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June 28, 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 2-5, 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

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 2-5

LEG 1 and LEG 2

June 28,1988

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

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1.0 INTRODUCTION

CRUISE REPORT
FOR
MMS CRUISE CAMP 2-5
May 10 - 25, 1988

1.0 INTRODUCTION

Cruise CAMP 2-5 was the fifth and final cruise 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 2-5 was to provide environmental data to help make these kinds of correlations and inferences. Cruise CAMP 2-5 represents the second post-spud cruise relative to the history of drilling at Platform Hidalgo (drilling began at this platform in November 1987).

Our soft-bottom sampling design has been revised in order to accommodate drilling schedule delays at Platform Julius. The revisions include the reduction of the number of site-specific stations at the Platform Julius site from 19 to 1. The site-specific station which will continue to be sampled is PJ-1. The revisions will remain in effect until January 1990. These revisions have resulted from recommendations reached through discussions with the Minerals Management Service and the Quality Review Board.

Cruise CAMP 2-5 consisted of two legs: Soft-Bottom Box Coring (Leg 1); and Hard-Bottom Sediment-Trap/Physical Oceanography (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 2-5 is shown in Figure 1-1.

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

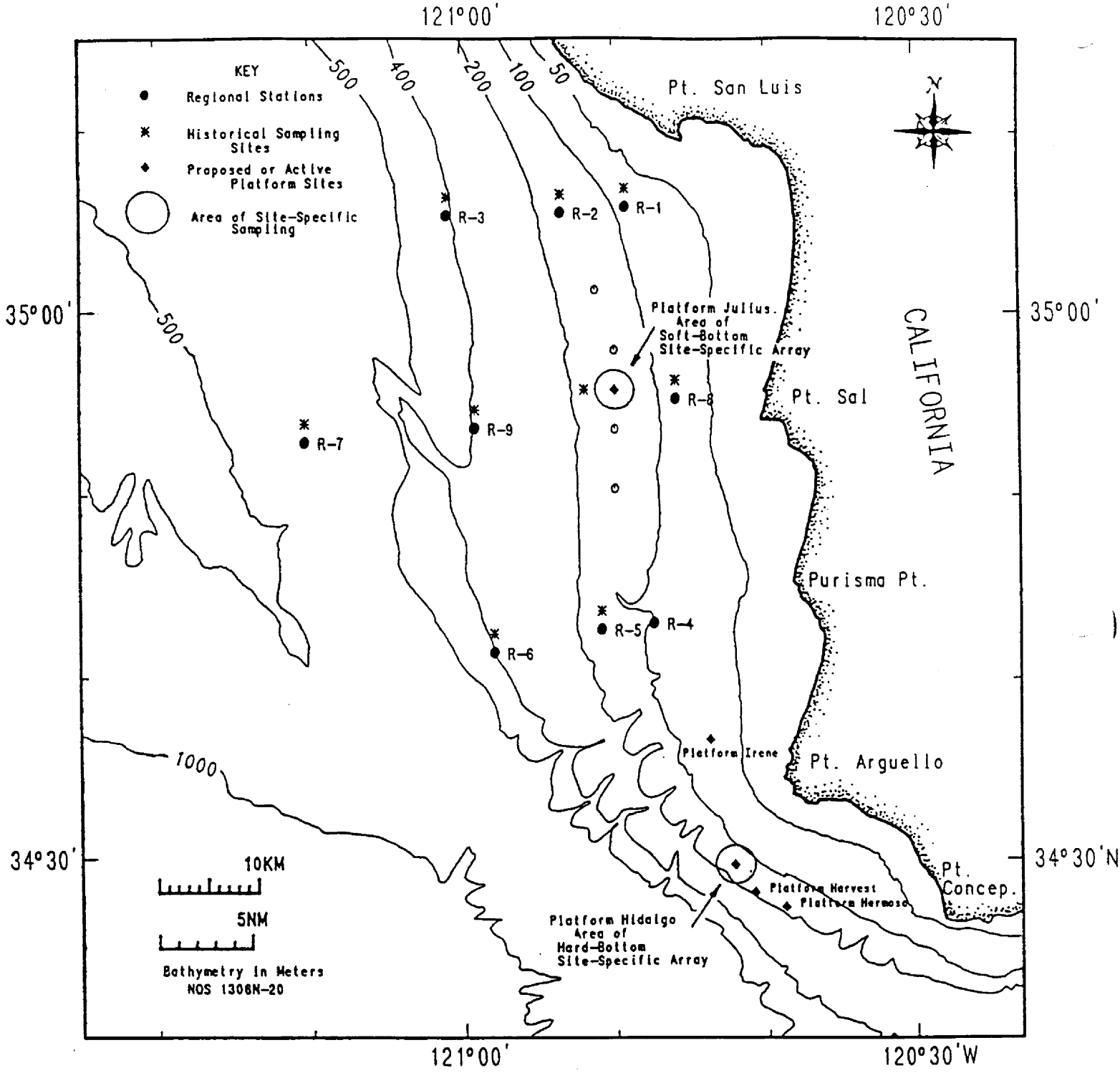

FIGURE 1-1. AREA OF STUDY AND STATION LOCATIONS FOR THE MMS CALIFORNIA OCS PHASE II MONITORING PROGRAM

2.0 MMS CRUISE CAMP 2-5

LEG 1 REPORT

2.0 CRUISE REPORT
MMS CRUISE CAMP 2-5, LEG 1
Soft-Bottom Box Coring
10-16 May, 1988

2.1 Objectives

The objectives of the Soft-Bottom Leg were to collect three replicate box cores at nine regional stations and one site-specific station. 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.

In addition, station-reference buoys were to be deployed at selected stations prior to a scheduled LORAN-C-servicing period which was being conducted by the U. S. Coast Guard.

2.2 Results

International Underwater Contractor's M/V Aloha departed Ventura Harbor on Wednesday, 11 May, 1988 at 0000 hours and returned on Monday, 16 May, 1988 at 0600 hours.

Operations commenced at noon on Wednesday with the deployments of station-reference buoys at Stations PJ-1, R-1, and R-2 in preparation for the LORAN-C (9940-Y) servicing period. The servicing period did not occur as scheduled and confirmation was obtained from the U. S. Coast Guard that the servicing period had been rescheduled for Thursday, 12 May between 0800 and 1600. In further preparation for the servicing period, a station-reference buoy was deployed at Station R-8.

Strong winds (20-40 knots) and high seas were encountered throughout the cruise. The majority of sampling operations were conducted during marginal-operating conditions. Sampling was severely impeded by the weather between 0700 on Friday, 13 May and 0600 on Sunday, 15 May. During this 47-hour time period, 40 hours were unworkable. The majority of the weathered-out time was spent hoved to in the vicinity of the northern-regional transect. However, eleven hours were spent moored in Pt. San Luis. During this time, Mr. Steve Mellenthien departed the cruise due to a flu illness.

Due to adverse weather conditions, the three box cores and one hydrocast were not collected at Station R-7. In addition, the third replicate box core and the one hydrocast were not collected at Station R-3. An additional day of cruise time was not implemented since the cruise schedule for Leg 2 depended on the prompt return of Leg 1. However, Don Barthelmess of IUC granted permission to extend our return to Ventura until 0600 on 16 May, 1988.

The cruise track and study area are shown in Figure 2-1. A summary of samples collected is shown in Table 2-1.

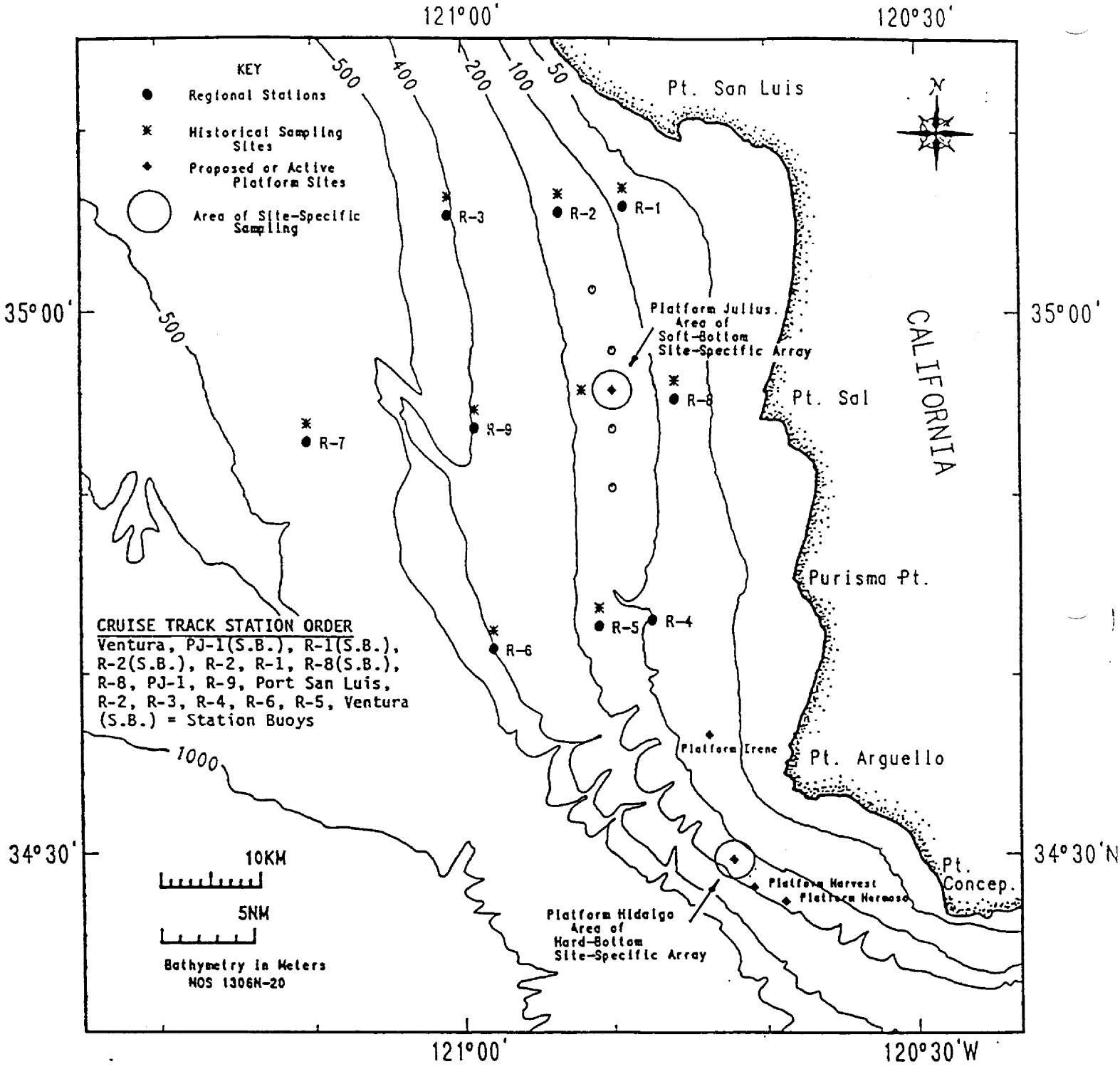

FIGURE 2-1. AREA OF STUDY AND STATION LOCATIONS WITH CRUISE TRACK INDICATED FOR MMS CRUISE CAMP 2-5, LEG 1, M/V ALOHA 10 -16 MAY, 1988.

TABLE 2-1. SUMMARY OF SAMPLES COLLECTED ON MMS CRUISE CAMP 2-5, LEG 1 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	9	3[a]	26	Battelle (Ventura)
Meiofauna	9	3	26	Univ. Texas
Core Radiography	9	1(x2)[b]	9(x2)	Univ. Maine
Surface Sediment (0-2cm): TM	9	3	26	Battelle (BNW)
Surface Sediment (0-2cm): HC	9	3	26	Battelle (Duxbury)
Subsurface Sediments (2-10cm): TM	3	3	9	Battelle (BNW)
Subsurface Sediments (2-10cm): HC	3	3	9	Battelle (Duxbury)
Pb/Th Ratios[c]	3	1	3	Battelle (BNW)
Sedimentology	9	3	26	Kinnetics (KLI)
Hydrography	7	1	7	Kinnetics (KLI)

a. Only two box-core replicates were collected at Station R-3.

b. One X-ray was taken of each of the two sediment cartridges collected from the 10 x 30-cm subcore.

c. These samples will be archived.

2.3 Navigation

The Northstar 800 LORAN-C receiver was to be the primary navigational aid for Leg 1. However, an electronic malfunction arose during the mobilization period, which prevented the use of the dual control-head system. The Northstar 7000 LORAN-C receiver was implemented as the primary navigational aid for Leg 1. 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.

The U. S. Coast Guard had scheduled a service period of the LORAN-C station in Searchlight, Nevada (9940-Y) for 11 May with an alternate date on 12 May. In order to maintain station navigational accuracy and to prevent a significant delay in the sampling schedule, station-reference buoys were deployed at Stations PJ-1, R-1, and R-2 prior to the LORAN station servicing period. The LORAN servicing period did not occur on 11 May, therefore, a station-reference buoy was deployed at Station R-8 when it was learned that the LORAN servicing-period would occur on 12 May.

All LORAN time delays were in the 9940 Group Repetition Interval (GRI) using a combination of the W, X, and Y secondary stations, the 16-k, 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. Portions of the sampling operations at Stations R-8 and PJ-1 occurred during the LORAN servicing period. Samples were collected within 60 m of the station-reference buoys. 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. Some of the latitude and longitude coordinates listed for the R-8 and PJ-1 sampling events are significantly offset from the reference latitude and longitude for these stations. These coordinates are erroneous due to the algorithm-interpolation difference between the time delay pair-stations in use during the LORAN servicing period.

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

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

2.4 Box Core Sampling

A Hessler-Sandia MK-III 0.25m^2 box core, vegematically partitioned into 25 individual 0.0 1m^2 subcores, was used to collect sediment samples (Figure 2-2). Three replicate box cores were collected at each of the eight regional stations (R-1 through R-6, R-8, and R-9) and the site-specific station (PJ-1) for various biological, chemical, and sedimentology parameters.

Due to adverse weather conditions resulting in a loss of sampling time, box core samples were not collected at Station R-7. In addition, the third replicate box core was not collected at Station R-3.

A total of 26 box core replicates were collected on Cruise CAMP 2-5, Leg 1.

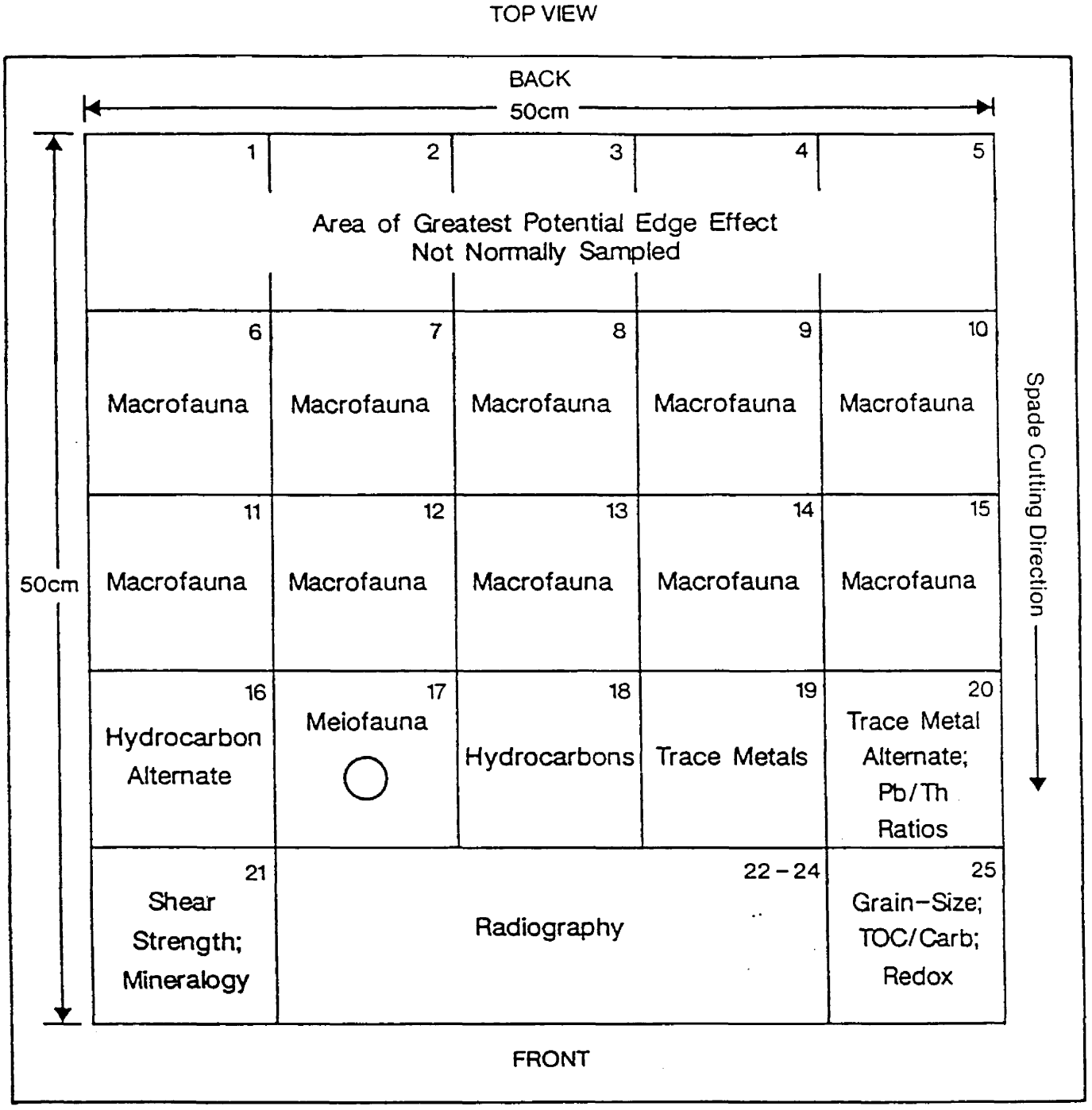

Figure 2-2 .Box core illustrating "vegematic" partitioning (top view).

TABLE 2-2. REGIONAL AND SITE-SPECIFIC STATION REFERENCE COORDINATES FOR MMS CRUISE CAMP 2-5, LEG 1 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 121°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

Revised 6/88

Latitude and Longitude from Northstar 7000 algorithm

TABLE 2-3. SUMMARY OF SAMPLE POSITIONS ON CRUISE CAMP 2-5, LEG 1 (M/V Aloha)

Station	Date and Time (PDT)	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	12 May 88 0021	Box Core 1	35°05.50'N 120°49.09'W	27795.3 42044.2	91	Penetration to 17 cm. Undisturbed surfaces. Midshipman curled up in subcore.
R-1	12 May 88 0153	Box Core 2	35°05.55'N 120°49.15'W	27795.0 42044.7	91	Two alternate subcores used for biology. Penetration to 15 cm.
R-1	12 May 88 0313	Box Core 3	35°05.54'N 120°49.20'W	27794.9 42044.8	91	Penetration to 15 cm. Partial wash; some alternate cores used.
R-1	12 May 88 0459	Hydrocast	35°05.54'N 120°49.17'W	27794.9 42044.7	91	
R-2	Reference Coordinates		35°05.13'N 120°53.40'W	27780.8 42057.1	161	
R-2	11 May 88 1806	Box Core 1	35°05.11'N 120°53.44'W	27780.8 42057.1	161	Seven "no-trips" between 1400-1800 due to mechanical problems. Penetration to 25 cm.
R-2	11 May 88 2022	Box Core 2	35°05.09'N 120°53.45'W	27780.7 42056.8	161	Surface slightly disturbed. Many juvenile echinoids present.
R-2	11 May88 2220	Box Core 3	35°05.09'N 120°53.41'W	27780.8 42056.7	161	Penetration to 25 cm. Good sample. Many echinoids present.
R-2	14 May 88 0547	Hydrocast	35°05.13'N 120°53.66'W	27780.0 42057.8	161	Sample collected 0.25 NM west of station due to strong winds and high seas.

TABLE 2-3. SUMMARY OF SAMPLE POSITIONS ON MMS CRUISE CAMP 2-5, LEG 1 (M/V Aloha) (Continued)

Station	Date and Time (PDT)	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	14 May 88 0842	Box Core 1	35°04.92'N 121°00.85'W	27756.1 42080.7	409	First attempt pre-tripped near bottom. Penetration to 25 cm. Amphipods on surface.
R-3	14 May 88 1143	Box Core 2	35°04.85'N 121°00.86'W	27756.1 42080.4	409	Four previous attempts unacceptable due to sea conditions and mechanical problems.
R-3	14 May 88 1345	Box Core 3	(not collected)			Wind up to 40 kt during box core recovery - sample unacceptable. Time constraints prohibited further attempts when weather subsided.
R-3	14 May 88	Hydrocast	(not collected)			Time constraints prohibited collection of hydrocast.
R-4	Reference Coordinates		34°43.18'N 120°47.28'W	27800.3 41921.5	92	
R-4	15 May 88 0723	Box Core 1	34°43.14'N 120°47.26'W	27800.4 41921.3	92	Penetration to 18 cm. Large ophiuroids present. Anoxic-type sediments in greater than 10-cm fraction.
R-4	15 May 88 0814	Box Core 2	34°43.12'N 120°47.25'W	27800.4 41921.2	92	Penetration to 16 cm. Undisturbed sample; polychaete tubes and ophiuroids visible.
R-4	15 May 88 0907	Box Core 3	34°43.14'N 120°47.24'W	27800.5 41921.2	92	Penetration to 16 cm. Harder packed sediment than in previous two reps. Deeper fraction appears anoxic.
R-4	15 May 88 0931	Hydrocast	34°43.13'N 120°47.26'W	27800.4 41921.2	92	

TABLE 2-3. SUMMARY OF SAMPLE POSITIONS ON MMS CRUISE CAMP 2-5, LEG 1 (M/V Aloha) (Continued)

	Station	Date and Time (PDT)	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	15 May 88 1745	Box Core 1	34°42.82'N 120°50.68'W	27789.7 41931.9	154	Penetration to 13cm. Much shell hash present. Some alternate cores used.
✓	R-5	15 May 88 1904	Box Core 2	34°42.84'N 120°50.70'W	27789.8 41932.0	154	Variable penetration. Alternate subcores used for macrofauna. Greater than 10-cm fraction collected from spade.
✓	R-5	15 May 88 2010	Box Core 3	34°42.83'N 120°50.72'W	27789.7 41932.0	154	Last core of cruise. Penetration to 10 cm. Scallop shells present in base sediment.
✓	R-5	15 May 88 1929	Hydrocast	34°42.78'N 120°50.84'W	27789.3 41932.2	154	
	R-6	Reference Coordinates		34°41.43'N 120°57.78'W	27768.0 41949.8	410	
✓	R-6	15 May 88 1111	Box Core 1	34°41.35'N 120°57.76'W	27768.0 41949.3	410	Penetration to 15 cm. Some alternate subcores used due to shallow penetration.
✓	R-6	15 May 88 1250	Box Core 2	34°41.50'N 120°57.77'W	27768.0 41950.1	410	Shallow penetration; fair sample. One alternate subcore used.
✓	R-6	15 May 88 1548	Box Core 3	34°41.41'N 120°57.79'W	27767.9 41949.7	410	Seven previous attempts were "no-trips." Penetration to 12 cm. Good sample.
✓	R-6	15 May 88 1345	Hydrocast	34°41.04'N 120°57.79'W	27768.0 41947.9	410	Sample collected 0.5 NM south of station due to high winds.

TABLE 2-3. SUMMARY OF SAMPLE POSITIONS ON MMS CRUISE CAMP 2-5, LEG 1 (M/V Aloha) (Continued)

Station	Date and Time (PDT)	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	No samples collected		---	---	---	Samples not collected due to weather and time constraints.
R-8	Reference Coordinates		34°55.24'N 120°45.80'W	16500.8 27805.6 41978.2	90	
✓ R-8	12 May 88 0858	Box Core 1	34°56.63'N 120°45.87'W	16500.8 27805.5	90	Loran Station-Y off the air. Positioning aided by station buoy. Latitude/longitude erroneous.
✓ R-8	12 May 88 1049	Box Core 2	34°56.48'N 120°45.90'W	16500.8 27805.4	90	Penetration to 12 cm. Much detritus and many ophiuroids in sample.
✓ R-8	12 May 88 1526	Box Core 3	34°57.33'N 120°45.86'W	16500.6 27805.6	90	Variable penetration 10-14 cm. Some alternate cores used. Greater than 10-cm fraction collected from spade.
✓ R-8	12 May 88 0759	Hydrocast	34°55.23'N 120°45.94'W	27805.1 41978.6	90	LORAN-C Station-Y shutdown at 0800.

TABLE 2-3. SUMMARY OF SAMPLE POSITIONS ON MMS CRUISE CAMP 2-5, LEG 1 (M/V Aloha) (Continued)

Station	Date and Time (PDT)	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	12 May 88 2246	Box Core 1	34°53.46'N 120°58.88'W	27763.7 42014.2	410	Wind up to 20 kt. Sample collected 0.13 NM east of station. Good sample.
✓ R-9	13 May 88 0141	Box Core 2	34°53.43'N 120°59.00'W	27763.3 42014.4	410	Penetration to 25 cm. Undisturbed sample.
✓ R-9	13 May 88 0323	Box Core 3	34°53.39'N 120°59.14'W	27762.8 42014.8	410	Good sample. Box on corer severely damaged by camera trip-weight. Positioning difficult.
✓ R-9	13 May 88 0558	Hydrocast	34°53.39'N 120°59.45'W	27761.9 42015.8	410	Wind steady at 30 kts; seas 10 ft.
PJ-1	Reference Coordinates		34°55.65'N 120°49.87'W	16495.5 27792.5 41994.5	145	
✓ PJ-1	12 May 88 1643	Box Core 1	34°57.07'N 120°49.87'W	16495.5 27792.6	145	Positioning aided by station buoy. Latitude and longitude are erroneous. Good sample.
✓ PJ-1	12 May 88 1813	Box Core 2	34°55.73'N 120°49.89'W	16495.5 27792.4 41995.1	145	LORAN-C Station-Y on the air. Many ophiuroids in samples.
✓ PJ-1	12 May 88 2031	Box Core 3	34°57.43'N 120°49.82'W	16495.1 27792.6 42003.8	145	Dense fog rolled in. Position questionable; LORAN erratic. Range indicates .10 NM.

Latitude and Longitude from Northstar 7000 algorithm.

2.5 Biology

From each of three replicate box cores at each of the eight regional stations (R-1 through R-6, R-8, and R-9) and one site-specific station (PJ-1), ten subcores (Subcore Numbers 6-15) were taken for benthic marcroinfauna, 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 preserved with approximately 10-percent buffered formalin. The >10-cm fraction was collected at all regional and site-specific stations sampled.

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

2.6 Chemistry

From each of three replicate box cores at each of the nine stations (eight regional and one site-specific) 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 stations PJ-1, 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 three stations (PJ-1, 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. 4-hour air-exposure samples for hydrocarbons and trace metals.
2. Trawl cable rinse for hydrocarbons.
3. Ship's hydraulic fluid for hydrocarbons.

2.7 Sedimentology

Samples were collected from each of the three replicate box cores at each of the nine stations in the Platform Julius study area (eight regional and one site-specific station) 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.

2.8 Core Radiography

At the nine 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 were taken as to the sample appearance.

2.9 Hydrography

A single Niskin bottle equipped with a deep-sea reversing thermometer (DSRT) was deployed at seven regional stations (R-1, R-2, R-4, R-5, R-6, R-8, and R-9), 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.

Hydrocasts were not performed at Stations R-3 and R-7 due to time constraints.

2.10 Cruise Participants

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

Battelle

James Campbell, Chief Scientist
Janet Kennedy, Second Scientist
Steve Mellenthien, Chemist
Heidi DeBra
Valerie Eikelmann

Kinnetic Laboratories, Inc.

Gary Gillingham
Sherri Hamer
Ken Kronschnabl
Don Arnold
Paul Barter

University of Maine

David Packer

University of Texas

John Kern

International Underwater Contractors, Inc.

8 Crew Members

2.11 Acknowledgements

The Chief Scientist and Second Scientist wish to thank the scientific personnel for their untiring dedication and skilled performances throughout the cruise, especially during the adverse weather. Special thanks is given to the crew of International Underwater Contractor's M/V Aloha for their skillful ship handling.

3.0 MMS CRUISE CAMP 2-5

LEG 2 REPORT

3.0 CRUISE REPORT
MMS CRUISE CAMP 2-5, LEG 2
Hard-Bottom Sediment-Trap/Physical Oceanography
May 17 - 25, 1988

3.1 Objectives

1. Retrieve, service and redeploy current meters at Platform Hidalgo and Platform Julius.
2. Retrieve, service and redeploy sediment traps at hard-bottom study sites.
3. Obtain water quality profiles and bottle casts from two locations near Platform Hidalgo and two locations near Platform Julius.

3.2 Scientific Personnel

Name	Affiliation	Responsibility
D. Beard	KLI	Current-Meter Servicing
R. Dellaert	Land & Sea	Navigation
R. Gale	Land & Sea	Navigation
D. Hardin	KLI	Chief Scientist
K. Kronschnabl	KLI	Sediment-Trap Servicing
M. Mertz	KLI	Current-Meter Servicing
P. Wilde	KLI	Current-Meter Servicing

3.3 Activities

5/17/88	1430-1800	Mobilized M/V Aloha.
5/18/88	0030	Departed Ventura Harbor.
	0900-2400	Waited for workable weather at Cojo Anchorage.
5/19/88	0630	Weather moderated; departed for Station PJ-13A.
	1100-1345	Retrieved current-meter mooring at Station PJ-13A and departed for Platform Hidalgo.
	1600-1900	Attempted to retrieve current-meter mooring at Platform Hidalgo. Departed for Cojo Anchorage.
5/20/88	0430	Departed for Platform Hidalgo.
	0715-1020	Retrieved current-meter mooring with ROV.
	1240-2030	Retrieved sediment traps from Stations PH-Est, PH-Fst, PH-Ist, PH-Jst, and PH-Nst.
5/21/88	0730-1030	Redeployed sediment traps at Stations PH-Est, PH-Jst, PH-Ist, PH-Fst, and PH-Est.
	1100-2017	Retrieved sediment traps from Stations PH-ST3, PH-ST2, PH-ST1 (three traps), and PH-Kst.
5/22/88	0645-0830	Retrieved and redeployed sediment traps from Station PH-Rst.
	0850-0930	Attempted to retrieve sediment traps from Station PHAR-ST.

5/22/88	0945-1330	Redeployed sediment traps at Stations PH-Kst, PH-ST3, PH-ST2 (three traps), and PH-ST1.
	1400-1445	Conducted hydrocast at Station Hydro 1.
	1545-1835	Retrieved sediment traps from Stations PH-Ust and PH-Wst.
	1845-2000	Redeployed sediment traps at Stations PH-Wst and PH-Ust; weather marginal to high winds and swell; departed for Port San Luis to rendevouz to replace SeaData pressure gauge.
5/23/88	0300-0130	Transfered equipment onto M/V Aloha.
	0800-2300	Prepared current-meter moorings for redeployment.
5/24/88	0600-0910	Prepared and redeployed current-meter mooring at Station PJ-13A.
	0945-1100	Conducted hydrocasts at Stations PJ-13 and PJ-11; departed for Platform Hidalgo.
	1550	Redeployed current-meter mooring at Platform Hidalgo.
	1605-1640	Conducted hydrocast at Station Hydro 2; swells 12-15 feet; departed for Ventura Harbor.
5/25/88	0045	Arrived at Ventura Harbor.
	0800-1100	Demobilized at M/V Aloha.

Upon MMS approval, Leg 2 was extended by one day to compensate for the long periods of unworkable weather encountered on this cruise leg.

3.4 Current Meters

The retrieval of the current meters was highly successful, although we encountered problems with the acoustic releases. The main release at Station PJ-13A, a Data-Sonics ATR 393, suffered a corrosion failure which we have seen in the past, and the problems with the other releases still have to be identified. The release from the secondary anchor at Platform Hidalgo was missing when the mooring was retrieved (the line had been cut). The mooring at Station PJ-13A was retrieved by grappling for the ground line to the secondary anchor. The ground line had been severed at Platform Hidalgo and the ROV was used to retrieve the mooring. The faulty releases were replaced with back-ups.

The current speed and direction data had been recorded successfully in the memory of four out of six of the current meters. All of the meters at Platform Hidalgo functioned well, as did the top meter at Station PJ-13A. The middle meter at PJ-13A, however, did not store data in its internal memory; fortunately the data can be recovered from the memory of the telemetry data-logger. The bottom meter at Station PJ-13A had insufficient data in its internal memory and had not been communicating with the telemetry system. Due to an attempt by the meter manufacturer to maintain sufficient memory space, the meters do not associate a time or date with the records, so recovery of the data from the bottom meter at PJ-13A will require detailed comparisons with the other meters to determine where the data gaps have occurred.

Vandalism continues to be a problem with the current-meter moorings. The auxiliary floatation has been repeatedly cut off of the surface floats and the auxiliary float on the subsurface cable (used to maintain gentle curvature of

the cable), which often floats near the surface, had been removed from the mooring at Station PJ-13A. Numerous propeller gouges were evident in the subsurface cable, reflecting the occurrence of heavy boat traffic very near the surface buoy. However, we have not identified any loss of data which can be related to vandalism at this time.

3.5 Sediment Traps

The first retrieval effort with the new sediment trap design was an overwhelming success. We learned much about the conditions under which successful retrieval is probable, and the optimum retrieval procedures. Each of the traps was located with the ROV within 45 minutes of the beginning of the dive. The Mesotech was the primary instrument used to locate the traps, once the ROV was in the immediate vicinity of the correct location (as indicated by navigation data). Hook-up of the spool line to the lift ring usually occurred within 10 minutes. After the first two recoveries, it was determined that no slack should be allowed in the spool line once the ROV reaches the surface; that the ship should back down on the retrieval line as slack is winched on board; and that once the retrieval line is taut and vertical, the traps should be winched on board very slowly. When sea state and wind conditions are marginal (approximately 8-10 ft swell, 25 knots) it becomes even more important to bring the ship directly over the traps before winching them on board, and that winch speed should be kept to a minimum.

The trapping efficiency of the new traps appears to be acceptable. Approximately 1.5 cm of material has accumulated in the traps during the four months they were in the water; we expect that more material will be collected throughout subsequent six-month deployment periods. The sodium azide preservative appeared to be effective, given the dead organisms which were observed in the traps, and the apparent lack of microbial activity. The following samples were recovered:

PH-Est	0 sample*
PH-Fst	1 samples
PH-Ist	4 samples
PH-Jst	4 samples
PH-Kst	4 samples
PH-Nst	4 samples
PH-Rst	4 samples
PH-Ust	0 samples*
PH-Wst	1 sample
PH-ST1	4 samples
PH-ST2	4 samples
PH-ST3	4 samples, plus 8 additional for testing the relative trapping efficienies of different trap diameters

Note: * Traps collected sediment, however contents were lost during recovery.

The traps at Station PHAR-ST remain in place. There was a structural failure on the ROV during retrieval and the traps were not brought off the bottom. Sea conditions on the last day of the cruise were too poor to dive, so these traps will be recovered on the next cruise (Oct 1988).

The sediment trap locations are shown in Figure 3-1. The deployment reference coordinates of all sediment traps are listed in Table 3-1.

3.6 Water Quality

Water-quality profiles and bottle casts were performed at Stations PJ-11 and PJ-13 in the Platform Julius Study Area and at Stations Hydro 1 and Hydro 2 in the Platform Hidalgo Study Area.

At each of the four stations, water-quality profiles were conducted using an InterOcean CSTD, which continuously recorded the parameters of dissolved oxygen, salinity, temperature, pH, and transmissivity throughout the cast.

Water samples were collected at each of the four stations using a series of three Niskin bottles situated for near-surface, mid-water, and near-bottom collection. Water samples were collected for the determination of salinity, dissolved oxygen, pH, total phosphate, nitrate/nitrite, and nutrients. Dissolved oxygen and pH samples were also used for CSTD probe calibrations.

All water quality parameters were samples successfully.

3.7 Navigation

The firm of Land and Sea Surveys, Inc. provided navigation services for Leg 2. All station positions in the Platform Hidalgo and Platform Julius vicinities were visited using a Motorola Miniranger System. The Miniranger System was interfaced to a 9826 Hewlett Packard Computer, which was linked to two color monitors to display the ship's position graphically. A Thinkjet printer and a 7475A Hewlett Packard plotter provided hard-copy printouts of Universal Transverse Mercator (UTM) coordinates and station plots. Land and Sea also provided the Ferranti O.R.E. Trackpoint System enabling the subsurface monitoring of IUC's Recon IV Remotely Operated Vehicle (ROV). Land and Sea's Mesotech Sonar provided directional monitoring of the sea floor relief within a 100-meter radius of the ROV. The Mesotech Sonar contributed to the efficient retrieval of the sediment traps.

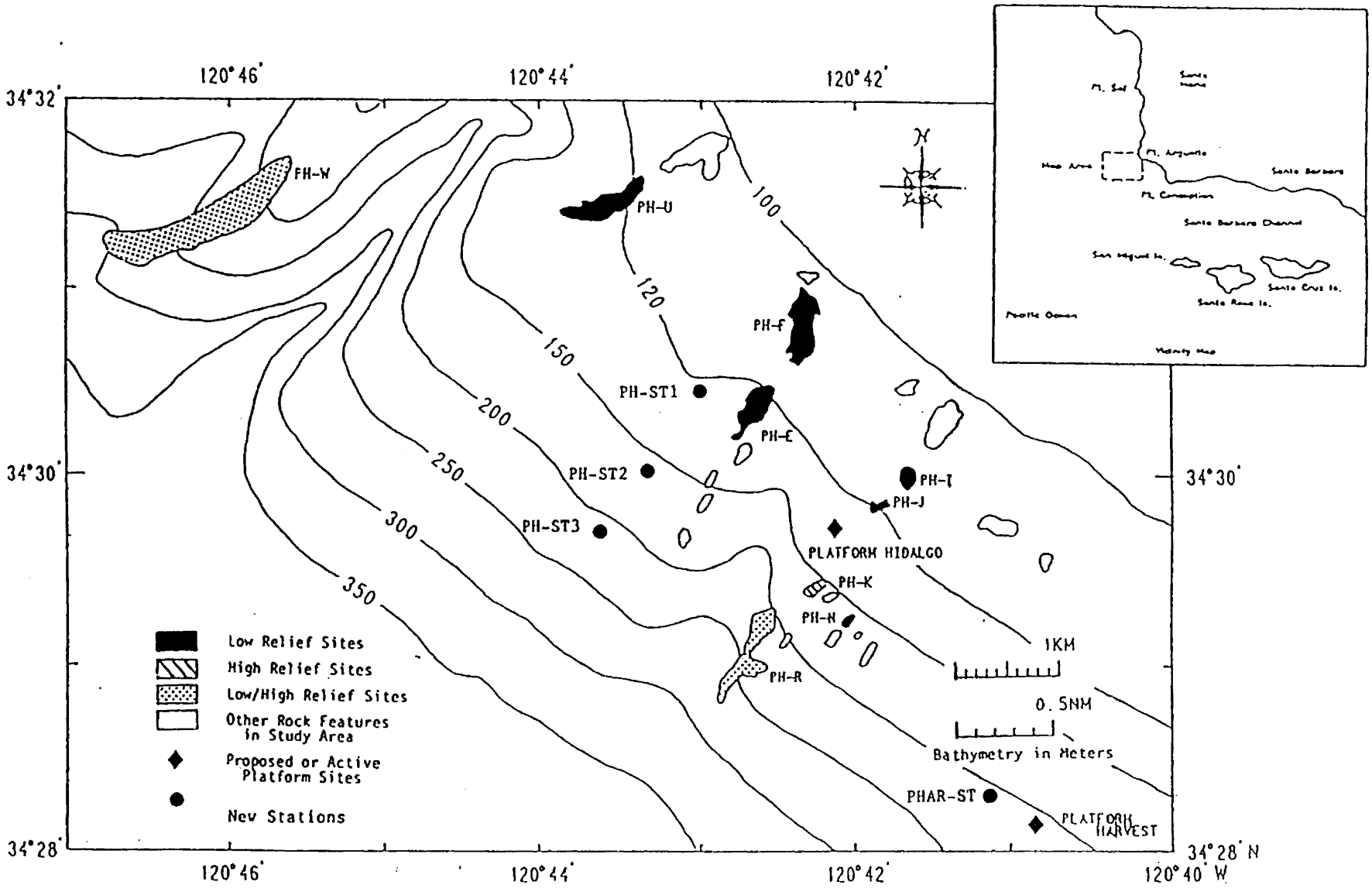

FIGURE 3-1. HARD BOTTOM FEATURES FOR SITE-SPECIFIC MONITORING NEAR PLATFORM HIDALGO

TABLE 3-1. REFERENCE COORDINATES OF SEDIMENT TRAPS DEPLOYED BY KINNETICS LABORATORIES, INC. FOR THE MMS CALIFORNIA OCS PHASE II MONITORING PROGRAM ON CRUISE CAMP 2-5, LEG 2, MAY, 1988

Station	Latitude Longitude	UTM Coordinates	Depth (m)
PH-Est	34°30.19'N 120°42.64'W	N3820128 E710179	119
PH-Fst	34°30.79'N 120°42.55'W	N3821250 E710292	105
PH-Ist	34°29.98'N 120°41.74'W	N3819767 E711570	107
PH-Jst	34°29.86'N 120°41.86'W	N3819548 E711390	117
PH-Kst	34°29.41'N 120°42.33'W	N3818691 E710695	160
PH-Nst	34°29.24'N 120°42.14'W	N3818390 E710986	166
PH-Rst	34°29.18'N 120°42.41'W	N3818267 E710582	213
PH-Ust	34°31.42'N 120°43.44'W	N3822381 E708909	113
PH-Wst	34°31.58'N 120°45.65'W	N3822598 E705522	195
PHAR-ST	34°28.00'N 120°41.03'W	N3816149 E712748	213
PH-ST1	34°30.55'N 120°43.11'W	N3820777 E709450	120
PH-ST2(1)	34°30.11'N 120°43.47'W	N3819956 E708909	163
PH-ST2(2)	34°30.11'N 120°43.47'W	N3819957 E709914	212
PH-ST2(3)	34°30.11'N 120°43.47'W	N3819952 E708912	212
PH-ST3	34°29.77'N 120°43.77'W	N3819324 E708473	212

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

PHAR-ST sediment-trap array was not recovered. However, the array was moved to the newly-listed coordinates during the recovery attempt.

Revised 6/88

APPENDIX A

FORM APPROVED: OMB NO. 41-R2765 – EXPIRES: 12-31-79

NOAA FORM 24-23
(1-76)

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
ENVIRONMENTAL DATA SERVICE
NATIONAL OCEANOGRAPHIC DATA CENTER

A00 DATA CENTER

OCEANOGRAPHY – GENERAL CRUISE INVENTORY
(ROSCOP – II)

A40 REFERENCE NUMBER

A01 EXPEDITION/PROJECT: California OCS Phase II Monitoring Program

A11 CRUISE NUMBER OR NAME: CAMP 2-5, Legs 1 and 2

A02 SHIP OR PLATFORM: M/V Aloha

A12 PLATFORM TYPE: 01

A03 COUNTRY: USA

A04 ORGANIZATION: Battelle Ocean Sciences
Kinnetic Laboratories, Inc.

A05 CHIEF SCIENTIST(S): J. F. Campbell, Battelle
D. Hardin, Kinnetics

	YES	NO	PART
A91 Declared national program?	X		
A81 Exchange restricted?		X	
A92 Co-operative program?		X	A72 NAME
A82 Co-ordinated internationally?		X	A62 BY WHOM?

A06 NAME AND ADDRESSES OF ORGANIZATIONS AND PERSONS WHOM TO QUERY

A1 J.L. Hyland, Battelle, Ventura, CA
B1 P.D. Boehm, Battelle, Duxbury, MA
C1 E. Crecelius, Battelle, Sequim, WA
D1 P. Kinney, Kinnetics, Santa Cruz, CA
E1 L. Watling, Univ. of Maine, Walpole, ME

FINAL DISPOSITION OF DATA

A2 J. L. Hyland
B2 Program Manager
C2 Battelle Ocean Sciences
D2 1431 Spinnaker Drive
E2 Ventura, CA 93001

DATE	DAY	MONTH	YEAR
A07 FROM	10	05	88
A17 TO	25	05	88

A08 GENERAL OCEAN AREAS: 57 A NE Pacific Ocean 121°N

A09 TYPE(S) OF MARINE ZONE(S): 07, 08

GEOGRAPHIC AREA
If all data were collected at a fixed station, fill in the co-ordinates

A10 LATITUDE ° ' " N/S

A20 LONGITUDE ° ' " E/W

A15 FEDERAL SUPPORT: U.S.D.I. Minerals Management Service

A25 REMARKS

Sediment Collection: 9 stations sampled with 0.25m^2 box core
13 stations sampled with sediment-trap arrays

DISCIPLINE AND TYPE OF MEASUREMENTS	Index 10° x 10° Qc	L	G	G	INDEX 1° x 1°	DISCIPLINE AND TYPE OF MEASUREMENTS	Index 10° x 10° Qc	L	G	G	INDEX 1° x 1°
A GS,H(NSF) B	7	3	1	2		A B					
A HP,HC,P B	7	3	1	2		A B					
A B,BS B	7	3	1	2		A B					
A B						A B					
A B						A B					
A B						A B					
A B						A B					

G – GEOLOGY GEOPHYSICS

GL MEASUREMENTS MADE AT A SPECIFIC LOCATION	NUMBER	i	l	FORMAT
G01 Dredge				
G02 Grab				
G03 Core rock *(no. of cores)*				
G04 Core–soft bottom *(no. of cores)*				
G05 Sampling by divers				
G06 Sampling by submersible				
G07 Drilling				
G08 Bottom photography				
G09 Sea floor temperature *(≤ 1 m from bottom)*				
G10 Accoustical properties of the sea floor				
G11 Engineering properties of the sea floor				
G12 Magnetic properties of the sea floor				
G13 Gravimetric properties of the sea floor				
G14 Radioactivity measurements				
G70 Other measurements				

GU MEASUREMENTS UNDERWAY				
G21 Motion picture of sea floor *(No. of nautical miles)*				
G22 Bathymetry-wide beam *(no. of nautical miles)*				
G23 Bathymetry-narrow beam *(no. of nautical miles)*				
G24 Side scan sonor *(no. of nautical miles)*				
G25 Seismic reflection *(no. of nautical miles)*				
G26 Seismic refraction *(no. of nautical miles)*				
G27 Gravimetry				
G28 Magnetism				
G29 Other measurements				

G – GEOLOGY GEOPHYSICS *(Continued)*

GS TYPES OF STUDIES	NUMBER	i	l	FORMAT
G31 Physical analysis of sediments	22	D	A	9
		1	2	
G32 Chemical analysis of sediments	22	BC	A	9
		1	2	
G33 Paleothermy				
G34 Paleomagnetism and rock magnetism				
G35 Paleontology				
G36 Geothermy				
G37 Geochronology				
G38 Mineral and fossil resources				
G39 Litteral zone studies				
G90 Other measurements				

D – DYNAMICS

D01 Current meters *(no. of stat.)*				
D02 Current meters *(Average duration of measurement days)*				
D03 Currents measured from ship drift				
D04 GEK				
D05 Drifters *(number)*				
D06 Swallow floats *(number)*				
D07 Drift cards *(no. released)*				
D08 Bottom drifters *(no. released)*				
D09 Tidal observation *(duration)*				
D10 Sea and swell *(no. of observations)*				
D90 Other measurements				

M – METEOROLOGY

M01 Upper air observations				
M02 Incident radiation				
M03 Air–sea interface studies				
M04 Ice observations				
M05 Occasional standard measurements				
M06 Systematic standard measurements				
M90 Other measurements				

H– HYDROGRAPHY

HS SURFACE	NUMBER	i	l	FORMAT
H01 Continuous temperature recording				
H02 Continuous salinity recording				
H03 Discrete temperature measurements				
H04 Discrete salinity measurements				
NEAR SEA FLOOR (≤ 10 m)				
H05 Continuous temperature recording				
H06 Continuous salinity recording				
H07 Discrete temperature measurements	11	D 1	A 2	9
H08 Discrete salinity measurements	11	D 1	A 2	9
HP PHYSICAL				
H09 Classical oceanographic stations				
H10 Vertical profiles (STD/CTD)	4	D 1	A 2	7
H11 Sub–surface measurements underway				
H12 Mechanical bathythermograph (No. of drops)				
H13 Bathythermograph–expendable (No. of drops)				
H14 Sound velocity stations				
H15 Acoustic stations				
H16 Transparency				
H17 Optics				
H18 Diffusion (Dynamic)				
H80 Other measurements				
HC CHEMICAL				
H21 Oxygen	11	D 1	A 2	9
H22 Phosphates				
H23 Total–P	4	D 1	A 2	9
H24 Nitrates	4	D 1	A 2	9
H25 Nitrites	4	D 1	A 2	9

HC CHEMICAL	NUMBER	i	l	FORMAT
H26 Silicates				
H27 Alkalinity				
H28 pH	4	D 1	A 2	9
H29 Chlorinity				
H30 Trace elements				
H31 Radioactivity				
H32 Isotopes Pb/Th in sediment	3	C 1	A 2	9
H33 Dissolved gases				
H90 Other measurements				

P – POLLUTION

P01 Suspended solids				
P02 Heavy metals in sediment	22	C 1	A 2	9
P03 Petroleum residues in sediment	22	B 1	A 2	9
P04 Chlorinated hydrocarbons				
P05 Other dissolved substances				
P06 Thermal pollution				
P07 Waste water: BOD				
P08 Waste water: Nitrates				
P09 Waste water: Microbiology				
P10 Waste water: Other				
P11 Discolored water				
P12 Bottom deposits				
P13 Contaminated organisms				
P90 Other measurements				

B – BIOLOGY

	NUMBER	i	l	FORMAT
B01 Primary productivity				
B02 Phytoplankton pigments				
B03 Seston				
B04 Particulate organic carbon				
B05 Particulate organic nitrogen				
B06 Dissolved organic matter				
B07 Bacterial and pelagic micro–organisms				
B08 Phytoplankton				
B09 Zooplankton				
B10 Neuston				
B11 Nekton				
B12 Invertebrate nekton				
B13 Pelagic eggs and larvae				
B14 Pelagic fish				
B15 Amphibians				
B16 Benthic bacteria and micro–organisms				
B17 Phytobenthos				
B18 Zoobenthos	9	A1	A2	9
B19 Commercial demersal fish				
B20 Commercial benthic molluscs				
B21 Commercial benthic crustacean				
B22 Attached plants and algae				
B23 Intertidal organisms				
B24 Borers and foulers				
B25 Birds				
B26 Mammals and reptiles				
B27 Deep scattering layers				
B28 Acoustical reflections on marine organisms				
B29 Biologic sounds				
B30 Bioluminescence				

	NUMBER	i	l	FORMAT
B31 Vitamin concentrations				
B32 Amino acid concentration				
B33 Hydrocarbon concentrations				
B34 Lipid concentrations				
B35 ATP–ADP–AMP concentrations				
B36 DNA–RNA concentrations				
B37 Taggings				
B80 Other measurements				
Sediment X-Rays	9	E1	A2	8
BS TYPES OF STUDIES				
B51 Identification	9	A1	A2	9
B52 Spatial and temporal distribution	9	A1	A2	9
B53 Monitoring and surveillance	9	A1	A2	9
B54 Biomass determination				
B55 Description of communities	9	A1	A2	9
B56 Food chains energy transfers				
B57 Population and environments	9	A1	A2	9
B58 Population structures	9	A1	A2	9
B59 Taxonomy, systematics, classification	9	A1	A2	9
B60 Physiology				
B61 Behaviour				
B62 Pathology, parasitology				
B63 Toxicology				
B64 Gear research				
B65 Exploratory fishing				
B66 Commercial fishing				
B67 Aquaculture				
B90 Other measurements				

☆ U.S. Government Printing Office: 1979—668–080