

**MC252 Deepwater Horizon Oil Spill  
Northern Gulf of Mexico MARU Recovery  
Mission Plan  
April 28, 2011**

**Originated as a requirement by:**

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**Amended plan by:**

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Approval of this work plan is for the purposes of obtaining data for the Natural Resource Damage Assessment. Each Party reserves the right to produce its own independent interpretation and analysis of any data collected pursuant to this work plan.

**BP Approval:**

Joyce Miley                      Joyce Miley                      5/2/11  
Printed Name                      Signature                      Date

**Federal Trustee Approval:**

Lisa DePinto                      Lisa DePinto                      5/2/11  
Printed Name                      Signature                      Date

**Louisiana Approval:**

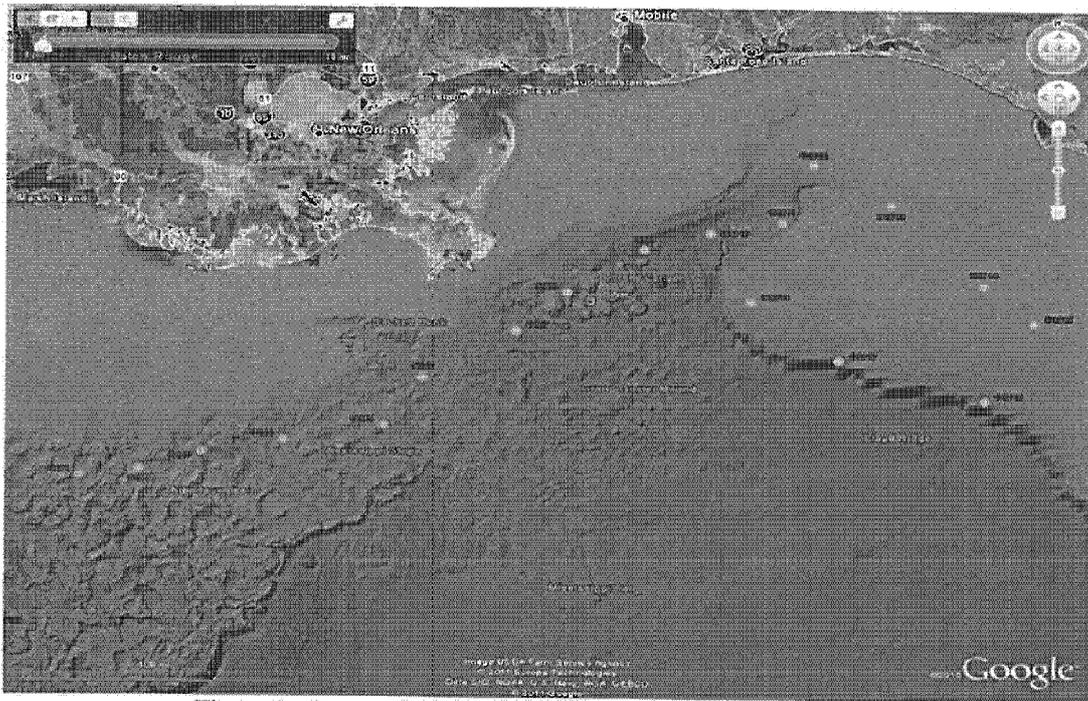
KAROLINE DESRUSSO                      [Signature]                      5/13/11  
Printed Name                      Signature                      Date  
*FOR KOLAND GOV. DAY*

**Background and Scope of Work**

The following describes the proposed field operations to support an ongoing bioacoustics monitoring program. This program is being conducted by the Cornell Bioacoustics Research Program (BRP), Cornell University. The Trustees and BP agree that acoustic monitoring using MARUs through August 2011 is a useful extension of the project.

This portion of the BRP project involves the passive acoustic monitoring of marine mammals in the Northern Gulf utilizing marine autonomous recording units (MARUs). An *autonomous recording unit (ARU)* is a digital audio recorder that can be programmed to record on a desired daily schedule and deployed for periods of weeks or months in a remote environment. The MARUs used in this project are packaged in positively buoyant glass spheres. A MARU is deployed by being dropped to the seafloor with an anchor such that the MARU floats a few

meters above the bottom. Underwater sounds are recorded through a hydrophone (underwater microphone) mounted outside the sphere. These analog sound data are conditioned, digitized, and stored in a binary digital audio format on electronic storage media. At the conclusion of the deployment, the MARU is sent an acoustic command to release itself from its anchor, and it floats to the surface for recovery. After the device is recovered, its recorded audio data are extracted and stored, and then the MARU is redeployed. The overall objective of this mission is to collect a duty cycled audio sample of marine mammal activity in the area of interest. The specific scope of this mission plan is to retrieve the 18 MARUs already deployed in the Northern Gulf for data download and sensor refurbishment, once the units are returned to Cornell University. These MARUs have recently stopped recording acoustic data due to storage capacity. Due to battery life limitations they will become completely inactive in mid-May. Should this happen, it would prevent an on-demand acoustic retrieval of the MARUs and they would automatically surface on pre-programmed back-up release timers over a period from 17 to 27 May 2011, *resulting in a significantly increased risk of data as well as hardware loss.*



*Figure 1 – Scope of Northern Gulf MARUs for this Project Mission*



*Figure 2 – Scope of Cornell’s Entire Gulf Acoustic Monitoring*

## **MARU Recovery**

### ***Vessel Mobilization and Mission***

The vessel being utilized for this project will be the M/V Wes Bordelon. Mobilization and demobilization will be in late April or early May.

Vessel mobilization involves arrival of Cornell personnel and equipment. One to two technicians from Cornell will accompany the mission in order to provide direction and support for the MARU retrieval and return shipment to Ithaca, NY. A single CSA Operations Manager will provide operational and HSE oversight. During the vessel mobilization phase of the operation, it is anticipated the CSA senior staff will communicate with SIMOPS personnel to establish operational parameters and communications protocols required during the recovery of the MARUs.

In order to recover the 18 Northern Gulf of Mexico MARU units, a total of approximately 1,700 nautical miles will be traveled. Assuming a transit speed of 10 knots and a 3 hour turnaround for each MARU unit, it is estimated that this project will require a 10 day effort.

### *Recovery of the MARUs in the Northern Gulf*

- 1) Vessel will arrive on site and shut propulsion down to protect submersible equipment.
- 2) From the Cornell supplied deployment kit the Cornell field agent will submerge a transducer disk to communicate with the MARU, along with a hydrophone to monitor the MARU's acoustic responses. This equipment is connected to a transponder box and laptop computer.
- 3) The MARU's individual acoustic release signal will be played through the computer and into the water while the Cornell field agent listens for a response. When the unit is verified to be on location a second release signal is played and the release sequence is activated. The time of the MARU's second response to the release signal will be recorded.
- 4) The submerged equipment (transducer disk and hydrophone) will be removed from the water to facilitate the vessel's repositioning back on site if necessary during the watch process.
- 5) All available eyes will scan the surface for the MARU. At the current depths, the MARU should hit the surface in approximately 30 minutes.
- 6) While searching for the MARU the Cornell field agent will have a VHF radio tuned to the released MARU's individual radio signature which will emit a signal upon surfacing. This is an indicator that the MARU has surfaced, even if it has not been spotted yet.
- 7) When the MARU is spotted on the surface the vessel will position for retrieval in accordance with a pre-discussed plan of action between the Cornell field agent and ship crew. The time that the MARU surfaces will be recorded. Only weighing 90 lbs. and with a 25" diameter the MARU is easily retrievable by hand using a boathook and more than one person lifting. Grappling hooks have also been utilized during retrieval. The MARU should typically be approached and retrieved from the lowest point on the vessel to minimize lifting and possible damage to the unit.
- 8) Once on board the MARU will be powered down, and that time will be recorded. The MARU will also be visually inspected by the Cornell field agent to document any overt abnormalities or damage. If a lease agreement for additional MARUs is in place at the time of mission departure, a second set of 18 MARU will replace the recovered MARU units.
- 9) The MARU will be placed in a Cornell-provided protective shipping case and stored on deck. The retrieval vessel will then proceed to the next MARU location.
- 10) Once all MARUs have been retrieved and the recovery vessel returns to port, all recovered MARUs will be shipped (FedEx) by the Cornell field agent back to Cornell University for data download and sensor refurbishment.

Estimated Costs

<b>MARU Recovery Mission Cost Table</b>	<b>Units</b>	<b>Unit Cost \$</b>	<b>Quantity</b>	<b>Total</b>
Mobilization Costs	ea	\$21,000	1	\$21,000
Vessel Costs (incl estimated fuel)	ea	\$322,207	1	\$322,207
SCRIPPS and CSA Support	ea	\$8,400	1	\$8,400
			<b>Total Estimated Cost</b>	<b>\$351,607</b>

The Parties acknowledge that this budget is an *estimate* and that actual costs may prove to be higher. BP's commitment to fund the costs of this work includes any additional reasonable costs within the scope of this approved work plan that may arise. The trustees will make a good faith effort to notify BP in advance of any such increased costs.