

**UNITED STATES DEPARTMENT OF THE INTERIOR
MINERALS MANAGEMENT SERVICE
GULF OF MEXICO OCS REGION**

NTL No. 2002-G01

Effective Date: March 15, 2002

**NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL, GAS, AND SULPHUR
LEASES AND PIPELINE RIGHT-OF-WAY HOLDERS IN THE
OUTER CONTINENTAL SHELF, GULF OF MEXICO OCS REGION**

Archaeological Resource Surveys and Reports

This Notice to Lessees and Operators and Pipeline Right-of-way Holders (NTL) supersedes NTL No. 98-06, dated August 10, 1998, and Letters to Lessees and Operators dated November 30, 1990, March 17, 1995, and September 5, 1995, and makes technical amendments and updates cited regulatory authorities.

Background

According to the requirements of the National Historic Preservation Act of 1966, as amended, and other applicable laws and regulations, the Minerals Management Service (MMS) is responsible for ensuring that archaeological resources on the Outer Continental Shelf (OCS) are not damaged or harmed by oil, gas, and sulphur operations. Archaeological resources are any material remains of human life or activities that are at least 50 years of age and that are of archaeological interest (see 30 CFR 250.105).

Studies conducted on behalf of the MMS (completed in 1977 and 1989) have developed, for resource management purposes, predictive models of where archaeological resources are likely to occur on the OCS in the Gulf of Mexico. These resources may be of two types: (1) drowned terrestrial prehistoric sites dating to the Late Pleistocene/Early Holocene period when sea levels were substantially lower than today, and (2) historic sites such as shipwrecks or lighthouses. The GOMR uses the results of these studies to determine which OCS areas have the highest potential for archaeological resources. The MMS has issued regulations at 30 CFR 250.194, 250.203(b)(15), 250.203(o), 250.204(b)(8)(v)(A), 250.204(s), and 250.1007(a)(5) that require OCS lessees and operators and pipeline right-of-way holders to conduct surveys within these areas of high archaeological potential and to submit the results to the MMS.

The above-cited regulations require that you include archaeological resource reports with your Exploration Plans (EP), Development Operations Coordination Documents (DOCD), and pipeline applications. The purpose of these reports is to provide information for the MMS Gulf of Mexico OCS Region (GOMR) to use for determining the potential existence of archaeological resources that may be affected by proposed operations. These reports are based primarily on an assessment of data obtained from remote-sensing surveys.

MMS GOMR Notification

To determine whether you need to conduct an archaeological resource survey (as authorized by 250.203(o), 250.204(s), and 250.1007(a)(5)) and submit an archaeological resource report (as required by 250.203(b)(15), 250.204(b)(8)(v)(A), and 250.1007(a)(5)), consult the list on the MMS Internet website at

<http://www.gomr.mms.gov/homepg/regulate/environ/archaeological/introduction.html>.

The website listing serves as the written notification the MMS GOMR makes according to 30 CFR 250.194(a). Conduct the survey and prepare the report if the OCS block(s) covered by your lease or pipeline right-of-way appears on the list. On a case by case basis, the MMS GOMR will inform you by letter if we redesignate a leased OCS block because of new information.

Archaeological Resource Surveys

Conduct archaeological resource surveys using the pattern and data acquisition instrumentation guidelines in Appendix No. 1 of this NTL. Since archaeological resource surveys are similar to other required remote-sensing surveys (e.g., shallow hazards surveys and live-bottom surveys), the MMS GOMR encourages you to conduct these surveys concurrently. Submit your written requests under paragraphs C, D, and E below to the appropriate MMS GOMR office (refer to paragraph B under the **Contacts and Mailing Addresses** section below for mailing addresses).

A. If your lease was issued *before* December 1973, you do not need to conduct an archaeological resource survey to cover your proposed seabed-disturbing lease activities, as long as the activities will take place within 500 feet of the center of a production facility installed before November 21, 1994, or in the disturbance corridor of a lease term pipeline installed before November 21, 1994.

B. If your lease was issued *after* December 1973, you do not need to conduct an archaeological resource survey to cover your proposed seabed-disturbing lease activities, including lease term pipelines, if you have previously conducted a lease survey (see Appendix No. 1, Section III.A) *for that lease* under the guidelines of the MMS GOMR NTL in place at the time you performed the survey.

C. If you have been directed by the MMS GOMR to conduct an archaeological resource survey, but you believe that you can prepare an acceptable archaeological resource report based on existing survey data (including data collected for an OCS block when it was previously leased) or other available information, submit a written request to the MMS GOMR Plans Section (for lease or site-specific surveys) or the MMS GOMR Pipeline Section (for pipeline surveys) for approval to use existing survey data in lieu of conducting a new survey. In your request, include a discussion of your rationale and a copy of any existing archaeological resource reports.

D. If you have been directed by the MMS GOMR to conduct an archaeological resource survey, but you believe that previous seafloor disturbances in the area would severely hinder your ability to gather useful information, submit a written request to the MMS GOMR Social Sciences Unit for approval to waive the survey. In your waiver request, include a discussion of your rationale and an "as-built" plat of your lease that depicts all existing facilities and pipelines

and the location(s) of the proposed seabed-disturbing activities. Include also a statement, prepared and signed by a professional archaeologist, that supports your waiver request.

E. If you have been directed by the MMS GOMR to conduct an archaeological resource survey, but you would like to use a survey pattern or survey data acquisition instrumentation different from that specified in Appendix No. 1 of this NTL, submit a written request to the MMS GOMR Social Sciences Unit for approval. In your request, include a description of the alternate pattern or instrumentation and a discussion of your rationale. Please be advised that the MMS GOMR will not ordinarily approve requests to use 3-D seismic information as a substitute for high-resolution sidescan sonar data for surveys on OCS blocks where historic shipwrecks may exist.

F. If the area you plan to survey is located in water depths greater than 200 meters (656 feet), you may perform the archaeological resource survey at 300-meter linespacing. In these water depths, you may also forego collecting magnetometer data.

Archaeological Resource Reports

Prepare archaeological resource reports using the guidelines in Appendix No. 2 of this NTL. The MMS GOMR encourages you to combine archaeological resource reports (when required) with shallow hazards reports (see NTL No. 98-20, dated September 15, 1998), since these reports are similar. Submit archaeological resource reports under paragraph A below and any written requests under paragraphs C and D below to the appropriate MMS GOMR office (refer to paragraph B under the **Contacts and Mailing Addresses** section below for mailing addresses).

A. In order to minimize possible delays in the review of your EP, DOCD, or pipeline application by the MMS GOMR, you may submit an archaeological resource report to the MMS GOMR Plans Section (reports for leases and well sites) or the MMS GOMR Pipeline Section (reports for right-of-way pipelines) before you submit the related EP, DOCD, or pipeline application.

B. Whether you include the report with your EP, DOCD, or pipeline application or submit it separately in advance, provide an original report and two (2) identical copies. After March 15, 2002, you may prepare the report in digital format and submit three separate CD-ROMs (see Appendix No. 2, Sections I and II.D).

C. If you have been directed by the MMS GOMR to prepare an archaeological resource report, but you believe that preparation of a report is not feasible or cannot be accomplished, submit a written request to the MMS GOMR Social Sciences Unit to forego the report. In your request, include a discussion of your rationale and an "as-built" plat (drawn to a scale of 1 inch = 1000 feet) of the subject OCS block or pipeline route that depicts all existing facilities (including pipelines) and the location of the proposed seabed-disturbing activities. As appropriate, you may combine your request with a related request to waive or alter an archaeological resource survey described in the preceding section of this NTL.

D. If an archaeological resource report was prepared under former MMS GOMR guidelines for an OCS block that was leased previously, that report may still be acceptable for activities proposed in EPs, DOCDs, and lease-term pipeline applications submitted under a new lease on the same OCS block, particularly if the OCS block is exclusively in an area of high

probability for the occurrence of prehistoric archaeological resources (i.e., the 300-meter line spacing survey area). In this case, you may submit a written request to the MMS GOMR Social Sciences Unit that the MMS GOMR accept the archaeological resource report prepared for the expired or relinquished lease (in lieu of preparing a new report). In your request, include a clean copy of the previously prepared archaeological resource report. ***Make sure that you submit your request before you submit the related EP, DOCD, or lease-term pipeline application.*** As appropriate, you may combine your request with a related request to waive or alter an archaeological resource survey described in the preceding section of this NTL.

Reviewing Archaeological Resource Reports

After you submit an archaeological resource report, the MMS GOMR will

A. Determine whether the archaeological resource report is adequate and complete and evaluate your geophysical interpretations and archaeological conclusions. Personnel with archaeological, geophysical, and other appropriate expertise will conduct this review and evaluation.

B. If the archaeological report is not adequate or complete, notify you in writing of the problems and identify the data or information necessary to correct or complete the report.

C. After reviewing your archaeological resource report, notify you in writing of any mitigating measures or operational restrictions that the MMS GOMR may impose on future activities.

Paperwork Reduction Act of 1995 (PRA) Statement

This NTL provides clarification and guidance on information collection requirements associated with archaeological resource surveys and reports. In part, it discusses how you make requests to use alternative procedures or equipment or depart from archaeological resource survey or report requirements. Under the requirements of the PRA (44 U.S.C. Chapter 35), an agency may not collect information without the approval of the Office of Management and Budget (OMB). In connection with the 30 CFR 250, subpart A, information collection regulatory requirements, the MMS has initiated the process to obtain such OMB approval for these requests by publishing a notice in the Federal Register (November 26, 2001, 66 FR 59024). In the meantime, you may submit the requests described in this NTL to the MMS GOMR on a voluntary basis.

The PRA also requires us to inform you that we will use the information submitted to evaluate your requests concerning archaeological resource surveys and reports. Without the information, we would be unable to make informed decisions, and you would not be able to use alternative procedures or equipment or to depart from archaeological resource survey or report requirements. We will protect all proprietary information submitted according to the Freedom of Information Act and 30 CFR 250.196. Responses will be mandatory. Public reporting burden for these requests is estimated to average approximately 1 hour for each response. Direct comments regarding the burden estimate or any other aspect of this information collection to the Information Collection Clearance Officer, Mail Stop 4230, Minerals Management Service, 1849 C Street, N. W., Washington, DC 20240.

This NTL also refers to the submission of EPs, DOCDs, and pipeline applications. The OMB has approved the information collection requirements for those submissions under 30 CFR 250, subpart B (1010-0049) and subpart J (1010-0050) regulatory information collections. You are advised that an agency may not conduct or sponsor, and you are not required to respond to, a collection of information unless it displays a currently valid OMB control number.

Contacts and Mailing Addresses

A. Contacts

The following chart provides contact names, telephone numbers, and e-mail addresses if you have any questions on archaeological resource surveys or reports.

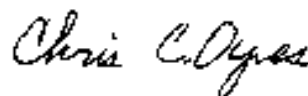
For...	Contact...	At...	Or at...
Archaeological resource reports in EPs and DOCDs	Mr. Nick Wetzel	(504) 736-2419	Nick.Wetzel@mms.gov
Archaeological resource reports in pipeline applications	Mr. Alex Alvarado	(504) 736-2547	Alex.Alvarado@mms.gov
Conducting archaeological resource surveys or preparing archaeological resource reports	Dr. Jack Irion, Dr. Rik Anuskiewicz, or Mr. David Ball	(504) 736-1742 (504) 736-2796 (504) 736-2859	Jack.Irion@mms.gov Rik.Anuskiewicz@mms.gov David.Ball@mms.gov

B. Mailing Addresses

The following provides the mailing addresses for the respective MMS GOMR offices where you submit archaeological resource reports and any requests regarding archaeological resource surveys or reports.

For...	Insert in (1) below	Insert in (2) below
MMS GOMR Plans Section	Field Operations	Plans Section (MS 5230)
MMS GOMR Pipeline Section	Field Operations	Pipeline Section (MS 5232)
MMS GOMR Social Sciences Unit	Leasing and Environment	Social Sciences Unit (5411)

U.S. Department of the Interior
 Minerals Management Service
 Gulf of Mexico OCS Region
 Office of _____ (1)
 Attention: _____ (2)
 1201 Elmwood Park Boulevard
 New Orleans, Louisiana 70123-2394



Chris C. Oynes
 Regional Director

APPENDIX NO. 1

GUIDELINES FOR ARCHAEOLOGICAL RESOURCE FIELD SURVEYS

I. Introduction

Perform your archaeological resource field surveys using the navigation systems, line-spacing patterns, and instrumentation described below.

II. Archaeological Resource Survey Navigation

Use a state-of-the-art navigation system that can continuously determine the surface position of the survey vessel. Ensure that the precision of the navigation system is ± 5 meters for surveys in water depths less than 200 meters (656 feet) and ± 15 meters for surveys in water depths 200 meters or greater. Log position fixes digitally at least every 12.5 meters (41 feet) along the vessel track and annotate them on all records at intervals no greater than 152 meters (500 feet). Show fixes on the final shot point chart at intervals no greater than 152 meters.

Use acoustic positioning of towed sensors for archaeological resource surveys conducted in water depths greater than 91 meters (300 feet) to facilitate sufficiently accurate mapping of any recorded contacts.

III. Archaeological Resource Survey Patterns

The MMS Internet website list will tell you whether to conduct the archaeological resource survey at a line spacing of no more than 50 meters (164 feet) or no more than 300 meters (984 feet). For OCS blocks that have a high probability for containing historic resources in water depths 200 meters or less, the survey line-spacing interval is no more than 50 meters. For OCS blocks that have a high probability for containing prehistoric archaeological resources, or historic resources in water depths greater than 200 meters (656 feet), the survey line-spacing interval is no more than 300 meters.

A. Lease Surveys

If it is likely that you will conduct multiple operations on a lease, it may be advantageous for you to conduct a lease survey. A lease survey covers the entire area of a lease, as well as any areas outside the lease that could be physically disturbed by your activities. The area of physical disturbances includes, but is not limited to, the area within which drilling vessel or work barge anchors may be placed, but does not include the area within which workboat anchors may be placed or the area within which similar minimal disturbances may occur. Depending upon the OCS block designation from the list on the MMS Internet website, run a lease survey along parallel primary lines spaced at a maximum of either 50 or 300 meters (164 or 984 feet) with cross-tie lines spaced at a maximum of 900 meters (2,953 feet). The MMS GOMR may direct you to use a tighter line spacing pattern in areas of known significant or potentially significant archaeological resources.

B. Single Drilling Site/Platform Surveys (Site Specific Surveys)

A site specific survey covers an area approximately 1,800 meters (5,906 feet) square centered upon a proposed drilling or platform site, as well as any areas outside this square that could be physically disturbed by your activities. The area of physical disturbances includes, but is not limited to, the area within which drilling vessel or work barge anchors may be placed, but does not include the area within which workboat anchors may be placed or the area within which similar minimal disturbances may occur. Depending upon the OCS block designation from the list on the MMS Internet website, run a lease survey along parallel primary lines spaced at a maximum of either 50 or 300 meters (164 or 984 feet), with three equidistant cross-tie lines. The MMS GOMR may direct you to use a tighter line spacing pattern in areas of known significant or potentially significant archaeological resources. You do not need to conduct a site-specific survey in any area that is sufficiently covered by a lease survey.

C. Right-of-way Pipeline Surveys

The survey pattern for all right-of-way pipelines consists of a line run along the proposed pipeline route (centerline), an offset parallel line on one side of the centerline (for 300-meter line spacing surveys only) located approximately 50 meters (152 feet) from the centerline, and a minimum of two additional offset parallel lines (on either side of the centerline) spaced at a maximum of 50 or 300 meters (164 or 984 feet), depending on the designation from the list on the MMS Internet website of the OCS blocks to be traversed by the pipeline. The number of offset parallel lines must be sufficient to provide coverage of the entire area that could be physically disturbed by your pipeline construction activities. The area of physical disturbances includes, but is not limited to, the area where pipeline lay barge anchors will be placed.

D. Lease-Term Pipeline Surveys

If a previously conducted lease or site-specific survey does not cover the route of a proposed lease term pipeline, conduct a survey that covers the route of the proposed pipeline. In this case, the survey pattern is the same as the one described for right-of-way pipelines in paragraph C above.

IV. Archaeological Resource Survey Data Acquisition Instrumentation

Make sure that geophysical instrumentation for your archaeological resource field surveys is representative of the state-of-the-art in technological development and is deployed in a manner that minimizes interference among the instrumentation systems. Interface all data recorders into the navigation system to ensure proper integration of information. Ensure that all instrumentation is adequately tuned and that all recorded data are readable, accurate, and properly annotated.

Use the following instrumentation to conduct an archaeological resource field survey:

A. Magnetometer

For all archaeological resource surveys you conduct in water depths less than 200 meters (656 feet), use a proton precession or cesium total field magnetometer to detect ferrous and other magnetically-susceptible metals. Tow the magnetometer sensor as near as possible (but no more than 6 meters (20 feet) above the seafloor) and in a way that minimizes interference from the vessel hull and the other survey instruments.

Attach a mechanical or digital depth sensor to the magnetometer sensor, and annotate each survey line with tow sensor depth and with start of the line (SOL) and end of the line (EOL) times. Ensure that magnetometer sensitivity is one gamma (γ) or one nanoTesla (nT) or less, and that the data sampling interval does not exceed one second. Ensure also that the background noise level does not exceed a total of 3 gammas peak to peak.

Record data on an analog strip recorder and on a digital medium in such a way that it can be linked to the positioning data. Make sure that the recording scales are set no higher than 1,000-gamma and 100-gamma full scale, respectively. Annotate shot points and recorder speed on the strip charts for each survey line. The MMS GOMR recommends that the strip chart recorder speed be approximately two inches per minute.

B. Dual Channel Sidescan Sonar

Use a towed, dual-channel, dual-frequency, sidescan sonar system to provide continuous planimetric images of the seafloor. For archaeological resource surveys run at a line spacing of 300 meters (984 feet), use a system that operates at no less than 100 kHz to provide sufficient resolution of seafloor conditions. For archaeological resource surveys run at a line spacing of 50 meters (164 feet), use a system that operates in the 300 to 500 kHz range.

Design the line spacing and display range to ensure 100 percent of the proposed survey area in the prime survey line direction is covered. Tow the sidescan sonar sensor above the seafloor at a distance that is 10 to 20 percent of the range of the instrument. As needed, run extra lines with the sidescan sonar operating at a frequency of 500 kHz or greater for detailed inspection of seafloor contacts. Ensure that the line spacing and display range you use are appropriate for the water depth. See Section V of this Appendix for suggested coverage areas.

Display the sidescan sonar data on a graphic recorder capable of adjusting the data for slant range effects and variable speed along line to give a true plan view of the seabed conditions as the survey progresses.

In addition, record the sidescan sonar data digitally. For pipeline surveys, image process and output the recorded data in mosaic form. Output such mosaics as a geo-referenced digital model of the seabed for use in interpretation and reporting.

C. Subbottom Profiler

Use a very high frequency sub-bottom acoustic profiler operating within the 1.5 to 4.5 kHz bandwidth to provide continuous and very high resolution information of near surface geological features within the uppermost 15 meters (50 feet) of sediment. Run the subbottom profiler system to provide penetration that exceeds the depth of disturbance (i.e., the equivalent to one-and-a-half times the spud can diameter for a jack-up rig, the maximum expected anchor penetration for an anchored rig or work barge, or the depth of a pipeline burial trench).

Make sure that the subbottom profiler system is capable of achieving a resolution of vertical bed separation of at least one foot in the uppermost 15 meters (50 feet) below mud-line.

Record the data digitally to allow signal processing to improve data quality further and allow export to a workstation for integrated interpretation and mapping of the data.

D. Depth Sounder.

Use a hull mounted, high-frequency, narrow beam hydrographic echo sounder to obtain bathymetric data. Display the data on a graphic recorder and log it digitally and continuously. Set up the depth sounder system to record with a sweep appropriate to the range of water depths expected in the survey area. Use a heave compensator in conjunction with the system to remove the effects of vessel movement from the data.

Calibrate water column sound velocity at the start and end of the survey by using a conductivity temperature depth (CTD) sensor or velocity probe capable of recording in the maximum water depth expected in the survey area.

E. Additional Investigations.

Under certain conditions, you may want to use, or the MMS GOMR may direct you to use, additional instrumentation and methods such as underwater television; still, video, or movie cameras; divers; remote or manned submersibles; coring; and additional survey lines.

V. Suggested Sidescan Sonar Coverage Areas

Height Above Seafloor	Range at 10% of Fish Altitude	Range at 20% of Fish Altitude
5 meters	50 meters/channel	25 meters/channel
10 meters	100 meters/channel	50 meters/channel
15 meters	150 meters/channel	75 meters/channel
20 meters	200 meters/channel	100 meters/channel

APPENDIX NO. 2

GUIDELINES FOR ARCHAEOLOGICAL RESOURCE REPORTS

I. Introduction

Include an evaluation and synthesis of the data you gathered during the archaeological resource survey in an archaeological resource report prepared, signed, and dated by an archaeologist and a geophysicist. Ensure that these professional personnel have the credentials and experience sufficient to qualify them to perform the necessary work. As needed, specialists in other fields may participate in data analysis and report preparation.

If you submit your report on CD-ROMs, ensure that they are in portable document format (PDF) and that you prepare all survey maps addressed in paragraph II.D below as DWG files oriented to the coordinate system appropriate to the area (e.g., Texas South Central, Louisiana South) under MMS standards.

II. Contents of Archaeological Resource Reports

Include the following information in the archaeological resource report:

- A. A description of the area that you surveyed including lease number(s), block numbers(s), OCS lease area(s), and water depths.
- B. A list of the individuals involved in survey planning, fieldwork, and report preparation, that includes a description of their duties.
- C. A discussion of the archaeological resource field survey including the following:
 1. A brief description of the navigation system including a statement of its estimated accuracy for the area you surveyed.
 2. A brief description of survey instrumentation including scale, sensitivity settings, sampling rates, and tow depths, as appropriate.
 3. A description of the survey vessel, including its size, sensor configuration and instrument set-backs, and navigation antennae locations.
 4. Vessel speed and course changes.
 5. Sea state and weather conditions.
 6. A copy of the *original* daily survey operations log.
 7. A description of survey procedures including a statement of survey and record quality, a comparison of survey line crossings, and discussion of any problems that may affect the ability of the report preparers to determine the potential for archaeological resources in the survey area.
 8. An explanation of the problem(s) if you were unable to meet the survey line spacing or instrumentation guidelines in Appendix No. 1 of this NTL.
- D. A navigation postplot map of the survey area at a scale of 1:12,000 showing survey lines, shot points at 152-meter (500-foot) intervals, line direction in the grid projection in which the lease is described (e.g., UTM, Lambert, or geographic coordinates) with tics placed every five inches thereon, and with geodetic graticules every 60 seconds. Orient this map, or separate maps at the same scale that also show

survey lines, shot points, and line direction, to true north and delineate the following, as appropriate:

1. The horizontal and vertical extent of all relict geomorphic features having potential for associated prehistoric sites. Such areas include, but are not limited to, tidal estuaries, embayments, barrier islands, beach ridge sequences, spits, alluvial terraces, and stream channels. When relict fluvial systems are recorded, make sure that the map:
 - a. differentiates between generations of channeling when more than one generation is present;
 - b. shows any internal channel features such as point bar deposits and terraces;
 - c. delineates any channel margin features such as natural levee ridges; and
 - d. indicates all depths of channel banks and channel axes (thalwegs).

Note: An isopach map of channel fill sediments is often the most efficient means of conveying the above information, but this method alone will not allow differentiation between more than one generation of channeling.
2. Bathymetry.
3. All magnetic anomalies and seafloor sidescan sonar contacts of unknown source (for magnetic anomalies use map symbol: σ ; for sidescan sonar contacts use map symbol: \boxtimes). Identify these magnetic anomalies and sidescan sonar contacts using only the aforementioned symbols and a unique number that is keyed to the listings in the unidentified magnetic anomaly and sidescan sonar tables in the text (see paragraph F below). In congested areas with numerous unidentified magnetic anomalies, you may use a map(s) at a scale of 1:6,000 to depict the anomalies. If you do, tie this congested area map(s) into the 1:12,000 survey area map. ***Plot all recommended avoidance areas on the survey area map.***
4. Sites of proposed oil and gas operations (e.g., well locations, platform sites, and/or pipelines), when available at the time of report preparation.
5. Sites of former oil and gas operations (e.g., abandoned well locations, platform sites, and/or pipelines).

Note: If you submit the report on CD-ROM, layer the DWG map information as follows:

- a. Layer 1 - Shot point locations and numbers and survey line numbers
- b. Layer 2 - Bathymetry, water depth values, and depth contours
- c. Layer 3 - Manmade features such as magnetic anomalies (magnitude, duration, and polarity), sidescan sonar targets, and identified shipwrecks, and pipelines, cables, and umbilicals
- d. Layer 4 - Relict geomorphic features

E. An analysis of the potential for prehistoric sites within the survey area that includes:

1. A review of current literature on late Pleistocene and Holocene geology, paleogeography, and sea level change in the area; marine and coastal prehistory; and previous archaeological resource reports in the area, if available. You may obtain a list of suggested references from the MMS Internet website at:
<http://www.gomr.mms.gov/homepg/regulate/envIRON/archaeological/introduction.html>
2. A discussion of relict geomorphic features and their archaeological potential to include the type, age, and association of the mapped features; the acoustic

characteristics of channels and their fill material; evidence for preservation or erosion of channel margins; evidence for more than one generation of fluvial downcutting; and the sea level curves you used in the assessment.

3. A discussion, based on the capabilities of current technology in relation to the thickness and composition of sediments overlying the area of a potential site, of the potential for identification and evaluation of buried prehistoric sites.
- F. A current review of existing records for reported shipwreck locations in the survey area and adjacent areas, and the following, as appropriate:
1. A table of the unidentified magnetic anomalies with the lease block and survey line location (corrected for sensor offset); gamma intensity; lateral extent (duration); whether the anomaly is characterized by a dipolar, monopolar, or complex signature; the magnetometer sensor tow depth; the X-Y coordinates of the center of each unidentified anomaly; and the recommended avoidance zone. A suggested format for this unidentified magnetic anomaly table is included in Section III of this Appendix;
 2. A table of sidescan sonar contacts with the lease block and survey line location (corrected for sensor offset), size, shape, height of protrusion above the seafloor, the X-Y coordinates, and recommended avoidance distance of each. A suggested format for this unidentified sidescan sonar contact table is included in the Section III of this Appendix;
 3. A discussion of any magnetic anomalies and sidescan sonar contacts of unknown source in terms of their potential as historic shipwrecks;
 4. A discussion of any correlation between magnetic anomalies or sidescan sonar contacts and known or probable sources;
 5. A discussion of the potential for shipwreck preservation in terms of bottom sediment type and thickness, and the effects of past and present marine processes in the survey area; and
 6. A discussion of the potential for identification and evaluation of potential shipwrecks considering the capabilities of current technology in relation to the water depth, probable thickness and composition of sediments overlying the potential shipwreck location, and the preservation potential.
- G. Representative data samples from each survey instrument to demonstrate the quality of the records. If appropriate, include the following data samples, which you may use in lieu of the representative data samples:
1. A sample of subbottom profiler data for *each type of relict landform* that you identify. When more than one generation of fluvial channeling is evident, include a sample that depicts each generation. Make sure that each sample is readable and include horizontal and vertical scales. If you want to provide any interpretive highlighting or annotation of the sample data, do so on either a separate overlay or a copy of the sample data. Do not highlight original survey data.
 2. Copies of all sidescan sonar data where contacts representing unidentified objects are recorded. Make sure that the copies are readable and include the scale. If you want to provide any interpretive highlighting or annotation of the sample sidescan sonar data, do so on either a separate overlay or a copy of the sample data. Do not highlight original survey data. For pipeline surveys, include a digital copy of the computer-generated mosaics as a geo-referenced Tagged Image Format (TIF) file.

3. Magnetometer data as follows:
 - a. For lease surveys and site-specific surveys, a clear copy of three complete lines of magnetometer data for each lease block. Make sure that two of these survey lines are primary lines and the other is a cross-tie line. Further, make sure that the primary survey lines are adjacent lines and run in two different cardinal directions (e.g., one survey line heading north and the other heading south). Whenever possible, include survey lines that record unidentified magnetic anomalies.
 - b. For pipeline surveys (i.e., lease term or right-of-way) that are three miles or longer in length, a clear copy of approximately one-quarter (25%) of the magnetometer data (analog strip chart) for the centerline of the survey. When selecting these data, make sure to include samples of any recorded unidentified magnetic anomalies. For pipeline surveys less than three miles in length, include a copy of all of the magnetometer data for the centerline. You may reduce these data for report reproduction. Ensure that data quality is sufficient to depict clearly both the 1,000-gamma and 100-gamma scale traces of the analog strip chart recorder.

- H. A summary of conclusions and recommendations supported by the archaeological resource field survey data and archaeological analyses including:
 1. A discussion of known or potential archaeological resources; and
 2. Recommendations for avoidance or for further archaeological investigations.

- I. A discussion of the data and results from any additional investigations (see Appendix No. 1, Section IV.E) that the MMS GOMR may have directed you to conduct.

III. Listing Unidentified Magnetic Anomalies and Sidescan Sonar Contacts

The following are suggested tables, including sample information, for listing unidentified magnetic anomalies and sidescan sonar contacts in archaeological resource reports.

A. Magnetic Anomalies

Anomaly Number	Area/Block	Line No.	Shot Pt.	Tow Height (feet)	Signature	Intensity (gammas)	Duration (feet)	Coord. System	Coordinates	Minimum Avoidance Dist. (feet)
1	MP 100	0020	11.4	20	Dipole	15	75	Louisiana South	X = 2770000 Y = 361000	50

B. Sidescan Sonar Contacts

Anomaly Number	Area/Block	Magnetometer Association	Dimensions LxWxH (ft)	Shape	Coord. System	Coordinates	Minimum Avoidance Dist. (feet)
1	MP 100	Line 0020 Shot Point 11.4	100 x 50 x 5	Linear	Louisiana South	X = 2770000 Y = 361000	50