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: Captain Joseph Pica, NOAA
Commanding Officer, NOAA Ship *Ronald H. Brown*

FROM: Captain Anne K. Lynch, NOAA
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for RB-14-03
NeMO 2014

Attached is the final Project Instruction for RB-14-03, NeMO 2014, which is scheduled aboard NOAA Ship *Ronald H. Brown* during the period of August 10 - August 19, 2014. Of the 13 DAS scheduled for this project, 13 DAS are funded by an OMAO allocation. This project is estimated to exhibit a Medium to High Operational Tempo. Acknowledge receipt of these instructions via e-mail to **OpsMgr.MOA@noaa.gov** at Marine Operations Center-Atlantic.

Attachment

cc:
MOA1

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Oceanic and Atmospheric Research
Pacific Marine Environmental Laboratory
7600 Sand Point Way NE
Seattle, WA 98115

~~DRAFT~~ BA Final Project Instructions

Date Submitted: July 31, 2014

Platform: NOAA Ship *Ronald H. Brown*

Project Number: RB-14-03

Project Title: NeMO 2014

Project Dates: August 10, 2014 to August 19, 2014

Prepared by: David Butterfield Dated: July 31 2014
David Butterfield
Chief Scientist
NOAA PMEL

Approved by: Chris Sabine Dated: 7/31/14
Chris Sabine
Director
NOAA PMEL

Approved by: ______ Dated: 08 AUG 2014
for Captain Anne K. Lynch, NOAA
Commanding Officer
Marine Operations Center - Atlantic

I. Overview

A. NOAA Ship *Ronald H. Brown* will participate in remotely operated vehicle diving operations with *Jason II* to conduct time-series observations and sampling at Axial Seamount, site of a long-term seafloor observatory. A new microbial incubator developed at PMEL will be deployed on Jason. A large-volume sampler for the study of viruses will be deployed multiple times as an elevator mooring. Sampling of hydrothermal fluids around the caldera of Axial Seamount will be conducted using the ROV. Instruments deployed in 2013 will be recovered. Hydrocasts (4-10) will be conducted with the ship's CTD rosette to sample hydrothermal plumes. The Brown will transit from San Francisco (location of dry dock work) to Newport, Oregon for staging. This research cruise is jointly funded by NOAA (ship time and PMEL science support), the Gordon and Betty Moore Foundation (microbial ecology and incubator project), and the Office of Naval Research (hydrothermal power generation study).

B. Days at Sea (DAS)

Of the 13 DAS scheduled for this project, 0 DAS are funded by the program and 13 DAS are funded by OMAO and 0 DAS are funded by Charter Funds. 2-3 DAS will be used to transit the ship from the shipyard to Newport, OR for staging. This project is estimated to exhibit a Medium to High Operational Tempo with 24 hour operations.

C. Operating Area

NeMO operating area is the Northeast Pacific within a 20 nautical mile radius of 46°N, 130°W, centered over the summit of Axial Seamount. See Appendix 1 for a map of the project working area.

D. Summary of Objectives

1. Time-series sampling of hydrothermal vent chemistry and microbiology. The NeMO project studies the interaction of geological, chemical, and biological processes in a deep-sea volcanic ecosystem using a combination of seafloor instruments and annual time-series sampling. We will use a variety of sampling instruments and devices with the Jason ROV to collect samples from key time-series sites to follow the chemical and microbiological evolution of the hydrothermal system.

2. Deployment of a new ROV-mounted incubator to conduct microbial growth experiments on the seafloor. We are developing a new incubator instrument to study the rates of microbiological processes on the seafloor with minimal delay and intervention. The primary experimental technique we will use is Stable Isotope Probing (SIP). SIP entails adding C-13-enriched bicarbonate to a sample and allowing the natural microbial community present to grow and incorporate the heavy carbon into its genetic material. The incubation is stopped, the genetic material is preserved on the seafloor, and the resulting DNA is extracted, separated by density gradient to isolate the active C-13-enriched fraction, and characterized by sequencing. The goal is to deploy this incubator 3 times during the cruise.

3. Recovery of heat-energy extraction test instruments deployed in 2013. Three instruments designed to evaluate the potential of high-temperature vents to generate energy from heat were deployed at 3 different vent sites in 2013. Each instrument will be recovered by attaching floatation to it with the ROV, releasing from the seafloor and recovering at the surface by the ship. David Dyer of the UW Applied Physics Lab is the lead scientist on this project and is developing detailed plans for the recovery.

4. Collection of large-volume samples for the study of viruses in hydrothermal fluids. An instrument capable of filling 2 200-liter containers with vent fluid will be mounted on an elevator mooring system, launched from the ship, and moved into place by the ROV. After a sample has been collected, the elevator mooring will be released and float to the surface, where it will be recovered by the ship. The goal is to deploy this system at least 3 times during the cruise.

E. Participating Institutions

NOAA PMEL, University of Washington, UW Applied Physics Lab, Marine Biological Laboratory, University of Massachusetts Amherst, J. Craig Venter Institute, Oregon State University, Maritime Applied Physics Corporation (MAPC), and Creare, Inc.

F. Personnel/Science Party

Name (Last, First)	**Date Aboard**	**Date Disembark**	**Gender**	**Affiliation**	**Nationality**
Butterfield, David	8/9/14	8/20/14	M	Univ. of Washington	USA
Roe, Kevin	8/9/14	8/20/14	M	Univ. of Washington	USA
Larson, Ben	8/9/14	8/20/14	M	Univ. of Washington	USA
Chace, Peter	8/9/14	8/20/14	M	Univ. of Washington	USA
Holden, James	8/9/14	8/20/14	M	U. Mass. Amherst	USA
Topcuoglu, Begum	8/9/14	8/20/14	F	U. Mass. Amherst	Turkey
Fortunato, Caroline	8/9/14	8/20/14	F	Marine Biological Lab	USA
Huber, Julie	8/9/14	8/20/14	F	Marine Biological Lab	USA

Stewart, Lucy	8/9/14	8/20/14	F	U. Mass. Amherst	New Zealand
Algar, Christopher	8/9/14	8/20/14	M	Marine Biological Lab	Canada
*Lawrence-Slavas, Noah	8/9/14	8/20/14	M	NOAA PMEL	USA
Evans, Leigh	8/9/14	8/20/14	M	Oregon State University	USA
Proskurowski, Giora	8/9/14	8/20/14	M	Univ. of Washington	USA
Zeigler-Allen, Lisa	8/9/14	8/20/14	F	Craig Venter Institute	USA
Tran, Dannylinh Nguyen	8/9/14	8/20/14	M	Craig Venter Institute	USA
Merle, Susan	8/9/14	8/20/14	F	Oregon State University	USA
Dyer, David	8/9/14	8/20/14	M	UW Applied Physics Lab	USA
Scidmore, Keith	8/9/14	8/20/14	M	Mapcorp	USA
Shapiro, Marc	8/9/14	8/20/14	M	Creare	USA
Collasius, Alberto	8/9/14	8/20/14	M	WHOI-NDSF	USA
Verhein, Korey	8/9/14	8/20/14	M	WHOI-NDSF	USA
Tradd, Benjamin	8/9/14	8/20/14	M	WHOI-NDSF	USA
Erick, Joshua	8/9/14	8/20/14	M	WHOI-NDSF	USA
Elder, Robert	8/9/14	8/20/14	M	WHOI-NDSF	USA
Kevis-Stirling, Akel	8/9/14	8/20/14	M	WHOI-NDSF	USA
Pelowski, James	8/9/14	8/20/14	M	WHOI-NDSF	USA
McCue, Scott	8/9/14	8/20/14	M	WHOI-NDSF	USA
Howland, Jonathan	8/9/14	8/20/14	M	WHOI-NDSF	USA
Kavanagh, Kevin	8/9/14	8/20/14	M	WHOI-NDSF	USA

**Foreign National Sponsor- Noah Lawrence-Slavas*

G. Administrative

1. Points of Contacts:

Chief Scientist:

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Ops Officer:
LT Adrienne Hopper
NOAA Ship *Ronald H. Brown*
Marine Operations Center, Atlantic
439 West York Street
Norfolk, VA 23510-1145
(843) 693-2082 (cell), (757) 299-8455 (e-fax)
OPS.Ronald.Brown@noaa.gov

2. Diplomatic Clearances

None required.

3. Licenses and Permits

None required.

II. Operations

The Chief Scientist is 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

Start	Stop	Operation
July 31/August 1	August 2/3	Transit from shipyard to Newport to stage.
August 10	August 11	Transit from Newport to Axial Seamount, 46°N and 130°W.
August 11	August 18	ROV dive operations. Instrument mooring deployments and recoveries. Hydrocasts with ship's CTD/rosette.
August 18	August 19	Transit from Axial Seamount back to Newport, Oregon.

B. Staging and Destaging

Staging: Prior to staging the ship will transit from the shipyard to Newport, OR. Loading and preparation of scientific equipment for this project will take place in Newport between August 6 and 10, 2014. The Jason ROV, winch, control vans, tool van, and storage vans will be loaded as early as possible with a shore crane at the NOAA Newport dock. Additional scientific equipment will be loaded using the ship's cranes. See Appendix 2 for a diagram of the van and major equipment placement on the ship, including weights, and Appendix 3 for a table of power requirements for major equipment, and additional requirements.

Scientists will arrive with equipment to be loaded onto the ship with the ship's crane between 1400 and 1500 on the afternoon of August 7th. If necessary, we request having the ship's crane available past 1700 to complete loading.

It is the responsibility of the scientists to arrange for shipment of their equipment to *Ronald H. Brown*. Woods Hole Oceanographic Institution and the National Deep Submergence Facility (NDSF) personnel will arrange for transport of all Jason ROV equipment to Newport. NDSF personnel, in coordination with the Operations Officer will arrange for the shore crane to load the ROV winch and vans.

Destaging: The ship will arrive back in port on August 19. If feasible, all science equipment will be offloaded on the day of arrival using the ship's cranes and loaded into trucks for transport to Seattle and other locations. On August 20, all Jason vans and heavy equipment will be offloaded in Newport with the use of a shore crane.

It is the responsibility of the scientists to arrange for shipment of their equipment and vans from *Ronald H. Brown*. The NDSF Expedition Leader, in coordination with the Operations Officer will arrange for the shore crane in Newport.

C. Operations to be Conducted

a. **Jason ROV diving**. Nearly all of the high-priority science work on this cruise depends on the Jason ROV. The Jason vehicle, Medea depressor system, launch and recovery system, vehicle tether, traction winch with 0.68" fiber-optic cable, USBL navigation transponder pole, Jason control vans, and tool van will all be deployed on the main deck. (A deck diagram is included in this draft document, to be modified pending discussion between the NDSF expedition leader and ship's personnel). ROV operations will occur around the clock, including launching and/or recovering the ROV at night. To accomplish the primary tasks, dives will need to be of 16 to 36 hour duration, so we will not be able to adhere to a regular 24-hour schedule with predictable daily launch and recovery times. Each ROV dive will have a dive plan with priority ranking and sequence of operations. There will be at least 3 scientists (watch leader, data logger, and video logger) in the control van with the Jason personnel for the duration of every dive.

b. **Large-volume water sampling for virus studies.** The large-volume water sampler will be mounted on an elevator platform provided by the Jason group. The science team will work with the ROV team to set up the elevator in Newport according to plans developed in advance. This platform will be launched over the side using the ship's main deck crane, at a pre-determined sampling site, prior to launching the ROV. The ROV will move the sampler into position, start, and monitor the sampling, and then release the drop weight to send the elevator back to the surface. The elevator will be recovered by the ship while the ROV is still in the water, and the water samples will be processed on deck and in the wet lab. (A photo of a previous elevator deployment is included in Appendix 4). This elevator will also hold small sampling devices (Integrated Gas-Tight samplers and titanium major samplers).

c. **Hydrothermal power test instrument recoveries.** Three seafloor instruments to evaluate the potential for energy production from hydrothermal vents were deployed in 2013. A diagram of one of these instruments is shown in Appendix 4. David Dyer of APL is preparing a floatation-recovery package that will be attached to the instrument frame by the ROV. The instrument and floatation will be recovered by the ship at the sea surface.

d. **CTD hydrocasts.** We will conduct hydrocasts with water sampling at a minimum of 6 stations around the caldera during times when the ROV is on deck. Water samples will be preserved for helium, DIC/TALK, trace metals, and nutrients. Shipboard analysis for hydrothermal gases (methane/hydrogen) will be done.

e. **Laboratory analysis and experiments.** A range of analyses will be carried out on board in the ship's labs. This includes preparation and maintenance of sampling instruments; sample extraction and processing; analysis of gases, dissolved sililca, hydrogen sulfide, ammonia, pH, and alkalinity; microbiological incubations and growth experiments; filtration of large volume water samples to concentrate viruses; preservation of samples for shore-based analysis. We expect to utilize all of the available laboratory space, including the main lab, bio-analytical lab, and wet lab. The hydro lab will primarily be occupied by the Jason ROV group. We require at least one working exhaust hood (preferably 2) for working with solvents and acids.

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. (This statement must remain in all project instructions)

SCUBA dives are not planned for this project.

E. Applicable Restrictions

Conditions which preclude normal ROV operations include poor weather, equipment failure, safety concerns, and unforeseen circumstances. Hydrocasts or multibeam mapping can continue in poor weather conditions unless working on deck becomes a safety issue.

III. Equipment

A. Equipment and Capabilities provided by the ship

The following systems and their associated support services are essential to the cruise. Sufficient consumables, back-up units, and on-site spare parts and technical support must be in place to assure that operational interruptions are minimal. All measurement instruments are expected to have current calibrations and all pertinent calibration information shall be included in the data package.

a. Navigational systems including high resolution GPS.

b. Reliable, uninterrupted power and deck space for the ROV, winch and related systems.

c. Laboratory/work space, storage space, and berthing for a full science party (30).

d. Refrigerator space (10 cubic feet) for seawater and hydrothermal water samples (no chemicals).

e. -80 freezer space (10 cubic feet) for seawater, hydrothermal water, and biological samples (no chemicals). Arrangements have been made to borrow a -80 freezer belonging to the R/V Thompson.

f. Walk-in cold room set to 4°C.

g. Walk-in freezer set to -20°C

h. Exhaust hoods for use of solvents and acids.

i. CTD with sensor suite (temperature, conductivity, dissolved O_2, pH, turbidity), data recording system, and rosette with 12 Niskin bottles, capable of hydrocast to 2000 meters depth.

j. Deck cranes, other machinery, and personnel for deploying and recovering seafloor instrument moorings (less than 30-meter total length).

k. Racks and/or hardware to secure compressed gas tanks in the ship's laboratories.

l. De-ionized water supply for cleaning and making chemical reagents.

m. Continuously flowing uncontaminated seawater to the CO_2 equilibrator in the Hydro Lab (6 L/min). A flow of uncontaminated seawater in the Wet Lab for sporadic collection of volumes up to 100 L.

n. Multibeam sonar system for ancillary mapping.

o. ADCP instrument to record ocean current data.

p. Networked computer printers and plotter.

q. Email and internet service.

r. PC-based work stations

B. Equipment and Capabilities provided by the scientists

a. ROV Jason and all associated gear (WHOI/NDSF)

b. Jason elevator and associated weights (WHOI/NDSF)

c. Navigational transponders (USBL system) for Jason operations (WHOI/NDSF).

d. Rapp traction winch system (WHOI/NDSF).

e. Control vans, tool van, rigging, vehicle, and shipping vans (WHOI/NDSF).

f. Effer crane for launch/recovery of ROV (WHOI/NDSF)

g. 4 Titanium major samplers (WHOI/NDSF).

h. Measured weights from a truck scale or similar will be provided for all science vans. It is understood that vans without current measured weights will not be accepted onboard. These weights can be found in Appendix 3.

i. Chemical reagents and compressed gases. A complete listing of all chemicals to be brought onboard is included in the Hazardous Materials section. Material Safety Data Sheets will be provided to the ship before any chemicals are loaded. Tanks will be secured vertically in tank racks. Hydrostatic test dates on gas cylinders will follow DOT regulations.

j. Other consumables, i.e., pens, pencils, paper, data storage media, etc.

k. ROV-mounted instrumentation including Hydrothermal Fluid and Particle Sampler with temperature and oxygen sensors, Incubator system, Integrated Gas-Tight samplers, UCSB Gas-Tight samplers.

l. Large-volume water sampler mounted on Jason elevator system for virus sampling.

m. Laboratory instrumentation for chemical and microbiological analysis (spectrophotometers, gas chromatographs, titrator, pH meters, microscope, ovens for incubations, filtration apparatus).

n. As a backup for the -80 freezer, the science party will bring liquid nitrogen to flash freeze samples.

o. Oxygen Redox Potential and Light Scattering sensors will be provided to connect to the ship's CTD.

IV. Hazardous Materials

A. Policy and Compliance

The Chief Scientist is 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 the anticipated quantity brought aboard, MSDS and appropriate neutralizing agents, buffers, or absorbents in amounts adequate to address spills of a size equal to the amount of chemical brought aboard, and a chemical hygiene plan. 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 of hazardous material indicating all materials have been used or 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 scientific chemicals is not permitted during projects aboard NOAA ships.

B. Inventory

Common Name of Material	Concentration	Amount	Neutralizer	Notes
Ethanol	95%	3 L	Vermiculite	
Ferric Chloride hexahydrate	Pure solid	90g	Vermiculite	
Hydrochloric Acid Solution	12M (37%)	1 L	Spill-X-A	
Hydrochloric Acid Solution	12M (37%)	0.5L	Spill-X-A	
N,N-Dimethyl-1,4-phenylenediamine dihydrochloride	pure solid	18g	sweep up	H2S color reagent, main lab
Potassium Iodate	1% solution	60 ml	vermiculite	main lab
Sodium Sulfide hydrated	pure solid	10g	sweep up	for sulfide standard
4-Methylaminophenol Sulfate (metol)	pure solid	50g	sweep up	water
Oxalic acid dihydrate	pure solid	250g	Spill-X-A	silica reagent, main lab
Sulfuric acid	<50%	2L	Spill-X-A	main lab
Air, compressed	n/a	2 tank (300cf)	None	main lab, GC
Ascarite	pure solid	5 g	Spill-X-C	main lab, GC
Helium, compressed	pure gas	1 tank (220cf)	evacuate area	main lab, GC
Hydrogen gas	100 ppm in Nitrogen	1 can (14L)	ventilate	main lab, GC standard
Hydrogen, compressed	pure gas	1 tank (300cf)	evacuate area	main lab, GC
Methane	100ppm in Helium	1 can (14L)	ventilate	main lab, GC standard
Nitrogen, compressed	pure gas	2 tanks (300cf)	evacuate area	main lab
Phenol solid	pure solid	30g	sodium hydroxide	main lab, reagent

Sodium Hydroxide	Solid	3x5g	Spill-X-C	
Sodium Hydroxide	Solid	200g	Spill-X-C	
Sodium Hypochlorite	7% solution	1 liter	Sodium bisulfite	
Sodium Nitroferricyanide	solid	3g	Zinc sulfate	
Ammonium hydroxide, 30% solution	30% solution	30ml	0.1M HCl	
Cadmium Acetate, solid	solid	10g	Dilute sodium sulfide	
Mercuric chloride, sat'd solution	Saturated solution	4.5g/30ml	Dilute sodium sulfide	
Hydrochloric Acid, 0.1M	0.1 M (0.3%)	1 liter	Spill-X-A	
Saf-Sol 20/20 aerosol	mixture	3x800ml	Vermiculite	
Thiourea	solid	2x7g	water	
acetone	100%	1 quart	vermiculite	
Sodium sulfide, 2.5% solution	2.5%	50ml	vermiculite	Holden
Ferrous chloride, 260 mM solution	0.26 mol/L	4x50ml	vermiculite	Holden
Formaldehyde, 37% solution	37%	50ml	Spill-X-FP	Holden
Ethanol, 70% solution	70%	100ml	Vermiculite	Holden
Hydrogen (80%):Carbon dioxide (20%), compressed	Compressed gas	1 tank (300cf)	ventilation	Holden
Nitrogen (80%): Carbon dioxide (20%), compressed	Compressed gas	1 tank (300cf)	Ventilation	Holden
Glutaraldehyde	25% solution	3x15ml	Vermiculite	Zeigler-Allen
Formaldehyde	37%	100 ml	Spill-X-FP	Zeigler-Allen
Ethanol	95%	1 liter	Vermiculite	Zeigler-Allen
Mitomycin C				Zeigler-Allen
Hydrochloric Acid, 37%	37% (12M)	0.5 liter	Spill-X-A	Fortunato
Ethanol	95%	24x0.5liter	vermiculite	Fortunato
Paraformaldehyde, 8%	8%	3x0.1 liter	Spill-X-FP	Fortunato
acetone	99%	1 quart	vermiculite	Evans
Liquified Petroleum Gas	99%	400g	None	Evans
sulphamic acid	99%	15x3g	Spill-X-A	Evans
denatured alcohol	95%	2 quarts	vermiculite	Evans

Liquid Nitrogen	100%	40 liters	none	

C. Chemical safety and spill response procedures

A: ACID

- Wear appropriate protective equipment 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 far ahead of spill for later disposal. 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 in original containers for re-use.
- Neutralize spill area and washings with Spill-X-A or soda ash or lime. Collect in a non-combustible container for prompt disposal.
- Spill-X-A or J. T. Baker NEUTRASORB® acid neutralizers are recommended for spills of this product.

M: Mercury

- Spills: Pick up and place in a suitable container for reclamation or disposal in a method that does not generate dust. Sprinkle area with sulfur or calcium polysulfide to suppress mercury. Use Mercury Spill Kit if need be.
- Mercuric chloride solution spills: wear personal protective equipment (gloves), absorb with vermiculite, transfer to plastic bag for disposal. Contained solution spills can be neutralized with an equal volume of dilute sodium sulfide to form mercuric sulfide solid, then absorb and dispose.

F: Formalin/Formaldehyde/Paraformaldehyde/Glutaraldehyde

- Ventilate area of leak or spill. Remove all sources of ignition.
- Wear appropriate personal protective equipment.
- Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible.
- Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, Spill-X-FP), and place in a chemical waste container.
- Do not use combustible materials, such as saw dust.

Inventory of Spill Kit supplies

Product Name	Amount	Chemicals it is useful against	Amount it can clean up
Spill-X-A	5x1.1kg	Acids	5 liters concentrated acid
Spill-X-C	2x.9kg	Caustics (bases)	1.3 liter conc. NH_4OH and 0.5 liter 50% NaOH
Vermiculite	4 cubic	Solvents and liquid spills	57 liters of liquid

	feet		
Spill-X-FP	3x.84kg	Formaldehyde/formalin	2.1 liters of 37% formaldehyde

Spill response materials have been calculated to exceed the total inventory brought on board

D. Radioactive Materials

No radioactive isotopes are planned for this project.

V. Additional Projects

A. Supplementary ("Piggyback") Projects

No Supplementary Projects are planned.

E. NOAA Fleet Ancillary Projects

No NOAA Fleet Ancillary Projects are planned.

VI. Disposition of Data and Reports

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.

VII. Meetings, Vessel Familiarization, and Project Evaluations

A. Pre-Project Meeting: The Chief Scientist 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 Chief Scientist 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 conducted a meeting no earlier than 24 hrs before or 7 days after the completion of a project to discuss the overall success and short comings 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 Chief Scientist, and members of the scientific party and is normally arranged by the Operations Officer and Chief Scientist.

D. Project Evaluation Report

Within seven days of the completion of the project, a Customer Satisfaction Survey is to be completed by the Chief Scientist. The form is available at http://www.omao.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 ships', 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. 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 project.

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 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 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 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 (3-14)) must be completed in advance by each participating scientist. The NHSQ can be obtained from the Chief Scientist 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 forms should be sent to the Regional Director of Health Services at the applicable Marine Operations Center. The NHSQ and Tuberculosis Screening Document should reach the Health Services Office no later than 4 weeks prior to the start of 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: Include only the Pacific OR Atlantic Office as applicable.

Regional Director of Health Services
Marine Operations Center – Atlantic
439 W. York Street
Norfolk, VA 23510
Telephone 757-441-6320
Fax 757-441-3760
Email MOA.Health.Services@noaa.gov

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 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

Hard hats are 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.

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. At the discretion of the ship CO, safety shoes (i.e. steel or composite toe protection) may be required to participate in any work dealing with suspended loads, including CTD deployment and recovery. The ship does not provide safety-toed shoes/boots. The ship's Operations Officer should be consulted by the Chief Scientist to ensure members of the scientific party report aboard with the proper attire.

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 means of communications, the ship can usually accommodate the 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 email 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 through the ship's Commanding Officer 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.

Completion of the above 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 within 3 days of embarking.

F. Foreign National Guests Access to OMAO Facilities and Platforms

All foreign national access to the vessel shall be in accordance with NAO 207-12 and RADM De Bow's March 16, 2006 memo (http://deemedexports.noaa.gov). National Marine Fisheries Service personnel will use the Foreign National Registration System (FNRS) 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 Line Office Deemed Export point of contact to assist with the process.

Foreign National access must be sought not only for access to the ship involved in the project but also for any Federal Facility access (NOAA Marine Operations Centers, NOAA port offices, USCG Bases) that foreign nationals might have to traverse to gain access to and from the ship. The following are basic requirements.

Full compliance with NAO 207-12 is required.

Responsibilities of the Chief Scientist:

1. Provide the Commanding Officer with the email generated by the Servicing Security Office granting approval for the foreign national guest's visit. (For NMFS-sponsored guests, this email will be transmitted by FNRS.) This email 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 Chief Scientist is responsible to provide 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 Office.
4. Export Control - Ensure that approved controls are in place for any technologies that are subject to Export Administration Regulations (EAR).

The Commanding Officer and the Chief Scientist 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 Chief Scientist or the DSN of the FNRS or Servicing Security Office email 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 - 8 weeks in advance of the project, provide the 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 Chief Scientist of any OMAO-sponsored foreign nationals that will be onboard while program equipment is aboard so that the Chief Scientist can take steps to prevent unlicensed export of Program controlled technology. The Commanding Officer and the Chief Scientist will work together to implement any access controls necessary to ensure no unlicensed export occurs of any controlled technology onboard regardless of ownership.

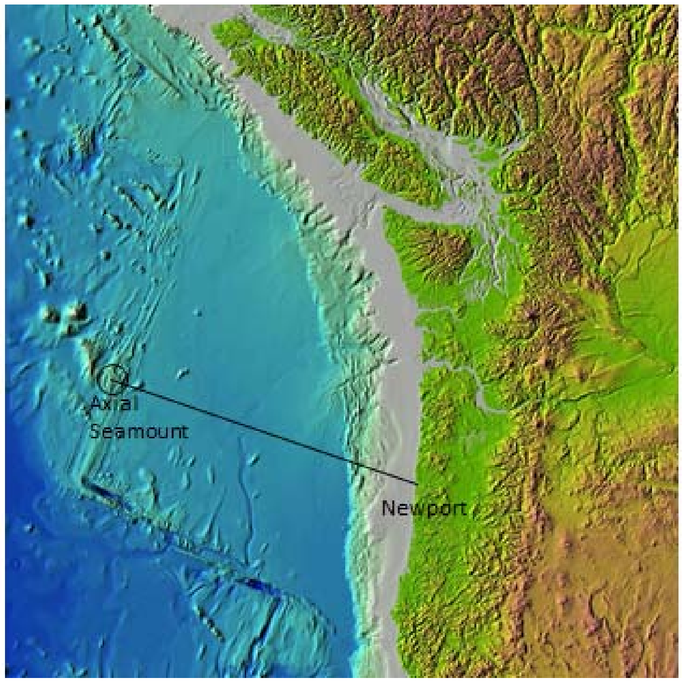
7. Ensure all OMAO personnel onboard receive the briefing on Espionage Indicators (NAO 207-12 Appendix A) at least annually or as required by the Servicing Security Office.

Responsibilities of the Foreign National Sponsor:

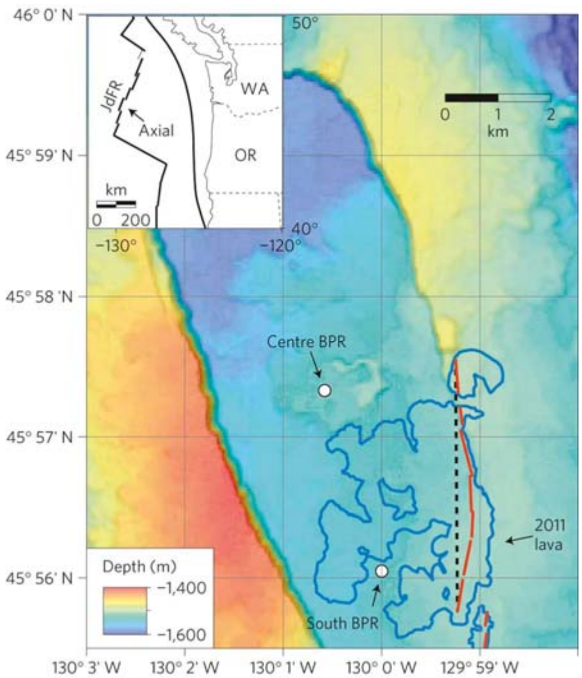
1. Export Control - The foreign national's sponsor is responsible for obtaining any required export licenses and complying with any conditions of those licenses prior to the foreign national being provided access to the controlled technology onboard regardless of the technology's ownership.
2. The DSN 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

IX. Appendices

Appendix 1. Map of project working area.



Regional map showing operations area at Axial Seamount, Newport, Oregon, and ship track.



Detail of working area. ROV dive operations will be conducted at the Axial Seamount summit caldera.

Appendix 2. Deck layout showing major equipment and weights and mobilization plan for Jason.

Jason II Deck Layout

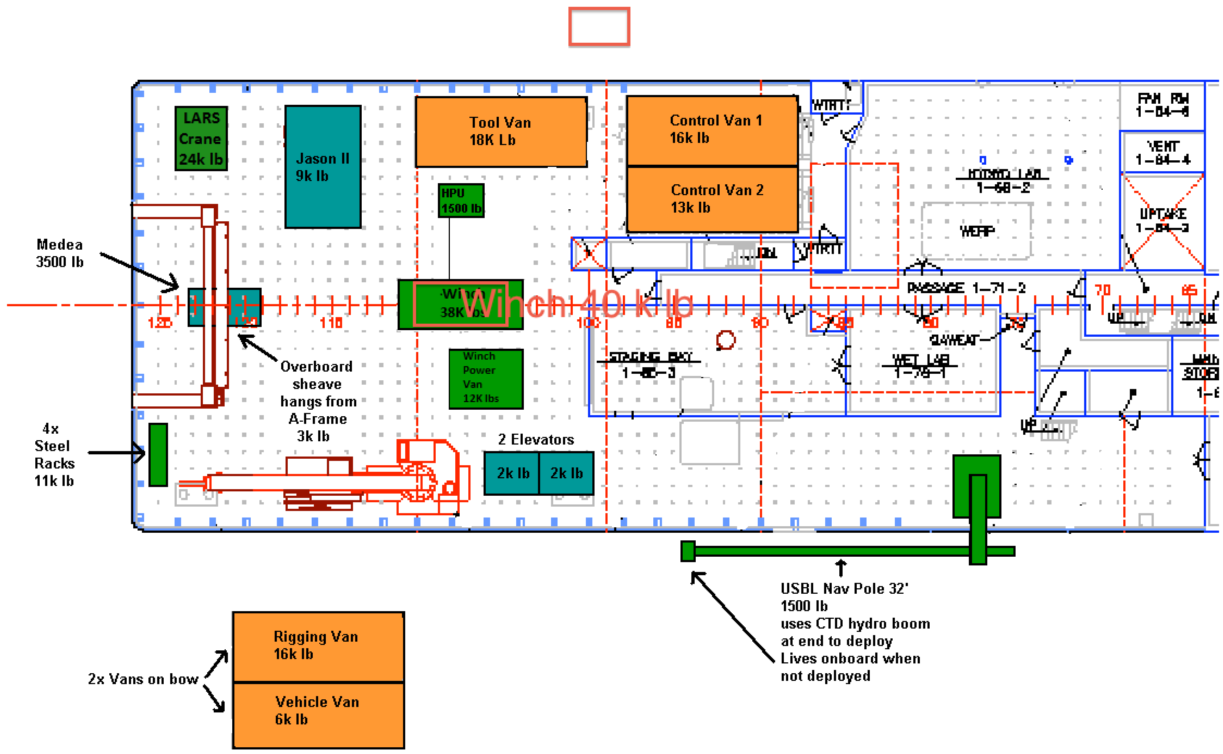


Figure A2-1 Diagram showing position and weights of Jason ROV equipment.

Summary of equipment weights:

Rapp Winch System:
Winch drum & wire: 40,500
Level Wind: 5300 lbs
Power Van: 10,000 lbs

Jason System:
Effer Crane: 23,500 lbs
Effer HPU: 1500 lbs
Control Van A - 18,100 lbs
Control Van B - 16,100 lbs
Tool Van: 24,000
Rigging Van: 15,400
Vehicle Van - 17,900 lbs (includes Jason 9100 lbs and Medea 3000 lbs)

Mobilization (MOB) Plan for R/V Ron Brown (RB)

6 thru 9 August 2014

10 August departure

This document describes details and the preferred order of loading Jason equipment to facilitate a rapid MOB. However, if the trucks are delayed or arrive in the wrong order we will change the order to keep the process moving. There will be concurrent ops, such as USBL system and deck plate installation that don't require the shore crane. If possible these will be accomplished with the ship crane while the shore crane is loading heavier items. When shore and ship crane operations are concurrent, the Jason EL will work with RB personnel to assure that safe operational procedures of two moving cranes are observed.

The Jason team requests that the shore crane be set up and RB personnel are ready to start operations by 0800 on day 1 of the MOB. Shore crane ops should be complete by 1700 of day 1. If there are delays in crane ops, we will request to work later on day 1 to avoid a second day of shore crane charges and delays. In this event we request the RB Bosun or designee work late to assist. After crane operations are complete we request the ship’s crew including deck personnel, Bosun, and ship electrician be available from 0800 until normal RB knockoff for the remainder of the MOB. As the MOB precedes the need for assistance from these personnel will decline.

Day 1 of the MOB is focused but not limited to shore crane operations. Below is the desired order for shore and ship crane ops.

1. Place the Dynacon portable winch on board as per attached drawing. These ops are accomplished with a coordinated effort of the RB Bosun (or designee), RB deck personnel, Jason team members, and directed by the winch tech. The deck plates can be placed with either the shore or RB crane. The winch components are placed with the shore crane due to their weight, in this order.

   Deck plates

   Drum of wire

   Level Wind

   Traction Head

HPU

When all the winch components are aboard, the winch tech will begin aligning and hooking up the winch in concert with continuing crane ops. The ship electrician will assist the winch tech to get power to the winch and get it energized. Usually winch installation is complete and operational by the end of day 1.

2. Remove port quarter bulwarks, place Jason LARS Crane in port quarter as per drawing. Jason team members will bolt down the crane. RB personnel install life lines where bulwarks are removed.

3. Place LARS crane HPU as per drawing, or similar. Jason team will connect hydraulics and with help from ship electrician connect power to crane HPU and get it running and moved to stow position while shore crane ops proceed.

4. Place Jason/Medea van on the dock out of the way with shore crane or fork truck. Jason personnel remove Jason and Medea from van with fork truck, place close to ship and shore crane, while shore crane ops continue.

5. Place Control Van deck plates (depending if the vessel has ‘peck and hail’ hold downs or similar).

6. Place Control Van 2, inner van as per drawing.

7. Place Control Van 1 outer van. RB personnel secure vans to deck.

8. Place Tool Van on ship as per drawing. RB personnel secure to deck.

9. Place Rigging Van on the dock, out of the way. Jason team will remove items from it to be placed on board with ship crane when available.

10. Place USBL pole base on board as per drawing.

    Place USBL pole components on board. Jason team will assemble.

    Place USBL stand on board. (Installation and assembly of the USBL system can be accomplished with the ship's crane as available, allowing shore crane ops to continue).

11. Place Jason and Medea on board as per drawing.

12. Place 2X elevators as per drawing, can be either ship or shore crane depending on availability.

13. Place steel racks on board, can be either ship or shore crane depending on availability.

14. Place rigging van on board where space is available, on bow.

15. Place empty vehicle van on board where space is available, on bow.

Concurrent to these crane operations there will be numerous items removed from the rigging and tool van and placed on the deck and into labs. Please see deck layout and power requirement docs for weights and electrical details.

Appendix 3. Jason Power Requirements

Subsystem	Volts	Phase	Freq (Hz)	[3]Circuit Breaker (A)	Typical Operating Current (A)	No-Load Current (A)	[1]Start-up Inrush Current (A)	[2]KVA calc'd from Typical Operating Current	[6]KVA calc'd from Circuit Breaker Size
Van Jetway[5]	480	3	60	100	65			54	83
Van Hotel	480	3	60	60	45			37	50
Effer	480	3	60	100	90		287	75	83
Rapp Winch	480	3	60	300	228	68	700	190	249
							Subtotal KVA	356	466
							Margin	30%	
							Total Required KVA	463	

[1]The startup inrush current is shown for those devices with large motors. No values indicate negligible inrush current. Further, any generator needs to be able to ride-through the inrush for the few milliseconds it lasts.

[2]The KVA calculation using Typical Operating Current. The calculation is V*I*sqrt(3)/1000.

[3]These are the typical circuit breaker values which most vessels use for our subsystems.

[4]If a stand alone generator is used, a circuit breaker panel needs to be provided with circuit breakers as shown above for each subsystem. Further, the panel needs to be able to accommodate the large input and output cables and should be watertight if located in any exposed environment.

[5]The Tool Van uses 480VAC single phase to power lights, outlets, and it's AC unit. This could be provided by the ship, but as designed, this comes off the Van Jetway feed.

[6]The KVA calculation using Circuit Breaker amperage. The calculation is V*I*sqrt(3)/1000.

Update History

26 Sep 2006 created to size out a 60Hz generator for the 50Hz German vessel R/V Merian

2006. new Effer power pack put into service, replacing the smaller original unit. Motor is 75HP

2008. new control vans built, redistributing some of the A/C load

20 March 2010 new Effer inrush is 287 amps, replacing the original 174 amps. C.Agee.

30 Jun 2011. no change in values, just some text cleanup. CLT

14 Sep 2011. no change in values, added KVA calcs based on circuit breaker size. CL

Appendix 4. Instrument and mooring information.

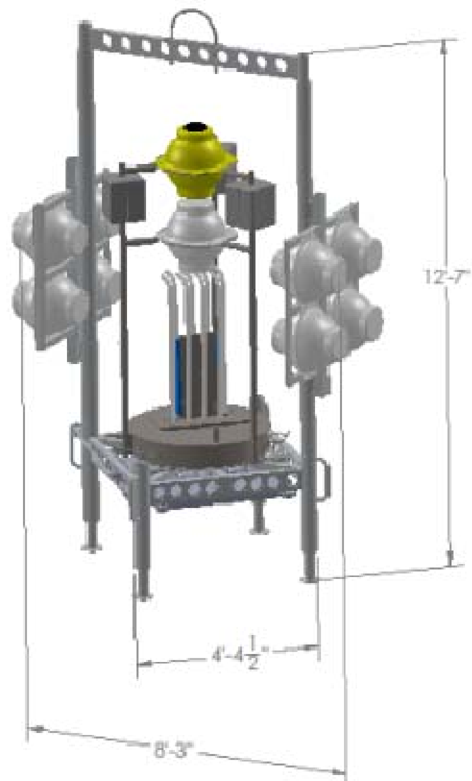


Figure A4-1. The APL hydrothermal power test instrument. Three of these instruments will be recovered from the seafloor by attaching floatation, releasing, and recovery at the sea surface.

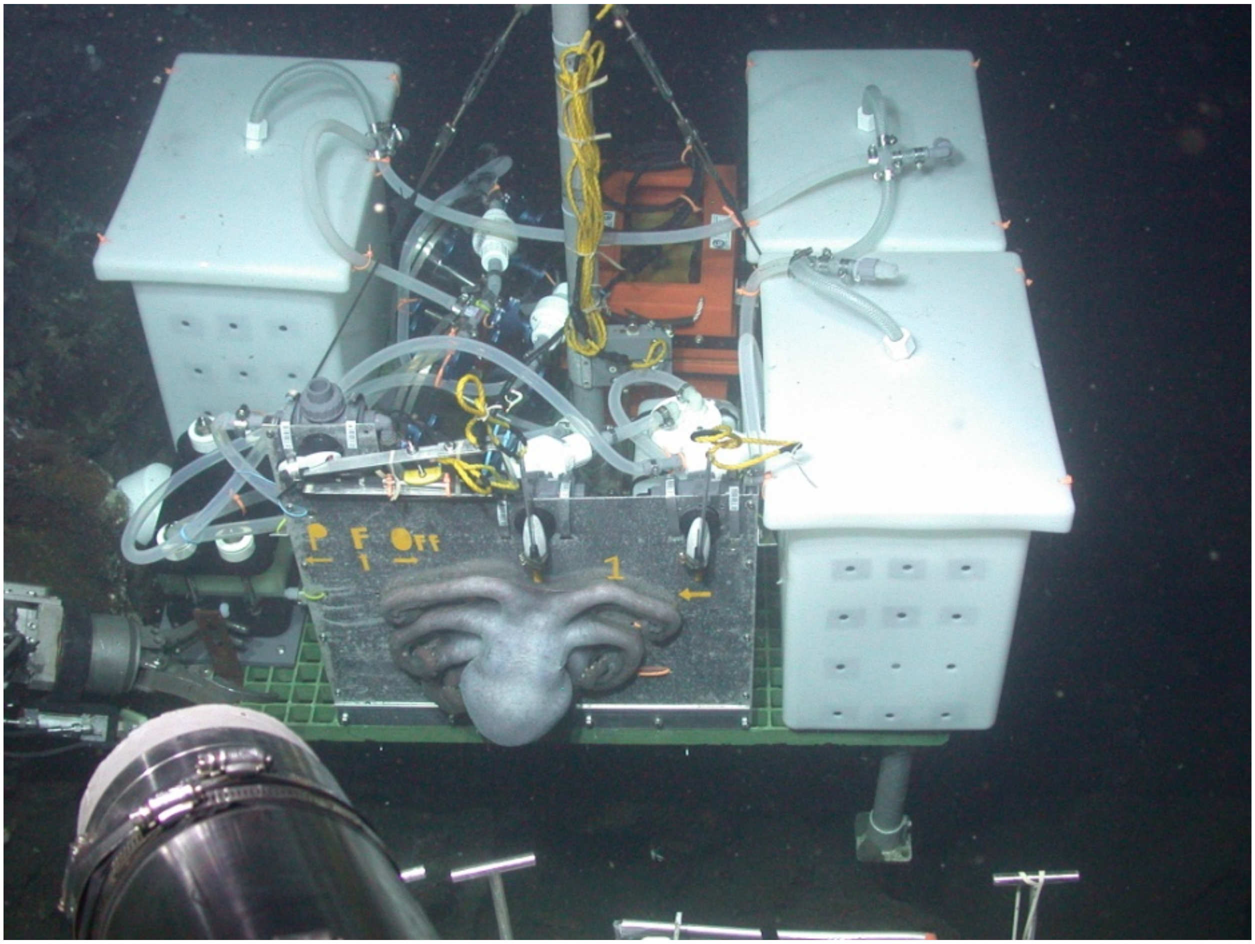


Figure A4-2. Photo of the large volume water sampler for virus studies, deployed on the seafloor. The elevator platform is approximately 5’x4’.

Mobilization (MOB) Plan for R/V Ron Brown (RB)

6 thru 9 August 2014

10 August departure

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