UNITED STATES GOVERNMENT
MEMORANDUM

April 4, 2019

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

Subject: Public Information copy of plan

- Control # - S-07941
- Type - Supplemental Exploration Plan
- Lease(s) - OCS-G33341 Block - 686 Keathley Canyon Area
- Operator - LLOG Exploration Offshore, L.L.C.
- Description - Subsea Well C and C-Alt
- 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.

Leslie Wilson
Plan Coordinator

Site Type/Name	Botm Lse/Area/Blk	Surface Location	Surf Lse/Area/Blk
WELL/C	G33341/KC/686	939 FNL, 1192 FEL	G33341/KC/686
WELL/C-ALT	G33341/KC/686	939 FNL, 1142 FEL	G33341/KC/686

PUBLIC COPY
February, 2019

SUPPLEMENTAL EXPLORATION PLAN

Keathley Canyon Block 686
OCS-G 33341
Leon Prospect
Affected State: Louisiana

Estimated Startup Date: May 1, 2019

SUBMITTED BY:
LLOG Exploration Offshore, L.L.C.
1001 Ochsner Boulevard
Suite 100
Covington, Louisiana 70433

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SECTION 1
PLAN CONTENTS

1.1 PLAN INFORMATION

LLOG Exploration Offshore, L.L.C. (LLOG) has been designated operator of Leases OCS-G 33335 / 33341, KC 642 / 686. Under this Supplemental Exploration Plan, LLOG proposes to Supplement Repsol E & P USA Inc.'s (Repsol) Revised Exploration Plan (Control No. R-5964) with proposed Locations C and C-Alt. These locations will bottomhole and surface in KC 686. **Well Location C-Alt is proposed as a mirror location of Well Location C and is intended as a re-spud location only**. The well will be drilled with a drillship or DP semi-submersible. The activities will be located in approximately 6,284 feet of water.

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

1.2 LOCATION

A Well Location Plat depicting the surface location and bottomhole location of the proposed well, measured depth/true vertical depth and water depth is included as **Attachment 1-B**. Also included as **Attachment 1-C** is a Bathymetry Map showing the water depths across the lease block and the location of the proposed well.

No anchors are associated with the activities proposed in this plan.

1.3 SAFETY AND POLLUTION PREVENTION FEATURES

LLOG proposes to drill the well with a drillship or DP semi-submersible equipped with a Subsea BOP. The BOP information and schematics will be included as a part of the 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 life saving equipment such as life rafts, life jackets, ring buoys, etc. as prescribed by the USCG, will be maintained on the rig at all times.

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 following tables detail the storage tanks and/or production vessels that will store oil (capacity greater than 25 bbls or more) and be used to support the proposed activities (MODU, barges, platforms, etc.):

Type of Storage Tank	Type of Facility	Tank Capacity (bbl)	Number of Tanks	Total Capacity (bbl)	Fluid Gravity (API)
Fuel Oil Marine Diesel	DP Semi-Submersible	164	1	164	30
Fuel Oil Day		367	2	734	30
Emergency Generator		31	1	31	30
Forward Hull Fuel Oil		4634	2	9268	30
Lower Aft Hull Fuel Oil		3462	2	6924	30
Lube Oil Services		117 10.5 4.6	1 1 1	132.1	45
Dirty Lube Oil		38 28	1 1	66	45
Dirty Bilge		190	4	760	10

Type of Storage Tank	Type of Facility	Tank Capacity (bbl)	Number of Tanks	Total Capacity (bbl)	Fluid Gravity (API)
Fuel Oil Storage Tank	Drillship	16,564	1	16,564	No. 2 Diesel – 43
Fuel Oil Storage Tank		16,685.5	1	16,685.5	No. 2 Diesel – 43
Fuel Oil Settling Tank		836.6	2	1,673.2	No. 2 Diesel – 43
Fuel Oil Day Tanks		836.6	2	1,673.2	No. 2 Diesel – 43

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

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

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:	X	Exploration Plan (EP)		Development Operations Coordination Document (DOCD)	
Company Name: LLOG Exploration Offshore, L.L.C.				BOEM Operator Number: 02058	
Address: 1001 Ochsner Boulevard, Suite 100				Contact Person: Kathy Gowland / Nelda Runyon	
Covington, LA 70433				Phone Number: 985-801-4300	
				E-Mail Address: kathygo@llog.com / neldar@llog.com	
If a service fee is required under 30 CFR 550.125(a), provide the		Amount paid	N/A	Receipt No.	N/A

Project and Worst Case Discharge (WCD) Information

Lease(s): OCS-G 33341				Area: Keathley Canyon			Block(s):686		Project Name (If Applicable):Leon
Objective(s)	X	Oil	X	Gas		Sulphur		Salt	Onshore Support Base(s): Fourchon, LA
Platform / Well Name: Well Location A				Total Volume of WCD: 6,019,350 bbls					API Gravity: 27.3°
Distance to Closest Land (Miles): 218 miles				Volume from uncontrolled blowout: 40,129 BOPD					

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	N-9559			
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
Drill, Test and TA Well Location C	05/01/2019	07/29/2019	90
Complete Well Location C	05/01/2020	07/29/2020	90
*Drill, Test, Complete and TA Well Location C-Alt	01/01/2021	06/29/2021	180
Well Location C-Alt is intended as a re-spud location only.			

Description of Drilling Rig

	Jackup	X	Drillship
	Gorilla Jackup		Platform rig
	Semisubmersible		Submersible
X	DP Semisubmersible		Other (Attach description)
Drilling Rig Name (If known):			

Description of Structure

	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			

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): Well Location C, KC 686					Previously reviewed under an approved EP or DOCD?	X	Yes		No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						X	Yes		No

WCD Info	For wells, volume of uncontrolled blowout (Bbls/Day): 40,129 BOPD	For structures, volume of all storage and pipelines (Bbls):	API Gravity of fluid	27.3°

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS-G 33341		OCS OCS
Area Name	Keathley Canyon		
Block No.	686		
Blockline Departures (in feet)	N/S Departure: 939' FNL	N/S Departure:	N/S Departure F __ L N/S Departure F __ L N/S Departure F __ L
	E/W Departure: 1,192' FEL	E/W Departure:	E/W Departure F __ L E/W Departure F __ L E/W Departure F __ L
Lambert X-Y coordinates	X: 1,757,048'	X:	X: X: X:
	Y: 9,550,581	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude: 26° 19' 12.502" N	Latitude:	Latitude Latitude Latitude
	Longitude: 92° 38' 37.751" W	Longitude:	Longitude Longitude Longitude

Water Depth (Feet): 6,284'	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:	

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): Well Location C-ALT, KC 686 (mirror location intended as re-spud location only)					Previously reviewed under an approved EP or DOCD?		Yes	X	No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						X	Yes		No

WCD Info	For wells, volume of uncontrolled blowout (Bbls/Day): 40,129 BOPD	For structures, volume of all storage and pipelines (Bbls):	API Gravity of fluid	27.3°

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS-G 33341		OCS OCS
Area Name	Keathley Canyon		
Block No.	686		
Blockline Departures (in feet)	N/S Departure: 939' FNL	N/S Departure:	N/S Departure F __ L N/S Departure F __ L N/S Departure F __ L
	E/W Departure: 1,142' FEL	E/W Departure:	E/W Departure F __ L E/W Departure F __ L E/W Departure F __ L
Lambert X-Y coordinates	X: 1,757,098'	X:	X: X: X:
	Y: 9,550,581	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude: 26° 19' 12.500" N	Latitude:	Latitude Latitude Latitude
	Longitude: 92° 38' 37.202" W	Longitude:	Longitude Longitude Longitude

Water Depth (Feet): 6,284'	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:	

SURFACE LOCATION C:
X: 1,757,048 Y: 9,550,581
Lat: 26 deg, 19 min, 12.502 sec
Long: -92 deg, 38 min, 37.751 sec
1192' FEL 939' FNL
(NAD27)

Public

LLOG exploration

Keathley Canyon Block 686

Gulf of Mexico

Location Map

0' 1000' 2000'

10/18

Geo: Sean O'Brien

SURFACE LOCATION C (alternate):
X: 1,757,098 Y: 9,550,581
Lat: 26 deg, 19 min, 12.500 sec
Long: -92 deg, 38 min, 37.202 sec
1142' FEL 939' FNL
(NAD27)

Public

LLOG exploration

Keathley Canyon Block 686

Gulf of Mexico

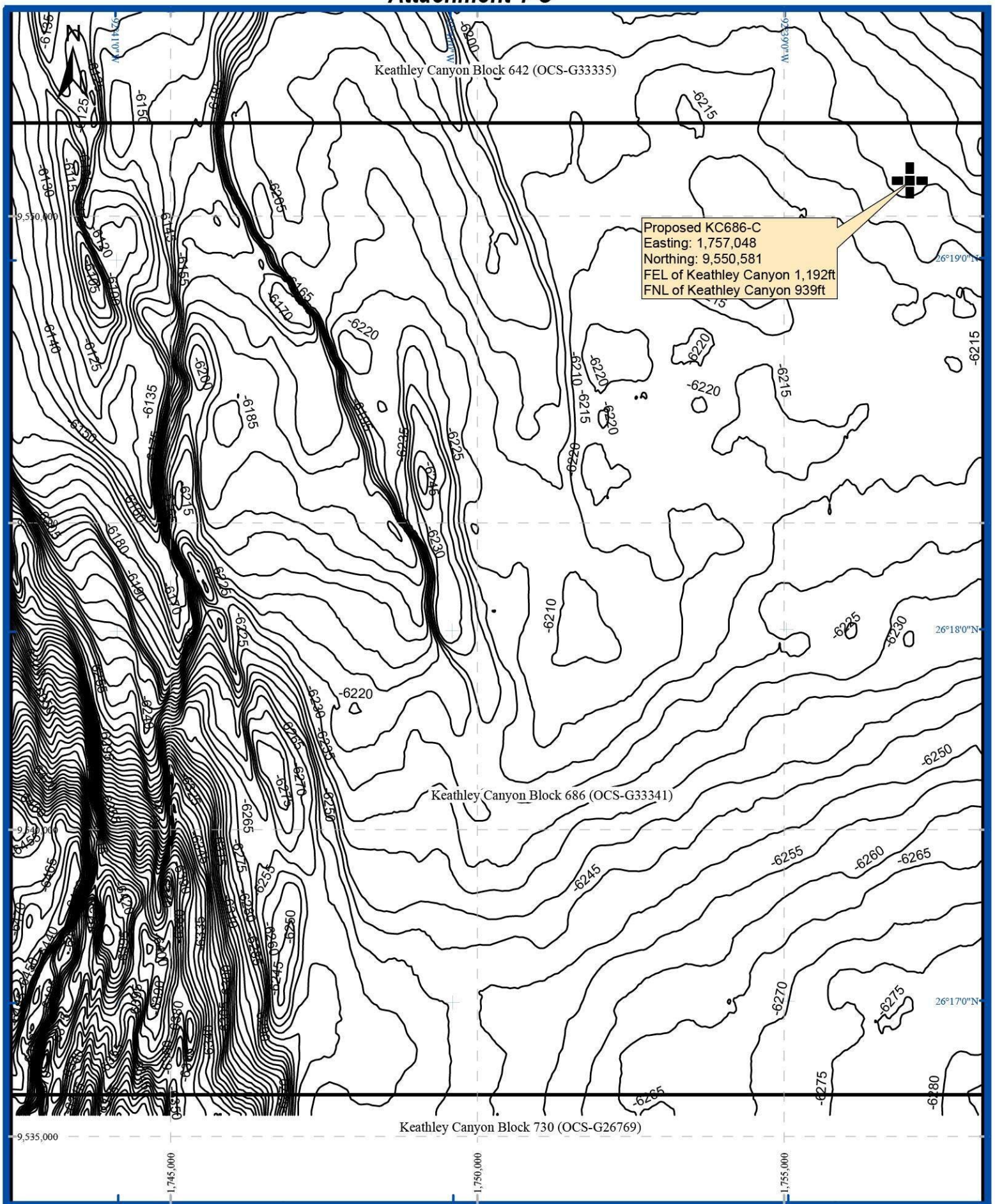
Location Map

0' 1000' 2000'

10/18

Geo: Sean Obrien

Attachment 1-C



Bathymetry Plat

Figure 10

SECTION 2
GENERAL INFORMATION

2.1 APPLICATIONS AND PERMITS

The table below provides all additional applications to be filed covering operations proposed in this EP.

Application/Permit	Issuing Agency	Status
Application for Permit to Drill	BSEE	To be submitted
Application for Permit to Modify	BSEE	To be submitted
Emergency Evacuation Plan	USCG	To be submitted

2.2 DRILLING FLUIDS

The table below provides the types and estimated volumes of the drilling fluids LLOG 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)	See Attachment 6-A, Table 1 of this Plan
Oil-based (diesel, mineral oil)	N/A
Synthetic-based (internal olefin, ester)	See Attachment 12-A, Table 2 of this Plan

2.3 NEW OR UNUSUAL TECHNOLOGY

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

2.4 BONDING STATEMENT

The bond requirements for the activities and facilities proposed in this Supplemental EP 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.

2.5 OIL SPILL FINANCIAL RESPONSIBILITY (OSFR)

LLOG Exploration Offshore, L.L.C. (Company No. 02058) will demonstrate oil spill financial responsibility for the facilities proposed in this EP according to 30 CFR 553.15 (a); and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities".

2.6 DEEPWATER WELL CONTROL STATEMENT

LLOG Exploration Offshore, L.L.C. (Company No. 02058) has the financial capability to drill a relief well and conduct other emergency well control operations.

2.7 BLOWOUT SCENARIO AND WORST-CASE DISCHARGE CALCULATIONS

In accordance with BOEM NTL No. 2015-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,” LLOG accepts the Blowout Scenario

and Worst-Case Discharge Assumptions and Calculations of 40,129 barrels of oil per day as accepted under EP (Control No. N-9559). The blowout scenario is detailed below.

BLOWOUT SCENARIO

Estimated Initial Flow Rate – Drilling – The worst-case discharge is 40,129 BOPD.

Maximum duration/total volume that could occur if the well sustained a blowout:

Scenario	Maximum Discharge Rate (bbl/day)	Discharge Duration (days)	Total Volume
Relief Well	40,129	150	6,019,350

Potential of wellbore to bridge over during a blowout: The target zone is commonly known to produce sand at normal production drawdown pressures, and is routinely gravel packed in completions. The drawdown pressure and flow rate during an uncontrolled blowout, without sand control, would cause sand face failure and lead to large amounts of sand production. However, it is impossible to determine if a sand bridge capable of stopping the blowout will form in the casing, and it is assumed that the blowout will continue until it can be mechanically stopped by an intervention.

Likelihood for surface intervention to stop blowout: Per Drilling Safety Rules, LLOG will fulfill and implement all applicable requirements and submit documentation which provides evidence that surface intervention, namely the BOP system, is compatible and properly designed for the specific operations on the planned well, and is therefore likely to stop the blowout.

In the event conventional surface intervention is required due to a loss of well control from the surface, third party well control equipment would be mobilized to the rig. In this case, it would be assumed that the BOPs are compromised, no combustion has occurred, and the rig is capable of supporting well control efforts with the assistance of a support vessel. As an example, the intervention would consist of top killing the well with kill weight mud or possibly replacing the BOPs with another set to contain any flow from failed equipment.

Relief Well
Rig type capable of drilling relief well at water depth and to TD:
There are currently a number of floating MODUs in the GOM that are capable of drilling a relief well in this water depth. The rigs listed below are currently conducting GOM operations and could be available for relief well operations. There will be no rig package constraints.

Rig Name	Contractor	Rated Water Depth	MODU Type	Rig Status
West Vela	Seadrill	12,000'	DP Drillship	Contracted GOM

Deepwater Asgard	Transocean	12,000'	DP Drillship	Contracted GOM
Pacific Sharav	Pacific Drilling	12,000'	DP Drillship	Contracted GOM
Rowan Relentless	Rowan	12,000'	DP Drillship	Contracted GOM

Time to acquire rig, move onsite and drill relief well: The expected time to temporarily abandon another well at its current location, pull riser, and move a relief well rig to the KC 686 location is 15 days. When the rig is on location, the well is expected to take 135 days to reach a depth suitable to begin kill operations.

Activity	Duration (days)
Move rig on location.	15
Jet 36" pipe to 6500' TVD/MD.	5
Drill 32" hole to 7400'. Run & cement 28".	10
Drill 26" hole to 10600'. Run & cement 22".	10
Run BOPs and riser & test.	10
Drill 21-1/2" hole 7 run & cement 18" liner (TVD & MD will be dependent on surface location) ± 15000' TVD.	10
Drill 19-1/2" hole & set & cement 16" (TVD & MD will be dependent on surface location) ± 21500' (just above well intersect).	20
Drill 16-1/2" hole & set & cement 14" casing to est. 23000' TVD (TVD & MD will be dependent on surface location).	20
Drill 14-1/2" hole to locate near original 11-7/8" casing. Set & cement 11-7/8" liner.	15
Drill 10-5/8" relief hole to intersect with reservoir section or production casing below 11-7/8" est. 28000' TVD (TVD & MD will be dependent on surface location).	15
Establish dynamic kill operations and kill well. Set P&A plugs as required.	20
Total anticipated time	**150**

Statement whether possibility of using nearby platform was considered: The well location is located too far away from the nearest structure in order to drill a relief well from a neighboring platform; therefore, a scenario is presented with a rig not being immediately available, requiring a suspension of operations prior to mobilization. If a rig is immediately available, an estimated 7 days could be saved.

The actual hole and casing sizes may vary with final relief well design dependent upon actual conditions at the time; this is for estimating time only. There are currently no plans or need to drill a relief well from any offset locations.

Measures to reduce the likelihood of a blowout, measures to enhance ability to conduct effective and early intervention in event of a blowout:

- LLOG would adhere to and conduct strict compliance with all regulations, including those listed in the latest Drilling Safety Rule, SEMS, Bridging Documents, Training, etc.
- This well is planned in a previously drilled area and has been designed to control any anticipated pressures that might be encountered.
- Liners/production casings are planned to have two independent floats to prevent any possible internal flowback and are equipped with an annular packer.
- Sufficient cement of appropriate density with anti-gas migration additives will be used to isolate any hydrocarbon bearing zones.
- All drill strings are planned to have at least one float valve installed in the BHA as close to the bit as practical.
- It is planned that drilling fluids of sufficient density to control all exposed formations will be maintained at all times during drilling operations.

Blowout Intervention

In the event of an uncontrolled flow of hydrocarbons from the wellbore, the oil spill response plan (OSRP) as detailed in the EP will be activated. In the event that the MODU and/or the wellbore are irreparably damaged during a blowout scenario, wellbore intervention would be performed by contracting an additional MODU, mobilizing it to location and drilling a relief well.

SECTION 3
GEOLOGICAL AND GEOPHYSICAL INFORMATION

3.1 GEOLOGICAL DESCRIPTION
Proprietary Information.

3.2 STRUCTURE CONTOUR MAPS
Proprietary Information.

3.3 INTERPRETED SEISMIC LINES
Proprietary Information.

3.4 GEOLOGICAL STRUCTURE CROSS-SECTIONS
Proprietary Information.

3.5 SHALLOW HAZARDS REPORTUSA
A shallow hazards survey was conducted over Keathley Canyon Blocks 642 and 686. The survey report was submitted with the Joint/Initial Exploration Plan (Control No. N-9559) approved on July 27, 2011.

3.6 SHALLOW HAZARDS ASSESSMENT
In accordance with NTL No. 2008-G05, "Shallow Hazards Program," a site-specific shallow hazards assessment has been prepared for the proposed surface locations evaluating seafloor and subsurface geological and manmade features and conditions that may adversely affect drilling operations. The shallow hazards assessment and archaeological assessment is included as **Attachment 3-D**.

3.7 HIGH-RESOLUTION SEISMIC LINES
Proprietary Information.

3.8 STRATIGRAPHIC COLUMN
Proprietary Information.

3.9 TIME VERSUS DEPTH TABLES
Sufficient well control data for the target areas proposed in this EP exists; therefore, seismic time versus depth tables for the proposed well location are not required.

Attachment 3-D

Well Clearance Letter for
Repsol E&P USA Inc.

Project:
Proposed KC686-C' Location
Keathley Canyon Block KC686, Offshore Gulf of Mexico

Description:
3D Geohazard Assessment

Project Number:
2018-091

Report Status:
Draft

Ocean Geo Solutions
8399 Westview Drive, Suite 200, Houston, 77055, USA
www.oceangeosolutions.com

REPORT AUTHORISATION AND DISTRIBUTION

Compilation	Geophysics	L Fuentes
Authorization	Geophysics	..... A Haigh
	Quality Assurance	..... D Haigh

Revision	Date	Title
0	December 11, 2018	Final

Distribution

1 copy

Repsol E& P USA Inc.
2455 Technology Forest Blvd
The Woodlands, TX 77381

For the attention of:
Scott Smith

SERVICE WARRANTY

USE OF THIS REPORT

This report has been prepared with due care, diligence and with the skill reasonably expected of a reputable contractor experienced in the types of work, carried out under the contract. As such, the findings in this report are based on an interpretation of data which is a matter of opinion on which professionals may differ and, unless clearly stated, is not a recommendation of any course of action.

Ocean Geo Solutions, Inc. has prepared this report for the client identified on the front cover in fulfillment of its contractual obligations under the referenced contract, and the only liabilities Ocean Geo Solutions, Inc. will accept are those contained therein.

Please be aware that further distribution of this report, in whole or part, or the use of the data for a purpose not expressly stated within the contractual work scope is at the client's sole risk, and Ocean Geo Solutions, Inc recommends that this disclaimer is included in any such distribution.

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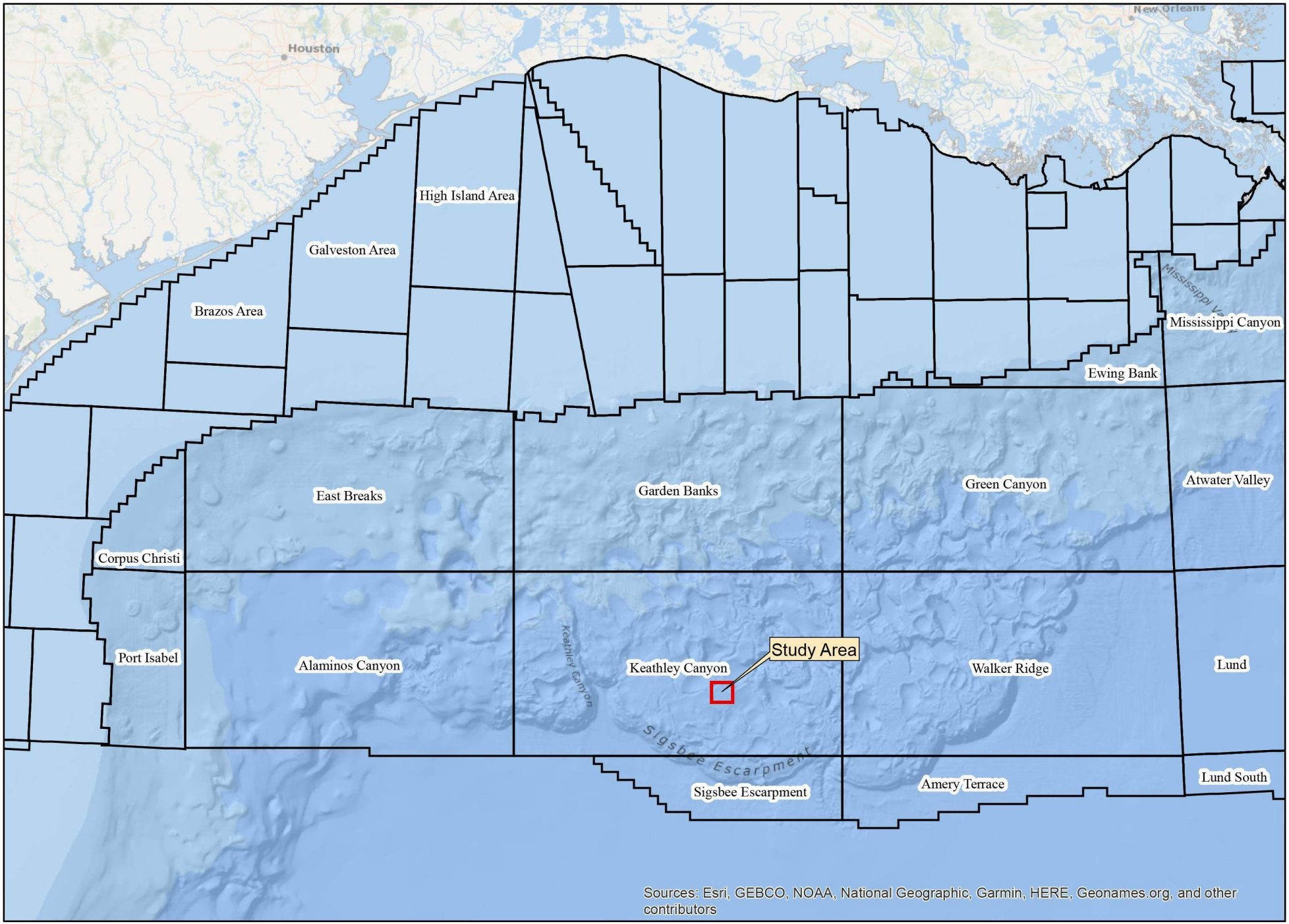
LOCATION MAP



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WELL CLEARANCE LETTER – PROPOSED KC686-C' WELL LOCATION

December 10, 2018
Repsol E&P USA Inc.
2455 Technology Forest Blvd,
The Woodlands
Texas, 77381

Attention: **Scott Smith**

Well Clearance Letter
Proposed KC686-C' Well Location
Keathley Canyon Block KC686
Offshore Gulf of Mexico

Ocean Geo Solutions Inc. was contracted by Repsol E&P USA Inc. to prepare a Well Clearance Letter for the proposed KC686-C' Well Location in Block 9686, Keathley Canyon Area (OCS-G- 33341). This assessment addresses seafloor and shallow geologic conditions that may impact drilling operations within 2,000ft of the proposed well site. The depth limit of this geohazard assessment is 3.555 seconds two-way time (TWT), -9,222ft Below Sea Surface (3,020ft below seabed). We understand that Repsol E&P USA Inc. plans to drill the proposed development well from a dynamically positioned drillship; therefore, an anchoring assessment was not requested. Relevant letter-size chart extracts, data examples, and a Top Hole Prognosis are presented with this Well Clearance Letter.

3D Geophysical Survey. Repsol E & P USA Inc. provided the 3D dataset to Gardline Surveys Inc. on tape media in SEG-Y format for loading onto a Seismic Micro-Technology (SMT) workstation. The 3D data cube contains a survey with 4-millisecond sample rate data to a record length of 6.0 seconds TWT below the sea surface. Inlines are oriented east to west, have a numerical increment of five, and exhibit a line spacing of 65.6158ft. Crosslines are oriented north to south, have a numerical increment of one, and exhibit a line spacing of 41.0101ft.

- The data was acquired by Veritas, VTS Keathley Canyon Phase II, Speculative 3D Seismic Survey.
- Source: Airgun
- Shotpoint Interval: 37.5m
- CMP Xline: 40m
- Group Spacing: 25m
- Streamer length: 7200m
- Record Length: 12.5sec
- Sample Interval: 2.0ms
- Nominal Fold: 48
-
- The Basic Processing Parameters:
- 3D DMO (offset cubes)
- Phase Shift Migration (offset cubes)
- Final velocity analysis on migrated gathers (MOVES velocities)

- 3D Stack (Preliminary migration)
- Inverse migration (Stack)
- Generate Final migration velocity model from inversion of MOVES velocities (GLINVEL)
- 3D One Pass Time Migration
- Migration PSTM MOVES

Data exhibits a good frequency response across the upper second below the seabed, with an effective frequency range of 5 - 65Hz (Figure 9). The data exhibits a dominant frequency in the upper second of approximately 52Hz, resulting in a mean vertical resolvability of typically 31ft and a layer detectability of 7ft. The data is considered good to excellent quality.

In summary and with reference to NTL No. 2008-G04:

a) The data provides imaging of sufficient resolution of the shallow section allowing a clear analysis of the shallow conditions.
b) The data can be loaded to a workstation at 16-bit resolution or greater and is unscaled.
c) There is no trace or sample decimation.
d) The sample interval and bin size are maintained throughout the assessment area.
e) The data possess a frequency content of 50Hz or higher at 50% power in the first second below the seabed.
f) Seabed reflection is free of gaps and is defined by a wavelet of stable shape and phase, allowing auto-tracking of the seabed event with minimum user intervention and guidance.
g) There are no significant acquisition artifacts throughout the dataset.
h) Merge points in the data are marked by no time shifts and very minimal amplitude changes, and are not a detriment to interpretation.
i) Processed bin sizes are 65.62ft x 41.01ft.
j) The sample rate of the data is 4ms.
k) An accurate velocity model has been utilized in the shallow section allowing optimum structural and stratigraphy resolution with no evidence of under- or over-migration.
l) There is no significant multiple energy.

The proposed activities are not within an area defined by BOEM as having high archaeological potential (see NTL No. 2011-JOINT-G-01). No archeological survey has been conducted.

1. LOCATION COORDINATES

1.1 Proposed KC686-C' Well Location

Proposed KC686-C' Well Location (Surface)								
Location Coordinates								
NAD 27 Datum - Clarke 1866 Ellipsoid					**UTM Zone 15 - CM 93° West**			
Latitude	**26°**	**19'**	**12.500"**	**North**	**Easting**	**1,757,098**	**US ft E**	
Longitude	**92°**	**38'**	**37.202**	**West**	**Northing**	**9,550,581**	**US ft N**	
FEL Keathley Canyon 686			**1,142ft**		**US ft**	**Inline**	**15200**	
FNL Keathley Canyon 686			**939ft**		**US ft**	**Crossline**	**3600**	
Water Depth: -6,202ft MSL			**Slope: <1.0° SW**					
Nearest Shoreline			188 Nautical Miles @ 30.18°					
Port of Operation			Fourchon 212 Nautical Miles @ 37.15°					
Nearest Manned Platform			A Lucius TLP in KC875			39.63 Miles @ 18.76°		

2. VELOCITY DATA

2.1 Seabed Depth

Time-to-depth conversion for the water column was derived using the Advocate and Hood (1993) polynomial.

Water Depth (ft.) =
$0.1105 - 5066.9193X + 468.6693X^2 - 554.7107X^3 + 340.7019X^4 - 116.991X^5 + 20.728X^6 - 1.4658X^7$
Where X = One Way Time to Seabed (in Seconds.

2.1 Sub-seabed Depth

Sub-seabed time to depth conversion was made using a polynomial function from a previous study on blocks located around 9 miles southeast of the study area with a similar geological setting.

Depth below seabed (ft) = $(453.24 * X^2) + (2455.6* X)$
Where X = two way time in seconds below seabed.

The depth below sea surface to any horizon is the sum of the seabed depth and the depth of the horizon below the seafloor.

3. SEABED CONDITIONS

3.1 Seabed Depth

Seabed depth at the proposed well location is -6,202ft TVDSS (0ft TVDBML), Figure 1. The seafloor gradient at the proposed well is <1.0° to the southwest.

3.2 Seafloor Morphology and Man-Made Features

The proposed KC686-C' well location is in the northeast of block KC686. At the proposed well location, the seabed is smooth (Figure 2). Soft clays and silts are predicted at the seabed. Sediments appear conducive for jetting of seabed casing with no hard layers predicted. Conditions are expected to be similar to those encountered at existing KC641-1, KC686-1 and KC686-2 well locations.

There are no anomalous seabed amplitudes indicative of hydrocarbon macroseep observed within a 2,000ft radius of the proposed location (Figure 3). The nearest site for the possibility of sensitive sessile benthic communities is located 7,666ft to the northwest of the proposed KC686-C well. Occasional areas with a moderate-amplitude at the seabed occur within 2,000ft; however, these anomalies are due to slight lithological variation at the seabed.

The existing well KC686-2 is located ~3,005ft to the SSE of the proposed well, the existing KC686-1 well occurs 11,260ft to the southwest, and the existing KC642-1 is located 4,875ft to the northwest. The following are the coordinates:

Existing KC686-1
X: 1750090
Y: 9541822

Existing KC686-2
X: 1756198
Y: 9547645

Existing KC642-1
X: 1756052
Y: 9555297

A tie line between the existing KC686 well and the proposed well is shown on Figure 7.

No other features are observed within a 2,000ft radius that could affect well emplacement or jetting of a casing.

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4. SUB-SEABED CONDITIONS

4.1 Gardline Surveys Inc. Hazard Classification Scheme

4.1.1 Shallow Gas Classification

Shallow gas detection is normally made in the first instance by recognition of anomalously high amplitude ('bright' spots). This parameter allied to a number of other characteristics, such as acoustic masking, underlying velocity pulldown, structural closure, edge effects, frequency reduction, and basal 'flat' spots are indicative of shallow gas accumulations. High amplitude polarity-reversed reflectors are particularly relevant to shallow gasified sands, particularly within the topmost kilometer of sediments below the seabed. The quantitative degree of these gas risks is further detailed as:

High Risk of Gas – **Repsol Risk Level 3** – Anomalously high amplitudes coupled with multiple other well-defined subsidiary indicators, such as acoustic masking, velocity pulldown, structural closure, phase reversal, frequency reduction, etc. Predicted Gas Risk considered *probable*.

Moderate Risk of Gas – **Repsol Risk Level 2**– Anomalously high amplitudes coupled with two other well-defined subsidiary indicators, such as acoustic masking, velocity pulldown, structural closure, phase reversal, frequency reduction, etc. Predicted Gas Risk considered *likely*.

Slight Risk of Gas – **Repsol Risk Level 1** – Anomalously high amplitudes coupled with one to two other well-defined subsidiary indicators, or very high amplitude alone. Predicted Gas Risk considered *possible*.

4.1.2 Shallow Water Flow Classification

High Shallow Water Flow Risk – **Repsol Risk Level 3** – Potential sand-prone interval, overlain by a well-defined seal with significant rapidly-deposited overburden, together with a tie to a known Shallow Water Flow zone in a nearby well. Shallow Water Flow considered *probable*.

Moderate Shallow Water Flow Risk– **Repsol Risk Level 2** – A potential sand-prone interval, overlain by a well-defined clay seal with significant rapidly deposited overburden. Shallow Water Flow considered *likely*.

Slight Shallow Water Flow Risk – **Repsol Risk Level 1** – Possible sand-prone interval, overlain by a poor or breached seal, or slowly deposited overburden. Or a moderate or high-risk type deposit, where a nearby well has disproved the flow zone. Shallow Water Flow considered unlikely but still *possible*.

4.2 Geology and Lithology

The sub-seabed geology has been divided into four units, A, B, C, and D. These are separated by Horizons H10, H20, H30, and Top of Salt (Figures 5 through 8).

4.3 Unit A

The lithology within the upper part of Unit A from the seabed to -6,338ft below sea surface (136ft below seabed) is characterized by well-layered and slightly moderate-amplitude reflectors interpreted as clays, silts, and minor coarser layers.

From -6,338ft below sea surface (136ft below seabed) to -6,503ft below sea surface (301ft below seabed) is interpreted to consist of slightly chaotic, low-amplitude reflectors interpreted as low energy channel infill clays, silts and occasional minor coarser interbeds.

The lower part of Unit A from -6,503ft below sea surface (301ft below seabed) to -6,706ft below sea surface (504ft below seabed) comprises well-layered, low and moderate-amplitude reflectors interpreted as clays, silts, and occasional sand interbeds. A <40ft thick sand interbed is interpreted at -6,653ft below sea surface (451ft below seabed). Minor drilling fluid circulation and wellbore stability problems are considered possible at this interbed.

Jetting of the casing through this upper unit is not interpreted to be problematic.

No gas hazards or shallow water flow risks are interpreted within Unit A at the wellbore or within 2,000ft.

Horizon H10 marks the base of this unit at -6,706ft TVDSS (504ft TVDBML).

4.4 Unit B

Unit B from -6,706ft below sea surface (504ft below seabed).to -7,034ft below sea surface (832ft below seabed). is characterized by chaotic, variable amplitude reflectors interpreted as a higher energy channelized mass transport deposit. The lithology is interpreted to consist of clays and silts with several sand interbeds and lenses. Due to a possible increase in poorly consolidated material in this section minor drilling fluid circulation and wellbore stability problems are considered possible through this interval.

Unit B exhibits character favorable for the development of shallow water flow. The unit exhibits acoustic character indicative of higher energy and possible rapid deposition rates that could have led to inadequate dewatering time. As such, a **Slight Shallow Water Flow Risk (1)** is assigned within this interval. The existing KC686-2 and KC686-1 well locations did not report any shallow water flow problems through this interval where conditions appear acoustically similar (Figure 7).

No risk of gas is assigned to Unit B at the proposed well or within a 2,000ft radius.

Horizon H20 marks the base of this unit at -7,034ft below sea surface (832ft below seabed). The well-path will traverse a fault at the level of Horizon H20. Minor drilling fluid circulation and wellbore stability problems may occur at the level of the fault.

4.5 Unit C

Unit C from -7,034ft below sea surface (below seabed) to -7,610ft below sea surface (1,408ft below seabed) comprises well-layered, low and occasional moderate-amplitude reflectors interpreted as clays and silts with occasional sand interbeds. A <40ft thick sand interbed occurs at -7,555ft below sea surface (1,357ft below seabed). Minor wellbore stability and drilling fluid circulation problems may occur at the level of the interbed.

No shallow gas or shallow water flow is predicted within Unit C at the proposed well location. Two risks of gas anomalies occur within 2,000ft of the proposed well. The nearest risk of gas anomaly is located 690ft to the southeast with no connectivity to the proposed wellbore.

The well-path will not traverse any faults within Unit C.

Horizon H30 is the base of Unit C occurring at -7,610ft below sea surface (1,408ft below seabed).

4.6 Unit D

The upper interval within Unit D from -7,610ft below sea surface (1,408ft below seabed) to -8,617ft below sea surface (2,415ft below seabed) is characterized by well-layered and slightly-chaotic, low and occasional moderate-amplitude reflectors interpreted as clays and silts with several sands.

The lower interval within Unit D from -8,617ft below sea surface (2,415ft below seabed) to -9,222ft below sea surface (3,020ft below seabed) comprises well-layered and chaotic, low and moderate-amplitude reflectors with clays, silts, and numerous sand interbeds. Due to the increased possibility of encountering coarser interbeds within this interval of Unit D a **Slight Shallow Water Flow Risk (1)** is assigned. The proposed well will not traverse any risk of gas anomalies within Unit D. The existing KC686-2 and KC686-1 wells traversed a similar acoustic character and did not report any problems in this interval (Figure 7).

The well-path will intersect five faults within Unit D at -7,887ft below sea surface (1,685ft below seabed), at -8,193ft below sea surface (1,991ft below seabed), at -8,617ft below sea surface (2,415ft below seabed), at -8,786ft below sea surface (2,584ft below seabed), and at -8,977ft below sea surface (2,775ft below seabed). Minor drilling fluid circulation and wellbore stability problems may occur at the level of the faults. In addition, the faults at -7,887ft and -8,617ft below sea surface are directly connected to a fault that extends into the shallower section. Given this setting is if possible that drilling fluid circulation problems may occur at the level of the fault if pressures over hydrostatic are exerted by the drilling fluid column. The existing KC686-2 and KC686-1 wells traversed similar faults with no reported drilling problems.

Top of Salt is the base of Unit D occurring at -9,222ft below sea surface (3,020ft below seabed).

4.7 Shallow Gas Assessment

No shallow gas is interpreted at the proposed well location.

4.8 Shallow Water Flow Assessment

Within Unit B, a **Slight Shallow Water Flow Risk (1)** is assigned from -6,706ft below sea surface (504ft below seabed).to -7,034ft below sea surface (832ft below seabed).

Within Unit D, a **Slight Shallow Water Flow Risk (1)** is assigned within the interval from -8,617ft below sea surface (2,415ft below seabed) to -9,222ft below sea surface (3,020ft below seabed).

5. CONCLUSIONS AND RECOMMENDATIONS

- Seabed

  No hazards or problems are interpreted.

- Unit A

  Minor wellbore stability and drilling fluid circulation problems are possible at the level of a <40ft thick sand interbed occurs at -6,653ft below sea surface (451ft below seabed).

- Unit B

  Within Unit B, a **Slight Shallow Water Flow Risk (1)** is assigned from -6,706ft below sea surface (504ft below seabed).to -7,034ft below sea surface (832ft below seabed). Appropriate drilling methodology is recommended to deal with a short-lived non-persistent possible water flow event.

  The well-path will traverse a fault at the level of Horizon H20 at -7,034ft below sea surface (832ft below seabed). Minor drilling fluid circulation and wellbore stability problems may occur. Casing seats should avoid all fault intersections as formation integrity could be compromised.

- Unit C

  Minor wellbore stability and drilling fluid circulation problems are possible at the level of A <40ft thick sand interbed occurs at -7,555ft below sea surface (1,357ft below seabed).

- Unit D

  Within Unit D, a **Slight Shallow Water Flow Risk (1)** is assigned within the interval from --8,617ft below sea surface (2,415ft below seabed) to -9,222ft below sea surface (3,020ft below seabed). Appropriate drilling methodology is recommended to deal with a short-lived non-persistent possible water flow event. Minor wellbore stability and drilling fluid circulation problems are also considered possible.

  The well-path will intersect five faults within Unit D at -7,887ft below sea surface (1,685ft below seabed), at -8,193ft below sea surface (1,991ft below seabed), at -8,617ft below sea surface (2,415ft below seabed), at -8,786ft below sea surface (2,584ft below seabed), and at -8,977ft below sea surface (2,775ft below seabed). Minor drilling fluid circulation and wellbore stability problems may occur at the level of the faults

  In addition, the faults at -7,887ft and -8,617ft below sea surface are directly connected to a fault that extends into the shallower section and if pressures over hydrostatic are exerted by the drilling fluid column then drilling fluid circulation problem could occur. Casing Seats should avoid fault intersections as formation integrity could be compromised.

We appreciate the opportunity to work with you on this project and look forward to continuing as your geohazards consultants. Please contact us if you have any questions or if we can be of further assistance.

Sincerely,
Ocean Geo Solutions Inc.

Andrew Haigh	Denise Haigh
Geophysical Manager	Quality Assurance

Copies Submitted: 1 copy to Scott Smith at Repsol E&P USA Inc.

Attachments:
Proposed KC686-C' Well Location
Seabed Depth Extract
Seabed Morphology Extract
Seabed Amplitude Extract
Geohazard Summary Extract
Inline Data Example
Crossline Data Example
Arbitrary Line Data Example
Top Hole Prognosis
ROV Plat
Power Spectrum
Bathymetry Plat
Public Information Plat
Proprietary Information Plat
Vicinity Plat
10-Mile Radius Plat

SECTION 4
HYDROGEN SULFIDE INFORMATION

4.1 CONCENTRATION

LLOG anticipates encountering zero ppm H_2S during the proposed operations.

4.2 CLASSIFICATION

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

4.3 H2S 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
BIOLOGICAL, PHYSICAL AND SOCIOECONOMIC INFORMATION

5.1 DEEPWATER BENTHIC COMMUNITIES

The seafloor disturbing activities proposed in this plan are in water depths greater than 300 meters (984'). Ocean Geo Solutions Inc. was contracted to provide an assessment of the shallow conditions at the proposed surface locations. The purpose of the assessment was to address seafloor conditions that may impact exploratory drilling operations within 2,000 feet of the proposed well sites. LLOG will avoid all high-density deepwater benthic communities by 2,000 feet from each proposed mud and cuttings discharge location and 250 feet from the location of all other seafloor disturbances. As per NTL No. 2009-G40, "Deepwater Benthic Communities," a map showing the 2,000-foot radius around the well site is included as **Attachment 3-D.**

5.2 TOPOGRAPHIC FEATURES (BANKS)

Activities proposed in this EP 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."

5.3 TOPOGRAPHIC FEATURES STATEMENT (SHUNTING)

Activities proposed under this EP will be conducted outside all Topographic Feature Protective Zones; therefore, shunting of drill cuttings and drilling fluids is not required per NTL No. 2009-G39, "Biologically Sensitive Underwater Features and Areas."

5.4 LIVE BOTTOMS (PINNACLE TREND FEATURES)

KC 686 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."

5.5 LIVE BOTTOMS (LOW RELIEF)

KC 686 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."

5.6 POTENTIALLY SENSITIVE BIOLOGICAL FEATURES MAP

KC 686 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.

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

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

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in the Gulf of Mexico
			Lease Area	Coastal	
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)
Manta Ray	Manta Birostris	T	X	X	Texas, Louisiana, Mississippi, Alabama, Florida
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.

5.8 ARCHAEOLOGICAL REPORT

KC 686 is not located in an area determined to have any historic or prehistoric cultural resources; therefore, an archaeological resource survey report is not provided.

5.9 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."

5.10 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 6
WASTES AND DISCHARGES INFORMATION

6.1 PROJECTED GENERATED WASTES

Table 1, "Wastes You Will Generate, Treat and Downhole Dispose or Discharge to the Gulf of Mexico" is included as **Attachment 6-A.**

6.2 MODELING REPORT

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

Attachment 6-A

TABLE 1. WASTES YOU WILL GENERATE, TREAT AND DOWNHOLE DISPOSE OR

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

KC 686 Projected generated waste			Projected ocean discharges		Projected Downhole
Type of Waste	Composition	Projected Amount	Discharge rate	Discharge Method	Answer yes or no
Will drilling occur ? If yes, fill in the muds and cuttings.					
EXAMPLE: Cuttings wetted with synthetic based fluid	*Cuttings generated while using synthetic based drilling fluid.*	*X bbl/well*	*X bbl/day/well*	*discharge overboard*	*No*
Water-based drilling fluid	Water based mud additives, barite and gel used for WBM	103,332 bbls/well	7,921 bbls/day/well	Discharge overboard	No
Cuttings wetted with water-based fluid	Cuttings generated while using water based drilling fluid.	5,932 bbls/well	455 bbls/day/well	Discharge overboard	No
Cuttings wetted with synthetic-based fluid	Cuttings generated while using synthetic based drilling fluid.	7,535 bbls/well	185 bbls/day/well	Discharge overboard	No
Will humans be there? If yes, expect conventional waste					
EXAMPLE: Sanitary waste water	Sanitary waste from living quarters	X bbl/well	X bbl/hr/well	chlorinate and discharge overboard	No
Domestic waste	Misc waste for living quarters	28,801 bbls/well	3.9 bbls/hr/well	Discharge overboard (no free oil)	No
Sanitary waste	Processed sanitary waste from living quarters	19,201 bbls/well	2.6 bbls/hr/well	Chlorinate and discharge overboard per USCG approved MSD	No
Is there a deck? If yes, there will be Deck Drainage					
Deck Drainage	Accumulated drainage due to rainfall	0 to 47,261 bbls/well	0 to 167 bbls/hr/well	Test for oil and grease and discharge overboard	No
Will you conduct well treatment, completion, or workover?					
Well treatment fluids - chemical product waste	Ethylene glycol, methonal	300 bbls/well	20 bbls/hr/well	Transported to shore on vessels in DOT approved containers to Fourchon base for pick-up	No
Well completion fluids	Brines: NaCL, KCl, CaBr2, CaCl2, spent acids (hydroflouric and hydrochloric), prop sand, debris from potential flowback operations	500 bbls/well	100 bbls/hr/well	Non-pollutant brines - tested for oil and grease for discharge overboard. This excludes clear brines containing Zinc, spent acids, prop sand and debris. These will be transported to shore on vessels in DOT approveed containers to Fourchon base and on to Newpark Base for disposal.	No
Workover fluids	Brines: NaCL, KCl, CaBr2, CaCl2, spent acids (hydroflouric and hydrochloric), prop sand, debris from potential flowback operations	500 bbls/well	100 bbls/hr/well	Non-pollutant brines - tested for oil and grease for discharge overboard. This excludes clear brines containing Zinc, spent acids, prop sand and debris. These will be transported to shore on vessels in DOT approveed containers to Fourchon base and on to Newpark Base for disposal.	No
Miscellaneous discharges. If yes, only fill in those associated with your activity.					
Desalinization unit discharge	Uncontaminated spent seawater used for potable water generation unit	0 to 100,000 bbls/well	60 bbls/hr/well	Discharge overboard	No
Blowout prevent fluid	Stack Magic 200/0/5% glycol based on 2% mixture with potable water	0 to 100 bbls/well	5 bbls/hr/well	Discharge at seafloor	No
Ballast water	Uncontaminated seawater used for ballast control	0 to 100,000 bbls/well	16,350 bbls/hr/well	Discharge overboard	No
Bilge water	Uncontaminated freshwater and seawater overflow / leakage accumuated from machinery operations	200 bbls/well	0 to 2 bbls/hr/well	Discharge overboard	No
Excess cement at seafloor	Excess cement slurry and mixwater used for cementing operation - NPDES allowed	1000 bbls/well	360 bbls/hr/well	Discharge at mudline	No
Fire water	Uncontaminated seawater used for fire control system - no additives	0 to 10,000 bbls/well	16,350 bbls/hr/well	Discharge overboard	No
Cooling water	Uncontaminated seawater used for heat exchanger operations used to cool machinery	0 to 400,000 bbls/well	0 to 1600 bbls/hr/well	Discharge overboard	No
Will you produce hydrocarbons? If yes fill in for produced water.					
Produced water	NA	NA	NA	NA	No
Will you be covered by an individual or general NPDES permit ?		**General NPDES**	GMG290000		
			Comply with the requirements of the NPDES permit.		

NOTE: If you will not have a type of waste, enter NA in the row.

SECTION 7
AIR EMISSIONS INFORMATION

7.1 EMISSIONS WORKSHEETS AND SCREENING QUESTIONS

Screen Questions for EP's	Yes	No
Is any calculated Complex Total (CT) Emission amount (tons) associated with your proposed exploration activities more than 90% of the amounts calculated using the following formulas: CT = $3400D^{2/3}$ for CO, and CT = 33.3D for the other air pollutants (where D = distance to shore in miles)?		X
Do your emission calculations include any emission reduction measures or modified emission factors?		X
Are your proposed exploration activities located east of 87.5° W longitude?		X
Do you expect to encounter H_2S at concentrations greater than 20 parts per million (ppm)?		X
Do you propose to flare or vent natural gas for more than 48 continuous hours from any proposed well?		X
Do you propose to burn produced hydrocarbon liquids?		X

7.2 SUMMARY INFORMATION

Included as **Attachment 7-A** are Air Emission Worksheets which show the emissions calculations for the Plan Emissions and if different, a set of worksheets showing the emissions calculations for the Complex Total Emissions.

This information was calculated by:

Kathy Gowland
985-801-4300
kathygo@llog.com

Attachment 7-A
DP Semi-Submersible

EXPLORATION PLAN (EP)
AIR QUALITY SCREENING CHECKLIST

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

COMPANY	LLOG Exploration Offshore, L.L.C.
AREA	Keathley Canyon
BLOCK	686
LEASE	OCS-G 33341
PLATFORM	N/A
WELL	C and C-Alt
COMPANY CONTACT	Kathy Gowland
TELEPHONE NO.	985-801-4317
REMARKS	Drill, TA, Complete and Test Well Locations C and mirror location C-Alt. Note: mirror location is intended as re-spud location only.

EMISSIONS FACTORS

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

Equipment/Emission Factors	units	PM	SOx	NOx	VOC	CO	REF.	DATE
NG Turbines	gms/hp-hr		0.00247	1.3	0.01	0.83	AP42 3.2-1& 3.1-1	10/96
NG 2-cycle lean	gms/hp-hr		0.00185	10.9	0.43	1.5	AP42 3.2-1	10/96
NG 4-cycle lean	gms/hp-hr		0.00185	11.8	0.72	1.6	AP42 3.2-1	10/96
NG 4-cycle rich	gms/hp-hr		0.00185	10	0.14	8.6	AP42 3.2-1	10/96
Diesel Recip. < 600 hp.	gms/hp-hr	1	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

EMISSIONS CALCULATIONS 1ST YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT		PHONE	REMARKS
LLOG Exploration Offshore, L.L.C.	Keathley Canyon	686	OCS-G 33341	N/A	C and C-Alt			Kathy Gowland	985-801-4317	Drill, TA, Complete and Test Well Locations C and mirror location C-Alt. Note: mirror location is intended as re-spud location only.

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	61200	2955.96	70943.04	24	90	43.14	24.74	1482.82	44.48	323.52	46.59	26.72	1601.44	48.04	349.41
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	12	39	5.07	2.91	174.45	5.23	38.06	1.19	0.68	40.82	1.22	8.91
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	12	78	5.07	2.91	174.45	5.23	38.06	2.38	1.36	81.64	2.45	17.81
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0				0.00					0.00	
DRILLING 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
2019	YEAR TOTAL						53.29	30.56	1831.72	54.95	399.65	50.15	28.76	1723.91	51.72	376.13
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											7259.40	7259.40	7259.40	7259.40	123154.39
	218.0															

EMISSIONS CALCULATIONS 2ND YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
LLOG Exploration Offshore, L.L.C.	Keathley Canyon	686	OCS-G 33341	N/A	C and C-Alt		Kathy Gowland	985-801-4317	Drill, TA, Complete and Test Well Locations C and mirror location C-Alt. Note: mirror location is intended as re-spud location only.

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	61200	2955.96	70943.04	24	90	43.14	24.74	1482.82	44.48	323.52	46.59	26.72	1601.44	48.04	349.41
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	12	39	5.07	2.91	174.45	5.23	38.06	1.19	0.68	40.82	1.22	8.91
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	12	78	5.07	2.91	174.45	5.23	38.06	2.38	1.36	81.64	2.45	17.81
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0				0.00					0.00	
DRILLING 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	YEAR TOTAL						**53.29**	**30.56**	**1831.72**	**54.95**	**399.65**	**50.15**	**28.76**	**1723.91**	**51.72**	**376.13**
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES															
	218.0											**7259.40**	**7259.40**	**7259.40**	**7259.40**	**123154.39**

EMISSIONS CALCULATIONS 2ND YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL			CONTACT	PHONE	REMARKS
LLOG Exploration Offshore, L.L.C.	Keathley Canyon	686	OCS-G 33341	N/A	C and C-Alt			Kathy Gowland	985-801-4317	Drill, TA, Complete and Test Well Locations C and mirror location C-Alt. Note: mirror location is intended as re-spud location only.

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	61200	2955.96	70943.04	24	180	43.14	24.74	1482.82	44.48	323.52	93.17	53.43	3202.89	96.09	698.81
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	12	78	5.07	2.91	174.45	5.23	38.06	2.38	1.36	81.64	2.45	17.81
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	12	156	5.07	2.91	174.45	5.23	38.06	4.75	2.72	163.28	4.90	35.63
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0				0.00					0.00	
DRILLING 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
2021	YEAR TOTAL						**53.29**	**30.56**	**1831.72**	**54.95**	**399.65**	**100.30**	**57.52**	**3447.82**	**103.43**	**752.25**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**											**7259.40**	**7259.40**	**7259.40**	**7259.40**	**123154.39**
	218.0															

SUMMARY

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL
LLOG Exploration Offshore, L.L.C.	Keathley Canyon	686	OCS-G 33341	N/A	C and C-Alt

Year	Emitted Substance				
	PM	SOx	NOx	VOC	CO
2019	50.15	28.76	1723.91	51.72	376.13
2020	50.15	28.76	1723.91	52.19	376.13
2021	100.30	57.52	3447.82	103.43	752.25
Allowable	7259.40	7259.40	7259.40	7259.40	123154.39

Drillship

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

EXPLORATION PLAN (EP)
AIR QUALITY SCREENING CHECKLIST

COMPANY	LLOG Exploration Offshore, L.L.C.
AREA	Keathley Canyon
BLOCK	686
LEASE	OCS-G 33341
PLATFORM	N/A
WELL	C and C-Alt
COMPANY CONTACT	Kathy Gowland
TELEPHONE NO.	985-801-4317
REMARKS	Drill, TA, Complete and Test Well Locations C and mirror location C-Alt. Note: mirror location is intended as re-spud location only.

EMISSIONS FACTORS

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

Equipment/Emission Factors	units	PM	SOx	NOx	VOC	CO	REF.	DATE
NG Turbines	gms/hp-hr		0.00247	1.3	0.01	0.83	AP42 3.2-1& 3.1-1	10/96
NG 2-cycle lean	gms/hp-hr		0.00185	10.9	0.43	1.5	AP42 3.2-1	10/96
NG 4-cycle lean	gms/hp-hr		0.00185	11.8	0.72	1.6	AP42 3.2-1	10/96
NG 4-cycle rich	gms/hp-hr		0.00185	10	0.14	8.6	AP42 3.2-1	10/96
Diesel Recip. < 600 hp.	gms/hp-hr	1	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

EMISSIONS CALCULATIONS 1ST YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
LLOG Exploration Offshore, L.L.C.	Keathley Canyon	686	OCS-G 33341	N/A	C and C-Alt		Kathy Gowland	985-801-4317	Drill, TA, Complete and Test Well Locations C and mirror location C-Alt. Note: mirror location is intended as re-spud location only.

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	61800	2984.94	71638.56	24	90	43.56	24.98	1497.36	44.92	326.70	47.04	26.98	1617.15	48.51	352.83
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	12	39	5.07	2.91	174.45	5.23	38.06	1.19	0.68	40.82	1.22	8.91
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	12	78	5.07	2.91	174.45	5.23	38.06	2.38	1.36	81.64	2.45	17.81
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0				0.00					0.00	
DRILLING 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
2019	YEAR TOTAL						53.71	30.80	1846.26	55.39	402.82	50.61	29.02	1739.61	52.19	379.55
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											7259.40	7259.40	7259.40	7259.40	123154.39
	218.0															

EMISSIONS CALCULATIONS 2ND YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT		PHONE	REMARKS
LLOG Exploration Offshore, L.L.C.	Keathley Canyon	686	OCS-G 33341	N/A	C and C-Alt			Kathy Gowland	985-801-4317	Drill, TA, Complete and Test Well Locations C and mirror location C-Alt. Note: mirror location is intended as re-spud location only.

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	61800	2984.94	71638.56	24	90	43.56	24.98	1497.36	44.92	326.70	47.04	26.98	1617.15	48.51	352.83
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	12	39	5.07	2.91	174.45	5.23	38.06	1.19	0.68	40.82	1.22	8.91
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	12	78	5.07	2.91	174.45	5.23	38.06	2.38	1.36	81.64	2.45	17.81
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0				0.00					0.00	
DRILLING 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	YEAR TOTAL						53.71	30.80	1846.26	55.39	402.82	50.61	29.02	1739.61	52.19	379.55
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES											7259.40	7259.40	7259.40	7259.40	123154.39
	218.0															

EMISSIONS CALCULATIONS 2ND YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL			CONTACT	PHONE	REMARKS
LLOG Exploration Offshore, L.L.C.	Keathley Canyon	686	OCS-G 33341	N/A	C and C-Alt			Kathy Gowland	985-801-4317	Drill, TA, Complete and Test Well Locations C and mirror location C-Alt. Note: mirror location is intended as re-spud location only.

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	61800	2984.94	71638.56	24	180	43.56	24.98	1497.36	44.92	326.70	94.09	53.95	3234.29	97.03	705.66
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PRIME MOVER>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BURNER diesel	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AUXILIARY EQUIP<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	12	78	5.07	2.91	174.45	5.23	38.06	2.38	1.36	81.64	2.45	17.81
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	12	156	5.07	2.91	174.45	5.23	38.06	4.75	2.72	163.28	4.90	35.63
	VESSELS>600hp diesel(tugs)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0				0.00					0.00	
DRILLING 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
2021	YEAR TOTAL						**53.71**	**30.80**	**1846.26**	**55.39**	**402.82**	**101.21**	**58.04**	**3479.22**	**104.38**	**759.10**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**											**7259.40**	**7259.40**	**7259.40**	**7259.40**	**123154.39**
	218.0															

SUMMARY

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL
LLOG Exploration Offshore, L.L.C.	Keathley Canyon	686	OCS-G 33341	N/A	C and C-Alt

Year	Emitted Substance				
	PM	SOx	NOx	VOC	CO
2019	50.61	29.02	1739.61	52.19	379.55
2020	50.61	29.02	1739.61	52.19	379.55
2021	101.21	58.04	3479.22	104.38	759.10
Allowable	7259.40	7259.40	7259.40	7259.40	123154.39

SECTION 8
OIL SPILL INFORMATION

8.1 OIL SPILL RESPONSE PLANNING

All the proposed activities and facilities in this EP will be covered by the Oil Spill Response Plan (OSRP) filed by LLOG (Company No. 02058) in accordance with 30 CFR, Biennial update found to be in compliance August 16, 2018 and revisions due to significant change to the greater than ten mile drilling worst case discharge scenario approved September 18, 2018.

The WCD proposed in this Plan does not exceed the WCD outlined in our OSRP.

8.2 SPILL RESPONSE SITES

The following locations will be used in the event an oil spill occurs as a result of the proposed activities.

Primary Response Equipment Location	Preplanned Staging Location
Houma, LA	**Fort Jackson, LA**

8.3 OSRO INFORMATION

The O'Brien Group (TOG) will provide trained personnel capable of providing supervisory management of the oil spill response in addition to contacting and deploying cleanup personnel and equipment.

LLOG utilized Clean Gulf Associates (CGA) as its primary provider for equipment, which is an industry cooperative owning an inventory of oil spill clean-up equipment. CGA is supported by the Marine Spill Response Corporation (MSRC), which is responsible for storing, inspecting, maintaining and dispatching CGA's equipment. The MSRC STARS network provides for the closest available personnel, as well as an MSRC supervisor to operate the equipment.

8.4 WORST CASE SCENARIO DETERMINATION

Category	Regional OSRP	EP
Type of activity	Exploratory MODU	Exploratory MODU
Facility Surface Location	Mississippi Canyon Block 386	Keathley Canyon Block 686
Facility designation	Well Location Well No. 001 (Revised Location B)	Location A
Distance to nearest shoreline (miles)	58 miles	218 miles
Volume: Storage Tanks (total) Facility Piping (total) Lease Term Pipeline Uncontrolled blowout (day) Barging Potential 24 Hour Volume (bbl)	396,602 bbls	40,129
Type of Liquid Hydrocarbon	Crude	Crude
API gravity	25°	27.3°

LLOG Exploration Offshore, L.L.C. (LLOG) has the capability to respond to the appropriate worst-case spill scenario included in its regional OSRP Plan, filed by LLOG (Company No. 02058) in accordance with 30 CFR 254, Biennial update found to be in compliance August 16, 2018 and revisions due to significant change to the greater than ten mile drilling worst case discharge scenario approved September 18, 2018.

Since LLOG has the capability to respond to the worst-case spill scenario included in its Regional OSRP filed by LLOG (Company No. 02058) in accordance with 30 CFR 254, Biennial update modification approved on August 16, 2018 and since the worst case discharge determined in this Exploration Plan for Keathley Canyon Block 686 does not exceed our worst case discharge outlined in our Regional OSRP, I hereby certify that LLOG Exploration Offshore, L.L.C. 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 Exploration Plan.

LLOG Exploration Offshore, L.L.C. (Company No. 02058) previously submitted the Regional OSRP Exploration WCD volume reviewed in Plan R-6763, Revised Exploration Plan, approved November 2, 2018.

8.5 OIL SPILL RESPONSE DISCUSSION

The Oil Spill Response Discussion is included as **Attachment 8-A.**

8.6 MODELING REPORT

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

Attachment 8-A

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 40,129 barrels of crude oil with an API gravity of 27.3°.

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 a 2% probability of impact to the shorelines of Matagorda County, TX, Galveston County, TX, and/or Cameron Parish, LA within 30 days. Cameron Parish includes the east side of Sabine Lake, Sabine National Wildlife Refuge, Calcasieu Lake, Lacassine National Wildlife Refuge (inland) and Grand Lake. Cameron Parish also includes the area along the coastline from Sabine Pass to Big Constance Lake in Rockefeller Wildlife Refuge. This region is composed of open public beaches, marshlands and swamps. It serves as a habitat for numerous birds, finfish and other animals, including several rare, threatened and endangered species. Galveston County includes the Gulf Beach from the west end of Galveston Island at Texas Highway 3005 to the east coast of High Island at the Jefferson County line. Habitats include marshes at the west end of Seawall Boulevard and on the east end of the island and open beaches and avian feeding areas all along the coastline, including a National Audubon Society Sanctuary. The waters of Galveston Bay are classified as an EPA National Estuary. Matagorda County stretches from Matagorda Bay, across the Colorado River and up to the border of San Bernard Wildlife Refuge (immediately west of the San Bernard River). The county includes Matagorda Peninsula on the Gulf coast and Matagorda Bay. This area is primarily open beach. However, marshland exists along the east side of Matagorda Bay. Several bird rookeries are present around the peninsula. Seagrass is present off of Matagorda Peninsula on the bay side.

Response

LLOG 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 18% or approximately 7,223 barrels of crude oil would be evaporated/dispersed within 24 hours, with approximately 32,906 barrels remaining.

Natural Weathering Data: KC 686, Well Location A	**Barrels of Oil**
WCD Volume	40,129
Less 18% natural evaporation/dispersion	7,223
Remaining volume	32,906

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.

LLOG'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 spill 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 141,000 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 Galveston County, Texas, Matagorda County, Texas, and/or Cameron 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 57,759 barrels. Temporary storage associated with skimming equipment equals 1,152 barrels. If additional storage is needed, various storage barges with a total capacity of 60,000 barrels 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. Master Service Agreements with AMPOL and OMI Environmental 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. 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. LLOG's contract Incident Management Team has access to the applicable ACP(s) and GRP(s).

Based on the anticipated worst case discharge scenario, LLOG 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 50 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

LLOG 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 LLOG'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): LLOG 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

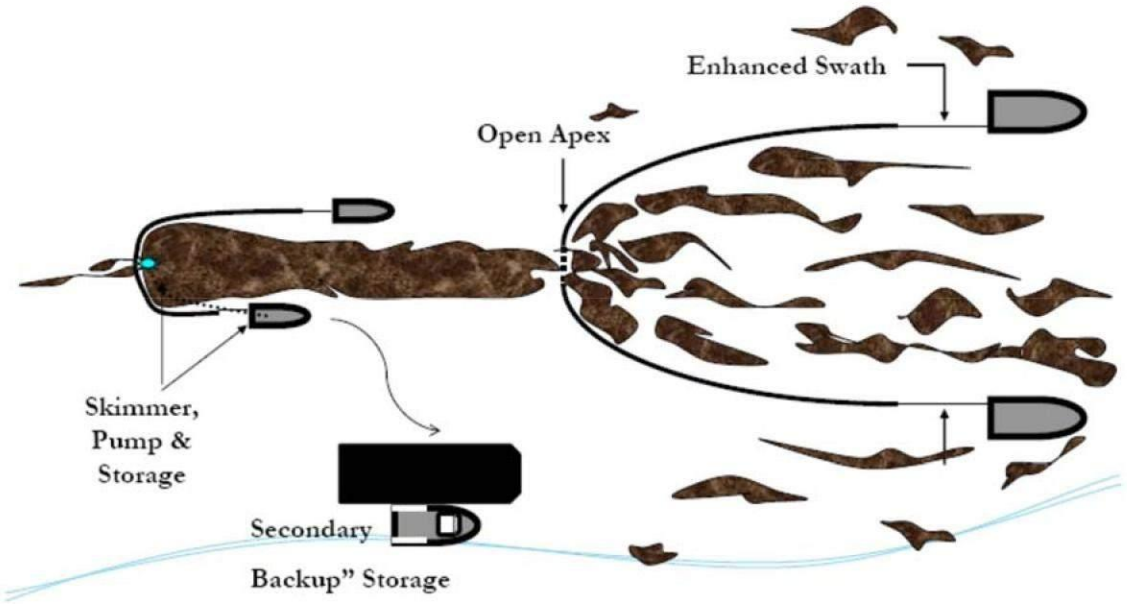
Mechanical Recovery – Deployed on large vessels of opportunity (VOO) the Koseq Rigid Sweeping Arms are high volume surge capacity deployed to increase recovery capacity at the source of a large oil spill in the offshore and outer nearshore environment of the Gulf of Mexico. They are highly mobile and 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.

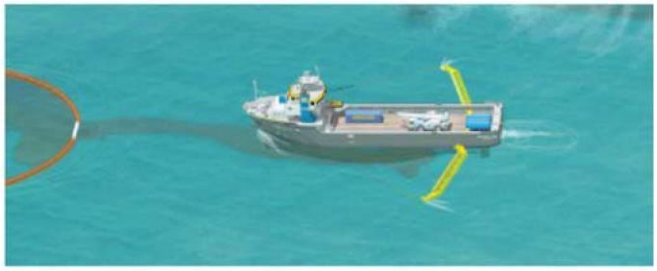
Command and Control – The large OSVs in many cases have state of the art communication and electronic systems, as well as the accommodations to support the function of directing all skimming operations offshore and reporting back to the command post.

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 LLOG'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 of 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

Prevailing winds, waves and currents along the Texas coast are from the southeast and northeast quadrants. Ten to 20 foot waves may occur during hurricanes. The combined effect of the winds, surface currents, and waves refracting shoreward produce the prevailing westerly longshore currents.

Tides are semi-diurnal and diurnal, and range in height from less than 1 foot to 2.5 feet. The direction, force, and duration of the wind has a considerable effect on the tides and currents. Fifteen foot tides may be expected during severe hurricanes and very low tides may accompany strong northerlies of long duration.

Surface water temperature averages slightly less than 90° F and ranges between 80 and 100° F during the late summer. During the winter the average is slightly less than 60° F and the range is between 35 and 80° F.

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 LLOG'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 30 day impact. The results are tabulated below.

Area/Block	OCS-G	Launch Area	Land Segment and/or Resource	Conditional Probability (%)
KC 686, Well Location A *218 miles from shore*	G33341	W29	Kenedy, TX Kleberg, TX Aransas, TX Calhoun, TX **Matagorda, TX** Brazoria, TX **Galveston, TX** Jefferson, TX **Cameron, LA** Vermilion, LA	1 1 1 1 **2** 1 **2** 1 **2** 1

WCD Scenario– <u>BASED ON WELL BLOWOUT DURING DRILLING OPERATIONS</u> (218 miles from shore)
32,906 bbls of crude oil (Volume considering natural weathering)
API Gravity 27.3°

FIGURE 2 – Equipment Response Time to KC 686, Well Location A

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	1.3	5.3
DC 3	1200	2	Houma	2	2	1.7	5.7
DC 3	1200	2	Houma	2	2	1.7	5.7
Aero Commander	NA	2	Houma	2	2	1.3	5.3

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	28	2	48
95' FRV	22885	249	NA	6	Galveston	2	0	2	12	1	17
95' FRV	22885	249	NA	6	Leeville	2	0	2	12	1	17
95' FRV	22885	249	NA	6	Vermilion	2	0	3	11	1	17
Boom Barge (CGA-300) 42" Auto Boom (25000')	NA	NA	1 Tug 50 Crew	4 (Barge) 2 (Per Crew)	Leeville	8	0	4	36	2	50
Enterprise Marine Services LLC (Available through contract with CGA)											
CTCo 2603	NA	25000	1 Tug	6	Amelia	13	0	6	28	1	48
CTCo 2607	NA	23000	1 Tug	6	Amelia	13	0	6	28	1	48
CTCo 2608	NA	23000	1 Tug	6	Amelia	13	0	6	28	1	48
CTCo 2609	NA	23000	1 Tug	6	Amelia	13	0	6	28	1	48
CTCo 5001	NA	47000	1 Tug	6	Amelia	13	0	6	28	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	3	21	6	54

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											
Mid-Ship SWS	22885	249	NA	4	Galveston	2	0	N/A	48	1	51
46' FRV	15257	65	NA	4	Lake Charles	2	0	2	2.5	1	7.5
Enterprise Marine Services LLC (Available through contract with CGA)											
CTCo 2604	NA	20000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 2605	NA	20000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 2606	NA	20000	1 Tug	6	Amelia	26	0	6	15	1	48

Staging Area: Cameron

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	5	2	1	12
SWS Egmopol	1810	100	NA	3	Morgan City	2	2	4.5	2	1	11.5
SWS Marco	3588	20	NA	3	Lake Charles	2	2	2	2	1	9
SWS Marco	3588	34	NA	3	Leeville	2	2	7	2	1	14
SWS Marco	3588	34	NA	3	Venice	2	2	9.5	2	1	16.5
Foilex Skim Package (TDS 150)	1131	50	1 Utility	3	Lake Charles	4	12	2	2	2	22
Foilex Skim Package (TDS 150)	1131	50	1 Utility	3	Galveston	4	12	5	2	2	25
Foilex Skim Package (TDS 150)	1131	50	1 Utility	3	Harvey	4	12	7	2	2	27
4 Drum Skimmer (Magnum 100)	680	100	1 Crew	3	Lake Charles	2	2	2	2	1	9
4 Drum Skimmer (Magnum 100)	680	100	1 Crew	3	Harvey	2	2	7	2	1	14
2 Drum Skimmer (TDS 118)	240	100	1 Crew	3	Lake Charles	2	2	2	2	1	9
2 Drum Skimmer (TDS 118)	240	100	1 Crew	3	Harvey	2	2	7	2	1	14

Staging Area: Cameron

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 MSA)									
34,050' 18" Boom	13 Crew	26	New Iberia, LA	2	2	3.5	2	12	21.5
12,850' 18" Boom	7 Crew	14	Chalmette, LA	2	2	7.5	2	6	19.5
900' 18" Boom	1 Crew	2	Morgan City, LA	2	2	5	2	2	13
30,000' 18" Boom	13 Crew	26	Harvey, LA	2	2	7.5	2	12	25.5
1,700' 18" Boom	2 Crew	4	Venice, LA	2	2	9	2	2	17
14,750' 18" Boom	7 Crew	14	Port Arthur, TX	2	2	1.5	2	6	13.5
OMI Environmental (available through MSA)									
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	4	2	3	11
3,500' 18" Boom	2 Crew	4	Port Arthur, TX	1	1	2	2	3	9
4,000' 18" Boom	2 Crew	4	Longview, TX	1	1	8	2	3	15
4,850' 18" Boom	2 Crew	4	Belle Chasse, LA	1	1	8	2	3	15
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	7	2	3	14
2,500' 18" Boom	1 Crew	2	Morgan City, LA	1	1	5	2	3	12
1,600' 18" Boom	1 Crew	2	Gonzalez, LA	1	1	8	2	3	15
1,900' 18" Boom	1 Crew	2	St. James, LA	1	1	6	2	3	13
2,000' 18" Boom	1 Crew	2	Galliano, LA	1	1	7	2	3	14
1,000' 18" Boom	1 Crew	2	St. Rose, LA	1	1	7	2	3	14
1,000' 18" Boom	1 Crew	2	Hackberry, LA	1	1	1	2	3	8
5,800' 18" Boom	3 Crew	6	Venice, LA	1	1	9	2	3	16
13,300' 18" Boom	6 Crew	12	Harvey, LA	1	1	7	2	3	14

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	7	1	2	14
Bird Scare Guns (24)	NA	NA	NA	2	Harvey	2	2	7	1	2	14
Bird Scare Guns (12)	NA	NA	NA	2	Galveston	2	2	5	1	2	12
Bird Scare Guns (12)	NA	NA	NA	2	Aransas Pass	2	2	9.5	1	2	16.5
Bird Scare Guns (48)	NA	NA	NA	2	Lake Charles	2	2	2	1	2	9
Bird Scare Guns (24)	NA	NA	NA	2	Leeville	2	2	7	1	2	14

Response Asset	Total
Offshore EDRC	144,940
Offshore Recovered Oil Capacity	145,747
Nearshore / Shallow Water EDRC	57,759
Nearshore / Shallow Water Recovered Oil Capacity	61,152

SECTION 9
ENVIRONMENTAL MONITORING INFORMATION

9.1 MONITORING SYSTEMS

LLOG subscribes to StormGeo Weather Service which provides access to real time weather conditions and provides periodic updates on impending inclement weather conditions in the Gulf of Mexico. LLOG also relies on the National Weather Service to support this service. LLOG closely coordinates activity with contractors and field personnel to ensure safety for evacuation to ensure protections of the environment and facility / equipment.

Company employees, contractors, and subcontractors are responsible for maintaining a vigilant watch for oil spill discharges. Any person who observes or becomes aware of an oil spill shall immediately report the incident to the person in charge of the facility. The Person in Charge must then immediately notify the "On Call" Qualified Individual/Incident Commander.

LLOG will monitor loop currents per the requirements set forth in NTL No. 2018-G01, "Ocean Current Monitoring."

9.2 INCIDENTAL TAKES

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

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

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

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

9.3 FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY

KC 686 is not located in the Flower Garden Banks National Marine Sanctuary; therefore, relevant information is not required in this EP.

SECTION 10
LEASE STIPULATIONS INFORMATION

Exploration activities are subject to the following stipulations attached to Lease OCS-G 33341, Keathley Canyon Block 686.

10.1 MARINE PROTECTED SPECIES

In accordance with the Federal Endangered Species Act and the Marine Mammal Protection Act, LLOG 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 11
ENVIRONMENTAL MITIGATION MEASURES INFORMATION

11.1 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.

11.2 INCIDENTAL TAKES

LLOG 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 12
SUPPORT VESSELS AND AIRCRAFT INFORMATION

12.1 GENERAL

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

Type	Maximum Fuel Tank Capacity	Maximum Number in Area at Any Time	Trip Frequency or Duration
Supply Boats	500 bbls	1	Six times weekly
Crew Boats	500 bbls	1	Three times weekly
Aircraft	279 gals	1	As Needed

12.2 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' OSV	1900 bbls	1 / weekly	Fourchon, LA to KC 686

12.3 DRILLING FLUID TRANSPORTATION

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

12.4 SOLID AND LIQUID WASTE TRANSPORTATION

Table 2, "Wastes You Will Transport and/or Dispose of Onshore," is included as **Attachment 12-A.**

12.5 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 12-B.**

Attachment 12-A

TABLE 2. WASTES YOU WILL TRANSPORT AND /OR DISPOSE OF ONSHORE

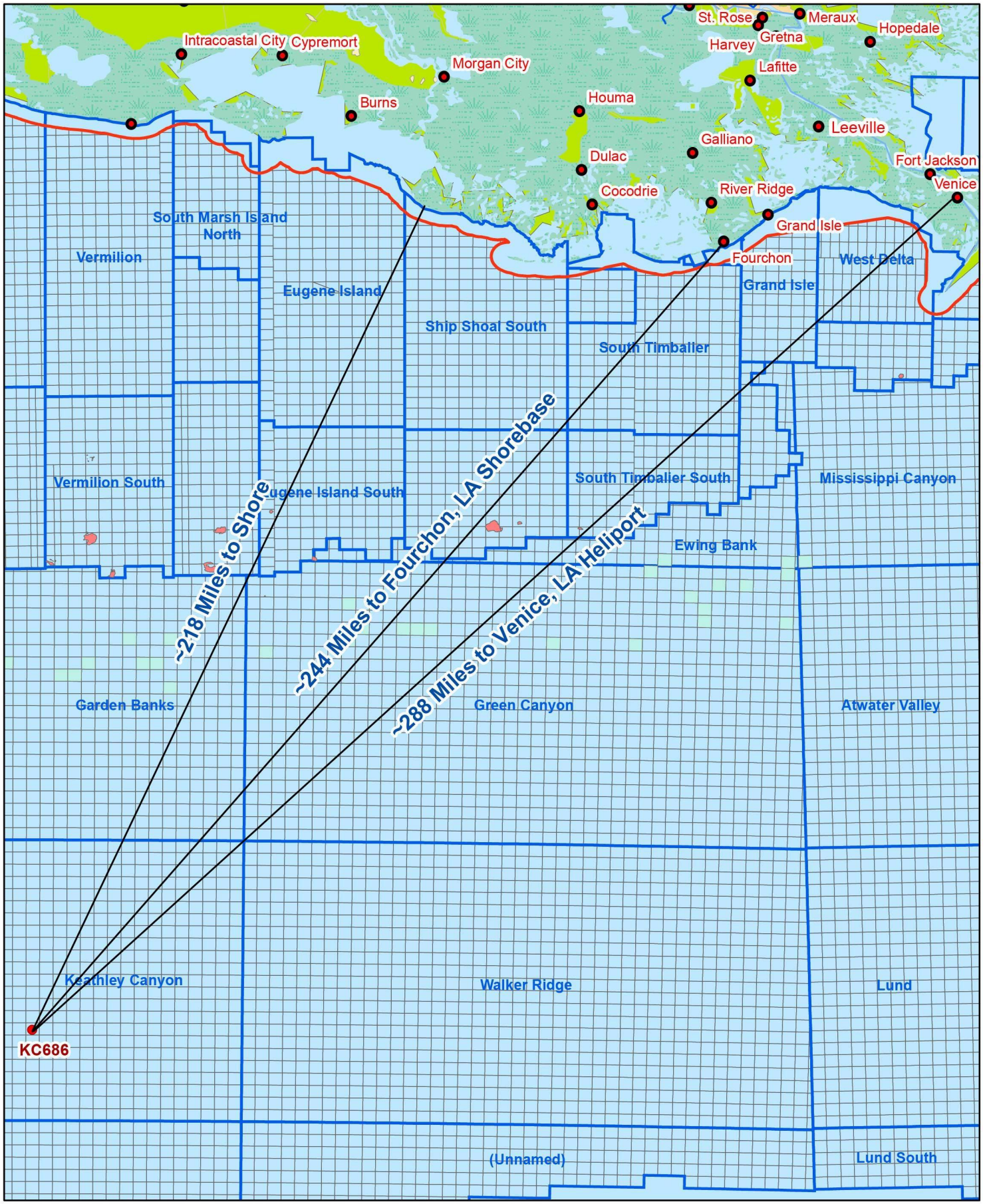
Please specify whatever the amount reported is a total or per well

KC 686	Projected generated waste	Solid and Liquid Wastses Transportation	Waste Disposal		
Type of Waste	**Composition**	**Transport Method**	**Name/Location of Facility**	**Amount**	**Disposal Method**
			Newport Environmental Services Inc., Ingleside, TX	*X bbl/well*	*Recycled*
Oil-based drilling fluid or mud	NA	NA	NA	NA	NA
Synthetic-based drilling fluid or mud	Internal olifin, ester nbased mud	Barged in 25 bbls cutting boxes and / or liquid mud tanks for supply vessels	Newpark Transfer Station, Fourchon, LA	6750 bbls / well	Recycled
Cuttings wetted with Water-based fluid	NA	NA	NA	NA	NA
Cuttings wetted with Synthetic-based fluid	NA	NA	NA	NA	NA
Cuttings wetted with oil-based fluids	NA	NA	NA	NA	NA
Will you produce hydrocarbons? If yes fill in for produced sand.					
Produced sand	NA	NA	NA	NA	NA
Will you have additional wastes that are not permitted for discharge? If					
EXAMPLE: trash and debris (recylables)	*Plastic, paper, aluminum*	*barged in a storage bin*	*ARC, New Iberia, LA*	*X lb/well*	*Recycled*
Trash and debris	Plastic, paper, aluminum	Barged in a storage bin	Blanchard Landfill, Golden Meadows, LA	4000 lbs / well	Recycled
Used oil	Spent oil from machinery	Barged in USCG approved transfer tote tanks.	L&L Services, Fourchon, LA	200 bbls / well	Recycled
Wash water	Wash water w/ SBM residue and surfactants	Barged in 25 bbls cutting boxes and / or liquid mud tanks for supply vessels	Newpark Transfer Station, Fourchon, LA	2000 bbls / well	Approved disposal well injection or land farm
Chemical product wastes	Spent treatment and / or damaged chemicals used in operations	Barged in 25 bbls cutting boxes and / or cutting boxes	L&L Services, Fourchon, LA	10 bbls / well	Recycled
NOTE: If you will not have a type of waste, enter NA in the row.					

Attachment 12-B

LLOG Exploration Offshore, L.L.C.

Vicinity Map
Keathley Canyon 686



SECTION 13
ONSHORE SUPPORT FACILITIES INFORMATION

13.1 GENERAL

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

Name	Location	Existing/New/Modified
LLOG c/o GIS Yard	Fourchon, Louisiana	Existing
Bristow-Venice Heliport	Venice, Louisiana	Existing

13.2 SUPPORT BASE CONSTRUCTION OR EXPANSION

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

13.3 SUPPORT BASE CONSTRUCTION OR EXPANSION TIMETABLE

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

13.4 WASTE DISPOSAL

The Table, "Wastes You Will Transport and/or Dispose of Onshore," is included as **Attachment 12-A.**

SECTION 14
COASTAL ZONE MANAGEMENT ACT (CZMA) INFORMATION

Coastal Zone Management certification is not required for activities proposed in this plan.

SECTION 15
ENVIRONMENTAL IMPACT ANALYSIS

The Environmental Impact Analysis is included as **Attachment 15-A.**

Attachment 15-A

LLOG Exploration Offshore, L.L.C. (LLOG)

Exploration Plan (Supplemental)
Keathley Canyon Block 686
OCS-G 33341

(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	
Fisheries		X			X	
Marine Mammals	X(8)	X			X(8)	X
Sea Turtles	X(8)	X			X(8)	X
Air quality	X(9)					
Shipwreck sites (known or potential)			(7)			
Prehistoric archaeological sites			(7)			
Vicinity of Offshore Location						
Essential fish habitat		X			X(6)	
Marine and pelagic birds					X	X
Public health and safety					(5)	
Coastal and Onshore						
Beaches					X(6)	X
Wetlands					X(6)	
Shore birds and coastal nesting birds					X6)	
Coastal wildlife refuges						
Wilderness areas						

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 Keathley Canyon Block 686

Proposed operations consist of the drilling, completion, testing and temporary abandonment of Well Location C in Keathley Canyon Block 686. The operations will be conducted with a DP drillship or DP semi-submersible.

1. Designated Topographic Features

Potential IPFs on topographic features include effluents and accidents.

Effluents: Keathley Canyon Block 686 is 101 miles from the closest designated Topographic Features Stipulation Block (Elvers Bank 101); 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 Repsol's Regional OSRP (refer to information submitted in **Section 8**).

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 impact topographic features.

2. Pinnacle Trend Area Live Bottoms

Potential IPFs on pinnacle trend area live bottoms include effluents and accidents.

Effluents: Keathley Canyon Block 686 is 325 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 Repsol's Regional OSRP (refer to information submitted in **Section 8**).

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 impact a live bottom (pinnacle trend) area.

3. Eastern Gulf Live Bottoms

Potential IPFs on Eastern Gulf live bottoms include effluents and accidents.

Effluents: Keathley Canyon Block 686 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 Repsol's Regional OSRP (refer to information submitted in **Section 8**).

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 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.

A DP drillship is being used for the proposed activities; therefore, only an insignificant amount of seafloor will be disturbed. Because physical disturbances to the seafloor will be minimized by the use of a DP drillship, Repsol's proposed operations in Keathley Canyon Block 686 would not cause impacts to benthic communities.

5. Water Quality

IPFs that could result in water quality degradation from the proposed operations in Keathley Canyon Block 686 include effluents and accidents.

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 Repsol's Regional Oil Spill Response Plan (refer to information submitted in **Section 8**).

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 Keathley Canyon Block 686 include effluents and accidents.

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 Repsol's Regional OSRP (refer to information submitted in **Section 8**).

There are no IPFs from emissions, physical disturbances to the seafloor 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 Keathley Canyon Block 686 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).

Repsol 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 Repsol 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 Repsol'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 Repsol's OSRP (refer to information submitted in accordance with **Section 8**).

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). Repsol 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 Repsol 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 Repsol's Regional Oil Spill Response Plan (refer to information submitted in accordance with **Section 8**).

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

9. Air Quality

The projected air emissions identified in **Section 7** are not expected to affect the OCS air quality primarily due to distance to the shore or to any Prevention of Significant Deterioration Class I air quality area such as the Breton Wilderness Area. Keathley Canyon Block 686 is beyond the 200 kilometer (124 mile) buffer for the Breton Wilderness Area and is 218 miles from the coastline. Therefore, no special mitigation, monitoring, or reporting requirements apply with respect to air emissions.

Accidents and blowouts can release hydrocarbons or chemicals, which could cause the emission of air pollutants. However, these releases would not impact onshore air quality because of the prevailing atmospheric conditions, emission height, emission rates, and the distance of Keathley Canyon Block 686 from the coastline. There are no other IPFs (including effluents, physical disturbances to the seafloor, wastes sent to shore for treatment or disposal) from the proposed activities which could impact air quality.

10. Shipwreck Sites (known or potential)

Potential IPFs that could impact known or unknown shipwreck sites as a result of the proposed operations in Keathley Canyon Block 686 include disturbances to the seafloor.

Physical disturbances to the seafloor: A DP drillship is being used for the proposed activities; therefore, only an insignificant amount of seafloor will be disturbed. Because physical disturbances to the seafloor will be minimized by the use of a DP drillship, Repsol's proposed operations in Keathley Canyon Block 686 would not cause impacts to shipwreck sites.

Additionally, Keathley Canyon Block 686 is not located in or adjacent to an OCS block designated by BOEM as having a high probability for occurrence of shipwrecks, therefore, no adverse impacts are expected.

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

11. Prehistoric Archaeological Sites

Potential IPFs that could cause impacts to prehistoric archaeological sites as a result of the proposed operations in Keathley Canyon Block 686 include disturbances to the seafloor.

Physical disturbances to the seafloor: A DP drillship is being used for the proposed activities; therefore, only an insignificant amount of seafloor will be disturbed. Because physical disturbances to the seafloor will be minimized by the use of a DP drillship, Repsol's proposed operations in Keathley Canyon Block 686 would not cause impacts to prehistoric archaeological sites.

Additionally, Keathley Canyon Block 686 is located outside the Archaeological Prehistoric high probability line, therefore, no adverse impacts are expected.

There are no other IPFs (including emissions, effluents, wastes sent to shore for treatment or disposal, or accidents) from the proposed activities which could impact prehistoric archeological 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 Keathley Canyon Block 686 include effluents and accidents. EFH includes all estuarine and marine waters and substrates in the Gulf of Mexico.

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 Repsol's Regional OSRP (refer to information submitted in **Section 8**).

There are no other IPFs (including emissions, physical disturbances to the seafloor and 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 Repsol's Regional OSRP (refer to information submitted in **Section 8**).

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). Repsol 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 Repsol 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 H_2S release) 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 **Section 4** 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 distance from shore (218 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 Repsol's Regional OSRP (refer to information submitted in **Section 8**).

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). Repsol 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 Repsol 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

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

Accidents: 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 (218 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Repsol's Regional OSRP (refer to information submitted in **Section 8**).

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). Repsol 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 Repsol 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 wetlands.

3. Shore Birds and Coastal Nesting Birds

Accidents: Oil spills could cause impacts to shore birds and coastal nesting birds. However, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Given the distance from shore (218 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Repsol's Regional OSRP (refer to information submitted in **Section 8**).

Discarded trash and debris: Coastal and marine birds are highly susceptible to entanglement in floating, submerged, and beached marine debris: specifically plastics. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA). Repsol 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 Repsol 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

Accidents: An accidental oil spill from the proposed activities could cause impacts to coastal wildlife refuges. However, it is unlikely that an oil spill would occur from the proposed activities (refer to Item 5, Water Quality). Due to the distance from shore (218 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Repsol's Regional OSRP (refer to information submitted in **Section 8**).

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). Repsol 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 Repsol 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.

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 (302 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 Repsol's Regional OSRP (refer to information submitted in **Section 8).**

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). Repsol 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 Repsol 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, Keathley Canyon Block 686 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. Structure Installation
   Operator will not conduct structure 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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Vermeer, K. and R. Vermeer, 1975 Oil threat to birds on the Canadian west coast. The Canadian Field-Naturalist. 89:278-298.

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

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

SECTION 16
ADMINISTRATIVE INFORMATION

16.1 EXEMPTED INFORMATION DESCRIPTION

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

16.2 BIBLIOGRAPHY

1. Initial Exploration Plan (Control No. N-9559).
2. Revised Exploration Plan (Control No. R-5964).
3. Revised Exploration Plan (Control No. R-6311).
4. Revised Exploration Plan (Control No. R-6763).
5. Gardline Shallow Hazard Survey for Keathley Canyon Blocks 642, 643, 686 and 687 (Report No. 8446) dated July 2010.