CENTER FOR MARINE RESOURCES AND ENVIRONMENTAL TECHNOLOGY and SEABED TECHNOLOGY REASERCH CENTER UNIVERSITY OF MISSISSIPPI

Activities Report for Cruise GOM3-06-MC118 aboard the *R/V Pelican*
Shallow Source – Deep Receiver Seismic Survey
Mississippi Canyon Federal Lease Block 118
Northern Gulf of Mexico
April 17-24, 2006

By
Leonardo Macelloni[1], Tom McGee[1], and Ken Sleeper[2]

[1]Center for Marine Resources and Environmental Technology
220 Old Chemistry
University of Mississippi
University, MS 38677

[2]Seabed Technology Research Center
220 Old Chemistry
University of Mississippi
University, MS 38677

CRUISE OBJECTIVES

1) Conduct a seismic survey of the site utilizing CMRET's Shallow Source – Deep Receiver (SS/DR) seismic survey system. Results of the survey will be used to develop a three dimensional subsurface model of the area and to aide in siting geophysical arrays at the facility.
2) Conduct a gun directivity test to evaluate effect of gun orientation with respect to receiver location. Results of test will be used in processing vertical hydrophone array data. The vertical array is a seismo/acoustic array to be installed at the observatory in the near future.

PARTICIPANTS

University of Mississippi: Center for Marine Resources and Environmental Technology (CMRET) and Seabed Technology Research Center (STRC):

Tom McGee, Chief Scientist; Leonardo Macelloni, Scientist; Ken Sleeper, Scientist; Matt Lowe, Mechanical Technician; Larry Overstreet, Mechanical Technician; Andy Gossett, Data Acquisition Technician.

Specialty Devices, Inc.

Scott Sharpe, Data Acquisition Consultant.

R/V Pelican Crew:

Dave Pond, Captain; Joe Malbrough, First Mate; Jack Pennington, Chief Engineer; Chuck Rowe, Science Technician; Mark Lewandowski, Assistance Engineer; and Steve Joltki, Cook.

INTRODUCTION

A scientific research cruise was undertaken to Mississippi Canyon Federal Lease Block 118 (Fig. 1) from April 17-24, 2006 aboard the *R/V Pelican*. The primary objective of the cruise was to conduct a seismic survey of the site; a secondary objective was to conduct a gun directionality test. Once on site, a CTD cast was conducted to get speed of sound profiles. Next, the Ultra Short Base Line was calibrated for accurate positioning of the deep receiver and then the gun directionality test was conducted. After these preliminary activities were completed the survey was initiated. At the end of the survey, an additional CTD cast was made. An Event Log (Appendix 1) is attached and provides details for each activity. An overview of the gun directionality test is provided in Appendix 2. A typed version of the survey log is also provided in Appendix 3.

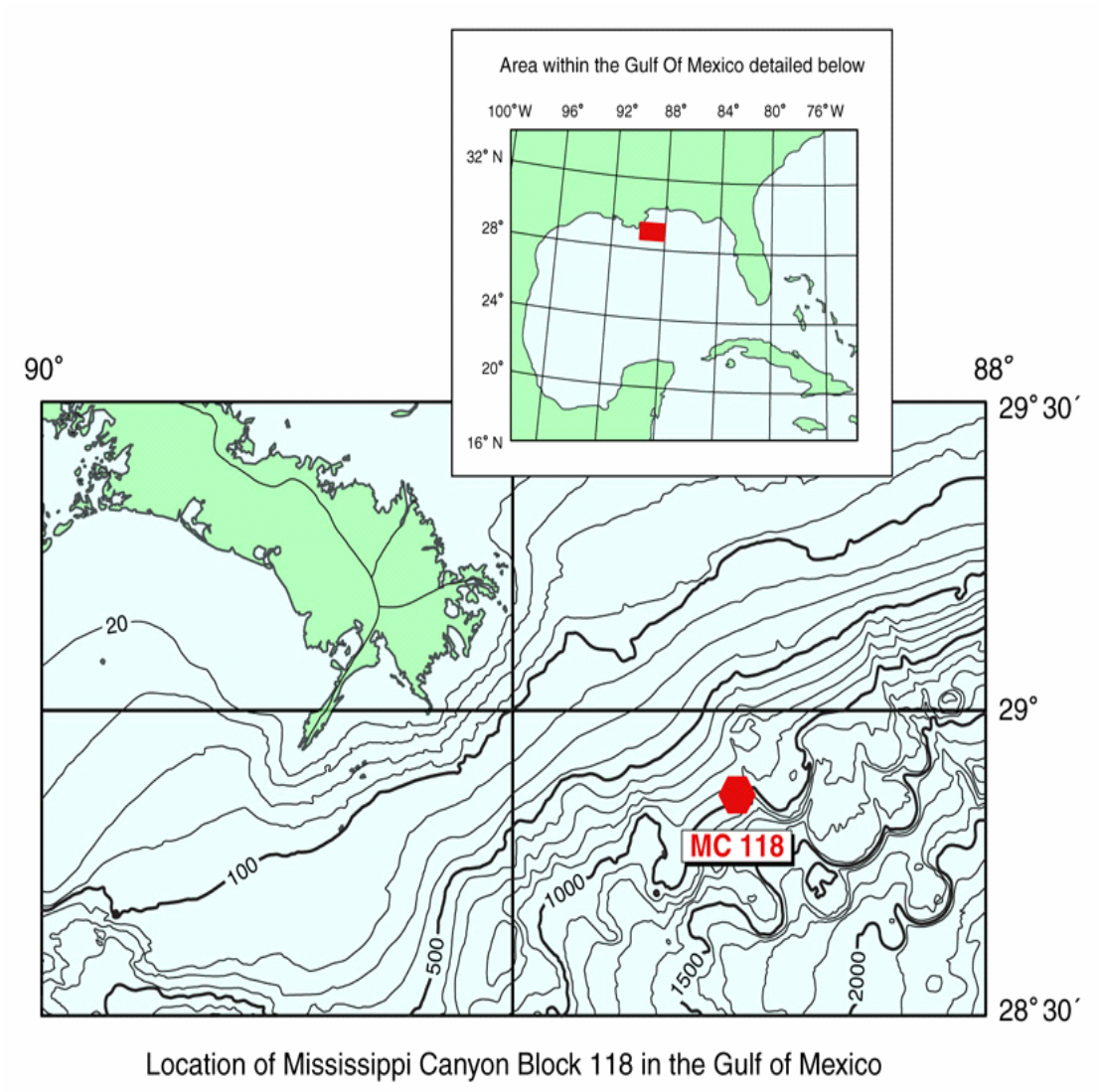


Figure 1. Location map of Mississippi Canyon Federal Lease Block 118.

SHALLOW SOURCE – DEEP RECIEVER SEISMIC SURVEY

A pre-cruise, survey grid was developed for the project that encompassed a 3x3km square area centered on the hydrate mound in Mississippi Canyon 118 (Fig 2). Transects were laid out EW and NS on a 50m spacing with a total of 120 proposed lines (60 in each direction). The geometry of the Shallow Source – Deep Receiver seismic survey is presented in Figure 3. The survey takes advantage of Far-field (normal incidence) geometries, retains polarity and allows for the derivation of absorption and reflection coefficients.

As presented in the Event Log (Appendix 1), 78 lines were shot. Of these lines, 6 were considered bad lines because of incomplete or faulty data. Reasons for faulty lines included trigger malfunctions (switched to shot phone), logging issues (spent batteries), hardware issues (hung computers) and other equipment failures (flooded array). The air compressor for the gun also had to be handled with care. Long turns and occasional shut downs were required for the compressor to keep up. On the night of the 21st, the valves of the first stage of the compressor had to be rebuilt. Efficiencies were improved following the rebuild.

Despite the minor glitches presented above, the survey was very successful. The survey nearly completed a 100m by 100m grid spacing with quite a number of the 50m grid lines completed in the NS direction. Figure 4 shows the lines that were obtained during this survey. The remainder of the grid is scheduled for completion on the next available cruise.

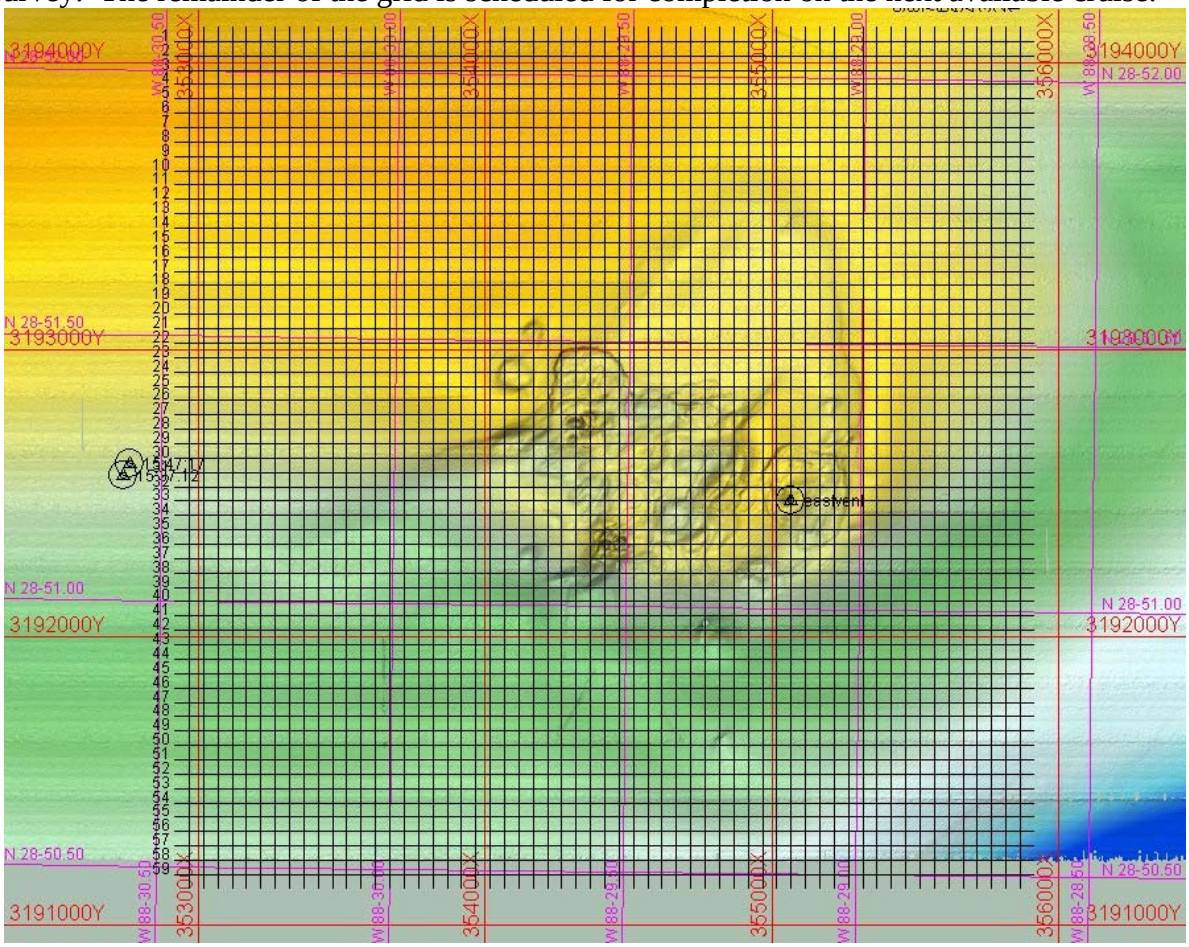


Figure 2. Pre-Cruise Survey Grid.

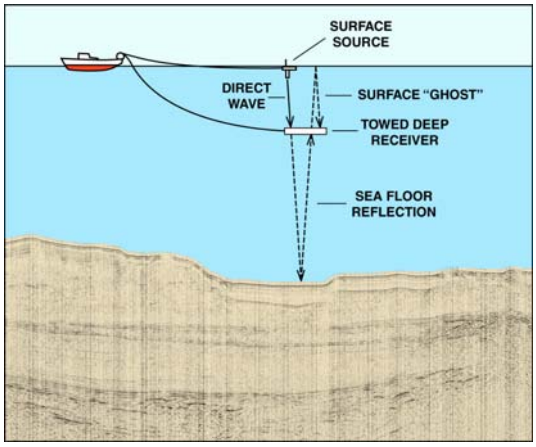


Figure 3. Shallow Source – Deep Receiver geometry for high resolution seismic survey

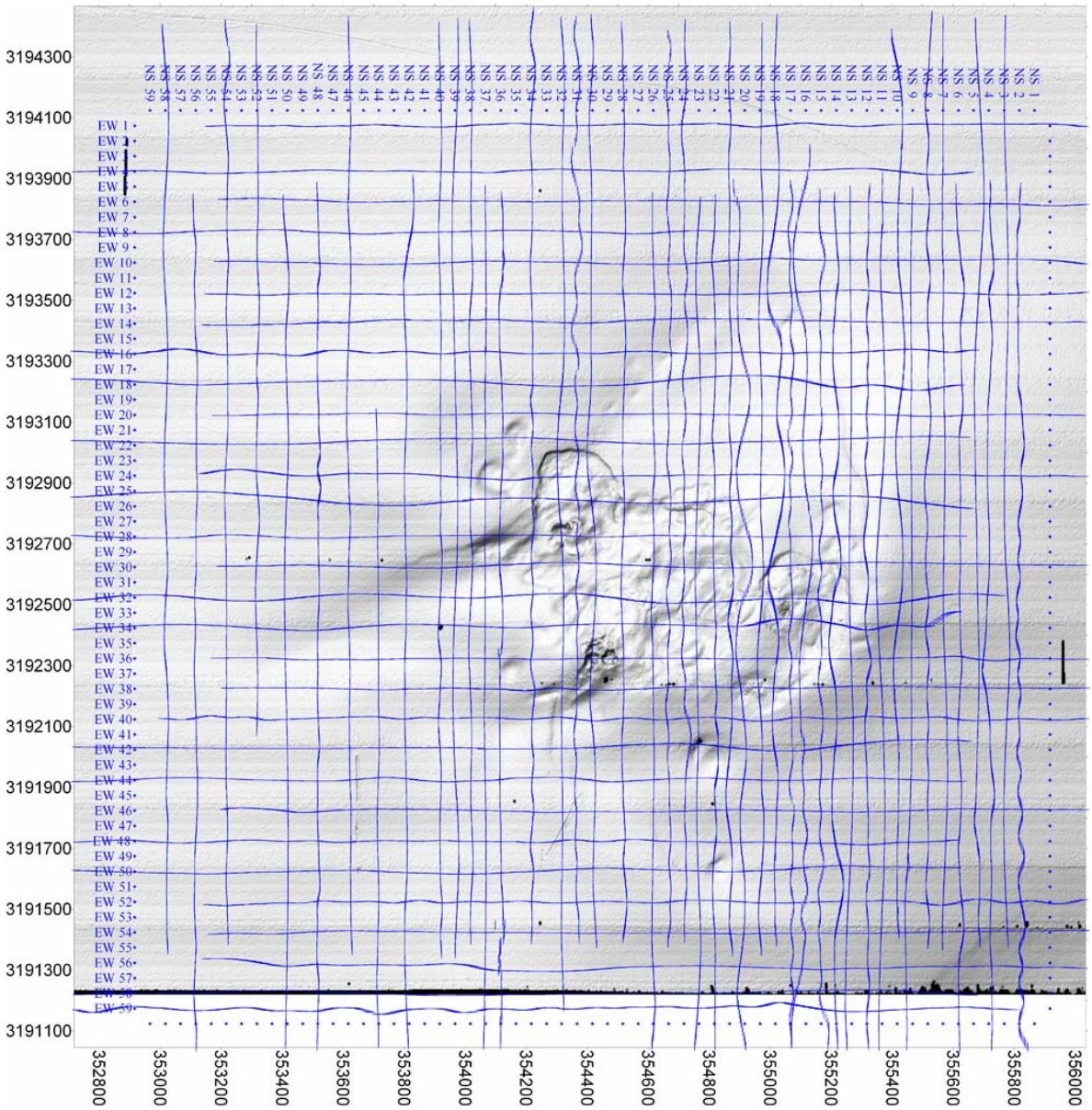


Figure 4. Ship track lines of survey transits acquired during this cruise.

CONCLUSIONS

The cruise was successful. The equipment worked very well and much of the survey grid was completed. Several small glitches occurred during the survey that were dealt with at sea. The compressor system was clearly the limiting factor. Approximately equal time was spent allowing the compressor to catch up as actually shooting lines. The survey was ended approximately 1-2 hours early due to a flooded array. A follow up cruise will be scheduled to complete the grid.

BACKGROUND and ACKNOWLEDGEMENTS

In 1999, the Center for Marine Resources and Environmental Technology facilitated the establishment of the Gulf of Mexico Hydrates Research Consortium. The Consortium has as its primary objective the emplacement of a seafloor station designed to monitor the activities of gas hydrates on the seafloor and in the shallow sub-seafloor. In 2004, the consortium chose Mississippi Canyon Federal Lease Block 118 as the preferred site for the Station. The Minerals Management Services of the Department of the Interior (DOI/MMS) subsequently set a side a portion of the block for the elusive use of the Consortiums research effort.

Funding for the research efforts of the Consortium are jointly supported by DOI/MMS, Department of Energy's National Energy and Technology Laboratory (DOE/NETL), and NOAA's National Institute for Undersea Science and Technology, Seabed Technology Research Center (NOAA/NIUST). Funding for ship time for the current cruise was provided by DOI/MMS. Development of the shallow source – deep receiver survey method was supported by DOE/NETL. Components to operate the shallow source – deep receiver survey system were supported by DOE/NETL and NOAA/NIUST.

APPENDICES:

APENNDIX 1: EVENT LOG

Event Log
SSDR Cruise on RV *Pelican*
17-24 April 2006

Scientific Staff: Tom McGee – Chief Scientist
Leonardo Macelloni – Scientist
Ken Sleeper - Scientist
Matt Lowe – Mechanical Technician
Larry Overstreet – Mechanical Technician
Andy Gossett – Data Acquisition Technician
Scott Sharpe – Data Acquisition Consultant

17 Apr 09:45 – Leo and Ken leave Oxford in van with Andy's gear.
10:00 – Pick up Tom
18:00 – Arrive Cocodrie and meet Matt, Andy, Larry and Scott onboard *Pelican*.
20:00 – Deck preparations complete
22:00 – Recording lab preparations complete

18 Apr 01:00 – Leave dock side
14:00 – Arrive MC118
14:15 – Begin CTD cast
15:15 – Complete CTD cast
15:30 – Begin preparing to deploy USBL
15:48 – Average speed in water column determined to be 1499.2 m/s
16:25 – USBL ship-mounted unit deployed
16:37 – USBL calibration buoy deployed
16:40 – Begin first calibration run
17:20 – First calibration results = 0.7% in y, 0.6% in x
17:30 – Begin second calibration run
18:00 – Second calibration results = 0.6% in y and 0.4% in x
18:05 – Too late to recover the calibration buoy, will wait for daylight tomorrow

19 Apr 06:30 – Heading to pop up calibration buoy
06:50 – Communication with acoustic releases
07:12 – Floats on the surface
07:26 – USBL transceiver onboard
07:40 – 80in^3 water gun being rigged 34' (10m) ahead of GPS antenna
08:02 – Gun and GPS float in the water
08:21 – Gun firing and GPS test OK
09:00 – Hydrophones rigged 67' behind deep-tow cable

09:14 – USBL transceiver rigged 4’ below hydrophone takeout
09:40 – Hydrophone in the water
10:00 – Hydrophone approx. 200m deep, ship speed approx. 2.75kn
10:18 – Gun auto firing for unknown reason
10:35 – Gun out of water and problem diagnosed to be a solenoid seal
11:02 – Gun back in water and firing normally
11:18 – Begin source directivity measurements
11:36 – Putting more deep-tow cable to increase setback distance
11:55 – 300m firing line out, gun 80m behind hydrophone, clipping severe
12:00 – Speed 3.8kn, strumming severe so cut back to 3.3kn
12:35 – Introduce 18db attenuation to eliminate clipping
12:45 – 5km from area so begin turn to return south
13:45 – Turn complete
14:07 – Begin directivity measurements @ file 300 (80m behind hydrophone)
14:11 – File 310 (10m increments)
14:20 – File 370 is maximum extent, begin reeling firing line back in
14:24 – Coming back in, file 360A
15:55 – File 10A, begin turn back to north
16:30 – Complete turn, shoot file 10
16:50 – File 290, complete directivity measurement
17:00 – Head for survey area, installing update to put nav into LGC headers
18:27 – Test recording on mound to check gain
18:30 – Looking for the source of unidentified noise
19:43 – Noise source still not found after extensive search
20:25 – Start Line 32SN firing every 10m, data on ch.1, gun phone on ch.2
21:05 – End Line 32SN
21:25 – Start Line 16NS firing every 15m
22:01 – End Line 16NS
22:50 – Start Line 30SN
23:23 – End Line3 30SN

20 Apr 00:13 – Start Line 20NS
00:48 – End Line 20NS
01:17 – Start Line31SN
01:53 – End Line 31SN (no good – most data lost)
02:25 – Start Line 15NS
03:00 – End Line 15NS
03:21 – Start Line 24SN
03:53 – End Line 24SN (appended to Ln15 – windowing required)
04:28 – Start Line 17NS
05:03 – End Line 17NS
05:23 – Start Line 25SN
05:58 – End Line 25SN
06:24 – Start Line 18NS (aborted)
06:40 – Abort Line 18NS

Appendix 1, Event Log

07:31 – Start Line 34SN
08:03 – End Line 34SN
08:36 – Start Line 44NS
09:03 – End Line 44NS
09:22 – Start Line 54SN
09:57 – End Line 54SN
10:42 – Start Line 20WE
11:15 – End Line 20WE
11:38 – Start Line 28EW
12:12 – End Line 28EW
12:37 – Start Line 36WE
13:14 – End Line 36WE
13:32 – Start Line 44EW
14.05 – End Line 44EW
No nav in LGC headers for lines 20WE, 28EW, 36WE, 44EW (in Hypack file)
14:38 – Start Line 52WE
14:54 – End Line 52WE (only about 1.5km of profile)
14:54 – Closure key pulse stopped due to dead battery
15:35 – Batteries and a BNC replaced to restore key pulse
16:12 – Start Line 48EW
16:45 – End Line 48EW
17:20 – Start Line 40WE
17:58 – End Line 40WE
18:36 – Start Line 32EW (aborted due to firing problems, must be rerun)
20:00 – TTL key part of problem, change to triggering off of shot phone
20:39 – Start Line 12WE, return to 10m shot spacing, data now on channel 2
21:13 – End Line 12WE
21:38 – Start Line 16EW
22:11 – End Line 16EW
22:51 – Start Line 56NS
23:27 – End Line 56NS

21 Apr 00:00 – Start Line 52SN
00:26 – End Line 52SN
01:03 – Start Line 48NS
01:40 – End Line 48NS
01:55 – Start Line 38SN
02:28 – End Line 38SN
05:00 – Start Line 26NS
05:35 – End Line 26NS
05:52 – Start Line 21NS
06:28 – End Line 21NS
07:19 – Start Line 12NS
07:55 – End Line 12NS
08:32 – Start Line 8SN

Appendix 1, Event Log

09:04 – End Line 8SN
09:41 – Start Line 4NS
10:16 – End Line 4NS
10:56 – Start Line 59EW
11:31 – End Line 59EW
12:12 – Start Line 56WE
12:47 – End Line 56WE
13:26 – Start Line 32EW
14:03 – End Line 32EW
14:29 – Start Line 24WE
15:00 – End Line 24WE
15:45 – Start Line 8EW
16:22 – End Line 8EW
17:23 – Start Line 12RWE
17:56 – End Line 12RWE
18:38 – Start Line 4EW
19:10 – End Line 4EW
20:14 – Start Line 1WE
20:51 – End Line 1WE
20:55 – Replace batteries in hydrophone preamp and USBL transponder
21:00 – Check valve in first stage of compressor
21:45 – Compressor running with improved efficiency
22:25 – Deep-tow assembly back in the water
22:53 – Start Line 2NS
23:32 – End Line 2NS
23:55 – Start Line 6SN

22 Apr 00:27 – End Line 6SN
00:30 – Weakening hydrophone signal on last third of Line 6SN
00:35 – Recover deep-tow assembly to check hydrophone preamp
02:30 – Replace batteries and redeploy deep-tow assembly
03:00 – Start Line 6RNS
03:33 – End Line 6RNS
03:51 – Start Line 10SN
04:23 – End Line 10SN
04:51 – Start Line 14NS
05:25 – End Line 14NS
05:45 – Start Line 18SN
06:19 – End Line 18SN
06:54 – Start Line 22NS
07:27 – End Line 22NS
08:01 – Start Line 28SN
08:35 – End Line 28SN
08:53 – Start Line 36NS
09:27 – End Line 36NS

Appendix 1, Event Log

09:51 – Start Line 40SN
10:27 – End Line 40SN
10:44 – Start Line 42NS
11:27 – End Line 42NS
11:50 – Start Line 46SN
12:23 – End Line 46SN
12:38 – Start Line 50NS
13:10 – End Line 50NS
13:45 – Start Line 58SN
14:18 – End Line 58SN (much noise on hydrophone)
14:20 – Retrieve deep-tow to investigate noise and find water in hydrophone
15:30 – Redeploy deep-tow assembly after replacing hydrophone array
16:20 – Start Line 6WE
16:51 – End Line 6WE
17:09 – Start Line 18EW
17:44 – End Line 18EW
18:08 – Start Line 10WE
18:43 – End Line 10WE
19:08 – Start Line 22EW
19:44 – End Line 22EW
20:08 – Start Line 14WE
20:44 – End Line 14WE
21:04 – Start Line 26EW
21:40 – End Line 26EW
22:05 – Start Line 30WE
22:39 – End Line 30WE
22:54 – Start Line 34EW
23:25 – End Line 34EW

23 Apr 00:04 – Start Line 38WE
00:37 – End Line 38WE
00:53 – Start Line 42EW
01:27 – End Line 42EW
01:52 – Start Line 46WE
02:22 – End Line 46WE
02:44 – Start Line 50EW
03:17 – End Line 50EW
03:37 – Start Line 54WE
04:13 – End Line 54WE
04:31 – Start Line 58EW
05:04 – End Line 58EW
05:38 – Start Line 39SN
06:10 – End Line 39SN
06:56 – Start Line 37NS
07:29 – End Line 37NS

06:56 – Start Line 37SN
07:29 – End Line 37SN
08:04 – Start Line 3SN
08:37 – End Line 3SN
09:05 – Start Line 9NS
09:42 – End Line 9NS
09:59 – Start Line 5SN
10:31 – End Line 5SN
10:51 – Start Line 11NS
11:30 – End Line 11NS
11:53 – Start Line 7SN
12:27 – End Line 7SN
12:44 – Start Line 13NS
13:20 – End Line 13NS
14:08 – Start Line 19SN
14:40 – End Line 19SN
14:57 – Start Line 23NS
15:23 – End Line 23NS (many noise spikes, apparently hydrophone flooded)
15:27 – Bringing deep-tow assembly on deck.
15:48 – Evidence of water in hydrophone, no other spare onboard
15:51 – Bringing source assembly on deck
16:19 – All gear on deck,
16:33 – USBL dismounted, CTD cast in progress
17:22 – Underway for Cocodrie

24 Apr 08:15 – Arrive Cocodrie
10:20 – Depart with electronics in van.
15:30 – Drop off Tom at crossroads.
15:45 – Arrive Oxford.

Software updates required for interpretation:

Determine time of start of source signature from precursor
Smooth navigation data
Calculate locations of reflection points

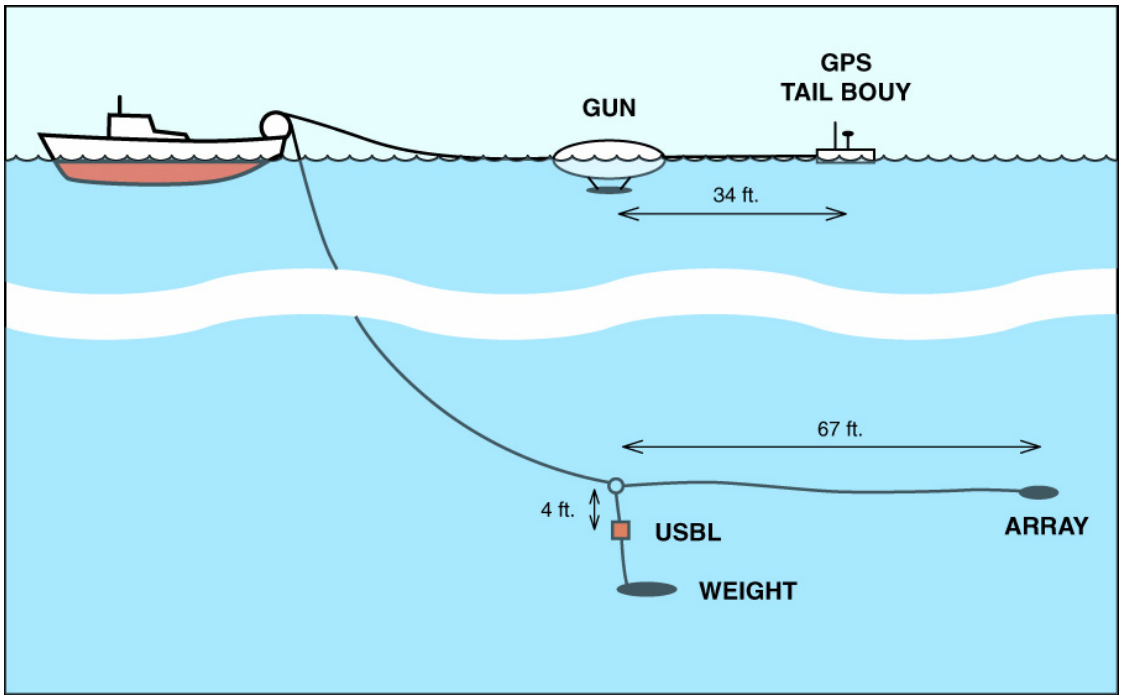
APENNDIX 2: GUN DIRECTIONALITY TEST

April 19, 2006
R/V Pelican
Northern Gulf of Mexico, Mississippi Canyon Federal Lease block 118

Water Gun Directionality Test

Equipment: 1) 80 cubic inch water gun mounted on a surface buoy and 2) hydrophone array and USBL transponder attached to a deep tow.

Geometry of Shallow Source and Deep Receiver: Gun located 34 feet (10.365m) in front of the GPS receiver and USBL transponder mounted 4 feet below and 67 feet in front of the hydrophone array as presented in the illustration below.



Procedure: Set the deep tow, hydrophone array at a more or less fixed position behind the ship and then pay out the water gun in ten meter increments from 10 to 370 meters. At each gun position, fire the gun 3 to 5 times and record the record, gun position, and the range and depth to the array.

Results: Seismic files with FFID's are available upon requests. Gun and array positions for each record are given in Table 1 (next page). Note that in Table 1, records are presented in the order that they were acquired. Records ending in "A" indicate the gun was being incrementally drawn toward the ship as opposed to being paid out. Note that between record 10A and 10 the ship changed course from approximately 180^0 to 360^0. Firing was temporarily delayed while the ship came about.

TABLE 1.

Record/gun position (m)	Range to USBL transponder (m)	Depth to USBL transponder (m)
300	237	257
310	232	265
320	231	264
330	229	268
340	232	263
350	235	259
360	234	261
370	232	263
360A	234	261
350A	235	261
340A	234	262
330A	235	261
320A	234	261
310A	233	261
300A	233	262
290A	231	264
280A	231	263
270A	233	261
260A	234	260
250A	234	260
240A	229	264
230A	228	265
220A	228	265
210A	236	257
200A	234	259
190A	233	259
180A	231	262
170A	232	262
160A	233	261
150A	235	259
140A	235	259
130A	230	263
120A	230	263
110A	229	264
100A	231	261
90A	227	266
80A	223	268
70A	221	271
60A	222	270
50A	223	270
40A	223	269
30A	223	269

Appendix 2, Gun Directionality Test

Record/gun position (m)	Range to USBL transponder (m)	Depth to USBL transponder (m)
20A	226	266
10A	227	265
10	208	285
20	203	289
30	202	290
40	200	291
50	199	292
60	200	291
70	199	292
80	200	291
90	201	289
100	203	289
110	206	287
120	206	287
130	207	287
140	208	285
150	208	285
160	206	286
170	205	288
180	205	288
190	204	288
200	204	288
210	204	288
220	203	289
230	203	289
240	204	288
250	203	287
260	205	287
270	207	286
280	205	288
290	205	287

Table 1.

Appendix 2, Gun Directionality Test

APPENDIX 3: SURVEY LOG

Date	File Name		Time		FFID		Navigation File	Notes
	Line	Dir	Start	End	Start	End		
4/19	32	SN	20.25	21.02	2	325	032_2025	Shooting interval 10 m
4/19	16	NS	21.29	21.59	326	524	016_21.25	Shooting interval 15 m, data in channel 1
4/19	30	SN	22.50	23.23	525	728	0.30_	Line 30 was appended to line 16
4/20	20	NS	00.13	00.48	733	922	020_0012	Trigger Problem FFID790
4/20	31	SN	01.17	01.53	923	990	031_0016	
4/20	15	NS	02.25	03.00	923	1126	015_0225	
4/20	24	SN	03.21	03.53	1127	1331	024_0321	Line 24 was appended to Line 15
4/20	17	NS	04.28	05.03	1332	1357	017_0428	
4/20	25	SN	05.23	05.58	1538	1736	025_0523	
4/20	18	NS	06.24		1744		018_0624	Aborted
4/20	34	SN	07.31	08.03	1737	1939	034_0731	
4/20	44	NS	08.36	09.03	1941	2094	044_0836	
4/20	54	SN	09.22	09.57	2095	2296	054_0922	FFID off by 1
4/20	20	WE	10.42	11.15	2297	2498	020_1042	
4/20	28	EW	11.38	12.12	2499	2703	028_1138	
4/20	36	WE	12.37	13.14	2704	2898	036_1236	Compressor off from FFID 2704 to2772, Timing problems
4/20	44	EW	13.32	14.05	2899	3090	044_1332	Computer stopped at FFID 3010, problems in navigation file
4/20	52	WE	14.38	15.10	3091	3190	052_1437	
4/20	48	EW	16.12	16.45	3191	3390	048_1612	
4/20	40	WE	17.20	17.58	3391	3619	040_1720	
4/20	32	EW	18.36		3628			Aborted
4/20	12	WE	20.39	21.13	3621	3922	012_2038	Shooting interval 10 m, switched break phone for trigger. FFID off from event: last event 4037 last FFID 3922
4/20	16	EW	21.38	22.11	4047	4351	016_2137	FFIDs behind event by 2

Date	File Name		Time		FFID		Navigation File	Notes
	Line	Dir	Start	End	Start	End		
4/20	56	NS	22.51	23.27	4352	4651	056_2251	FFIDs behind event by 1
4/21	52	SN	00.00	00.26	4652	4459	052_0000	
4/21	48	NS	01.03	01.40	4958	5262	048_0103	
4/21	38	SN	01.55	02.28	5263	5565	038_0155	
4/21	26	NS	05.00	05.35	5566	5868	026_0500	
4/21	21	SN	05.52	06.28	5869	6174	021_0552	
4/21	12	NS	07.19	07.55	6175	6479	012_0719	FFID off by 1
4/21	8	SN	08.32	09.04	6480	6786	008_0832	
4/21	4	NS	09.41	10.16	6787	7095	004_0941	
4/21	59	EW	10.56	11.31	7095	7417	059_1056	
4/21	56	WE	12.12	12.47	7418	7725	056_1212	
4/21	32	EW	13.26	14.03	7726	8042	032_1326	
4/21	24	WE	14.29	15.00	8043	8353	024_1429	
4/21	8	EW	15.45	16.22	8354	8658	008_1545	
4/21	12R	WE	17.23	17.54	8659	8965	012_1723	
4/21	4	EW	18.38	19.10	8966	9268	004_1838	One event off
4/21	1	WE	20.14	20.51	9269	9573	001_2014	
4/21	2	NS	22.53	23.32	9574	9883	002_2253	
4/21	6	SN	23.55	00.27	9884	10187	006_2355	Events reset at 10000! At FFID 10100 start losing signal
4/22	6R	NS	03.00	03.33	1	304	006_0300	Line 6 NS run second time. Reset FFIDs to 1
4/22	10	SN	03.51	04.23	305	601	010_0351	Two events off, Tail buoy 50-100 m to the east
4/22	14	NS	04.51	05.25	602	906	014_0451	Tail buoy about 75 m to the east due to the wind
4/22	18	SN	05.45	06.19	907	1214	018_0545	Difficult holding line, storm front approaching

Date	File Name		Time		FFID		Navigation File	Notes
	Line	Dir	Start	End	Start	End		
4/22	22	NS	06.54	07.27	1215	1515	022_0654	Tail buoy about 75 m east, USBL about 25 m NE
4/22	28	SN	08.01	08.35	1516	1816	028_0801	Tail buoy about 75 m east
4/22	36	NS	08.53	09.27	1817	2124	036_0853	complete
4/22	40	SN	09.51	10.27	2125	2430	040_0951	Tail buoy 50 m East
4/22	42	NS	10.44	11.27	2431	2746	042_1044	Line 42 appended to Line 40, Event off by 1
4/22	46	SN	11.50	12.23	2747	3052	046_1150	
4/22	50	NS	12.38	13.10	3053	3554	050_1238	
4/22	58	SN	13.45	14.18	3355	3659	058_1345	Noise on receiver
4/22	6	WE	16.20	16.51	3660	3959	006_1620	
4/22	18	EW	17.09	17.44	3960	4261	018_1719	
4/22	10	WE	18.08	18.43	4262	4562	010_1808	
4/22	22	EW	19.08	19.44	4563	4864	022_1908	
4/22	14	WE	20.08	20.44	4865	5169	014_2008	
4/22	26	EW	21.04	21.40	5170	5471	026_2104	
4/22	30	WE	22.05	22.39	5472	5772	030_2205	
4/22	34	EW	22.54	23.25	5773	6074	034_2254	
4/23	38	WE	00.04	00.37	6075	6376	038_0004	
4/23	42	EW	00.53	01.27	6377	6677	042_0053	
4/23	46	WE	01.52	02.22	6678	6977	046_0152	
4/23	50	EW	02.44	03.17	6978	7277	050_0244	Tail buoy 100 m North
4/23	54	WE	03.37	04.13	7278	7582	054_0337	USBL 25 m to North, Tail buoy 75 m North
4/23	58	EW	04.31	05.04	7583	7888	058_1431	Tail buoy 50-75 m North
4/23	39	SN	05.38	06.10	7889	8195	039_0538	Tail buoy 50 m to East

Date	File Name		Time		FFID		Navigation File	Notes
	Line	Dir	Start	End	Start	End		
4/23	37	NS	06.56	07.29	8196	8500	037_0656	
4/23	3	SN	08.04	08.37	8501	8805	003_0804	
4/23	9	NS	09.05	09.42	8806	9110	009_0905	
4/23	5	SN	09.59	10.31	9111	9417	005_0959	
4/23	11	NS	10.51	11.30	9418	9725	011_1051	
4/23	7	SN	11.53	12.27	9726	10031/31	007_1153	After 10000 reset events
4/23	13	NS	12.44	13.20	32	339	013_1244	
4/23	19	SN	14.08	14.40	340	591	019_1408	Line 19 appended to line 13, lost last 200 m line failed at event 591
4/23	23	NS	14.57	15.23	592	893	023_1457	Bad FFIDs: 740 741 746 747 758 767 772 775 777 778
								781 787 793 797 798 799 800 801 809 813 816 820 821 844 846 847 848 851 852 853 854 857 859 863 864 865 866 875 881 884 890