

FINAL REPORT

LOUISIANA SAND RESOURCE INVENTORY
1985 VIBRACORE SERVICES

For

DEPARTMENT OF NATURAL RESOURCES
STATE OF LOUISIANA
CONTRACT NO. 21940-86-01
OCR CONTRACT NO. 431-6006
AMMENDMENT OCR CONTRACT NO. 431-6006A

By

ALPINE OCEAN SEISMIC SURVEY, INC.
NORWOOD, NEW JERSEY

JUNE, 1986



OCEAN/SEISMIC/SURVEY

ABSTRACT

Alpine Ocean Seismic Survey, Inc. conducted a marine sediment sampling program, consisting of 125 VIBRACORE samples to forty feet below the ocean bottom, for the Louisiana Department of Natural Resources. These samples were taken during the period of April 21 to May 14, 1986. The survey is entitled "Louisiana Sand Resource Inventory 1985 Vibracore Services", DNR Contract No. 21940-86-01; OCR Contract No. 431-6006, which called for 100 VIBRACORE cores, and Amendment OCR Contract No. 431-6006A, which called for an additional 25 cores to be taken concurrently with the primary contract services.

Services rendered under this contract include providing an Alpine Model 271 VIBRACORE system to take the samples; the jack up vessel Blue Streak 8, which is a 130 foot leg class vessel, owned and operated by Blue Streak Marine of Belle Chase, Louisiana; a Syledis navigational system for vessel location control; a field crew including one geologist and technicians to operate the VIBRACORE UNIT and navigational equipment around the clock; and all necessary support equipment for the operation.

The cores were taken over a wide geographic area of southern coastal Louisiana, ranging from offshore of Marsh Island to northwest of the Mississippi River southwest entrance channel. The cores were delivered in three groups to representatives of the state during the project.



This report presents a map showing the locations of the VIBRACORE core sites relative to the coastline, a discussion of the VIBRACORE equipment and significant techniques used in the field operations, penetration data for each core, and a list of site coordinates and water depths for each core.



INTRODUCTION

A program of VIBRACORE sampling consisting of 125 cores taken to forty feet below ocean bottom has been conducted by Alpine Ocean Seismic Survey, Inc. in April-May, 1986 as part of the continuing investigation by the Louisiana Department of Natural Resources into the nature and distribution of the shallow subsurface sediments along the Louisiana Gulf coast. The project was conducted under contract No. 21940-86-01; OCR Contract, No. 431-6006, and Amendment OCR Contract 431-6006A, jointly entitled "Louisiana Sand Resource Inventory 1985 Vibracore Services." The original contract was for 100 core samples forty feet long. The amendment added an additional twenty five samples forty feet long, with the understanding that the original work and the added work would be carried out concurrently.

Locating and identifying potential offshore sand borrow areas for beach replenishment projects is one of the primary objectives of the program. Core sites were located on the basis of previous seismic profiling data obtained by the state geologists in the study area, and were planned so as to identify the sediment types present at points of interest in the study area. Cores were taken in the areas of Trinity Shoal, Tiger Shoal, Ship Shoal, several nearshore areas along the Timbalier Island chain, along the shoreline near the Bayou Lafourche entrance, and along Plaquemines Parish.

This project was the second VIBRACORE survey conducted by Alpine for the State. The first project was completed in the fall of 1983, using the same Vibracore sampling equipment but a different vessel..



The areas sampled at that time were more confined, including Holly-Peveto Beach, Isles Dernieres, Ship Shoal, and Cheniere Ronquille. The field methods were essentially the same as those used on the present project.

This report discusses the equipment and techniques used for the 1986 survey, and presents the data resulting from the penetration recordings taken for each core. A brief descriptive log of the schedule of field operations is included.

METHODS

VIBRACORE

The Alpine Model 271 VIBRACORE was used to obtain all the sediment cores during this project. This system is capable of obtaining cores to forty feet below the ocean bottom. The support tower is a 45 foot long aluminum H-beam supported by four foot-pads and stiff legs which are attached to a cross bar 12 feet above the base of the tower. The tower serves as a sliding guide for the air-driven vibrator which drives the attached core pipe into the ocean bottom sediments. The sediments are retained in a clear 3 5/8" ID plastic liner inserted in the metal core pipe.

Two 20 foot lengths of plastic liner are spliced together in order to obtain a complete forty foot core in one attempt. However, in many sediment types, either full penetration is not achieved on the first attempt, or soft sediments of low shear strength prevent full recovery of the material penetrated. While full recovery was obtained at a few sites on the first attempt during this project,



the cores were usually obtained in as many as four runs. In these cases, the upper few feet of the unit depth penetrated is recovered, and the rest lost or displaced. In order to obtain further recovery at these sites, the jetting technique, described below, was employed.

Jetting Technique

The jetting technique is used to achieve deeper penetration and longer recovery lengths in sediments which cannot be fully penetrated in one vibratory attempt, or to obtain cores of better quality. In this procedure, only one 20' liner is inserted into the bottom of the steel core pipe during each run. The liner is held in place by being threaded into the collar at the bottom of the core pipe. The core retainer and cutting edge are also screwed into the collar and then the whole unit is threaded onto the core pipe.

After refusal is encountered during the first vibratory coring run, a new liner is inserted inside the coring pipe, and the VIBRACORE rig again placed on the ocean bottom very close to the spot where the first run was completed. High pressure water is pumped via a two inch hose down through the core pipe, washing away the sediment and allowing the pipe to penetrate to the depth where the first run was terminated. Then the water is turned off and the air turned on to the vibrator, thus driving the pipe the second twenty feet or to refusal. This method has the advantage of allowing cores to be taken in shorter lengths if desired, and to reduce the disturbance in the upper part of the section. However, the time required can be much



longer than that required to obtain a core in a single run.

Penetration Graph

The time and depth of penetration of each core are monitored on deck by a strip chart recorder. The recorder is connected by electrical cable to a potentiometer on the vibrator. This potentiometer turns along a chain attached alongside the beam.

One turn of the potentiometer equals one foot of penetration which is indicated by one passage of the recorder pen across the strip chart record. These data are later converted by computer to a manageable plotted format. The plotted graphs, which indicate the depth to the top and bottom of each core run, the time required for each foot of the penetration, the location of the core in latitude and longitude, and the water depth of the core site, are presented in the Appendix to this report.

Water Depths

Water depths were taken from the vessel's digital fathometer at the time the vessel first stopped at each site before jacking up. The depths were checked by noting the water depth on the VIBRACORE in the shallower holes. No tide corrections were made.

Navigation

A Syledis navigational system was used for positioning the vessel during this project. This system utilizes pre-existing shore stations in a range-range mode with accuracy of plus/minus five meters. The Syledis system computer presents the vessel location in latitude and longitude. Since the navigational antenna was set-up on



the wheel house of the vessel and the core was taken off the opposite end of the boat for each core site, an offset distance between the antenna and the coring tower was recorded and used to generate the final corrected position for each core site. After a core was taken, the required position data for the next core site was entered into the Syledis navigation-computer system which automatically determined a course and distance to the upcoming site. On the last day of the coring operations, positions of the core sites were determined from the boat's Loran System, because one Syledis shore station signal was not adequately received. Since Loran signals had frequently been correlated to the Syledis read-out values and found to be comparable, the Loran readings were judged satisfactory for core positions of the last day. Coordinate data of core sites derived from the Syledis system, and adjusted for the offset distance and direction between coring tower and antenna, are presented on the the penetration graphs and on the charts of the core locations. A separate list of core numbers and their latitude-longitude coordinates is also included in Appendix One.

VESSEL

The vessel used for this survey was the BLUE STREAK 8, which is owned and operated by Blue Streak Marine of Belle Chase, Louisiana. This vessel is a self-propelled jack-up type barge, of the 130 foot leg class, with a seventy foot fixed boom crane of twenty-five ton line pull capacity. A table of complete vessel details is presented in Appendix Two.



Operators of the vessel were able to get the boat very close to shore even in rough sea conditions and were instrumental in the successful completion of the project.

SCHEDULE OF OPERATIONS

Initial mobilization of coring equipment on the vessel took place in Cameron, La. on April 17 and 18, 1986. On April 19 the vessel was scheduled to go to sea for a trial core, but since bad weather caused a delay for two days, this period was used for additional preparations for the cruise.

On the evening of April 20, the vessel left for sea, coming on site at 0230, April 21. The test core was completed by daylight and the vessel steamed eastward to Freshwater Bayou to make a crew change and pick up the DNR personnel. The first scheduled core was taken in the Trinity Shoal area on Tuesday April 22. The thirty (30) cores in that area were completed on April 27.

The Shell Reef Area cores were done next, with all nine being completed by April 29, after which the boat went into Cocodrie to drop off the cores. Many of the cores in the Shell Reef area contained very soft material, requiring as many as four runs to obtain full recovery.

On May 1, the Ship Shoal Area cores were started. Due to weather considerations during this period, some of the cores in the Point Au Fer and Timbalier areas, which were farther inshore and more protected from northerly winds, were completed. The cores for the



Point Au Fer and Ship Shoal areas were completed by May 8, and unloaded at Cocodrie.

Between May 9 and May 10, the fifteen remaining Timbalier cores were completed and the Lafourche area cores started. The cores planned for sites 4 and 9 and the Lafourche area were deleted.

The Lafourche cores were completed early on May 12, and the Plaquemines area cores started. Eighteen cores were completed by the evening of May 13, with sites 15 and 17 being deleted. The vessel was demobilized in Venice, La. on May 14.



7. PLAQUEMINES AREA

<u>SITE #</u>	<u>LATITUDE - Y</u>	<u>LONGITUDE - X</u>	<u>WATER DEPTH - FT.</u>
P-86-1	29° 09.34'	89° 34.37'	34.0' LORAN
P-86-2	29° 16' 42.08	89° 40' 00.36"	15.0'
P-86-3	29° 14' 51.94"	89° 40' 29.98"	25.0'
P-86-4	29° 12' 37.52"	89° 41' 09.85"	38.0'
P-86-5	29° 11.56'	89° 29.28	13.0' LORAN
P-86-6	29° 08' 33.10"	89° 30' 21.42"	27.0'
P-86-7	29° 10.16'	89° 27.81'	15.0' LORAN
P-86-8	29° 12' 47.21"	89° 37' 54.04"	28.0'
P-86-9	29° 15' 09.92"	89° 37' 01.96"	14.0'
P-86-10	29° 10.41'	89° 38.15'	36.0' LORAN
P-86-11	29° 13.42'	89° 32.57'	4.0' LORAN
P-86-12	29° 14' 00.74"	89° 58' 53.50"	11.0'
P-86-13	29° 10' 30.50"	89° 55' 45.30"	45.0'
P-86-14	29° 13' 36.61"	89° 58' 30.67"	21.0'
P-86-16	29° 14' 31.05"	89° 56' 33.50"	9.0'
P-86-18	29° 18' 23.70"	89° 48' 59.77"	11.0'
P-86-19	29° 17' 55.01"	89° 44' 09.45"	12.0'
P-86-20	29° 13' 17.62"	89° 44' 06.50"	39.0'

8. TEST CORE

TC-86-1	29° 36' 19.27"	93° 06' 00.30"	38.0'
---------	----------------	----------------	-------