


UNITED STATES GOVERNMENT  
MEMORANDUM

April 19, 2010

To: Public Information (MS 5030)  
From: Plan Coordinator, FO, Plans Section (MS 5231)  
Subject: Public Information copy of plan  
Control # - S-07409  
Type - Supplemental Exploration Plan  
Lease(s) - OCS-G32534 Block - 814 Green Canyon Area  
Operator - Cobalt International Energy, L.P.  
Description - Subsea Wells E, F, and G  
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.

  
Karen Dunlap  
Plan Coordinator

Site Type/Name	Botm Lse/Area/Blk	Surface Location	Surf Lse/Area/Blk
WELL/E	G32534/GC/814	5802 FSL, 7868 FEL	G32534/GC/814
WELL/F	G32534/GC/814	1270 FSL, 520 FEL	G32534/GC/814
WELL/G	G32534/GC/814	5079 FSL, 7246 FWL	G32534/GC/814

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S-7409  
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**PUBLIC COPY**  
March 26, 2010

### SUPPLEMENTAL EXPLORATION PLAN

Lease Number(s): OCS-G 32534  
Area/Block(s): Green Canyon Block 814  
Prospect Name: Ligurian  
Offshore: Louisiana

Submitted by: Cobalt International Energy, L.P.  
Two Post Oak Blvd.  
Suite 1200  
Houston, Texas 77056

Truitt Smith  
(713) 579-9100  
Truitt.Smith@cobaltintl.com

Estimated start up date: May 15, 2010

Authorized Representative:  
Erin Rachal  
J. Connor Consulting, Inc.  
16225 Park Ten Place, Suite 700  
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(281) 578-3388  
[erin.rachal@jccteam.com](mailto:erin.rachal@jccteam.com)

No. Copies Being Submitted:  
Proprietary: 1 HC + 1 CD  
Public Info: 1 HC + 2CD  
  
For MMS:  
Plan No. \_\_\_\_\_  
Assigned to: \_\_\_\_\_

**COBALT INTERNATIONAL ENERGY, L.P.**

**SUPPLEMENTAL EXPLORATION PLAN**

**LEASE OCS-G 32534**

**GREEN CANYON BLOCK 814**

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**

Cobalt International Energy, L.P. proposes to drill, complete, and potentially test three (3) well sites all being located in Green Canyon Block 814. Additional operations being covered under this EP include the setting of a subsea manifold over the proposed well locations. See attached OCS Plan Information Form – Form MMS-137, included as *Attachment A-1*.

### **(B) LOCATION**

Included as *Attachment A-2* is a location map depicting the proposed surface location of each proposed well. Included as *Attachment A-3* is a bathymetry map depicting the water depths of the proposed wells and the proposed maximum radius of anchor spread of any associated drilling unit or construction barge.

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

Cobalt will use a semi-submersible drilling rig for the proposed operations. 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	4,750	4	19,000	32.4°

### **(E) ADDITIONAL MEASURES**

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

### OCS PLAN INFORMATION FORM

#### GENERAL INFORMATION

Type of OCS Plan: <input checked="" type="checkbox"/> Exploration Plan (EP)	Development Operations Coordination Document (DOCD)		
Company Name: Cobalt International Energy		MMS Operator Number: 02873	
Address: Two Post Oak Blvd. Suite 1200 Houston, Texas 77056		Contact Person: Erin Rachal	
		Phone Number: (281) 578-3388	
		Email Address: erin.rachal@jccteam.com	
Lease(s): OCS-G- 32534 / 32536	Area: Green Canyon	Block(s): 814 & 858	Project Name (If Applicable): Ligurian
Objective(s): <input checked="" type="checkbox"/> Oil <input type="checkbox"/> Gas <input type="checkbox"/> Sulphur <input type="checkbox"/> Salt	Onshore Base: Fourchon, LA		Distance to Closest Land (Miles): 136

#### 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 <input type="checkbox"/> X <input checked="" type="checkbox"/> No <input type="checkbox"/>
Do you propose to use new or unusual technology to conduct your activities?	Yes <input type="checkbox"/> X <input checked="" type="checkbox"/> No <input type="checkbox"/>
Do you propose any facility that will serve as a host facility for deepwater subsea development?	Yes <input type="checkbox"/> X <input checked="" type="checkbox"/> No <input type="checkbox"/>
Do you propose any activities that may disturb an MMS-designated high-probability archaeological area?	Yes <input type="checkbox"/> X <input checked="" type="checkbox"/> No <input type="checkbox"/>
Have all of the surface locations of your proposed activities been previously reviewed and approved by MMS?	Yes <input type="checkbox"/> X <input checked="" type="checkbox"/> No <input type="checkbox"/>

#### Tentative Schedule of Proposed Activities

Proposed Activity	Start Date	End Date	No. of Days
Drill and Complete GC814 Well Location E	05/15/10	09/12/10	120
Drill and Complete GC814 Well Location F	10/01/10	01/29/11	120
Drill and Complete GC814 Well Location G	02/01/11	06/01/11	120

#### 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 checked="" 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

<b>Proposed Well/Structure Location</b>					
Well or Structure Name/Number (If renaming well or structure, reference previous name): Well Location E					Subsea Completion
Anchor Radius (if applicable) in feet: 14000'					<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Lease No.</b>	<b>Surface Location</b>			<b>Bottom-Hole Location (For Wells)</b>	
	OCS-G 32534				
<b>Area Name</b>	Green Canyon				
<b>Block No.</b>	814				
<b>Blockline Departures (in feet)</b>	N/S Departure: 5802' FSL				
	E/W Departure: 7868' FEL				
<b>Lambert X-Y coordinates</b>	X: 2336452.0'				
	Y: 9858282.0'				
<b>Latitude/ Longitude</b>	Latitude: 27° 9' 3.892" N				
	Longitude: 90° 51' 32.984" W				
	TVD (Feet):		MD (Feet):	Water Depth (Feet): 5829'	
<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

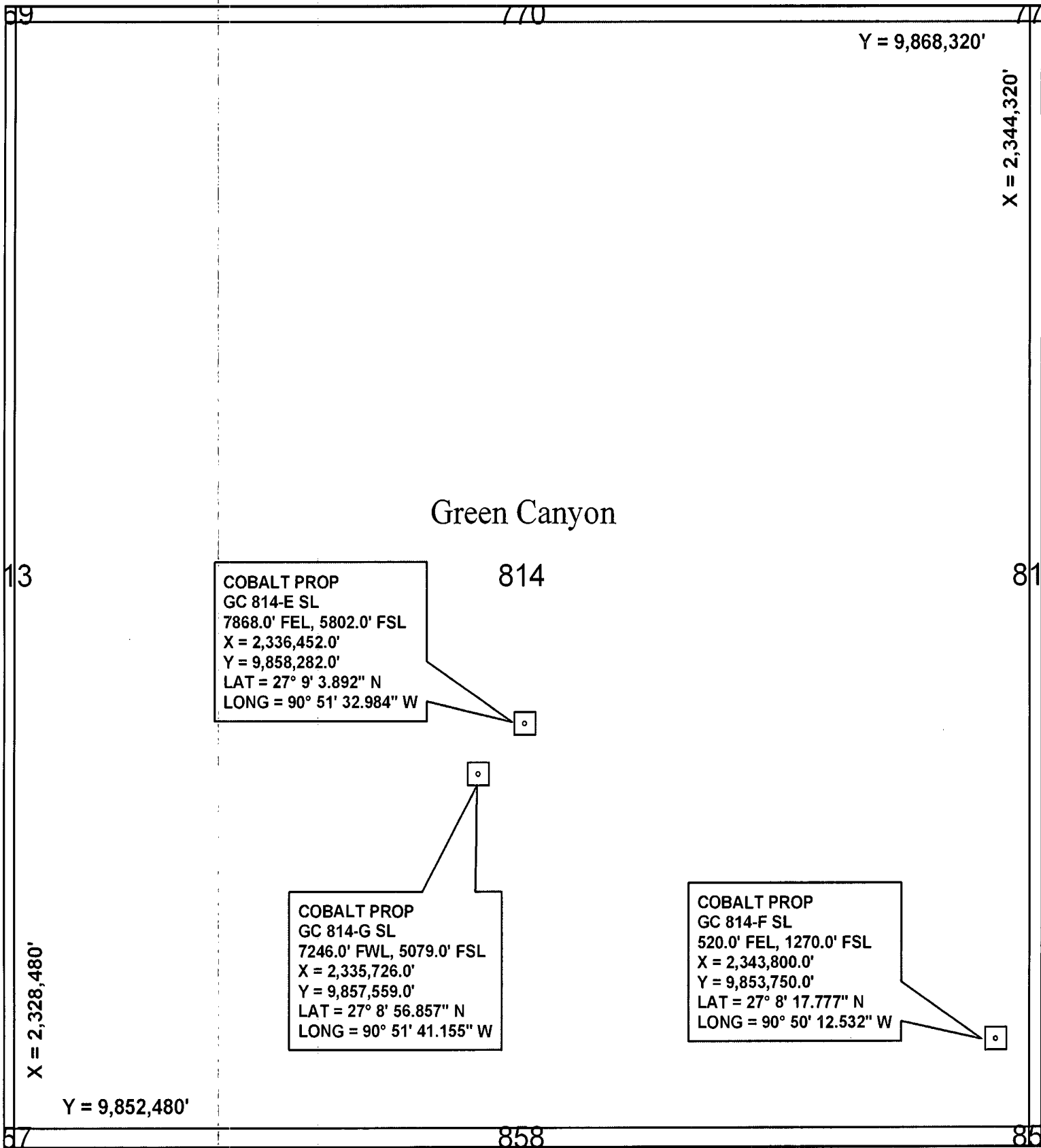
<b>Proposed Well/Structure Location</b>					
Well or Structure Name/Number (If renaming well or structure, reference previous name): Well Location F					Subsea Completion
Anchor Radius (if applicable) in feet: 14000'					<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Lease No.</b>	<b>Surface Location</b>			<b>Bottom-Hole Location (For Wells)</b>	
	OCS-G 32534				
<b>Area Name</b>	Green Canyon				
<b>Block No.</b>	814				
<b>Blockline Departures (in feet)</b>	N/S Departure: 1270' FSL				
	E/W Departure: 520' FEL				
<b>Lambert X-Y coordinates</b>	X: 2343800.0'				
	Y: 9853750.0'				
<b>Latitude/ Longitude</b>	Latitude: 27° 8' 17.7777" N				
	Longitude: 90° 50' 12.532" W				
TVD (Feet):		MD (Feet):		Water Depth (Feet): 5822'	
<b>Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)</b>					
<b>Anchor Name or No.</b>	<b>Area</b>	<b>Block</b>	<b>X Coordinate</b>	<b>Y Coordinate</b>	<b>Length of Anchor Chain on Seafloor</b>
			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

<b>Proposed Well/Structure Location</b>					
Well or Structure Name/Number (If renaming well or structure, reference previous name): Well Location G					Subsea Completion
Anchor Radius (if applicable) in feet: 14000'					<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<b>Lease No.</b>	<b>Surface Location</b>			<b>Bottom-Hole Location (For Wells)</b>	
	OCS-G 32534				
<b>Area Name</b>	Green Canyon				
<b>Block No.</b>	814				
<b>Blockline Departures (in feet)</b>	N/S Departure: 5079' FSL				
	E/W Departure: 7246' FWL				
<b>Lambert X-Y coordinates</b>	X: 2335726.0'				
	Y: 9857559.0'				
<b>Latitude/ Longitude</b>	Latitude: 27° 8' 56.857" N				
	Longitude: 90° 51' 41.155" W				
TVD (Feet):		MD (Feet):		Water Depth (Feet): 5837'	
<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>					



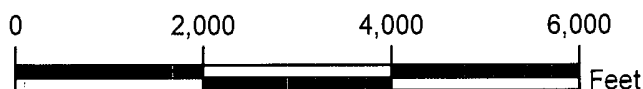
# Green Canyon Block 814 Proposed Well Locations



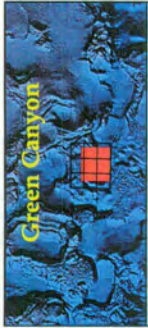
Attachment A-2

LOCATION MAP

Scale 1:24,000







**Study Area**

- Legend**
- CTM Modeling & Editing
  - 3D Seismic Volume and Contours
  - Leaf/Tree Grid Points
  - Well Locations
  - Proposed Locations
  - 1400 ft radius circle (per NITL 2005-G01)
  - 14,000 ft potential radius circle
  - Seafloor Features
  - Seafloor Faults (FIP Segments for Interpretation only)
  - Shoof Area
  - Seafloor Depositional Model
  - Bathymetry Contour
  - Grid & Contour Method
  - SB & Contour
  - SB & Contour

**Bathymetry**

400 ft

1,400 ft



**Modeling Description:**  
 Bathymetry derived from  
 Vertical Exaggeration 4x



This map is not intended for navigation purposes. It is a computer-generated map based on 3D seismic data.

Geospatial Data: NAD83  
 Projection: UTM  
 Contour Interval: 100 Feet  
 Grid Point: 1/8 Degree Foot

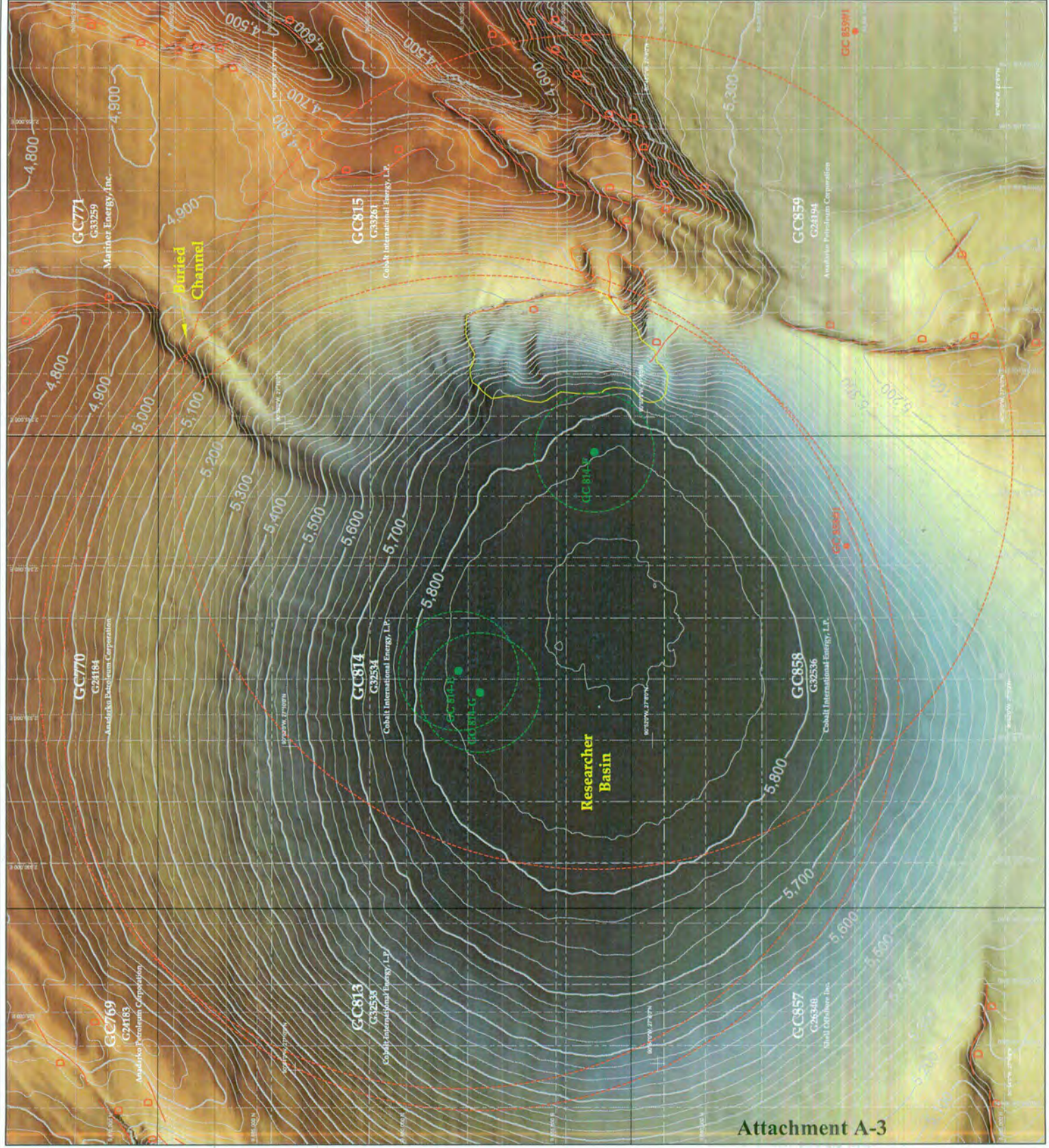
**Cobalt International Energy**

Block 814  
 Green Canyon Area  
 Gulf of Mexico

**Map 1**  
 Annotated Seafloor Rendering  
 and Bathymetry

Map prepared by:  
 Berger Geosciences, LLC

**B-geo**





**APPENDIX B  
GENERAL INFORMATION**

***(A) APPLICATIONS AND PERMITS***

<b>Application/Permit</b>	<b>Issuing Agency</b>	<b>Status</b>
Application for Permit to Drill	MMS	To be submitted

***(C) NEW OR UNUSUAL TECHNOLOGY***

Cobalt International Energy, L.P. 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 \$1,000,000.00 areawide exploratory bond, furnished and maintained according to 30 CFR 256, subpart I; NTL No. 2000-G16, "Guidelines for General Lease Surety Bonds;"

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

Cobalt International Energy, L.P., MMS company number 02873, has demonstrated 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***

Cobalt International Energy, L.P., MMS company number 02873 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 data.

**(B) STRUCTURE CONTOUR MAPS**

Current structure contour maps drawn on the top of each prospective hydrocarbon sand, showing the entire lease block, the location of each proposed well, and the locations of geological cross-sections are included as proprietary data.

**(C) INTERPRETED 3-D SEISMIC LINE(S)**

Attached to one Proprietary Information copy of this plan are interpreted 3-D seismic lines. These lines are migrated, annotated with depth scale, and are within 500' of the surface locations of the proposed wells.

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

Interpreted geological structure cross-sections showing the location and depth of each proposed well and at least one key horizon and the objective sands labeled using standard biostratigraphic terms are included as proprietary data.

**(E) SHALLOW HAZARDS REPORT**

A shallow hazards survey was conducted over Green Canyon Block 814, Well Locations E, F and G. Three copies of the shallow hazard report are being submitted to the MMS under separate cover.

**(F) SHALLOW HAZARDS ASSESSMENT**

A shallow hazards assessment has been prepared for each proposed surface location, evaluating seafloor and subsurface geological and manmade features and conditions that may adversely affect drilling operations, and is included as *Attachment C-1*.

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

Attached to one Proprietary Copy of this Plan are 3-D survey information including swath bathymetry/seafloor rendering/edge detection (fault scarp trends) overlain with the seafloor amplitude.

**(H) STRATIGRAPHIC COLUMN**

A generalized biostratigraphic/lithostratigraphic column depicting each well from the seafloor to total depth, with each objective horizon labeled, is included as proprietary data.

**(I) TIME VS DEPTH TABLES**

Sufficient well control data for the target areas proposed in this EP exists; therefore, seismic time versus depth tables for the proposed well locations are not required.

## Proposed Well GC 814-E

### Introduction

The seafloor assessment considers seafloor conditions within a potential anchoring radius of 14,000 ft from the proposed well, including the 2,000 ft radius from the muds and cuttings discharge location. The subsurface assessment considers the conditions from the seafloor to 3.6 seconds two-way travel time (~4,147 ft BML), more than one second below the mudline at the proposed well.

The assessment of the proposed well GC 814-E is based on the interpretation of 3-D seismic data and is consistent with the findings presented in the report entitled *Geologic and Stratigraphic Assessment, Block 812, 814, 858, and 902, Green Canyon Area, Gulf of Mexico, Project No. 0408-1481*; prepared by Geoscience Earth & Marine Services, Inc. for Cobalt International Energy, L.P.; dated July 18, 2008.

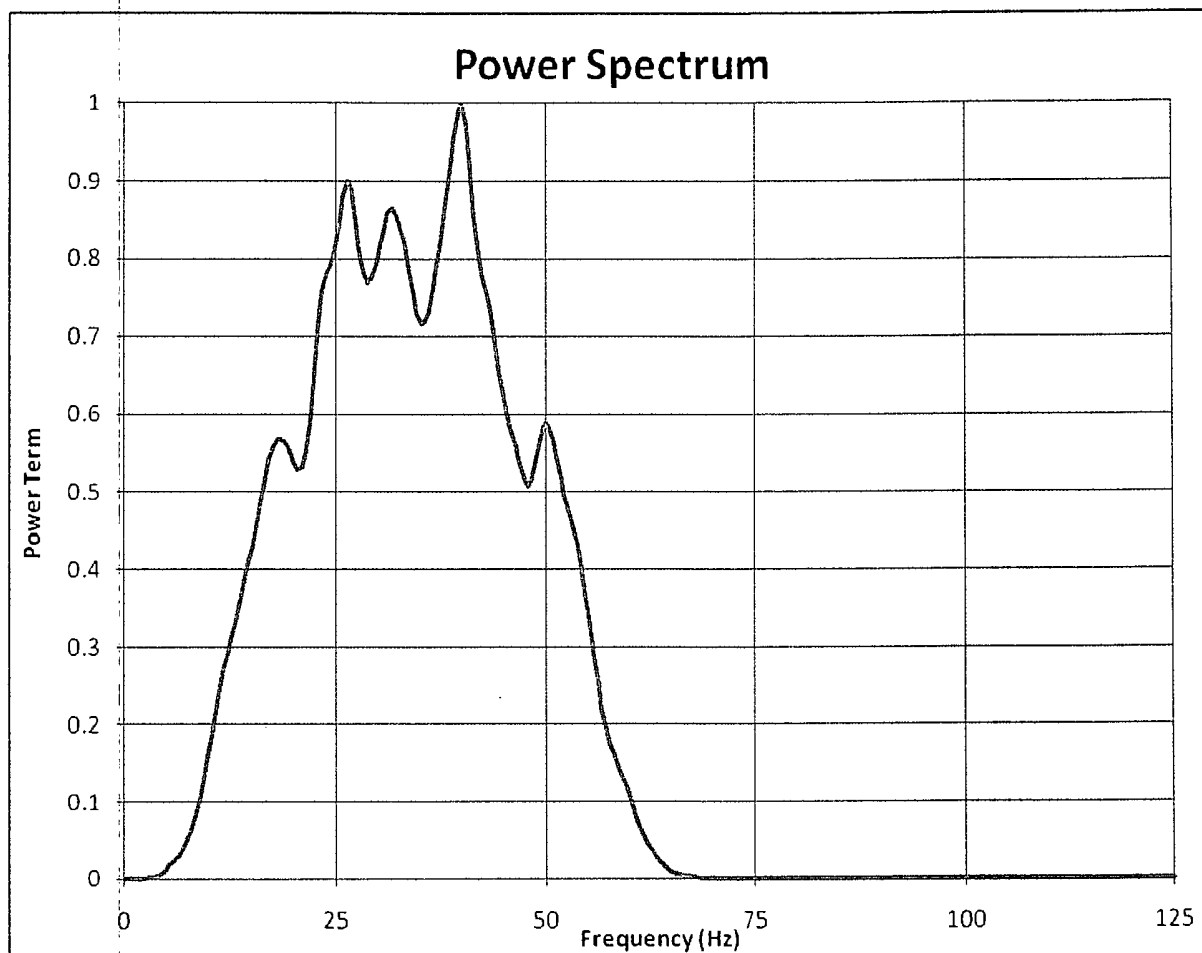
The proposed well GC 814-E location provided by Cobalt is as follows:

NAD27 UTM ZONE 15, US Survey ft		Geographic Coordinates	
X	Y	Latitude	Longitude
2,336,452	9,858,282	27° 9' 3.892"	-90° 51' 32.984"
Block Calls		3-D Seismic Line Reference	
		Line	Trace
7,868' FEL	5,802' FSL	2055	9307

Table 1. Location, block calls, and seismic lines for Proposed Well GC 814-E

### Data Quality

The power spectrum for the proposed well was derived through the use of Seismic Micro-Technology's TracePAK tools. The frequency content appears to meet the minimum 50 Hz within the upper 1.0 second below the seafloor set forth in NTL No. 2008-G04.



Power Spectrum at Proposed Well GC 814-E

### **Potential Anchoring Radius (14,000 ft)**

Cobalt has not provided a specific anchor pattern design plan for favorability assessment. Per Cobalt's input, a potential anchoring radius of 14,000 ft was used for this analysis ([Figure 1](#)).

**Seafloor Conditions.** The bathymetry values within the potential anchoring radius range from 4,925 ft to 5,855 ft below sea level (BSL; see GEMS Map 2 [2008]). The potential anchoring radius for the proposed well GC 814-E is predominantly contained within Researcher Basin where the seafloor is relatively smooth and featureless ([Map 1](#); [Figure 1](#)). Slopes range between 0.0° and 42.4° within the potential anchoring radius ([Figure 2](#)). The steepest slopes are associated with a seafloor mound at the limits of the potential anchoring radius and within the seafloor slump scour which occurs between 9,295 ft and 13,600 ft east-southeast of the proposed well.

The seafloor within the slump scour is slightly irregular, without distinctive sediment pathways ([Map 1](#); [Figure 3](#)). The seafloor slump scour measures about 6,860 ft north-to-south and about 3,580 ft west-to-east, along the direction of failure. A cross-section view of this slump scour shows that consolidated sediments are likely exposed at or near the seafloor ([Figure 4](#)). There is no seismic evidence of a distinct layer of drape sediments covering these consolidated soils. It is likely that this slump feature is geologically recent; however, the

area appears stable at this time and no other areas within the potential anchoring radius appear to exhibit oversteepening. There is no thick accumulation of slump sediments at the base of the slump scour and there are no long run-outs of deposits extending near the proposed well GC 814-E.

The seafloor expression of a buried channel is located in the northeastern quadrant of the potential anchoring radius. The buried channel expression trends nearly north to south along the GC 814/815 block boundary ([Figure 1](#)). The buried channel is about 1,150 ft wide at the edge of the potential anchoring radius. The limits of the buried channel expression are located about 6,750 ft northeast of the proposed well GC 814-E.

Two seafloor faults occur within the potential anchoring radius; both are within the eastern third of the radius ([Map 1](#); [Figure 1](#)). The nearest seafloor fault generally trends north to south and bounds the seafloor slump scour and occurs 12,120 ft east of the proposed well and is downthrown to the west. The other fault trends northwest to southeast and is located at the southern limit of the seafloor slump scour, about 12,225 ft from the proposed well. This fault is not associated with the slump scour and is downthrown to the northeast. Offset along this fault is generally less than ten feet.

Two seafloor expulsion mounds occur along the eastern edge of the potential anchoring radius ([Map 1](#); [Figure 1](#)). Both are located at the southeastern side of the seafloor slump scour. The larger expulsion mound is about 1,240 ft north-to-south and about 2,020 ft east-to-west and occurs 13,150 ft east-southeast of the proposed well. Steep slopes of up to 42.4° occur with this larger mound. The smaller expulsion mound is about 620 ft north-to-south and about 1,400 ft east-to-west and occurs 13,830 ft east-southeast of the proposed well. Slopes associated with this mound are much less pronounced, only reaching 17.3° near the potential anchoring radius for proposed well GC 814-E.

Man-Made Features. The only reported existing man-made feature within the potential anchoring radius is one existing well ([Map 1](#); MMS, 2010). The GC 858#1 well is located approximately 13,650 ft south-southeast of the proposed well GC 814-E.

There is no evidence of anomalous man-made features from the 3-D seismic data; however, man-made features and other seafloor conditions may exist that are not detectable within the resolution limits of the 3-D seismic data used for this assessment.

Benthic Communities. Seafloor amplitude anomalies can help identify possible areas of hydrocarbon seepage and/or carbonate accumulations that could support chemosynthetic or other deepwater benthic communities.

The seafloor amplitude response within the potential anchoring radius is relatively benign ([Map 2](#); [Figure 5](#)). There are no amplitude anomalies within Researcher Basin; however, several minor amplitude anomalies occur along the eastern edge of the potential anchoring radius within the seafloor slump scour. The nearest amplitude anomaly is located 9,920 ft east of the proposed well GC 814-E, with a group of amplitude anomalies associated with the seafloor slump scour. There is no evidence of fluid migration from depth along the slump bounding fault, or at any other point within the slump scour ([Figure 4](#)). It is likely that the amplitude anomalies within the slump scour are due to the exposure of consolidated

sediments within the scour, rather than the presence of hydrocarbons near the seafloor. It is unlikely that these anomalies represent areas that could support high-density chemosynthetic communities. Other deepwater benthic communities may be attached to the more consolidated seafloor materials; however, it is unlikely they would be found in large numbers.

Seafloor amplitude anomalies associated with seafloor expulsion mounds are located at and just beyond the limits of the potential anchoring radius at the southeastern corner of the slump scour (Map 2; Figure 5). The nearest amplitude anomaly associated with these expulsion mounds occurs more than 13,970 ft east-southeast of the proposed well GC 814-E. The expulsion mounds do not appear to be active at this time as there is a very small area of anomalous seafloor amplitudes. Additionally, there is no indication of fluid migration in the subsurface below the expulsion mounds (Figure 6). There is no evidence of stacked amplitude anomalies along buried faults, vertical acoustic void zones that extend to or near the seafloor, or any other subsurface amplitude anomalies indicating the presence of migrating hydrocarbons within the sediment column. Although there is a deep acoustic void below the southern expulsion mound, it appears to be associated with the steeply-dipping salt body causing the localized uplift.

The outlined areas of anomalous seafloor amplitude response are the most likely to support high-density benthic communities (Map 2). High-density chemosynthetic or other deepwater benthic communities may also be located within or near the seafloor amplitude anomalies within the relict expulsion mounds.

**Although we do not know the exact anchor pattern to be used, we recommend that any seafloor disturbances be located at least 250 ft from any features that could support high-density chemosynthetic communities or other deepwater benthic communities. We recommend using a state-of-the art positioning system to ensure any seafloor disturbances do not occur within 250 ft of such areas.**

#### **Muds and Cuttings Discharge Location (2,000 ft radius)**

Seafloor Conditions. The proposed well GC 814-E is located in the north-central portion of Researcher Basin (Map 1; Figure 1). Bathymetry values within the muds and cuttings discharge area for the proposed well range from 5,781 ft to 5,844 ft BSL (Map 3). The bathymetry value at this location is 5,829 ft BSL. The seafloor at the proposed well is generally smooth and slopes to the south at 0.2° (Figure 2).

There are no seafloor faults or seafloor amplitude anomalies within 2,000 ft of the proposed well (Map 4).

There are no reported man-made features within 2,000 ft of the proposed muds and cuttings discharge location (Map 1; MMS, 2010).

Benthic Communities. The nearest seafloor amplitude anomaly occurs 9,920 ft east of the proposed well and it is likely due to exposed consolidated sediments (Map 2). There are no seafloor amplitude anomalies or other indicators of hydrocarbon migration to the seafloor near the proposed well.



**Features or areas that could support high-density chemosynthetic communities or other deepwater benthic communities are not anticipated within 2,000 ft of the proposed muds and cuttings discharge location.**

### Wellbore Location

**Stratigraphy.** All six defined stratigraphic marker horizons were traced at the proposed well GC 814-E. A generalized description of the stratigraphic sequences can be found in Section 4 of the GEMS Geologic and Stratigraphic Assessment (2008). The GC 858-#1 well was drilled after the completion of the GEMS report (2008). The stratigraphy at this existing well ties to the sequences traced at the proposed well ([Figure 7](#)). The stratigraphic descriptions have been revised based on the conditions at the existing well. The following is an assessment of the conditions that will be encountered directly below the surface location.

Seafloor to Horizon 10. The sediments between the seafloor and Horizon 10 are hemipelagic clay drape sediments. This sequence is 236 ft thick at the proposed well ([Figure 8](#); GEMS report Map 6 [2008]).

There is a *low* potential of gas hydrates in this sequence. There is a *negligible* potential of shallow gas from within this sequence. There is a *negligible* potential of SWF from this sequence.

Horizon 10 to Horizon 20. The sequence between Horizon 10 and 20 is composed of mass transport deposits that are likely silts and clays, overlaid by thin clay turbidites. The sequence is about 496 ft thick at the proposed well. Horizon 20 is encountered 732 ft BML ([Figure 8](#); GEMS report Map 7 [2008]).

There is a *low* potential of gas hydrates in this sequence. There is a *negligible* potential of shallow gas from within this sequence. There is a *negligible* potential of SWF from this sequence.

Horizon 20 to Horizon 30. The sequence between Horizons 20 and 30 is composed of low-amplitude, parallel to slightly discontinuous reflectors that represent turbidite deposits that likely contain silts and clays. The sequence is about 764 ft thick at the proposed well. Horizon 30 is encountered at 1,496 ft BML ([Figure 8](#); GEMS report Map 8 [2008]).

There is a *low* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from within this sequence. There is a *low* potential of SWF from this sequence.

Horizon 30 to Horizon 40. The sequence between Horizons 30 and 40 is composed of parallel reflectors overlying moderate- to high-amplitude chaotic reflectors that represent turbidite deposits overlying an intraslope fan sequence. The upper turbidites are likely composed of silts and clays. The intraslope fan has been interpreted at the "GC Red" unit (GEMS, 2008). The intraslope fan sediments likely contain sands and silts. The sands are likely to be continuous and possibly overpressured. Thin sands were encountered at the GC 858#1 well within this sequence ([Figure 8](#)) and it is likely that thicker sands will be encountered at the proposed well GC 814-E. The sequence is about 898 ft thick at the

proposed well. Horizon 40 is encountered at 2,394 ft BML (Figure 8; GEMS report Map 9 [2008]).

The base of the gas hydrate stability zone (BGHSZ) is estimated at 1,736 ft BML (Maekawa et al., 1995). There is a *low* potential of gas hydrates in this sequence from Horizon 30 (1,496 ft BML) to the BGHSZ (1,736 ft BML) and a *negligible* potential from 1,736 ft BML to the base of this sequence (2,394 ft BML). There is a *moderate* potential of shallow gas from within this sequence. There is a *moderate* potential of SWF from this sequence.

Horizon 40 to Horizon 50. The sequence between Horizons 40 and 50 is composed of low-amplitude, parallel to slightly discontinuous reflectors. These reflectors represent turbidite deposits likely to contain silts and clays. The sequence is about 445 ft thick at the proposed well. Horizon 50 is encountered at 2,839 ft BML (Figure 8).

There is a *negligible* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from within this sequence. There is a *low* potential of SWF from this sequence.

Horizon 50 to Horizon 60. The sequence between Horizons 50 and 60 is composed of moderate amplitude slightly discontinuous reflectors overlying low-amplitude chaotic reflectors. These reflectors represent basin-fill deposits that may be sand-prone in the upper half with an increasing silt and clay content with depth. Sands were encountered at the GC 858#1 well within this sequence (Figure 7) and it is likely that sands will also be encountered at the proposed well GC 814-E. The sequence is about 829 ft thick at the proposed well. Horizon 60 is encountered at 3,668 ft BML (Figure 8).

The nearest subsurface amplitude anomaly to the proposed well occurs within this sequence, approximately 1,450 ft southwest of the proposed well GC 814-E (Map 4). This anomaly may represent a localized accumulation of gases within the sand-prone sediments of this sequence.

There is a *negligible* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from within this sequence. There is a *moderate* potential of SWF from this sequence.

Horizon 60 to Investigation Limit. The sequence below Horizon 60 contains alternating units of turbidites and expanded basin-fill deposits. The turbidites are likely to contain silts and clays. The basin-fill sediments are likely to be silts and thin sands. The sediments to the investigation limit of 3.6 seconds are predominantly clay-prone turbidites.

The top of salt is encountered beyond the investigation limit at 10,716 ft BML (16,545 ft BSL; GEMS report Map 10 [2008]).

There is a *negligible* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from within this sequence. There is a *low* potential of SWF from this sequence.

**Faults.** There are no seafloor faults at or near the proposed well GC 814-E. A vertical wellbore will not intersect any apparent buried faults within the investigation limit (Figure 8).

## Proposed Well GC 814-F

### Introduction

The seafloor assessment considers seafloor conditions within a potential anchoring radius of 14,000 ft from the proposed well, including the 2,000 ft radius from the muds and cuttings discharge location. The subsurface assessment considers the conditions from the seafloor 3.6 seconds two-way travel time (~4,155 ft BML), more than one second below the mudline at the proposed well.

The assessment of the proposed well GC 814-F is based on the interpretation of 3-D seismic data and is consistent with the findings presented in the report entitled *Geologic and Stratigraphic Assessment, Block 812, 814, 858, and 902, Green Canyon Area, Gulf of Mexico, Project No. 0408-1481*; prepared by Geoscience Earth & Marine Services, Inc. for Cobalt International Energy, L.P.; dated July 18, 2008.

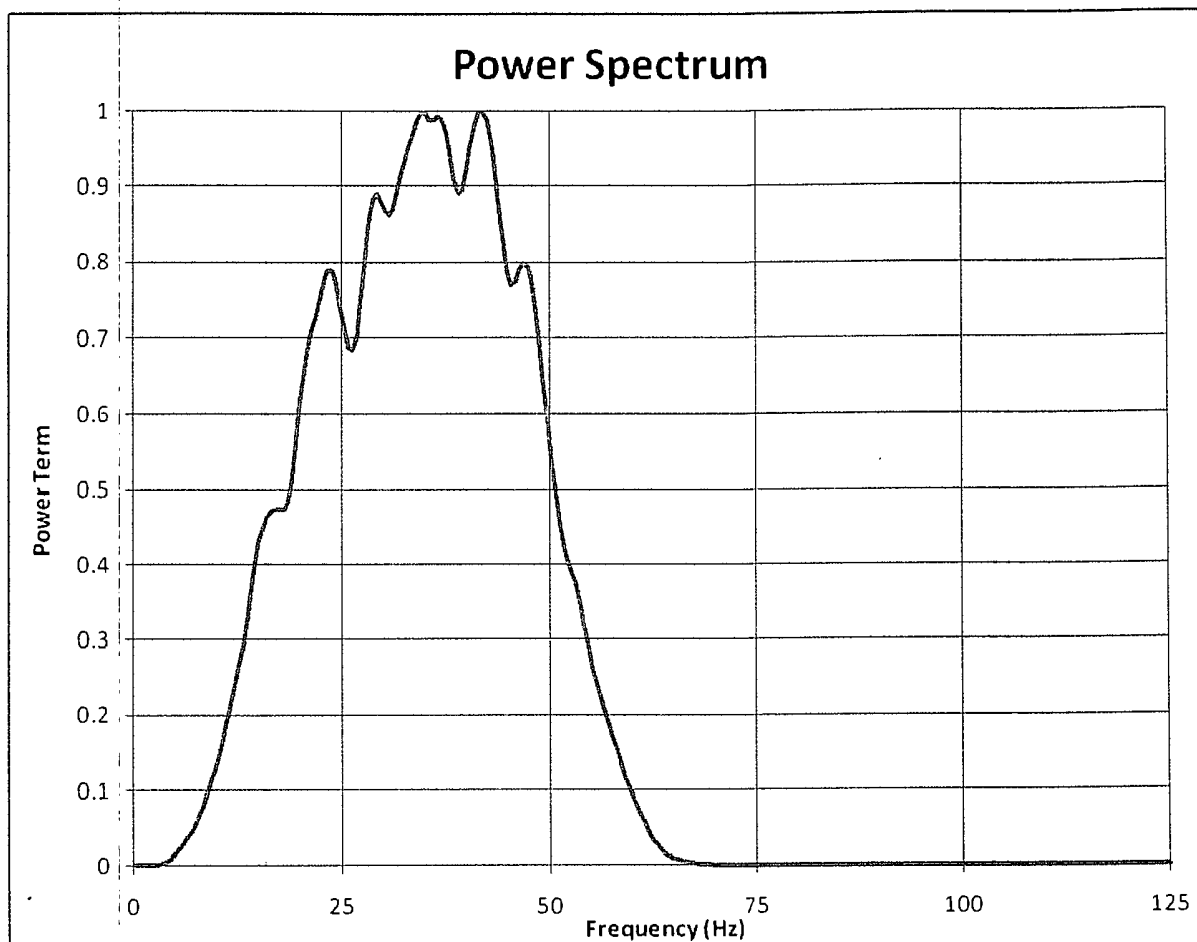
The proposed well GC 814-F location provided by Cobalt is as follows:

NAD27 UTM ZONE 15, US Survey ft		Geographic Coordinates	
X	Y	Latitude	Longitude
2,343,800	9,853,750	27° 8' 17.777"	-90° 50' 12.532"
Block Calls		3-D Seismic Line Reference	
		Line	Line
520' FEL	1,270' FSL	1986	9486

Table 2. Location, block calls, and seismic lines for Proposed Well GC 814-F

### Data Quality

The power spectrum for the proposed well was derived through the use of Seismic Micro-Technology's TracePAK tools. The frequency content appears to meet the minimum 50 Hz within the upper 1.0 second below the seafloor set forth in NTL No. 2008-G04.



Power Spectrum at Proposed Well GC 814-F

### **Potential Anchoring Radius (14,000 ft)**

Cobalt has not provided a specific anchor pattern design plan for favorability assessment. Per Cobalt's input, a potential anchoring radius of 14,000 ft was used for this analysis ([Figure 1](#)).

**Seafloor Conditions.** The bathymetry values within the potential anchoring radius range from 4,435 ft to 5,855 ft below sea level (BSL; see GEMS Map 2 [2008]). The western half of the potential anchoring radius for the proposed well GC 814-F is contained within Researcher Basin where the seafloor is relatively smooth and featureless ([Map 1](#); [Figure 1](#)). The eastern half of the potential anchoring radius is along the eastern bounding ridge of the basin. The ridge contains a seafloor slump scour, seafloor faults, and two seafloor expulsion mounds. Slopes range between 0.0° and 43.5° within the potential anchoring radius ([Figure 2](#)). The steepest slopes occur east of the proposed well along the seafloor faults along the eastern ridge which divides Researcher Basin from a large unnamed basin to the southeast. Elevated and irregular slopes occur within the seafloor slump scour located between 1,975 ft east and 6,300 ft northeast of the proposed well GC 814-F.

A total of twenty seafloor faults occur within the potential anchoring radius; all occur east of the proposed well ([Map 1](#); [Figure 1](#)). The nearest seafloor fault occurs 3,535 ft east-southeast of the proposed well. This fault trends northwest to southeast and is downthrown

to the northeast. The generally north to south trending fault that bounds the seafloor slump scour occurs 5,330 ft east-northeast of the proposed well and is downthrown to the west. Thirteen of the remaining seafloor faults occur to the east of the proposed well along a southwest to northeast trending ridge. These faults follow the trend of the ridge and are generally downthrown to the east and southeast with seafloor offsets of up to 45 ft. These faults also have variable extents ranging from about 700 ft to nearly 4,000 ft. The final four faults occur southeast of the proposed well GC 814-F. These faults are downthrown to the east and bound the large unnamed basin located in GC 859 and 860. Seafloor offsets of over 60 ft occur along these faults.

The seafloor within the slump scour is slightly irregular, without distinctive sediment pathways (Map 1; Figure 3). The slump scour area is about 6,860 ft north-to-south and 3,840 ft east-to-west. The slump scour occurs between 1,975 ft east and 6,300 ft northeast of the proposed well GC814-F. A cross-section view of this slump scour shows that consolidated sediments are likely exposed at or near the seafloor (Figure 4). There is no seismic evidence of a distinct layer of drape sediments covering these consolidated soils. It is likely that this slump feature is geologically recent; however, the area appears stable at this time and no other areas within the potential anchoring radius appear to exhibit oversteepening. There is no thick accumulation of slump sediments at the base of the slump scour and there are no long run-outs of deposits extending near the proposed well GC 814-F.

The seafloor expression of a buried channel is located in the northern portion of the potential anchoring radius. The buried channel expression trends nearly north to south along the GC 814/815 block boundary (Figure 1). The buried channel is about 1,050 ft wide at the edge of the potential anchoring radius. The limits of the buried channel expression are located about 7,200 ft north of the proposed well GC 814-F.

Two seafloor expulsion mounds occur within the potential anchoring radius (Map 1; Figure 1). Both are located east of the seafloor slump scour. The larger expulsion mound is about 1,240 ft north-to-south and about 2,020 ft east-to-west and occurs 4,730 ft east-southeast of the proposed well. Steep slopes of up to 42.4° occur with this larger mound. The smaller expulsion mound is about 620 ft north-to-south and about 1,400 ft east-to-west and occurs 5,735 ft east of the proposed well. Slopes associated with this mound only reach a maximum of about 17.3°.

Man-Made Features. The only reported existing man-made feature within the potential anchoring radius is one existing well (Map 1; MMS, 2010). The GC 858#1 well is located approximately 9,025 ft south-southwest of the proposed well GC 814-F.

There is no evidence of anomalous man-made features from the 3-D seismic data; however, man-made features and other seafloor conditions may exist that are not detectable within the resolution limits of the 3-D seismic data used for this assessment.

Benthic Communities. Seafloor amplitude anomalies can help identify possible areas of hydrocarbon seepage and/or carbonate accumulations that could support chemosynthetic communities.

The seafloor amplitude response within the western half of the potential anchoring radius is relatively benign ([Map 2](#); [Figure 5](#)). There are no amplitude anomalies within Researcher Basin; however, several amplitude anomalies are located within the potential anchoring radius in the southern half of GC 815. A group of anomalies occurs within the seafloor slump scour to the northeast of the proposed well. Anomalies are found in association with the seafloor expulsion mounds and with some of the seafloor faults near the limits of the potential anchoring radius.

The nearest amplitude anomaly is located 2,500 ft east-northeast of the proposed well GC 814-F within the seafloor slump scour. This anomaly occurs with several others within the seafloor slump scour. There is no evidence of fluid migration from depth along the slump bounding fault, or at any other point within the slump scour ([Figure 4](#)). It is likely that the amplitude anomalies within the slump scour are due to the exposure of consolidated sediments within the scour, rather than the presence of hydrocarbons near the seafloor. It is unlikely that these anomalies represent areas that could support high-density chemosynthetic communities. Other deepwater benthic communities may be attached to the more consolidated seafloor materials; however, it is unlikely they would be found in large numbers.

Two seafloor amplitude anomalies associated with seafloor expulsion mounds are located within the potential anchoring radius ([Map 2](#); [Figure 5](#)). The larger amplitude anomaly occurs about 5,545 ft east-southeast of the proposed well GC 814-F within the limits of the larger expulsion mound. A second amplitude anomaly is found along the eastern edge of the smaller expulsion mound, about 6,785 ft east-northeast of the proposed well. The expulsion mounds do not appear to be active at this time as there is a very small area of anomalous seafloor amplitudes. Additionally, there is no indication of fluid migration in the subsurface below the expulsion mounds ([Figure 6](#)). There is no evidence of stacked amplitude anomalies along buried faults, vertical acoustic void zones that extend to or near the seafloor, or any other subsurface amplitude anomalies indicating the presence of migrating hydrocarbons within the sediment column. Although there is a deep acoustic void below the southern expulsion mound, it appears to be associated with the steeply-dipping salt body causing the localized uplift.

Several amplitude anomalies follow a southwest to northeast trend along a major fault in the eastern portion of the potential anchoring radius ([Map 2](#)). The nearest of these amplitudes occurs about 10,840 ft east-northeast of the proposed well and the grouping trends beyond the limit of the potential anchoring radius. There are no indications of fluid migration along these seafloor faults, such as stacked amplitude anomalies or subsurface acoustic void zones. The seafloor amplitude anomalies may represent areas of ponded soft sediments that have sloughed off the steep slopes of the seafloor faults.

The outlined areas of anomalous seafloor amplitude response are the most likely to support high-density benthic communities ([Map 2](#)). High-density chemosynthetic or other deepwater benthic communities may also be located within or near the seafloor amplitude anomalies within the relict expulsion mounds.

Although we do not know the exact anchor pattern to be used, we recommend that any seafloor disturbances be located at least 250 ft from any features that could support high-density chemosynthetic communities or other deepwater benthic communities. We recommend using a state-of-the art positioning system to ensure any seafloor disturbances do not occur within 250 ft of such areas.

### **Muds and Cuttings Discharge Location (2,000 ft radius)**

**Seafloor Conditions.** The proposed well GC 814-F is located in the eastern portion of Researcher Basin (Map 1; Figure 1). Bathymetry values within the muds and cuttings discharge area for the proposed well range from 5,766 ft to 5,843 ft BSL (Map 5). The bathymetry value at this location is 5,822 ft BSL. The seafloor at the proposed well is generally smooth and slopes to the west-southwest at about 1.0° (Figure 2).

There are no seafloor faults or seafloor amplitude anomalies within 2,000 ft of the proposed well (Map 6). The eastern limit of the seafloor slump scour is located 1,975 ft east of the proposed well GC 814-G. Slightly irregular seafloor might be encountered with this edge of the slump scour.

There are no reported man-made features within 2,000 ft of the proposed muds and cuttings discharge location (Map 1; MMS, 2010).

**Benthic Communities.** The nearest seafloor amplitude anomaly occurs 2,500 ft east-northeast of the proposed well within the seafloor slump scour. This anomaly is likely due to exposed consolidated sediments (Map 2). There are no seafloor amplitude anomalies or other indicators of hydrocarbon migration to the seafloor near the proposed well.

**Features or areas that could support high-density chemosynthetic communities or other deepwater benthic communities are not anticipated within 2,000 ft of the proposed muds and cuttings discharge location.**

### **Wellbore Location**

**Stratigraphy.** All six defined stratigraphic marker horizons were traced at the proposed well GC 814-F. A generalized description of the stratigraphic sequences can be found in Section 4 of the GEMS Geologic and Stratigraphic Assessment (2008). The GC 858-#1 well was drilled after the completion of the GEMS report (2008). The stratigraphy at this existing well ties to the sequences traced at the proposed well (Figure 7). The stratigraphic descriptions have been revised based on the conditions at the existing well. The following is an assessment of the conditions that will be encountered directly below the surface location.

**Seafloor to Horizon 10.** The sediments between the seafloor and Horizon 10 are hemipelagic clay drape sediments. This sequence is 236 ft thick at the proposed well (Figure 9; GEMS report Map 6 [2008]).

The nearest subsurface amplitude anomaly to the proposed well occurs within the sediments between the seafloor and Horizon 10, approximately 300 ft west of the proposed well GC 814-F (Map 6). This anomaly may represent a localized accumulation of biogenic gas. The uplifted ridge to the east may have deposited organic rich sediments that accumulated

along the edge of the basin, allowing for biogenic gases to accumulate in the shallowest sediments.

There is a *low* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from within this sequence. There is a *negligible* potential of SWF from this sequence.

Horizon 10 to Horizon 20. The sequence between Horizon 10 and 20 is composed of mass transport deposits that are likely silts and clays, overlaid by thin clay turbidites. The sequence is about 268 ft thick at the proposed well. Horizon 20 is encountered 504 ft BML (Figure 9; GEMS report Map 7 [2008]).

There is a *low* potential of gas hydrates in this sequence. There is a *negligible* potential of shallow gas from within this sequence. There is a *negligible* potential of SWF from this sequence.

Horizon 20 to Horizon 30. The sequence between Horizons 20 and 30 is composed of low-amplitude, parallel to slightly discontinuous reflectors that represent turbidite deposits that likely contain silts and clays. The sequence is about 327 ft thick at the proposed well. Horizon 30 is encountered at 831 ft BML (Figure 9; GEMS report Map 8 [2008]).

There is a *low* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from within this sequence. There is a *low* potential of SWF from this sequence.

Horizon 30 to Horizon 40. The sequence between Horizons 30 and 40 is pinching out along the edge of salt. The sequence contains prominent parallel reflectors with a section of slightly amorphous reflectors. This sequence probably represents predominantly clay turbidite deposits with possible thin mass transport deposits. The mass transport deposits may be associated with the intraslope fan sequence "GC Red" unit which is pinching out at the proposed well GC 814-F. The mass transport deposits likely contain silts and thin sands. There is no evidence of the continuous sands found in thicker, basinal portions of the "GC Red" unit. Thin sands were encountered at the GC 858#1 well within this sequence (Figure 7); however, as the unit is so thinned at the proposed well extensive sands are unlikely. If sands are encountered within this sequence they are likely to be overpressured due to the uplift along the salt. The sequence is about 121 ft thick at the proposed well. Horizon 40 is encountered at 952 ft BML (Figure 9; GEMS report Map 9 [2008]).

There is a *low* potential of gas hydrates in this sequence. There is a *moderate* potential of shallow gas from within this sequence. There is a *moderate* potential of SWF from this sequence.

Horizon 40 to Horizon 50. The sequence between Horizons 40 and 50 is composed of low-amplitude parallel to slightly discontinuous reflectors. These reflectors represent turbidite deposits likely to contain silts and clays. The sequence is about 375 ft thick at the proposed well. Horizon 50 is encountered at 1,327 ft BML (Figure 9).

There is a *low* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from within this sequence. There is a *low* potential of SWF from this sequence.



Horizon 50 to Horizon 60. The sequence between Horizons 50 and 60 is composed of moderate-amplitude, slightly discontinuous reflectors overlying low-amplitude chaotic reflectors. These reflectors represent basin-fill deposits that may be sand-prone in the upper half with an increasing silt and clay content with depth. Sands were encountered at the GC 858#1 well within this sequence (Figure 7) and it is likely that sands will also be encountered at the proposed well GC 814-F. The sequence is about 445 ft thick at the proposed well. Horizon 60 is encountered at 1,772 ft BML (Figure 9).

The base of the gas hydrate stability zone (BGHSZ) is estimated at 1,735 ft BML (Maekawa et al., 1995). There is a *low* potential of gas hydrates in this sequence from Horizon 50 (1,327 ft BML) to the BGHSZ (1,735 ft BML) and a *negligible* potential from 1,735 ft BML to the base of this sequence (1,772 ft BML). There is a *low* potential of shallow gas from within this sequence. There is a *moderate* potential of SWF from this sequence.

Horizon 60 to Investigation Limit. The sequence below Horizon 60 contains alternating units of turbidites and expanded basin-fill deposits. The turbidites are likely to contain silts and clays. The basin-fill sediments are likely to be silts and thin sands. A series of mass transport deposits occur between 2,505 ft and 3,599 ft BML (Figure 9). This unit contains moderate- to high-amplitude discontinuous to chaotic reflectors, indicating these sediments may be sand-prone.

The top of salt is encountered beyond the investigation limit at 12,929 ft BML (18,751 ft BSL; GEMS report Map 10 [2008]).

There is a *negligible* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from the upper units of the sequence. There is a *moderate* potential of shallow gas from the mass transport deposits between 2,505 ft and 3,599 ft BML and a *low* potential of shallow gas to the investigation limit. There is a *low* potential of SWF from this sequence.

Faults. A vertical wellbore at the proposed well GC 814-F will not intersect any apparent buried faults within the investigation limit (Figure 9). The nearest buried fault occurs about 200 ft south of the proposed well. There is no evidence of fluid migration along this fault.

## Proposed Well GC 814-G

### Introduction

The seafloor assessment considers seafloor conditions within a potential anchoring radius of 14,000 ft from the proposed well, including the 2,000 ft radius from the muds and cuttings discharge location. The subsurface assessment considers the conditions from the seafloor 3.6 seconds two-way travel time (~4,138 ft BML), more than one second below the mudline at the proposed well.

The assessment of the proposed well GC 814-G is based on the interpretation of 3-D seismic data and is consistent with the findings presented in the report entitled *Geologic and Stratigraphic Assessment, Block 812, 814, 858, and 902, Green Canyon Area, Gulf of Mexico, Project No. 0408-1481*; prepared by Geoscience Earth & Marine Services, Inc. for Cobalt International Energy, L.P.; dated July 18, 2008.

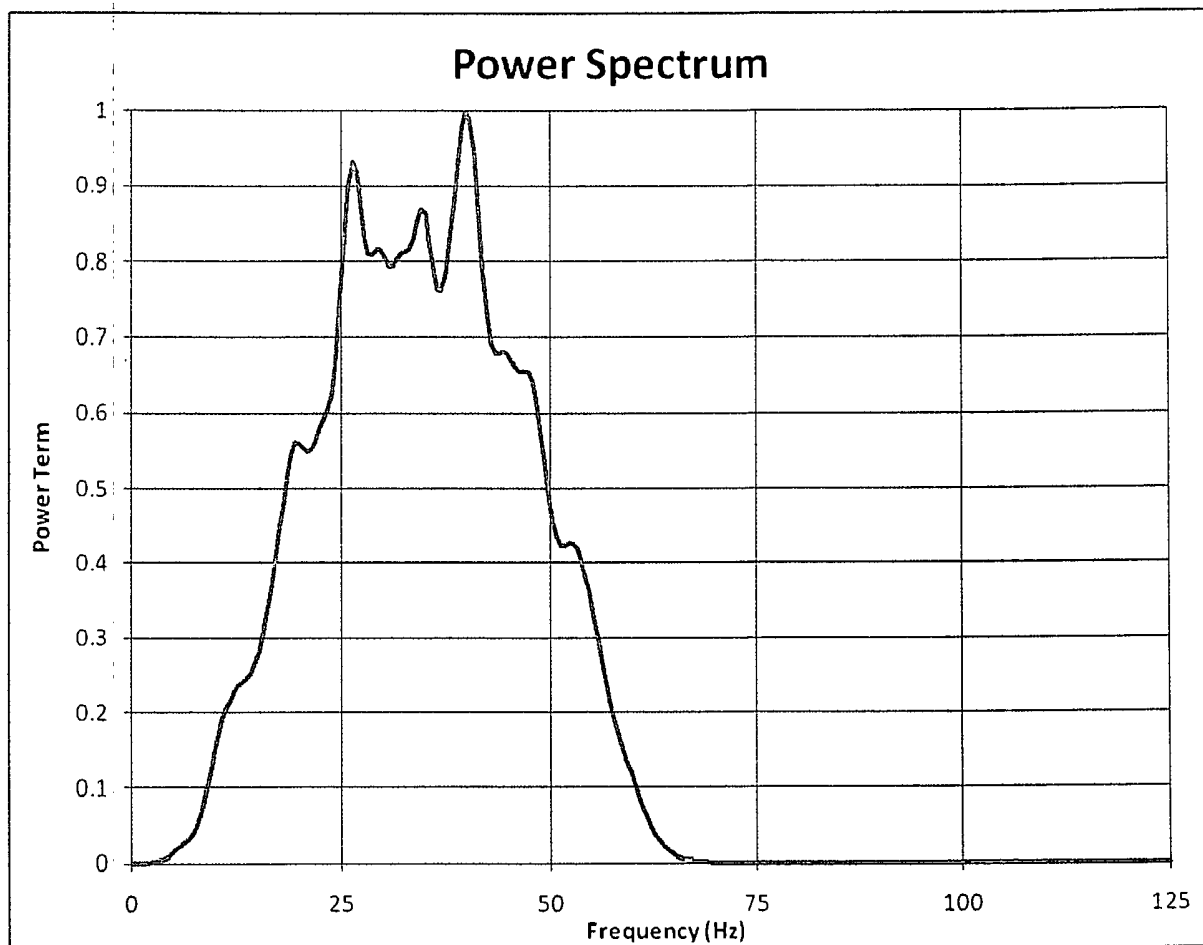
The proposed well GC 814-G location provided by Cobalt is as follows:

NAD27 UTM ZONE 15, US Survey ft		Geographic Coordinates	
X	Y	Latitude	Longitude
2,335,726	9,857,559	27° 8' 56.857"	-90° 51' 41.155"
Block Calls		3-D Seismic Line Reference	
		Line	Trace
7,249' FWL	5,079' FSL	2044	9289

Table 3. Location, block calls, and seismic lines for Proposed Well GC 814-G

### Data Quality

The power spectrum for the proposed well was derived through the use of Seismic Micro-Technology's TracePAK tools. The frequency content appears to meet the minimum 50 Hz within the upper 1.0 second below the seafloor set forth in NTL No. 2008-G04.



Power Spectrum at Proposed Well GC 814-G

### Potential Anchoring Radius (14,000 ft)

Cobalt has not provided a specific anchor pattern design plan for favorability assessment. Per Cobalt's input, a potential anchoring radius of 14,000 ft was used for this analysis ([Figure 1](#)).

Seafloor Conditions. The bathymetry values within the potential anchoring radius range from 4,970 ft to 5,855 ft below sea level (BSL; see GEMS Map 2 [2008]). The potential anchoring radius for the proposed well GC 814-G is predominantly contained within Researcher Basin where the seafloor is relatively smooth and featureless ([Map 1](#); [Figure 1](#)). Slopes range between 0.0° and 37.1° within the potential anchoring radius ([Figure 2](#)). The steepest slopes occur within the seafloor slump scour, which occurs between 9,895 ft and 14,160 ft east-southeast of the proposed well.

The seafloor within the slump scour is slightly irregular, without distinctive sediment pathways ([Map 1](#); [Figure 3](#)). The seafloor slump scour measures about 6,860 ft north-to-south and about 3,580 ft west-to-east, along the direction of failure. A cross-section view of this slump scour shows that consolidated sediments are likely exposed at or near the seafloor ([Figure 4](#)). There is no seismic evidence of a distinct layer of drape sediments covering these consolidated soils. It is likely that this slump feature is geologically recent; however, the area appears stable at this time and no other areas within the potential anchoring radius

appear to exhibit oversteepening. There is no thick accumulation of slump sediments at the base of the slump scour and there are no long run-outs of deposits extending near the proposed well GC 814-G.

The seafloor expression of a buried channel is located in the northeastern quadrant of the potential anchoring radius. The buried channel expression trends nearly north to south along the GC 814/815 block boundary ([Figure 1](#)). The buried channel is about 1,050 ft wide in the northwestern corner of GC 815 where it crosses the potential anchoring radius. The limits of the buried channel expression are located about 7,380 ft northeast of the proposed well GC 814-G.

Two seafloor faults occur within the potential anchoring radius; both are within the eastern third of the radius ([Map 1](#); [Figure 1](#)). The nearest seafloor fault trends northwest to southeast and is located near the southern limit of the seafloor slump scour, about 12,430 ft from the proposed well. This fault is not associated with the slump scour and is downthrown to the northeast. Offset along this fault is generally less than ten feet. The other fault within the potential anchoring radius is the generally north to south trending fault that bounds the seafloor slump scour. This bounding fault occurs 12,700 ft east of the proposed well and is downthrown to the west.

A large seafloor expulsion mound occurs along the eastern edge of the potential anchoring radius ([Map 1](#); [Figure 1](#)). A second expulsion mound is located just beyond the limits of the potential anchoring radius. Both mounds are located at the southeastern side of the seafloor slump scour. The larger expulsion mound is about 1,240 ft north-to-south and about 2,020 ft east-to-west and occurs 13,580 ft east-southeast of the proposed well. Steep slopes of up to 42.4° occur with this larger mound just beyond the potential anchoring radius. The smaller expulsion mound is about 620 ft north-to-south and about 1,400 ft east-to-west and occurs 14,300 ft east-southeast of the proposed well. Slopes associated with this mound are much less pronounced, only reaching a maximum 17.3° near the potential anchoring radius for proposed well GC 814-G.

Man-Made Features. The only reported existing man-made feature within the potential anchoring radius is one existing well ([Map 1](#); MMS, 2010). The GC 858#1 well is located approximately 13,250 ft south-southeast of the proposed well GC 814-G.

There is no evidence of anomalous man-made features from the 3-D seismic data; however, man-made features and other seafloor conditions may exist that are not detectable within the resolution limits of the 3-D seismic data used for this assessment.

Benthic Communities. Seafloor amplitude anomalies can help identify possible areas of hydrocarbon seepage and/or carbonate accumulations that could support chemosynthetic or other deepwater benthic communities.

The seafloor amplitude response within the potential anchoring radius is relatively benign ([Map 2](#); [Figure 5](#)). There are no amplitude anomalies within Researcher Basin; however, several minor amplitude anomalies occur along the eastern edge of the potential anchoring radius within the seafloor slump scour. The nearest amplitude anomaly is located 10,460 ft east-southeast of the proposed well GC 814-G, with a group of amplitude anomalies

associated with the seafloor slump scour. There is no evidence of fluid migration from depth along the slump bounding fault, or at any other point within the slump scour ([Figure 4](#)). It is likely that the amplitude anomalies within the slump scour are due to the exposure of consolidated sediments within the scour, rather than the presence of hydrocarbons near the seafloor. It is unlikely that these anomalies represent areas that could support high-density chemosynthetic communities. Other deepwater benthic communities may be attached to the more consolidated seafloor materials; however, it is unlikely they would be found in large numbers.

Seafloor amplitude anomalies associated with seafloor expulsion mounds are located beyond the limits of the potential anchoring radius at the southeastern corner of the slump scour ([Map 2](#); [Figure 5](#)). The nearest amplitude anomaly associated with these expulsion mounds occurs about 14,340 ft east-southeast of the proposed well GC 814-G. The expulsion mounds do not appear to be active at this time as there is a very small area of anomalous seafloor amplitudes. Additionally, there is no indication of fluid migration in the subsurface below the expulsion mounds ([Figure 6](#)). There is no evidence of stacked amplitude anomalies along buried faults, vertical acoustic void zones that extend to or near the seafloor, or any other subsurface amplitude anomalies indicating the presence of migrating hydrocarbons within the sediment column. Although there is a deep acoustic void below the southern expulsion mound, it appears to be associated with the steeply-dipping salt body causing the localized uplift.

The outlined areas of anomalous seafloor amplitude response are the most likely to support high-density benthic communities ([Map 2](#)). High-density chemosynthetic or other deepwater benthic communities may also be located within or near the seafloor amplitude anomalies within the relict expulsion mounds.

**Although we do not know the exact anchor pattern to be used, we recommend that any seafloor disturbances be located at least 250 ft from any features that could support high-density chemosynthetic communities or other deepwater benthic communities. We recommend using a state-of-the art positioning system to ensure any seafloor disturbances do not occur within 250 ft of such areas.**

### **Muds and Cuttings Discharge Location (2,000 ft radius)**

Seafloor Conditions. The proposed well GC 814-G is located in the north-central portion of Researcher Basin ([Map 1](#); [Figure 1](#)). Bathymetry values within the muds and cuttings discharge area for the proposed well range from 5,803 ft to 5,845 ft BSL ([Map 7](#)). The bathymetry value at this location is 5,837 ft BSL. The seafloor at the proposed well is generally smooth and slopes slightly to the south at 0.1° ([Figure 2](#)).

There are no seafloor faults or seafloor amplitude anomalies within 2,000 ft of the proposed well ([Map 8](#)).

There are no reported man-made features within 2,000 ft of the proposed muds and cuttings discharge location ([Map 1](#); MMS, 2010).

Benthic Communities. The nearest seafloor amplitude anomalies occur 10,460 ft east-southeast of the proposed well and are likely due to exposed consolidated sediments (Map 2). There are no seafloor amplitude anomalies or other indicators of hydrocarbon migration to the seafloor near the proposed well.

**Features or areas that could support high-density chemosynthetic communities or other deepwater benthic communities are not anticipated within 2,000 ft of the proposed muds and cuttings discharge location.**

### Wellbore Location

Stratigraphy. All six defined stratigraphic marker horizons were traced at the proposed well GC 814-G. A generalized description of the stratigraphic sequences can be found in Section 4 of the GEMS Geologic and Stratigraphic Assessment (2008). The GC 858-#1 well was drilled after the completion of the GEMS report (2008). The stratigraphy at this existing well ties to the sequences traced at the proposed well (Figure 7). The stratigraphic descriptions have been revised based on the conditions at the existing well. The following is an assessment of the conditions that will be encountered directly below the surface location.

Seafloor to Horizon 10. The sediments between the seafloor and Horizon 10 are hemipelagic clay drape sediments. This sequence is 261 ft thick at the proposed well (Figure 10; GEMS report Map 6 [2008]).

There is a *low* potential of gas hydrates in this sequence. There is a *negligible* potential of shallow gas from within this sequence. There is a *negligible* potential of SWF from this sequence.

Horizon 10 to Horizon 20. The sequence between Horizon 10 and 20 is composed of mass transport deposits that are likely silts and clays, overlaid by thin clay turbidites. The sequence is about 517 ft thick at the proposed well. Horizon 20 is encountered 778 ft BML (Figure 10; GEMS report Map 7 [2008]).

There is a *low* potential of gas hydrates in this sequence. There is a *negligible* potential of shallow gas from within this sequence. There is a *negligible* potential of SWF from this sequence.

Horizon 20 to Horizon 30. The sequence between Horizons 20 and 30 is composed of low-amplitude parallel to slightly discontinuous reflectors that represent turbidite deposits that likely contain silts and clays. The sequence is about 812 ft thick at the proposed well. Horizon 30 is encountered at 1,590 ft BML (Figure 10; GEMS report Map 8 [2008]).

There is a *low* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from within this sequence. There is a *low* potential of SWF from this sequence.

Horizon 30 to Horizon 40. The sequence between Horizons 30 and 40 is composed of parallel reflectors overlying moderate- to high-amplitude chaotic reflectors that represent turbidite deposits overlying an intraslope fan sequence. The upper turbidites are likely composed of silts and clays. The intraslope fan has been interpreted at the "GC Red" unit

(GEMS, 2008). The intraslope fan sediments likely contain sands and silts. The sands are likely to be continuous and possibly overpressured. Thin sands were encountered at the GC 858#1 well within this sequence ([Figure 7](#)) and it is likely that thicker sands will be encountered at the proposed well GC 814-G. The sequence is about 900 ft thick at the proposed well. Horizon 40 is encountered at 2,490 ft BML ([Figure 10](#); GEMS report Map 9 [2008]).

The base of the gas hydrate stability zone (BGHSZ) is estimated at 1,738 ft BML (Maekawa et al., 1995). There is a *low* potential of gas hydrates in this sequence from Horizon 30 (1,590 ft BML) to the BGHSZ (1,738 ft BML) and a *negligible* potential from 1,738 ft BML to the base of this sequence (2,490 ft BML). There is a *moderate* potential of shallow gas from within this sequence. There is a *moderate* potential of SWF from this sequence.

Horizon 40 to Horizon 50. The sequence between Horizons 40 and 50 is composed of low-amplitude parallel to slightly discontinuous reflectors. These reflectors represent turbidite deposits likely to contain silts and clays. The sequence is about 461 ft thick at the proposed well. Horizon 50 is encountered at 2,951 ft BML ([Figure 10](#)).

There is a *negligible* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from within this sequence. There is a *low* potential of SWF from this sequence.

Horizon 50 to Horizon 60. The sequence between Horizons 50 and 60 is composed of moderate-amplitude, slightly discontinuous reflectors overlying low-amplitude chaotic reflectors. These reflectors represent basin-fill deposits that may be sand-prone in the upper half with an increasing silt and clay content with depth. Sands were encountered at the GC 858#1 well within this sequence ([Figure 7](#)) and it is likely that sands will also be encountered in the upper half of this sequence at the proposed well GC 814-G. The sequence is about 806 ft thick at the proposed well. Horizon 60 is encountered at 3,757 ft BML ([Figure 10](#)).

The nearest subsurface amplitude anomaly to the proposed well occurs within this sequence, approximately 480 ft west of the proposed well GC 814-G ([Map 8](#)). This anomaly may represent a localized accumulation of gases within the sand-prone sediments of this sequence.

There is a *negligible* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from within this sequence. There is a *moderate* potential of SWF from this sequence.

Horizon 60 to Investigation Limit. The sequence below Horizon 60 contains alternating units of turbidites and expanded basin-fill deposits. The turbidites are likely to contain silts and clays. The basin-fill sediments are likely to be silts and thin sands. The top of salt is encountered beyond the investigation limit at 10,514 ft BML (16,351 ft BSL; GEMS report Map 10 [2008]).

There is a *negligible* potential of gas hydrates in this sequence. There is a *low* potential of shallow gas from within this sequence. There is a *low* potential of SWF from this sequence.

**Faults.** There are no seafloor faults at or near the proposed well GC 814-G. A vertical wellbore will not intersect any apparent buried faults within the investigation limit (Figure 10).



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

**(A) CONCENTRATION**

Cobalt 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), Cobalt requests that Green Canyon Block 814 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 could disturb seafloor areas in deepwater, therefore, a report described in Attachment B of NTL No. 2000-G20 "Deepwater Chemosynthetic Communities" is provided below:

**MAPS**

Submitted under separate cover are maps prepared using 3-D seismic data depicting bathymetry, seafloor and shallow geological features, surface location of proposed well(s) and a radius circle of 2000 feet around each such location.

**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**

All proposed well locations and the associated anchor pattern:

- 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).

**1. Sensitive Underwater Features**

A semi-submersible drilling rig will be used for this project. Neither the drilling rig nor the associated anchors will be placed within 500 feet of a no-activity zone. Therefore, topographic features information is not required.

**2. Marine Sanctuaries**

Green Canyon Block 814 is not located within 100 feet of any pinnacle trend feature with vertical relief equal to or greater than 8 feet; therefore, live bottom information is not required.

**(B) TOPOGRAPHIC FEATURES MAP**

Activities proposed in this EP do not fall within 305 meters (1000 feet) of the "no activity zone", therefore no map is required.

**(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***

Green Canyon Block 814 is not located within 100 feet of any pinnacle trend feature with vertical relief equal to or greater than 8 feet; therefore, live bottom information is not required.

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

Green Canyon Block 814 is not located within 100 feet of any pinnacle trend feature with vertical relief equal to or greater than 8 feet; therefore, live bottom (low relief) maps are not required.

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

Green Canyon Block 814 is not located within 30 meters (100 feet) of potentially sensitive biological features; therefore, biologically sensitive area maps are not required.

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

MMS has determined that there is enough data gathered in this grid area, therefore, we will not be conducting any ROV surveys either pre-spudging 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***

Green Canyon Block 814 is not located in an area determined to have any historic or prehistoric cultural resources.

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

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

Projected Generated Waste information is not required in this Exploration Plan, per NTL 2008-G04.

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

Discharge information is not required in this Exploration Plan, per NTL 2008-G04.

## 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)	366.05	89916.25	366.05
Particular matter (PM)	48.55	4528.80	48.55
Sulphur dioxide (SO <sub>2</sub> )	222.72	4528.80	222.72
Nitrogen oxides (NO <sub>x</sub> )	1669.20	4528.80	1669.20
Volatile organic compounds (VOC)	50.37	4528.80	50.37

<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.

Enclosed as **Attachment G-1** are the emissions worksheets prepared in accordance with 30 CFR 250.303(d).

This information was calculated by: Erin Rachal  
(281) 578-3388  
erin.rachal@jccteam.com



## APPENDIX H OIL SPILLS INFORMATION

**(A) OIL SPILL RESPONSE PLANNING**

**(2)(i)** All proposed activities and facilities in this EP will be covered by the Regional OSRP filed by Cobalt International Energy, L.P., MMS GOM Number 02873, in accordance with 30 CFR 254 and approved on June 30, 2009.

**(A)(2)(ii) SPILL RESPONSE SITES**

Primary Response Equipment Location	Preplanned Staging Location
Houma, LA Venice, LA Belle Chasse, LA	Houma or Fourchon, LA Venice, LA Venice, LA

**(A)(2)(iii) OSRP INFORMATION**

Cobalt'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.

**(A)(2)(iv) WORST-CASE SCENARIO COMPARISON**

Category	Regional OSRP WCD	EP WCD
Type of Activity	Exploratory	Exploratory
Facility Location (Area/Block)	Green Canyon 957	Green Canyon 814
Facility Designation		Well Location E
Distance to Nearest Shoreline (miles)	146	136
Volume		
Storage tanks (total)		
Uncontrolled blowout	57.5 MBOPD	50.4 MBOPD
Total Volume	57.5 MBOPD	50.4 MBOPD
Type of Oil(s) (crude, condensate, diesel)	Crude	Crude
API Gravity	22°	22°

Cobalt 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 Cobalt has the capability to respond to the worst-case spill scenario included in our Regional OSRP approved on June 30, 2009, 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 Cobalt 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**

Green Canyon Block 814 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 32534 Green Canyon Block 814.

#### **1. Military Warning Area (MWA)**

Green Canyon Blocks 814 and 858 are located within designated MWA-W92. The Naval Air Station will be contacted in order to coordinate and control the electromagnetic emissions during the proposed operations.

#### **4. Marine Protected Species**

Lease Stipulation No. 8 is meant to reduce the potential taking of marine protected species. Cobalt 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**

**(a) MEASURES TAKEN TO AVOID, MINIMIZE, AND MITIGATE IMPACTS**

Not applicable.

**(b) INCIDENTAL TAKES**

Cobalt International Energy, L.P. 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**

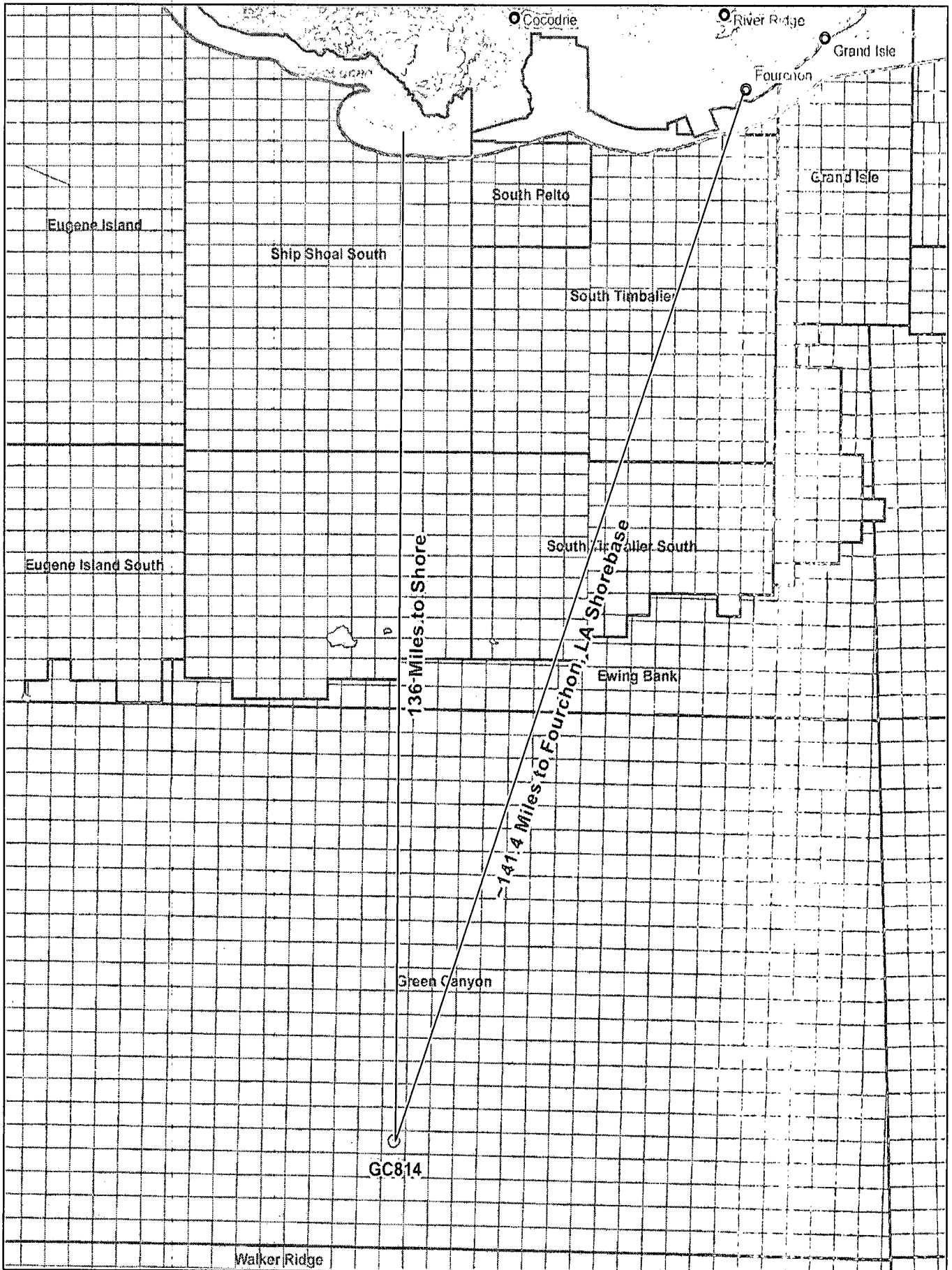
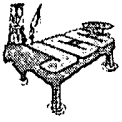
**(A) GENERAL**

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	2	2 Days
Anchor Handling Boat	1500 bbls	1	10 Days
Crew Boat	500 bbls	1	3 trips/week
Supply Boat	500 bbls	1	3 trips/week
Helicopter	NA	1	As needed

**(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**

Provide a listing in the table below of the onshore facilities that will be used to provide supply and service support for the proposed activities:

<i>Name of Shorebase</i>	<i>Location</i>	<i>Existing/New/Modified</i>
Fourchon Service Base	Port Fourchon, LA	Existing
MI Drilling Fluids	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.

**(C) WASTE DISPOSAL**

Provide information in the table below on the onshore facilities you will use to store and dispose of any solid and liquid wastes generated by the proposed activities.

<i>Name/Location of Facility</i>	<i>Type of waste</i>	<i>Amount</i>	<i>Rate</i>	<i>Disposal Method</i>
Chemical Waste Management; Carlyss, LA	Norm-contaminated wastes	1 ton	NA	Transport to a transfer station via dedicated barge
Waste Management; Lake Charles, LA	Trash and debris	1000 ft <sup>3</sup>	3 ft <sup>3</sup> /day	Transport in storage bins on crew boat to shorebase; truck to landfill

**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 not required for the proposed supplemental operations.

**APPENDIX O  
ENVIRONMENTAL IMPACT ANALYSIS (EIA)**

**Supplemental Exploration Plan  
Green Canyon Block 814  
OCS-G 32534**

**(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			(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			(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:
  - o 4-mile zone of the Flower Garden Banks, or the 3-mile zone of Stetson Bank;
  - o 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;
  - o Essential Fish Habitat (EFH) criteria of 500 ft. from any no-activity zone; or
  - o 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 Green Canyon Block 814

Proposed operations consist of the drilling, completion and testing of Well Locations GC 814 D, E and F. 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:** Green Canyon Block 814 is 60 miles from the closest designated Topographic Features Stipulation Block (Ewing-1 Bank); therefore, no adverse impacts are expected.

**Effluents:** Green Canyon Block 814 is 60 miles from the closest designated Topographic Features Stipulation Block (Ewing-1); 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 Cobalt'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:** Green Canyon Block 814 is 202 miles from the closest live bottom (pinnacle trend) area; therefore, no adverse impacts are expected.

**Effluents:** Green Canyon Block 814 is 202 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 Cobalt'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:** Green Canyon Block 814 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:** Green Canyon Block 814 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 Cobalt'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*

Green Canyon Block 814 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:** Green Canyon Block 814 is approximately 33 miles from a known chemosynthetic community site (Chemo Green Canyon Block 287), listed in NTL 2000-G20. This Supplemental 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 Green Canyon Block 814 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 Cobalt'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 Green Canyon Block 814 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 Cobalt'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 Green Canyon Block 814 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).

Cobalt 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 Cobalt'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 Cobalt'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). Cobalt 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 Cobalt'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*

The projected air emissions identified in Appendix G are not expected to affect the OCS air quality primarily due to distance to the shore or to any Prevention of Significant Deterioration Class I air quality area such as the Breton Wilderness Area. Green Canyon Block 814 is beyond the 200 kilometer (124 mile) buffer for the Breton Wilderness Area and is 136 miles from the coastline. Therefore, no special mitigation, monitoring, or reporting requirements apply with respect to air emissions.



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 Green Canyon Block 814 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 could 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 Green Canyon Block 814 include disturbances to the seafloor. Green Canyon Block 814 is not located in or adjacent to an OCS block designated by MMS as having a high probability for occurrence of shipwrecks. Cobalt 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 which could impact prehistoric archaeological sites as a result of the proposed operations in Green Canyon Block 814 include disturbances to the seafloor (structure emplacement) and accidents (oil spill). Green Canyon Block 814 is located outside the Archaeological Prehistoric high probability line. Cobalt 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 Cobalt'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 which could impact 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 Green Canyon Block 814 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 Cobalt'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 Cobalt'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). Cobalt 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 (136 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 Cobalt'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). Cobalt 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 (136 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Cobalt'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 (136 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Cobalt'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). Cobalt 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 (136 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Cobalt'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 distance from the nearest designated Wilderness Area (186 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 Cobalt'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, Green Canyon Block 814 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:

1. Drilling & completion
  - a. Secure well
  - b. Secure rig / platform
  - c. Evacuate personnel

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

2. Caisson Installation  
Operator will not conduct caisson installation operations during Tropical Storm or Hurricane threat.

#### **(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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## (I) References

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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.