

UNITED STATES GOVERNMENT  
MEMORANDUM

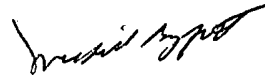
January 26, 2010

To: Public Information (MS 5030)  
From: Plan Coordinator, FO, Plans Section (MS  
5231)

Subject: Public Information copy of plan  
Control # - N-09481  
Type - Initial Exploration Plan  
Lease(s) - OCS-G33158 Block - 493 Mississippi Canyon Area  
Operator - Mariner Energy, Inc.  
Description - Subsea Wells A, B, and C  
Rig Type - SEMISUBMERSIBLE

Attached is a copy of the subject plan.

It has been deemed submitted as of this date and is under review for approval.



Michelle Griffitt  
Plan Coordinator

Site Type/Name	Botm Lse/Area/Blk	Surface Location	Surf Lse/Area/Blk
WELL/A	G33158/MC/493	5159 FNL, 2611 FEL	G33158/MC/493
WELL/B	G33158/MC/493	5434 FNL, 1060 FEL	G33158/MC/493
WELL/C	G33158/MC/493	5344 FNL, 941 FEL	G33158/MC/493

NOTED - SCHEXNAILDRF

Rec'd 1/26/10

1/12/010  
APPENDIX

N-998-1

COASTAL ZONE MANAGEMENT  
CONSISTENCY CERTIFICATION

INITIAL EXPLORATION PLAN

MISSISSIPPI CANYON BLOCK 493

OCS-G 33158

The proposed activities described in detail in this OCS Plan comply with Louisiana's approved Coastal Management Program and will be conducted in a manner consistent with such Program

Mariner Energy Inc.  
Lessee or Operator

  
Certifying Official

January 7, 2010  
Date

N-59F-1  
1/12/01

APPENDIX I

**OCS PLAN INFORMATION FORM (CONTINUED)**  
Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location					
Well or Structure Name/Number (If renaming well or structure, reference previous name): B					Subsea Completion
Anchor Radius (if applicable) in feet: 10,000					<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Lease No.	Surface Location			Bottom-Hole Location (For Wells)	
	OCS-G 33158			OCS-G 33158	
Area Name	Mississippi Canyon			Mississippi Canyon	
Block No.	493			493	
Blockline Departures (in feet)	N/S Departure: 5,434' FNL			N/S Departure:	
	E/W Departure: 1,060' FEL			E/W Departure:	
Lambert X-Y coordinates	X: 838,459.57			X:	
	Y: 10,338,086			Y:	
Latitude/ Longitude	Latitude: 28.464776110			Latitude:	
	Longitude: -89.4963860.38			Longitude:	
TVD (Feet): 10,500		MD (Feet): 10,500		Water Depth (Feet): 1,755	
<b>Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)</b>					
Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
<p><b>Paperwork Reduction Act of 1995 Statement:</b> The Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires us to inform you that MMS collects this information as part of an applicant's Exploration Plan or Development Operations Coordination Document submitted for MMS approval. We use the information to facilitate our review and data entry for OCS plans. We will protect proprietary data according to the Freedom of Information Act and 30 CFR 250.196. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget Control Number. The use of this form is voluntary. The public reporting burden for this form is included in the burden for preparing Exploration Plans and Development Operations Coordination Documents. We estimate that burden to average 580 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Mail Stop 4230, Minerals Management Service, 1849 C Street, N.W., Washington, DC 20240.</p>					

**MMS Form MMS-137 (July 2005 – Supersedes all previous editions of form MMS-137, which may not be used.)**

N-9481

**PUBLIC COPY**

January 7, 2010



**INITIAL EXPLORATION PLAN**

Lease Number: OCS-G 33158  
 Area/Block: Mississippi Canyon Block 493  
 Prospect Name: Covellite  
 Offshore: Louisiana

Submitted by: Mariner Energy, Inc.  
 2000 W. Sam Houston Parkway S.  
 Suite 2000  
 Houston, Texas 77042

Blaine Dinger  
 (713) 954-5588  
 bdinger@mariner-energy.com

Estimated start up date: March 15, 2009

Authorized Representative:  
 Cindy Bailey  
 J. Connor Consulting, Inc.  
 16225 Park Ten Place, Suite 700  
 Houston, Texas 77084  
 (281) 578-3388  
 cindy.bailey@jccteam.com

No. Copies Being Submitted:  
 Proprietary: 1 & CD  
 Public Info: 1 & CD

For MMS:  
 Plan No. N-9481  
 Assigned to: M. Griffith Evans

**MARINER ENERGY, INC.**  
**INITIAL EXPLORATION PLAN**  
**LEASE OCS-G 33158**  
**MISSISSIPPI CANYON BLOCK 493**

APPENDIX A	<i>Plan Contents</i>
APPENDIX B	<i>General Information</i>
APPENDIX C	<i>Geological, Geophysical Information</i>
APPENDIX D	<i>H2S Information</i>
APPENDIX E	<i>Biological, Physical and Socioeconomic Information</i>
APPENDIX F	<i>Wastes and Discharge Information</i>
APPENDIX G	<i>Air Emissions Information</i>
APPENDIX H	<i>Oil Spills Information</i>
APPENDIX I	<i>Environmental Monitoring Information</i>
APPENDIX J	<i>Lease Stipulations Information</i>
APPENDIX K	<i>Environmental Mitigation Measures Information</i>
APPENDIX L	<i>Support Vessels and Aircraft Information</i>
APPENDIX M	<i>Onshore Support Facilities Information</i>
APPENDIX N	<i>Coastal Zone Management Act (CZMA) Information</i>
APPENDIX O	<i>Environmental Impact Analysis</i>
APPENDIX P	<i>Administrative Information</i>

## APPENDIX A PLAN CONTENTS

### **(A) PLAN INFORMATION FORM**

Under this Initial Exploration Plan, Mariner Energy, Inc. (Mariner) proposed to drill, complete and potentially test three (3) well locations and install subsea wellheads/manifolds.

See attached OCS Plan Information Form – Form MMS-137, included as *Attachment A-1*.

### **(B) LOCATION**

Included as *Attachment A-2* is a Well Location Map depicting the proposed surface and bottom locations the proposed wells. Also included as *Attachment A-3* is a Bathymetry Map showing the water depths across the lease block. The maximum radius of the anchor spread of the associated drilling unit for each well location is included as *Attachments A-4, A-5 and A-6*.

### **(C) SAFETY AND POLLUTION PREVENTION FEATURES**

A description of the drilling unit is included on the OCS Plan Information Form. Rig specifications will be made part of each Application for Permit to Drill.

Safety features on the drilling unit will include well control, pollution prevention, and blowout prevention equipment as described in Title 30 CFR Part 250, Subparts C, D, E, and G; and as further clarified by MMS Notices to Lessees, and current policy making invoked by the MMS, Environmental Protection Agency and the U.S. Coast Guard. Appropriate life rafts, life jackets, ring buoys, etc., will be maintained on the facility at all times.

Pollution prevention measures include installation of curbs, gutters, drip pans, and drains on drilling deck areas to collect all contaminants and debris.

### **(D) STORAGE TANKS AND/OR PRODUCTION VESSELS**

All facility tanks of 25 barrels or more.

Type of Storage Tank	Type of Facility	Tank Capacity (bbls)	Number of Tanks	Total Capacity (bbls)	Fluid Gravity (API)
Fuel Oil (Marine Diesel)	Semi-Submersible	2481	1	2481	34°

### **(F) ADDITIONAL MEASURES**

Mariner does not propose additional safety, pollution prevention, or early spill detection measures beyond those required by 30 CFR 250.

### **(G) COST RECOVERY FEE**

Included as *Attachment A-7* is a payment receipt in the amount of \$10,327.00 for the cost recovery fees associated with this plan.

### OCS PLAN INFORMATION FORM

#### GENERAL INFORMATION

Type of OCS Plan:	X	Exploration Plan (EP)	Development Operations Coordination Document (DOCD)			
Company Name: Mariner Energy, Inc.			MMS Operator Number: 00818			
Address: 2000 W. Sam Houston Parkway South Suite 2000 Houston, Texas 77042			Contact Person: Cindy Bailey			
			Phone Number: (281) 578-3388			
			Email Address: cindy.bailey@jcccteam.com			
Leases: G33158	Area: Mississippi Canyon	Block: 493	Project Name (If Applicable): Covellite			
Objective(s):	<input type="checkbox"/> Oil	<input checked="" type="checkbox"/> Gas	<input type="checkbox"/> Sulphur	<input type="checkbox"/> Salt	Onshore Base: Fourchon	Distance to Closest Land (Miles): 32.7

#### Description of Proposed Activities (Mark all that apply)

<input checked="" type="checkbox"/> Exploration drilling	<input type="checkbox"/> Development drilling
<input checked="" type="checkbox"/> Well completion	<input type="checkbox"/> Installation of production platform
<input type="checkbox"/> Well test flaring (for more than 48 hours)	<input type="checkbox"/> Installation of production facilities
<input type="checkbox"/> Installation of caisson or platform as well protection structure	<input type="checkbox"/> Installation of satellite structure
<input checked="" type="checkbox"/> Installation of subsea wellheads and/or manifolds	<input type="checkbox"/> Commence production
<input type="checkbox"/> Installation of lease term pipelines	<input type="checkbox"/> Other (Specify and describe)

Have you submitted or do you plan to submit a Conservation Information Document to accompany this plan?		Yes	X	No
Do you propose to use new or unusual technology to conduct your activities?		Yes	X	No
Do you propose any facility that will serve as a host facility for deepwater subsea development?		Yes	X	No
Do you propose any activities that may disturb an MMS-designated high-probability archaeological area?		Yes	X	No
Have all of the surface locations of your proposed activities been previously reviewed and approved by MMS?		Yes	X	No

#### Tentative Schedule of Proposed Activities

Proposed Activity	Start Date	End Date	No. of Days
Drill, Complete and Test Well Location A and install subsea tree/manifold	03/15/10	05/14/10	60
Drill, Complete and Test Well Location B and install subsea tree/manifold	08/01/10	09/30/10	60
Drill, Complete and Test Well Location C and install subsea tree/manifold	01/15/11	03/16/11	60

Description of Drilling Rig		Description of Production Platform	
<input type="checkbox"/> Jackup	<input type="checkbox"/> Drillship	<input type="checkbox"/> Caisson	<input type="checkbox"/> Tension leg platform
<input type="checkbox"/> Gorilla Jackup	<input type="checkbox"/> Platform rig	<input type="checkbox"/> Well protector	<input type="checkbox"/> Compliant tower
<input checked="" type="checkbox"/> Semisubmersible	<input type="checkbox"/> Submersible	<input type="checkbox"/> Fixed platform	<input type="checkbox"/> Guyed tower
<input type="checkbox"/> DP Semisubmersible	<input type="checkbox"/> Other (Attach Description)	<input type="checkbox"/> Subsea manifold	<input type="checkbox"/> Floating production system
<input type="checkbox"/> Drilling Rig Name (If Known):		<input type="checkbox"/> Spar	<input type="checkbox"/> Other (Attach description)

#### Description of Lease Term Pipelines

From (Facility/Area/Block)	To (Facility/Area/Block)	Diameter (inches)	Length (Feet)

**OCS PLAN INFORMATION FORM (CONTINUED)**  
 Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location					
Well or Structure Name/Number (If renaming well or structure, reference previous name): A					Subsea Completion
Anchor Radius (if applicable) in feet: 10,000					<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	Surface Location			Bottom-Hole Location (For Wells)	
Lease No.	OCS-G 33158				
Area Name	Mississippi Canyon				
Block No.	493				
Blockline Departures (in feet)	N/S Departure: 5,158' FNL				
	E/W Departure: 2,611' FEL				
Lambert X-Y coordinates	X: 836,908.700'				
	Y: 10,338,3691.700'				
Latitude/ Longitude	Latitude: 28.465443363				
	Longitude: -89.501227727				
TVD (Feet):			MD (Feet):	Water Depth (Feet): 1805	
<b>Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)</b>					
Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
<p><b>Paperwork Reduction Act of 1995 Statement:</b> The Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires us to inform you that MMS collects this information as part of an applicant's Exploration Plan or Development Operations Coordination Document submitted for MMS approval. We use the information to facilitate our review and data entry for OCS plans. We will protect proprietary data according to the Freedom of Information Act and 30 CFR 250.196. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget Control Number. The use of this form is voluntary. The public reporting burden for this form is included in the burden for preparing Exploration Plans and Development Operations Coordination Documents. We estimate that burden to average 580 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Mail Stop 4230, Minerals Management Service, 1849 C Street, N.W., Washington, DC 20240.</p>					



**OCS PLAN INFORMATION FORM (CONTINUED)**  
 Include one copy of this page for each proposed well/structure

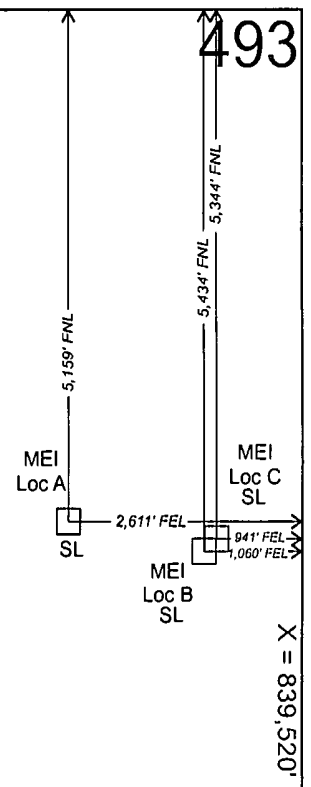
Proposed Well/Structure Location						
Well or Structure Name/Number (If renaming well or structure, reference previous name): B					Subsea Completion	
Anchor Radius (if applicable) in feet: 10,000					<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
	Surface Location			Bottom-Hole Location (For Wells)		
Lease No.	OCS-G 33158					
Area Name	Mississippi Canyon					
Block No.	493					
Blockline Departures (in feet)	N/S Departure: 5,344' FNL					
	E/W Departure: 1,060' FEL					
Lambert X-Y coordinates	X: 838,459.57					
	Y: 10,338,086					
Latitude/ Longitude	Latitude: 28.464776110					
	Longitude: -89.4963860.38					
	TVD (Feet):		MD (Feet):	Water Depth (Feet): 1,755		
Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)						
Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor	
			X =	Y =		
			X =	Y =		
			X =	Y =		
			X =	Y =		
			X =	Y =		
			X =	Y =		
			X =	Y =		
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**OCS PLAN INFORMATION FORM (CONTINUED)**  
 Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location					
Well or Structure Name/Number (If renaming well or structure, reference previous name): C					Subsea Completion
Anchor Radius (if applicable) in feet: 10,000					<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
	Surface Location			Bottom-Hole Location (For Wells)	
Lease No.	OCS-G 33158				
Area Name	Mississippi Canyon				
Block No.	493				
Blockline Departures (in feet)	N/S Departure: 5,344. FNL				
	E/W Departure: 941' FEL				
Lambert X-Y coordinates	X: 838,579.170				
	Y: 10,338,175.70				
Latitude/ Longitude	Latitude: 28.465027586				
	Longitude: -89.496019780				
	TVD (Feet):		MD (Feet):		Water Depth (Feet): 1,752
<b>Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)</b>					
Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
<p><b>Paperwork Reduction Act of 1995 Statement:</b> The Paperwork Reduction Act of 1995 (44 U.S.C. Chapter 35) requires us to inform you that MMS collects this information as part of an applicant's Exploration Plan or Development Operations Coordination Document submitted for MMS approval. We use the information to facilitate our review and data entry for OCS plans. We will protect proprietary data according to the Freedom of Information Act and 30 CFR 250.196. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid Office of Management and Budget Control Number. The use of this form is voluntary. The public reporting burden for this form is included in the burden for preparing Exploration Plans and Development Operations Coordination Documents. We estimate that burden to average 580 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to the Information Collection Clearance Officer, Mail Stop 4230, Minerals Management Service, 1849 C Street, N.W., Washington, DC 20240.</p>					

Y = 10,343,520'

493



X = 823,680'

X = 839,520'

**MEI Loc. A**  
**Surface Location**  
 5,159' FNL & 2,611' FEL of MC 493  
 X = 836,908.700'  
 Y = 10,338,361.700'  
 Lat. = 28.465443363  
 Long. = -89.501227727

**MEI Loc. B**  
**Surface Location**  
 5,434' FNL & 1,060' FEL of MC 493  
 X = 838,459.57'  
 Y = 10,338,086'  
 Lat. = 28.464776110  
 Long. = -89.4963860.38

**MEI Loc. C**  
**Surface Location**  
 5,344' FNL & 941' FEL of MC 493  
 X = 838,579.170'  
 Y = 10,338,175.70'  
 Lat. = 28.465027586  
 Long. = -89.496019780

Y = 10,327,680'

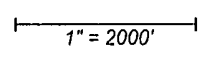


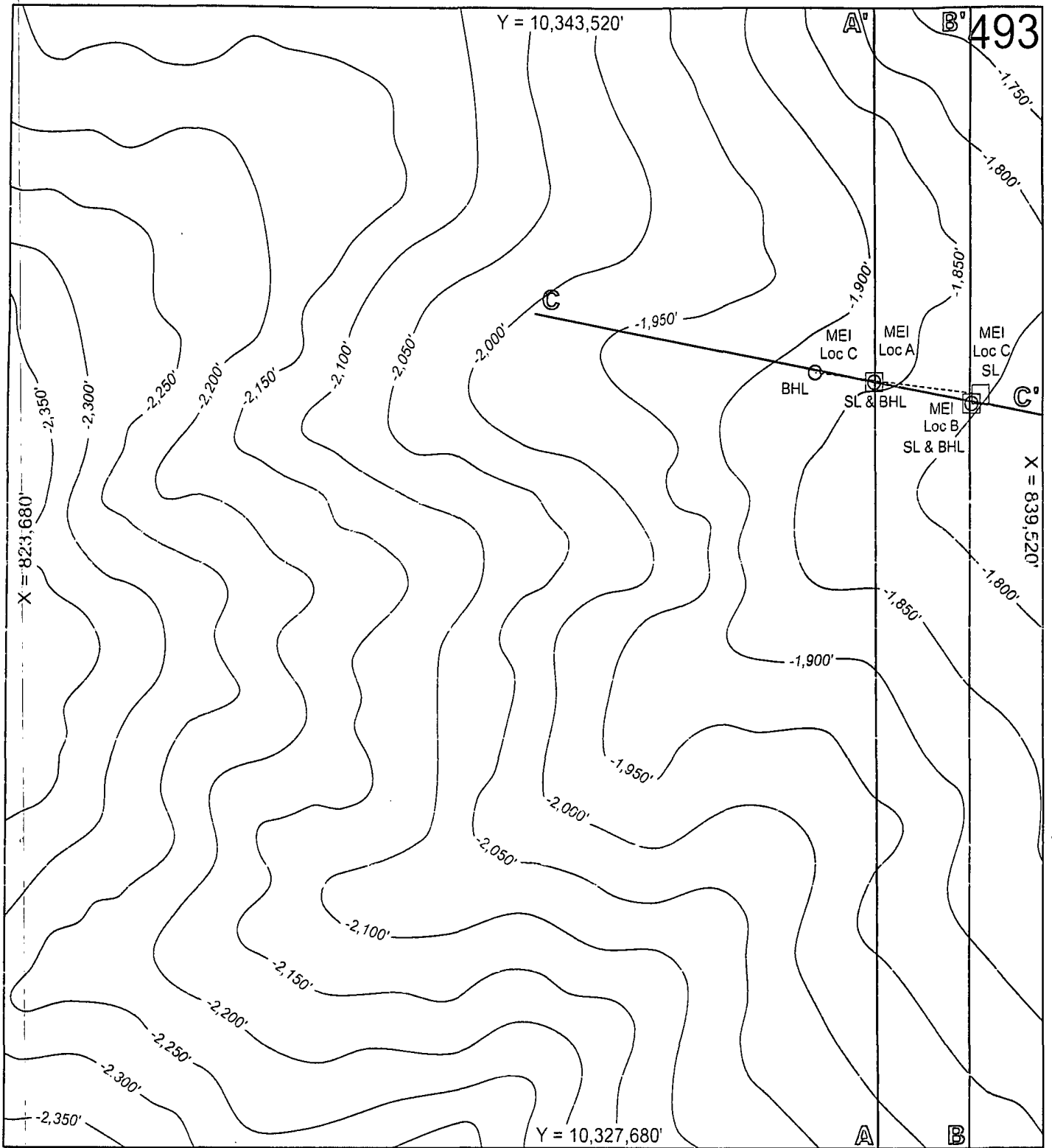
**MARINER ENERGY, INC.**

Mississippi Canyon 493  
 OCS-G 33158

Surface  
 Location Plat

12-16-09  
 C.I. = 100'





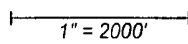
**MARINER ENERGY, INC.**

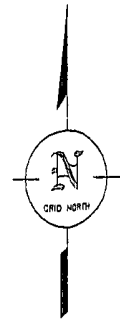
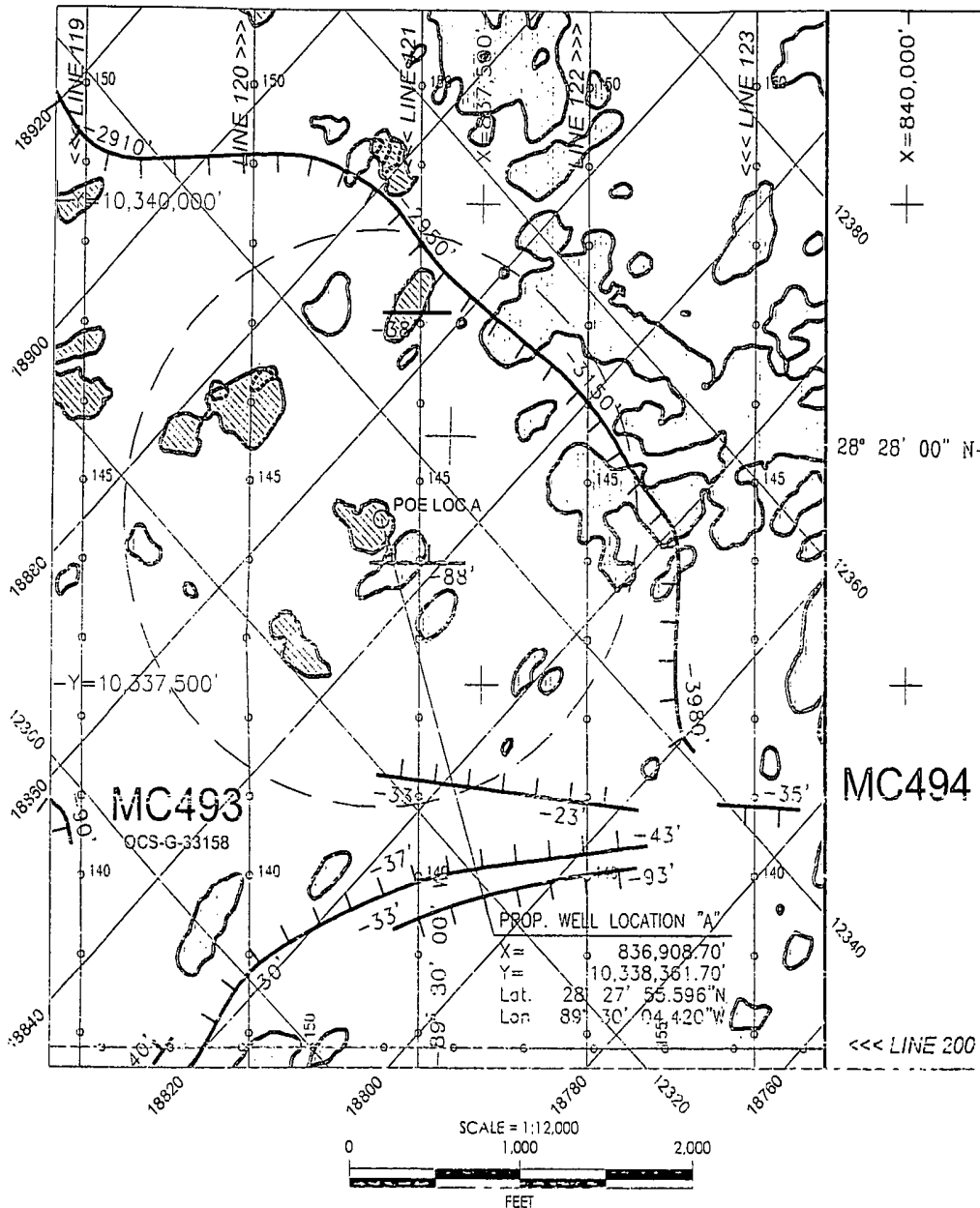
Mississippi Canyon 493

OCS-G 33158

Bathymetry Map

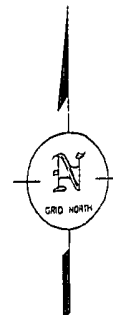
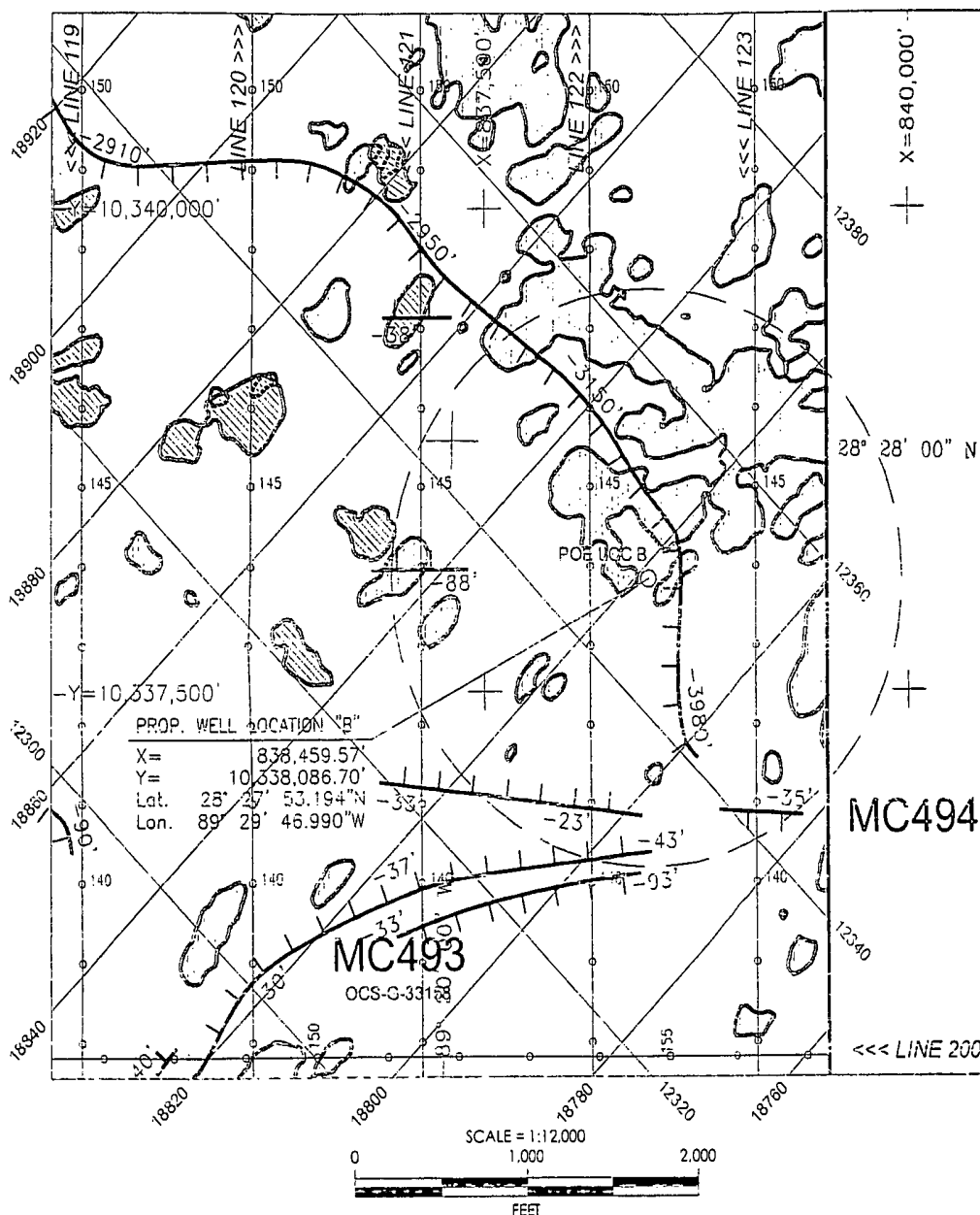
12-16-09  
C.I. = 50'





- |   |   |
|---|---|
| <p>12660 — 3-D SURVEY CROSSLINE AND NUMBER WITH SPACING AT 82.02' (25m)</p> <p>18660 — 3-D SURVEY INLINE AND NUMBER WITH SPACING AT 98.37' (30m)</p> <p>POE LOC A (O) PROPOSED WELLSITE LOCATION AND DESIGNATION WITH A 1,500 FT RADIUS CIRCLE AS PER MMS NTL 2000-G20.</p> <p>-180' BURIED FAULT WITH DEPTH BELOW SEAFLOOR IN FEET. HACHURES ON DOWNTHROWN SIDE.</p> | <p><b>HIGH-AMPLITUDE ANOMALIES</b></p> <p>(O) AMPLITUDE ANOMALIES WITHIN SEQUENCE 2 (BETWEEN HORIZON 10 AND HORIZON 20 OR APPROXIMATE STRATIGRAPHIC EQUIVALENT)</p> <p>(O) AMPLITUDE ANOMALIES WITHIN SEQUENCE 3 (BETWEEN HORIZON 20 AND HORIZON 30 OR APPROXIMATE STRATIGRAPHIC EQUIVALENT)</p> <p>(O) AMPLITUDE ANOMALIES WITHIN SEQUENCE 4 (BETWEEN HORIZON 30 AND HORIZON 40 OR APPROXIMATE STRATIGRAPHIC EQUIVALENT)</p> |
|---|---|

**SUBSURFACE GEOLOGIC FEATURES MAP**  
**PROPOSED WELLSITE "A"**  
**"COVELLITE" PROSPECT**  
 BLOCK 493, OCS-G-33158  
 MISSISSIPPI CANYON AREA

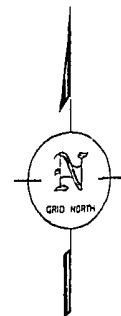
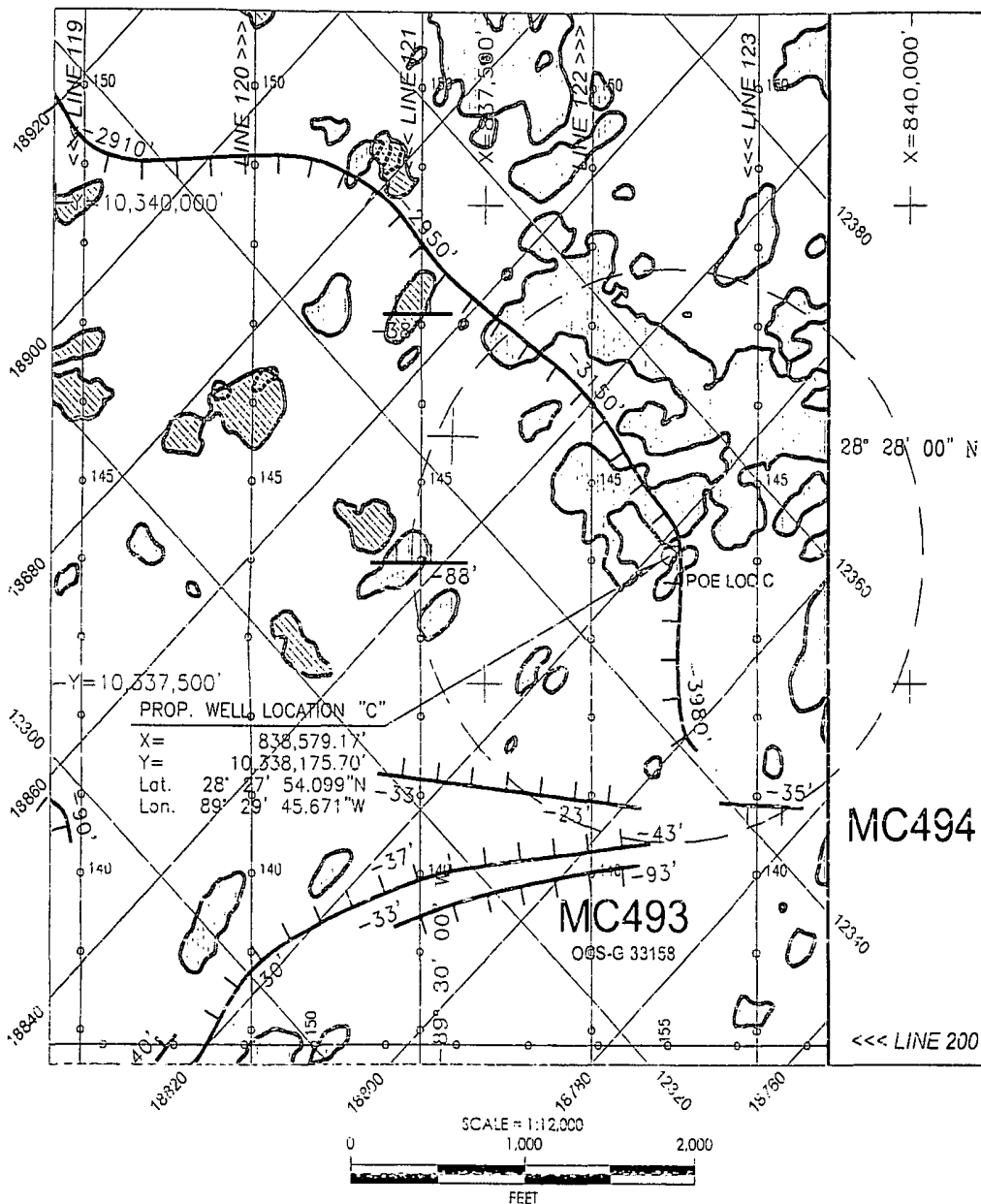


- 12660 — 3-D SURVEY CROSSLINE AND NUMBER WITH SPACING AT 82.02' (25m)
- 18660 — 3-D SURVEY INLINE AND NUMBER WITH SPACING AT 98.37' (30m)
- POE LOC B PROPOSED WELLSITE LOCATION AND DESIGNATION WITH A 1,500 FT RADIUS CIRCLE AS PER MMS NTL 2000-G20.
- 180' TOP OF BURIED FAULT WITH DEPTH BELOW SEAFLOOR IN FEET. HACHURES ON DOWNTHROWN SIDE.

**HIGH-AMPLITUDE ANOMALIES**

- AMPLITUDE ANOMALIES WITHIN SEQUENCE 2 (BETWEEN HORIZON 10 AND HORIZON 20 OR APPROXIMATE STRATIGRAPHIC EQUIVALENT)
- AMPLITUDE ANOMALIES WITHIN SEQUENCE 3 (BETWEEN HORIZON 20 AND HORIZON 30 OR APPROXIMATE STRATIGRAPHIC EQUIVALENT)
- AMPLITUDE ANOMALIES WITHIN SEQUENCE 4 (BETWEEN HORIZON 30 AND HORIZON 40 OR APPROXIMATE STRATIGRAPHIC EQUIVALENT)

**SUBSURFACE GEOLOGIC FEATURES MAP**  
**PROPOSED WELLSITE "B"**  
**"COVELLITE" PROSPECT**  
 BLOCK 493, OCS-G-33158  
 MISSISSIPPI CANYON AREA



- 12660 — 3-D SURVEY CROSSLINE AND NUMBER WITH SPACING AT 82.02' (25m)
- 18660 — 3-D SURVEY INLINE AND NUMBER WITH SPACING AT 98.37' (30m)
- POE LOC C (O) PROPOSED WELLSITE LOCATION AND DESIGNATION WITH A 1,500 FT RADIUS CIRCLE AS PER MMS NTL 2000-G20.
- 180' TOP OF BURIED FAULT WITH DEPTH BELOW SEAFLOOR IN FEET, HACHURES ON DOWNTHROWN SIDE.

- HIGH-AMPLITUDE ANOMALIES**
- AMPLITUDE ANOMALIES WITHIN SEQUENCE 2 (BETWEEN HORIZON 10 AND HORIZON 20 OR APPROXIMATE STRATIGRAPHIC EQUIVALENT)
  - AMPLITUDE ANOMALIES WITHIN SEQUENCE 3 (BETWEEN HORIZON 20 AND HORIZON 30 OR APPROXIMATE STRATIGRAPHIC EQUIVALENT)
  - AMPLITUDE ANOMALIES WITHIN SEQUENCE 4 (BETWEEN HORIZON 30 AND HORIZON 40 OR APPROXIMATE STRATIGRAPHIC EQUIVALENT)

**SUBSURFACE GEOLOGIC FEATURES MAP**  
**PROPOSED WELLSITE "C"**  
**"COVELLITE" PROSPECT**  
 BLOCK 493, OCS-G-33158  
 MISSISSIPPI CANYON AREA

**Cindy Kunkel**

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**From:** paygovadmin@mail.doc.twai.gov  
**Sent:** Thursday, January 07, 2010 7:49 AM  
**To:** Cindy Bailey  
**Subject:** Pay.Gov Payment Confirmation

THIS IS AN AUTOMATED MESSAGE. PLEASE DO NOT REPLY.

Your transaction has been successfully completed.

Transaction Summary

Application Name: MMS Exploration Plan - BF Pay.gov Tracking ID: 2507JGV6 Agency Tracking ID: 74096165863

Account Holder Name: Mariner Energy, Inc.  
Transaction Type: Sale  
Transaction Amount: \$10,326.00  
Billing Address: 2000 W. Sam Houston Pkwy, S.  
Billing Address 2: Suite 2000  
City: Houston  
State/Province: TX  
Zip/Postal Code: 77042  
Country: USA  
Card Type: American Express  
Card Number: \*\*\*\*\*3000  
Transaction Date: Jan 7, 2010 8:48:41 AM

Region: Gulf of Mexico  
Contact: Terri Young 7134528183  
Company Name/No: Mariner Energy, Inc., 00818 Lease Number(s): 33158, , ,  
Area-Block: Mississippi Canyon MC, 493: , , , , , Surface Locations: 3



**APPENDIX B  
GENERAL INFORMATION**

**(A) APPLICATIONS AND PERMITS**

No additional applications or permits are required to conduct the activities proposed herein.

**(B) DRILLING FLUIDS**

Type of Drilling Fluid	Estimated Volume of Drilling Fluid to be Used per Well
Water-based (seawater, freshwater, barite)	7,000 bbl/well
Oil-based (diesel, minerals, oil)	NA
Synthetic-based (internal olefin, ester)	3,500 bbls/well

**(C) NEW OR UNUSUAL TECHNOLOGY**

Mariner does not propose to use any new or unusual technology to carry out the proposed exploration activities.

**(D) BONDING STATEMENT**

The bond requirements for the activities and facilities proposed in this EP are satisfied by a \$3,000,000.00 areawide development bond, furnished and maintained according to 30 CFR 256, subpart I; NTL No. 2000-G16, "Guidelines for General Lease Surety Bonds;" and a current MMS-approved deferment from providing additional security under 30 CFR 256.53(d) and National NTL No. 2008-N07, "Supplemental Bond Procedures". If at any point Mariner will no longer qualify for a supplemental bonding deferment, Mariner will either provide the required additional security or a third party guarantee within 60 days after such disqualification.

**(E) OIL SPILL FINANCIAL RESPONSIBILITY (OSFR)**

Mariner, MMS company number 00818 will demonstrate oil spill financial responsibility for the facilities proposed in this EP according to 30 CFR Part 253; and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities".

**(F) DEEPWATER WELL CONTROL STATEMENT**

Mariner, MMS company number 00818 will have the financial capability to drill a relief well and conduct other emergency well control operations.

**APPENDIX C**  
**GEOLOGICAL AND GEOPHYSICAL INFORMATION**

***(A) GEOLOGICAL DESCRIPTION***

Proprietary Information

***(B) STRUCTURE CONTOUR MAPS***

Proprietary Information

***(C) INTERPRETED 3-D SEISMIC LINES***

Proprietary Information

***(D) GEOLOGICAL STRUCTURE CROSS-SECTIONS***

Proprietary Information

***(E) SHALLOW HAZARDS REPORT***

Proprietary Information

***(F) SHALLOW HAZARDS ASSESSMENT***

Utilizing the 3D seismic exploration data, a shallow hazards assessment was prepared for the proposed surface locations, and is included as *Attachment C-8, C-9 and C-10*.

***(G) HIGH-RESOLUTION SEISMIC LINES***

Proprietary Information

***(H) STRATIGRAPHIC COLUMN***

Proprietary Information

***(I) TIME VS DEPTH TABLES***

Proprietary Information



Report No. 2409-5007  
September 9, 2009

200 Dulles Drive  
Lafayette, Louisiana 70506  
Phone: (337) 237-2636  
Fax: (337) 268-3221

Mariner Energy, Inc.  
2000 W. Sam Houston Parkway South  
Houston, Texas 77042

Attention: Mr. John Worthen

**Wellsite Clearance Letter  
Proposed Wellsite A  
Block 493 (OCS-G-33158)  
Mississippi Canyon Area, Gulf of Mexico**

**Introduction.** Fugro GeoServices, Inc. (FGSI) was contracted by Mariner Energy, Inc. to prepare a wellsite-specific geohazards assessment of Proposed Wellsite A. This proposed well has a surface location in Mississippi Canyon (MC) Block 493 (OCS-G-33158) and is planned to be vertical through the top-hole section. The principal scope of the assessment is to address specific seafloor and shallow geologic conditions in the vicinity of the proposed surface location. Potential drilling hazards in the top-hole section are identified and assessed to a depth limit of approximately 2,719 ft below seafloor (1.0 second two-way time below seafloor).

This site-specific assessment is an addendum to FGS! Report No. 2409-5007, "Shallow Hazards and Archaeological Assessment, Block 493 (OCS-G-33158) and Vicinity, Mississippi Canyon Area, Gulf of Mexico". Please refer to that report for a comprehensive assessment of geohazards within MC493 and vicinity, as well as a description of the data used in this study, its limitations, time-depth conversions, and a complete list of references used in this investigation. This wellsite clearance assessment, together with the above-referenced geohazards assessment, comply with the latest guidelines established by the Minerals Management Service (MMS) in Notices to Lessees (NTLs) 2008-G05 and 2000-G20 for shallow drilling hazards and chemosynthetic community assessment, respectively. High-resolution geophysical data was collected by an autonomous underwater vehicle (AUV) in order to comply with the MMS guidelines regarding archaeological resources surveys and reporting (NTL 2005-G07). The archaeological assessment for MC493 and vicinity is presented in Appendix C of Report No. 2409-5007.

This wellsite clearance assessment is based upon the interpretation of 3D seismic exploration data integrated with high-resolution AUV geophysical data. The AUV survey includes multibeam bathymetry, side-scan sonar, and subbottom profiler data. A checkshot survey from an offset well (MC496-1), was provided by Mariner Energy, Inc., and was used for time-depth calculations in the 3D seismic sediment column.

**3D Seismic Frequency and Phase.** Based on frequency spectra analysis of the 3D seismic data at 50% power (within the upper 1.0 second two-way travel time below the seafloor), the frequency bandwidth for data covering Proposed Wellsite A ranges from about 15 to 62 Hz, with an obvious bias towards a range of 29.5 Hz to 62 Hz (Appendix A, Figure A-1). This frequency bandwidth corresponds to a limit of separability of about 37.5 ft, assuming a representative frequency of 40 Hz and an average velocity of 6,000 ft/sec in the shallow section. Other details regarding the data descriptions and limitations are documented in FGS! Report No. 2409-5007. Overall, the data used in this study are judged to be of adequate quality and resolution to make an assessment of the geologic conditions and potential hazards that may constrain exploratory drilling operations within the study area.



**Graphics.** A Seafloor Features and Bathymetry Map (1:24,000-scale) showing the proposed wellsite, water depth contours, and seafloor features accompanies this wellsite assessment. A 1,500 ft radius around the proposed wellsite is shown on this map as per MMS NTL No. 2000-G20, and a 10,000 ft radius circle is shown around the wellsite to indicate the maximum area of potential seafloor disturbance that may be affected by anchoring. Shallow geologic conditions at the proposed wellsite are summarized on the attached tophole prognosis chart. The nearest inline and crossline profiles from the 3D seismic data are attached to illustrate shallow geologic conditions in the vicinity of the proposed location. A page-size side-scan sonar mosaic covering a portion of the larger AUV survey area shows Proposed Wellsite A and the 1,500 ft wellsite radius limit. Additionally, a page-size figure of the side scan sonar line (Line 121) covering the wellsite shows a closer view of the sonar image. The closest subbottom profile to the proposed wellsite (Line 121) is attached to illustrate the shallow geologic conditions in the area of the proposed wellbore. A page-size 1:12,000-scale Subsurface Geologic Features Map is also included to illustrate geologic conditions in the vicinity of the proposed wellbore.

**Proposed Well Location.** The surface location for Proposed Wellsite A is in the northeastern portion of Mississippi Canyon Block 493 as follows:

<b>Proposed Wellsite A</b> <b>Block 493, Mississippi Canyon Area</b> <b>UTM Zone 16, NAD 1927</b>	
X = 836,908.70'	Y = 10,338,361.70'
Latitude: 23° 27' 55.596" N	Longitude: 89° 30' 04.420" W
3D Inline: 12334	3D Crossline: 18850

**Water Depth and Seafloor Gradient.** The water depth at Proposed Wellsite A is about 1,805 ft, assuming zero datum at sea surface, and the local seafloor gradient is about 2.2° (~3.8%) to the northwest. The seafloor in the immediate vicinity of the proposed wellsite appears smooth and stable.

**Seafloor Features.** There are no seafloor amplitude anomalies, seafloor faults, or seafloor morphology typically associated with fluid expulsion features identified within a 1,500 ft radius of the proposed wellsite. Review of the side-scan sonar data within the 1,500 ft radius of the proposed wellsite indicates a seafloor of light to moderate reflectivity interpreted to represent generally uniform, fine-grained sediments. Therefore, the probability of encountering high-density chemosynthetic communities within 1,500 ft of the proposed wellsite is considered to be very low to negligible.

**Man-Made Obstructions.** The study area lies within a zone designated as archaeologically sensitive by the Minerals Management Service (NTL 2005-G07). No man-made features, such as pipelines, wellheads, or other infrastructure are reported within a 1,500 ft radius of the proposed wellsite. Additionally, no side-scan sonar targets were identified within 1,500 feet of Proposed Wellsite A. This interpretation is supported by the FGS! Archaeological Assessment dated August 13, 2009 and included in Appendix C of FGS! Report No. 2409-5007. The closest significant man-made feature is the MC493-1 well, which is located approximately 2,800 ft to the northwest.

**Mooring Considerations.** An anchored rig may be utilized to drill the proposed well; however, a specific anchor pattern is not available at this time. Therefore, based on water depths in the area, Mariner Energy, Inc. has provided a maximum anchor pattern radius of 10,000 ft centered on the proposed surface location. The following discussion assesses seafloor conditions relative to anchoring within the area encompassed by the 10,000 ft radius.

Water depths within the potential anchor spread area range from approximately 1,395 to 2,190 ft, and seafloor gradients range from about 1.13° (~2%) to 6.2° (~10.8%). No seafloor faults, fault scarps, or other

topographic anomalies were noted within the proposed anchor radius. Sonar data within the 10,000 ft radius of the proposed wellsite indicates a seafloor of light to moderate reflectivity interpreted to represent generally uniform, fine-grained sediments.

No anomalously high amplitude seafloor returns were noted on the AUV side-scan sonar, pinger, or 3D seismic records within the maximum proposed anchor radius. Additionally, no evidence of seafloor expulsion features, gas hydrate accumulations, or outcrops of authigenic carbonate rock were observed. Thus, the likelihood of encountering chemosynthetic communities within 10,000 feet of the proposed wellsite is considered to be very low.

As previously mentioned, the MC493-1 well is located approximately 2,800 ft to the northwest of the proposed wellsite. The location of this feature should be avoided/planned around prior to anchor design. No sonar contacts or evidence of additional man-made features are observable in the geophysical data within 10,000 feet of Proposed Wellsite A.

**Stratigraphy.** The mapped horizons (Horizons 10, 20, 30, and 40) divide the shallow section into four stratigraphic sequences (Sequences 1 through 4) of distinct seismic character and inferred lithology. Three horizons (Horizons 10, 20, and 30) and four sequences are identified above the depth limit of investigation in the vicinity of the proposed wellsite. Predicted depths of Horizons 10, 20, and 30 and the intervening sequence thicknesses are displayed on the attached Tophole Prognosis Chart for the proposed wellbore.

Sequence 1 is about 241 ft thick at the proposed wellbore, and is interpreted to be primarily parallel-stratified clays and silts that accumulated from the normal gravitational settling of suspended material in a marine environment (normal marine deposits). These sediments are interbedded with thin, fine-grained mass transport deposits (MTDs), which are visible in the pinger profiles. Sequence 2 is approximately 754 ft thick. The upper 1/3 of the sequence consists of generally fine-grained, stacked MTDs that are sporadically interrupted by clay-filled channels. Parallel-layered, fine-grained normal marine deposits characterize the middle 1/3 of the sequence. The lower portion of the sequence is composed of fine-grained MTDs, with sediments near the lower sequence boundary consisting of a moderate to high-amplitude sandy layer. Sequence 3 is cumulatively about 1,217 ft thick and is divided into three intervals. The upper interval is about 249 ft thick and is comprised of fine-grained MTDs and fine-grained, continuous to discontinuous normal marine deposits. The middle interval is about 544 ft thick, and is composed of sand-prone levee deposits, clay-filled channels, MTDs, and parallel-layered, fine-grained normal marine deposits. The lower portion of the sequence is 424 ft thick and is generally composed of parallel-layered, fine-grained normal marine deposits and MTDs. Horizon 30, which is the lower sequence boundary, dips to the southeast at about 1.2 degrees (2%). Sequence 4 is about 507 ft thick and consists of fine-grained MTDs with parallel-layered normal marine clay deposits.

**Fault Penetrations.** No seafloor faults or buried faults intersect the wellbore. A buried fault trending east-west is observable in the pinger profiles about 225 ft to the south of Proposed Wellsite A at a depth of 88 feet BML. This fault is downthrown to the north. A second buried fault is located about 1,075 ft to the north of Proposed Wellsite A, trends east-west, is downthrown to the north, and is buried at a depth of 38 feet BML. Additionally, a third buried fault is located about 1,330 feet to the south of the proposed wellsite. This fault trends east-west, is downthrown to the north, and is buried 23 to 33 ft BML. No other faults are located within 1,500 feet of the proposed wellsite within the depth of investigation. None of the aforementioned faults pose a hazard or constraint to exploration activity at the proposed wellsite.

**Potential for Sub-Seafloor Gas Hydrates.** No evidence of a bottom-simulating-reflector (BSR) that may indicate the base of the gas hydrate stability zone (BGHSZ) was observed in the shallow seismic data in the vicinity of the proposed wellbore. It is important to note that the presence of a BSR is not a requisite for the presence of gas hydrates, nor is a BSR alone necessarily indicative of gas hydrates. The seismic data cannot help directly predict the distribution and quantity of hydrates within the stability zone. However, it is reasonable, in general, to expect that accumulations of gas hydrates are more likely to occur near

accumulations of free-phase gas, which are interpreted to be present within Sequences 2 through 4 in the study area. The likelihood that gas hydrates exist at the proposed wellbore is reduced due to the lack of local faulting in the GHSZ, the absence of local fluid expulsion features, and the absence of significant free-phase gas indicators in the 3D seismic data. Using the fundamental gas hydrate phase equilibrium curve, gas hydrates are predicted to be stable within the entire tophole section. If gas hydrates are present in the shallow sediments, they would likely occur within the predominately fine-grained interval between the seafloor and the BGHSZ in localized and disseminated accumulations of small crystals and nodules, lenses and partings, or thin veins. Although disseminated gas hydrates are possible, it is unlikely that this condition would constrain exploratory drilling.

**Potential for Free-Phase Gas Accumulations.** One subsurface seismic amplitude anomaly that was interpreted to represent possible free-phase gas accumulation will be intersected by the proposed vertical wellbore within the depth limit of investigation. This anomaly is located near the base of Sequence 2, and represents a sand-prone normal marine deposit. Despite a polarity response that is not characteristic of a gas-charged interval, the anomaly is given a "low" (rather than "negligible") shallow gas potential. No other anomalies interpreted to represent possible shallow gas are intersected by the proposed wellbore. Thus, a shallow gas potential of "negligible" is interpreted for the remainder of the sequences in the tophole section. The potential for encountering shallow gas (and overpressured water sands) within the shallow section is assessed based on open-hole conditions with no pressure control in place. All subsurface amplitude anomalies in the vicinity of the proposed wellbore are annotated on the attached page-size 1:12,000-scale Subsurface Geologic Features Map.

The closest amplitude anomaly indicative of a significant shallow gas accumulation is about 525 ft to the southeast at a depth of 1,525 ft BML (within Sequence 3). Seismic amplitude analysis is a subjective process; therefore, any additional seismic records collected near the proposed well location should be inspected for evidence of shallow gas. Possible shallow gas accumulations should be avoided or otherwise mitigated by proper well design.

**Potential for Shallow Water-Flow (SWF).** Shallow geologic conditions are conducive for the induction and preservation of geopressure within sand-prone deposits in portions of the study area. All sequences in the tophole section contain fine-grained mass-movement deposits of varying thickness. Sediments in Sequence 1 and most of Sequence 2 are interpreted to consist primarily of fine-grained sediments; thus, the potential for shallow water flow is deemed "negligible". However, the lower portion of sequence 2 contains a moderate to high-amplitude sandy layer overlain by rapidly deposited sediments. This, in conjunction with the lack of local fluid migration pathways to the surface increases the SWF potential to "low". The upper part of Sequence 3 is considered to have a negligible potential for SWF. The low-impedance, low-amplitude, semi-continuous to discontinuous reflectors suggest that these deposits have been reworked by channels and contain interbedded MTDs. A portion of the middle unit of Sequence 3 is interpreted to be more sand prone than the upper unit, and is therefore assessed a low potential for SWF. These sediments are overlain by mass-movement deposits that may have acted to induce and preserve overpressures within the sand-prone materials. The lower unit of Sequence 3 is predicted to be clay-prone, and is assessed a negligible SWF potential. Most of Sequence 4 contains clay-prone parallel-stratified sediments. A negligible potential for SWF is therefore assessed for Sequence 4.

**Closing.** We appreciate the opportunity to work with you on this project and look forward to continuing as your geohazards consultants. If you have any questions concerning this assessment, please do not hesitate to call Dean Gresham (337-268-3236).

Sincerely,

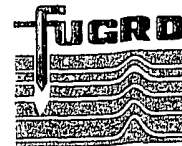
**FUGRO GEOSERVICES, INC.**

A handwritten signature in cursive script that reads "Dean Gresham".

Dean Gresham  
Staff Geologist

**Attachments:**

- Seafloor Features and Bathymetry Map Showing Maximum Proposed Anchor Radius (1:24,000)
- Topographic Prognosis Chart, Proposed Well "A" Location, Block 493, Mississippi Canyon Area
- 3D Seismic Section, Portion of Inline 12334, Proposed Well "A" Location, Block 493, Mississippi Canyon Area
- 3D Seismic Section, Portion of Crossline 18850, Proposed Well "A" Location, Block 493, Mississippi Canyon Area
- Sonar Mosaic at Proposed Well "A" Location, Block 493, Mississippi Canyon Area
- Portion of Sonar Line 121 at Proposed Well "A" Location, Block 493, Mississippi Canyon Area
- Portion of Subbottom Profiler Line 121, at Proposed Well "A" Location, Block 493, Mississippi Canyon Area
- Sub-Seafloor Geologic Features Map, Proposed Wellsite A (page-size, 1:12,000)



## FUGRO GEOSERVICES, INC.

Report No. 2409-5007  
September 9, 2009

200 Dulles Drive  
Lafayette, Louisiana 70506  
Phone: (337) 237-2636  
Fax: (337) 268-3221

Mariner Energy, Inc.  
2000 W. Sam Houston Parkway South  
Houston, Texas 77042

Attention: Mr. John Worthen

**Wellsite Clearance Letter  
Proposed Wellsite B  
Block 493 (OCS-G-33158)  
Mississippi Canyon Area, Gulf of Mexico**

**Introduction.** Fugro GeoServices, Inc. (FGSI) was contracted by Mariner Energy, Inc. to prepare a wellsite-specific geohazards assessment of Proposed Wellsite B. This proposed well has a surface location in Mississippi Canyon (MC) Block 493 (OCS-G-33158) and is planned to be vertical through the tophole section. The principal scope of the assessment is to address specific seafloor and shallow geologic conditions in the vicinity of the proposed surface location. Potential drilling hazards in the tophole section are identified and assessed to a depth limit of approximately 2,719 ft below seafloor (1.0 second two-way time below seafloor).

This site-specific assessment is an addendum to FGSI Report No. 2409-5007, "Shallow Hazards and Archaeological Assessment, Block 493 (OCS-G-33158) and Vicinity, Mississippi Canyon Area, Gulf of Mexico". Please refer to that report for a comprehensive assessment of geohazards within MC493 and vicinity, as well as a description of the data used in this study, its limitations, time-depth conversions, and a complete list of references used in this investigation. This wellsite clearance assessment, together with the above-referenced geohazards assessment, comply with the latest guidelines established by the Minerals Management Service (MMS) in Notices to Lessees (NTLs) 2008-G05 and 2000-G20 for shallow drilling hazards and chemosynthetic community assessment, respectively. High-resolution geophysical data was collected by an autonomous underwater vehicle (AUV) in order to comply with the MMS guidelines regarding archaeological resources surveys and reporting (NTL 2005-G07). The archaeological assessment for MC493 and vicinity is presented in Appendix C of Report No. 2409-5007.

This wellsite clearance assessment is based upon the interpretation of 3D seismic exploration data integrated with high-resolution AUV geophysical data. The AUV survey includes multibeam bathymetry, side-scan sonar, and subbottom profiler data. A checkshot survey from an offset well (MC496-1), was provided by Mariner Energy, Inc., and was used for time-depth calculations in the 3D seismic sediment column.

**3D Seismic Frequency and Phase.** Based on frequency spectra analysis of the 3D seismic data at 50% power (within the upper 1.0 second two-way travel time below the seafloor), the frequency bandwidth for data covering Proposed Wellsite B ranges from about 15 to 62 Hz, with an obvious bias towards a range of 29.5 Hz to 62 Hz (Appendix A, Figure A.1). This frequency bandwidth corresponds to a limit of separability of about 37.5 ft, assuming a representative frequency of 40 Hz and an average velocity of 6,000 ft/sec in the shallow section. Other details regarding the data descriptions and limitations are documented in FGSI Report No. 2409-5007. Overall, the data used in this study are judged to be of adequate quality and resolution to make an assessment of the geologic conditions and potential hazards that may constrain exploratory drilling operations within the study area.





**Graphics.** A Seafloor Features and Bathymetry Map (1:24,000-scale) showing the proposed wellsite, water depth contours, and seafloor features accompanies this wellsite assessment. A 1,500 ft radius around the proposed wellsite is shown on this map as per MMS NTL No. 2000-G20, and a 10,000 ft radius circle is shown around the wellsite to indicate the maximum area of potential seafloor disturbance that may be affected by anchoring. Shallow geologic conditions at the proposed wellsite are summarized on the attached tophole prognosis chart. The nearest inline and crossline profiles from the 3D seismic data are attached to illustrate shallow geologic conditions in the vicinity of the proposed location. A page-size side-scan sonar mosaic covering a portion of the larger AUV survey area shows the proposed wellsite and the 1,500 ft wellsite radius limit. Additionally, a page-size figure of the side scan sonar line covering the wellsite (Line 122) shows a closer view of the sonar image. The closest subbottom profile to the proposed wellsite (Line 122) is attached to illustrate the shallow geologic conditions in the area of the proposed wellbore. A page-size 1:12,000-scale Subsurface Geologic Features Map is also included to illustrate geologic conditions in the vicinity of the proposed wellbore.

**Proposed Well Location.** The surface location for Proposed Wellsite B is in the northeastern portion of Mississippi Canyon Block 493 as follows:

<b>Proposed Wellsite B</b> <b>Block 493, Mississippi Canyon Area</b> <b>UTM Zone 16, NAD 1927</b>	
X = 838,459.57'	Y = 10,338,086.70'
Latitude: 28° 27' 53.194" N	Longitude: 89° 29' 46.990" W
3D Inline: 12348	3D Crossline: 18819

**Water Depth and Seafloor Gradient.** The water depth at Proposed Wellsite B is predicted to be about 1,755 ft, assuming zero datum at sea surface, and the local seafloor gradient is about 1.32° (~2.3%) to the northwest. The seafloor in the immediate vicinity of the proposed wellsite appears smooth and stable.

**Seafloor Features.** There are no seafloor amplitude anomalies, seafloor faults, or seafloor morphology typically associated with fluid expulsion features identified within a 1,500 ft radius of the proposed wellsite. Review of the side-scan sonar data within the 1,500 ft radius circle around the proposed wellsite indicates a seafloor of light to moderate reflectivity interpreted to represent generally uniform, fine-grained sediments. Therefore, the probability of encountering high-density chemosynthetic communities within 1,500 ft of the proposed wellsite is considered to be very low to negligible.

**Man-Made Obstructions.** The study area lies within a zone designated as archaeologically sensitive by the Minerals Management Service (NTL 2005-G07). No man-made features, such as pipelines, wellheads, or other infrastructure are reported within a 1,500 ft radius of the proposed wellsite. Additionally, no side-scan sonar targets were identified within 1,500 feet of Proposed Wellsite B. This interpretation is supported by the FGSi Archaeological Assessment dated August 13, 2009 and included in Appendix C of FGSi Report No. 2409-5007. The closest significant man-made feature is the MC493-1 well, which is located approximately 4,350 ft to the northwest.

**Mooring Considerations.** An anchored rig may be utilized to drill the proposed well; however, a specific anchor pattern is not available at this time. Therefore, based on water depths in the area, Mariner Energy, Inc. has provided a maximum anchor pattern radius of 10,000 ft centered on the proposed surface location. The following discussion assesses seafloor conditions relative to anchoring within the area encompassed by the 10,000 ft radius.

Water depths within the potential anchor spread area range from approximately 1,365 to 2,135 ft, and seafloor gradients range from about 1.13° (~2%) to 6.2° (~10.8%). No seafloor faults, fault scarps, or other topographic anomalies were noted within the proposed anchor radius. Sonar data within the 10,000 ft radius of the proposed wellsite indicate a seafloor of light to moderate reflectivity interpreted to represent generally uniform, fine-grained sediments.

No anomalously high amplitude seafloor returns were noted on the AUV side-scan sonar, pinger, or 3D seismic records within the maximum proposed anchor radius. Additionally, no evidence of seafloor expulsion features, gas hydrate accumulations, or outcrops of authigenic carbonate rock were observed. Thus, the likelihood of encountering chemosynthetic communities within 10,000 feet of the proposed wellsite is considered to be very low.

As previously mentioned, the MC493-1 well is located approximately 4,350 ft to the northwest of the proposed wellsite. The location of this feature should be avoided/planned around prior to anchor design. No sonar contacts or evidence of additional man-made features are observable in the geophysical data within 10,000 feet of Proposed Wellsite B.

**Stratigraphy.** The mapped horizons (Horizons 10, 20, 30, and 40) divide the shallow section into four stratigraphic sequences (Sequences 1 through 4) of distinct seismic character and inferred lithology. Three horizons (Horizons 10, 20, and 30) and four sequences are identified above the depth limit of investigation in the vicinity of the proposed wellsite. Predicted depths of Horizons 10, 20, and 30 and the intervening sequence thicknesses are displayed on the attached Tophole Prognosis Chart for the proposed wellbore.

Sequence 1 is about 246 ft thick at the proposed wellbore, and is interpreted to be primarily parallel-stratified clays and silts that accumulated from the normal gravitational settling of suspended material in a marine environment (normal marine deposits). These sediments are interbedded with thin, fine-grained mass transport deposits (MTDs), which are observable in the pinger profiles. Sequence 2 is approximately 759 ft thick. The upper 1/3 of the sequence consists of generally fine-grained, stacked MTDs that are sporadically interrupted by clay-filled channels. Parallel-layered, fine-grained normal marine deposits characterize the middle 1/3 of the sequence. The lower portion of the sequence is composed of fine-grained MTDs, with sediments near the lower sequence boundary consisting of a moderate to high-amplitude sandy layer. Sequence 3 is cumulatively about 1,290 ft thick and is divided into three intervals. The upper interval is about 126 ft thick and is comprised of fine-grained MTDs and fine-grained, semi-continuous to discontinuous normal marine deposits. The middle interval is about 360 ft thick, and is composed of sand-prone levee deposits, clay-filled channels, MTDs, and parallel-layered, fine-grained normal marine deposits. The lower portion of the sequence is about 804 ft thick, and is generally composed of parallel-layered, fine-grained normal marine deposits and MTDs. Horizon 30, which is the lower sequence boundary, dips to the southeast at about 1.2 degrees (2%). Sequence 4 is about 424 ft thick and consists of fine-grained MTDs with parallel-layered normal marine clay deposits.

**Fault Penetrations.** No seafloor faults or buried faults intersect the wellbore. A buried fault trending east-west is observable in the pinger profiles about 1,050 ft to the west of Proposed Wellsite B at a depth of 88 feet BML. This fault is downthrown to the north. A second buried fault is located about 1,275 ft to the southeast of Proposed Wellsite B, trends east-west, is downthrown to the south, and is buried at a depth of 35 feet BML. Additionally, a third buried fault is located about 1,225 feet to the south of the proposed wellsite. This fault trends east-west, is downthrown to the north, and is buried 23 to 33 ft BML. No other faults are located within 1,500 feet of the proposed wellsite within the depth of investigation. None of the aforementioned faults pose a hazard or constraint to exploration activity at the proposed wellsite.

**Potential for Sub-Seafloor Gas Hydrates.** No evidence of a bottom-simulating-reflector (BSR) that may indicate the base of the gas hydrate stability zone (BGHSZ) was observed in the shallow seismic data in the vicinity of the proposed wellbore. It is important to note that the presence of a BSR is not a requisite for the presence of gas hydrates, nor is a BSR alone necessarily indicative of gas hydrates. The seismic data

cannot help directly predict the distribution and quantity of hydrates within the stability zone. However, it is reasonable, in general, to expect that accumulations of gas hydrates are more likely to occur near accumulations of free-phase gas, which are interpreted to be present within Sequences 2 through 4 in the study area. The likelihood that gas hydrates exist at the proposed wellbore is reduced due to the lack of local faulting in the GHSZ, the absence of local fluid expulsion features, and the absence of significant free-phase gas indicators in the 3D seismic data. Using the fundamental gas hydrate phase equilibrium curve, gas hydrates are predicted to be stable within the entire tophole section. If gas hydrates are present in the shallow sediments, they would likely occur within the predominately fine-grained interval between the seafloor and the BGHSZ in localized and disseminated accumulations of small crystals and nodules, lenses and partings, or thin veins. Although disseminated gas hydrates are possible, it is unlikely that this condition would constrain exploratory drilling.

**Potential for Free-Phase Gas Accumulations.** One subsurface seismic amplitude anomaly that was interpreted to represent possible free-phase gas accumulation will be intersected by the proposed vertical wellbore within the depth limit of investigation. This anomaly is located near the base of Sequence 2, and represents a sand-prone normal marine deposit. Despite a polarity response that is not characteristic of a gas-charged interval, the anomaly is given a "low" (rather than "negligible") shallow gas potential. No other anomalies interpreted to represent possible shallow gas are intersected by the proposed wellbore. Thus, a shallow gas potential of "negligible" is interpreted for the remainder of the sequences in the tophole section. The potential for encountering shallow gas (and overpressured water sands) within the shallow section is assessed based on open-hole conditions with no pressure control in place. All subsurface amplitude anomalies in the vicinity of the proposed wellbore are annotated on the attached page-size 1:12,000-scale Subsurface Geologic Features Map.

The closest amplitude anomalies indicative of probable shallow gas accumulation is about 700 ft to the southwest at a depth of 1,125 ft BML (within Sequence 3). Seismic amplitude analysis is a subjective process; therefore, any additional seismic records collected near the proposed well location should be inspected for evidence of shallow gas. Possible shallow gas accumulations should be avoided or otherwise mitigated by proper well design.

**Potential for Shallow Water-Flow (SWF).** Shallow geologic conditions are conducive for the induction and preservation of geopressure within sand-prone deposits in portions of the study area. All sequences in the tophole section contain fine-grained mass-movement deposits of varying thickness. Sediments in Sequence 1 and most of Sequence 2 are interpreted to consist primarily of fine-grained sediments; thus, the potential for shallow water flow is deemed "negligible". However, the lower portion of sequence 2 contains a moderate to high-amplitude sandy layer overlain by rapidly deposited sediments. This, in conjunction with the lack of local fluid migration pathways to the surface increases the SWF potential to "low". The upper part of Sequence 3 is considered to have a negligible potential for SWF. The low-impedance, low-amplitude, chaotic, discontinuous reflectors suggest that these deposits consist of MTDs. The middle unit of Sequence 3 is interpreted to be more sand prone than the upper unit, and is therefore assessed a low potential for SWF. These sediments are overlain by mass-movement deposits that may have acted to induce and preserve overpressures within the sand-prone materials. The lower unit of Sequence 3 is predicted to be clay-prone, and is assessed a negligible SWF potential. Most of Sequence 4 contains clay-prone parallel-stratified sediments. A negligible potential for SWF is therefore assessed for Sequence 4.

**Closing.** We appreciate the opportunity to work with you on this project and look forward to continuing as your geohazards consultants. If you have any questions concerning this assessment, please do not hesitate to call Dean Gresham (337-268-3236).

Sincerely,

**FUGRO GEOSERVICES, INC.**

A handwritten signature in cursive script that reads "Dean Gresham".

Dean Gresham  
Staff Geologist

**Attachments:**

- Seafloor Features and Bathymetry Map Showing Maximum Proposed Anchor Radius (1:24,000)
- Tophole Prognosis Chart, Proposed Well "B" Location, Block 493, Mississippi Canyon Area
- 3D Seismic Section, Portion of Inline 12348, Proposed Well "B" Location, Block 493, Mississippi Canyon Area
- 3D Seismic Section, Portion of Crossline 18819, Proposed Well "B" Location, Block 493, Mississippi Canyon Area
- Sonar Mosaic at Proposed Well "B" Location, Block 493, Mississippi Canyon Area
- Portion of Sonar Line 122 at Proposed Well "B" Location, Block 493, Mississippi Canyon Area
- Portion of Subbottom Profiler Line 122, at Proposed Well "B" Location, Block 493, Mississippi Canyon Area
- Sub-Seafloor Geologic Features Map, Proposed Well site B (page-size, 1:12,000)



## FUGRO GEOSERVICES, INC.

Report No. 2409-5007  
September 9, 2009

200 Dulles Drive  
Lafayette, Louisiana 70506  
Phone: (337) 237-2636  
Fax: (337) 268-3221

Mariner Energy, Inc.  
2000 W. Sam Houston Parkway South  
Houston, Texas 77042

Attention: Mr. John Worthen

**Wellsite Clearance Letter  
Proposed Wellsite C  
Block 493 (OCS-G-33158)  
Mississippi Canyon Area, Gulf of Mexico**

**Introduction.** Fugro GeoServices, Inc. (FGSI) was contracted by Mariner Energy, Inc. to prepare a wellsite-specific geohazards assessment of Proposed Wellsite C. This proposed well has a surface location in Mississippi Canyon (MC) Block 493 (OCS-G-33158) and is planned to be vertical through the tophole section. The principal scope of the assessment is to address specific seafloor and shallow geologic conditions in the vicinity of the proposed surface location. Potential drilling hazards in the tophole section are identified and assessed to a depth limit of approximately 2,719 ft below seafloor (1.0 second two-way time below seafloor).

This site-specific assessment is an addendum to FGSI Report No. 2409-5007, "Shallow Hazards and Archaeological Assessment, Block 493 (OCS-G-33158) and Vicinity, Mississippi Canyon Area, Gulf of Mexico". Please refer to that report for a comprehensive assessment of geohazards within MC493 and vicinity, as well as a description of the data used in this study, its limitations, time-depth conversions, and a complete list of references used in this investigation. This wellsite clearance assessment, together with the above-referenced geohazards assessment, comply with the latest guidelines established by the Minerals Management Service (MMS) in Notices to Lessees (NTLs) 2008-G05 and 2000-G20 for shallow drilling hazards and chemosynthetic community assessment, respectively. High-resolution geophysical data was collected by an autonomous underwater vehicle (AUV) in order to comply with the MMS guidelines regarding archaeological resources surveys and reporting (NTL 2005-G07). The archaeological assessment for MC493 and vicinity is presented in Appendix C of Report No. 2409-5007.

This wellsite clearance assessment is based upon the interpretation of 3D seismic exploration data integrated with high-resolution AUV geophysical data. The AUV survey includes multibeam bathymetry, side-scan sonar, and subbottom profiler data. A checkshot survey from an offset well (MC496-1), was provided by Mariner Energy, Inc., and was used for time-depth calculations in the 3D seismic sediment column.

**3D Seismic Frequency and Phase.** Based on frequency spectra analysis of the 3D seismic data at 50% power (within the upper 1.0 second two-way travel time below the seafloor), the frequency bandwidth for data covering Proposed Wellsite C ranges from about 15 to 62 Hz, with an obvious bias towards a range of 29.5 Hz to 62 Hz (Appendix A, Figure A.1). This frequency bandwidth corresponds to a limit of separability of about 37.5 ft, assuming a representative frequency of 40 Hz and an average velocity of 6,000 ft/sec in the shallow section. Other details regarding the data descriptions and limitations are documented in FGSI Report No. 2409-5007. Overall, the data used in this study are judged to be of adequate quality and resolution to make an assessment of the geologic conditions and potential hazards that may constrain exploratory drilling operations within the study area.



**Graphics.** A Seafloor Features and Bathymetry Map (1:24,000-scale) showing the proposed wellsite, water depth contours, and seafloor features accompanies this wellsite assessment. A 1,500 ft radius around the proposed wellsite is shown on this map as per MMS NTL No. 2000-G20, and a 10,000 ft radius circle is shown around the wellsite to indicate the maximum area of potential seafloor disturbance that may be affected by anchoring. Shallow geologic conditions at the proposed wellsite are summarized on the attached tophole prognosis chart. The nearest inline and crossline profiles from the 3D seismic data are attached to illustrate shallow geologic conditions in the vicinity of the proposed location. A page-size side-scan sonar mosaic covering a portion of the larger AUV survey area shows the proposed wellsite and the 1,500 ft wellsite radius limit. Additionally, a page-size figure of the side scan sonar line covering the wellsite (Line 122) shows a closer view of the sonar image. The closest subbottom profile to the proposed wellsite (Line 122) is attached to illustrate the shallow geologic conditions in the area of the proposed wellbore. A page-size 1:12,000-scale Subsurface Geologic Features Map is also included to illustrate geologic conditions in the vicinity of the proposed wellbore.

**Proposed Well Location.** The surface location for Proposed Wellsite C is in the northeastern portion of Mississippi Canyon Block 493 as follows:

Proposed Wellsite C Block 493, Mississippi Canyon Area UTM Zone 16, NAD 1927	
X = 838,579.17'	Y = 10,338,175.70'
Latitude: 28° 27' 54.099" N	Longitude: 89° 29' 45.671" W
3D Inline: 12350	3D Crossline: 18818

**Water Depth and Seafloor Gradient.** The water depth at Proposed Wellsite C is calculated to be about 1,752 ft, assuming zero datum at sea surface, and the local seafloor gradient is about 1.32° (~2.3%) to the northwest. The seafloor in the immediate vicinity of the proposed wellsite appears smooth and stable.

**Seafloor Features.** There are no seafloor amplitude anomalies, seafloor faults, or seafloor morphology typically associated with fluid expulsion features identified within a 1,500 ft radius of the proposed wellsite. Review of the side-scan sonar data within the 1,500 ft radius circle around the proposed wellsite indicates a seafloor of light to moderate reflectivity interpreted to represent generally uniform, fine-grained sediments. Therefore, the probability of encountering high-density chemosynthetic communities within 1,500 ft of the proposed wellsite is considered to be very low to negligible.

**Man-Made Obstructions.** The study area lies within a zone designated as archaeologically sensitive by the Minerals Management Service (NTL 2005-G07). No man-made features, such as pipelines, wellheads, or other infrastructure are reported within a 1,500 ft radius of the proposed wellsite. Additionally, no side-scan sonar targets were identified within 1,500 feet of Proposed Wellsite C. This interpretation is supported by the FGSi Archaeological Assessment dated August 13, 2009 and included in Appendix C of FGSi Report No. 2409-5007. The closest significant man-made feature is the MC493-1 well, which is located approximately 4,425 ft to the northwest.

**Mooring Considerations.** An anchored rig may be utilized to drill the proposed well; however, a specific anchor pattern is not available at this time. Therefore, based on water depths in the area, Mariner Energy, Inc. has provided a maximum anchor pattern radius of 10,000 ft centered on the proposed surface location. The following discussion assesses seafloor conditions relative to anchoring within the area encompassed by the 10,000 ft radius.

Water depths within the potential anchor spread area range from approximately 1,355 to 2,130 ft, and seafloor gradients range from about  $1.13^{\circ}$  (~2%) to  $6.2^{\circ}$  (~10.8%). No seafloor faults, fault scarps, or other topographic anomalies were noted within the proposed anchor radius. Sonar data within the 10,000 ft radius of the proposed wellsite indicate a seafloor of light to moderate reflectivity interpreted to represent generally uniform, fine-grained sediments.

No anomalously high amplitude seafloor returns were noted on the AUV side-scan sonar, pinger, or 3D seismic records within the maximum proposed anchor radius. Additionally, no evidence of seafloor expulsion features, gas hydrate accumulations, or outcrops of authigenic carbonate rock were observed. Thus, the likelihood of encountering chemosynthetic communities within 10,000 feet of the proposed wellsite is considered to be very low.

As previously mentioned, the MC493-1 well is located approximately 4,425 ft to the northwest of the proposed wellsite. The location of this feature should be avoided/planned around prior to anchor design. No sonar contacts or evidence of additional man-made features are observable in the geophysical data within 10,000 feet of Proposed Wellsite C.

**Stratigraphy.** The mapped horizons (Horizons 10, 20, 30, and 40) divide the shallow section into four stratigraphic sequences (Sequences 1 through 4) of distinct seismic character and inferred lithology. Three horizons (Horizons 10, 20, and 30) and four sequences are identified above the depth limit of investigation in the vicinity of the proposed wellsite. Predicted depths of Horizons 10, 20, and 30 and the intervening sequence thicknesses are displayed on the attached Tophole Prognosis Chart for the proposed wellbore.

Sequence 1 is about 241 ft thick at the proposed wellbore, and is interpreted to be primarily parallel-stratified clays and silts interbedded with thin, fine-grained mass transport deposits (MTDs), which are observable in the pinger profiles. Sequence 2 is approximately 743 ft thick. The upper 1/3 of the sequence consists of generally fine-grained, stacked MTDs that are sporadically interrupted by clay-filled channels. Parallel-layered, fine-grained normal marine deposits characterize the middle 1/3 of the sequence. The lower portion of the sequence is composed of fine-grained MTDs, with sediments near the lower sequence boundary consisting of a moderate to high-amplitude sandy layer. Sequence 3 is cumulatively about 1,313 ft thick and is divided into three intervals. The upper interval is about 88 ft thick and is comprised of fine-grained MTDs and fine-grained, semi-continuous to discontinuous normal marine deposits. The middle interval is about 429 ft thick, and is composed of sand-prone levee deposits, clay-filled channels, MTDs, and parallel-layered, fine-grained normal marine deposits. The lower portion of the sequence is 796 ft thick and is generally composed of parallel-layered, fine-grained normal marine deposits and MTDs. Horizon 30, which is the lower sequence boundary, dips to the southeast at about 1.2 degrees (2%). Sequence 4 is about 421 ft thick and consists of fine-grained MTDs with parallel-layered normal marine clay deposits.

**Fault Penetrations.** No seafloor faults or buried faults intersect the wellbore. A buried fault trending east-west is observable in the pinger profiles about 1,175 ft to the west of Proposed Wellsite C at a depth of 88 feet BML. This fault is downthrown to the north. A second buried fault is located about 1,250 ft to the southeast of Proposed Wellsite C, trends east-west, is downthrown to the south, and is buried at a depth of 35 feet BML. Additionally, a third buried fault is located about 1,325 feet to the south of the proposed wellsite. This fault trends east-west, is downthrown to the north, and is buried 23 to 33 ft BML. No other faults are located within 1,500 feet of the proposed wellsite within the depth of investigation. None of the aforementioned faults pose a hazard or constraint to exploration activity at the proposed wellsite.

**Potential for Sub-Seafloor Gas Hydrates.** No evidence of a bottom-simulating-reflector (BSR) that may indicate the base of the gas hydrate stability zone (BGHSZ) was observed in the shallow seismic data in the vicinity of the proposed wellbore. It is important to note that the presence of a BSR is not a requisite for the presence of gas hydrates, nor is a BSR alone necessarily indicative of gas hydrates. The seismic data cannot help directly predict the distribution and quantity of hydrates within the stability zone. However, it is

reasonable, in general, to expect that accumulations of gas hydrates are more likely to occur near accumulations of free-phase gas, which are interpreted to be present within Sequences 2 through 4 in the study area. The likelihood that gas hydrates exist at the proposed wellbore is reduced due to the lack of local faulting in the GHSZ, the absence of local fluid expulsion features, and the absence of significant free-phase gas indicators in the 3D seismic data. Using the fundamental gas hydrate phase equilibrium curve, gas hydrates are predicted to be stable within the entire tophole section. If gas hydrates are present in the shallow sediments, they would likely occur within the predominately fine-grained interval between the seafloor and the BGHSZ in localized and disseminated accumulations of small crystals and nodules, lenses and partings, or thin veins. Although disseminated gas hydrates are possible, it is unlikely that this condition would constrain exploratory drilling.

**Potential for Free-Phase Gas Accumulations.** One subsurface seismic amplitude anomaly that was interpreted to represent possible free-phase gas accumulation will be intersected by the proposed vertical wellbore within the depth limit of investigation. This anomaly is located near the base of Sequence 2, and represents a sand-prone normal marine deposit. Despite a polarity response that is not characteristic of a gas-charged interval, the anomaly is given a "low" (rather than "negligible") shallow gas potential. No other anomalies interpreted to represent possible shallow gas are intersected by the proposed wellbore. Thus, a shallow gas potential of "negligible" is interpreted for the remainder of the sequences in the tophole section. The potential for encountering shallow gas (and overpressured water sands) within the shallow section is assessed based on open-hole conditions with no pressure control in place. All subsurface amplitude anomalies in the vicinity of the proposed wellbore are annotated on the attached page-size 1:12,000-scale Subsurface Geologic Features Map.

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**Closing.** We appreciate the opportunity to work with you on this project and look forward to continuing as your geohazards consultants. If you have any questions concerning this assessment, please do not hesitate to call Dean Gresham (337-268-3236).

Sincerely,

**FUGRO GEOSERVICES, INC.**



Dean Gresham  
Staff Geologist

**Attachments:**

- Seafloor Features and Bathymetry Map Showing Maximum Proposed Anchor Radius (1:24,000)
- Tophole Prognosis Chart, Proposed Well "C" Location, Block 493, Mississippi Canyon Area
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- Portion of Sonar Line 122 at Proposed Well "C" Location, Block 493, Mississippi Canyon Area
- Portion of Subbottom Profiler Line 122, at Proposed Well "C" Location, Block 493, Mississippi Canyon Area
- Sub-Seafloor Geologic Features Map, Proposed Well site C (page-size, 1:12,000)

**APPENDIX D**  
**HYDROGEN SULFIDE INFORMATION**

***(A) CONCENTRATION***

Mariner does not anticipate encountering any H<sub>2</sub>S during the proposed operations.

***(B) CLASSIFICATION***

In accordance with Title 30 CFR 250.490(c), Mariner requests that Mississippi Canyon Block 493 be classified by the MMS as H<sub>2</sub>S absent.

**APPENDIX E**  
**BIOLOGICAL, PHYSICAL AND SOCIOECONOMIC INFORMATION**

**(A) CHEMOSYNTHETIC COMMUNITIES REPORT**

Activities proposed in this plan will disturb seafloor in water depths greater than 400 meters (1,312 feet), therefore, a report described in Attachment B of NTL No. 2000-G20 "Deepwater Chemosynthetic Communities" is provided below:

**NTL 2000-G20; Attachment B – (A) Map(s)**

Attached to one copy of this EP are maps prepared using 3-D seismic data depicting bathymetry, seafloor and shallow geological features, surface location of proposed wells, positions of anchors and chains relative to the proposed operations, and a radius circle of 1500 feet around each such location.

**NTL 2000-G20; Attachment B – (B) Analysis**

Using 3-D seismic information, all seafloor features and areas that could be disturbed by the activities proposed in this plan have been identified. The likelihood of these proposed activities disturbing these seafloor and shallow geologic features is discussed in the following summary statement:

**Associated Anchors – No Anchor Disturbances Within 500 Feet of Chemosynthetic Communities**

Well Locations A, B and C and the associated anchor pattern:

- Features or areas that could support high-density chemosynthetic communities are **not** located within 1,500 feet of each proposed muds and cuttings discharge location.
  
- Features or areas that could support high-density chemosynthetic communities are **not** located within 500 feet of any seafloor disturbances resulting from our use of anchors (including those caused by anchors, anchor chains, and wire ropes).

**(B) TOPOGRAPHIC FEATURES MAP**

Activities proposed in this EP do not fall within 305 meters (1000 feet) of a topographic "no activity zone".

**(C) TOPOGRAPHIC FEATURES STATEMENT (SHUNTING)**

All activities proposed under this EP will be conducted outside all Topographic Feature Protective Zones, therefore shunting of drill cuttings and drilling fluids is not required.

**(D) LIVE BOTTOMS (PINNACLE TREND) MAP**

Mississippi Canyon Block 493 is not located within 61 meters (200 feet) of any live-bottom (pinnacle trend) features.

**(E) LIVE BOTTOMS (LOW RELIEF) MAP**

Mississippi Canyon Block 493 is not located within 100 feet of any live-bottom (low-relief) features.

***(F) POTENTIALLY SENSITIVE BIOLOGICAL FEATURES***

Mississippi Canyon Block 493 is not located within 61 meters (200 feet) of potentially sensitive biological features.

***(G) REMOTELY OPERATED VEHICLE (ROV) SURVEYS***

MMS has determined that there is enough data gathered in this grid area, therefore, we will not be conducting any ROV surveys either pre-spudding or post-drilling operations.

***(H) THREATENED AND ENDANGERED SPECIES, CRITICAL HABITAT, AND MARINE MAMMAL INFORMATION***

Under Section 7 of the Endangered Species Act (ESA) all federal agencies must ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its designated critical habitat.

In accordance with the 30 CFR 250, Subpart B, effective May 14, 2007, and further outlined in Notice to Lessees (NTL) 2008-G04, lessees/operators are required to address site-specific information on the presence of federally listed threatened or endangered species and critical habitat designated under the ESA and marine mammals protected under the Marine Mammal Protection Act (MMPA) in the area of proposed activities under this plan.

NOAA Fisheries currently lists the Sperm Whale, Leatherback Turtle, Green Turtle, Hawksbill Turtle, and the Kemp's Ridley Turtle as endangered and the Loggerhead Turtle and Gulf Sturgeon as threatened. Currently there are no designated critical habitats for the listed species in the Gulf of Mexico Outer Continental Shelf, however, it is possible that one or more of these species could be seen in the area of our operations.

***(I) ARCHAEOLOGICAL REPORT***

Mississippi Canyon Block 493 has been determined as potentially containing prehistoric archaeological properties, therefore, an Archaeological Survey Report has been prepared in accordance with NTL 2005-G07 "Archaeological Surveys and Reports" and is being submitted under separate cover.

**APPENDIX F**  
**WASTES AND DISCHARGES INFORMATION**

***(A) PROJECTED GENERATED WASTES***

Projected Generated Waste information is not applicable in this Exploration Plan.

***(B) PROJECTED OCEAN DISCHARGES***

Discharge information is not applicable in this Exploration Plan.

## APPENDIX G AIR EMISSIONS INFORMATION

### (A) EMISSIONS WORKSHEETS AND SCREENING QUESTIONS

Screen Procedures for EP's	Yes	No
Is any calculated Complex Total (CT) Emission amount (tons) associated with your proposed exploration activities more than 90% of the amounts calculated using the following formulas: $CT = 3400D^{2/3}$ for CO, and $CT = 33.3D$ for the other air pollutants (where D = distance to shore in miles)?		X
Do your emission calculations include any emission reduction measures or modified emission factors?		X
Are your proposed exploration activities located east of 87.5° W longitude?		X
Do you expect to encounter H <sub>2</sub> S at concentrations greater than 20 parts per million (ppm)?		X
Do you propose to flare or vent natural gas for more than 48 continuous hours from any proposed well?		X
Do you propose to burn produced hydrocarbon liquids?		X

There are no existing facilities or activities co-located with the currently proposed activities, therefore the Complex Total Emissions are the same as the Plan Emissions and are provided in the table below.

Air Pollutant	Plan Emission Amounts <sup>1</sup> (tons)	Calculated Exemption Amounts <sup>2</sup> (tons)	Calculated Complex Total Emission Amounts <sup>3</sup> (tons)
Carbon Monoxide (CO)	206.69	34980.14	206.69
Particular matter (PM)	27.56	1098.90	27.56
Sulphur dioxide (SO <sub>2</sub> )	126.42	1098.90	126.42
Nitrogen oxides (NO <sub>x</sub> )	947.31	1098.90	947.31
Volatile organic compounds (VOC)	28.42	1098.90	28.42

<sup>1</sup>For activities proposed in your EP, list the projected emissions calculated from the worksheets.

<sup>2</sup>List the exemption amounts for your proposed activities calculated by using the formulas in 30 CFR 250.303(d).

<sup>3</sup>List the complex total emissions associated with your proposed activities calculated from the worksheets.

This information was calculated by: Cindy Bailey  
(281) 578-3388  
cindy.bailey@jcccteam.com

## APPENDIX H OIL SPILLS INFORMATION

### **(A) OIL SPILL RESPONSE PLANNING**

All proposed activities and facilities in this EP will be covered by the Regional or Sub-regional OSRP filed by Mariner, MMS GOM Number 00818, in accordance with 30 CFR 254 and approved on December 1, 2008 (updated plan submitted on November 23, 2009, currently waiting on approval).

### **(B) SPILL RESPONSE SITES**

Primary Response Equipment Location	Preplanned Staging Location
Houma, Louisiana	Houma, Louisiana
Venice, Louisiana	Fourchon, Louisiana
	Venice, Louisiana

### **(C) OSRO INFORMATION**

Mariner's primary equipment provider is Clean Gulf Associates (CGA). The Marine Spill Response Corporation's (MSRC) STARS network will provide closest available personnel, as well as an MSRC supervisor to operate the equipment.

### **(D) WORST-CASE SCENARIO COMPARISON**

Category	Regional OSRP WCD	EP WCD
Type of Activity	Exploratory Drilling	Exploratory Drilling
Facility Location (Area/Block)	GC505	MC493
Facility Designation		Semisubmersible
Distance to Nearest Shoreline (miles)	108	32.7
Volume Storage tanks (total) Uncontrolled blowout Total Volume	3,000 bbl 3,000 bbl	2,500 bbl 2,500 bbl
Type of Oil(s) (crude, condensate, diesel)	Condensate	Condensate
API Gravity	50	50

Mariner has determined that the worst-case scenario from the activities proposed in this EP do not supersede the worst-case scenario from our approved Regional OSRP.

Since Mariner has the capability to respond to the worst-case spill scenario included in our Regional OSRP approved on December 1, 2008, and since the worst-case scenario determined for our EP does not replace the worst-case scenario in our Regional OSRP, I hereby certify that Mariner has the capability to respond, to the maximum extent practicable, to a worst-case discharge, or a substantial threat of such a discharge, resulting from the activities proposed in our EP.



**APPENDIX I**  
**ENVIRONMENTAL MONITORING INFORMATION**

***(A) MONITORING SYSTEMS***

There are no environmental monitoring systems currently in place or planned for the proposed activities.

***(B) INCIDENTAL TAKES***

There is no reason to believe that any of the endangered species or marine mammals as listed in the ESA will be “taken” as a result of the operations proposed under this plan.

To date, it has been documented that the use of explosives and/or seismic devices can affect marine life. Operations proposed in this plan will not be utilizing either of these devices.

***(C) FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY***

Mississippi Canyon Block 493 is not located in the Flower Garden Banks National Marine Sanctuary; therefore, the requested information is not required in this EP.

**APPENDIX J**  
**LEASE STIPULATIONS INFORMATION**

Exploration activities are subject to the following stipulations attached to Lease OCS-G 33158 Mississippi Canyon Block 493.

***Marine Protected Species***

Lease Stipulation No. 8 is meant to reduce the potential taking of marine protected species. Mariner will operate in accordance with NTL 2007-G04, to minimize the risk of vessel strikes to protected species and report observations of injured or dead protected species, and the prevention of intentional and/or accidental introduction of debris into the marine environment.

**APPENDIX K**  
**ENVIRONMENTAL MITIGATION MEASURES INFORMATION**

***(B) INCIDENTAL TAKES***

Mariner will adhere to the requirements as set forth in the following documents, as applicable, to avoid or minimize impacts to any of the species listed in the ESA as a result of the operations conducted herein:

- NTL 2007-G04, "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting
- NTL 2007-G03, "Marine Trash and Debris Awareness and Elimination"
- NTL 2007-G02, "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program"

**APPENDIX L  
SUPPORT VESSELS AND AIRCRAFT INFORMATION**

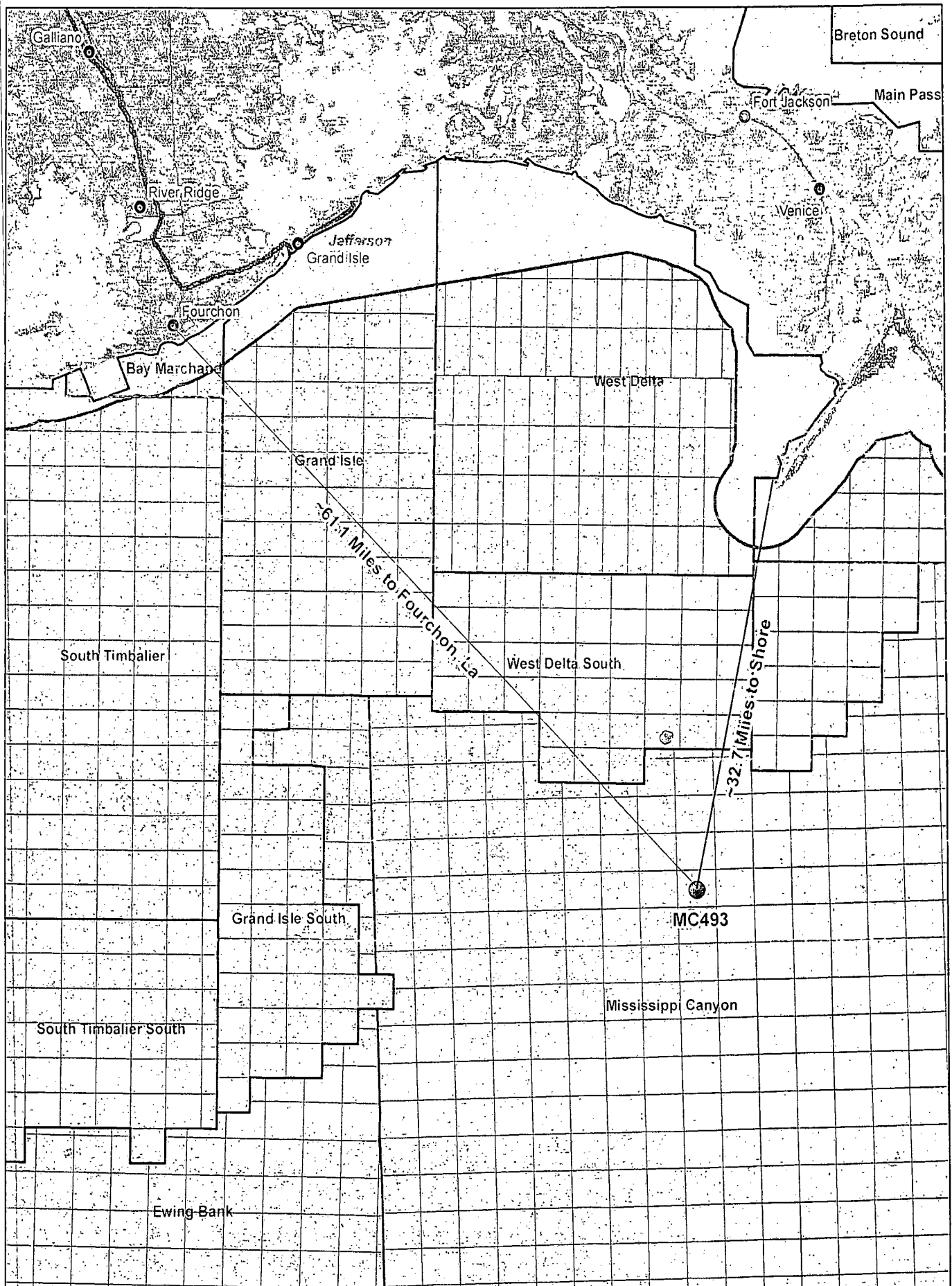
**(A) GENERAL**

The most practical, direct route from the shorebase as permitted by weather and traffic conditions will be utilized.

<b>Type</b>	<b>Maximum Fuel Tank Capacity</b>	<b>Maximum Number in Area at Any Time</b>	<b>Trip Frequency or Duration</b>
Tug Boats	3000 bbls	1	1 day
Anchor Handling Boat	1500 bbls	1	4 days
Crew Boat	500 bbls	1	4/week
Supply Boat	6000 bbls	1	3/week
Helicopter	560 gals	1	Daily

**(E) VICINITY MAP**

Enclosed as *Attachment L-1* is a vicinity map showing the location of the activities proposed herein relative to the shoreline with the distance of the proposed activities from the shoreline and the primary route(s) of the support vessels and aircraft that will be used when traveling between the onshore support facilities and the drilling unit.



**APPENDIX M  
ONSHORE SUPPORT FACILITIES INFORMATION**

***(A) GENERAL***

<i>Name of Shorebase</i>	<i>Location</i>	<i>Existing/New/Modified</i>
Martin Fuel Dock North	Port Fourchon, LA	Existing

***(B) SUPPORT BASE CONSTRUCTION OR EXPANSION***

There will be no new construction of an onshore support base, nor will we expand the existing shorebase as a result of the operations proposed in this Exploration Plan.

***(D) WASTE DISPOSAL***

<i>Name/Location of Facility</i>	<i>Type of waste</i>	<i>Amount</i>	<i>Rate</i>	<i>Disposal Method</i>
Waste Management, Fourchon, La	Trash and Debris	600 lbs	5 lbs/day	Land Farming
Chemical Waste Management, Carlyss, La.	Chemical product waste	50 bbls	0.5 bbls/day	Stored in containers and shipped to shore for disposal
Chemical Waste Management, Carlyss, La.	Non-Hazardous Liquid: Workover Fluids	150 bbls	2 bbls/day	Temporary Storage

**APPENDIX N**  
**COASTAL ZONE MANAGEMENT (CZMA) INFORMATION**

Relevant enforceable policies were considered in certifying consistency for Louisiana. A certificate of Coastal Zone Management Consistency for the state of Louisiana is enclosed as *Attachment N-1*.

**COASTAL ZONE MANAGEMENT  
CONSISTENCY CERTIFICATION**

**INITIAL EXPLORATION PLAN**

**MISSISSIPPI CANYON BLOCK 493**

**OCS-G 33158**

The proposed activities described in detail in this OCS Plan comply with Louisiana's approved Coastal Management Program and will be conducted in a manner consistent with such Program

Mariner Energy Inc.  
Lessee or Operator

\_\_\_\_\_  
Certifying Official

\_\_\_\_\_  
Date



**APPENDIX O**  
**ENVIRONMENTAL IMPACT ANALYSIS (EIA)**  
**Mariner Energy, Inc. (Mariner)**

**Initial Exploration Plan**  
**Mississippi Canyon Block 493**  
**OCS-G 33158**

**(A) Impact Producing Factors**

**ENVIRONMENTAL IMPACT ANALYSIS WORKSHEET**

Environment Resources	Impact Producing Factors (IPFs) Categories and Examples					
	Refer to recent GOM OCS Lease Sale EIS for a more complete list of IPFs					
	Emissions (air, noise, light, etc.)	Effluents (muds, cutting, other discharges to the water column or seafloor)	Physical disturbances to the seafloor (rig or anchor emplacements, etc.)	Wastes sent to shore for treatment or disposal	Accidents (e.g., oil spills, chemical spills, H <sub>2</sub> S releases)	Discarded Trash & Debris
<b>Site-specific at Offshore Location</b>						
Designated topographic features		(1)	(1)		(1)	
Pinnacle Trend area live bottoms		(2)	(2)		(2)	
Eastern Gulf live bottoms		(3)	(3)		(3)	
Chemosynthetic communities			X(4)			
Water quality		X	X		X	
Fisheries		X	X		X	
Marine Mammals	X(8)	X			X(8)	X
Sea Turtles	X(8)	X			X(8)	X
Air quality	X(9)					
Shipwreck sites (known or potential)			(7)			
Prehistoric archaeological sites			X(7)			
<b>Vicinity of Offshore Location</b>						
Essential fish habitat		X	X		X(6)	
Marine and pelagic birds	X				X	X
Public health and safety					(5)	
<b>Coastal and Onshore</b>						
Beaches					X(6)	X
Wetlands					X(6)	
Shore birds and coastal nesting birds					X(6)	X
Coastal wildlife refuges					X	
Wilderness areas					X	

## Footnotes for Environmental Impact Analysis Matrix

- 1) Activities that may affect a marine sanctuary or topographic feature. Specifically, if the well or platform site or any anchors will be on the seafloor within the:
  - 4-mile zone of the Flower Garden Banks, or the 3-mile zone of Stetson Bank;
  - 1000-m, 1-mile or 3-mile zone of any topographic feature (submarine bank) protected by the Topographic Features Stipulation attached to an OCS lease;
  - Essential Fish Habitat (EFH) criteria of 500 ft. from any no-activity zone; or
  - Proximity of any submarine bank (500 ft. buffer zone) with relief greater than 2 meters that is not protected by the Topographic Features Stipulation attached to an OCS lease.
- 2) Activities with any bottom disturbance within an OCS lease block protected through the Live Bottom (Pinnacle Trend) Stipulation attached to an OCS lease.
- 3) Activities within any Eastern Gulf OCS block where seafloor habitats are protected by the Live Bottom (Low-Relief) Stipulation attached to an OCS lease.
- 4) Activities on blocks designated by the MMS as being in water depths 400 meters or greater.
- 5) Exploration or production activities where H<sub>2</sub>S concentrations greater than 500 ppm might be encountered.
- 6) All activities that could result in an accidental spill of produced liquid hydrocarbons or diesel fuel that you determine would impact these environmental resources. If the proposed action is located a sufficient distance from a resource that no impact would occur, the EIA can note that in a sentence or two.
- 7) All activities that involve seafloor disturbances, including anchor emplacements, in any OCS block designated by the MMS as having high-probability for the occurrence of shipwrecks or prehistoric sites, including such blocks that will be affected that are adjacent to the lease block in which your planned activity will occur. If the proposed activities are located a sufficient distance from a shipwreck or a prehistoric site that no impact would occur, the EIA can note that in a sentence or two.
- 8) All activities that you determine might have an adverse effect on endangered or threatened marine mammals or sea turtles or their critical habitats.
- 9) Production activities that involve transportation of produced fluids to shore using shuttle tankers or barges.

## **(B) Analysis**

### **Site-Specific at Mississippi Canyon Block 493**

Proposed operations consist of the drilling, completion, and potential testing of three well locations; and the installation of a subsea tree/manifold. Operations will be conducted with a semi-submersible.

#### ***1. Designated Topographic Features***

Potential IPFs on topographic features include physical disturbances to the seafloor, effluents, and accidents.

**Physical disturbances to the seafloor:** Mississippi Canyon Block 493 is 12 miles from the closest designated Topographic Features Stipulation Block (Sackett Bank); therefore, no adverse impacts are expected.

**Effluents:** Mississippi Canyon Block 493 is 12 miles from the closest designated Topographic Features Stipulation Block (Sackett Bank); therefore, no adverse impacts are expected.

**Accidents:** It is unlikely that an accidental surface or subsurface spill would occur from the proposed activities (refer to statistics in **Item 5**, Water Quality). Oil spills cause damage to benthic organisms only if the oil contacts the organisms. Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 10 m depth. At this depth, the oil is found only at concentrations several orders of magnitude lower than the amount shown to have an effect on corals. Because the crests of topographic features in the Northern Gulf of Mexico are found below 10 m, no oil from a surface spill could reach their sessile biota. Oil from a subsurface spill is not applicable due to the distance of these blocks from a topographic area. The activities proposed in this plan will be covered by Mariner's Regional OSRP (refer to information submitted in **Appendix H**).

There are no other IPFs (including emissions and wastes sent to shore for disposal) from the proposed activities, which could impact topographic features.

#### ***2. Pinnacle Trend Area Live Bottoms***

Potential IPFs on pinnacle trend area live bottoms include physical disturbances to the seafloor, effluents, and accidents.

**Physical disturbances to the seafloor:** Mississippi Canyon Block 493 is 82 miles from the closest live bottom (pinnacle trend) area; therefore, no adverse impacts are expected.

**Effluents:** Mississippi Canyon Block 493 is 82 miles from the closest live bottom (pinnacle trend) area; therefore, no adverse impacts are expected.

**Accidents:** It is unlikely that an accidental surface or subsurface spill would occur from the proposed activities (refer to statistics in **Item 5**, Water Quality). Oil spills have the potential to foul benthic communities and cause lethal and sublethal effects on live bottom organisms. Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 10 m depth. At this depth, the oil is found only at concentrations several orders of magnitude lower than the amount shown to have an effect on marine organisms. Oil from a subsurface spill is not applicable due to the distance of these blocks from a live bottom (pinnacle trend) area. The activities proposed in this plan will be covered by Mariner's Regional OSRP (refer to information submitted in **Appendix H**).

There are no other IPFs (including emissions and wastes sent to shore for disposal) from the proposed activities which could impact a live bottom (pinnacle trend) area.

### ***3. Eastern Gulf Live Bottoms***

Potential IPFs on Eastern Gulf live bottoms include physical disturbances to the seafloor, effluents, and accidents.

**Physical disturbances to the seafloor:** Mississippi Canyon Block 493 is not located in an area characterized by the existence of live bottoms, and this lease does not contain a Live-Bottom Stipulation requiring a photo documentation survey and survey report.

**Effluents:** Mississippi Canyon Block 493 is not located in an area characterized by the existence of live bottoms; therefore, no adverse impacts are expected.

**Accidents:** It is unlikely that an accidental surface or subsurface spill would occur from the proposed activities (refer to statistics in **Item 5**, Water Quality). Oil spills cause damage to live bottom organisms only if the oil contacts the organisms. Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 10 m depth. At this depth, the oil is found only at concentrations several orders of magnitude lower than the amount shown to have an effect on marine invertebrates. Oil from a subsurface spill is not applicable due to the distance of these blocks from a live bottom area. The activities proposed in this plan will be covered by Mariner's Regional OSRP (refer to information submitted in **Appendix H**).

There are no other IPFs (including emissions and wastes sent to shore for disposal) from the proposed activities which could impact an Eastern Gulf live bottom area.

### ***4. Chemosynthetic Communities***

Mississippi Canyon Block 493 is located in water depths 1,312 feet (400 meters) or greater. IPFs that could result in impacts to chemosynthetic communities from the proposed activities include physical disturbances to the seafloor.

**Physical disturbances to the seafloor:** Mississippi Canyon Block 493 is approximately 39 miles from a known chemosynthetic community site (Chemo Mississippi Canyon Block 969), listed in NTL 2000-G20. This Initial Exploration Plan submittal includes the required maps, analyses, and statement(s). The proposed activities will be conducted in accordance with NTL 2000-G20, which will ensure that features or areas that could support high-density chemosynthetic communities will not be impacted.

There are no other IPFs (including emissions, effluents, wastes sent to shore for disposal, or accidents) from the proposed activities which could impact chemosynthetic communities.

### ***5. Water Quality***

IPFs that could result in water quality degradation from the proposed operations in Mississippi Canyon Block 493 include disturbances to the seafloor, effluents and accidents.

**Physical disturbances to the seafloor:** Bottom area disturbances resulting from the emplacement of drill rigs, the drilling of wells and the installation of platforms and pipelines would increase water-column turbidity and re-suspension of any accumulated pollutants, such as trace metals and excess nutrients. This would cause short-lived impacts on water quality conditions in the immediate vicinity of the emplacement operations.

**Effluents:** Levels of contaminants in drilling muds and cuttings and produced water discharges, discharge-rate restrictions and monitoring and toxicity testing are regulated by the EPA NPDES permit, thereby eliminating many significant biological or ecological effects. Operational discharges are not expected to cause significant adverse impacts to water quality.

**Accidents:** Oil spills have the potential to alter offshore water quality; however, it is unlikely that an accidental surface or subsurface spill would occur from the proposed activities. Between 1980 and 2000, OCS operations produced 4.7 billion barrels of oil and spilled only 0.001 percent of this oil, or 1 bbl for every 81,000 bbl produced. The spill risk related to a diesel spill from drilling operations is even less. Between 1976 and 1985, (years for which data were collected), there were 80 reported diesel spills greater than one barrel associated with drilling activities. Considering that there were 11,944 wells drilled, this is a 0.7 percent probability of an occurrence. If a spill were to occur, the water quality of marine waters would be temporarily affected by the dissolved components and small oil droplets. Dispersion by currents and microbial degradation would remove the oil from the water column and dilute the constituents to background levels. Historically, changes in offshore water quality from oil spills have only been detected during the life of the spill and up to several months afterwards. Most of the components of oil are insoluble in water and therefore float. The activities proposed in this plan will be covered by Mariner's Regional Oil Spill Response Plan (refer to information submitted in **Appendix H**).

There are no other IPFs (including emissions, physical disturbances to the seafloor, and wastes sent to shore for disposal) from the proposed activities which could cause impacts to water quality.

## **6. Fisheries**

IPFs that could cause impacts to fisheries as a result of the proposed operations in Mississippi Canyon Block 493 include physical disturbances to the seafloor, effluents and accidents.

**Physical disturbances to the seafloor:** The emplacement of a structure or drilling rig results in minimal loss of bottom trawling area to commercial fishermen. Pipelines cause gear conflicts which result in losses of trawls and shrimp catch, business downtime and vessel damage. Most financial losses from gear conflicts are covered by the Fishermen's Contingency Fund (FCF). The emplacement and removal of facilities are not expected to cause significant adverse impacts to fisheries.

**Effluents:** Effluents such as drilling fluids and cuttings discharges contain components and properties which are detrimental to fishery resources. Moderate petroleum and metal contamination of sediments and the water column can occur out to several hundred meters down-current from the discharge point. Offshore discharges are expected to disperse and dilute to very near background levels in the water column or on the seafloor within 3,000 m of the discharge point, and are expected to have negligible effect on fisheries.

**Accidents:** An accidental oil spill has the potential to cause some detrimental effects on fisheries; however, it is unlikely that such an event would occur from the proposed activities (refer to **Item 5**, Water Quality). The effects of oil on mobile adult finfish or shellfish would likely be sublethal and the extent of damage would be reduced to the capacity of adult fish and shellfish to avoid the spill, to metabolize hydrocarbons, and to excrete both metabolites and parent compounds. The activities proposed in this plan will be covered by Mariner's Regional OSRP (refer to information submitted in **Appendix H**).

There are no IPFs from emissions, or wastes sent to shore for disposal from the proposed activities which could cause impacts to fisheries.

## **7. Marine Mammals**

GulfCet II studies revealed that cetaceans of the continental shelf and shelf-edge were almost exclusively bottlenose dolphin and Atlantic spotted dolphin. Squid eaters, including dwarf and pygmy killer whale, Risso's dolphin, rough-toothed dolphin, and Cuvier's beaked whale, occurred most frequently along the upper slope in areas outside of anticyclones. IPFs that could cause impacts to marine mammals as a result of the proposed operations in Mississippi Canyon Block 493 include emissions, effluents, discarded trash and debris, and accidents.

**Emissions:** Noises from drilling activities, support vessels and helicopters may elicit a startle reaction from marine mammals. This reaction may lead to disruption of marine mammals' normal activities. Stress may make them more vulnerable to parasites, disease, environmental contaminants, and/or predation (Majors and Myrick, 1990). There is little conclusive evidence for long-term displacements and population trends for marine mammals relative to noise.

**Effluents:** Drilling fluids and cuttings discharges contain components which may be detrimental to marine mammals. Most operational discharges are diluted and dispersed upon release. Any potential impact from drilling fluids would be indirect, either as a result of impacts on prey items or possibly through ingestion in the food chain (API, 1989).

**Discarded trash and debris:** Both entanglement in, and ingestion of debris have caused the death or serious injury of marine mammals (Laist, 1997; MMC, 1999). The limited amount of marine debris, if any, resulting from the proposed activities is not expected to substantially harm marine mammals. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA).

Mariner will operate in accordance with the regulations and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass.

Informational placards will be posted on all vessels and facilities having sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "All Washed Up: The Beach Litter Problem". Thereafter, all personnel will view the marine trash and debris training video annually.

**Accidents:** Collisions between support vessels and cetaceans would be unusual events, however should one occur, death or injury to marine mammals is possible. Contract vessel operators can avoid marine mammals and reduce potential deaths by maintaining a vigilant watch for marine mammals and maintaining a safe distance when they are sighted. Vessel crews should use a reference guide to help identify the twenty-eight species of whales and dolphins, and the single species of manatee that may be encountered in the Gulf of Mexico OCS. Vessel crews must report sightings of any injured or dead protected marine mammal species immediately, regardless of whether the injury or death is caused by their vessel, to the Marine Mammal and Sea Turtle Stranding Hotline at (800) 799-6637, or the Marine Mammal Stranding Network at (305) 862-2850. In addition, if the injury or death was caused by a collision with a contract vessel, the MMS must be notified within 24 hours of the strike by email to

[protectedspecies@mms.gov](mailto:protectedspecies@mms.gov). If the vessel is the responsible party, it is required to remain available to assist the respective salvage and stranding network as needed.

Oil spills have the potential to cause sublethal oil-related injuries and spill-related deaths to marine mammals. However, it is unlikely that an accidental oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Oil spill response activities may increase vessel traffic in the area, which could add to changes in cetacean behavior and/or distribution, thereby causing additional stress to the animals. The effect of oil dispersants on cetaceans is not known. The acute toxicity of oil dispersant chemicals included in Mariner's OSRP is considered to be low when compared with the constituents and fractions of crude oils and diesel products. The activities proposed in this plan will be covered by Mariner's OSRP (refer to information submitted in accordance with **Appendix H**).

There are no other IPFs (including physical disturbances to the seafloor) from the proposed activities which could impact marine mammals.

## **8. Sea Turtles**

IPFs that could cause impacts to sea turtles as a result of the proposed operations include emissions, effluents, discarded trash and debris, and accidents. GulfCet II studies sighted most loggerhead, Kemp's ridley and leatherback sea turtles over shelf waters. Historically these species have been sighted up to the shelf's edge. They appear to be more abundant east of the Mississippi River than they are west of the river (Fritts et al., 1983b; Lohofener et al., 1990). Deep waters may be used by all species as a transitory habitat.

**Emissions:** Noise from drilling activities, support vessels, and helicopters may elicit a startle reaction from sea turtles, but this is a temporary disturbance.

**Effluents:** Drilling fluids and cuttings discharges are not known to be lethal to sea turtles. Most operational discharges are diluted and dispersed upon release. Any potential impact from drilling fluids would be indirect, either as a result of impacts on prey items or possibly through ingestion in the food chain (API, 1989).

**Discarded trash and debris:** Both entanglement in, and ingestion of, debris have caused the death or serious injury of sea turtles (Balazs, 1985). The limited amount of marine debris, if any, resulting from the proposed activities is not expected to substantially harm sea turtles. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA). Mariner will operate in accordance with the regulations and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised



when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass.

Informational placards will be posted on all vessels and facilities having sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "All Washed Up: The Beach Litter Problem". Thereafter, all personnel will view the marine trash and debris training video annually.

**Accidents:** Collisions between support vessels and sea turtles would be unusual events, however should one occur, death or injury to sea turtles is possible. Contract vessel operators can avoid sea turtles and reduce potential deaths by maintaining a vigilant watch for sea turtles and maintaining a safe distance when they are sighted. Vessel crews should use a reference guide to help identify the five species of sea turtles that may be encountered in the Gulf of Mexico OCS. Vessel crews must report sightings of any injured or dead protected sea turtle species immediately, regardless of whether the injury or death is caused by their vessel, to the Marine Mammal and Sea Turtle Stranding Hotline at (800) 799-6637, or the Marine Mammal Stranding Network at (305) 862-2850. In addition, if the injury or death was caused by a collision with a contract vessel, the MMS must be notified within 24 hours of the strike by email to [protectedspecies@mms.gov](mailto:protectedspecies@mms.gov). If the vessel is the responsible party, it is required to remain available to assist the respective salvage and stranding network as needed.

All sea turtle species and their life stages are vulnerable to the harmful effects of oil through direct contact or by fouling of their food. Exposure to oil can be fatal, particularly to juveniles and hatchlings. However, it is unlikely that an accidental oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Oil spill response activities may increase vessel traffic in the area, which could add to the possibility of collisions with sea turtles. The activities proposed in this plan will be covered by Mariner's Regional Oil Spill Response Plan (refer to information submitted in accordance with **Appendix H**).

There are no other IPFs (including physical disturbances to the seafloor) from the proposed activities which could impact sea turtles.

## **9. Air Quality**

Mississippi Canyon Block 493 is located 88 miles from the Breton Wilderness Area and 32.7 miles from shore. Applicable emissions data is included in Appendix G of the Plan.

There would be a limited degree of air quality degradation in the immediate vicinity of the proposed activities. Plan Emissions for the proposed activities do not exceed the annual exemption levels as set forth by MMS. Accidents and blowouts can release hydrocarbons or chemicals, which could cause the emission of air pollutants. However, these releases would not impact onshore air quality because of the prevailing atmospheric conditions, emission height, emission rates, and the distance of Mississippi

Canyon Block 493 from the coastline. There are no other IPFs (including effluents, physical disturbances to the seafloor, wastes sent to shore for treatment or disposal) from the proposed activities which would impact air quality.

#### ***10. Shipwreck Sites (known or potential)***

IPFs that could impact known or unknown shipwreck sites as a result of the proposed operations in Mississippi Canyon Block 493 include disturbances to the seafloor. Mississippi Canyon Block 493 is not located in or adjacent to an OCS block designated by MMS as having a high probability for occurrence of shipwrecks. Mariner will report to MMS the discovery of any evidence of a shipwreck and make every reasonable effort to preserve and protect that cultural resource. There are no other IPFs (including emissions, effluents, wastes sent to shore for treatment or disposal, or accidents) from the proposed activities which could impact shipwreck sites.

#### ***11. Prehistoric Archaeological Sites***

IPFs that could cause impacts to prehistoric archaeological sites as a result of the proposed operations in Mississippi Canyon Block 493 are physical disturbances to the seafloor and accidents (oil spills).

**Physical Disturbances to the seafloor:** Mississippi Canyon Block 493 is located inside the Archaeological Prehistoric high probability lines. Mariner will report to MMS the discovery of any object of prehistoric archaeological significance and make every reasonable effort to preserve and protect that cultural resource.

**Accidents:** An accidental oil spill has the potential to cause some detrimental effects to prehistoric archaeological sites if the release were to occur subsea. However, it is unlikely that an accidental oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). The activities proposed in this plan will be covered by Mariner's Regional Oil Spill Response Plan (refer to information submitted in accordance with **Appendix H**).

There are no other IPFs (including emissions, effluents, wastes sent to shore for treatment or disposal) from the proposed activities that could cause impacts to prehistoric archaeological sites.

### **Vicinity of Offshore Location**

#### ***1. Essential Fish Habitat (EFH)***

IPFs that could cause impacts to EFH as a result of the proposed operations in Mississippi Canyon Block 493 include physical disturbances to the seafloor, effluents and accidents. EFH includes all estuarine and marine waters and substrates in the Gulf of Mexico.

**Physical disturbances to the seafloor:** The Live Bottom Low Relief Stipulation, the Live Bottom (Pinnacle Trend) Stipulation, and the Eastern Gulf Pinnacle Trend Stipulation would prevent most of the potential impacts on live-bottom communities and EFH from bottom disturbing activities (e.g., anchoring, structure emplacement and removal).

**Effluents:** The Live Bottom Low Relief Stipulation, the Live Bottom (Pinnacle Trend) Stipulation, and the Eastern Gulf Pinnacle Trend Stipulation would prevent most of the potential impacts on live-bottom communities and EFH from operational waste discharges. Levels of contaminants in drilling muds and cuttings and produced-water discharges, discharge-rate restrictions, and monitoring and toxicity testing are regulated by the EPA NPDES permit, thereby eliminating many significant biological or ecological effects. Operational discharges are not expected to cause significant adverse impacts to EFH.

**Accidents:** An accidental oil spill has the potential to cause some detrimental effects on EFH. Oil spills that contact coastal bays and estuaries, as well as OCS waters when pelagic eggs and larvae are present, have the greatest potential to affect fisheries. However, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). The activities proposed in this plan will be covered by Mariner's Regional OSRP (refer to information submitted in **Appendix H**).

There are no other IPFs (including emissions, or wastes sent to shore for treatment or disposal) from the proposed activities which could impact essential fish habitat.

## ***2. Marine and Pelagic Birds***

IPFs that could impact marine birds as a result of the proposed activities include air emissions, accidental oil spills, and discarded trash and debris from vessels and the facilities.

**Emissions:** Emissions of pollutants into the atmosphere from these activities are far below concentrations which could harm coastal and marine birds.

**Accidents:** An oil spill would cause localized, low-level petroleum hydrocarbon contamination. However, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Marine and pelagic birds feeding at the spill location may experience chronic, nonfatal, physiological stress. It is expected that few, if any, coastal and marine birds would actually be affected to that extent. The activities proposed in this plan will be covered by Mariner's Regional OSRP (refer to information submitted in **Appendix H**).

**Discarded trash and debris:** Marine and pelagic birds could become entangled and snared in discarded trash and debris, or ingest small plastic debris, which can cause permanent injuries and death. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA). Mariner will operate in accordance with the regulations and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials,

particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. Informational placards will be posted on all vessels and facilities having sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "All Washed Up: The Beach Litter Problem". Thereafter, all personnel will view the marine trash and debris training video annually. Debris, if any, from these proposed activities will seldom interact with marine and pelagic birds; therefore, the effects will be negligible.

There are no other IPFs (including effluents, physical disturbances to the seafloor, or wastes sent to shore for treatment or disposal) from the proposed activities which could impact marine and pelagic birds.

### ***3. Public Health and Safety Due to Accidents***

There are no IPFs (emissions, effluents, physical disturbances to the seafloor, wastes sent to shore for treatment or disposal or accidents, including an accidental H<sub>2</sub>S releases) from the proposed activities which could cause impacts to public health and safety. In accordance with NTL No. 2007-G11, sufficient information is included in **Appendix C** to justify our request that our proposed activities be classified by MMS as H<sub>2</sub>S absent.

## **Coastal and Onshore**

### ***1. Beaches***

IPFs from the proposed activities that could cause impacts to beaches include accidents (oil spills) and discarded trash and debris.

**Accidents:** Oil spills contacting beaches would have impacts on the use of recreational beaches and associated resources. Due to the distance from shore (32.7 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. The activities proposed in this plan will be covered by Mariner's Regional OSRP (refer to information submitted in **Appendix H**).

**Discarded trash and debris:** Trash on the beach is recognized as a major threat to the enjoyment and use of beaches. There will only be a limited amount of marine debris, if any, resulting from the proposed activities. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA). Mariner will operate in accordance with the regulations and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and

packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass.

Informational placards will be posted on all vessels and facilities having sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), “All Washed Up: The Beach Litter Problem”. Thereafter, all personnel will view the marine trash and debris training video annually.

There are no other IPFs (emissions, effluents, physical disturbances to the seafloor, or wastes sent to shore for treatment or disposal) from the proposed activities which could impact beaches.

## **2. Wetlands**

Accidents: Oil spills could cause impacts to wetlands, however, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Due to the distance from shore (32.7 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Mariner’s Regional OSRP (refer to information submitted in **Appendix H**).

There are no other IPFs (emissions, effluents, physical disturbances to the seafloor, or wastes sent to shore for treatment or disposal) from the proposed activities which could impact wetlands.

## **3. Shore Birds and Coastal Nesting Birds**

Accidents: Oil spills could cause impacts to shore birds and coastal nesting birds. However, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Given the distance from shore (32.7 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Mariner’s Regional OSRP (refer to information submitted in **Appendix H**).

**Discarded trash and debris:** Coastal and marine birds are highly susceptible to entanglement in floating, submerged, and beached marine debris: specifically plastics. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA). Mariner will operate in accordance with the regulations and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass.

Informational placards will be posted on vessels and every facility that has sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), “All Washed Up: The Beach Litter Problem”. Thereafter, all personnel will view the marine trash and debris training video annually.

There are no other IPFs (emissions, effluents, physical disturbances to the seafloor, or wastes sent to shore for treatment or disposal) from the proposed activities that could cause impacts to shore birds and coastal nesting birds.

#### ***4. Coastal Wildlife Refuges***

Accidents: An accidental oil spill from the proposed activities could cause impacts to coastal wildlife refuges. However, it is unlikely that an oil spill would occur from the proposed activities (refer to Item 5, Water Quality). Due to the distance from shore (32.7 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Mariner’s Regional OSRP (refer to information submitted in **Appendix H**).

There are no other IPFs (emissions, effluents, physical disturbances to the seafloor, or wastes sent to shore for treatment or disposal) from the proposed activities that could cause impacts to coastal wildlife refuges.

#### ***5. Wilderness Areas***

An accidental oil spill from the proposed activities could cause impacts to wilderness areas. However, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Due to the response capabilities that would be implemented, no significant adverse impacts are expected. The activities proposed in this plan will be covered by Mariner’s Regional OSRP (refer to information submitted in **Appendix H**).

#### ***6. Other Environmental Resources Identified***

##### **(C) Impacts on your proposed activities.**

The site-specific environmental conditions have been taken into account for the proposed activities. No impacts are expected on the proposed activities from site-specific environmental conditions.

##### **(D) Environmental Hazards**

During the hurricane season, June through November, the Gulf of Mexico is impacted by an average of ten tropical storms (39-73 mph winds), of which six become hurricanes (> 74 mph winds). Due to its location in the gulf, Mississippi Canyon Block 493 may experience hurricane and tropical storm force winds, and related sea currents. These factors can adversely impact the integrity of the operations covered by this plan. A significant storm may present physical hazards to operators and vessels, damage exploration or production equipment, or result in the release of hazardous materials (including

hydrocarbons). Additionally, the displacement of equipment may disrupt the local benthic habitat and pose a threat to local species.

The following preventative measures included in this plan may be implemented to mitigate these impacts:

**Drilling & completion**

- a. Secure well locations
- b. Secure semi-submersible
- c. Evacuate personnel

Drilling activities will be conducted in accordance with NTL No.'s 2008-G09 and 2009-G10.

**(E) Alternatives**

No alternatives to the proposed activities were considered to reduce environmental impacts.

**(F) Mitigation Measures**

No mitigation measures other than those required by regulation will be employed to avoid, diminish, or eliminate potential impacts on environmental resources.

**(G) Consultation**

No agencies or persons were consulted regarding potential impacts associated with the proposed activities. Therefore, a list of such entities has not been provided.

**(H) Preparer(s)**

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Although not cited, the following were utilized in preparing this EIA:

- Hazard Surveys
- MMS EIS's:
  - GOM Deepwater Operations and Activities. Environmental Assessment. MMS 2000-001
  - GOM Central and Western Planning Areas Sales 166 and 168 Final Environmental Impact Statement. MMS 96-0058



**APPENDIX P**  
**ADMINISTRATIVE INFORMATION**

***(A) EXEMPTED INFORMATION DESCRIPTION***

The proposed bottom-hole locations of the planned wells have been removed from the public information copy of the EP as well as any discussions of the target objectives, geologic or geophysical data, and any interpreted geology.

***(B) BIBLIOGRAPHY***

Not applicable.