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GULF OF MEXICO  
INFORMATION TRANSFER MEETING

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New Orleans, LA

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Under the Direction of  
Mr. Joseph U. LeBlanc, BLM Program Manager  
(713/845-2153)  
and  
Dr. Robert M. Rogers, BLM Project COAR  
(504/589-6541)

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## Archaeology

### Participants

The archaeology sessions were attended by the following:

Barto Arnold	State of Texas Antiquities Committee, Austin, TX
Henry Berryhill	USGS, Marine Geology, Corpus Christi, TX
Arnold Bouma	USGS, Marine Geology, Corpus Christi, TX
Gordon Burton	USGS, Reston, VA
Donna Byrne	BLM, New Orleans OCS Office, LA
W.A. Cockrell	State of Florida, Department of State, Division of Archives, History and Records Management, Tallahassee, FL
Jim Coleman	Louisiana State University, Baton Rouge, LA
Robert Floyd	John Chance and Associates, Inc., Lafayette, LA
Ed Friedman	USGS, Reston, VA
Sherwood Gagliano	Coastal Environments Inc., Baton Rouge, LA
Jim Hauser	Odom Offshore, Baton Rouge, LA
Jack Hill	Oceanonics, Houston, TX
Bob Hoff	Decca, Houston, TX
Lori Hughston	ARCO Oil and Gas, Houston, Tx
Dana Larson	Exxon, Houston, TX
Murice Rinkel	State of Florida OCS Representative, St. Petersburg, FL
Reynold Ruppe	Arizona State University, Tempe, AZ
Jim Sides	John Chance and Associates, Inc., Lafayette, LA
Brent Smith	USGS, Metairie, LA
Melanie Stright	BLM, New Orleans OCS Office, LA

### Introduction

The Archaeology session on May 12 was opened by Melanie Stright of the New Orleans OCS Office. She indicated that the overall purpose of the meeting was to obtain feedback for the EIS process. The four basic questions to be addressed were:

- (1) What is the legal and regulatory basis for the cultural resources program on the OCS?
- (2) What are the potential impacts to significant cultural resources from oil and gas development?
- (3) Which impacts are the most significant?
- (4) What changes should be made in the cultural resources program to improve it?

Three major concerns with the current cultural resources program on the OCS are:

- (1) Shipwreck Archaeology--is the magnetometer effective in locating and/or avoiding historically significant shipwrecks with present line spacing?
- (2) Prehistoric Archaeology--what are the capabilities for site identification and information retrieval using current coring techniques (penetration, core analysis, spacing, and configuration)?
- (3) What is the overall cost/benefit ratio of the cultural resources program on the OCS?

Ms. Stright stated that in her opinion an initial change in the program which would be beneficial to both industry and archaeology would be to reduce the broad high probability area where archaeological surveys are currently being required by using existing geophysical data to outline areas of increasingly lower probabilities for site occurrence, locatability, and recoverability.

#### Evaluation of the Current Cultural Resources Program

Speaker: Reynold Ruppé, Arizona State Univ., Tempe, AZ

Dr. Reynold Ruppé talked on the results of his study conducted during a six month IPA appointment with BLM. This study was designed to evaluate the effectiveness of the current cultural resources program on the OCS in meeting the intent of the law. It involved assessment of the quality of the marine survey archaeological reports over the last six years. Dr. Ruppé brought up the following major problems with the current program:

- (1) There are basic conflicts between federal agencies, particularly USGS and BLM, regarding their specific responsibilities and authorities under the current program.
- (2) Report quality is not assured because there is no "peer review" of the marine survey archaeologists' reports. The result is that in the reports reviewed by Dr. Ruppé, neither the geophysicists nor the marine survey archaeologists are doing adequate assessment. A related problem is that most survey jobs and archaeological assessments are contracted to the "low bidder." Two possible solutions to problems with quality assessments were offered: (a) send examples of what are thought to be inadequate reports to the Society of Professional Archaeologists (SOPA) grievance committee for review; and (b) have BLM and USGS require that the reports be published.
- (3) The ultimate legality of the program is in question: (a) the Antiquities Act of 1906 was ruled inapplicable to the OCS as per the 1978 "Atocha decision," and (b) the question has been raised as to the applicability of the National Historic Preservation Act of 1966 to the OCS. Dana Larson of Exxon made the point that the OCS Lands Act, as amended,

specifically states that "Exploration will not . . . disturb any site, structure, or object of historical or archaeological significance."

- (4) Responsibility for further investigations is in question. Should the federal government or the lessee have this responsibility?
- (5) Adequacy of the program cannot be assessed without ground truthing of selected anomalies.

Dr. Ruppé's presentation was interrupted by numerous comments and discussion. After the question of the legality of the program was discussed at length, it was mutually agreed by all present that to proceed with any meaningful discussion of the cultural resources program, the legality of the program would be assumed.

As the result of Dr. Ruppé's presentation, and the extensive discussions it produced, four major concerns were raised:

- (1) After six years and over 1,000 marine survey reports, no real archaeological information has been collected in the Gulf of Mexico as a result of the present program.
- (2) Are the archaeological surveys currently being required in the Gulf of Mexico effective in identifying and/or avoiding significant cultural resources in terms of technology, assessment quality, and the amount and type of further investigations being conducted?
- (3) Use and transfer of data being gathered are inadequate. There is very little sharing of data, and there is no central storehouse for the data.
- (4) There is no professional review of marine survey archaeologists' work outside the federal agencies.

The Predictive Model for Prehistoric Site Occurrence

Speakers: Sherwood Gagliano, Coastal Environments, Inc.,  
Baton Rouge, LA  
Robert J. Floyd, John Chance and Associates, Inc.,  
Lafayette, LA

After the general discussion session, Dr. Sherwood Gagliano gave a short presentation on the predictive model for prehistoric site occurrence presented in his 1977 cultural resources baseline study for the northern Gulf of Mexico. He also spoke briefly on the progress and preliminary findings of a study he is currently doing under contract with HCRS entitled "Sedimentological Studies of Archaeological Deposits."

The basic tenets and findings of Dr. Gagliano's studies indicate that areas of high probability for the occurrence of drowned

prehistoric archaeological sites may be located on sub-bottom profiler records by using the terrestrial analogue of site association with specific features of coastal geomorphology. These areas of high probability can then be investigated further through core analysis. The preliminary findings of his sedimentological studies indicate that certain sedimentological parameters may be identified which can distinguish a cultural deposit from a naturally occurring deposit.

Robert J. Floyd presented additional evidence supporting Dr. Gagliano's position by showing specific sub-bottom profiler records of well defined relict geomorphology which, using the terrestrial analogue of Avery Island, Louisiana, would indicate areas of high probability for prehistoric site occurrence.

#### Alternative Courses of Action

As a result of Monday's discussions, the following four courses of action for the OCS cultural resources program surfaced:

- (1) Status Quo--continue the OCS cultural resources program in its present form (requiring surveys within the high probability area at 150 m line spacing).
- (2) Eliminate the requirement for an archaeological survey at 150 m line spacing. Work more closely with the oil industry and use the geophysical data being gathered at 300 m line spacing as the basis for "in-house" archaeological assessments by USGS and BLM, calling in consulting archaeologists when the need arises. Geophysical data would also be used to identify areas for further archaeological studies, which would be jointly funded by the government and industry.
- (3) Continue the archaeological survey requirements at 150 m line spacing, but eliminate the contract archaeologist by routinely requiring that all magnetic anomalies, side-scan sonar contacts, and certain relict geomorphology be avoided by oil and gas activities.
- (4) Continue the archaeological survey requirements at 150 m line spacing, but eliminate many areas from the archaeological survey requirements by using existing geophysical data to outline areas of increasingly lower probability for site occurrence, locatability and recoverability, within the currently broad high probability area.

On Tuesday, May 13, the opening session was geared to this fourth alternative. Reports were given on two recent geological studies in the Gulf of Mexico and the applicability of the results of these studies towards the deletion of large areas from the archaeological survey requirement.

Subaqueous Sediment Instabilities in the Offshore Mississippi Delta  
 Speaker: Jim Coleman, Louisiana State Univ., Baton Rouge, LA

Dr. Jim Coleman reported on the results of a recent BLM study entitled "Subaqueous Sediment Instabilities in the Offshore Mississippi Delta." Side-scan sonar and seismic data compiled for the active delta region indicate that the current Mississippi Delta area is covered by a thick sequence of Recent sediments, and that faulting, slumping, and mass sediment movement are widespread. Recent disturbed sediments within the survey area ranged from zero to more than 200 feet thick. Dr. Coleman stated that the depth of sediments deposited in the survey area over the last 100 years alone averages about 40 feet thick.

Mr. Robert Floyd, in commenting on the archaeological implications of this information, combined with his own diving experience in the active delta, stated that he felt further archaeological investigations, even for historic shipwrecks, in the active Mississippi Delta are not feasible. J. Barto Arnold III, State Underwater Archaeologist for Texas, took exception to Mr. Floyd's assessment. Arnold stated that the Mississippi Delta area is an extremely high probability area for the occurrence of historic shipwrecks, and that it therefore should not be deleted from the archaeological survey requirements. He further stated that even though further investigations may not be feasible, ferromagnetic remains of wrecks could still be located and avoided by oil and gas activities.

Dr. Coleman's response to this argument was that the mass sediment movement throughout the historic period would probably have completely destroyed and scattered any ships which might have gone down in the area. Dr. Gagliano commented that should Mr. Floyd's suggestion be adopted, the near-shore submerged historic sites off the mouth of the Mississippi should not be "written off." These sites, however, lie in waters under the jurisdiction of the State of Louisiana, and management decisions made on the OCS would not affect such sites.

No final consensus was reached on the recommendation by Robert Floyd to delete from the archaeological survey requirement the blocks covered by Dr. Coleman's data.

BLM's Geological Mapping Program in the Gulf of Mexico  
 Speaker: Henry Berryhill, USGS, Corpus Christi, TX

Dr. Henry Berryhill reported on his ongoing geologic mapping program for the BLM in the Gulf of Mexico. His work involves constructing a series of regional geologic base maps from existing USGS preexisting shallow seismic data at 1.5 mile line spacing and collecting new seismic data on a three-mile grid to tie in existing data. It was Dr. Berryhill's position that maps produced by the study would be useful in redefining high probability areas for the occurrence, locatability, and preservation of archaeological sites.

Maps on the series which may provide useful information for this purpose include:



- (1) Water Circulation--Rates of Sedimentation
- (2) Paleogeography and Depositional Environments, Late Pleistocene and Holocene
- (3) Post Wisconsin Sedimentation Patterns and Tectonism
- (4) Structure of the Continental Terrace--Salt Diapirs

Dr. Gagliano qualified the usefulness of these maps by stating that both the geomorphology detailed on the maps and the time intervals covered by the maps are of too gross a scale for direct application to archaeological problems. Dr. Gagliano expressed a desire to work directly with the original data to compile maps more useful for the archaeological problems at hand.

Procedures and Problems in Archaeological Remote Sensing Surveys  
 Panel Discussion: Joint Session, Geophysicists and Archaeologists

The second session on May 13 was a joint session of geophysicists and archaeologists to discuss the procedures and problems involved in the archaeological remote sensing surveys. Discussion focused on the capabilities of the current surveys at 150 m line spacing for locating historic shipwrecks and prehistoric archaeological sights. As a result of the panel discussion, the following major points were brought out:

- (1) The technology and methodology exist to locate historically significant shipwrecks; however, the general survey mode of the present surveys probably will not locate all historically significant wrecks.
- (2) The present surveys at 150 m line spacing were designed as sampling surveys. The concept was to avoid all evidence which may indicate the presence of a shipwreck (all unidentified magnetic anomalies and side-scan contacts) by the distance to the next survey line (150 m).
- (3) Designing archaeological surveys with a search mode and 100% magnetometer coverage would not be economically feasible on a routine basis.
- (4) All present agreed that some ground truthing of magnetic anomalies is absolutely necessary to further evaluate the effectiveness of the current survey methodology. Barto Arnold indicated that one-third of all promising magnetic anomalies in state waters without any side-scan sonar confirmation, when investigated, have been related to shipwrecks. However, he also stated that this correlation on the OCS would probably be much lower.
- (5) Dr. Berryhill asked whether any evidence of shipwrecks might be observed on sub-bottom profiler records. After some discussion, the general consensus was that no such evidence would be observed due to the interference in the shallow returns of seismic signals.

- (6) Evidence of relict geomorphology, which would indicate areas of high probability for prehistoric site occurrence, is observable on sub-bottom profiler records; however, evidence of specific sites generally is not observable, due to the relatively small size of most prehistoric sites.
- (7) It would be possible to improve survey methodology to actually locate evidence of extremely large cultural deposits; however, once again this was thought to be not economically feasible.

Opinions on the effectiveness of the existing archaeological surveys ranged from the feeling that they are absolutely useless to the opinion that they are gathering useful information for future studies and that as a result of the surveys, numerous archaeological sites both historic and prehistoric, are probably being avoided by oil and gas activities.

It was Dr. Berryhill's suggestion that technological capabilities and economic feasibility be the main factors considered in determining our survey requirements and methodology. Dr. Berryhill strongly supported the option of using available information to refine high probability areas where archaeological surveys are required down to areas of "highest probability," where more intensive surveys, further investigations, and future study efforts should concentrate.

At the end of this session Barto Arnold offered the following resolution for adoption by the group:

Given that:

- (1) neither industry nor the archaeological community are satisfied with the current OCS cultural resources survey requirements;
- (2) both industry and the archaeological community wish to avoid disturbing objects causing magnetic anomalies and to avoid certain sub-bottom geological features which may be high probability locations for prehistoric sites and hazardous to rig stability; and
- (3) analysis and synthesis of existing data are inadequate and basic field research under-funded.

Be it resolved that:

- (1) means be developed to accomplish the avoidance mentioned in #2 above in a more reasonable, mutually satisfactory manner; and
- (2) BLM and industry fund more basic research and synthesis on OCS cultural resources on a high priority basis.

This resolution was seconded by Dr. Gagliano. No opposition to the resolution was expressed.

As a result of the meeting, two specific proposals for future studies were offered:

- (1) A study to ground truth selected magnetic anomalies in order to determine what types of ferromagnetic objects produce what types of signatures, and what types of objects are being located and avoided as a result of surveys. Thousands of anomalies have been located and simply avoided by oil and gas operations, with no further confirmation or investigation, and therefore no further archaeological information on the Gulf.
- (2) A study to run intensive surveys and do extensive data collection and testing of a specific high probability area for prehistoric site occurrence in order to actually locate prehistoric sites on the OCS and to help establish characteristic site signatures.