

*double sided
printing*

February 18, 1988

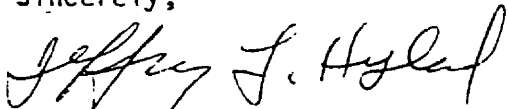
Dr. Gary Brewer
Minerals Management Service
Pacific OCS Office
1340 West Sixth Street
Los Angeles, CA 90017

Re: MMS Contract No. 14-12-0001-30262

Dear Gary:

Enclosed please find a copy of the Cruise Report for MMS Cruise CAMP 2-4, Leg 1 and Leg 2. I have distributed copies of this document to Principal Investigators, Quality Review Board members, and oil company representatives.

Sincerely,



Jeffrey L. Hyland, Ph.D.
Program Manager

JLH/hms

Enclosure

cc: Ms. Frances Sullivan, MMS Contracting Officer
(MS 635, Herndon, VA)

Dr. Donald Aurand, Chief of Environmental Studies Program
(MS 644, Washington, D.C.)

CRUISE REPORT

FOR

MMS CRUISE CAMP 2-4

LEG 1 and LEG 2

February 19, 1988

CALIFORNIA OCS PHASE II MONITORING PROGRAM

Performed for

**U. S. Department of the Interior
MINERALS MANAGEMENT SERVICE
Pacific OCS Office**

**1340 West Sixth Street
Los Angeles, California 90017**

by

**Mr. James F. Campbell
BATTELLE
Ocean Sciences and Technology Department
Ventura Office
1431 Spinnaker Drive
Ventura, California 93001**

**Mr. Dane Hardin
KINETIC LABORATORIES, INCORPORATED
Santa Cruz, California, 95061**

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION.	1-1
2.0 LEG 1: HARD-BOTTOM SEDIMENT-TRAP DEPLOYMENT/WATER QUALITY	
2.1 Objectives	2-1
2.2 Scientific Personnel	2-1
2.3 Activities	2-1
2.4 Results.	2-1
2.5 Navigation	2-4
3.0 LEG 2: SOFT-BOTTOM BOX CORING	
3.1 Objectives	3-1
3.2 Results.	3-1
3.3 Navigation	3-4
3.4 Box Core Sampling.	3-4
3.5 Biology.	3-4
3.6 Chemistry.	3-6
3.7 Sedimentology.	3-6
3.8 Core Radiography	3-6
3.9 Hydrography.	3-7
3.10 Cruise Participants.	3-7
3.11 Acknowledgements	3-7

APPENDIX A - REPORT OF OBSERVATIONS/SAMPLES COLLECTED BY
OCEANOGRAPHIC PROGRAMS (ROSCOP)

LIST OF TABLES

	<u>Page</u>
Table 2-1. Reference Coordinates of Sediment Traps Deployed by Kinnetics Laboratories, Inc. for the MMS California OCS Phase II Monitoring Program on Cruise CAMP 2-4, Leg 1, January, 1988	2-3
Table 3-1. Summary of Samples Collected on MMS Cruise CAMP 2-4, Leg 2 of the MMS California OCS Phase II Monitoring Program	3-3
Table 3-2. Regional and Site-Specific Station Reference Coordinates for MMS Cruise CAMP 4-2, Leg 2 of the MMS California OCS Phase II Monitoring Program.	3-8
Table 3-3. Summary of Sample Positions on Cruise CAMP 2-4, Leg 2 (M/V) <u>Aloha</u>	3-9

LIST OF FIGURES

Figure 1-1. Area of Study and Station Locations for the MMS California OCS Phase II Monitoring Program.	1-2
Figure 2-1. Hard-Bottom Features for Site-Specific Monitoring Near <u>Platform Hidalgo</u>	2-2
Figure 3-1. Area of Study and Station Locations with Cruise Track Indicated for MMS Cruise CAMP 2-4, Leg 2, M/V <u>Aloha</u> 29 January - 4 February, 1988	3-2
Figure 3-2. Box Core Illustrating "Vegetatic" Partitioning (Top View).	3-5

1.0 INTRODUCTION

CRUISE REPORT
FOR
MMS CRUISE CAMP 2-4
25 January 1988 - 4 February 1988

1.0 INTRODUCTION

Cruise CAMP 2-4 is the fourth of five cruises scheduled for Year Two of the MMS California Phase II Monitoring Program (MMS Contract No. 14-12-0001-30262). This program is designed to monitor potential environmental changes at a series of regional stations and at two arrays of site-specific stations near oil production platforms in the Western Santa Barbara Channel and Santa Maria Basin region of the California OCS. Platform Hidalgo (Lease P-0450) off Point Arguello was selected for hard-bottom, site-specific monitoring, and Platform Julius (Lease P-0409) off Point Sal was selected for soft-bottom, site-specific monitoring. Specific objectives of the program are:

1. To detect and measure potential long-term (or short-term) changes in the marine environment adjacent to oil and gas platforms; and
2. To determine whether changes observed in the marine environment during the monitoring period are caused by drilling-related activities or are a product of natural processes.

To accomplish these objectives, we are looking closely for potential biological changes and concomitant chemical or physical changes that can be linked to specific drilling events. An overall objective of Cruise CAMP 2-4 was to provide environmental data to help make these kinds of correlations and inferences. Cruise CAMP 2-4 represents the first post-spud cruise relative to the history of drilling at Platform Hidalgo (drilling began at this platform in November 1987).

Cruise CAMP 2-4 consisted of two legs: Hard-Bottom Sediment-Trap Deployment/Water Quality (Leg 1); and Soft-Bottom Box Coring (Leg 2).

The M/V Aloha, which is owned and operated by International Underwater Contractors (I.U.C.), was the support vessel for the cruise. The study area for MMS Cruise CAMP 2-4 is shown in Figure 1-1.

The Leg-1 Cruise Report, written by Dane Hardin, is in Section 2.0, and the Leg-2 Cruise Report, written by James Campbell, is in Section 3.0.

A crew exchange was scheduled to occur in Port San Luis between Legs 1 and 2. However, all Leg 1 objectives were completed more than a day early and it was advantageous to all concerned to have the M/V Aloha return to Ventura Harbor prior to commencing Leg 2.

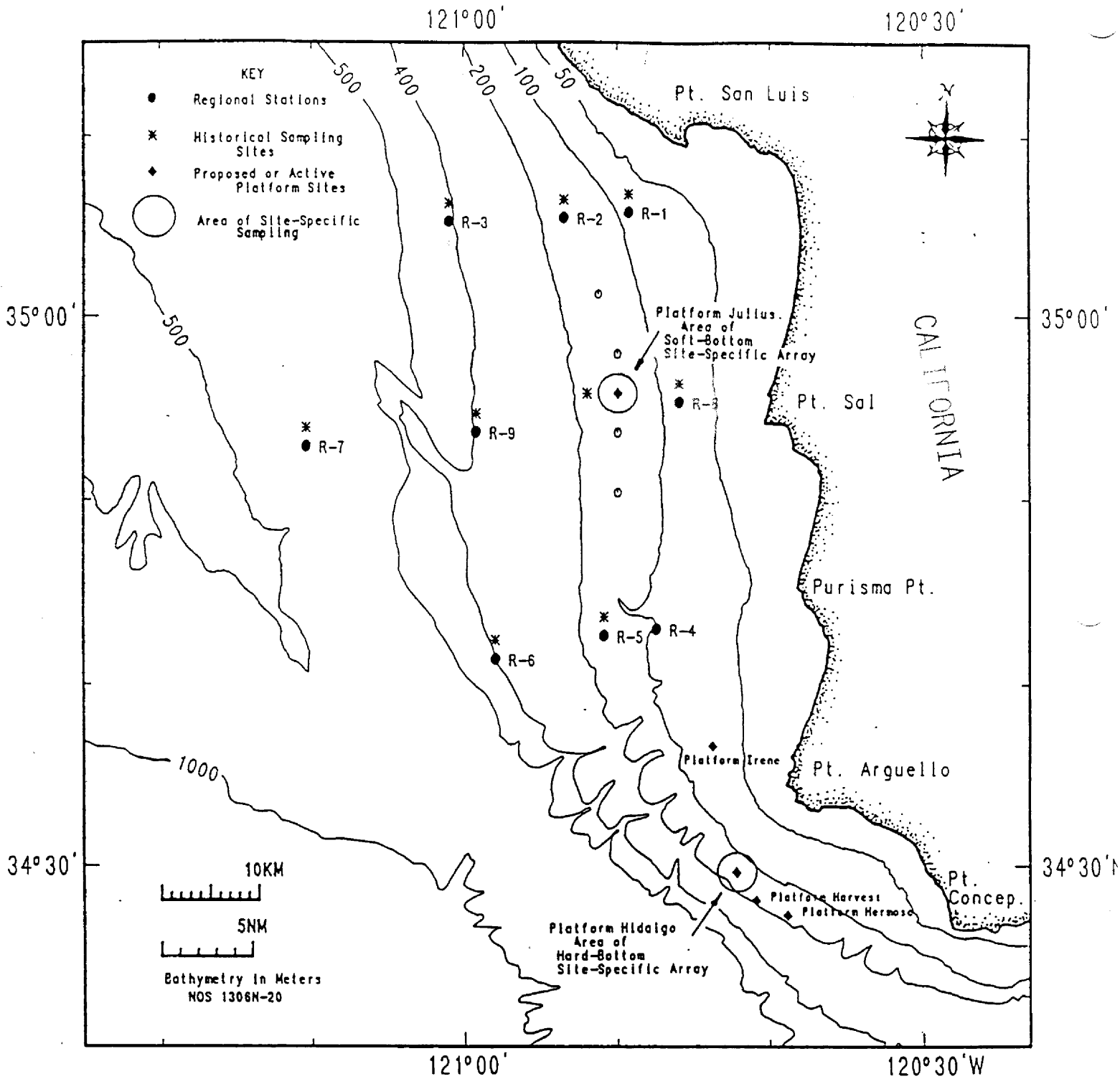


FIGURE 1-1. AREA OF STUDY AND STATION LOCATIONS FOR THE MMS CALIFORNIA OCS PHASE II MONITORING PROGRAM

2.0 CRUISE REPORT
MMS CRUISE CAMP 2-4, LEG 1
Hard-Bottom Sediment Trap Deployment/Water Quality
25 - 28 January 1988

2.1 Objectives

1. Deploy 15 sediment trap arrays at 13 locations near Platform Hidalgo.
2. Obtain water quality profiles and bottle casts from two locations near Platform Hidalgo and two locations near Platform Julius.

2.2 Scientific Personnel

<u>Name</u>	<u>Affiliation</u>	<u>Responsibility</u>
J. Cooley	Land & Sea	Navigation
R. Gale	Land & Sea	Navigation
D. Hardin	KLI	Chief Scientist
S. Kinney	KLI	Sediment Trap Deployment
K. Kronschnabl	KLI	Sediment Trap Deployment
M. Mertz	KLI	Sediment Trap Deployment

2.3 Activities

01/25/88	1230-1830 2400	Mobilized M/V <u>Aloha</u> . Departed Ventura Harbor.
01/26/88	0800 0920-1747 1845-2015	Arrived at PH-Wst. Deployed sediment traps at all stations. Collected profiles and bottle casts at Hydro 1.
01/27/88	0800-1030 1405 2215	Collected profiles and bottle casts at PJ-11 and PJ-13. Profile and bottle cast completed at Hydro 2. Departed for Ventura Harbor. Arrived Ventura Harbor.
01/28/88	0800-1030	Demobilized M/V <u>Aloha</u>

2.4 Results

Sediment Traps (Objective 1)

The deployment of the sediment traps went very smoothly. Very calm seas aided smooth operations. The new sediment trap design was very easy to handle on deck and to set up for deployment. The trap locations are shown in Figure 2-1 and the trap reference coordinates are listed in Table 2-1.

Water Quality (Objective 2)

All water quality parameters were sampled successfully.

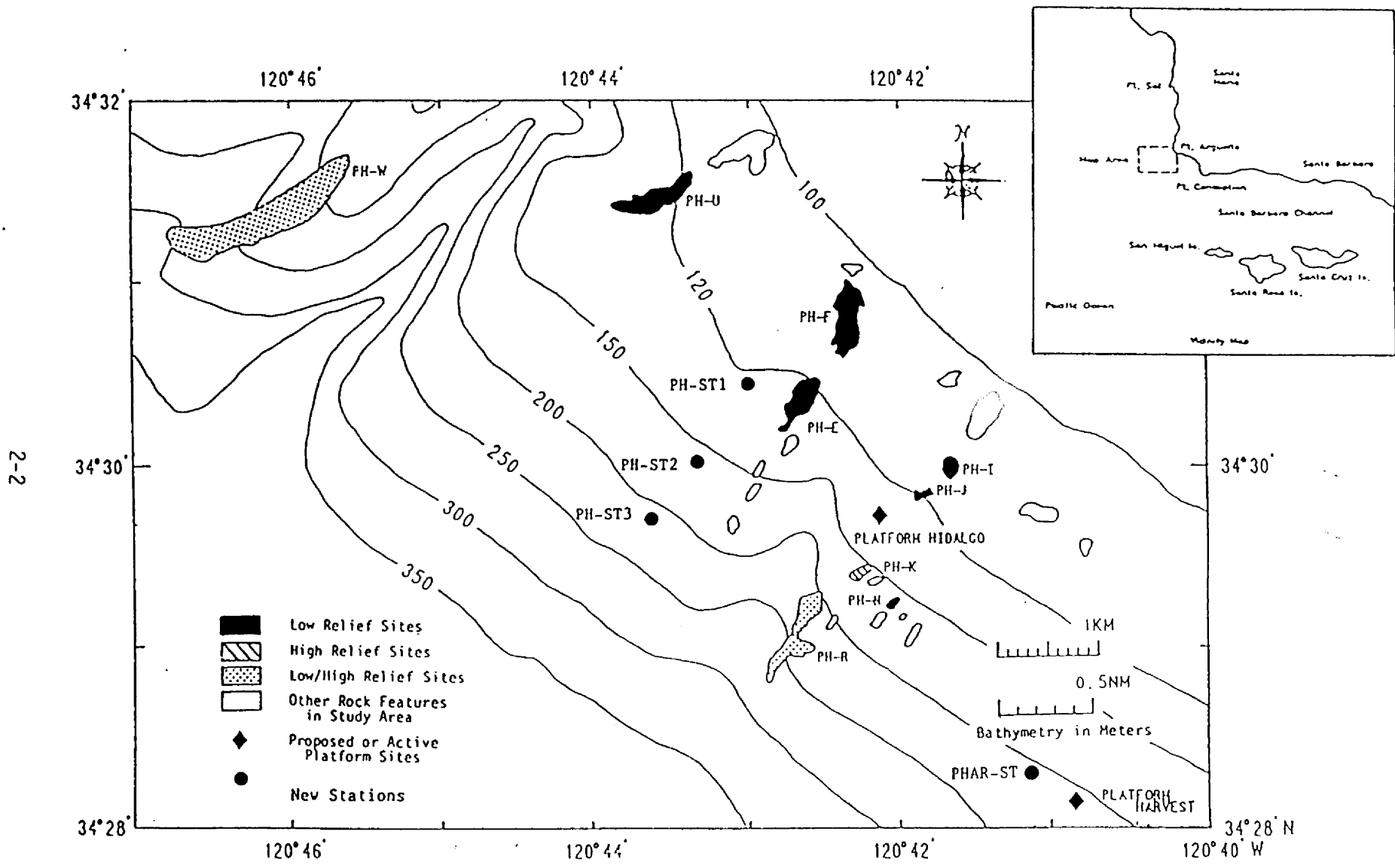


FIGURE 2-1. HARD BOTTOM FEATURES FOR SITE-SPECIFIC MONITORING NEAR PLATFORM HIDALGO

2.0 MMS CRUISE CAMP 2-4

LEG 1 REPORT

TABLE 2-1. REFERENCE COORDINATES OF SEDIMENT TRAPS DEPLOYED BY KINNETICS LABORATORIES, INC. FOR THE MMS CALIFORNIA OCS PHASE II MONITORING PROGRAM ON CRUISE CAMP 2-4, LEG 1, JANUARY, 1988

Station	Latitude Longitude	UTM Coordinates	Depth (m)
PH-Est	34°30.19'N 120°42.64'W	N3820130 E710181	119
PH-Fst	34°30.79'N 120°42.54'W	N3821249 E710313	105
PH-Ist	34°29.97'N 120°41.74'W	N3819764 E711572	107
PH-Jst	34°29.86'N 120°41.86'W	N3819548 E711399	117
PH-Kst	34°29.41'N 120°42.32'W	N3818694 E710707	160
PH-Nst	34°29.25'N 120°42.13'W	N3818407 E710997	166
PH-Rst	34°29.17'N 120°42.43'W	N3818248 E710550	213
PH-Ust	34°31.42'N 120°43.44'W	N3822373 E708915	113
PH-Wst	34°31.57'N 120°45.65'W	N3822589 E705514	195
PHAR-ST	34°28.33'N 120°41.09'W	N3816742 E712632	213
PH-ST1	34°39.54'N 120°43.10'W	N3820769 E709460	120
PH-ST2	34°30.12'N 120°43.47'W	N3819969 E708924	163
PH-ST3(1)	34°29.78'N 120°43.77'W	N3819334 E709468	212
PH-ST3(2)	34°29.78'N 120°43.78'W	N3819338 E708463	212
PH-ST3(3)	34°29.78'N 120°43.78'W	N3819337 E708461	212

Sediment trap positions are offset by 50 meters in variable bearings from sediment grab target positions.

Revised 2/88

2.5 Navigation

Land and Sea Surveys, Inc. provided navigation services for Leg 1 during operations at Platform Hidalgo. Equipment used was a Motorola Miniranger interfaced to a 9826 Hewlett Packard computer. A color monitor on the bridge displayed the ship's position relative to the target coordinates, enabling the ship's helmsman to position the ship. The Northstar 7000 LORAN-C receiver was used to navigate to PJ-11 and PJ-13 for water quality sampling at the Platform Julius site.

3.0 MMS CRUISE CAMP 2-4

LEG 2 REPORT

3.0 CRUISE REPORT
MMS CRUISE CAMP 2-4, LEG 2
Soft-Bottom Box Coring
29 January - 4 February, 1988

3.1 Objectives

The objectives of the Soft-Bottom Leg were to collect three replicate box cores at nine regional stations and three site-specific stations. Each Box Core was to be sampled for benthic infauna (macrofauna and meiofauna), sediment chemistry, and sedimentology parameters. A single hydrocast was to be performed at each of the nine regional stations for near-bottom measurements of dissolved oxygen, salinity, and temperature.

3.2 Results

International Underwater Contractor's M/V Aloha departed Ventura Harbor on Friday, 29 January 1988 at 0000 hours. The cruise track and study area are shown in Figure 3-1. Moderate to strong winds (10-25 knots) were experienced throughout the cruise.

During the hydrocast operation at station R-3, the hydrowire became entangled with the ship's starboard propeller. The Niskin bottle, reversing thermometer, hydroweight and approximately 1,500 ft of hydrowire were lost in the incident. At the time of the incident, it was believed that the hydrowire was not wrapped around the shaft and would not affect the operations of the starboard propeller. However, while conducting box core operations at the next station (R-7), the starboard propeller froze up. By this time, weather conditions had begun to deteriorate.

As a result of the problem with the propeller and deteriorating weather, the M/V Aloha transited to Port San Luis on Saturday evening, January 30. The following morning, Sunday, January 31; two IUC divers assessed the situation and began cutting the hydrowire from the shaft. Offshore weather reports for January 31 indicated winds in excess of 30 knots and seas to 12 feet. These conditions would have prevented any coring operations; therefore, it is likely that the M/V Aloha would have been weathered out and on standby in Port San Luis on this day, regardless of the hydrowire incident. On Monday, February 1, two additional IUC personnel arrived in Pt. San Luis to assist with the removal of the wire. The job was completed during the afternoon and the Aloha resumed box coring operations on Monday evening.

The cruise proceeded uninterrupted, with the exception of a 4-hour standby due to strong winds in excess of 25 knots encountered on Tuesday, February 2.

In spite of the interruptions, the sampling was successful in that all scheduled box cores were collected at each of the 12 stations and the cruise was conducted within the allotted time period. Hydrocasts were collected at two stations only, since there was an insufficient length of hydrowire remaining on the winch; however, hydrocasts are not part of the required sampling and are taken only on a time-permitted basis.

A summary of samples collected is shown in Table 3-1.

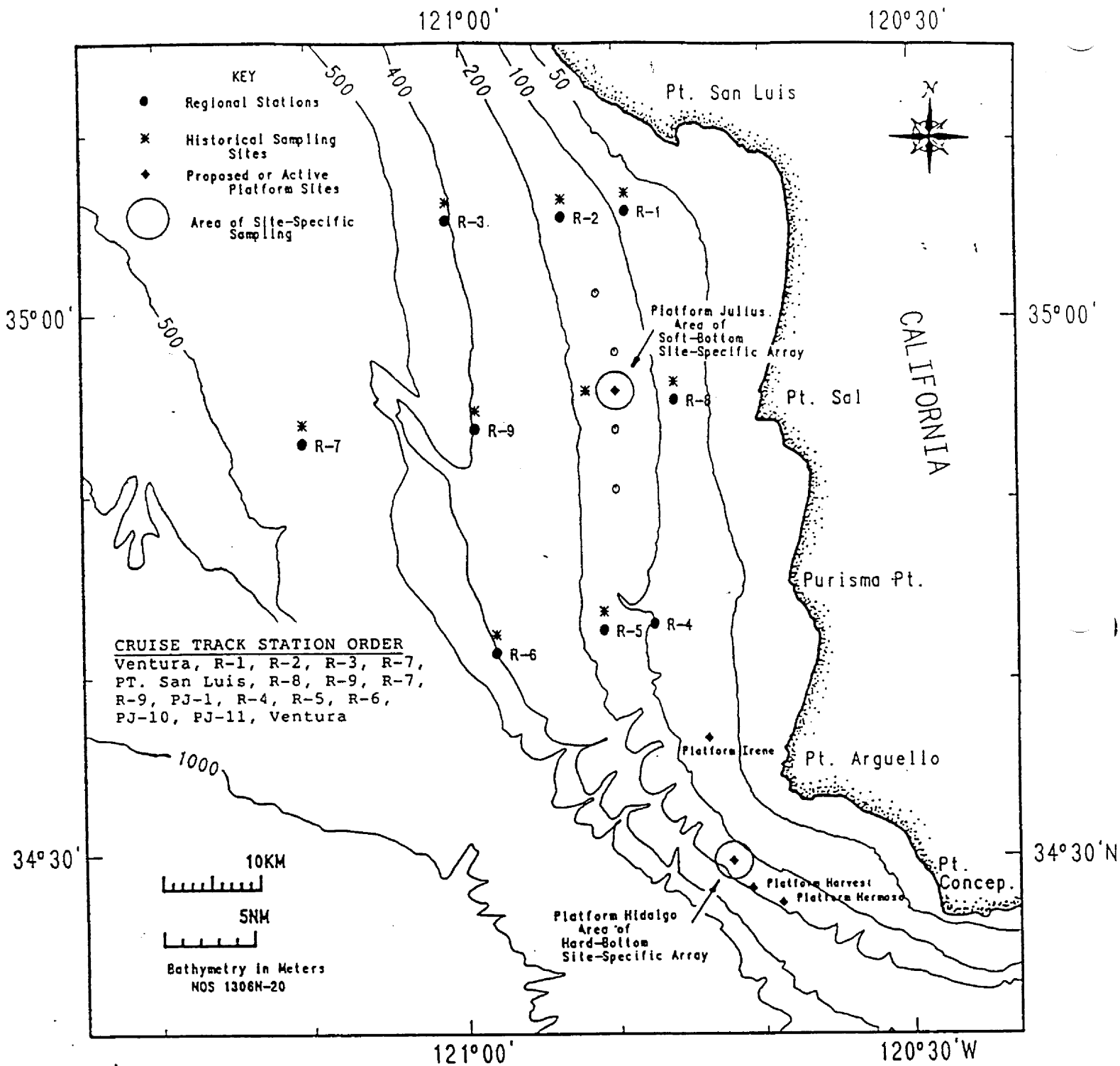


FIGURE 3-1. AREA OF STUDY AND STATION LOCATIONS WITH CRUISE TRACK INDICATED FOR MMS CRUISE CAMP 2-4, LEG 2, M/V ALOHA 29 JANUARY - 4 FEBRUARY, 1988.

TABLE 3-1. SUMMARY OF SAMPLES COLLECTED ON MMS CRUISE CAMP 2-4, LEG 2 OF THE MMS CALIFORNIA OCS PHASE II MONITORING PROGRAM

Sample Type	Number of Stations	Number of Replicates/ Station	Total Number Collected on Cruise	Sample Custody
Infaunal Box Core	12	3	36	Battelle (Ventura)
Meiofauna	12	3	36	Univ. Texas
Core Radiography	12	1(x2) ⁽¹⁾	12(x2)	Univ. Maine
Surface Sediment (0-2cm): TM	12	3	36	Battelle (BNW)
Surface Sediment (0-2cm): HC	12	3	36	Battelle (Duxbury)
Subsurface Sediments (2-10cm): TM	4	3	12	Battelle (BNW)
Subsurface Sediments (2-10cm): HC	4	3	12	Battelle (Duxbury)
Pb/Th Ratios ⁽²⁾	4	1	4	Battelle (BNW)
Sedimentology	12	3	36	Kinnetics (KLI)
Hydrography ⁽³⁾	2	1	2	Kinnetics (KLI)

1. One X-ray was taken of each of the two sediment cartridges collected from the 10 x 30-cm subcore.
2. These samples will be archived.
3. Only two of nine samples collected due to hydrowire mishap.

3.3 Navigation

The Northstar 7000 LORAN C receiver was the primary navigational aid for Leg 2. A navigation software package developed by Mr. Andy Eliason of Eliason Data Services was used to integrate an Apple IIe microcomputer and Epson printer with the LORAN C.

All LORAN time delays were in the 9940 Group Repetition Interval (GRI) using the X and Y secondary stations, the 27-k and 41-k lines, respectively. All station navigation was based on LORAN time delays established in conjunction with the Miniranger System on previous cruises. The latitude and longitude coordinates listed in this section are the products of the Northstar 7000 algorithm. The latitude and longitude from the Northstar are offset from geodetic coordinates and should not be used for station navigation purposes on this program.

Station depths listed in this report are reference depths, as station depth was not recorded during this cruise.

Time was recorded in Pacific Standard Time (PST). Station reference coordinates are listed in Table 3-2. A summary of sample positions is shown in Table 3-3.

3.4 Box Core Sampling

A Hessler-Sandia MK-III 0.25m² box core, vegetatively partitioned into 25 individual 0.01m² subcores, was used to collect sediment samples (Figure 3-2). Three replicate cores were collected at each of the nine regional stations (R-1 through R-9) and the three site-specific stations (PJ-1, PJ-10, and PJ-11) for various biological, chemical, and sedimentology parameters.

An Ocean Instruments DEEP-EYE Camera System was mounted on the box core for the purpose of acquiring epifauna photographs. The camera worked well at the first seven stations. Subsequently, the camera trigger-switch fatigued and was inoperable for the remaining five box core stations. The epifaunal photograph situation is being addressed to eliminate any future problems.

A total of 36 box core replicates were collected on Cruise CAMP 2-4, Leg 2.

3.5 Biology

From each of three replicate box cores at each of the nine regional stations (R-1 through R-9) and the three site-specific stations (PJ-1, PJ-10, and PJ-11), ten subcores (Subcore Numbers 6-15) were taken for benthic macroinfauna, and one subcore (Subcore Number 17) was used to take a single 2-cm-diameter sample for meiofauna.

Macrofaunal samples were processed on board ship in the following manner. The subcores were removed individually from the box and the upper 10 cm of sediment were extruded, cut, and placed in an elutriating bucket. The remaining portion of the subcore (>10 cm) also was extruded and placed in an elutriating bucket. Three to four subcores were extruded and placed in one elutriating bucket. The 0 to 10-cm fraction was processed with filtered seawater through a 0.3-mm-mesh sieve and the >10-cm fraction was processed through a 1.0-mm-mesh sieve. The residue from both fractions was rinsed into separate 16-oz glass jars and

TOP VIEW

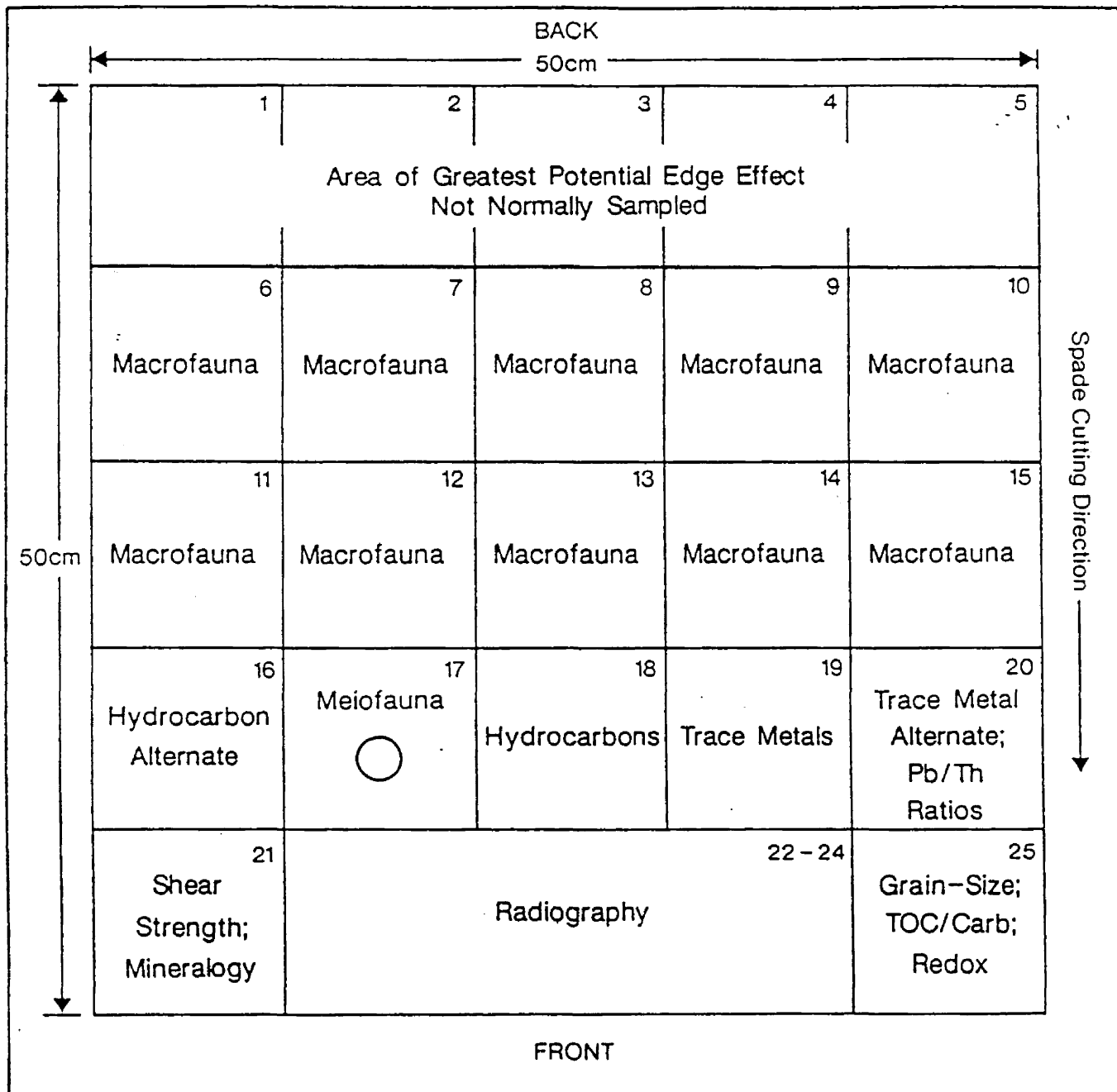


FIGURE 3-2. BOX CORE ILLUSTRATING "VEGEMATIC" PARTITIONING (top view).

preserved with approximately 10-percent buffered formalin. The >10-cm fraction was collected at all regional and site-specific stations.

Meiofauna samples were extruded to a 10-cm fraction at 2-cm intervals from the core tubes and relaxed for 5 minutes in MgCl₂, followed by preservation in 5-percent formalin and storage in 60-ml plastic tubes.

3.6 Chemistry

From each of three replicate box cores at each of the 12 stations (9 regional and 3 site-specifics) a 0 to 2-cm Trace Metal (TM) chemistry sample was collected from a Teflon-coated subcore (Subcore No. 19) and a 0 to 2-cm Hydrocarbon Chemistry (HC) sample was collected from a solvent-rinsed subcore (Subcore No. 18). Sediment trace-metal and hydrocarbon samples were frozen following collection.

At four stations (PJ-1, R-7, R-8 and R-9), the upper 10 cm of Subcores No. 19 and No. 18 were collected for TM and HC, respectively. These cores were sectioned into separate 0 to 2-cm and 2 to 10-cm fractions. The deeper sediment-core sections were analyzed to investigate the vertical extent of TM and HC penetration.

At four stations (PJ-1, R-7, R-8, and R-9), one subcore (Subcore No. 20) was taken from one of the replicate box cores for the analysis of Lead and Thorium isotope ratios. The Pb/Th ratio sample was collected by inserting an acid-washed CAB core liner into the subcore and capping both ends. The sample was frozen subsequently and archived for possible analysis at a later date.

Several quality-assurance samples and blanks were collected for chemistry analyses. These samples, which will be analyzed to detect any background contamination, are as follows:

1. 45-minute air-exposure samples for hydrocarbons and trace metals.
2. 14-hour air-exposure samples for hydrocarbons and trace metals.
3. Ship's diesel fuel for hydrocarbons.

3.7 Sedimentology

Samples were collected from each of the three replicate box cores at each of the 12 stations in the Platform Julius study area (9 regional and 3 site-specific stations) for the determination of sediment properties. Measurements and samples for TOC, carbonate, grain size, and REDOX were taken from Subcore No. 25. At all stations, sediment shear-strength measurements and mineralogy samples were taken from Subcore No. 21.

3.8 Core Radiography

At the 12 stations, a specially designed 10 x 30-cm subcore (in place of Subcores No. 22, 23, and 24) was removed from one of the box-core replicates for x-ray analysis (for evidence of bioturbation). Two plastic cartridges were inserted into the subcore and surrounding mud was washed away. Immediately following collection, the x-raying took place in the ship's laboratory and the photos were developed in the darkroom. The mud cartridges were dismantled and notes will be taken as to the sample appearance.

3.9 Hydrography

A single Niskin bottle equipped with a deep-sea reversing thermometer (DSRT) was deployed at two regional stations (R-1 and R-2), to collect samples for the determination of near-bottom dissolved oxygen, salinity, and temperature. Dissolved oxygen was measured in triplicate on board using the Winkler titrimetric method. Salinity samples were measured using a Hanna H-18333 conductivity probe. Temperature was recorded from the thermometer.

During the hydrocast operation at Station R-3, the hydrowire became entangled in the ship's starboard propeller. The Niskin bottle, thermometer, hydroweight and 1,500 feet of hydrowire were lost during this accident. With only 200 feet of hydrowire remaining on the winch drum, hydrocasts could not be performed at the remaining stations.

3.10 Cruise Participants

Participants on Cruise CAMP 2-4, Leg 2 and their affiliations were:

Battelle

James Campbell, Chief Scientist
Janet Kennedy, Second Scientist
John Brown, Chemist
Elaine Byers
Heidi DeBra
Valerie Eikelmann

Kinnetic Laboratories, Inc.

Gary Gillingham
Sherry Hamer
Ken Kronschnabl
Don Arnold
Suzanne Healy

University of Texas

John Kern

International Underwater Contractors, Inc.

8 Crew Members

3.11 Acknowledgements

The Chief Scientist and Second Scientist wish to thank the scientific personnel for their dedication and hard work which resulted in a successful cruise.

TABLE 3-2. REGIONAL AND SITE-SPECIFIC STATION REFERENCE COORDINATES FOR
MMS CRUISE CAMP 2-4, LEG 2 OF THE
MMS CALIFORNIA OCS PHASE II MONITORING PROGRAM

Station	Northstar 7000 Latitude Longitude	UTM Coordinates	LORAN Time Delays	Depth (m)
R-1	35°05.55'N 120°49.20'W	N3885790 E698776	27794.9 42044.9	91
R-2	35°05.13'N 120°53.40'W	N3885047 E692345	27780.8 42057.1	161
R-3	35°04.98'N 120°00.84'W	N3884443 E680956	27756.2 42081.0	409
R-4	34°43.18'N 120°47.28'W	N3843676 E702399	27800.3 41921.5	92
R-5	34°42.85'N 120°50.69'W	N3842964 E697156	27789.8 41932.0	154
R-6	34°41.43'N 120°57.78'W	N3840354 E686413	27768.0 41949.8	410
R-7	34°52.62'N 121°10.31'W	N3861248 E667092	27727.7 42047.7	565
R-8	34°55.24'N 120°45.80'W	N3866433 E704208	27805.6 41978.2	90
R-9	34°53.49'N 120°59.03'W	N3863016 E684098	27763.2 42014.9	410
PJ-1	34°55.65'N 120°49.87'W	N3867215 E698032	27792.5 41994.6	145
PJ-10	34°53.53'N 120°49.85'W	N3863215 E698119	27792.5 41983.6	147
PJ-11	34°57.82'N 120°49.82'W	N3871214 E697946	27792.6 42006.0	136

Revised 11/87

Latitude and Longitude from Northstar 7000 algorithm

TABLE 3-3. SUMMARY OF SAMPLE POSITIONS ON CRUISE CAMP 2-4, LEG 2 (M/V Aloha)

Station	Date and Time (PST)	Sample	Latitude Longitude	LORAN Time Delays	Depth (m)	Comments
R-1	Reference Coordinates		35°05.55'N 120°49.20'W	27794.9 42044.9	91	
R-1	29 Jan 88 1441	Box Core 1	35°05.58'N 120°49.17'W	27795.0 42044.9	91	Penetration to 15 cm. Slight swell, minor wind. Undisturbed surfaces.
R-1	29 Jan 88 1625	Box Core 2	35°05.59'N 120°49.21'W	27794.8 42045.2	91	Densely compacted layers. Penetration to 15 cm.
R-1	29 Jan 88 1815	Box Core 3	35°05.56'N 120°49.17'W	27794.9 42044.8	91	First attempt no trip. Soft upper sediment layer, dense lower.
R-1	29 Jan 88 2050	Hydrocast	35°05.54'N 120°49.20'W	27794.8 42044.8	91	Good sample.
R-2	Reference Coordinates		35°05.13'N 120°53.40'W	27780.8 42057.1	161	
R-2	29 Jan 88 2312	Box Core 1	35°05.12'N 120°53.45'W	27780.7 42057.0	161	Penetration to 30 cm. Soft mud.
R-2	30 Jan 88 0056	Box Core 2	35°05.15'N 120°53.41'W	27780.9 42057.0	161	Slightly less penetration than rep. 1.
R-2	30 Jan 88 0321	Box Core 3	35°05.09'N 120°53.44'W	27780.7 42056.8	161	First attempt no trip. Undisturbed surfaces. An alternate subcore used for macrofauna.
R-2	29 Jan 88 2232	Hydrocast	35°05.17'N 120°53.41'W	27780.8 42057.2	161	Good sample.

TABLE 3-3. SUMMARY OF SAMPLE POSITIONS ON MMS CRUISE CAMP 2-4, LEG 2 (M/V Aloha) (Continued)

Station	Date and Time (PST)	Sample	Latitude Longitude	LORAN Time Delays	Depth (m)	Comments
R-3	Reference Coordinates		35°04.98'N 121°00.84'W	27756.2 42081.0	409	
R-3	30 Jan 88 0519	Box Core 1	35°04.95'N 121°00.84'W	27756.2 42080.8	409	Penetration to 30 cm. Extremely soft sediment. Piston pins secured.
R-3	30 Jan 88 0841	Box Core 2	35°04.99'N 121°00.81'W	27756.3 42081.0	409	Two previous attempts no trips due to rigging error. Wind increased to 20 kts.
R-3	30 Jan 88 0929	Box Core 3	35°04.92'N 121°00.83'W	27756.3 42080.6	409	Penetration to 30 cm. Soft green mud.
R-3	30 Jan 88 1111	Hydrocast	35°04.91'N 121°00.92'W	27755.9 42080.9	---	No hydrocast collected. Hydrowire caught in starboard screw. Insufficient wire to continue casts on this cruise.
R-4	Reference Coordinates		34°43.18'N 120°47.28'W	27800.3 41921.5	92	
R-4	2 Feb 88 2116	Box Core 1	34°43.15'N 120°47.27'W	27800.4 41921.4	92	Penetration to 15 cm. Much macrofauna and detritus. Vandenberg satellite launch at 2155.
R-4	2 Feb 88 2248	Box Core 2	34°43.14'N 120°47.28'W	27800.3 41921.3	92	Good sample. Wind increasing to 20 kts.
R-4	3 Feb 88 0114	Box Core 3	34°43.12'N 120°47.35'W	27800.1 41921.5	92	Penetration to 20 cm. Subcores pushed down as box was removed from corer.

3-10

TABLE 3-3. SUMMARY OF SAMPLE POSITIONS ON MMS CRUISE CAMP 2-4, LEG 2 (M/V Aloha) (Continued)

Station	Date and Time (PST)	Sample	Latitude Longitude	LORAN Time Delays	Depth (m)	Comments
R-5	Reference Coordinates		34°42.85'N 120°50.69'W	27789.8 41932.0	154	
R-5	3 Feb 88 0321	Box Core 1	34°42.81'N 120°50.73'W	27789.7 41932.0	154	Alternate subcores used for macrofauna. Scallop shells present in base sediment layer.
R-5	3 Feb 88 0503	Box Core 2	34°42.83'N 120°50.68'W	27789.8 41931.8	154	Less shell debris than rep. 1. Wind 22 kts, difficult positioning.
R-5	3 Feb 88 0811	Box Core 3	34°42.84'N 120°50.66'W	27789.9 41931.9	154	Previous attempt unacceptable due to wash-out. Penetration to 15 cm.
R-6	Reference Coordinates		34°41.43'N 120°57.78'W	27768.0 41949.8	410	
R-6	3 Feb 88 1159	Box Core 1	34°41.41'N 120°57.79'W	27768.0 41949.7	410	First attempt; trawl wire fouled on box core, trawl wire reterminated. Penetration to 12 cm. Some alternates used.
R-6	3 Feb 88 1317	Box Core 2	34°41.41'N 120°57.82'W	27768.0 41949.8	410	Penetration to 13 cm. Good sample. Greater than 10-cm fraction from spade.
R-6	3 Feb 88 1458	Box Core 3	34°41.41'N 120°57.78'W	27768.0 41949.6	410	First attempt no trip. Penetration to 13 cm. One alternate used.

TABLE 3-3. SUMMARY OF SAMPLE POSITIONS ON MMS CRUISE CAMP 2-4, LEG 2 (M/V Aloha) (Continued)

Station	Date and Time (PST)	Sample	Latitude Longitude	LORAN Time Delays	Depth (m)	Comments
R-7		Reference Coordinates	34°52.62'N 121°10.31'W	27727.7 42047.7	565	
R-7	30 Jan 88 1335	Box Core 1	34°52.69'N 121°10.28'W	27727.8 42047.9	565	Good sample. Starboard screw frozen due to hydrowire. Heading to Pt. San Luis.
R-7	2 Feb 88 0803	Box Core 2	34°52.63'N 121°10.31'W	27727.7 42047.8	565	Piston pins secured.
R-7	2 Feb 88 0934	Box Core 3	34°52.59'N 121°10.29'W	27727.7 42047.5	565	Penetration to 30 cm. Some cores slightly disturbed.
3-12 R-8		Reference Coordinates	34°55.24'N 120°45.80'W	27805.6 41978.2	90	
R-8	1 Feb 88 2132	Box Core 1	34°55.25'N 120°45.79'W	27805.6 41978.2	90	First attempt unacceptable due to shallow penetration.
R-8	1 Feb 88 2316	Box Core 2	34°55.24'N 120°45.82'W	27805.6 41978.2	90	Sediment surface slightly disturbed.
R-8	2 Feb 88 0050	Box Core 3	34°55.26'N 120°45.79'W	27805.7 41978.2	90	Penetration to 11 cm. Much soft coral present.

TABLE 3-3. SUMMARY OF SAMPLE POSITIONS ON MMS CRUISE CAMP 2-4, LEG 2 (M/V Aloha) (Continued)

Station	Date and Time (PST)	Sample	Latitude Longitude	LORAN Time Delays	Depth (m)	Comments
R-9		Reference Coordinates	34°53.49'N 120°59.03'W	27763.2 42014.9	410	
R-9	2 Feb 88 0423	Box Core 1	34°53.49'N 120°59.01'W	27763.3 42014.8	410	First attempt unacceptable due to over penetration and uneven hit. Penetration to 25 cm. "Forams" present.
R-9	2 Feb 88 0509	Box Core 2	34°53.50'N 120°59.02'W	27763.2 42014.9	410	Penetration to 25 cm. Soft upper layers, dense lower layers.
R-9	2 Feb 88 1138	Box Core 3	34°53.49'N 120°59.02'W	27763.2 42014.8	410	Penetration to 25 cm. Undisturbed surfaces. "Forams" present.
PJ-1		Reference Coordinates	34°55.65'N 120°49.87'W	27792.5 41994.6	145	
PJ-1	2 Feb 88 1308	Box Core 1	34°55.62'N 120°49.85'W	27792.5 41994.5	145	Penetration to 20 cm. Many echinoids and ophiuroids present.
PJ-1	2 Feb 88 1418	Box Core 2	34°55.64'N 120°49.83'W	27792.6 41994.4	145	Penetration to 22 cm. Excellent surfaces. Box core camera malfunction.
PJ-1	2 Feb 88 1443	Box Core 3	34°55.65'N 120°49.86'W	27792.5 41994.5	145	Penetration to 25 cm. Wind up to 25 kts.

TABLE 3-3. SUMMARY OF SAMPLE POSITIONS ON MMS CRUISE CAMP 2-4, LEG 2 (M/V Aloha) (Continued)

Station	Date and Time (PST)	Sample	Latitude Longitude	LORAN Time Delays	Depth (m)	Comments
PJ-10	Reference Coordinates		34°53.53'N 120°49.85'W	27792.5 41983.6	147	
PJ-10	3 Feb 88 1722	Box Core 1	34°53.54'N 120°49.82'W	27792.6 41983.5	147	Penetration to 20 cm.
PJ-10	3 Feb 88 1831	Box Core 2	34°53.55'N 120°49.83'W	27792.6 41983.6	147	Penetration to 25 cm.
PJ-10	3 Feb 88 1944	Box Core 3	34°53.55'N 120°49.85'W	27792.5 41983.6	147	Many ophiuroids, echinoids and polychaetes present. One alternate subcore used.
3-14 PJ-11	Reference Coordinates		34°57.82'N 120°49.82'W	27792.6 42006.0	136	
PJ-11	3 Feb 88 2106	Box Core 1	34°57.83'N 120°49.82'W	27792.7 42005.8	136	Good sample. Undisturbed surfaces.
PJ-11	3 Feb 88 2223	Box Core 2	34°57.83'N 120°49.84'W	27792.6 42006.1	136	Penetration to 25 cm. Many ophiuroids.
PJ-11	3 Feb 88 2325	Box Core 3	34°57.83'N 120°49.85'W	27792.6 42006.0	136	Penetration to 25 cm. Undisturbed surfaces.

Latitude and Longitude from Northstar 7000 algorithm

B - BIOLOGY

	NUMBER	1	2	FORMAT		NUMBER	1	2	FORMAT
B01 Primary productivity					B31 Vitamin concentrations				
B02 Phytoplankton pigments					B32 Amino acid concentration				
B03 Seston					B33 Hydrocarbon concentrations				
B04 Particulate organic carbon					B34 Lipid concentrations				
B05 Particulate organic nitrogen					B35 ATP-ADP-AMP concentrations				
B06 Dissolved organic matter					B36 DNA-RNA concentrations				
B07 Bacterial and pelagic micro-organisms					B37 Taggings				
B08 Phytoplankton					B80 Other measurements				
B09 Zooplankton					Sediment X-Rays	12	E 1	A 2	8
B10 Neuston					BS TYPES OF STUDIES				
B11 Nekton					B51 Identification	12	A 1	A 2	9
B12 Invertebrate nekton					B52 Spatial and temporal distribution	12	A 1	A 2	9
B13 Pelagic eggs and larvae					B53 Monitoring and surveillance	12	A 1	A 2	9
B14 Pelagic fish					B54 Biomass determination				
B15 Amphibians					B55 Description of communities	12	A 1	A 2	9
B16 Benthic bacteria and micro-organisms					B56 Food chains energy transfers				
B17 Phytobenthos					B57 Population and environments	12	A 1	A 2	9
B18 Zoobenthos	12	A 1	A 2	9	B58 Population structures	12	A 1	A 2	9
B19 Commercial demersal fish					B59 Taxonomy, systematics, classification	12	A 1	A 2	9
B20 Commercial benthic molluscs					B60 Physiology				
B21 Commercial benthic crustacean					B61 Behaviour				
B22 Attached plants and algae					B62 Pathology, parasitology				
B23 Intertidal organisms					B63 Toxicology				
B24 Borers and foulers					B64 Gear research				
B25 Birds					B65 Exploratory fishing				
B26 Mammals and reptiles					B66 Commercial fishing				
B27 Deep scattering layers					B67 Aquaculture				
B28 Acoustical reflections on marine organisms					B90 Other measurements				
B29 Biologic sounds									
B30 Bioluminescence									

H - HYDROGRAPHY

HS SURFACE	NUMBER	i	l	FORMAT	HC CHEMICAL	NUMBER	i	l	FORMAT
H01 Continuous temperature recording					H26 Silicates				
H02 Continuous salinity recording					H27 Alkalinity				
H03 Discrete temperature measurements					H28 pH				
H04 Discrete salinity measurements					H29 Chlorinity				
NEAR SEA FLOOR (≤ 10 m)					H30 Trace elements				
H05 Continuous temperature recording					H31 Radioactivity				
H06 Continuous salinity recording					H32 Isotopes Pb/Th in sediment	4	C	A	9
H07 Discrete temperature measurements	6	D	A	9	H33 Dissolved gases				
H08 Discrete salinity measurements	6	D	A	9	H90 Other measurements				
HP PHYSICAL									
H09 Classical oceanographic stations									
H10 Vertical profiles (STD/CTD)	4	D	A	7	P - POLLUTION				
H11 Sub-surface measurements underway					P01 Suspended solids				
H12 Mechanical bathythermograph (No. of drops)					P02 Heavy metals in sediment	12	C	A	9
H13 Bathythermograph-expendable (No. of drops)					P03 Petroleum residues in sediment	12	B	A	9
H14 Sound velocity stations					P04 Chlorinated hydrocarbons				
H15 Acoustic stations					P05 Other dissolved substances				
H16 Transparency					P06 Thermal pollution				
H17 Optics					P07 Waste water: BOD				
H18 Diffusion (Dynamic)					P08 Waste water: Nitrates				
H80 Other measurements					P09 Waste water: Microbiology				
					P10 Waste water: Other				
					P11 Discolored water				
					P12 Bottom deposits				
HC CHEMICAL					P13 Contaminated organisms				
H21 Oxygen	6	D	A	9	P90 Other measurements				
H22 Phosphates									
H23 Total-P									
H24 Nitrates									
H25 Nitrites									



February 18, 1988

Mr. Nelson Ross
National Oceanographic Data Center
P. O. Box 571
La Jolla, CA 92038

Dear Mr. Nelson:

Enclosed please find the ROSCOP Oceanography General Cruise Inventory of the Minerals Management Service California OCS Phase II Monitoring Program, Cruise CAMP 2-4, Legs 1 and 2.

Sincerely yours,

Approved:

A handwritten signature in cursive script that reads "James F. Campbell".

James F. Campbell
Chief Scientist

A handwritten signature in cursive script that reads "Jeffrey L. Hyland".

Jeffrey L. Hyland Ph.D.
Program Manager

JFC/hms

Enclosure

cc: Dr. Gary Brewer, MMS
Ms. Frances Sullivan, MMS
Dr. Donald Aurand, MMS

B - BIOLOGY

	NUMBER			FORMAT		NUMBER			FORMAT
B01 Primary productivity					B31 Vitamin concentrations				
B02 Phytoplankton pigments					B32 Amino acid concentration				
B03 Seston					B33 Hydrocarbon concentrations				
B04 Particulate organic carbon					B34 Lipid concentrations				
B05 Particulate organic nitrogen					B35 ATP-ADP-AMP concentrations				
B06 Dissolved organic matter					B36 DNA-RNA concentrations				
B07 Bacterial and pelagic micro-organisms					B37 Taggings				
B08 Phytoplankton					B80 Other measurements				
B09 Zooplankton					Sediment X-Rays	12	E 1	A 2	8
B10 Neuston					BS TYPES OF STUDIES				
B11 Nekton					B51 Identification	12	A 1	A 2	9
B12 Invertebrate nekton					B52 Spatial and temporal distribution	12	A 1	A 2	9
B13 Pelagic eggs and larvae					B53 Monitoring and surveillance	12	A 1	A 2	9
B14 Pelagic fish					B54 Biomass determination				
B15 Amphibians					B55 Description of communities	12	A 1	A 2	9
B16 Benthic bacteria and micro-organisms					B56 Food chains energy transfers				
B17 Phytobenthos					B57 Population and environments	12	A 1	A 2	9
B18 Zoobenthos	12	A 1	A 2	9	B58 Population structures	12	A 1	A 2	9
B19 Commercial demersal fish					B59 Taxonomy, systematics, classification	12	A 1	A 2	9
B20 Commercial benthic molluscs					B60 Physiology				
B21 Commercial benthic crustacean					B61 Behaviour				
B22 Attached plants and algae					B62 Pathology, parasitology				
B23 Intertidal organisms					B63 Toxicology				
B24 Borers and foulers					B64 Gear research				
B25 Birds					B65 Exploratory fishing				
B26 Mammals and reptiles					B66 Commercial fishing				
B27 Deep scattering layers					B67 Aquaculture				
B28 Acoustical reflections on marine organisms					B90 Other measurements				
B29 Biologic sounds									
B30 Bioluminescence									

H - HYDROGRAPHY											
HS SURFACE		NUMBER	i	I	FORMAT	HC CHEMICAL		NUMBER	i	I	FORMAT
H01	Continuous temperature recording					H26	Silicates				
H02	Continuous salinity recording					H27	Alkalinity				
H03	Discrete temperature measurements					H28	pH				
H04	Discrete salinity measurements					H29	Chlorinity				
NEAR SEA FLOOR (≤ 10 m)						H30	Trace elements				
H05	Continuous temperature recording					H31	Radioactivity				
H06	Continuous salinity recording					H32	Isotopes Pb/Th in sediment	4	C	A	9
H07	Discrete temperature measurements	6	D	A	9	H33	Dissolved gases				
H08	Discrete salinity measurements	6	D	A	9	H90	Other measurements				
HP PHYSICAL											
H09	Classical oceanographic stations										
H10	Vertical profiles (STD/CTD)	4	D	A	7	P - POLLUTION					
H11	Sub-surface measurements underway					P01	Suspended solids				
H12	Mechanical bathythermograph (No. of drops)					P02	Heavy metals in sediment	12	C	A	9
H13	Bathythermograph-expendable (No. of drops)					P03	Petroleum residues in sediment	12	B	A	9
H14	Sound velocity stations					P04	Chlorinated hydrocarbons				
H15	Acoustic stations					P05	Other dissolved substances				
H16	Transparency					P06	Thermal pollution				
H17	Optics					P07	Waste water: BOD				
H18	Diffusion (Dynamic)					P08	Waste water: Nitrates				
H80	Other measurements					P09	Waste water: Microbiology				
						P10	Waste water: Other				
						P11	Discolored water				
						P12	Bottom deposits				
HC CHEMICAL						P13	Contaminated organisms				
H21	Oxygen	6	D	A	9	P90	Other measurements				
H22	Phosphates										
H23	Total-P										
H24	Nitrates										
H25	Nitrites										