

UNITED STATES GOVERNMENT  
MEMORANDUM

July 2, 2025

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

Subject: Public Information copy of plan  
Control # - N-09968  
Type - Initial Exploration Plan  
Lease(s) - OCS-G32458 Block - 956 Garden Banks Area  
Operator - Cobalt International Energy, L.P.  
Description - Subsea Wells C, C1, D, D1, E and E1  
Rig Type - Not Found

Attached is a copy of the subject plan.

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

Tommy Hoke  
Plan Coordinator

Site Type/Name	Botm Lse/Area/Blk	Surface Location	Surf Lse/Area/Blk
WELL/C	G32458/GB/956	7291 FNL, 1714 FEL	G32458/GB/956
WELL/C1	G32458/GB/956	7491 FNL, 1714 FEL	G32458/GB/956
WELL/D	G32458/GB/956	5748 FNL, 4969 FEL	G32458/GB/956
WELL/D1	G32458/GB/956	5748 FNL, 4769 FEL	G32458/GB/956
WELL/E	G32458/GB/956	6579 FNL, 6052 FEL	G32458/GB/956
WELL/E1	G32458/GB/956	6579 FNL, 5852 FEL	G32458/GB/956



November 28, 2016

PUBLIC DATA

Plans Unit  
Bureau of Ocean Energy Management  
1201 Elmwood Park Boulevard  
New Orleans, LA 70123

RE: Initial Exploration Plan  
OCS-G 32458, Garden Banks Block 956

Gentlemen:

Lease OCS-G 32458, Garden Banks Block 956, was issued in the Central Gulf of Mexico Lease Sale No. 206 on June 1, 2008, with a lease expiration date of May 31, 2018.

Under this Initial Exploration Plan, Cobalt International Energy, L. P. (Cobalt) proposes to drill six well locations, Well Locations C, D and E and mirror locations C1, D1 and E1. The mirror locations are intended as re-spud locations only.

The wells will be drilled with a dynamically positioned drillship and will involve the use of a subsea BOP stack.

Estimated startup date for the proposed drilling is October 15, 2017. Please contact me at [annerenee.laplante@cobaltintl.com](mailto:annerenee.laplante@cobaltintl.com) and our Regulatory Consultant, Jean Martin, at (281) 698-8544 or [jean.martin@jccteam.com](mailto:jean.martin@jccteam.com) if you have questions or require further information.

Sincerely,

A handwritten signature in black ink that reads "Jean Martin". The signature is written in a cursive, flowing style.

*for* Anne-Renee Laplante  
Regulatory Lead

ARL/JM  
Enclosures

**PUBLIC DATA**  
November 28, 2016

**INITIAL  
EXPLORATION PLAN**



Garden Banks Block 956  
OCS-G 32458  
Baffin Bay Prospect  
Offshore, Louisiana

**Estimated Startup Date: October 15, 2017**

**SUBMITTED BY:**

Cobalt International Energy, L.P.  
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Anne-Renee Laplante  
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## APPENDICES

- Appendix A:** OCS Plan Form, Well Location Plat, Bathymetry Map and Pay.gov Receipt
- Appendix B:** Worst Case Discharge Assumptions and Calculations
- Appendix C:** Structure Maps, Seismic Lines, Cross Sections, Shallow Hazards Assessments and Stratigraphic Column
- Appendix D:** Generated Wastes
- Appendix E:** Air Emission Spreadsheets
- Appendix F:** Oil Spill Response Discussion
- Appendix G:** Wastes Transported to Shore and Vicinity Map
- Appendix H:** Coastal Zone Management Certification
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# SECTION 1

## PLAN CONTENTS

### 1.1 PLAN INFORMATION

Lease OCS-G 32458, Garden Banks Block 956, was issued in the Central Gulf of Mexico Lease Sale No. 206 on June 1, 2008, with a lease expiration date of May 31, 2018.

Under this Initial Exploration Plan, Cobalt International Energy, L.P. (Cobalt) proposes to drill six well locations, C, D and E and mirror locations C1, D1 and E1. The mirror locations are intended as re-spud locations only.

The wells will be drilled with a drillship and will involve the use of a subsea BOP stack. An OCS Plan Information Form is included in **Appendix A**.

### 1.2 LOCATION

Included in **Appendix A** is a Well Location Plat depicting the surface locations and bottom locations of the proposed wells. Also included in **Appendix A** is a Bathymetry Map showing the water depths across the lease block and the locations of the proposed wells.

### 1.3 SAFETY AND POLLUTION PREVENTION FEATURES

Detailed rig specifications will be made a 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 30 CFR 250 Subparts C, D, E and O; and as further clarified by BSEE Notices to Lessees, and current policy making invoked by the BOEM, BSEE, Environmental Protection Agency (EPA) and the U.S. Coast Guard (USCG). Schematics of the BOP and control system will be provided with the Application for Permit to Drill. An approved welding procedure and location of designated safe welding areas will also be available on the rig.

The rig is equipped with safety and fire-fighting equipment required to comply with USCG and American Bureau of Shipping (ABS) requirements. Appropriate life saving equipment such as life rafts, life jackets, ring buoys, etc. as prescribed by the USCG, will be maintained on the rig 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. Compliance will be maintained with the EPA NPDES Permit which covers the lease. The rig will be monitored daily and any waste or fuel resulting in pollution of the Gulf waters will be reported to the representative in charge for immediate isolation and correction of the problem. Any spill will be reported to the appropriate governmental agencies.

#### 1.4 STORAGE TANKS AND PRODUCTION VESSELS

The table below provides storage tank capacity for storage tanks of 25 barrels or more that will store fuel, oil and lubricants.

Type of Storage Tank	Type of Facility	Tank Capacity (bbl)	Number of Tanks	Total Capacity (bbl)	Fluid Gravity (API)
Fuel Oil (Marine Diesel)	Drillship (P FO Tank)	18,645 bbls	1	18,645 bbls	32.40
Fuel Oil (Marine Diesel)	Drillship (STBD FO Tank)	18,645 bbls	1	18,645 bbls	32.40
Fuel Oil (Marine Diesel)	Drillship (Center Tank)	29,178 bbls	1	29,178 bbls	32.40
Fuel Oil (Marine Diesel)	Drillship (Portable Daily Svc Tank)	806 bbls	1	806 bbls	32.40
Fuel Oil (Marine Diesel)	Drillship (Stbd Tank)	806 bbls	1	806 bbls	32.40

#### 1.5 ADDITIONAL MEASURES

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

#### 1.6 COST RECOVERY FEE

The cost recovery fee confirmation receipt totaling \$11,019 (receipt 25UQG3AU) is included in **Appendix A**.

## SECTION 2 GENERAL INFORMATION

### 2.1 APPLICATIONS AND PERMITS

Listed in the table below are additional permits/applications to be filed before operations can commence under this EP:

Application/Permit	Issuing Agency	Status
Application for Permit to Drill	BSEE	To be submitted
Application for Permit to Modify	BSEE	To be submitted

### 2.2 DRILLING FLUIDS

Type of Drilling Fluid	Estimated Volume of Drilling Fluid to be Used per Well
Water-based -- Barite, Sodium Chloride Brine, Salt, Xantham Gum, Poly Plus, Lime, Poly Pac UL, Caustic Soda, Defoam X, Greencide 25 g	75,000 bbls (including dilution)
Oil-based (diesel, minerals, oil)	0 bbls
Synthetic-based (internal olefin, ester) – Barite, Synthetic B, Suremul, Surewet, Rheflat, Rhethik, Lime, Calcium Chloride	20,970 bbls (including dilution)

### 2.3 NEW OR UNUSUAL TECHNOLOGY

Cobalt does not propose using any new or unusual technology for the operations proposed in this plan.

### 2.4 BONDING STATEMENT

The bond requirements for the activities and facilities proposed in this EP are satisfied by a \$1,000,000 area-wide exploratory bond which is furnished and maintained according to 30 CFR 556.900 (a) and 30 CFR 556.901 (a) and (b) and NTL No. 2015-BOEM-N04, "General Financial Assurance." Cobalt International Energy, L.P. is currently exempt from supplemental bonding.

### 2.5 OIL SPILL FINANCIAL RESPONSIBILITY (OSFR)

Cobalt International Energy, L.P., BOEM Company No. 02873, will demonstrate oil spill financial responsibility for the facilities proposed in this EP according to 30 CFR Part 553.15 (a); and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities".

### 2.6 DEEPWATER WELL CONTROL STATEMENT

Cobalt International Energy, L.P., BOEM Company No. 02873, will have the financial capability to drill a relief well and conduct other emergency well control operations.

## 2.7 BLOWOUT SCENARIO AND WORST CASE DISCHARGE CALCULATIONS

### 1. Flowrate/Duration/Total Volume:

The table below outlines the estimated volume of produced oil in the event of an uncontrolled blowout. The estimated volume ranges from 70.7 to 10,391.1 mbo. The low side value assumes the blowout can be controlled within one day (for example by formation bridging or subsea remotely operated vehicle (ROV) intervention) while the high side number assumes a relief well is required to kill the well.

Scenario	Number of Days	Average Rate (bopd)	Total Volume (mbo)
Initial Blowout	1	70,745	70.7
Potential Bridging Event	10	70,517	705.2
Potential Top Kill Operation	30	70,018	2,100.5
Drill Relief Well	155	67,039	10,391.1

### 2. Potential of wellbore to bridge over:

The sands to be encountered by the GB 956-C well are expected to be moderately consolidated, and in the unlikely event of a blowout, bridging caused by failure of the shales and/or sands is a possibility. Based on discussions with Wild Well Control (WWC) and several experienced drillers, if bridging occurs, it should occur within 24 hours to 10 days of the initial blowout. Cobalt's WCD calculations, intervention and response plans, however, do NOT assume that bridging will occur.

### 3. Likelihood for surface intervention to stop blowout:

Several surface intervention options are available in the event of a blowout. In addition, Cobalt maintains a master service agreement with WWC to provide engineering and operational expertise in the event of a well control event. A "top kill" intervention operation to kill the well would take about 30 operational days to implement. This includes planning the kill execution, conducting a safety review and risk assessment, procuring and mobilizing equipment, hooking up the subsea equipment to a high pressure high volume pumping vessel, pressure testing, and the kill operation itself. WWC is generating a preliminary dynamic kill procedure based on anticipated Baffin Bay conditions.

### 4. Rig type capable of drilling relief well:

The preferred rig to drill a relief well in the GB 956-C block is a dynamically positioned 5<sup>th</sup> or 6<sup>th</sup> generation drillship with the following minimum specifications:

- 2.5 MM lb lifting capability
- 4-1/2" internal dimension (ID) choke/kill lines
- Minimum 5 ram 18-3/4" 15,000 psi blowout preventers (BOPs) with 2 x 10,000 psi annulars

- 6,000 ft of 21" riser
- 6-5/8" drill pipe
- 4 x 2,200 horsepower mud pumps
- 15,000 bbls combined active and reserve pit capacity
- 15,000 psi rated cementing unit with liquid add system (LAS)

There are 25 suitable rigs currently in the GoM which meet the specifications outlined above that could be used to drill a relief well at GB 956-C. It is unlikely that any of these rigs will be under direct contract to Cobalt when the GB 956-C well is spud. A Relief Well List is included in **Appendix B**.

#### **5. Platform rigs in the vicinity:**

There are no platform rigs in the vicinity of the GB 956-C well.

#### **6. Time to acquire rig:**

The time to drill a relief well and kill a blowout at Baffin Bay is estimated to be **155 days**. This time estimate includes:

- 2 days to identify a rig
- 10 days to suspend operations and prepare to demob
- 2 days to transit from the existing site to the site of the relief well and mobilize on the relief well site
- 118 days to penetrate to the last casing shoe above the blowout
- 20 days to intersect the blowout
- 3 days to kill the blowout

The time required to move a rig to the relief well location is dependent on the activity in progress at the relief rig's existing location. Assuming the well underway will have to be suspended, the time required to spud a relief well after securing a rig is approximately 14 days which includes 2 days to secure rig, 7 days to set plugs and test, 3 days to pull riser and recover transponders, and 2 days to transit and mobilize equipment for the relief well. The estimated drilling time for the GB 956-C to penetrate to the last liner shoe is 118 days. Due to the additional time associated with directional control and ranging, it is expected that a relief well will require 20 more days to reach target depth (10 days ranging runs including trip time).

#### **7. Measures to enhance ability to prevent blowout and reduce the likelihood of a blowout:**

Cobalt's primary focus is to design and drill the well such that well control incidents do not occur. Cobalt's approach to drilling wells safely and efficiently in the GoM is to use an experienced integrated team comprised of drilling engineers, rig personnel, and subsurface staff to plan, design, and execute the drilling plan. Cobalt's general philosophy is to overdesign the well in order to provide a prudent margin for safety and response to unlikely well control events.

Cobalt also recognizes the value of third party expertise and uses third party engineering firms to validate the casing design and cementing program as well as to identify blowout intervention options which will be incorporated into the well design. Reviews are conducted with the drilling contractor and partners as well as key service providers such as WWC in order to capitalize on their experience and to ensure alignment.

**8. Measures to enhance ability to conduct effective and early intervention in the event of a blowout:**

Cobalt is also prepared to react to a kick in the event that it occurs and to intervene and respond in the unlikely event of a blowout. Activities such as simulating a response to a kick are practiced on the rig on a routine basis to ensure familiarity with well control procedures and rig equipment. In addition, time is spent prior to the spud of the well to preplan drilling and subsea intervention and response options in order to be better prepared to respond in the event of blowout. This work is conducted in conjunction with WWC and Cobalt's subsea and safety teams.

**9. Arrangements for drilling relief wells:**

Though not required, a conceptual relief well casing design and well plan will be prepared by Cobalt. WWC will review the well design to confirm that an uncontrolled blowout of the Wilcox sand can be killed with a relief well that intersects the wellbore at the 9-5/8" liner casing shoe which is the last string of pipe above the Wilcox sands. In addition, a surface area with a radial extent of 3,500 feet from the proposed GB 956-C drill site has been surveyed and cleared by Berger Geosciences, LLC to expedite the detailed planning of a relief well, if required. All long lead tubulars and well head equipment will be available in the event a relief well is required.

Worst Case Discharge Assumptions and Calculations are included in **Appendix B (Proprietary Copy Only)**.

## **SECTION 3**

### **GEOLOGICAL AND GEOPHYSICAL INFORMATION**

#### **3.1 GEOLOGICAL DESCRIPTION**

Proprietary Information

#### **3.2 STRUCTURE CONTOUR MAPS**

Proprietary Information

#### **3.3 INTERPRETED SEISMIC LINES**

Proprietary Information

#### **3.4 GEOLOGICAL STRUCTURE CROSS-SECTIONS**

Proprietary Information

#### **3.5 SHALLOW HAZARDS REPORT**

A shallow hazards report, "Shallow Hazards Assessment, Benthic Communities Evaluation, Archaeological Resource Assessment and Wellsite Discussions, Baffin Bay Prospect, Garden Banks Area, Block 913 (Lease No. G34528), 956 (Lease No. G32458), 957 (Lease No. G32459), and 1000 (Lease G 35380), Gulf of Mexico," prepared by Berger Geosciences, LLC., is provided under separate cover.

The AUV geophysical site hazard survey operations report, "Survey Operations Report Site Hazard Survey, Blocks 956 (OCS-G-32458), 957 (OCS-G-32459) & 1000 (OCS-G-35380), Garden Banks Area, September, 2014, C&C Project 140720," prepared by C&C Technologies Survey Services, is provided under separate cover.

#### **3.6 SHALLOW HAZARDS ASSESSMENT**

A shallow hazards assessment for each well prepared by Berger Geosciences is included in **Appendix C**. Bound paper copies of the shallow hazards assessment for each well are included in the shallow hazards report.

#### **3.7 HIGH-RESOLUTION SEISMIC LINES**

Proprietary Information

#### **3.8 STRATIGRAPHIC COLUMN**

Proprietary Information

#### **3.9 TIME VERSUS DEPTH TABLES**

Proprietary Information

## **SECTION 4 HYDROGEN SULFIDE INFORMATION**

### **4.1 CONCENTRATION**

Cobalt anticipates encountering zero ppm H<sub>2</sub>S during the proposed operations.

### **4.2 CLASSIFICATION**

In accordance with Title 30 CFR 250.490(c), Cobalt requests that the area of proposed operations proposed in this plan be classified by the BOEM as H<sub>2</sub>S absent.

## **SECTION 5**

### **BIOLOGICAL, PHYSICAL AND SOCIOECONOMIC INFORMATION**

#### **5.1 DEEPWATER BENTHIC COMMUNITIES**

Activities proposed in this plan could disturb seafloor areas in deepwater; therefore, information described in Attachment A of NTL No. 2009-G40 “High Density Deepwater Benthic Communities Information for OCS Plans” is provided.

Included in **Appendix C, Wellsite Discussions**, are maps prepared using 3-D seismic data depicting bathymetry, seafloor and shallow geological features, surface locations of the proposed wells, and a radius circle of 2,000 feet around each location.

All seafloor features and areas located within 2,000 feet of each proposed mud and cuttings discharge location have been evaluated for high-density chemosynthetic or benthic communities. The proposed wells will be drilled with a dynamically positioned drillship; thus, there are no associated anchors, anchor chains or wire ropes.

Features or areas that could support high-density chemosynthetic or benthic communities are not anticipated within 2,000 feet of the Garden Banks Block 956 well locations.

#### **5.2 TOPOGRAPHIC FEATURES (BANKS)**

Activities proposed in this EP do not fall within 305 meters (1,000 feet) of a topographic “No Activity Zone;” therefore, no map is required per NTL No. 2009-G39.

#### **5.3 TOPOGRAPHIC FEATURES STATEMENT (SHUNTING)**

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 per NTL No. 2009-G39.

#### **5.4 LIVE BOTTOMS (PINNACLE TREND FEATURES)**

These operations are not located within 61 meters (200 feet) of any live-bottom (pinnacle trend) features; therefore, no map is required per NTL No. 2009-G39.

#### **5.5 LIVE BOTTOMS (LOW RELIEF)**

Garden Banks Block 956 is not located within 30 meters (100 feet) of any live bottom (low relief) features; therefore, no map is required per NTL No. 2009-G39.

#### **5.6 POTENTIALLY SENSITIVE BIOLOGICAL FEATURES MAP**

Garden Banks Block 956 is not located within 30 meters (100 feet) of potentially sensitive biological features; therefore, no map is required per NTL No. 2009-G39.

#### **5.7 THREATENED AND ENDANGERED SPECIES, CRITICAL HABITAT, AND MARINE MAMMAL INFORMATION**

The federally listed endangered and threatened species potentially occurring in the lease area and along the Gulf Coast are provided in the table below.

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in the Gulf of Mexico
			Lease Area	Coastal	
<b>Marine Mammals</b>					
Manatee, West Indian	<i>Trichechus manatus latirostris</i>	E	--	X	Florida (peninsular)
Whale, Blue	<i>Balaenoptera masculus</i>	E	X*	--	None
Whale, Finback	<i>Balaenoptera physalus</i>	E	X	--	None
Whale, Humpback	<i>Megaptera novaeangliae</i>	E	X	--	None
Whale, North Atlantic Right	<i>Eubalaena glacialis</i>	E	X	--	None
Whale, Sei	<i>Balaenoptera borealis</i>	E	X	--	None
Whale, Sperm	<i>Physeter catodon</i> (= <i>macrocephalus</i> )	E	X	--	None
<b>Terrestrial Mammals</b>					
Mouse, Beach (Alabama, Choctawatchee, Perdido Key, St. Andrew)	<i>Peromyscus polionotus</i>	E	-	X	Alabama, Florida (panhandle) beaches
<b>Birds</b>					
Plover, Piping	<i>Charadrius melodus</i>	T	-	X	Coastal Texas, Louisiana, Mississippi, Alabama and Florida (panhandle)
Crane, Whooping	<i>Grus Americana</i>	E	-	X	Coastal Texas
<b>Reptiles</b>					
Sea Turtle, Green	<i>Chelonia mydas</i>	T	X	X	None
Sea Turtle, Hawksbill	<i>Eretmochelys imbricata</i>	E	X	X	None
Sea Turtle, Kemp's Ridley	<i>Lepidochelys kempi</i>	E	X	X	None
Sea Turtle, Leatherback	<i>Dermochelys coriacea</i>	E	X	X	None
Sea Turtle, Loggerhead	<i>Caretta caretta</i>	T	X	X	Texas, Louisiana, Mississippi, Alabama, Florida
<b>Fish</b>					
Sturgeon, Gulf	<i>Acipenser oxyrinchus</i> (= <i>oxyrhynchus</i> ) <i>desotoi</i>	T	X	X	Coastal Louisiana, Mississippi, Alabama and Florida (panhandle)
<b>Corals</b>					
Coral, Elkhorn	<i>Acopora palmate</i>	T	-	X	Florida Keys and Dry Tortugas
Coral, Staghorn	<i>Acopora cervicornis</i>	T	-	X	Florida

Abbreviations: E = Endangered; T = Threatened

\* The Blue Fin, Humpback, North Atlantic Right, and Sei Whales are rare or extralimital in the Gulf of Mexico and are unlikely to be present in the lease area.

## 5.8 ARCHAEOLOGICAL REPORT

Garden Banks Block 956 is not located in an area determined to have any historic or prehistoric cultural resources and no archaeological avoidances are recommended within 1,000 feet of the proposed wells. However, an archaeological resource survey report is included in the "Shallow Hazards Assessment, Benthic Communities Evaluation, Archaeological Resource Assessment and Wellsite Discussions, Baffin Bay Prospect, Garden Banks Area, Block 913 (Lease No.

G34528), 956 (Lease No. G32458), 957 (Lease No. G32459), and 1000 (Lease G 35380), Gulf of Mexico,” prepared by Berger Geosciences, LLC. and provided under separate cover.

#### **5.9 AIR AND WATER QUALITY INFORMATION**

This EP does not propose activities for which the State of Florida is an affected state; therefore, the discussion required per NTL No. 2008-G04, “Information Requirements for Exploration and Development Operations Coordination Documents,” is not applicable to this EP.

#### **5.10 SOCIOECONOMIC INFORMATION**

The activities proposed in this plan are not located offshore Florida; therefore, socioeconomic information required per NTL No. 2008-G04, “Information Requirements for Exploration Plans and Development Operations Coordination Documents,” is not applicable to this EP.

## **SECTION 6 WASTES AND DISCHARGES INFORMATION**

### **6.1 PROJECTED GENERATED WASTES**

The table provided in **Appendix D**, “Generated Wastes,” summarizes information on the projected solid and liquid wastes likely to be generated by the activities proposed in this EP and wastes that will be discharged to the Gulf of Mexico.

No wastes will be treated, stored or disposed of downhole at the offshore facility per NTL No. 2009-G35, “Sub-Seabed Disposal and Offshore Storage of Solid Waste.”

## SECTION 7 AIR EMISSIONS INFORMATION

### 7.1 EMISSIONS WORKSHEETS AND SCREENING QUESTIONS

Screen Questions 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

### 7.2 SUMMARY INFORMATION

The emission spreadsheets are included in **Appendix E**.

This information was calculated by: Jean Martin  
281-698-8544  
[jean.martin@jccteam.com](mailto:jean.martin@jccteam.com)

## SECTION 8 OIL SPILL INFORMATION

### 8.1 OIL SPILL RESPONSE PLANNING

All the proposed activities and facilities in this Revised EP will be covered by the Oil Spill Response Plan (OSRP) filed by Cobalt (Company No. 02873) on November 14, 2014, and approved on December 17, 2014, and found to be in compliance per 30 CFR 254.30(a) through April 27, 2018, by BSEE during its biennial review on May 17, 2016. Cobalt's revised WCD of 331,849 bbls/day for the Regional Oil Spill Response Plan was approved by BSEE on December 17, 2014, per 30 CFR 254.30(b)(2). The revised WCD was accepted by BOEM on October 17, 2014 (Plan Control Number S-7705).

### 8.2 SPILL RESPONSE SITES

Below are primary response and preplanned staging locations.

<b>Primary Response Equipment Location(s)</b>	<b>Preplanned Staging Locations</b>
Leeville, LA; Venice, LA; Port Fourchon, LA; Houma, LA; Fort Jackson, LA; Lake Charles, LA; Grand Isle, LA; New Iberia, LA; Houston, TX; Galveston, TX; Ingleside, TX; Kiln, MS; Pascagoula, MS	Fourchon, LA; Cocodrie, LA; Lake Charles, LA; Galliano, LA; Leeville, LA; Galveston, TX

### 8.3 OSRO INFORMATION

Cobalt's primary equipment provider is Marine Spill Response Corporation (MSRC). Clean Gulf Associates (CGA) and National Response Corporation (NRC) are the secondary and tertiary equipment providers. MSRC personnel are responsible for operating MSRC response equipment. Clean Gulf Associates Services (CGAS) will provide closest available personnel, as well as a CGAS supervisor to operate the equipment. Through its Independent Contractor Network (ICN), NRC will also provide closest available personnel, as well as an NRC ICN supervisor to operate the equipment.

#### 8.4 WORST CASE SCENARIO DETERMINATION

Category	Regional OSRP WCD - Drilling	EP WCD - Drilling
Type of Activity	Drilling	Drilling
Facility Location (Area/Block)	MC 693	GB 956
Facility Designation	A	C
Distance to Nearest Shoreline (miles)	67.8	163.1
Volume		
Storage tanks (total)	0	0
Uncontrolled blowout	331,849 bbls/day	70,745 bbls/day
<b>Total Volume</b>	<b>331,849 bbls/day</b>	<b>70,745 bbls/day</b>
Type of oil(s) (crude, condensate, diesel)	Oil	Oil
API gravity	39°	23.3° to 30.9°

Cobalt has determined that the worst-case scenario from the activities proposed in this EP does 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 December 17, 2014 (Control Number O-663), and found to be in compliance per 30 CFR 254.30(a) through April 27, 2018, by BSEE during its biennial review on May 17, 2016, and since the worst-case scenario determined for our EP does not replace the worst-case scenario in our Regional OSRP, Cobalt hereby certifies 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 this EP.

#### 8.5 OIL SPILL RESPONSE DISCUSSION

A spill response discussion covering these proposed exploratory activities is provided in **Appendix F**.

## **SECTION 9**

### **ENVIRONMENTAL MONITORING INFORMATION**

#### **9.1 MONITORING SYSTEMS**

Ocean currents will be monitored and ocean current data will be reported to the National Oceanic and Atmospheric Administration (NOAA) National Data Buoy Center (NDBC) internet website as required by NTL No. 2009-G02, "Ocean Current Monitoring."

Impact Weather and Eddy Watch will provide real-time weather and metocean information.

#### **9.2 INCIDENTAL TAKES**

There is no reason to believe that any of the endangered species or marine mammals as listed in the Endangered Species Act (ESA) will be "taken" as a result of the operations proposed under this plan.

It has been documented that the use of explosives and or seismic devices can affect marine life. Operations proposed in this plan will not utilize explosives or an air gun. If a borehole seismic survey (VSP) is conducted, trained observers and a ramp-up procedure will be used.

Cobalt 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 No. 2015-BSEE-G03, "Marine Trash and Debris Awareness and Elimination"
- NTL No. 2016-BOEM-G01, "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting"
- NTL No. 2016-BOEM-G02, "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program"

#### **9.3 FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY**

Garden Banks Block 956 is not located in the Flower Garden Banks National Marine Sanctuary; therefore, provisions for monitoring the impact of an oil spill are not required in this EP.

## **SECTION 10**

### **LEASE STIPULATIONS INFORMATION**

#### **10.1 MARINE PROTECTED SPECIES**

In accordance with the Federal Endangered Species Act and the Marine Mammal Protection Act, Cobalt will:

- (a) Collect and remove flotsam resulting from activities related to exploration, development, and production of this lease;
- (b) Post signs in prominent places on all vessels and platforms used as a result of activities related to exploration, development, and production of this lease detailing the reasons (legal and ecological) why release of debris must be eliminated;
- (c) Observe for marine mammals and sea turtles while on vessels, reduce vessel speed to 10 knots or less when assemblages of cetaceans are observed, and maintain a distance of 90 meters or greater from whales, and a distance of 45 meters or greater from small cetaceans and sea turtles;
- (d) Employ mitigation measures prescribed by BOEM/BSEE or the National Marine Fisheries Service (NMFS) for all seismic surveys, including the use of an “exclusion zone” based upon the appropriate water depth, ramp-up and shutdown procedures, visual monitoring, and reporting;
- (e) Identify important habitats, including designated critical habitat, used by listed species (e.g., sea turtle nesting beaches, piping plover critical habitat), in oil spill contingency planning and require the strategic placement of spill cleanup equipment to be used only by personnel trained in less-intrusive cleanup techniques on beaches and bay shores; and
- (f) Immediately report all sightings and locations of injured or dead protected species (e.g., marine mammals and sea turtles) to the appropriate stranding network. If oil and gas industry activity is responsible for the injured or dead animal (e.g., because of a vessel strike), the responsible parties should remain available to assist the stranding network. If the injury or death was caused by a collision with the lessee’s vessel, the lessee must notify BOEM within 24 hours of the strike.

BOEM and BSEE issue Notices to Lessees (NTLs), which more fully describe measures implemented in support of the above-mentioned statutes and regulations, as well as measures identified by the U.S. Fish and Wildlife Service and NMFS arising from, among others, conservation recommendations, rulemakings pursuant to the MMPA, or consultation. The lessee and its operators, personnel, and subcontractors, while undertaking activities authorized under this lease, must implement and comply with the specific mitigation measures outlined in NTL No. 2016-BOEM-G01, “Vessel Strike Avoidance and Injured/Dead Protected Species Reporting;” NTL No. 2016-BOEM-G02, “Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program;” and NTL No. 2015-BSEE-G03, “Marine Trash and

Debris Awareness and Elimination.” At the lessee’s option, the lessee, its operators, personnel, and contractors may comply with the most current measures to protect species in place at the time an activity is undertaken under this lease, including but not limited to new or updated versions of the NTLs identified in this paragraph. The lessee and its operators, personnel, and subcontractors will be required to comply with the mitigation measures, identified in the above referenced NTLs, and additional measures in the conditions of approvals for their plans or permits.

## **SECTION 11**

### **ENVIRONMENTAL MITIGATION MEASURES INFORMATION**

#### **11.1 INCIDENTAL TAKES**

Mitigation measures and monitoring for incidental takes of protected species will be conducted in accordance with the following Notices to Lessees, as application, to avoid or minimize impacts to any of the species listed in the Endangered Species Act (ESA) as a result of the operations conducted herein:

- NTL No. 2015-BSEE-G03, “Marine Trash and Debris Awareness and Elimination”
- NTL No. 2016-BOEM-G01, “Vessel Strike Avoidance and Injured/Dead Protected Species Reporting”
- NTL No. 2016-BOEM-G02, “Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program”

## SECTION 12 SUPPORT VESSELS AND AIRCRAFT INFORMATION

### 12.1 GENERAL

The most practical, direct route from the shorebase as permitted by weather and traffic conditions will be utilized. Information regarding the vessels and aircraft to be used to support the proposed activities is provided in the table below.

Type	Maximum Fuel Tank Capacity (gal)	Maximum Number in Area at Any Time	Trip Frequency or Duration
Supply Vessel	342,300	1	1 trip/week
Fast Supply Vessel	20,000	1	5 trips/week
Helicopter	760	1	1/day

### 12.2 DIESEL OIL SUPPLY VESSELS

Fuel for the drilling unit will be transported via a supply vessel as follows:

Size of Fuel Supply Vessel (ft)	Capacity of Fuel Supply Vessel (gal)	Frequency of Fuel Transfers	Route Fuel Supply Vessel Will Take
240	342,300	1-2 times per month	Most direct route from Fourchon, LA

\*Please note that the actual vessels have not yet been contracted.

### 12.3 SOLID AND LIQUID WASTE TRANSPORTATION

The table provided in **Appendix G**, "Waste Transported to Shore," summarizes information on the projected wastes likely to be generated by the activities proposed in this EP and those wastes will be transported to shore for disposal.

### 12.4 VICINITY MAP

**Appendix G** contains 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 of the support vessels and aircraft that will be used when traveling between the onshore support facilities and the drilling unit.

## SECTION 13 ONSHORE SUPPORT FACILITIES INFORMATION

### 13.1 GENERAL

Per NTL No. 2008-G04, the following table reflects the onshore facilities to be utilized to provide supplies and services support for the activities proposed in this Exploration Plan.

Name	Location	Existing/New/Modified
Martin Terminal North Yard	Port Fourchon, Louisiana	Existing
Petroleum Helicopters, Inc.	Amelia, Louisiana	Existing

### 13.2 SUPPORT BASE CONSTRUCTION OR EXPANSION

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

### 13.3 WASTE DISPOSAL

The "Waste Transported to Shore" table is included in **Appendix G**.

## **SECTION 14**

### **COASTAL ZONE MANAGEMENT ACT (CZMA) INFORMATION**

Under direction of the Coastal Zone Management Act (CZMA), the State of Louisiana developed a Coastal Zone Management Program (CZMP) to allow for the supervision of significant land and water use activities that take place within or that could significantly affect the Louisiana coastal zone.

Proposed activities are 163.1 miles from the Louisiana shore. Measures will be taken to avoid or mitigate the probable impacts. Cobalt will operate in compliance with existing federal and state laws, regulations, and resultant enforceable program policies in Louisiana's CZMP.

The OCS related oil and gas exploratory and development activities having potential impact on the Louisiana Coastal Zone are based on the location of the proposed facilities, access to those sites, best practical techniques for drilling locations, drilling equipment guidelines for the prevention of adverse environmental effects, effective environmental protection, emergency plans and contingency plans.

Relevant enforceable policies were considered in certifying consistency for Louisiana. A certificate of Coastal Zone Management Consistency for the state of Louisiana is included in **Appendix H**.

## SECTION 15 ENVIRONMENTAL IMPACT ANALYSIS

The Environmental Impact Analysis is included in **Appendix I**.

## **SECTION 16**

### **ADMINISTRATIVE INFORMATION**

#### **16.1 EXEMPTED INFORMATION DESCRIPTION**

The proposed bottomhole locations of the planned wells have been removed from the Public Information copy of this EP as well as any information concerning the target objectives, geologic or geophysical data, and any interpreted geology or subsurface information. In addition, the worst-case discharge calculations have been removed from the Public Information copy of the Blowout Scenario and Worst-Case Discharge Document.

#### **16.2 BIBLIOGRAPHY**

1. Survey Operations Report Site Hazard Survey, Blocks 956 (OCS-G-32458), 957 (OCS-G-32459) & 1000 (OCS-G-35380), Garden Banks Area, September, 2014, C&C Project 140720, prepared by C&C Technologies Survey Services.
  
2. Shallow Hazards Assessment, Benthic Communities Evaluation, Archaeological Resource Assessment and Wellsite Discussions, Baffin Bay Prospect, Garden Banks Area, Block 913 (Lease No. G34528), 956 (Lease No. G32458), 957 (Lease No. G32459), and 1000 (Lease G 35380), Gulf of Mexico, (Project No. 16-07-22), prepared by Berger Geosciences, LLC.

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**Appendix A:** OCS Plan Form, Well Location Plat, Bathymetry Map and Pay.gov Receipt

**OCS PLAN INFORMATION FORM**

**General Information**

Type of OCS Plan:	<input checked="" type="checkbox"/>	Exploration Plan (EP)	<input type="checkbox"/>	Development Operations Coordination Document (DOCD)
Company Name: Cobalt International Energy, L.P.			BOEM Operator Number: 02873	
Address: 910 Memorial City Way, Suite 100			Contact Person: Anne-Renee Laplante and Jean Martin	
Houston, TX 77024			Phone Number: (713) 452-2357, (281) 698-8544	
			E-Mail Address: <a href="mailto:annerenee.laplante@cobaltintl.com">annerenee.laplante@cobaltintl.com</a> , <a href="mailto:jean.martin@jccteam.com">jean.martin@jccteam.com</a>	
If a service fee is required under 30 CFR 550.125(a), provide the	Amount paid	\$11,019	Receipt No.	25UQG3AU

**Project and Worst Case Discharge (WCD) Information**

Leases: OCS-G 32458	Areas: Garden Banks	Blocks: 956	Project Name (If Applicable): Baffin Bay		
Objectives	<input checked="" type="checkbox"/> Oil	<input checked="" type="checkbox"/> Gas	<input type="checkbox"/> Sulphur	<input type="checkbox"/> Salt	Onshore Support Base: Fourchon, LA
Platform / Well Name: GB 956 Location C	Total Volume of WCD: 10,391,100 bbl	API Gravity: 23.3° to 30.9°			
Distance to Closest Land (Miles): 163.1 mi.	Volume from uncontrolled blowout: 70,745 bopd				
Have you previously provided information to verify the calculations and assumptions for your WCD?	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	X	No
If so, provide the Control Number of the EP or DOCD with which this information was provided					
Do you propose to use new or unusual technology to conduct your activities?	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	X	No
Do you propose to use a vessel with anchors to install or modify a structure?	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	X	No
Do you propose any facility that will serve as a host facility for deepwater subsea development?	<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	X	No

**Description of Proposed Activities and Tentative Schedule (Mark all that apply)**

Proposed Activity	Start Date	End Date	No. of Days
Well Location C: Exploration drilling	10/15/2017	3/3/2018	140
Well Location D: Exploration drilling	1/1/2019	5/20/2019	140
Well Location E: Exploration drilling	1/1/2020	5/19/2020	140
Well Location C1*: Exploration drilling	1/1/2021	5/20/2021	140
Well Location D1*: Exploration drilling	1/1/2022	5/20/2022	140
Well Location E1*: Exploration drilling	1/1/2023	5/20/2023	140
<b>*NOTE: Mirror wells C1, D1 and E1 will only be drilled if necessary as re-spud locations.</b>			

**Description of Drilling Rig**

**Description of Structure**

<input type="checkbox"/>	Jackup	<input checked="" 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"/>	Fixed platform	<input type="checkbox"/>	Compliant tower
<input type="checkbox"/>	Semisubmersible	<input type="checkbox"/>	Submersible	<input type="checkbox"/>	Spar	<input type="checkbox"/>	Guyed tower
<input type="checkbox"/>	DP Semisubmersible	<input type="checkbox"/>	Other (Attach description)	<input type="checkbox"/>	Floating production system	<input type="checkbox"/>	Other (Attach description)
Drilling Rig Name (If known):							

**Description of Lease Term Pipelines**

From (Facility/Area/Block)	To (Facility/Area/Block)	Diameter (Inches)	Length (Feet)
NA	NA	NA	NA

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

Proposed Well/Structure Location										
Well or Structure Name/Number (If renaming well or structure, reference previous name): GB 956 C				Previously reviewed under an approved EP or DOCD?			<input type="checkbox"/>	Yes	X	No
Is this an existing well or structure?		<input type="checkbox"/>	Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						X	Yes	<input type="checkbox"/>	No	
<b>WCD Info</b>	For wells, volume of uncontrolled blowout (Bbls/Day): 70,745 bopd			For structures, volume of all storage and pipelines (Bbls): NA			API Gravity of fluid		23.3° to 30.9°	
	<b>Surface Location</b>			<b>Bottom-Hole Location (For Wells)</b>			<b>Completion (For multiple completions, enter separate lines)</b>			
<b>Lease No.</b>	OCS-G 32458			OCS-G 32458			OCS OCS			
<b>Area Name</b>	Garden Banks			Garden Banks						
<b>Block No.</b>	956			956						
<b>Blockline Departures (in feet)</b>	N/S Departure: 7291.0' FNL			N/S Departure:			N/S Departure		F __ L	
	E/W Departure: 1714.0' FEL			E/W Departure:			E/W Departure		F __ L	
<b>Lambert X-Y coordinates</b>	X: 1,851,566.0'			X:			X:		X:	
	Y: 9,813,509.0'			Y:			Y:		Y:	
<b>Latitude/ Longitude</b>	Latitude: 27° 2' 33.739" N			Latitude:			Latitude		Latitude	
	Longitude: 92° 21' 3.959" W			Longitude:			Longitude		Longitude	
Water Depth (Feet): 5,039'				MD (Feet):		TVD (Feet):		MD (Feet):		TVD (Feet):
Anchor Radius (if applicable) in feet:				NA				MD (Feet):		TVD (Feet):
Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)										
Anchor Name or No.	Area	Block	X Coordinate		Y Coordinate		Length of Anchor Chain on Seafloor			
NA	NA	NA	X: NA		Y: NA		NA			
			X:		Y:					
			X:		Y:					
			X:		Y:					
			X:		Y:					
			X:		Y:					
			X:		Y:					

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

Proposed Well/Structure Location									
Well or Structure Name/Number (If renaming well or structure, reference previous name): GB 956 C1				Previously reviewed under an approved EP or DOCD?			Yes	X	No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						X	Yes		No
<b>WCD Info</b>	For wells, volume of uncontrolled blowout (Bbls/Day): 70,745 bopd			For structures, volume of all storage and pipelines (Bbls): NA		API Gravity of fluid		23.3° to 30.9°	
	<b>Surface Location</b>			<b>Bottom-Hole Location (For Wells)</b>		<b>Completion (For multiple completions, enter separate lines)</b>			
<b>Lease No.</b>	OCS-G 32458			OCS-G 32458		OCS OCS			
<b>Area Name</b>	Garden Banks			Garden Banks					
<b>Block No.</b>	956			956					
<b>Blockline Departures (in feet)</b>	N/S Departure: 7,491.0' FNL			N/S Departure:		N/S Departure		F __ L	
	E/W Departure: 1,714.0' FEL			E/W Departure:		N/S Departure		F __ L	
<b>Lambert X-Y coordinates</b>	X: 1,851,566.0'			X:		X:		F __ L	
	Y: 9,813,309.0'			Y:		Y:		F __ L	
<b>Latitude/ Longitude</b>	Latitude: 27° 2' 31.758" N			Latitude:		Latitude		F __ L	
	Longitude: 92° 21' 3.970" W			Longitude:		E/W Departure		F __ L	
Water Depth (Feet): 5,039'				MD (Feet):	TVD (Feet):	MD (Feet):		TVD (Feet):	
Anchor Radius (if applicable) in feet:				NA		MD (Feet):		TVD (Feet):	
Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)									
Anchor Name or No.	Area	Block	X Coordinate		Y Coordinate		Length of Anchor Chain on Seafloor		
NA	NA	NA	X: NA		Y: NA		NA		
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				

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

Proposed Well/Structure Location									
Well or Structure Name/Number (If renaming well or structure, reference previous name): GB 956 D				Previously reviewed under an approved EP or DOCD?			Yes	X	No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						X	Yes		No
<b>WCD Info</b>	For wells, volume of uncontrolled blowout (Bbls/Day): 70,745 bopd			For structures, volume of all storage and pipelines (Bbls): NA		API Gravity of fluid		23.3° to 30.9°	
	<b>Surface Location</b>			<b>Bottom-Hole Location (For Wells)</b>		<b>Completion (For multiple completions, enter separate lines)</b>			
<b>Lease No.</b>	OCS-G 32458			OCS-G 32458		OCS OCS			
<b>Area Name</b>	Garden Banks			Garden Banks					
<b>Block No.</b>	956			956					
<b>Blockline Departures (in feet)</b>	N/S Departure: 5748.0' FNL			N/S Departure:		N/S Departure		F __ L	
	E/W Departure: 4969.0' FEL			E/W Departure:		N/S Departure		F __ L	
<b>Lambert X-Y coordinates</b>	X: 1,848,311.0'			X:		X:		F __ L	
	Y: 9,815,052.0'			Y:		Y:		F __ L	
<b>Latitude/ Longitude</b>	Latitude: 27° 2' 49.190" N			Latitude:		Latitude		F __ L	
	Longitude: 92° 21' 39.882" W			Longitude:		E/W Departure		F __ L	
Water Depth (Feet): 4,821'				MD (Feet):	TVD (Feet):	MD (Feet):		TVD (Feet):	
Anchor Radius (if applicable) in feet:				NA		MD (Feet):		TVD (Feet):	
Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)									
Anchor Name or No.	Area	Block	X Coordinate		Y Coordinate		Length of Anchor Chain on Seafloor		
NA	NA	NA	X: NA		Y: NA		NA		
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				

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

Proposed Well/Structure Location									
Well or Structure Name/Number (If renaming well or structure, reference previous name): GB 956 D1				Previously reviewed under an approved EP or DOCD?			Yes	X	No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						X	Yes		No
<b>WCD Info</b>	For wells, volume of uncontrolled blowout (Bbls/Day): 70,745 bopd			For structures, volume of all storage and pipelines (Bbls): NA		API Gravity of fluid		23.3° to 30.9°	
	<b>Surface Location</b>			<b>Bottom-Hole Location (For Wells)</b>		<b>Completion (For multiple completions, enter separate lines)</b>			
<b>Lease No.</b>	OCS-G 32458			OCS-G 32458		OCS OCS			
<b>Area Name</b>	Garden Banks			Garden Banks					
<b>Block No.</b>	956			956					
<b>Blockline Departures (in feet)</b>	N/S Departure: 5,748.0' FNL			N/S Departure:		N/S Departure		F __ L	
	E/W Departure: 4,769.0' FEL			E/W Departure:		N/S Departure		F __ L	
<b>Lambert X-Y coordinates</b>	X: 1,848,511.0'			X:		X:		F __ L	
	Y: 9,815,052.0'			Y:		Y:		F __ L	
<b>Latitude/ Longitude</b>	Latitude: 27° 2' 49.180" N			Latitude:		Latitude		F __ L	
	Longitude: 92° 21' 37.669" W			Longitude:		E/W Departure		F __ L	
Water Depth (Feet): 4,821'				MD (Feet):	TVD (Feet):	MD (Feet):		TVD (Feet):	
Anchor Radius (if applicable) in feet:				NA		MD (Feet):		TVD (Feet):	
Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)									
Anchor Name or No.	Area	Block	X Coordinate		Y Coordinate		Length of Anchor Chain on Seafloor		
NA	NA	NA	X: NA		Y: NA		NA		
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				

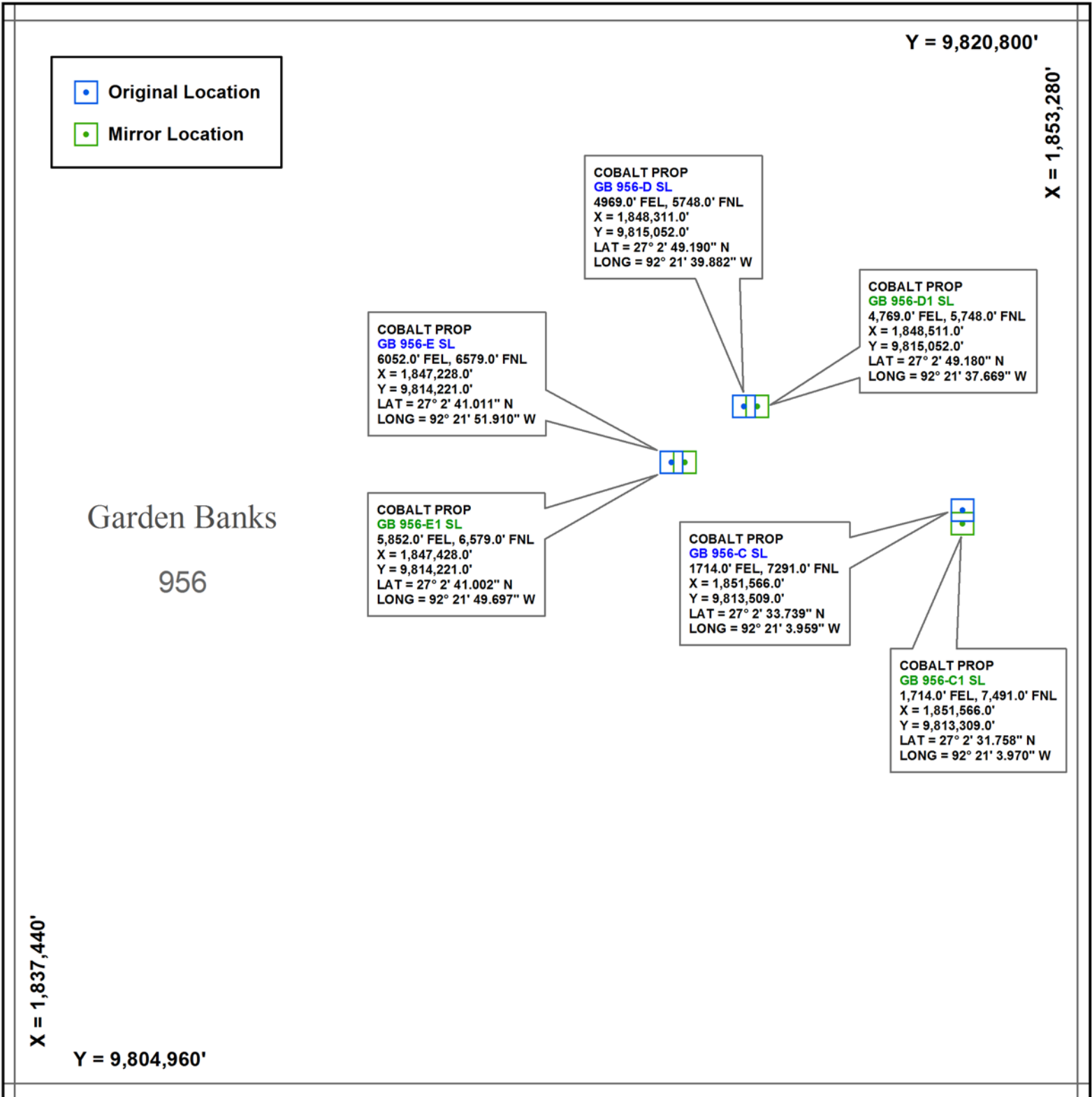
**OCS PLAN INFORMATION FORM (CONTINUED)**  
**Include one copy of this page for each proposed well/structure**

Proposed Well/Structure Location									
Well or Structure Name/Number (If renaming well or structure, reference previous name): GB 956 E				Previously reviewed under an approved EP or DOCD?			Yes	X	No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						X	Yes		No
<b>WCD Info</b>	For wells, volume of uncontrolled blowout (Bbls/Day): 70,745 bopd			For structures, volume of all storage and pipelines (Bbls): NA		API Gravity of fluid		23.3° to 30.9°	
	<b>Surface Location</b>			<b>Bottom-Hole Location (For Wells)</b>		<b>Completion (For multiple completions, enter separate lines)</b>			
<b>Lease No.</b>	OCS-G 32458			OCS-G 32458		OCS OCS			
<b>Area Name</b>	Garden Banks			Garden Banks					
<b>Block No.</b>	956			956					
<b>Blockline Departures (in feet)</b>	N/S Departure: 6579.0' FNL			N/S Departure:		N/S Departure		F __ L	
	E/W Departure: 6052.0' FEL			E/W Departure:		N/S Departure		F __ L	
<b>Lambert X-Y coordinates</b>	X: 1,847,228.0'			X:		X:		F __ L	
	Y: 9,814,221.0'			Y:		X:		F __ L	
<b>Latitude/ Longitude</b>	Latitude: 27° 2' 41.011" N			Latitude:		Y:		F __ L	
	Longitude: 92° 21' 51.910" W			Longitude:		Y:		F __ L	
Water Depth (Feet): 4,821'				MD (Feet):	TVD (Feet):	MD (Feet):		TVD (Feet):	
Anchor Radius (if applicable) in feet:				NA		MD (Feet):		TVD (Feet):	
Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)									
Anchor Name or No.	Area	Block	X Coordinate		Y Coordinate		Length of Anchor Chain on Seafloor		
NA	NA	NA	X: NA		Y: NA		NA		
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				

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

Proposed Well/Structure Location									
Well or Structure Name/Number (If renaming well or structure, reference previous name): GB 956 E1				Previously reviewed under an approved EP or DOCD?			Yes	X	No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						X	Yes		No
<b>WCD Info</b>	For wells, volume of uncontrolled blowout (Bbls/Day): 70,745 bopd			For structures, volume of all storage and pipelines (Bbls): NA		API Gravity of fluid		23.3° to 30.9°	
	<b>Surface Location</b>			<b>Bottom-Hole Location (For Wells)</b>		<b>Completion (For multiple completions, enter separate lines)</b>			
<b>Lease No.</b>	OCS-G 32458			OCS-G 32458		OCS OCS			
<b>Area Name</b>	Garden Banks			Garden Banks					
<b>Block No.</b>	956			956					
<b>Blockline Departures (in feet)</b>	N/S Departure: 6,579.0' FNL			N/S Departure:		N/S Departure		F __ L	
	E/W Departure: 5,852.0' FEL			E/W Departure:		N/S Departure		F __ L	
<b>Lambert X-Y coordinates</b>	X: 1,847,428.0'			X:		X:		F __ L	
	Y: 9,814,221.0'			Y:		Y:		F __ L	
<b>Latitude/ Longitude</b>	Latitude: 27° 2' 41.002" N			Latitude:		Latitude		F __ L	
	Longitude: 92° 21' 49.697" W			Longitude:		E/W Departure		F __ L	
Water Depth (Feet): 4,821'				MD (Feet):	TVD (Feet):	MD (Feet):		TVD (Feet):	
Anchor Radius (if applicable) in feet:				NA		MD (Feet):		TVD (Feet):	
Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)									
Anchor Name or No.	Area	Block	X Coordinate		Y Coordinate		Length of Anchor Chain on Seafloor		
NA	NA	NA	X: NA		Y: NA		NA		
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				
			X:		Y:				

# Garden Banks Block 956 Proposed Well Locations

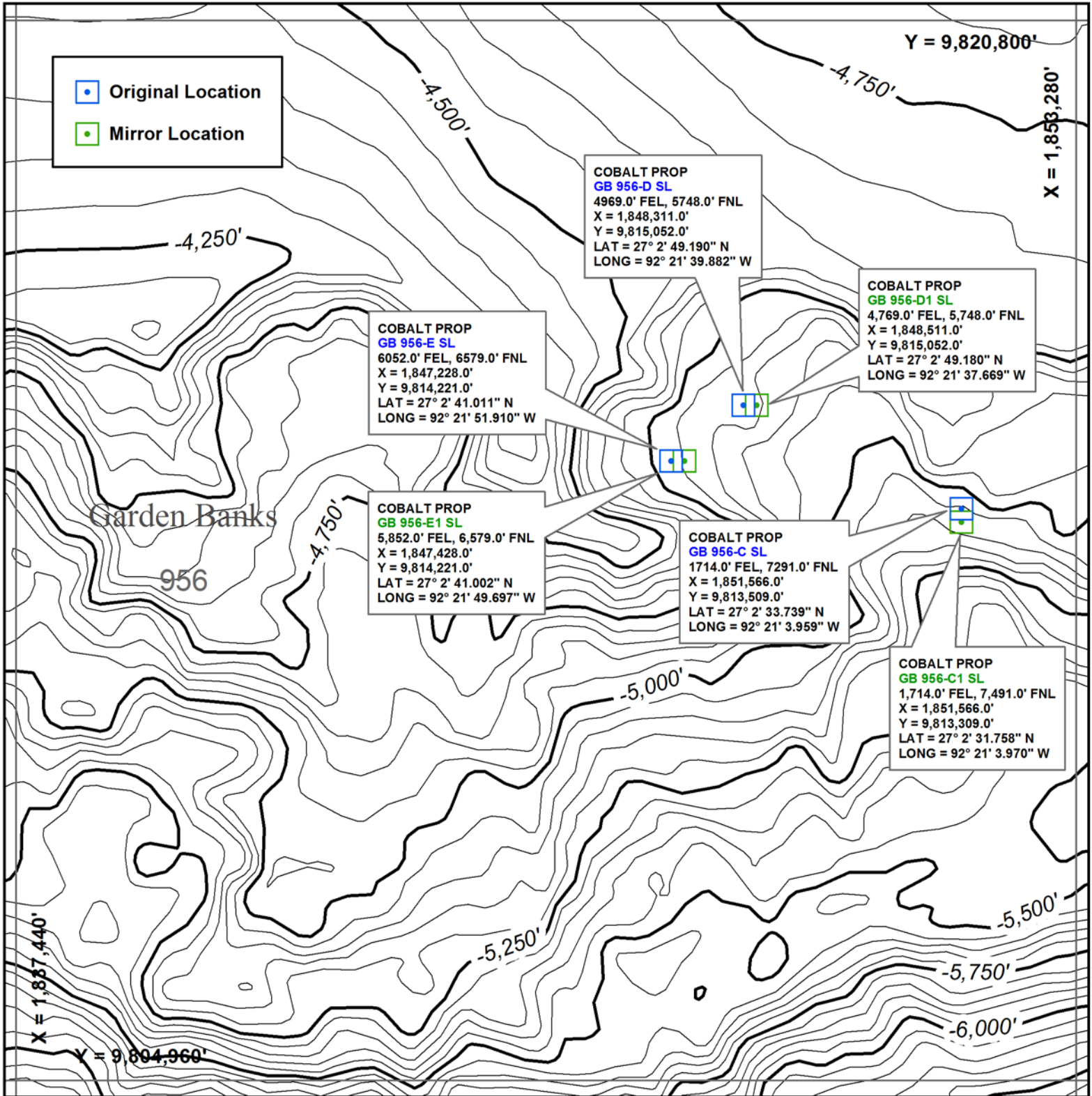


LOCATION MAP

Scale 1:24,000



# Garden Banks Block 956 Proposed Well Locations



**WATER BOTTOM DEPTH  
CI = 50'**

**Scale 1:24,000**



-----Original Message-----

From: notification@pay.gov [mailto:notification@pay.gov]

Sent: Thursday, November 03, 2016 3:29 PM

To: Jean Martin

Subject: Pay.gov Payment Confirmation: BOEM Exploration Plan - BF

Your payment has been submitted to Pay.gov and the details are below. If you have any questions regarding this payment, please contact Brenda Dickerson at (703) 787-1617 or BseeAccountsReceivable@bsee.gov.

Application Name: BOEM Exploration Plan - BF

Pay.gov Tracking ID: 25UQG3AU

Agency Tracking ID: 75122610870

Transaction Type: Sale

Transaction Date: 11/03/2016 04:28:59 PM EDT

Account Holder Name: Anne-Renee Laplante

Transaction Amount: \$11,019.00

Card Type: Visa

Card Number: \*\*\*\*\*3545

Region: Gulf of Mexico

Contact: Jean Martin 281-698-8544

Company Name/No: Cobalt International Energy, L.P., 02873

Lease Number(s): 32458, , , ,

Area-Block: Garden Banks GB, 956: , : , : , : ,

Surface Locations: 3

THIS IS AN AUTOMATED MESSAGE. PLEASE DO NOT REPLY.

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**Appendix B: Worst Case Discharge Assumptions and Calculations**

**Figure 7: Dynamically Positioned Deepwater Rigs with 2MM lb  
Derrick Capacity Currently in the GoM (25)**

Contractor	Rig	Type	Water Depth (ft)	Current Operator	Location	Status
DIAMOND	OCEAN BLACK HAWK	DRILL SHIP	12000	ANADARKO	GC 563 #1	DRILLING
DIAMOND	OCEAN BLACK HORNET	DRILL SHIP	12000	ANADARKO	GC 562 #6	DRILLING
NOBLE	BOB DOUGLAS	DRILL SHIP	10000	ANADARKO	GC 859 #5ST	DRILLING
ROWAN	RESOLUTE	DRILL SHIP	12000	ANADARKO	GI 61	WARM STACKED
SEADRILL	WEST AURIGA	DRILL SHIP	12000	BP	GC 743 #DC-141	DRILLING
SEADRILL	WEST VELA	DRILL SHIP	12000	BP	GI 71	BETWEEN WELL MAINTENANC
PACIFIC	SANTA ANA	DRILL SHIP	12000	CHEVRON	KC 10 #3	DRILLING
PACIFIC	SHARAV	DRILL SHIP	12000	CHEVRON	GC 807 #3	DRILLING
TRANSOCEAN	DISCOVERER CLEAR LEADER	DRILL SHIP	12000	CHEVRON	WR 758 #PS-1ST	DRILLING
TRANSOCEAN	DISCOVERER INSPIRATION	DRILL SHIP	12000	CHEVRON	GC 640 #PS-10	DRILLING
TRANSOCEAN	DEEPWATER ASGARD	DRILL SHIP	12000	CHEVRON	GC 640 #PC-4	DRILLING
TRANSOCEAN	DEEPWATER CONQUEROR	DRILL SHIP	12000	CHEVRON		NEW BUILD
ROWAN	ROWAN RELIANCE	DRILL SHIP	12000	COBALT	GB 959 #4	DRILLING
MAERSK	DEEPWATER VIKING	DRILL SHIP	12000	EXXON	WR 584 #JU-105	DRILLING
DIAMOND	OCEAN BLACK LION	DRILL SHIP	12000	HESS	GC 511 #WI-3	DRILLING
STENA DRILLING	STENA FORTH	DRILL SHIP	10000	HESS	MC 726 #6	DRILLING
SEADRILL	WEST NEPTUNE	DRILL SHIP	12000	LLOG	MC 609 #1	DRILLING
ROWAN	ROWAN RENAISSANCE	DRILL SHIP	12000	REPSOL	GI 61	WARM STACKED
NOBLE	DON TAYLOR	DRILL SHIP	12000	SHELL	MC 811 #2	DRILLING
NOBLE	GLOBETROTTE R I	DRILL SHIP	10000	SHELL	MC 566 #2	DRILLING
TRANSOCEAN	DEEPWATER PROTEUS	DRILL SHIP	12000	SHELL	MC 393 #VX-2	RIGGING UP
TRANSOCEAN	DEEPWATER THALASSA	DRILL SHIP	12000	SHELL	WR 508 #11	DRILLING
DIAMOND	OCEAN BLACK RHINO	DRILL SHIP	12000		GI 71	UPGRADES & INSPECTION
MAERSK	VALIANT	DRILL SHIP	12000		GI 44	
TRANSOCEAN	DISCOVERER INDIA	DRILL SHIP	12000			WARM STACKED

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**Appendix C:** Structure Maps, Seismic Lines, Cross Sections, Shallow Hazards Assessments and Stratigraphic Column

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## Wellsite Discussion

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Garden Banks Area

Block 956

Gulf of Mexico

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<a href="#">Figure W-4</a>	Subbottom profiler Line 105 at Proposed Well GB 956-C & C'
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<a href="#">Figure W-8</a>	Seismic sections with tophole prognosis for Proposed Well GB 956-D & D'
<a href="#">Figure W-9</a>	Power spectrum for Proposed Well GB 956-E & E'
<a href="#">Figure W-10</a>	Subbottom profiler Line 116 at Proposed Well GB 956-E & E'
<a href="#">Figure W-11</a>	Seismic sections with tophole prognosis for Proposed Well GB 956-E & E'

## List of Maps (1:12,000)

<a href="#">Map W-1</a>	Bathymetry, Proposed Well GB 956-C & C'
<a href="#">Map W-2</a>	Bathymetry, Proposed Well GB 956-D & D'
<a href="#">Map W-3</a>	Bathymetry, Proposed Well GB 956-E & E'

## Shallow Hazards Assessment for the Proposed Wells

This section contains an assessment of the shallow hazards and tophole prognoses for three proposed exploration wells in the Subsurface Study Area.

The seafloor benthic assessment and muds and cuttings discharge location considers surface conditions within a 2,000-ft radius from the proposed well locations. The archaeological assessment considers surface conditions within a 1,000-ft radius from the proposed wells. The wellsite assessments consider the conditions within a 500-ft radius from the seafloor to 1.2 seconds two-way travel time approximately 3,749 ft below the mudline (BML). An additional 3,500-ft radius subsurface assessment for a potential relief well zone (PRWZ) was assessed from the proposed well locations.

### **Maximum Anchor Radius Criteria**

Cobalt anticipates using a dynamically positioned Mobile Offshore Drilling Unit (MODU) in the seafloor assessment area; therefore, no specific anchor pattern has been analyzed.

### **Tophole Prognosis Criteria**

The following sections specify the criteria used to develop the tophole prognosis for the proposed wells. The assessment is based on the evaluation of 3-D seismic data. The tophole assessment is restricted to the specific proposed well location.

**Gas Hydrates.** The base of the estimated gas hydrate stability zone (BGHSZ) is calculated based on Maekawa et al. (1995) or an identifiable bottom-simulating reflector. The potential for solid gas hydrates was evaluated for the proposed wells. The criteria include:

- Is water depth conducive for gas hydrate formation?
- What is the estimated depth to the base of the gas hydrate stability zone (BGHSZ) at the proposed well?
- Is a bottom-simulating reflector (BSR) present between the seafloor and BGHSZ?
- Is a BSR present within 500 ft of the proposed well?
- Does the proposed well intersect a BSR?
- Have gas hydrates been identified in the region of the proposed well?

<b>HIGH</b>	The wellsite conditions meet ALL of the above stated criteria, and correlates to an existing well that encountered gas hydrates.
<b>MODERATE</b>	The wellsite conditions meet SEVERAL of the above stated criteria. There is no direct evidence of gas hydrates at nearby wells.
<b>LOW</b>	The wellsite conditions meet SOME of the above stated criteria, and does not correlate to nearby wells.
<b>NEGLIGIBLE</b>	The wellsite conditions meet FEW to NONE of the above stated criteria, and there is no evidence of gas hydrates at nearby wells.

## Wellsite Discussion

Baffin Bay Prospect  
Garden Banks Area  
Block 956



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**Shallow Gas.** The potential for shallow gas was evaluated for the proposed well. The criteria used to evaluate each proposed well include:

- Does an anomalous amplitude event exist in proximity of the proposed well, and is there evidence for connectivity to the proposed wellbore?
- Is there supporting geophysical evidence for shallow gas associated with the anomalous amplitude?
- Is there an anomalous amplitude within a sequence that may be sand-prone?
- Is there evidence of migration of fluid (including hydrocarbons) from depth, such as along a fault plane?
- Does the sequence correlate to other wells within the area that encountered shallow gas?
- Is the proposed well located in a frontier area with little or no offset well control?

### HIGH

The amplitude event meets ALL of the above stated criteria, or correlates to an existing well that encountered shallow gas.

### MODERATE

The amplitude event meets SEVERAL of the above stated criteria. There is no direct evidence of shallow gas from nearby wells.

### LOW

The amplitude event meets SOME of the above stated criteria, and does not correlate to nearby wells.

### NEGLIGIBLE

The amplitude event meets FEW to NONE of the above stated criteria, and there is no evidence of shallow gas from nearby wells.

**Shallow Water Flow.** The potential for shallow water flow (SWF) was assessed for the proposed well. The potential for SWF is based on the following criteria:

- Does the stratigraphic unit correlate to a regional sand-prone sequence?
- Was the area subject to high Pleistocene sedimentation rates and rapid overburden deposition?
- Is the sequence composed of high-amplitude, chaotic reflectors indicative of sand?
- Is there a potential seal (perhaps clay-prone) above the sand-prone sequence?
- Does the sequence correlate to other wells within the area that encountered SWF?
- If there are no existing wells in the area with reported SWF, is the proposed well located in a frontier area with little or no offset well control?

### HIGH

The stratigraphic unit meets ALL of the above stated criteria, or correlates to an existing well that encountered SWF.

### MODERATE

The stratigraphic unit meets SEVERAL of the above stated criteria. There is no direct evidence of SWF from nearby wells.

### LOW

The stratigraphic unit meets SOME of the above stated criteria, and does not correlate to nearby wells.

### NEGLIGIBLE

The stratigraphic unit meets FEW to NONE of the above stated criteria, and there is no evidence of SWF from nearby wells.

## Proposed Well GB 956-C & C'

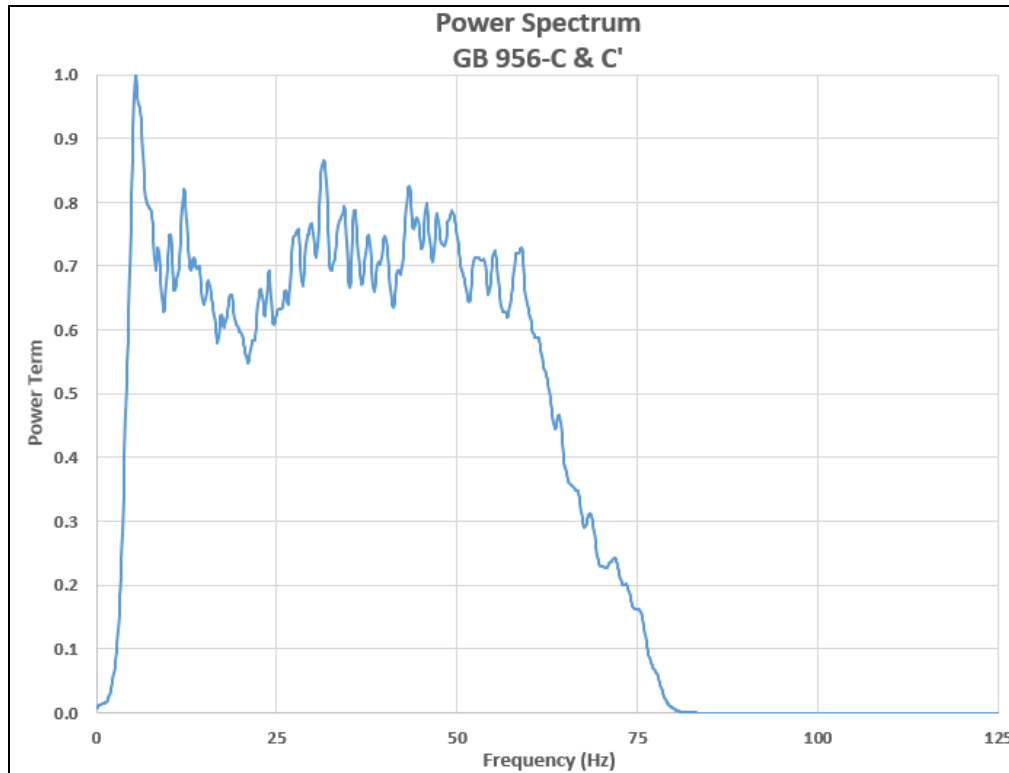
The water depth at proposed well GB 956-C & C' location is 5,039 ft below sea level (BSL; [Map W-1](#)). The proposed location provided by Cobalt is as follows:

**Table W-1. Location information for Proposed Well GB 956-C & C'**

NAD27 UTM Zone 15 North, US Survey ft		Geographic Coordinates	
X	Y	Latitude	Longitude
1,851,566.00	9,813,509.00	27° 02' 33.739" N	92° 21' 03.959" W
Block Calls		3-D Seismic Line Reference	
		Line	Trace
7,291' FNL	1,714' FEL	7446	14878

### Power Spectrum Analysis

The power spectrum for the proposed well was derived through the use of IHS Kingdom Suite's Trace Calculator tools. The frequency content within the upper one second below the seafloor is of sufficient quality for shallow hazards analysis.



[Figure W-3](#): Power spectrum for Proposed Well GB 956-C & C'

## **Seafloor Conditions**

The following paragraphs summarize the seafloor morphology, benthic potential, and archaeological potential at the proposed well location.

**Seafloor Morphology.** Proposed Well GB 956-C & C' is located in the eastern portion of GB 956. Water depths within the map area range from 4,359 ft to 5,658 ft BSL ([Map W-1](#)) with a water depth of 5,039 ft BSL at the proposed location. The seafloor is characterized by a broad arc of gravity related slumps derived from salt uplift ([Figure W-1](#), [Map W-1](#)). Slumping within this region consists of multiple successions of major and minor slump escarpments generally failing to the south. Seabed slope values are highly variable within the muds and cuttings discharge location for the proposed well. Slopes range from nearly flat along terraced slump deposits up to 67° along individual slump scarps ([Map 5](#)).

**Water depth at the proposed well GB 956-C & C' is 5,039 ft BSL and slopes to the southwest at 3°.**

Four seafloor faults are identified in the eastern and northern portions of the muds and cuttings discharge location ([Map 6](#)). All of these faults are within an extensively slumped region originating from shallow salt uplift. The nearest seafloor fault is located 534 ft east of the proposed well. There is no evidence of fluid migration along the identified faults.

**Four seafloor faults are identified within 2,000-ft of the proposed well location.**

**Benthic Communities Assessment.** No high-density benthic communities or confirmed organisms are reported within 2,000 ft of the proposed well location. There are no seafloor amplitude anomalies or BOEM seep anomalies located within 2,000 ft of the proposed well location ([Map 4](#)). The nearest area interpreted to potentially support high-density benthic communities occurs 2.9 miles east of the proposed well location.

**Features or areas that could support high-density chemosynthetic or other benthic communities are not anticipated within 2,000 ft of Proposed Well GB 956-C & C'.**

**Infrastructure.** There is no existing infrastructure within GB 956. ([Figure W-1](#); BOEM, 2016a). The nearest existing well is located 6 miles east of the proposed well location in GB 958.

**There is no apparent infrastructure within 2,000 ft of the proposed well.**

**Archaeologic Assessment.** A review of the archaeological assessment covering the proposed well location is summarized in [Section 3](#). There are no archaeologically significant contacts or archaeological avoidance zones within 1,000 ft of the proposed well ([Map 7](#)).

**There are no sonar targets or archaeological avoidances within 1,000 ft of the proposed well location.**

## **Wellsite Assessment**

The *wellsite assessment* covers the conditions within a 500-ft radius from the proposed well location. Geologic features near Proposed Well GB 956-C & C', including amplitude anomalies and faults, can be found on [Maps 4](#) and [6](#).

The water depth at the proposed well is 5,039 ft BSL ([Map W-1](#)). The seafloor at the proposed well slopes to the southwest with a gradient of 3° ([Map 5](#)).

**There are no apparent seafloor faults resolved within the 3-D seismic data within 500 ft of the proposed well.**

### **Stratigraphy and Tophole Prognosis**

The proposed well GB 956-C & C' lies within the central Transitional Slump Zone separating Morgan Basin in the north of the Subsurface Study Area from Calcasieu Basin in the south. Nine stratigraphic marker horizons and the top of salt are identified within the basins, but only Horizons B and D from Morgan Basin can be traced beneath or close to the proposed well. A generalized description of the stratigraphic sequences can be found in [Section 1.4](#) of this report. The following is an assessment of the conditions that will be encountered directly below the planned surface location.

Seafloor to the SBP Penetration Limit. Horizon D is the first stratigraphic marker horizon traced on the 3-D seismic data; however, the subbottom profiler (SBP) data provided more detailed information about the sediments within this sequence.

The sequence between the seafloor and the SBP penetration limit is characterized by a 13 ft layer of clay drape overlying low-reflectivity chaotic reflectors interpreted to be MTDs containing interbedded silts and clays sourced from repeated local slump failures ([Figure W-4](#)). The SBP penetration limit occurs at approximately 250 ft BML.

Seafloor to Horizon D. This sequence contains two units. The upper unit is composed of low-to-moderate amplitude, discontinuous to amorphous reflectors representing a thin layer of clay drape overlying MTDs containing silts, clays, and sands ([Figure W-5](#)). The upper unit is approximately 120 ft thick at the proposed well. The second unit is interpreted as low-to-moderate sub-parallel reflectors representing stratified silts, clays, and isolated sands. The lower unit is approximately 461 ft thick at the proposed well. The interface between the two units occurs at 120 ft BML and may correlate to Horizon C.

Within this sequence, a shallow fault plane or slump surface will be penetrated at 146 ft BML. Caution is recommended when penetrating this fault ([Figure W-4](#)).

There is a *Moderate* potential for gas hydrates within this sequence. There is a *Negligible* potential for shallow gas from the seafloor to 120 ft BML, a *Moderate* potential for shallow gas from 120 ft to 146 ft BML, and a *Low* potential for shallow gas from 146 ft to Horizon D (5,620 ft BSL; [Map 10](#)) within this sequence. There is a *Negligible* potential for SWF from the seafloor to 120 ft BML and a *Low* potential for SWF from 120 ft BML to Horizon D (5,620 ft BSL; [Map 10](#)).

Horizon D to the Investigation Limit. The sequence between Horizon D and the Investigation Limit contains four units. The top unit is composed of chaotic low-amplitude reflectors representing clay-dominated MTDs. This unit is interpreted to be approximately 692 ft thick. The second unit is interpreted as low- to moderate discontinuous reflectors interpreted at silt and sand dominated MTDs. The second unit is interpreted to be approximately 185 ft thick. The third unit is interpreted to represent uplifted low-to-moderate parallel to discontinuous reflectors interpreted to represent Clay dominated MTDs with thin interbedded layers of silt. The third unit is interpreted to be approximately 1,140 ft thick. The bottom unit is interpreted to represent low-to-moderate sub-parallel reflectors of stratified silts and clays with isolated sands ([Figure W-5](#)) and extends to 1,151 ft to the limit of investigation. The sediments in the deeper units are likely similar to the materials deeper in Morgan Basin, but have been stretched and faulted with the buoyant rise of shallow salt.

## Wellsite Discussion

Baffin Bay Prospect  
Garden Banks Area  
Proposed Well GB 956-C & C'



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Within this sequence, two subsurface faults will be penetrated at estimated depths of 938 ft and 1,452 ft BML. Caution is recommended when penetrating these faults.

A bottom simulating reflector (BSR) has been mapped ([Map 6](#)) beneath the Transitional Slump Zone and may mark the base of the gas hydrate stability zone (BGHSZ) at 1,479 ft BML. There is *Moderate* potential for gas hydrates from Horizon D to the BGHSZ (1,479 ft BML) and a *Negligible* potential from the BGHSZ to the investigation limit (3,749 ft BML).

Seismic amplitude anomalies some of which may represent shallow gas have been mapped throughout the Subsurface Study Area ([Map 6](#)). None of these anomalies directly underlie the Proposed Well GB 956-C & C' well or lie within 500 ft of the vertical wellbore to the limit of investigation. Based on the local distribution of possible shallow gas anomalies and the interpreted lithology, we assess a *Negligible* potential for shallow gas from Horizon D to 1,273 ft BML, a *Moderate* potential for shallow gas from 1,273 ft to 1,458 ft BML, and a *Low* potential from 1,458 ft to the investigation limit of 3,749 ft BML.

There is a *Negligible* potential for SWF from Horizon D to 1,273 ft BML and a *Low* potential for SWF from 1,273 ft to the investigation limit of 3,749 ft BML.

### **Potential Relief Well Zone**

Cobalt has not provided a specific relief well location for the Proposed Well GB 956-C & C' for a shallow hazards assessment and tophole prognosis. This assessment evaluates all interpreted shallow hazards within the potential relief well zone (PRWZ) within a radius of 3,500-ft around the proposed well location (as per Cobalt's input) and provides a favorability assessment.

**Seafloor Conditions.** The water depths within the PRWZ range from 4,610 ft to 5,470 ft BSL ([Map W-1](#)). The seafloor within the PRWZ is characterized by a broad arc of gravity related slumps derived from salt uplift ([Figure W-1](#)). Slumping within this region consists of multiple successions of major and minor slump escarpments generally failing to the southwest. Slopes are highly variable within the PRWZ for the proposed well. Seafloor slope values range from nearly flat within terraced slump deposits to slopes up to 67° along escarpments within the PRWZ ([Map 5](#)).

Eight seafloor faults are identified within the PRWZ with the majority located in the eastern portion ([Map 6](#)). All of these faults are within the Transitional Slump Zone and originate from shallow salt uplift. The faults identified are orientated and dipping in various directions. There is no evidence of fluid migration along the identified faults.

### **Eight seafloor faults are identified within the limits of the PRWZ.**

**Benthic Communities.** There are no seafloor amplitude anomalies or BOEM water bottom anomalies within the limits of the potential relief well zone for GB 956-C & C' ([Map 4](#)).

### **Features or areas that could support high-density chemosynthetic communities or other benthic communities are not anticipated within the potential relief well zone.**

**Infrastructure.** There is no existing infrastructure within the PRWZ for the proposed well.

**Archaeological Assessment.** The high-resolution geophysical data were used to evaluate seafloor conditions. No unidentified sonar contacts were reported within the limits of the PRWZ ([Map 7](#)).

**There are no sonar targets within the limits of the PRWZ.**

**Subsurface Conditions.**

Horizons A, C, and D are defined within portions of the PRWZ for GB 956-C & C'. A generalized description of all the stratigraphic sequences can be found in Section 1.4.

Extensional faulting within the limits of the PRWZ is observed, with some shallowing to the seafloor. Eight seafloor faults are observed within the limits of the PRWZ, with the majority of these faults identified in the eastern portion. These faults have variable trend directions of northwest-southeast, east-west, and northeast-southwest. The majority of these faults within the PRWZ are downthrown to the south, southwest, and southeast ([Map 6](#)).

**There are eight seafloor faults resolved within the 3-D seismic data within the limits of the PRWZ.**

**Shallow Hazards**

Gas Hydrates. A bottom-simulating reflector (BSR) has been identified in the northern two-thirds of the potential relief well zone for proposed well GB 956-C & C' ([Map 6](#)). The depth to the BSR ranges from 1,000 ft to 1,750 ft BML. This depth is equivalent to the base of the gas hydrate stability zone (BGHSZ) as the BSR represents the velocity contrast between solid gas hydrates and free gas in the sediment column. Where the BSR is defined, there is a *Moderate* potential for gas hydrates between the seafloor and the BSR, down to 1,750 ft BML.

In the southern one-third of the potential relief well zone there is no identified BSR, nor is there any indication of fluid migration to the seafloor. In this portion of the potential relief well zone, the BGHSZ is predicted to be between 1,515 ft and 1,553 ft BML (Maekawa et al., 1995). There is a *Low* potential for gas hydrates between the seafloor and the BGHSZ, at a depth of 1,553 ft BML where the BSR is not defined. There is a *Negligible* potential for gas hydrates from the sediments below the BGHSZ throughout the potential relief well zone.

Shallow Gas. There are several amplitude anomalies that may represent shallow gas pockets within the following intervals of the PRWZ ([Map 6](#)). There is a *Negligible* potential for shallow gas within the stratigraphic intervals not mentioned below.

- Seafloor to 200 ms BML (0 ft to 520 ft BML). There is one small amplitude anomalies between the seafloor and 520 ft BML within the southeastern portion of the potential relief well zone ([Map 6](#)). This anomaly is located directly below the seafloor and probably represents stratigraphic changes related to prominent reflector rather than shallow gas. There is a *negligible* to *low* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitude.
- 200 ms to 400 ms BML (520 ft to 1,079 ft BML). There are five amplitude anomalies in the southeastern, western, and northwestern portions of the PRWZ between 520 ft to 1,079 ft BML ([Map 6](#)). These anomalies follow a general northwest-southeast trend and are likely related to the strong reflectors representing the condensed clays at the top of Horizon D. These stratigraphic changes are unlikely to represent possible shallow gas accumulations. There is a

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*Negligible* to *Low* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitudes.

- 400 ms to 600 ms BML (1,079 ft to 1,677 ft BML). There are numerous amplitude anomalies identified between 1,079 ft and 1,677 ft BML within the potential relief well zone, with a large cluster of anomalies located in the southeastern portion ([Map 6](#)). The majority of the amplitude anomalies identified are in a region where the BSR is defined, or neighboring it. Any shallow gas within this interval is likely trapped as solid gas hydrates. There is a *Negligible* to *Low* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitudes.
- 600 ms to 800 ms BML (1,677 ft to 2,315 ft BML). There are numerous scattered amplitude anomalies identified between 1,677 ft and 2,315 ft BML in the potential relief well zone, with a large cluster of anomalies within the south and southeast portions of the PRWZ ([Map 6](#)). These anomalies are likely associated with minor sandy pockets within the MTDs at the base of Horizon D, below the BGHSZ. These anomalies could potentially represent free gas trapped beneath the solid gas hydrates represented by the BSR. There is a *Negligible* to *Moderate* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitudes.
- 800 ms to 1,000 ms BML (2,315 ft to 2,992 ft BML). There are four amplitude anomalies between 2,315 ft and 2,992 ft BML within the southeast and west-central portions of the potential relief well zone ([Map 6](#)). These amplitude anomalies are interpreted to represent isolated sand lenses within stratified clay and silt sediments. Shallow gas may be affiliated with these sand lenses. There is a *Negligible* to *Moderate* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitudes.
- 1,000 ms to 1,200 ms BML (2,992 ft to 3,749 ft BML). There are three amplitude anomalies between 2,992 ft and 3,749 ft BML within the southeastern portion of potential relief well zone ([Map 6](#)). These amplitude anomalies are interpreted to represent isolated sand lenses within stratified clay and silt sediments. Shallow gas may be affiliated with these sand lenses. There is a *Negligible* to *Moderate* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitudes.

Shallow Water Flow. There is a *Negligible* to *Moderate* potential for shallow water flow within the PRWZ. The moderate potential correlates to the more sand-prone mass transport deposits found within each sequence below the seafloor within the PRWZ. Caution should be taken when penetrating the sand prone mass transport deposits within the PRWZ.

### **Conclusions and Recommendations**

At the proposed well location, the seafloor is rugose due to the extensive slumping in the region. The recently slumped deposits near the seafloor may contain a higher water content and a deeper casing self-penetration may be expected at this location. Sediments beneath this well location are expected to be predominantly clay, silts, and isolated sands. A vertical wellbore will encounter buried faults at 146 ft, 938 ft, and 1,452 ft BML. Shallow gas may be associated with these faults.

Prior to drilling a relief well, we recommend a shallow hazards assessment and tophole prognosis be prepared at the specific relief well location.

## Proposed Well GB 956-D & D'

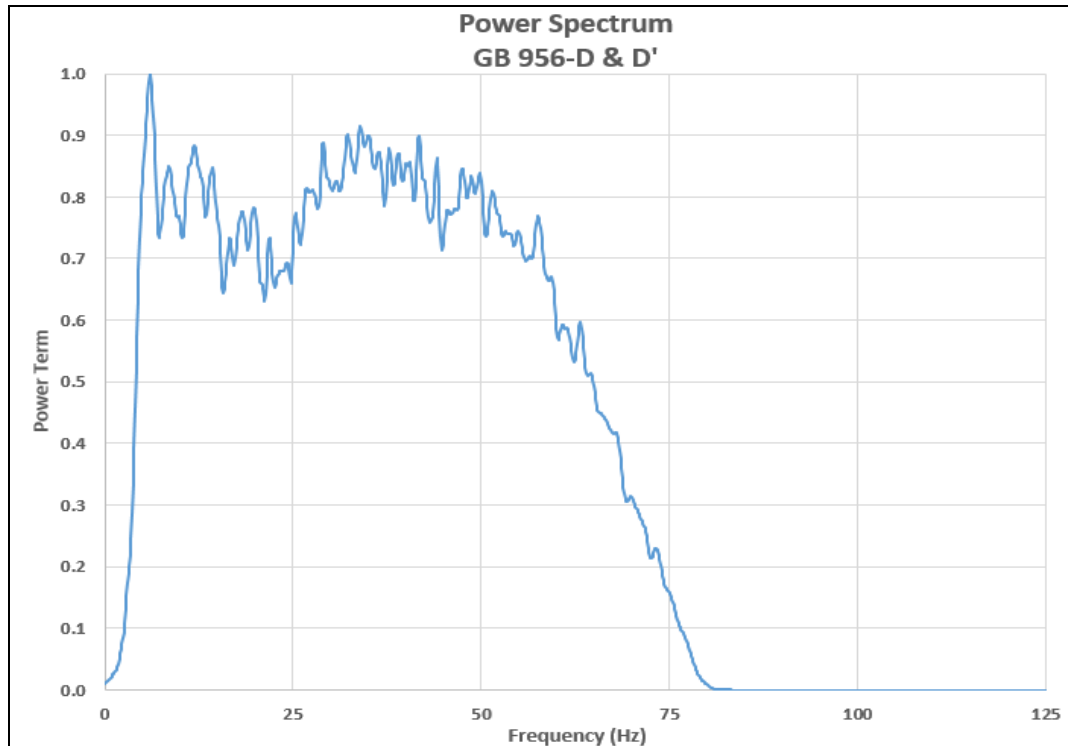
The water depth at proposed well GB 956-D & D' location is 4,821 ft below sea level (BSL; [Map W-2](#)). The proposed location provided by Cobalt is as follows:

**Table W-2. Location information for Proposed Well GB 956-D & D'**

NAD27 UTM Zone 15 North, US Survey ft		Geographic Coordinates	
X	Y	Latitude	Longitude
1,848,311	9,815,052	27° 02' 49.190" N	92° 21' 39.882" W
Block Calls		3-D Seismic Line Reference	
		Line	Trace
5,748' FNL	4,969' FEL	7428	14919

### Power Spectrum Analysis

The power spectrum for the proposed well was derived through the use of IHS Kingdom Suite's Trace Calculator tools. The frequency content within the upper one second below the seafloor is of sufficient quality for shallow hazards analysis.



**Figure W-6:** Power spectrum for Proposed Well GB 956-D & D'

## **Seafloor Conditions**

The following paragraphs summarize the seafloor morphology, benthic potential, and archaeological potential at the proposed well location.

**Seafloor Morphology.** Proposed Well GB 956-D & D' is located in the eastern portion of GB 956. Water depths within the map area range from 4,246 ft to 5,481 ft BSL ([Map W-2](#)) with a depth of 4,821 ft BSL at the proposed location. The seafloor is characterized by a broad arc of gravity related slumps derived from salt uplift ([Figure W-1](#)). Slumping within this region consists of multiple successions of major and minor slump escarpments generally failing to the south. Seabed slope values are highly variable within the 2,000-ft radius muds and cuttings discharge location for the proposed well. Slopes range from nearly flat along terraced slump deposits up to 64° along individual slump scarps ([Map 5](#)).

**Water depth at the proposed well GB 956-D & D' is 4,821 ft BSL and slopes to the southeast at 6°.**

Two seafloor faults are identified in the northwestern and southeastern portions of the muds and cuttings discharge location ([Map 6](#)). Both of these faults are within an extensively slumped region originating from shallow salt uplift. These faults trend west to east and are downthrown to the south. The nearest seafloor fault is located 444 ft southeast of the proposed well. There is no evidence of fluid migration along the identified faults.

**Two seafloor faults are identified within 2,000-ft of the proposed well location.**

**Benthic Communities Assessment.** No high-density benthic communities or confirmed organisms are reported within 2,000 ft of the proposed well location. There are no seafloor amplitude anomalies or BOEM seep anomalies located within 2,000 ft of the proposed well location ([Map 4](#)). The nearest area interpreted to potentially support high-density benthic communities occurs 3.5 miles east of the proposed well location.

**Features or areas that could support high-density chemosynthetic or other benthic communities are not anticipated within 2,000 ft of Proposed Well GB 956-D & D'.**

**Infrastructure.** There is no existing infrastructure within GB 956. ([Figure W-1](#); BOEM, 2016a). The nearest existing well is located 6.6 miles east of the proposed well location.

**There is no apparent infrastructure within 2,000 ft of the proposed well.**

**Archaeologic Assessment.** A review of the archaeological assessment covering the proposed well location is summarized in [Section 3](#). There are no archaeologically significant contacts or archaeological avoidance zones within 1,000 ft of the proposed well ([Map 7](#)).

**There are no sonar targets or archaeological avoidances within 1,000 ft of the proposed well location.**

## Wellsite Assessment

The *wellsite assessment* covers the conditions within a 500-ft radius from the proposed well location. Geologic features near Proposed Well GB 956-D & D', including amplitude anomalies and faults, can be found on [Maps 4](#) and [6](#).

The water depth at the proposed well is 4,821 ft BSL ([Map W-2](#)). The seafloor at the proposed well slopes to the southeast with a gradient of 6° ([Map 5](#)).

One seafloor fault is identified 444 ft southwest of the proposed well. This fault is trending west to east and is downthrown to the south, away from the proposed well ([Map 6](#)).

**There is one apparent seafloor fault resolved within the 3-D seismic data within 500 ft of the proposed well.**

## Stratigraphy and Tophole Prognosis.

The proposed well GB 956-D & D' lies within the central Transitional Slump Zone separating Morgan Basin in the north of the Subsurface Study Area from Calcasieu Basin in the south. Nine stratigraphic marker horizons and the top of salt are identified within the basins, but only Horizon D from Morgan Basin can be traced beneath or close to the proposed well. A generalized description of the stratigraphic sequences can be found in [Section 1.4](#) of this report. The following is an assessment of the conditions that will be encountered directly below the planned surface location.

Seafloor to the SBP Penetration Limit. Horizon D is the first stratigraphic marker horizon traced on the 3-D seismic data; however, the subbottom profiler (SBP) data provided more detailed information about the sediments within this sequence.

The sequence between the seafloor and the SBP penetration limit is characterized by a 14 ft layer of clay drape overlying low-reflectivity chaotic reflectors interpreted to be mass transport deposits containing interbedded silts and clays sourced from repeated local slump failures ([Figure W-7](#)). The SBP penetration limit occurs at approximately 265 ft BML.

Seafloor to Horizon D. This sequence contains two units. The upper unit is composed of low-to-moderate amplitude, discontinuous to amorphous reflectors representing a thin layer of clay drape overlying MTDs containing silts, clays, and sands ([Figure W-8](#)). The upper unit is approximately 62 ft thick at the proposed well. The second unit is interpreted as low-to-moderate sub-parallel reflectors representing semi-stratified silts, clays, and isolated sands. The lower unit is approximately 508 ft thick at the proposed well. The interface between the two units occurs at 62 ft BML and may correlate to Horizon C.

Within this sequence, a shallow fault will be penetrated at 300 ft BML. Caution is recommended when penetrating this fault.

There is a *Moderate* potential for gas hydrates within this sequence. There is a *Negligible* potential for shallow gas from the seafloor to 62 ft BML and a *Low* potential for shallow gas from 62 ft to Horizon D (5,391 ft BSL; [Map 10](#)) within this sequence. There is a *Negligible* potential for SWF from the seafloor to 62 ft BML and a *Low* potential for SWF from 62 ft BML to Horizon D (5,391 ft BSL; [Map 10](#)).

Horizon D to the Investigation Limit. The sequence between Horizon D and the Investigation Limit contains four units. The top unit is composed of chaotic low-amplitude reflectors representing clay-

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dominated MTDs. This unit is interpreted to be approximately 534 ft thick. The second unit is interpreted as low- to moderate discontinuous reflectors interpreted at silt and sand dominated MTDs. The second unit is interpreted to be approximately 560 ft thick. The third unit is interpreted to represent uplifted low-to-moderate parallel to discontinuous reflectors interpreted to represent clay dominated MTDs with thin interbedded layers of silt. The third unit is interpreted to be approximately 640 ft thick. The bottom unit is interpreted to represent low-to-moderate sub-parallel reflectors of stratified silts and clays with isolated sand ([Figure W-8](#)). The sediments in the deeper units are likely similar to the materials deeper in Morgan Basin but have been stretched and faulted with the buoyant rise of shallow salt. The bottom unit is approximately 1,445 ft thick and extends to the limit of investigation.

Within this sequence, a bottom simulating reflector (BSR) has been mapped ([Map 6](#)) beneath the Transitional Slump Zone and may mark the base of the gas hydrate stability zone (BGHSZ) at 1,400 ft BML. There is *Moderate* potential for gas hydrates from Horizon D to the BGHSZ (1,400 ft BML) and a *Negligible* potential from the BGHSZ to the investigation limit (3,749 ft BML).

Seismic amplitude anomalies some of which may represent shallow gas have been mapped throughout the Subsurface Study Area ([Map 6](#)). None of these anomalies directly underlie the Proposed Well GB 956-C & C' well or lie within 500 ft of the vertical wellbore to the limit of investigation. Based on the local distribution of possible shallow gas anomalies and the interpreted lithology, we assess a *Negligible* potential for shallow gas from Horizon D to 1,104 ft BML, a *Moderate* potential for shallow gas from 1,104 ft to 1,664 ft BML, and a *Low* potential from 1,664 ft to the investigation limit of 3,749 ft BML.

There is a *Negligible* potential for SWF from Horizon D to 1,104 ft BML and a *Low* potential for SWF from 1,104 ft to the investigation limit of 3,749 ft BML.

### **Potential Relief Well Zone**

Cobalt has not provided a specific relief well location for the Proposed Well GB 956-D & D' for a shallow hazards assessment and tophole prognosis. This assessment evaluates all interpreted shallow hazards within the potential relief well zone (PRWZ) with a radius of 3,500-ft around the proposed well location (as per Cobalt's input) and provide a favorability assessment.

**Seafloor Conditions.** The water depths within the PRWZ range from 4,246 ft to 5,205 ft BSL ([Map W-2](#)). The majority of the seafloor within the PRWZ is characterized by a broad arc of gravity related slumps derived from salt uplift ([Map W-2](#)). Slumping within this region consists of multiple successions of major and minor slump escarpments generally failing to the southwest. Slopes are highly variable within the PRWZ for the proposed well. Seafloor slope values range from nearly flat within terraced slump deposits to slopes up to 67° along escarpments within the PRWZ ([Map 5](#)). The northern portion of the PRWZ is located on the edge of Morgan Basin. The seafloor within Morgan Basin is relatively flat with a succession of minor slumps failing towards the Transitional Slump Zone.

Two seafloor faults are identified in the northwestern and southeastern portions the PRWZ ([Map 6](#)). Both of these faults are within the Transitional Slump Zone and originate from shallow salt uplift. All of these faults are within an extensively slumped region originating from shallow salt uplift. There is no evidence of fluid migration along the identified faults.

**Two seafloor faults are identified within the limits of the PRWZ.**

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**Benthic Communities.** There are no seafloor amplitude anomalies or BOEM water bottom anomalies within the limits of the PRWZ for GB 956-D & D' ([Map 4](#)).

**Features or areas that could support high-density chemosynthetic communities or other benthic communities are not anticipated within the potential relief well zone.**

**Infrastructure.** There is no existing infrastructure within the PRWZ for the proposed well.

**Archaeological Assessment.** The high-resolution geophysical data were used to evaluate seafloor conditions. No unidentified sonar contacts were reported within the limits of the PRWZ ([Map 7](#)).

**There are no sonar targets within the limits of the PRWZ.**

### **Subsurface Conditions**

Horizons A, C, and D are defined within portions of the PRWZ for GB 956-D & D'. A generalized description of all the stratigraphic sequences can be found in [Section 1.4](#).

Extensional faulting within the limits of the PRWZ is observed within the Transitional Slump Zone, with two faults extending to the seafloor. These faults trend southwest-northeast and are downthrown to the southeast ([Map 6](#)).

**There are two buried faults revealed within the 3-D seismic data within the limits of the PRWZ.**

### **Shallow Hazards**

**Gas Hydrates.** A bottom-simulating reflector (BSR) has been identified in the majority of the potential relief well zone for proposed well GB 956-D & D' ([Map 6](#)). The depth to the BSR ranges from 1,150 ft to 1,600 ft BML. This depth is equivalent to the base of the gas hydrate stability zone (BGHSZ) as the BSR represents the velocity contrast between solid gas hydrates and free gas in the sediment column. Where the BSR is defined, there is a **Moderate** potential for gas hydrates between the seafloor and the BSR, up to 1,600 ft BML.

In the northern tip of the potential relief well zone, there is no identified BSR, nor is there any indication of fluid migration to the seafloor. In this portion of the potential relief well zone, the BGHSZ is predicted to be between 1,505 ft and 1,557 ft BML (Maekawa et al., 1995). There is a **Low** potential for gas hydrates between the seafloor and the BGHSZ, at a depth of 1,557 ft BML where the BSR is not defined. There is a **Negligible** potential for gas hydrates from the sediments below the BGHSZ throughout the potential relief well zone.

**Shallow Gas.** There are several amplitude anomalies that may represent shallow gas pockets within the following intervals of the PRWZ ([Map 6](#)). There is a **Negligible** potential for shallow gas within the stratigraphic intervals not mentioned below.

- **200 ms to 400 ms BML (520 ft to 1,079 ft BML).** There is one amplitude anomaly in the eastern portion of the PRWZ between 520 ft to 1,079 ft BML ([Map 6](#)). This anomaly is likely related to the strong reflectors representing the condensed clays at the top of Horizon D. This stratigraphic change is unlikely to represent possible shallow gas accumulations. There is a **Negligible** to **Low**

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potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitude.

- 400 ms to 600 ms BML (1,079 ft to 1,677 ft BML). There are numerous scattered amplitude anomalies identified between 1,079 ft and 1,677 ft BML within the northern half of the potential relief well zone ([Map 6](#)). The amplitude anomalies identified are in a region where the BSR is defined. Any shallow gas within this interval is likely trapped as solid gas hydrates. There is a *Negligible* to *Low* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitudes.
- 600 ms to 800 ms BML (1,677 ft to 2,315 ft BML). There are numerous scattered amplitude anomalies identified between 1,677 ft and 2,315 ft BML in the potential relief well zone, with a large cluster of anomalies within the northwestern portion of the PRWZ ([Map 6](#)). These anomalies are likely associated with minor sandy pockets within the mass transport deposits at the base of Horizon D, below the BGHSZ. These anomalies could potentially represent free gas trapped beneath the solid gas hydrates represented by the BSR. There is a *Negligible* to *Moderate* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitudes.
- 800 ms to 1,000 ms BML (2,315 ft to 2,992 ft BML). There are two amplitude anomalies between 2,315 ft and 2,992 ft BML within the southeastern portion of the potential relief well zone ([Map 6](#)). These amplitude anomalies are interpreted to represent isolated sand lenses within stratified clay and silt sediments. Shallow gas may be affiliated with these sand lenses. There is a *Negligible* to *Moderate* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitudes.
- 1,000 ms to 1,200 ms BML (2,992 ft to 3,749 ft BML). There is one amplitude anomaly between 2,992 ft and 3,749 ft BML within the west-central potential relief well zone ([Map 6](#)). This amplitude anomaly is interpreted to represent an isolated sand lens within stratified clay and silt sediments. Shallow gas may be affiliated with this sand lens. There is a *Negligible* to *Moderate* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitude.

Shallow Water Flow. There is a *Negligible* to *Moderate* potential for shallow water flow within the PRWZ. The moderate potential correlates to the more sand-prone mass transport deposits found within each sequence below the seafloor within the PRWZ. Caution should be taken when penetrating the sand prone mass transport deposits within the PRWZ.

### Conclusions and Recommendations

At the proposed well location, the seafloor is rugose due to the extensive slumping in the region. The recently slumped deposits near the seafloor may contain a higher water content and a deeper casing self-penetration may be expected at this location. Sediments beneath this well location are expected to be predominantly clay, silts, and isolated sands. A vertical wellbore will encounter a buried fault at 300 ft BML. Shallow gas may be associated with this fault.

Prior to drilling a relief well, we recommend a shallow hazards assessment and tophole prognosis be prepared at the specific relief well location.

## Proposed Well GB 956-E & E'

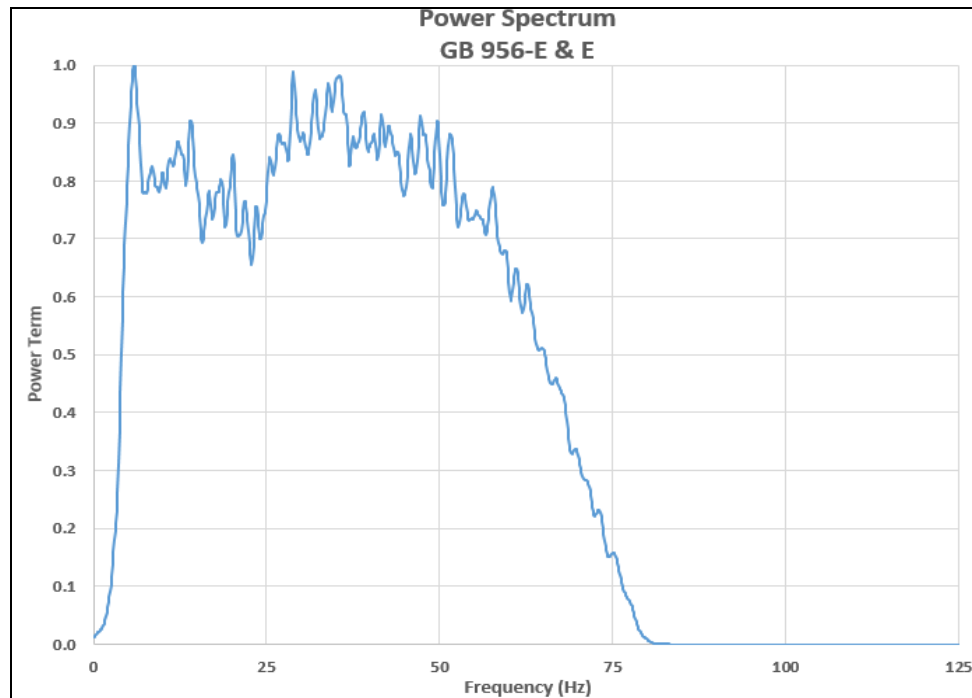
The water depth at proposed well GB 956-E & E' location is 4,821 ft below sea level (BSL; [Map W-3](#)). The proposed location provided by Cobalt is as follows:

**Table W-3. Location information for Proposed Well GB 956-E & E'**

NAD27 UTM Zone 15 North, US Survey ft		Geographic Coordinates	
X	Y	Latitude	Longitude
1,847,228	9,814,221	27° 02' 41.011" N	92° 21' 51.910" W
Block Calls		3-D Seismic Line Reference	
		Line	Trace
6,579' FNL	6,052' FEL	7407	14922

### Power Spectrum Analysis

The power spectrum for the proposed well was derived through the use of IHS Kingdom Suite's Trace Calculator tools. The frequency content within the upper one second below the seafloor is of sufficient quality for shallow hazards analysis.



**Figure W-9:** Power spectrum for Proposed Well GB 956-E & E'

## **Seafloor Conditions**

The following paragraphs summarize the seafloor morphology, benthic potential, and archaeological potential at the proposed well location.

**Seafloor Morphology.** Proposed Well GB 956-E & E' is located in the eastern portion of GB 956. Water depths within the map area range from 4,242 ft to 5,505 ft BSL ([Map W-3](#)) with a water depth of 4,756 ft BSL at the proposed location. The seafloor is characterized by a broad arc of gravity related slumps derived from salt uplift ([Figure W-1](#); [Map W-3](#)). Slumping within this region consists of multiple successions of major and minor slump escarpments generally failing to the south. Seabed slope values are highly variable within the 2,000-ft radius muds and cuttings discharge location for the proposed well. Slopes range from nearly flat along terraced slump deposits up to 64° along individual slump scarps ([Map 5](#)).

**Water depth at the proposed well GB 956-E & E' is 4,756 ft BSL and slopes to the east at 8°.**

Two seafloor faults are identified in the northeastern portion of the muds and cuttings discharge location ([Map 6](#)). Both of these faults are within an extensively slumped region originating from shallow salt uplift. These faults trend west to east and are downthrown to the south. The nearest seafloor fault is located 1,031 ft northeast of the proposed well. There is no evidence of fluid migration along the identified faults.

**Two seafloor faults are identified within 2,000-ft of the proposed well location.**

**Benthic Communities Assessment.** No high-density benthic communities or confirmed organisms are reported within 2,000 ft of the proposed well location. There are no seafloor amplitude anomalies or BOEM seep anomalies located within 2,000 ft of the proposed well location ([Map 4](#)). The nearest area interpreted to potentially support high-density benthic communities occurs 3.7 miles east of the proposed well location.

**Features or areas that could support high-density chemosynthetic or other benthic communities are not anticipated within 2,000 ft of Proposed Well GB 956-E & E'.**

**Infrastructure.** There is no existing infrastructure within GB 956. ([Figure W-1](#); BOEM, 2016a). The nearest existing well is located 6.8 miles east of the proposed well location in GB 958.

**There is no apparent infrastructure within 2,000 ft of the proposed well.**

**Archaeologic Assessment.** A review of the archaeological assessment covering the proposed well location is summarized in [Section 3](#). There are no archaeologically significant contacts or archaeological avoidance zones within 1,000 ft of the proposed well ([Map 7](#)).

**There are no sonar targets or archaeological avoidances within 1,000 ft of the proposed well location.**

## **Wellsite Assessment**

The *wellsite assessment* covers the conditions within a 500-ft radius from the proposed well location. Geologic features near Proposed Well GB 956-E & E', including amplitude anomalies and faults, can be found on [Maps 4](#) and [6](#).

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The water depth at the proposed well is 4,756 ft BSL ([Map W-3](#)). The seafloor at the proposed well slopes to the southeast with a gradient of 8° ([Map 5](#)).

**There are no apparent seafloor faults resolved within the 3-D seismic data within 500 ft of the proposed well.**

### **Stratigraphy and Tophole Prognosis.**

The proposed well GB 956-E & E' lies within the central Transitional Slump Zone separating Morgan Basin in the north of the Subsurface Study Area from Calcasieu Basin in the south. Nine stratigraphic marker horizons and the top of salt are identified within the basins, but only Horizons B and D from Morgan Basin can be traced beneath or close to the proposed well. A generalized description of all of the stratigraphic sequences can be found in [Section 1.4](#) of this report. The following is an assessment of the conditions that will be encountered directly below the planned surface location.

Seafloor to the SBP Penetration Limit. Horizon D is the first stratigraphic marker horizon traced on the 3-D seismic data; however, the subbottom profiler (SBP) data provided more detailed information about the sediments within this sequence.

The sequence between the seafloor and the SBP penetration limit is characterized by a 32 ft layer of clay drape overlying low-reflectivity chaotic reflectors interpreted to be mass transport deposits containing interbedded silts and clays sourced from repeated local slump failures ([Figure W-10](#)). The SBP penetration limit occurs at approximately 240 ft BML.

Seafloor to the Investigation Limit (3,749 ft BML). This sequence contains six units. The upper unit is composed of low-to-moderate amplitude, discontinuous to amorphous reflectors representing a thin layer of clay drape overlying MTDs containing silts, clays, and sands ([Figure W-11](#)). The upper unit is approximately 73 ft thick at the proposed well. The second unit is interpreted as low-to-moderate sub-parallel reflectors representing semi-stratified silts, clays, and isolated sands. The lower unit is approximately 243 ft thick at the proposed well.

Within the second unit, a shallow fault will be penetrated at 180 ft BML. Caution is recommended when penetrating this fault.

The third unit is composed of chaotic low-amplitude reflectors representing clay-dominated MTDs. This unit is interpreted to be approximately 697 ft thick. The fourth unit is interpreted as low- to moderate discontinuous reflectors interpreted as silt and sand dominated MTDs. The fourth unit is interpreted to be approximately 481 ft thick. The fifth unit is interpreted to represent uplifted low-to-moderate parallel to discontinuous reflectors interpreted to represent clay dominated MTDs with thin interbedded layers of silt. The fifth unit is interpreted to be approximately 323 ft thick. The bottom or sixth unit is interpreted to represent low-to-moderate sub-parallel reflectors of stratified silts and clays with isolated sand ([Figure W-10](#)). The sediments in the deeper units are likely similar to the materials deeper in Morgan Basin, but have been stretched and faulted with the buoyant rise of shallow salt. The base unit is approximately 1,932 ft thick and extends to the limit of investigation.

Within this sequence, a bottom simulating reflector (BSR) is identified, marking the base of the gas hydrate stability zone (BGHSZ) at 1,237 ft BML. There is *Moderate* potential for gas hydrates from the seafloor to the BGHSZ (1,237 ft BML) and a *Negligible* potential from the BGHSZ to the investigation limit (3,749 ft BML).

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Seismic amplitude anomalies some of which may represent shallow gas have been mapped throughout the Subsurface Study Area ([Map 6](#)). None of these anomalies directly underlie the Proposed Well GB 956-E & E' well or lie within 500 ft of the vertical wellbore to the limit of investigation. Based on the local distribution of possible shallow gas anomalies and the interpreted lithology, we assess a *Negligible* potential for shallow gas from the seafloor to 73 ft BML, a *Moderate* potential for shallow gas from 73 ft to 316 ft BML, a *Negligible* potential from 316 ft to 1,013 ft BML, a *Moderate* potential from 1,013 ft to 1,494 ft BML, and a *Low* potential from 1,494 ft BML to the investigation limit of 3,749 ft BML.

There is a *Negligible* potential for SWF from the seafloor to 73 ft BML, a *Low* potential for shallow gas from 73 ft to 316 ft BML, a *Negligible* potential from 316 ft to 1,013 ft BML, and a *Low* potential from 1,013 ft BML to the investigation limit.

### **Potential Relief Well Zone**

Cobalt has not provided a specific relief well location for Proposed Well GB 956-E & E' for a shallow hazards assessment and tophole prognosis. This assessment evaluates all interpreted shallow hazards within the potential relief well zone (PRWZ) with a radius of 3,500-ft around the proposed well location (as per Cobalt's input) and provide a favorability assessment ([Map W-3](#)).

Seafloor Conditions. The water depths within the PRWZ range from 4,246 ft to 5,124 ft BSL ([Map W-3](#)). The majority of the seafloor within the PRWZ is characterized by a broad arc of gravity related slumps derived from salt uplift ([Map W-3](#)). Slumping within this region consists of multiple successions of major and minor slump escarpments generally failing to the southwest. Slopes are highly variable within the PRWZ for the proposed well. Seafloor slope values range from nearly flat within terraced slump deposits to slopes up to 64° along escarpments within the PRWZ ([Map 5](#)). The northern portion of the PRWZ is located on the edge of Morgan Basin. The seafloor within Morgan Basin is relatively flat with a succession of minor slumps failing towards the Transitional Slump Zone.

Two seafloor faults are identified in the northeastern portion of the PRWZ ([Map 6](#)). Both of these faults are within the Transitional Slump Zone and originate from shallow salt uplift. These faults trend west to east and are downthrown to the south. There is no evidence of fluid migration along the identified faults.

### **Two seafloor faults are identified within the limits of the PRWZ.**

Benthic Communities. There are no seafloor amplitude anomalies or BOEM water bottom anomalies within the limits of the potential relief well zone for GB 956-E & E' ([Map 4](#)).

### **Features or areas that could support high-density chemosynthetic communities or other benthic communities are not anticipated within the potential relief well zone.**

Infrastructure. There is no existing infrastructure within the PRWZ for the proposed well.

Archaeological Assessment. The high-resolution geophysical data were used to evaluate seafloor conditions. No unidentified sonar contacts were reported within the limits of the PRWZ ([Map 7](#)).

### **There are no sonar targets within the limits of the PRWZ.**

## Subsurface Conditions

Horizons A, C, and D are defined within the northern portions of the PRWZ for GB 956-E & E'. A generalized description of all the stratigraphic sequences can be found in [Section 1.4](#).

Extensional faulting within the limits of the PRWZ is observed within the Transitional Slump Zone, with two faults carrying to the seafloor. These faults trend southwest-northeast and are downthrown to the southwest ([Map 6](#)).

**There are two buried faults resolved within the 3-D Seismic data within the limits of the PRWZ.**

## Shallow Hazards

Gas Hydrates. A bottom-simulating reflector (BSR) has been identified in the majority of the potential relief well zone for proposed well GB 956-E & E' ([Map 6](#)). The depth to the BSR ranges from 1,336 ft to 1,861 ft BML. This depth is equivalent to the base of the gas hydrate stability zone (BGHSZ) as the BSR represents the velocity contrast between solid gas hydrates and free gas in the sediment column. Where the BSR is defined, there is a *Moderate* potential for gas hydrates between the seafloor and the BSR, down to 1,861 ft BML.

In the southwestern portion of the potential relief well zone, there is no identified BSR, nor is there any indication of fluid migration to the seafloor. In this portion of the potential relief well zone, the BGHSZ is predicted to be between 1,501 ft and 1,559 ft BML (Maekawa et al., 1995). There is a *Low* potential for gas hydrates between the seafloor and the BGHSZ, at a depth of 1,559 ft BML where the BSR is not defined. There is a *Negligible* potential for gas hydrates from the sediments below the BGHSZ throughout the potential relief well zone.

Shallow Gas. There are several amplitude anomalies that may represent shallow gas pockets within the following intervals of the PRWZ ([Map 6](#)). There is a *Negligible* potential for shallow gas within the stratigraphic intervals not mentioned below.

- 200 ms to 400 ms BML (520 ft to 1,079 ft BML). There is one amplitude anomaly in the northeastern portion of the PRWZ between 520 ft to 1,079 ft BML ([Map 6](#)). This anomaly is likely related to the strong reflectors representing the condensed clays at the top of Horizon D. This stratigraphic change is unlikely to represent possible shallow gas accumulations. There is a *Negligible to Low* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitude.
- 400 ms to 600 ms BML (1,079 ft to 1,677 ft BML). There are four amplitude anomalies identified between 1,079 ft and 1,677 ft BML within the northern portion of the potential relief well zone ([Map 6](#)). The amplitude anomalies identified are in a region where the BSR is defined. Any shallow gas within this interval is likely trapped as solid gas hydrates. There is a *Negligible to Low* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitudes.
- 600 ms to 800 ms BML (1,677 ft to 2,315 ft BML). There are numerous scattered amplitude anomalies identified between 1,677 ft and 2,315 ft BML in the potential relief well zone, with a large cluster of anomalies within the northwestern portion of the PRWZ ([Map 6](#)). These

## Wellsite Discussion

Baffin Bay Prospect  
Garden Banks Area  
Proposed Well GB 956-E & E'



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anomalies are likely associated with minor sandy pockets within the mass transport deposits at the base of Horizon D, below the BGHSZ. These anomalies could potentially represent free gas trapped beneath the solid gas hydrates represented by the BSR. There is a *Negligible* to *Moderate* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitudes.

- 800 ms to 1,000 ms BML (2,315 ft to 2,992 ft BML). There are two amplitude anomalies between 2,315 ft and 2,992 ft BML within the eastern portion of the potential relief well zone ([Map 6](#)). These amplitude anomalies are interpreted to represent isolated sand lenses within stratified clay and silt sediments. Shallow gas may be affiliated with these sand lenses. There is a *Negligible* to *Moderate* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitudes.
- 1,000 ms to 1,200 ms BML (2,992 ft to 3,749 ft BML). There is one amplitude anomaly between 2,992 ft and 3,749 ft BML within the northcentral portion potential relief well zone ([Map 6](#)). This amplitude anomaly is interpreted to represent an isolated sand lens within stratified clay and silt sediments. Shallow gas may be affiliated with this sand lens. There is a *Negligible* to *Moderate* potential for shallow gas from this interval, with the potential increasing with proximity to the anomalous amplitude.

Shallow Water Flow. There is a *Negligible* to *Moderate* potential for shallow water flow within the PRWZ. The moderate potential correlates to the more sand-prone mass transport deposits found within each sequence below the seafloor within the PRWZ. Caution should be taken when penetrating the sand prone mass transport deposits within the PRWZ.

### **Conclusions and Recommendations**

At the proposed well location, the seafloor is rugose due to the extensive slumping in the region. The recently slumped deposits near the seafloor may contain a higher water content and a deeper casing self-penetration may be expected at this location. Sediments beneath this well location are expected to be predominantly clay, silts, and isolated sands. A vertical wellbore will encounter a buried fault at 300 ft BML. Shallow gas may be associated with this fault.

Prior to drilling a relief well, we recommend a shallow hazards assessment and tophole prognosis be prepared at the specific relief well location.

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**Appendix D: Generated Wastes**

**TABLE 1. WASTE ESTIMATED TO BE GENERATED, TREATED AND/OR DOWNHOLE DISPOSED OR DISCHARGED TO THE GOM**

Projected generated waste			Projected ocean discharges		Projected Downhole Disposal
Type of Waste	Composition	Projected Amount	Discharge rate	Discharge Method	Answer yes or no
<b>Will drilling occur ? If yes, you should list muds and cuttings</b>					
Water-based drilling fluid	Sea and FW Gel, Lignite, Barite	110,000 bbl/well	2,000 bbl/hr/well (maximum while drilling and/or circulating)	Seafloor discharge prior to installation of marine riser.	No
Cuttings wetted with water-based fluid	Drill cuttings generated while using water-based drilling fluids	3,575 bbl/well	150 bbl/hr/well (maximum while drilling only)	Seafloor discharge prior to installation of marine riser.	No
Cuttings wetted with synthetic-based fluid	Drill cuttings generated while using synthetic-based drilling fluid	11,063 bbl/well*	48 bbl/hr (maximum while drilling only)	Treated cuttings will be discharged overboard while drilling SBM interval. Cuttings are centrifuged and passed through cuttings dryer to reduce ROC percentage in compliance with EPA and will then be shunted through a downpipe to 25' below the water's surface.	No
Small volume discharge of synthetic-based fluid	Pit cleaners	100 bbl/well	10 bbl/hr/well		No
*Includes bbl of SBM on treated cuttings discharged overboard					
<b>Will humans be there? If yes, expect conventional waste</b>					
Domestic waste	Gray water from galley, lavatory and laundry	54,000 bbl/well	75 gal/person/day	Treated by 2x100% Hamworthy Super Trident 8 Biological Sewage Treatment Plants, IMO & MED certified and accepted by USCG for non-US flagged vessels in US waters. Discharged through port-side caisson (cuttings chute) below sea level. Projected amount is based on maximum POB of 150.	No

Projected generated waste			Projected ocean discharges		Projected Downhole Disposal
Type of Waste	Composition	Projected Amount	Discharge rate	Discharge Method	Answer yes or no
Sanitary waste	Treated human body waste from toilets	18,000 bbl/well	25 gal/person/day	Treated by 2x100% Hamworthy Super Trident 8 Biological Sewage Treatment Plants, IMO & MED certified and accepted by USCG for non-US flagged vessels in US waters. Discharged through port-side caisson (cuttings chute) below sea level. Projected amount is based on maximum POB of 150.	No
<b>Is there a deck? If yes, there will be Deck Drainage</b>					
Deck Drainage	Rainwater and rig washing	45,000 bbl/well (based on 65 inches/yr average rainfall)	10 bbl/hr/well (dependent on rainfall)	Oily water is treated in one of four (4) separators and discharged through port-side caisson (cutting chute) below sea level.	No
<b>Will you conduct well treatment, completion, or workover?</b>					
Well treatment fluids	NA	NA	NA	NA	NA
Well completion fluids	NA	NA	NA	NA	NA
Workover fluids	NA	NA	NA	NA	NA
<b>Miscellaneous discharges. If yes, only fill in those associated with your activity.</b>					
Desalinization unit discharge	Rejected water from watermaker unit	151,000 bbl/well	31,650 gal/day/well	Discharged below sea level via port or starboard caisson (saltwater service discharge). Discharge rate is based on one unit running for 24 consecutive hours.	No
Hydrate control fluids	Methanol, Glycol, Vegetable oil	50 bbl/well	2 bbl/hr/well		No
Blowout prevent fluid	2% solution of Erifon HD603HP BOP control fluid in potable water	1,000 bbl/well	150 bbl/month/well	Discharged at seafloor.	No
Ballast water	Uncontaminated seawater used to maintain proper draft	700,000 bbl/well	3,500 bbl/day/well	Per MARPOL regulations, discharged below sea level at one of four (4) points depending upon which quadrant of the vessel is being ballasted.	No
Bilge water	NA	NA	NA	NA	NA
Excess cement at seafloor	Cement slurry	500 bbl/well	20 bbl/minute/well	Discharged at seafloor	No

Projected generated waste			Projected ocean discharges		Projected Downhole Disposal
Type of Waste	Composition	Projected Amount	Discharge rate	Discharge Method	Answer yes or no
Fire water	Seawater with no addition of chemicals	27,400,000 bbl/well	137,000 bbl/day/well	Discharge below sea level at stern caisson (port or starboard). Note: Fire water pumps are fed continuously from salt water service ring (cooling water). The fire water pumps will only discharge when in use.	No
Cooling water	Seawater with no addition of chemicals	27,400,000 bbl/well	137 bbl/day/well	Discharged below sea level at stern caisson (port or starboard). Discharge rate is calculated based on two (2) pumps running for 24 consecutive hours.	No
<b>Will you produce hydrocarbons? If yes fill in for produced water.</b>					
Produced water	NA	NA	NA	NA	NA
<b>Please enter <i>individual</i> or <i>general</i> to indicate which type of NPDES permit you will be covered by?</b>			GMG 290375		

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**Appendix E:** Air Emissions Spreadsheets

EXPLORATION PLAN (EP)  
AIR QUALITY SCREENING CHECKLIST

COMPANY	Cobalt International Energy, L.P.
AREA	Garden Banks
BLOCK	956
LEASE	OCS-G 32458
PLATFORM	NA
WELL	Exploration drilling GB 956 C & C1, D & D1, E & E1. C1, D1 and E1 are mirror locations of C, D and E respectively.
COMPANY CONTACT	Jean Martin
TELEPHONE NO.	(281) 698-8544
REMARKS	

## EMISSIONS FACTORS

Fuel Usage Conversion Factors	Natural Gas Turbines		Natural Gas Engines		Diesel Recip. Engine		REF.	DATE
	SCF/hp-hr	9.524	SCF/hp-hr	7.143	GAL/hp-hr	0.0483	AP42 3.2-1	4/76 & 8/84

Equipment/Emission Factors	units	PM	SOx	NOx	VOC	CO	REF.	DATE
NG Turbines	gms/hp-hr		0.00247	1.3	0.01	0.83	AP42 3.2-1& 3.1-1	10/96
NG 2-cycle lean	gms/hp-hr		0.00185	10.9	0.43	1.5	AP42 3.2-1	10/96
NG 4-cycle lean	gms/hp-hr		0.00185	11.8	0.72	1.6	AP42 3.2-1	10/96
NG 4-cycle rich	gms/hp-hr		0.00185	10	0.14	8.6	AP42 3.2-1	10/96
Diesel Recip. < 600 hp.	gms/hp-hr	1	1.468	14	1.12	3.03	AP42 3.3-1	10/96
Diesel Recip. > 600 hp.	gms/hp-hr	0.32	1.468	11	0.33	2.4	AP42 3.4-1	10/96
Diesel Boiler	lbs/bbl	0.084	2.42	0.84	0.008	0.21	AP42 1.3-12,14	9/98
NG Heaters/Boilers/Burners	lbs/mmscf	7.6	0.593	100	5.5	84	P42 1.4-1, 14-2, & 14	7/98
NG Flares	lbs/mmscf		0.593	71.4	60.3	388.5	AP42 11.5-1	9/91
Liquid Flaring	lbs/bbl	0.42	6.83	2	0.01	0.21	AP42 1.3-1 & 1.3-3	9/98
Tank Vapors	lbs/bbl				0.03		E&P Forum	1/93
Fugitives	lbs/hr/comp.				0.0005		API Study	12/93
Glycol Dehydrator Vent	lbs/mmscf				6.6		La. DEQ	1991
Gas Venting	lbs/scf				0.0034			

Sulphur Content Source	Value	Units
Fuel Gas	3.33	ppm
Diesel Fuel	0.4	% weight
Produced Gas( Flares)	3.33	ppm
Produced Oil (Liquid Flaring)	1	% weight

**EMISSIONS CALCULATIONS 1ST YEAR**

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS							
Cobalt International Ener	Garden Banks	956	OCS-G 32458	NA	Exploration drilling GB 956 C & C1, D & D1,		Jean Martin	(281) 698-8544								
OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	61800	2984.94	71638.56	24	78	43.56	199.83	1497.36	44.92	326.70	40.77	187.04	1401.53	42.05	305.79
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	2065	99.7395	2393.75	6	56	1.46	6.68	50.03	1.50	10.92	0.24	1.12	8.36	0.25	1.82
	VESSELS>600hp diesel(supply)	3000	144.9	3477.60	8	11	2.11	9.70	72.69	2.18	15.86	0.09	0.43	3.24	0.10	0.71
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC. TANK-	BPD	SCF/HR	COUNT												
		0			0	0				0.00					0.00	
DRILLING WELL TEST	OIL BURN GAS FLARE	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
<b>2017 YEAR TOTAL</b>							<b>47.13</b>	<b>216.21</b>	<b>1620.08</b>	<b>48.60</b>	<b>353.47</b>	<b>41.11</b>	<b>188.59</b>	<b>1413.13</b>	<b>42.39</b>	<b>308.32</b>
<b>EXEMPTION CALCULATION</b>	<b>DISTANCE FROM LAND IN MILES</b>											<b>5427.90</b>	<b>5427.90</b>	<b>5427.90</b>	<b>5427.90</b>	<b>101454.35</b>
	163.0															

**EMISSIONS CALCULATIONS 2ND YEAR**

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL	CONTACT	PHONE	REMARKS									
Cobalt International Energy	Garden Banks	956	OCS-G 32458	NA	Exploration drilling GB 956 C & C1, D & D1, E & E1	Jean Martin	(281) 698-8544										
OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS					
	Diesel Engines	HP	GAL/HR	GAL/D													
	Nat. Gas Engines	HP	SCF/HR	SCF/D													
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO	
DRILLING	PRIME MOVER>600hp diesel	61800	2984.94	71638.56	24	62	43.56	199.83	1497.36	44.92	326.70	32.41	148.67	1114.03	33.42	243.06	
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	VESSELS>600hp diesel(crew)	2065	99.7395	2393.75	6	44	1.46	6.68	50.03	1.50	10.92	0.19	0.89	6.65	0.20	1.45	
	VESSELS>600hp diesel(supply)	3000	144.9	3477.60	8	9	2.11	9.70	72.69	2.18	15.86	0.07	0.34	2.58	0.08	0.56	
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	MISC.	BPD	SCF/HR	COUNT													
	TANK-	0			0	0				0.00					0.00		
DRILLING	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WELL TEST	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	
<b>2018 YEAR TOTAL</b>							<b>47.13</b>	<b>216.21</b>	<b>1620.08</b>	<b>48.60</b>	<b>353.47</b>	<b>32.68</b>	<b>149.90</b>	<b>1123.26</b>	<b>33.70</b>	<b>245.07</b>	
<b>EXEMPTION CALCULATION</b>	<b>DISTANCE FROM LAND IN MILES</b>											<b>5427.90</b>	<b>5427.90</b>	<b>5427.90</b>	<b>5427.90</b>	<b>101454.35</b>	
	163.0																

**EMISSIONS CALCULATIONS 3RD-7TH YEAR**

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL	CONTACT	PHONE	REMARKS									
Cobalt International Energy	Garden Banks	956	OCS-G 32458	NA	Exploration drilling GB 956 C & C1, D & D1, E & E1	Jean Martin	(281) 698-8544										
OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS					
	Diesel Engines	HP	GAL/HR	GAL/D													
	Nat. Gas Engines	HP	SCF/HR	SCF/D													
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO	
DRILLING	PRIME MOVER>600hp diesel	61800	2984.94	71638.56	24	140	43.56	199.83	1497.36	44.92	326.70	73.18	335.71	2515.56	75.47	548.85	
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	VESSELS>600hp diesel(crew)	2065	99.7395	2393.75	0	100	1.46	6.68	50.03	1.50	10.92	0.00	0.00	0.00	0.00	0.00	
	VESSELS>600hp diesel(supply)	3000	144.9	3477.60	0	20	2.11	9.70	72.69	2.18	15.86	0.00	0.00	0.00	0.00	0.00	
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	MISC.	BPD	SCF/HR	COUNT													
	TANK-	0			0	0				0.00					0.00		
DRILLING	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WELL TEST	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	
<b>2019-2023 YEAR TOTAL</b>							<b>47.13</b>	<b>216.21</b>	<b>1620.08</b>	<b>48.60</b>	<b>353.47</b>	<b>73.18</b>	<b>335.71</b>	<b>2515.56</b>	<b>75.47</b>	<b>548.85</b>	
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											5427.90	5427.90	5427.90	5427.90	101454.35	
	163.0																

SUMMARY

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL
Cobalt Internatio	Garden Banks	956	OCS-G 32458	NA	Exploration drilling GB
Year	Emitted Substance				
	PM	SOx	NOx	VOC	CO
2017	41.11	188.59	1413.13	42.39	308.32
2018	32.68	149.90	1123.26	33.70	245.07
2019-2023	73.18	335.71	2515.56	75.47	548.85
Allowable	5427.90	5427.90	5427.90	5427.90	101454.35

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**Appendix F: Oil Spill Response Discussion**



**Cobalt**  
International Energy

# Garden Banks 956 Exploratory Plan

October 2016

Developed by:

*The Response Group*  
Emergency Response | Pre-Planning & Support

## **Worst Case Discharge scenario for GB 956**

### **1) Worst Case Summary**

Given the anticipated reservoir thickness and historical productivity index Cobalt International Energy has estimated that the worst case discharge from activities at GB 956 is estimated to be 70,000 barrels of oil per day for drilling. Calculations are based on formulas defined by BSEE regulations.

This individual summary includes the following maps and information:

1. Overview Map
2. Offset Operators Map
3. Land Impact Probability Map
4. Aerial Surveillance Response Equipment Status Boards
5. Equipment Location Map
6. In-Situ Burn Equipment Status Boards
7. Dispersant Application Map
8. Dispersant Application Status Boards
9. Slick Containment Equipment Status Boards
10. Offshore On-Water Recovery & Storage Equipment Status Boards
11. Nearshore On-Water Recovery Equipment Status Boards
12. Shoreline Protection & Wildlife Support Status Boards

### **2) Facility Information**

- Type of Operation: Drilling
- Area and Block: Garden Bank 956
- Latitude: 27° 02' 33.739" N
- Longitude: 92° 21' 3.959" W
- Distance to Shore: 142 Nautical Miles
- Water Depth: 5,039'
- API Gravity: 30°

3) **Worst Case Discharge Volume**

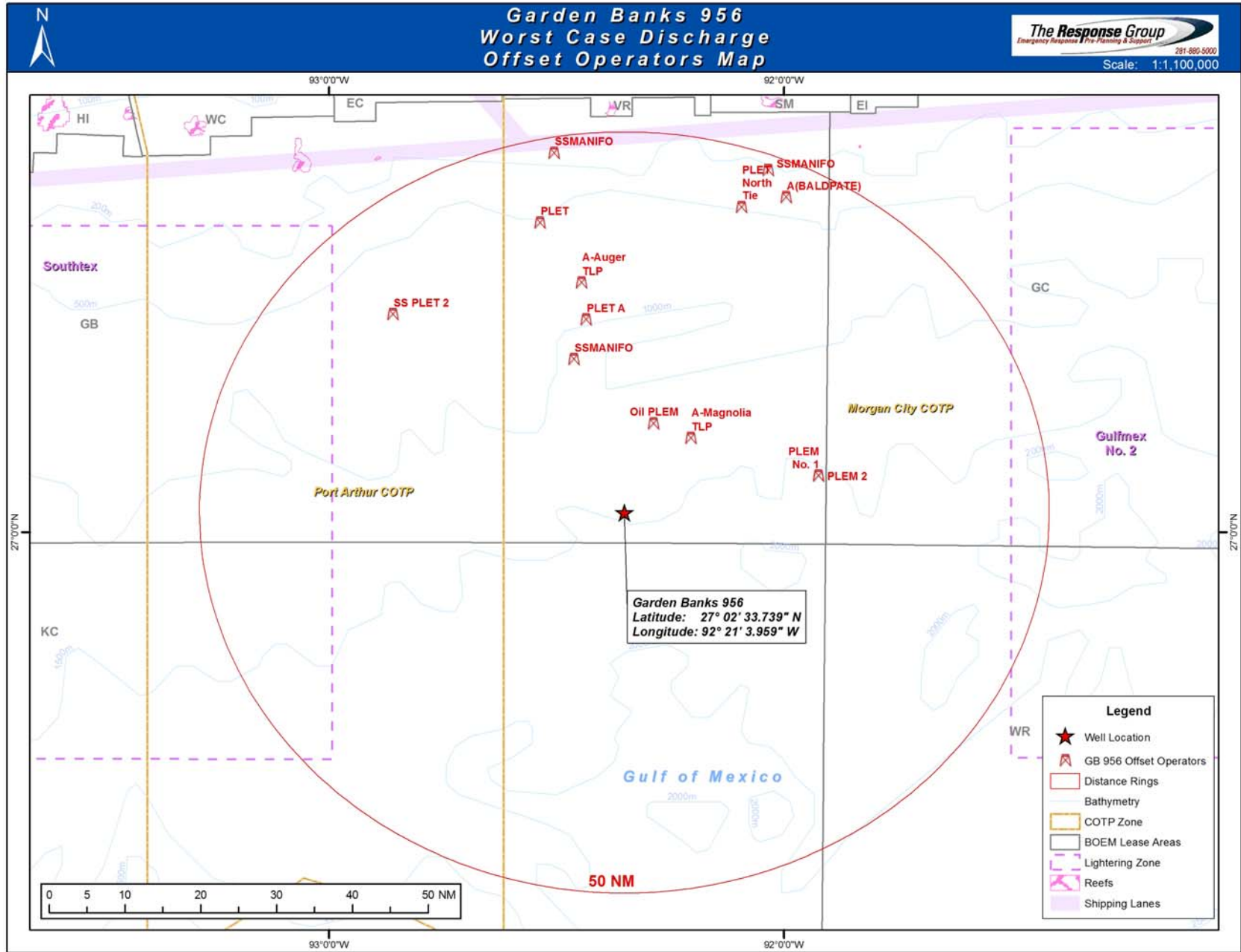
a) **Drilling Volume**

An ADIOS 2 model was run on a similar product based on the oil that would reach the surface. The results indicate 16% of the product would be evaporated / naturally dispersed into the water column within 24 hours. Below is a table outlining the estimated applicable subsea and surface evaporation and dispersion quantities.

<b>Criteria</b>	<b>Barrels</b>
Highest capacity well uncontrolled blowout volume associated with facility	70,745
<b>TOTAL WORST CASE DISCHARGE</b>	<b>70,745</b>
Surface Natural Evaporation and Dispersion - 16% (ADIOS2)	11,319
<b>TOTAL SPILL VOLUME REMAINING AFTER NATURAL SURFACE EVAPORATION &amp; DISPERSION</b>	<b>59,426</b>



# GB 956



November 1, 2016

4) Land Segment Identification

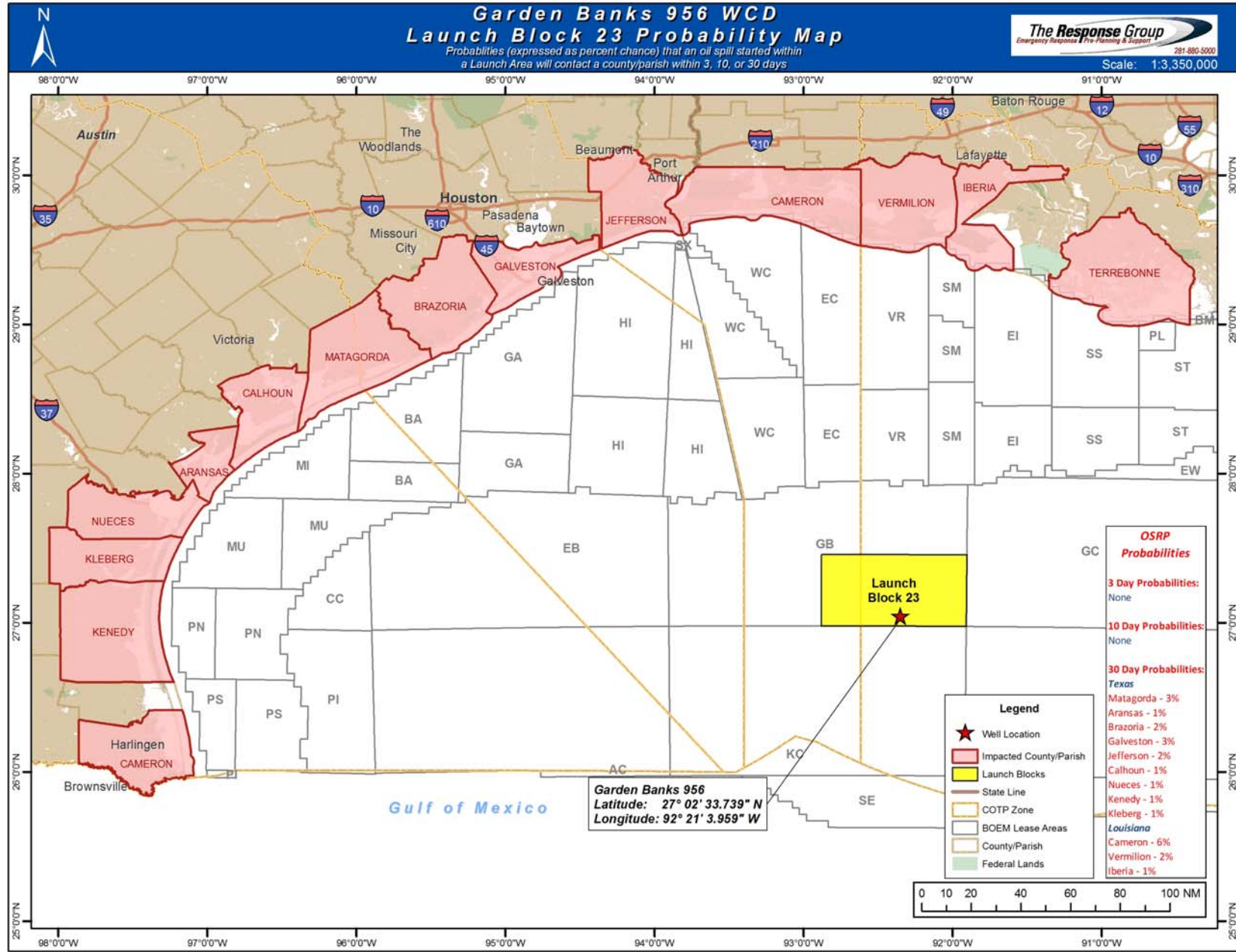
Land areas that could be potentially impacted by an oil spill from GB 956 were determined using the BOEM Oil Spill Risk Analysis Model (OSRAM) available on the BOEM website. The OSRAM estimates the probability that an oil spill occurring in a particular launch area will contact a certain county or parish within 3, 10, and 30 days. The land segment that has the highest probability of being impacted by the GB 956 well is **Cameron, Louisiana**, at 6 percent. Land segments identified by the model are listed in the table below.

OCS Launch Area 23 for the Gulf of Mexico Area was utilized as the point of origin. Land segments identified by the model are listed below (referenced from “Oil-Spill Risk Analysis: Contingency Planning Statistics for Gulf of Mexico OCS Activities” – OCS Report MMS 2004-026):

Area and Spill Site	Land Segment Contact	Percent Impact Chance (Days)		
		3	10	30
Garden Banks 956 Launch Block #23	<b>Land Segment No. &amp; County/ Parish &amp; State</b>			
	Cameron, TX	--	--	1
	Kennedy, TX	--	--	1
	Kleberg, TX	--	--	1
	Nueces, TX	--	--	1
	Aransas, TX	--	--	1
	Calhoun, TX	--	--	1
	Matagorda, TX	--	--	3
	Brazoria, TX	--	--	2
	Galveston, TX	--	--	3
	Jefferson, TX	--	--	2
	<b>Cameron, LA</b>	--	--	<b>6</b>
	Vermilion, LA	--	--	2
	Iberia, LA	--	--	1
	Terrebonne, LA	--	--	1

Note: "--"denotes a value of less than 0.5%.

# GB 956

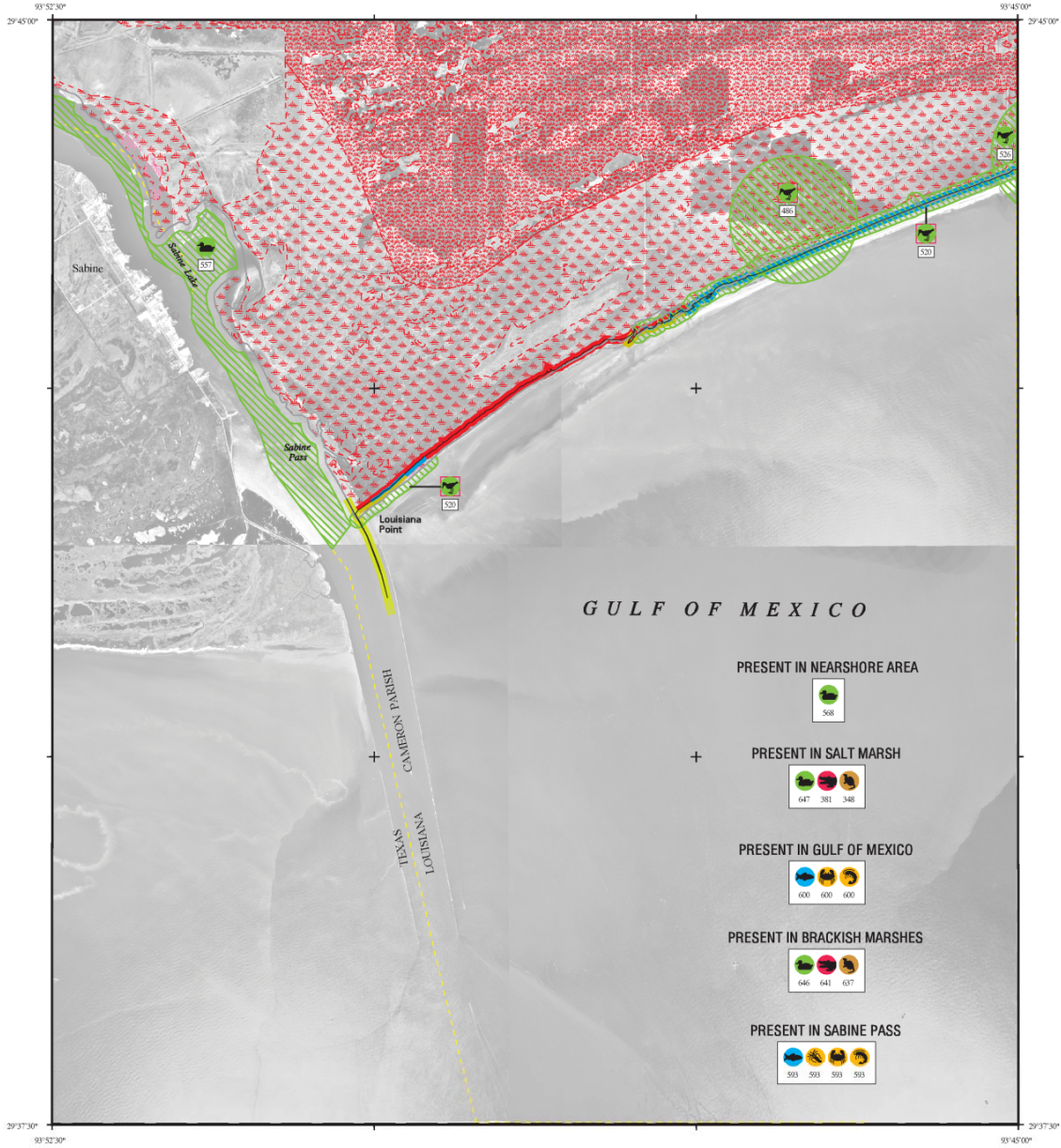


November 1, 2016

**5) Resource Identification**

A sample Environmental Sensitivity Index map based on the current Area Contingency Plan (ACP) is located below.

ENVIRONMENTAL SENSITIVITY INDEX MAP



**SHORELINE**

- 1988 SHORELINE
- 2001 SHORELINE

**SHORELINE HABITATS (ESI)**  
2001 ESI Shoreline Classification

- 1B EXPOSED, SOLID MAN-MADE STRUCTURES
- 2A EXPOSED WAVE-CUT PLATFORMS IN CLAY
- 2B EXPOSED SCARPS AND STEEP SLOPES IN CLAY
- 3A FINE- TO MEDIUM-GRAINED SAND BEACHES
- 3B SCARPS AND STEEP SLOPES IN SAND
- 4 COARSE-GRAINED SAND BEACHES
- 5 MIXED SAND AND GRAVEL BEACHES
- 6A GRAVEL BEACHES
- 6B RIPRAP
- 7 EXPOSED TIDAL FLATS
- 8A SHELTERED ROCKY SHORES AND SHELTERED SCARPS IN MUD OR CLAY
- 8B SHELTERED, MAN-MADE STRUCTURES
- 8C SHELTERED RIPRAP
- 8A SHELTERED TIDAL FLATS
- 8B SHELTERED, VEGETATED LOW BANKS
- 10A SALT- AND BRACKISH-WATER MARSHES
- 10B FRESHWATER MARSHES
- 10C FRESHWATER SWAMPS
- 10D SCRUB-SHRUB WETLANDS

**NOTE FOR COASTAL MAPS:**  
Due to the dynamic nature of the Louisiana coastline, biological resources may represent historical locations that do not correspond with the depicted shoreline.

**COASTAL HABITATS**  
Based on 1988 Digital Shoreline

- 10A SALT MARSH
- 10A BRACKISH MARSH
- 10A INTERMEDIATE MARSH
- 10B FRESHWATER MARSH
- 10C FORESTED WETLAND
- 10D SCRUB-SHRUB WETLAND
- SEAGRASS

SCALE 1:50000

1 5 0 1 KILOMETER

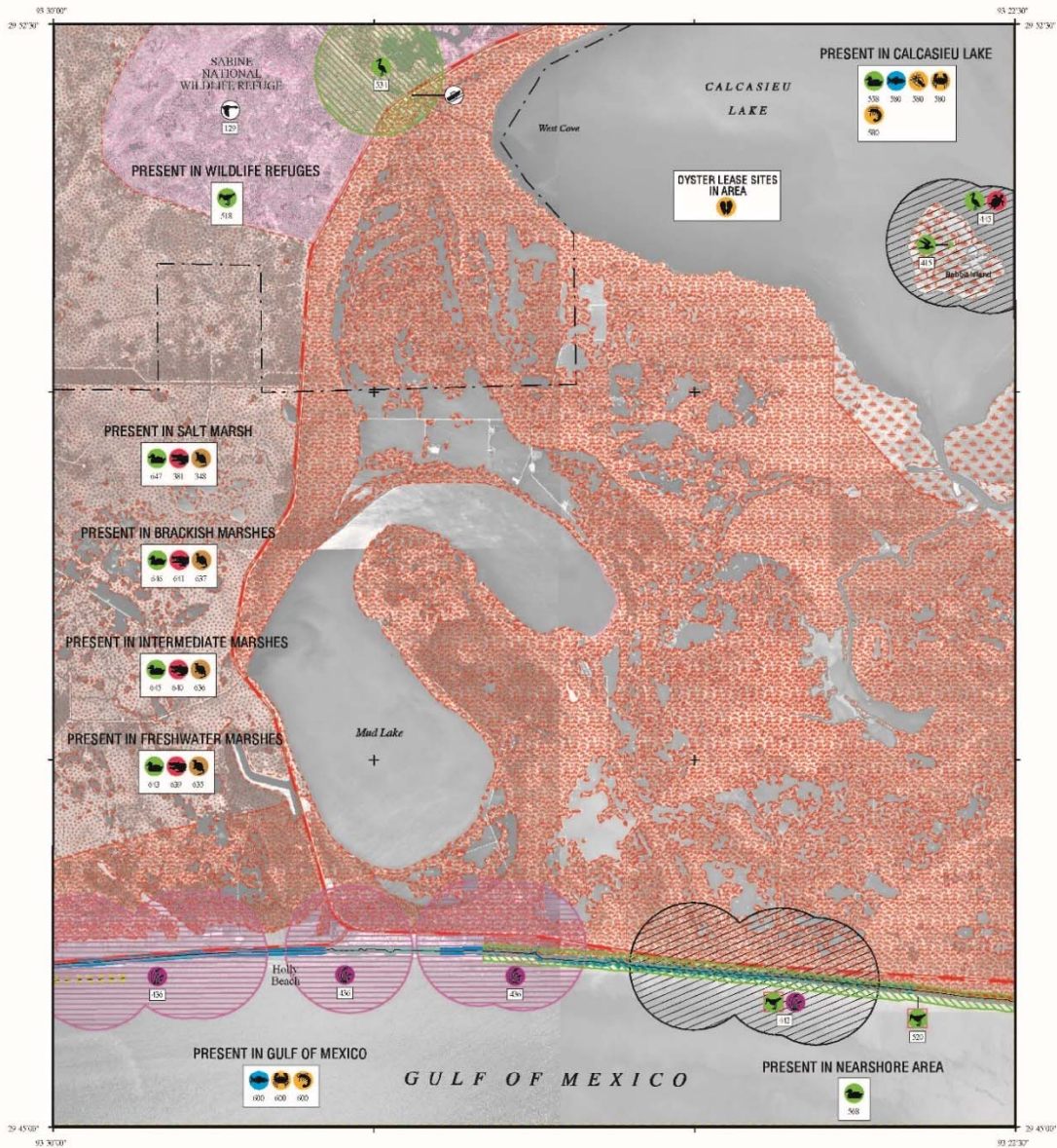
1 5 0 1 MILE

Not For Navigation

December 2003  
Published at Seattle, Washington  
National Oceanic and Atmospheric Administration  
National Ocean Service  
Office of Response and Restoration  
Hazardous Materials Response Division

TEXAS POINT LA-1

ENVIRONMENTAL SENSITIVITY INDEX MAP



**SHORELINE**

1988 SHORELINE  
2001 SHORELINE

**SHORELINE HABITATS (ESI)**  
2001 ESI Shoreline Classification

- 1B EXPOSED, SOLID MAN-MADE STRUCTURES
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Based on 1988 Digital Shoreline

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- 10B FRESHWATER MARSH
- 10C FORESTED WETLAND
- 10D SCRUB-SHRUB WETLAND
- SEAGRASS

SCALE 1:50000

1 5 0 1 KILOMETER  
1 5 0 1 MILE

Not for Navigation

December 2003  
Published at Seattle, Washington  
National Oceanic and Atmospheric Administration  
National Ocean Service  
Office of Response and Restoration  
Hazardous Materials Response Division

**HOLLY BEACH LA-5**

**6. Response**

Based on the anticipated worst case discharge scenario, Cobalt can be onsite with contracted oil spill recovery equipment with adequate response capacity to contain and recover surface hydrocarbons, and prevent land impact, to the maximum extent practicable, within an estimated 55 hours (based on the equipment’s Effective Daily Recovery Capacity (EDRC)).

Cobalt has contracted with Clean Gulf Associates (CGA), Marine Spill Response Corporation (MSRC) and National Response Corporation (NRC) as the primary Oil Spill Removal Organizations. Below are primary response and preplanned staging location(s).

<b>Primary Response Equipment Location(s)</b>	<b>Preplanned Staging Location(s)</b>
Leeville, LA; Venice, LA; Port Fouchon, LA; Houma, LA; Fort Jackson, LA; Lake Charles: LA; Grand Isle, LA; New Iberia, LA; Houston, TX; Galveston, TX; Ingleside, TX; Kiln, MS; Pascagoula, MS	Fourchon, La; Cocodrie, LA; Lake Charles, LA; Galliano, LA; Leeville, LA; Galveston, TX

Upon notification of the spill, procedures will be followed with the partial or full mobilization of the resources depending on the incident complexity. The status boards, located below, outline equipment as well as temporary storage equipment to be considered in order to cope with an initial spill. The status boards outline on-water containment, on-water recovery, temporary storage, aerial and vessel dispersant application, in-situ burning and shoreline protection equipment identified as most relevant in addressing any oil that remains present on the surface of the water. These status boards estimate times needed for procurement, load out, travel to the site and deployment.

The Qualified Individual, Person in Charge, Incident Commander or designee may contact other service companies if the Unified Command deems such services necessary to the response effort. The status boards below outline recovery equipment as well as temporary storage equipment to be considered in order to cope with an initial worst case discharge at the source. The status board list estimates individual times needed for procurement, load-out, travel time to the site, and deployment. In addition, either a fixed wing aircraft or helicopter would be dispatched for aerial surveillance at the spill location. The dispatch of aerial support will be dependent on available daylight hours, weather conditions, and other safety considerations. Aerial support may also be used to coordinate and survey response efforts (such as in-situ burning, dispersant application and mechanical recovery). The effectiveness of these response efforts can be enhanced will the use of air-based spotters, who can guide these systems to the different oil concentrations and assist will the coordination of simultaneous operations. Air-based spotters may be equipped with air to marine/ground communication equipment.

**SIMOPS**

Simultaneous operations (SIMOPS) may involve different companies working in close proximity on identical and/or different tactical objectives. SIMOPS can be either subsea operations, surface operations or a combination of both. These operations must be well planned and coordinated. SIMOPS will be evaluated daily and coordinated based on the response efforts needs, as well as, additional criteria's (e.g. meteorological conditions, sea state, etc.). Regular communications will be established and maintained during all SIMOPS activities.

<b>SIMOPS Activities May Include</b>	
✓	Dispersant Application (Aerial, Vessel, and Subsea)
✓	In-situ Burning
✓	Mechanical Recovery
✓	Nearshore / Shoreline Response
✓	Source Control

Vessel locations may also be monitored with real-time vessel tracking technologies, such as Automated Identification Systems (AIS), GPS tracking, cell phone data, etc. These technologies may be used to direct vessels to the appropriate areas of oil concentration to enhance encounter rates.

The company will maintain an effective and well-coordinated response effort for the duration of the response effort to control the source of the spill and to the point when the Federal On-Scene Coordinator deems the response effort complete.

**Response Technologies Discussion**

This section discusses various response technologies (in no prioritized order) that might be employed during a response to a discharge of oil. The particular response technologies applied during a spill event will be coordinated based on the most accurate and up-to-date knowledge of the situation, which will determine the types of technology to be used, the locations at which particular technologies are applied, and the implementation of simultaneous operations (SIMOPS).

Cobalt will work with their OSRO(s) to establish a remote sensing program during an incident. The goal of the remote sensing program is to integrate a common operating picture for the entire response. Remote sensing capabilities will be used on aircraft, vessels, and other platforms as appropriate. The following outlines some of the goals of a remote sensing program.

- Determine the location of an oil slick
- Determine oil thickness
- Operate day and night, if safe to do so
- Operate under adverse weather conditions, if safe to do so
- Have the ability to work long distance offshore
- Ability to update and provide information in pre-determined timeframe
- Acceptance of upgrades in capacities

**Extended Response Operations**

For an extended response to an uncontrolled well blowout of up to 120 days, additional provisions for sustained operations and source control will be implemented by the Unified Command as necessary. These options may include but are not limited to the following:

<b>Extended Response Options</b>	
✓	Command Post Coordination
✓	Expanded Community Relations and Public Awareness
✓	Expanded GIS and Satellite Imagery Coordination
✓	Expanded Safety and Monitoring Programs
✓	Expanding Staging Areas and Decontamination Sites
✓	Extended Logistics and Procurement
✓	Extended Wildlife Response and Care
✓	Personnel Staffing and Resource
✓	Relief Well Drilling
✓	Subsea Containment
✓	Vessel of Opportunity Program
✓	Volunteer Programs
✓	Well Control Technologies

**Offshore Response**

Offshore response strategies may include skimming with Oil Spill Response Vessels (OSRVs), Oil Spill Response Barges (OSRBs), and Quick Strike OSRVs.

Initial response will likely consist of an Oil Spill Response Vessel (OSRV) due to quick mobilization and response time of these dedicated vessels. All estimated response times are captured in the Status Boards above. Additional response equipment and resources will begin cascading in to the site or staging area(s). An offshore response will consist of simultaneous operations of containment booming and skimming operations. Dispersant application and in-situ burn operations will be evaluated by Unified Command, and if approved, these techniques will be used in the simultaneous operations. The equipment maybe used in the following offshore response strategies.

Offshore Response Strategies	
✓	Mechanical recovery efforts using vessels, barges, ocean boom, skimming equipment, and spotter aircraft. These resources will be deployed close to the source in order to contain and collect the maximum amount of oil and enhancing encounter rates. This may include mechanical recovery vessels and barges equipped with ocean boom systems and/or mechanical recovery vessels and barges that will deploy skimming systems on vessels of opportunity to contain and recover oil that strays from the source area.
✓	Spotter aircraft may be utilized to assist and direct skimming vessels and barges to areas of concentrated oil to ensure maximum encounter rates. Aerial and vessel communications will be established using the appropriately chosen communications system coordinated through the OSRO(s) and the FOSC.
✓	Deployment of offshore resources with night sensing capabilities to enhance slick tracking during night time operations. The use of night sensing capabilities (e.g. x-band radar systems, infrared cameras, etc.) will assist deployment of assets to areas consisting of the thickest oil to enhance the encounter and recovery rates. These night operations will only commence if it is deemed safe to do so.
✓	Upon approval, In-situ burn assets will be deployed outside of the source area in a U configuration to collect and burn oil in heavy concentrated areas.
✓	Upon approval, dispersant application to disperse oil. Approved dispersant operations may consist of subsea and/or surface dispersant applications. Dispersant application requires the appropriate Regional Response Team (RRT) approval and will be in compliance with the RRT IV & VI guidelines.

For additional information regarding offshore response strategies, refer to individual OSRO's response tactics guide book.

### **Surveillance**

Upon notification of a release and mobilization of the response, either a fixed-wing aircraft or helicopter would be dispatched as promptly as possible (considering available daylight hours, weather conditions and other safety factors) to conduct visual surveillance at the spill source. If necessary and safe, this surveillance could be supplemented through use of vessels as well. The effectiveness of many response technologies (such as in-situ burning, dispersant application and mechanical recovery) can be enhanced through collaboration with air-based spotters, who can guide these systems to the oil concentrations and coordinate simultaneous operations (SIMOPS). Air-based spotters may be equipped with air to marine/ground communication equipment to facilitate communications with marine- and land-based response assets. Vessel locations may also be monitored in real-time using vessel-tracking technologies (such as Automated Identification Systems (AIS) data, GPS-based tracking, cell phone data, etc.), which can facilitate vessels being deployed for optimal recovery. Additional information regarding methods of identifying and tracking a spill on water are discussed in.

### **Mechanical Cleanup Methods**

Mechanical oil spill response uses physical barriers (boom) and mechanical devices (skimmers) to redirect and remove oil from the surface of the water.

<b>Mechanical Cleanup Methods</b>	
✓	Skimming systems will deploy boom in several different configurations. Generally, boom will be deployed in a J-configuration for a high EDRC rated single skimming unit. This usually requires only one support vessel to attend the boom. Single skimming units will be located in the heavy concentrated oil and can be assisted by a spotter plane and remote sensing technologies to enhance encounter rate and effective recovery. The system transfers recovered oil to the onboard tanks for primary storage. The system boom may also be deployed in a U-configuration with an open apex to funnel oil to a single skimming unit. This requires the skimming vessels(s) to be positioned closely behind the open apex for collection and recovery.
✓	For identified areas of heavy oil that cannot be addressed immediately by skimming vessels, containment boom will be deployed to contain the oil until skimming operations can commence in these areas. Once skimmers are on-site the oil will be directed to the skimming units. The oil may be dumped into the path of the skimming unit or boom may be configured into a U-configuration with an open apex to funnel oil to the awaiting skimming vessels.
✓	Deployment of offshore resources with night sensing capabilities to enhance mechanical skimming activities and slick tracking during night time operations. The use of night sensing capabilities (e.g. x-band radar systems, infrared cameras, etc.) will assist skimming vessels to deploy assets to areas consisting of the thickest oil to enhance the encounter and recovery rates.
✓	Vessels of opportunity (VOO) equipped with skimming systems will be deployed to identified locations with recoverable oil. If any locations are identified to contain light oil, vessels will be equipped with sorbent materials to pick up the lighter oil.

Current proven and available sensing technology for tracking oil at night includes hand held, boat mounted and aircraft mounted infrared sensing. Multiple new oil sensing technologies (radar, satellite imagery, fluorometry, etc.) are being reviewed and developed by the industry and as they become more mature, proven and available to the industry, The Unified Command will work with the OSROs for improving the response capability. These and any other new oil sensing technologies that become available will be deployed with the purpose of improving the ability of keeping deployed oil skimming platforms in the most highly concentrated areas of spilled oil and may be used to potentially improve the capabilities to skim beyond traditional daylight hours. However the latter capability can only be implemented taking all aspects of safe operations in account and ensuring that there is no additional risk to human life.

Mechanical oil spill response uses physical barriers (boom) and mechanical devices (skimmers) to redirect and remove oil from the surface of the water.

### **Dispersant Application**

Applying dispersant from aerial, vessel, and subsea applications may be a viable response option and will require the appropriate approvals. All dispersant application methods must be approved by the appropriate RRT and will be in compliance with RRT IV and VI guidelines.

A listing of the Aerial Dispersant Equipment is located on the status boards within this Section.

### **Aerial Dispersant Application**

Dispersants from aerial and vessel applications may be viable response options and will require the appropriate approvals.

If deemed appropriate and with approval, aerial dispersant application can be utilized with ASI's three DC-3, assuming a 1:20 application rate, 90% effectiveness, and 4-5 sorties per day.

### **Vessel Based Dispersant Application**

Vessel-based dispersant application is another available response option. In previous responses, boat-spray systems were used for both dispersing oil and suppressing vapors near the spill source on the water surface. Vessel-based dispersants are also applied under the direction and approval of a designated Federal On-Scene Coordinator (FOSC), and in a manner consistent with the National Contingency Plan and the applicable Regional Response Plan(s) and/or Area Contingency Plans (ACPs).

If appropriate, vessel spray systems can be installed on offshore vessels of opportunity to apply dispersants at the source or at other areas where there are significant concentrations of oil. Using inductor nozzles installed on fire-water monitors, skid mounted systems, or purpose-built boom-arm spray systems, vessels can initially apply dispersant within the first 12 to 24 hours of the response, and thereafter as needed.

Priorities for dispersant use and rationing of existing supplies will be determined on an incident specific basis to allow for maximum effectiveness of dispersants. Dispersant use will be dictated by approval, safety, weather, and sea states before application and coordinated with Unified Command. In addition, after assessing the situation and notifications will be made within 48 hours of the initial spill to begin ramping up dispersant production through Nalco.

All dispersant application will be in compliance with RRT IV and VI guidelines.

For additional information regarding dispersant response strategies, refer to individual OSRO's response tactics guide book.

### **In Situ Burning**

Open-water in-situ burning (ISB) also may be used as a response strategy, depending on the circumstances of the release. ISB services may be provided by the primary OSRO contractors. If appropriate conditions exist and approvals are granted, one or multiple ISB task forces could be deployed offshore.

Task forces typically consist of two to four fire teams, each with two vessels capable of towing fire boom, guide boom or tow line with either a handheld or aeri ally-deployed oil ignition system. At least one support/safety boat would be present during active burning operations to provide logistics, safety and monitoring support. Depending upon a number of factors, up to 4 burns per 12-hour day could be completed per ISB fire team. Most fire boom systems can be used for approximately 8-12 burns before being replaced. Fire intensity and weather will be the main determining factors for actual burns per system. Although the actual amount of oil that will be removed per burn is dependent on many factors, recent data suggests that a typical burn might eliminate approximately 750 barrels. For planning purposes and based on the above assumptions, a single task force of four fire teams with the appropriate weather and safety conditions could complete four burns per day and remove up to ~12,000 bbls/day.

After assessing the situation and notification should be made within the 48 hours of the initial spill to begin ramping up fire boom production through contracted OSRO(s).

Considerations and limitations to ISB include atmospheric and sea conditions, oil weathering, air quality impacts, safety of response workers, and risk of secondary fires. All safety considerations will be evaluated.

For additional information regarding in-situ burning response strategies, refer to individual OSRO's response tactics guide book.

**Well Containment**

The initial response to a well blowout would be an attempt to activate the blowout preventers and close the well. The Source Control team will be stood up immediately with notifications to the primary well control provider, Helix Well Containment Group (HWCG) in the event of a blowout. The first step will be determining the method for source control (i.e. capped and killed or captured and flow). These options will be determined prior to drilling using the Well Containment Screening Tool.

Subsea containment resources would be mobilized in the event of an uncontrolled well blowout. Subsea containment incorporates simultaneous operations to cap or contain the flow of oil within the well, contain the oil outside of the well and collect at surface facilities or vessels and chemically disperse the oil at the well head. HWCG has been contracted to supply the subsea dispersant applications. .

Source Control Activities	
✓	Notifications to regulatory authorities, HWCG, and support contractors regarding well control incident
✓	Site assessment, initial response, and well monitoring
✓	Notification and activation of any equipment and contract services outside of HWCG will be initiated by Cobalt (e.g. shuttle tankers, helicopters, etc.)
✓	Notification, as needed, to members of HWCG to assist Cobalt Source Control Group during source control operations
✓	Debris Removal and Lower Marine Riser Package (LMRP) Recovery Considerations, if applicable
✓	Coordination of ROVs, support vessels, intervention vessels, subsea dispersant equipment, subsea dispersant application, debris removal tools, umbilical, chemical delivery, pumping services, and other equipment for WCD scenarios
✓	Run Intervention Riser System
✓	Well Capping and Shut-in Operation Activities

For additional detailed information on these systems, their components, and deployment times, refer to the current Regional Containment Demonstration provided to BSEE by Cobalt and HWCG.

Information on how these systems will be deployed to respond to a specific well can be found in the NTL 2010-N10 information submitted as a supplement to the individual.

### **Nearshore and Shoreline Protection**

If a nearshore spill were to occur, shoreline impact would depend upon existing environmental conditions. Nearshore response may include the deployment of shoreline boom on beach areas, or protection and sorbent boom on vegetated areas, as well as shallow water response strategies. Sorbent boom is a readily available resource and can be acquired as needed. OSRO's have resources which can be deployed for a shoreline cleanup effort (equipment locations are depicted on the Equipment Location map), as well as the contractor Shoreline Protection & Wildlife Support Status Board in this section.

Strategies would be based upon surveillance and real time trajectories provided by The Response Group that depict areas of potential impact given actual sea and weather conditions. Strategies from the Area Contingency Plan, The Response Group and Unified Command would be consulted to ensure that environmental and special economic resources would be correctly identified and prioritized to ensure optimal protection. The deployment of nearshore resources with night sensing capabilities to enhance slick tracking may be used during night time operations. The use of night sensing capabilities (e.g. x-band radar systems, infrared cameras, etc.) will assist deployment of assets to areas consisting of the thickest oil to enhance the encounter and recovery rates.

For additional information regarding Nearshore and Shoreline response strategies, refer to individual OSRO's response tactics guide book, the National Response Corporation's Spill Response Guidebook, the Area Contingency Plans, and the appropriate Shoreline Response Strategy Guidebook developed by The Response Group.

### **Surveillance**

Either a fixed-wing aircraft or helicopter will conduct visual surveillance to assess the situation and assist in coordinating Nearshore and Shoreline response activities. If necessary and safe, this surveillance could be supplemented through use of vessels as well. The effectiveness of many response technologies (such as in-situ burning, dispersant application and mechanical recovery) can be enhanced through collaboration with air-based spotters, who can guide these systems to the oil concentrations and coordinate simultaneous operations (SIMOPS). Air-based spotters may be equipped with air to marine/ground communication equipment to facilitate communications with marine- and land-based response assets. Vessel locations may also be monitored in real-time using vessel-tracking technologies (such as Automated Identification Systems (AIS) data, GPS-based tracking, cell phone data, etc.), which can facilitate vessels being deployed for optimal recovery.

**Mechanical Cleanup Methods**

In order to minimize shoreline impact, mechanical recovery resources will be deployed to contain and collect oil. In shallow water areas, it may be possible to collect and corral oil with ocean boom and move it to deeper water or low-current areas that allow for better skimmer access and higher encounter and recovery rates. Skimmers will also be deployed in natural collection points along the shoreline.

<b>This Table Outlines Some Of The Water-Borne Tactics That May Be Used In A Shallow Water Environment</b>	
✓	Shallow Water Barge Skimming (SBS)
✓	Combination FRV/SBS
✓	Shallow Water Skimmers
✓	Shallow Water Recovery Barge (Skimming System/Shuttle Barge)

<b>This table outlines an example of land-based tactics that may be used in shallow water environments</b>	
✓	Vacuum Trucks
✓	Shore-side Skimmers
✓	Sorbent Materials

For additional information regarding mechanical response strategies, refer to individual OSRO's response tactics guide book.

### **Dispersant Applications**

Dispersant use within 10 miles of shore will be considered on a case-by-case basis. Consideration will be given according to the location of the spill material, distance from shore, water depth, trajectory modeling, and environmental impacts of a non-dispersed spill. The Near Shore Environmental Dispersant Expedited Approval Process (NSE EAP) Initial Call and Minimum Criteria Checklists may be used if deemed appropriate and with approval, aerial dispersant application can be utilized aerial dispersants denoted in the Status Boards above. It is assumed there will be a 1:20 application rate, 90% effectiveness with the ability to conduct 4-5 sorties per day.

Vessel dispersant application may be another available response option. If appropriate, vessel spray systems can be installed on offshore vessels of opportunity using inductor nozzles (installed on fire-water monitors), skid mounted systems, or purpose-built boom arm spray systems. Vessels can apply dispersant within the first 12-24 hours of the response and continually as directed.

All dispersant applications will be in compliance with the RRT IV and VI guidelines.

For additional information regarding dispersant response strategies, refer to individual OSRO's response tactics guide book.

### **In-situ Burning**

In-situ burning nearshore and along shorelines may be a possible option based on several conditions and with appropriate approvals from the RRT. In-situ burning along certain types of shorelines may be used to minimize physical damage where access is limited or if it is determined that mechanical/manual removal may cause a substantial negative impact on the environment. All safety considerations will be evaluated.

In addition, after assessing the situation and notifications will be made within 48 hours of the initial spill to begin ramping up fire boom production through contracted OSRO(s).

For additional information regarding in-situ burning response strategies, refer to individual OSRO's response tactics guide book.

**Shoreline Protection**

The Response Group’s Shoreline Response Guides depict the protection response modes applicable for oil spill clean-up operations. Each response mode is schematically represented to show optimum deployment and operation of the equipment in areas of environmental concern. Supervisory personnel have the option to modify the deployment and operation of equipment, allowing a more effective response to site-specific circumstances. The following are various types of boom that may be deployed to protect the shoreline.

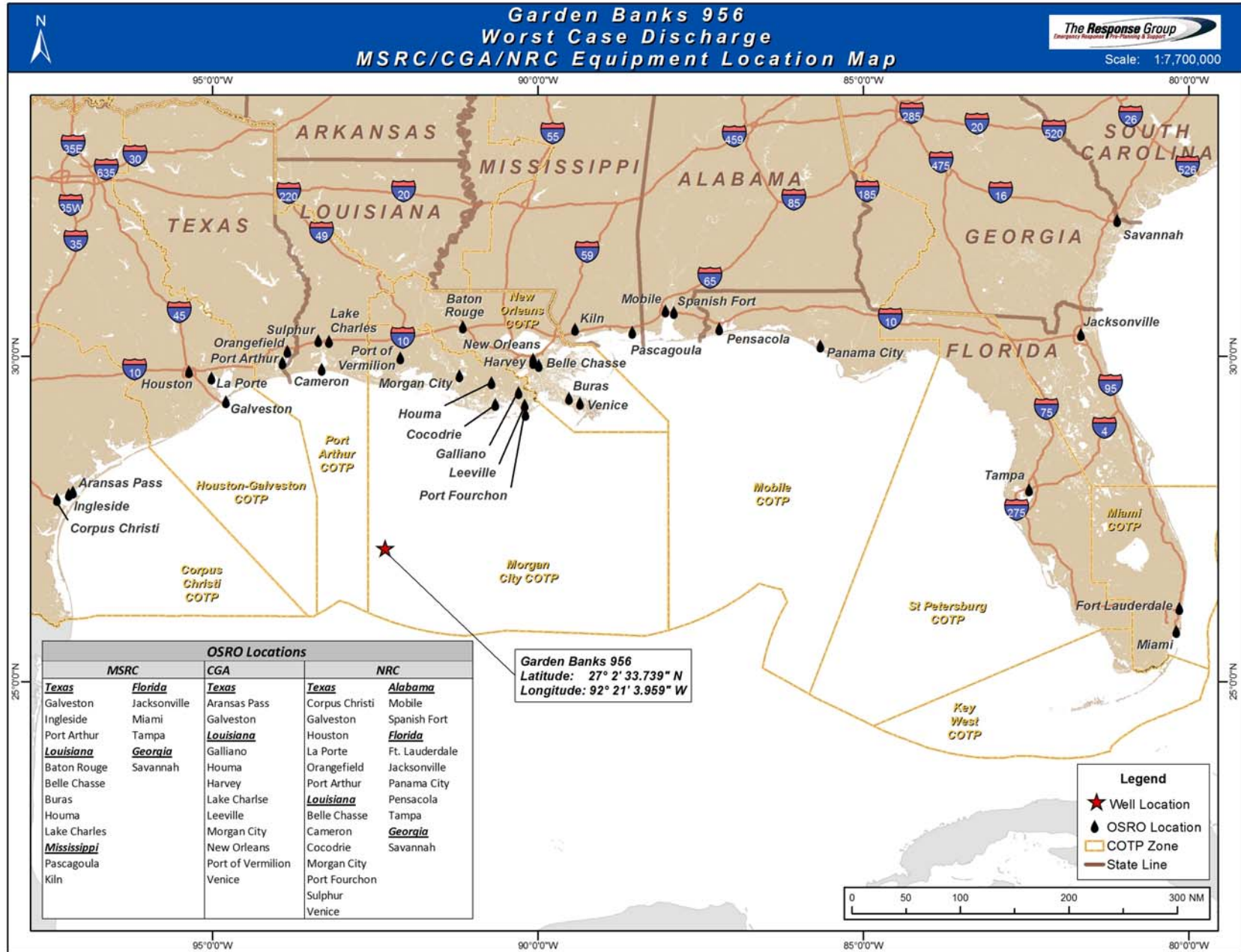
<b>Shoreline Boom Options</b>	
Near Shore Booming	When oil impact threatens shoreline or marshes. Medium size boom (~18”) to deflect or contain oil or use to prevent impact to sensitive areas.
Bottom-Seal Boom	Typically used in shallow water with higher-currents. The shallow skirt minimizes the drag in the current and allows it to conform to the substrate so that it can continue to act as a barrier to oil during changing tides or lower water levels. Bottom seal boom uses ballast tubes that are filled with water and lies on the bottom to provide a seal against oil passage.
Inland Boom	Inland boom is the smallest conventional boom and is designed for deployment in very shallow water; as the draft is only 6-12 inches. It is normally deployed in more protected waters where there is little or no wave action.
Sorbent Boom	Deployed to absorb oil and act as a protective measure against thin oil sheens under very quiet water conditions. Snare boom may be used for more viscous oils under higher wave and current conditions. Sorbent booms effectiveness is limited to only the thinnest sheens.

For additional information regarding shoreline response strategies, refer to individual OSRO’s response tactics guide book, the National Response Corporation’s Spill Response Guidebook, the Area Contingency Plans, and the appropriate Shoreline Response Strategy Guidebook developed by The Response Group.

**Wildlife Support**

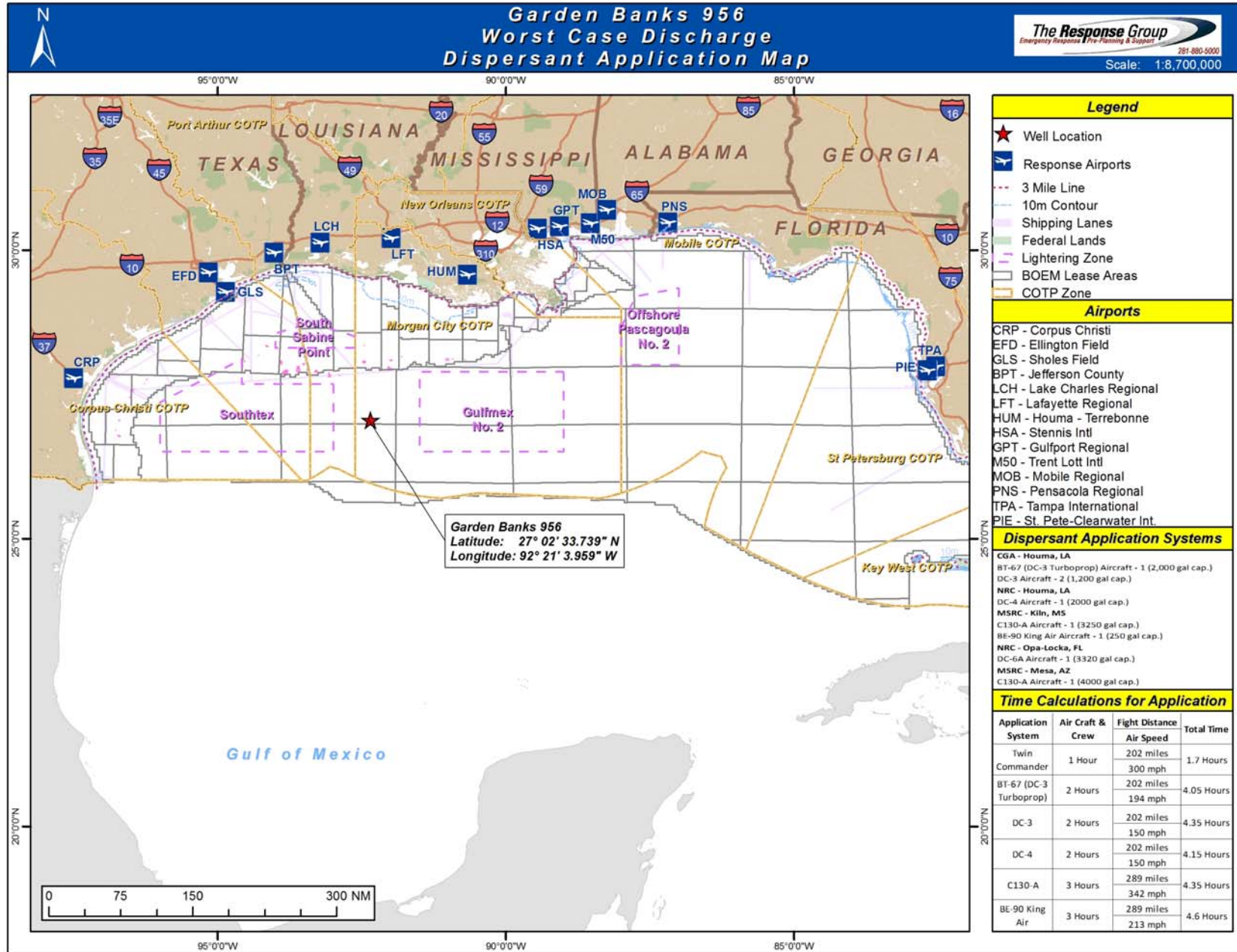
If wildlife is threatened due to a spill, the OSRO's have resources available that can be utilized to protect and rehabilitate wildlife. Please see the sample shoreline and wildlife support status board to obtain any other information.

<b>Garden Banks 956 - Exploratory Sample Aerial Surveillance Activation List</b>										
Aerial Surveillance System	Supplier & Phone	Airport/City, State	Aerial Surveillance Package	Quantity	Staging Location	Distance to Site from Staging (nautical miles)	Response Times (Hours)			
							Staging ETA	Loadout Time	ETA to Site	Total ETA
<i>* - These components are additional operational requirements that must be procured in addition to the system identified.</i>										
Twin Commander Air Speed - 260 Knots	Airborne Support (985) 851-6391	Houma, LA	Surveillance Aircraft	1	Houma, LA	202	1	0.25	0.67	1.95
			Spotter Personnel	2						
			Crew - Pilots	1						
Aztec Piper Air Speed - 150 Knots	Airborne Support (985) 851-6391	Houma, LA	Surveillance Aircraft	1	Houma, LA	202	1	0.25	1.18	2.45
			Spotter Personnel	2						
			Crew - Pilots	1						
Eurocopter EC-135 Helicopter Air Speed - 141 knots	PHI (800) 235-2452	Houma, LA	Surveillance Aircraft	1	Houma, LA	202	1	0.25	1.25	2.50
			Spotter Personnel	2						
			Crew - Pilots	1						
Sikorsky S-76 Helicopter Air Speed - 141 knots	PHI (800) 235-2452	Houma, LA	Surveillance Aircraft	1	Houma, LA	202	1	0.25	1.25	2.50
			Spotter Personnel	2						
			Crew - Pilots	1						



Garden Banks 956 - Exploratory Sample In-Situ Burn Equipment Activation List											
Skimming System	Supplier & Phone	Warehouse	Skimming Package	Quantity	Staging Area	Distance to Site from Staging (Miles)	Response Times (Hours)				
							Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA
<p><b>NOTE:</b> Planholder has access to additional ISB assets. For a comprehensive list of those assets, see Section 19.</p> <p>* - These components are additional operational requirements that must be procured in addition to the system identified.</p> <p>** - Teams will deploy in sections of 500' at any given time</p>											
Fire Team (In-Situ Burn Fire System)	MSRC (800) OIL-SPIL	Lake Charles, LA	** Fire Boom (ft)	2,000	Cocodrie, LA	190	5.75	1	13.5	1	21.25
			Tow Line (ft)	600							
			* Appropriate Vessel	2							
			Personnel	2							
Fire Team (In-Situ Burn Fire System)	MSRC (800) OIL-SPIL	Houston, TX	** Fire Boom (ft)	16,000	Cocodrie, LA	190	7.75	1	13.5	1	23.25
			Tow Line (ft)	600							
			* Appropriate Vessel	2							
			Personnel	2							
Fire Team (In-Situ Burn Fire System)	MSRC (800) OIL-SPIL	Galveston, TX	** Fire Boom (ft)	1,000	Cocodrie, LA	190	8.5	1	13.5	1	24
			Tow Line (ft)	600							
			* Appropriate Vessel	2							
			Personnel	2							
Fire Team (In-Situ Burn Fire System, EL-FB-02)	NRC (800) 899-4672	New Iberia, LA	Fire Boom (ft)	500	Cocodrie, LA	190	2.5	4	33	2	41.5
			* Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	2							
			Personnel	6-12							
Fire Team (In-Situ Burn Fire System, EL-FB-03)	NRC (800) 899-4672	New Iberia, LA	Fire Boom (ft)	500	Cocodrie, LA	190	2.5	4	33	2	41.5
			* Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	2							
			Personnel	6-12							
Fire Team (In-Situ Burn Fire System)	MSRC (800) OIL-SPIL	Portland, ME	** Fire Boom (ft)	1,000	Cocodrie, LA	190	28	1	13.5	1	43.5
			Tow Line (ft)	600							
			* Appropriate Vessel	2							
			Personnel	2							
Supply Team (Supply Vessel System)	MSRC (800) OIL-SPIL	Cocodrie, LA	* Offshore Vessel 110' - 310'	1	Cocodrie, LA	190	4	1	38	1	44
			Personnel	6							
Fire Team (In-Situ Burn Fire System)	CGA (888) 242-2007	Harvey, LA	Fire Boom (ft)	500	Cocodrie, LA	190	4	24	19	1	48
			Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	3							
			Personnel	20							
Fire Team (In-Situ Burn Fire System)	CGA (888) 242-2007	Harvey, LA	Fire Boom (ft)	500	Cocodrie, LA	190	4	24	19	1	48
			Guide Boom/Tow Line (ft)	400							
			* Offshore Vessel (0.5 kt capability)	3							
			Personnel	20							
<b>TOTAL FIRE BOOM AVAILABLE (FEET)</b>										<b>22,000</b>	

GB 956



November 1, 2016

## Garden Banks 956 - Exploratory Sample Offshore Aerial Dispersant Activation List

Aerial Dispersant System	Supplier & Phone	Airport/ City, State	Aerial Dispersant Package	Quantity	Staging Location	Distance to Site from Staging (Miles)	Response Times (Hours)				
							Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA
<b>NOTE: Planholder has access to additional dispersant assets. For a comprehensive list of assets, see Section 18.</b> * - These components are additional operational requirements that must be procured in addition to the system(s) identified. ** The second flight times listed are to demonstrate subsequent sortie and application timeframes. *** The dispersants listed is for gallon capacity only not amount stored at each location.											
Twin Commander Air Speed - 300 MPH	CGA/Airborne Support (985) 851-6391	Houma, LA	Aero Commander	1	Houma, LA	202	1	0	0.67	0	1.70
			Spotter Personnel	2							
			Crew - Pilots	1							
BT-67 (DC-3 Turboprop) Aircraft Air Speed - 194 MPH	CGA/Airborne Support (985) 851-6391	Houma, LA	DC-3 Dispersant Aircraft	1	Houma, LA 1st Flight	202	2	0.5	1.04	0.5	4.05
			Dispersant - Gallons	2000							
			Spotter Aircraft	1							
			Spotter Personnel	2							
			Crew - Pilots	2							
DC-4 Aircraft Air Speed - 150 MPH	NRC/Airborne Support (985) 851-6391	Houma, LA	DC-4 Dispersant Aircraft	1	Houma, LA 1st Flight	202	2	0.5	1.35	0.3	4.15
			Dispersant - Gallons	***2000							
			Spotter Aircraft	1							
			Spotter Personnel	2							
			Crew - Pilots	2							
DC-3 Aircraft Air Speed - 150 MPH	CGA/Airborne Support (985) 851-6391	Houma, LA	DC-3 Dispersant Aircraft	1	Houma, LA 1st Flight	202	2	0.5	1.35	0.5	4.35
			Dispersant - Gallons	1200							
			Spotter Aircraft	1							
			Spotter Personnel	2							
			Crew - Pilots	2							
DC-3 Aircraft Air Speed - 150 MPH	CGA/Airborne Support (985) 851-6391	Houma, LA	DC-3 Dispersant Aircraft	1	Houma, LA 1st Flight	202	2	0.5	1.35	0.5	4.35
			Dispersant - Gallons	1200							
			Spotter Aircraft	1							
			Spotter Personnel	2							
			Crew - Pilots	2							
DC-3 Aircraft Air Speed - 150 MPH	CGA/Airborne Support (985) 851-6391	Houma, LA	DC-3 Dispersant Aircraft	1	Houma, LA 1st Flight	202	2	0.5	1.35	0.5	4.35
			Dispersant - Gallons	1200							
			Spotter Aircraft	1							
			Spotter Personnel	2							
			Crew - Pilots	2							
C130-A Aircraft Air Speed - 342 MPH	MSRC (800) OIL-SPIL	Kiln, MS	C130-A Disp Aircraft	1	Stennis INTL., MS 1st Flight	289	3	0.0	0.84	0.5	4.35
			Dispersant - Gallons	3250							
			*Spotter Aircraft	1							
			*Spotter Personnel	2							
			Crew - Pilots	2							
BE-90 King Air Aircraft Air Speed - 213 MPH	MSRC (800) OIL-SPIL	Kiln, MS	BE-90 Dispersant Aircraft	1	Stennis INTL., MS 1st Flight	289	3	0.00	1.35	0.20	4.60
			Dispersant - Gallons	250							
			* Spotter Aircraft	1							
			*Spotter Personnel	2							
			Crew - Pilots	2							
DC-6A Aircraft Air Speed - 250 MPH	NRC/Florida Air Transport (786) 527-2963	Opa-Locka, FL	DC-6 Dispersant Aircraft	1	Opa-Locka, FL 1st Flight	751	2	0.5	3.00	0.3	5.85
			Dispersant - Gallons	***3320							
			Spotter Aircraft	1							
			Spotter Personnel	2							
			Crew - Pilots	2							
C130-A Aircraft Air Speed - 342 MPH	MSRC (800) OIL-SPIL	Mesa, AZ	C130-A Disp. Aircraft	1	Stennis INTL., MS 1st Flight	289	7	0.3	0.84	0.5	8.70
			Dispersant - Gallons	4000							
			*Spotter Aircraft	1							
			*Spotter Personnel	2							
			Crew - Pilots	2							

## Garden Banks 956 - Exploratory Sample Offshore Boat Spray Dispersant Activation List

Boat Spray Dispersant System	Supplier & Phone	Warehouse	Boat Spray Dispersant Package	Quantity	Staging Area	Distance to Site from Staging (Miles)	Response Times (Hours)				
							Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA
<b>NOTE:</b> Planholder has access to additional dispersant assets. For a comprehensive list of assets, see Section 18. *- These components are additional operational requirements that must be procured by OSROs in addition to the system(s) identified.											
Fire Monitor Induction Dispersant Spray System	AMPOL (800) 482-6765	Port Fourchon, LA	Dispersant Spray System	1	Cocodrie, LA	190	4	0.5	13.5	1	19
			Dispersant (Gallons)	500							
			Personnel	4							
			* 110' Utility Boat	1							
			* Crew Boat	1							
USCG SMART Team	USCG	Mobile, AL	Personnel	4	Cocodrie, LA	190	6	1	13.5	0.5	21
			* Crew Boat	1							
			Dispersant Spray System	1							
Fire Monitor Induction Dispersant Spray System	AMPOL (800) 482-6765	Cameron, LA	Dispersant Spray System	1	Cocodrie, LA	190	6.5	0.5	13.5	1	21.5
			Dispersant (Gallons)	500							
			Personnel	4							
			* 110' Utility Boat	1							
			* Crew Boat	1							
Vessel Based Dispersant Spray System	CGA (888) 242-2007	Harvey, LA	Dispersant Spray System	1	Cocodrie, LA	190	4	0.5	19	1	24.5
			Dispersant (Gallons)	330							
			Personnel	4							
			* Utility Boat	1							
			* Crew Boat	1							
Vessel Based Dispersant Spray System	CGA (888) 242-2007	Aransas Pass, TX	Dispersant Spray System	1	Cocodrie, LA	190	11	0.5	19	1	31.5
			Dispersant (Gallons)	330							
			Personnel	4							
			* Utility Boat	1							
			* Crew Boat	1							
Fixed Vessel Dispersant Spray System <i>(NRC Admiral)</i>	NRC (800) 899-4672	Galveston, TX	Dispersant Spray System	1	Galveston, TX	222	0	0.5	38.5	1	40
			Dispersant (Gallons)								
			Personnel	4							
			* Crew Boat	1							
			* Utility Boat	1							
Portable Vessel Dispersant Spray System	NRC (800) 899-4672	Everett, MA	Ayles Fernie AFEDO System	1	Cocodrie, LA	190	40.5	0.5	33	1	75
			Dispersant (Gallons)								
			Personnel	4							
			* Crew Boat	1							
			* Utility Boat	1							

**Garden Banks 956 - Exploratory  
Sample Offshore Slick Containment Activation List**

Skimming System	Supplier & Phone	Warehouse	Containment Package	Quantity	Staging Area	Distance to Site from Staging (Miles)	Response Times (Hours)				
							Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA
Offshore Containment System	MSRC (800) OIL-SPIIL	Lake Charles, LA	67" Pressure Inflatable Boom	1,320'	Cocodrie, LA	190	5.75	1	13.5	1	21.25
			*Appropriate Vessel	2							
			*Personnel	4							
			*Safety Monitor	1							
Offshore Containment System	MSRC (800) OIL-SPIIL	Lake Charles, LA	67" Pressure Inflatable Boom	1,320'	Cocodrie, LA	190	5.75	1	13.5	1	21.25
			*Appropriate Vessel	2							
			*Personnel	4							
			*Safety Monitor	1							
Offshore Containment System	MSRC (800) OIL-SPIIL	Houston, TX	67" Pressure Inflatable Boom	1,320'	Cocodrie, LA	190	7.75	1	13.5	1	23.25
			*Appropriate Vessel	2							
			*Personnel	4							
			*Safety Monitor	1							
Offshore Containment System	MSRC (800) OIL-SPIIL	Houston, TX	67" Pressure Inflatable Boom	1,320'	Cocodrie, LA	190	7.75	1	13.5	1	23.25
			*Appropriate Vessel	2							
			*Personnel	4							
			*Safety Monitor	1							
Offshore Containment System	MSRC (800) OIL-SPIIL	Houston, TX	67" Pressure Inflatable Boom	1,320'	Cocodrie, LA	190	7.75	1	13.5	1	23.25
			*Appropriate Vessel	2							
			*Personnel	4							
			*Safety Monitor	1							
Offshore Containment System	MSRC (800) OIL-SPIIL	Houston, TX	67" Pressure Inflatable Boom	1,320'	Cocodrie, LA	190	7.75	1	13.5	1	23.25
			*Appropriate Vessel	2							
			*Personnel	4							
			*Safety Monitor	1							
Offshore Containment System	MSRC (800) OIL-SPIIL	Galveston, TX	67" Pressure Inflatable Boom	1,320'	Cocodrie, LA	190	8.5	1	13.5	1	24
			*Appropriate Vessel	2							
			*Personnel	4							
			*Safety Monitor	1							
Offshore Containment System	MSRC (800) OIL-SPIIL	Ingleside, TX	67" Pressure Inflatable Boom	1,320'	Cocodrie, LA	190	11.25	1	13.5	1	26.75
			*Appropriate Vessel	2							
			*Personnel	4							
			*Safety Monitor	1							
Offshore Containment System	MSRC (800) OIL-SPIIL	Miami, FL	67" Pressure Inflatable Boom	1,320'	Cocodrie, LA	190	16	1	13.5	1	31.5
			*Appropriate Vessel	2							
			*Personnel	4							
			*Safety Monitor	1							
Offshore Containment System	MSRC (800) OIL-SPIIL	Miami, FL	67" Pressure Inflatable Boom	1,320'	Cocodrie, LA	190	16	1	13.5	1	31.5
			*Appropriate Vessel	2							
			*Personnel	4							
			*Safety Monitor	1							
CGA-300 Boom Barge **	CGA (888) 242-2007	Leeville, LA	43" Auto Boom (ft)	25,000'	Leeville, LA	204	0	4	29	4	37
			Ocean Tug	1							
			*70'+ Offshore Utility Boat	50							
			Personnel	400							
Offshore Slick Containment System	NRC (800) 899-4672	Grand Isle, LA	42" Ocean Boom (ft)	1,000'	Cocodrie, LA	190	1	4	33	2	40
			*Offshore Vessel	2							
			Personnel	6-12							
			Safety Representative	2							
Offshore Slick Containment System	NRC (800) 899-4672	Grand Isle, LA	42" Ocean Boom (ft)	1,000'	Cocodrie, LA	190	1	4	33	2	40
			*Offshore Vessel	2							
			Personnel	6-12							
			Safety Representative	2							
Offshore Slick Containment System	NRC (800) 899-4672	Bayou La Batre, AL	42" Ocean Boom (ft)	1,000'	Cocodrie, LA	190	4.5	4	33	2	43.5
			*Offshore Vessel	2							
			Personnel	6-12							
			Safety Representative	2							

\* - These components are additional operational requirements that must be procured in addition to the system identified.  
 \*\* - The boom on this barge will be combined with vessels to create multiple containment systems, depending on the needs of the response.

<b>Garden Banks 956 - Exploratory Sample Offshore Slick Containment Activation List</b>											
Skimming System	Supplier & Phone	Warehouse	Containment Package	Quantity	Staging Area	Distance to Site from Staging (Miles)	Response Times (Hours)				
							Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA
* - These components are additional operational requirements that must be procured in addition to the system identified.											
** - The boom on this barge will be combined with vessels to create multiple containment systems, depending on the needs of the response.											
Offshore Slick Containment System	NRC (800) 899-4672	Port Arthur, TX	42" Ocean Boom (ft)	1,000'	Cocodrie, LA	190	6	4	33	2	45
			*Offshore Vessel	2							
			Personnel	6-12							
			Safety Representative	2							
Offshore Slick Containment System	NRC (800) 899-4672	Galveston, TX	42" Ocean Boom (ft)	1,000'	Cocodrie, LA	190	7	4	33	2	46
			*Offshore Vessel	2							
			Personnel	6-12							
			Safety Representative	2							
Offshore Slick Containment System	NRC (800) 899-4672	Baytown, TX	42" Ocean Boom (ft)	1,000'	Cocodrie, LA	190	7.5	4	33	2	46.5
			*Offshore Vessel	2							
			Personnel	6-12							
			Safety Representative	2							
Offshore Slick Containment System	NRC (800) 899-4672	Corpus Christi, TX	42" Ocean Boom (ft)	1,000'	Cocodrie, LA	190	12	4	33	2	51
			*Offshore Vessel	2							
			Personnel	6-12							
			Safety Representative	2							
<b>TOTAL SLICK CONTAINMENT BOOM SYSTEMS (FEET)</b>										<b>45,200'</b>	

Garden Banks 956 - Exploratory Sample Offshore On-Water Recovery & Storage Activation List													
Skimming System	Supplier & Phone	Warehouse	Skimming Package	Quantity	Effective Daily Recovery Capacity (EDRC in Bbls/Day)	Storage (Barrels)	Staging Area	Distance to Site from Staging (Miles)	Response Times (Hours)				
									Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA
* - These components are additional operational requirements that must be procured in addition to the system identified. ** - These components are additional operational requirements for the packages to be used in an enhanced skimming deployment. *** - Specific barge names may vary.													
FRV H.I. Rich	CGA (888) 242-2007	Leeville, LA	Lamor Brush Skimmer	2	22,885	249	Leeville, LA	204	3	0	12	1	16
			36" Boom	64									
			95' Vessel	1									
			X Band Radar	1									
FRV Galveston Island	CGA (888) 242-2007	Galveston, TX	Lamor Brush Skimmer	2	22,885	249	Galveston, TX	222	2	0	13	1	16
			36" Boom	64									
			95' Vessel	1									
			X Band Radar	1									
FRV Breton Island	CGA (888) 242-2007	Venice, LA	Lamor Brush Skimmer	2	22,885	249	Venice, LA	250	2	0	14.5	1	18
			36" Boom	64									
			95' Vessel	1									
			X Band Radar	1									
Deep Blue Responder LFF 100 Brush	MSRC (800) OIL-SPIIL	Port Fourchon, LA	LFF 100 Brush Skimmer	1	18,086	4,000	Port Fourchon, LA	194	2	1	14	1	18
			Backup - Stress 1 Skimmer	1									
			67" Pressure Inflatable Boom	2640'									
			210' Vessel	1									
			Personnel	9									
			32' Support Boat	1									
			X Band Radar	1									
			Infrared Camera	1									
FAES #4 "Buster"	1												
Gulf Coast Responder Transrec-350	MSRC (800) OIL-SPIIL	Lake Charles, LA	Transrec Skimmer	1	10,567	4,000	Lake Charles, LA	222	2	1	16	1	20
			Backup - Stress 1 Skimmer	1									
			67" Pressure Inflatable Boom	2640'									
			210' Vessel	1									
			Personnel	9									
			32' Support Boat	1									
			X Band Radar	1									
			Infrared Camera	1									
FAES #4 "Buster"	1												
Texas Responder Transrec-350	MSRC (800) OIL-SPIIL	Galveston, TX	Transrec Skimmer	1	10,567	4,000	Galveston, TX	222	2	1	16	1	20
			Backup - Stress 1 Skimmer	1									
			67" Pressure Inflatable Boom	2640'									
			210' Vessel	1									
			Personnel	9									
			32' Support Boat	1									
			X Band Radar	1									
			Infrared Camera	1									
FAES #4 "Buster"	1												
Stress 2	MSRC (800) OIL-SPIIL	Pascagoula, MS	Offshore Skimmer	1	3,017	0	Cocodrie, LA	190	5.5	1	13.5	1	21
			67" Pressure Inflatable Boom	110'									
			Personnel	5									
			*Appropriate Vessel	2									
			*Temporary Storage	1									
Stress 1	MSRC (800) OIL-SPIIL	Lake Charles, LA	Offshore Skimmer	1	15,840	0	Cocodrie, LA	180	5.75	1	13.5	1	22
			67" Pressure Inflatable Boom	110'									
			Personnel	5									
			*Appropriate Vessel	2									
			*Temporary Storage	1									
Southern Responder Transrec-350	MSRC (800) OIL-SPIIL	Ingleside, TX	Transrec Skimmer	1	10,567	4,000	Ingleside, TX	308	2	1	22	1	26
			Backup - Stress 1 Skimmer	1									
			67" Pressure Inflatable Boom	2640'									
			210' Vessel	1									
			Personnel	9									
			32' Support Boat	1									
			X Band Radar	1									
			Infrared Camera	1									
FAES #4 "Buster"	1												

Garden Banks 956 - Exploratory Sample Offshore On-Water Recovery & Storage Activation List													
Skimming System	Supplier & Phone	Warehouse	Skimming Package	Quantity	Effective Daily Recovery Capacity (EDRC in Bbls/Day)	Storage (Barrels)	Staging Area	Distance to Site from Staging (Miles)	Response Times (Hours)				
									Staging ETA	Loadout Time	ETA to Site	Deployment Time	Total ETA
* - These components are additional operational requirements that must be procured in addition to the system identified. ** - These components are additional operational requirements for the packages to be used in an enhanced skimming deployment. *** - Specific barge names may vary.													
Fast Response Unit "FRU" 1.0	CGA (888) 242-2007	Galveston, TX	Foilex 250 Skimmer	1	4,251	100	Galveston, TX	222	4	2	22	1	29
			Personnel	4									
			* 100-185' Utility Boat	1									
			53' Skimming Boom	75'									
			** 67" Sea Sentry	440'									
** Crew Boat	1												
			** Add'l Storage	1		100							
NRC "Energy" OSRV	NRC (800) 899-4672	Grand Isle, LA	Vikoma Sea 60 Skimmer	1	1,509	300	Morgan City, LA	202	2.5	4	35	2	44
			Operational 42" Boom	200'									
			Additional 42" Boom	2,000'									
			Personnel	4-8									
			Boom Boat	1									
			110' Vessel	1									
NRC "ADMIRAL" OSRV	NRC (800) 899-4672	Galveston, TX	Marco XI Skimmer	1	28,526	300	Galveston, TX	222	0	4	38.5	2	45
			8-Band Rope Mop Skimmer	1									
			Operational 42" Boom	200'									
			Additional 42" Boom	2,000'									
			Personnel	4-8									
			110' Vessel	1									
			Boom Boat	1									
SOS System 379	NRC (800) 899-4672	New Iberia, LA	Marco XI Skimmer	1	24,000	0	Cocodrie, LA	190	2.5	4	33	2	42
			* Support Vessel	1									
			Sweep Boom	100'									
			Personnel	4-8									
			* Offshore Vessel	1									
			* Marine Tank	1		100							
SOS System 363	NRC (800) 899-4672	Belle Chasse, LA	Marco XI Skimmer	1	24,000	0	Cocodrie, LA	190	1.5	4	33	2	41
			* Boom	100'									
			Personnel	4-8									
			* Offshore Vessel	1									
NRC "VALIANT" OSRB	NRC (800) 899-4672	Aransas Pass, TX	Marco XI Skimmer	1	24,000	20,892	Aransas Pass, TX	301	0	4	52.5	2	59
			Operational 42" Boom	200'									
			Additional 42" Boom	2,000'									
			Personnel	4-8									
			Boom Boat	1									
			* Nearshore/Offshore Tug	2									
NRC "DEFENDER" OSRB	NRC (800) 899-4672	Bayou La Batre, AL	Vikoma Cascade Skimmer	1	29,520	16,500	Bayou La Batre, AL	360	0	4	61	2	67
			Marco XI Skimmer	1									
			Operational 42" Boom	200'									
			Additional 42" Boom	3,000'									
			Personnel	4-8									
			198' Barge	1									
			Boom Boat	1									
			* Nearshore/Offshore Tug	2									
***Moran/ Long Island	CGA (888) 242-2007	Houma, LA	Offshore Barge	1	N/A	82,982	Houma, LA	213	24-72	0	26	1	51 to 99
			Personnel	4									
			Offshore Tug	1									
***Moran/ Tennessee	CGA (888) 242-2007	Houma, LA	Offshore Barge	1	N/A	82,022	Houma, LA	213	24-72	0	26	1	51 to 99
			Personnel	4									
			Offshore Tug	1									
***K-Sea DBL 101 Offshore Barge	CGA (888) 242-2007	Belle Chasse, LA	Offshore Barge	1	N/A	107,285	Houma, LA	213	24-72	0	26	1	51 to 99
			Personnel	10									
			* Offshore Tug	1									
***K-Sea DBL 102 Offshore Barge	CGA (888) 242-2007	Belle Chasse, LA	Offshore Barge	1	N/A	107,285	Houma, LA	213	24-72	0	26	1	51 to 99
			Personnel	10									
			* Offshore Tug	1									
<b>DERATED RECOVERY RATE (BBLs/DAY)</b>												<b>273,105</b>	
<b>STORAGE CAPACITY INCLUDING SKIMMING VESSELS (BARRELS)</b>												<b>415,713</b>	

Garden Banks 956 - Exploratory Sample Nearshore On-Water Recovery Activation List													
Skimming System	Supplier & Phone	Warehouse	Skimming Package	Quantity	Effective Daily Recovery Capacity (EDRC In Bbls/Day)	Storage (Barrels)	Staging Area	Distance to Nearshore Environment (Miles)	Response Times (Hours)				
									Staging ETA	Loadout Time	ETA to Nearshore Environment	Deployment Time	Total ETA
* - These components are additional operational requirements that must be procured in addition to the system identified.													
FRV MV RW Armstrong	CGA (888) 242-2007	Morgan City, LA	Lori Brush Skimmer	2	15,257	65	Morgan City, LA	202	2	0	12	1	15
			36" Boom	46'									
			46" Vessel	1									
			Personnel	4									
SW CGA-72 FRV	CGA (888) 242-2007	Morgan City, LA	Marco Belt Skimmer	2	21,500	249	Morgan City, LA	202	2	0	12	1	15
			36" Auto Boom	150'									
			Personnel	4									
			56" SWS Vessel	1									
			* 14'-16' Alum. Flatboat	2									
SWS CGA-76 FRV	CGA (888) 242-2007	Leeville, LA	Lori Brush Skimmer	2	22,885	249	Leeville, LA	204	2	0	12	1	15
			36" Boom	150'									
			60" Vessel	1									
			X Band Radar	1									
			Personnel	4									
SWS CGA-75 FRV	CGA (888) 242-2007	Galveston, TX	Lori Brush Skimmer	2	22,885	249	Galveston, TX	222	2	0	13	1	16
			36" Boom	150'									
			60" Vessel	1									
			X Band Radar	1									
			Personnel	4									
SW CGA-74 FRV	CGA (888) 242-2007	Vermilion, LA	Marco Belt Skimmer	2	21,500	249	Vermilion, LA	215	2	0	12.5	1	16
			36" Auto Boom	150'									
			Personnel	4									
			56" SW Vessel	1									
			* 14'-16' Alum. Flatboat	2									
FRV MV Bastian Bay	CGA (888) 242-2007	Lake Charles, LA	Lori Brush Skimmer	2	15,257	65	Lake Charles, LA	222	2	0	13	1	16
			36" Boom	46'									
			46" Vessel	1									
			Personnel	4									
SW CGA-73 FRV	CGA (888) 242-2007	Lake Charles, LA	Marco Belt Skimmer	2	21,500	249	Lake Charles, LA	222	2	0	13	1	16
			36" Auto Boom	150'									
			Personnel	5									
			56" SWS Vessel	1									
			* 14'-16' Alum. Flatboat	2									
SW CGA-71 FRV	CGA (888) 242-2007	Aransas Pass, TX	Marco Belt Skimmer	2	21,500	249	Galveston, TX	222	2	0	13	1	16
			36" Auto Boom	150'									
			Personnel	5									
			56" SWS Vessel	1									
			* 14'-16' Alum. Flatboat	2									
SWS CGA-53 MARCO Shallow Water Skimmer	CGA (888) 242-2007	Leeville, LA	Marco Belt Skimmer	1	3,588	34	Cocodrie, LA	190	4	1	11	1	17
			* 18" Boom (contractor)	100'									
			Personnel	3									
			38' Skimming Vessel	1									
FRV MV Grand Bay	CGA (888) 242-2007	Venice, LA	Lori Brush Skimmer	2	15,257	65	Venice, LA	250	2	0	14.5	1	18
			36" Boom	46'									
			46" Vessel	1									
			Personnel	4									
SWS CGA-77 FRV	CGA (888) 242-2007	Venice, LA	Lori Brush Skimmer	2	22,885	249	Venice, LA	250	2	0	14.5	1	18
			36" Boom	150'									
			60" Vessel	1									
			X Band Radar	1									
			Personnel	4									
SWS CGA-52 MARCO Shallow Water Skimmer	CGA (888) 242-2007	Venice, LA	Marco Belt Skimmer	1	3,588	34	Cocodrie, LA	190	6	1	11	1	19
			* 18" Boom (contractor)	100'									
			Personnel	3									
			36' Skimming Vessel	1									
SWS CGA-51 MARCO Shallow Water Skimmer	CGA (888) 242-2007	Lake Charles, LA	Shallow Water Barge	1	3,588	20	Cocodrie, LA	190	6	1	11	1	19
			Marco Belt Skimmer	1									
			* 18" Boom (contractor)	100'									
			Personnel	3									
			34' Skimming Vessel	1									
Shallow Water Barge	1												

**Garden Banks 956 - Exploratory  
Sample Nearshore On-Water Recovery Activation List**

Skimming System	Supplier & Phone	Warehouse	Skimming Package	Quantity	Effective Daily Recovery Capacity (EDRC in Bbls/Day)	Storage (Barrels)	Staging Area	Distance to Nearshore Environment (Miles)	Response Times (Hours)				
									Staging ETA	Loadout Time	ETA to Nearshore Environment	Deployment Time	Total ETA
^ - These components are additional operational requirements that must be procured in addition to the system identified.													
SBS w/ Queensboro	MSRC (800) OIL-SPIL	Belle Chasse, LA	Skimmer	1	905	400	Cocodrie, LA	190	4	1	13.5	1	20
			18" Boom	50'									
			Personnel	4									
			Non-self-propelled barge	1									
MSRC "Kvichak"	MSRC (800) OIL-SPIL	Belle Chasse, LA	Marco I Skimmer	1	3,588	24	Cocodrie, LA	190	4	1	13.5	1	20
			Personnel	2									
			30' Shallow Water Vessel	1									
			Push Boat	1									
SBS w/ GT-185 w/adapter	MSRC (800) OIL-SPIL	Baton Rouge, LA	Skimmer	1	1,371	400	Cocodrie, LA	190	4.5	1	13.5	1	20
			18" Boom	50'									
			Personnel	4									
			Non-self-propelled barge	1									
MSRC "Quick Strike"	MSRC (800) OIL-SPIL	Lake Charles, LA	LORI Brush Skimmer	2	5,000	50	Lake Charles, LA	222	2	1	16	1	20
			Personnel	3									
			47' Fast Response Boat	1									
			Push Boat	1									
FRV CGA 58 Timbalier Bay	CGA (888) 242-2007	Aransas Pass, TX	Lori Brush Skimmer	2	15,257	65	Aransas Pass, TX	301	2	0	17.5	1	21
			36" Boom	46'									
			46' Vessel	1									
			Personnel	4									
MSRC "Kvichak"	MSRC (800) OIL-SPIL	Pascagoula, MS	Marco I Skimmer	1	3,588	24	Cocodrie, LA	190	5.5	1	13.5	1	21
			Personnel	2									
			30' Shallow Water Vessel	1									
			Push Boat	1									
SBS w/ Queensboro	MSRC (800) OIL-SPIL	Pascagoula, MS	Skimmer	1	905	400	Cocodrie, LA	190	5.5	1	13.5	1	21
			18" Boom	50'									
			Personnel	4									
			Non-self-propelled barge	1									
SBS w/ AardVAC	MSRC (800) OIL-SPIL	Pascagoula, MS	Skimmer	1	3,840	400	Cocodrie, LA	190	5.5	1	13.5	1	21
			18" Boom	50'									
			Personnel	4									
			Self-propelled barge	1									
GT-185	MSRC (800) OIL-SPIL	Pascagoula, MS	Skimmer	1	1,371	*500	Cocodrie, LA	190	6	1	13.5	1	21
			18" Boom	50'									
			Personnel	5									
			*Appropriate Vessel	2									
SBS w/ Queensboro	MSRC (800) OIL-SPIL	Lake Charles, LA	Skimmer	1	905	400	Cocodrie, LA	190	5.75	1	13.5	1	22
			18" Boom	50'									
			Personnel	4									
			Non-self-propelled barge	1									
SBS w/ Queensboro	MSRC (800) OIL-SPIL	Lake Charles, LA	Skimmer	1	905	400	Cocodrie, LA	190	5.75	1	13.5	1	22
			18" Boom	50'									
			Personnel	4									
			Non-self-propelled barge	1									
SBS w/ Queensboro	MSRC (800) OIL-SPIL	Lake Charles, LA	Skimmer	1	905	400	Cocodrie, LA	190	5.75	1	13.5	1	22
			18" Boom	50'									
			Personnel	4									
			Self-propelled barge	1									
SBS w/ Queensboro	MSRC (800) OIL-SPIL	Lake Charles, LA	Skimmer	1	905	400	Cocodrie, LA	190	5.75	1	13.5	1	22
			18" Boom	50'									
			Personnel	4									
			Self-propelled barge	1									
MSRC "Kvichak"	MSRC (800) OIL-SPIL	Galveston, TX	Marco I Skimmer	1	3,588	24	Cocodrie, LA	190	8.5	1	13.5	1	24
			Personnel	2									
			30' Shallow Water Vessel	1									
			Push Boat	1									

**Garden Banks 956 - Exploratory  
Sample Nearshore On-Water Recovery Activation List**

Skimming System	Supplier & Phone	Warehouse	Skimming Package	Quantity	Effective Daily Recovery Capacity (EDRC in Bbls/Day)	Storage (Barrels)	Staging Area	Distance to Nearshore Environment (Miles)	Response Times (Hours)				
									Staging ETA	Loadout Time	ETA to Nearshore Environment	Deployment Time	Total ETA
* - These components are additional operational requirements that must be procured in addition to the system identified.													
SBS w/ Queensboro	MSRC (800) OIL-SPIIL	Galveston, TX	Skimmer	1	905	400	Cocodrie, LA	190	8.5	1	13.5	1	24
			18" Boom	50'									
			Personnel	4									
			Non-self-propelled barge	1									
			Push Boat	1									
SBS w/ GT-185 w/adapter	MSRC (800) OIL-SPIIL	Galveston, TX	Skimmer	1	1,371	400	Cocodrie, LA	190	8.5	1	13.5	1	24
			18" Boom	50'									
			Personnel	4									
			Non-self-propelled barge	1									
			Push Boat	1									
SBS w/ Queensboro	MSRC (800) OIL-SPIIL	Memphis, TN	Skimmer	1	905	400	Cocodrie, LA	190	8.75	1	13.5	1	25
			18" Boom	60'									
			Personnel	4									
			Non-self-propelled barge	1									
			Push Boat	1									
MSRC "Kvichak"	MSRC (800) OIL-SPIIL	Ingleside, TX	Marco I Skimmer	1	3,588	24	Cocodrie, LA	190	11.25	1	13.5	1	27
			Personnel	2									
			30' Shallow Water Vessel	1									
			Skimmer	1									
SBS w/ GT-185 w/adapter	MSRC (800) OIL-SPIIL	Ingleside, TX	18" Boom	50'	1,371	400	Cocodrie, LA	190	11.25	1	13.5	1	27
			Personnel	4									
			Self-propelled barge	1									
			Skimmer	1									
GT-185	MSRC (800) OIL-SPIIL	Jacksonville, FL	Skimmer	1	1,371	500	Cocodrie, LA	190	11	1	13.5	1	27
			18" Boom	60'									
			Personnel	5									
			*Appropriate Vessel	2									
			*Temporary Storage	1									
MSRC "Kvichak"	MSRC (800) OIL-SPIIL	Savannah, GA	Marco I Skimmer	1	3,588	24	Cocodrie, LA	190	13.5	1	13.5	1	29
			Personnel	2									
			30' Shallow Water Vessel	1									
			Skimmer	1									
GT-185	MSRC (800) OIL-SPIIL	Tampa, FL	Skimmer	1	1,371	500	Cocodrie, LA	190	13	1	13.5	1	29
			18" Boom	50'									
			Personnel	5									
			*Appropriate Vessel	2									
			*Temporary Storage	1									
SBS w/ Queensboro	MSRC (800) OIL-SPIIL	Roxana, IL	Skimmer	1	905	400	Cocodrie, LA	190	13	1	13.5	1	29
			18" Boom	50'									
			Personnel	4									
			Non-self-propelled barge	1									
			Push Boat	1									
WP-1	MSRC (800) OIL-SPIIL	Miami, FL	Skimmer	1	3,017	500	Cocodrie, LA	190	16	1	13.5	1	32
			18" Boom	50'									
			Personnel	5									
			*Appropriate Vessel	2									
			*Temporary Storage	1									
AARDVAC	MSRC (800) OIL-SPIIL	Miami, FL	Skimmer	1	3,840	500	Cocodrie, LA	190	16	1	13.5	1	32
			18" Boom	50'									
			Personnel	5									
			*Appropriate Vessel	2									
			*Temporary Storage	1									
AARDVAC	MSRC (800) OIL-SPIIL	Miami, FL	Skimmer	1	3,840	500	Cocodrie, LA	190	16	1	13.5	1	32
			18" Boom	50'									
			Personnel	5									
			*Appropriate Vessel	2									
			*Temporary Storage	1									
SBS w/ Queensboro	MSRC (800) OIL-SPIIL	Whiting, IN	Skimmer	1	905	400	Cocodrie, LA	190	16.75	1	13.5	1	33
			18" Boom	60'									
			Personnel	4									
			Non-self-propelled barge	1									
			Push Boat	1									

Garden Banks 956 - Exploratory Sample Nearshore On-Water Recovery Activation List													
Skimming System	Supplier & Phone	Warehouse	Skimming Package	Quantity	Effective Daily Recovery Capacity (EDRC in Bbls/Day)	Storage (Barrels)	Staging Area	Distance to Nearshore Environment (Miles)	Response Times (Hours)				
									Staging ETA	Loadout Time	ETA to Nearshore Environment	Deployment Time	Total ETA
* - These components are additional operational requirements that must be procured in addition to the system identified.													
SWS CGA-55 Egmopol Shallow Water Skimmer	CGA (888) 242-2007	Morgan City, LA	Marco Skimmer	1	1,810	100	Cocodrie, LA	190	4	1	27	1	33
			* 18" Boom (contractor)	100'									
			Personnel	3									
			38' Skimming Vessel	1									
SBS w/ Queensboro	MSRC (800) OIL-SPIL	Toledo, OH	Skimmer	1	905	400	Cocodrie, LA	190	18.25	1	13.5	1	34
			18" Boom	50'									
			Personnel	4									
			Non-self-propelled barge	1									
SBS w/ AardVAC	MSRC (800) OIL-SPIL	Virginia Beach, VA	Skimmer	1	3,840	400	Cocodrie, LA	190	20	1	13.5	1	36
			18" Boom	50'									
			Personnel	4									
			Self-propelled barge	1									
SBS w/ Stress 1	MSRC (800) OIL-SPIL	Chesapeake City, MD	Skimmer	1	15,840	400	Cocodrie, LA	190	21.25	1	13.5	1	37
			18" Boom	50'									
			Personnel	4									
			Non-self-propelled barge	1									
CGA-54 Egmopol Shallow Water Skimmer	CGA (888) 242-2007	Galveston, TX	Marco Belt Skimmer	1	1,810	100	Cocodrie, LA	190	9	1	27	1	38
			* 18" Boom (contractor)	100'									
			Personnel	3									
			34' Skimming Vessel	1									
SBS w/ GT-185	MSRC (800) OIL-SPIL	Bayonne, NJ	Skimmer	1	1,371	400	Cocodrie, LA	190	22.5	1	13.5	1	38
			18" Curtain Internal Foam	60'									
			Personnel	4									
			Non-self-propelled barge	1									
SBS w/ Stress 1	MSRC (800) OIL-SPIL	Edison/Perth Amboy, NJ	Skimmer	1	15,840	400	Cocodrie, LA	190	23	1	13.5	1	39
			18" Boom	50'									
			Personnel	4									
			Self-propelled barge	1									
MSRC "Kvichak"	MSRC (800) OIL-SPIL	Edison/Perth Amboy, NJ	Marco I Skimmer	1	3,588	24	Cocodrie, LA	190	22.75	1	13.5	1	39
			Personnel	2									
			30' Shallow Water Vessel	1									
MSRC "Kvichak"	MSRC (800) OIL-SPIL	Edison/Perth Amboy, NJ	Marco I Skimmer	1	3,588	24	Cocodrie, LA	190	22.75	1	13.5	1	39
			Personnel	2									
			30' Shallow Water Vessel	1									
SOS System 332	NRC (800) 899-4672	Belle Chasse, LA	Vikoma Fasflo Skimmer	1	2,112	0	Cocodrie, LA	190	2	4	33	2	41
			* Sweep Boom	100'									
			Personnel	4-8									
			* Nearshore Vessel	1									
SBS w/ GT-185	MSRC (800) OIL-SPIL	Providence, RI	Skimmer	1	1,371	400	Cocodrie, LA	190	25.5	1	13.5	1	41
			18" Curtain Internal Foam	60'									
			Personnel	4									
			Non-self-propelled barge	1									
SBS w/ Queensboro	MSRC (800) OIL-SPIL	Everett, MA	Skimmer	1	905	400	Cocodrie, LA	190	26	1	13.5	1	42
			18" Boom	50'									
			Personnel	4									
			Non-self-propelled barge	1									
SOS System 102	NRC (800) 899-4672	New Iberia, LA	Weir Disc Skimmer	1	1,371	24	Cocodrie, LA	190	3	4	33	2	42
			* Sweep Boom	100'									
			Personnel	4-8									
			* Nearshore Vessel	1									
SOS System 358 A	NRC (800) 899-4672	New Iberia, LA	Vikoma Fasflo Skimmer	1	2,112	0	Cocodrie, LA	190	3	4	33	2	42
			* Sweep Boom	100'									
			Personnel	4-8									
			* Nearshore Vessel	1									

**Garden Banks 956 - Exploratory  
Sample Nearshore On-Water Recovery Activation List**

Skimming System	Supplier & Phone	Warehouse	Skimming Package	Quantity	Effective Daily Recovery Capacity (EDRC in Bbls/Day)	Storage (Barrels)	Staging Area	Distance to Nearshore Environment (Miles)	Response Times (Hours)				
									Staging ETA	Loadout Time	ETA to Nearshore Environment	Deployment Time	Total ETA
* - These components are additional operational requirements that must be procured in addition to the system identified.													
MSRC "Kvichak"	MSRC (800) OIL-SPIL	Portland, ME	Marco I Skimmer Personnel 30' Shallow Water Vessel	1 2 1	3,588	24	Cocodrie, LA	190	28	1	13.5	1	44
SBS w/ WP-1	MSRC (800) OIL-SPIL	Portland, ME	Skimmer 18" Boom Personnel Self-propelled barge	1 50' 4 1	3,017	400	Cocodrie, LA	190	28	1	13.5	1	44
SOS System 371	NRC (800) 899-4672	Sulphur, LA	Vikoma Fasflo Skimmer * Sweep Boom Personnel * Nearshore Vessel	1 100' 4-8 1	2,112	24	Cocodrie, LA	190	5	4	33	2	44
SOS System 104	NRC (800) 899-4672	Pensacola, FL	Weir Disc Skimmer * Sweep Boom Personnel * Nearshore Vessel	1 100' 4-8 1	1,371	24	Cocodrie, LA	190	7	4	33	2	46
SOS System WD-114	NRC (800) 899-4672	Port Arthur, TX	NRC Weir Disk Skimmer * Sweep Boom Personnel * Nearshore Vessel	1 100' 4-8 1	1,371	24	Cocodrie, LA	190	6	4	33	2	45
SOS System 202	NRC (800) 899-4672	La Porte, TX	NRC Weir Disk Skimmer * Sweep Boom Personnel * Nearshore Vessel	1 100' 4-8 1	1,371	24	Cocodrie, LA	190	8	4	33	2	47
SOS System 721	NRC (800) 899-4672	Baytown, TX	AP Multi Skimmer * Sweep Boom Personnel * Nearshore Vessel * Marine Tank	1 100' 4-8 1 1	823	0 50	Cocodrie, LA	190	8	4	33	2	47
MSRC "Lightning"	MSRC (800) OIL-SPIL	Tampa, FL	LORI Brush Skimmer Personnel 47' Fast Response Boat	2 3 1	5,000	50	Tampa, FL	616	2	1	44	1	48
SOS System 385	NRC (800) 899-4672	Panama City, FL	Vikoma Fasflo Skimmer * Sweep Boom Personnel * Nearshore Vessel * Marine Tank	1 100' 4-8 1 1	2,112	0 50	Cocodrie, LA	190	9	4	33	2	48
SOS System 313	NRC (800) 899-4672	Corpus Christi, TX	Weir Disk Skimmer * Sweep Boom Personnel * Nearshore Vessel	1 100' 4-8 1	1,371	24	Cocodrie, LA	190	12.00	4	33	2	51
SOS System 205	NRC (800) 899-4672	Tampa, FL	Weir Disc Skimmer * Sweep Boom Personnel * Nearshore Vessel	1 100' 4-8 1	1,371	24	Cocodrie, LA	190	15	4	33	2	54
SOS System 333	NRC (800) 899-4672	Atlantic Beach, FL	Vikoma Fasflo Skimmer * Sweep Boom Personnel * Nearshore Vessel * Marine Tank	1 100' 4-8 1 1	2,112	0 50	Cocodrie, LA	190	16	4	33	2	55
SOS System 203	NRC (800) 899-4672	Cocoa, FL	Weir Disk Skimmer * Sweep Boom Personnel * Nearshore Vessel	1 100' 4-8 1	1,371	24	Cocodrie, LA	190	18	4	33	2	57
SOS System 204	NRC (800) 899-4672	Fort Lauderdale, FL	Weir Disk Skimmer * Sweep Boom Personnel * Nearshore Vessel	1 100' 4-8 1	1,371	24	Cocodrie, LA	190	20	4	33	2	59
<b>DERATED RECOVERY RATE (BBLs/DAY)</b>											<b>366,929</b>		
<b>SKIMMING VESSEL STORAGE CAPACITY (BARRELS)</b>											<b>15,745</b>		

**Garden Banks 956 - Exploratory  
Sample Shoreline Protection & Wildlife Support List**

Supplier & Phone	Warehouse	Equipment Listing	Quantity	Staging Area	Response Times (Hours)			
					Staging ETA	Loadout Time	Deployment Time	Total ETA
AMPOL (800) 482-6765	Harvey, LA	Containment Boom - 18" to 24"	8,000'	Cocodrie, LA	4	1	1	6
		Containment Boom - 6" to 10"	3,000'					
ES&H Environmental (877) 437-2634	Houma, LA	Containment Boom - 10"	2,000'	Cocodrie, LA	4	1	1	6
		Containment Boom - 18"	20,000'					
		Containment Boom - 24"	5,000'					
		Jon Boat - 12' to 16'	30					
		Response Boats - 22' to 25'	2					
		Response Boats - 26' to 29'	4					
		Portable Skimmers	23					
		Shallow Water Skimmers	2					
OMI (985) 798-1005	Houma, LA	Containment Boom - 18" to 24"	2,000'	Cocodrie, LA	4	1	1	6
		Containment Boom - 6" to 10"	500'					
		Response Boats - 16'	2					
		Response Boats - 25' to 28'	1					
		Response Boats - (Cabin Boat) 27' to 30'	1					
		Shallow Water Skimmers	3					
Lawson Environmental Service (985) 876-0420	Houma, LA	Containment Boom - 18"	30,000'	Cocodrie, LA	4	1	1	6
		Containment Boom - 12"	2,000'					
		Containment Boom - 10"	9,500'					
		Response Boats - 14'	10					
		Response Boats - 16'	6					
		Response Boats - 20'	5					
		Response Boats - 24'	8					
		Response Boats - 26'	4					
		Response Boats - 28'	7					
		Response Boats - 32'	4					
Portable Skimmers	6							
ES&H Environmental (877) 437-2634	Morgan City, LA	Containment Boom - 10"	2,000'	Cocodrie, LA	4	1	1	6
		Containment Boom - 18"	500'					
		Jon Boat - 12' to 16'	3					
		Response Boats - 18' to 21'	2					
		Response Boats - 22' to 25'	1					
		Portable Skimmers	2					
Wildlife Hazing Cannon	12							
ES&H Environmental (877) 437-2634	Port Fourchon, LA	Containment Boom - 18"	1000'	Cocodrie, LA	4	1	1	6
		Response Boats - 22' to 25'	1					
		Portable Skimmers	1					
CGA (888) 242-2007	Harvey, LA	Wildlife Rehab Trailer	1	Cocodrie, LA	4	1	1	6
		Wildlife Husbandry Trailer	1					
		Support Trailer	3					
		Bird Scare Cannons	120					
		Contract Truck (Third Party)	3					
		Personnel (Responder/Mechanic)	4					
ES&H Environmental (877) 437-2634	Belle Chasse, LA	Containment Boom - 10"	1,500'	Cocodrie, LA	4	1	1	6
		Containment Boom - 18"	15,500'					
		Containment Boom - 24"	5,000'					
		Jon Boat - 12' to 16'	4					
		Response Boats - 18' to 21'	1					
		Response Boats - 22' to 25'	1					
		Response Boats - 26' to 29'	3					
		Portable Skimmers	10					
Wildlife Hazing Cannon	50							
OMI (800) 645-6671	Belle Chasse, LA	Containment Boom - 18" to 24"	4,500'	Cocodrie, LA	4	1	1	6
		Containment Boom - 6" to 10"	500'					
		Response Boats - 20'	1					
		Response Boats - 25' to 28'	2					
		Portable Skimmers	12					
		Shallow Water Skimmers	1					
		Bird Scare Cannons	12					
		Response Personnel	24					

**Garden Banks 956 - Exploratory  
Sample Shoreline Protection & Wildlife Support List**

Supplier & Phone	Warehouse	Equipment Listing	Quantity	Staging Area	Response Times (Hours)			
					Staging ETA	Loadout Time	Deployment Time	Total ETA
USES Environmental (888) 279-9930	Meraux, LA	Containment Boom - 18"	6,000'	Cocodrie, LA	4	1	1	6
		Containment Boom - 10"	1,000'					
		Response Boats - 16'	23					
		Response Boats - 18'	1					
		Response Boats - 24'	1					
		Response Boats - 26'	2					
		Response Boats - 28'	1					
Portable Skimmers	2							
USES Environmental (888) 279-9930	Hahnville, LA	Containment Boom - 18"	500'	Cocodrie, LA	4	1	1	6
USES Environmental (888) 279-9930	Amelia, LA	Containment Boom - 18"	500'	Cocodrie, LA	4	1	1	6
USES Environmental (888) 279-9930	Marrero, LA	Containment Boom - 18"	600'	Cocodrie, LA	4	1	1	6
OMI (800) 645-6671	Galliano, LA	Containment Boom - 18" to 24"	2,000'	Cocodrie, LA	4	1	1	6
		Containment Boom - 6" to 10"	500'					
		Response Boats - 16'	1					
		Response Boats (Barge) - 25' to 33'	1					
		Response Boats - 25' to 28'	1					
		Portable Skimmers	3					
OMI (800) 645-6671	Morgan City, LA	Containment Boom - 18" to 24"	2,500	Cocodrie, LA	4	1	1	6
		Containment Boom - 6" to 10"	400'					
		Response Boats - 16'	2					
		Response Boats - 25' to 28'	1					
		Portable Skimmers	3					
		Response Personnel	3					
ES&H Environmental (877) 437-2634	Golden Meadow, LA	Containment Boom - 10"	1,000'	Cocodrie, LA	4	1	1	6
		Containment Boom - 18"	13,000					
		Jon Boat - 12' to 16'	2					
		Response Boats - 18' to 21'	1					
		Response Boats - 22' to 25'	1					
		Response Boats - 26' to 29'	1					
		Portable Skimmers	5					
		Wildlife Hazing Cannon	12					
OMI (800) 645-6671	Port Allen, LA	Containment Boom - 18" to 24"	2500'	Cocodrie, LA	4.5	1	1	7
		Containment Boom - 6" to 10"	500'					
		Response Boats - 16'	2					
		Response Boats - 25 to 33'	1					
		Shallow Water Skimmers	1					
		Response Personnel	6					
ES&H Environmental (877) 437-2634	Lafayette, LA	Containment Boom - 10"	500'	Cocodrie, LA	4.75	1	1	7
		Containment Boom - 18"	13,000'					
		Jon Boat - 12' to 16'	3					
		Response Boats - 18' to 21'	1					
		Response Boats - 22' to 25'	1					
		Response Boats - 26' to 29'	1					
		Portable Skimmers	4					
		Wildlife Hazing Cannon	12					
AMPOL (800) 482-6765	New Iberia, LA	Containment Boom - 6" to 10"	4,150'	Cocodrie, LA	4.5	1	1	7
		Containment Boom - 18" to 24"	34,050'					
		Response Boats - 14' to 20'	3					
		Response Boats - 21' to 36'	3					
		Portable Skimmers	27					
Clean Harbors (800) 645-8265	New Iberia, LA	Containment Boom - 18" to 24"	33,800'	Cocodrie, LA	4.5	1	1	7
		Containment Boom - 6" to 10"	500'					
		Response Boats - 21' to 36'	4					

## Garden Banks 956 - Exploratory Sample Shoreline Protection & Wildlife Support List

Supplier & Phone	Warehouse	Equipment Listing	Quantity	Staging Area	Response Times (Hours)			
					Staging ETA	Loadout Time	Deployment Time	Total ETA
OMI (800) 645-6671	New Iberia, LA	Containment Boom - 18" to 24"	12,000'	Cocodrie, LA	4.5	1	1	7
		Containment Boom - 6" to 10"	300'					
		Response Boats - 16'	3					
		Response Boats (Barge) - 25' to 33'	1					
		Response Boats - 25' to 28'	1					
		Portable Skimmers	8					
Response Personnel	8							
Clean Harbors (800) 645-8265	Baton Rouge, LA	Containment Boom - 18" to 24"	14,000'	Cocodrie, LA	4.5	1	1	7
		Response Boats - 14' to 20'	1					
		Portable Skimmers	3					
		Response Personnel	13					
SWS Environmental (877) 742-4215	Baton Rouge, LA	Containment Boom - 18"	1,000'	Cocodrie, LA	4.5	1	1	7
		Response Boats - 25' to 42'	2					
		Shallow Water Skimmers	1					
		Response Personnel	6					
Wildlife Ctr. of Texas (713) 861-9453	Baton Rouge, LA	Wildlife Specialist - Personnel	6 to 20	Cocodrie, LA	4.5	1	1	7
USES Environmental (888) 279-9930	Lafitte, LA	Containment Boom - 18"	1,000'	Cocodrie, LA	4.25	1	1	7
		Response Boats - 18'	2					
USES Environmental (888) 534-2744	Geismar, LA	Containment Boom - 18"	1,000'	Cocodrie, LA	4.25	1	1	7
		Response Boats - 16'	2					
		Portable Skimmers	1					
USES Environmental (888) 279-9930	Biloxi, MS	Containment Boom - 18"	2,000'	Cocodrie, LA	5	1	1	7
		Response Boats - 16'	1					
OMI (800) 645-6671	Venice, LA	Containment Boom - 18" to 24"	1,500'	Cocodrie, LA	5.5	1	1	8
		Response Boats - 16'	4					
		Response Boats (Barge) - 25' to 33'	1					
		Response Boats - 25' to 28'	2					
		Response Boats - (Cabin Boat) 27' to 30'	1					
		Shallow Water Skimmers	3					
Portable Skimmers	2							
AMPOL (800) 482-6765	Venice, LA	Containment Boom - 18" to 24"	2,250'	Cocodrie, LA	5.5	1	1	8
		Response Boats - 14' to 20'	2					
		Response Boats - 21' to 36'	1					
		Portable Skimmers	2					
ES&H Environmental (877) 437-2634	Venice, LA	Containment Boom - 10"	2,000'	Cocodrie, LA	5.5	1	1	8
		Containment Boom - 18"	13,000'					
		Containment Boom - 24"	10,000					
		Jon Boat - 12' to 16'	4					
		Response Boats - 22' to 25'	1					
		Response Boats - 26' to 29'	2					
		Portable Skimmers	5					
Wildlife Hazing Cannon	25							
USES Environmental (888) 279-9930	Venice, LA	Containment Boom - 18"	10,000'	Cocodrie, LA	5.5	1	1	8
		Response Boats - 16'	15					
		Response Boats - 26'	2					
		Response Boats - 30'	1					
		Portable Skimmers	2					
Shallow Water Skimmers	1							
USES Environmental (888) 279-9930	Lake Charles, LA	Containment Boom - 10"	100'	Cocodrie, LA	5.75	1	1	8
		Containment Boom - 18"	7,700'					
		Response Boats - 16'	3					
		Response Boats - 27'	1					
		Response Boats - 37'	1					

### Garden Banks 956 - Exploratory Sample Shoreline Protection & Wildlife Support List

Supplier & Phone	Warehouse	Equipment Listing	Quantity	Staging Area	Response Times (Hours)			
					Staging ETA	Loadout Time	Deployment Time	Total ETA
ES&H Environmental (877) 437-2634	Lake Charles, LA	Containment Boom - 10"	500'	Cocodrie, LA	5.75	1	1	8
		Containment Boom - 18"	15,000'					
		Containment Boom - 24"	5,000'					
		Jon Boat - 12' to 16'	3					
		Response Boats - 18' to 21'	2					
		Response Boats - 26' to 29'	2					
		Portable Skimmers	13					
		Wildlife Hazing Cannon	40					
Miller Env. Services (800) 929-7227	Sulphur, LA	Containment Boom - 10"	600'	Cocodrie, LA	5.75	1	1	8
		Containment Boom - 18"	14,000'					
		Jon Boats - 14' to 16'	2					
		Jon Boats - 16' w/25hp HP Outboard Motor	2					
		Air Boat - 18'	1					
		Work Boat - 18'	2					
		Response Boats - 24' - 28'	4					
		Portable Skimmers	5					
		Shallow Water Skimmers	1					
		Response Personnel	49					
		USES Environmental (888) 279-9930	Mobile, AL					
Containment Boom - 18"	5,000'							
Response Boats - 16'	1							
Response Boats - 18'	1							
Response Boats - 20'	1							
Response Boats - 26'	1							
Portable Skimmers	2							
AMPOL (800) 482-6765	Port Arthur, TX	Containment Boom - 18" to 24"	16,000'	Cocodrie, LA	6.75	1	1	9
		Response Boats - 14' to 20'	2					
		Response Boats - 21' to 36'	1					
		Portable Skimmers	3					
Clean Harbors (800) 645-8265	Port Arthur, TX	Containment Boom - 18" to 24"	3,000'	Cocodrie, LA	6.75	1	1	9
		Response Boats - 21' to 36'	2					
		Portable Skimmers	2					
		Response Personnel	54					
Garner Environmental (800) 424-1716	Port Arthur, TX	Containment Boom - 6"	22,000'	Cocodrie, LA	6.75	1	1	9
		Response Boats - 14' to 20'	8					
		Response Boats - 21' to 36'	1					
		Portable Skimmers	3					
Miller Env. Services (800) 929-7227	Beaumont, TX	Containment Boom - 18"	14,000'	Cocodrie, LA	6.75	1	1	9
		Response Boats - 18'	2					
		Response Boats - 24'	2					
		Shallow Water Skimmers	1					
		Response Personnel	47					
SWS Environmental (877) 742-4215	Pensacola, FL	Containment Boom - 18"	2,500'	Cocodrie, LA	6.75	1	1	9
		Response Boats - 16' to 25'	2					
		Shallow Water Skimmers	1					
		Response Personnel	2					
OMI (800) 645-6671	Port Arthur, TX	Containment Boom - 18" to 24"	4000'	Cocodrie, LA	6.75	1	1	9
		Response Boats - 14' to 20'	6					
		Response Boats - 21' to 36'	2					
		Shallow Water Skimmers	1					
OMI (800) 645-6671	Houston, TX	Containment Boom - 18" to 24"	4000'	Cocodrie, LA	7.75	1	1	10
		Response Boats - 16'	3					
		Response Boats - 25' to 28'	1					
		Portable Skimmers	1					
Miller Env. Services (800) 929-7227	Houston, TX	Containment Boom - 18"	12,000'	Cocodrie, LA	7.75	1	1	10
		Shallow Water Skimmers	1					
		Response Boats - 28'	1					
		Responder Personnel	38					

**Garden Banks 956 - Exploratory  
Sample Shoreline Protection & Wildlife Support List**

Supplier & Phone	Warehouse	Equipment Listing	Quantity	Staging Area	Response Times (Hours)			
					Staging ETA	Loadout Time	Deployment Time	Total ETA
Clean Harbors (800) 645-8265	Houston, TX	Containment Boom - 18" to 24"	4,500'	Cocodrie, LA	7.75	1	1	10
		Response Boats - 14' to 20'	2					
		Response Boats - 21' to 36'	3					
		Portable Skimmers	1					
		Response Personnel	14					
ES&H Environmental (877) 437-2634	Houston, TX	Containment Boom - 10"	500'	Cocodrie, LA	7.75	1	1	10
		Containment Boom - 18"	13,000'					
		Containment Boom - 24"	5,000'					
		Jon Boat - 12' to 16'	2					
		Response Boats - 26' to 29'	2					
		Portable Skimmers	2					
		Wildlife Hazing Cannon	12					
SWS Environmental (877) 742-4215	Houston, TX	Containment Boom - 18"	20,000'	Cocodrie, LA	7.75	1	1	10
		Response Boats - 16' to 25'	1					
		Response Boats - 25' to 42'	2					
		Portable Skimmers	2					
		Response Personnel	19					
USES Environmental (888) 279-9930	Houston, TX	Containment Boom - 6"	500'	Cocodrie, LA	7.75	1	1	10
		Containment Boom - 20"	10,000'					
		Response Boats - 16'	4					
		Response Boats - 26'	1					
Wildlife Ctr. of Texas (713) 861-9453	Houston, TX	Wildlife Specialist - Personnel	6 to 20	Cocodrie, LA	7.75	1	1	10
Garner Environmental (800) 424-1716	Deer Park, TX	Containment Boom - 6"	18,900'	Cocodrie, LA	7.75	1	1	10
		Response Boats - 12'	2					
		Response Boats - 16' to 20'	5					
		Response Boats - 30'	2					
		Portable Skimmers	25					
		Shallow Water Skimmers	3					
Phoenix Pollution Control & Environmental Services (281) 838-3400	Baytown, TX	Containment Boom - 18"	13,000'	Cocodrie, LA	7.5	1	1	10
		Containment Boom - 10"	1,150'					
		Response Boats - 16'	6					
		Response Boats - 20'	3					
		Response Boats - 24'	1					
		Response Boats - 35'	2					
Garner Environmental (800) 424-1716	La Marque, TX	Containment Boom - 6"	9,500'	Cocodrie, LA	8.25	1	1	11
		Response Boats - 16'	5					
		Response Boats - 24'	1					
		Portable Skimmers	7					
USES Environmental (888) 279-9930	Memphis, TN	Containment Boom - 6"	850'	Cocodrie, LA	8.75	1	1	11
		Containment Boom - 12"	300'					
		Containment Boom - 18"	5,000'					
		Response Boats - 12'	3					
		Response Boats - 14'	5					
		Response Boats - 16'	2					
		Response Boats - 24'	1					
Response Boats - 28'	1							
SWS Environmental (877) 742-4215	Memphis, TN	Containment Boom - 6"	100'	Cocodrie, LA	8.75	1	1	11
		Containment Boom - 12"	800'					
		Containment Boom - 18"	800'					
		Response Boats - 25' to 42'	1					
		Shallow Water Skimmers	1					
		Response Personnel	9					

**Garden Banks 956 - Exploratory  
Sample Shoreline Protection & Wildlife Support List**

Supplier & Phone	Warehouse	Equipment Listing	Quantity	Staging Area	Response Times (Hours)			
					Staging ETA	Loadout Time	Deployment Time	Total ETA
SWS Environmental (877) 742-4215	Panama City, FL	Containment Boom - 18'	7,000'	Cocodrie, LA	8.75	1	1	11
		Response Boats - 16' to 25'	3					
		Response Boats - 25' to 42'	1					
		Portable Skimmers	6					
		Response Personnel	10					
Miller Env. Services (800) 929-7227	Corpus Christi, TX	Containment Boom - 10'	2,000'	Cocodrie, LA	11.25	1	1	14
		Containment Boom - 18'	30,000'					
		Jon Boats - 14' to 16' w/25hp motor	4					
		Jon Boats - 16' to 18' w/Outboard motor	4					
		Air Boat - 14'	1					
		Response Boats - 24' to 26'	4					
		Portable Skimmers	6					
		Shallow Water Skimmers	2					
		Response Personnel	142					
		SWS Environmental (877) 742-4215	Jacksonville, FL					
Response Boats - 16' to 25'	2							
Shallow Water Skimmers	1							
Response Personnel	8							
SWS Environmental (877) 742-4215	Tampa, FL	Containment Boom - 18'	2,000'	Cocodrie, LA	13	1	1	15
		Response Boats - 16' to 25'	2					
		Response Boats - 25' to 42'	1					
		Shallow Water Skimmers	1					
		Response Personnel	10					
SWS Environmental (877) 742-4215	Tampa, FL	Containment Boom - 18'	2,000'	Cocodrie, LA	13	1	1	15
		Response Boats - 16' to 25'	2					
		Response Boats - 25' to 42'	1					
		Portable Skimmers	1					
		Response Personnel	10					
SWS Environmental (877) 742-4215	St. Petersburg, FL	Containment Boom - 18'	10,800'	Cocodrie, LA	13.25	1	1	16
		Response Boats - 16' to 25'	1					
		Response Boats - 25' to 42'	1					
		Portable Skimmers	1					
		Response Personnel	8					
SWS Environmental (877) 742-4215	Savannah, GA	Containment Boom - 18'	1,400'	Cocodrie, LA	13.5	1	1	16
		Response Boats - 16' to 25'	3					
		Shallow Water Skimmers	1					
		Response Personnel	7					
SWS Environmental (877) 742-4215	Fort Lauderdale, FL	Containment Boom - 18'	1,000'	Cocodrie, LA	15.5	1	1	18
		Response Boats - 16' to 25'	2					
		Response Boats - 25' to 42'	1					
		Shallow Water Skimmers	1					
		Response Personnel	8					
Tri-State Bird Rescue & Research, Inc. (800) 261-0980	Newark, DE	Wildlife Specialist - Personnel	6 to 12	Cocodrie, LA	21	1	1	23

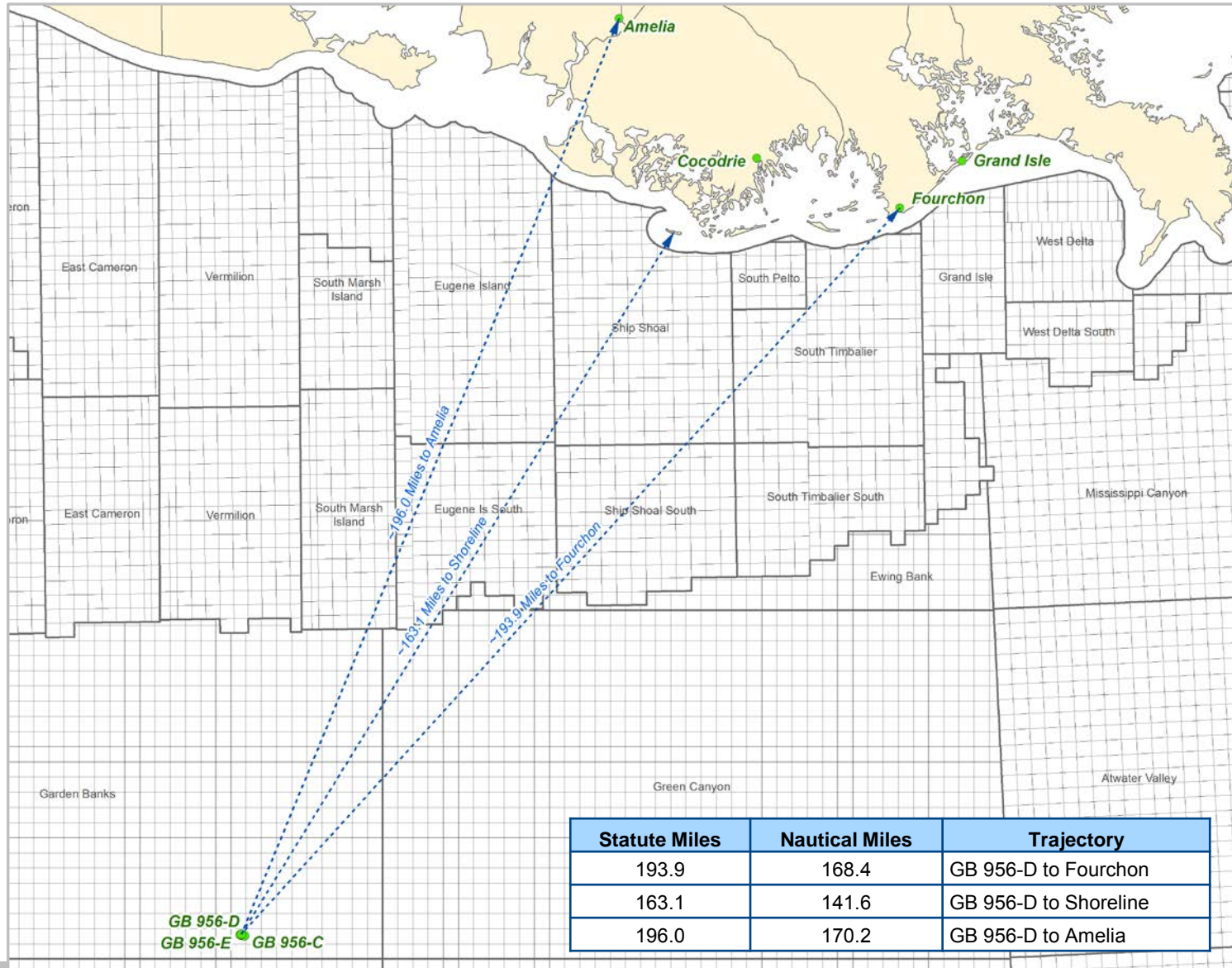
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**Appendix G: Wastes Transported to Shore and Vicinity Map**

**TABLE 2. WASTE AND SURPLUS ESTIMATED TO BE TRANSPORTED AND/OR DISPOSED OF ONSHORE**

Projected generated waste		Solid and Liquid Wastes transportation	Waste Disposal		
Type of Waste	Composition	Transport Method	Name/Location of Facility	Amount	Disposal Method
<b>Will drilling occur ? If yes, fill in the muds and cuttings.</b>					
Oil-based drilling fluid or mud	NA	NA	NA	NA	NA
Synthetic-based drilling fluid or mud	Spent synthetic-based drilling fluids	Cutting boxes on supply boat	R360 Environmental Solutions or Ecoserve; Fourchon, LA	500 bbl/well	Land farming or injection
Synthetic-based drilling fluid or mud	Used synthetic-based drilling fluids	Drums or tanks on supply boats	Baker Hughes; Fourchon, LA	30,000 bbl/well	Recycled
Cuttings wetted with water-based fluid	NA	NA	NA	NA	NA
Cuttings wetted with synthetic-based fluid	NA	NA	NA	NA	NA
Cuttings wetted with oil-based fluids	NA	NA	NA	NA	NA
<b>Will you produce hydrocarbons? If yes fill in for produced sand.</b>					
Produced sand	NA	NA	NA	NA	NA
<b>Will you have additional wastes that are not permitted for discharge? If yes, fill in the appropriate rows.</b>					
Trash and debris (non-recyclable)	Non-recyclable non-hazardous trash and debris	Storage bins on supply boat	Martin Terminal/Sweede; Fourchon, LA	10 cu ft/day	River Birch Landfill; Avondale, LA
Trash and debris (recyclable)	Recyclable non-hazardous trash and debris	Bags or storage bins on supply boat	Techoil; New Iberia, LA	25 lb/day	Recycled
Trash and debris (recyclable)	Batteries, glass, lamps and light tubes	Vendor supplied DOT storage bins on supply vessel then trucked to vendor facility	American Recovery; Houma, LA	2 bbl/month	Recycled
Used oil	Used oil, oil filters, rags, pads, empty drums, cooking oil	Vendor supplied DOT storage bins on supply vessel then trucked to vendor facility	American Recovery; Houma, LA	107 bbl/month	Recycled
Tank wash water*	NA	NA	NA	NA	NA
Chemical product wastes	Paint solvents, unused	Vendor supplied DOT storage bins on supply vessel then trucked to vendor chemicals, etc. facility	American Recovery; Houma, LA	1 bbl/day	Hazardous waste disposal procedures followed
*Disposed of offshore as Small Volume Discharge					

# Baffin Bay Vicinity Map



Statute Miles	Nautical Miles	Trajectory
193.9	168.4	GB 956-D to Fourchon
163.1	141.6	GB 956-D to Shoreline
196.0	170.2	GB 956-D to Amelia

---

**Appendix H: Coastal Zone Management Certification**

**COASTAL ZONE MANAGEMENT**

**CONSISTENCY CERTIFICATION**

**INITIAL EXPLORATION PLAN**

**GARDEN BANKS BLOCK 956**

**OCS-G 32458**

The proposed activity complies with the enforceable policies of the Louisiana approved management program and will be conducted in a manner consistent with such program.

Cobalt International Energy, Inc.

A large, stylized handwritten signature in black ink, appearing to read "James H. Painter". The signature is written over a horizontal line.

James H. Painter

Certifying Official

11/03/2016

Date

---

**Appendix I: Environmental Impact Analysis**

# **ENVIRONMENTAL IMPACT ANALYSIS EXPLORATION PLAN**

**Baffin Bay Prospect  
Surface Location in Garden Banks Block 956**

**Cobalt International Energy, L.P.**



**November 2016**

**Prepared by:**



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**CK Associates' Project 14325**

**LIST OF ACRONYMS**

AQR	Air Quality Report
bbbl	barrel
BOEM	Bureau of Ocean Energy Management
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BOP	Blowout Preventer
BSEE	Bureau of Safety and Environmental Enforcement
C	Celsius
CBD	Center of Biological Diversity
CFR	Code of Federal Regulations
CGA	Clean Gulf Associates
CIAP	Coastal Impact Assistance Program
CO	carbon monoxide
Cobalt	Cobalt International Energy, L.P.
CPA	Central Planning Area
CWIS	Cooling Water Intake Structure
CWPPRA	Coastal Wetlands Protection, Planning & Restoration Act
DD	Development Driller
DOCD	Development Operations Coordination Document
DP	Dynamically Positioned
DPS	Distinct Population Segment
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIA	Environmental Impact Analysis
EIS	Environmental Impact Statement
EP	Exploration Plan
ESA	Endangered Species Act
FAA	Federal Aviation Administration

**LIST OF ACRONYMS**

FGBNMS	Flower Garden Banks National Marine Sanctuary
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
ft	feet
GMFMC	Gulf of Mexico Fishery Management Council
GOM	Gulf of Mexico
H <sub>2</sub> S	Hydrogen Sulfide
HAPC	Habitat Area of Particular Concern
IPF	impact-producing factor
km	kilometer
l	liter
LCRP	Louisiana Coastal Resources Program
LP	Launch Point
m	meter
MARPOL	International Convention for the Prevention of Pollution from Ships
µg	micrograms
mm	millimeter
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MPRSA	Marine Protection, Research, and Sanctuaries Act
MSRC	Marine Spill Response Corporation
MWCC	Marine Well Containment Company
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NERR	National Estuarine Research Reserve
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration

**LIST OF ACRONYMS**

NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Corporation
NTL	Notice to Lessees
NWR	National Wildlife Refuge
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OSRA	Oil Spill Risk Analysis
OSRO	Oil Spill Response Organization
OSRP	Oil Spill Response Plan
PAH	polycyclic aromatic hydrocarbon
PEA	Programmatic Environmental Assessment
PEIS	Programmatic Environmental Impact Statement
PM	particulate matter
ppe	personal protective equipment
ppm	parts per million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
SONS	Spill of National Significance
SOx	sulfur oxides
SRT	Status Review Team
USDOC	U.S. Department of Commerce
USDOI	U.S. Department of the Interior
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	Volatile Organic Compound
WCD	Worst Case Discharge
WPA	Western Planning Area

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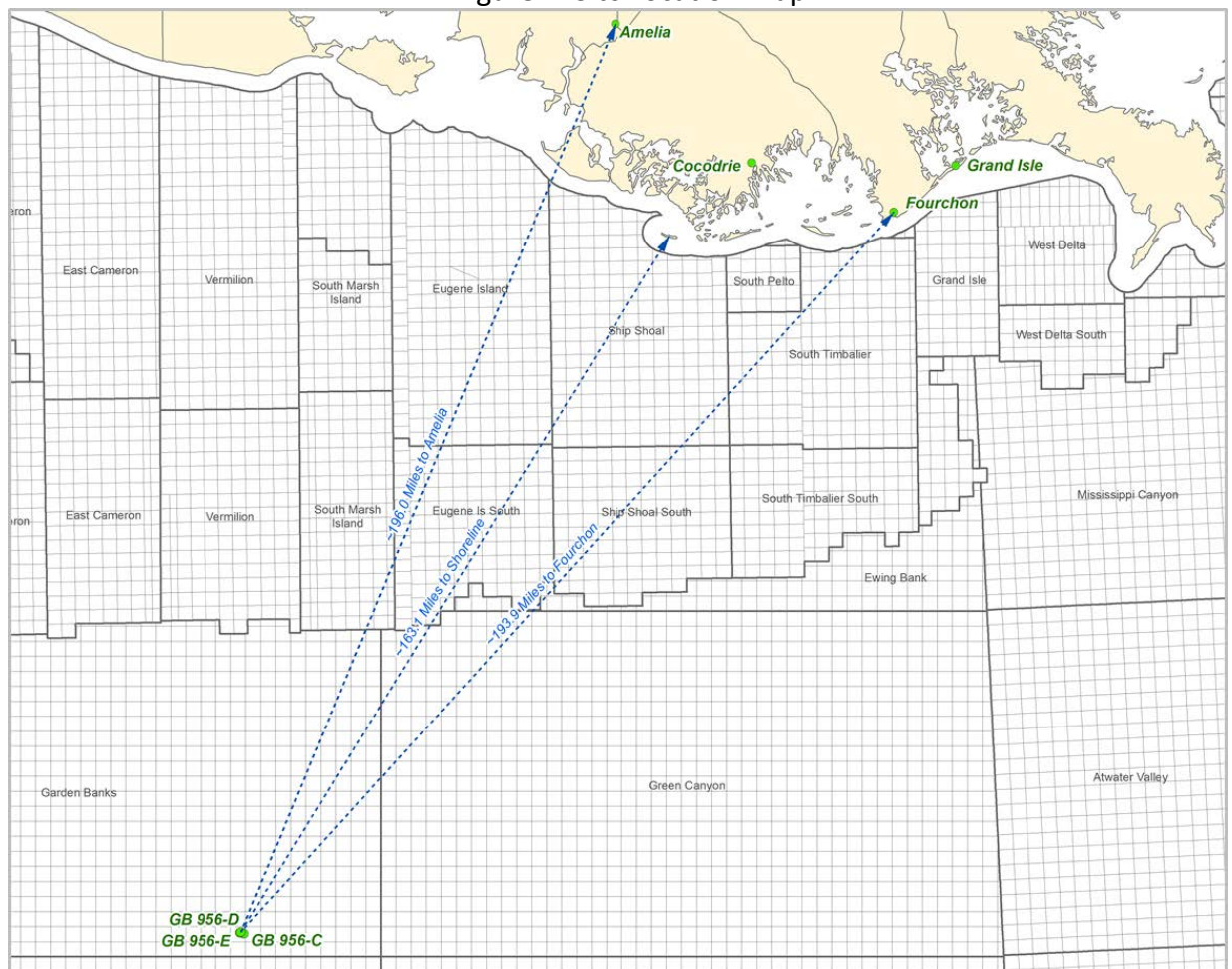
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- 2 Seafloor Biological Communities
- 3 Coastal Wildlife Refuges and Cities

## 1.0 INTRODUCTION

### 1.1 Project Background

This Environmental Impact Analysis (EIA) was prepared to analyze any potential impacts from the proposed activities described in the Exploration Plan (EP) for Garden Banks (GB) 956 “Baffin Bay” Prospect Area. This project involves the drilling of six well locations in Garden Banks Block 956 called C, D, and E and their respective mirror sites C1, D1, and E1 to serve as re-spud locations only. The project area is approximately 163 miles (mi) (262 kilometers (km)) east of the nearest Louisiana coastline (Figure 1).

Figure 1. Site Location Map



Water depths range from 4,246 feet below Mean Sea Level (MSL) to 5,658 feet below MSL surrounding the three (3) proposed well sites. The seafloor slightly slopes to the southwest at proposed Well GB 956-C & C' and to the southeast at proposed Wells GB 956-D & D' and GB 956-E & E' (Berger Geosciences, LLC, 2016).

Cobalt International Energy, L.P. (Cobalt) proposes to drill three bottom hole locations in the Baffin Bay Prospect Area. Section 1 of the EP provides a description of the proposed activities. The exploratory wells will be drilled with a dynamically positioned (DP) drillship. The DP drillship will use a global positioning system (GPS), specific computer software, and sensors in conjunction with a series of thrusters to maintain position. The drillship will not require any anchors or mooring during the proposed operations.

Support vessels will consist of aircraft/helicopter making one trip daily and offshore supply vessels generally one to five times per week. A fuel supply vessel will be required one to two times per month to supply the drilling unit. Cobalt anticipates that it will take about 140 days to drill and complete each of the proposed wells with an estimated spud date of October 15, 2017.

The primary onshore facility used to provide supply and service support is the existing Martin Terminal North Yard in Port Fourchon, Louisiana. The Martin Terminal North Yard is located approximately 194 mi (312 km) (Figure 1) from the project area and will be used to support general vessel operations. The Martin Terminal North Yard provides a vehicle parking lot, office space, radio communication equipment, outside and warehouse storage space, crane, forklifts, water and fueling facilities, and boat dock space. The base is in operation 24 hours each day. Petroleum Helicopters, Inc. will provide service support from Amelia, Louisiana.

No new employees are expected to move permanently into the area. The proposed wells will have a negligible impact on socioeconomic conditions such as local employment, existing offshore and coastal infrastructure (including major sources of supplies, services, energy, and water), and minority and lower income groups. Levels of boat and helicopter traffic, as well as demand for goods and services including scarce coastal resources, will represent a small fraction of the level of activity occurring at the shore base. The response to a release would be staged primarily out of existing facilities; however, there could be limited temporary impacts on land use along the coast if additional staging areas were needed. These areas would return to their original use as the response is demobilized.

## **1.2 Regulatory Context**

### **Key Environmental Legislation**

Environmental legislation applicable to the Cobalt project is listed in Table 1 below.

**Table 1 Key Environmental Legislation**

Clean Air Act (CAA)	Marine Protection, Research, and Sanctuaries Act (MPRSA)
Clean Water Act (CWA)	Migratory Bird Treaty Act (MTBA)
Coastal Wetlands Protection, Planning and Restoration Act (CWPPRA)	National Environmental Policy Act (NEPA)
Coastal Impact Assistance Program (CIAP)	National Estuarine Research Reserves (NERR)
Endangered Species Act (ESA)	National Pollutant Discharge Elimination System (NPDES)
Flower Garden Banks National Marine Sanctuary (FGBNMS)	Outer Continental Shelf Lands Act (OCSLA)
Louisiana Coastal Resources Program (LCRP)	Resource Conservation and Recovery Act (RCRA)
Magnuson-Stevens Fishery Conservation and Management Act	U.S. Coast Guard Regulations

**Notice to Lessees and Operators**

Notice to Lessees and Operators (NTLs) were issued or reissued by the Minerals Management Service (MMS) prior to June 2010. Beginning in June 2010 until September 2011, NTLs were issued or reissued by Bureau of Ocean Energy, Management, Regulation, and Enforcement (BOEMRE). Currently NTLs are issued or reissued jointly by Bureau of Ocean Energy Management (BOEM) and Bureau of Safety and Environmental Enforcement (BSEE) or individually by BOEM or BSEE. Existing NTLs issued by MMS, BOEMRE, BOEM, BSEE or jointly between BOEM and BSEE, as well as any future issued or reissued NTLs are regulated by BOEM and BSEE. This EIA addresses relevant NTLs listed in Table 2 below.

**Table 2  
Applicable Notice to Lessees and Operators**

<b>BOEM NTL 2015-N02</b>	<b>Elimination of Expiration Dates on Certain Notice to Lessees and Operators Pending Review and Reissuance</b>
Eliminates all expiration dates from NTLs currently posted on the BOEM website.	
<b>BOEM NTL 2016-G01</b>	<b>Vessel Strike Avoidance and Injured/Dead Protected Species Reporting</b>
Provides guidelines to identify and avoid injury to marine mammals and sea turtles. Additionally provides guidance on how to report injured or dead species.	

**Table 2 (Continued)**  
**Applicable Notice to Lessees and Operators**

<b>BSEE NTL 2015 GO3</b>	<b>Marine Trash and Debris Awareness and Elimination</b>
Provides guidance for the management of marine trash and debris. Requires marine trash and debris placards to be posted, the implementation of marine trash and awareness training, and certification process.	
<b>NTL 2011-JOINT-G01</b>	<b>Revisions to the List of OCS Lease Blocks Requiring Archaeological Resource Surveys and Reports</b>
Provides additions to the list of OCS blocks that require archaeological surveys and reports, and the required survey line spacing for each block.	
<b>BSEE NTL 2010-N10</b>	<b>Statement of Compliance with Applicable Regulations and Evaluation of Information Demonstrating Adequate Spill Response and Well Containment Resources</b>
Directs operators using subsea or surface blowout preventers (BOPs) on a floating facility to submit a statement, signed by an authorized company official, that authorized activities by the operator will be in compliance with applicable regulations, including the Safety Measures regulations. Informs operators there will be an evaluation whether adequate information has been submitted to demonstrate the ability to access and can deploy containment resources that would be adequate to promptly respond to a blowout or other loss of well control.	
<b>BOEM NTL 2015-N01</b>	<b>Information Requirements for Exploration Plans, Development and Production Plans, and Development Operations Coordination Documents on the OCS</b>
Supersedes the limitations set forth in NTL 2010-N06 regarding a blowout scenario and worst case discharge (WCD) scenario. Provides guidance regarding the information required to be submitted with plans.	
<b>NTL 2009-G40</b>	<b>Deepwater Benthic Communities</b>
Provide guidance to protect high-density deepwater benthic communities from damage by OCS oil and gas activities. Includes all high-density deepwater communities (not just high-density chemosynthetic communities) in deepwater greater than 984 ft (300 meters (m)).	

**Table 2 (Continued)**  
**Applicable Notice to Lessees and Operators**

<b>NTL 2009–G39</b>	<b>Biologically-Sensitive Underwater Features and Areas</b>
Provide guidance to protect biologically-sensitive underwater features and areas (i.e., topographic features, pinnacles, live bottom/low relief features, and other potentially sensitive biological features) in water less than 984 ft (300 m).	
<b>BOEM NTL 2014–G04</b>	<b>Military Warning and Water Test Areas</b>
Provide links to the addresses and telephone numbers of the individual command headquarters for the military warning and water test areas in the Gulf of Mexico (GOM). Lessee or designator operators are stipulated to enter into an agreement with the appropriate military command headquarters in the applicable warning or water test area concerning electromagnetic emissions, and use of boat and aircraft before commencing traffic.	
<b>NTL 2008-G05</b>	<b>Shallow Hazards Program</b>
Provides guidance on data collection, reports, analyses, and mitigation to comply with the Minerals Management Service (MMS) shallow hazards program.	
<b>NTL 2008-G04</b>	<b>Information requirements for Exploration Plans and Development Operations Coordination Documents</b>
Provides guidance on information requirements for OCS plans. Includes guidance on compliance with the Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA); replacing high resolution survey lines with 3-Dimensional (3-D) survey data; and information for shallow hazards analyses. Contains the requirements used to prepare a project specific EIA.	
<b>NTL 2005-G07</b>	<b>Archaeological Resource Surveys and Reports</b>
Provides guidance for archaeological discoveries, clarifies when to report discoveries, responsibility for conducting discovery investigations and assessments, penalties for non-compliance and changes to survey requirements.	

**National Environmental Policy Act**

To comply with the OCSLA and NEPA, Environmental Impact Statements (EIS) have been prepared related to OCS leasing programs. In 2007, the Final EIS was published for Central Planning Area (CPA) lease sales 205, 206, 208, 213, 216, and 222, and Western Planning Area (WPA) lease sales 204, 207, 210, 215, and 218 (MMS, 2007). This EIS describes affected resources and assessed potential impacts and cumulative effects from, oil and gas activities for oil and gas lease sales from 2007 to 2012.

Three supplemental EISs were published for certain lease sales in the CPA and WPA after the 2007 final EIS was published. These supplemental EISs summarize and incorporate by reference the 2007 EIS, address potential changes in baseline conditions, incorporate new issues, coordination and consultations. In 2008 the Final Supplemental EIS was published for CPA lease sales 208, 213, 216, and 222, and WPA lease sales 210, 215, and 218 (MMS, 2008a). In 2011 a Supplemental EIS was prepared for WPA lease sale 218 (BOEMRE, 2011). In 2012 the Final Supplemental EIS was published for CPA lease sale 216 and 222 (BOEM, 2012a).

In 2012, new lease sale areas became available in the CPA and WPA. A final EIS was published in 2012 for WPA lease sales 229, 233, 238, 246, and 248 and CPA lease sales 227, 231, 235, 241, and 247 (BOEM, 2012b). This EIS describes affected resources and assessed potential impacts and cumulative effects from, oil and gas activities for oil and gas lease sales from 2012 to 2017.

A supplemental EIS was published in April 2013 for WPA Lease Sale 233 and CPA 231 (BOEM, 2013). Supplemental EIS's were published in September 2014 for CPA Lease Sales 235, 241, and 247 and September 2015 for CPA Lease Sales 241 and 247 and EPA Lease Sale 226 (BOEM, 2014; BOEM, 2015). These supplemental EISs summarize and incorporate by reference the 2012 multi-lease sale EIS, address potential changes in baseline conditions, incorporate new issues, coordination and consultations. Information from these EIS's and supplemental EIS's are used and incorporated by reference.

### **Requirement of an EIA**

An EIA is required to be submitted with a EP as specified in 30 Code of Federal Regulations (CFR) 550.212. The contents of the EIA are discussed in 30 CFR 550.227 and NTL 2008-G04.

## **2.0 IMPACT PRODUCING FACTORS**

Impact Producing Factors (IPFs) identified in NTL 2008-G04, CFR 550.227, and recent NEPA documents are considered. The IPFs are addressed in detail in the impact analysis for the affected resources in Section 3 of this EIA.

### **2.1 Routine Operations**

Several IPFs may be considered routine for the project such as air emissions, operational effluents, noise, lights, cooling water intakes, marine trash and debris, vessel traffic, seafloor disturbances, and waste (MMS, 2007; BOEM, 2012a, 2012b, 2013). The following are a description of each routine IPF:

### **Air emissions from drilling operations, helicopters and service vessels**

Common emissions emitted are particulate matter (PM), Sulfur Oxides (SO<sub>x</sub>), Nitrogen Oxides (NO<sub>x</sub>), Volatile Organic Compounds (VOC), and Carbon Monoxide (CO). Diesel powered generators, pumps, or motors and from lighter fuels located on the drillship, support vessels, and helicopters emit the majority of the emissions.

### **Operational effluents (Drilling fluids and cuttings, uncontaminated ballast water, treated sanitary wastes, deck drainage, etc.)**

Typical operational discharges associated with drillships and support vessels include drilling fluids and cuttings, uncontaminated ballast water, uncontaminated seawater, deck drainage, sanitary waste water, domestic wastes and other miscellaneous discharges (subsea wellhead preservation fluids, subsea production control fluids and hydrate control fluids).

### **Noise and lights (Drillship, helicopter and support vessel presence)**

The drillship and support vessels are floating structures in the deepwater environment. Sounds produced by the drilling operations can originate from generators and pumps as well as bangs and clangs from operations. Sound from support vessels will generally be propeller operation.

### **Cooling water intakes**

Cooling Water Intakes Structures (CWIS) for the drillship and support vessels are regulated by Section 316(b) of the Clean Water Act (CWA) if built after July 17, 2006. If the drillship or vessels to be utilized were built before 2006, then it would not be subject to the CWIS design requirements of the 316(b) regulation. If the drillship or vessel to be utilized was built after 2006, then each CWIS is expected to have been designed with sufficient open area to ensure that through-screen velocities remain at or below the required 0.5 ft/second. This is a requirement for CWIS structures with a design intake capacity of at least two (2) million gallons of seawater per day with at least 25% being used for cooling purposes.

### **Marine trash and debris**

The majority of the waste generated will be associated with offshore food service operations, as well as installation and maintenance activities. Typical wastes generated include municipal trash (paper, plastic, wood, food wrappings, etc.), scrap metal, and chemicals.

### **Waste sent to shore for treatment and disposal**

Operational waste is collected and stored until it is shipped to appropriate on-shore landfill or disposal-company.

An accidental release of oil could generate large quantities of additional waste materials and debris. This could include: tar balls, oiled vegetation and sand, spent personal protective equipment (PPE), oil and oily water, and oiled sorbent materials (e.g. rags, boom and absorbent pads).

### **Helicopter and service vessel traffic**

Support vessels will consist of aircraft/helicopter making 4 trips weekly and offshore supply boats and crew boats generally daily to every two days. Existing ports, production facilities, and navigation channels will be used.

### **Physical seafloor disturbance**

The existing production platform is attached by 4 piles at the bottom. Support vessels are dynamically positioned, so there are no associated anchors, anchor chain or wire ropes. A small area limited to around the wellbore where the bottom template and BOP are located would be disturbed.

## **2.2 Accidental Events**

Accidental events are unplanned, unforeseeable events that have a low probability of occurrence. Several IPFs can occur from an accidental event such as a vessel collision with marine mammals and sea turtles; vessel and helicopter collisions with coastal and marine birds; and accidental releases such as oil spill and/or blowout, chemical spill, hydrogen sulfide (H<sub>2</sub>S) release, etc.

### **Vessel and Helicopter Collisions**

Collisions between OCS vessels and environmental resources associated with the project are expected to be unusual events. Compliance with BOEM NTL 2016-G01 is expected to reduce the likelihood of collisions.

### **Accidental Releases**

An accidental release can occur from a storage tank accident, release from a fuel transfer operation accident, a leak from damage to the fuel tanks on the support vessel, and a blowout. Most small spills (<1,000 barrels (bbl)) as a result of OCS activities involve fuel spills such as fuel oil or diesel (BOEM, 2012b, 2013, 2014b, 2015). Most OCS petroleum spills are <1 bbl, with an average size of 0.05 bbl.

Median size spills range from 1 – 10 bbl and averaged 3 bbl. Only 0.05 percent of spills averaged  $\geq 1,000$  bbl (BOEM, 2012b, 2013, 2014b, 2015). Spills averaging  $\geq 1,000$  bbl could be the result of a blowout.

Historically, blowouts are rare events and most do not result in oil spills. The probability for a deep drilling blowout during exploration drilling based on U.S. Gulf of Mexico data is estimated at 0.0021 (Holand, 1997). From 1992 to 2005, half of blowouts lasted less than half a day, and fewer than 10% of blowouts resulted in spilled oil (MMS, 2007). BOEM is in the process of updating these spill frequency estimates to include the Macondo event; however, significant changes to the spill rates for the entire OCS are not anticipated (BOEMRE, 2011; BOEM, 2012c). The Interim Final Drilling Safety Rule states the baseline risk of a catastrophic blowout is estimated to be once every 26 years (<http://www.gpo.gov/fdsys/pkg/FR-2010-10-14/pdf/2010-25256.pdf>).

Cobalt has estimated the WCD for GB 956-C, the well with the greatest potential for impact, according to NTL 2015-NO1. The WCD scenario and calculations, as well as measures to prevent a blowout, reduce the likelihood of a blowout, and conduct effective and early intervention in the event of a blowout are provided in the EP (Section 2). Cobalt will comply with the safety measures specified in NTL 2010-N10 and the Interim Final Drilling Safety Rule (<http://www.gpo.gov/fdsys/pkg/FR-2010-10-14/pdf/2010-25256.pdf>). Based on these factors, it is reasonable to conclude that the likelihood of an accidental spill to occur has been reduced (BOEM, 2012b, 2013). Additionally, the regulations (30 CFR 254) require the submittal of an Oil-Spill Response Plan (OSRP) that outlines the availability of spill containment and cleanup equipment as well as trained response personnel, to the extent practicable, to a WCD or a substantial threat of such a discharge.

The regulations (30 CFR 254) require the submittal of an Oil-Spill Response Plan (OSRP) that outlines the availability of spill containment and cleanup equipment as well as trained response personnel, to the extent practicable, to a WCD or a substantial threat of such a discharge. The WCD in Cobalt's Regional Oil Spill Response Plan (OSRP) is 331,849 bopd for an exploratory activity. The WCD calculations for the activities described in this EP are 70,745 bopd. Therefore, Cobalt has determined that the worst-case scenario from the activities proposed in this EP does not exceed the worst-case scenario from the approved Regional OSRP. There is no need for additional response equipment beyond the equipment identified in the approved OSRP WCD planning scenario in accordance with 30 CFR 254.26(d)(I).

### 2.2.1 Oil Spill Risk Analysis

The occurrence of an oil spill (or spills) is a matter of probability and its impact is determined by variables such as the amount of oil, winds and currents that transport spills (Ji et al., 2004). The occurrence of a spill cannot be predicted; however, an estimate of an oil spill contacting environmental resources can be calculated.

Oil spill trajectory simulations from an Oil Spill Risk Analysis (OSRA) model were used to estimate conditional probabilities of a spill contacting segments of shoreline represented by counties or parishes (Ji et al., 2004). The OSRA model initiated hypothetical oil spills uniformly in space and time and simulated the likely trajectory of a surface slick, from 75 hypothetical locations in the CPA and WPA (Ji et al., 2004, Figure 1). The trajectory simulates the hypothetical spill's movement on the surface of water by using modeled ocean current and wind fields. It does not consider spill response activities (i.e., clean up), dispersion, chemical composition, or weathering processes that could alter the quantity or properties of oil (Ji et al., 2004; Ji et al., 2011). The OSRA model tabulated the number of contacts that each trajectory simulation made as it moved across or touched (contacts) segments of shoreline. Each trajectory was allowed to continue for as long as 30 days and contacts within 3, 10 and 30 days were compiled. If the hypothetical spill contacted shoreline sooner than 30 days, the spill trajectory was terminated, and the contact was recorded (Ji et al., 2004). When the model predictions were compared to the oil slick resulting from the Deepwater Horizon oil spill, trajectories of the model, while slightly larger than the actual slick area, were similar in shape and distribution (Ji et al., 2011). The location of a launch area(s) where a lease or facility is located can be found at <http://www.boem.gov/OSRAM/>:  
[http://www.boem.gov/uploadedFiles/BOEM/Environmental Stewardship/Environmental Assessment/Oil Spill Modeling/2004-026.pdf](http://www.boem.gov/uploadedFiles/BOEM/Environmental_Stewardship/Environmental_Assessment/Oil_Spill_Modeling/2004-026.pdf).

The surface location and proposed wellbore locations within Garden Banks Block 956 are located in the Launch Area 23. The conditional probabilities of contact are summarized in Table 3. The model predicts no shoreline contact within 3 and 10 days of a spill to Texas and Louisiana shorelines. A spill during the spring is predicted to have the highest chance of making landfall (Cameron Parish, LA). After 30 days, there is a greater than 0.5 percent chance that oil will make contact with land in as few as 3 (autumn spill) or up to 14 (spring spill) counties or parishes across Texas and Louisiana. Locations considered in the model with all values less than 0.5 percent are not shown in Table 3.

**Table 3**  
**Summary of conditional probabilities that a hypothetical oil spill starting in Launch Area 23 will contact a segment of shoreline (county or parish) within 3/10/30 days for all seasons and on a seasonal basis**

County/Parish	All Seasons	Winter	Spring	Summer	Autumn
Cameron, TX	- / - / 1	- / - / -	- / - / -	- / - / 1	- / - / 1
Kenedy, TX	- / - / 1	- / - / 1	- / - / -	- / - / 1	- / - / 1
Kleberg, TX	- / - / 1	- / - / 2	- / - / 1	- / - / -	- / - / -
Nueces, TX	- / - / 1	- / - / 1	- / - / -	- / - / -	- / - / -
Aransas, TX	- / - / 1	- / - / 2	- / - / 1	- / - / -	- / - / -
Calhoun, TX	- / - / 1	- / - / 2	- / - / 1	- / - / -	- / - / 1
Matagorda, TX	- / - / 3	- / - / 5	- / - / 6	- / - / 2	- / - / -
Brazoria, TX	- / - / 2	- / - / 2	- / - / 5	- / - / 2	- / - / -
Galveston, TX	- / - / 3	- / - / 1	- / - / 9	- / - / 3	- / - / -
Jefferson, TX	- / - / 2	- / - / -	- / - / 7	- / - / 3	- / - / -
Cameron, LA	- / - / 6	- / - / -	- / - / 20	- / - / 3	- / - / -
Vermilion, LA	- / - / 2	- / - / -	- / - / 6	- / - / 2	- / - / -
Iberia, LA	- / - / 1	- / - / -	- / - / 3	- / - / 1	- / - / -
Terrebonne, LA	- / - / 1	- / - / -	- / - / 3	- / - / 2	- / - / -
LaFourche, LA	- / - / -	- / - / -	- / - / 1	- / - / -	- / - / -
Jefferson, LA	- / - / -	- / - / -	- / - / 1	- / - / -	- / - / -
Plaquemines, LA	- / - / 1	- / - / -	- / - / 2	- / - / 1	- / - / -

Note: "-" = less than 0.5 percent. Locations with all shoreline contact values less than 0.5 percent are not shown.

### 2.2.2 Catastrophic Oil Spill Risk Analysis

BOEM describes a catastrophic spill event as a high-volume, long duration oil spill event, regardless of the cause, whether natural disaster (i.e., hurricane) or manmade (i.e., human error and terrorism) (BOEM, 2012b, 2013, 2014b, 2015). A Spill of National Significance (SONS) is defined as a spill that because of the severity, size, location, actual or potential impact on the public health and welfare or the environment, or the necessary response effort is so complex that it requires extraordinary coordination of federal, state, local, and responsible party resources to contain and cleanup the discharge (40 CFR 300). Furthermore, a WCD for an offshore facility is the largest foreseeable discharge in adverse weather conditions (Section 311(a) (24) of the CWA).

A catastrophic spill event analysis and an OSRA Catastrophic Spill Run were completed to estimate the impacts of a potential catastrophic (high volume, long duration) oil spill (BOEM, 2012b, 2013, 2014b, 2015). Releases were simulated for

five hypothetical launch points (three launch points in the CPA and two launch points in the WPA). The proposed activity in Garden Banks Block 956 is nearest to Launch Point (LP) 3. The modeling for a high volume, long duration oil spill supplements the previous OSRA spill projections (Ji et al., 2004).

Time of year, location relative to winds, currents, land, sensitive resources, specifics of the well (i.e., flow rates, hydrocarbon characteristics, and infrastructure damage), and response (i.e., speed and effectiveness) were factored into the analysis. Conditional probabilities of contact with environmental resources within 60 days of travel time were calculated for each of the hypothetical spill sites. The probability estimates were tabulated for the 60-day trajectories, as averages for the 14 years of the analysis from 1993 to 2006.

The conditional probabilities of land/oil contact on a seasonal basis are summarized in Table 4. As time passes there is a higher probability these impacts may extend to near shore and coastal resources. Understandably the model concluded that near shore and coastal resources closer to the spill site have the greatest likelihood of impact. The chance for shoreline impacts increases as time increases due to interactions between the oil and ocean and wind currents (BOEM, 2012b, 2013, 2014b, 2015). Differences between Tables 3 and 4 may be due to the differences in number and precise locations of the hypothetical releases and the duration of the model runs.

The catastrophic event model predicts no shoreline contact within 3 days of a spill. After 10, 30, and 120 days, in all seasons except fall, there is a greater than 0.5 percent chance that counties or parishes may be contacted. Land segments closest to the spill sites had the greatest likelihood of contact. Louisiana and Texas have the greatest chance of a spill contacting the shoreline if a spill was to occur.

**Table 4**  
**Summary of conditional probabilities that a hypothetical catastrophic oil spill starting at Launch Point 3 will contact a county/parish within 3/10/30/120 days.**

	Spring	Summer	Fall	Winter
Cameron, TX	-/-/-	-/-/2	-/-/2	-/-/2
Willacy, TX	-/-/-	-/-/2	-/-/3	-/-/3
Kenedy, TX	-/-/1	-/-/9	-/-/5	-/-/8
Kleberg, TX	-/-/-	-/-/4	-/-/1/6	-/-/1/6
Nueces, TX	-/-/-	-/-/2	-/-/1/2	-/-/1/6
Aransas, TX	-/-/1	-/-/3	-/-/2	-/-/5
Calhoun, TX	-/-/-	-/-/6	-/-/1/4	-/-/1/6
Matagorda, TX	-/-/3/4	-/-/11	-/-/1/6	-/-/2/17
Brazoria, TX	-/-/1/3	-/-/2/8	-/-/1/4	-/-/3/12
Galveston, TX	-/-/3/6	-/-/2/5	-/-/1/4	-/-/3/10
Jefferson, TX	-/-/7/9	-/-/1/1	-/-/2	-/-/1/4
Cameron, LA	-/-/11/12	-/1/1/4	-/-/4	-/-/1/4
Vermilion, LA	-/-/5/6	-/1/1/2	-/-/-	-/-/1/2
Iberia, LA	-/-/4/4	-/-/-	-/-/-	-/-/1
Terrebonne, LA	-/4/12/14	-/-/2	-/-/-	-/1/2/3
Lafourche, LA	-/2/8/10	-/-/1/2	-/-/-	-/-/1/1
Jefferson, LA	-/-/2/2	-/-/1/1	-/-/-	-/-/1
Plaquemines, LA	-/2/10/12	-/-/1/2	-/-/-	-/-/1
Jackson, MS	-/-/1/1	-/-/-	-/-/-	-/-/-
Baldwin, AL	-/-/1/1	-/-/-	-/-/-	-/-/-
Monroe, FL	-/-/-	-/-/1	-/-/1	-/-/-
Bay, FL	-/-/1	-/-/-	-/-/-	-/-/-
Franklin, FL	-/-/-	-/-/-	-/-/-	-/-/1
Dade, FL	-/-/-	-/-/1	-/-/-	-/-/-
Tamaulipas, Mexico	-/-/1	-/-/10	-/-/10	-/-/4
Veracruz-Llave, Mexico	-/-/-	-/-/1/7	-/-/1	-/-/-
Tabasco, Mexico	-/-/-	-/-/1	-/-/-	-/-/-

Note: “-” = less than 0.5 percent. Locations with all shoreline contact values less than 0.5 percent are not shown.

Table 5 is the EIA worksheet modeled after Form BOEM-0142 ([www.boem.gov/about-boem/procurement-business-opportunities/boem-ocs-operation-forms/BOEM-0142.aspx](http://www.boem.gov/about-boem/procurement-business-opportunities/boem-ocs-operation-forms/BOEM-0142.aspx)). This worksheet defines Impact Producing Factors (IPFs) that could affect various environmental resources. The footnotes provide additional information regarding the applicability to this specific project.

**TABLE 5  
ENVIRONMENTAL IMPACT ANALYSIS WORKSHEET**

The IPF's that have the potential to cause impacts to the listed environmental resources are identified by an "X". The IPF's that have no or negligible impacts to the listed environmental resources are identified by a "-". References to applicable footnotes are identified by "( )".

Environmental Resources	Impact Producing Factors (IPFs)								
	Air Emissions	Operational Effluents	Noise and Lights	Cooling Water Intake	Marine Trash and Debris	Helicopter and Service Vessel traffic	Physical disturbance to seafloor	Wastes sent to shore for treatment or disposal	Accidents (e.g., releases, vessel and helicopter collisions)
<b>Air and water quality</b>									
Air quality	X; -(9)	-	-	-	-	-	-	-	X(6)
Water quality	-	X	-	-	-	-	-	-	X(6)
<b>Seafloor biological communities</b>									
Soft bottom communities	-	X	-	-	-	-	X	-	X(6)
Designated topographic features	-	-(1)	-	-	-	-	-(1)	-	X(6)
Pinnacle Trend area live bottoms	-	-(2)	-	-	-	-	-(2)	-	X(6)
Live bottoms/low relief	-	-(3)	-	-	-	-	-(3)	-	X(6)
High-density benthic communities	-	-(4)	-	-	-	-	-(4)	-	X(6)
<b>Fisheries and essential fish habitat</b>									
Fisheries	-	X	X	X	-	-	-	-	X(6)
Essential fish habitat	-	X	X	-	-	-	-	-	X(6)
<b>Coastal and marine birds</b>									
Shorebirds and coastal nesting birds	-	-	-	-	X	X	-	-	X(6)
Marine and pelagic birds	-	X	X	-	X	X	-	-	X(6)
<b>Coastal Resources</b>									
Beaches	-	-	-	-	X	X	-	-	X(6)
Wetlands/Sea grass	-	-	-	-	X	X	-	-	X(6)
Coastal wildlife refuges and wild. areas	-	-	-	-	X	X	-	-	X(6)
<b>Threatened, endangered, and protected species</b>									
Marine mammals	-	X	X(8)	-	X	X	-	-	X(6,8)
Sea turtles	-	X	X(8)	-	X	X	-	-	X(6,8)
Fish	-	-	-	-	-	-	-	-	X(6)
Coastal and marine birds	-	-	-	-	X	X	-	-	X(6)
Beach mice	-	-	-	-	X	X	-	-	X(6)
<b>Archaeological resources</b>									
Shipwreck sites (known or potential)	-	-	-	-	-	-	X	-	X(6)
Prehistoric archaeological sites	-	-	-	-	-	-	-(7)	-	X(6)
<b>Other environmental resources identified</b>									
Public health and safety	-	-	-	-	-	-	-	-	-(5); X(6)
Socioeconomics	-	-	-	-	-	-	-	-	X(6)
Groundwater and onshore env.	-	-	-	-	-	-	-	X	X(6)

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:*
  - a. *4-mile zone of the Flower Garden Banks, or the 3-mile zone of Stetson Bank;*
  - b. *1000-m, 1-mi or 3-mi zone of any topographic feature (submarine bank) protected by the Topographic Features Stipulation attached to an OCS lease;*
  - c. *Essential Fish Habitat (EFH) criteria of 500 ft from any no-activity zone; or*
  - d. *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.*
- No marine sanctuaries, topographic features, or activity zones are identified within or near the lease block.
2. *Activities with any bottom disturbance within an OCS lease block protected through the Live Bottom Activities (Pinnacle Trend) Stipulation attached to an OCS lease.*
- Garden Banks Block 956 is not located within 200 feet (61 meters) of any live bottom (pinnacle trend) features.
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.*
- Garden Banks Block 956 is not located within 100 feet of any live bottom (low relief) features.
4. *Activities on blocks designated by the BOEM as being in water depths 300 meters or greater.*
- The nearest known chemosynthetic community is located approximately 29 miles southeast of the prospect area.
5. *Exploration or production activities where H<sub>2</sub>S concentrations greater than 500 ppm might be encountered.*
- The BOEM has classified the area as H<sub>2</sub>S absent.
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.*
- An accidental release could affect the resources identified by an “x”. The affected resource and the impact analysis are discussed in Section 3.0.
7. *All activities that involve seafloor disturbances, including anchor emplacements, in any OCS block designated by the BOEM 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 prehistoric site that no impact would occur, the EIA can note that in a sentence or two.*
- The Garden Bank Block 956 requires archaeological resource surveys and reports. Mitigation guidelines released in March 2011 (Pre-Seabed Disturbance Survey Mitigation) require an assessment prior to undertaking any bottom disturbing activities. The proposed drilling will be done with a drillship so there will be no seafloor disturbance from anchors, anchor chains, or wire rope.
8. *All activities that you determine might have an adverse effect on endangered or threatened marine mammals or sea turtles or their critical habitats.*
- Several IPFs may affect marine mammals, sea turtles, or their critical habitats including drillship presence and emissions, support vessel and helicopter traffic, and accidents. The affected resource and the impact analysis are discussed in Section 3.0.
9. *Production activities that involve transportation of produced fluids to shore using shuttle tankers or barges*
- No produced fluids will be transported.

### 3.0 AFFECTED RESOURCES AND IMPACT ANALYSIS

#### 3.1 Air and Water Quality

##### 3.1.1 Air Quality

**Affected Resource** – Wind flow in the GOM is primarily driven by the clockwise circulation around the Bermuda High resulting in a prevailing southeasterly to southerly flow, which is conducive to transporting emissions toward shore (MMS, 2007). This circulation is affected by other, periodic, large-scale weather features such as tropical cyclones (hurricanes) during summer and fall and by extratropical cyclones (cold fronts) during winter. The air over the OCS water is not classified because there is no regulatory provision in the Clean Air Act (CAA) for classification in waters outside of the boundaries of State waters (BOEM, 2012b, 2013, 2014b, 2015). The coastal counties and parishes of Alabama, Florida, Louisiana, and Mississippi are in attainment of the National Ambient Air Quality Standards (NAAQS) for CO, NO<sub>x</sub>, SO<sub>x</sub>, ozone and particulates (USEPA, 2012). Several counties in the Houston, Texas metropolitan area, including the coastal counties Brazoria, Chambers, and Galveston are nonattainment areas for 8-hour ozone (USEPA, 2012a).

**Impact Analysis** – IPFs potentially affecting offshore air quality are air emissions from drillship operations, helicopters and service vessels; and, an accidental release.

The proposed activities are located approximately 163 mi (262.3 km) from the nearest shoreline in coastal Louisiana and approximately 203 mi (327 km) from the nearest shoreline in coastal Texas (Figure 3). Emissions from the proposed activities have been projected and are below the regulatory exemption levels as specified in 30 CFR 550.303(d) and any additional modeling is not required. Any air quality impacts of the proposed activities are expected to be localized (BOEM, 2012a; 2012b). The complete Air Quality Report (AQR) can be found in Section 7 of the EP.

The projected air emissions are not expected to affect the air quality of coastal areas. The proposed project is approximately 254 mi (408 km) to the nearest point of Breton Wilderness Area, which is outside of the 124 mi (200 km) buffer. An accidental spill and/or blowouts can release hydrocarbons or chemicals, which could cause the emission of air pollutants. However, these releases are not expected to impact onshore air quality because of the prevailing atmospheric conditions, emission height, emission rates, and the distance of the project area from the coastline. Implementation of new BOEM/BSEE environmental and safety regulations may further reduce the probability of the occurrence of a large volume/long duration spill. Following the Macondo event, extensive air quality

monitoring was conducted by the U. S. Environmental Protection Agency (USEPA) along the Gulf Coast ([www.epa.gov/bpspill/air.html](http://www.epa.gov/bpspill/air.html) and <http://www.epa.gov/bpspill/air-mon.html>). The air quality monitoring has not found any pollutants at levels expected to cause long term harm (BOEM, 2012b, 2013, 2014b, 2015).

The proposed project is not expected to have any long term significant or measurable impacts to air quality in the OCS or to any Prevention of Significant Deterioration (PSD) Class I air quality area such as Breton Sound Wilderness Area.

### 3.1.2 Offshore Water Quality

**Affected Resource** – The GOM is the largest semi-enclosed coastal sea in the western Atlantic, encompassing about 579,150 square mi (1,500,000 square km) (Heileman and Rabalais, 2009). The coastal areas contain more than 750 estuaries, bays, and sub-estuaries that are associated with 47 major estuaries (Heileman and Rabalais, 2009). The GOM is influenced by freshwater input from rivers (primarily the Mississippi River), which accounts for about two-thirds of the input into the GOM, and tropical weather events (i.e., tropical depressions, tropical storms, and/or hurricanes), which represent major climatological features of the area (Heileman and Rabalais, 2009).

The GOM is divided into the continental shelf, continental slope and the GOM basin. The continental shelf varies in width extending as much as 155 mi (250 km) from the coastline in some areas, being narrowest in the vicinity of the Mississippi River Delta eastward to the Florida Panhandle. Water depth extends down to less than 165 ft (50 m) on the inner continental shelf and between 165 and 1,300 ft (50 and 400 m) on the outer continental shelf (Qian, et al., 2003). The phytoplankton population in the northeastern GOM is controlled by proximity to, magnitude, and timing of fresh water outflows from rivers, bays, and estuaries (Qian, et al., 2003). The continental slope extends from the edge of the continental shelf to the start of the GOM Basin, with depths ranging from 1,300 to 9,800 ft (400 to 3,000 m). The GOM Basin contains the deepest waters and habitats. Water depths range from 9,800 ft (3,000 m) to more than 14,100 ft (4,300 m).

The average salinity in the GOM is 36 on the unitless practical salinity scale (pss) (NOAA, 2011) although salinity may decrease to less than 25 near freshwater input from rivers (NOAA Regional Climatology, 2011). Variations in phytoplankton type are very closely associated with water salinity (Qian, et al., 2003). The summer surface temperature in the GOM is approximately 84° Fahrenheit (F) (29° Celsius (C)) while the winter temperature is approximately 68° F (20° C) in the northern GOM and 75° F (24° C) in the southern portion of the GOM (NOAA, 2011). During the summer a thermocline may develop where warmer water may be found

ranging in depth from just below the surface to 160 ft (50 m) below the surface. Below the thermocline the temperature of the water becomes colder and denser. The coldest water in the GOM is found below 3,300 ft (1,000 m) where the water is less than 40.6° F (4.8° C) (NOAA, 2011).

Typical operational discharges associated with offshore oil and gas activities include drilling fluids and cuttings, uncontaminated ballast water, uncontaminated seawater, deck drainage, sanitary waste water, domestic wastes, produced water and other miscellaneous discharges (subsea wellhead preservation fluids, subsea production control fluids and hydrate control fluids). Refer to Section 6 of the EP for a list of operational discharges associated with this operation.

**Impact Analysis** – IPFs potentially affecting water quality are operational effluents (discharges) and accidents.

Operational discharges associated with this project are in the waste and discharge table in Section 6 of the EP. Discharges are expected to be in compliance with the current National Pollutant Discharge Elimination System (NPDES) General Permit GMG290000. The USEPA has stated that discharges in compliance with the NPDES Permit, GMG290000 will not cause unreasonable degradation of the water quality and the marine environment (USEPA, 2012b). This general permit sets prohibitions, limitations and monitoring requirements that are established to protect the water quality and marine environment.

There may be increased turbidity and disturbed substrates during the drilling operation near the entry point. The increased turbidity would be short term (duration of the drilling and completion) and localized (BOEM, 2012b, 2013, 2014b, 2015). No significant impact is expected.

Support vessel discharges (treated sanitary wastes, deck drainage, ballast water, bilge water and domestic wastes) are expected to be in compliance with United States Coast Guard (USCG) regulations found at 33 CFR 140, 33 CFR 151 and 33 CFR 159. These regulations incorporate and implement the OCSLA, Shore Protection Act of 1988, the Act to Prevent Pollution from Ships of 1980 as amended, including Annexes I, II, and V of the International Convention for the prevention of Pollution from Ships (MARPOL 73/78), and NPDES General Permit for GOM requirements. Cobalt contractual agreements with vessel owner/operators require support vessel discharges to comply with all applicable regulations. Discharges from support vessels are not expected to have significant impacts to water quality.

During a spill or well blowout, the water quality of marine waters could be impacted. The extent of such impacts will vary depending on, among other factors, the magnitude and duration of such an incident. Most of the released oil would be expected to reach the surface and form a slick (BOEM, 2012b). Studies following the Macondo incident have shown that dispersed oil, methane and other gasses in the water column were biodegraded by microbes (Hazen et al., 2010; Kessler et al., 2011; Valentine et al., 2010). Implementation of new BOEM/BSEE environmental and safety regulations is expected to further reduce the probability of the occurrence of a large volume/long duration spill.

### 3.2 Seafloor Biological Communities

#### 3.2.1 Soft Bottom Benthic Communities

**Affected Resource** – Much of the GOM consists of soft sediments. Single-celled bacteria to invertebrates as well as fish inhabit soft-bottom habitat at almost every depth range in the GOM (BOEM, 2012b). Major groups of animals that live in this habitat include: bacteria and other microbenthos (<0.063 millimeters (mm)); meiofauna (0.063-0.3 millimeter (mm)) primarily small nematode worms, copepods, polychaete worms, ostracods, and kinorhynchans; macrofauna (>0.3 mm) polychaetes, nematodes, ostracods, copepods, bivalves, tanaidacids, bryozoans, isopods, amphipods, and others; and megafauna (larger organisms such as crabs, sea pens, sea cucumbers, crinoids, and bottom-dwelling (demersal) fish). The continental slope and deep sea consist of large areas of fine sediment that support benthic communities with lower densities and biomass but higher diversity (BOEM, 2012a, 2012b).

Cobalt contracted Berger Geosciences, LLC to perform an archaeological, benthic communities, and shallow hazard assessment for the Garden Banks Area Blocks 913, 956, 957, and 1000 (Berger Geosciences, LLC., 2016). No sessile benthic communities were identified.

**Impact Analysis** – IPFs potentially affecting soft bottom benthic communities are physical disturbance to seafloor, operational effluent discharges (drilling mud and cuttings), and an accidental release.

The proposed drilling and completion activities will be done with a drillship and support vessels, so there are no associated anchors, anchor chain or wire ropes. The area disturbed would be limited to around the wellbore where the bottom template and BOP are located. The typical area disturbed where the bottom template and BOP are located is about 0.62 acres (ac) (0.25 hectares (ha)) (MMS, 2007). The disturbance for this project is not expected to exceed 0.62 ac per well. Soft bottom communities are plentiful in the GOM and re-colonization would be expected to occur within hours to days for bacteria and less than a year up to

about one to two years for most macrofauna species (BOEMRE, 2011; BOEM, 2012a, 2012b, 2013). The area disturbed is small in relation to the GOM and the lease area. No significant impact to soft bottom communities is expected as a result of direct disturbance.

Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 32.8 ft (10 m) depth and modeling did indicate that oil could reach a depth of 65.6 ft (20 m). At the 65.6 ft (20 m) depth, the oil is found only at concentrations several orders of magnitude lower than the amount shown to have an effect on marine organisms, corals, and invertebrates (Lange, 1985; McAuliffe et al., 1975, 1981; Knap et al., 1985).

An accidental release (blowout) at the seafloor could create a crater and re-suspend and disperse large quantities of benthic sediments within a 984 ft (300 m) radius of the blowout site (BOEMRE, 2011; BOEM, 2012a, 2012b, 2013), burying benthic communities. If a drillship happens to sink to the seafloor following a blowout, benthic communities would also be buried by portions of the drillship or additional re-suspending (redistribution) of sediment (BOEMRE, 2011; BOEM, 2012a, 2012b, 2013). Even in situations where substantial burial of typical benthic infaunal communities occurred, recolonization from populations from neighboring soft bottom substrate would be expected over a relatively short period of time for all size ranges of organisms, in a matter of days for bacteria and probably less than one year for most macrofauna species (Lu and Wu, 2006; Netto et al., 2009; Santos et al., 2009; NRC, 2003).

Low concentrations of dispersed oil may occur in areas near a blowout site in offshore waters following the subsea use of dispersants (Joint Analysis Group 2011). The use of dispersants may increase the weathering process and allow oil on the surface to obtain greater depths than physical mixing would permit. Subsurface spills could result in the formation and settling of oil-saturated material and oil-sediment particles could come into contact with living soft bottom biota tissue. The extent of such impacts will vary depending on, among other factors, the type of oil, the magnitude and duration of such an incident. Should any of the oil come in contact with soft bottom biota, effects, if any, would be primarily sublethal (Montague, et al., 2013). The most severe reduction in benthic abundance and diversity was found within 3 km of the oil release. Recovery rates are likely to be slow (on the order of decades or longer) due to the depth. Contact from small spills is minimized due to water depth.

### 3.2.2 Designated Topographic Features

**Affected Resource** – Topographic features otherwise known as banks usually consist of rock upthrust caused by uplift (salt diapirs) of underlying layers of salt

(BOEM, 2012b). Hardbottom benthic communities support areas of high biomass, high diversity, and high numbers of plant and animal species. Topographic features also support, either as shelter or food, or both, large numbers of commercially and recreationally important fishes (BOEM, 2012b).

There are 38 known topographic features in the GOM that support various, diverse reef ecosystems; 21 in the WPA and 17 in the CPA (BOEMRE, 2011; BOEM, 2012a, 2012b; MMS, NTL 2009-G39) (Figure 2). The Marine Protection, Research, and Sanctuaries Act (MPRSA) of 1972 established the National Marine Sanctuary Program, which is administered by National Oceanic and Atmospheric Administration (NOAA). The Flower Garden Banks National Marine Sanctuary (FGBNMS), which was designated in 1992, is the only sanctuary that exists in the northern GOM. The East and West Flower Garden Banks and Stetson Bank comprise the FGBNMS and are located in the WPA (BOEM, 2012b, 2013, 2014b, 2015).

**Impact Analysis** – The only IPF potentially affecting topographic features (banks) is an accidental release.

The nearest topographic feature to the prospect area is Sidner Bank, located about 60 mi (96.5 km) to the north (Figure 2). The site-specific offshore location of the proposed activities is outside the 3-mile zone of any identified topographic feature. Further discussion on potential impacts from an accidental release can be found in Section 2.2.1 of this EIA. Due to distance and the depth such impact is not expected.

### 3.2.3 Pinnacle Trend Area Live Bottoms

**Affected Resource** – A region of topographic relief along the northeastern portion of the CPA is known as the “pinnacle trend,” at the outer edge of the Mississippi-Alabama shelf between the Mississippi River and DeSoto Canyon (BOEM, 2012a, 2012b) (Figure 2). The pinnacles appear to be carbonate reef structures in an intermediate stage between growth and fossilization (MMS, 1996; Gardner, et al. 2003; USGS, 2008). This area contains a variety of features from low-relief rocky areas to major pinnacles, as well as ridges, scarps, and relict patch reefs. These discrete mounds vary in size and structural complexity (BOEM, 2012a, 2012b).

**Impact Analysis** – The only IPF potentially affecting pinnacle trend features is an accidental release.

The pinnacle trend area is about 276 miles (444 km) northeast of the proposed project, along the shelf edge south of Mississippi and Alabama (Figure 2). Garden Banks Block 956 is not covered by the Live Bottom (Pinnacle Trend) Stipulation.

Further discussion on potential impacts from an accidental release can be found in Section 2.2.1 of this EIA. Due to distance and the depth such impact is not expected.

#### 3.2.4 Live Bottom/Low Relief

**Affected Resource** – Live-bottoms (low relief features) are seagrass communities; biological assemblages of sessile invertebrates living upon and attached to naturally occurring hard or rocky formations with rough, broken, or smooth topography; and areas of hard substrate and vertical relief that may favor the accumulation of turtles, fishes, or other fauna (MMS, NTL 2009-G39). According to NTL 2009-G39, the live bottom (low relief) stipulation applies to all lease blocks in the Eastern Planning Area in water depths of 328 ft (100 m) or less.

**Impact Analysis** – The only IPF potentially affecting live bottoms would be an accidental release. Garden Banks Area Block 956 is not covered by the Live Bottom (Low Relief) lease stipulation.

Further discussion on potential impacts from an accidental release can be found in Section 2.2.1 of this EIA. Due to distance and the depth such impact is not expected.

#### 3.2.5 High-Density Deepwater Benthic Communities

**Affected Resource** – High-density deepwater communities are features or areas that could support high-density chemosynthetic communities, high-density deepwater corals, and other associated high-density hard bottom communities (NTL 2009-G40). Chemosynthetic communities are defined as persistent, largely sessile assemblages of marine organisms dependent upon chemosynthetic bacteria as their primary food source (MacDonald, 1992) (Figure 2). A carbon source independent of photosynthesis is used by chemosynthetic communities. Although the process of chemosynthesis is entirely microbial, chemosynthetic bacteria and their primary production can support thriving assemblages of higher organisms through symbiosis. The occurrence of chemosynthetic organisms dependent on hydrocarbon seepage, which places them at water depths greater than 1,000 ft (305 m) (MMS, 2007). Natural hydrocarbon seepage is considered the predominate source of petroleum in the GOM and was estimated to be approximately 980,000 bbl/yr (BOEM, 2012a, 2012b; NRC, 2003). This depth range places chemosynthetic communities in the deepwater region of the GOM.

The communities are dominated by vestimentiferan tubeworms, mytilid mussels, vesicomyid clams, and infaunal lucinid or thyasirid clams (BOEM, 2012a, 2012b; MacAvoy, et al. 2005). These faunal groups tend to display distinctive characteristics in terms of how they aggregate, the size of aggregations, the

geological and chemical properties of the habitats in which they occur and, to some degree, the heterotrophic fauna that occur with them. Many of the species found at cold seep communities in the GOM are new to science and remain undescribed (BOEMRE, 2011; BOEM, 2012a, 2012b). In fact, a total of 107 new species, many of which were new genera and species, were confirmed during a recent five-year study of chemosynthetic and cold water communities (BOEM, 2014a).

**Impact Analysis** – The IPF potentially affecting high-density deepwater communities is an accidental release.

None of the known high-density deepwater benthic community locations listed in NTL 2009-G40 are in Garden Banks Block 956 (Figure 2). The nearest known chemosynthetic community is located in approximately 29 miles southeast of the proposed project area.

Further discussion on potential impacts from an accidental release can be found in Section 2.2.1 of this EIA. Contact from an accidental release is minimized due to water depth.

### 3.3 Fisheries and Essential Fish Habitat

**Affected Resource** – Most fishes inhabiting the GOM, whether benthic or pelagic as adults, have pelagic larval stages. The pelagic eggs and larvae become part of the planktonic community for various lengths of time, usually 10 - 100 days depending on the species (Ditty, 1986; Ditty et al., 1988; Richards et al., 1989, 1990). Fish overproduce eggs on an enormous scale and the overwhelming majority of them die at an early stage, generally as food for predators. Variability in survival and transport of pelagic larval stages is thought to be an important determinant of future year-class strength in adult populations of fishes and invertebrates (Underwood and Fairweather, 1989; Doherty and Fowler, 1994). In general, the distribution of fish larvae depends on spawning behavior of adults, hydrographic structure at a variety of scales, duration of the pelagic period, behavior of larvae, and larval mortality and growth (Leis, 1991). It is estimated that there are 200 families with more than 1,700 species whose early life stages may occur in the GOM (Richards, 1990).

The fish fauna from the shoreline to a depth of about 66 ft (20 m) is dominated by sea catfishes (Ariidae), lizardfishes (Synodontidae), drums, croakers, and seatrout (sciaenids) (McEachran and Fechhelm, 1998). These fish are very dependent on estuaries as nursery grounds (Darnell and Soniat, 1979; Darnell, 1988). Out to a depth of 131 – 164 ft (40-50 m), on muddy bottoms, the fish fauna is dominated by porgies (Sparidae), batfishes (Ogcocephalidae), sea-robins (Triglidae), sea basses (Serranidae), and left-eyed flounders (Bothidae). These species are also

largely dependent on estuaries as nursery grounds. On shell or hard bottoms in the same depth range (66 to 131 to 164 ft (20 to 40 or 50 m)), a slightly different species group occurs dominated by snappers (Lutjanidae) and other spiny-rayed fishes with a preference for hard substrate (McEachran and Fechhelm, 1998). The remaining OCS, ranging to a depth of approximately 656 ft (200 m), generally has a muddy or silty soft bottom and dominated by hakes (Phycidae), scorpionfishes (Scorpaenidae), and batfishes (ogcocephalids) (McEachran and Fechhelm, 1998).

Pelagic fishes occurring from the beach to the open ocean are divided into coastal pelagic species and oceanic pelagic species. Coastal pelagic species are one of the most abundant fishes in the world and traverse shelf waters of the region throughout the year (Moyle and Cech, 2004). Oceanic pelagic species, such as tuna, wahoo and marlins, occur throughout the GOM, especially at or beyond the shelf edge near offshore platforms (Franks, 2000) and are reportedly associated with hydrographic features such as fronts, eddies, and discontinuities (Power and May, 1991).

Many oceanic species are associated with floating seaweed (*Sargassum* spp.), jellyfishes, siphonophores, and driftwood, because they provide forage and/or nursery habitat. Most fish associated with floating seaweed are temporary residents, for example, juveniles of species that reside in shelf or coastal waters as adults (BOEM, 2012a, 2012b). Hatchling sea turtles also use *Sargassum* as a preferred habitat (Carr and Meylan, 1980). Dolphin fish, yellowfin tuna, blackfin tuna, skipjack tuna, Atlantic bonito, little tunny, and wahoo also feed on the small fishes and invertebrates attracted to *Sargassum* (Morgan et al., 1985).

Mesopelagic fish assemblages in the GOM include lanternfishes (myctophids), with bristlemouths (gonostomatids) and hatchetfishes (sternoptychids). These fishes make extensive vertical migrations during the night from mesopelagic depths (656 - 3,281 ft or 200 - 1,000 m) to feed in higher, food-rich layers of the water column (Hopkins and Baird, 1985). Mesopelagic fishes are important ecologically because they transfer substantial amounts of energy between mesopelagic and epipelagic zones over each diel cycle (Hopkins and Baird, 1985).

The deeper dwelling bathypelagic fishes inhabit the water column at depths greater than 3,281 ft (1,000 m) and seldom migrate into shallower waters. This zone receives no sunlight and temperatures range from 40° F (4.4° C) to 50° F (10° C). Common species include deep-sea angler fishes (Ceratioidei), bristlemouths or lightfishes (gonostomatids) and scaleless black dragonfishes (Melanostomiidae) (McEachran and Fechhelm, 1998).

An Essential Fish Habitat (EFH) is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, and growth to maturity (NMFS, 2010). Due to the wide variation of habitat requirements for all life history stages, EFH for the

GOM includes all estuarine and marine waters and substrates from the shoreline to the seaward limit of the Exclusive Economic Zone (EEZ) (200 mi (322 km)). The Magnuson-Stevens Fishery Conservation and Management Act places requirements on any Federal agency with respect to EFH, and requires the development of management plans for all managed fish species (NMFS, 2010). The GOM Fisheries Management Council (GMFMC) currently maintains Fishery Management Plans (FMP) for a variety of bay and estuarine species that spend a large part of their life cycles in these nearshore environments.

The GMFMC currently describes FMP's for certain species of reef fish, shrimp, spiny lobster, stone crab, corals, migratory pelagics, and red drum. Occurrences of these managed species are generally within the estuary and bay systems in the GOM. None of the stocks managed by the GMFMC are endangered or threatened. Table 6 provides a list of species managed under the FMPs.

**Table 6**  
**Species Managed Under GMFMC FMPs**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Scientific Name</b>
Red drum	<i>Sciaenops ocellatus</i>	Cobia	<i>Rachycentron canadum</i>
Red grouper	<i>Epinephelus morio</i>	Goldface tilefish	<i>Caulolatilus chrysops</i>
Gag grouper	<i>Mycteroperca microlepis</i>	Blueline tilefish	<i>Caulolatilus microps</i>
Scamp grouper	<i>Mycteroperca phenax</i>	Tilefish	<i>Lopholatilus chamaeleonticeps</i>
Speckled hind	<i>Epinephelus drummondhayi</i>	Almaco jack	<i>Seriola rivoliana</i>
Atlantic goliath grouper	<i>Epinephelus itajara</i>	Banded rudderfish	<i>Seriola zonata</i>
Yellowedge grouper	<i>Hyporthodus flavolimbatus</i>	Spanish mackerel	<i>Scomberomorus maculatus</i>
Warsaw grouper	<i>Hyporthodus nigritus</i>	Hogfish	<i>Lachnolaimus maximus</i>
Snowy grouper	<i>Hyporthodus niveatus</i>	Brown shrimp	<i>Penaeus aztecus</i>
Black grouper	<i>Mycteroperca bonaci</i>	White shrimp	<i>Penaeus setiferus</i>
Yellowmouth grouper	<i>Mycteroperca interstitialis</i>	Pink shrimp	<i>Penaeus duorarum</i>
Yellowfin grouper	<i>Mycteroperca venenosa</i>	Royal red shrimp	<i>Pleoticus robustus</i>
Red snapper	<i>Lutjanus campechanus</i>	Stone crab	<i>Menippe spp.</i>
Gray snapper	<i>Lutjanus griseus</i>	Caribbean spiny lobster	<i>Panulirus argus</i>
Yellowtail snapper	<i>Ocyurus chrysurus</i>	Corals	Class Hydrozoa and Anthozoa

**Table 6**  
**Species Managed Under GMFMC FMPs**

Common Name	Scientific Name	Common Name	Scientific Name
Lane snapper	<i>Lutjanus synagris</i>	Wenchman	<i>Pristipomoides aquilonaris</i>
Queen snapper	<i>Etelis oculatus</i>	Vermilion snapper	<i>Rhomboplites aurorubens</i>
Mutton snapper	<i>Lutjanus analis</i>	Gray triggerfish	<i>Balistes capricus</i>
Blackfin snapper	<i>Lutjanus buccanella</i>	Greater amberjack	<i>Seriola dumerili</i>
Cubera snapper	<i>Lutjanus cyanopterus</i>	Lesser amberjack	<i>Seriola fasciata</i>
Silk snapper	<i>Lutjanus vivanus</i>	King mackerel	<i>Scomberomorus cavalla</i>

Source: <http://gulfcouncil.org/Beta/GMFMCWeb/downloads/species%20managed.pdf>

Migratory species that are likely to be encountered include tuna (Scombridae), billfish (Istiophoridae), swordfish (Xiphiidae), and sharks (Squaliformes). These groups are under the direct management of National Oceanic and Atmospheric Administration (NOAA) Fisheries and are not included as GMFMC managed species. The EFH areas for these highly migratory species are described in separate FMP's, including the FMP for Atlantic tunas, swordfish, and sharks (NMFS, 2009) and the Atlantic billfish FMP Amendment 1 (NMFS, 1999). Highly migratory species with EFH at or near the proposed project area include the following (NMFS, 2009):

- Bigeye tuna (juvenile, adult)
- Yellowfin tuna (juveniles, spawning adults, adults)
- Swordfish (larvae, juvenile, adult)
- Blue marlin (juveniles, adults)
- White marlin (juveniles, adults)
- Sailfish (all)
- Longbill spearfish (juveniles, adults)
- Bigeye thresher shark (all)
- Bluefin tuna (spawning, eggs, larvae, adults)
- Skipjack tuna (spawning adults)
- Dusky shark (juveniles, adults)
- Roundscale spearfish (juveniles, adults)
- Longfin mako shark (all)
- Tiger shark (adults)
- Oceanic whitetip shark (all)
- Silky shark (all)
- Whale shark (all)

As described by NOAA Fisheries documents (NMFS, 2009), the current status of the scientific knowledge of these species is such that habitat preferences are largely unknown or are difficult to determine. In the case with shark species, it is difficult to define the habitat of sharks of this temperate zone in the GOM because most species are highly migratory, using diverse habitats in apparently nonspecific or poorly understood ways. Temperature is a primary factor affecting the distribution of sharks, and their movement in coastal waters is usually correlated with unpredictable seasonal changes in water temperature. Some of the highly migratory species occur offshore beyond the 200-m isobath, and many, such as billfishes, are associated with upwelling areas where canyons cause changes in current flow (upwelling) and create areas of higher productivity (NMFS, 2009).

In addition, NMFS (NMFS, 2009) designated a Habitat Area of Particular Concern (HAPC) for spawning Atlantic bluefin tuna (*Thunnus thynnus*), and this covers much of the deepwater GOM. The bluefin tuna typically spawn in the northwestern and northeastern GOM during January through June, with peak spawning in April and May (Teo et al., 2007). The bluefin tuna forage from the surface down as far as 3,000 ft (914 m) (Teo, 2007). HAPC include the near shore areas of intertidal and estuarine habitats that may provide food and rearing for juvenile fish and shell fish; offshore areas with substrates of high habitat value or vertical relief, which serve as cover for fish and shell fish; and marine and estuary habitat used for migration, spawning, and rearing of fish and shellfish.

Atlantic bluefin tuna utilize the GOM during summer breeding months, when they are known to be commercially and recreationally landed (Teo et al., 2007; Teo and Block, 2010). The Center for Biological Diversity (CBD) petitioned the NMFS, on May 24, 2010 requesting that the Atlantic bluefin tuna, an Atlantic bluefin tuna distinct population segment (DPS) consisting of one or more sub-populations in the U. S. waters, or the entire species be listed as endangered or threatened under the Endangered Species Act (ESA). The petition also requested that critical habitat be designated for the species. The NMFS appointed an Atlantic bluefin tuna status review team (SRT) to assess the species status. After an extensive scientific review by the SRT, including comments from invited Atlantic bluefin tuna experts and five listening sessions with Atlantic bluefin tuna fishermen, it was announced on May 27, 2011 that Atlantic bluefin tuna currently do not warrant species protection under the ESA (Atlantic Bluefin Tuna Status Review Team, 2011). The Atlantic bluefin tuna is currently listed as an ESA Species of Concern.

**Impact Analysis** – IPFs potentially affecting fisheries and EFH are drillship presence (noise and lights), cooling water intakes, and an accidental release.

Fish may be attracted to the fixed platform and the drillship. Drillships maintain exterior lighting for working at night and for navigational and aviation safety in accordance with applicable Federal safety regulations. This artificial lighting may

also attract and directly or indirectly impact natural resources. Epipelagic fishes such as tunas, dolphin, billfishes, and jacks, are commonly attracted to fixed and drifting surface structures (e.g., Holland et al., 1990; Higashi, 1994; Relini et al., 1994; BOEM, 2012a, 2012b). The feeding of epipelagic predators could be enhanced by attracting and concentrating smaller fish species.

Discharges of operational wastes from the proposed activities to marine waters are expected to disperse, to very near background levels at a distance of 3,281 ft (1,000 m) (Kennicut, 1995; CSA, 1997), and are usually undetectable at distances greater than 9,843 ft (3,000 m) (Kennicut, 1995; CSA, 1997). No adverse impact associated with discharge of operational wastes is expected.

Drilling operations produce underwater sounds that may impact certain marine resources. Sources of drilling-related sounds include those from drilling operations themselves.

Underwater marine sounds associated with drilling operations are not particularly intense and include strong tonal components at low frequencies (averaging 10 to 500 Hz) and infrasonic frequencies in at least some cases (Richardson et al., 1995; MMS, 2000). From a drillship, sound and vibration associated with drilling operations are transmitted to the water either through the air or the risers (MMS, 2000). Based on available data, marine sound generated from drillships during drilling and in the absence of thrusters can be expected to range between 154 and 176 dB re 1  $\mu$ Pa @ 1 m (Greene, 1986; Nedwell et al., 2001). The drilling from the drillship and support vessels will be temporary; therefore, impacts on fish populations from noise and lights, whether beneficial or adverse, would be considered insignificant.

Cooling Water Intakes Structures (CWIS) for drillships and vessels are regulated by Section 316(b) of the CWA if built after July 17, 2006. This regulation has been incorporated into the current GMG290000 permit. If the drillship that will be utilized was built before 2006, then it would not be subject to the CWIS design requirements of the 316(b) regulation or GMG290000. If the drillship was built after 2006, then it may be subject to the 316(b) regulation and NPDES permit (GMG290000) CWIS design and monitoring requirements if any CWIS has a design intake capacity of two (2) million gallons of seawater per day with at least 25% of that being used for cooling purposes. The CWA 316(b) regulation requires that CWIS be designed with sufficient open area to ensure that the through screen velocities remain at or below 0.5 ft/second to minimize the potential for entrainment and impingement. If applicable, the drillship is expected to have been designed with sufficient open area to ensure that through screen velocities remain at or below 0.5 ft/second to minimize the potential for entrainment and impingement to meet the applicable CWIS regulations mentioned above. The majority of the stronger-swimming juvenile, smaller adult, and adult fishes are

thought to escape entrainment or impingement because of the low intake velocity of less than 0.5 ft/second. Impacts of entrainment are not expected to be significant to plankton or ichthyoplankton (fish eggs and larvae) populations because of these CWIS permit design requirements. Plankton has the potential to be entrained during the intake of cooling water although ichthyoplankton abundance and diversity are generally higher along the mid-shelf and lower in the deep offshore areas (MMS, 2007, 2008a; BOEMRE, 2011; BOEM, 2012a, 2012b). Results of the GOM CWIS Entrainment Monitoring Study (CSA and LGL, 2014), indicated the ichthyoplankton densities were only a small fraction of those found at the shallow depths (i.e. less than 200 m) and the areas closer to shore along the continental shelf. The study concluded that the entrainment of ichthyoplankton by CWIS will not have a noticeable or biologically significant impact to commercially or recreationally important species. No significant entrainment or impingement impacts on key species are expected based on the findings of the 2009 desktop CWIS Source Water Biological Baseline Characterization Study and Entrainment Monitoring Study (LGL Ecological Research Associates, 2009; CSA and LGL, 2014).

Regardless of spill size, adult fish are likely to actively avoid an oil spill, thereby limiting the effects and lessening the extent of damage (Baker et al., 1991; Malins et al., 1982). Observations at oil spills indicate that free-swimming fish ordinarily avoid harm from oil spills (NRC, 1985). Some work has demonstrated avoidance of extremely small concentrations of hydrocarbons. Farr et al. (1995) reported the behavioral avoidance of dissolved concentrations of a polycyclic aromatic hydrocarbon (PAH) as low as 14.7 micrograms per liter ( $\mu\text{g/l}$ ) by a species of minnow.

Adult fish must experience continual exposure to relatively high levels of hydrocarbons over several months before secondary toxicological compounds that represent biological harm are detected in the liver (Payne et al., 1988). The direct effects of spilled oil on fish occur through the ingestion of oil or oiled prey and through the uptake of dissolved petroleum products through the gills and epithelium by adults and juveniles (NRC, 1985, 2002). Upon exposure to spilled oil, liver enzymes of fish oxidize soluble hydrocarbons into compounds that are easily excreted in the urine (Spies et al., 1982). Ordinary changes in salinity, temperature, and food abundance (Evans and Rice, 1974; NRC, 1985, 2002) have little effect. Migratory species could be impacted if oil spills covered large areas of nearshore open waters. One of the few adult fish-kills on record following an oil spill was on the French coast in 1978 when several tons of small rock-clinging fish (not commercially harvested) were killed at the site of the *Amoco Cadiz* wreck (MMS, 2007).

When sensitive early stages of fish (eggs and larvae) are exposed to spilled oil in the upper water column, the success of a spawning event may be reduced

(BOEMRE, 2011; BOEM, 2012a, 2012b). These effects have been demonstrated to be dependent on time and location of a spill and also the vertical distribution of fish larvae (Vikebo et al., 2013). However, fish overproduce eggs on an enormous scale and the overwhelming majority die at an early stage, generally as food for predators (NRC, 1985, 2002; BOEM, 2012a, 2012b). This was confirmed during and after the *Torrey Canyon* spill off Southwest England and the *Argo Merchant* spill off Nantucket. In each case, 90 percent of fish eggs and larvae died, pilchard and pollack, respectively, were observed in the affected area, but this had no impact on the regional commercial fishery (Baker et al., 1991). No significant adverse impact is expected to fishery and EFH resources.

### 3.4 Coastal and Marine Birds

#### 3.4.1 Shorebirds and Coastal Nesting Birds

**Affected Resource** – Shorebirds are those members of the order Charadriiformes generally restricted to coastline margins (beaches, mudflats, etc.). There are five taxonomic families of shorebirds in the GOM; Jacanidae (jacanas), Haematopodidae (oystercatchers), Recurvirostridae (stilts and avocets), Charadriidae (plovers), and Scolopacidae (sandpipers, snipes, and allies) (Hayman et al., 1986). An important characteristic of almost all shorebird species is their strongly developed migratory behavior, with some shorebirds migrating from nesting places in the far north to the southern part of South America (Terres, 1991). Along the Gulf coast, observers have recorded 44 species of shorebirds. Six species nest in the area; the remaining species are wintering residents and/or “staging” transients (Pashley, 1991).

The term wading birds refers to birds that have adapted to living in marshes and shallow water. Seventeen species of wading birds in the order Ciconiiformes currently nest in the U.S., and all except the wood stork nest in the northern GOM coastal region (Martin, 1991; Terres, 1991). These families have representatives in the northern GOM: herons, bitterns, and egrets (Ardeidae), storks (Ciconiidae), ibises and spoonbills (Threskiornithidae), crane (Gruidae), and rails, moorhens, gallinules and coots (Rallidae) (Martin, 1991; Terres, 1991).

Waterfowl belong to the taxonomic order Anseriformes and include swans, geese, and ducks. A total of 27 species are regularly reported along the north-central and western Gulf coast (Clapp et al., 1982; National Geographic Society, 1983; Madge and Burn, 1988). Many species usually migrate from wintering grounds along the Gulf coast to summer nesting grounds in the northern U.S. waterfowl migration pathways have traditionally been divided into four parallel north-south paths, or “flyways,” across the North American continent. The Gulf coast serves as the southern terminus of the Mississippi (Louisiana, Mississippi, and Alabama) flyway.

Waterfowl are social and have a diverse array of feeding adaptations related to their habitat (Johnsgard, 1975).

There are four main groups of diving birds, respectively: cormorants, anhingas, loons, and grebes. The only representative diving birds known to breed in waters of the Gulf are the double-crested and olivaceous/neotropic cormorants are the only representative diving birds known to breed in the waters of the GOM (BOEM, 2012b). Loons and grebes frequently spend most of their diurnal and nocturnal activity budgets resting, loafing, and conducting other maintenance activities on the water (BOEM, 2012b).

**Impact Analysis** – IPFs potentially affecting shorebirds and coastal nesting birds are support vessel and helicopter traffic, marine debris, and accidental release.

Helicopter and support-vessel traffic related to the proposed project could sporadically disturb feeding, resting, or nesting behavior of birds or cause abandonment of preferred habitat. Helicopter and vessel traffic could contribute to indirect population loss through reproductive failure resulting from nest abandonment. The Federal Aviation Administration (FAA) (Advisory Circular 91-36C) and corporate helicopter policy specify minimum altitude of 2,000 ft (610 m) over populated areas and biologically sensitive areas such as wildlife refuges and national parks. It is expected that approximately 10 percent of helicopter trips would occur at altitudes somewhat below the minimums listed above as a result of inclement weather. Due to the short term (duration of the drilling and completion activities) duration and sporadic frequency, no significant impact is expected.

Support vessels should use selected nearshore and coastal (inland) navigation waterways, or corridors, and adhere to protocol set forth by the USCG for reduced vessel speeds within these nearshore and inland areas. Routine presence and low speeds of support vessels within these waterways would diminish the effects of disturbance from support vessels on nearshore and inland populations of coastal and marine birds. The effects of support vessel traffic on shorebird and coastal nesting birds offshore would result in no significant impact.

Coastal and marine birds can become entangled and snared in discarded trash and debris. Additionally, many species will ingest small plastic debris, either intentionally or incidentally. Compliance with BSEE NTL 2015-G03 is expected to result in no significant impact with trash and debris.

An accidental release or blowout from the proposed project could cause impacts to shorebirds and coastal nesting birds if contact is made. In the case of an oil spill, oil-spill cleanup methods often require heavy trafficking of beaches and wetland areas, application of oil dispersant and bioremediation chemicals, and the

distribution and collection of oil containment booms and absorbent material (BOEM, 2012b, 2013, 2014b, 2015). The presence of humans, along with boats, aircraft, and other technological creations, could temporarily disturb coastal birds after a spill (National Audubon Society, 2010; USFWS, 2011).

Investigations have shown that oil-dispersant mixtures are similar to that of oil alone in its effects to successful reproduction in birds (Albers, 1979; Albers and Gay, 1982). The external exposure of adult birds to oil/dispersant emulsions may reduce chick survival more than exposure to oil alone; however, successful dispersal of a spill will generally reduce the probability of exposure of coastal and marine birds to oil (Butler et al., 1988; French-McCay 2004; NRC, 2005). Weathering (evaporation, emulsification, dissolution, photo-oxidation, and microbial oxidation) and distance can also help break down oil reduce the exposure of coastal and marine birds to oil. The greater the distance the more time there is for weathering to occur.

If physical oiling of individuals or local groups of birds occurs, some degree of both acute and chronic physiological stress associated with direct and secondary uptake of oil would be expected (Albers, 2006; Pérez et al., 2010; Zabala et al., 2010). Low levels of oil could stress birds by interfering with food detection, feeding, predator avoidance and territory definition, homing of migratory species, susceptibility to physiological disorders, disease resistance, growth rates, reproduction, and respiration (O'Hara and Morandin, 2010). Permitted hazing has been used to deter birds from the path of an approaching oil slick or booms have been used to protect sensitive colonies (Clark, 1984). Contact is minimized due to distance from small spills. Implementation of new BOEM/BSEE environmental and safety regulations may further reduce the probability of the occurrence of a large volume/long duration spill.

#### 3.4.2 Marine and Pelagic Birds

**Affected Resource** – Seabirds are a diverse group of birds that spend much of their lives on or over saltwater; they live far from land most of the year, except at breeding time when they return to nesting areas along coastlines (Terres, 1991). Species diversity and overall abundance is highest in the spring and summer and lowest in the fall and winter. Four categories of seabirds have been documented in the GOM: summer migrants (e.g., shearwaters, storm petrels and boobies), summer residents that breed in the GOM (e.g., sooty, least, and sandwich tern, and frigate birds), winter residents (e.g., gannets, gulls, and jaegers), and permanent resident species (e.g., laughing gulls and royal and bridled terns) (Hess and Ribic, 2000). Seabirds typically aggregate in social groups called colonies; the degree of colony formation varies among species (Parnell et al., 1988). They also tend to associate with various oceanic conditions including specific sea-surface temperatures, salinities, areas of high planktonic productivity, or current activity.

Seabirds obtain their food from the sea with a variety of behaviors including piracy, scavenging, dipping, plunging, and surface seizing (Hess and Ribic, 2000; Parnell et al., 1988).

**Impact analysis** – IPFs potentially affecting marine and pelagic birds are drillship presence (noise and lights), support vessels and helicopter traffic, effluent discharges, marine debris, and accidents.

Section 3.3 discusses potential impacts due to noise and light further. The drilling from the drillship, and support vessels will be temporary; therefore, impacts on marine and pelagic birds from noise and lights, whether beneficial or adverse, would be considered insignificant.

Helicopter and support vessel traffic could sporadically disturb feeding, resting, or nesting behavior of marine and pelagic birds or cause abandonment of preferred habitat (National Audubon Society, 2010). The FAA (Advisory Circular 91-36C) and corporate helicopter policy specify minimum altitude of 2,000 ft (610 m) over populated areas and biologically sensitive areas such as wildlife refuges and national parks. It is expected that approximately 10 percent of helicopter trips would occur at altitudes somewhat below the minimums listed above as a result of inclement weather. Due to the short term (duration of the drilling and completion activities) duration and sporadic frequency, no significant impact is expected.

Marine birds can become entangled and snared in discarded trash and debris. In addition, many species will readily ingest small plastic debris, either intentionally or incidentally (BOEM, 2012b, 2013). Interaction with plastic materials is therefore very serious and can lead to permanent injuries and death. Compliance with BSEE NTL 2015-G03 is expected to result in no significant impact with trash and debris.

Physical oiling of individuals or local groups of birds, depending on the extent and concentration could result in some degree of acute and chronic physiological stress (Albers, 2006; Pérez et al., 2010; Zabala et al., 2010). Low levels of oil could stress birds by interfering with food detection, feeding impulses, predator avoidance, territory definition, homing of migratory species, susceptibility to physiological disorders, disease resistance, growth rates, reproduction, and respiration (O'Hara and Morandin, 2010). Implementation of BOEM/BSEE environmental and safety regulations may further reduce the probability of the occurrence of a large volume/long duration spill.

## 3.5 Coastal Resources

### 3.5.1 Beaches

**Affected Resource** – Coastal barriers and beaches are dynamic habitats and provide a variety of niches that support many avian, terrestrial, aquatic, and amphibian species, some of which are endangered or threatened (MMS, 2007). Accumulations and movements of sediments that make up barrier and beach landforms are often described in terms of transgressive and regressive sequences. A transgressive sequence moves the shore landward allowing marine deposits to form on terrestrial sediments. A regressive sequence is one in which terrestrial sediments are deposited over marine deposits as land builds out, into the sea. Although transgressive landforms are dominant in the western and northern GOM, both transgressive and regressive barriers may occur in the region (MMS, 2007).

Barrier islands have incurred damage from hurricanes and other storms. The areas have experienced varying degrees of erosion, land and vegetation loss, loss in elevation or beach profile and, in some cases, movement toward shore as a result of the previous hurricane seasons. The resulting change in elevation and island profiles reduces the ability of these features to provide the pre-storm coastal protection to the mainland beaches and wetlands. Over time these barriers can rebuild to some extent naturally as they become revegetated by opportunistic species, and the formation of dunes will begin again with the availability and nature of wind-blown sand. It is the intent of both Federal and State coastal restoration initiatives like the Coastal Wetlands Protection, Planning & Restoration Act (CWPPRA), Louisiana Coastal Resources Program (LCRP), and Coastal Impact Assistance Program (CIAP) to assist in these barrier island restorations (BOEM, 2012b, 2013, 2014b, 2015).

**Impact Analysis** – The IPFs potentially affecting beaches are vessel traffic, marine debris, and accidental releases.

An increase in vessel traffic is expected to occur and could result in minor incremental impacts to channels and coastal erosion rates. Standard activities associated with oil and gas activities have been documented and typically have a limited number of vessels required and a relatively short timeframe resulting in impacts being short term (duration of the drilling and completion activities) and localized (BOEM, 2012a, 2012b, 2013). Vessel support would likely use armored coastal channels, as well as existing offshore channels and sea lanes. Speed and wake restrictions in harbors and channels will be followed to further reduce any potential impacts. No significant impacts are expected.

Trash on the beach is recognized as a threat to the enjoyment and use of beaches. Only a limited amount of marine debris, if any, should result from the proposed activities. Compliance with BSEE NTL 2015-G03 is expected to result in no significant impact with trash and debris.

The distance to the Louisiana shore is approximately 163 mi (262 km) (Figure 1). Distances to other Gulf state shorelines are approximately 203 mi (335 km) to Texas; 274 mi (441 km) to Mississippi; 330 mi (531 km) to Alabama; and 364mi (586 km) to Florida (Figure 3). Offshore small fuel-spills have a diminished probability of impacting beaches due to distance and the effects of dispersion, weathering, and/or evaporation by natural processes (BOEM, 2012a, 2012b). Small inshore spills (<1,000 bbl) would be confined to the navigation channels (BOEM, 2012a, 2012b). The majority of these spills (96 percent) have averaged <1 bbl (average size is 0.05 bbl) and 98 percent of spills are <10 bbl (average size is 3 bbl) (BOEM, 2012a, 2012b). Spilled fuel can also occur as a result of a vessel collision; however, wake restrictions in harbors and channels will be followed to further reduce any potential impacts from vessel collision resulting in spilled fuel. No significant impact is expected to beaches.

Offshore oil spills of large volume and long duration could pose problems for beaches and nearshore barrier islands if contact is made (BOEM, 2012a, 2012b). The extent of a large volume and long duration spill will vary depending on, among other factors, the magnitude and duration of such a release.

Weathering (evaporation, emulsification, dissolution, photo-oxidation, and microbial oxidation) and distance can also help break oil. Meteorological and hydrological conditions at the time of the spill coupled with the quantity and location of the spill determines the fate of accidental releases or oil spills (BOEM, 2012a, 2012b). Spilled oil would need strong southerly winds to persist for an extended time prior to or immediately after the spill to elevate water levels to move onto beaches or across dunes. However, these strong winds would accelerate oil-slick dispersal, spreading, and weathering, thereby reducing impact severity at a landfall site. Studies conducted after the Deepwater Horizon spill indicated that the release of oil can continue to cause ongoing beach and shoreline vegetation contamination and re-oiling, particularly under storm conditions. However, some areas showed some recovery within one year (Operation Science Advisory Team 2013, 2014). Oil or its components that remain in the sand after cleanup may be (1) released periodically when storms and high tides resuspend or flush beach sediments, (2) decomposed by biological activity, or (3) volatilized and dispersed during hot or sunny days (Webb, 1988). Implementation of BOEM/BSEE environmental and safety regulations may further reduce the probability of the occurrence of a large volume/long duration spill.

### 3.5.2 Wetlands

**Affected Resource** – Wetland habitats found along the Gulf coast include fresh, brackish, and saline marshes; mud and sand flats; and forested wetlands of mangrove swamps, cypress-tupelo swamps, and bottomland hardwoods. These can support mixed communities of plant species or pure stands of single species. Coastal wetlands are characterized by high organic productivity, high detritus production, and efficient nutrient recycling. Wetlands provide habitat for a great number and wide diversity of invertebrates, fish, reptiles, birds, and mammals, and are particularly important nursery grounds for many economically important fish and shellfish (BOEM, 2012b).

Deltaic Plain wetlands are on a series of overlapping riverine deltas that have extended onto the continental shelf during the past 6,000 years. Historically, the deltaic plain areas that were located near the active Mississippi River channel tended to build outward, and marsh areas tended to expand. At the same time, areas located near inactive, abandoned channels tended to deteriorate and erode as a result of the lack of sediment (BOEM, 2012b).

Chenier Plain wetlands are located west of the Atchafalaya Bay in the western part of coastal Louisiana and eastern part of coastal Texas in a series of separate ridges of shell and sand oriented parallel or oblique to the Gulf Coast. These ridges are separated by progradational mudflats that are now marshes or open water. The mudflats were built during times when the Mississippi River Channel was located on the western side of the Deltaic Plain or when minor changes in localized hydrologic and sedimentation patterns favored deposition on the Chenier Plain (BOEM, 2012b, 2013, 2014b, 2015).

Brackish marshes along the Texas coast in the vicinity of southern Padre Island occur in less saline, inland areas and are divided into frequently and infrequently flooded marshes. Infrequently flooded marshes contain an assemblage of plants that are much more tolerant of dry conditions. Freshwater marshes in Texas occur inland above tidally delivered saline waters, in association with streams, lakes, and catchments. Broken bands of black mangroves (*Avicennia germinans*) also occur in this area (Brown et al., 1977; White et al., 1986). Wind-tidal flats of mud and sand are mostly found around shallow bay margins and in association with shoals. South of Corpus Christi and into Tamaulipas, flats increasingly replace lagoonal and bay marshes. Laguna Madre of Texas is divided into northern and southern parts by the wind-tidal flats of the Land-Cut Area, just south of Baffin Bay. The Intracoastal Waterway is dredged through this area, as are a series of well access channels. Dredging has caused topographic and vegetative changes among the flats of Laguna Madre (Brown et al., 1977; White et al., 1986).

Several factors contribute to wetland loss in coastal Louisiana. Sediment deprivation is a result of a 50 percent decrease in the suspended-sediment load of the river since the 1950's, the channelization of the river, and the primary cause, the construction of the flood protection levees. Subsidence and sea level rise have caused submergence of lower wetland areas. Construction of ring levees allowed drainage and development of extensive wetlands. Development activities in low areas, outside leveed areas, have caused the filling of wetlands. Construction of canals converted wetlands to open water and upland spoil banks. Canals and subsidence also contributed to increased tidal influence and salinities in freshwater and low salinity wetlands, which in turn has increased erosion and sediment export (BOEM, 2012a, 2012b).

**Impact Analysis** – The IPFs potentially affecting wetlands are vessel traffic, marine debris, and accidental releases.

Only a slight increase in vessel traffic is expected to occur, but vessel size may increase due to supply needs and open-sea conditions. Currently, existing ports, production facilities, and navigation channels would be used, eliminating the need for the expansion or construction of facilities into wetland areas. Vessel support would use armored coastal channels, as well as existing offshore channels and sea lanes. No significant impact is expected.

Only a limited amount of marine debris, if any, should result from the proposed activities. Compliance with BSEE NTL 2015-G03 is expected to result in no significant impact with trash and debris.

The primary reason for vegetation loss and ultimately facilitating land loss associated with an oil spill is impact to the vegetation root system (Webb et al., 1981, 1985; Alexander and Webb, 1983, 1985, 1987; Lytle, 1975; Delaune et al., 1979; Fischel et al., 1989). Vegetation diebacks may only happen for one growing season depending upon the concentration and the season during which contact occurs. The extent of such impacts will vary depending on, among other factors, the magnitude and duration of such an incident. The larger the spill with longer duration may result in more impact (BOEM, 2012a, 2012b).

Should a spill occur inshore or in nearshore waters, it presents a much greater potential for adversely impacting wetlands due to their proximity to the spill. Oil could accumulate in sheens and thick layers in the marsh and in protected pools and embayments (MMS, 2007, 2008a). Distant offshore spills or blowouts have a diminished probability of impacting inland wetland shorelines and seagrasses, largely due to their sheltered locations (BOEM, 2012a, 2012b). Refer to Section 3.5.1 of this EIA for additional information. Implementation of BOEM/BSEE environmental and safety regulations may further reduce the probability of the occurrence of a large volume/long duration spill.

### 3.5.3 Coastal Wildlife Refuges and Wilderness Areas

**Affected Resource** – The National Wildlife Refuge (NWR) System, managed by the U.S. Fish and Wildlife Service (USFWS), is a system of public lands and waters set aside to conserve wildlife and fisheries resources. In addition to the NWR system, the National Estuarine Research Reserve (NERR) is a partnership program between NOAA and the coastal states that created a network of protected areas established for long-term research, education, and stewardship. There are also Wildlife Management Areas (WMAs), Coastal Preserves (CPs), National and Historical Parks, and State Parks (SP). Table 7 is a list of the NWRs, NERRs, WMAs, CPs, Parks and SP (NOAA, 2012).

**Table 7**  
**Coastal Wildlife Refuges and Wilderness Areas**  
**Texas**

<b><u>Cameron County</u></b>		
Lower Rio Grande Valley NWR	Laguna Atascosa NWR	Brazos Island SP
Isla Blanca Park	Andy Bowie County Park	Edwin King Atwood Park
Laguna Madre Estuarine and Coastal Marine Area		
<b><u>Willacy County</u></b>		
Lower Rio Grande Valley NWR	Laguna Atascosa NWR	Padre Island Nat. Seashore
Laguna Madre Estuarine and Coastal Marine Area		
<b><u>Kenedy and Kleberg Counties</u></b>		
Padre Island National Seashore	Laguna Madre Estuarine and Coastal Marine Area	
<b><u>Nueces County</u></b>		
Laguna Madre Estuarine and Coastal Marine Area		Mustang Island SP
Port Aransas Park	Mission-Aransas NERR	
<b><u>Aransas County</u></b>		
Mission-Aransas NERR	Goose Island SP	
<b><u>Calhoun County</u></b>		
Mission-Aransas NERR	Guadalupe Delta WMA	Matagorda Island SP
Welder Flats CP		
<b><u>Matagorda County</u></b>		
Aransas NWR	Mad Island WMA	Big Boggy NWR
San Bernard NWR		
<b><u>Brazoria County</u></b>		
San Bernard NWR	Brazoria NWR	Justin Hurst WMA
Christmas Bay CP		
<b><u>Galveston County</u></b>		
Brazoria NWR	Galveston Island SP	Seawolf Park
Apffel Park	Atkinson WMA	Old Ft. Travis Park

**Table 7**  
**Coastal Wildlife Refuges and Wilderness Areas**

Anahuac NWR	Ft. Anahuac Park	McFaddin NWR
<b><u>Jefferson County</u></b>		
McFaddin NWR	Sea Rim SP	Murphree WMA
Texas Point NWR		
<b><u>Orange County</u></b>		
Lower Neches WMA		
<b>Louisiana</b>		
<b><u>Cameron Parish</u></b>		
Sabine NWR	Cameron Prairie NWR	Lacassine NWR
Little Pecan Island Natural Area	Peveto Woods Nat. Area	Rockefeller WMA
<b><u>Vermilion Parish</u></b>		
Rockefeller WMA	Paul J. Rainey WMA	
<b><u>Iberia Parish</u></b>		
Shell Keys NWR	Russell sage Foundation Marsh Island WMA	
<b><u>Terrebonne Parish</u></b>		
Atchafalaya Delta State WMA	Isles Denieres Barrier Islands Refuge	
Cypremont Point SP	Burns Point Recreation Area	
<b><u>Lafourche Parish</u></b>		
Point Au Chein WMA	Wisner WMA	Grand Isle SP
East Timbalier Island NWR		
<b><u>Plaquemines Parish</u></b>		
Delta NWR	Pass Au Loutrie WMA	Breton NWR
Salvador WMA	Jean Lafitte National Historical Park	
St. Bernard SP		
<b><u>St. Bernard Parish</u></b>		
Biloxi WMA	Bayou Sauvage NWR	
<b>Mississippi</b>		
<b><u>Hancock County</u></b>		
Pearl River State WMA		
<b><u>Jackson County</u></b>		
Mississippi Sandhill Crane NWR	Grand Bay NERR	
<b>Alabama</b>		
<b><u>Mobile County</u></b>		
Grand Bay NERR	Bon Secour NWR	Indian Mound Park
Jefferson Park	Arlington Park	
<b><u>Baldwin County</u></b>		
Weeks Bay NERR	Gulf SP	
<b>Florida</b>		

**Table 7**  
**Coastal Wildlife Refuges and Wilderness Areas**

<b><u>Escambia County</u></b>		
Tarklin Bayou Preserve	Fort Pickins SP	Gulf Islands Nat. Seashore
<b><u>Okaloosa County</u></b>		
Choctawhatchee National Forest		
<b><u>Walton County</u></b>		
Choctawhatchee National Forest		
<b><u>Bay County</u></b>		
Camp Helen SP	St. Andrews SP	
<b><u>Gulf County</u></b>		
Apalachicola NERR	St. Joseph Peninsula SP	St. Vincent NWR
<b><u>Liberty County</u></b>		
Apalachicola NERR		
<b><u>Franklin County</u></b>		
Apalachicola NERR	St. Vincent NWR	Takes Hell SP
<b><u>Wakula County</u></b>		
St. Marks NWR	Bald Point SP	
<b><u>Taylor County</u></b>		
Ecofina River SP	Tide Swamp WMA	
<b><u>Dixie and Levy Counties</u></b>		
Lower Suwannee NWR		
<b><u>Citrus and Hernando Counties</u></b>		
Crystal River NWR	Chassohowitzka NWR	
<b><u>Pasco County</u></b>		
Werner-Boyce Salt Springs SP		
<b><u>Hillsborough County</u></b>		
Anclote Key Preserve SP	Honeymoon Island SP	
<b><u>Manatee County</u></b>		
Pinellas NWR	Egmont Key NWR	Passage Key NWR
Terra Ceia Preserve SP		
<b><u>Charlotte County</u></b>		
Island Bay SP		
<b><u>Lee County</u></b>		
Pine Island NWR	JN Ding Darling NWR	
<b><u>Collier</u></b>		
Barefoot Beach SP		
<b><u>Miami-Dade County</u></b>		
Everglades National Park	Key West NWR	Great White Heron NWR

**Table 7**  
**Coastal Wildlife Refuges and Wilderness Areas**

National Key Deer Refuge	Dry Tortugas National Park
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**Impact Analysis** – The IPFs potentially affecting coastal wildlife refuges and wilderness areas are vessel traffic, marine debris, and an accidental release.

Only a slight increase in vessel traffic is expected to occur, but vessel size may increase due to supply needs and open-sea conditions. Currently, existing ports, production facilities, and navigation channels would be used, eliminating the need for the expansion or construction of facilities into coastal wildlife refuges and wilderness areas. Vessel support would use armored coastal channels, as well as existing offshore channels and sea lanes. No significant impact is expected.

Only a limited amount of marine debris, if any, should result from the proposed activities. Compliance with BSEE NTL 2015-G03 is expected to result in no significant impact with trash and debris.

Should a spill occur inshore or in nearshore waters, it presents a greater potential for adversely impacting coastal wildlife refuges and wilderness areas due to their proximity to the spill. Oil could accumulate in sheens and thick layers in the marsh and in protected pools and embayments often associated with coastal wildlife refuges and wilderness areas (MMS, 2007, 2008a). Distant offshore fuel-spills have a diminished probability of impacting coastal wildlife refuges and wilderness areas due to distance and the effects of dispersion, weathering, and/or evaporation by natural processes (BOEM, 2012a, 2012b). Refer to Section 3.5.1 of this EIA for additional information. Implementation of BOEM/BSEE environmental and safety regulations may further reduce the probability of the occurrence of a large volume/long duration spill.

### 3.6 Threatened and Endangered Species

#### 3.6.1 Marine Mammals

**Affected Resource** – Marine mammals that occur in the GOM consist of 28 species of cetaceans (whales and dolphins) and one sirenian (manatee) species (Waring et al., 2012). Seven of the cetacean species are in the suborder Mysticeti (i.e., baleen whales) and 21 of the cetacean species are in the suborder Odontoceti (i.e., toothed whales, dolphins and their allies) (Waring et al, 2012; BOEM, 2012b). The seven species in the Mysticeti suborder are considered extralimital or rare and five of the species are listed as endangered. Only the Bryde’s whale (*Balaenoptera edeni*) and the Minke whale (*Balaenoptera acutorostrata*) are not listed as endangered (Waring et al., 2012; BOEM, 2012b). The sperm whale (*Physeter*

*macrocephalus*) is the only specie in the Odontoceti suborder listed as endangered. The only member of the Order Sirenia found in the GOM is the endangered West Indian manatee (*Trichechus manatus manatus*). All marine mammals are protected species under the MMPA. The sperm whale is common in the northern GOM (Waring et al., 2012). The annual marine mammal stock assessment report for the GOM indicates that the northern right, blue, fin, sei, and humpback whales are rare in the GOM (Waring et al., 2012). The West Indian manatee (*Trichechus manatus*) typically inhabits only coastal marine, brackish, and freshwater areas, but a few individuals have been observed in deeper water (USFWS, 2001; Fertl, et al. 2005; Pabody, et al., 2009). There are no critical habitats designated within the offshore GOM for the threatened and endangered species of marine mammals. The endangered and non-endangered marine mammals are listed in Table 8.

**Table 8**  
**Marine Mammals in the GOM**

Common Name	Scientific Name	Status <sup>1</sup>	Migration <sup>2</sup>	Population <sup>2</sup>
<b>Sirenia</b>				
West Indian manatee	<i>Trichechus manatus</i>	E	Resident	4,834
<b>Odontocete</b>				
Sperm whale	<i>Physeter macrocephalus</i>	E	Resident	763
Dwarf and Pygmy sperm whales	<i>Kogia spp.</i>	NL	Resident	186
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	NL	Resident	74
Blainvilles', Gervais', and Sowerby's beaked whales	<i>Mesoplodon spp.</i>	NL	Resident	149
Atlantic spotted dolphin	<i>Stenella frontalis</i>	NL	Resident	unknown
Bottlenose dolphin	<i>Tursiops truncatus</i>	NL	Resident	51,192
Clymene dolphin	<i>Stenella clymene</i>	NL	Resident	129
False killer whale	<i>Pseudorca crassidens</i>	NL	Resident	777
Fraser's dolphin	<i>Lagenodelphis hosei</i>	NL	Resident	Unknown
Killer whale	<i>Orcinus orca</i>	NL	Resident	28
Melon-headed whale	<i>Peponocephala electra</i>	NL	Resident	2,235
Pantropical spotted dolphin	<i>Stenella attenuata</i>	NL	Resident	50,880
Pygmy killer whale	<i>Feresa attenuata</i>	NL	Resident	152
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	NL	Resident	2,415
Risso's dolphin	<i>Grampus griseus</i>	NL	Resident	2,442
Rough-toothed dolphin	<i>Steno bredanensis</i>	NL	Resident	624
Spinner dolphin	<i>Stenella longirostris</i>	NL	Resident	11,441
Striped dolphin	<i>Stenella coeruleoalba</i>	NL	Resident	1,849
<b>Mysticete</b>				
Blue whale	<i>Balaenoptera musculus</i>	E	Extralimital	440
Fin whale	<i>Balaenoptera physalus</i>	E	Extralimital	1,618
Humpback whale	<i>Megaptera novaeangliae</i>	E	Extralimital	11,570
North Atlantic right Whale	<i>Eubalaena glacialis</i>	E	Extralimital	476

**Table 8**  
**Marine Mammals in the GOM**

Common Name	Scientific Name	Status <sup>1</sup>	Migration <sup>2</sup>	Population <sup>2</sup>
Sei whale	<i>Balaenoptera borealis</i>	E	Extralimital	253
Bryde's whale	<i>Balaenoptera edeni</i>	NL	Extralimital	33
Minke whale	<i>Balaenoptera acutorostrata</i>	NL	Extralimital	20,741

<sup>1</sup> E=Endangered; T = Threatened; NL = Not Listed

<sup>2</sup> NOAA Office of Protected

Species:<http://www.nmfs.noaa.gov/pr/sars/species.htm#largewhales>,

<http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/humpbackwhale.htm>.

**Impact Analysis** – The IPFs potentially affecting marine mammals include drillship presence, installation/support vessel presence (noise and lights), vehicle traffic, effluent discharges, and loss of debris, and an accidental release.

Sounds from drilling operations are generally low frequency (BOEM, 2012a, 2012b). Sounds from drilling operations could be intermittent, sudden, or high intensity. The distinction between transient and continuous sounds is not absolute as generators and pumps operate essentially continuous, however there are bangs and clangs dominated by operations (Richardson et al., 1995; Southall et al., 2007). Sound from vessels will generally be propeller operation where the intensity is dependent upon the vessel size and speed. Sound from vessels is generally transitory (BOEM, 2012a, 2012b). A minimum altitude of 700 ft (213 m) should be maintained by helicopter pilots while in transit offshore. Helicopter pilots are required to maintain an altitude of 1,000 ft (305 m) within 300 ft (91 m) of marine mammals when sighted.

Sound from drilling activities, installation/support vessels and helicopters may cause avoidance behaviors (displacement), masking either communication or sounds from predators, or interruption of resting, feeding, breeding, or migrating marine mammals (Tyack, 2008; Richardson et al., 1995; BOEM, 2013). These effects are expected to be short term (BOEM, 2013). There may be short-term displacements of individual marine mammals, but these displacements are unlikely to affect survival or productivity (BOEM, 2013). There is little conclusive evidence for long-term displacements and population trends for marine mammals relative to sound (Richardson et al., 1995; Southall et al., 2007).

Section 3.3 discusses potential impacts due to noise and light further. Activities associated with drillship and support vessels will be temporary; therefore, impacts on marine mammals from noise and lights, whether beneficial or adverse, would be considered insignificant.

Discharges of operational waste water from the installation activities to marine waters are expected to disperse, to very near background levels at a distance of

3,281 ft (1,000 m) (BOEM, 2012b; CSA, 1997), and is usually undetectable at distances greater than 9,843 ft (3,000 m) (MMS, 2007) Refer to Section 3.1.2 of this EIA for additional information. No adverse impact is expected.

A factor of previous concern was the lack of ability that cetaceans possessed for detecting and avoiding the various flowlines, risers, umbilicals, and mooring lines (MMS, 2007). However, in the last half-century no entanglements were noted most likely due to advances in cable design and laying since the mid-1950s (Carter et al., 2009). Sperm whales are one of 11 whale species that are hit commonly by ships (Laist et al., 2001). Frequency of vessel strikes between vessels and cetaceans in the GOM are addressed in the 2012 – 2017 Multi-Lease Sale EIS (BOEM, 2012b). Adherence with BOEM NTL 2016-G01 and BSEE NTL 2015-G03 is expected to minimize potential for vessel strike and marine debris related impacts.

Oil spills could affect marine mammals through various pathways: surface contact, inhalation, ingestion, and baleen fouling (Geraci, 1990). Direct contact with oil for marine mammals can lead to irritation and damage of skin and soft tissues (such as mucous membranes of the eyes) (Geraci and St. Aubin, 1990). In cetaceans, fouling of baleen plates can occur so as to hinder the flow of water and interfere with feeding, and incidental ingestion of oil and/or tar.

Crude oil or volatile distillates (total petroleum hydrocarbons) release toxic vapors that, when inhaled, can lead to irritation of eyes and respiratory membranes, lung congestion, and pneumonia. Subsequent absorption of some volatile hydrocarbons into the bloodstream may accumulate into such tissues as the brain, liver, spleen, and kidneys causing neurological disorders, organ damage, and cancer (ATSDR, 1999). Toxic vapor concentrations just above the water's surface (where cetaceans draw breath) may reach critical levels for the first few hours after a spill, prior to evaporation and dispersion of volatile aromatic hydrocarbons and other light components (Geraci, 1990). Cetaceans may consume oil contaminated prey (Geraci, 1990). In some cases, marine mammals have been shown to detect and avoid oil slicks (Geraci, 1990), while other reports indicate marine mammals did not attempt to avoid spilled oil (Smultea and Würsig, 1995).

There have been no experimental studies and only a handful of observations suggesting that oil has harmed any manatees or dugongs (St. Aubin and Lounsbury, 1990). Direct contact with discharged oil probably does not impact adult manatees' thermoregulatory abilities because they use blubber for insulation (MMS, 2008a). Manatees are generalized feeders that might consume tarballs along with their normal food; such occurrences have been rarely reported (St. Aubin and Lounsbury, 1990).

Implementation of new BOEM/BSEE environmental and safety regulations may further reduce the probability of the occurrence of a large volume/long duration spill. No adverse impact is expected. Entanglement and ingestion of debris have caused death or serious injury to marine mammals (Laist, 1997). Compliance with BSEE NTL 2012-G01 is expected to result in no adverse impact.

### 3.6.2 Sea Turtles

**Affected Resource** – Five species of sea turtle are found in the waters of the GOM: Kemp’s ridley (*Lepidochelys kempii*), loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*) (Pritchard, 1997). All are protected under the ESA; and all except the loggerhead turtle and green sea turtle (threatened) are listed as endangered. Sea turtles spend nearly all of their lives in the water. Females must emerge periodically from the ocean to nest on beaches. Sea turtles are long-lived, slow-reproducing animals. It is generally believed that all sea turtle species spend the first few years of their lives in pelagic waters, occurring in driftlines and convergence zones (in sargassum rafts) where they find refuge and food in items that accumulate in surface circulation features (Carr, 1987). No critical habitat has been designated for these species in the GOM.

Adult sea turtles in the GOM are apparently less abundant in the deeper waters of the GOM than they are in waters less than 80-160 ft (27-50 m) deep (NRC, 1990). Sea turtle abundance in the GOM appears to increase east of Mobile Bay (Davis et al., 2000). Factors such as water depth, bottom sediments, and prey availability may account for this. The threatened and endangered sea turtles are listed in Table 9.

**Table 9**  
**ESA Listed Sea Turtles in the GOM**

Common Name	Scientific Name	Status <sup>1</sup>	Migration	Population <sup>2</sup>
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E	Vagrant	N/A
Loggerhead sea turtle	<i>Caretta caretta</i>	T	Vagrant	N/A
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	E	Vagrant	N/A
Green sea turtle	<i>Chelonia mydas</i>	T	Vagrant	N/A
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	E	Vagrant	N/A

<sup>1</sup> E=Endangered; T = Threatened; NL = Not Listed

<sup>2</sup>U.S. Fish and Wildlife Service. Environmental Conservation Online System. <http://ecos.fws.gov/>

The leatherback sea turtle is commonly found in relatively shallow continental shelf waters along the U.S. Atlantic coast (Shoop and Kenney, 1992) and northern GOM (Collard, 1990; Davis et al., 2000). The loggerhead sea turtle occurs throughout the continental shelf (Dodd, 1988; Plotkin et Al., 1993; Davis et al., 2000). Loggerheads nest in significant numbers along the Florida Panhandle

(Florida Fish and Wildlife Conservation Commission, 2015) and, to a lesser extent, from Texas through Alabama (NMFS and USFWS, 2008). Loggerhead turtles will nest on beaches within the Breton NWR in Louisiana. Important feeding areas for green sea turtles in the GOM include the Indian River, Florida Bay, Homosassa River, Crystal River, and Cedar Key in Florida and the lower Texas Coast (Landry and Costa, 1999, NMFS, 1993). Green turtles infrequently nest on Florida Panhandle beaches though numbers are increasing (Florida Fish and Wildlife Conservation Commission, 2015). The hawksbill is recorded from all the GOM States (NMFS, 1993). Texas and Florida are the only states where hawksbills are sighted with any regularity (BOEM, 2012b). The main Kemp's ridley nesting site is Rancho Nuevo beach, Tamaulipas, Mexico (NMFS et al., 2011). Kemp's ridley turtles typically do not nest anywhere along the northern GOM, although there have been occasional reports of Kemp's ridleys' nesting in Alabama (Share the Beach, 2013).

**Impact Analysis** – The IPFs potentially affecting sea turtles include drillship presence, installation/support vessel presence (noise and lights), effluent discharges, vessel traffic, and loss of debris, and an accidental release.

Sounds from drilling operations could be continuous, intermittent, sudden, or high intensity during operations (BOEM, 2012a; 2012b). Refer to Section 3.6.1 of this EIA for additional information. Disturbance by sound may stress animals, weaken their immune systems, and make them more vulnerable to parasites and diseases that normally would not be fatal (BOEM, 2012b, 2013, 2014b, 2015). Sound from drilling activities, installation/support vessels and helicopters may cause avoidance behaviors (displacement) or interruption of resting, feeding, breeding, or migrating sea turtles (NRC, 1990; McCauley et al., 2000).

Section 3.3 discusses potential impacts due to noise and light further. The activities associated with drilling and support vessels will be temporary; therefore, impacts on sea turtles from noise and lights, whether beneficial or adverse, would be considered insignificant.

Depending on the timing of the spill's occurrence in coastal waters, its impact and resulting cleanup may interrupt sea turtle migration, feeding, mating, and/or nesting activity for extended periods (days, weeks, months) (BOEM, 2012b, 2013, 2014b, 2015). Exposure to hydrocarbons persisting in the sea following an oil slick may result in sublethal and lethal impacts (e.g., decreased health, reproductive fitness, and longevity; and increased vulnerability to disease) to sea turtles (BOEM, 2012b, 2013, 2014b, 2015). Spilled oil could have an effect on beaches that may be used for turtle nesting areas. This could result in no nesting or affect nest site selection. Sea turtle hatchling exposure to, fouling by, or consumption of tarballs persisting in the sea following the dispersal of an oil slick may be fatal (BOEM, 2012b, 2013, 2014b, 2015). The net result of any disturbance would depend on

the size and percentage of the population affected, ecological importance of the disturbed area, environmental and biological parameters that influence an animal's sensitivity to disturbance and stress, and the accommodation time in response to prolonged disturbance (St. Aubin, 2001). Implementation of new BOEM/BSEE environmental and safety regulations may further reduce the probability of the occurrence of a large volume/long duration spill.

Collisions between OCS vessels and sea turtles within the project area are expected to be unusual events (Laist et al., 2001). Compliance with BOEM NTL 2016-G01 is expected to result in no significant impact.

Entanglement in, and ingestion of, debris has caused the death or serious injury of sea turtles (Balazs, 1985). Compliance with BSEE NTL 2015-G03 is expected to result in no significant impact.

### 3.6.3 Fish

**Affected Resource** – The Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is the only listed threatened fish species in the GOM that inhabits major rivers and inner shelf waters from the Mississippi River to the Suwannee River, Florida (Barkuloo, 1988). The Gulf sturgeon is an anadromous fish that migrates from the sea upstream into coastal rivers to spawn in freshwater, it historically ranged from the Mississippi River to Charlotte Harbor, Florida (Wakeford, 2001). Gulf sturgeons are bottom suction feeders that have ventrally located, highly extrusible mouths. Fishes that forage by taste are opportunistic feeders because smell is much more discriminating than taste. Another adaptation of sturgeon to major rivers and offshore waters is mobility (an adaptation to the large habitat scale).

The Gulf sturgeon critical habitat occurs in the estuarine and riverine locations along the Gulf coast east of the Mississippi River in Louisiana, Mississippi, Alabama, and Florida. Critical habitat is defined as special geographic areas that are essential for the conservation of a threatened and endangered species, and that may require special management and protection. Designated Gulf Sturgeon habitat is confined to state waters (USFWS and GSMFC, 1995; USFWS and GSMFC, 2009).

The endangered smalltooth sawfish (*Pristis pectinata*) was historically common throughout the GOM. The current range of the smalltooth sawfish is peninsular Florida and common only to the everglades (NMFS, 2009). Smalltooth sawfish are livebearers and the juvenile smalltooth sawfish occupy shallow estuaries and nearshore areas (NMFS, 2009). The current designated critical habitat for the smalltooth sawfish is two areas along the southwest coast of Florida:

(<http://www.nmfs.noaa.gov/pr/species/fish/smalltooth-sawfish.html>). ESA listed fish are listed in Table 10.

**Table 10**  
**ESA Listed Fish in the GOM**

Common Name	Scientific Name	Federal Status	Migration Patterns	Population <sup>1</sup>
Gulf sturgeon	<i>Acipenser oxyrinchus desotoi</i>	Threatened	transient	9,400-11,000
Smalltooth sawfish	<i>Pristis pectinata</i>	Endangered	resident	N/A

<sup>1</sup>U.S. Fish and Wildlife Service. Environmental Conservation Online System. <http://ecos.fws.gov/>

**Impact Analysis** – The only IPF potentially affecting the threatened and endangered fish is accidental releases.

Due to distance (nearest shoreline is approximately 163 mi (262 km)) and the response capabilities no significant adverse impacts are expected. Contact is minimized due to distance from small spills for the Gulf sturgeon and smalltooth sawfish.

It is unlikely there would be any Gulf sturgeon in the proposed project area due to water depth (BOEM, 2012a, 2012b). If oil reaches Gulf sturgeon habitat, the fish could be affected by direct ingestion, ingestion of oiled prey, or the absorption of dissolved petroleum products through the gills. Based on the life history of this species, subadult and adult Gulf sturgeon would be most vulnerable to an estuarine or marine oil spill, and would be vulnerable only during winter months (from September 1 through April 30) when this species is foraging in estuarine and marine habitats (NMFS, 2007).

Smalltooth sawfish are not likely to be present from the Florida panhandle to Texas. The Garden Banks Area is outside the current range and critical habitat (NMFS, 2009).

Further discussion on potential impacts from releases can be found in Section 3.3. Implementation of BOEM/BSEE environmental and safety regulations may further reduce the probability of the occurrence of a large volume/long duration spill.

#### 3.6.4 Coastal and Marine Birds

**Affected Resource** – Several birds that inhabit or frequent the northern GOM coastal areas are recognized by USFWS as either endangered or threatened: interior least tern (*Sterna antillarum*), Mississippi sandhill crane (*Grus canadensis*), piping plover (*Charadrius melodus*), whooping crane (*Grus americana*), red knot (*Calidris canutus rufa*), and wood stork (*Mycteria americana*) (BOEM, 2012a, 2012b, 2013).

On July 10, 2001, the final rule was published for critical habitat for the wintering population of piping plover in 82 areas from west Florida south to Tampa Bay, Alabama, Louisiana, and Texas. On May 19, 2009, an additional 139,029 acres (56,263 hectares) of were designated as critical habitat for the wintering population of piping plover to extend the critical habitat in coastal Texas. Critical habitat identifies specific areas that are essential to the conservation of a listed species and that may require special management consideration or protection. The primary constituent needs for the piping plover are those habitat components that are essential for the primary biological needs of foraging, sheltering, and roosting. The least tern is not considered federally endangered or threatened within 50 mi of the GOM. Only the interior nesting colonies are endangered (MMS, 2007, 2008a). Two other coastal species (Bald Eagle and Brown Pelican) are no longer listed as endangered or threatened (BOEM, 2012a, 2012b, 2013). ESA listed shorebirds and coastal nesting birds are listed in Table 11.

**Table 11**  
**ESA Listed Birds in the GOM**

Common Name	Scientific Name	Federal Status	Migration Patterns	Population <sup>1,2</sup>
Interior least tern	<i>Sterna antillarum</i>	Endangered	transient	N/A
Mississippi sandhill crane	<i>Grus canadensis pulla</i>	Endangered	resident	N/A
Piping plover	<i>Charadrius melodus</i>	Threatened	transient	8,000
Red knot	<i>Calidris canutus rufa</i>	Threatened	transient	N/A
Whooping crane	<i>Grus americana</i>	Endangered	transient	405
Wood stork	<i>Mycteria americana</i>	Threatened	transient	N/A

<sup>1</sup>Bird and life international, piping plover. <http://www.birdlife.org/datazone/speciesfactsheet.php?id=3127>.

<sup>2</sup>USFWS environmental conservation online system. <http://ecos.fws.gov/>

**Impact Analysis** - The IPFs potentially affecting threatened and endangered birds are helicopter traffic, marine debris, and accidental release.

Helicopter and service-vessel traffic are not expected to result in significant impact if the FAA (Advisory Circular 91 36C), corporate helicopter policy, and USCG protocol are followed. Compliance with BSEE NTL 2015-G03 is expected to result in no significant impact with trash and debris.

Due to distance (nearest shore is about 163 mi (262 km)) and the response capabilities, accidental releases are not expected to result in significant adverse impacts. As discussed in Section 3.5 of this EIA (Coastal Resources), large spills may impact the habitats used by coastal marine birds. No significant impact is expected to shorebirds and coastal nesting birds.

### 3.6.5 Beach Mice

**Affected Resource** – The Alabama (*Peromyscus polionotus ammobates*), Choctawhatchee (*Peromyscus polionotus allophrys*), St. Andrew (*Peromyscus polionotus peninsularis*), and Perdido Key Beach Mice (*Peromyscus polionotus trissyllepsis*), occupy restricted habitats in the mature coastal dunes of Florida and Alabama (BOEM, 2012a, 2012b, 2013). All four subspecies are listed as endangered. ESA listed beach mice are listed in Table 12.

**Table 12**  
**ESA Listed Beach Mice along the Northern GOM**

Common Name	Scientific Name	Federal Status	Migration Patterns	Population <sup>1</sup>
Alabama beach mouse	<i>Peromyscus polionotus ammobates</i>	Endangered	resident	N/A
Perdido key beach mouse	<i>Peromyscus polionotus trissyllepsis</i>	Endangered	resident	N/A
Choctawhatchee beach mouse	<i>Peromyscus polionotus allophrys</i>	Endangered	resident	N/A
St. Andrew beach mouse	<i>Peromyscus polionotus peninsularis</i>	Endangered	resident	N/A

<sup>1</sup>USFWS environmental conservation online system. <http://ecos.fws.gov/>

**Impact Analysis** – The IPFs potentially affecting beach mice are vessel traffic, marine debris, and accidental releases.

An increase in the number of vessel trips could result in minor incremental impacts to channels and coastal erosion rates. Standard activities associated with exploration, development and production have been documented and typically have a limited number of vessels required and a relatively short timeframe for each phase resulting in impacts being short term (duration of the drilling and completion activities) and localized. No significant impacts are expected. Compliance with BSEE NTL 2015-G03 is expected to result in no significant impact with trash and debris.

Further relevant discussion on potential effects of an accidental release and subsequent cleanup to relevant coastal beaches and wetland habitat areas for beach mice can be found in Section 3.5 of this EIA. No significant impact is expected to beach mice.

## 3.7 Archaeological Resources

### 3.7.1 Shipwreck Sites (known or potential)

**Affected Resource** – A historic shipwreck is defined as a submerged or buried vessel, at least 50 years old, that has foundered, stranded, or wrecked and is

presently lying on or embedded in the seafloor including vessels that exist intact or as scattered components on or in the seafloor. Several studies (Garrison et al., 1989; Pearson et al., 2003) have been conducted to model areas in the GOM where historic shipwrecks were most likely to exist. A study in 1977 concluded that two-thirds of the total number of shipwrecks in the northern GOM lie within 1 mi (1.5 km) of the shore and most of the remainder lie between one and six mi (1.5 and 10 km) off the coast (Coastal Environments Inc., 1977). In 1989 a study found that frequency of shipwrecks in the open sea of the Eastern GOM to be nearly double that of the Central and Western GOM (Garrison et al., 1989). The highest observed frequencies of shipwrecks were within areas of intense marine traffic, such as the approaches and entrances to seaports and the mouths of navigable rivers and straits. The most recent study in 2003 used about 15 years of high-resolution shallow hazard surveys in lease blocks and along pipeline routes (Pearson et al., 2003). Several of these pipeline hazard surveys succeeded in locating historic ships, ranging in age from an 18th-century armed sailing ship to a World War II German U-boat (Pearson et al., 2003).

Over a dozen shipwrecks have been located in deep water and nine of these ships have been confirmed visually as historic vessels (Pearson et al., 2003). Many of these wrecks were not previously known to exist in these areas from the historical records. As a result, the guidelines for conducting archaeological surveys were revised and about 1,200 lease blocks were added to the list of blocks requiring an archaeological survey and assessment (NTL 2005-G07 and Joint NTL 2011-G01). Since implementation of these new lease blocks there have been at least 10 possible historic shipwrecks reported in this area. Most of these wrecks are known only through the historical record and, to date, have not been located on the ocean floor. The BOEM/BSEE Shipwreck Database lists 911 wrecks in the CPA and 494 wrecks in the WPA (MMS, 2007; BOEMRE, 2011; BOEM, 2012a, 2012b).

**Impact Analysis** – The only IPFs potentially affecting shipwrecks are accidental releases.

Garden Banks Block 956 is not stipulated as requiring archaeological resource surveys and reports (NTL 2005-G07 and Joint NTL 2011-G01). However, mitigation guidelines, released in March 2011 entitled “Pre-Seabed Disturbance Survey Mitigation” require an archaeological assessment prior to undertaking any bottom disturbing activities. Berger Geosciences, LLC performed an archaeological resource survey, shallow hazards assessment, and benthic communities evaluation for Garden Banks Blocks 913, 956, 957, and 1000 (Berger Geosciences, LLC, 2016). No archaeologically significant artifacts were identified within the study area. In addition, no existing man-made features or infrastructure were identified. Should Cobalt discover man-made debris that appears to indicate the presence of a shipwreck within or adjacent to the project area, Cobalt will immediately halt operations

An accidental release (blowout) at the seafloor could create a crater and resuspend and disperse large quantities of bottom sediments within a 984 ft (300 m) radius of the blowout site (BOEM, 2012a, 2012b), burying shipwrecks. Subsurface spills could result in the formation and settling of oil-saturated material, and oil-sediment particles could come into contact with shipwrecks. The extent of such impacts will vary depending on, among other factors, the magnitude and duration of such an incident. Implementation of BOEM/BSEE environmental and safety regulations may further reduce the probability of the occurrence of a large volume/long duration spill.

### 3.7.2 Prehistoric Archaeological Sites

**Affected Resource** – Archaeological resources are any material remains of human life or activities that are at least 50 years of age and that are of archaeological interest (30 CFR 550.105). The Archaeological Resources Regulation (30 CFR 550.194) provides specific authority to each BOEM/BSEE Regional Director to require archaeological resource surveys, analyses, and reports. Surveys are required prior to any exploration or development activities on leases within areas determined to have a high potential for archaeological resources (NTL 2005-G07 and Joint NTL 2011-G01).

During the period 20,000-17,000 years before present, sea level in the northern GOM was estimated from 295 ft (90 m), to 427 ft (130 m), lower than present sea level (Nelson and Bray, 1970). Sea level in the northern GOM reached its present stand around 3,500 years before present (Pearson et al., 1986).

Early man was estimated to have arrived into the GOM region around 12,000 years before present (Aten, 1983; Rees, 2010). Sea-level for the northern GOM was estimated to have been from 148-197 ft (45-60 m) below the present day sea level (Coastal Environments Inc., 1977, 1982). Prehistoric sites dating after 12,000 years before present have the highest potential on the continental shelf from the shore to the 148-197 ft (45 to 60 m) bathymetric contour. BOEM has adopted the 197 ft (60 m) water depth as the seaward extent for archaeological site potential in GOM because of uncertainties in the depth of sea level and the entry date of prehistoric man into North America.

Remote-sensing surveys have identified barrier islands and back-barrier embayments, river channels and associated floodplains and terraces, and salt-dome features as having a high potential for prehistoric sites. There is evidence that mound building activity may have occurred as early as 6,200 years before present in Louisiana and Florida suggesting manmade features may exist in the shallow portions of the OCS (Hagg, 1992; Saunders et al., 1992; Russo, 1992).

The McFaddin Beach site, east of Galveston in the McFaddin National Wildlife Refuge, has produced late Pleistocene megafaunal remains and lithics and Paleo-Indian artifacts (Stright et al., 1999). Surveys from Sabine-Calcasieu River Valley and other areas of the western part of the CPA have produced evidence of floodplains, terracing, and point-bar deposits in association with relict late Pleistocene fluvial systems (Coastal Environments Inc., 1986). Prehistoric sites associated with these features would have a high potential for preservation. The Salt Mine Valley site on Avery Island in Louisiana is a Paleo-Indian site associated with a salt-dome solution feature (Coastal Environments Inc., 1977). Solution features at the crest of these domes would have a high potential for preservation of associated prehistoric sites.

**Impact Analysis** – IPFs for archaeological resources will result from accidental releases.

Garden Banks Block 956 is not stipulated as requiring archaeological resource surveys and reports (NTL 2005-G07 and Joint NTL 2011-G01). However, mitigation guidelines, released in March 2011 entitled “Pre-Seabed Disturbance Survey Mitigation” require an archaeological assessment prior to undertaking any bottom disturbing activities. Berger Geosciences, LLC performed an archaeological resource survey, shallow hazards assessment, and benthic communities evaluation for Garden Banks Blocks 913, 956, 957, and 1000 (Berger Geosciences, LLC, 2016). No prehistoric relict channels or other landforms were identified within the survey area. The magnetometer and sidescan sonar data indicated a total of 69 anomalies; however, Berger Geosciences, LLC interprets these to be “modern debris” or are “natural in origin”. Should Cobalt discover man-made debris that appears to indicate the presence of a shipwreck within or adjacent to the project area, Cobalt will immediately halt operations and contact BOEM archeologists.

An accidental release (blowout) at the seafloor could create a crater and resuspend and disperse large quantities of bottom sediments within a 984 ft (300-m) radius of the blowout site (BOEM, 2012a, 2012b), burying archaeological resources. Subsurface spills could result in the formation and settling of oil-saturated material, and oil-sediment particles could come into contact with archaeological resources. The extent of such impacts will vary depending on, among other factors, the magnitude and duration of such an incident.

### **3.8 Other Resources Identified**

Other resources identified are public health and safety, socioeconomic and waste management.

### 3.8.1 Public Health and Safety

An accidental H<sub>2</sub>S release from the proposed activities is not expected that could impact public health and safety. This project does not expect to encounter the presence of H<sub>2</sub>S in concentrations greater than 500 parts per million (ppm). In accordance with 30 CFR 550.215(b), Cobalt has submitted information to justify their request that the area of our proposed activities continue to be classified as H<sub>2</sub>S absent. Refer to Section 7 of the EP.

An accidental release could result in the public being exposed to oil on the water and along the shoreline, including skin contact or breathing volatile organic compounds. The amount of exposure will depend on the magnitude and duration, the physical/chemical characteristics of the material, the oceanic conditions and the effectiveness of the spill response. During the recent Macondo event extensive air sampling conducted by the USEPA found no evidence of onshore levels of contaminants that are of significant concern for the long term health of residents of coastal communities (<https://archive.epa.gov/bpspill/web/html/air-mon.html> and <https://archive.epa.gov/bpspill/web/html/air.html>).

Wildlife cleaning and rehabilitation workers have reported concerns including scrapes and cuts, itchy or red skin or rash, and symptoms of headache or feeling faint, dizzy, or fatigued. Hand, shoulder, or back pain was also reported by some wildlife cleaning workers (Centers for Disease Control and Prevention, 2010). In a study where spill response workers were exposed to heat stress and acute exposure to hydrocarbons headaches, dizziness, nausea, vomiting, cough, respiratory distress, and chest pain were reported (Solomon and Janssen, 2010). No significant impact is expected to public health and safety.

### 3.8.2 Socioeconomics

**Affected Resource** – Commercially important species include the estuary-dependent species such as Atlantic menhaden, shrimps, oyster, crabs, and sciaenids (Benson, 1982; Hoese and Moore, 1977). Menhaden, with landings of about 1.4 billion pounds and valued at \$1044 million, was the most important GOM species in quantity landed during 2011. Shrimp, with landings of nearly 220 million pounds and valued at about \$438 million, was the most important GOM species in value landed during 2004. In 2011 commercial fishermen in the GOM region landed 1.8 billion pounds of finfish and shellfish (NMFS, 2011). In 2011, over 3 million anglers took 24 million recreational fishing trips were taken in the GOM, which generated about \$12 billion in sales, over \$9 billion in fishing trips and durable equipment (NMFS, 2011).

Tourism and recreation are integral components of the economy of the GOM. Visitors to Texas, Louisiana, Mississippi, Alabama, and Florida spent approximately

\$94 billion in 2008 (BOEMRE, 2011; BOEM, 2012a, 2012b). This spending helped to support approximately 2.4 million jobs in recreation-based industries statewide. Approximately, 600,000 of these jobs are in counties that are directly along the coast. Recreational jobs account for 14.8 percent of Gulf Coast employment, greater than the national average of 12.4 percent (BOEMRE, 2011; BOEM, 2012a, 2012b). Gulf Coast recreational employment is reasonably cyclical, with the peak months during the past few years occurring between March and June (BOEMRE, 2011; BOEM, 2012a, 2012b). Archaeological sites provide recreational opportunities (e.g. tourism and diving) both offshore and onshore.

The importance of the oil and gas industry to the coastal communities of the GOM is significant, especially in Louisiana, eastern Texas and coastal Alabama. Oil service related employment is concentrated in coastal Louisiana Parishes (St. Mary, Terrebonne, Lafourche, Iberia, and Plaquemines) and drilling related employment is most concentrated in Harris County, Texas and Lafayette Parish Louisiana (BOEM, 2012a, 2012b). Changes in OCS oil and gas activities have significant employment implications to the communities, especially those directly or indirectly related to oil and gas development (BOEM, 2013).

Sufficient land is designated in commercial and industrial parks and adjacent to the existing ports to minimize potential disruption to current residential and business use patterns (MMS, 2007, 2008a). The high level of offshore oil and gas activity in the GOM is accompanied by development of onshore service and support facilities. This onshore infrastructure includes gas processing plants, navigation channels, oil refineries, pipelines, storage yards, fabrication yards, separation facilities, service bases, and terminals as well as landfills and disposal sites for drilling and production wastes (MMS, 2007, 2008a).

**Impact Analysis** – The IPF potentially affecting socioeconomics is an accidental release.

A large volume/long duration accidental release has the potential to impact on recreation and tourism; recreational and commercial fishing and employment. Tourism impact would depend on the extent to which any structural/ecological damage can be repaired, as well as on the extent to which public confidence in the tourism industry can be restored (BOEMRE, 2011; BOEM, 2012a, 2012b). For example, a long duration/large volume oil spill may result in a recreational and/or commercial fishery closure. An accidental release may or may not result in fishery closures, depending on the magnitude and duration of the spill, the oceanographic and meteorological conditions at the time, and the effectiveness of spill response measures.

Most small spills (<1,000 barrels (bbl)) as a result of OCS activities involve fuel spills such as fuel oil or diesel (MMS, 2007, 2008a). Most OCS petroleum spills are <1

bbl, with an average size of 0.05 bbl. Median size spills range from 1 – 10 bbl and averaged 3 bbl. Only 0.05 percent of spills averaged  $\geq 1,000$  bbl (MMS, 2007, 2008a). The most common size spill predicted for activities in the WPA and CPA is  $<1$  bbl (MMS, 2007, 2008a) and caused by a hose rupture resulting in the loss of the contents of a fuel transfer hose.

Most OCS petroleum spills are  $<1$  bbl, with an average size of 0.05 bbl. Median size spills range from 1 – 10 bbl and averaged 3 bbl. Only 0.05 percent of spills averaged  $\geq 1,000$  bbl

A small fuel spill would be brief and the resulting opportunity for impact would be brief. The potential to impact on recreation and tourism; recreational and commercial fishing and employment would be negligible as a small fuel spill would disperse, weather or evaporate by natural processes within a few hours to days (MMS, 2007, 2008a). An accidental fuel spill would likely not result in fishery closures.

Damage by an accidental release on corals and other organisms on archaeological resources (i.e. shipwreck sites) could change the surrounding site and increase degradation. Additionally, onshore habitat could degrade and erode, which would increase exposure to and subsidence of prehistoric and historic sites. Archaeological resources affected from the release or cleanup activities cannot be reversed, therefore leading to a loss of archaeological data.

The Martin Terminal North Yard facility in Port Fourchon, Louisiana will be primarily used to support general vessel operations and is located approximately 194 mi (312 km) (Figure 1) from the general project area, and provides outdoor and warehouse storage space, crane services, drinking and drill water, fueling facilities, and dock space. The base is in operation 24 hours each day.

No new or expanded facilities will be constructed, and no new employees are expected to move permanently into the area. The project will have a negligible impact on socioeconomic conditions such as local employment, existing offshore and coastal infrastructure (including major sources of supplies, services, energy, and water), and minority and lower income groups. Levels of boat and helicopter traffic, as well as demand for goods and services including scarce coastal resources, will represent a small fraction of the level of activity occurring at the shore base. The response to a release would be staged primarily out of existing facilities; however, there could be limited temporary impacts on land use along the coast if additional staging areas were needed. These areas would eventually return to their original use as the response is demobilized. No significant impact is expected to socioeconomic resources.

### 3.8.3 Waste Management

**Affected Resource** – Offshore drilling operations generate several types of wastes such as municipal trash (paper, plastic, wood, food wrappings, etc.), scrap metal, spent drilling fluids, and chemicals. A majority of the waste generated is associated with offshore food service operations, as well as drilling operations and maintenance activities of the drillship. These waste types are identified in the various tables submitted in the EP and are managed in accordance with USEPA's and applicable state waste regulations. Operational waste is collected and stored until it is shipped to appropriate permitted landfills or disposal companies.

An accidental release of oil could generate large quantities of additional waste materials and debris. This could include: tar balls, oiled vegetation and sand, spent personal protective equipment (PPE), oil and oily water, and oiled sorbent materials (e.g. rags, boom and absorbent pads) (USEPA, 2010). The amount of material generated will depend on the magnitude and duration, the physical/chemical characteristics of the material, the oceanic conditions and the effectiveness of the spill response. The waste generated from a spill response will be segregated by waste type and sent to an appropriate disposal facility permitted to receive and manage such wastes.

**Impact Analysis** – The IPFs potentially affecting groundwater and onshore environments are onshore waste disposal and an accidental release.

Landfills are state permitted waste management facilities and must comply with the Resource Conservation and Recovery Act (RCRA) regulations at the federal, state and local levels. The regulations include design criteria for the protection of groundwater and the surrounding environments such as: location restrictions, composite liner requirements, leachate collection and removal systems, operating practices, groundwater monitoring requirements, closure and post-closure care requirements, corrective action provisions, and financial assurance. Cobalt conducts routine independent audits of commercial waste disposal facilities to review their waste management practices, permitting and compliance history. Refer to Section 6 of the EP for additional information regarding approved waste disposal vendors and sites. Refer to Section O of the EP for additional information regarding wastes types and amounts.

Cobalt will manage waste in accordance with the regulations and avoid accidental loss of solid waste 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 in accordance with BSEE NTL 2015-G03. Refer to Section 2.1 of this EIA for additional information. 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.

The Dismukes et al. (2007) study stated that landfill capacities do not appear to be a constraint in any fashion to the ongoing or future development of offshore oil and gas activities. Environmental regulators in the region indicated that existing facilities have ample capacity without future constraints. The USEPA recently stated that active landfills have abundant capacity to handle the expected wastes from large response efforts and therefore, the addition of the waste generated from large response efforts would not significantly shorten the expected life-span of the landfills (USEPA, 2010). Therefore, there are no significant impacts expected from onshore waste disposal to groundwater and the onshore environments.

#### **4.0 ENVIRONMENTAL HAZARDS**

The proposed activities could be adversely impacted by strong environmental phenomena (e. g. hurricanes). Cobalt's Severe Weather Contingency Plan identifies the thresholds (e. g. wind speed, current speed) at which such impacts may occur and describes the consequences and measures Cobalt will take to mitigate those impacts.

Garden Banks Block 956 does not lie within a Military Warning Area ([http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Gulf-of-Mexico-Region/MWA\\_boundaries-pdf.aspx](http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Gulf-of-Mexico-Region/MWA_boundaries-pdf.aspx)). The nearest military warning areas are W-147AB, W-59BC, and W-59A located approximately 75 miles or more north of the prospect area. It is more than 100 mi from Ordnance Disposal Areas (<http://www.boem.gov/Environmental-Stewardship/Environmental-Studies/Gulf-of-Mexico-Region/OrdnanceDumpingAreas.aspx>).

#### **5.0 CUMULATIVE IMPACT ANALYSIS**

Cumulative effects of OCS (i.e., oil and gas leasing, exploration, development, and production) and non-OCS related activities for the CPA and WPA as well as the Gulf Coast region have been addressed as part of the NEPA documentation completed for proposed multi-sale lease activities. OCS related activities include routine operations (e.g., drillship presence (noise and lights), bottom disturbing activities, vessel traffic, operational discharges, noise generated by platforms, drillships, helicopters and vessels, seismic surveys, explosive structure removals) and accidental events (e.g., oil spills, oil-spill-response activities, vessel collisions loss of debris from service vessels and OCS structures). Non-OCS related activities were considered, but not limited to crude oil import tankering, State oil and gas activity, recreational and commercial fishing, coastal development, natural processes (hypoxia), and recreational, commercial and military vessel traffic. These OCS and non-OCS activities are considered in this section so far as

they could contribute to the cumulative environmental and socioeconomic impacts pertinent to the proposed activities. Cumulative impacts from OCS and non-OCS related activities are discussed in the EISs for lease sales in the GOM (MMS, 2007; MMS, 2008a; BOEMRE, 2011; BOEM 2011a, 2011b, 2012).

The proposed activities described in the EP are similar to those addressed in previous multiscale final and draft supplemental EISs (MMS 2007, 2008a; BOERME 2011; BOEM 2011b, 2012). The recent final and draft supplemental EISs analyzes impacts upon environmental and socioeconomic resources, including cumulative impacts, against new information related to the Macondo incident. The cumulative impacts discussed in these NEPA documents include other reasonably foreseeable activities expected to take place in the GOM. Incremental impacts from the work planned in this project are expected to be negligible as a result of conforming to the laws, regulations, lease stipulations, and NTLs, and the limited geographic scope and duration.

Although regulatory uncertainties continue to affect the approval of new exploration and development plans, and the issuance of new permits to drill, additional projects are expected to proceed. The closest existing production facility is in Garden Banks Block 783, located about 15 miles away. The closest approved drilling activity is in Garden Banks Block 998, located about 7 miles way. Discussions below address how the impacts, if any, from the proposed EP activities are expected to contribute to the cumulative impacts of this and other similar projects.

The Gulf Coast has survived major natural and manmade disasters (i.e., hurricanes and oil spills), through which the people and environmental resources of the GOM and the Gulf Coast have repeatedly demonstrated their resiliency. While environmental and socioeconomic resources may recover from a natural or manmade disaster if given enough time between disasters, disasters happening in unison or within short periods of each other would make recovery more difficult (BOEMRE, 2011; BOEM, 2011b, 2012a, 2011b).

The magnitude of OCS and non-OCS activity in the GOM is so immense that routine activities associated with a single OCS oil and gas activity (e.g., single lease sale, single well) would likely have minor to no incremental contribution to the impacts of cumulative activities. However, a large blowout and spill could contribute to cumulative impacts on a variety of GOM resources (BOEMRE, 2011; BOEM, 2011b, 2012).

## **6.0 MITIGATION MEASURES**

The proposed action includes numerous mitigation measures required by laws, regulations, and BOEM lease stipulations and NTLs. The project should comply with all applicable Federal, State, and local requirements concerning air pollutant emissions, discharges to water, and solid waste disposal. All project activities should be conducted under guidance by Cobalt's OSRP and will include the measures described in NTL 2016-G02, NTL 2016-G01, NTL 2015-BSEE-G03, and NTL 2012-JOINT-G02. Additional mitigation measures include:

- Low sulfur fuel to be used.
- Water treatment equipment will be effectively operated and maintained to reduce pollutant discharge.
- A waste minimization plan will be followed for ongoing operations to recycle and source reduce waste.

O'Brien's provides spill management expertise to Cobalt, and Cobalt is a member of the Helix Well Containment Group (HWCG) which provides a comprehensive well-containment response system. Additionally, Cobalt has contracts in-place with three (3) Oil Spill Removal Organizations (OSROs): Marine Spill Response Corporation (MSRC), National Response Corporation (NRC), and Clean Gulf Associates (CGA). MSRC, NRC, and CGA will provide both equipment and trained personnel in the event an oil spill response is mounted as a result of Cobalt's proposed activities described in the Plan.

## **7.0 CONSULTATION**

No agencies or persons were consulted regarding potential impacts associated with the proposed activities.

## **8.0 PREPARERS**

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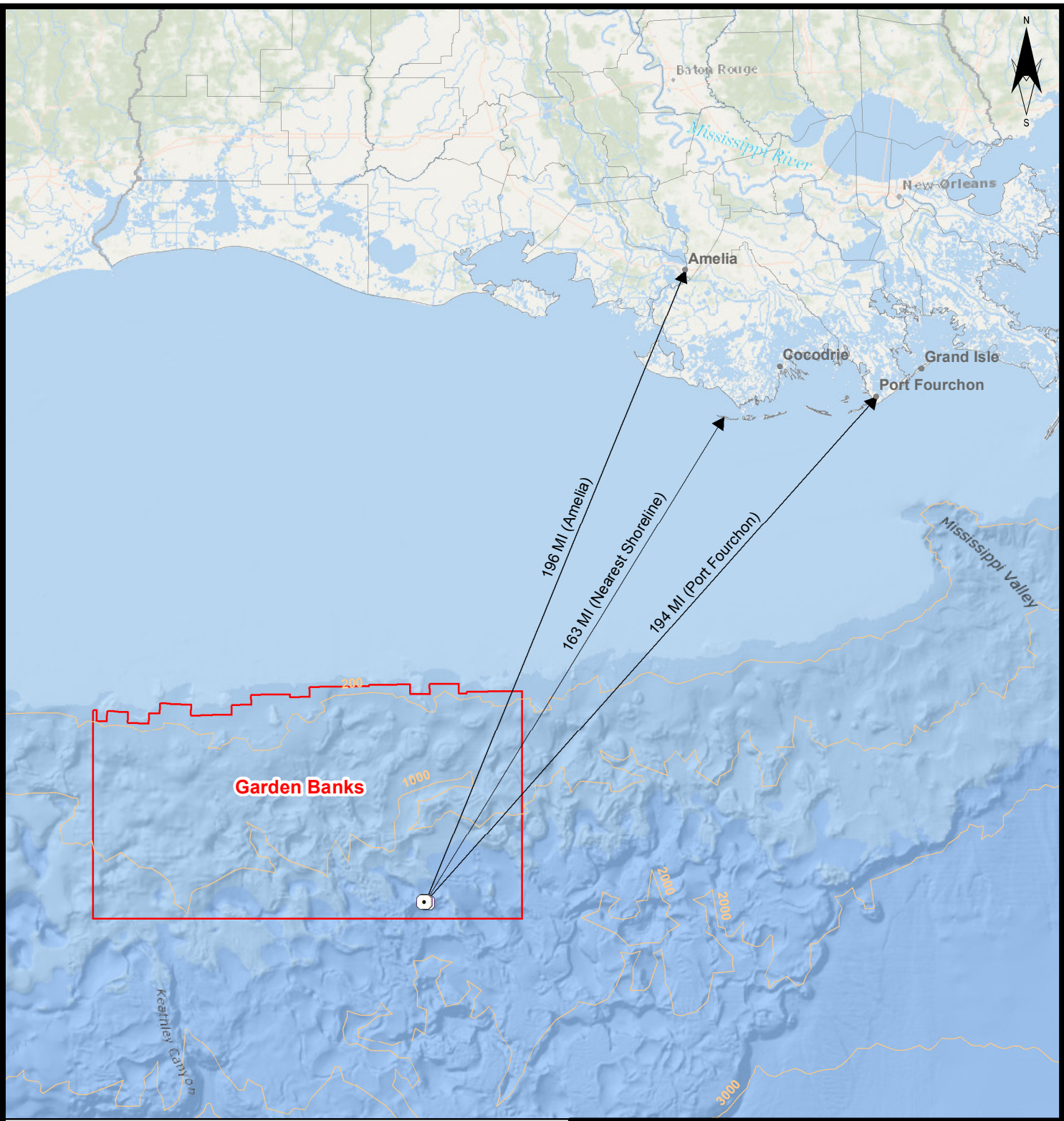
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## FIGURES



- Garden Banks 956
- Bathymetric Contour (NOAA)
- Protraction Areas (BOEM-GOMR)

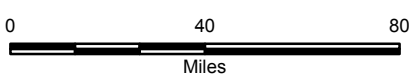


**Cobalt International Energy, L.P.**  
Houston, Texas

Environmental Impact Analysis

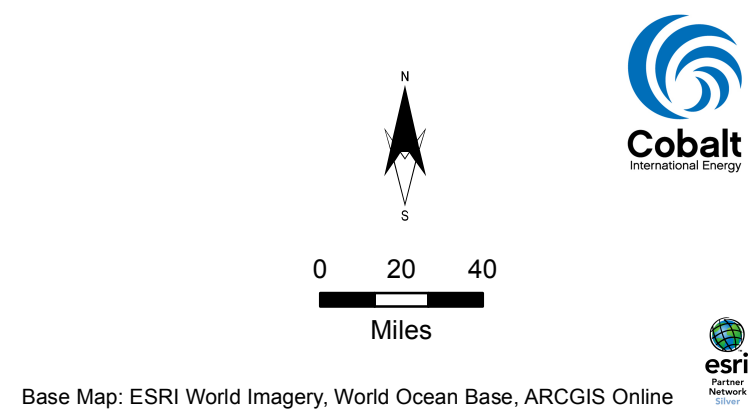
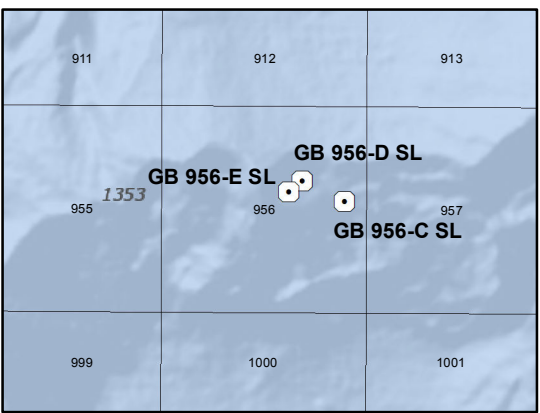
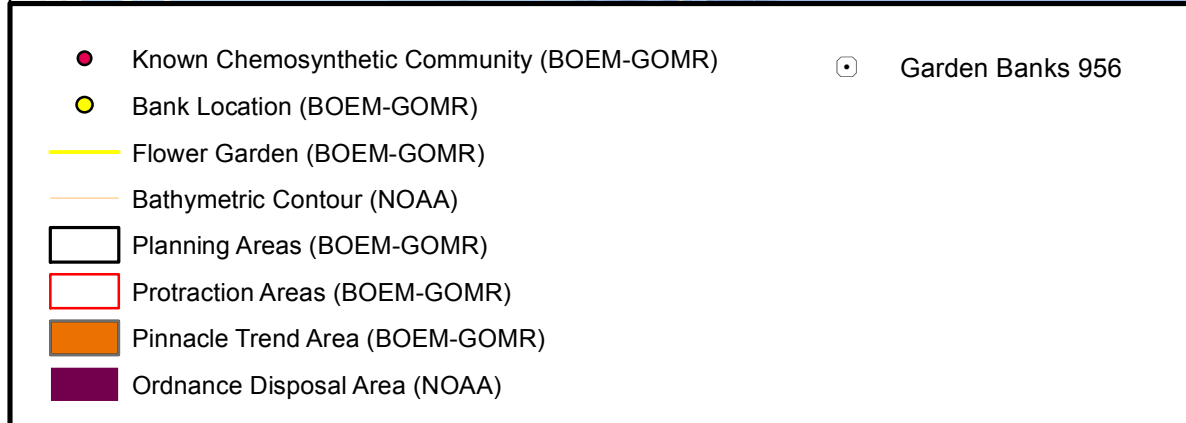
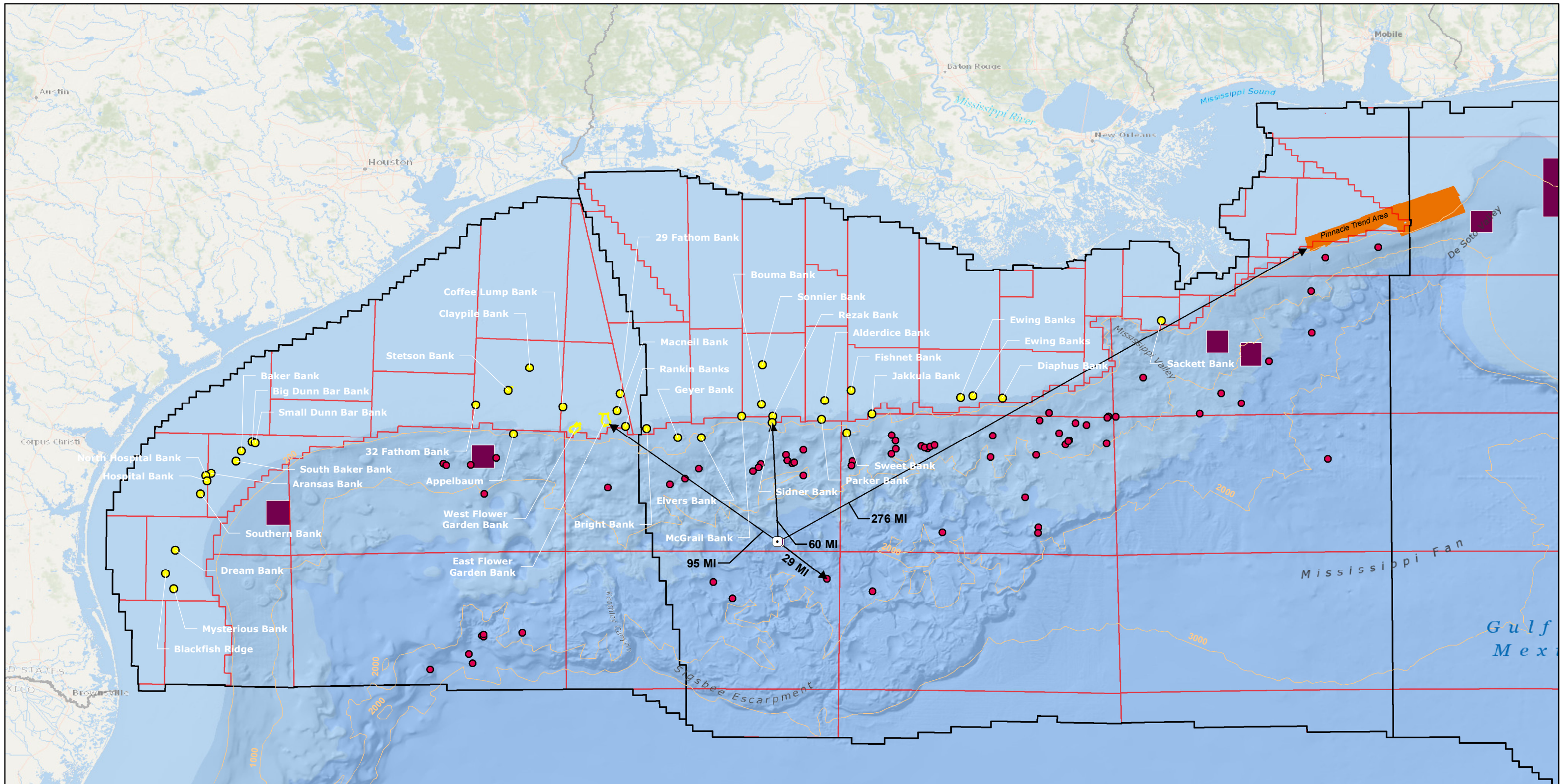
**Site Location Map**

Gulf of Mexico



Drawn:	CPL/AM10.4
Checked:	CMP
Approved:	JLD
Date:	11/01/2016
Dwg. No.:	A14325-01

**Figure 1**



**Cobalt International Energy, L.P.**  
Houston, Texas

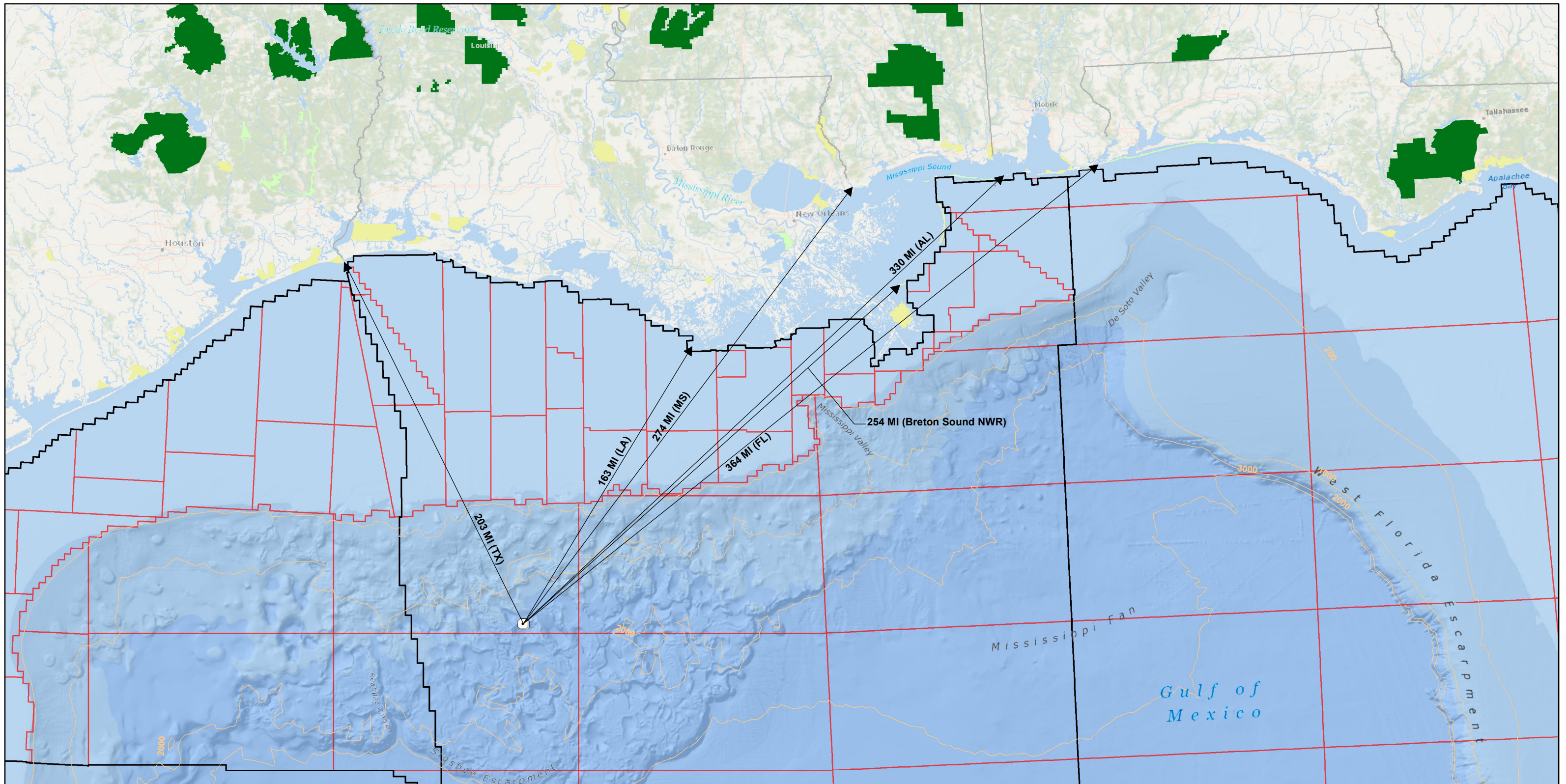
Environmental Impact Analysis

**Seafloor Biological Communities**

Gulf of Mexico

Drawn:	CPL/AM10.4
Checked:	CMP
Approved:	JLD
Date:	11/01/2016
Dwg. No.:	B14325-02

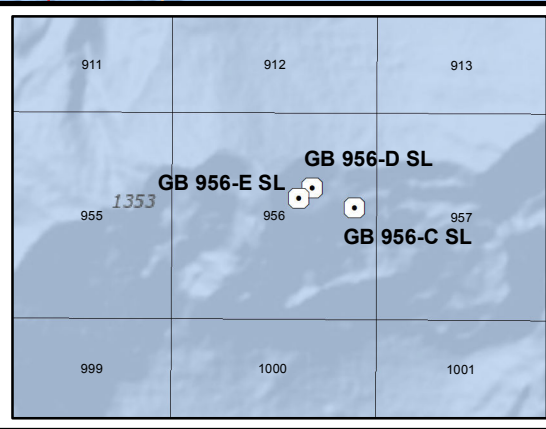
Figure 2



- Garden Banks 956
- Bathymetric Contour (NOAA)
- Planning Areas (BOEM-GOMR)
- Protraction Areas (BOEMS-GOMR)

**Federal Lands (ESRI)**

- Forest Service
- Fish and Wildlife Service
- National Park Service



Miles

Base Map: ESRI World Imagery, World Ocean Base, ARCGIS Online

**Cobalt International Energy, L.P.**  
Houston, Texas

Environmental Impact Analysis

**Coastal Wildlife Refuges and Cities**

Gulf of Mexico

Drawn:	CPL/AM10.4
Checked:	CMP
Approved:	JLD
Date:	11/01/2016
Dwg. No.:	B14325-03

Environmental Consultants

Partner Network

Figure 3