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Other Pertinent Files:

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- Approved NRC Form 241 (nrc 241 UGA 5-07.pdf)
- Permits and certifications (hard copies will be provided)
- MSDS Sheets (hard copies will be provided)
- Berthing Plan (file will be provided after the science party receives specific information identifying which berths are available to the science party)

RV BROWN CRUISE PLAN

for

Deepwater Program: Exploration and Research of Northern Gulf of Mexico Deepwater Natural and Artificial Hard Bottom Habitats with Emphasis on Coral Communities: Reefs, Rigs and Wrecks
LopheliaII

(Contract No. M08PC20038)

May 19, 2009

This document represents TDI-Brooks' Cruise Plan for the LopheliaII Cruise scheduled on NOAA Ship RONALD H. BROWN from 19 August – 12 September 2009. The cruise will mobilize in Miami, Florida. We anticipate one mid-cruise personnel transfer on 5 September. The cruise will demobilize in Pensacola, Florida.

1 Cruise Overview

The Lophelia II project involves exploration and research of the northern Gulf of Mexico deepwater natural and artificial hard bottom habitats with emphasis on coral communities. The 2009 component of the project builds on information obtained from the first Lophelia II cruise in September 2008 and involves two cruises: Cruise 2 will survey potential sites and Cruise 3 (this cruise) will return to known sites and the newly-discovered sites targeted by Cruise 1 and 2 for further exploration.

2 Cruise Description and Objectives

Cruise Summary

This is the second of two 2009 cruises with the main objective of more in-depth study, survey and sampling of Lophelia sites located in previous cruises. This will be a 25-day cruise including several transit days with the probability of an at-sea personnel transfer.

Cruise Objectives

This is an intensive working cruise using the *JASON II* ROV to survey and sample target areas of *Lophelia* identified in the September 2008 and June 2009 cruises. Physical and biological samples will be collected from *Lophelia* sites for further study.

a. SM2K surveys of natural sites
b. Large scale random transects over *Lophelia* sites
c. Photo mosaics surveys of *Lophelia* sites including:
    i. Oil Platforms
    ii. Natural Hard Bottoms

iii. Deep Shipwrecks

d. Community collections using customized sampling gear

e. Collection of live corals and maintenance in cold room for transport back to laboratories

f. Deployment and positioning by *JASON II* of:

i. 2 Larval Traps

ii. 2 Time-Lapse Cameras

g. Sporadic Multi-beam sampling

h. Running elevators for collections – 8-10 over cruise

i. Science party will require use of the minus-80 degree freezer

j. NOAA Ocean Exploration & Research Signature Expedition

i. Near-real time web-coverage

ii. NOAA Web Coordinator / Data Manager will be on board

k. USGS onboard for meiofauna, crab genetics & coral genetics

Vessel: NOAA Ship, RON BROWN

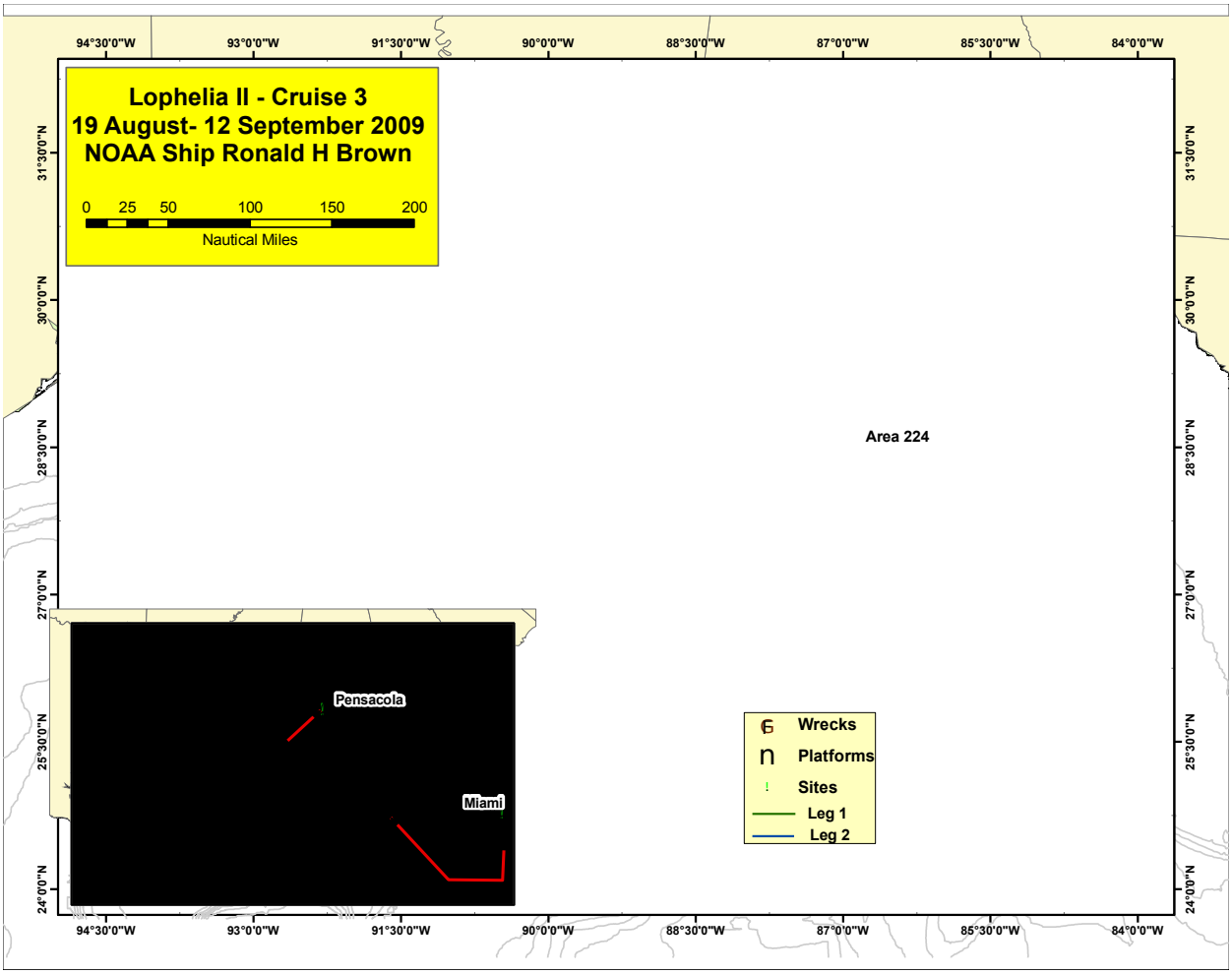
l. 22 Berths available (for Science crew)

ROV: *JASON II* out of Woods Hole Oceanographic Institute. The *JASON II* will be deployed for targeted photographic and physical sampling of corals.

Potential Dive Sites: Sites will be finalized with information gathered during the June 2009 cruise. The potential sites and a preliminary cruise track are shown below.

Summary
NOAA Ship RONALD H. BROWN
Cruise Number: RB-09-08 ?
Project Deepwater Program: Exploration and Research of Northern Gulf of Mexico Deepwater Natural and Artificial Hard Bottom Habitats with Emphasis on Coral Communities: Reefs, Rigs and Wrecks; LopheliaII
Cruise dates: 19 August – 12 September 2009
Working Area: The northern Gulf of Mexico continental slope
Itinerary: Depart: Miami, FL,- 19 August**;** Arrive: **Pensacola**, - 12 September
Endorsements:RADM Richard R. Behn, NOAA**,** Director, Marine and Aviation Operations Centers**,** Marine Operations Center, Atlantic**,** Norfolk, VA 23510-1145
Chief Scientist: Dr. Charles R. Fisher, Penn State University, Department of Biology**,** State College PA16802

Station locations



Participating Organizations

- Penn State University (PSU)
- Louisiana State University (LSU)
- Texas A&M University (TAMUCC))
- Temple University (TEMPLE))
- Woods Hole Oceanographic Institution (WHOI)
- US Geological Survey (USGS)
- TDI BROOKS INTERNATIONAL (TDI-BROOKS)
- Minerals Management Service (MMS)
- NOAA Ocean Exploration Program (NOAA OE)

Personnel (Chief Scientist and participants)

There will be one personnel transfer during the cruise. The following list contains names from all legs.

NAME	AFFIL.	SEX	NAT.	POSITION
Dr. Harry Roberts	LSU	M	US	scientist
Dr. Dong Feng	LSU	M	FN	scientist
Dan Warren	C&C	M	US	scientist
William Shedd	MMS	M	US	scientist
Jack Irion	MMS	M	US	scientist
TBD	NOAA-OE	?	?	Data management
Dr. Charles Fisher	PSU	M	US	Chief scientist
Liz Podowski	PSU	F	US	Tech
Arunima Sen	PSU	F	??	student
John Parkinson	PSU	M	US	student
Stephanie Lessard-Pilon	PSU	F	Can	student
Liz Goehring	PSU	F	US	outreach
Dr. Ian Macdonald	TAMUCC	M	US	scientist
Peter Etnoyer	TAMUCC	M	US	student
Doug Weaver	TAMUCC	M	US	student
Dr. Jim Brooks	TDI	M	US	scientist
Dr. Bernie Bernard	TDI	M	US	scientist
Lara Miles	TDI	F	US	Tech
Mike Kullman	TDI	M	US	Tech

Greg Patterson	TDI	M	US	Tech
Brion Dolan	TDI	M	US	Tech
Dr. Erik Cordes	Temple	M	US	Chief scientist
Andrea Quattrini	Temple	F	US	student
Jay Lunden	Temple	M	US	student
Leslie Wickes	Temple	F	US	student
Kate Songile	Temple	F	US	student
Luke Byrnes	Temple	M	US	student
Cheryl Morrison	USGS	F	US	Scientist
Amanda Demopolous	USGS	F	US	scientist
Chris German	WHOI	M	UK-PRA	scientist
Scott Worrilow	WHOI	M	US	Tech
Steven Manganini	WHOI	M	US	Tech
Tim Shank	WHOI	M	US	scientist
Santiago Herrera	WHOI	M	?	student
Dagmar Rohrlich		M	Ger	reporter

Affiliation Addresses

PSU	Dept. of Biology, State College, PA 16802
LSU	Geosciences Complex, Baton Rouge, LA 70803
TAMUCC	Physical and Life Sciences Dept., Corpus Christi, TX 78412-5774
TEMPLE	Biology Department,Temple University, 1900 N 12th St, Philadelphia PA 19122
WHOI	National Deep Submergence Facility, Woods Hole Oceanographic Institution, Woods Hole, MA 02543-1050
USGS	US Geological Survey, Florida Integrated Science Center, St. Petersburg, FL 33701
TDI-Brooks International	1902 Pinon Dr., College Station, TX 77845
MMS	Gulf of Mexico OCS Region and Atlantic Activities New Orleans, LA 70123-2394
NOAA OE	NOAA Office of Ocean Exploration, 1315 East-West Highway, Silver Spring, MD 20910

Administrative:

Point of Contact:

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Other POC's

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University Park, PA 16802
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Jeremy Potter (NOAA-OE)
Tel: 301-734-1025
E-mail: Jeremy.potter@noaa.gov

3 OPERATIONS

Data Collections

The primary data to be collected using the ROV includes SM2000 multibeam, digital video and still photographic imagery, CTD with DO and pH sensors, geological samples, and genetic and live coral samples. Other data streams from the ROVs, such as vehicle attitude, acoustic data, and sonar imagery are recorded by networked computers in the control van. Navigational data for both the ship and ROV systems will also be recorded. While in transit to and from the site, and during times when the ROV is not deployed, Seabeam multibeam bathymetric data will be collected. Biological samples of benthic fishes and invertebrates will also be collected using traps deployed from the ship.

Staging plan

All of the equipment for this expedition (listed below) will be loaded and installed onboard the NOAA Ship RONALD H. BROWN in MiamiFL during 15-19 August 2009. WHOI has begun working with Sunshine Shipping Inc. and Sims Crane regarding mobilization. Crane services are scheduled for May 31 and June 1.

The crane will offload equipment from the trucks on May 31 and then load the equipment from the pier to the ship on June 1. Please see attachment titled PEV_Staging_Critical Correspondence.pdf for detailed information regarding Fort Lauderdale port security procedures.

Contact Information for Staging:

Carrie White
Sunshine Shipping Inc. as agents only
Off: 954-764-8434
Fax: 954-763-8093
Email: opspev@sunshineships.com

Robert Kraft
Sims Crane
Cell: 813-624-4117

Description	**Wt. (lbs)**	**Destination**	**Power**	**Notes**
1 x 20 ft Control Van*	13, 500	Forward of Jason on the port side, main deck beside the staging bay	Needs two 480V, 3 phase circuits, 60A and 100A service	Two control vans will be connected
1 x 20 ft Control Van*	10,500			
1 x 20 ft Tool Van	18,000	Close to Jason on the main deck starboard side	480V, 30A	Can plug into Control van if it's close by
1 x 20 ft Rigging Van	11,200	Preferred location is close to the tool van on the main deck	N/A	Used for storage of science and Jason gear.
1 x 20 ft Vehicle Van	17,500			
1 Effer Crane	13,500	Port quarter as far aft and as far to port as is possible	480V 3-phase, 100 amp service	Used to deploy and recover Jason. Limited to 14.6' of reach with the crane
2 x 20 ft EMPTY Winch containers	7,000 ea	No preferred location		
Dynacon winch & Wire	23,600			
Traction winch, level wind, & power pack	18,700			

The assistance of the bosun and deck personnel is required during the mobilization. In addition to the equipment listed in the above table, additional assistance from the bosun and deck personnel may be needed to crane on 2 larval/sediment traps, 2 camera systems, and ~3000-4000 lbs of science gear housed in small shipping containers. Also, the assistance of both the survey technician and electrical technician is requested to facilitate the integration of ROV control vans with the ship. The navigation computer inside the control van needs serial data provided by the ship's SCS, namely P-Code DGPS position information in NMEA format. The ship's heading from the gyro and water depths from the ship's echo sounder are also needed as separate serial data streams. We also request the assistance of the electrical technician to help provide connections between the control van and the bridge and between the control van and the main lab for routing audio (intercom), video, and computer (VGA) signals.

Cruise plan

Please note that the following station plan will be modified based on findings and progress at each site and on the findings from Cruise 2 of this program scheduled for mid-June. This plan assumes that launches and recoveries of Jason will occur on watch changes, and 12 hour (minimum) surface time between lowerings. We have included some of the potential contingencies; however there are numerous others connected to equipment and techniques we will be testing for the first time. A key consideration will be the use of USBL during ROV mapping activities. This is NOT assumed, but would save considerable time and effort if possible

Date	Site	Launch	Recover	Tasks	Time to this site @ 10 kts
19-Aug	Depart Miami				
20-Aug	WFlaSlope	1200?		transects, mosaics, community, genetics	
21-Aug	WFlaSlope		2000		
22-Aug	PA224	0800		transects (@ base then up the escarpment), mosaics, community, genetics	12
23-Aug	PA224		2000	transit to VK906	
24-Aug	VK906	0800	2000	transects (over coral mounds), community (including antipatharian), genetics	9
25-Aug	Pompano VK989	0800	2000	platform survey	1.5
26-Aug	MC751	0800		larval/sediment traps? Lots of genetics, community, live corals?	7.5
27-Aug	MC751		2000	transects, mosaics	
28-Aug	GC852	1600		deploy transponders, current meter, camera	10
29-Aug	GC852		2000	genetics sampling, maybe a gorg/black coral bushmaster (already have transects?)	
30-Aug	Joliet GC184	0800	2000	platform survey	4.5
31-Aug	GC354	0800	2000	potential current meter site, could be replaced by unknown site in area	2
1-Sep	GC140	0800	2000	good shallow site, but known - could be replaced	2
2-Sep	MC588	1200	0800	could be replaced by good site from Sentry survey	13
3-Sep	VK826	2000		launch transponder, larval traps, camera deployment	8
4-Sep	VK826			intensive sampling, live corals (elevator?)	
5-Sep	Neptune VK826		1200	transit to Neptune w/out recovery? **At sea transfer**	
6-Sep	VK786			VK wreck	1.5
7-Sep	EW1008			EW wreck	14
8-Sep	GC245			Green Lantern	4

Date	Site	Launch	Recover	Tasks	Time to this site @ 10 kts
9-Sep	GC245			recovery, transit to next site (leaves room for one long dive at best wreck)	
10-Sep	MC657			7000' wreck	15
11-Sep	VK826	0800	2000	live coral run, camera swap?	5
12-Sep	Arrive Pensacola			< 12 hrs from VK826	12

ALL WRECK SITE LOCATIONS ARE CONSIDERED CONFIDENTIAL INFORMATION FOR PROJECT USE ONLY AND ARE NOT FOR GENERAL DISTRIBUTION. ALL QUESTIONS REGARDING THE USE OF WRECK COORDINATES SHOULD BE DIRECTED TO DR. JACK IRION, MMS SOCIAL SCIENCE UNIT, NEW ORLEANS, LA.

OIL RIG WORK IS CONTINGENT ON SHIP AND ROV APPROVAL AND OCEANOGRAPHIC CONDITIONS AT THE SITES. ALTERNATE SITES IN THE SAME AREAS WILL BE PLANNED AS CONTINGENCIES FOR RELATIVELY POOR CONDITIONS.

Multibeam Operations:

The shipboard Seabeam 2112 (12 Khz) swath bathymetric sonar system is required for this cruise. Multibeam data already exists for much of the region where we are diving the ROV. During vehicle down times, we intend to increase the coverage by surveying in regions where we do not have coverage. We anticipate that raw multibeam data and geo-referenced images of the bathymetry will be needed following the survey for integration into the navigation system of the ROV. The scientific party will provide areas and coverage parameters.

Current Meter Operations

The moorings will be designed for measuring currents at two near bottom elevations (5 and 100 meters) at two sites ranging from 400 to 1500 meters depth. The mooring consists of a subsurface buoy, wire and chain, instruments, and a bottom anchor. Current meters will be Aanderra RCM 7 or 8 current meters. The subsurface buoy is a Flotation Technologies 40" sphere capable of deployment to 3000 meter depth. Buoyancy is approximately 600 lbs. Mooring wire (1/4" Nilspin) and chain (3/8" Coil Proof), as well as other hardware (shackles, links, swivels, etc.) are of sufficient tensile strength to survive currents in excess of 2 knots. The anchor is made up of freight car railroad wheels weighing approximately 700 lbs. each. These wheels are clustered "barbell" fashion on a 6" pipe mandrel. The deployment method is a soft touch down by using the deck winch to lower the mooring to the bottom, and released from the winch cable by using an acoustic release (Edge Tech 8200 series) attached to the top of the mooring. Recovery after approximately one year will be done via release of the mooring by surface command of the deployed release units.

Due to the requirement to place the mooring at a precise location on the sea floor, the mooring will be assembled anchor first. The bottom section (anchor, chain and releases, and lower current meter) is lifted on the A-frame as a single unit and lowered as one link until the shackle at the top of the current meter in level with the deck. At this point the weight of the assembly is

transferred to a chain hanging down from the A-frame, and the winch cable freed. The 95 meter long mooring wire is then attached to the deck cable and wound on the winch. The wire end is then threaded through the A-frame pulley and lowered to the top of the mooring assembly already hanging from the chain. It is attached there and the load transferred to winch. The 95 meter section is played out from the winch until the top end of the wire is level with the deck, and its load is transferred to the hanging chain. The top components of the mooring (upper current meter, chain and float, along with another acoustic release used to uncouple from the mooring once it is resting on the bottom) are then lifted up and the bottom end of the upper current meter is attached to the assembly hanging from the chain. Finally, the load is transferred to the deck winch and the mooring is assembled and hanging vertical from the A-frame behind the ship. Once over the precise location, the assembled mooring can now be lowered to very near the bottom. After final maneuvering of the ship and the science party is satisfied the anchor is over the desired point of the sea floor, the anchor is lowered the final few meters and the release attached to the top float is commanded to release. The mooring is now resting on the bottom and the winch cable is reeled up with the deployment release on the end of the cable. At this time ranging to the release units is also performed from various set off points around to the mooring to assure location, and then the releases are set to a quiet state.

Sediment Trap Mooring Configuration and Deployment Procedure

We propose to deploy 2 identical sediment trap moorings in the Gulf of Mexico during the JASON Cruise in August/September 2009. Each mooring includes 1 sediment trap, 2 acoustic releases, 1 current meter, floatation, wire rope, chain with an anchor, and have been designed to address three important requirements:

1. The sediment trap must be as close to the sea floor as possible (5 meters from the bottom).
2. JASON must be able to move the mooring to an exact location after deployment by lifting from the top of the mooring (mooring weight is estimated at approximately 50lbs).
3. The mooring must remain in place for one year. The instruments (Sediment traps, current meters, and acoustic releases) require ample battery life, and the anchor must be heavy enough to hold the mooring during high current velocities (mooring weight is estimated at > 300lbs with possible extra Danforth anchor).

In order to accommodate all 3 requirements, each mooring has been fitted with 2 acoustic releases, one on the upper portion of the mooring and one on the lower portion of the mooring. The moorings will be initially deployed with extra floatation and lifting bail and have a total mooring weight of approximately 50lbs when initially deployed. At this reduced weight, Jason will be able to grab and move the mooring to the exact location of choice. After the location has been certified, the extra floatation will be released by a shipboard signal sent to the acoustic release on the upper portion of the mooring. The resulting weight of the mooring will be greater that 300lbs and provide ample holding capacity for 1 year. The acoustic release on the lower portion of the mooring will be activated after 1 year during recovery operations.

The proposed mooring deployment procedure plan utilizes the anchor first method through the A-frame and uses the ship's trawl wire for lifting. A vertical chain stopper is attached to the A-frame in order to stop-off and attach the mooring instruments and hardware during the mooring

deployment. The mooring will then be lowered by the trawl wire with an acoustic transponder/release connecting the end of the trawl wire to the top of the mooring. This transponder/release will be used to accurately navigate the mooring over a predetermined position, (most likely a site chosen from JASON's survey prior to deployment in water depth of >1400m) and also to release the mooring into position by sending a command from the ship. After the mooring is deployed, JASON can grab and move the mooring to an exact location. A shipboard command is then sent to the acoustic release on the upper portion of the mooring in order to release the extra floatation which will be recovered by the ship at any time after surfacing. Both moorings will remain for 1 year and be recovered with the use of the acoustic release on the lower portion of each mooring.

Remotely Operated Vehicle and Elevator Operations

The majority of the operations will consist of ROV dives shallower than 3,000 meters. The ship's FOO and bosun will meet with the JASON operations crew, Chief Scientist, and watch leaders prior to operations to ensure clarity of ROV launch, dive and recovery procedures. Once a dive location has been selected, the ship and WHOI crew will determine the deployment site in order to maximize the probability of reaching the seafloor at the predetermined location.

During each deployment after the vehicles are launched and begin their decent to the seafloor, the ROV operations team will begin a 24 hour watch schedule. Each watch will have a watch leader who is responsible for carrying-out the planned dive activities. We will adhere to the watch schedule for the duration of each dive.

During deployment of the ROV system, the JASON ROV is launched using the articulating crane, and the MEDEA towsled is launched using the A-frame. During some of the dives, we will be deploying larval/sediment traps and elevators to supplement and facilitate our sample collection activities. There will be no more than one elevator deployed at a time. Once launched using the ship's crane, the elevators float to the bottom where they can be repositioned by the ROV. Once samples are loaded, an acoustic command is sent to release the drop weights and the elevator floats to the surface. Elevators are recovered by shipboard crew members using grappling hooks or, if weather permits, a crew member in a RHIB. The biological and geological samples brought to the surface in the elevators will be processed onboard, in the ship's wet lab, biological lab, and main lab.

We will attempt to schedule ROV recovery and lowering with ship's crew watch changes.

Navigation

Navigation will be based on the best available information, including P-code GPS if available. The GPS will be linked to an integrated navigation system provided by the JASON operations crew. Current planning involves the use of both LBL and USBL navigation. This will require deployment and recovery of the transducer when not conducting ROV operations. The JASON group plans to use the ship's 12 kHz transducer in associated with LBL. The science party is providing a USBL system that they plan to deploy through the ship's moon pool. All ship and

ROV locations and activities will be logged by the JASON operations team. Transponders will also be used for ROV navigation in a subset of sites.

Ship's navigational information will be recorded on the Marine Operations Abstract (MOA) by the bridge watch. In addition to recording ROV dive 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.

Waypoints

Most of the time the NOAA Ship RONALD H. BROWN will be holding station at a to be determined location around the sites listed in Appendix A. More waypoints will be added for the Seabeam surveys and as detailed ROV dive plans are developed

Station Operations

The initial launch at each site may be several hundred meters down current of the first dive target. It will take between 40 minutes and 2 hours for the ROVs to reach the bottom depending on water depth. After arriving at the seafloor, the scanning sonar and vehicle tracking system will be used to navigate the ROVs. The ROV Navigator will maintain constant communication between the ROV operators in the control vans and the officers on the bridge during the entire dive operation.

Following approval of the CO and the ROV Expedition Leader, and taking into consideration the sea state and current structure, we will attempt to survey 2-3 oil platforms during the cruise. When operating near an oil rig, the ship will maintain dynamic positioning within 300-500 feet of the rig structure. The ROV will be equipped with the longer 100m tether for these operations, allowing the ship to remain further from the rig structure. Because the sub-surface portions of the rigs are normally slanted out from the platform itself, the ship will be able to maintain a reasonable distance from the rig while still providing the ROV with access to the near-bottom portions of the structure.

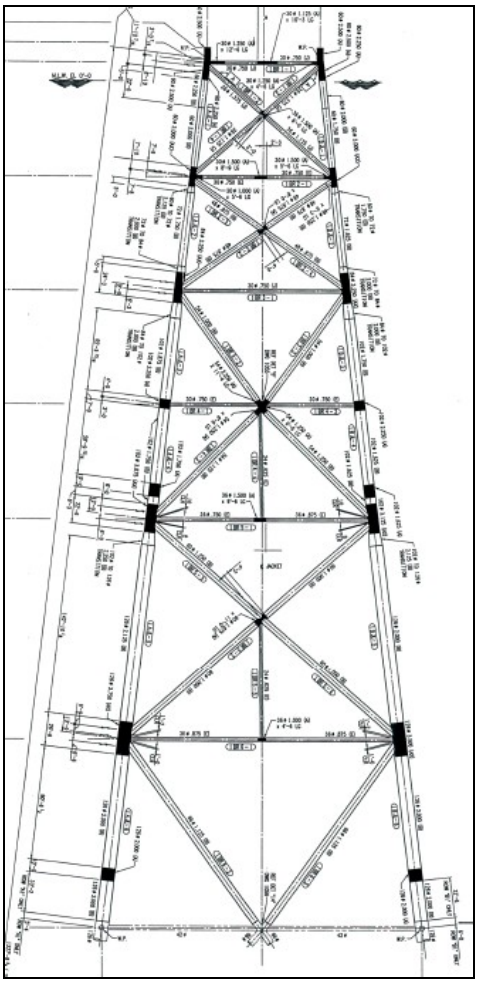

Illustration of subsurface Pompano oil rig structure

Positioning of NOAA Ship Ron Brown during survey of the Pompano structure in 2003 (image courtesy of Jeremy Potter, NOAA)

Underway Operations

The only underway operations, as previously mentioned, will be the collection of multibeam bathymetric data using the Seabeam system.

Applicable Restrictions

ROV operations will require use of Dynamic Positioning. Consideration of the effect of wind, current and seas on the ship is critical to the operation. ROV operations will be performed on station and may require the RHB to display Restricted Maneuverability lights/insignia as appropriate and at the discretion of Command.

The Chief Scientist is authorized to alter the scientific portion of this cruise plan with the concurrence of the Commanding Officer, provided that the proposed changes will not: (1) jeopardize the safety of personnel or the ship; (2) exceed the time allotted for the cruise; (3) result in undue additional expense; or (4) change the general intent of the cruise.

Small Boat Operations

Small boat operations are weather dependent and at the Command's discretion. As mentioned before, it will be a requirement of the expedition to utilize a small boat to retrieve the elevators and possibly transponders. In addition, during one of these recoveries, we may want to have the outreach team film or photograph the vessel. We may also request to use a small boat to film a launch or recovery of the vehicles. Small boat operations are not normally required for ROV operations, but may be requested if recovery difficulty arises.

One at sea personnel transfer will occur approximately two-thirds of the way through the cruise. The details of the transfer will be provided as details are finalized. Any at-sea personnel transfer will be entirely at the Command's discretion, particularly with regard to safety and weather and sea conditions.

Education and Outreach

NOAA Ocean Explorer Web site: NOAA OE education and outreach tasks involve the development of text documents, images, and videos that will be transmitted to shore (and from UW and URI) for posting on the NOAA Ocean Explorer Web site (oceanexplorer.noaa.gov). This effort will be conducted in conjunction with PI's.

De-staging plan

All science equipment and personnel will be removed from the ship in Pensacola FL. We anticipate that de-staging will begin on Sept 12 and end on Sept 13. The science party is awaiting information from the Ronald H. Brown regarding pier location and agent contact information.

4 FACILITIES

Equipment and capabilities provided by ship

1. Seabeam or equivalent multibeam bathymetric mapping sonar
2. XBT for speed of sound calibration
3. Differential GPS navigation and serial data output, NMEA format
4. Heading and water depth instruments with serial data output
5. Deck machinery for science gear deployment and recovery.
6. A-frame for launching Medea, current meter moorings, and sediment/larval traps
7. Power to the winch and vans
8. Dynamic positioning system for vessel station-keeping
9. INMARSAT satellite telephone service for voice and data (email)
10. Networked computer printers and plotter
11. Use of walk in cold room and freezer for live coral maintenance and sample storage
12. Use of –80°C Freezer, and use of –20 chest freezer.
13. Use of compressed air in staging bay
14. Use of CTD and Niskin water sampling rosette
15. Three air tuggers
16. Narrow band Acoustic Doppler Current Profiling (ADCP) system

17. Laboratory and storage space
18. PC based SCS workstations
19. Zodiac, or equivalent, and motor for elevator recovery, ROV contingencies, and video and still photo acquisition
20. Crane support for all equipment during mobilization and demobilization.
21. Access to and use of the moon pool and transducer
22. Access to clean sea water and fresh water on aft deck or in wet lab.

Additionally sufficient consumables, backup units, and on-site spares 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. The ship is requested to provide technical expertise and assistance if unexpected problems arise

Equipment and capabilities provided by science party

The scientific party will provide the following items and will be responsible for their maintenance:

1. All biological and chemical sampling equipment and supplies including: push core equipment, coral collection devices, various nets and bio-boxes.
2. Marine aquaria for maintenance of live corals in cold rooms
3. All software associated with photo mosaic
4. All larval/sediment traps and associated acoustic releases
5. Current meter arrays
6. Remote camera systems
7. CTD with DO and pH probes for use with ROV
8. Deployment/recovery elevators
9. JASON II ROV and associated equipment
10. Navigational transponders associated w/ ROV operations
11. Dynacom winch system
12. Control van, tool van, rigging, vehicle, and shipping vans
13. Effer crane

5 Communications

The NOAA Ship RONALD H. BROWN will communicate daily with the NOAA Marine Operations Center-Atlantic.

Inmarsat Mini-M: 011-874-761 831 360 (Voice)
Inmarsat B: 011-874-336 899 620 (Voice)
Inmarsat B: 011-874-336 899 621 (Fax)

The Chief Scientist, his designee, or the ROV Operations Manager may request the use of the ship′s radio to communicate with other research or commercial vessels in the operating area.

The NOAA Ship RONALD H. BROWN is equipped with INMARSAT and cellular telephones. The Chief Scientist or other members of the science party may need access to these systems with permission from the Commanding Officer on a cost-reimbursable basis. Payment may be made by direct payment via Credit Card during the cruise for INMARSAT calls.

An account on Lotus cc:Mail for each embarked personnel will be established by the shipboard electronics staff. The general format is:

Firstname.Lastname.atsea@rbnems.ronbrown.omao.noaa.gov.

Any transmissions from or to the ship via the VSAT Internet system will be done such that the conduct of normal ship's business is not prevented by an inordinate use of available bandwidth. The science party may request addition bandwidth on the ship VSAT internet system.

6 DISPOSITION OF DATA AND REPORTS

Data responsibilities

1) The Chief Scientist is responsible for the disposition, feedback on data quality, and archiving of data and specimens collected on board the ship for the primary project. The Chief Scientist is also responsible for the dissemination of copies of these data to Co-PI's in a timely manner. The ship may assist in copying data and reports insofar as facilities allow.

2) The Chief Scientist will receive all original data gathered by the ship for the primary project. This data transfer will be documented on NOAA form 61-29 "Letter Transmitting Data."

3) The Commanding Officer is responsible for all data collected for ancillary projects until those data have been transferred to the Projects' principal investigators or their designees. Data transfers will be documented on NOAA Form 61-29. Copies of ancillary project data will be provided to the Chief Scientist when requested. Reporting and sending copies of ancillary project data to NESDIS (ROSCOP form) is the responsibility of the program office sponsoring those projects.

4) NOAA OE: To ensure proper archive of metadata, and to ensure that all metadata meets FGDC compliance, OE will see that NESDIS receives the following (all metadata information will be generated from the EIS).

5) The NOAA Central Library will receive all metadata associated with video, and will also receive a copy of the highlight video for archive.
   a) NODC will receive all metadata associated with oceanographic data sets.
   b) NGDC will receive all geophysical metadata such as Seabeam, side scan, etc.
   c) NCDDC will receive all shipboard digital data (such as CTD, fathometer, and ship track information), ROV navigational data, and additional metadata, to develop future products in collaboration with PI's. For this requirement, OE requests copies of shipboard digital data and ROV navigational data on CD or DVD at the end of the cruise.

6) The science party will be responsible for the collection and organization of all data (other than shipboard digital data and ROV data) relative to meeting the goals and objectives of their projects. This includes working with the appropriate ship's personnel to obtain relevant data collected by the Scientific Computer System (SCS), and compilation of metadata records associated with physical samples.

Data Requirements

The following data products will be included in the cruise data package:

1 Marine Operations Abstracts
2 CTD data (on CD's) and CTD data notebook including CTD cast logs
3 Salinity sample analysis floppy
4 ADCP digital recordings
5 Multibeam digital data on CD or DVD
6 Marine weather observation logs
7 Hard copy, large format maps of multibeam surveys
8 Calibration information for ship's salinometer and thermosalinograph
9 SCS data tapes
10 Cruise operations spreadsheet w/ actual speed/dates made good along trackline

Marine Observation Log

A Marine Operations Abstract (MOA) form will be maintained by the ship's officers during the cruise. The critical information to record at each station is:

1 GMT date
2 GMT time
3 Position
4 Station number
5 Bottom depth

At present, a paper form (hard copy) MOA is the most secure method for ensuring that these data are recorded and preserved. However, a secure electronic version could be used to replace the paper MOA.

Records and Reports

1. The ship's officers will maintain the Marine Operations Abstract (MOA) during the cruise and will provide the Chief Scientist with a copy at the end of the cruise.

2. The Chief Scientist will complete the ship's Operations Evaluation Form and forward a copy to the Director, NOAA Marine Operations Center and to the OE representative. The ship's Field Operations Officer will provide the Chief Scientist with this form.

3. The Chief Scientist is required to provide NOAA OE with the following.
    - A quick look report (QLR) focused on accomplishments of the cruise. OE will provide a general outline for the QLR, and it should be submitted no later than 10-12 days post-cruise, but ideally, before disembarking.
    - An OE cruise summary for the Web site with images, as specified in the Web Production Plan. This should be submitted no later than 30 days post-cruise, and is designed to build on the accomplishments described in the QLR.

4. Media products that will be developed by OE in collaboration with PI's include the following.
    - Select ROV video will be used to develop a highlights video that will be provided to news media at the end of the cruise. An annotation file will be developed that will describe the contents of the video, and will include proper credit and contact information.
    - Select high-resolution still images (10-20) will be used to develop a CD that will be provided to print media at the end of the cruise. A file of captions will be developed that will describe each still image, and will include proper credit and contact information.
    - As described in the Web Production Plan, the Ocean Explorer Web site will contain background essays, daily logs, and summaries generated by members of the science party. The Web site will also contain still images, video clips, and slide shows generated by the OE Web Coordinator under the approval of the Chief Scientist and members of the science party.

Daily Progress Reports

TDI-Brooks shall submit a Daily Progress Report (DPR) by 1000 on the day following. All times on the DPR shall be referenced to local time. Information presented shall include as a minimum:

- Brief summary, diary of events, work performed, special problems encountered, weather and safety incidents.
- "Today" and "to-date" tally of:
    - Working time
    - Standby time
    - Weather downtime
    - Equipment downtime
    - Vessel downtime
- Location of survey vessel at midnight.
- Brief outline of findings.
- Quality statement covering the sufficiency and accuracy of the data collected.
- Work planned for the next 24-hour period.
- Comments.

Pre- and post-cruise meetings

Meetings will be arranged and conducted at the discretion of the Chief Scientist. During transit to the site and periodically throughout the cruise science meetings will be held in the ship's lounge or the main science lab.

Ship operation evaluation report

A Ship Operations Evaluation Report will be completed by the Chief Scientist and forwarded to NC3.

7 HAZARDOUS MATERIALS

Policy / compliance

The RONALD H. BROWN will operate in full compliance with all environmental compliance requirements imposed by NOAA. All hazardous materials and substances needed to carry out the objectives of the embarked science mission, including ancillary tasks, are the direct responsibility of the embarked designated Chief Scientist, whether or not that Chief Scientist is using them directly. The RONALD H. BROWN Environmental Compliance Officer will work with the Chief Scientist to ensure that this management policy is properly executed, and that any problems are brought promptly to the attention of the Commanding Officer.

In accordance with NC Instruction 6280B, the Chief Scientist will provide an inventory of all hazardous material, including Material Safety Data Sheets (MSDS) and quantities, to the Commanding Officer at least two weeks prior to sailing. The inventory shall be updated at departure, accounting for the amount of material being removed, as well as the amount consumed in science operations and the amount being removed in the form of waste. The Chief Scientist shall have copies of each MSDS available when the hazardous materials are loaded aboard. Hazardous material for which the MSDS is not provided will not be loaded aboard. Compressed gas storage cylinders (including those containing air) will also be included in the inventory with the date of the last hydrostatic certification.

Hazardous Materials

to be determined – but will NOT include radioactive materials.

Compressed Gases:

The ship's dedicated HAZMAT Locker contains two 45-gallon capacity flam cabinets and one 22-gallon capacity flam cabinet, plus some available storage on deck. All HAZMAT, except small amounts for ready use, must be stored in the HAZMAT Locker. If science party requirements exceed ship's storage capacity, excess HAZMAT must be stored in dedicated lockers meeting OSH/NFPA standards to be provided by the science party. Scientific groups

requiring Hazmat storage should compute volume of storage required prior to the cruise and ensure adequacy onboard.

The scientific party, under supervision of the Chief Scientist, shall be prepared to respond fully to emergencies involving spills of any mission HAZMAT. This includes providing properly trained personnel for response, as well as the necessary neutralizing chemicals and clean-up materials. The ship's Environmental Compliance Officer will review the onboard inventory of MSDS's and will advise Chief Scientist if ship already has compounds listed in Appendices. Ship's personnel are not first responders and will act in a support role only in the event of a spill. The Chief Scientist shall provide a list of science party members that are properly trained to respond in the event of hazmat spills.

The Chief Scientist is directly responsible for the handling, both administrative and physical, of all scientific party hazardous wastes. No liquid wastes shall be introduced into the ship's drainage system. No solid waste material shall be placed in the ship's garbage.

The oncoming Chief Scientist will work with the departing Chief Scientist and the ship's environmental Compliance Officer to ensure proper tracking of inherited hazardous materials.

8 MISCELLANEOUS

Scientific Berthing

A berthing plan will be provided after the science party receives specific information identifying which berths are available to the science party.

The Chief Scientist is responsible for assigning berthing for scientific party within the spaces designated as scientific berthing. The Chief Scientist is responsible for returning the scientific berthing spaces back over to the ship in the condition in which they were received; for stripping bedding and linen return; and for the return of any room keys which were issued. The Chief Scientist is also responsible for the cleanliness of the laboratory spaces and the storage areas utilized by the scientific party, both during the cruise and its conclusion prior to departing the ship.

In accordance with NC Instruction 5355.0, Controlled Substances Aboard NOAA Vessels dated 06 August 1985; all persons boarding NOAA vessels give implied consent to conform to 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.

Medical Forms and Emergency Contacts

The NOAA Health Services Questionnaire (NHSQ) must be completed in advance by each participating scientist. Scientists are required to be medically approved by NOAA Marine Operations Center Atlantic prior to sailing should reach the ship no later than 30 days prior to the cruise. This will allow time to medically clear the individual and to request more information

if needed. All personnel must also provide results of PPD (TB) test taken within 12 months of sailing. We ask that all personnel bring any prescription medication they may need and any over-the-counter medicine that is taken routinely (e.g. an aspirin per day, etc.). The ship maintains a stock of medications aboard, but supplies are limited and chances to restock are few.
Felipe: Please verify that Mike Futch is still the contact, or if forms should be sent to Emily.
Contact for NHSQ's:
LT Michael Futch
mike.futch@noaa.gov
Voice: (757)441-6320
FAX: 757-441-3760

Prior to departure, the Chief Scientist will provide a listing of emergency contacts to the Executive Officer, RHB for all members of the scientific party, with the following information: name, name of contact, address of contact, relationship to member, and contact telephone number. Protocol for entering and exiting port areas will vary. In US ports, you must have a government ID to enter. All others (visitors and scientists outside of the government) may (depending on port security) require an escort to and from the ship. All personnel, including crew, are still checked against lists supplied to port security. A passport is recommended for all personnel embarking aboard the RHB.

9 Health, Safety & Environment

Shipboard Safety

Safety of operations is of utmost importance. Scientists will attend all safety briefings as required by the vessel Command. Wearing open-toed footwear of any kind outside of private berthing areas (i.e. to and from showers) is not permitted onboard this ship. This shipboard safety regulation is included in the Commanding Officer's Standing Orders, and will be enforced. All members of the scientific party should be aware of this regulation before embarking.

TDI-Brooks recognizes that HSE is of paramount importance. TDI-Brooks will operate under an extensive HSE system that includes documentations such as Health Safety, and Environment (HSE) Manual, Safety Manual, and Coring Manual. We address such issues as hazard ids, job safety analysis, risk management, safety and job training, personnel protective equipment, and behavior-based safety. We are committed not only to providing a safe work environment and protecting the health of our employees, contractors, and visitors but also protecting the environment. Our documents and protocols comply with both national and international standards concerning safety, health and environmental protection.

Emergency Information

Due to the ship′s long deployments, the Medical Officer assigned to the ship is a US Public Health Service Commissioned Corps nurse. The Medical Officer is available at any hour of the day to provide emergency medical care as required. Regularly scheduled sick call will be held in the ship's hospital from 0800 - 1130 daily and patients will be seen on a first-come/first served basis; however, patients with acute conditions will take priority. Do not hesitate to contact the

Medical Officer at any hour of the day to receive treatment for an injury or illness, no matter how slight it might appear. The ship's hospital is equipped with a complete inventory of modern medical equipment and stocked with a wide range of medications and supplies. Several members of the ship's operating crew are certified Emergency Medical Technicians or are certified in CPR/first-aid and may assist the Medical Officer as required. Should additional medical expertise and advice be required, a medical advisory service can be contacted at any hour of the day. This service provides physicians specialized in emergency medical care who are immediately available to provide consultation, advice, and if necessary, medical evacuation coordination services.

In addition to routine and emergency medical care, the Medical Officer provides wellness services on an individual and confidential basis. Available services include:

- Blood pressure, diabetes, and general health assessment and monitoring.
- Weight management information and support.
- Substance abuse information and support.
- Smoking cessation information and support.
- Stress management and mental health information.
- General medical and wellness information and advice upon request

There are numerous first-aid kits distributed throughout the ship. Notify the Medical Officer if their use is required.

Wage marine working hours and rest periods

The Chief Scientist shall be cognizant of the reduced capability of the NOAA Ship RONALD H. BROWN operating crew to support 24-hour mission activities with a high tempo of deck operations at all hours. Wage marine employees are subject to negotiated work rules contained in the applicable collective bargaining agreement. Dayworkers' hours of duty are a continuous eight-hour period, beginning no earlier than 0600 and ending no later than 1800. It is not permissible to separate such an employee's workday into several short work periods with interspersed non-work periods. Dayworkers called out to work between the hours of 0000 and 0600 are entitled to a rest period of one hour for each such hour worked. Such rest periods begin at 0800 and will result in no dayworkers being available to support science operations until the rest period has been observed. All wage marine employees are supervised and assigned work only by the Commanding Officer or designee. The Chief Scientist and the Commanding Officer shall consult regularly to ensure that the shipboard resources available to support the embarked mission are utilized safely, efficiently and with due economy.

Drug and alcohol policy

In accordance with NMAO Drug and Alcohol Policy (NMAO #3, dated May 7, 1999), which forbids the possession and/or use of illegal drugs and alcohol aboard NOAA Vessels, 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.

Shipping Information

DETAILS OF THIS SECTION TO BE PROVIDED BY THE RON BROWN
All items to be shipped in advance for mobilization in Miami during Aug 15-19 2009 should be sent to the following address. A list of shipped items should be sent via e-mail at the contact address below. Mobilization port TBD.

Master
NOAA Ship RONALD H. BROWN

CONTACT:
Micheline McMullen
Sunshine Shipping
Ft. Lauderdale, Florida
mmcmullen@sunshineships.com

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