

**UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT
GULF OF MEXICO REGIONAL OFFICE**

BOEM NTL No. 2005-G07

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NOTICE TO LESSEES AND OPERATORS OF FEDERAL OIL
AND GAS, AND SULPHUR LEASES IN THE GULF OF MEXICO
OUTER CONTINENTAL SHELF (OCS)

Archaeological Resource Reports and Surveys

Authority

The Outer Continental Shelf Lands Act (OCSLA) includes provisions addressing properties that are historically or archaeologically significant and authorizes the Secretary of the Interior to issue a permit for geological explorations only if the Secretary determines, in accordance with regulations issued by the Secretary, that such explorations will not disturb any site, structure, or object of historical or archaeological significance (43 U.S.C. 1340(g)). The Bureau of Ocean Energy Management (BOEM) has issued regulations addressing OCSLA requirements for these properties at 30 CFR 550.194.

The BOEM regulations are complemented by requirements of the National Historic Preservation Act of 1966 (NHPA), as amended (54 U.S.C. 304101), and regulations issued under the NHPA by the Advisory Council on Historic Preservation (Council or ACHP), particularly those implementing 54 U.S.C. 306108 (Section 106 of the NHPA). Section 106 of the NHPA requires BOEM to take into account the effect of its actions on any historic property and afford the Council a reasonable opportunity to comment.

Purpose

BOEM is reissuing this Notice to Lessees and Operators (NTL) to comply with Executive Order (E.O.) 13891 of October 9, 2019, *Promoting the Rule of Law Through Improved Agency Guidance Documents*; and the Office of Management and Budget (OMB) Memorandum, M-20-02, implementing the E.O.; and to better track the requirements of 550.194. This reissued NTL rescinds NTL No. 2011-JOINT-G01, including the Appendix, which advised you to refer to a list of specified OCS lease blocks in determining whether an archaeological resource report or survey should be submitted with your Exploration Plan (EP), Development Operations Coordination Document (DOCD), or Development and Production Plan (DPP).

This NTL is intended to clarify when the Regional Director may require you to submit an archaeological resource report pursuant to 550.194 and provides recommendations on how you should prepare such a report if required to do so by the Regional Director.

Pursuant to 550.194, an archaeological report may be required for lease areas when the Regional Director has “reason to believe that an archaeological resource may exist” 30 CFR 550.194(a). The Preamble to the regulation states that “‘reason to believe’ is established by a technical analysis of *existing* archaeological, geological, and other pertinent environmental data.” See 71 Fed. Reg. 23858 (Apr. 25, 2006) (emphasis added). If the archaeological report suggests that an archaeological resource may be present, you must either locate the site of any operation so as not to adversely affect the area where the archaeological resources may be (550.194(a)(1)), or conduct further archaeological investigation to establish to the satisfaction of the Regional Director that an archaeological resource does not exist or will not be adversely affected by the operations (550.194(a)(2)).

You should be aware that an archaeological survey is typically needed to meet the requirements of the second option.

This NTL also provides guidance on the BOEM regulations regarding archaeological resources you discover while conducting operations in the area of your lease. It clarifies when you must halt operations and report discoveries to BOEM, states that you are responsible for conducting discovery investigations and assessments, and reminds you of the penalties that could be assessed for non-compliance.

Background Regarding 550.194

BOEM’s procedure for protecting archaeological resources is set out in 550.194, *How must I protect archaeological resources?* That section provides:

- a) If the Regional Director has reason to believe that an archaeological resource may exist in the lease area, the Regional Director will require in writing that your EP, DOCD, or DPP be accompanied by an archaeological report. If the archaeological report suggests that an archaeological resource may be present, you must either:
 - 1) Locate the site of any operation so as not to adversely affect the area where the archaeological resource may be; or
 - 2) Establish to the satisfaction of the Regional Director that an archaeological resource does not exist or will not be adversely affected by operations. This requires further archaeological investigation, conducted by an archaeologist and a geophysicist, using survey equipment and techniques the Regional Director considers appropriate. You must submit the investigation report to the Regional Director for review.
- b) If the Regional Director determines that an archaeological resource is likely to be present in the lease area and may be adversely affected by operations, the Regional Director will notify you immediately. You must not take any action that may adversely affect the archaeological resource until the Regional Director has told you how to protect the resource.

- c) If you discover any archaeological resource while conducting operations in the lease or right-of-way area, you must immediately halt operations within the area of the discovery and report the discovery to the BOEM Regional Director. If investigations determine that the resource is significant, the Regional Director will tell you how to protect it.

Archaeological resources are defined in BOEM regulations as any material remains of human life or activities that are at least 50 years of age and that are of archaeological interest (30 CFR 550.105). These resources also generally meet the definition of “historic properties” in the ACHP regulations (36 CFR 800.16(1)(1)).

Studies conducted on behalf of BOEM and its predecessor agencies in 1977, 1989, 2003, 2006, 2008, 2011 and 2014 provide information on the types and extent of archaeological resources that are likely to be present on the OCS in the Gulf of Mexico.¹ These resources may be of two types: (1) drowned terrestrial prehistoric sites dating to the Late Pleistocene and Early Holocene epochs when sea levels were substantially lower than today; and (2) historic sites such as shipwrecks or lighthouses. BOEM uses the results of these studies, in addition to existing survey data, and other information, to determine which OCS areas may have archaeological resources that could be affected by proposed operations and to provide the Regional Director with a basis for requiring an archaeological report, based on the “reason to believe” standard set forth in BOEM’s regulation, 550.194(a).

The ACHP regulations, at 36 CFR 800.4(a)(1)-(4), require BOEM to determine the area of potential effects and then: 1) Review existing information on historic properties; 2) Seek information from parties likely to have knowledge about historic properties in the area; and, 3) Gather information from appropriate Indian tribes and Native Hawaiian organizations. The ACHP regulations define the “area of potential effects” to mean the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. (36 CFR 800.16(d)).

Once the area of potential effects has been determined, the ACHP regulations provide that the agency (BOEM) take the steps necessary to identify historic properties within the area. The regulations require *a reasonable and good faith effort* to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Agencies are also required to take into account past planning, research and studies, the magnitude and nature of the undertaking and the degree of Federal involvement, the nature and extent of potential effects on historic properties, and the likely nature and location of historic properties within the area of potential effects. The agency official (BOEM Regional Director) is also expected to consider other applicable professional, State, tribal and local laws, standards and guidelines. (36 CFR 800.4(b)). The ACHP regulation at 36 CFR 800.5(a)(1) states that adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. The Secretary’s Standards and Guidelines for Identification, developed by the

¹ <https://marinecadastre.gov/espis/#/search/txt=archaeology&geo=>

National Park Service in 1983, provide guidance on identification of historic properties. (48 Fed. Reg. 44,716-42).

BOEM Notification

If the Regional Director has reason to believe that an archaeological resource may exist in the area of your lease in consideration of the provisions for historic property identification based on a review of available information, such as the results of the operator's shallow hazards survey required under 30 CFR 550.214(e), archival reviews, studies, or other information, the Regional Director, will require, in writing, that you submit an archaeological resource report with your EP, DOCD, or DPP application. See 30 CFR 550.194(a). The archaeological report is expected to contain sufficient information to enable the Regional Director to evaluate whether an archaeological resource may be present. If the archaeological report suggests that an archaeological resource may be present, you must either locate the site of any operation so as not to adversely affect the area where the archaeological resources may be (550.194(a)(1)), or conduct further archaeological investigation to establish to the satisfaction of the Regional Director that an archaeological resource does not exist or will not be adversely affected by the operations (550.194(a)(2)), which typically will require a field survey.

Archaeological Resource Reports

BOEM recommends that you prepare archaeological resource reports in accordance with the guidelines in **Appendix No. 1** (Reports) of this NTL. Conducting a combined geohazards and archaeological field survey before submitting a report may expedite review of your EP, DOCD, or DPP by reducing requests under 30 CFR 550.194(a)(2) for additional information later. Such survey, if you choose to conduct one, may be combined with your shallow hazards survey. You are encouraged to submit archaeological resource reports (when required) with shallow hazards reports (see NTL No. 2008-G05, Shallow Hazards Program, effective May 1, 2008, at <https://www.boem.gov/sites/default/files/regulations/Notices-To-Lessees/2008/08-g05.pdf>) since these reports are similar.

You should submit archaeological resource reports with your EP, DOCD, or DPP (or before you submit a plan pursuant to paragraph A below) and any written requests under paragraphs B and C below, to the appropriate BOEM office. Refer to 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 DPP, you may submit an archaeological resource report or a lease survey or a site-specific survey before you submit the related EP, DOCD, or DPP.
- B. When you submit your archaeological resource report, you should provide an original hard copy report and two (2) identical copies. In lieu of submitting a hard copy report, you may prepare the report in digital format and submit three (3) separate CD-ROMs. If you are submitting your archaeological resource report with your shallow hazard survey report, please refer to NTL 2008-G05 (or successor) for guidance on submittals. Submission of

digital copies of reports and maps may expedite the review of your EP, DOCD, or DPP.

- C. If you have been directed by BOEM to prepare an archaeological resource report, but you believe that preparation of a report is not feasible or cannot be accomplished, you should submit a written request to the BOEM Social Sciences Unit (BOEM SSU) to forgo the report. In your request, please include a discussion of your rationale and an “as-built” plat (drawn to a scale of 1 inch = 1,000 feet) of the subject OCS block that depicts all existing facilities (including pipelines) and the location of the proposed seafloor-disturbing activities. As appropriate, you may combine your request with a related request to waive or alter an archaeological resource survey, as described below under paragraphs A, B, C or D of the Archaeological Resource Surveys section.

After you submit an archaeological resource report, BOEM will determine whether the archaeological resource report is complete and adequate for evaluating your geophysical interpretations and archaeological conclusions. If the archaeological report is not complete and adequate for evaluation, BOEM will notify you in writing of the problems and identify the data or information necessary to correct or complete the report.

After reviewing your archaeological report, BOEM will notify you if BOEM’s review of your report indicates a seafloor feature that may be an archaeological resource within the immediate area of any proposed operations.

If BOEM provides such notification, you can either:

- A. Avoid the feature by a minimum distance specified by BOEM; or
- B. Establish, on the basis of further investigation conducted under the direction of a professional archaeologist and using such equipment and techniques the BOEM SSU deems appropriate, that an archaeological resource does not exist or that your operations will not adversely affect the potential archaeological resource. If you choose to investigate the feature, contact the BOEM SSU at least two (2) weeks before you plan to commence the field investigations. BOEM recommends, but does not require, the following guidance on conducting these investigations:
1. Diver Evaluation Of Unidentified Magnetic Anomalies And/or Side-Scan Sonar Targets: Search And Methodological Requirements, which can be found at: <https://www.boem.gov/environment/diver-evaluation-unidentified-magnetic-anomalies-and-or-side-scan-sonar-targets-search>; and
 2. Remotely Operated Vehicle (ROV) Investigations of Unidentified Magnetic Anomalies and/or Sidescan Sonar Targets: Methodological Guidelines, which can be found at: https://www.boem.gov/sites/default/files/environmental-stewardship/Archaeology/ROV_2015_10.pdf.

Archaeological Resource Surveys

You are encouraged to consider using the pattern and data acquisition instrumentation guidelines in **Appendix No. 2** of this NTL if you choose to submit an archaeological resource survey with your archaeological resource report under 550.194(a), or if you choose to conduct further investigations under 550.194(a)(2) to demonstrate that the archaeological resource does not exist or will not be adversely affected by your operations. Since archaeological resource surveys are often similar to other required remote-sensing surveys (e.g., shallow hazards surveys and live-bottom surveys), BOEM encourages you to conduct these surveys concurrently. You should submit information under paragraphs A and B below to the appropriate BOEM office and refer to the **Contacts and Mailing Addresses** section below for mailing addresses.

- A. If you choose to conduct further investigations under 550.194(a)(2) but believe, based on existing survey data (including data collected for an OCS block when it was previously leased) or other available information, that you have sufficient information without conducting an archaeological resource survey, you should write to the BOEM Plans Section (for lease or site-specific surveys) describing how you intend to use existing survey data in lieu of conducting a new archaeological resource survey, and include your rationale and a copy of any existing archaeological resource reports. BOEM will notify you whether the existing information is sufficient for you to be excused from conducting an archaeological resource survey.
- B. If you choose to conduct further investigations under 550.194(a)(2), but believe that previous seafloor disturbances in the area would severely hinder your ability to gather useful information, you should contact the BOEM SSU and explain why a field survey is unwarranted. You should include your rationale and an “as-built” plat of your lease that depicts all existing facilities and pipelines and the location(s) of the proposed seafloor-disturbing activities. You should also include a statement, prepared and signed by a professional archaeologist (as defined in 36 CFR part 61), that supports your position. BOEM will notify you if you are excused from conducting the further investigations/field survey.
- C. If you intend to use a survey pattern or survey acquisition data instrumentation different from that specified in **Appendix No. 2** of this NTL, please inform the BOEM SSU of your plans at least two (2) weeks before you commence the archaeological resource survey. Please note that BOEM discourages the use of 3-D seismic information as a substitute for high-resolution sidescan sonar data for archaeological surveys and the Regional Director is unlikely to approve its use if a survey is conducted.

If, upon review of the results of your further investigation, the Regional Director determines that an archaeological resource is likely to be present in the area proposed for operations, and may be adversely affected by operations, BOEM will notify you in writing of any mitigating measures or operational restrictions that BOEM will impose on your activities.

Required Notification and Suspension of Operations After Discovery of Shipwrecks or Other Archaeological Resources on the Seafloor - Lease area surveys (30 CFR 550.194(c))

If you discover man-made debris that appears to indicate the presence of an archaeological resource (e.g., a sonar image or visual confirmation of an iron, steel, or wooden shipwreck hull, wooden timbers, anchors, concentrations of man-made objects such as bottles or ceramics, piles of ballast rock or other cultural materials such as aircraft wreckage) within or adjacent to your lease area during your shallow hazard survey, diver inspection, or remotely operated vehicle (ROV) inspection, you must immediately halt operations, take steps to ensure that the site is not disturbed in any way, and notify the BOEM contacts listed below, within 48 hours of its discovery. You must cease all operations within 1,000 feet (305 meters) of the site until the Regional Director determines if the resource is significant and instructs you on what steps you must take to assess the potential historic significance of the site and what steps you must take to protect it. *NOTE ALSO: Under section 110 of the National Historic Preservation Act (54 U.S.C. §306109), BOEM may charge Federal permittees for costs related to historic preservation activities.*

Penalties

Failure to comply with regulations with respect to archaeological resources can result in civil penalties under BOEM's regulations at 30 CFR 550.1404. In addition, Section 110(k) of the National Historic Preservation Act (54 U.S.C. 306113) prohibits a Federal agency from granting a loan, loan guarantee, permit, license, or other assistance to an applicant who, with the intent to avoid the requirements of Section 106 of the Act, has intentionally, significantly, and adversely affected a historic property to which the grant would relate. It likewise prohibits such assistance to an applicant who, having legal power to prevent it, has allowed such adverse effect to occur, unless the agency, after consultation with the Council, determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant (see 36 CFR 800.9(c)(1)).

Guidance Document Statement

BOEM issues NTLs as guidance documents in accordance with 30 CFR 550.103 to clarify and provide more detail about certain BOEM regulatory requirements and to outline the recommended information to be provided in various submittals. Under that authority, this NTL sets forth policy on and interpretation of statutory, regulatory, lease, contractual, or plan approval provisions to provide a clear and consistent approach for complying with those provisions. If you wish to use an alternate method for compliance, you are encouraged to get feedback from BOEM staff on the adequacy of your proposal to comply with the regulation. Except to the extent that provisions of this NTL derive from requirements established by statute, regulation or by a provision in the lease, they do not have the force and effect of law and are not meant to bind the public in any way. This NTL is intended only to provide clarity to the public regarding existing requirements under the law.

While this NTL includes recommendations and guidance, the recommendation and guidance provisions may be made mandatory through a lease stipulation or condition of approval from

BOEM. If you are issued a plan, permit or other authorization from BOEM with a condition of approval, or a lease with a stipulation, requiring compliance with this NTL or identified portions thereof, you must implement those portions or all aspects of the NTL, if particular aspects are not singled out in the stipulation or condition of approval. Under such circumstances, you must implement and comply with the NTL (or identified portions thereof) regardless of whether the terms within the NTL would otherwise be a recommendation or request (e.g., use of the term “should” in the NTL will be considered “must” if required by the lease stipulation or condition of approval).

Paperwork Reduction Act of 1995 (PRA) Statement

This NTL provides clarification, description, and interpretation of requirements contained in 30 CFR part 550, subpart A. An agency may not conduct or sponsor a collection of information unless it displays a currently valid OMB Control Number. OMB has approved the information collection requirements in these regulations under OMB Control No. 1010-0114. This NTL does not impose additional information collection requirements subject to the Paperwork Reduction Act of 1995.

Contacts and Mailing Addresses

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, DOCDs, or DPPs	Mr. Doug Jones (BOEM)	Douglas.Jones@boem.gov (504) 736-2859	Archaeology@boem.gov
Conducting archaeological resource surveys or preparing archaeological resource reports	Mr. Doug Jones (BOEM)	Douglas.Jones@boem.gov (504) 736-2859	Archaeology@boem.gov
Notification of the discovery of a shipwreck	Mr. Doug Jones (BOEM)	Douglas.Jones@boem.gov (504) 736-2859	Archaeology@boem.gov

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

For:	Contact:	Attention:
BOEM Plans Section	Office of Leasing and Plans	Plans Section (GM235D)
BOEM SSU	Office of the Environment	Social Sciences Unit (GM673E)

Bureau of Ocean Energy Management
 Gulf of Mexico Regional Office
 1201 Elmwood Park Blvd.
 New Orleans, LA 70123
 Office of _____
 Attention: _____

Michael A. Celata
 Regional Director, Gulf of Mexico Regional Office
 Bureau of Ocean Energy Management
 Department of Interior Regions 1, 2, 4 and 6

[Appendices](#)

APPENDIX NO. 1

RECOMMENDATIONS FOR ARCHAEOLOGICAL RESOURCE REPORTS

I. Introduction

Your archaeological resource report should provide sufficient information for the Regional Director to make a determination whether archaeological resources may be present in the area of your lease in accordance with 550.194(a). You should include an evaluation and synthesis of the data you gathered, including information from a geohazard/archaeological resource survey if conducted, in an archaeological resource report prepared, signed, and dated by an archaeologist and a geophysicist. These professional personnel must have the credentials and experience sufficient to qualify them to perform the necessary work (qualifications for professional archaeologists can be found at 36 CFR part 61). As needed, specialists in other fields may participate in data analysis and report preparation.

If your archaeological assessment is submitted with your shallow hazards report, include this assessment as a separate appendix. If you submit your report on CD-ROMs, they should be in a separate portable document format (PDF) file. You should also prepare a digital copy of all survey maps addressed in paragraph II.D of this Appendix as DWG files oriented to the North American Datum of 1927 (NAD 27) coordinate system.

II. Recommended Contents of Archaeological Resource Reports

If you conducted an archaeological resource survey, BOEM recommends including 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 minimum and maximum water depths for each lease block covered in the report. In order to minimize possible delays in the review of your EP, DOCD, or DPP by BOEM, you may submit an archaeological resource report for a lease survey or a site-specific survey before you submit the related EP, DOCD, or DPP.
- B. A list of the individuals involved in survey planning, fieldwork, and report preparation, and 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 heights off seafloor, as appropriate for each instrument.
 3. A description of the survey vessel, including its size, sensor configuration, 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, including sensor height off seafloor for the magnetometer and sidescan sonar for the beginning and end of each survey line.
 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. 2** 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. For each copy of the report, submit one hardcopy and two digital copies (one in PDF format and one DWG format) of this map. 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, the map should:
 - a. differentiate between generations of channeling when more than one generation is present;
 - b. show any internal channel features such as point bar deposits and terraces;
 - c. delineate any channel margin features such as natural levee ridges;
 - d. indicate all depths of channel banks and channel axes (thalwegs); and
 - e. delineate all areas recommended by your archaeologist for avoidance for potential archaeological resources.

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: ▲; for sidescan sonar contacts use map symbol: ☒). Identify these magnetic anomalies and sidescan sonar contacts using only the aforementioned symbols and a unique number 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. You should *plot all recommended potential archaeological 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).

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 BOEM Internet website at:
<https://www.boem.gov/environment/gulf-mexico-archaeological-information>.
2. A discussion of relict geomorphic features and their archaeological potential that includes 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 OCS block, shot point, 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 height off seafloor; the NAD 27 decimal degree 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, shot point, and survey line location (corrected for sensor offset); size; shape; height of protrusion above the seafloor; the NAD

27 decimal degree coordinates; and recommended avoidance distance of each. A suggested format for this unidentified sidescan sonar contact table is included in 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 (include an analysis of reported nearby wrecks and their potential association with these contacts on the basis of vessel size and anomaly characterization);
 4. A discussion of any correlation between magnetic anomalies or sidescan sonar contacts and known or probable sources;
 5. For any archaeological resources that can be positively identified from remote-sensing records, an analysis of their possible significance and recommendations for any further research or special precautions that may be necessary.
 6. 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
 7. 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 includes 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.

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. 2, Section IV.E) that you may have conducted.

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)	NAD 27 Coordinates (in decimal degrees)	Minimum Avoidance Dist. (feet)
1	MP 100	0020	11.4	20	Dipole	15	75		100

B. Sidescan Sonar Contacts

Anomaly Number	Area/Block	Magnetometer Association	Dimensions LxWxH (ft)	Shape	NAD 27 Coordinates (in decimal degrees)	Minimum Avoidance Dist. (feet)
1	MP 100	Mag. Anomaly 1, Line 0020, Shot Point 11.4	100 x 50 x 5	Linear		100

APPENDIX NO. 2

RECOMMENDATIONS FOR ARCHAEOLOGICAL RESOURCE FIELD SURVEYS

I. Introduction

BOEM recommends that the archaeological resource field surveys that you perform use the navigation systems, line-spacing patterns, and instrumentation described below. Archaeological resource surveys are generally intended to further characterize an archaeological resource that was identified in the geohazard survey. Operators may instead find it expedient to conduct the archaeological resource survey at the same time as the geohazard survey.

II. Archaeological Resource Survey Navigation

BOEM recommends that you use a state-of-the-art navigation system that can continuously determine the surface position of the survey vessel. The precision of the navigation system should be ± 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.

We recommend you 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 for Lease Surveys

The BOEM Regional Supervisor, Office of the Environment, will advise 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 in water depths 200 meters or less, the survey line-spacing interval should be no more than 50 meters. For OCS blocks in water depths greater than 200 meters (656 feet), the survey line-spacing interval should be no more than 300 meters.

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. A lease survey should be run along parallel primary lines spaced at a maximum of either 50 or 300 meters (164 or 984 feet) with crosstie lines spaced at a maximum of 900 meters (2,953 feet). BOEM may request that you use a tighter line spacing pattern in areas of known significant or potentially significant archaeological resources. An archaeological survey may only be necessary over a small portion of the block or an alternative survey methodology may be more effective. It is recommended that you contact the BOEM SSU for specific guidance on how to proceed.

IV. Archaeological Resource Survey Data Acquisition Instrumentation

Geophysical instrumentation for your archaeological resource field surveys should be representative of the state-of-the-art in technological development and be deployed in a manner that minimizes interference among the instrumentation systems. You should interface all data recorders into the navigation system to ensure proper integration of information. All instrumentation should be adequately tuned and all recorded data should be readable, accurate, and properly annotated. Poor quality data resulting from inadequate acquisition or processing technique is not acceptable and may result in a need to resurvey. BOEM recommends use of 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), BOEM recommends that you 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.

You should attach a depth sensor to the magnetometer sensor and annotate each survey line with tow sensor height off seafloor and with start of the line (SOL) and end of the line (EOL) times. Magnetometer sensitivity should be one gamma (γ) or one nanoTesla (nT) or less, and the data sampling interval should not exceed one (1) second. The background noise level should not exceed a total of 3 gammas peak to peak.

You should record data 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.

B. Dual Channel Sidescan Sonar

You should 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), you should 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), you should use a system that operates in the 300- to 500-kHz range.

You should design the line spacing and display range to cover 100 percent of the proposed survey area in the prime survey line direction. This may require running tighter survey transects than what is specified in this Appendix, Section III. 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. Line spacing and display range you use should be appropriate for the water depth. See Section V of this Appendix for suggested coverage areas.

BOEM recommends that you 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 seafloor conditions as the survey progresses.

You should 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.

C. Subbottom Profiler

BOEM recommends that you use a very high-frequency subbottom 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 of 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).

The subbottom profiler system should be capable of achieving a resolution of vertical bed separation of at least one (1) foot in the uppermost 15 meters (50 feet) below the mudline.

You should 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

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

You should 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

For archaeological surveys, BOEM generally will not accept the use of 3-D seismic data as a substitute for high-resolution sidescan sonar data. For EPs, DOCDs, or DPPs in deepwater lease blocks, autonomous underwater vehicle (AUV) or remotely operated vehicle (ROV) surveys may be appropriate. Contact the BOEM SSU if you wish to discuss other survey options.

Under certain conditions, you may want 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