

**NICARAGUA RISE CRUISE  
HIGH RESOLUTION SEISMIC SURVEY  
R/V CAPE HATTERAS, LEG 1  
21 APRIL TO 14 MAY 1992**

by

David A. Mucciarone

Rice University Cruise Participants: Andre' W. Droxler, David A. Mucciarone, Andrew Cunningham.

This is a technical summary of Leg 1 aboard the R/V Cape Hatteras. The logistics of this cruise were a bit complicated due to the fact we had to supply almost all of the seismic equipment. This involved renting a 24 ft truck to transport a 6000 lb. air compressor and other cruise supplies from Rice University to the Port of Miami to meet the R/V Cape Hatteras. Transport of the equipment began on 21 April and ended on 23 April in Miami. The R/V Cape Hatteras departed the dock at 0800 on 24 April for a three day transit to the area of the Nicaragua Rise. Seismic using the SSI GI-90 ci air gun lasted approximately 16 days. Seismic acquisition was both digital using the Elics digital acquisition system (TIGA v2.6) and analog via the EPC recorder. Energy source was the SSI GI-90 ci air gun in conjunction with a 50 hydrophone streamer. Collection of 3.5 KHz seismic was analog and acquired via the R/V Cape Hatteras hull mounted unit. The cruise (leg 1) ended on 14 May in Montego Bay, Jamaica. All of the cruise equipment brought down to the Port of Miami, including dredge and piston core samples were returned to Rice University via another leased 24 ft truck. The R/V Cape Hatteras after finishing Leg 2 arrived at the dock in Miami at 0800 on 03 June, and cleared customs by 1000 later that same morning. This return transit took place on 02 June and arrived in Houston on 04 June 1992.

Seismic acquisition:

	<u>GI-90</u>
Shooting Interval =	6000 - 9000 ms
Sampling Frequency =	1000 HZ
Recording Length =	2048 ms
Energy =	2000 - 2500 psi
High Pass Filter Digital=	20 Hz
Low Pass Filter Digital =	400 Hz
High Pass Filter Analog =	60 Hz
Low Pass Filter Analog =	1500 Hz
Generator/Injector delay =	42-44 ms

Leased Equipment, Insurance, & Miscellaneous:

- 1) Ingersoll-Rand 6R80-100 with 453 Detroit Diesel (6000 psi, 100 cfm) @ \$150.00/day
- 2) I/O AG-7 Seismic gun controller @ \$65.00/day  
ARDCO Industries  
P.O. Box 451960  
322 Riley Road  
Houston, TX 77245-1960
- 3) SSI GI-90 ci water gun @ N/C
  - a) Time break hydrophone
  - b) Jumpers
  - c) Towing assembly (bracket & float)
  - d) Special tooling kit
  - e) Seal kitSeismic System Inc.  
8925 Lipan  
Houston, TX 77063

- 4) Compressor valve and filter manifold @ \$20.00/day  
 TEXSEIS Inc.  
 10810 Old Katy Road  
 Houston, TX 77043
- 5) Insurance for all cruise equipment was obtained from John L. Wortham & Son agent Scott Howard.  
 John L. Wortham & Son  
 Address: 2727 Allen Parkway  
 (P.O. Box 1388)  
 Houston, TX 77251
- 6) Core D-Tube Boxes and plastic D-Tubes  
 Ocean Drilling Program  
 Texas A&M University Research Park  
 1000 Discovery Drive  
 College Station, TX 77840

Listed in the back of this report is a packing list of all the equipment transported to Miami and used on board the R/V Cape Hatteras. In addition, all seismic, station, and core log sheets are appended to the back of this report.

#### CRUISE OUTLINE:

- |               |  |
|---------------|--|
| 21 April 1992 | <ol style="list-style-type: none"> <li>1) Depart Houston at 0730 with 24 ft Budget truck headed for Miami, Fla. Drivers Mucciarone and Cunningham.</li> <li>2) Made stops for food and gas (2 fuel stops averaged 9.5 mpg diesel)</li> <li>3) Stayed at Econo Lodge in Tallahassee, Fla.</li> </ol>  |
| 22 April 1992 | <ol style="list-style-type: none"> <li>1) Continued our road trip at 0800. Again made stops for food and fuel averaging 9.5 mpg.</li> <li>2) Arrived at RSMS University of Miami at 1900 to park in secured lot. Met up with Droxler.</li> <li>3) Stay one night at Hampton Inn in Miami.</li> </ol>   |
| 23 April 1992 | <ol style="list-style-type: none"> <li>1) Meet ship at Port of Miami with truck at 0900. Unload all equipment onto the R/V Cape Hatteras. Also unload/load Univ. of So. Florida equipment.</li> <li>2) Return Budget truck to airport at 1500.</li> <li>3) Stow and secure all equipment.</li> </ol>   |
| 24 April 1992 | <ol style="list-style-type: none"> <li>1) Depart port at 0800</li> <li>2) Set up seismic digital acquisition systems (Rice U. and Univ. of S. Fla.).</li> <li>3) Prepare hose bundle/firing lines for GI-90 ci air gun.</li> </ol>   |
| 25 April 1992 | <ol style="list-style-type: none"> <li>1) Repair R/V Cape Hatteras streamers - add odorless kerosene.</li> <li>2) Set up 3.5 KHz to USF Elics system, trouble shoot.</li> <li>3) Attempt to set up GPS software on Elics. Not communicating. Set up separate GPS and manually log in Elics and Mass Comp shot numbers every 15 minutes. At the end will down load GPS data to diskette.</li> </ol> |
| file<br>we    |  |
| 26 April 1992 | <ol style="list-style-type: none"> <li>1) Set up GI-90 ci air gun with float. Set gun depth to 1.5 m from mid float.</li> </ol>  |
| 27 April 1992 | <ol style="list-style-type: none"> <li>1) Over board GI-90 air gun at 1900.</li> <li>2) Problems with towing array - tow line broke.</li> <li>3) Problems with too little air - using two compressors to power gun with 12 219 cf storage bottles. ARDCO compressor smoking bad.</li> <li>4) Manifold regulator o-ring blow out. Repaired by remove regulator and using auxiliary</li> </ol>       |
| auxiliary     |  |

- compressor.
- 5) Install TIGA version 2.6 (upgrade Wyse v 1.7).
  - 6) After a while ARDCO compressor kept up 2000 psi by itself. Shut of ships
  - 7) Training session on Elics.
- 28 April 1992
- 1) Arrive on station at 0410 began survey with line CH92001.
  - 2) Collecting 3.5 KHz and GI-90 data on both Elics systems.
  - 3) Broken air line, piece of air hose stuck in main shaft of GI gun. After about 2 hr all hose bits removed. Had to use ships air hose, no spare hose connectors.
- 29 April 1992
- 1) Both GI-90 and 3.5 KHz working, shot lines CH92001 - 003
  - 2) Hose blow out on storage bottles - replaced hose.
  - 3) Tow line broke again - replaced with wire cable.
  - 4) Low pressure - cleaned filter screen before regulator.
  - 5) USF computer not working, no longer collecting 3.5 KHz seismic.
  - 6) Elics system freezing up. Reason unknown.
  - 7) Problem with contact closure running AG-7.
  - 8) Start using ships digital acquisition system - Mass Comp.
- 30 April 1992
- 1) Continuing seismic survey. GI-90 air gun riding well.
  - 2) ARDCO compressor front crank shaft seal leaking. Add oil to compressor and engine.
  - 3) Shooting GI gun at 8000 ms, using EPC 4800 as contact closure for AG-7.
  - 4) Called Elics about system freeze ups.
  - 5) Cleaned regulator filters.
- 01 May 1992
- 1) Continuing with seismic survey.
  - 2) Elics still freezing up - many attempts to correct problem with no success.
  - 3) Bad oil and fuel leaks on ARDCO compressor. took off line. Using ships compressor. Sent message to ARDCO about problems.
  - 4) Finished through line CH92006, begin CH92007.
- 02 May 1992
- 1) Tape backup of lines CH92001 - 007. Shot lines CH92007 - 009.
  - 2) Electronics room very hot. Add temporary A/C duct.
  - 3) Still using ships compressor.
- 03 May 1992
- 1) Repaired ARDCO compressor fuel leak - new hose.
  - 2) Using ARDCO compressor to assist ships compressor - turn on every 4 hr. to charge storage bottles for about 20 minutes. Shooting at 9000-10000 ms.
  - 3) Shot lines CH92009 - CH92012.
- 04 May 1992
- 1) Continue seismic with CH92012.
  - 2) ARDCO compressor smoking very bad. Remove and replace air cleaner on ARDCO compressor - fixed smoking problem.
  - 3) ARDCO compressor alternator belts broke one at 1217 and the other at 1621. Replaced with one belt.
  - 4) ARDCO compressor blow-down block failing (stage 4).
  - 5) Cleaned manifold filters.
  - 6) Finished through line CH92015.
- 05 May 1992
- 1) For once compressor doing fine.
  - 2) Begin line CH92016.
  - 3) Clean and drain filters on manifold.
  - 4) Elics still freezing.
  - 5) Back up files to tape - lines CH92008 - 018.

compressor	6) ARDCO Compressor down again at 2117 - main shaft between engine and unit. Will attempt to weld shaft.
06 May 1992	1) ARDCO compressor down and out at 0145, shaft broke again. 2) Elics still freezing up. 3) Using ships 50 cfm compressor - have to stop at end of each line to let compressor up, shooting at 10000 ms.
catch	
07 May 1992	1) Elics still freezing up - running out of ideas. 2) GI-90 air gun down injector stopped firing. Spring broke in solenoid - repaired at 0815. 3) Shooting through CH92026.
08 May 1992	1) Seismic doing well. 2) Another attempt to repair ARDCO compressor - make a shaft, install at 1620. Running at 1000 RPM, gun staying above 2000 psi, shut down ships compressor.
09 May 1992	1) ARDCO compressor doing fine. 2) Tape back up lines CH92018 through CH92031. 3) Seismic equipment fine, clean and drain manifold filters.
10 May 1992	1) Begin CH92032 - still using ARDCO compressor until 1538 when shaft sheared off. Captain will not allow another repair attempt - safety reasons. 2) Using ships compressor again at 10 sec.
11 May 1992	1) Still shooting seismic. Line CH92033 and CH92034. 2) Replace tow cable - cable was damaged.
12 May 1992	1) Working on line CH92035. 2) Pressure release on one storage bottle bad, closed valve, sown to 11 bottles. 3) Problem with GI gun, generator not firing (1430). Pulled gun and changed all seals. Recorded approximately 125,000 shots, estimate about 140,000 shots fired. 4) Clean and drain filters in manifold.
13 May 1992	1) Continue seismic survey, last day will end at midnight. 2) Seismic doing fine. 3) End with line CH92042.
14 May 1992	1) Break down seismic gear, wrap up hose/firing line bundle. Clean and rebuild GI-90 gun. Clean up manifold. 2) Pack up seismic gear except Elics which will be used to collect 3.5 KHz seismic on Leg 2. 3) Back all seismic data on tape lines CH92032 - CH92042.
15 May 1992	1) Leave Montego Bay, Jamaica on Continental.

