

**BELIZE CRUISE REPORT
HIGH RESOLUTION SEISMIC SURVEY CRUISE
BELIZE, CENTRAL AMERICA
R/V LONE STAR, LEGS 1, 2, AND 3
11 NOVEMBER 1992 TO 09 JANUARY 1993**

by

David A. Mucciarone

Rice University cruise participants: John B. Anderson (1,3), Andre' W. Droxler (1,3), David A. Mucciarone (1,2,3), and C. Elmer Ferro (1).

University of Miami cruise participants: Don McNeill (2), Gergor Eberli (2), Mike Grammer (2), Dominic Esker (2).

The following is a technical summary of the three Belize cruise legs aboard the R/V *Lone Star*. The Belize high resolution survey was a joint effort between Rice University, Legs 1 and 3, and University of Miami, Leg 2. All three legs incorporated seismic with coring in the lagoon and outside the barrier reef ranging from Belize City to the international boarder between Belize and Guatemala. Seismic acquisition was both digital using the Elics digital acquisition system (WYSE v1.7) and analog via the EPC recorder. Energy sources were the EG&G Uniboom and SSI S-15 ci water gun in conjunction with an ITI 10 hydrophone streamer. Collection of 3.5 KHz seismic was unsuccessful due to equipment failure. Coring devices used were a 10 ft piston core and 15 ft vibra core. Details of the seismic and cores taken on Legs 1 and 3 are appended to the back of this technical report. Additional information on Leg 2 is available from the University of Miami.

Seismic acquisition:

	<u>Uniboom</u>	<u>S-15</u>
Shooting Interval =	1000 ms	3000 ms
Sampling Frequency =	8000 Hz	2000 HZ
Recording Length =	256 ms	1024 ms
Energy =	300 J	2000 psi
High Pass Filter Digital=	60 Hz	60 Hz
Low Pass Filter Digital =	2400 Hz	800 Hz
High Pass Filter Analog =	300 Hz	60 Hz
Low Pass Filter Analog =	2400 Hz	1500 Hz
Signal Amplification =	40-50	35-40

Seismic File Statistics for Leg 1:

<u>Line name</u>	<u>Distance ktmi</u>	<u>Shots</u>	<u>Time</u>	<u>Size MB</u>	<u>Tape#</u>	<u>Source</u>	<u>Date</u>
LS92-01	0.75	784	0:13	0.8	001,004	UB	11/11/92
LS92-01B	5.00	3760	1:01	0.0		UB	11/11/92
LS92-02B	18.00	7170	1:54	7.8	001,004	UB	11/11/92
LS92-03	7.20	5360	1:33	5.8	001,004	UB	11/12/92
LS92-04	4.75	3706	1:01	4.0	001,004	UB	11/12/92
LS92-05A	1.70	1243	0:20	1.3	001,004	UB	11/12/92
LS92-05B	7.50	5261	1:27	5.7	001,004	UB	11/12/92
LS92-06	5.00	2055	0:38	2.2	001,004	UB	11/12/92
LS92-07	11.50	7539	2:08	8.9	001,004	UB	11/13/92
LS92-08	3.75	2846	0:47	3.1	001,004	UB	11/13/92
LS92-08B	6.75	4014	1:05	4.3	001,004	UB	11/13/92
LS92-09	5.00	3520	0:59	3.8	001,004	UB	11/13/92
LS92-10	10.60	6883	1:53	7.4	002,005	UB	11/13/92
LS92-11	5.30, 15.00	17700	4:51	19.2	002,005	UB	11/13/92

LS92-12	3.50	3295	0:54	3.5	002,005	UB	11/13/92
LS92-13	29.5, 3.25, 2.0, 5.0	33900	9:25	37.1	003,006	UB	11/13-14/92
LS92-14	2.00, 5.60	9650	2:39	10.4	003,006	UB	11/14/92
LS92-15	10.50	9691	2:40	10.5	007,009	UB	11/14/92
LS92-16	12.00	14067	3:53	15.3	007,009	UB	11/16/92
LS92-17	6.25,7.25,8.75	13261	3:38	14.4	007,009	UB	11/16-17/92
LS92-18	20.00	18970	6:13	20.6	008,010	UB	11/17/92
LS92-19	4.20	805	0:39	0.9	008,010	S-15	11/17/92
LS92-20	5.25, 4.25	2828	2:20	3.1	008,010	S-15	11/17/92
LS92-21	4.8, 4.8	2276	1:52	2.5	008,010	S-15	11/17/92
LS92-22	4.6, 4.6	2239	1:51	0.0		S-15	11/17/92
LS92-23	6.70	1533	1:16	1.7	008,010	S-15	11/17/92
LS92-24	7.50	1625	1:18	1.8	008,010	S-15	11/17/92
LS92-25	7.00	1681	1:19	1.9	008,010	S-15	11/17/92
LS92-26	2.80	741	0:36	0.8	008,010	S-15	11/17/92
LS92-26B	14.50	2730	3:00	3.0	008,010	S-15	11/17-18/92
LS92-26C	5.80	1038	1:09	1.4	008,010	S-15	11/18/92
LS92026D	0.85	420	0:21	0.1	008,010	S-15	11/18/92
LS92-27	14.15	3237	3:38	3.6	008,010	S-15	11/18/92
LS92-27B	10.25	1452	1:38	1.5	008,010	S-15	11/18/92
LS92-28	0.45	200	0:10	0.1	008,010	S-15	11/18/92
LS92-28B	3.9, 5.25, 5.9 ,6.5	5612	4:37	5.9	011,012	S-15	11/18/92
LS92-29	11.50	2699	2:13	2.9	011,012	S-15	11/19/92
LS92-30	11.70	2752	2:15	3.0	011,012	S-15	11/19/92
LS92-31	7.00	1938	1:45	2.1	011,012	S-15	11/19/92
LS92-32	2.60	433	0:22	0.5	011,012	S-15	11/19/92
LS92-33	15.75	3833	3:09	4.1	011,012	S-15	11/19/92
LS92-34	8.30	1955	1:36	2.1	011,012	S-15	11/19/92
LS92-35	17.10	4301	3:33	4.6	011,012	S-15	11/20/92
LS92-36	17.00	3681	3:12	4.2	011,012	S-15	11/20/92
LS92-37	11.00	2636	2:09	0.0		S-15	11/20/92
LS92-38	12.50	3807	3:08	4.1	011,012	S-15	11/20/92
LS92-39	4.65	1343	1:06	1.5	011,012	S-15	11/20/92
LS92-40	12.00	6720	4:21	7.3	011,012	S-15	11/21/92
LS92-41	6.00	1814	0:58	0.0		S-15	11/21/92
LS92-41B	7.00	2074	1:43	2.3	011,012	S-15	11/21/92
LS92-42	26.00	6950	5:44	7.5	011,012	S-15	11/21-22/92
LS92-43	11.50	3398	2:49	3.7	011,012	S-15	11/22/92

UB Total Shots Recorded = 174,682

S-15 Total Shots Recorded = 78,752

UB Total Miles Recorded = 233.6

S-15 Total Miles Recorded = 308.1

UB Total Hours Recorded = 49.2

S-15 Total Hours Recorded = 65.8

Seismic File Statistics for Leg 2*:

Line name	Size MB	Tape#	Source	Date
UM92-01	10.3	001,002	S-15	11/30/92
UM92-02	24.8	001,002	UB	11/30/92
UM92-03	5.3	001,002	UB	11/30/92
UM92-04	4.5	001,002	UB	11/30/92
UM92-05	12.7	003,004	UB	11/30/92
UM92-06	7.4	003,004	S-15	11/30/92
UM92-07	0.3	003,004	S-15	11/30/92
UM92-07B	2.1	003,004	S-15	11/30/92
UM92-08	3.8	003,004	S-15	11/30/92
UM92-09B	2.2	003,004	S-15	11/30/92

UM92-10B	1.6	003,004	S-15	11/30/92
UM92-11	4.6	003,004	S-15	11/30/92
UM92-12	2.1	003,004	S-15	11/30/92
UM92-13	6.6	003,004	S-15	11/30/92
UM92-14	5.1	003,004	S-15	11/30/92
UM92-15	3.9	003,004	S-15	11/30/92
UM92-16	30.6	005,006	UB	12/04/92
UM92-17	9.1	005,006	S-15	12/04/92
UM92-18	15.2	005,006	S-15	12/04/92
UB Total Shots Recorded = 95,466		S-15 Total Shots Recorded = 48,433		
UB Total Miles Recorded = 104.0		S-15 Total Miles Recorded = 220.0		
UB Total Hours Recorded = 23.0		S-15 Total Hours Recorded = 39.0		

Line name	Tape Capacity MB	Shots/Tape	Tape#	Source	Date
UM92-19	47.0		007,008	UB	UNKNOWN
UM92-20	47.0		007,008	UB	UNKNOWN
UM92-21	47.0		007,008	UB	UNKNOWN
UM92-22	47.0	43385	007,008	UB	UNKNOWN
UM92-23B	32.4		009,010	UB	UNKNOWN
UM92-24	32.4		009,010	UB	UNKNOWN
UM92-25	32.4	29908	009,010	UB	UNKNOWN
UM92-26	50.0		011,012	UB	UNKNOWN
UM92-27	50.0		011,012	UB	UNKNOWN
UM92-28	50.0		011,012	UB	UNKNOWN
UM92-29	50.0		011,012	UB	UNKNOWN
UM92-30	50.0		011,012	UB	UNKNOWN
UM92-31	50.0	46154	011,012	UB	UNKNOWN
UM92-32	50.0		013,014	UB	UNKNOWN
UM92-33	50.0		013,014	UB	UNKNOWN
UM92-34	50.0		013,014	UB	UNKNOWN
UM92-35	50.0		013,014	UB	UNKNOWN
UM92-36	50.0		013,014	UB	UNKNOWN
UM92-37	50.0		013,014	UB	UNKNOWN
UM92-38	50.0	46154	013,014	UB	UNKNOWN
UM92-39	51.0		015,016	UB	UNKNOWN
UM92-40	51.0		015,016	UB	UNKNOWN
UM92-41	51.0		015,016	UB	UNKNOWN
UM92-42	51.0		015,016	UB	UNKNOWN
UM92-43	51.0		015,016	UB	UNKNOWN
UM92-44	51.0	47077	015,016	UB	UNKNOWN
UM92-44B	35.0		017,018	UB	UNKNOWN
UM92-45	35.0		017,018	UB	UNKNOWN
UM92-45B	35.0		017,018	UB	UNKNOWN
UM92-46	35.0	32308	017,018	UB	UNKNOWN
UM92-47	8.0	7385	019,020	UB	UNKNOWN

*Additional seismic information available from the University of Miami.

UB Total Shots Recorded = 252,371
 UB Total Miles Recorded = 315.0
 UB Total Hours Recorded = 70.1

Seismic File Statistics for Leg 3:

Line name	Distance ktmi	Shots	Time	Size MB	Tape#	Source	Date
LS93-44	14.50	3786	3:08	15.5	014,015	S-15	01/05/93
LS93-45	7.5, 9.0	4588	3:46	18.8	014,015	S-15	01/06/93

LS93-46	16.50	3947	3:11	16.3	014,015	S-15	01/06/93
LS93-47	6.00	1465	1:13	6.1	014,015	S-15	01/06/93
LS93-48	14.50	3717	3:03	15.3	014,015	S-15	01/06/93
LS93-49	10.5, 2.0	3192	2:30	12.5	016,017	S-15	01/06/93
LS93-50	9.50	2341	1:56	9.6	016,017	S-15	01/06/93
LS93-51	12.0	3212	2:39	13.2	016,017	S-15	01/06/93
LS93-52	7.75	2152	1:46	8.8	018,019	S-15	01/06/93
LS93-53	8.50	2134	1:46	8.7	018,019	S-15	01/06/93
LS93-54	5.2, 4.5	2536	2:05	10.4	018,019	S-15	01/06/93
LS93-55	1.5, 4.5	1660	1:23	6.9	018,019	S-15	01/07/93
LS93-56	7.50	1966	1:37	8.3	018,019	S-15	01/07/93
LS93-57	6.00	1529	1:15	0.0		S-15	01/07/93
LS93-58	8.5, 5.0, 8.25	17680	4:56	72.4	020A-B,021A-B	UB	01/08/93
LS92-59	6.0, 8.5, 3.75	8168	2:15	33.3	020A-B,021A-B	UB	01/09/93
LS92-59B	1.10	860	0:15	0.9	020A-B,021A-B	UB	01/09/93
LS93-60	6.6, 4.6, 3.5, 3.0	10509	2:53	11.5	020A-B,021A-B	UB	01/09/93
UB Total Shots Recorded = 37,217				S-15 Total Shots Recorded = 38,225			
UB Total Miles Recorded = 58.8				S-15 Total Miles Recorded = 147.5			
UB Total Hours Recorded = 10.3				S-15 Total Hours Recorded = 31.3			

UB Total Shots Recorded on Legs 1 - 3 = 559,736 S-15 Total Shots Recorded on Legs 1 - 3 = 165,410
 UB Total Miles Recorded on Legs 1 - 3 = 711.4 S-15 Total Miles Recorded on Legs 1 - 3 = 675.6
 UB Total Hours Recorded on Legs 1 - 3 = 152.6 S-15 Total Hours Recorded on Legs 1 - 3 = 136.1
 UB Total Days Recorded on Legs 1 - 3 = 6.36 S-15 Total Days Recorded on Legs 1 - 3 = 5.67

Coring Statistics for Leg 1:

Station #	Core type	Date	Lat.	Long.	WD (ft)	Length (cm)	Sections
LS92-01	VC	11/15/92	17 14.95	88 14.12	36	324	1C,2B,3A
LS92-02	VC	11/15/92	17 14.75	88 09.60	58	380	1C,2B,3A
LS92-03	VC	11/15/92	17 14.71	88 08.95	58	266	1C,2B,3A
LS92-04	VC	11/15/92	17 15.04	88 06.38	50	285	1B,2A
LS92-05	VC	11/15/92	17 14.78	88 05.77	13	197	1B,2A
LS92-06	VC	11/15/92	17 20.94	88 10.31	72	380	1C,2B,3A,VT
LS92-07	VC	11/15/92	17 21.96	88 09.56	85	368	1C,2B,3A
LS92-08	VC	11/15/92	17 22.89	88 08.35	86	375	1C,2B,3A,VT
LS92-09	PC	11/19/92	16 36.62	88 02.33	750	100	1A
LS92-10	PC	11/19/92	16 37.37	88 00.35	900	0	NS
LS92-11	PC	11/20/92	16 21.30	88 04.59	85	0	NC
LS92-12	GS	11/21/92	16 59.08	88 13.37	5	0	N/A
LS92-13	VC	11/21/92	16 59.08	88 13.37	5	135	1A

Key: VC=Vibracore; PC=Piston core; GS=Grab sample; NS=No sample; NC=Nose cone; N/A= not applicable; VT=Verity top.

Coring Statistics for Leg 2:

Information available from the University of Miami.

Coring Statistics for Leg 3:

Station #	Core type	Date	Lat.	Long.	WD (ft)	Length (in)	Sections
LS93-01	PC	01/07/93	16 54.91	88 01.24	1100	37	1 uncut
LS93-02	PC	01/07/93	16 052.46	88 02.52	950	44	1 uncut
LS93-03	PC	01/07/93	16 38.34	87 54.81	1050	63	1 uncut
LS93-04	PC	01/08/93	16 35.87	87 54.54	750	0	NS

LS93-05	PC	01/08/93	16 37.11	87 58.08	950	40	1 uncut
LS93-06	PC	01/08/93	16 37.35	88 00.15	900	77	1 uncut
LS93-07	PC	01/08/93	16 37.11	88 02.08	800	25	1 uncut
LS93-08	PC	01/09/93	17 10.57	88 07.26	50	105	1 uncut

Key:PC=Piston core; NS=No sample; 1 uncut=Core not cut in 1.5 m sections.

CRUISE OUTLINE LEG 1: 09 November to 23 November 1992

- 09 November 1992
- 1) Depart IAH at 12:03a on Continental Flt. 433 to Belize City. Transported all seismic equipment on plane.
 - 2) Arrive at R/V Lone Star at approximately 1600. Load all seismic and personal gear onboard. Stay and sleep at dock. Ship needs repair after transit from Galveston to Belize.
- 10 November 1992
- 1) Set up seismic digital and analog acquisition systems.
 - 2) Repair rubber seal over uniboom plate.
 - 3) Make ship repairs
- 11 November 1992
- 1) Leave dock at approximately 0800.
 - 2) Begin shooting seismic with uniboom in back reef. Begin recording at 1050 with line LS92-01
 - 3) Problems with Elics TIGA version 2.08. Freezing up again.
 - 4) Set up Elics Wyse version 1.7. Begin using Wyse system on line LS92-2B.
 - 5) Work on setting up 3.5 KHz with Bat Fish. Problems with transducer cable connectors.
 - 6) Complete lines LS92-01 through LS92-02B.
 - 7) Anchor in Dangriga. Pick up pilot.
 - 8) Work on setting up GPS navigation system. Poor connections.
- 12 November 1992
- 1) GPS navigation system working.
 - 2) Leave Dangriga, shot more uniboom seismic, lines LS92-03 through LS92-06.
 - 3) Bat Fish 3.5 KHz working for a short time, then broke again.
 - 4) Anchor in Dangriga again.
- 13 November 1992
- 1) C. Elmer Ferro arrived after an immigration delay.
 - 2) More uniboom seismic. Shot lines LS92-07 through LS92-13.
 - 3) Still trying to repair the 3.5 KHz system.
 - 4) Set up vibra coring system
 - 5) Shot uniboom through the night.
- 14 November 1992
- 1) More uniboom data, lines LS92-14 through LS92-15.
 - 2) Set up S-15 ci water gun.
 - 3) Back up seismic data lines LS-01 to LS92-15 on tape.
 - 4) 3.5 KHz still not working.
 - 5) Anchor near Belize City.
 - 6) Weather too rough to shot S-15 water gun data outside the barrier reef. Coring scheduled for 15 November.
- 15 November 1992
- 1) Take vibra cores inside barrier reef. Total of 8 cores.
 - 2) Dock in Belize City.
 - 3) Work on 3.5 KHz transducer cable.
- 16 November 1992
- 1) Busy work in Belize City - Embassy, Fisheries, ship parts, fuel and water.
 - 2) Leave dock at 1600 heading south.
 - 3) Still working on 3.5 KHz cable, try epoxy on connector. Attach support harness.

4) Begin uniboom at 1725, shot lines LS92-16 and LS92-17.

- 17 November 1992
- 1) Shot seismic with uniboom through night finishing with line LS92-18 at 0615.
 - 2) Connect and overboard S-15 water gun for seismic outside barrier reef. Begin with LS92-19 on channel delta continuing to LS92-26. Shot S-15 overnight.
 - 3) Back up seismic data lines LS92-15 through LS92-17 on tape.
- 18 November 1992
- 1) More S-15 seismic shot lines LS92-26B to LS92-28B.
 - 2) Set up piston coring device.
 - 3) Back up seismic data lines LS92-18 through LS92-28B on tape.
 - 4) Anchor behind South Water Caye.
- 19 November 1992
- 1) Begin S-15 seismic again at 0720 south of Glovers Reef. Shot lines LS92-29 to LS92-34. Problems with S-15 miss firing. Attempted to repair gun after approximately 27,600 shots. Clean gun and replaced parts 104, 107, 132, 133, 135, 136, 137, 140, 141, 142, 145, 148, 158, 361, 3102, 3103. Gun fired fine for about 1 hour than began miss firing again. Pulled gun again, cleaned and regreased. Gun worked fine for about 2 hours.
- 20 November 1992
- 1) More S-15 seismic. Cleaned and regreased water gun again. Shot lines LS92-35 to LS92-39.
 - 2) Take piston cores near channel delta area.
 - 3) Make up new hose bundle in an attempt to fix S-15 miss firing.
 - 4) Attempt 3 vibra cores with no success.
 - 5) Anchor in Dangriga, John Anderson leaves for Houston.
- 21 November 1992
- 1) Take a vibra core in Dangriga.
 - 2) Test out new S-15 Hose bundle
 - 3) John Anderson departs ship for Houston.
 - 4) Head for Tobacco Caye to continue with S-15 survey. Shot lines LS92-40 to LS92-43. Gun still miss firing. Appears to be in the gun controller.
- 22 November 1992
- 1) Problem with exhaust system on ship. End S-15 seismic survey at 0635 and head for Belize City for repairs. Finish S-15 survey with LS92-43.
 - 2) bring all seismic gear onboard. Break down gear Clean and regrease S-15. Replace main shaft seal part 226B133.
 - 3) Back up seismic data lines LS92-29 through LS92-43 on tape.
 - 4) Dock in Belize City at approximately 1400.
 - 5) End of Leg 1.
- 23 November 1992
- 1) Leave Belize City at 1512 on Continental Flt. 1672 at 1830.
- CRUISE OUTLINE LEG 2: 29 November to 16 December 1992⁺
- 29 November 1992
- 1) Depart IAH at 1330 on TACA to Belize City, arrive at 1600.
 - 2) Clean and regrease S-15.
 - 3) Set up and test acquisition system. Set up navigation program on UM computer.
 - 4) Repaired gun controller, loose board.
- 30 November 1992
- 1) Take on fuel and water. Load University of Miami coring rig.
 - 2) Assemble both S-15 and Uniboom.
 - 3) Repair exhaust system hose.
 - 4) Repair leaks in computer room roof.
 - 5) Leave Belize City at 1930 heading toward Dangriga.

6) Begin shooting S-15 at 2341 on line UM92-01 using 6" extenders at 3000 Hz and 3000 ms shooting rate. Record not good, rough sea state.

- 01 December 1992 1) UM92-01 end at 0830, pulled S-15 and began using uniboom at 8000 Hz and 1000 ms shooting rate UM92-02 started at 0915.
2) Stopped shooting uniboom, rough sea state (4'-5' up to 7'). Uniboom not riding well, data getting noisy, pulled gear at 1815 and headed landward for protection. End line UM92-04. At 2210 seas laid down enough to start shooting again. Began heading SE on UM92-05 using uniboom.
- 02 December 1992 1) Sea state holding, put S-15 in and began shooting UM92-06 with 15" extenders at 2000 Hz and 3000 ms shooting interval.
2) Blow down block on port side compressor not working properly. Necessary to close the valve manually every 15 minutes.
3) Rigged up power supply for ITI streamer. Put in series 12v power supply with 9v battery for approximately 20v under load.
4) Repaired second compressor, fan rubbing against plumbing lines, cable tied tubing away from fan. No problems with blow down block on starboard compressor. However, pressure builds to 3500 psi with 4 bottles open. By closing 2, the pressure remains at 2200 to 2400 psi.
- 03 December 1992 1) S-15 and gun controller doing well, no miss firing. Working on lines UM92-14 and UM92-15.
2) Back up seismic data to tape. Lines UM92-01 through UM92-15 approximately 98 MB. Train University of Miami group on back up procedure.
3) Pulled S-15 for one line, replace with uniboom to shoot shallow seismic on line UM92-16. After about 8 hr's we pulled the uniboom and used the S-15 for lines UM92-17 and UM92-18.
- 04 December 1992 1) Still using S-15, shooting line UM92-18.
2) Stopped shooting at about 0530 and headed for Placencia for my flight to Belize City.
3) Clean and regreased S-15. replaced parts 266B133 shaft bearing, and 16A3101, 16A3102, 16A3103, and 16A361 all solenoid parts.
4) Pack/stow all S-15 equipment (float, hose bundle, S-15, and regulator.
5) Leave Placencia at 1145 for Belize City.
6) University of Miami finished with S-15 survey, will use the uniboom for the duration of their cruise ending on 16 December 1992.
- 05 December 1992 1) Leave Belize at 0955 on TACA, arrive IAH at 1315.

+ This outline only represents the portion of Leg 2 I attended.

CRUISE OUTLINE LEG 3: 04 January to 09 January 1993

- 04 January 1993 1) Depart IAH at 12:03a on Continental Flt. 433 to Belize City.
2) Arrive at R/V Lone Star at approximately 1600. Load all seismic and personal gear onboard. Stay and sleep at dock.
3) Set up and test S-15. Problem with regulator pressure gauge. Replaced gauge.
4) Set up navigation system.
- 05 January 1993 1) Depart dock at 0850. Problem with Elics digital acquisition system computer. First was a hard disk failure, then a memory error. These problems were solved by reseating the boards. Next problem was no synchronization with the trigger in profile mode. On Wyse version 1.7 it would sync fine in control mode but not profile. Tried TIGA

version 2.8, would not sync in either control or profile mode. Pulled all boards and chips, cleaned contacts with contact cleaner and dried out computer with heat gun. Finally, sync in both control and profile modes. Switched back to Wyse system and began shooting seismic on line LS93-44 at 2046.

2) Shooting S-15 at 2000 Hz and 3000 ms intervals with 2200 psi.

- 06 January 1993
- 1) Continue with S-15 survey. Shot lines LS93-45 through LS93-54.
 - 2) Back up seismic data on tape, lines LS93-44 to LS93-51.
 - 3) Noticed data was not compressed.
 - 4) Set up piston coring device.
- 07 January 1993
- 1) Continue S-15 survey, lines LS93-55 to LS93-57.
 - 2) Attempted three piston cores near Turneffe Reef with no success. Headed south to take two piston cores east of South Water Caye.
 - 3) Anchored behind South Water Caye.
- 08 January 1993
- 1) Start day out piston coring. Took 7 cores.
 - 2) Break down S-15. Clean, rebuild, and regrease S-15. Replaced 226B104, 226B107, 226B132, 226B133, 226B135, 226B136, 226B137, 226B140, 226B142, 226B145, 226B148, 226B158, 226B160.
 - 3) Stow S-15, hose bundle, float, and regulator.
 - 4) Clean up laserette. Untangle back up hose bundle and stow properly.
 - 5) Begin shooting with uniboom inside barrier reef beginning with LS93-58.
 - 6) Hard disk filled after line LS93-59.
 - 7) Backed up lines LS93-52 to LS93-59 on tape. Data still not compressed. Re loaded Wyse version 1.7 for lines LS93-59B and LS93-60. Data now compressed.
 - 8) Uniboom miss firing. Cleaned electrodes.
- 09 January 1993
- 1) Finished uniboom survey with line LS93-60. Pack up all seismic equipment (uniboom, streamer).
 - 2) Back up seismic data on tape lines LS93-58 through LS93-60.
 - 3) Set up piston coring device for one last core inside the barrier reef. Then pack up piston coring unit.
 - 4) Arrive at dock at about 1130. Leave for airport at around 1315. Leave Belize City at 1515 on Continental Flt. 1672, arrive IAH at 1830.