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 Anne K Lynch CAPT/NOAA
Commanding Officer, NOAA Marine Operations Center-Atlantic

SUBJECT: Project Instruction for RB-14-02
Tropical Oceans Atmosphere (TAO) 95W, 110W, 125W

Attached is the final Project Instruction for RB-14-02, Tropical Oceans Atmosphere (TAO) 95W, 110W, 125W, which is scheduled aboard NOAA Ship *Ronald H. Brown* during the period of 21 March – 22 April, 2014. Of the 33 DAS scheduled for this project, 33 DAS are funded by an OMAO allocation. This project is estimated to exhibit a Medium Operational Tempo. Acknowledge receipt of these instructions via e-mail to **OpsMgr.MOA@noaa.gov** at Marine Operations Center-Atlantic.

Attachment

cc:
MOA1

Final Project Instructions

Date Submitted: February 21, 2014

Platform: NOAA Ship *Ronald H. Brown*

Project Number: RB-14-02

Project Title: Tropical Oceans Atmosphere (TAO) 95W, 110W, 125W

Project Dates: March 21, 2014 to April 22, 2014

Prepared by: B. Lake   Dated: 2/24/14

Brian Lake
Chief Scientist
National Data Buoy Center

Approved by: Jeff W. Jenner   Dated: 2/24/14

Jeff Jenner
Operations Manager
National Data Buoy Center

Approved by: Dated: 2/24/14

Stephen Cucullu
Operations Branch Chief
National Data Buoy Center

Approved by: Anne K Lynch CAPT/NOAA   Dated: 2/26/14

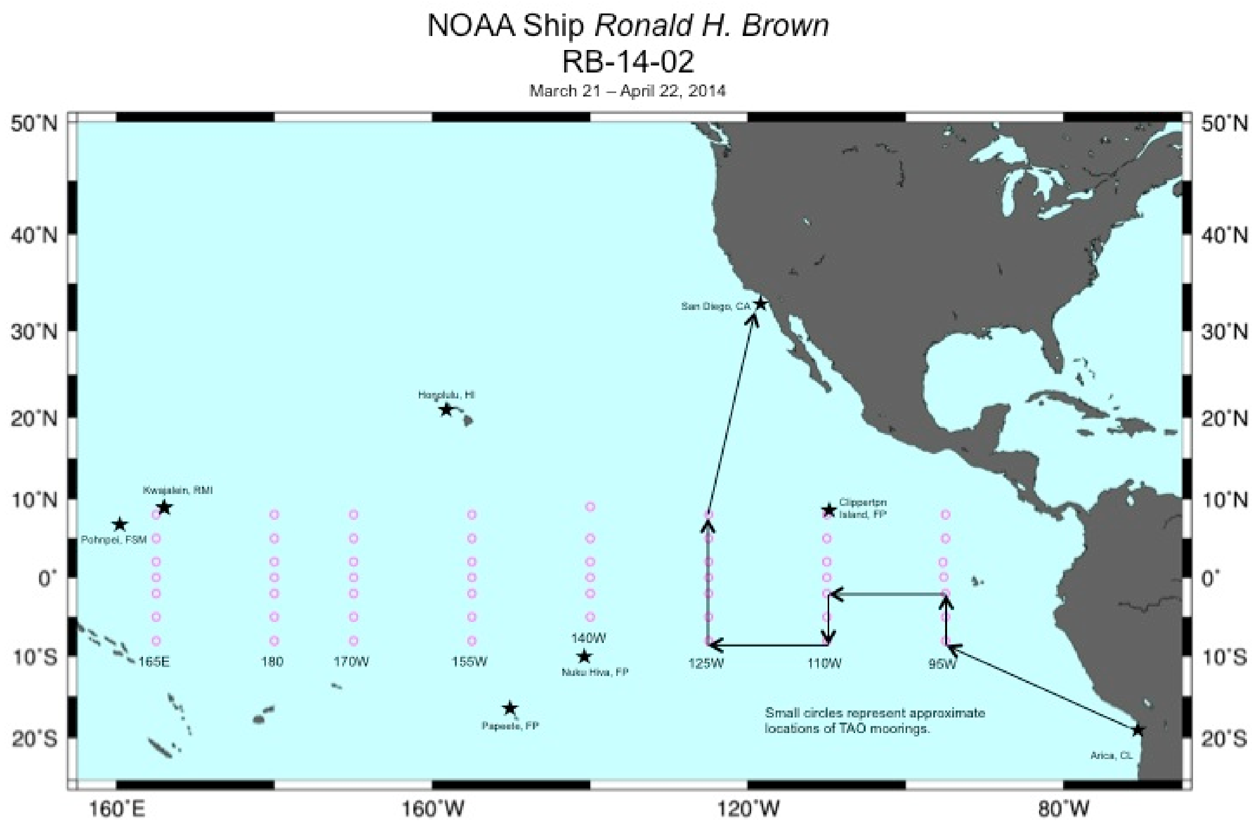
Captain Anne Lynch, NOAA
Commanding Officer
Marine Operations Center - Atlantic

I. Overview

A. Load ship - March 18 -19, 2014. Underway - March 21 – April 22, 2014. Unload ship April 23 - 24, 2014.

B. Service Level Agreements
Of the 33 DAS scheduled for this project, 33 DAS are funded by OMAO. This project is estimated to exhibit a Medium Operational Tempo.

C. Operating Area



D. Summary of Objectives

The objective of this cruise is the maintenance of the TAO Array along the 95°W, 110°W, and 125W meridians. The scientific complement for the cruise will embark in Arica, CL on March 20, 2014. The ship will depart on March 21, 2014 to commence operations as listed in Appendix A. After completion of operations, NOAA Ship *Ronald*

H. Brown will proceed to San Diego, CA arriving on or about April 22, 2014. All dates and times referred to in these cruise instructions are in Pacific Standard Time (PST).

E. Participating Institutions

National Data Buoy Center. Argo Floats from PMEL and Global Drifting Buoys from AOML will also be deployed during this cruise

F. Personnel/Science Party: name, title, gender, affiliation, and nationality

Name (Last, First)	**Title**	**Date Aboard**	**Date Disembark**	**Gender**	**Affiliation**	**Nationality**
Brian Lake	Cruise Lead	3/20/14	4/22/14	M	NDBC	US
William Thompson	Lead Tech.	3/20/14	4/22/14	M	NDBC	US
James Rauch	Support Tech.	3/20/14	4/22/14	M	NDBC	US
Rodney Watkins	Support Tech.	3/20/14	4/22/14	M	NDBC	US

G. Administrative

1. Points of Contacts:

Chief Sci.: Brian Lake
National Data Buoy Center
7600 Sand Point Way NE
Seattle, WA 98115
206-526-4891
Brian.Lake@noaa.gov

NDBC Ops: Jeff Jenner
National Data Buoy Center
Stennis Space Center, MS 39529
228-688-2784
Jeff.Jenner@noaa.gov

2. Diplomatic Clearances
NA

3. Licenses and Permits
NA

II. Operations

A. Project Itinerary

Depart Arica Chile on March 21, 2017, conduct operations as outlined in Appendix A, arrive in San Diego on April 22, 2014.

B. Staging and Destaging

Staging will take place in Arica Chile on March 17th and 18th, 2014. De-staging will take place in San Diego, CA on April 23rd and 24th, 2014.

C. Operations to be conducted

The details of station work are summarized in Appendices A. The cruise will involve underway operations between stations, including CTDs, mooring recoveries, deployments, and repairs (Section 2.03). During the cruise, it is requested that the vessel provide to the Chief Scientist an updated operations spreadsheet (similar to Appendix A) with actual times and speeds made good for the entire cruise. The TAO project will provide regular updates of buoy positions during the cruise in order to recover those adrift.

2.01 Underway Operations

2.01.1 ADCP

A ship-mounted ADCP system will be used to continuously measure the currents in the upper ocean along the trackline. At a minimum, data from the ADCP will be logged from the start of the transit once in international waters (or waters for which there is research clearance) and continue until leaving international waters. For calibration purposes it is essential that bottom tracking be activated at the start and end of a cruise when in water depths shallower than 500m. The ship's Survey Technician will be in charge of data storage (hard drive to disks and/or CD's as necessary). The ADCP will be interfaced to the ship's GPS receiver and will receive data at one-second intervals. The clock on the ADCP IBM computer will NOT be reset while underway. ADCP operating parameters will not be changed without the permission of the Chief Scientist, in consultation with Dr. Eric Firing, and after informing TAO personnel of the intended parameter change. All ADCP data will be provided to the chief scientist and sent to Dr. Eric Firing at the University of Hawaii.

Accurate ship navigation is essential for valid ADCP current measurements. The ship will provide a fully operational GPS receiver and Seapath 200 system (or equivalent) for navigation input. Ship's ET will select proper GPS codes to enable ADCP navigation data collection. The ADCP will be interfaced with the ship's gyro so that accurate heading information is available to the ADCP.   A manual comparison of the ADCP heading/gyro reading will be logged by the Electronics Technician while the ship is dockside, at the beginning of a cruise and checked periodically throughout the cruise. For calibration purposes, “Bottom Tracking” should be activated whenever the ship is transiting water shallower than 500m.

Due to compatibility problems, the ADCP is not interfaced to SCS, so GPS navigation and gyro inputs must be connected directly to the ADCP system. If the ADCP becomes interfaced to the SCS, then the ADCP data will be recorded on both the ADCP recording system and the SCS. Appropriate data storage systems will be connected to the ADCP system for ADCP data collection. The ADCP data recorded on the IBM has course and speed information from the navigation data that is exactly time coincident with the ADCP ensembles.

The ADCP system will be operated by ship personnel and will continuously log data to the ADCP storage disks during the entire cruise. If necessary, the ADCP data disks will be changed when full. Full disks will be labeled and backed up. An ADCP log will be maintained by the Electronics Technician and a check of the ADCP recording of heading, time, velocity and navigation information will be done periodically to ensure the system is operating properly. Any inconsistencies, such as heading, time, and/or navigation input not in agreement with actual/expected, will be noted in the log and reported to the Commanding Officer and Chief Scientist.

Principle Investigator:

Dr Eric Firing, University of Hawaii   efiring@iniki.soest.hawaii.edu

2.01.2 SST and SSS

Sea surface temperature and salinity will be recorded continuously with a SEABIRD SBE-21 accurate to within 0.1 C and 0.01 psu. The Survey Technician will translate the data from the thermosalinograph to ASCII. It is the vessel’s responsibility to ensure that the thermosalinograph is calibrated, at a minimum, annually.

2.02 CTD Observations

A Sea-Bird 911 plus CTD with dual temperature and conductivity sensors will be the primary system and will be provided by the program. A backup Sea-Bird 911 plus CTD with dual sensors is also required and will be provided by the ship. A Sea-Bird carousel and twelve 10-liter Niskin bottles will be used to collect water samples for the analysis of salinity. A backup Sea-Bird carousel and spare Niskins will be provided by the program.

At a minimum, 1000 meter CTD casts shall be conducted at each mooring site for sensor inter-comparison purposes. As time permits, additional or deeper CTD’s should be conducted whenever addition of the CTD's will not impact scheduled mooring work. For example, if the ship would arrive at the next mooring site in the middle of the night, it is preferable to do CTD's on the way, rather than remain hove to waiting for daylight. Another example would be when mooring operations are significantly ahead of schedule. Beyond those at mooring sites, CTD's should be conducted in the following order of priority:

- 1000m CTD's at one-degree latitude intervals between 8° N and 8° S, along the ship's trackline.

- Extend 1000m CTD's at mooring sites to a minimum of 3000m or a maximum depth of 200m from the bottom. Four to six deep casts are optimal, occurring at the beginning and end of the cruise as well as at both equatorial sites.

For each cast, the CTD operator should be notified at least 30 minutes prior to arriving on station in order to ready the underwater package and power up the instrumentation (i.e. turn on the deck unit) giving the electronics time to equilibrate.

Once the CTD has been deployed, it should be held at 10 m for 2 minutes to activate the pumps and remove any air bubbles in the sensor tubing. The winch operator should then raise the package to just beneath the surface being careful to not let the sensors come out of the water. The CTD operator will hit "markscan" and then instruct the winch operator to start down.

Descent rates should be 30 m/min from 0-50 m, 45 m/min from 50-200 m, and 60 m/min beyond 200 m. An entry in the Marine Operations Abstract should be made for each CTD cast at the maximum cast depth by the bridge watch. Ascent rates should not exceed 60 m/min. If possible, all 8 Niskin bottles should be closed at specified depths in the water column. After recovery and data acquisition is completed, the deck unit should be turned off.

CTD data will be acquired and processed on the ship's computer equipped with SEASOFT software. The capability to display CTD data using the SCS system and monitors will be available. The CTD operator will complete the CTD cast logs. The CTD operator or bridge watch will maintain the CTD weather log.

Water samples for salinity analysis will be taken from 8 depths per station instead of 12 and running 40 samples per standard instead of 36. The Survey Technician will run salinity analysis on the ship's autosalinometer within 2-3 days after the samples are collected using ACI2000 software. The autosalinometer will be standardized with IAPSO standard seawater, provided by the program, before each salinity run. Bottle salinity data will be used post-cruise at NDBC for conductivity sensor calibration.

The Chief Scientist in consultation with the FOO will set a cruise CTD operator schedule for the science party to assist and cover 24 hour CTD operations as needed relative to the CST's workload.

The Survey Technician will complete the NDBC provided CTD logs. Instructions for filling out the CTD logs are contained in Appendix B: NDBC CTD Procedures.

2.03 Mooring Operations

Mooring Operations are scheduled to be conducted as shown in Appendix A. Operations will be conducted from 8S 95W to 2S 95W and then to 2S 110W to 8S 110W and the from 8S 125W to 8N 125W . The following mooring operations are anticipated, though the work may be changed by direction of the Chief Scientist; in consultation, with the Commanding Officer.

Location	***Mooring Type***	***Operation***	***Status***
8°S 95°W	Refresh	Recover/Deploy	
32413	DART	Recover/Deploy	Surface buoy is adrift
5°S 95°W	ATLAS	Recover	Not transmitting
5°S 95°W	Refresh	Deploy	
2°S 95°W	ATLAS	Recover	
2°S 95°W	Refresh	Deploy	
2°S 110°W	ATLAS	Recover?	Not Transmitting
2°S 110°W	Refresh	Deploy	
5°S 110°W	ATLAS	Recover?	Adrift
5°S 110°W	Refresh	Deploy	
8°S 110°W	ATLAS	Recover	
8°S 110°W	Refresh	Deploy	
8°S 125°W	Refresh	Recover/Deploy	
5°S 125°W	Refresh	Recovery/Deploy	
2°S 125°W	ATLAS	Recover?	Not Transmitting
2°S 125°W	Refresh	Deploy	
0° 125°W	ATLAS/CO2	Recover?	Not Transmitting
0° 125°W	Refresh/CO2	Deploy	
2°N 125°W	Refresh	Recover?/Deploy	Adrift
5°N 125°W	ATLAS	Recover?	Not Transmitting
5°N 125°W	Refresh	Deploy	
8°N 125°W	ATLAS	Recover	
8°N 125°W	Refresh	Deploy	

2.05 Navigation

Navigation will be based on the best available information, including GPS, dead reckoning, radar and visual bearings as appropriate. GPS is vital to the efficient deployment of a mooring and is the preferred navigational aid in the project area. Radar ranges and visual bearings to buoys may be required during deployment and recovery operations.

Navigational information will be recorded on the Electronic Marine Operations Abstract (EMOA) by the bridge watch. In addition to recording mooring events as they occur, various courses and speeds may be logged when on station. In the event of an SCS failure, the bridge watch will record hourly GPS positions in the MOA.

2.06 Multibeam

Multibeam swath surveys are requested for all mooring sites of this cruise as defined above. The center beam information of the Multibeam system will be used to observe and record bottom depth for this and future mooring deployments. The Chief Scientist will provide areas and coverage parameters for the surveys relative to time available as the cruise progresses. Contoured plots of mooring site surveys will be generated by the Chief Survey Technician.

2.07 Underway Measurements in support of Global Carbon Cycle Research (GCC)

2.07.1 Request:

As part of the ongoing research to quantify the CO2 uptake by the world's oceans we have installed underway systems on BROWN. After initial start-up, which requires about one hour of monitoring, the system needs checking twice a day requiring a total of about 20-minutes. We would also request weekly data downloads and transmission such that we can perform on shore near-real-time quality control to assess if the instrument is operating satisfactorily. All costs of the email transmissions and survey technician overtime would be covered by AOML. The chief survey technician, J. Shannahoff, has operated the instrument before with good results. In the event of system malfunction that cannot be easily repaired, we will ask Mr. Shannahoff to shut the system down. The shoreside leader of the effort, Mr. Robert Castle has interacted closely with J. Shannahoff and feels that this arrangement would work well.

2.07.2 Introduction:

The underway sensors on RHB will be used in support of the objectives of the Global Carbon Cycle Research (GCC) to quantify the uptake of carbon by the world's ocean and to understand the bio-geochemical mechanisms responsible for variations of partial pressure of CO2 in surface water (pCO2). This work is a collaborative effort between the CO2 groups at AOML and PMEL.

The semi-automated instruments are installed on a permanent basis in the hydrolab of RHB and are operated by personnel from AOML and PMEL. All work is performed on a not-to-interfere basis and does not introduce any added ship logistic requirements other than the continuous operation of the bow water pump and thermosalinograph. This effort requires one permanent berth for the operator of the systems. The instrumentation is comprised of an underway system to measure pCO2, a SOMMA (single operator multi-parameter metabolic analyzer) -coulometer system to measure total Dissolved Inorganic Carbon (DIC), - a Turner Designs fluorometer, and a YSI oxygen probe. An oxygen titrator and stand-alone fluorometer will be used to calibrate the underway oxygen and fluorometer, respectively. All the instruments are set up along the port side bulkhead and aft bench in the hydrolab. The batch oxygen and DIC samples will be analyzed in AOML.

2.07.3 Rationale:

Current estimates of anthropogenic CO2 uptake by the oceans range from 1 to 2.8 Gigatons per year. The CO2 fluxes between air and water are poorly constrained because of lack of seasonal and geographic coverage of delta pCO2 (the air-water disequilibrium) values and incomplete understanding of factors controlling the air-sea exchange of carbon dioxide. Seasonal and temporal coverage can be increased dramatically by deploying pCO2 analyzers on ships.

The effort on RHB is expanded beyond the historical scope of the underway programs by incorporating additional sensors to improve our understanding of the factors controlling pCO2 levels.

2.07.4 Sensor Suite and Maintenance:

2.07.4.1 Underway pCO2 system

This system consists of a large (40-liter) air-water equilibrator requiring an unobstructed drain at floor level for the 15 L/min outflow, an infra red analyzer with valves and flow meters, and a computer controlling the operating sequence and which also logs the data. The underway pCO2 system is an integrated package for measurement of pCO2 in air and water and support sensors necessary to reduce the data (such as equilibrator temperature, location, salinity, sea surface temperature and barometric pressure). This system is an upgrade from the initial systems and requires routine checks at 6-12 hour intervals, including logging of mercury thermometers in the equilibrator.

2.07.4.2 Oxygen sensor

This is a compact pulsed electrode unit which also contains a temperature sensor. This is a new sensor built by Dr. Langdon at LDEO. Water requirement is 2-Liter/minute with a bench top drain. One foot of bench space is required. During this cruise the data will be validated against samples taken four times a day and analyzed by potentiometric winkler titrations.

2.07.4.3 Turner Designs Fluorometer

This instrument, which was jointly purchased by AOML and MOC-A for BALDRIGE, requires a water throughput of about 5 L/min. Periodic cleaning of the flow through cell (2-14 days) is required . The signal of the fluorometer is logged on the shipboard SCS system or on the computer logging the underway pCO2 data. Aliquots of seawater are extracted twice per day and analyzed for chlorophyll and phaopigments on a separate fluorometer following routine procedures to calibrate the fluorometer signal. This information will be particularly useful to extrapolate the observations from the NASA SEAWIFS satellite to in situ pigment concentrations.

2.07.5 Summary - Ship infrastructure support:

2.07.5.1 Continuous seawater supply: 20 lpm minimum, 40 lpm maximum for instruments, and 75 lpm throughput to assure short residence time of water in line and minimal heating.

2.07.5.2 Access to TSG and SCS data: Temperature at intake, salinity from TSG, fluorometer signal, wind speed (true and relative), wind direction (true and relative), time, latitude, longitude, and ship speed.

2.07.5.3 Bench space, hydrolab space, access to bow water line and drains.

Principal investigators:

Dr Rik Wanninkhof, AOML	305-361-4379	Rik.Wannikhof@noaa.gov
Dr Richard Feely, PMEL	206-526-6214	Richard.A.Feely@noaa.gov

Specific questions should be directed to:

Robert Castle, AOML	305-361-4418	Robert.Castle@noaa.gov

2.08 Atlantic Oceanographic and Meteorological Laboratory (AOML) Surface Drifters

The Global Drifter Center at NOAA/AOML requests drifter deployments on an ancillary basis. The drifters are small, easily deployed devices that are tracked by ARGOS and provide Sea Surface Temperature (SST) and mixed layer currents. The global array of drifters provides SST ground truth for NOAA's polar orbiting satellite AVHRR SST maps. They also provide data to operational meteorological and ocean models, and research ocean current data sets.

Drifter Positions - TBA

Principal Investigator
Shaun Dolk, NOAA/AOML (305) 361-4546 Shaun.Dolk@noaa.gov

2.09 Pacific Marine Environmental Laboratory (PMEL) Argo Profiling CTD Floats

Four Argo floats are scheduled for deployment on this cruise.   Individual deployment positions can be shifted by a degree or so along the ship track if more convenient. Each float weighs about 56 lbs. The boxes weigh about 200 lbs. full and are 82” long x 17” high x 23” long. Boxes cannot be stored or transported on their small ends.   The floats are sensitive to high temperatures, so as space for a pair of floats becomes available on the computer lab rack, it will be desirable to move floats from the next box to the rack at the earliest convenient time. A manual for float testing and deployment has been sent to the ship. Float deployment locations are as follows:

Latitude:	Longitude:
-13.4552	-81.995
-12.7117	-83.8831
-11.9548	-85.7601
-11.1853	-87.6266
-10.4041	-89.4831
-9.6123	-91.3305
-8.8106	-93.1692
-8.0	-95.0
-5.0	-95.0
-2.0	-95.0
-2.0	-104.0
-2.0	-110.0
-5.0	-110.0
-8.0	-110.0
-2.0	-125.0
0.0	-125.0
2.0	-125.0
5.0	-125.0
20.0	-121.0

Gregory Johnson	(206) 526-6806	pmel_floats@noaa.gov
Elizabeth Steffen	(206) 526-6747	pmel_floats@noaa.gov

D. Dive Plan

NA

E. Applicable Restrictions

Conditions which preclude normal operations: Poor weather conditions may delay or cancel certain procedures, such as small boat operations and CTD casts. Decisions will be made on a case by case basis after consultation between the ship's crew and captain and the chief scientist. The primary consideration is the safety of the ship's crew and scientists. Possible mitigation strategies include waiting until conditions improve, canceling CTD casts, and recovering moorings without small boat operations. Unforeseen circumstances such as equipment failure may also cause a delay or cancelation of certain operations. Appropriate courses of action will be determined after discussion among the captain, crew, and chief scientist.

III. Equipment

A. Equipment and Capabilities provided by the ship (itemized):

- Narrow band Acoustic Doppler Current Profiling (ADCP) system.
- Hydro winch with slip rings and sufficient CTD cable for casts up to 5500 meters.
- Recently calibrated (i.e. at least annually) salinometer plus sample bottles.
- GPS Navigation equipment.
- Marine Operations Abstracts (OCS Worksheet 001).
- Deck machinery for mooring recovery and deployment.
- Laboratory and storage space.
- PC based SCS workstation.
- Sea surface temperature and salinity system (thermosalinograph).
- Zodiac, or equivalent, and motor for servicing moorings.
- Recently calibrated Seabird CTD, 2T/C sensor pairs, rosette frame and pylon, and deck unit.
- Electronic & mechanical terminations for CTD.
- Fathometer capable of depth readouts to 6000 meters.

B. Equipment and Capabilities provided by the scientists (itemized):

- One Seabird CTD, two temperature/conductivity T/C pairs, rosette frame and pylon (with spare), deck unit, oxygen sensor (and spare), load cell (and spare).
- IAPSO standard water
- All components of the planned moorings.
- Peck & Hale Release-A-Matic hook.
- CTD spare parts and supplies.
- Twenty-four 10-liter Niskin bottles.
- Consumables - i.e. copy/printer paper, data storage media, pens and pencils.

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 FEC 07, the scientific party will include with their project instructions and provide to the CO of the respective ship 60 to 90 days before departure:

- A list of hazardous materials by name and anticipated quantity
- Include a chemical spill plan the addresses all of the chemicals the program is bringing aboard. This shall include:

    - Procedures on how the spilled chemicals will be contained and cleaned up.
    - A complete inventory (including volumes/amounts) of the chemical spill supplies and equipment brought aboard by the program. This must be sufficient to clean and neutralize <u>all</u> of the chemicals brought aboard by the program.
    - A list of the trained personnel that will be accompanying the project and the training they've completed.

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.

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	**Qty**	**Notes**	**Trained Individual**	**Spill control**
Lithium batteries	43-16 D-cell batteries	Fire Hazard	Brian Lake	Class D fire extinguiser will be available
Lithium batteries	600 AA batteries	Fire Hazard	Brian Lake	Class D fire extinguiser will be available
Paint	8 1-gallon can	Fume Hazard	Brian Lake	Tarp

C. Radioactive Isotopes

No Radioactive Isotopes are planned for this cruise . OR

V. Additional Projects

A. Supplementary ("Piggyback") Projects – see section II.

B. NOAA Fleet Ancillary Projects - None

VI. Disposition of Data and Reports

A. Data Responsibilities

B. Pre and Post Project Meeting

Prior to departure, the Chief Scientist will conduct a meeting of the scientific party to train them in sample collection and inform them of project objectives. Some vessel protocols, e.g., meals, watches, etiquette, etc. will be presented by the ship's Operations Officer.

Post-Project Meeting: Upon completion of the project, a meeting will normally be held at 0830 (unless prior alternate arrangements are made) and attended by the ship's officers, the Chief Scientist and members of the scientific party to review the project. Concerns regarding safety, efficiency, and suggestions for improvements for future projects should be discussed. Minutes of the post-project meeting will be distributed to all participants by email, and to the Commanding Officer and Chief of Operations, Marine Operations Center.

C. Ship Operation Evaluation Report

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

25FEB14 notified of new submission of PER on new template

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

VII. Miscellaneous

A. Meals and Berthing

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 survey.

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 7, 1999 which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels.

B. Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ, Revised: 02 JAN 2012) 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. The completed form should be sent to the Regional Director of Health Services at Marine Operations Center. The participant can mail, fax, or scan and send via secure e-mail the form using the contact information below; participants should take precautions to protect their Personally Identifiable Information (PII) and medical information. The NHSQ 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 that health services might require before clearance to sail can be granted. Please contact MOC Health Services with any questions regarding eligibility or completion of the NHSQ. Be sure to include proof of tuberculosis (TB) testing, sign and date the form, and indicate the ship or ships the participant will be sailing on. The participant will receive an email notice when medically cleared to sail if a legible email address is provided on the NHSQ.

Contact information:

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

Prior to departure, the Chief Scientist must provide 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 are also required when working with suspended loads. Work vests are required when working near open railings and during small boat launch and recovery operations. Hard hats and work vests will be provided by the ship when required.

D. Communications

A progress report on operations prepared by the Chief Scientist may be relayed to the program office. Sometimes it is necessary for the Chief Scientist to communicate with another vessel, aircraft, or shore facility. Through various 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 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 *NMAO 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 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 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 (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.

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 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 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 Regional 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 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 NMAO approval 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 FRNS 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 - 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 Regional 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, 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

Appendices

A. TAO Operations spreadsheet (Station/Waypoint List).

B. NDBC CTD Instructions

C. Load List

NOAA Ship *Ronald H. Brown*

RB-14-02

Activity	Latitude Deg.	Latitude Min		Longitude Deg.	Longitude Min.		Deployed (mos)	Dist. (nmi)	Speed (kts)	Transit (hrs)	On Sta (hrs)	Arrive Date / Time	Depart Date / Time
Arica, Chile	**18**	**29.02**	**S**	**70**	**22.25**	**W**							**21-Mar 16:00**
R/D REFRESH & CTD	**8**	**01.41**	**S**	**95**	**14.90**	**W**	**25.3**	**1579.7**	**12.0**	**131.6**	**12.0**	**27-Mar 03:38**	**27-Mar 15:38**
Deploy DART 32413	**7**	**23.80**	**S**	**93**	**30.00**	**W**	**43.1**	**110.5**	**12.0**	**9.2**	**16.0**	**28-Mar 00:51**	**28-Mar 16:51**
CTD	7	00.00	S	95	00.00	W		92.4	12.0	7.7	0.0	29-Mar 00:33	29-Mar 00:33
CTD	6	00.00	S	95	00.00	W		60.0	12.0	5.0	0.0	29-Mar 05:33	29-Mar 05:33
Recov ATLAS, Deploy Refresh	**5**	**07.73**	**S**	**95**	**01.08**	**W**	**25.2**	**52.3**	**12.0**	**4.4**	**12.0**	**29-Mar 09:54**	**29-Mar 21:54**
CTD	4	00.00	S	95	00.00	W		67.7	12.0	5.6	0.0	30-Mar 03:33	30-Mar 03:33
CTD	3	00.00	S	95	00.00	W		60.0	12.0	5.0	0.0	30-Mar 08:33	30-Mar 08:33
Recov ATLAS, Deploy Refresh	**1**	**59.00**	**S**	**95**	**10.50**	**W**	**11.9**	**61.9**	**12.0**	**5.2**	**12.0**	**30-Mar 13:42**	**31-Mar 01:42**
Recov ATLAS, Deploy Refresh	**2**	**01.50**	**S**	**109**	**58.00**	**W**	**25.6**	**878.5**	**12.0**	**73.2**	**14.0**	**03-Apr 02:55**	**03-Apr 16:55**
CTD	3	00.00	S	110	00.00	W		58.5	12.0	4.9	0.0	03-Apr 21:47	03-Apr 21:47
CTD	4	00.00	S	110	00.00	W		60.0	12.0	5.0	0.0	04-Apr 02:47	04-Apr 02:47
Recov ATLAS, Deploy Refresh	**4**	**59.50**	**S**	**109**	**59.01**	**W**	**25.6**	**59.5**	**12.0**	**5.0**	**12.0**	**04-Apr 07:45**	**04-Apr 19:45**
CTD	6	00.00	S	110	00.00	W		60.5	12.0	5.0	0.0	05-Apr 00:47	05-Apr 00:47
CTD	7	00.00	S	110	00.00	W		60.0	12.0	5.0	0.0	05-Apr 05:47	05-Apr 05:47
Recov ATLAS, Deploy Refresh	**7**	**59.76**	**S**	**110**	**03.83**	**W**	**31.9**	**59.9**	**12.0**	**5.0**	**12.0**	**05-Apr 10:47**	**05-Apr 22:47**
R/D REFRESH & CTD	**7**	**59.25**	**S**	**124**	**59.25**	**W**	**24.1**	**886.7**	**12.0**	**73.9**	**16.0**	**09-Apr 00:40**	**09-Apr 16:40**
CTD	7	00.00	S	125	00.00	W		59.3	12.0	4.9	0.0	09-Apr 21:36	09-Apr 21:36
CTD	6	00.00	S	125	00.00	W		60.0	12.0	5.0	0.0	10-Apr 02:36	10-Apr 02:36
R/D REFRESH & CTD	**5**	**02.36**	**S**	**124**	**51.30**	**W**	**24.2**	**58.3**	**12.0**	**4.9**	**12.0**	**10-Apr 07:28**	**10-Apr 19:28**
CTD	4	00.00	S	125	00.00	W		63.0	12.0	5.2	0.0	11-Apr 00:43	11-Apr 00:43
CTD	3	00.00	S	125	00.00	W		60.0	12.0	5.0	0.0	11-Apr 05:43	11-Apr 05:43
Recov ATLAS, Deploy Refresh	**2**	**02.10**	**S**	**124**	**53.50**	**W**	**24.2**	**58.3**	**12.0**	**4.9**	**12.0**	**11-Apr 10:34**	**11-Apr 22:34**
CTD	1	00.00	S	125	00.00	W		62.4	12.0	5.2	0.0	12-Apr 03:46	12-Apr 03:46
Recov ATLAS, Deploy Refresh (	**0**	**33.60**	**S**	**124**	**23.58**	**W**	**24.0**	**47.4**	**12.0**	**16.4**	**18.0**	12-Apr 20:10	**13-Apr 14:10**
CTD	1	00.00	N	125	00.00	W		45.0	12.0	16.4	0.0	14-Apr 06:34	14-Apr 06:34
R/D REFRESH & CTD	**1**	**58.00**	**N**	**125**	**02.00**	**W**	**24.1**	**60.0**	**12.0**	**16.4**	**15.0**	**14-Apr 22:58**	**15-Apr 13:58**
CTD	3	00.00	N	125	00.00	W		60.0	12.0	5.0	0.0	15-Apr 18:58	15-Apr 18:58
CTD	4	00.00	N	125	00.00	W		60.0	12.0	5.0	0.0	15-Apr 23:58	15-Apr 23:58
Recov ATLAS, Deploy Refresh	**5**	**05.20**	**N**	**124**	**56.30**	**W**	**24.5**	**65.3**	**12.0**	**5.4**	**12.0**	**16-Apr 05:25**	**16-Apr 17:25**
CTD	6	00.00	N	125	00.00	W		54.9	12.0	4.6	0.0	16-Apr 21:59	16-Apr 21:59
CTD	7	00.00	N	125	00.00	W		60.0	12.0	5.0	0.0	17-Apr 02:59	17-Apr 02:59
Recov ATLAS, Deploy Refresh	**8**	**00.50**	**N**	**125**	**00.30**	**W**	**25.8**	**60.5**	**12.0**	**5.0**	**12.0**	17-Apr 08:02	**17-Apr 20:02**
San Diego, CA	32	38.42	N	117	06.31	W		1541.9	12.0	128.5	0.0	23-Apr 04:31	

*** ALL TIMES ARE IN Hawaiian (HST). ****

CTD CAST LOG

Enter applicable information in the yellow-colored cells. Rose-colored areas are critical; light-rose are highly-encouraged.

Ship: Ron Brown

Cruise: RB-14-02-TA

Cast #

Observer:

Weather Conditions

Items with marked with * must use the appropriate code figure from the Tables

Air Temp (dry)	•	° C	**Visibility**	* [0 - 9]		**Cloud** (amount)	*	[1 - 8]
Air Temp (wet)	•	° C	**Wind Direction**	° T Wind to		**Cloud** (type)	*	[0 - 9]
Barometer		hpa (mb)	**Wind Speed**	kt		**Weather**	*	[0 - 9]
						Sea Swell	*	[0 - 9]

Code Figures

Cells colored **RED** require **complete** entries

	Start of Cast	At Depth	End of Cast
Date	- MAR - 1 4 DD - MMM - YY (MMM)	- - DD-MMM-YY	- - DD-MMM-YY
Time (GMT)	: : HH : MM : SS	: : HH:MM:SS	: : HH:MM:SS
Latitude	° • ' S N or S	° • ' N S	° • ' N S
Longitude	° • ' W W or E	° • ' W E	° • ' W E
Depth	• m	Depth • m	Depth • m
		Corr. Depth • m	
		Wire Out • m	
CTD Pressure	- ± • dB (sign)	CTD Pressure • dB	

Weather Condition Code Figure Tables

Visibility
- 0 <.02 miles
- 1 .02 to .05 miles
- 2 .05 to .25 miles
- 3 .25 to .50 miles
- 4 .50 to 1 mile
- 5 1 to 2 miles
- 6 2 to 5 miles
- 7 5 to 10 miles
- 8 10 to 26 miles
- 9 > 26 miles

Cloud (amount)
- 1 1/8 or less
- 2 2/8
- 3 3/8
- 4 4/8
- 5 5/8
- 6 6/8
- 7 7/8
- 8 8/8

Cloud (type)
- 0 Cirrus
- 1 Cirrocumulus
- 2 Cirrostratus
- 3 Altocumulus
- 4 Altostratus
- 5 Nimbostratus
- 6 Stratocumulus
- 7 Stratus
- 8 Cumulus
- 9 Cumulonimbus

Weather
- 0 Clear
- 1 Partly Cloudy
- 2 Continuous Layer of Clouds
- 3 -- not used ---
- 4 Fog or Haze
- 5 Drizzle
- 6 Rain
- 7 Snow or Rain/ Snow Mixed
- 8 Showers
- 9 Thunderstorms

Sea Swell
- 0 0 feet, Calm, Glassy
- 1 0 to .3 feet, Calm, Rippled
- 2 .3 to 1.5 feet, Smooth, Wavelet
- 3 1.5 to 4 feet, Slight
- 4 4 to 8 feet, Moderate
- 5 8 to 13 feet, Rough
- 6 13 to 19 feet, Very Rough
- 7 19 to 29 feet, High
- 8 29 to 45 feet, Very High
- 9 45 feet +, Phenomenal

Fill in the section below if Salinity samples are taken

Nominal Pressure	Trigger Position	Actual Pressure (dB)	Confirmed (DELETE one)	Salinity Bottle #	Salinity Sample ID
<					enter once / enter each
			Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		
		•	Yes No		

Observer(s)	Confirmed (DELETE one)
	Yes No

	SST	SSS
CTD	•	•
TSG	•	•

▼ **Comments**

NONE

INSTRUCTIONS FOR RECORDING NDBC TAO CTD

CAST LOG AND BOTTLE SALINITY INFORMATION

ON SHIPS OTHER THAN KA'IMIMOANA

For questions, contact

Raymond Beets at raymond.beets@noaa.gov

or

Robert Weir at robert.weir@noaa.gov

Version of 07 March 2011

Cast Log Information

An Excel application is provided for collecting the CTD cast metadata in a cast log. Instructions for use follow.

Summary of Use of NDBC Excel CTD Cast Log Application
Note: You must use macros

Pre Cast: Enter

1) Cast Number (format SSC###x. For the Melville cruise, it will be a label such as ME10051: ME1 cruise, station 005, cast 1 at that station. Create new cast log and increment cast numbers if more than one cast is made at a station. Use capital letters ME)
2) Observer
3) Nominal Pressures as needed
4) CTD surface pressure

Start of Cast: Enter

1) Date
2) Time
3) Ship position Lat/Lon
4) Ocean depth

At Depth: Enter

1) Weather conditions
2) CTD Pressure
3) Salinity Sample IDs (cast number with a 1-digit serial bottle number appended.. Serial bottle numbers go from 1 to 8 or 1 to 11 and are serial over the cast, not cumulative over the whole cruise.) DO NOT USE LEADING ZEROES on the serial bottle number.

End of Cast: Enter

1) Ship's SST & SSS
2) CTD's SST & SSS

Post Cast: Execute

1) Macro: Create Cast Log
2) Macro: Archive
3) Macro: Clear

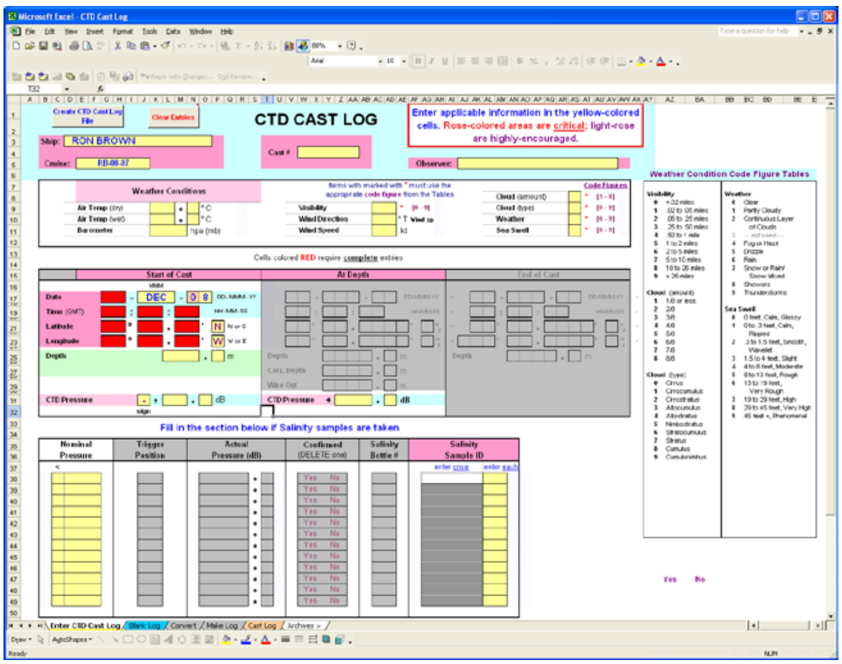
Details of Use of NDBC Excel CTD Cast Log Application

Any section with a gray filled background does not need to be collected, logged, or manipulated.

The Comments section may be edited whenever a documented comment is desired.

Initial One-Time-Only Steps

1) Insert the CD (or thumb drive or whatever) labeled CTD Cast Log (or something similar) into your primary computer for the cruise.
2) Copy the excel file, CTD Cast Log, onto the hard drive of the computer.
3) Open the excel file, CTD Cast Log, when you wish to begin preliminary preparations for your first CTD cast. From here-on, you will only be working with the Excel file copied to your primary computer's hard drive. The Excel workbook you see should look like this.



4) If you're not already on the "Enter CTD Cast Log" sheet and see the above view, click on the tab at the bottom of the screen with said label.
5) Enter the Ship Name in the Ship header, Cell D3. (ex. RON BROWN or WECOMA)
6) Enter the Cruise ID in the Cruise header, Cell E5. (ex. RB-08-07)
   Formatting is SS-YY-##, where SS is the two digit initials for the ship, YY is the year, and ## is the number of the cruise for the year for the ship. For example WE-10-01. Please use capital letters and hyphens (not lower case letters or underscores or spaces).

Pre Cast

This is done before the CTD is deployed as part of the initial preparation. This can be done while en route to the CTD station.

1) Open the Excel application with name CTD Cast Log.xls (or a similar name). Each cast will be saved as a separate worksheet in the same Excel file workbook.
2) Enter cast number, Cell W4. (ex. RB70011)
   a. Format for the cast number is SSC###x, where
      i. SS – Ship Initials (WECOMA= WE) (Please use capital letters)
      ii. C – Cruise number for the ship for the year (RB-08-07 is 7, KA-08-06 is 6, etc.)
      iii. ### - Station number of the cruise (001 = 1st, 002 = 2nd, etc.)
      iv. x – Attempt number for that CTD cast of that station (1st attempt = 1, 2nd = 2, etc.)
      v. Example: WE10181 (please use capital letters): WECOMA cruise 1, station 018; attempt number 1
      vi. IMPORTANT: also enter this cast number for the first part of the salinity sample ID entered into Cell AG38
3) Log Observer, Cell AJ5. (Person supervising or performing the CTD cast, first and last name)
4) Optionally, fill in the Nominal Pressure column as needed based on the number of Salinity Samples to be taken and the respective depths. Cells D38 and greater (possibly a < sign in one Cell column C)
5) Record the pressure read by the CTD at the surface , Cell L31 and O31

Start of Cast:

This is done when the CTD is just below the surface of the ocean, a depth of less than 5 meters.

1) Enter the Date, Row 17. (DD – MMM – YY)
2) Enter the Time, Row 19. (HH : MM : SS)
3) Enter the Ship's Latitude and Longitude, Row 21 & 23. (Degrees – Decimal – Seconds – N/S W/E)
4) Enter the approximate depth of the ocean at the ship's location, Cell L25 & P25.
5) The salinity sample IDs are made up of the cast number and an incrementing integer. Enter the cast number in Cell AG38. Then the first salinity sample should have a "1" entered in Cell AL38. Second salinity sample needs to have a "2" entered in Cell AL39, and so on. You do not have to enter the cast number multiple times; only for the first salinity sample.

At Depth and On Up-cast:

This is done at the maximum depth desired for the CTD cast as the up-cast occurs, with stops at each designated depth for a water sample.

1) Enter the current weather conditions. These are obtained from the Ship's SCS and from the Bridge. Rows 8 through 11. *This step can be done while the CTD has left the maximum depth and is rising to the next desired depth.*
2) As each salinity sample is taken, enter the incrementing number beginning with one in the second (Column AL) sequential salinity sample ID column in Cells AL38 and subsequent. (ie first sample is 1, second 2, third 3, etc., and cumulative only over the cast not over the cruise. Maximum value is 25; do not use any leading zeroes.) Except for the first sample, the cast ID does not have to be entered again.
3) The "Salinity Bottle #" column is not used in processing and may be used for an auxiliary way of labeling the bottle samples taken, if desired. Note that salinometer values MUST be accompanied by the salinity sample ID composed of the cast number and sample sequence number in the data file delivered to NDBC.

End of Cast:

This is done at the conclusion of the CTD cast when the CTD has returned to just below the ocean's surface, a depth of less than 5 meters.

1) Enter the CTD's SST and SSS, Row 67.
2) Enter the Ship's SST and SSS, Row 68.

Post Cast:

This is done after the CTD has been retrieved, and the ship has resumed its normal operations.

1) Click on the button labeled, Create CTD Cast Log File. This will run a macro.
2) Double check your inputs, and if they verify click on the button labeled Archive. This will run another macro.
3) Click on the button labeled Clear Entries. This will run another macro to clear your entries in preparation for the next cast.
4) Click Save.
5) Close.

End of Cruise Only Steps

This can be done any time after the last CTD cast is performed, but before your return to SSC.

1) Insert a blank writeable CD (or DVD) into your computer with the CTD Cast Log Excel file to be saved.
2) Copy the file CTD Cast Log.xls onto the blank CD for delivery to NDBC
3) Do this a second time with a second (backup) CD.

4) Label both CDs as CTD Cast Logs SS-YY-##, where SS is the two digit initials for the ship, YY is the year, and ## is the number of the cruise for the year for the ship. (ex RB-08-07 or WE-10-01)
5) Group these CDs with the other CDs being brought back to NDBC at the end of the cruise.

See the following example of a completed and archived cast log

Note:
1.) Cruise is entered using capital letters and hyphens (not small letter, not underscores, not blanks)
2.) Cast ID is entered in capital letters.
3.) Salinity sample ID is composed of cast ID and a sequential bottle number starting with 1 that starts over again with 1 for each new cast. Some sequential bottle numbers will be 1 digit, some will be 2 (10 and 11). Do not insert leading zeroes.
4.) If the ship prefers to use a different identification system for bottle samples, those can also be entered in the Salinity Bottle # column if desired.
5.) Items shaded (in yellow) are optional: Nominal pressure, Trigger Position #, Confirmed, and Bottle Salinity # are not used by NDBC and entry is not required.

KA'IMIMOANA CTD CAST LOG

Cruise: KA-08-06 Cast: KA60231 Observer: Tonya Watson

Air Temp (dry)	30.0	Visibility	7	Cloud (amt)	5/8
Air Temp (wet)	27.0	Winds (dir)	021	Cloud (type)	8
Barometer	1008	Winds (spd)	04	Weather	1
				Sea Swell	4

	Start of Cast	At Depth	End of Cast
Date	13-SEP-08		
Time (GMT)	2:43:13		
Latitude	0801.918S		
Longitude	16449.147E		
Depth	3896.7		
Corrected Depth	-----		
Wire Out	-----		
CTD Pressure	-1.3		

Nominal Pressure	Trigger Position #	Actual Pressure	Confirmed	Salinity Bottle #	Salinity Sample ID
3000	1	3000.	Yes	1	KA602311
2000	4	2000.	Yes	2	KA602312
1500	7	1500.	Yes	3	KA602313
500	10	500.	Yes	4	KA602314
200	13	200.	Yes	5	KA602315
40	16	40.	Yes	6	KA602316
20	19	20.	Yes	7	KA602317
<5	22	4.5	Yes	8	KA602318

	SST	SSS
CTD	29.653	35.327
TSG	29.995	35.400

Obsevers	Confirmed
	Yes
Tonya Watson	

Comments:
NONE

Summary of Preparing Salinometer Analysis Data for Delivery to NDBC

1. Collection of bottle salinities for analysis with an on-board salinometer should follow standard procedures. However, note the assumed numbering convention in TAO bottle salinity data files: Bottle salinity values are identified by cast ID and sequential cast sample number. The sequential cast sample number should not exceed 11 because only 8 to 11 bottles samples are taken at each cast. Please do not insert leading zeroes for samples 1 through 9. An example salinity sample ID would be WE101529. This would indicate ship WE, cruise 1 for NDBC, site 015, cast number 2 at that site, sample 9.

2. Please record all bottle salinity analyses in an Excel file that contains at least the following columns: Salinity Sample ID, Average Salinometer Value, and Comments (text). (Exact column labels used are not of major importance.) If more than one salinity sample analysis is performed on a bottle, insert the average salinometer value (of good results, of course).

3. IMPORTANT: Note that the Salinity Sample ID must be of the form of cast number with appended cast sequential bottle number as entered in the cast log (eg, RB60231 would be ship RB, cruise 6, cast 023, salinity sample 1 for the cast; RB602311 would be the salinity sample 11: NO LEADING ZEROES for cast salinity sample number, PLEASE!

4. If more than one valid salinometer value is available, please compute and enter only the average value.

5. Please give the Excel file a descriptive name such as SalinitiesWE-10-01.xls

6. If salinometer data must be delivered as a txt file, please separate columns with at least one blank and give the file a descriptive name such as SalinitiesWE-10-01.txt

7. An example of what a possible salinometer analysis data file might look like:

Salinity Sample ID	Salinity		Comments
KA1035101	34.94695		KA10351 180E/W 8N 3000m processed during KA0902 no problems
KA1035102	34.95134		
KA1035103	34.94505		
KA1035104	34.94250		
KA1035105	34.94061		
KA1035106	34.94565		
KA1035107	34.94331		
KA1035108	34.94166		
KA2001101	34.67049		KA20011 165E 8N 3000m bottles 1-7 fired manually at depth (m) not pressure (db)
KA2001102	34.63469		
KA2001103	34.59784		
KA2001104	34.56329		
KA2001105	34.51764		
KA2001106	34.58403		
KA2001107	34.48838		
KA2001108	34.45684		autofire at 3 db

KA2002101	34.55880		KA20021 165E 7N 1000m no problems
KA2002102	34.54214		
KA2002103	34.55888		
KA2002104	34.61502		
KA2002105	34.50290		
KA2002106	34.40895		
KA2002107	34.38047		
KA2002108	34.38203		
KA2003101	34.55519		KA20031 165E 5N 1000m bottle #5 triggered but not fired
KA2003102	34.55138		bottle #2 partially dumped on recovery enough left for flushing and full sample
KA2003103	34.55692		
KA2003104	34.60588		no sample #5
KA2003106	34.32737		no sample #5

CTD CAST LOG

For use when electronic logs are unavailable

Cruise: ______________ Cast #: _________ Observer: ________________________

Weather Conditions

Air Temp (dry)		Visibility		Cloud (amt)	/ 8
Air Temp (wet)		Winds (dir)		Cloud (type)	
Barometer (mb)		Winds (spd)		Weather	
		enter speed in knots		Sea Swell	

Refer to Weather Condition Codes

	Start of Cast	Entry Format	examples
Date		MM/DD/YYYY	11/15/2008
Time (GMT)		HH:MM:SS	12:32:17
Latitude		DD MM.mm N/S	5 01.02 S
Longitude		DDD MM.mm W/E	95 00.35 W

Salinity Bottle Samples

Actual Pressure	Salinity Bottle #	Salinity Sample ID

	SST	SSS
CTD	.	.
TSG		

Comments

Weather Condition Codes

Visibility

0	<.02 miles
1	.02 to .05 miles
2	.05 to .25 miles
3	.25 to .50 miles
4	.50 to 1 mile
5	1 to 2 miles
6	2 to 5 miles
7	5 to 10 miles
8	10 to 26 miles
9	> 26 miles

Cloud (amt)

1	1/8 or less
2	2/8
3	3/8
4	4/8
5	5/8
6	6/8
7	7/8
8	8/8

Cloud (type)

0	Cirrus
1	Cirrocumulus
2	Cirrostratus
3	Altocumulus
4	Altostratus
5	Nimbostratus
6	Stratocumulus
7	Stratus
8	Cumulus
9	Cumulonimbus

Weather

0	Clear
1	Partly Cloudy
2	Continuous Layer of Clouds
3	--------
4	Fog or Haze
5	Drizzle
6	Rain
7	Snow or Rain/ Snow Mixed
8	Showers
9	Thunderstorms

Sea Swell

0	0 feet, Calm, Glassy
1	0 to .3 feet, Calm, Rppled
2	.3 to 1.5 feet, Smooth, Wavelet
3	1.5 to 4 feet, Slight
4	4 to 8 feet, Moderate
5	8 to 13 feet, Rough
6	13 to 19 feet, Very Rough
7	19 to 29 feet, High
8	29 to 45 feet, Very High
9	45 feet +, Phenomenal

Load List

RB-14-02

Load Date **2/5,6,7/2014**
Requested Destination Delivery Date: Pierside on March 18, 2014
Shipping Type requested: 6-40 foot Containers?
From: Brian Lake
TAO/DART
Building 3203
Stennis Space Center, MS 39529

Shipping Address:
NOAA Ship Ronald H. Brown
Arica, Chile

***NOTE* Hazardous materials are highlighted in yellow**

ITEM	NUMBER	WEIGHT PER	TOTAL WEIGHT	DIMENSIONS
Buoy	11	700	7,700	2.3m Toroid
Tower	11	150	1,650	2m x 4m
Bridle	11	300	3,300	2m x 3m
Bridle Weights	33	110	3,630	12in x 8in x 2in
Buoy Inserts	2	110	220	3' diameter x 2'
ANCHOR Single Stack	12	4,666	55,992	32" Diameter
ANCHOR Double Stack	4	6,200	24,800	32" Diameter
Spools, Nylon 11/16"	52	300	15,600	32in x 36in
Working line spool	1	750	750	4' diameter
36X24X18 Grey Boxes	20	200	4,000	36in X 24in X 18in
Mooring Components, shackles, chain, etc	1	1,500	1,500	4ft x 4ft x 2.5ft
Electronic Tube Boxes	11	150	1,650	36in X 24in X 18in
Module Boxes	9	50	450	19in x 19in x 17in
Spool Nilspin wire	15	720	10,800	28in x 28in x 30in
Acoustic Release	15	115	1,725	3'x1'x1'
Camera boxes	5	50	250	3'x1'x1'
Tool Chest	2	100	200	28"x18"x36"

Pressure Washer	1	200	200	4'x1'x1'
DART Buoy Hull / Bridle / Mast	1	3,600	3,600	5'H x 8'Dia
DART BPR and Anchor	2	1,200	2,400	4'x3'x4'
DART Spare BPR Platforms	3	150	450	4'x3'x2'
DART Spare BPR anchor	3	800	2,400	4'x3'x2'
DART Basket w/ floats	1	650	650	4'x4'x4'
DART Acoustic release	3	115	345	3'x1'x1'
DART mooring line box	1	3,000	3,000	4'x4'x8'
DART gray boxes	12	250	3,000	3'x3'x2'
CTD Package	1	750	750	4'x4'x8'
Tube Table	1	700	700	5'x10'x4'
Pallet line cutters	1	225	225	3'x3'x3'
Black Plastic case (CO2)	1	30	30	52"x14"x14"
Pelican Cases (CO2)	2	30	60	38"x28"x20"
AOML Float boxes	2	100	200	4'x4'x4'
Compressed air cyliner (UN1002)	1	70	70	34"x13"x13"
Argo Float boxes (contain lithium batteries)	8	100	800	74"x15"x16"
Lithium AA batteries contained in equipment	300			
Lithium sensor AA batteries. 150 to a box	3	4	12	8"x12"x1"
Lithium Payload Batteries.	36	8	288	12"x8"x6"
Paint 1 gallon can	8	3	24	gallon can
TOTAL			**153,421**	

TOTAL WEIGHT: 76.7 Tons

Approval: ______________________________