout the day maximising coverage and sites surveyed per day. Small boats will be outfitted with retrieval rigging to decrease impacts to the environment. Several station will be deployed using a small baited arm in order to better investigate predator presence on the reef. All baited stations will be deployed towards the completion of Leg II and at least 2 nmi from any dive team minimizing surveys impacts and increasing diver safety.

B. NOAA Fleet Ancillary Projects

No ancillary projects are planned at this time.

VI. Disposition of Data and Reports

The project will follow the current PIFSC and CREP data management plans, both of which comply with NOAA requirements. Disposition of data gathered aboard NOAA ships will conform to NAO 216-101 *Ocean Data Acquisitions* and NAO 212-15 *Management of Environmental Data and Information*. To guide the implementation of these NAOs, NOAA's Environmental Data Management Committee (EDMC) provides the *NOAA Data Documentation Procedural Directive* (data documentation) and *NOAA Data Management Planning Procedural Directive* (preparation of Data Management Plans). OMAO is developing procedures and allocating resources to manage OMAO data and Programs are encouraged to do the same for their Project data.

A. Data Classifications: *Under Development*

1. OMAO Data

2. Program Data - *Under Development*.

Contact Nori Shoji (Noriko.Shoji@noaa.gov), PIFSC Directorate - Science Operations Lead, for PIFSC data policy updates.

B. Responsibilities: *Under Development*

Integrated ecosystem observations of coral reefs are collected to characterize the spatial and temporal variability of the distribution, abundance, and diversity of corals, algae, other macroinvertebrates, and fishes in the context of their benthic habitats. All data are quality assured, processed, and made available to region managers and stakeholders.

VII. Meetings, Vessel Familiarization, and Project Evaluations

A. Pre-Project Meeting: The Project Leader and Commanding Officer will conduct a meeting of pertinent members of the scientific party and ship's crew to discuss required equipment, planned operations, concerns, and establish mitigation strategies for all concerns. This meeting shall be conducted before the beginning of the project with sufficient time to allow for preparation of the ship and project personnel. The ship's Operations Officer usually is delegated to assist the Project Leader in arranging this meeting.

B. Vessel Familiarization Meeting: The Commanding Officer is responsible for ensuring scientific personnel are familiarized with applicable sections of the standing orders and vessel protocols, e.g., meals, watches, etiquette, drills, etc. A vessel familiarization meeting shall be conducted in the first 24 hours of the project's start and is normally presented by the ship's Operations Officer.

- C. Post-Project Meeting: The Commanding Officer is responsible for conducting a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and shortcomings of the project. Concerns regarding safety, efficiency, and suggestions for future improvements shall be discussed and mitigations for future projects will be documented for future use. This meeting shall be attended by the ship's officers, applicable crew, the Project Leader, and members of the scientific party and is normally arranged by the Operations Officer and Project Leader.

- D. Project Evaluation Report: Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Project Leader. The form is available at <http://www.oma.noaa.gov/fleeteval.html> and provides a "Submit" button at the end of the form. Submitted form data is deposited into a spreadsheet used by OMAO management to analyze the information. Though the complete form is not shared with the ship, specific concerns and praises are followed up on while not divulging the identity of the evaluator.

VIII. Miscellaneous

A. Meals and Berthing

The ship will provide meals for the scientists listed above. Meals will be served 3 times daily beginning one hour before scheduled departure, extending throughout the project, and ending two hours after the termination of the project. Packed lunches will be required for scientists on all full-day small boat operations. Special dietary requirements for scientific participants will be made available to the ship's command at least seven days prior to the project.

Berthing requirements, including number and gender of the scientific party, will be provided to the ship by the Project Leader. The Project Leader 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 makeup of the ship's complement. The Project Leader and Chief Scientist are 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 Project Leader and Chief Scientist are also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the project and at its conclusion prior to departing the ship.

All NOAA scientists will have proper travel orders when assigned to any NOAA ship. The Project Leader and Chief Scientist will ensure that all non NOAA or

non-Federal scientists aboard also have proper orders. It is the responsibility of the Project Leader and 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 17, 2000 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, NF 57-10-01 (03-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Project Lead or the NOAA website <http://www.corporateservices.noaa.gov/~noaaforms/eforms/nf57-10-01.pdf>.

All NHSQs submitted after March 1, 2014 must be accompanied by [NOAA Form \(NF\) 57-10-02](#) - Tuberculosis Screening Document in compliance with [OMAO Policy 1008](#) (Tuberculosis Protection Program).

The completed form should be sent to the Regional Director of Health Services at Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the project to allow time for the participant to obtain and submit additional information should health services require it, before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of either form. Ensure to fully complete each 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.

The participant can mail, fax, or email the forms to the contact information below. Participants should take precautions to protect their Personally Identifiable Information (PII) and medical information and ensure all correspondence adheres to DOC guidance (http://ocio.os.doc.gov/ITPolicyandPrograms/IT_Privacy/PROD01_008240).

The only secure email process approved by NOAA is [Accellion Secure File Transfer](#) which requires the sender to setup an account. [Accellion's Web Users](#)

[Guide](#) is a valuable aid in using this service, however to reduce cost the DOC contract doesn't provide for automatically issuing full functioning accounts. To receive access to a "Send Tab", after your Accellion account has been established send an email from the associated email account to accellionAlerts@doc.gov requesting access to the "Send Tab" function. They will notify you via email usually within 1 business day of your approval. The "Send Tab" function will be accessible for 30 days.

Contact information:

Regional Director of Health Services
Marine Operations Center – Pacific
2002 SE Marine Science Dr.
Newport, OR 97365
Telephone 541-867-8822
Fax 541-867-8856
Email MOP.Health-Services@noaa.gov

Prior to departure, the Project Leader and Chief Scientist must provide an electronic listing of emergency contacts to the Executive Officer for all members of the scientific party, with the following information: contact 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 with chin straps 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 program and worn when required.

All scientists will comply with standing safety regulations of PIFSC and that of the vessel's standing orders from the Commanding Officer.

D. Communications

A progress report on operations prepared by the Project Leader and Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Project Leader and Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various means of communications, the ship can usually

accommodate the Project Leader and Chief Scientist. Special radio voice communications requirements should be listed in the project instructions. The ship's primary means of communication with the Marine Operations Center is via e-mail and the Very Small Aperture Terminal (VSAT) link. Standard VSAT bandwidth at 128kbs is shared by all vessels staff and the science team at no charge. Increased bandwidth in 30-day increments is available on the VSAT systems at increased cost to the scientific party. If increased bandwidth is being considered, program accounting is required and it must be arranged at least 30 days in advance.

E. IT Security

Any computer that will be hooked into the ship's network must comply with the *OMAO Fleet IT Security Policy 1.1* (November 4, 2005) 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.
4. Provide the Electronics Technician with a spreadsheet of the following information:

<u>Device</u>	<u>Name</u>	<u>Operating System</u>	<u>LAN MAC Address</u>	<u>WAN MAC Address</u>
<i>Iphone</i>	<i>Scientist</i>	<i>MAC OS</i>	<i>21:34:6K:P8:W6:77</i>	<i>21:34:6K:P8:W6:78</i>
<i>Laptop</i>	<i>Scientist</i>	<i>Windows XP</i>	<i>23:34:6K:P8:M6:77</i>	<i>23:34:6K:P8:M6:78</i>

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

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 prior to embarking. Arrangements to take the Course and/or achieve security clearance for any non-NOAA computers should be coordinated with PIFSC/CREP administration well in advance of the project.

F. Foreign National Guests Access to OMAO Facilities and Platforms

The foreign national participants for project SE-16-02 are Alice Lawrence, Marc Nadon, Joran Goetze (or Damon Driesson), Adel Heenan and no others. PIFSC Coxswain Jamie Barlow will serve as the onboard foreign national sponsor for these participants.

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM DeBow's March 16, 2006 memo (<http://deemedexports.noaa.gov>). National Marine Fisheries Service personnel will use the Foreign National Registration System (FRNS) to submit requests for access to NOAA facilities and ships. The Departmental Sponsor/NOAA (DSN) is responsible for obtaining clearances and export licenses and for providing escorts required by the NAO. DSNs should consult with their designated Deemed Exports point of contact to assist with the process.

Full compliance with NAO 207-12 is required.

Responsibilities of the Project Leader and Chief Scientist:

1. Provide the Commanding Officer with the e-mail generated by the FRNS granting approval for the foreign national guest's visit. This e-mail will identify the guest's DSN and will serve as evidence that the requirements of NAO 207-12 have been complied with.
2. Escorts – The Project Lead is responsible for providing escorts to comply with NAO 207-12 Section 5.10, or as required by the vessel's DOC/OSY Regional Security Officer.
3. Ensure all non-foreign national members of the scientific party receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Officer.
4. Export Control – Ensure that approved controls are in place for any technologies that are subject to Export Administration Regulations (EAR).

The Commanding Officer, Chief Scientist and the Project Leader will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.

Responsibilities of the Commanding Officer:

1. Ensure only those foreign nationals with DOC/OSY clearance are granted access.
2. Deny access to OMAO platforms and facilities by foreign nationals from countries controlled for anti-terrorism (AT) reasons and individuals from Cuba or Iran without written approval from the Director of the Office of Marine and Aviation Operations and compliance with export and sanction regulations.

3. Ensure foreign national access is permitted only if unlicensed deemed export is not likely to occur.
4. Ensure receipt from the Project Leader and Chief Scientist or the DSN of the FRNS or Servicing Security Office e-mail granting approval for the foreign national guest's visit.
5. Ensure Foreign Port Officials, e.g., Pilots, immigration officials, receive escorted access in accordance with maritime custom to facilitate the vessel's visit to foreign ports.
6. Export Control – Eight weeks in advance of the project, provide the Project Leader and Chief Scientist with a current inventory of OMAO controlled technology onboard the vessel and a copy of the vessel Technology Access Control Plan (TACP). Also notify the Project Leader of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Project Leader and Chief Scientist can take steps to prevent unlicensed export of program controlled technology. The Commanding Officer, Chief Scientist and the Project Leader will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.
7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the servicing Security Officer.

Responsibilities of the Foreign National Sponsor:

1. Export Control – The foreign national's sponsor is responsible for obtaining any required export licenses and complying with any conditions of those licenses prior to the foreign national being provided access to the controlled technology onboard regardless of the technology's ownership.
2. The DSN of the foreign national shall assign an on-board program individual, who will be responsible for the foreign national while on board. The identified individual must be a U.S. citizen and a NOAA or DOC employee. According to DOC/OSY, this requirement cannot be altered.

3. Ensure completion and submission of Appendix C (Certification of Conditions and Responsibilities for a Foreign National Guest) as required by NAO 207-12 Section 5.03.h.

APPENDICES

Appendix 1: Operating Areas for SE-16-02

Appendix 2: Station/Waypoint List (coordinates in Latitude, Longitude: degree-minutes)

Appendix 3: Dive plans (3) and DEAP (attached files)

Appendix 4: Program Equipment List (attached file)

Appendix 5: Hazardous Materials Inventory

Appendix 6: Chemical Safety and Spill Response Procedures

Appendix 1: Operating Areas for SE-16-02

Appendix 1_Working Areas_SE_16_02

Appendix 2: Station/Waypoint List (coordinates in Latitude, Longitude: degree-minutes)

Appendix 2_Waypoints_SE_16_02

Appendix 3: Dive Plans (Attached Files):

(Once staffing is finalized, Dive Plans and Dive Accident Management Plans will be filed.)

Appendix 3_Dive Plans & DEAPs_SE_16_02

Appendix 4: Program Provided Equipment List (Attached File):

Appendix 4_Load List_SE_16_02

Appendix 5: Hazardous Materials Inventory

Appendix 5_MSDS_SE_16_02

Inventory of Hazardous Materials

Common Name	Quantity	Notes	Trained Individual	Spill Control*
Sofnolime 797 Nonindicating 'Sorb'	5 kegs (45lbs ea.)	Stored on deck. Spent product stored on deck.	Ray Boland / Andrew Gray	NT, B
Gasoline, unleaded	3.4 kL	Volatile, Flammable Stored in ship's hip tank	Ship's Chief Engineer	Ship SOP
95% Ethyl Alcohol (190 proof)	5 L	Highly Volatile, Flammable Bulk stored in ship's fantail tank; Daily use quantity (19 L carboy) stored in ARMS lab in secondary containment; Preserved samples stored in secondary containment in Scientific freezer. (Daily use)	Ship's Chief Engineer (Bulk) Louise Giuseffi / Keviin Lino (Daily use & sample quantities)	AL (Daily use)
Mercuric Chloride (Saturated solution, 7g HgCl ₂ in 60 ml of deionized water)	6 0 ml	Scientific samples consist of 200 µl HgCl ₂ solution in 500 ml of seawater	Jeanette Clark/ Kevin Lino	M
Pool Time Shock XtraBlue 6 in 1 Pool Shock (primarily Sodium Dichloro-s-Triazinetrione-	4.6 kg	Corrosive Contained in ten 1- lb bags within lidded 5-gal bucket	Kevin Lino / Andrew Gray	P

Dihydrate)		on Grated Deck		
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Appendix 6: Section IV.C. Chemical Safety and Spill Response Procedures

***Spill Control Key**

A: Acids

- Wear appropriate personal protective equipment (PPE) and clothing during clean-up.
- Keep upwind. Keep out of low areas.
- Ventilate closed spaces before entering them.
- Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible.
- **Large Spills:** Dike ahead of spill for containment. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.
- **Small Spills:** Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.
- Never return spills to original containers for re-use.
- Neutralize spill area and washings with soda ash or lime. Collect in a non-combustible container for disposal.
- J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this type.

AL: Alcohols (daily use quantities)

- Extinguish smoking lamp. Remove all sources of ignition.
- Wear appropriate PPE and clothing during clean-up.
- Ventilate closed spaces before entering them.
- Use absorbent socks to surround spills or to divert fluid flow.
- Use vermiculite or kitty litter to soak up and absorb fluid.
- Do not use combustible materials, such as saw dust.
- Use absorbent pads/diapers to wipe up the spill or a dust pan to sweep up vermiculite/kitty litter.
- Place used absorbents in plastic bag or pail.
- Clean surface thoroughly to remove residual contamination.
- Bags containing used absorbents will be properly disposed of once the ship returns to port.

B: Bases

- Wear appropriate PPE and clothing during clean-up.
- Keep upwind. Keep out of low areas.

- Ventilate closed spaces before entering them.
- Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible.
- **Large Spills:** Dike ahead of spill for containment. Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal.
- **Small Spills:** Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.
- Never return spills to original containers for re-use.
- Neutralize spill area and washings with product such as Grainger Base Eater Spill Kit. Collect in a non-combustible container for prompt disposal.

F: Fixatives/Formalin/Formaldehyde

- Wear appropriate PPE (gloves, goggles, breathing mask).
- Ventilate area of leak or spill. Remove all sources of ignition.
- 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, kitty litter, absorbent pads), and place in a chemical waste container. A dust pan and plastic bags are available to aid in cleanup and disposal.
- Do not use combustible materials, such as saw dust.

NT: Non-toxic

- Wear appropriate PPE and clothing during clean-up.
- Ventilate area.
- Contain spill where safe to do so.
- Absorb liquid with paper towel while wearing gloves; place waste in sealed plastic container until processed on land.

M: Mercury

- Wear appropriate PPE and clothing during clean-up (a minimum of nitrile gloves and eyewear).
- Stop the flow of fluid by using absorbent material (e.g. cloth, fleece, paper) to dike and soak up the spilled solution.
- Use Mercury Spill Kit if need be.
- Sprinkle area with sulfur or calcium polysulfide to suppress mercury.
- Contaminated area should be wiped with water dampened absorbent material, until one feels the area is sufficiently clean.
- Pick up used absorbents and place in a suitable container for reclamation or disposal in a method that does not generate dust

- If all the HgCl₂ solution from a spill is not wiped up, then potential exists for the HgCl₂ to come out of solution, and HgCl₂ crystals are more problematic (from a health perspective) than HgCl₂ in solution.
- All PPE and absorbent material contaminated with HgCl₂ should be contained in a zip-top bag labeled “HgCl₂ Waste,” kept within the ship’s HAZMAT locker, and properly disposed of once the ship returns to port.
- The concentration of HgCl₂ in solution, once mixed with copious amounts of fresh/salt water, will rapidly dilute the concentration of HgCl₂ relieving concern for further contamination by effluent, as concentrations will be below environmental toxicity, see MSDS for toxicological information.
- Areas of skin contact should be thoroughly rinsed under fresh/salt water for a minimum of 15 minutes.
- HgCl₂ solution contact with eyes/ingestion should be immediately addressed by the ship’s doctor, rinse eyes for a minimum of 15 minutes.

P: Powdered Chlorine Salts

- Wear appropriate PPE (gloves, eyewear, dust mask, etc.) and clothing during clean-up.
- Ventilate area.
- Keep upwind. Avoid inhalation of salts, granules or dust.
- **Large Spills:** Sweep or scoop all spilled material, contaminated soil or other materials and place into clean, dry containers for disposal. Do not close containers containing wet or damp material. If wet or damp, container should be left open in a well-ventilated area to disperse any hazardous gases that may form. Once cleaned, neutralize/flood the spill area with large amounts of water as appropriate.
- **Small Spills:** Sweep or scoop up spilled material and add it to dive gear “disinfectant” rinse tote if available and full of water. If dive gear “disinfectant” rinse tote is not available, dispose of collected material into a clean, dry container. Once cleaned, neutralize/flood spill area with large amounts of water as appropriate.
- Never return spills to original containers for re-use.