UNITED STATES GOVERNMENT
MEMORANDUM

February 13, 2019

To: Public Information
From: Plan Coordinator, LP, Plans Section
(GM235D)

Subject: Public Information copy of plan

- Control # - S-07921
- Type - Supplemental Development Operations Coordinations Document
- Lease(s) - OCS 00391 Block - 26 Grand Isle Area
- Operator - Cantium, LLC
- Description - Well 002 and Caisson 05
- 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.

Michelle Griffitt
Plan Coordinator

Site Type/Name	Botm Lse/Area/Blk	Surface Location	Surf Lse/Area/Blk
CAIS/05		2897 FNL, 4405 FEL	00391/GI/26
WELL/001	00391/GI/26	2898 FNL, 4394 FEL	00391/GI/26
WELL/002	00391/GI/26	2897 FNL, 4405 FEL	00391/GI/26

PUBLIC COPY
November 9, 2018

SUPPLEMENTAL DEVELOPMENT OPERATIONS COORDINATION DOCUMENT

Grand Isle Block 26 / Grand Isle Block 25
OCS 00391 / SL 21881
Unit Contract No. 891003915
Bexley Heath

Estimated Startup Date: February 15, 2019

SUBMITTED BY:
Cantium, LLC
111 Park Place Drive, Suite 100
Covington, LA 70433

Dan Alonso
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dan.alonso@cantium.us

AUTHORIZED REPRESENTATIVE:
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Record of Changes – PUBLIC COPY
S-7921, S-DOCD, Cantium, LLC, (OCS-G 00391 / SL21881, Grand Isle Blocks 26 / 25)

Date	Section	Page	Remarks
1/18/19		Cover	Include BHL lease number
1/18/19		Attachment List	Include Section 16
1/18/19	1.1	1	Update Plan Information
1/18/19	1	Attachment 1-A	Update coordinates on Form 137
1/18/19	1	Attachment 1-B	Update Location Plat
1/18/19	9.1, 9.4	16	Update OSRP approval date
1/18/19	13.1, 13.2	22	Update to include modification of Caisson No. 5; expand discussion of transportation system
1/18/19	16	25, Attachment 16-A	Include CZM Information and certification

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1-B	Well Location Plat
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Section 7	**Wastes and Discharges Information**
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16-A	Coastal Zone Management (CZM) Certification
Section 17	**Environmental Impact Analysis (EIA)**
17-A	Environmental Impact Analysis (EIA)

SECTION 1
PLAN CONTENTS

1.1 PLAN INFORMATION

Lease OCS 00391, Grand Isle Block 26 was issued July 17, 1948. Caisson #5 was installed on December 10, 2007. The lease is held by unit production. Cantium, LLC (Cantium) was designated operator of Lease OCS 00391 effective July 20, 2017. Lease OCS 00391 is in the South Bay Marchand Unit Contract No. 891003915, which was approved effective November 25, 2002.

Under this Supplemental Development Operations Coordination Document (DOCD), Cantium proposes to drill, complete, test and place one well on production, with a bottom-hole location in Grand Isle Block 25 SL21881. The proposed well will be drilled and produced from existing Caisson No. 5, which will be modified to a multi-well structure by adding a slot. The well path crosses from Grand Isle Block 26, Lease OCS 00391 into Louisiana state waters, Grand Isle Block 25, State Lease SL21881 and bottom-holes in that lease. The crossover from the federal lease to the state lease is entered on Form 137 for well 002 in the column labeled 'Bottom-Hole Location (For Wells)'.

The well location referred to throughout this plan as Well No. 002 is actually Well No. 001. Two wells were initially proposed for this area but the activities for one well have been postponed leaving one well which is now Well No. 001.

These development operations are in approximately 50 feet of water. The well will be drilled with a jackup MODU.

The OCS Plan Information Form BOEM-137 is included as **Attachment 1-A.**

1.2 LOCATION

A Well Location Plat depicting the surface location of the proposed well and water depth is included as **Attachment 1-B**.

1.3 SAFETY AND POLLUTION PREVENTION FEATURES

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

The rig will be equipped with safety and fire-fighting equipment required to comply with United States Coast Guard (USCG) regulations. Appropriate lifesaving equipment such as life rafts, life jackets, ring buoys, etc. as prescribed by the USCG, will be maintained on the rig at all times.

Safety features on the drilling unit will include well control, pollution prevention, and blowout prevention equipment as described in BSEE regulations 30 CFR 250 C, D, E, O, Q and S; and

as further clarified by BSEE Notices to Lessees, and current policy making invoked by the BSEE, Environmental Protection Agency (EPA) and the USCG.

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. 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. All spills will be reported to the appropriate governmental agencies.

1.4 STORAGE TANKS AND PRODUCTION VESSELS

The table below provides storage tanks with capacity of 25 barrels or more that will store fuels, 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)	MODU	3,704	2	7,408	32.4°
Production	MODU	25	1	25	25°

1.5 POLLUTION PREVENTION MEASURES

These operations do not propose activities for which the State of Florida is an affected state.

1.6 ADDITIONAL MEASURES

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

1.7 COST RECOVERY FEE

Documentation of the $4,238 cost recovery fee payment is included as **Attachment 1-C.**

U.S. Department of the Interior
Bureau of Ocean Energy Management

Attachment 1-A

OMB Control Number: 1010-0151
OMB Approval Expires: 6/30/2021

OCS PLAN INFORMATION FORM

General Information

Type of OCS Plan:		Exploration Plan (EP)	X	Development Operations Coordination Document (DOCD)			
Company Name: Cantium, LLC				BOEM Operator Number: 03481			
Address: 111 Park Place Drive, Suite 100				Contact Person: Dena Rodriguez			
Covington, LA 70433				Phone Number: 281-698-8512			
				E-Mail Address: dena.rodriguez@jccteam.com			
If a service fee is required under 30 CFR 550.125(a), provide the		Amount paid	$4,238	Receipt No.	26DD8IIJ		

Project and Worst Case Discharge (WCD) Information

Lease: OCS 00390			Area: Grand Isle			Block: 26			Project Name (If Applicable): N/A		
Objective(s)	X	Oil	X	Gas		Sulphur		Salt	Onshore Support Bases: Fourchon, LA; Golden Meadow, LA		
Platform / Well Name: SG-26			Total Volume of WCD: 1,534,800 bbls			API Gravity: 25°					
Distance to Closest Land (Miles): 4.1			Volume from uncontrolled blowout: 25,580 bbls								

Have you previously provided information to verify the calculations and assumptions for your WCD?	X	Yes		No
If so, provide the Control Number of the EP or DOCD with which this information was provided	R-6349			
Do you propose to use new or unusual technology to conduct your activities?		Yes	X	No
Do you propose to use a vessel with anchors to install or modify a structure?		Yes	X	No
Do you propose any facility that will serve as a host facility for deepwater subsea development?		Yes	X	No

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

Proposed Activity	Start Date	End Date	No. of Days
Modification of structure	02/15/2019	02/28/2019	14
Drill, Complete, Test, Commence Production – Well No. 001	03/15/2019	07/17/2019	125
Production – Well No. 001	07/18/2019	07/18/2029	10 year reserve life
Future Well Intervention Activities – Well No. 001	01/01/2020	12/31/2029	150 days/year

Description of Drilling Rig

X	Jackup		Drillship	
	Gorilla Jackup		Platform rig	
	Semisubmersible		Submersible	
	DP Semisubmersible		Other (Attach description)	
Drilling Rig Name (If known): Rowan EXL III or equivalent jackup				

Description of Structure

X	Caisson		Tension leg platform
	Fixed platform		Compliant tower
	Spar		Guyed tower
	Floating production system		Other (Attach description)

Description of Lease Term Pipelines

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

Form BOEM- 0137 (June 2018 – Supersedes all previous editions of this form which may not be used.)

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): 001					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?							Yes	X	No

WCD Info	For wells, volume of uncontrolled blowout (Bbls/Day): 370	For structures, volume of all storage and pipelines (Bbls):	API Gravity of fluid	50°

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS 00391	SL21881	OCS OCS
Area Name	Grand Isle	Grand Isle	
Block No.	26	25	
Blockline Departures (in feet)	N/S Departure: 2,898.18' FNL	N/S Departure:	N/S Departure F __ L N/S Departure F __ L N/S Departure F __ L
	E/W Departure: 4,394.21' FEL	E/W Departure:	E/W Departure F __ L E/W Departure F __ L E/W Departure F __ L
Lambert X-Y coordinates	X: 2,394,233.52	X:	X: X: X:
	Y: 153,121.13	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude: 29° 04' 54.7988" N	Latitude:	Latitude Latitude Latitude
	Longitude: 90° 05' 57.1767" W	Longitude:	Longitude Longitude Longitude

Water Depth (Feet): 50'	MD (Feet):	TVD (Feet):	MD (Feet): MD (Feet): MD (Feet):	TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet: N/A				

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
N/A			X:	Y:	
			X:	Y:	
			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): Caisson #5					Previously reviewed under an approved EP or DOCD?	X	Yes		No
Is this an existing well or structure?	X	Yes		No	If this is an existing well or structure, list the Complex ID or API No.	2030			
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?							Yes	X	No

WCD Info	For wells, volume of uncontrolled blowout (Bbls/Day):	For structures, volume of all storage and pipelines (Bbls): 0	API Gravity of fluid	

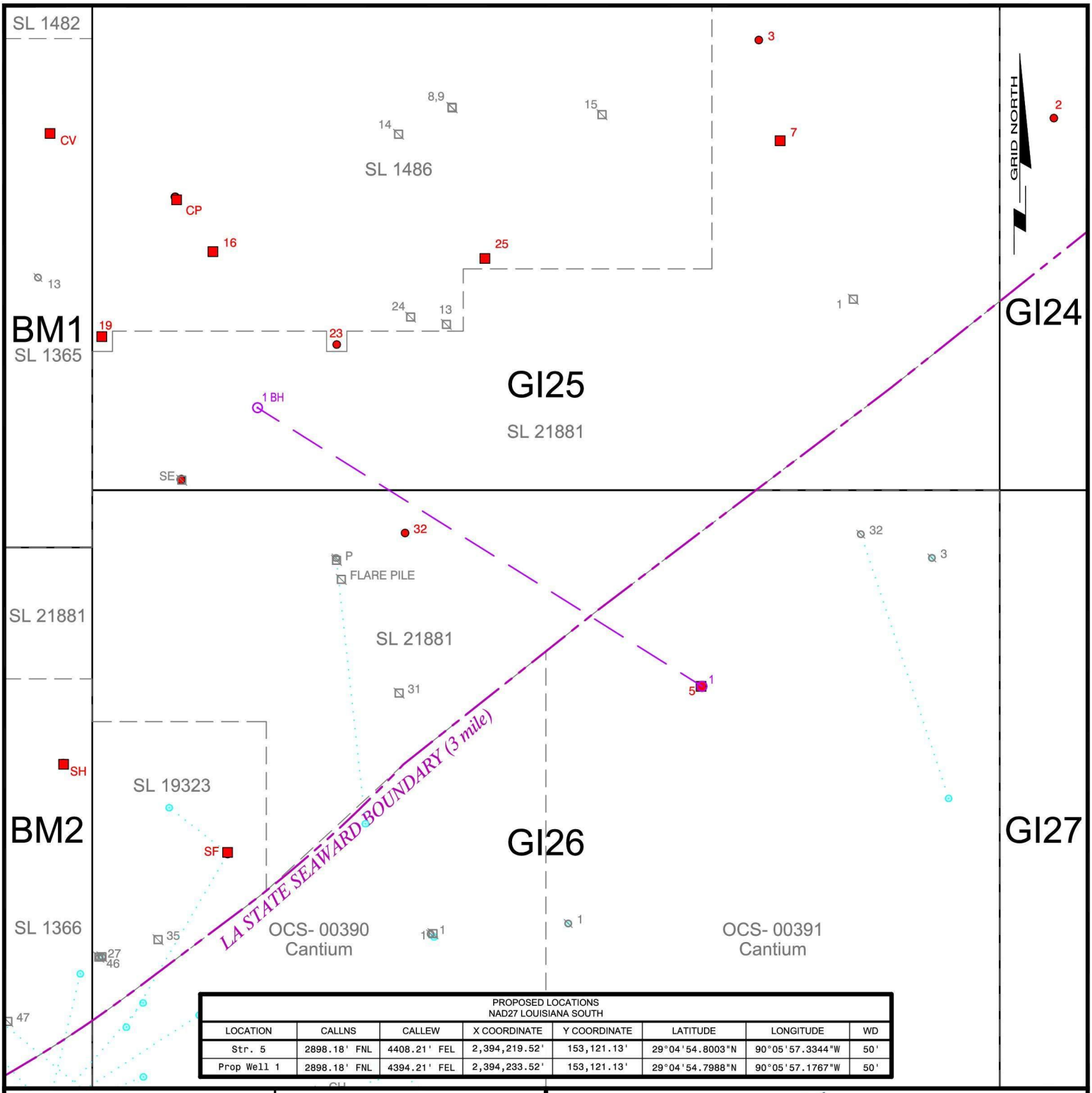
	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS 00391		OCS OCS
Area Name	Grand Isle		
Block No.	26		
Blockline Departures (in feet)	N/S Departure: 2,898.18' FNL	N/S Departure:	N/S Departure F __ L N/S Departure F __ L N/S Departure F __ L
	E/W Departure: 4,408.21' FEL	E/W Departure:	E/W Departure F __ L E/W Departure F __ L E/W Departure F __ L
Lambert X-Y coordinates	X: 2,394,219.52	X:	X: X: X:
	Y: 153,121.13	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude: 29° 04' 54.8003" N	Latitude:	Latitude Latitude Latitude
	Longitude: 90° 05' 57.3344" W	Longitude:	Longitude Longitude Longitude

Water Depth (Feet): 50'	MD (Feet):	TVD (Feet):	MD (Feet): MD (Feet): MD (Feet):	TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet: N/A				

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
N/A			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	

Attachment 1-B



PROPOSED LOCATIONS
NAD27 LOUISIANA SOUTH

LOCATION	CALLNS	CALLEW	X COORDINATE	Y COORDINATE	LATITUDE	LONGITUDE	WD
Str. 5	2898.18' FNL	4408.21' FEL	2,394,219.52'	153,121.13'	29°04'54.8003"N	90°05'57.3344"W	50'
Prop Well 1	2898.18' FNL	4394.21' FEL	2,394,233.52'	153,121.13'	29°04'54.7988"N	90°05'57.1767"W	50'

CANTIUM
Velox, Elegantes, et Efficiens

DEVELOPMENT OPERATIONS COORDINATION DOCUMENT

SL21881 BLOCK 25
GRAND ISLE AREA
GULF OF MEXICO

Geodetic Datum: NAD27
Projection: LOUISIANA SOUTH
Grid Units: US SURVEY FEET

SCALE 1:24000
0 2000
FEET

FUGRO
FUGRO USA MARINE, INC.
6100 Hillcroft Ave.
Houston, Texas 77081
(713) 346-3700

Job No.: 18015353 | Date: 01/17/2019 | Drwn: MM | Chart: 1 Of: 1

DWG File: 1901005302_GI26-25_DOCD_1_SL21881 REV.1

1/17/2019

PUBLIC INFORMATION

Receipt

Tracking Information

Pay.gov Tracking ID: 26DD8IIJ

Agency Tracking ID: 75612224507

Form Name: BOEM Development Operations Coordination Document or DPP

Application Name: BOEM Development/DOCD Plan - BD

Payment Information

Payment Type: Bank account (ACH)

Payment Amount: $4,238.00

Transaction Date: 11/09/2018 07:52:07 AM EST

Payment Date: 11/13/2018

Region: Gulf of Mexico

Contact: Sheri Merrell 5042563602

Company Name/No: Cantium, LLC, 03481

Lease Number(s): 0390, 0369, , ,

Area-Block: Bay Marchand BM, 2: Grand Isle GI, 26: , : , : ,

Type-Wells: Initial Plan, 1

Account Information

Account Holder Name: Cantium, LLC

Routing Number: 065400137

Account Number: **********9230

SECTION 2
GENERAL INFORMATION

2.1 APPLICATIONS AND PERMITS

The table below provides the additional applications to be filed covering operations proposed in this DOCD.

Application/Permit	Issuing Agency	Status
APD	BSEE	To Be Submitted
APM	BSEE	To Be Submitted

2.2 DRILLING FLUIDS

The table below provides the types and estimated volumes of the drilling fluids Cantium plans to use to drill the proposed well.

Type of Drilling Fluid	Estimated Volume of Drilling Fluid to be Used per Well (bbl)
Water-based (seawater, freshwater, barite)	10,000
Oil-based (diesel, mineral oil)	0
Synthetic-based (internal olefin, ester)	11,000

2.3 PRODUCTION

Proprietary Information

2.4 OIL CHARACTERISTICS

Oil characteristics are not required to be submitted with this plan.

2.5 NEW OR UNUSUAL TECHNOLOGY

No new or unusual technology is proposed in this DOCD as defined by 30 CFR 550.200.

2.6 BONDING STATEMENT

The bond requirements for the activities and facilities proposed in this DOCD are satisfied by an area-wide bond, 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"; and additional security under 30 CFR 556.901(d) – (f) and NTL No. 2016-BOEM-N01, “Requiring Additional Security” as required by BOEM.

2.7 OIL SPILL FINANCIAL RESPONSIBILITY (OSFR)

Cantium, LLC (Company No. 03481) has demonstrated oil spill financial responsibility for the facilities proposed in this DOCD according to 30 CFR Part 553.15 (a); and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities".

2.8 DEEPWATER WELL CONTROL STATEMENT

Operations proposed in this plan are located in water depths less than 300 meters (984 feet); therefore, a deepwater well control statement is not provided.

2.9 SUSPENSION OF PRODUCTION

Cantium does not anticipate filing any requests for Suspension of Production to hold the lease or unit addressed in this DOCD in active status.

2.10 BLOWOUT SCENARIO AND WORST CASE DISCHARGE CALCULATIONS

In accordance with NTL No. 2015-BOEM-N01, "Information Requirements for Exploration Plans, Development and Production Plans, and Development Operations Coordination Documents on the OCS for Worst Case Discharge and Blowout Scenarios," the Worst Case Discharge Assumptions and Calculations were submitted and approved on June 24, 2015 under DOCD Control No. R-6349.

Estimated initial flow rate: The calculated Worst Case Discharge for Grand Isle Block 26 Well No. SG026 is 25,580 bbl of crude.

Maximum duration/total volume that could occur if the Grand Isle Block 26 Well No. SG026 blew out:

Scenario	Maximum Discharge Rate (bbl/day)	Discharge Duration (days)	Total Volume Condensate (bbl)
Relief Well	25,580	60	1,534,800

Potential of wellbore to bridge over during a blowout: Due to the unconsolidated nature of the sand quality of the proposed target reservoir, the potential for the well to bridge over is very high within the first 5-10 days of a loss of control incident. The planned casing program exits existing casing at a depth where fracture gradient is high enough to hold in the event the wellbore has been fully evacuated with gas. The pressure trend is normal gradient. There are no over-pressured zones. Drilling techniques would likely experience an underground blowout as the path of least resistance preceded by bridging in the wellbore.

Likelihood for surface intervention to stop blowout: Most successful well kill operations are conducted via surface intervention by trained well control specialists. In the event of an actual blowout, intervention at the surface will be guided by well control specialists from Wild Well Control. The jack-up rig style offers good access to surface well control equipment for surface intervention.

Rig type capable of drilling relief well at water depth and to TD: The type of rig necessary to drill in water depths up to 50' would be either a mat jack-up or an independent leg rig. There are approximately 5 units of this type available in the Gulf of Mexico fleet. A relief well rig can be placed a safe distance from the affected rig and still reach intercept depths needed. Rigs we can use to drill a relief well are WFD #300, WFD #350, Enterprise #264, Ensco #68, and Spartan #202.

Rig package constraints: Some rigs may be restricted during hurricane season, but there are several rigs available that are not restricted.

Time to acquire rig, move onsite and drill relief well:

Activity	Duration (days)
Assess the situation and obtain the optimum MODU; secure well at current location of MODU	15
Mobilization time to relief well location	5
Drill the relief well, intersect and kill the well	40
Total anticipated time	60

Statement whether possibility of using nearby platform was considered: Yes, if a mat rig was selected, the rig would position on the UAux platform which is 2000' away. To reduce drill time with an easier directional approach, an open water location 500' to 1000' is another option, especially if using an independent-leg type rig.

Other measures to enhance ability to prevent a blowout: All targets are in the normal trend pressure profile. The fracture gradient of the window shoe is designed to be strong enough to allow for shut-in of the wellbore with 80% gas evacuation. In Bay Marchand, any open hole wellbore influx would also include contributions from significant, exposed water sands, so in a blowout scenario, there would always be a large volume of fluids associated with the flow stream. Cantium will adhere to and conduct all operations in compliance with all regulations. This would include, but not be limited to:

- Sufficient mud weight margin can be maintained without mud losses.
- Test and certify BOPs with proper working pressure.
- Maintain enough barite on location to weight up the mud system 0.5 ppg.
- Properly test TIW and BOP on rig floor.
- Monitor trip speeds to minimize surge and swab pressures.
- Check well for flow regularly especially following drilling breaks.
- Rig up and function test gas detectors properly.
- Earnestly conduct well control drills with each crew.
- Thoroughly review offset information to identify drilling hazards.

Drilling information will be available for real-time display and reviewed by office engineers and rig superintendents via a company like OFI. Drilling information will be available for monitoring 24/7 with geoscience team for accurate pore pressure analysis via OFI along with real time Baker LWD transmission.

Measures to reduce the likelihood of a blowout:

- Perform offset-well history review. Most wells are drilled in known fields with established pressure profiles.
- Create proper mud design and maintain MW to control well as per the offset information.
- Design and maintain in proper functioning order the atmospheric degasser.

- Maintain stuck pipe spotting material on location.
- Maintain enough LCM material on location to mix two pills.
- Monitor pressures while making preparations to circulate the invading fluids out of the wellbore and regain hydrostatic pressure control of the formation pressure, should the well need to be shut it.
- Run cement bond logs where applicable.
- Make routine short trips when warranted.
- Circulate bottoms up frequently.
- Run centralizers by normally accepted practices where applicable.
- Model cement jobs and drilling fluid hydraulics for rate and ecd effects.

Measures to enhance ability to conduct effective and early intervention in event of a blowout:

- Minimize the impact of an event by having well trained personnel at the well site.
- Be sure drillers understand it is always acceptable to shut-in a well to evaluate well conditions at any time.
- Make initial contact with surface intervention specialist.
- Perform hazard assessment and operations assessment to establish path forward.
- Set up firefighting equipment of vessels.
- Begin firewater application to cool the area or to prevent ignition while working in proximity to flow.
- Clear debris and move onto the rig.
- Cut off damaged wellhead and BOPs.
- Install new wellhead.
- Install diverter and capping stack.
- Rig up snubbing unit.
- Snub in and kill well.

Arrangements for drilling relief wells:

- Maintain awareness of the location of other rigs working in the Gulf Shelf.
- Build relations with other operators in the Shelf, like Arena, Cox, and Energy XXI who also support an active drilling program.
- The company that is providing the rig for the project has 1 additional rig at our call with a second expected in fourth quarter 2018.
- Other shelf operators understand we would seek the most readily and capable rig to respond and would work with other Operators as needed to make them available.
- The type of rig necessary to drill in water depths of 50' is either an independent leg jack-up rig or mat jack-up.
- There are approximately 5 rigs working on the shelf that are available in the Gulf of Mexico fleet.

Any other measures: N/A

SECTION 3
GEOLOGICAL AND GEOPHYSICAL INFORMATION

3.1 GEOLOGICAL DESCRIPTION
Proprietary Information

3.2 STRUCTURE CONTOUR MAP
Proprietary Information

3.3 INTERPRETED SEISMIC LINES
Proprietary Information

3.4 GEOLOGICAL STRUCTURE CROSS-SECTIONS
Proprietary Information

3.5 SHALLOW HAZARDS REPORT
The proposed operations will be conducted from a previously approved surface location; therefore, in accordance with NTL No. 2008-G05, "Shallow Hazards Program," a shallow hazards report is not provided.

3.6 SHALLOW HAZARDS ASSESSMENT
The proposed operations will be conducted from a previously approved surface location; therefore, in accordance with NTL No. 2008-G05, "Shallow Hazards Program," a site-specific shallow hazards assessment is not provided.

3.7 HIGH-RESOLUTION SEISMIC LINES
Proprietary Information

3.8 STRATIGRAPHIC COLUMN
Proprietary Information

3.9 TIME VS DEPTH TABLES
Proprietary Information

SECTION 4
HYDROGEN SULFIDE INFORMATION

4.1 CONCENTRATION

Cantium anticipates encountering 0 ppm H_2S during the proposed operations.

4.2 CLASSIFICATION

In accordance with Title 30 CFR 250.490(c), Cantium requests that the area of proposed operations be classified by the BOEM as H_2S absent.

4.3 H_2S CONTINGENCY PLAN

An H_2S Contingency Plan is not required for the activities proposed in this plan.

4.4 MODELING REPORT

Modeling reports are not required for the activities proposed in this plan.

SECTION 5
MINERAL RESOURCE CONSERVATION INFORMATION

5.1 TECHNOLOGY & RESERVOIR ENGINEERING PRACTICES AND PROCEDURES

Proprietary Information

5.2 TECHNOLOGY AND RECOVERY PRACTICES AND PROCEDURES

Proprietary Information

5.3 RESERVOIR DEVELOPMENT

Proprietary Information

SECTION 6
BIOLOGICAL, PHYSICAL AND SOCIOECONOMIC INFORMATION

6.1 DEEPWATER BENTHIC COMMUNITIES

Activities proposed in this DOCD are in water depths less than 300 meters (984 feet); therefore, information as outlined in Attachment A of NTL No. 2009-G40, "Deepwater Benthic Communities," is not provided.

6.2 TOPOGRAPHIC FEATURES (BANKS)

Activities proposed in this DOCD do not fall within 305 meters (1000 feet) of a topographic "No Activity Zone;" therefore, no map is required per NTL No. 2009-G39, "Biologically Sensitive Underwater Features and Areas."

6.3 TOPOGRAPHIC FEATURES STATEMENT (SHUNTING)

Activities proposed under this DOCD 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, "Biologically Sensitive Underwater Features and Areas."

6.4 LIVE-BOTTOMS (PINNACLE TREND FEATURES)

Grand Isle Block 26 is not located within 61 meters (200 feet) of any pinnacle trend feature; therefore, a separate bathymetric map is not required per NTL No. 2009-G39, "Biologically Sensitive Underwater Features and Areas."

6.5 LIVE BOTTOMS (LOW RELIEF)

Grand Isle Block 26 is not located within 30 meters (100 feet) of any live bottom (low relief) feature with vertical relief equal to or greater than 8 feet; therefore, live bottom (low relief) maps are not required per NTL No. 2009-G39, "Biologically Sensitive Underwater Features and Areas."

6.6 POTENTIALLY SENSITIVE BIOLOGICAL FEATURES

Grand Isle Block 26 is not located within 30 meters (100 feet) of potentially sensitive biological features. In accordance with NTL No. 2009-G39, "Biologically Sensitive Underwater Features and Areas," biologically sensitive area maps are not required.

6.7 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	
Marine Mammals					
Manatee, West Indian	*Trichechus manatus latirostris*	E	--	X	Florida (peninsular)
Whale, Blue	*Balaenoptera masculus*	E	X*	--	None
Whale, Finback	*Balaenoptera physalus*	E	X*	--	None
Whale, Humpback	*Megaptera novaeangliae*	E	X*	--	None
Whale, North Atlantic Right	*Eubalaena glacialis*	E	X*	--	None
Whale, Sei	*Balaenopiera borealis*	E	X*	--	None
Whale, Sperm	*Physeter catodon (=macrocephalus)*	E	X	--	None
Terrestrial Mammals					
Mouse, Beach (Alabama, Choctawatchee, Perdido Key, St. Andrew)	*Peromyscus polionotus*	E	-	X	Alabama, Florida (panhandle) beaches
Birds					
Plover, Piping	*Charadrius melodus*	T	-	X	Coastal Texas, Louisiana, Mississippi, Alabama and Florida (panhandle)
Crane, Whooping	*Grus Americana*	E	-	X	Coastal Texas
Reptiles					
Sea Turtle, Green	*Chelonia mydas*	T	X	X	None
Sea Turtle, Hawksbill	*Eretmochelys imbricata*	E	X	X	None
Sea Turtle, Kemp's Ridley	*Lepidochelys kempli*	E	X	X	None
Sea Turtle, Leatherback	*Dermochelys coriacea*	E	X	X	None
Sea Turtle, Loggerhead	*Caretta caretta*	T	X	X	Texas, Louisiana, Mississippi, Alabama, Florida
Fish					
Sturgeon, Gulf	*Acipenser oxyrinchus (=oxyrhynchus) desotoi*	T	X	X	Coastal Louisiana, Mississippi, Alabama and Florida (panhandle)
Corals					
Coral, Elkhorn	*Acopora palmate*	T	-	X	Florida Keys and Dry Tortugas
Coral, Staghorn	*Acopora cervicornis*	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.

6.8 ARCHAEOLOGICAL REPORT

The proposed operations will be conducted from a previously approved surface location; therefore, in accordance with NTL No. 2005-G07, "Archaeological Resource Surveys and Reports," and NTL No. 2011-JOINT-G01, "Revisions to the List of OCS Lease Blocks Requiring Archaeological Resource Surveys and Reports," an archaeological resource survey report is not provided.

6.9 AIR AND WATER QUALITY INFORMATION

Air and water quality information is not required to be included in this plan per NTL No. 2008-G04, "Information Requirements for Exploration Plans and Development Operations Coordination Documents."

6.10 SOCIOECONOMIC INFORMATION

Socioeconomic information is not required to be included in this plan per NTL No. 2008-G04, "Information Requirements for Exploration Plans and Development Operations Coordination Documents."

SECTION 7
WASTES AND DISCHARGES INFORMATION

7.1 PROJECTED GENERATED WASTES

"Wastes You Will Generate, Treat and Downhole Dispose or Discharge to the Gulf of Mexico" is included as **Attachment 7-A.**

7.2 MODELING REPORT

Modeling reports are not required for the activities proposed in this plan.

Attachment 7-A WASTE ESTIMATED TO BE GENERATED, TREATED AND/OR DOWNHOLE DISPOSED OR DISCHARGED TO THE GOM

Please specify if the amount reported is a total or per well amount and be sure to include appropriate units.

Projected generated waste			Projected ocean discharges		Projected Downhole Disposal
Type of Waste	**Composition**	**Projected Amount**	**Discharge rate**	**Discharge Method**	**Answer *yes* or *no***
Will drilling occur ? If yes, you should list muds and cuttings					
Water-based drilling fluid	Spud Mud / Low Solids Non Dispersed Water-based mud	10,0000 bbl/well	24,000 bbl/day/well	discharge overboard	No
Cuttings wetted with water-based fluid	Cuttings generated while using water-based drilling fluid.	3,400 bbl/well	680 bbl/day/well	discharge overboard	No
Synthetic based drilling fluid	Synthetic based drilling fluid.	11,000 bbl/well	NA	ship to shore below deck storage tanks on offshore support vessels and recycled	No
Cuttings wetted with synthetic based fluid	Cuttings generated while using syntheric based drilling fluid.	8,100 bbl/well	350 bbl/day/well	discharge overboard	No
Will humans be there? If yes, expect conventional waste					
Domestic waste	Domestic waste (grey water) from living quarters	30,000 bbl/well	10 bbl/hr/well	discharge overboard	No
Sanitary waste	Sanitary waste (black water) from living quarters	3,000 bbl/well	1 bbl/hr/well	chlorinate and discharge overboard	No
Is there a deck? If yes, there will be Deck Drainage					
Deck Drainage	Rain / Potable / Seawater	15,000 bbl/well	100 bbl/hr/well	discharge overboard or through OWS prior to discharge, as required	No
Will you conduct well treatment, completion, or workover?					
Well treatment fluids	NA				
Well completion fluids	NA				
Workover fluids	NA				
Miscellaneous discharges. If yes, only fill in those associated with your activity.					
Desalinization unit discharge	Super Saturated Seawater	44,000 bbl/well	15 bbl/hr/well	discharge overboard	No
Blowout prevent fluid	Water based hydraulic fluid	750 bbl/well	0.25 bbl/hr/well	discharge overboard	No
Ballast water	Potable water	10,000 bbl/well	1,000 bbl/hr/well	discharge overboard	No
Bilge water	Seawater / Potable water	10,000 bbl/well	1,000 bbl/hr/well	discharge overboard through OWS	No
Excess cement at seafloor	Class H Cement	500 bbl/well	10 bbl/hr/well	discharge overboard	No
Fire water	Seawater	12,500 bbl/well	0.25 bbl/hr/well	discharge overboard	No
Cooling water	Seawater	300,000 bbl/well	100 bbl/hr/well	discharge overboard	No
Will you produce hydrocarbons? If yes fill in for produced water.					
Produced water	NA				
Please enter *individual* or *general* to indicate which type of NPDES permit you will be covered by?			General		
NOTE: If you will not have a type of waste for the activity being applied for, enter NA for all columns in the row.			NOTE: All discharged wastes should comply with the requirements of the NPDES permit.		

Attachment 8-A

DOCD AIR QUALITY SCREENING CHECKLIST

OMB Control No. 1010-0151
OMB Approval Expires: 06/30/2021

COMPANY	Cantium, LLC
AREA	Grand Isle
BLOCK	26
LEASE	OCS 00391
PLATFORM	Caisson 5
WELL	001
COMPANY CONTACT	Dena Rodriguez
TELEPHONE NO.	281-698-8512
REMARKS	Drill, complete, test and place one well on production utilizing Rowan EXL III o equivalent jackup MODU; Rowan EXL III jackup historical fuel usage used; no production equipment on caisson; Emissions provide for future operations including contingency drilling days each year for maintenance, workovers, recompletions, interventions and abandonment activities

LEASE TERM PIPELINE CONSTRUCTION INFORMATION:		
YEAR	NUMBER OF PIPELINES	TOTAL NUMBER OF CONSTRUCTION DAYS
2018	0	0
2019	0	0
2020	0	0
2021	0	0
2022	0	0
2023	0	0
2024	0	0
2025	0	0
2026	0	0
2027	0	0
2028	0	0

AIR EMISSIONS CUMPUTATION 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	0.1835	14	1.12	3.03	AP42 3.3-1	10/96
Diesel Recip. > 600 hp.	gms/hp-hr	0.32	0.1835	11	0.33	2.4	AP42 3.4-1	10/96
Diesel Boiler	lbs/bbl	0.084	0.3025	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	0.05	% weight
Produced Gas(Flares)	3.33	ppm
Produced Oil (Liquid Flaring)	1	% weight

AIR EMISSIONS CALCULATIONS - FIRST YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
Cantium, LLC	Grand Isle	26	OCS 00391	Caisson 5	002		Dena Rodriguez	281-698-8512	Drill, complete, test and place one well on production utilizing Rowan EXL III or equivalent jackup M

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	D/YR	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	10225	493.8675	2362.50	24	125	7.21	4.13	247.74	7.43	54.05	2.15	1.24	74.07	2.22	16.16
	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(supply)	2065	99.7395	2393.75	10	54	1.46	0.83	50.03	1.50	10.92	0.39	0.23	13.51	0.41	2.95
	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
	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
	VESSELS>600hp diesel(tugs)	8400	405.72	9737.28	10	2	5.92	3.40	203.52	6.11	44.41	0.06	0.03	2.04	0.06	0.44
PIPELINE INSTALLATION	PIPELINE LAY 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
	SUPPORT VESSEL 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
	PIPELINE BURY 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
	SUPPORT VESSEL 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
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
PRODUCTION	RECIP.<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
	RECIP.>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
	SUPPORT VESSEL diesel	2065	99.7395	2393.75	10	47	1.46	0.83	50.03	1.50	10.92	0.34	0.20	11.76	0.35	2.57
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	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	
	FLARE-		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	PROCESS VENT-		0		0	0				0.00					0.00	
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		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		208333.3		24	2		0.12	14.87	12.56	80.94		0.00	0.36	0.30	1.94
2019 YEAR TOTAL							16.04	9.32	566.21	29.10	201.23	2.95	1.69	101.73	3.34	24.06
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											136.53	136.53	136.53	136.53	8709.67
	4.1															

AIR EMISSIONS CALCULATIONS - THIRD YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
Cantium, LLC	Grand Isle	26	OCS 00391	Caisson 5	002		Dena Rodriguez	281-698-8512	Drill, complete, test and place one well on production utilizing Rowan EXL III or equivalent jackup M

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	D/YR	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	10225	493.8675	2362.50	24	150	7.21	4.13	247.74	7.43	54.05	2.59	1.48	88.88	2.67	19.39
	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(supply)	2065	99.7395	2393.75	10	65	1.46	0.83	50.03	1.50	10.92	0.47	0.27	16.26	0.49	3.55
	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
	VESSELS>600hp diesel(tugs)	8400	405.72	9737.28	10	2	5.92	3.40	203.52	6.11	44.41	0.06	0.03	2.04	0.06	0.44
PIPELINE INSTALLATION	PIPELINE LAY 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
	SUPPORT VESSEL 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
	PIPELINE BURY 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
	SUPPORT VESSEL 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
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
PRODUCTION	RECIP.<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
	RECIP.>600hp diesel (support)	2065	99.7395	2393.75	10	62	1.46	0.83	50.03	1.50	10.92	0.45	0.26	15.51	0.47	3.38
	SUPPORT VESSEL 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
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	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	
	FLARE-		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	PROCESS VENT-		0		0	0				0.00					0.00	
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
DRILLING WELL TEST	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
	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2020-2029	YEAR TOTAL						16.04	9.20	551.33	16.54	120.29	3.57	2.05	122.69	3.68	26.77
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											136.53	136.53	136.53	136.53	8709.67
	4.1															

* This AQR includes contingency drilling days each year for maintenance, workovers, recompletions, interventions and abandonment activities. Facility is within 100 km of Breton Sound, however contingency activity emissions will not occur for consecutiv years.

AIR EMISSIONS CALCULATIONS

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL
Cantium, LLC	Grand Isle	26	OCS 00391	Caisson 5	002

Year	Emitted Substance				
	PM	SOx	NOx	VOC	CO
2019	2.95	1.69	101.73	3.34	24.06
2020-2029	3.57	2.05	122.69	3.68	26.77
Allowable	136.53	136.53	136.53	136.53	8709.67

Attachment 8-A

DOCD AIR QUALITY SCREENING CHECKLIST

OMB Control No. 1010-0151
OMB Approval Expires: 06/30/2021

COMPANY	Cantium, LLC
AREA	Grand Isle
BLOCK	26
LEASE	OCS 00391
PLATFORM	Caisson 5
WELL	001
COMPANY CONTACT	Dena Rodriguez
TELEPHONE NO.	281-698-8512
REMARKS	Drill, complete, test and place one well on production utilizing Rowan EXL III o equivalent jackup MODU; Rowan EXL III jackup historical fuel usage used; no production equipment on caisson; Emissions provide for future operations including contingency drilling days each year for maintenance, workovers, recompletions, interventions and abandonment activities

LEASE TERM PIPELINE CONSTRUCTION INFORMATION:		
YEAR	NUMBER OF PIPELINES	TOTAL NUMBER OF CONSTRUCTION DAYS
2018	0	0
2019	0	0
2020	0	0
2021	0	0
2022	0	0
2023	0	0
2024	0	0
2025	0	0
2026	0	0
2027	0	0
2028	0	0

AIR EMISSIONS CUMPUTATION 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	0.1835	14	1.12	3.03	AP42 3.3-1	10/96
Diesel Recip. > 600 hp.	gms/hp-hr	0.32	0.1835	11	0.33	2.4	AP42 3.4-1	10/96
Diesel Boiler	lbs/bbl	0.084	0.3025	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	0.05	% weight
Produced Gas(Flares)	3.33	ppm
Produced Oil (Liquid Flaring)	1	% weight

AIR EMISSIONS CALCULATIONS - FIRST YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
Cantium, LLC	Grand Isle	26	OCS 00391	Caisson 5	002		Dena Rodriguez	281-698-8512	Drill, complete, test and place one well on production utilizing Rowan EXL III or equivalent jackup M

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	D/YR	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	10225	493.8675	2362.50	24	125	7.21	4.13	247.74	7.43	54.05	2.15	1.24	74.07	2.22	16.16
	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(supply)	2065	99.7395	2393.75	10	54	1.46	0.83	50.03	1.50	10.92	0.39	0.23	13.51	0.41	2.95
	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
	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
	VESSELS>600hp diesel(tugs)	8400	405.72	9737.28	10	2	5.92	3.40	203.52	6.11	44.41	0.06	0.03	2.04	0.06	0.44
PIPELINE INSTALLATION	PIPELINE LAY 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
	SUPPORT VESSEL 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
	PIPELINE BURY 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
	SUPPORT VESSEL 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
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
PRODUCTION	RECIP.<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
	RECIP.>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
	SUPPORT VESSEL diesel	2065	99.7395	2393.75	10	47	1.46	0.83	50.03	1.50	10.92	0.34	0.20	11.76	0.35	2.57
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	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	
	FLARE-		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	PROCESS VENT-		0		0	0				0.00					0.00	
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		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		208333.3		24	2		0.12	14.87	12.56	80.94		0.00	0.36	0.30	1.94
2019 YEAR TOTAL							16.04	9.32	566.21	29.10	201.23	2.95	1.69	101.73	3.34	24.06
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											136.53	136.53	136.53	136.53	8709.67
	4.1															

AIR EMISSIONS CALCULATIONS - THIRD YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
Cantium, LLC	Grand Isle	26	OCS 00391	Caisson 5	002		Dena Rodriguez	281-698-8512	Drill, complete, test and place one well on production utilizing Rowan EXL III or equivalent jackup M

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	D/YR	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	10225	493.8675	2362.50	24	150	7.21	4.13	247.74	7.43	54.05	2.59	1.48	88.88	2.67	19.39
	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(supply)	2065	99.7395	2393.75	10	65	1.46	0.83	50.03	1.50	10.92	0.47	0.27	16.26	0.49	3.55
	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
	VESSELS>600hp diesel(tugs)	8400	405.72	9737.28	10	2	5.92	3.40	203.52	6.11	44.41	0.06	0.03	2.04	0.06	0.44
PIPELINE INSTALLATION	PIPELINE LAY 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
	SUPPORT VESSEL 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
	PIPELINE BURY 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
	SUPPORT VESSEL 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
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
PRODUCTION	RECIP.<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
	RECIP.>600hp diesel (support)	2065	99.7395	2393.75	10	62	1.46	0.83	50.03	1.50	10.92	0.45	0.26	15.51	0.47	3.38
	SUPPORT VESSEL 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
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	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	
	FLARE-		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	PROCESS VENT-		0		0	0				0.00					0.00	
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
DRILLING WELL TEST	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
	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2020-2029	YEAR TOTAL						16.04	9.20	551.33	16.54	120.29	3.57	2.05	122.69	3.68	26.77
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											136.53	136.53	136.53	136.53	8709.67
	4.1															

* This AQR includes contingency drilling days each year for maintenance, workovers, recompletions, interventions and abandonment activities. Facility is within 100 km of Breton Sound, however contingency activity emissions will not occur for consecutiv years.

AIR EMISSIONS CALCULATIONS

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL
Cantium, LLC	Grand Isle	26	OCS 00391	Caisson 5	002

Year	Emitted Substance				
	PM	SOx	NOx	VOC	CO
2019	2.95	1.69	101.73	3.34	24.06
2020-2029	3.57	2.05	122.69	3.68	26.77
Allowable	136.53	136.53	136.53	136.53	8709.67

Rig	Item description	Report Date	UOM	Used
EXL 3	DIESEL FUEL	12/31/17	BARRELS	[redacted]
EXL 3	DIESEL FUEL	1/1/18	BARRELS	47
EXL 3	DIESEL FUEL	1/2/18	BARRELS	53
EXL 3	DIESEL FUEL	1/3/18	BARRELS	65
EXL 3	DIESEL FUEL	1/4/18	BARRELS	57
EXL 3	DIESEL FUEL	1/5/18	BARRELS	46
EXL 3	DIESEL FUEL	1/6/18	BARRELS	125
EXL 3	DIESEL FUEL	1/7/18	BARRELS	23
EXL 3	DIESEL FUEL	1/8/18	BARRELS	68
EXL 3	DIESEL FUEL	1/9/18	BARRELS	21
EXL 3	DIESEL FUEL	1/10/18	BARRELS	52
EXL 3	DIESEL FUEL	1/11/18	BARRELS	31
EXL 3	DIESEL FUEL	1/12/18	BARRELS	32
EXL 3	DIESEL FUEL	1/13/18	BARRELS	31
EXL 3	DIESEL FUEL	1/14/18	BARRELS	39
EXL 3	DIESEL FUEL	1/15/18	BARRELS	31
EXL 3	DIESEL FUEL	1/16/18	BARRELS	22
EXL 3	DIESEL FUEL	1/17/18	BARRELS	21
EXL 3	DIESEL FUEL	1/18/18	BARRELS	31
EXL 3	DIESEL FUEL	1/19/18	BARRELS	37
EXL 3	DIESEL FUEL	1/20/18	BARRELS	35
EXL 3	DIESEL FUEL	1/21/18	BARRELS	33
EXL 3	DIESEL FUEL	1/22/18	BARRELS	25
EXL 3	DIESEL FUEL	1/23/18	BARRELS	39
EXL 3	DIESEL FUEL	1/24/18	BARRELS	27
EXL 3	DIESEL FUEL	1/25/18	BARRELS	27
EXL 3	DIESEL FUEL	1/26/18	BARRELS	26
EXL 3	DIESEL FUEL	1/27/18	BARRELS	19
EXL 3	DIESEL FUEL	1/28/18	BARRELS	45
EXL 3	DIESEL FUEL	1/29/18	BARRELS	42
EXL 3	DIESEL FUEL	1/30/18	BARRELS	32
EXL 3	DIESEL FUEL	1/31/18	BARRELS	20
EXL 3	DIESEL FUEL	2/1/18	BARRELS	32
EXL 3	DIESEL FUEL	2/2/18	BARRELS	25
EXL 3	DIESEL FUEL	2/3/18	BARRELS	37
EXL 3	DIESEL FUEL	2/4/18	BARRELS	30
EXL 3	DIESEL FUEL	2/5/18	BARRELS	32
EXL 3	DIESEL FUEL	2/6/18	BARRELS	49
EXL 3	DIESEL FUEL	2/7/18	BARRELS	26
EXL 3	DIESEL FUEL	2/8/18	BARRELS	31
EXL 3	DIESEL FUEL	2/9/18	BARRELS	63
EXL 3	DIESEL FUEL	2/10/18	BARRELS	21
EXL 3	DIESEL FUEL	2/11/18	BARRELS	21
EXL 3	DIESEL FUEL	2/12/18	BARRELS	21

Rig	Item description	Report Date	UOM	Used
EXL 3	DIESEL FUEL	2/13/18	BARRELS	52
EXL 3	DIESEL FUEL	2/14/18	BARRELS	42
EXL 3	DIESEL FUEL	2/15/18	BARRELS	51
EXL 3	DIESEL FUEL	2/16/18	BARRELS	21
EXL 3	DIESEL FUEL	2/17/18	BARRELS	50
EXL 3	DIESEL FUEL	2/18/18	BARRELS	29
EXL 3	DIESEL FUEL	2/19/18	BARRELS	16
EXL 3	DIESEL FUEL	2/20/18	BARRELS	19
EXL 3	DIESEL FUEL	2/21/18	BARRELS	21
EXL 3	DIESEL FUEL	2/22/18	BARRELS	42
EXL 3	DIESEL FUEL	2/23/18	BARRELS	42
EXL 3	DIESEL FUEL	2/24/18	BARRELS	23
EXL 3	DIESEL FUEL	2/25/18	BARRELS	31
EXL 3	DIESEL FUEL	2/26/18	BARRELS	21
EXL 3	DIESEL FUEL	2/27/18	BARRELS	32
EXL 3	DIESEL FUEL	2/28/18	BARRELS	52
EXL 3	DIESEL FUEL	3/1/18	BARRELS	26
EXL 3	DIESEL FUEL	3/2/18	BARRELS	50
EXL 3	DIESEL FUEL	3/3/18	BARRELS	28
EXL 3	DIESEL FUEL	3/4/18	BARRELS	42
EXL 3	DIESEL FUEL	3/5/18	BARRELS	22
EXL 3	DIESEL FUEL	3/6/18	BARRELS	36
EXL 3	DIESEL FUEL	3/7/18	BARRELS	48
EXL 3	DIESEL FUEL	3/8/18	BARRELS	20
EXL 3	DIESEL FUEL	3/9/18	BARRELS	32
EXL 3	DIESEL FUEL	3/10/18	BARRELS	23
EXL 3	DIESEL FUEL	3/11/18	BARRELS	21
EXL 3	DIESEL FUEL	3/12/18	BARRELS	69
EXL 3	DIESEL FUEL	3/13/18	BARRELS	22
EXL 3	DIESEL FUEL	3/14/18	BARRELS	50
EXL 3	DIESEL FUEL	3/15/18	BARRELS	32
EXL 3	DIESEL FUEL	3/16/18	BARRELS	20
EXL 3	DIESEL FUEL	3/17/18	BARRELS	103
EXL 3	DIESEL FUEL	3/18/18	BARRELS	50
EXL 3	DIESEL FUEL	3/19/18	BARRELS	28
EXL 3	DIESEL FUEL	3/20/18	BARRELS	56
EXL 3	DIESEL FUEL	3/21/18	BARRELS	50
EXL 3	DIESEL FUEL	3/22/18	BARRELS	53
EXL 3	DIESEL FUEL	3/23/18	BARRELS	37
EXL 3	DIESEL FUEL	3/24/18	BARRELS	68
EXL 3	DIESEL FUEL	3/25/18	BARRELS	63
EXL 3	DIESEL FUEL	3/26/18	BARRELS	41
EXL 3	DIESEL FUEL	3/27/18	BARRELS	74
EXL 3	DIESEL FUEL	3/28/18	BARRELS	31

Rig	Item description	Report Date	UOM	Used
EXL 3	DIESEL FUEL	3/29/18	BARRELS	63
EXL 3	DIESEL FUEL	3/30/18	BARRELS	52
EXL 3	DIESEL FUEL	3/31/18	BARRELS	41
EXL 3	DIESEL FUEL	4/1/18	BARRELS	74
EXL 3	DIESEL FUEL	4/2/18	BARRELS	31
EXL 3	DIESEL FUEL	4/3/18	BARRELS	52
EXL 3	DIESEL FUEL	4/4/18	BARRELS	73
EXL 3	DIESEL FUEL	4/5/18	BARRELS	53
EXL 3	DIESEL FUEL	4/6/18	BARRELS	87
EXL 3	DIESEL FUEL	4/7/18	BARRELS	66
EXL 3	DIESEL FUEL	4/8/18	BARRELS	36
EXL 3	DIESEL FUEL	4/9/18	BARRELS	64
EXL 3	DIESEL FUEL	4/10/18	BARRELS	66
EXL 3	DIESEL FUEL	4/11/18	BARRELS	42
EXL 3	DIESEL FUEL	4/12/18	BARRELS	37
EXL 3	DIESEL FUEL	4/13/18	BARRELS	52
EXL 3	DIESEL FUEL	4/14/18	BARRELS	42
EXL 3	DIESEL FUEL	4/15/18	BARRELS	52
EXL 3	DIESEL FUEL	4/16/18	BARRELS	69
EXL 3	DIESEL FUEL	4/17/18	BARRELS	68
EXL 3	DIESEL FUEL	4/18/18	BARRELS	21
EXL 3	DIESEL FUEL	4/19/18	BARRELS	62
EXL 3	DIESEL FUEL	4/20/18	BARRELS	64
EXL 3	DIESEL FUEL	4/21/18	BARRELS	32
EXL 3	DIESEL FUEL	4/22/18	BARRELS	37
EXL 3	DIESEL FUEL	4/23/18	BARRELS	48
EXL 3	DIESEL FUEL	4/24/18	BARRELS	53
EXL 3	DIESEL FUEL	4/25/18	BARRELS	41
EXL 3	DIESEL FUEL	4/26/18	BARRELS	45
EXL 3	DIESEL FUEL	4/27/18	BARRELS	47
EXL 3	DIESEL FUEL	4/28/18	BARRELS	46
EXL 3	DIESEL FUEL	4/29/18	BARRELS	52
EXL 3	DIESEL FUEL	4/30/18	BARRELS	62
EXL 3	DIESEL FUEL	5/1/18	BARRELS	52
EXL 3	DIESEL FUEL	5/2/18	BARRELS	53
EXL 3	DIESEL FUEL	5/3/18	BARRELS	67
EXL 3	DIESEL FUEL	5/4/18	BARRELS	42
EXL 3	DIESEL FUEL	5/5/18	BARRELS	53
EXL 3	DIESEL FUEL	5/6/18	BARRELS	31
EXL 3	DIESEL FUEL	5/7/18	BARRELS	42
EXL 3	DIESEL FUEL	5/8/18	BARRELS	56
EXL 3	DIESEL FUEL	5/9/18	BARRELS	42
EXL 3	DIESEL FUEL	5/10/18	BARRELS	31
EXL 3	DIESEL FUEL	5/11/18	BARRELS	52

Rig	Item description	Report Date	UOM	Used
EXL 3	DIESEL FUEL	5/12/18	BARRELS	63
EXL 3	DIESEL FUEL	5/13/18	BARRELS	31
EXL 3	DIESEL FUEL	5/14/18	BARRELS	32
EXL 3	DIESEL FUEL	5/15/18	BARRELS	71
EXL 3	DIESEL FUEL	5/16/18	BARRELS	63
EXL 3	DIESEL FUEL	5/17/18	BARRELS	25
EXL 3	DIESEL FUEL	5/18/18	BARRELS	64
EXL 3	DIESEL FUEL	5/19/18	BARRELS	35
EXL 3	DIESEL FUEL	5/20/18	BARRELS	62
EXL 3	DIESEL FUEL	5/21/18	BARRELS	39
EXL 3	DIESEL FUEL	5/22/18	BARRELS	67
EXL 3	DIESEL FUEL	5/23/18	BARRELS	60
EXL 3	DIESEL FUEL	5/24/18	BARRELS	56
EXL 3	DIESEL FUEL	5/25/18	BARRELS	64
EXL 3	DIESEL FUEL	5/26/18	BARRELS	52
EXL 3	DIESEL FUEL	5/27/18	BARRELS	63
EXL 3	DIESEL FUEL	5/28/18	BARRELS	42
EXL 3	DIESEL FUEL	5/29/18	BARRELS	57
EXL 3	DIESEL FUEL	5/30/18	BARRELS	47
EXL 3	DIESEL FUEL	5/31/18	BARRELS	32
EXL 3	DIESEL FUEL	6/1/18	BARRELS	66
EXL 3	DIESEL FUEL	6/2/18	BARRELS	41
EXL 3	DIESEL FUEL	6/3/18	BARRELS	37
EXL 3	DIESEL FUEL	6/4/18	BARRELS	54
EXL 3	DIESEL FUEL	6/5/18	BARRELS	78
EXL 3	DIESEL FUEL	6/6/18	BARRELS	47
EXL 3	DIESEL FUEL	6/7/18	BARRELS	21
EXL 3	DIESEL FUEL	6/8/18	BARRELS	57
EXL 3	DIESEL FUEL	6/9/18	BARRELS	48
EXL 3	DIESEL FUEL	6/10/18	BARRELS	51
EXL 3	DIESEL FUEL	6/11/18	BARRELS	44
EXL 3	DIESEL FUEL	6/12/18	BARRELS	68
EXL 3	DIESEL FUEL	6/13/18	BARRELS	58
EXL 3	DIESEL FUEL	6/14/18	BARRELS	79
EXL 3	DIESEL FUEL	6/15/18	BARRELS	56
EXL 3	DIESEL FUEL	6/16/18	BARRELS	37
EXL 3	DIESEL FUEL	6/17/18	BARRELS	41
EXL 3	DIESEL FUEL	6/18/18	BARRELS	53
EXL 3	DIESEL FUEL	6/19/18	BARRELS	62
EXL 3	DIESEL FUEL	6/20/18	BARRELS	32
EXL 3	DIESEL FUEL	6/21/18	BARRELS	37
EXL 3	DIESEL FUEL	6/22/18	BARRELS	52
EXL 3	DIESEL FUEL	6/23/18	BARRELS	31
EXL 3	DIESEL FUEL	6/24/18	BARRELS	72

Rig	Item description	Report Date	UOM	Used
EXL 3	DIESEL FUEL	6/25/18	BARRELS	42
EXL 3	DIESEL FUEL	6/26/18	BARRELS	35
EXL 3	DIESEL FUEL	6/27/18	BARRELS	64
EXL 3	DIESEL FUEL	6/28/18	BARRELS	73
EXL 3	DIESEL FUEL	6/29/18	BARRELS	67
EXL 3	DIESEL FUEL	6/30/18	BARRELS	52
EXL 3	DIESEL FUEL	7/1/18	BARRELS	35
EXL 3	DIESEL FUEL	7/2/18	BARRELS	62
EXL 3	DIESEL FUEL	7/3/18	BARRELS	53
EXL 3	DIESEL FUEL	7/4/18	BARRELS	52
EXL 3	DIESEL FUEL	7/5/18	BARRELS	43
EXL 3	DIESEL FUEL	7/6/18	BARRELS	72
EXL 3	DIESEL FUEL	7/7/18	BARRELS	52
EXL 3	DIESEL FUEL	7/8/18	BARRELS	53
EXL 3	DIESEL FUEL	7/9/18	BARRELS	22
EXL 3	DIESEL FUEL	7/10/18	BARRELS	88
EXL 3	DIESEL FUEL	7/11/18	BARRELS	63
EXL 3	DIESEL FUEL	7/12/18	BARRELS	30
EXL 3	DIESEL FUEL	7/13/18	BARRELS	63
EXL 3	DIESEL FUEL	7/14/18	BARRELS	31
EXL 3	DIESEL FUEL	7/15/18	BARRELS	52
EXL 3	DIESEL FUEL	7/16/18	BARRELS	43
EXL 3	DIESEL FUEL	7/17/18	BARRELS	63
EXL 3	DIESEL FUEL	7/18/18	BARRELS	52
EXL 3	DIESEL FUEL	7/19/18	BARRELS	58
EXL 3	DIESEL FUEL	7/20/18	BARRELS	76
EXL 3	DIESEL FUEL	7/21/18	BARRELS	32
EXL 3	DIESEL FUEL	7/22/18	BARRELS	52
EXL 3	DIESEL FUEL	7/23/18	BARRELS	63
EXL 3	DIESEL FUEL	7/24/18	BARRELS	62
EXL 3	DIESEL FUEL	7/25/18	BARRELS	48
EXL 3	DIESEL FUEL	7/26/18	BARRELS	68
EXL 3	DIESEL FUEL	7/27/18	BARRELS	47
EXL 3	DIESEL FUEL	7/28/18	BARRELS	57
EXL 3	DIESEL FUEL	7/29/18	BARRELS	45
EXL 3	DIESEL FUEL	7/30/18	BARRELS	73
EXL 3	DIESEL FUEL	7/31/18	BARRELS	42
EXL 3	DIESEL FUEL	8/1/18	BARRELS	42
EXL 3	DIESEL FUEL	8/2/18	BARRELS	48
EXL 3	DIESEL FUEL	8/3/18	BARRELS	49
EXL 3	DIESEL FUEL	8/4/18	BARRELS	99
EXL 3	DIESEL FUEL	8/5/18	BARRELS	62
EXL 3	DIESEL FUEL	8/6/18	BARRELS	23
EXL 3	DIESEL FUEL	8/7/18	BARRELS	64

Rig	Item description	Report Date	UOM	Used
EXL 3	DIESEL FUEL	8/8/18	BARRELS	53
EXL 3	DIESEL FUEL	8/9/18	BARRELS	66
EXL 3	DIESEL FUEL	8/10/18	BARRELS	32
EXL 3	DIESEL FUEL	8/11/18	BARRELS	21
EXL 3	DIESEL FUEL	8/12/18	BARRELS	68
EXL 3	DIESEL FUEL	8/13/18	BARRELS	47
EXL 3	DIESEL FUEL	8/14/18	BARRELS	21
EXL 3	DIESEL FUEL	8/15/18	BARRELS	89
EXL 3	DIESEL FUEL	8/16/18	BARRELS	53
EXL 3	DIESEL FUEL	8/17/18	BARRELS	75
EXL 3	DIESEL FUEL	8/18/18	BARRELS	47
EXL 3	DIESEL FUEL	8/19/18	BARRELS	48
EXL 3	DIESEL FUEL	8/20/18	BARRELS	52
EXL 3	DIESEL FUEL	8/21/18	BARRELS	58
EXL 3	DIESEL FUEL	8/22/18	BARRELS	21
EXL 3	DIESEL FUEL	8/23/18	BARRELS	60
EXL 3	DIESEL FUEL	8/24/18	BARRELS	25
EXL 3	DIESEL FUEL	8/25/18	BARRELS	84
EXL 3	DIESEL FUEL	8/26/18	BARRELS	37
EXL 3	DIESEL FUEL	8/27/18	BARRELS	54
EXL 3	DIESEL FUEL	8/28/18	BARRELS	66
EXL 3	DIESEL FUEL	8/29/18	BARRELS	42
EXL 3	DIESEL FUEL	8/30/18	BARRELS	0
EXL 3	DIESEL FUEL	8/31/18	BARRELS	57
EXL 3	DIESEL FUEL	9/1/18	BARRELS	42
EXL 3	DIESEL FUEL	9/2/18	BARRELS	31
EXL 3	DIESEL FUEL	9/3/18		
EXL 3	DIESEL FUEL	9/4/18		
EXL 3	DIESEL FUEL	9/5/18		
EXL 3	DIESEL FUEL	9/6/18		
EXL 3	DIESEL FUEL	9/7/18		
EXL 3	DIESEL FUEL	9/8/18	BARRELS	178
EXL 3	DIESEL FUEL	9/9/18	BARRELS	32
EXL 3	DIESEL FUEL	9/10/18	BARRELS	31
EXL 3	DIESEL FUEL	9/11/18	BARRELS	32
EXL 3	DIESEL FUEL	9/12/18	BARRELS	52
EXL 3	DIESEL FUEL	9/13/18	BARRELS	52
EXL 3	DIESEL FUEL	9/14/18	BARRELS	32
EXL 3	DIESEL FUEL	9/15/18	BARRELS	45
EXL 3	DIESEL FUEL	9/16/18	BARRELS	54
EXL 3	DIESEL FUEL	9/17/18	BARRELS	27
EXL 3	DIESEL FUEL	9/18/18	BARRELS	33
EXL 3	DIESEL FUEL	9/19/18	BARRELS	44
EXL 3	DIESEL FUEL	9/20/18	BARRELS	18

Rig	Item description	Report Date	UOM	Used
EXL 3	DIESEL FUEL	9/21/18	BARRELS	63
EXL 3	DIESEL FUEL	9/22/18	BARRELS	42
EXL 3	DIESEL FUEL	9/23/18	BARRELS	31
EXL 3	DIESEL FUEL	9/24/18	BARRELS	42
EXL 3	DIESEL FUEL	9/25/18	BARRELS	58
EXL 3	DIESEL FUEL	9/26/18	BARRELS	47
EXL 3	DIESEL FUEL	9/27/18	BARRELS	42
EXL 3	DIESEL FUEL	9/28/18	BARRELS	56
EXL 3	DIESEL FUEL	9/29/18	BARRELS	39
EXL 3	DIESEL FUEL	9/30/18	BARRELS	33
EXL 3	DIESEL FUEL	10/1/18	BARRELS	37
EXL 3	DIESEL FUEL	10/2/18	BARRELS	73
EXL 3	DIESEL FUEL	10/3/18	BARRELS	42
EXL 3	DIESEL FUEL	10/4/18	BARRELS	26
EXL 3	DIESEL FUEL	10/5/18	BARRELS	43
EXL 3	DIESEL FUEL	10/6/18	BARRELS	86
EXL 3	DIESEL FUEL	10/7/18	BARRELS	1
EXL 3	DIESEL FUEL	10/8/18	BARRELS	0
EXL 3	DIESEL FUEL	10/9/18	BARRELS	0
EXL 3	DIESEL FUEL	10/10/18	BARRELS	0
EXL 3	DIESEL FUEL	10/11/18	BARRELS	0
EXL 3	DIESEL FUEL	10/12/18	BARRELS	53
EXL 3	DIESEL FUEL	10/13/18	BARRELS	26

SECTION 9
OIL SPILL INFORMATION

9.1 OIL SPILL RESPONSE PLANNING

All the proposed activities and facilities in this DOCD will be covered by the Oil Spill Response Plan (OSRP) filed by Cantium, LLC (Company No. 03481) dated August 2017 and last approved on January 14, 2019 (OSRP Control No. O-1011).

9.2 SPILL RESPONSE SITES

Primary Response Equipment Location	Preplanned Staging Location
Houma, LA	Houma, LA
Venice, LA	Venice, LA
Harvey, LA	Harvey, LA

9.3 OSRO INFORMATION

Cantium's primary equipment provider is Clean Gulf Associates. Clean Gulf Associates Services will provide closest available personnel, as well as a supervisor to operate the equipment.

9.4 WORST-CASE DISCHARGE SCENARIO DETERMINATION

Category	Drilling		Production	
	Regional OSRP WCD	DOCD WCD	Regional OSRP WCD	DOCD WCD
Type of Activity	Drilling	<10 Miles Drilling	<10 Miles Production	<10 Miles Production
Facility location (Area/Block)	BM2	BM2 (SL) GI26 (BHL)	ST24	BM2 (SL) GI26 (BHL)
Facility designation	CG072	SG026	CM003	SG026
Distance to nearest shoreline (miles)	5.1	5	6.8	5
Storage tanks & flowlines (bbl)	0	0	0	0
Lease term pipelines (bbl)	0	0	0	0
Uncontrolled blowout (bbl)	42,509	25,580	9,400	1,952
Total Volume (bbl)	**42,509**	**25,580**	**9,400**	**1,952**
Type of oil(s) (crude, condensate, diesel)	Crude	Crude	Crude	Crude
API gravity	27°	25°	27°	25°

Worst Case Discharge Assumptions and Calculations were submitted and approved on June 24, 2015 under DOCD Control No. R-6349.

The WCD for Well No. 001 is calculated to be 370 STB/day which does not supersede the current WCD volume of 25,580 bbls/day for GI26 Well No. SG026.

Since Cantium, LLC has the capability to respond to the worst-case spill scenario included in our Regional OSRP approved on January 14, 2019, and since the worst-case scenario determined for our DOCD does not replace the worst-case scenario in our Regional OSRP, Cantium, LLC hereby certifies that Cantium, LLC 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 DOCD.

9.5 OIL SPILL RESPONSE DISCUSSION

The Oil Spill Response Discussion is included as **Attachment 9-A.**

9.6 MODELING REPORT

Modeling reports are not required for the activities proposed in this plan.

SPILL RESPONSE DISCUSSION

For the purpose of NEPA and Coastal Zone Management Act analysis, the largest spill volume originating from the proposed activity would be a well blowout during drilling operations, estimated to be 25,580 barrels of crude oil with an API gravity of 25°.

Land Segment and Resource Identification

Trajectories of a spill and the probability of it impacting a land segment have been projected utilizing information in the BOEM Oil Spill Risk Analysis Model (OSRAM) for the Central and Western Gulf of Mexico available on the BOEM website. The results are shown in **Figure 1.** The BOEM OSRAM identifies the highest probability of impact to the shorelines of Lafourche Parish and/or Terrebonne Parish, Louisiana within 3 days and to Terrebonne Parish, Louisiana within 10 and 30 days. Lafourche Parish includes Timbalier Bay and Bayou LaFourche east to Bay Tambour and Caminada Bay. The Timbalier Bay area contains rookeries, mangroves, oyster beds and finfish and shellfish nursery grounds. Seven rookeries are located northwest of Grand Isle in Bay Tambour and Caminada Bay. Open beaches are located along the Gulf Coast. This area is a part of the Barataria Basin, a unique fishery habitat which has shallow estuarine waters, sandbars, small barrier and coastal islands and wetlands. This area is also a nesting ground for the brown pelican, an endangered species. Terrebonne Parish includes the eastern portion of Atchafalaya National Wildlife Refuge across to Timbalier Bay. The Terrebonne parish also includes the area along the Gulf Coast including Caillou Bay, Isles Dernieres and Terrebonne Bay. The entire parish is classified as an EPA National Estuary. This area is primarily marshland, broken up by numerous small bays and freshwater lakes.

Response

Cantium, LLC will make every effort to respond to the Worst Case Discharge as effectively as practicable. A description of the response equipment under contract to contain and recover the Worst Case Discharge is shown in **Figure 2.**

Using the estimated chemical and physical characteristics of crude oil, an ADIOS weathering model was run on a similar product from the ADIOS oil database. The results indicate 14% or approximately 3,581 barrels of crude oil would be evaporated/dispersed within 24 hours, with approximately 21,999 barrels remaining.

Natural Weathering Data: BM 2, Well No. SG-26	**Barrels of Oil**
WCD Volume	25.580
Less 14% natural evaporation/dispersion	3,581
Remaining volume	21,999

Figure 2 outlines equipment, personnel, materials and support vessels as well as temporary storage equipment available to respond to the worst case discharge. The volume accounts for the amount remaining after evaporation/dispersion at 24 hours. The list estimates individual times

needed for procurement, load out, travel time to the site and deployment. **Figure 2** also indicates how operations will be supported.

Cantium, LLC's Oil Spill Response Plan includes alternative response technologies such as dispersants and in-situ burn. Strategies will be decided by Unified Command based on an operations safety analysis, the size of the spill, weather and potential impacts. If aerial dispersants are utilized, 8 sorties (9,600 gallons) from two of the DC-3 aircrafts and 4 sorties (8,000 gallons) from the Basler aircraft would provide a daily dispersant capability of 7,540 barrels. If the conditions are favorable for in-situ burning, the proper approvals have been obtained and the proper planning is in place, in-situ burning of oil may be attempted. Slick containment boom would be immediately called out and on-scene as soon as possible. Offshore response strategies may include attempting to skim utilizing CGA's response equipment, with a total derated skimming capacity of 144,940 barrels. Temporary storage associated with skimming equipment equals 4,747 barrels. If additional storage is needed, various storage barges with a total capacity 147,000+ bbls may be mobilized and centrally located to provide temporary storage and minimize off-loading time. **Safety is first priority. Air monitoring will be accomplished and operations deemed safe prior to any containment/skimming attempts.**

If the spill went unabated, shoreline impact in Lafourche and/or Terrebonne Parish, Louisiana would depend upon existing environmental conditions. Shoreline protection would include the use of CGA's near shore and shallow water skimmers with a totaled derated skimming capacity of 93,131 barrels. Temporary storage associated with skimming equipment equals 1,466 barrels. If additional storage is needed, various storage barges with a total capacity 94,000 bbls may be mobilized and centrally located to provide temporary storage and minimize off-loading time. Onshore response may include the deployment of shoreline boom on beach areas, or protection and sorbent boom on vegetated areas. Letters of Intent from AMPOL and OMI will ensure access to 164,600 feet of 18" shoreline protection boom. **Figure 2** outlines individual times needed for procurement, load out, travel time to the site and deployment. Strategies would be based upon surveillance and real time trajectories that depict areas of potential impact given actual sea and weather conditions. Applicable Area Contingency Plans (ACPs), Geographic Response Plans (GRPs), and Unified Command (UC) will be consulted to ensure that environmental and special economic resources are correctly identified and prioritized to ensure optimal protection. Shoreline protection strategies depict the protection response modes applicable for oil spill clean-up operations. As a secondary resource, the State of Louisiana Initial Oil Spill Response Plan will be consulted as appropriate to provide detailed shoreline protection strategies and describe necessary action to keep the oil spill from entering Louisiana's coastal wetlands. The UC should take into consideration all appropriate items detailed in Tactics discussion of this Appendix. The UC and their personnel have the option to modify the deployment and operation of equipment to allow for a more effective response to site-specific circumstances. Cantium, LLC's contract Spill Management Team has access to the applicable ACP(s) and GRP(s).

Based on the anticipated worst case discharge scenario, Cantium, LLC 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 60 hours (based on the equipment's Effective Daily Recovery Capacity (EDRC)).

Initial Response Considerations

Actual actions taken during an oil spill response will be based on many factors to include but not be limited to:

- Safety
- Weather
- Equipment and materials availability
- Ocean currents and tides
- Location of the spill
- Product spilled
- Amount spilled
- Environmental risk assessments
- Trajectory and product analysis
- Well status, i.e., shut in or continual release

Cantium, LLC will take action to provide a safe, aggressive response to contain and recover as much of the spilled oil as quickly as it is safe to do so. In an effort to protect the environment, response actions will be designed to provide an "in-depth" protection strategy meant to recover as much oil as possible as far from environmentally sensitive areas as possible. Safety will take precedence over all other considerations during these operations.

Coordination of response assets will be supervised by the designation of a SIMOPS group as necessary for close quarter vessel response activities. Most often, this group will be used during source control events that require a significant number of large vessels operating independently to complete a common objective, in close coordination and support of each other. This group must also monitor the subsurface activities of each vessel (ROV, dispersant application, well control support, etc.). The SIMOPS group leader reports to the Source Control Section Chief.

In addition, these activities will be monitored by the spill management team (SMT) and Unified Command via a structured Common Operating Picture (COP) established to track resource and slick movement in real time.

Upon notification of a spill, the following actions will be taken:

- Information will be confirmed
- An assessment will be made and initial objectives set
- OSROs and appropriate agencies will be notified
- ICS 201, Initial Report Form completed
- Initial Safety plan will be written and published
- Unified Command will be established
    - Overall safety plan developed to reflect the operational situation and coordinated objectives
    - Areas of responsibility established for Source Control and each surface operational site
    - On-site command and control established

Offshore Response Actions

Equipment Deployment

Surveillance

- Surveillance Aircraft: within two hours of QI notification, or at first light
- Provide trained observer to provide on site status reports
- Provide command and control platform at the site if needed
- Continual surveillance of oil movement by remote sensing systems, aerial photography and visual confirmation
- Continual monitoring of vessel assets using vessel monitoring systems

Dispersant application assets

- Put ASI on standby
- With the FOSC, conduct analysis to determine appropriateness of dispersant application (refer to Section 18)
- Gain FOSC approval for use of dispersants on the surface
- Deploy aircraft in accordance with a plan developed for the actual situation
- Coordinate movement of dispersants, aircraft, and support equipment and personnel
- Confirm dispersant availability for current and long range operations
- Start ordering dispersant stocks required for expected operations

Containment boom

- Call out early and expedite deployment to be on scene ASAP
- Ensure boom handling and mooring equipment is deployed with boom
- Provide continuing reports to vessels to expedite their arrival at sites that will provide for their most effective containment
- Use Vessels of Opportunity (VOO) to deploy and maintain boom

Oceangoing Boom Barge

- Containment at the source
- Increased/enhanced skimmer encounter rate
- Protection booming

In-situ Burn assets

- Determine appropriateness of in-situ burn operation in coordination with the FOSC and affected SOSC
- Determine availability of fire boom and selected ignition systems
- Start ordering fire boom stocks required for expected operations
- Contact boom manufacturer to provide training & tech support for operations, if required
- Determine assets to perform on water operation
- Build operations into safety plan
- Conduct operations in accordance with an approved plan
- Initial test burn to ensure effectiveness

Dedicated off-shore skimming systems
General

- Deployed to the highest concentration of oil
- Assets deployed at safe distance from aerial dispersant and in-situ burn operations

CGA HOSS Barge

- Use in areas with heaviest oil concentrations
- Consider for use in areas of known debris (seaweed, and other floating materials)

CGA 95' Fast Response Vessels (FRVs)

- Designed to be a first vessel on scene
- Capable of maintaining the initial Command and Control function for on water recovery operations
- 24 hour oil spill detection capability
- Highly mobile and efficient skimming capability
- Use as far off-shore as safely possible

CGA FRUs

- To the area of the thickest oil
- Use as far off-shore as allowed
- VOOs 140' – 180' in length
- VOOs with minimum of 18' x 38' or 23' x 50' of optimum deck space
- VOOs in shallow water should have a draft of <10 feet when fully loaded

T&T Koseq Skimming Systems

- To the area of the thickest oil
- Use as far off-shore as allowed
- VOOs with a minimum of 2,000 bbls storage capacity
- VOOs at least 200' in length
- VOOs with deck space of 100' x 40' to provide space for arms, tanks, and crane
- VOOs for shallow water should be deck barges with a draft of <10 feet when fully loaded

Storage Vessels

- Establish availability of CGA contracted assets (See Appendix E)
- Early call out (to allow for tug boat acquisition and deployment speeds)
- Phase mobilization to allow storage vessels to arrive at the same time as skimming systems
- Position as closely as possible to skimming assets to minimize offloading time

Vessels of Opportunity (VOO)

- Use Cantium, LLC's contracted resources as applicable
- Industry vessels are ideal for deployment of Vessel of Opportunity Skimming Systems (VOSS)
- Acquire additional resources as needed
- Consider use of local assets, i.e. fishing and pleasure craft for ISB operations or boom tending
- Expect mission specific and safety training to be required
- Plan with the US Coast Guard for vessel inspections
- Place VOOs in Division or Groups as needed
- Use organic on-board storage if appropriate
- Maximize non-organic storage appropriate to vessel limitations
- Decant as appropriate after approval to do so has been granted
- Assign bulk storage barges to each Division/Group
- Position bulk storage barges as close to skimming units as possible
- Utilize large skimming vessel (e.g. barges) storage for smaller vessel offloading
- Maximize skimming area (swath) to the optimum width given sea conditions and available equipment
- Maximize use of oleophilic skimmers in all operations, but especially offshore
- Nearshore, use shallow water barges and shuttle to skimming units to minimize offloading time
- Plan and equip to use all offloading capabilities of the storage vessel to minimize offloading time

Adverse Weather Operations:

In adverse weather, when seas are $\geq$ 3 feet, the use of larger recovery and storage vessels, oleophilic skimmers, and large offshore boom will be maximized. KOSEQ Arm systems are built for rough conditions, and they should be used until their operational limit (9.8' seas) is met. Safety will be the overriding factor in all operations and will cease at the order of the Unified Command, vessel captain, or in an emergency, "stop work" may be directed by any crew member.

Surface Oil Recovery Considerations and Tactics
(Offshore and Near-shore Operations)

Maximization of skimmer-oil encounter rate

- Place barges in skimming task forces, groups, etc., to reduce recovered oil offloading time
- Place barges alongside skimming systems for immediate offloading of recovered oil when practicable
- Use two vessels, each with heavy sea boom, in an open-ended "V" configuration to funnel surface oil into a trailing skimming unit's organic, V-shaped boom and skimmer (see page 7, *CGA Equipment Guide Book and Tactic Manual* (CGATM)

- Use secondary vessels and heavy sea boom to widen boom swath beyond normal skimming system limits (see page 15, CGATM)
- Consider night-time operations, first considering safety issues
- Utilize all available advanced technology systems (IR, X-Band Radar, etc.) to determine the location of, and move to, recoverable oil
- Confirm the presence of recoverable oil prior to moving to a new location

Maximize skimmer system efficiency

- Place weir skimming systems in areas of calm seas and thick oil
- Maximize the use of oleophilic skimming systems in heavier seas
- Place less mobile, high EDRC skimming systems (e.g. HOSS Barge) in the largest pockets of the heaviest oil
- Maximize onboard recovered oil storage for vessels.
- Obtain authorization for decanting of recovered water as soon as possible
- Use smaller, more agile skimming systems to recover streamers of oil normally found farther from the source. Place recovered oil barges nearby

Recovered Oil Storage

- Smaller barges in larger quantities will increase flexibility for multi-location skimming operations
- Place barges in skimming task forces, groups, etc., to reduce recovered oil offloading time
- Procure and deploy the maximum number of portable tanks to support Vessel of Opportunity Skimming Systems if onboard storage is not available
- Maximize use of the organic recovered oil storage capacity of the skimming vessel

Command, Control, and Communications (C^3)

- Publish, implement, and fully test an appropriate communications plan
- Design an operational scheme, maintaining a manageable span of control
- Designate and mark C^3 vessels for easy aerial identification
- Designate and employ C^3 aircraft for task forces, groups, etc.
- Use reconnaissance air craft and Rapid Response Teams (RAT) to confirm the presence of recoverable oil

On Water Recovery Group
When the first skimming vessel arrives on scene, a complete site assessment will be conducted before recovery operations begin. Once it is confirmed that the air monitoring readings for O2, LEL, H2S, CO, VOC, and Benzene are all within the permissible limits, oil recovery operations may begin.

As skimming vessels arrive, they will be organized to work in areas that allow for the most efficient vessel operation and free vessel movement in the recovery of oil. Vessel groups will vary in structure as determined by the Operations Section of the Unified Command, but will generally consist, at a minimum, of the following dedicated assets:

- 3 to 5 – Offshore skimming vessels (recovery)
- 1 – Tank barge (temporary storage)
- 1 – Air asset (tactical direction)
- 2 – Support vessels (crew/utility for supply)
- 6 to 10 – Boom vessels (enhanced booming)

Example *(**Note:** Actual organization of TFs will be dependent on several factors including, asset availability, weather, spilled oil migration, currents, etc.)*

The 95' FRV Breton Island out of Venice arrives on scene and conducts an initial site assessment. Air monitoring levels are acceptable and no other visual threats have been observed. The area is cleared for safe skimming operations. The Breton Island assumes command and control (CoC) of on-water recovery operations until a dedicated non-skimming vessel arrives to relieve it of those duties.

A second 95' FRV arrives and begins recovery operations alongside the Breton Island. Several more vessels begin to arrive, including a third 95' FRV out of Galveston, the HOSS Barge (High Volume Open Sea Skimming System) out of Harvey, a boom barge (CGA 300) with 25,000' of 42" auto boom out of Leeville, and 9 Fast Response Units (FRUs) from the load-out location at C-Port in Port Fourchon.

As these vessels set up and begin skimming, they are grouped into task forces (TFs) as directed by the Operations Section of the Unified Command located at the command post.

Initial set-up and potential actions:

- A 1,000 meter safety zone has been established around the incident location for vessels involved in Source Control
- The HOSS Barge is positioned facing the incident location just outside of this safety zone or at the point where the freshest oil is reaching the surface
- The HOSS Barge engages its Oil Spill Detection (OSD) system to locate the heaviest oil and maintains that ability for 24-hour operations

- The HOSS Barge deploys 1,320' of 67" Sea Sentry boom on each side, creating a swath width of 800'
- The Breton Island and H.I. Rich skim nearby, utilizing the same OSD systems as the HOSS Barge to locate and recover oil
- Two FRUs join this group and it becomes TF1
- The remaining 7 FRUs are split into a 2 and 3 vessel task force numbered TF2 and TF3
- A 95' FRV is placed in each TF
- The boom barge (CGA 300) is positioned nearby and begins deploying auto boom in sections between two utility vessels (1,000' to 3,000' of boom, depending on conditions) with chain-link gates in the middle to funnel oil to the skimmers
- The initial boom support vessels position in front of TF2 and TF3
- A 100,000+ barrel offshore tank barge is placed with each task force as necessary to facilitate the immediate offload of skimming vessels

The initial task forces (36 hours in) may be structured as follows:

TF 1

- 1 – 95' FRV
- 1 – HOSS Barge with 3 tugs
- 2 – FRUs
- 1 – 100,000+ barrel tank barge and associated tug(s)
- 1 – Dedicated air asset for tactical direction
- 8 – 500' sections of auto boom with gates
- 8 – Boom-towing vessels
- 2 – Support vessels (crew/utility)

TF 2

- 1 – 95' FRV
- 4 – FRUs
- 1 – 100,000+ barrel tank barge and associated tug(s)
- 1 – Dedicated air asset for tactical direction
- 10 – 500' sections of auto boom with gates
- 10 – Boom-towing vessels
- 2 – Support vessels (crew/utility)

TF 3

- 1 – 95' FRV
- 3 – FRUs
- 1 – 100,000+ barrel tank barge and associated tug(s)
- 1 – Dedicated air asset for tactical direction
- 8 – 500' sections of auto boom with gates
- 8 – Boom-towing vessels
- 2 – Support vessels (crew/utility)

Offshore skimming equipment continues to arrive in accordance with the ETA data listed in figure H.3a; this equipment includes 2 AquaGuard skimmers and 11 sets of Koseq Rigid Skimming Arms. These high volume heavy weather capable systems will be divided into functional groups and assigned to specific areas by the Operations Section of the Unified Command.

At this point of the response, the additional TFs may assume the following configurations:

TF 4

- 2 – Sets of Koseq Rigid Skimming Arms w/ associated 200'+ PIDVs
- 1 – AquaGuard Skimmer
- 1 – 100,000+ barrel tank barge and associated tug(s)
- 1 – Dedicated air asset for tactical direction
- 2 – Support vessels (crew/utility)
- 6 – 500' sections of auto boom with gates
- 6 – Boom-towing vessels

TF 5

- 3 – Sets of Koseq Rigid Skimming Arms w/ associated 200'+ PIDVs
- 1 – AquaGuard Skimmer
- 1 – 100,000+ barrel tank barge and associated tug(s)
- 1 – Dedicated air asset for tactical direction
- 2 – Support vessels (crew/utility)
- 8 – 500' sections of auto boom with gates
- 8 – Boom-towing vessels

TF 6

- 3 – Sets of Koseq Rigid Skimming Arms w/ associated 200'+ PIDVs
- 1 – 100,000+ barrel tank barge and associated tug(s)
- 1 – Dedicated air asset for tactical direction
- 2 – Support vessels (crew/utility)
- 6 – 500' sections of auto boom with gates
- 6 – Boom-towing vessels

TF 7

- 3 – Sets of Koseq Rigid Skimming Arms w/ associated 200'+ PIDVs
- 1 – 100,000+ barrel tank barge and associated tug(s)
- 1 – Dedicated air asset for tactical direction
- 2 – Support vessels (crew/utility)
- 6 – 500' sections of auto boom with gates
- 6 – Boom-towing vessels

CGA Minimum Acceptable Capabilities for Vessels of Opportunity (VOO)
Minimum acceptable capabilities of Petroleum Industry Designed Vessels (PIDV) for conducting Vessel of Opportunity (VOO) skimming operations are shown in the table below. PIDVs are "purpose-built" to provide normal support to offshore oil and gas operators. They include but are not limited to utility boats, offshore supply vessels, etc. They become VOOs when tasked with oil spill response duties.

Capability	FRU	KOSEQ	AquaGuard
Type of Vessel	Utility Boat	Offshore Supply Vessel	Utility Boat
Operating parameters			
Sea State	3-5 ft max	9.8 ft max	3-5 ft max
Skimming speed	≤1 kt	≤3 kts	≤1 kt
Vessel size			
Minimum Length	100 ft	200 ft	100 ft
Deck space for: • Tank(s) • Crane(s) • Boom Reels • Hydraulic Power Units • Equipment Boxes	18x32 ft	100x40 ft	18x32 ft
Communication Assets	Marine Band Radio	Marine Band Radio	Marine Band Radio

Tactical use of Vessels of Opportunity (VOO): Cantium, LLC will take all possible measures to maximize the oil-to-skimmer encounter rate of all skimming systems, to include VOOs, as discussed in this section. VOOs will normally be placed within an On-water recovery unit as shown in figures below.

Skimming Operations: PIDVs are the preferred VOO skimming platform. OSROs are more versed in operating on these platforms and the vessels are generally large enough with crews more likely versed in spill response operations. They also have a greater possibility of having on-board storage capacity and the most likely vessels to be under contract, and therefore more readily available to the operator. These vessels would normally be assigned to an on-water recovery group/division (see figure below) and outfitted with a VOSS suited for their size and capabilities. Specific tactics used for skimming operations would be dependent upon many parameters which include, but are not limited to, safety concerns, weather, type VOSS on board, product being recovered, and area of oil coverage. Planners would deploy these assets with the objective of safely maximizing oil- to-skimmer encounter rate by taking actions to minimize non-skimming time and maximizing boom swath. Specific tactical configurations are shown in figures below.

The Fast Response Unit (FRU): A self-contained, skid based, skimming system that is deployed from the right side of a vessel of opportunity (VOO). An outrigger holds a 75' long section of air inflatable boom in place that directs oil to an apex for recovery via a Foilex 250

weir skimmer. The outrigger creates roughly a 40' swath width dependent on the VOO beam. The lip of the collection bowl on the skimmer is placed as close to the oil and water interface as possible to maximize oil recovery and minimize water retention. The skimmer then pumps all fluids recovered to the storage tank where it is allowed to settle, and with the approval of the Coast Guard, the water is decanted from the bottom of the tank back into the water ahead of the containment boom to be recycled through the system. Once the tank is full of as much pure recovered oil as possible it is offloaded to a storage barge for disposal in accordance with an approved disposal plan. A second 100 barrel storage tank can be added if the appropriate amount of deck space is available to use as secondary storage.

Tactical Overview

Mechanical Recovery – The FRU is designed to provide fast response skimming capability in the offshore and nearshore environment in a stationary or advancing mode. It provides a rated daily recovery capacity of 4,100 barrels. An additional boom reel with 440' of offshore boom can be deployed along with the FRU, and a second support vessel for boom towing, to extend the swath width when attached to the end of the fixed boom. The range and sustainability offshore is dependent on the VOO that the unit is placed on, but generally these can stay offshore for extended periods. The FRU works well independently or assigned with other on-water recovery assets in a task force. In either case, it is most effective when a designated aircraft is assigned to provide tactical direction to ensure the best placement in recoverable oil.
Maximum Sea Conditions – Under most circumstances the FRU can maintain standard oil spill recovery operations in 2' to 4' seas. Ultimately, the Coast Guard licensed Captain in charge of the VOO (with input from the CGAS Supervisor assigned) will be responsible to determine when the sea conditions have surpassed the vessel's safe operating capabilities.

Possible Task Force Configuration (Multiple VOOs can be deployed in a task force)
1 – VOO (100' to 165' Utility or Supply Vessel)
1 – Boom reel w/support vessel for towing
1 – Tank barge (offshore) for temporary storage
1 – Utility/Crewboat (supply)
1 – Designated spotter aircraft

The VOSS (yellow) is being deployed and connected to an out-rigged arm. This is suitable for collection in both large pockets of oil and for recovery of streaming oil.

The oil-to-skimmer encounter rate is limited by the length of the arm. Skimming pace is ≤ 1 knot.

Through the use of an additional VOO, and using extended sea boom, the swath of the VOSS is increased therefore maximizing the oil-to-skimmer encounter rate. Skimming pace is ≤ 1 knot.

The Koseq Rigid Sweeping Arm: A skimming system deployed on a vessel of opportunity. It requires a large Offshore or Platform Supply Vessel (OSV/PSV), greater than 200' with at least 100' x 50' of free deck space. On each side of the vessel, a 50' long rigid framed Arm is deployed that consists of pontoon chambers to provide buoyancy, a smooth nylon face, and a hydraulically adjustable mounted weir skimmer. The Arm floats independently of the vessel and is attached by a tow bridle and a lead line. The movement of the vessel forward draws the rubber end seal of the arm against the hull to create a collection point for free oil directed to the weir by the Arm face. The collection weir is adjusted to keep the lip as close to the oil water interface as possible to maximize oil recovery while attempting to minimize excess water collection. A transfer pump (combination of positive displacement, screw type and centrifuge suited for highly viscous oils) pump the recovered liquid to portable tanks and/or dedicated fixed storage tanks onboard the vessel. After being allowed to sit and separate, with approval from the Coast Guard, the water can be decanted (pumped off) in front of the collection arm to be reprocessed through the system. Once full with as much pure recovered oil as possible, the oil is transferred to a temporary storage barge where it can be disposed of in accordance with an approved disposal plan.

Tactical Overview

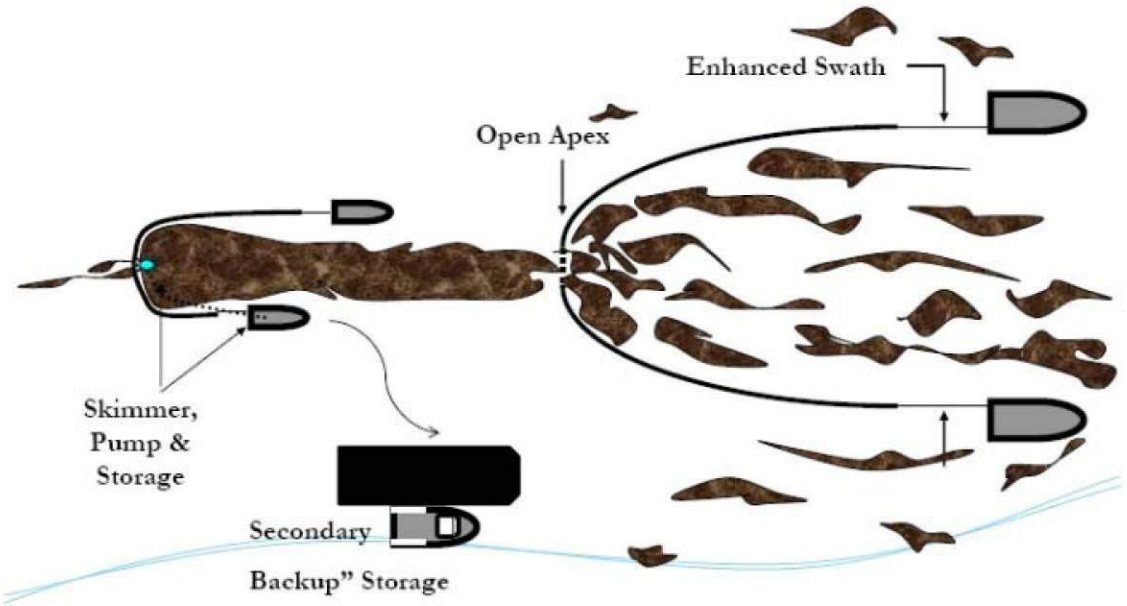
Mechanical Recovery – Deployed on large vessels of opportunity (VOO) the Koseq Rigid Sweeping Arms are high volume surge capacity deployed to increase recovery capacity at the source of a large oil spill in the offshore and outer nearshore environment of the Gulf of Mexico. They are highly mobile and sustainable in rougher sea conditions than normal skimming vessels (9.8' seas). The large Offshore Supply Vessels (OSV) required to deploy the Arms are able to remain on scene for extended periods, even when sea conditions pick up. Temporary storage on deck in portable tanks usually provides between 1,000 and 3,000 bbls. In most cases, the OSV will be able to pump 20% of its deadweight into the liquid mud tanks in accordance with the vessels Certificate of Inspection (COI). All storage can be offloaded utilizing the vessels liquid transfer system.

Maximum Sea Conditions - Under most circumstances the larger OSVs are capable of remaining on scene well past the Skimming Arms maximum sea state of 9.8'. Ultimately it will be the decision of the VOO Captain, with input from the T&T Supervisor onboard, to determine when the sea conditions have exceeded the safe operating conditions of the vessel.

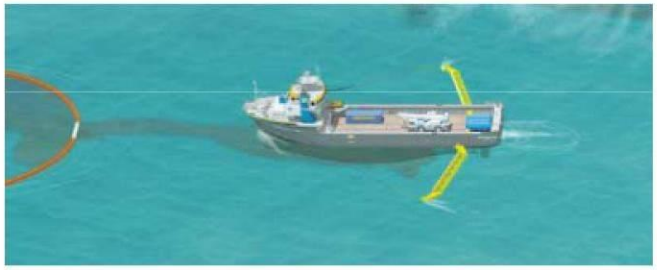
Command and Control – The large OSVs in many cases have state of the art communication and electronic systems, as well as the accommodations to support the function of directing all skimming operations offshore and reporting back to the command post.

Possible Task Force Configuration (Multiple Koseq VOOs can be deployed in a task force)

1 – $\geq$ 200' Offshore Supply Vessels (OSV) with set of Koseq Arms
2 to 4 portable storage tanks (500 bbl)
1 – Modular Crane Pedestal System set (MCPS) or 30 cherry picker (crane) for deployment
1 – Tank barge (offshore) for temporary storage
1 – Utility/Crewboat (supply)
1 – Designated spotter aircraft
4 – Personnel (4 T&T OSRO)



Scattered oil is "caught" by two VOO and collected at the apex of the towed sea boom. The oil moves thought a "gate" at that apex, forming a larger stream of oil which moves into the boom of the skimming vessel. Operations are paced at >1. A recovered oil barge stationed nearby to minimize time taken to offload recovered oil.



This is a depiction of the same operation as above but using KOSEQ Arms. In this configuration, the collecting boom speed dictates the operational pace at $\geq$ 1 knot to minimize entrainment of the oil.

Clean Gulf Associates (CGA) Procedure for Accessing Member-Contracted and other Vessels of Opportunity (VOOs) for Spill Response

- CGA has procedures in place for CGA member companies to acquire vessels of opportunity (VOOs) from an existing CGA member's contracted fleet or other sources for the deployment of CGA portable skimming equipment including Koseq Arms, Fast Response Units (FRUs) and any other portable skimming system(s) deemed appropriate for the response for a potential or actual oil spill, WCD oil spill or a Spill of National Significance (SONS).

- CGA uses Port Vision, a web-based vessel and terminal interface that empowers CGA to track vessels through Automatic Identification System (AIS) and terminal activities using a Geographic Information System (GIS). It provides live AIS/GIS views of waterways showing current vessel positions, terminals, created vessel fleets, and points-of-interest. Through this system, CGA has the ability to get instant snapshots of the location and status of all vessels contracted to CGA members, day or night, from any web-enabled PC.

Near Shore Response Actions

Timing

- Put near shore assets on standby and deployment in accordance with planning based on the actual situation, actual trajectories and oil budgets
- VOO identification and training in advance of spill nearing shoreline if possible
- Outfitting of VOOs for specific missions
- Deployment of assets based on actual movement of oil

Considerations

- Water depth, vessel draft
- Shoreline gradient
- State of the oil
- Use of VOOs
- Distance of surf zone from shoreline

Surveillance

- Provide trained observer to direct skimming operations
- Continual surveillance of oil movement by remote sensing systems, aerial photography and visual confirmation
- Continual monitoring of vessel assets

Dispersant Use

- Generally will not be approved within 3 miles of shore or with less than 10 meters of water depth
- Approval would be at Regional Response Team level (Region 6)

Dedicated Near Shore skimming systems

- FRVs
- Egmopol and Marco SWS
- Operate with aerial spotter directing systems to observed oil slicks

VOO

- Use Cantium, LLC's contracted resources as applicable
- Industry vessel are usually best for deployment of Vessel of Opportunity Skimming Systems (VOSS)
- Acquire additional resources as needed
- Consider use of local assets, i.e. fishing and pleasure craft
- Expect mission specific and safety training to be required
- Plan with the US Coast Guard for vessel inspections
- Operate with aerial spotter directing systems to oil patches

Shoreline Protection Operations

Response Planning Considerations

- Review appropriate Area Contingency Plan(s)
- Locate and review appropriate Geographic Response and Site Specific Plans
- Refer to appropriate Environmentally Sensitive Area Maps
- Capability for continual analysis of trajectories run periodically during the response
- Environmental risk assessments (ERA) to determine priorities for area protection
- Time to acquire personnel and equipment and their availability
- Refer to the State of Louisiana Initial Oil Spill Response Plan, Deep Water Horizon, dated 2 May 2010, as a secondary reference
- Aerial surveillance of oil movement
- Pre-impact beach cleaning and debris removal
- Shoreline Cleanup Assessment Team (SCAT) operations and reporting procedures
- Boom type, size and length requirements and availability
- Possibility of need for In-situ burning in near shore areas
- Current wildlife situation, especially status of migratory birds and endangered species in the area
- Check for Archeological sites and arrange assistance for the appropriate state agency when planning operations the may impact these areas

Placement of boom

- Position boom in accordance with the information gained from references listed above and based on the actual situation
- Determine areas of natural collection and develop booming strategies to move oil into those areas
- Assess timing of boom placement based on the most current trajectory analysis and the availability of each type of boom needed. Determine an overall booming priority and conduct booming operations accordingly. Consider:
    - Trajectories
    - Weather forecast
    - Oil Impact forecast
    - Verified spill movement
    - Boom, manpower and vessel (shallow draft) availability
    - Near shore boom and support material, (stakes, anchors, line)

Beach Preparation - Considerations and Actions

- Use of a 10 mile go/no go line to determine timing of beach cleaning
- SCAT reports and recommendations
- Determination of archeological sites and gaining authority to enter
- Monitoring of tide tables and weather to determine extent of high tides
- Pre cleaning of beaches by moving waste above high tide lines to minimize waste
- Determination of logistical requirements and arranging of waste removal and disposal

- Staging of equipment and housing of response personnel as close to the job site as possible to maximize on-site work time
- Boom tending, repair, replacement and security (use of local assets may be advantageous)
- Constant awareness of weather and oil movement for resource re-deployment as necessary
- Earthen berms and shoreline protection boom may be considered to protect sensitive inland areas
- Requisitioning of earth moving equipment
- Plan for efficient and safe use pf personnel, ensuring:
    - A continual supply of the proper Personal Protective Equipment
    - Heating or cooling areas when needed
    - Medical coverage
    - Command and control systems (i.e. communications)
    - Personnel accountability measures
- Remediation requirements, i.e., replacement of sands, rip rap, etc.
- Availability of surface washing agents and associated protocol requirements for their use (see National Contingency Plan Product Schedule for list of possible agents)
- Discussions with all stakeholders, i.e., land owners, refuge/park managers, and others as appropriate, covering the following:
    - Access to areas
    - Possible response measures and impact of property and ongoing operations
    - Determination of any specific safety concerns
    - Any special requirements or prohibitions
    - Area security requirements
    - Handling of waste
    - Remediation expectations
    - Vehicle traffic control
    - Domestic animal safety concerns
    - Wildlife or exotic game concerns/issues

Inland and Coastal Marsh Protection and Response Considerations and Actions

- All considered response methods will be weighed against the possible damage they may do to the marsh. Methods will be approved by the Unified Command only after discussions with local Stakeholder, as identified above.
    - In-situ burn may be considered when marshes have been impacted
- Passive clean up of marshes should considered and appropriate stocks of sorbent boom and/or sweep obtained.
- Response personnel must be briefed on methods to traverse the marsh, i.e.,
    - use of appropriate vessel
    - use of temporary walkways or road ways
- Discuss and gain approval prior cutting or moving vessels through vegetation
- Discuss use of vessels that may disturb wildlife, i.e, airboats
- Safe movement of vessels through narrow cuts and blind curves

- Consider the possibility that no response in a marsh may be best
- In the deployment of any response asset, actions will be taken to ensure the safest, most efficient operations possible. This includes, but is not limited to:
    - Placement of recovered oil or waste storage as near to vessels or beach cleanup crews as possible.
    - Planning for stockage of high use items for expeditious replacement
    - Housing of personnel as close to the work site as possible to minimize travel time
    - Use of shallow water craft
    - Use of communication systems appropriate ensure command and control of assets
    - Use of appropriate boom in areas that I can offer effective protection
    - Planning of waste collection and removal to maximize cleanup efficiency
- Consideration or on-site remediation of contaminated soils to minimize replacement operations and impact on the area

Decanting Strategy

Recovered oil and water mixtures will typically separate into distinct phases when left in a quiescent state. When separation occurs, the relatively clean water phase can be siphoned or decanted back to the recovery point with minimal, if any, impact. Decanting therefore increases the effective on-site oil storage capacity and equipment operating time. FOSC/SOSC approval will be requested prior to decanting operations. This practice is routinely used for oil spill recovery.

CGA Equipment Limitations

The capability for any spill response equipment, whether a dedicated or portable system, to operate in differing weather conditions will be directly in relation to the capabilities of the vessel the system in placed on. Most importantly, however, the decision to operate will be based on the judgment of the Unified Command and/or the Captain of the vessel, who will ultimately have the final say in terminating operations. Skimming equipment listed below may have operational limits which exceed those safety thresholds. As was seen in the Deepwater Horizon (DWH) oil spill response, vessel skimming operations ceased when seas reached 5-6 feet and vessels were often recalled to port when those conditions were exceeded. Systems below are some of the most up-to-date systems available and were employed during the DWH spill.

Boom	3 foot seas, 20 knot winds
Dispersants	Winds more than 25 knots Visibility less than 3 nautical miles Ceiling less than 1,000 feet.
FRU	8 foot seas
HOSS Barge/OSRB	8 foot seas
Koseq Arms	8 foot seas
OSRV	4 foot seas

Environmental Conditions in the GOM

Louisiana is situated between the easterly and westerly wind belts, and therefore, experiences westerly winds during the winter and easterly winds in the summer. Average wind speed is generally 14-15 mph along the coast. Wave heights average 4 and 5 feet. However, during hurricane season, Louisiana has recorded wave heights ranging from 40 to 50 feet high and winds reaching speeds of 100 mph. Because much of southern Louisiana lies below sea level, flooding is prominent.

Surface water temperature ranges between 70 and 80 ° F during the summer months. During the winter, the average temperature will range from 50 and 60 ° F.

The Atlantic and Gulf of Mexico hurricane season is officially from 1 June to 30 November. 97% of all tropical activity occurs within this window. The Atlantic basin shows a very peaked season from August through October, with 78% of the tropical storm days, 87% of the minor (Saffir-Simpson Scale categories 1 and 2) hurricane days, and 96% of the major (Saffir-Simpson categories 3, 4 and 5) hurricane days occurring then. Maximum activity is in early to mid September. Once in a few years there may be a hurricane occurring "out of season" - primarily in May or December. Globally, September is the most active month and May is the least active month.

FIGURE 1
TRAJECTORY BY LAND SEGMENT

Trajectory of a spill and the probability of it impacting a land segment have been projected utilizing Cantium, LLC's WCD and information in the BOEM Oil Spill Risk Analysis Model (OSRAM) for the Central and Western Gulf of Mexico available on the BOEM website using 3, 10, and 30 day impact. The results are tabulated below.

Area/Block	Lease Number	Launch Area	Land Segment and/or Resource	Conditional Probability (%)
Sidetrack, complete, produce 1 well (SG-26) **BM 2, Well No. SG-26** *4.1 miles from shore*	00369	C37		*3 day*
			Terrebone, LA	**13**
			Lafourche, LA	**13**
			Jefferson, LA	2
			Plaquemines, LA	4
				10 day
			Cameron, LA	1
			Vermilion, LA	2
			Iberia, LA	1
			Terrebonne, LA	**18**
			Lafourche, LA	15
			Jefferson, LA	3
			Plaquemines, LA	9
				30 day
			Matagorda, TX	1
			Brazoria, TX	1
			Galveston, TX	1
			Jefferson, TX	1
			Cameron, LA	6
			Vermilion, LA	4
			Iberia, La	1
			Terrebonne, LA	**20**
			Lafourche, LA	16
			Jefferson, LA	4
			Plaquemines, LA	10

WCD Scenario– <u>BASED ON WELL BLOWOUT DURING DRILLING OPERATIONS</u> (4.1 miles from shore)
21,999 bbls of crude oil (Volume considering natural weathering)
API Gravity 25°

FIGURE 2 – Equipment Response Time to BM 2, Well No. SG-26

Dispersants/Surveillance

Dispersant/Surveillance	Dispersant Capacity (gal)	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to site	Total Hrs
ASI							
Basler 67T	2000	2	Houma	2	2	0.3	2.3
DC 3	1200	2	Houma	2	2	0.3	2.3
DC 3	1200	2	Houma	2	2	0.3	2.3
Aero Commander	NA	2	Houma	2	2	0.3	2.3

Offshore Response

Offshore Equipment Pre-Determined Staging	EDRC	Storage Capacity	VOO	Persons Required	From	Hrs to Procure	Hrs to Loadout	Hrs to GOM	Travel to Spill Site	Hrs to Deploy	Total Hrs
CGA											
HOSS Barge	76285	4000	3 Tugs	12	Harvey	6	0	12	4.5	2	24.5
95' FRV	22885	249	NA	6	Venice	2	0	3	0.5	1	6.5
95' FRV	22885	249	NA	6	Leeville	2	0	2	2	1	7
95' FRV	22885	249	NA	6	Vermilion	2	0	3	3	1	9
Boom Barge (CGA-300) 42" Auto Boom (25000')	NA	NA	1 Tug 50 Crew	4 (Barge) 2 (Per Crew)	Leeville	8	0	4	1	2	15
Kirby Offshore (Available through contract with CGA)											
RO Barge	NA	80000+	1 Tug	6	Venice	50	12	4	5	1	72
Enterprise Marine Services LLC (Available through contract with CGA)											
CTCo 2606	NA	20000	1 Tug	6	Amelia	31	0	6	10	1	48
CTCo 5001	NA	47000	1 Tug	6	Amelia	31	0	6	10	1	48

Staging Area: Fourchon

Offshore Equipment With Staging	EDRC	Storage Capacity	VOO	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Site	Hrs to Deploy	Total Hrs
CGA											
Hydro-Fire Boom	NA	NA	8 Utility	40	Harvey	0	24	2.7	0.5	6	33.2

Nearshore Response

Nearshore Equipment Pre-determined Staging	EDRC	Storage Capacity	VOO	Persons Required	From	Hrs to Procure	Hrs to Loadout	Hrs to GOM	Travel to Spill Site	Hrs to Deploy	Total Hrs
CGA											
Trinity SWS	21500	249	NA	4	Vermilion	2	0	N/A	48	1	51
Trinity SWS	21500	249	NA	4	Morgan City	2	0	N/A	48	1	51
46' FRV	15257	65	NA	4	Morgan City	2	0	2	2.5	1	7.5
46' FRV	15257	65	NA	4	Venice	2	0	2	3.5	1	8.5
Enterprise Marine Services LLC (Available through contract with CGA)											
CTCo 2603	NA	25000	1 Tug	6	Amelia	34.5	0	6	6.5	1	48
CTCo 2607	NA	23000	1 Tug	6	Amelia	34.5	0	6	6.5	1	48
CTCo 2608	NA	23000	1 Tug	6	Amelia	34.5	0	6	6.5	1	48
CTCo 2609	NA	23000	1 Tug	6	Amelia	34.5	0	6	6.5	1	48

Staging Area: Fourchon

Nearshore Equipment With Staging	EDRC	Storage Capacity	VOO	Persons Req.	From	Hrs to Procure	Hrs to Load Out	Travel to Staging	Travel to Deployment	Hrs to Deploy	Total Hrs
CGA											
SWS Egmopol	1810	100	NA	3	Galveston	2	2	12	2	1	19
SWS Egmopol	1810	100	NA	3	Morgan City	2	2	3	2	1	10
SWS Marco	3588	20	NA	3	Lake Charles	2	2	7	2	1	14
SWS Marco	3588	34	NA	3	Leeville	2	2	2	2	1	10
SWS Marco	3588	34	NA	3	Venice	2	2	5	2	1	12
Foilex Skim Package (TDS 150)	1131	50	1 Utility	3	Lake Charles	4	12	7	2	2	27
Foilex Skim Package (TDS 150)	1131	50	1 Utility	3	Galveston	4	12	12	2	2	32
Foilex Skim Package (TDS 150)	1131	50	1 Utility	3	Harvey	4	12	3	2	2	23
4 Drum Skimmer (Magnum 100)	680	100	1 Crew	3	Lake Charles	2	2	7	2	1	14
4 Drum Skimmer (Magnum 100)	680	100	1 Crew	3	Harvey	2	2	3	2	1	10
2 Drum Skimmer (TDS 118)	240	100	1 Crew	3	Lake Charles	2	2	7	2	1	14
2 Drum Skimmer (TDS 118)	240	100	1 Crew	3	Harvey	2	2	3	2	1	10

Staging Area: Fourchon

Shoreline Protection Boom	VOO	Persons Req.	Storage/Warehouse Location	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Deployment	Hrs to Deploy	Total Hrs
AMPOL (available through Letter of Intent)									
34,050' 18" Boom	13 Crew	26	New Iberia, LA	2	2	4.1	2	12	22.1
12,850' 18" Boom	7 Crew	14	Chalmette, LA	2	2	3	2	6	15
900' 18" Boom	1 Crew	2	Morgan City, LA	2	2	3	2	2	11
30,000' 18" Boom	13 Crew	26	Harvey, LA	2	2	3	2	12	21
1,700' 18" Boom	2 Crew	4	Venice, LA	2	2	5	2	2	13
14,750' 18" Boom	7 Crew	14	Port Arthur, TX	2	2	9	2	6	21
OMI Environmental (available through Letter of Intent)									
12,500' 18" Boom	6 Crew	12	New Iberia, LA	1	1	4	2	3	11
6,400' 18" Boom	3 Crew	6	Houston, TX	1	1	11	2	3	18
3,500' 18" Boom	2 Crew	4	Port Arthur, TX	1	1	9	2	3	16
4,000' 18" Boom	2 Crew	4	Longview, TX	1	1	13	2	3	20
4,850' 18" Boom	2 Crew	4	Belle Chasse, LA	1	1	3	2	3	10
8,000' 18" Boom	3 Crew	6	Port Allen, LA	1	1	5	2	3	12
2,000' 18" Boom	1 Crew	2	Houma, LA	1	1	2	2	3	9
2,500' 18" Boom	1 Crew	2	Morgan City, LA	1	1	3	2	3	10
1,600' 18" Boom	1 Crew	2	Gonzalez, LA	1	1	4	2	3	11
1,900' 18" Boom	1 Crew	2	St. James, LA	1	1	3	2	3	10
2,000' 18" Boom	1 Crew	2	Galliano, LA	1	1	1	2	3	8
1,000' 18" Boom	1 Crew	2	St. Rose, LA	1	1	3	2	3	10
1,000' 18" Boom	1 Crew	2	Hackberry, LA	1	1	8	2	3	15
5,800' 18" Boom	3 Crew	6	Venice, LA	1	1	5	2	3	12
13,300' 18" Boom	6 Crew	12	Harvey, LA	1	1	3	2	3	10

Wildlife Response	EDRC	Storage Capacity	VOO	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Deployment	Hrs to Deploy	Total Hrs
					CGA						
Wildlife Support Trailer	NA	NA	NA	2	Harvey	2	2	3	1	2	10
Bird Scare Guns (24)	NA	NA	NA	2	Harvey	2	2	3	1	2	10
Bird Scare Guns (12)	NA	NA	NA	2	Galveston	2	2	12	1	2	19
Bird Scare Guns (12)	NA	NA	NA	2	Aransas Pass	2	2	16.5	1	2	23.5
Bird Scare Guns (48)	NA	NA	NA	2	Lake Charles	2	2	7	1	2	14
Bird Scare Guns (24)	NA	NA	NA	2	Leeville	2	2	2	1	2	9

Response Asset	Total
Offshore EDRC	144,940
Offshore Recovered Oil Capacity	151,747+
Nearshore / Shallow Water EDRC	93,131
Nearshore / Shallow Water Recovered Oil Capacity	95,466

SECTION 10
ENVIRONMENTAL MONITORING INFORMATION

10.1 MONITORING SYSTEMS

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

10.2 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 be utilizing either of these devices.

Cantium 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"

10.3 FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY

Grand Isle Block 26 is not located in the Flower Garden Banks National Marine Sanctuary; therefore, relevant information is not required in this DOCD.

SECTION 11
LEASE STIPULATIONS INFORMATION

Development activities are subject to the following stipulations attached to Lease OCS 00391, Grand Isle Block 26.

11.1 MARINE PROTECTED SPECIES

In accordance with the Federal Endangered Species Act and the Marine Mammal Protection Act, Cantium 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 implementing 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 12
ENVIRONMENTAL MITIGATION MEASURES INFORMATION

12.1 MEASURES TAKEN TO AVOID, MINIMIZE, AND MITIGATE IMPACTS

This plan does not propose activities for which the state of Florida is an affected state; therefore, mitigation information is not required for the activities proposed in this plan.

12.2 INCIDENTAL TAKES

Cantium will adhere to the requirements set forth in the following documents, as applicable, 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 13
RELATED FACILITIES AND OPERATIONS INFORMATION

13.1 RELATED OCS FACILITIES AND OPERATIONS

The subject well will be produced from existing Caisson No. 5. This caisson will be modified to a multi-well structure by adding a slot to drill and produce the proposed well. A 6-inch bulk gas lease term pipeline approximately 10,910 feet in length is installed to transport produced gas from Caisson No. 5 to Platform X in Grand Isle Block 26. This pipeline will be returned to service.

13.2 TRANSPORTATION SYSTEM

A 4-inch pipeline (Segment No. 100) and a 6-inch pipeline (Segment No. 11102) were installed to transport produced hydrocarbons from Platform X to Platform R in Grand Isle Block 26. Hydrocarbons are transported to an onshore facility via Segment No. 14470. Two phase liquids from the 10-inch GI37 R pipeline (Segment No. 14470), BM1 HH/Tango (8-inch pipeline) and BM 3 C&I (8-inch pipeline) complexes are pumped to the Cantium Port Fourchon Tank farm. The fluids are received in various storage tanks depending on the State or Federal allocation of the hydrocarbons. Water is separated and treated onsite to NPDES standards and is pumped via a 12-inch line to BM 3 K&N facility for disposal. The oil flows into another stock tank for further separation and then through a LACT unit consisting of two meters which are proved once a month using a positive displacement prover loop. There is a separate LACT and prover for both Federal and State production trains. Prior to measurement, the oil can be diverted back to the tank for further treating if the required BS&W is not met. Oil production is allocated on the basis of individual well tests. No new nearshore or onshore pipelines or facilities will be constructed.

13.3 PRODUCED LIQUID HYDROCARBONS TRANSPORTATION VESSELS

There will not be any transfers of liquid hydrocarbons other than via pipeline.

SECTION 14
SUPPORT VESSELS AND AIRCRAFT INFORMATION

14.1 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	Maximum Number in Area at Any Time (drlg / prod)	Trip Frequency or Duration (drlg / prod)
Tug boat	59,548 gal	2 / 0	2 total / 0
Supply boat	7,240 gal	1 / 1	3x week / 2x week
Helicopter	560 gal	As required	As required

14.2 DIESEL OIL SUPPLY VESSELS

Information regarding vessels to be used to supply diesel oil for fuel and other purposes is provided in the table below.

Size of Fuel Supply Vessel (ft)	Capacity of Fuel Supply Vessel	Frequency of Fuel Transfers	Route Fuel Supply Vessel Will Take
180	1,500 bbls	weekly	Shortest route from Shorebase to block

14.3 DRILLING FLUID TRANSPORTATION

Drilling fluid transportation information is not required to be submitted with this plan.

14.4 SOLID AND LIQUID WASTE TRANSPORTATION

A table, "Wastes You Will Transport and/or Dispose of Onshore," is included as **Attachment 14-A.**

14.5 VICINITY MAP

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 routes of the support vessels and aircraft that will be used when traveling between the onshore support facilities and the drilling unit is included as **Attachment 14-B.**

Attachment 14-A WASTE AND SURPLUS ESTIMATED TO BE TRANSPORTED AND/OR DISPOSED OF ONSHORE

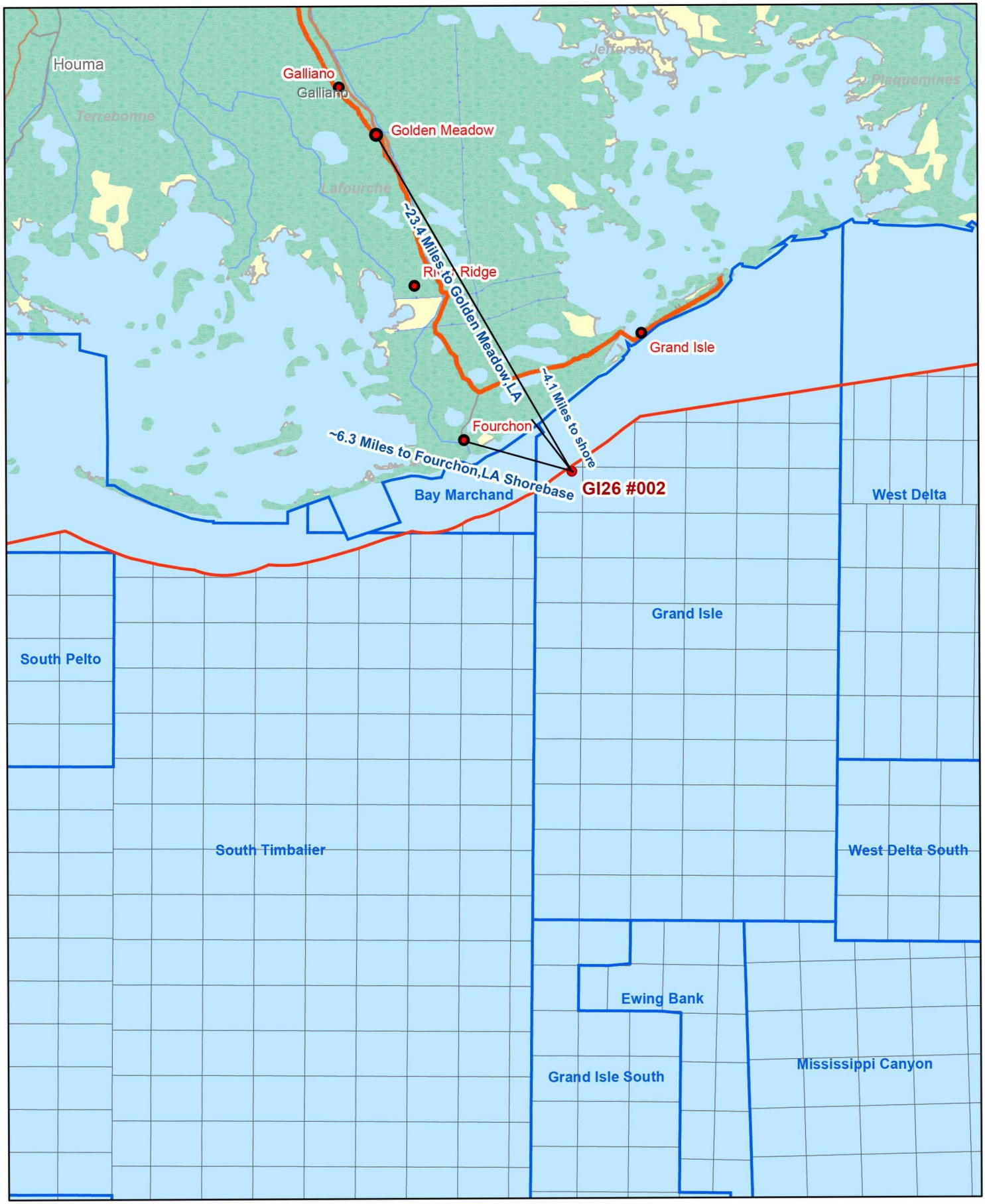
please specify whether the amount reported is a total or per well

	Projected generated waste		Solid and Liquid Wastes transportation	Waste Disposal		
Type of Waste	**Composition**		**Transport Method**	**Name/Location of Facility**	**Amount**	**Disposal Method**
Will drilling occur ? If yes, fill in the muds and cuttings.						
Water-based drilling fluid or mud	NA					
Synthetic-based drilling fluid or mud	GT 3000		Below deck storage tanks on offshore support vessels	EcoServices, LLC, Fourchon, LA	11,000 bbl/well	Recycled
Oil-based drilling fluid or mud	NA					
Cuttings wetted with water-based fluid	NA					
Cuttings wetted with synthetic-based fluid	NA					
Cuttings wetted with oil-based fluids	NA					
Will you produce hydrocarbons? If yes fill in for produced sand.						
Produced sand	NA					
Will you have additional wastes that are not permitted for discharge? If yes, fill in the appropriate rows.						
Trash and debris	Plastic, paper, aluminum		barged in a storage bin	WM, Fourchon, LA	15,000 lbs/well	Recycled or Land fill
Used oil	Oil		barged in 55 gal drums	EcoServices, LLC, Fourchon, LA	30 drums/well	Recycled
Wash water	Water		Below deck storage tanks on offshore support vessels	EcoServices, LLC, Fourchon, LA	2,500 bbls/well	Disposal
Chemical product wastes	Misc.		barged in a storage bin	EcoServices, LLC, Fourchon, LA	1,000 lbs/well	Disposal
NOTE: If you will not have a type of waste, enter NA in the row.						

Attachment 14-B

Cantium, LLC

Vicinity Map
Grand Isle 26



SECTION 15
ONSHORE SUPPORT FACILITIES INFORMATION

15.1 GENERAL

The onshore facilities to be used to provide supply and service support for the proposed activities are provided in the table below.

Name	Location	Existing/New/Modified
Fourchon Service Base	Fourchon, Louisiana	Existing
Bristow Helicopters	Golden Meadow, Louisiana	Existing

15.2 SUPPORT BASE CONSTRUCTION OR EXPANSION

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

15.3 SUPPORT BASE CONSTRUCTION OR EXPANSION TIMETABLE

A support base construction or expansion timetable is not required for the activities proposed in this plan.

15.4 WASTE DISPOSAL

A table, "Wastes You Will Transport and/or Dispose of Onshore," is included as **Attachment 14-A.**

SECTION 16
COASTAL ZONE MANAGEMENT (CZM) 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 4.1 miles from the Louisiana shore. Measures will be taken to avoid or mitigate the probable impacts. Cantium will operate in compliance with existing federal and state laws, regulations, and resultant enforceable program policies in Louisiana's Coastal Zone Management Program.

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 as **Attachment 16-A.**

Attachment 16-A

COASTAL ZONE MANAGEMENT
CONSISTENCY CERTIFICATION
DEVELOPMENT OPERATIONS COORDINATION DOCUMENT
GRAND ISLE BLOCK 26 (SL) / GRAND ISLE BLOCK 25 (BHL)
OCS 00391 (SL) / SL21881 (BHL)

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.

Cantium, LLC

Lessee or Operator

Certifying Official

1/16/2019

Date

SECTION 17
ENVIRONMENTAL IMPACT ANALYSIS (EIA)

The Environmental Impact Analysis is included as **Attachment 17-A.**

Cantium, LLC (Cantium)

Development Operations Coordination Document
Grand Isle Block 26
OCS-G 00391

(A) IMPACT PRODUCING FACTORS

ENVIRONMENTAL IMPACT ANALYSIS WORKSHEET

Environment Resources	Impact Producing Factors (IPFs) Categories and Examples Refer to recent GOM OCS Lease Sale EIS for a more complete list of IPFs					
	Emissions (air, noise, light, etc.)	Effluents (muds, cutting, other discharges to the water column or seafloor)	Physical disturbances to the seafloor (rig or anchor emplacements, etc.)	Wastes sent to shore for treatment or disposal	Accidents (e.g., oil spills, chemical spills, H_2S releases)	Discarded Trash & Debris
Site-specific at Offshore Location						
Designated topographic features		(1)	(1)		(1)	
Pinnacle Trend area live bottoms		(2)	(2)		(2)	
Eastern Gulf live bottoms		(3)	(3)		(3)	
Benthic communities			(4)			
Water quality		X	X		X	
Fisheries		X	X		X	
Marine Mammals	X(8)	X			X(8)	X
Sea Turtles	X(8)	X			X(8)	X
Air quality	X(9)					
Shipwreck sites (known or potential)			X(7)			
Prehistoric archaeological sites			X(7)			
Vicinity of Offshore Location						
Essential fish habitat		X	X		X(6)	
Marine and pelagic birds	X				X	X
Public health and safety					(5)	
Coastal and Onshore						
Beaches					X(6)	X
Wetlands					X(6)	
Shore birds and coastal nesting birds					X(6)	X
Coastal wildlife refuges					X	
Wilderness areas					X	

Footnotes for Environmental Impact Analysis Matrix

1) Activities that may affect a marine sanctuary or topographic feature. Specifically, if the well or platform site or any anchors will be on the seafloor within the:
   - 4-mile zone of the Flower Garden Banks, or the 3-mile zone of Stetson Bank;
   - 1000-m, 1-mile or 3-mile zone of any topographic feature (submarine bank) protected by the Topographic Features Stipulation attached to an OCS lease;
   - Essential Fish Habitat (EFH) criteria of 500 ft. from any no-activity zone; or
   - Proximity of any submarine bank (500 ft. buffer zone) with relief greater than 2 meters that is not protected by the Topographic Features Stipulation attached to an OCS lease.
2) Activities with any bottom disturbance within an OCS lease block protected through the Live Bottom (Pinnacle Trend) Stipulation attached to an OCS lease.
3) Activities within any Eastern Gulf OCS block where seafloor habitats are protected by the Live Bottom (Low-Relief) Stipulation attached to an OCS lease.
4) Activities on blocks designated by the BOEM as being in water depths 300 meters or greater.
5) Exploration or production activities where H2S concentrations greater than 500 ppm might be encountered.
6) All activities that could result in an accidental spill of produced liquid hydrocarbons or diesel fuel that you determine would impact these environmental resources. If the proposed action is located a sufficient distance from a resource that no impact would occur, the EIA can note that in a sentence or two.
7) All activities that involve seafloor disturbances, including anchor emplacements, in any OCS block designated by the 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 a prehistoric site that no impact would occur, the EIA can note that in a sentence or two.
8) All activities that you determine might have an adverse effect on endangered or threatened marine mammals or sea turtles or their critical habitats.
9) Production activities that involve transportation of produced fluids to shore using shuttle tankers or barges.

(B) ANALYSIS

Site-Specific at Grand Isle Block 26

Proposed operations consist of the drilling, completion, and testing of one well and placement of the well on production. Operations will be conducted with a jack-up rig.

1. Designated Topographic Features

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

Physical disturbances to the seafloor: Grand Isle Block 26 is 45 miles from the closest designated Topographic Features Stipulation Block (Sackett Bank); therefore, no adverse impacts are expected.

Effluents: Grand Isle Block 26 is 45 miles from the closest designated Topographic Features Stipulation Block (Sackett Bank); therefore, no adverse impacts are expected.

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

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

2. Pinnacle Trend Area Live Bottoms

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

Physical disturbances to the seafloor: Grand Isle Block 26 is 99 miles from the closest live bottom (pinnacle trend) area; therefore, no adverse impacts are expected.

Effluents: Grand Isle Block 26 is 99 miles from the closest live bottom (pinnacle trend) area; therefore, no adverse impacts are expected.

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

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

3. Eastern Gulf Live Bottoms

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

Physical disturbances to the seafloor: Grand Isle Block 26 is not located in an area characterized by the existence of live bottoms, and this lease does not contain a Live-Bottom Stipulation requiring a photo documentation survey and survey report.

Effluents: Grand Isle Block 26 is not located in an area characterized by the existence of live bottoms; therefore, no adverse impacts are expected.

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

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

4. Benthic Communities

There are no IPFs (including emissions, physical disturbances to the seafloor, wastes sent to shore for disposal, or accidents) from the proposed activities that could cause impacts to benthic communities.

Operations proposed in this plan are in water depths of 50 feet. High-density benthic communities are found only in water depths greater than 984 feet (300 meters); therefore, Cantium's proposed operations in Grand Isle Block 26 would not cause impacts to benthic communities.

5. Water Quality

IPFs that could result in water quality degradation from the proposed operations in Grand Isle Block 26 include disturbances to the seafloor, effluents and accidents.

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

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

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

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

6. Fisheries

IPFs that could cause impacts to fisheries as a result of the proposed operations in Grand Isle Block 26 include physical disturbances to the seafloor, effluents and accidents.

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

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

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

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

7. Marine Mammals

GulfCet II studies revealed that cetaceans of the continental shelf and shelf-edge were almost exclusively bottlenose dolphin and Atlantic spotted dolphin. Squid eaters, including dwarf and pygmy killer whale, Risso's dolphin, rough-toothed dolphin, and Cuvier's beaked whale, occurred most frequently along the upper slope in areas outside of anticyclones. IPFs that could cause impacts to marine mammals as a result of the proposed operations in Grand Isle Block 26 include emissions, effluents, discarded trash and debris, and accidents.

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

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

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

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

Informational placards will be posted on all vessels and facilities having sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "Think About It" (*previously "All Washed Up: The Beach Litter Problem"*). Thereafter, all personnel will view the marine trash and debris training video annually. Offshore personnel will also receive an explanation from Cantium management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

Accidents: Collisions between support vessels and cetaceans would be unusual events, however should one occur, death or injury to marine mammals is possible. Contract vessel operators can avoid marine mammals and reduce potential deaths by maintaining a vigilant watch for marine mammals and maintaining a safe distance when they are sighted. Vessel personnel should use a Gulf of Mexico reference guide to help identify the twenty-one species of whales and dolphins, and the single species of manatee that may be encountered in the Gulf of Mexico OCS. Vessel personnel must report sightings of any injured or dead protected marine mammal species

immediately, regardless of whether the injury or death is caused by their vessel, to the NMFS Southeast Marine Mammal Stranding Hotline at 1-877-433-8299 (http://www.nmfs.noaa.gov/pr/health/report.htm#southeast). Any injured or dead protected species should also be reported to takereport.nmfsser@noaa.gov. In addition, if the injury or death was caused by a collision with a contract vessel, the BOEM must be notified within 24 hours of the strike by email to protectedspecies@bsee.gov. If the vessel is the responsible party, it is required to remain available to assist the respective salvage and stranding network as needed.

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

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

8. Sea Turtles

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

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

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

Discarded trash and debris: Both entanglement in, and ingestion of, debris have caused the death or serious injury of sea turtles (Balazs, 1985). The limited amount of marine debris, if any, resulting from the proposed activities is not expected to substantially harm sea turtles. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the

Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA). Cantium will operate in accordance with the regulations and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass.

Informational placards will be posted on all vessels and facilities having sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "Think About It" (*previously "All Washed Up: The Beach Litter Problem"*). Thereafter, all personnel will view the marine trash and debris training video annually. Offshore personnel will also receive an explanation from Cantium management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

Accidents: Collisions between support vessels and sea turtles would be unusual events, however should one occur, death or injury to sea turtles is possible. Contract vessel operators can avoid sea turtles and reduce potential deaths by maintaining a vigilant watch for sea turtles and maintaining a safe distance when they are sighted. Vessel crews should use a reference guide to help identify the five species of sea turtles that may be encountered in the Gulf of Mexico OCS. Vessel crews must report sightings of any injured or dead protected sea turtle species immediately, regardless of whether the injury or death is caused by their vessel, to the State Coordinators for the Sea Turtle Stranding and Salvage Network (STSSN) at http://www.sefsc.noaa.gov/species/turtles/stranding_coordinators.htm (phone numbers vary by state). Any injured or dead protected species should also be reported to takereport.nmfsser@noaa.gov. In addition, if the injury or death was caused by a collision with a contract vessel, the BOEM must be notified within 24 hours of the strike by email to protectedspecies@bsee.gov. If the vessel is the responsible party, it is required to remain available to assist the respective salvage and stranding network as needed.

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

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

9. Air Quality

Grand Isle Block 26 is located 60 miles from the Breton Wilderness Area and 4.1 miles from shore. Applicable emissions data is included in **Appendix H** of the Plan.

There would be a limited degree of air quality degradation in the immediate vicinity of the proposed activities. Plan Emissions for the proposed activities do not exceed the annual exemption levels as set forth by BOEM. Accidents and blowouts can release hydrocarbons or chemicals, which could cause the emission of air pollutants. However, these releases would not impact onshore air quality because of the prevailing atmospheric conditions, emission height, emission rates, and the distance of Grand Isle Block 26 from the coastline. There are no other IPFs (including effluents, physical disturbances to the seafloor, wastes sent to shore for treatment or disposal) from the proposed activities which would impact air quality.

10. Shipwreck Sites (known or potential)

IPFs that could cause impacts to known or unknown shipwreck sites as a result of the proposed operations in Grand Isle Block 26 are disturbances to the seafloor.

Physical Disturbances to the seafloor: Grand Isle Block 26 is located within the area designated by BOEM as high-probability for occurrence of shipwrecks. Cantium will report to BOEM the discovery of any evidence of a shipwreck and make every reasonable effort to preserve and protect that cultural resource.

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

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

11. Prehistoric Archaeological Sites

IPFs that could cause impacts to prehistoric archaeological sites as a result of the proposed operations in Grand Isle Block 26 are physical disturbances to the seafloor and accidents (oil spills).

Physical Disturbances to the seafloor: Grand Isle Block 26 is located inside the Archaeological Prehistoric high probability lines. Cantium will report to BOEM the discovery of any object of prehistoric archaeological significance and make every reasonable effort to preserve and protect that cultural resource.

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

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

Vicinity of Offshore Location

1. Essential Fish Habitat (EFH)

IPFs that could cause impacts to EFH as a result of the proposed operations in Grand Isle Block 26 include physical disturbances to the seafloor, effluents and accidents. EFH includes all estuarine and marine waters and substrates in the Gulf of Mexico.

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

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

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

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

2. Marine and Pelagic Birds

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

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

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

Discarded trash and debris: Marine and pelagic birds could become entangled and snared in discarded trash and debris, or ingest small plastic debris, which can cause permanent injuries and death. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA). Cantium will operate in accordance with the regulations and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. Informational placards will be posted on all vessels and facilities having sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "Think About It" (*previously "All Washed Up: The Beach Litter Problem"*). Thereafter, all personnel will view the marine trash and debris training video annually. Offshore personnel will also receive an explanation from Cantium management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE. Debris, if any, from these proposed activities will seldom interact with marine and pelagic birds; therefore, the effects will be negligible.

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

3. Public Health and Safety Due to Accidents.

There are no IPFs (emissions, effluents, physical disturbances to the seafloor, wastes sent to shore for treatment or disposal or accidents, including an accidental H2S releases) from the proposed activities which could cause impacts to public health and safety. In accordance with NTL No.'s 2008-G04, 2009-G27, and 2009-G31, sufficient information is included in **Appendix D** to justify our request that our proposed activities be classified by BSEE as H_2S absent.

Coastal and Onshore

1. Beaches

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

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

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

Informational placards will be posted on all vessels and facilities having sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "Think About It" (*previously "All Washed Up: The Beach Litter Problem"*). Thereafter, all personnel will view the marine trash and debris training video annually. Offshore personnel will also receive an explanation from Cantium management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

2. Wetlands

Salt marshes and seagrass beds fringe the coastal areas of the Gulf of Mexico. Due to the distance from shore (4.1 miles), accidents (oil spills) and discarded trash and debris represent IPFs which could impact these resources.

Accidents: Level of impact from an oil spill will depend on oil concentrations contacting vegetation, kind of oil spilled, types of vegetation affected, season of the year, pre-existing stress level of the vegetation, soil types, and numerous other factors. Light-oiling impacts will cause plant die-back with recovery within two growing seasons without artificial replanting. However, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water quality). If a spill were to occur, response capabilities as outlined in Cantium's Regional OSRP (refer to information submitted in **Appendix I**) would be implemented.

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

Informational placards will be posted on all vessels and facilities having sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "Think About It" (*previously "All Washed Up: The Beach Litter Problem"*). Thereafter, all personnel will view the marine trash and debris training video annually. Offshore personnel will also receive an explanation from Cantium management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

3. Shore Birds and Coastal Nesting Birds

Wisner WMA (7 miles from Grand Isle Block 26) is a highly productive habitat for wildlife. Thousands of shore birds use the refuge as a wintering area. Also, wading birds nest on the refuge. The Wisner WMA provides habitat for colonies of nesting wading birds and seabirds as well as wintering shorebirds and waterfowl. The most abundant nesters are brown pelicans, laughing gulls, and royal, Caspian, and sandwich terns. IPFs from the proposed activities that could cause impacts to shore birds and coastal nesting birds are accidents (oil spills) and discarded trash and debris.

Accidents: Oil spills could cause impacts to shore birds and coastal nesting birds. The birds most vulnerable to direct effects of oiling include those species that spend most of their time swimming on and under the sea surface, and often aggregate in dense flocks (Piatt et al., 1990; Vauk et al., 1989). Coastal birds, including shorebirds, waders, marsh birds, and certain water fowl, may be the hardest hit indirectly through destruction of their feeding habitat and/or food source (Hansen, 198l; Vermeer and Vermeer, 1975). Direct oiling of coastal birds and certain seabirds is usually minor; many of these birds are merely stained as a result of their foraging behaviors. Birds can ingest oil when feeding on contaminated food items or drinking contaminated water.

Oil-spill cleanup operations will result in additional disturbance of coastal birds after a spill. However, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water quality). Due to the distance from shore (4.1 miles), Cantium would immediately implement the response capabilities outlined in their Regional OSRP (refer to information submitted in **Appendix I**).

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

Informational placards will be posted on vessels and every facility that has sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "Think About It" (*previously "All Washed Up: The Beach Litter Problem"*). Thereafter, all personnel will view the marine trash and debris training video annually. Offshore personnel will also receive an explanation from Cantium management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

4. Coastal Wildlife Refuges

Grand Isle Block 26 is approximately 7 miles from the Wisner WMA. Management goals of the Wisner WMA are waterfowl habitat management, marsh restoration, providing sanctuary for nesting and wintering seabirds, and providing sandy beach habitat for a variety of wildlife species. IPFs from the proposed activities that could cause impacts to this coastal wildlife refuge are accidents (oil spills) and discarded trash and debris.

Impacts to shore birds and coastal nesting birds and to the beach, was covered in previous sections. Other wildlife species found on the refuges include nutria, rabbits, raccoons, alligators, and loggerhead turtles. Impacts to loggerhead turtles were also covered under a previous section.

Accidents: It is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water quality). Response capabilities would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Cantium's Regional OSRP (refer to information submitted in **Appendix I**).

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

Informational placards will be posted on vessels and every facility that has sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "Think About It" (*previously "All Washed Up: The Beach Litter Problem"*). Thereafter, all personnel will view the marine trash and debris training video annually. Offshore personnel will also receive an explanation from Cantium management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

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

5. Wilderness Areas

Accidents: An accidental oil spill from the proposed activities could cause impacts to wilderness areas. However, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Due to the distance from the nearest designated Wilderness Area (60 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. The activities proposed in this plan will be covered by Cantium's Regional OSRP (refer to information submitted in **Appendix I).**

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

Informational placards will be posted on vessels and every facility that has sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "Think About It" (*previously "All Washed Up: The Beach Litter Problem"*). Thereafter, all personnel will view the marine trash and debris training video annually. Offshore personnel will also receive an explanation from Cantium management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

6. Other Environmental Resources Identified

There are no other environmental resources identified for this impact assessment.

(C) IMPACTS ON PROPOSED ACTIVITIES

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

(D) ENVIRONMENTAL HAZARDS

During the hurricane season, June through November, the Gulf of Mexico is impacted by an average of ten tropical storms (39-73 mph winds), of which six become hurricanes (> 74 mph winds). Due to its location in the gulf, Grand Isle Block 26 may experience hurricane and tropical storm force winds, and related sea currents. These factors can adversely impact the integrity of the operations covered by this plan. A significant storm may present physical hazards to operators and vessels, damage exploration or production equipment, or result in the release of hazardous materials (including hydrocarbons). Additionally, the displacement of equipment may disrupt the local benthic habitat and pose a threat to local species.

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

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

Drilling activities will be conducted in accordance with NTL No.'s 2008-G09, 2009-G10, and 2010-N10.

2. Platform / Structure Installation
   Operator will not conduct platform / structure installation operations during Tropical Storm or Hurricane threat.

3. Pipeline Installation
   Operator will not conduct pipeline installation operations during Tropical Storm or Hurricane threat.

(E) ALTERNATIVES

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

(F) MITIGATION MEASURES

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

(G) CONSULTATION

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

(H) PREPARER(S)

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

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

SECTION 18
ADMINISTRATIVE INFORMATION

18.1 EXEMPTED INFORMATION DESCRIPTION

The proposed bottomhole location of the planned well has been removed from the Public Information copy of the DOCD as well as any discussions of the target objectives, geologic or geophysical data, and interpreted geology.

18.2 BIBLIOGRAPHY

1. DOCD Control No. R-6349