UNITED STATES GOVERNMENT December 3, 2019
MEMORANDUM

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

Subject: Public Information Copy of Plan

Control #	-	N-10087
Type	-	Exploration Plan
Lease(s)	-	OCS-G 35893 – 21 Walker Ridge Area
Operator	-	LLOG Exploration Offshore, LLC
Description	-	Subsea Wells A, A Alt, and B

Attached is a copy of the subject plan.

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

Laura Christensen, Esq.
Plan Coordinator
Office of Leasing and Plans

LLOG EXPLORATION OFFSHORE, L.L.C.
1001 Ochsner Boulevard, Suite 100
Covington, Louisiana 70433

INITIAL EXPLORATION PLAN

OCS-G 35893 LEASE

WALKER RIDGE BLOCK 21

PUBLIC INFORMATION COPY

Prepared By:

Sue Sachitana
Regulatory Specialist
LLOG Exploration Offshore, L.L.C.
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Sue.Sachitana@llog.com

Date: October 3, 2019

Initial Exploration Plan
Plan N-10087
Walker Ridge Block 21

OCS-G-35893 Lease

FINAL AMENDED COPY

RECORD OF CHANGES

DATE	SECTION-PAGE	BRIEF SYMOPSIS
October 15, 2019	Section A, Attachment A-3	Bathymetry Maps
November 18, 2019	FINAL AMENDED COPY	

APPENDIX A
PLAN CONTENTS
(30 CFR Part 550.211 and 550.241)

A. Plan information

In accordance with 30 CFR 550.211 and 550.241(a), NTL No. 2008-G04 and NTL 2015-N01, LLOG Exploration Offshore, LLC (LLOG) proposes the drilling, completion, testing and installation of subsea wellhead and/or manifold for one (1) proposed surface location and (2) bottom hole locations (A and B) on Lease OCS-G-35893, Walker Ridge Block 21. *One (1) alternate well location (A Alt) included are proposed as a mirror locations of Well "A" and are intended as re-spud locations only to* be used if necessary.

Included as ***Attachment A-1*** is Form BOEM 137 "OCS Plan Information Form", which provides for the drilling, sub-sea completion and testing of all well locations.

B. Location

Attachment A-2 *– Well Location Plat*
Attachment A-3 *– Bathymetry Map – Seafloor disturbance area*

C. Safety & Pollution Features

LLOG will utilize a Drillship or a DP semi-submersible drilling rig for the proposed operations. A description of the drilling units is included on the OCS Plans Information Form. Rig specifications will be made part of the Application for Permit to Drill.

Safety features on the drilling unit will include well control, pollution prevention, and blowout prevention equipment as described in Title 30 CFR Part 250, Subparts C, D, E and G; and further clarified by BOEM's Notices to Lessees, and currently policy making invoked by BOEM, EPA and USCG. Appropriate life rafts, life jackets, ring buoys, etc., will be maintained on the facility at all times.

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

D. Storage Tanks and Vessels

The following table details 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 (bbls)	Number of tanks	Total Capacity (bbls)	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 Settleing 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

Type of Storage Tank	Type of Facility	Tank Capacity (bbls)	Number of tanks	Total Capacity (bbls)	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

E. Pollution Prevention Measures:

Not applicable. The State of Florida is not an affected State by the proposed activities in this plan.

F. Additional measures:

LLOG does not propose any additional safety, pollution prevention, or early detection measures, beyond those required in 30 CFR 250 and per December 13, 2010 – Guidance for Deepwater Drillers to Comply with Strengthened Safety and Environmental Standards.

OCS Plan Information Form

Attachment A-1
(Proprietary Information)

Initial Exploration Plan
OCS-G-35893 Lease
Walker Ridge Block 21

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

OMB Control Number: 1010-0151
OMB Approval Expires: 12/31/18

OCS PLAN INFORMATION FORM

General Information

Type of OCS Plan:		Exploration Plan (EP)		Development Operations Coordination Document (DOCD)	
	X	INITIAL			

Company Name: LLOG EXPLORATION OFFSHORE L.L.C.	BOEM Operator Number: 02058
Address:	Contact Person: SUE SACHITANA
1001 OCHSNER BOULEVARD	Phone Number: 985-801-4300
COVINGTON, LA 70433	E-Mail Address: sue.sachitana@llog.com

If a service fee is required under 30 CFR 550.125(a), provide the	Amount paid		Receipt No.	

Project and Worst Case Discharge (WCD) Information

Lease(s): OCS-G 35893	Area: WR	Block(s): 21	Project Name (If Applicable): MELISANDRE

Objective(s)	X	Oil		Gas		Sulphur		Salt	Onshore Support Base(s): FOURCHON

Platform/Well Name: Loc B	Total Volume of WCD: 289,264 BOPD	API Gravity: 33°
Distance to Closest Land (Miles): 145	Volume from uncontrolled blowout: 289,264 BOPD	

Have you previously provided information to verify the calculations and assumptions for your WCD?		Yes	X	No
If so, provide the Control Number of the EP or DOCD with which this information was provided				
Do you propose to use new or unusual technology to conduct your activities?		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
Exploration drilling			SEE ATTACHED
Development drilling			SCHEDULE OF ACITIVITES
Well completion			
Well test flaring (for more than 48 hours)			
Installation or modification of structure			
Installation of production facilities			
Installation of subsea wellheads and/or manifolds			
Installation of lease term pipelines			
Commence production			
Other (Specify and attach description)			

Description of Drilling Rig

	Jackup	X	Drillship		Caisson		Tension leg platform
	Gorilla Jackup		Platform rig		Fixed platform		Compliant tower
	Semisubmersible		Submersible		Spar		Guyed tower
X	DP Semisubmersible		Other (Attach Description)		Floating production system		Other (Attach Description)

Drilling Rig Name (If Known):

Description of Structure

Description of Lease Term Pipelines

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

OCS PLAN INFORMATION FORM (CONTINUED)

Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): Loc. A					Previously reviewed under an approved EP or DOCD?		Yes	X	No
Is this an existing well or structure?		Yes		No X	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): 289,264 BOPD	For structures, volume of all storage and pipelines (Bbls):	API Gravity of fluid 33°	
	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**	
Lease No.	OCS G 35893	OCS	OCS OCS	
Area Name	Walker Ridge			
Block No.	21			
Blockline Departures (in feet)	N/S Departure: F S L 5,138.65'	N/S Departure: F___ L	N/S Departure: F___ L N/S Departure: F___ L N/S Departure: F___ L	
	E/W Departure: F E L 7,078.89'	E/W Departure: F___ L	E/W Departure: F___ L E/W Departure: F___ L E/W Departure: F___ L	
Lambert X-Y coordinates	X: 2,321,401.11	X:	X: X: X:	
	Y: 9,778,418.65	Y:	Y: Y: Y:	
Latitude/ Longitude	Latitude 26° 55' 55.709" N	Latitude	Latitude Latitude Latitude	
	Longitude 90° 54' 34.215" W	Longitude	Longitude Longitude Longitude	
Water Depth (Feet): 6,209'		MD (Feet):	TVD (Feet):	MD (Feet): TVD (Feet): MD (Feet): TVD (Feet): MD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet:				

Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)

Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): Loc. A Alt					Previously reviewed under an approved EP or DOCD?		Yes	X	No
Is this an existing well or structure?		Yes		No X	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): 289,264 BOPD				For structures, volume of all storage and pipelines (Bbls):		API Gravity of fluid 33°		

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS G 35893	OCS	OCS OCS
Area Name	Walker Ridge		
Block No.	21		
Blockline Departures (in feet)	N/S Departure: F S L 5,088.65'	N/S Departure: F___ L	N/S Departure: F___ L N/S Departure: F___ L N/S Departure: F___ L
	E/W Departure: F E L 7,078.89'	E/W Departure: F___ L	E/W Departure: F___ L E/W Departure: F___ L E/W Departure: F___ L
Lambert X-Y coordinates	X: 2,321,401.11	X:	X: X: X:
	Y: 9,778,368.65	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude 26° 55' 55.214" N	Latitude	Latitude Latitude Latitude
	Longitude 90° 54' 34.224" W	Longitude	Longitude Longitude Longitude
Water Depth (Feet): 6,208'		MD (Feet): / TVD (Feet):	MD (Feet): / TVD (Feet): MD (Feet): / TVD (Feet): MD (Feet): / TVD (Feet):
Anchor Radius (if applicable) in feet:			

Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)

Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

OCS PLAN INFORMATION FORM (CONTINUED)

Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): Loc. B					Previously reviewed under an approved EP or DOCD?		Yes	X	No
Is this an existing well or structure?		Yes		No X	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): 289,264 BOPD				For structures, volume of all storage and pipelines (Bbls):		API Gravity of fluid 33°		

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS G 35893	OCS	OCS OCS
Area Name	Walker Ridge		
Block No.	21		
Blockline Departures (in feet)	N/S Departure: F S___ L 5,138.65'	N/S Departure: F___ L	N/S Departure: F___ L N/S Departure: F___ L N/S Departure: F___ L
	E/W Departure: F E___ L 7,078.89'	E/W Departure: F___ L	E/W Departure: F___ L E/W Departure: F___ L E/W Departure: F___ L
Lambert X-Y coordinates	X: 2,321,401.11	X:	X: X: X:
	Y: 9,778,418.65	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude 26° 55' 55.709" N	Latitude	Latitude Latitude Latitude
	Longitude 90° 54' 34.215" W	Longitude	Longitude Longitude Longitude
Water Depth (Feet): 6,209'		MD (Feet): / TVD (Feet):	MD (Feet): / TVD (Feet): MD (Feet): / TVD (Feet): MD (Feet): / TVD (Feet):
Anchor Radius (if applicable) in feet:			

Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)

Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

Proposed Schedule of Activities

WELL / EVENT	SPUD	TD	COMPL START	COMPL FINISH	DESCRIPTION
WR 21 "B"	1-Apr-20	28-May-20	24-Jun-21	3-Aug-21	Drill, TA, Complete
WR 21 "A"	28-May-20	23-Jul-20	15-May-21	24-Jun-21	Drill, TA, Complete

Well Location Plats

Attachment A-2
(Proprietary Information)

Y = 9,789,120.00

PROPOSED WELL LOCATIONS

LOCATION	BLOCK	CALLS		COORDINATES		LATITUDE	LONGITUDE	WD		
'A' (SL)	WR/21	7,078.89' FEL	5,138.65' FSL	X = 2,321,401.11	Y = 9,778,418.65	26° 55' 55.709"N	90° 54' 34.215"W	6,209'		
'A' ALT(SL)	WR/21	7,078.89' FEL	5,088.65' FSL	X = 2,321,401.11	Y = 9,778,368.65	26° 55' 55.214"N	90° 54' 34.224"W	6,208'		
'B' (SL)	WR/21	7,078.89' FEL	5,138.65' FSL	X = 2,321,401.11	Y = 9,778,418.65	26° 55' 55.709"N	90° 54' 34.215"W	6,209'		

WR 21
OCS-G 35893
LLOG EXPLORATION OFFSHORE L.L.C.

X = 2,312,640.00

X = 2,328,480.00

'A' , 'A' ALT & 'B'(SL)

1,000 0 1,000 2,000
SCALE IN FEET

Y = 9,773,280.00

SHEET 1 OF 1
PUBLIC INFORMATION

DATUM: NAD 27
SPHEROID: CLARKE 1866
PROJECTION: U.T.M.
ZONE: 15

Echo OFFSHORE LLC
36499 Perkins Road
Prairieville, Louisiana 70769
Tel: 225-673-2163

LLOG EXPLORATION OFFSHORE, L.L.C.

LLOG exploration

EXPLORATION PLAT

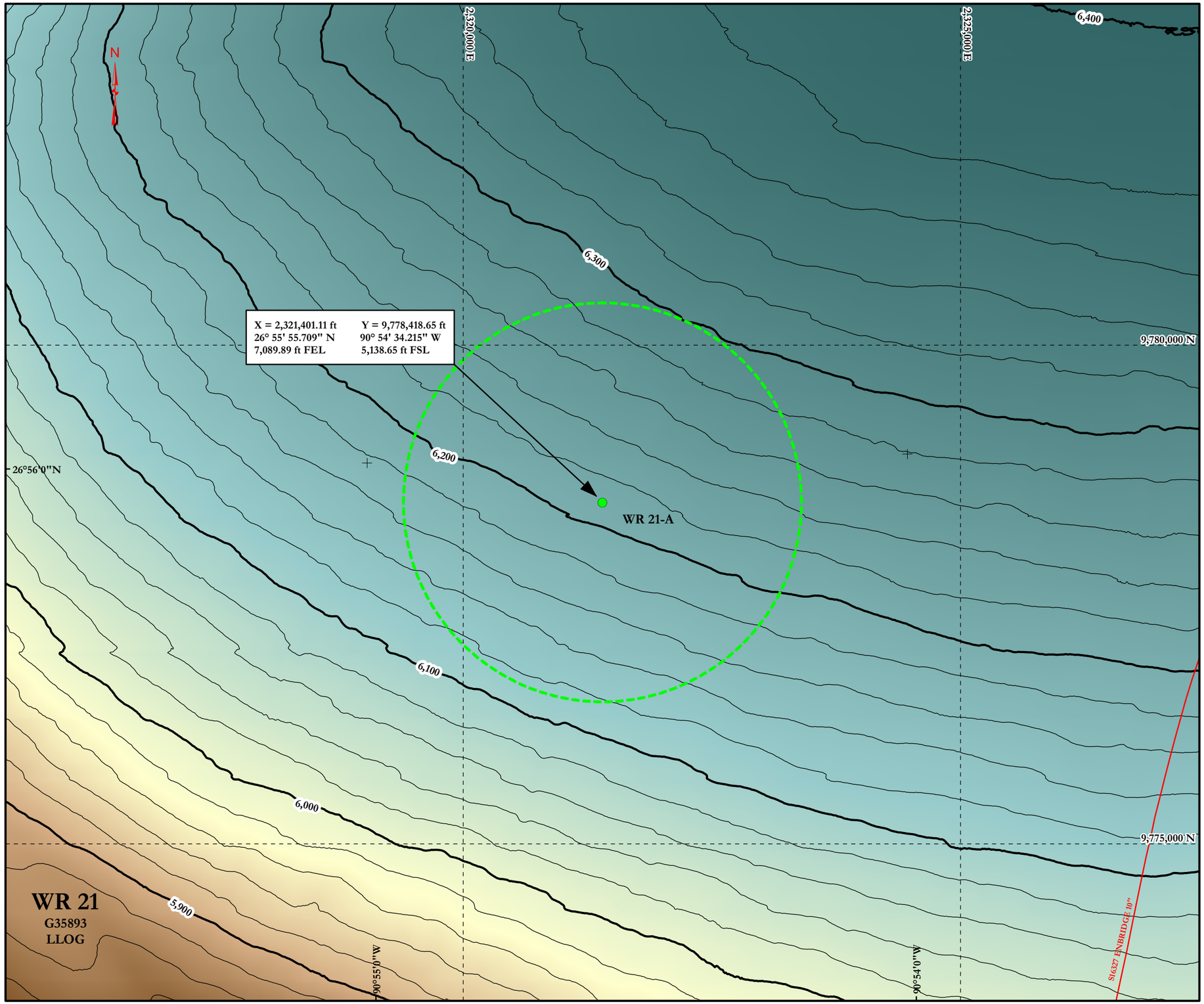
PROPOSED WELLS 'A', 'A' ALT & 'B'
OCS-G 35893 BLOCK 21
WALKER RIDGE AREA

GULF OF MEXICO

DRAWN BY:	DATE:	CHECKED BY:	DRAWING No.:
JFL	09/04/2019	RJN	18-013 EXP
REV. DATE:	REV. No.:	SCALE:	JOB No.:
		1"=2,000'	18-013-41

Bathymetry Map

Attachment A-3
(Public Information)



Legend

- Lat/Long Grid Points
- UTM Northing and Easting Grid Lines
- Gas Pipeline, Active
- Proposed Well
- 2,000-ft Radius Circle
- 20-ft Contour
- 100-ft Contour

Depths
(Below Sea Level)

5,827 ft

6,402 ft

Grid Information:
Data Source: AUV Multibeam
Method: Kriging
Spacing: 10 ft
Search Radius: 30 ft

IMPORTANT NOTICE
This map is not intended for navigation purposes.
Public information obtained from BOEM database (August 2019).

Geodetic Datum: NAD27
Projection: UTM
Zone: 15N
Grid Units: Feet

Interpretation By: J. Keenan
Cartography: T. Nguyen
Project No.: 18-05-15
Date: August 2019

0 500 1,000 1,500 2,000 Feet

Scale =1:12,000

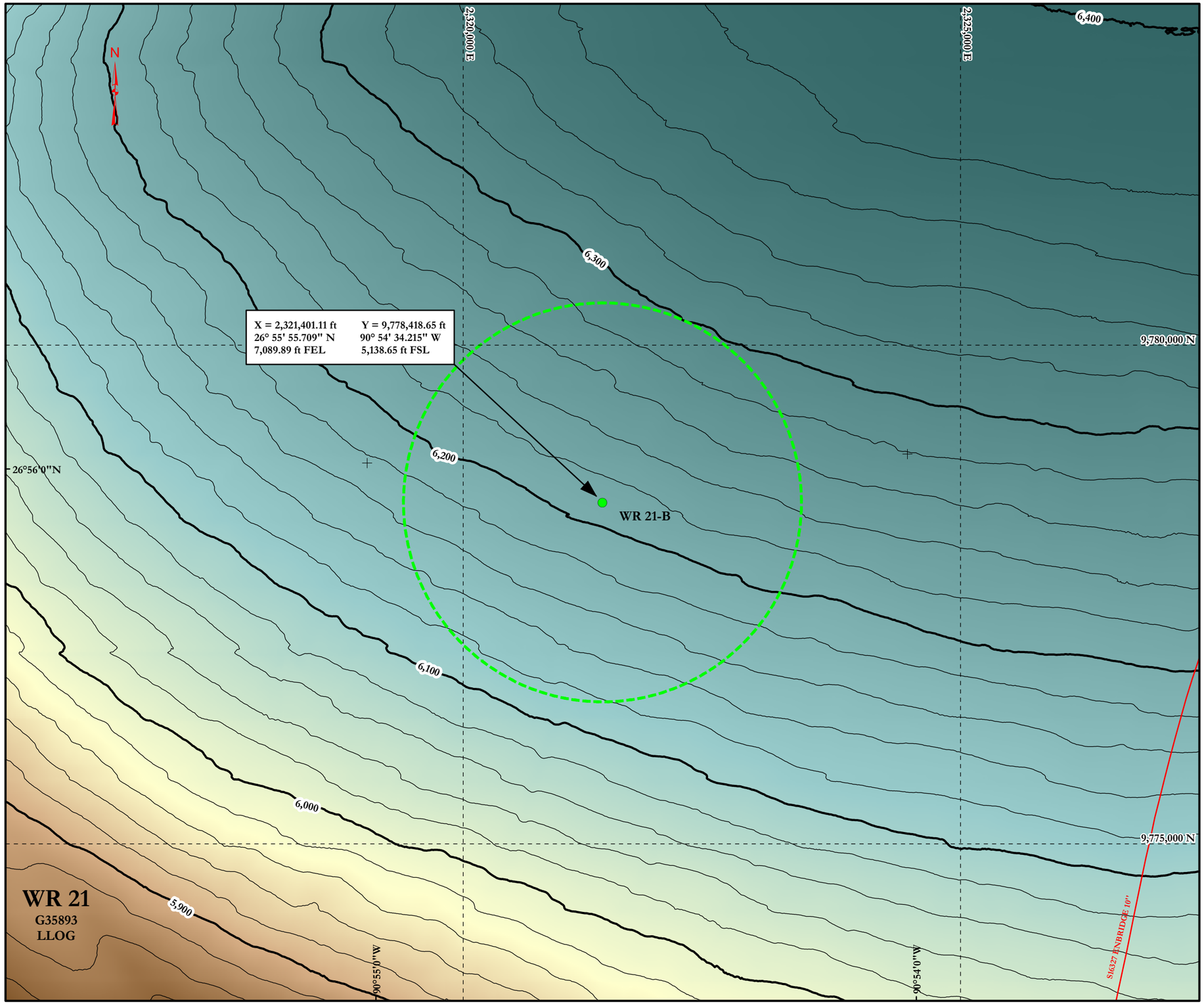
LLOG exploration

Block 21
Walker Ridge Area
Gulf of Mexico

Map W-1
Bathymetry
Proposed Well WR 21-A
Lease No. G35893

Map Prepared by:
Berger Geosciences, LLC.

B-geO



Legend

- Lat/Long Grid Points
- UTM Northing and Easting Grid Lines
- Proposed Well
- Gas Pipeline, Active
- 2,000-ft Radius Circle
- 20-ft Contour
- 100-ft Contour

Depths
(Below Sea Level)

5,827 ft

6,402 ft

Grid Information:
Data Source: AUV Multibeam
Method: Kriging
Spacing: 10 ft
Search Radius: 30 ft

IMPORTANT NOTICE
This map is not intended for navigation purposes.
Public information obtained from BOEM database (August 2019).

Geodetic Datum: NAD27
Projection: UTM
Zone: 15N
Grid Units: Feet

Interpretation By: J. Keenan
Cartography: T. Nguyen
Project No.: 18-05-15
Date: August 2019

0 500 1,000 1,500 2,000 Feet

Scale =1:12,000

LLOG exploration

Block 21
Walker Ridge Area
Gulf of Mexico

Map W-2
Bathymetry
Proposed Well WR 21-B
Lease No. G35893

Map Prepared by:
Berger Geosciences, LLC.

B-geO

APPENDIX B
GENERAL INFORMATION
(30 CFR Part 550.213 and 550.243)

A. Applications and Permits

There are no Federal/State applications to be submitted for the activities provided for in this Plan (exclusive to BOEM permit applications and general permits issued by the EPA and COE)

Application/Permit	Issuing Agency	Status
LA Consistency	LA Coastal Zone Management	Pending
APD/APM	BSEE	To be filed

B. Drilling Fluids

Type of Drilling Fluid	Estimated Volume of Drilling Fluid to be used per Well
Water Based (seawater, freshwater, barite)	**See Appendix F, Table 1 of this Plan**
Oil–based (diesel, mineral oil)	**N/A**
Synthetic-based (internal olefin, ester)	**See Appendix F, Table 2 of this Plan**

C. New Or Unusual Technology

LLOG does not propose using any new and/or unusual technology for the operations proposed in this Initial Plan.

D. Bonding Statement

The bond requirements for the activities and facilities proposed in this Initial Exploration Plan are satisfied by an area wide bond, furnished and maintained according to 30 CFR Part 256; subpart I; NTL No. 2000-G16, "Guidelines for General Lease Surety Bonds," and additional security under 30 CFR 256.53(d) and NTL No. 2003-N06 "Supplemental Bond Procedures."

E. Oil Spill Responsibility (OSFR)

LLOG Exploration Offshore, L.L.C (MMS Co. No. 02058) will demonstrate oil spill financial responsibility for the facilities proposed in this Initial EP according to 30 CFR Part 553, and NTL No. 2008-N05 "Guidelines for Oil Spill Financial Responsibility (OSFR) for Covered Facilities."

F. Deepwater Well Control Statement

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

G. Blowout Scenario

See the following Worst Case Discharge Calculations (Proprietary) – ***Attachment B-1*** and Blowout Scenario, including Site Specific Proposed Relief Well and Intervention Planning and Relief Well Response Time Estimate (Public Information) - ***Attachment B-2.***

NTL 2015-N01 Data

Worst Case Discharge Calculations
Attachment B-1

(Proprietary Information)

NTL 2015-N01 Data

Blowout Scenario

Attachment B-2
(Public Information)

Initial Exploration Plan
OCS-G-35893 Lease
Walker Ridge Block 21

BLOWOUT SCENARIO

Pursuant with 30 CFR 550.213(g), 550.219, 550,250 and NTL 2015-N01 the following attachment provides a blowout scenario description, information regarding any oil spill, WCD results and assumptions of potential spill and additional measures taken to firstly enhance the ability to prevent a blowout and secondly to manage a blowout scenario if it occurred.

INFORMATION REQUIREMENTS

PROPOSED PROSPECT INFORMATION

Well Surface Location	WD	X (NAD 27)	Y (NAD 27)	Latitude	Longitude
WR 21 "B" OCS-G-35893	6209	2,321,401	9,778,419'	26° 55' 55.709"	90° 54' 34.215"

INFORMATION REQUIREMENTS

A) Blowout scenario

The WR 21 "B" well to be drilled to potential outlined in the Geological and Geophysical Information Section of this plan utilizing a typical subsea wellhead system, conductor, surface and intermediate casing strings and a MODU rig with marine riser and a subsea BOP system. A hydrocarbon influx and a well control event occurring from the objective sand is modeled with no drill pipe or obstructions in the wellbore followed by a failure of the subsea BOP's and loss of well control at the seabed. The simulated flow and worst case discharge (WCD) results for all wells are calculated and the highest WCD is used for this unrestricted blowout scenario.

B) Estimated flow rate of the potential blowout

Category	Initial EP
Type of Activity	Drilling
Facility Location (area / block)	WR 21 (surface location)
Facility Designation	MODU
Distance to Nearest Shoreline (nautical miles)	~126
Uncontrolled Blowout (Volume per day)	**289,264** bbls (max. est. - Merlin®) (see attached)
Type of Fluid	Crude (33.0 API oil)

C) Total volume and maximum duration of the potential blowout

Duration of Flow (days)	**73** days total (see Relief Well Response Estimate below)
Total Volume of Spill (bbls)	**~15.192** MMBO based on **73** days of uncontrolled flow based on simulator models (Merlin®)

D) Assumptions and calculations used in determining the worst case discharge

Submitted as Attachment B-1 in the Proprietary Copy of this Plan - Omitted from Public Information Copies

E) Potential for the well to bridge over

Mechanical failure/collapse of the borehole in a blowout scenario is influenced by several factors including in-situ stress, rock strength and fluid velocities at the sand face. Given the substantial fluid velocities inherent in the WCD, and the scenario as defined where the formation is not supported by a cased and cemented wellbore, it is possible that the borehole may fall/collapse/bridge over within a span of a few days, significantly reducing the outflow of the rates. For this blowout scenario, no bridging is considered.

F) Likelihood for intervention to stop blowout

The likelihood of surface intervention to stop a blowout is based on some of the following equipment specific to potential MODU's to be contracted for this well. It is reasonable to assume that the sooner you are able to respond to the initial blowout, the better likelihood there is to control and contain the event due to reduced pressures at the wellhead, less exposure of well fluids to erode and compromise the well control equipment, and less exposure of hydrocarbons to the surface to safeguard personnel and equipment in an emergency situation. This equipment includes:

- Secondary Acoustic BOP Control System – based on specific rig contracted for work, BOP's possibly available with active secondary acoustic controls for specific BOP functions. This system has the ability to communicate and function specific BOP controls from the surface in the event of a failure of the primary umbilical control system. This system typically can establish BOP controls from the surface acoustic system package on the rig or by deploying a second acoustic package from a separate vessel of opportunity. This system may not be included on all MODU's presently in GOM. This system is typically configured to function the following:

  - Blind/shear ram close
  - Pipe ram close
  - LMRP disconnect

- ROV Intervention BOP Control System – includes one or more ROV intervention panels mounted on the subsea BOP's located on the seabed allows a ROV utilizing standard ROV stabs to access and function the specific BOP controls. These functions will be tested at the surface as part of the required BOP stump test and selectively at the seafloor to ensure proper functionality. These function include the following (at a minimum):

  - Blind/shear ram close
  - Pipe ram close
  - LMRP disconnect
  - WH disconnect

- Deadman / Autoshear function – typically fitted on DP MODU's and but to be on all MODU's operating in the GOM according to new requirements, this equipment allows for an automated pre-programmed sequence of functions to close the casing shear rams and the blind/shear rams in the event of an inadvertent or emergency disconnect of the LMRP or loss of both hydraulic and electrical supply from the surface control system.

In the event that the intervention systems for the subsea BOP's fail, LLOG will initiate call out of a secondary containment / surface intervention system supported by the Helix Well Containment Group (HWCG) of which LLOG is a member. This system incorporates a capping stack capable of being deployed from the back of a vessel of opportunity equipped with an ROV or from the Helix Q4000 DP

MODU. Based on the potential integrity concerns of the well, a "cap and flow" system can be deployed which may include the HWCG single vessel solution utilizing the PTS processing module capable of handling up to 130,000 BOPD flowback. The vertical intervention work is contingent upon the condition of the blowing out well and what equipment is intact to access the wellbore for kill or containment operations. The available intervention equipment may also require modifications based on actual wellbore conditions. Standard equipment is available through the Helix Deepwater Containment System to fit the wellhead and BOP stack profiles used for the drilling of the above mentioned well.

G) Availability of rig to drill relief well, rig constraints and timing of rigs

LLOG currently has one deepwater MODU under contract (Seadrill West Neptune DP drillship). In the event of a blowout scenario that does not involve loss or damage to the rig such as an inadvertent disconnect of the BOP's, then the existing contracted rig may be available for drilling the relief well and vertical intervention work. If the blowout scenario involves damage to the rig or loss of the BOP's and riser, a replacement rig or rigs will be required.

With the current activity level in the GOM, 20 deepwater MODU'S are potentially available to support the relief well drilling operations. Rig share and resource sharing agreements are in place between members of the Helix Well Containment Group. The ability to negotiate and contract an appropriate rig or rigs to drill relief wells is highly probable in a short period of time. If the rig or rigs are operating, the time to properly secure the well and mobe the rig to the relief well site location is estimated to be about 14 to 21 days. Dynamically positioned (DP) MODU's would be the preferred option due to the logistical advantage versus a moored MODU which may add complications due to the mooring spread.

VESSELS OF OPPORTUNITY

Based on the water depth restrictions for the proposed locations the following "Vessels of Opportunity" are presently available for utilization for intervention and containment and relief well operations. These may include service vessels and drilling rigs capable of working in the potential water depths and may include moored vessels and dynamically positioned vessels. The specific conditions of the intervention or relief well operations will dictate the "best fit" vessel to efficiently perform the desired results based on the blowout scenario. The list included below illustrates specific option that may vary according to the actual timing / availability at the time the vessels are needed.

OPERATION	SPECIFIC VESSEL OF OPPORTUNITY
Intervention and Containment	• Helix Q4000 (DP Semi) • HWCG PTS Well Test Skid (Single Vessel Solution)
Relief Well Drilling Rigs	• Seadrill West Neptune (DP Drillship) • Sevan LA (DP Semi) • Ensco 8500 or similar (DP Semi) • Rowan Resolute (DP Drillship)
ROV / Multi-Purpose Service Vessels	• Oceaneering (numerous DP ROV vessels) • HOS Achiever, Iron Horse 1 and 2 (DP MPSV) • Helix Pipe Lay Vessel (equipped w/ 6" PL – 75,000') • Other ROV Vessels – (Chouest, HOS, Fugro, Subsea 7)
Shuttle Tanker / Barge Support	• OSG Ship Management

H) Measures taken to enhance ability to prevent blowout

Pursuant to BOEM-2010-034 Final Interim Rules, measures to enhance the ability to prevent or reduce the likelihood of a blowout are largely based on proper planning and communication, identification of potential hazards, training and experience of personnel, use of good oil field practices and proper equipment that is properly maintained and inspected for executing drilling operations of the proposed well or wells to be drilled.

When planning and designing the well, ample time is spent analyzing offset data, performing any needed earth modeling and identifying any potential drilling hazards or well specific conditions to safeguard the safety of the crews when well construction operations are underway. Once the design criteria and well design is established, the well design is modeled for the lifecycle of the wellbore to ensure potential failure modes are eliminated. Pursuant to BOEM-2010-0034 Interim Final Rules implemented additional considerations of a minimum of 2 independent barriers for both internal and external flow paths in addition to proper positive and negative testing of the barriers.

The proper training of crew members and awareness to identify and handle well control event is the best way prevent a blowout incident. Contractor's personnel and service personnel training requirements are verified per regulatory requirements per guidelines issued in BOEM-2010-034 Interim Final Rules. Drills are performed frequently to verify crew training and improve reaction times.

Good communication between rig personnel, office support personnel is critical to the success of the operations. Pre-spud meetings are conducted with rig crews and service providers to discuss, inform and as needed improve operations and well plans for safety and efficiency considerations. Daily meetings are conducted to discuss planning and potential hazards to ensure state of preparedness and behavior is enforced to create an informed and safe culture for the operations. Any changes in the planning and initial wellbore design is incorporated and communicated in a Management of Change (MOC) process to ensure continuity for all personnel.

Use of established good oil field practices that safeguard crews and equipment are integrated to incorporate LLOG's, the contractor and service provider policies.

Additional personnel and equipment will be used as needed to elevate awareness and provide real time monitoring of well conditions while drilling such as MWD/LWD/PWD tools used in the bottom hole assemblies. The tool configuration for each open hole section varies to optimize information gathered including the use of Formation-Pressure-While-Drilling (FPWD) tools to establish real time formation pressures and to be used to calibrates pore pressure models while drilling. Log information and pressure data is used by the drilling engineers, geologist and pore pressure engineers to maintain well control and reduced potential events such as well control events and loss circulation events.

Mud loggers continuously monitor return drilling fluids, drill gas levels and cuttings as well as surface mud volumes and flow rates, rate of penetration and lithology/paleo to aid in understanding trends and geology being drilled. Remote monitoring of real time drilling parameters and evaluation of geologic markers and pore pressure indicators is used to identify potential well condition changes.

Proper equipment maintenance and inspection program for same to before the equipment is required. Programmed equipment inspections and maintenance will be performed to ensure the equipment operability and condition. Operations will cease as needed in order to ensure equipment and well conditions are maintained and controlled for the safety of personnel, rig and subsurface equipment and the environment.

I) Measures to conduct effective and early intervention in the event of a blowout

In conjunction with the LLOG Exploration's "Well Control Emergency Response Plan" and as required by NTL 2010-N06, the following is provided to demonstrate the potential time needed for performing secondary intervention and drilling of a relief well to handle potential worst case discharge for the proposed prospect. Specific plans are integrated into the Helix Well Containment Groups procures to be approved and submitted with the Application for Permit to Drill. Equipment availability, backup equipment and adaptability to the potential scenarios will need to be addressed based on the initial site assessment of the seafloor conditions for intervention operations. Relief well equipment such as backup wellhead equipment and tubulars will be available in LLOG's inventory for immediate deployment as needed to address drilling the relief well(s).

SITE SPECIFIC PROPOSED RELIEF WELL AND INTERVENTION PLANNING

No platform was considered for drilling relief wells for this location due to location, water depth and lack of appropriate platform within the area. For this reason a moored or DP MODU will be preferred / required.

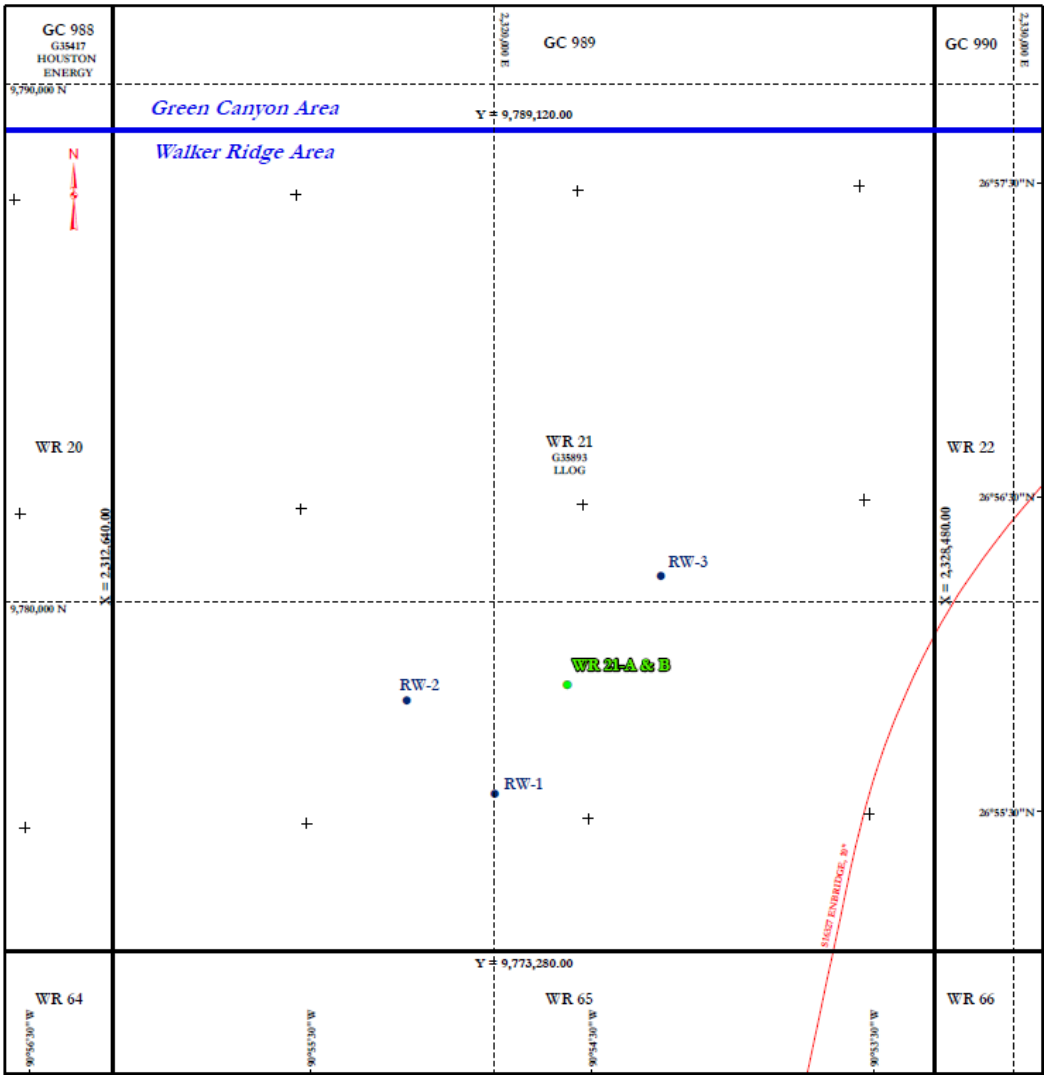
Relief well sites have been initially identified to address blowout scenarios for the potential geologic targets for the proposed well. A total of **3** relief well surface locations in WR 21 are proposed for the "B" Location drill site and are shown below. Based on actual seafloor state unforeseen at this time, the final location(s) may need to be revised. The locations have been selected based on proximity to the targets sands and potential shallow hazards.

Proposed EP Well	Proposed Relief Well	X (NAD 27)	Y (NAD 27)
WR 21 "B" OCS-G-35893	WR 21 RW1 Relief Well #1	2,320,000	9,776,300'
	WR 21 RW2 Relief Well #2	2,318,300'	9,778,100'
	WR 21 RW3 Relief Well #3	2,323,200'	9,780,500'

RELIEF WELL RESPONSE TIME ESTIMATE

OPERATION	TIME ESTIMATE (DAYS)
IMMEDIATE RESPONSE • safeguard personnel, render first-aid • make initial notifications • implement short term intervention (if possible) • implement spill control • develop Initial Action Plan	1
INTERIM REPSONSE • establish Onsite Command Center and Emergency Management Team • assess well control issues • mobilize people and equipment (Helix DW Containment System) • implement short term intervention and containment (if possible) • develop Intervention Plan • initiate relief well planning • continue spill control measures	4

INTERVENTION AND CONTAIMENT OPERATIONS • mobilize equipment and initiate intervention and containment operations • perform TA operations and mobilize relief wells rig(s) • finalize relief well plans, mobilize spud equipment, receive approvals • continue spill control measures	14
RELIEF WELL(S) OPERATIONS • continue intervention and containment measures • continue spill control measures • drill relief well (s)	40
PERFORM HYDRAULIC KILL OPERATIONS / SECURE BLOWNOUT WELL • continue intervention and containment measures • continue spill control measures • perform hydraulic kill operations, monitor well, secure well	14
ESTIMATED TOTAL DAYS OF UNCONTROLLED FLOW	**73**
SECURE RELIELF WELL(S) / PERFORM P&A / TA OPERATIONS / DEMOBE	30
TOTAL DAYS	**103**



APPENDIX C
GEOLOGICAL AND GEOPHYSICAL INFORMATION
(30 CFR Part 550.214 and 550.244)

A. Geological Description

Included as ***Attachment C-1*** are the geological targets and a narrative of trapping features proposed in this Plan

B. Structure Contour Maps

Included as ***Attachment C-2*** are current structure maps (depth base and expressed in feet subsea) depicting the entire lease coverage area; drawn on top of the prospective hydrocarbon sands. The maps depict each proposed bottom hole location and applicable geological cross section.

C. Interpreted Seismic Lines

Included as ***Attachment C-3*** is a copy of the migrated and annotated (shot points, time lines, well paths) deep seismic line within 500 feet of the surface location being proposed in this Plan.

D. Geological Structure Cross-Sections

An interpreted geological cross section depicting the proposed well locations and depth of the proposed wells is included as ***Attachment C-4***. Such cross section corresponds to each seismic line being submitted.

E. Shallow Hazards Report

A Shallow Hazards Assessment and Benthic Communities Evaluation for Block 21, Green Canyon Area was prepared by Berger Geosciences dated August 20, 2019 which was submitted to BOEM by letter dated August 26, 2019.

F. Shallow Hazards Assessment

Utilizing the 3D deep seismic exploration data a shallow hazards analysis was prepared for the proposed surface locations, evaluating seafloor and subsurface geologic and manmade features and conditions, and is included as ***Attachment C-5.***

G. Stratigraphic Column

A generalized biostratigraphic/lithostratigraphic column from the seafloor to the total depth of the proposed wells is included as ***Attachment C-6.***

H. Time vs Depth Tables

LLOG has determined that there is existing sufficient well control data for the target areas proposed in this Plan; therefore, tables providing seismic time versus depth for the proposed well locations are not required.

Geological Description

Attachment C-1
(Proprietary Information)

Structure Maps

Attachment C-2
(Proprietary Information)

Deep Seismic Lines

Attachment C-3
(Proprietary Information)

Cross Section Maps

Attachment C-4
(Proprietary Information)

Shallow Hazards Assessment

Attachment C-5
(Public Information)

Initial Exploration Plan
OCS-G-35893 Lease
Walker Ridge Block 21

Section 1

Shallow Hazards Assessment
Walker Ridge Area
Block 21
Gulf of Mexico

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1.1 Introduction

LLOG Exploration Company, LLC. (LLOG) contracted Berger Geosciences, LLC. (Berger) to complete a shallow hazards assessment for Walker Ridge (WR) Area, Block 21 (Lease No. G35893) located approximately 212 miles south of New Orleans, Louisiana (Figure 1-1). Section 1.1 of this report discusses the purpose and scope of the shallow hazards assessment, the available data and quality, and the methods of analysis.

Purpose and Scope

The scope of Section 1 is to describe the seafloor and shallow geologic conditions in WR 21 based on 3-D seismic data. The Seafloor Assessment Area is defined as WR 21 with a 3,000-ft halo into the adjacent blocks. The Subsurface Study Area is limited to WR 21 with a 1,000-ft halo into adjacent blocks (Figure 1-3). The depth limit of this assessment is from the seafloor to 7,000 ft below the mudline (BML).

Section 1 of this report is intended to satisfy the requirements set forth in the Mineral Management Services (MMS) Notice To Lessees (NTL) No. 2008-G05 on Shallow Hazards Programs (MMS, 2008b) and the applicable shallow hazards portions of NTL No. 2008-G04 (MMS, 2008a) as part for submittals of Exploration Plans and Development Operations Coordination Documents. Bureau of Ocean Energy Management NTL 2015-N02 (BOEM, 2015a) eliminates the expiration of MMS NTLs 2008-G04 and 2008-G05.

An evaluation of the potential for high-density benthic communities in the Seafloor Assessment Area is included in Section 2. Detailed hazards assessments and tophole prognoses for two proposed wells within the Subsurface Study Area are included in the Wellsite Discussion section at the end of this report. The two proposed wells share a common surface hole location and vertical wellbore path down to the limit of the geohazards assessment at 7,000 ft BML.

Available Data

LLOG provided Berger with a 3-D seismic depth volume, a 3-D seismic time volume, and AUV high-resolution geophysical data. Both the 3-D seismic depth and 3-D seismic time datasets cover all of WR blocks 988-990, WR blocks 20-22, and WR blocks 64-66 (Map 1). The 3-D seismic time dataset, Walker Ridge Phase 1, was acquired and processed by Western Geco as part of their Ultra Surveys group. Acquisition took place between August 1996 and January 1999. Depth processing was completed in September 2006 by Schlumberger as part of their larger E-Dog survey. A summary of the acquisition and processing reports are included in the Seismic Data Summary in Appendix A. The inlines are oriented approximately northwest-southeast and the crosslines are oriented approximately southwest-northeast in both data sets. In the time data the inlines increment by one, and have a line spacing of 65.62 ft and the crosslines increment by one, and have a line spacing of 41.01 ft. In the depth data the inlines increment by two, and have a line spacing of 131.23 ft and the crosslines increment by four, and have a line spacing of 164.04 ft. The data quality of these 3-D seismic datasets is considered adequate for the shallow hazards assessment of WR 21.

Echo Offshore, LLC. (Echo) was contracted to collect AUV high-resolution geophysical data to satisfy the requirements of an archaeological resources survey over WR 21. The final data from this survey was used to supplement the 3-D seismic data at the proposed well locations for this shallow hazards assessment.

The Navigation Post-Plot map (Map 1) displays the location of the datasets utilized in this shallow hazards assessment. All primary AUV tracklines with acquisition direction and shotpoint locations are displayed. For both of the 3-D seismic volumes every 50th inline and every 100th are displayed. The maps were generated using the Universal Transverse Mercator (UTM) projection system, and coordinates are presented in Zone 15 North (15N), using the North American Datum of 1927 (NAD27) on the Clarke 1866 Ellipsoid. Map grid units are in U.S. survey ft.

Methodology

The AUV data were utilized for providing local bathymetry values, assessing the seafloor conditions, and supplementing the near-surface geologic interpretation at the proposed well locations. A constant sediment velocity was used to convert the subbottom time to depth; see Appendix B.

The 3-D seismic volumes were thoroughly interpreted within the assessment area to provide this shallow hazards assessment. The seafloor and stratigraphic horizons (Horizons 10, 20, 30, 40, 50, 60, and the top of salt) were mapped on both of the 3-D seismic volumes. These 3-D seismic horizons define seven stratigraphic units (Units 1, 2, 3, 4, 5, 6, and 7) within the Subsurface Study Area. Sediment thickness and horizon depths shown on Maps 6 and 7 were exported from the 3-D depth volume.

All stratigraphic units were screened for possible shallow gas anomalies by searching for the maximum negative amplitude between the horizons on the 3-D time volume. Further investigation of the anomalous amplitude responses with respect to the local geology was performed to assess for potential stratigraphic responses. Subsurface investigation was limited to a depth of 7,000 ft BML or the top of salt, whichever is shallowest.

The map projection system is Universal Transverse Mercator (UTM) Zone 15 North (15N), North American Datum of 1927 (NAD27) on the Clarke 1866 Ellipsoid. Map grid units are in U.S. survey feet (Map 1).

1.2 Regional Geologic Setting

The continental slope of the northern Gulf of Mexico contains thick, rapidly deposited clastic sediments. These sediments have built out over the Louann Salt, a ductile Jurassic salt layer that has deformed due to the weight of the overlying sediments. The result of the gravitational extension of salt and sediments is a complex geologic setting with active salt movement, rapid sea level-driven sedimentation, and gravity slope-failures (Diegel et al., 1995; Prather et al., 1998). The morphology of the northern Gulf of Mexico is dominated by sediment filled minibasins and salt-cored ridge features (Figure 1-1). An arcuate system of normal faults generally dipping basinward with ongoing shallow and listric, gently dipping deep-seated faulting occurs with relation to the underlying allochthonous salt canopy and the autochthonous Louann Salt. Continued sedimentation and slope instability results in the burial of these features by hemipelagic draped deposits and debris flows.

Minibasins of the Gulf of Mexico tend to be areas of salt withdrawal, while the ridges and seafloor highs are areas of buoyant salt uplift or structural folds (Rowan, 1995). Basin sedimentation commonly displays cyclical sections of chaotic sediments overlying laminated sediments representing eustatic sea level fluctuations. The heads of canyons often have steep scarps representing slope failures and subsequent erosion. Widespread slides and debris flows can scour and infill the basin floors. Upward migrating fluids and gases can create a variety of expulsion features including seafloor mounds, pockmarks, authigenic carbonate deposits, gas hydrates, and debris flows (Roberts and Carney, 1997). These features often occur along ridge crests, tops of diapiric highs, edges of basins, and close to slope failures where faults extend to or near the seafloor.

Salt Tectonics

The area of interest lies within the tabular salt-minibasin province and within Pillsbury Basin (Diegel et al., 1995; Figure 1-1 and 1-3), which is dominated by allochthonous salt tongues and sediment-filled minibasins. Progradational sedimentary loading resulted in salt withdrawal and the formation of passive diapirs and other salt bodies. Salt tongues can cause substantial extension of overlying sediments and subsequent faulting (Tauvers, 1995). The lower portions of the continental slope show a progressive level of deformation of the salt and sediments (Diegel et al., 1995). The distal limit of the mobile salt in the Gulf of Mexico is marked by the Sigsbee Escarpment located about 20 miles east of the study area (Figure 1-1 and 1-2).

Seismic correlations and well data confirm that deepwater carbonate beds of Mesozoic age have been found above/in front of the shallow allochthonous salt canopy in the northern Gulf of Mexico (Fiduk et al., 2014). The seismic character of these rafts strongly resembles that of in situ Mesozoic carbonates and overlying Paleogene strata. Cretaceous and Wilcox seismic facies have been mapped at the salt canopy level on seismic data in Alaminos Canyon, Garden Banks, Green Canyon, Keathley Canyon, and Walker Ridge protraction areas (Fiduk et al., 2014). As salt inflates to form broad diapiric structures, overlying strata (i.e., Jurassic and Cretaceous carbonates) are lifted above the adjacent subsiding minibasins containing equivalent strata. At later times in the Eocene, Oligocene, and Miocene, salt from the inflated structures broke out to form shallow canopies. As salt flowed laterally it carried the roof material with it (Fiduk et al., 2014). Radial spreading of the salt separates the roof material into multiple smaller units that become rafted pieces spreading with the allochthonous salt.

Shallow Water Flow

Shallow, overpressured sands or "flowing water sands", generally observed when water flows from the formation to the seafloor, are a significant problem in the deepwater region of the Gulf of Mexico (Alberty et al., 1997; Ostermeier et al., 2002). Shallow water flow (SWF) often occurs when pore fluids in sand exert pressures greater than hydrostatic. These conditions occur when rapidly deposited sediments apply pressure to the underlying sand-prone section faster than it can be dissipated, resulting in overpressured sands. An overlying seal of fine-grained sediments (i.e., a "condensed" section) can prevent the upward escape of water from the pressurized sediments. If the overlying seal has been breached by erosion or faulting prior to drilling, the overpressured fluids can naturally escape resulting in pressure reduction in the formation.

Shallow water flow typically occurs in water depths greater than 1,700 ft and at burial depths ranging from 500 ft to 3,500 ft BML (Smith, 2002; Alberty et al., 1997). Although SWF zones cannot be defined with certainty using seismic data alone, the conditions that create overpressure can be assessed. The northern Gulf of Mexico can be roughly divided into zones of high, moderate, and low risk of SWF occurrence based on previous events (Ostermeier et al., 2002). The Walker Ridge protraction area lies within the zone of moderate risk of shallow water flow.

The regional sand-prone sequence, the Red Unit, has been identified in the shallow sediments of the Green Canyon area. The southern limit of the Red Unit is located approximately 19 miles north of WR 21 (Figure 1-1 and 1-2). This sand-prone unit has been known to produce flows at relatively shallow depths. The closest two flows are reported in GC 859 and 823 at depths of 1,622 ft and 1,715 ft BML, respectively (Figure 1-1 and 1-2).

Gas Hydrates

Gas hydrates are water-based solids resembling ice that are produced under conditions of sufficient hydrostatic pressure within the proper temperature regime (Milkov and Sassen, 2000; Maekawa et al., 1995; Kvenvolden and Barnard, 1983). Gas hydrates have been found in water depths exceeding 1,500 ft in the northern Gulf of Mexico (Brooks et al., 1989; Cooper and Hart, 2003). These solid gas hydrates can remain stable within the near-surface sediments; however, the thickness of this layer is largely dependent on local geothermal conditions (Milkov and Sassen, 2000; Roberts et al., 2006). The water depths and temperature gradients in the Seafloor Assessment Area are within the range in which escaping methane gas or mixed gases can produce gas hydrates at or near the seafloor. The depth to which gas hydrates may remain stable is defined as the base of the gas hydrate stability zone (BGHSZ). The presence of shallow salt can result in locally higher geothermal gradients due to increased temperatures above salt. The actual depth to the BGHSZ above shallow salt bodies is likely to be significantly shallower than that calculated using the generalized model due to the modified geothermal gradient.

Common 3-D seismic data indicators of gas hydrates are bottom simulating reflectors (BSRs), data wipe-out indicating fluid migration to the surface, and amplitude signatures cross-cutting stratigraphy (Roberts et al., 2006). When gas hydrates form on the seafloor they can, in many circumstances, be recognized or inferred by the subtle mounding of the seafloor surrounding a vent, resulting in anomalous seafloor response (Neurauter and Bryant, 1989; Brooks and Bryant, 1985; Roberts et al., 2006). Gas hydrates are often identified when these seismic features are found in association with structural controls that could direct hydrocarbons from depth to the near-surface.

1.3 Seafloor Conditions

The Seafloor Assessment Area is defined as WR 21 with a 3,000-ft halo into the adjacent blocks (Map 1 and Figure 1-3). Map 2 details the water depths across the Seafloor Assessment Area. Map 3 and Figure 1-3 show the rendering of the seafloor from the 3-D seismic time data. Map 4 and Figure 1-6 show the variations in seafloor amplitude response. Map 5 displays seafloor and subsurface features identified within the assessment area. The seafloor slope is depicted in Figure 1-4. The locations of the vertical sections referenced in the following portions of the text are shown in Figure 1-3.

Water Depths

Water depths range from 5,429 ft to 6,422 ft BSL as seen on Map 2. Water depths are shallowest in the north and northwest and generally increase to the northeast into Pillsbury Basin (Figure 1-3).

Seafloor Morphology and Slope

The general morphology of the Seafloor Assessment Area is smooth and featureless (Map 3 and Figure 1-3). Fault scarps and uplifted seafloor exist in the north, northwest, and southwest portions of the area (Map 3). Faults in the north and northwest trend northeast-southwest and range in length from 1,325 ft to over 18,000 ft. Seafloor offset across these faults is typically between 50 ft and 100 ft but is in excess of 200 ft is places. Faults in the southwest portion of the area trend north-south and northeast-southwest and range in length from 1,200 ft to 7,400 ft. Seafloor offset across these faults ranges from a few feet up to 70 ft. The seafloor in the remaining portions of the area forms a gently, northeasterly sloping ramp into Pillsbury Basin.

Seafloor slopes are generally less than 5.0° across the central, eastern, and southern portions of the area (Figure 1-4). Slopes in excess of 10° are located in the north, northwest, west, and southwest of the area and are associated with seafloor faults.

Fourteen slump scarps are identified on the more resolute AUV data in the northern portion of the area (Map 5 and Figure 1-5). The slump scarps range in length from 60 ft to 440 ft and are all associated with a thrust fault that extends to the seafloor (Map 5). Seafloor slope values associated with the scarps are in excess of 30° (Figure 1-4).

Seafloor Amplitude and Benthic Communities

The amplitude response of the seafloor peak reflector is generally low and consistent throughout the Seafloor Assessment Area (Map 4 and Figure 1-6). The maximum positive seafloor amplitude was used to assess the seafloor anomalies. A slight northwest to southeast banding is observed in amplitudes throughout the assessment area. This banding is interpreted to represent acquisition artifacts and does not impact the assessment of the seafloor amplitudes.

Seafloor amplitude anomalies are located in the northern, western, and southern portions of the assessment area (Maps 4 and 5; Figure 1-6). All identified seafloor amplitude anomalies are associated with seafloor or shallow buried faults (Figure 1-7). There are no indications in the seismic data for active hydrocarbon migration along these faults to the seafloor. These seafloor amplitude anomalies likely represent areas of overconsolidated sediments at or near the seafloor and are not considered to be areas that could support chemosynthetic or other benthic communities.

A full discussion of the potential for deepwater benthic communities is included in Section 2 of this report.

Gas Hydrates

Seismic indicators of gas hydrates at the seafloor include expulsion features such as mounds and pockmarks, data wipe-out indicating fluid migration to the surface, and BSRs or amplitude signatures cross-cutting stratigraphy accompanying structures that could provide pathways for fluid migration from depth (Roberts et al., 2006). Mounds, pockmarks, and BSRs have not been identified in the assessment area (Map 5). The calculated base of the gas hydrate stability zone (BGHSZ) ranges from 1,676 ft to 1,828 ft BSL. Seafloor amplitude anomalies in the area are not associated with subsurface features that might indicate possible hydrocarbon migration such as evidence of data wipe-out, therefore, the overall potential for gas hydrates at or near the seafloor throughout the Seafloor Assessment Area is considered to be negligible to low.

Man-Made Features

Cultural Resources. Pursuant to the public information in the NOAA Automated Wreck and Obstruction Information System (2019), there are no historically significant shipwrecks reported within WR 21. An archaeological survey and report was completed by Echo Offshore, LLC. and will be submitted under separate cover (Echo, 2019).

Infrastructure. There are no existing wells within the Seafloor Assessment Area (Map 1). An active gas pipeline trends southwest-northeast across the southeastern quadrant of the Seafloor Assessment Area. The 10-in gas pipeline, segment no.16327, is operated by Enbridge Offshore.

1.4 Subsurface Geologic Conditions

This section discusses the subsurface conditions and potential geologic hazards interpreted from the 3-D seismic data. The assessment of the subsurface geologic conditions was confined to WR 21 with a 1,000-ft halo into the adjacent blocks and is termed the Subsurface Study Area (Figure 1-3). The depth limit of the assessment is from the seafloor to 7,000 ft BML (approximately 2.121 s BML). The significant subsurface features within the Subsurface Study Area have been summarized on Map 5.

The seafloor, the top of salt, and six subsurface horizons (Horizons 10, 20, 30, 40, 50, and 60) were interpreted within the Subsurface Study Area based on seismic characteristics and regional geology (Figures 1-7, 1-8, 1-9, 1-10, and 1-11). An isopach map from the seafloor to Horizon 10 is shown on Map 6. Map 7 is a structure map from the sea surface to Horizon 60. The locations of vertical seismic displays referred to in this section are illustrated in Figure 1-3.

Stratigraphy, Shallow Water Flow, and Shallow Gas

The Subsurface Study Area is located within the tabular salt-minibasin province of the Gulf of Mexico as defined by Diegel et al., 1995. Block WR 21 lies within Pillsbury Basin, which is a moderate-sized mini-basin rimmed by salt diapirs (Figure 1-8). The stratigraphy within the Subsurface Study Area is dominated by repeated mass transport deposits separated by normally deposited, layered marine silts and clays (Figure 1-8).

Salt uplift along the perimeter on Pillsbury Basin has resulted in faulting consisting of both normal and thrust faults. The uplifted and faulted margins of the basin have periodically failed into the basin depositing the mass transport sequences. Ongoing salt movement is evidenced by the active salt-rooted faults (seafloor faults) within the Subsurface Study Area and by the recent slumping along one of these faults (Map 5 and Figure 1-5).

Shallow water flow (SWF) is a known problem in the Gulf of Mexico. There are no reported SWF events in the Walker Ridge protraction area, however, WR 21 lies along the northern boundary of the protraction area with the Green Canyon protraction area, where numerous SWF events have been reported. The regional high-risk sand-bearing unit in the Green Canyon Area is the Red Unit, identified by Shell Oil (Figure 1-2). The Subsurface Study Area is not located within defined limits of the Red Unit and the nearest SWF, at 1,622 ft BML, was reported from the G24194 #4 well in GC 859 located about 12 miles to the north-northeast of WR 21 (Figure 1-2). The SWF was categorized as a low severity flow and well integrity was maintained (BOEM, 2019a).

Areas of anomalous negative amplitudes in the subsurface may indicate locations of shallow gas pockets. Other supporting indicators on the seismic data include acoustic wipe-out, phase reversals, and reflector truncation associated with stratigraphic or structural traps. All subsurface intervals were screened for maximum negative amplitudes. The anomalies identified were investigated further with respect to the local geology. Indicators of shallow gas, such as phase reversal and stacked anomalies along faults, are present throughout the subsurface study area. The distribution of areas of possible shallow gas is shown on Map 5.

Seafloor to Horizon 10 (UNIT 1). Unit 1, between the seafloor and Horizon 10, consists of low amplitude, parallel and continuous reflectors interpreted to represent hemipelagic clay drape overlying stratified silts and clays (Figures 1-7, 1-8, and 1-9). Interbedded, thin mass transport deposits are present below the hemipelagic drape. This sequence thickens to the northeast ranging from 210 ft to 583 ft thick (Map 6). Horizon 10 is a trough reflector that is continuous throughout the Subsurface

Study Area and is mapped as the transition from stratified deposits above to chaotic deposits below (Figures 1-7, 1-8, and 1-9). Horizon 10 is mapped between 5,824 ft and 7,014 ft BSL. The horizon is shallowest in the northwest and deepest in the northeastern corner of the area.

Amplitude anomalies between the seafloor and Horizon 10 correspond with the identified seafloor anomalies and represent the trough reflection following the anomalous seafloor peak reflection. Therefore, no anomalies representing shallow gas are identified within Unit 1 (Map 5).

This sequence is assessed to have a negligible potential for SWF and negligible potential for shallow gas.

Horizon 10 to Horizon 20 (UNIT 2). Unit 2, between Horizon 10 and Horizon 20, consists of low-amplitude, chaotic reflections overlying low- to moderate-amplitude, parallel and continuous reflectors (Figure 1-9). The upper sub-unit of chaotic reflections are interpreted to represent silt- and clay-dominated slump and other mass transport deposits. These deposits are relatively uniform in thickness across Pillsbury Basin. The lower sub-unit of parallel and continuous reflectors are interpreted to represent bedded debris flows and turbidites consisting of silt and clay with thin sands possible near the base. This lower sub-unit thins and pinches out to the west, along the margin of the basin (Figures 1-7, 1-8, and 1-9). Horizon 20 marks the base of this unit and is a peak reflector that is present throughout the area. Horizon 20 is mapped between 278 ft and 1,568 ft BML (5,727 ft and 7,965 ft BSL). The sediments between the seafloor and Horizon 20 are thinnest in the southwest and thicken to the northeast.

Relatively few amplitude anomalies are identified within Unit 2 (Map 5). The anomalies tend to occur in the west and northwest of the area and are associated with seafloor or buried faults (Figure 1-8 and 1-9). These anomalies may represent lithologic variation across faults but the possibility for gas within isolated sands at the base of Unit 2 and trapped against faults exists.

This sequence is assessed to have a negligible to low potential for SWF and a negligible to moderate potential for shallow gas.

Horizon 20 to Horizon 30 (UNIT 3). Unit 3, the interval between Horizon 20 and Horizon 30 consists of three sub-units (Figure 1-8). The upper sub-unit contains low-amplitude, discontinuous to semi-continuous reflectors interpreted to represent clay- and silt-rich debris flows. The middle sub-unit contains low-amplitude, chaotic to discontinuous reflections interpreted to represent clay and silt dominated mass transport deposits. The middle sub-unit appears to be channelized, however, individual channels have been eroded by subsequent channels and mass transport deposition and are not traceable for long distances. The lower sub-unit contains low-amplitude, parallel and continuous reflections interpreted to represent normally deposited clays and silts (Figure 1-8).

The base of this unit, Horizon 30, is a peak reflector that is present throughout the area except along the western portion of the Subsurface Study Area where the horizon is not identifiable due to uplift and faulting (Figures 1-7, 1-8, and 1-9). Horizon 30 is mapped between 6,884 ft and 9,982 ft BSL and is shallowest along the southern limit of the area and deepest in the northeast. The thickness of sediment between the seafloor and Horizon 3 ranges from 996 ft to 3,554 ft thick and is thinnest in the south and thickens to the northeast.

The majority of amplitude anomalies between Horizon 20 and Horizon 30 occur as large anomalies in the southwestern quadrant of the area (Map 5). These anomalies are associated with the trough reflection immediately below Horizon 20 and may represent a sand-rich layer at the top of Unit 3

(Figures 1-7, 1-8, and 1-9). A single large anomaly, as well as smaller scattered anomalies, are located in the northeastern quadrant of the area within this interval (Map 5).

Horizons deeper than Horizon 20 are not mappable in the extreme northwest corner of the Subsurface Study Area (Figure 1-7) due to salt uplift. Amplitude anomalies in this area are annotated as occurring between Horizon 20 and Top of Salt (Map 5).

This sequence is assessed to have a negligible to low potential for SWF and a negligible to high potential for shallow gas.

Horizon 30 to Horizon 40 (UNIT 4). Unit 4, the interval between Horizon 30 and Horizon 40 Horizon 40, low- to moderate-amplitude, chaotic reflections alternating with moderate-amplitude, parallel and continuous reflectors (Figures 1-7, 1-8, 1-9, and 1-10). These reflections are interpreted to represent silt and clay dominated slumps and debris flows alternating with silt- and sand-prone bedded turbidites.

A channel is mapped within Unit 4 in the northeast quadrant of the area (Map 5 and Figure 1-10). The channel is about 950 ft wide and trends from southwest to northeast. Additional channels are visible in cross section views but do not extend laterally over a mappable distance, presumably having been eroded by turbidite deposition.

Horizon 40 is a trough reflector that is faulted out in the northwest, west, and southwest portions of the area. Horizon 40 is mapped between 1,968 ft and 6,470 ft BML (7,768 ft and 12,896 ft BSL). The horizon is shallowest in the southern portion of the area and deepest in the northeastern portion of the area.

Relatively few amplitude anomalies are identified between Horizon 30 and Horizon 40 with the majority of them occurring in association with the mapped channel in the northeast of the area (Map 5). A few small, isolated anomalies occur in the center and southeast of the area. All of the anomalies identified are considered to represent gas charged, sand bodies and should be avoided.

This sequence is assessed to have a low to moderate potential for SWF and a low to high potential for shallow gas.

Horizon 40 to Horizon 50 (Unit 5). Unit 5, the interval between Horizon 40 and Horizon 50, consists of low-amplitude chaotic reflections (Figures 1-8, 1-9, 1-10, and 1-11). These reflections are interpreted to represent clay- and silt-rich debris flows and other mass transport deposits.

Horizon 50 is a trough reflector that is faulted out in the northwest, west, and southwest portions of the area. Horizon 50 is mapped between 2,459 ft and 7,591 ft BML (8,342 ft and 14,016 ft BSL). The horizon is shallowest in the southern portion of the area and deepest in the northeastern portion of the area.

The identified amplitude anomalies between Horizon 40 and Horizon 50 are small and occur along a northwest to south trending line in the southwest portion of the area and in two clusters in the east and southeast portion of the area (Map 5). These amplitude anomalies are interpreted to represent biogenic gas trapped within isolated sands within this unit.

This sequence is assessed to have a negligible to low potential for SWF and a negligible to moderate potential for shallow gas.

Horizon 50 to Horizon 60 (Unit 6). The interval between Horizon 50 and Horizon 60, Unit 6, contains moderate- to high-amplitude, continuous reflectors overlying low-amplitude, chaotic to discontinuous reflections (Figures 1-8, 1-10, and 1-11). These reflections are interpreted to represent

sand dominated bedded turbidites overlying clay- and silt- rich debris flows and turbidites with isolated sand intervals possible.

Horizon 60 is a peak reflector that is faulted out in the northwest, west, and southwest portions of the area. Horizon 60 is mapped between 2,684 ft and 9,961 ft BML (8,807 ft and 16,188 ft BSL; Map 7). The horizon is shallowest in the southwestern portion of the area and deepest in the northeastern portion of the area (Map 7).

Most of the amplitude anomalies identified within Unit 5 between Horizon 50 and Horizon 60 are scattered throughout the southeast quadrant of the area (Map 5). These amplitude anomalies are associated with the high-amplitude, continuous reflections within the upper portion of this unit (Figure 1-10). They are interpreted to represent biogenic gas trapped within sand-rich turbidites.

This sequence is assessed to have a low to moderate potential for SWF and a low to moderate potential for shallow gas.

Horizon 60 to Limit of Investigation (Unit 7). Unit 7, the interval between Horizon 60 and the limit of investigation (7,000 ft BML) contains low- to moderate-amplitude, semi-parallel, and semi-continuous reflectors interpreted to represent silt- and clay-dominated bedded turbidites and debris flows with interbedded sands possible (Figure 1-8).

The majority of the amplitude anomalies between Horizon 60 and limit of investigation are located in the southern portion of the area with lesser numbers of anomalies located southwestern and southeastern quadrants (Map 5). Several of the anomalies located in the southern portion of the area occur as flat spots in the seismic data (Figure 1-11). These amplitude anomalies are interpreted to represent thermogenic gas which has migrated from depth along faults.

This sequence is assessed as low to moderate for SWF and low to high potential for shallow gas.

Structure

The structure within the Subsurface Study Area is influenced by the presence of a salt diaper in the western portion of the area (Figures 1-7 and 1-8). Salt is shallowest along the western portion of the area and deepest in the northeast (Figure 1-12). Intrusion of the salt body has uplifted and faulted the overlying and adjacent sediments (Figures 1-7 through 1-11). Both normal and reverse faults are identified within the area (Map 5). Active (seafloor) faults associated with this salt body are located throughout the western portion of the area but are more common in the northwest (Map 5). Buried faults are located in the west-central and southwestern portions of the area.

Mapped horizons dip eastward and northeastward into Pillsbury Basin (Map 7) and sediment thickness likewise increase towards the center of the basin (Map 6) in the extreme northeastern corner of the Subsurface Study Area.

1.5 Conclusions and Recommendations

The following conclusions and recommendations are based on the assessment of 3-D seismic data from the seafloor to 7,000 ft BML (2.121 s BML).

Water Depth. Water depths in the Seafloor Assessment Area range from 5,429 ft to 6,422 ft BSL and are classified as deepwater according to the Bureau of Ocean Energy Management.

Seafloor Morphology and Slope. The slopes in the Seafloor Assessment Area range from nearly flat to 70°. Features within the Seafloor Assessment Area include seafloor faults and slumps. The steepest slopes are associated with seafloor faults in the northern and western portions of the area.

Man-Made Features. There are no existing wells within the Seafloor Assessment Area. There is one existing pipeline within the Seafloor Assessment Area located in the southeastern portion of WR block 21. There are no historically significant shipwrecks reported within the Seafloor Assessment Area. The required archaeological survey and report was completed by Echo (2019) and is to be submitted under separate cover.

Gas Hydrates. Bottom-simulating reflectors have not been identified in the Subsurface Study Area. The calculated base of the gas hydrate stability zone (BGHSZ) ranges from 1,224 ft and 1,883 ft BSL. The overall potential for gas hydrates is assessed as negligible to low.

Stratigraphy and Shallow Water Flow. The seafloor, top of salt, and six horizons were mapped from the 3-D seismic time data. The Subsurface Study Area does not lie within the defined regional shallow sand-prone Red Unit associated with the Eastern Depocenter and no SWF events have been reported in the Walker Ridge area. The closest two flows are reported in GC 859 and 823 at depths of 1,622 ft and 1,715 ft BML, respectively. The potential for shallow water flow in the study area is assessed as low (clay-dominated units) to moderate (sand-bearing units). A buried channel is identified between Horizons 30 and 40 trending southwest to northeast through the northeast quadrant of the Subsurface Study Area.

Subsurface Faulting. Shallow buried faults and associated antithetic faults were identified within the Subsurface Study Area. The buried faults are rooted in a large salt body along the western limit of the study area. Amplitude anomalies along the buried faults may indicate potential hydrocarbon migration.

Shallow Gas. Subsurface amplitude anomalies that may represent shallow gas occur in all subsurface sediment sequences except between the seafloor and Horizon 10. There is an overall negligible to high potential for shallow gas in the Subsurface Study Area. Avoiding amplitude anomalies with well placement and close observation of the wellhead while drilling for signs of shallow gas is recommended.

Stratigraphic Column

Attachment C-6
(Proprietary Information)

APPENDIX D
HYDROGEN SULFIDE (H_2S) INFORMATION
(30 CFR Part 550.215 and 550.245)

A. Concentration

LLOG does not anticipate encountering H_2S while conducting the proposed exploratory operations provided for under this plan.

B. Classification

In accordance with 30 CFR 250.490 (c) and NTL No. 2009-G31 "Hydrogen Sulfide", LLOG requests that the proposed locations be classified H2S absent. The basis for this determination is the evaluation of Walker Ridge 67 LLOG #1, Lease OCS-G 32661. According to the Mud Gas Isotope Analysis from 21,610'- 25,030' MD, H2S concentration was 0 ppm for each sample in the stated interval depth.

C. H2S Contingency Plan

Not applicable for the proposed operations.

D. Modeling Report

Not applicable to the proposed operations.

APPENDIX E
BIOLOGICAL, PHYSICAL AND SOCIOECONOMIC INFORMATION
(30 CFR Part 550.216 and 550.247)

A. High-Density Deepwater Benthic Communities Information

Known benthic or chemosynthetic communities are not reported within the Seafloor Assessment Area of Walker Ridge Block 21. The nearest known reported high-density benthic community is an unidentified community in GC 852, about 15 miles northwest of the Seafloor Assessment Area.

There is no evidence of fluid migration to the seafloor within 2,000 ft. of Proposed Well WR well location A or B. There are no seafloor amplitude anomalies or signs of gas migration within 2,000 ft. of the proposed well. There are no BSRs or other seismic indicators of gas hydrates within 2,000 ft. of the proposed well.

Features or areas that could support high-density chemosynthetic or other benthic communities are not anticipated within 2,000 ft. of Proposed Well locations A or B.

B. Topographic Features Map

The activities proposed in this Plan are not affected by a topographic feature.

C. Topographic Features Statement (Shunting)

The activities proposed in this Plan are not affected by a topographic feature; therefore, LLOG is not required to shunt drill cuttings and drill fluids.

D. Live Bottoms (Pinnacle Trend) Map

Walker Ridge Block 21 is not located within the vicinity of a proposed live bottom (Pinnacle trend) area.

E. Live Bottoms (Low Relief) Map

Walker Ridge Block 21 is not located within the vicinity of a proposed live bottom (Low Relief) area.

F. Potentially Sensitive Biological Features Map

Walker Ridge Block 21 is not located within the vicinity of a proposed sensitive biological feature area.

G. Threatened or Endangered Species, Critical Habitat, and Marine Mammal Information.

Proposed activities in **Walker Ridge Block 21** is not located in a critical habitat designated under ESA and marine mammals protected under the MMPA. In the event federally listed species become present on **Walker Ridge Block 21**, LLOG will mitigate impact through compliance with BOEM NTL 2007-G03, 2004-G01 and NTL 2015 BSEE-G03. See ***Attachment E-1*** for a list of the NOAA Species known in the Gulf of Mexico.

H. Archaeological Information

The Walker Ridge 21 block is not regarded as being in a high probability zone for historic shipwrecks based on Bureau of Ocean Energy Management (BOEM) and Bureau of Safety and Environmental Enforcement (BSEE) NTL No. 2011-JOINT-G01 (BOEM/BSEE, 2011). Pursuant to the public information in the NOAA Automated Wreck and Obstruction Information System and Navigational Charts (NOAA, 2019); no shipwrecks are reported within WR 21. The required archaeological survey was prepared by Echo Offhsore, LLC in September, 2019 and a report for the vicinity of the proposed well was completed by Echo Offshore, LLC and was submitted to BOEM under separate cover by letter dated September 9, 2019. For avoidances and sonar contacts please refer to the Echo Offshore LLC report.

I. Air and Water Quality Information

Not applicable to proposed operations.

J. Socioeconomic Information

Not applicable to proposed operations.

NOAA Species Known in GOM

Attachment E-1
(Public Information)

NOAA FISHERIES
Southeast Region
Protected Resources Division

Gulf of Mexico's Threatened and Endangered Species

For more information on listed species please visit:
http://www.nmfs.noaa.gov/pr/species/esa/listed.htm
http://sero.nmfs.noaa.gov/protected_resources/index.html

Marine Mammal Species	Scientific Name	Status
fin whale	*Balaenoptera physalus*	Endangered
humpback whale	*Megaptera novaeangliae*	Endangered
sei whale	*Balaenoptera borealis*	Endangered
sperm whale	*Physeter macrocephalus*	Endangered
Sea Turtle Species		
green sea turtle	*Chelonia mydas*	Threatened[1]
hawksbill sea turtle	*Eretmochelys imbricata*	Endangered
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered
leatherback sea turtle	*Dermochelys coriacea*	Endangered
loggerhead sea turtle	*Caretta caretta*	Threatened[2]
Fish Species		
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	Threatened
smalltooth sawfish	*Pristis pectinata*	Endangered
Invertebrate Species		
lobed star coral	*Orbicella annularis*	Threatened
mountainous star coral	*Orbicella faveolata*	Threatened
boulder star coral	*Orbicella franksi*	Threatened
elkhorn coral	*Acropora palmata*	Threatened[3]

Critical Habitat Designations

For final rules, maps, and GIS data please visit:
http://sero.nmfs.noaa.gov/maps_gis_data/protected_resources/critical_habitat/index.html

Loggerhead sea turtle: There are 38 designated marine areas that occur throughout the Southeast Region.

Gulf sturgeon: There are 14 marine and estuarine units located in Northwest Florida, Alabama, Mississippi, and eastern Louisiana.

Smalltooth sawfish: There are two habitat units located in Charlotte Harbor and in the Ten Thousand Islands/Everglades, Florida.

[1] Florida's breeding population is listed as endangered.
[2] Northwest Atlantic distinct population segment.
[3] Colonies located at Flower Garden Banks National Marine Sanctuary.

APPENDIX F
WASTE AND DISCHARGE INFORMATION
(30 CFR PART 550.217 AND 550.248)

A. Projected Generated Wastes

See the following tables:

TABLE 1. Wastes you will generate, treat and downhole dispose or discharge to the GOM

TABLE 2. Wastes you will transport and /or dispose of onshore

B. Modeling

Not applicable. Proposed activities will be covered by U.S. EPA NPDES General Permit.

TABLE 1. WASTES YOU WILL GENERATE, TREAT AND DOWNHOLE DISPOSE OR DISPOSE OR DISCHARGE IN THE GOM

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

WR 21

Projected generated waste			Projected ocean discharges		Downhole Disposal
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	146,731 bbls/well	9,701 bbls/day/well	Discharge overboard	No
Cuttings wetted with water-based fluid	Cuttings generated while using water based drilling fluid.	6,254 bbls/well	413 bbls/day/well	Discharge overboard	No
Cuttings wetted with synthetic-based fluid	Cuttings generated while using synthetic based drilling fluid.	2,487 bbls/well	118 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	14,486 bbls/well	3.1 bbls/hr/well	Discharge overboard (no free oil)	No
Sanitary waste	Processed sanitary waste from living quarters	9,657 bbls/well	2.1 bbls/hr/well	Chlorinate and discharge overboard	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	NPDES approved treatment fluid used for well operations	100 bbls/well	20 bbls/hr/well	Test for oil and grease and discharge overboard.	No
Well completion fluids	Clear brines used for completion operations	500 bbls/well	100 bbls/hr/well	Test for oil and grease and discharge overboard. This excludes clear brines containing Zinc	No
Workover fluids	N/A	N/A	NA	NA	No
Miscellaneous discharges. If yes, only fill in those associated with your activity.					
Desalinization unit discharge	N/A	N/A	N/A	N/A	N/A
Blowout prevent fluid	N/A	N/A	N/A	N/A	N/A
Ballast water	Uncontaminated seawater used for ballast control	0 to 100,000 bbls/well	16,350 bbls/hr/well	Discharge overboard	No
Bilge water	N/A	N/A	N/A	N/A	N/A
Excess cement at seafloor	Excess cement slurry and mixwater used for cementing operation - NPDES allowed	300 bbls/well	360 bbls/hr/well	Discharge at mudline	No
Fire water	Uncontaminated seawater used for fire control system	0 to 10,000 bbls/well	16,350 bbls/hr/well	Discharge overboard	No
Cooling water	N/A	N/A	N/A	N/A	N/A
Will you produce hydrocarbons? If yes fill in for produced water.					
Produced water	NA	NA	NA	NA	N/A
Will you be covered by an individual or general NPDES permit ?			GMG 290180		
			comply with the requirements of the NPDES permit.		

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

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

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

WR 21	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	N/A	NA	N/A	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	N/A	NA	N/A	NA	NA
Cuttings wetted with Synthetic-based fluid	N/A	NA	N/A	NA	NA
Cuttings wetted with oil-based fluids	N/A	NA	N/A	NA	NA
Will you produce hydrocarbons? If yes fill in for produced sand.					
Produced sand					
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.

APPENDIX G
AIR EMISSIONS INFORMATION
(30 CFR PART 550.218AND 550.249)

A. Emissions Worksheets and Screening Questions

The Projected Quality Emissions Report (Form MMS-138) addresses the proposed drilling, completion and potential testing operations utilizing a typical drillship, with related support vessels and construction barge information.

As evidenced by ***Attachment G-1,*** the worksheets were completed based on the proposed flaring and burning operations.

Screening Questions for EP's	***Yes***	***No***
Is any calculated Complete Total (CT) Emission amount (in 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
Does your emission calculations include any emission reduction measures or modified emission factors?		X
Are your proposed exploration activities located east of 87.5 degrees W longitude?		X
Do you expect to encounter H2S 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

B. Emissions Reduction Measures

The projected air emissions are within the exemption level; therefore, no emission reduction measures are being proposed.

C. Verification of Nondefault Emissions Factors

LLOG has elected to use the default emission factors as provided in ***Attachment G-1.***

D. Non-Exempt Activities

The proposed activities are within the exemption amount as provided in ***Attachment G-1.***

E. Modeling Report

This section of the Plan is not applicable to the proposed operations.

Air Quality Emissions Report

Attachment G-1
(Public Information)

Initial Exploration Plan
OCS-G-35893 Lease
Walker Ridge Block 21

OMB Control No. 1010-0151
OMB Approval Expires: 12/31/2014

EXPLORATION PLAN (EP)
AIR QUALITY SCREENING CHECKLIST

COMPANY	LLOG Exploration Offshore, L.L.C.
AREA	Walker Ridge
BLOCK	21
LEASE	OCS-G-35893
PLATFORM	
WELL	WR 21 A, B & Alt A
COMPANY CONTACT	Sue Sachitana, Regulatory Specialist
TELEPHONE NO.	985-801-4300
REMARKS	DP Semisubmersible Rig

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	0.005505	14	1.12	3.03	AP42 3.3-1	10/96
Diesel Recip. > 600 hp.	gms/hp-hr	0.32	0.005505	11	0.33	2.4	AP42 3.4-1	10/96
Diesel Boiler	lbs/bbl	0.084	0.009075	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	0.0015	% 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 Offsho	Walker Ridge	21	OCS-G-35893		WR 21 A, B & Alt A		Sue Sachitana, Regulatory Spec	985-801-4300	

OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	61200	2955.96	70943.04	24	113	43.14	0.74	1482.82	44.48	323.52	58.49	1.01	2010.70	60.32	438.70
	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	48	5.07	0.09	174.45	5.23	38.06	1.47	0.03	50.69	1.52	11.06
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	12	97	5.07	0.09	174.45	5.23	38.06	2.95	0.05	101.38	3.04	22.12
	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	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
INSTALLATION	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	BPD	SCF/HR	COUNT												
	TANK-	0			0	0				0.00					0.00	
DRILLING	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2020	**YEAR TOTAL**						**53.29**	**0.92**	**1831.72**	**54.95**	**399.65**	**62.92**	**1.08**	**2162.77**	**64.88**	**471.88**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**											**4828.50**	**4828.50**	**4828.50**	**4828.50**	**93840.63**
	145.0															

EMISSIONS CALCULATIONS 2ND YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
LLOG Exploration Offsho	Walker Ridge	21	OCS-G-35893		WR 21 A, B & Alt A		Sue Sachitana, Regulatory Spec	985-801-4300	

OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
DRILLING	PRIME MOVER>600hp diesel	61200	2955.96	70943.04	24	80	43.14	0.74	1482.82	44.48	323.52	41.41	0.71	1423.51	42.71	310.58
	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	34	5.07	0.09	174.45	5.23	38.06	1.04	0.02	35.89	1.08	7.83
	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	12	69	5.07	0.09	174.45	5.23	38.06	2.09	0.04	71.77	2.15	15.66
	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	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
INSTALLATION	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	0.00	0.00	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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	**BPD**	**SCF/HR**	**COUNT**												
	TANK-	0			0	0				0.00					0.00	
DRILLING	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2021	**YEAR TOTAL**						**53.29**	**0.92**	**1831.72**	**54.95**	**399.65**	**44.54**	**0.77**	**1531.17**	**45.94**	**334.07**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**											**4828.50**	**4828.50**	**4828.50**	**4828.50**	**93840.63**
	145.0															

SUMMARY

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL
LLOG Exploratio	Walker Ridge	21	OCS-G-35893		WR 21 A, B & Alt A

Year	Emitted Substance				
	PM	SOx	NOx	VOC	CO
2020	62.92	1.08	2162.77	64.88	471.88
2021	44.54	0.77	1531.17	45.94	334.07
2022	0.00	0.00	0.00	0.00	0.00
2023	0.00	0.00	0.00	0.00	0.00
Allowable	4828.50	4828.50	4828.50	4828.50	93840.63

DOCD AIR QUALITY SCREENING CHECKLIST

OMB Control No. 1010-0151
OMB Approval Expires: 12/31/2014

COMPANY	LLOG Exploration Offshore, L.L.C.
AREA	Walker Ridge
BLOCK	21
LEASE	OCS-G-35893
PLATFORM	
WELL	WR 21 A, B & Alt A
COMPANY CONTACT	Sue Sachitana
TELEPHONE NO.	985-801-4300
REMARKS	Drill Ship - Drilling & Completion Operations

LEASE TERM PIPELINE CONSTRUCTION INFORMATION:

YEAR	NUMBER OF PIPELINES	TOTAL NUMBER OF CONSTRUCTION DAYS
2019		N/A
2020		
2021		
2022		
2023		
2024		
2025		
2026		
2027		
2028		
2029		

AIR EMISSIONS CUMPUTATION FACTORS

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

Equipment/Emission Factors	units	PM	SOx	NOx	VOC	CO	REF.	DATE
NG Turbines	gms/hp-hr		0.00247	1.3	0.01	0.83	AP42 3.2-1& 3.1-1	10/96
NG 2-cycle lean	gms/hp-hr		0.00185	10.9	0.43	1.5	AP42 3.2-1	10/96
NG 4-cycle lean	gms/hp-hr		0.00185	11.8	0.72	1.6	AP42 3.2-1	10/96
NG 4-cycle rich	gms/hp-hr		0.00185	10	0.14	8.6	AP42 3.2-1	10/96
Diesel Recip. < 600 hp.	gms/hp-hr	1	0.005505	14	1.12	3.03	AP42 3.3-1	10/96
Diesel Recip. > 600 hp.	gms/hp-hr	0.32	0.005505	11	0.33	2.4	AP42 3.4-1	10/96
Diesel Boiler	lbs/bbl	0.084	0.009075	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[2]	0.0015	% weight
Produced Gas(Flares)	3.33	ppm
Produced Oil (Liquid Flaring)	1	% weight

AIR EMISSIONS CALCULATIONS - FIRST YEAR

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
LLOG Exploration Offshore, L	Walker Ridge	21	OCS-G-35893		WR 21 A, B & Alt A		Sue Sachitana	985-801-4300	Drillship

OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
Drilling	PRIME MOVER>600hp diesel	**61,800**	**2,985**	**71,638.56**	24	113	43.56	0.75	1497.36	44.92	326.70	59.07	1.02	2030.42	60.91	443.00
	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
	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
2 x per week	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	6	48	5.07	0.09	174.45	5.23	38.06	0.74	0.01	25.34	0.76	5.53
2x per week	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	10	97	5.07	0.09	174.45	5.23	38.06	2.46	0.04	84.48	2.53	18.43
	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
PIPELINE	PIPELINE LAY BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INSTALLATION	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PIPELINE BURY BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY	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
INSTALLATION	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	RECIP.<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	RECIP.>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	**BPD**	**SCF/HR**	**COUNT**												
	TANK-	0			0	0				0.00					0.00	
	FLARE-		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	PROCESS VENT-		0		0	0				0.00					0.00	
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
DRILLING	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2020	**YEAR TOTAL**						**53.71**	**0.92**	**1846.26**	**55.39**	**402.82**	**62.26**	**1.07**	**2140.24**	**64.21**	**466.96**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES** 145.0											**4828.50**	**4828.50**	**4828.50**	**4828.50**	**93840.63**

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL		CONTACT	PHONE	REMARKS
LLOG Exploration Offshore, L	Walker Ridge	21	OCS-G-35893		WR 21 A, B & Alt A		Sue Sachitana	985-801-4300	Drillship

OPERATIONS	EQUIPMENT	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR					ESTIMATED TONS				
	Diesel Engines	HP	GAL/HR	GAL/D												
	Nat. Gas Engines	HP	SCF/HR	SCF/D												
	Burners	MMBTU/HR	SCF/HR	SCF/D	HR/D	DAYS	PM	SOx	NOx	VOC	CO	PM	SOx	NOx	VOC	CO
Drilling	PRIME MOVER>600hp diesel	**61,800**	**2,985**	**71638.56**	24	80	43.56	0.75	1497.36	44.92	326.70	41.82	0.72	1437.46	43.12	313.63
	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
2 x per week	VESSELS>600hp diesel(crew)	7200	347.76	8346.24	6	34	5.07	0.09	174.45	5.23	38.06	0.52	0.01	17.94	0.54	3.91
2x per week	VESSELS>600hp diesel(supply)	7200	347.76	8346.24	10	69	5.07	0.09	174.45	5.23	38.06	1.74	0.03	59.81	1.79	13.05
	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
PIPELINE INSTALLATION	PIPELINE LAY BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PIPELINE BURY BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	DERRICK BARGE diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MATERIAL TUG diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(crew)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS>600hp diesel(supply)	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	RECIP.<600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	RECIP.>600hp diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SUPPORT VESSEL diesel	0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	TURBINE nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.2 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle lean nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	RECIP.4 cycle rich nat gas	0	0	0.00	0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	BURNER nat gas	0	0.00	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	MISC.	**BPD**	**SCF/HR**	**COUNT**												
	TANK-	0			0	0				0.00					0.00	
	FLARE-		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
	PROCESS VENT-		0		0	0				0.00					0.00	
	FUGITIVES-			0.0		0				0.00					0.00	
	GLYCOL STILL VENT-		0		0	0				0.00					0.00	
DRILLING	OIL BURN	0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	GAS FLARE		0		0	0		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00
2021 YEAR TOTAL							**53.71**	**0.92**	**1846.26**	**55.39**	**402.82**	**44.08**	**0.76**	**1515.22**	**45.46**	**330.59**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES** 145.0											**4828.50**	**4828.50**	**4828.50**	**4828.50**	**93840.63**

AIR EMISSIONS CALCULATIONS

COMPANY	AREA	BLOCK	LEASE	PLATFORM	WELL
LLOG Explorati	Walker Ridge	21	OCS-G-35893		WR 21 A, B & Alt A

Year	Emitted Substance				
	PM	SOx	NOx	VOC	CO
2020	62.26	1.07	728.50	2140.24	466.96
2021	44.08	0.76	1515.22	45.46	330.59
2022	0.00	0.00	0.00	0.00	0.00
2023	0.00	0.00	0.00	0.00	0.00
2024	0.00	0.00	0.00	0.00	0.00
2025	0.00	0.00	0.00	0.00	0.00
2026	0.00	0.00	0.00	0.00	0.00
2027	0.00	0.00	0.00	0.00	0.00
2028	0.00	0.00	0.00	0.00	0.00
Allowable	4828.50	4828.50	4828.50	4828.50	93840.63

APPENDIX H
OIL SPILL INFORMATION
(30 CFR PART 550.219 AND 550.250)

A. Oil Spill Response Planning

All the proposed activities in this Exploration Plan will be covered by the Oil Spill Response Plan filed by LLOG (No. 02058) in accordance with 30 CFR 254, Biennial update found to be in compliance May 29, 2019. The plan was modified by letter dated September 13, 2019 and accepted by BOEM September 18, 2019.

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

B. 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	Pre-Planned Staging Location(s)
Houma, LA	Fort Jackson, LA

C. 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 utilizes Clean Gulf Associates (CGA) as it's 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's (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.

D. Worst-Case Scenario Information

Category	*Regional OSRP*	*EP*
Type of Activity	Exploratory MODU	Exploratory MODU
Facility Surface Location	**Mississippi Canyon Block 386/387**	**Walker Ridge Block 21**
Facility Description	Location Well 001 (Revised Location B)	Location B
Distance to Nearest Shoreline (Miles)	58 miles	145 miles
Volume: Storage Tanks (total) Facility Piping (total) Lease Term Pipeline Uncontrolled Blowout (day) Barging **Potential 24 Hour Volume (bbls)**	**396,602 bbls**	**289,264 bbls**
Type of Liquid Hydrocarbon	Crude Oil	Crude Oil
API Gravity	25º	33°

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 (No. 02058) in accordance with 30 CFR 254, Biennial update found to be in compliance May 29, 2019.

Since 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 (Operator No.02058) in accordance with 30 CFR 254 Biennial update modification approved on August 16, 2018 and since the worst case discharge determined in Exploration Plan for Mississippi Canyon Block 387 is the 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 to be reviewed in Plan R-6763, Revised Exploration Plan, which was approved on November 2, 2018.

The required proprietary data outlined in NTL 2015-N01 is being submitted to BOEM within the Confidential Copy of this Initial Exploration Plan.

LLOG Exploration Offshore, L.L.C., Company No. 02058 will not use any new or unusual technology in responding to an oil spill.

E. Oil Spill Response Discussion

See the following Oil Spill Response Discussion.

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 289,264 barrels of crude oil with an API gravity of 33°.

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 3% probability of impact to the shorelines of Cameron Parish, Louisiana 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.

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 13% or approximately 37,604 barrels of crude oil would be evaporated/dispersed within 24 hours, with approximately 251,660 barrels remaining.

Natural Weathering Data: WR 21, Well Loc B	**Barrels of Oil**
WCD Volume	289,264
Less 13% natural evaporation/dispersion	37,604
Remaining volume	251,660

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 and MSRC spill response equipment, with a total derated skimming capacity of 1,189,841 barrels. Temporary storage associated with skimming equipment equals 415,796 barrels. If additional storage is needed, various storage barges with a total capacity of 1.17 million+ barrels 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 Cameron Parish, Louisiana would depend upon existing environmental conditions. Shoreline protection would include the use of CGA and MSRC near shore and shallow water skimmers with a totaled derated skimming capacity of 294,320 barrels. Temporary storage associated with skimming equipment equals 9,437 barrels. If additional storage is needed, various storage barges with a total capacity 361,000+ bbls may be mobilized and centrally located to provide temporary storage and minimize off-loading time. Onshore response may include the deployment of shoreline boom on beach areas, or protection and sorbent boom on vegetated areas. A Master Service Agreement with AMPOL will ensure access to 63,750 feet of 18" shoreline protection boom. **Figure 2** outlines individual times needed for procurement, load out, travel time to the site and deployment. Strategies would be based upon surveillance and real time trajectories that depict areas of potential impact given actual sea and weather conditions. Applicable Area Contingency Plans (ACPs), Geographic Response Plans (GRPs), and Unified Command (UC) will be consulted to ensure that environmental and special economic resources are correctly identified and prioritized to ensure optimal protection. Shoreline protection strategies depict the protection response modes applicable for oil spill clean-up operations. As a secondary resource, the State of Louisiana Initial Oil Spill Response Plan will be consulted as appropriate to provide detailed shoreline protection strategies and describe necessary action to keep the oil spill from entering Louisiana's coastal wetlands. The UC should take into consideration all appropriate items detailed in Tactics discussion of this Appendix. The UC and their personnel have the option to modify the deployment and operation of equipment to allow for a more effective response to site-specific circumstancess. 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 75 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 Incident Management Team (IMT) 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

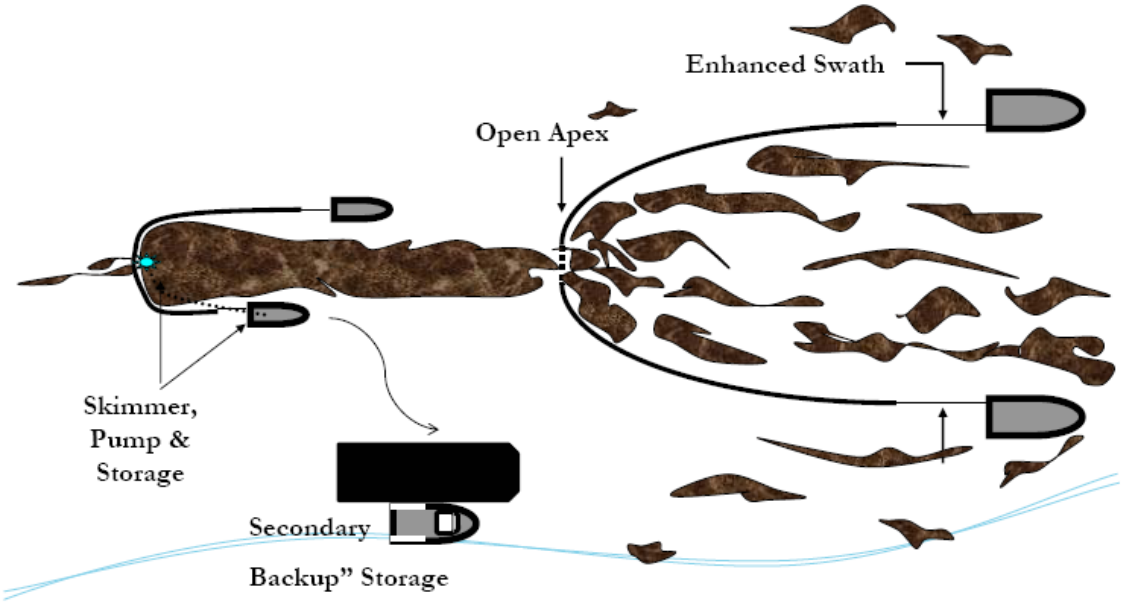
Mechanical Recovery – Deployed on large vessels of opportunity (VOO) the Koseq Rigid Sweeping Arms are high volume surge capacity deployed to increase recovery capacity at the source of a large oil spill in the offshore and outer nearshore environment of the Gulf of Mexico. They are highly mobile and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

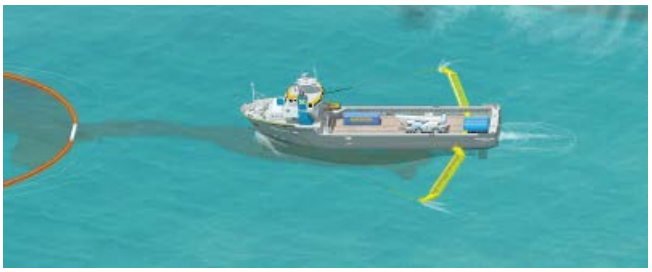
Command and Control – The large OSVs in many cases have state of the art communication and electronic systems, as well as the accommodations to support the function of directing all skimming operations offshore and reporting back to the command post.

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 (%)
WR 21, Well Loc B *145 miles from shore*	G35893	C47	Matagorda, TX Brazoria, TX Galveston, TX Jefferson, TX **Cameron, LA** Vermilion, LA Terrebonne, LA Plaquemines, LA	1 1 2 1 **3** 1 1 1

WCD Scenario– <u>BASED ON WELL BLOWOUT DURING DRILLING OPERATIONS</u> (145 miles from shore)
251,660 bbls of crude oil (Volume considering natural weathering)
API Gravity 33°

FIGURE 2 – Equipment Response Time to WR 21, Well Loc B

Surveillance Aircraft

Name/Type	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to site	Total Hrs
ASI (available through contract with CGA)						
Aero Commander	2	Houma, LA	2	2	1	5
T&T Marine (available through contract with CGA)						
CJ3 Citation	2	Houston/Galveston, TX	2	2	1	5

Dispersant Aircraft

Name/Type	Dispersant Capacity (gal)	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to site	Total Hrs
ASI (available through contract with CGA)							
Basler 67T	2000	2	Houma, LA	2	2	1	5
DC 3	1200	2	Houma, LA	2	2	1.3	5.3
DC 3	1200	2	Houma, LA	2	2	1.3	5.3
MSRC							
C-130 Spray AC	3,250	2	Kiln, MS	4	0	0.8	4.8
King Air BE90 Spray AC	250	2	Kiln, MS	4	0	1.5	5.5

Offshore Response

Offshore Equipment Pre-Determined Staging	EDRC	Storage Capacity	Support Vessel(s)	Persons Required	From	Hrs to Procure	Hrs to Loadout	Hrs to GOM	Travel to Spill Site	Hrs to Deploy	Total Hrs
CGA											
95’ FRV	22885	249	NA	6	Galveston	2	0	2	15	1	20
95’ FRV	22885	249	NA	6	Leeville	2	0	2	8	1	13
95’ FRV	22885	249	NA	6	Venice	2	0	3	8.5	1	14.5
95’ FRV	22885	249	NA	6	Vermilion	2	0	3	8.5	1	14.5
Boom Barge (CGA-300) 42” Auto Boom (25000’)	NA	NA	1 Tug 50 Crew	4 (Barge) 2 (Per Crew)	Leeville, LA	8	0	4	23	2	37
HOSS Barge	76285	4000	3 Tugs	8	Harvey, LA	6	0	12	21	2	41

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
MSRC											
Louisiana Responder 1 Transrec 350*2,640' 67" Curtain Pressure Boom*	10567	4000	NA	14	Fort Jackson, LA	2	0	4.5	12	1	19.5
MSRC 452 Offshore Barge 1 Crucial Disk 88/30*2,640' 67" Curtain Pressure Boom*	11122	45000	3 Tugs	6	Fort Jackson, LA	2.5	0	6	21	1	30.5
Mississippi Responder 1 Transrec 350 *2,640' 67" Curtain Pressure Boom*	10567	4000	NA	14	Pascagoula, MS	2	0	2	20	1	25
MSRC 402 Offshore Barge 1 Crucial Disk 88/30 *2,640' 67" Curtain Pressure Boom*	11122	40300	3 Tugs	6	Pascagoula, MS	2.5	0	3	35	1	41.5
S.T. Benz Responder 1 LFF 100 Brush *2,640' 67" Curtain Pressure Boom*	18086	4000	NA	14	Grand Isle, LA	2	0	1	12	1	16
Gulf Coast Responder 1 Transrec 350 *2,640' 67" Curtain Pressure Boom*	10567	4000	NA	14	Lake Charles, LA	2	0	4	18	1	25
Texas Responder 1 Transrec 350 *2,640' 67" Curtain Pressure Boom*	10567	4000	NA	14	Galveston, TX	2	0	1	21	1	25
MSRC 570 Offshore Barge 1 Crucial Disk 88/30 *2,640' 67" Curtain Pressure Boom*	11122	56900	3 Tugs	6	Galveston, TX	2.5	0	2	36	1	41.5
Southern Responder 1 Transrec 350 *2,640' 67" Curtain Pressure Boom*	10567	4000	NA	14	Ingleside, TX	2	0	1	28	1	32
MSRC 403 Offshore Barge 1 Crucial Disk 88/30 *2,640' 67" Curtain Pressure Boom*	11122	40300	3 Tugs	6	Ingleside, TX	2.5	0	2	49	1	54.5
Florida Responder 1 Transrec 350 *2,640' 67" Curtain Pressure Boom*	10567	4000	NA	14	Miami, FL	2	0	2	54	1	58
MSRC 360 Offshore Barge 1 Crucial Disk 88/30 *1,320' 67" Curtain Pressure Boom*	11122	36000	3 Tugs	6	Tampa, FL	2.5	0	2	63	1	68.5

Offshore Recovered Oil Storage Pre-determined Staging	EDRC	Storage Capacity	Support Vessel(s)	Persons Required	From	Hrs to Procure	Hrs to Loadout	Hrs to GOM	Travel to Spill Site	Hrs to Deploy	Total Hrs
Kirby Offshore (available through contract with CGA and/or MSRC)											
RO Barge	NA	80000+	1 Tug	6	Venice, LA	34	0	4	21	1	60
RO Barge	NA	100000+	1 Tug	6	Venice, LA	34	0	4	21	1	60
RO Barge	NA	100000+	1 Tug	6	Venice, LA	34	0	4	21	1	60
RO Barge	NA	100000+	1 Tug	6	Venice, LA	34	0	4	21	1	60
RO Barge	NA	100000+	1 Tug	6	Venice, LA	34	0	4	21	1	60
RO Barge	NA	110000+	1 Tug	6	Venice, LA	34	0	4	21	1	60
RO Barge	NA	130000+	1 Tug	6	Venice, LA	34	0	4	21	1	60
RO Barge	NA	140000+	1 Tug	6	Venice, LA	34	0	4	21	1	60
RO Barge	NA	150000+	1 Tug	6	Venice, LA	34	0	4	21	1	60
RO Barge	NA	160000+	1 Tug	6	Venice, LA	34	0	4	21	1	60

Staging Area: Fourchon

Offshore Equipment Preferred Staging	EDRC	Storage Capacity	Support Vessel(s)	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Site	Hrs to Deploy	Total Hrs
CGA											
FRU (1) + 100 bbl Tank (2)	4251	200	1 Utility	6	Vermilion	2	6	5.5	13	1	27.5
FRU (1) + 100 bbl Tank (2)	4251	200	1 Utility	6	Galveston	2	6	12	13	1	34
FRU (1) + 100 bbl Tank (2)	4251	200	1 Utility	6	Aransas Pass	2	6	16.5	13	1	38.5
FRU (1) + 100 bbl Tank (2)	4251	200	1 Utility	6	Lake Charles	2	6	7	13	1	29
FRU (3) + 100 bbl Tank (6)	12753	600	3 Utility	18	Leeville	2	6	2	13	1	24
FRU (2) + 100 bbl Tank (4)	8502	400	2 Utility	12	Venice	2	6	5	13	1	27
T&T Marine (available through direct contract with CGA)											
Aqua Guard Triton RBS (1)	22323	2000	1 Utility	6	Galveston	4	12	12	13	2	43
Aqua Guard Triton RBS (1)	22323	2000	1 Utility	6	Harvey	4	12	3	13	2	34
Koseq Skimming Arms (10) Lamor brush	228850	60000	10 OSV	60	Galveston	24	24	12	13	2	75
Koseq Skimming Arms (6) MariFlex 150 HF	108978	36000	6 OSV	36	Galveston	24	24	12	13	2	75
Koseq Skimming Arms (2) Lamor brush	45770	12000	2 OSV	12	Harvey	24	24	3	13	2	66
Koseq Skimming Arms (4) MariFlex 150 HF	72652	24000	4 OSV	24	Harvey	24	24	3	13	2	66

Offshore Equipment Preferred 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	13	6	46
MSRC											
67” Curtain Pressure Boom (53570’)	NA	NA	14*	7	Houston	1	2	11	13	1	28
1000’ Fire Resistant Boom	NA	NA	3*	6	Galveston	1	4	12	13	6	36
16000’ Fire Resistant Boom	NA	NA	3*	6	Houston	1	4	11	13	6	35
2000’ Hydro Fire Boom	NA	NA	8*	8	Lake Charles	1	4	7	13	6	31

** Utility Boats, Crew Boats, Supply Boats, or Fishing Vessels*

Staging Area: Fourchon

Offshore Equipment Preferred 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
MSRC											
Crucial Disk 56/30 Skimmer (1)	5671	500	1 Utility	6	Ingleside	1	2	17	13	1	34
GT-185 Skimmer w Adaptor (1)	1371	500	1 Utility	6	Ingleside	1	2	17	13	1	34
Foilex 250 Skimmer (1)	3977	500	1 Utility	6	Ingleside	1	2	17	13	1	34
Stress I Skimmer (1)	15840	500	1 Utility	6	Ingleside	1	2	17	13	1	34
Walosep 4 Skimmer (1)	3017	500	1 Utility	6	Ingleside	1	2	17	13	1	34
Crucial Disk 88/30 Skimmer (1)	11122	500	1 Utility	6	Galveston	1	2	12	13	1	29
GT-185 Skimmer w Adaptor (2)	2742	1000	2 Utility	12	Galveston	1	2	12	13	1	29
Walosep 4 Skimmer (1)	3017	500	1 Utility	6	Galveston	1	2	12	13	1	29
Foilex 250 Skimmer (1)	3977	500	1 Utility	6	Galveston	1	2	12	13	1	29
Stress I Skimmer (1)	15840	500	1 Utility	6	Galveston	1	2	12	13	1	29
GT-185 Skimmer w Adaptor (1)	1371	500	1 Utility	6	Port Arthur	1	2	9	13	1	26
Desmi Skimmer (1)	3017	500	1 Utility	6	Lake Charles	1	2	7	13	1	24
Foilex 250 Skimmer (1)	3977	500	1 Utility	6	Lake Charles	1	2	7	13	1	24
GT-185 Skimmer w Adaptor (1)	1371	500	1 Utility	6	Lake Charles	1	2	7	13	1	24
Stress I Skimmer (2)	31680	1000	2 Utility	12	Lake Charles	1	2	7	13	1	24
LFF 100 Brush Skimmer (1) *1,320‘ 67” Curtain Pressure Boom*	18086	1000	1 PSV	14	Lake Charles	1	2	7	13	1	24
LFF 100 Brush Skimmer (1) *1,320‘ 67” Curtain Pressure Boom*	18086	1000	1 PSV	14	Lake Charles	1	2	7	13	1	24
LFF 100 Brush Skimmer (1) *1,320‘ 67” Curtain Pressure Boom*	18086	1000	1 PSV	14	Lake Charles	1	2	7	13	1	24
Transrec 350 Skimmer (1) *1,320‘ 67” Curtain Pressure Boom*	10567	1000	1 PSV	14	Lake Charles	1	2	7	13	1	24
Transrec 350 Skimmer (1) *1,320‘ 67” Curtain Pressure Boom*	10567	1000	1 PSV	14	Lake Charles	1	2	7	13	1	24

Staging Area: Fourchon

Offshore Equipment Preferred 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
MSRC											
GT-185 Skimmer w Adaptor (1)	1371	500	1 Utility	6	Baton Rouge	1	2	4	13	1	21
Stress I Skimmer (1)	15840	500	1 Utility	6	Grand Isle	1	2	1	13	1	18
LFF 100 Brush Skimmer (1) *1,320‘ 67” Curtain Pressure Boom*	10567	1000	1 PSV	14	Houma	1	2	2	13	1	19
GT-185 Skimmer w Adaptor (1)	1371	500	1 Utility	6	Belle Chasse	1	2	3	13	1	20
Walosep W4 Skimmer (1)	3017	500	1 Utility	6	Belle Chasse	1	2	3	13	1	20
Foilex 250 Skimmer (1)	3977	500	1 Utility	6	Belle Chasse	1	2	3	13	1	20
Foilex 200 Skimmer (1)	1989	500	1 Utility	6	Belle Chasse	1	2	3	13	1	20
Crucial Disk 56/30 Skimmer (1)	5671	500	1 Utility	6	Belle Chasse	1	2	3	13	1	20
Desmi Skimmer (1)	3017	500	1 Utility	6	Fort Jackson	1	2	5	13	1	22
Stress I Skimmer (1)	15840	500	1 Utility	6	Fort Jackson	1	2	5	13	1	22
Crucial Disk 88/30 Skimmer (1) *1,320‘ 67” Curtain Pressure Boom*	11122	1000	1 PSV	14	Fort Jackson	1	2	5	13	1	22
Crucial Disk 88/30 Skimmer (1) *1,320‘ 67” Curtain Pressure Boom*	11122	1000	1 PSV	14	Fort Jackson	1	2	5	13	1	22
GT-185 Skimmer (1)	1371	500	1 Utility	6	Pascagoula	1	2	6	13	1	23
Crucial Disk 88/30 Skimmer (1)	11122	500	1 Utility	6	Pascagoula	1	2	6	13	1	23
Stress I Skimmer (1)	15840	500	1 Utility	6	Pascagoula	1	2	6	13	1	23
Stress II Skimmer (1)	3017	500	1 Utility	6	Pascagoula	1	2	6	13	1	23
Stress I Skimmer (1)	15840	500	1 Utility	6	Tampa	1	2	22	13	1	39
Crucial Disk 56/30 Skimmer (1)	5671	500	1 Utility	6	Tampa	1	2	22	13	1	39
GT-185 Skimmer w Adaptor (1)	1371	500	1 Utility	6	Tampa	1	2	22	13	1	39
GT-185 Skimmer w Adaptor (1)	1371	500	1 Utility	6	Miami	1	2	28	13	1	45
Walosep W4 Skimmer (1)	3017	500	1 Utility	6	Miami	1	2	28	13	1	45
Desmi Skimmer (1)	3017	500	1 Utility	6	Miami	1	2	28	13	1	45
Stress I Skimmer (1)	15840	500	1 Utility	6	Miami	1	2	28	13	1	45

Nearshore Response

Nearshore Equipment	EDRC	Storage Capacity	Support Vessel(s)	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Hrs to GOM	Travel to Staging	Hrs to Deploy	Total Hrs
CGA											
46' FRV	15257	65	NA	4	Aransas Pass	2	0	2	16	1	21
46' FRV	15257	65	NA	4	Leeville	2	0	2	8	1	13
46' FRV	15257	65	NA	4	Lake Charles	2	0	2	2.5	1	7.5
46' FRV	15257	65	NA	4	Venice	2	0	2	11	1	16
Mid-Ship SWS	22885	249	NA	4	Leeville	2	0	N/A	48	1	51
Mid-Ship SWS	22885	249	NA	4	Venice	2	0	N/A	48	1	51
Mid-Ship SWS	22885	249	NA	4	Galveston	2	0	N/A	48	1	51
Trinity SWS	21500	249	NA	4	Leeville	2	0	N/A	48	1	51
Trinity SWS	21500	249	NA	4	Lake Charles	2	0	N/A	48	1	51
Trinity SWS	21500	249	NA	4	Vermilion	2	0	N/A	48	1	51
Trinity SWS	21500	249	NA	4	Galveston	2	0	N/A	48	1	51
MSRC											
30 ft. Kvichak *Marco I Skimmer (1)*	3588	24	NA	6	Ingleside, TX	1	1	2	10	0	14
30 ft. Kvichak *Marco I Skimmer (1)*	3588	24	NA	6	Galveston, TX	1	1	2	3	0	7
30 ft. Kvichak *Marco I Skimmer (1)*	3588	24	NA	6	Belle Chasse, LA	1	1	2	11	0	15
30 ft. Kvichak *Marco I Skimmer (1)*	3588	24	NA	6	Pascagoula, MS	1	1	2	16	0	20
MSRC Lightning 2 LORI Brush Pack	5000	50	NA	6	Tampa. FL	2	0	1	36	1	40
MSRC Quick Strike 2 LORI Brush Pack	5000	50	NA	6	Lake Charles, LA	2	0	1	2	1	6

Nearshore Response, cont'd.

Nearshore Equipment	EDRC	Storage Capacity	Support Vessel(s)	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Hrs to GOM	Travel to Staging	Hrs to Deploy	Total Hrs
Enterprise Marine (available through contract with CGA)											
CTCo 2603	NA	25000	1 Tug	6	Amelia, LA	26	0	6	15	1	48
CTCo 2604	NA	20000	1 Tug	6	Amelia, LA	26	0	6	15	1	48
CTCo 2605	NA	20000	1 Tug	6	Amelia, LA	26	0	6	15	1	48
CTCo 2606	NA	20000	1 Tug	6	Amelia, LA	26	0	6	15	1	48
CTCo 2607	NA	23000	1 Tug	6	Amelia, LA	26	0	6	15	1	48
CTCo 2608	NA	23000	1 Tug	6	Amelia, LA	26	0	6	15	1	48
CTCo 2609	NA	23000	1 Tug	6	Amelia, LA	26	0	6	15	1	48
CTCo 5001	NA	47000	1 Tug	6	Amelia, LA	26	0	6	15	1	48
Kirby Offshore (available through contract with CGA and/or MSRC)											
RO Barge	NA	80000+	1 Tug	6	Venice, LA	24	0	4	31	1	60
RO Barge	NA	80000+	1 Tug	6	Venice, LA	24	0	4	31	1	60

Staging Area: Cameron

Nearshore and Inland Skimmers With Staging	EDRC	Storage Capacity	Support Vessel(s)	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	Leeville	2	2	7	2	1	14
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	NA	3	Lake Charles	4	12	2	2	2	22
Foilex Skim Package (TDS 150)	1131	50	NA	3	Galveston	4	12	5	2	2	25
Foilex Skim Package (TDS 150)	1131	50	NA	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
MSRC											
AardVac Skimmer (1)	3840	400	1 Utility	4	Lake Charles	1	1	1	2	0	5
AardVac Skimmer (1)	3840	400	1 Utility	4	Pascagoula	1	1	9.5	2	0	13.5
AardVac Skimmer (2)	7680	800	2 Utility	8	Miami, FL	1	1	31	2	0	35
Queensboro Skimmer (1)	905	400	1 Utility	4	Galveston	1	1	5	2	0	9
Queensboro Skimmer (5)	4525	2000	5 Utility	20	Lake Charles	1	1	1	2	0	5
Queensboro Skimmer (1)	905	400	1 Utility	4	Belle Chasse	1	1	7	2	0	11
Queensboro Skimmer (1)	905	400	1 Utility	4	Pascagoula	1	1	9.5	2	0	13.5
WP 1 Skimmer (1)	3017	400	1 Utility	4	Ingleside	1	1	9.5	2	0	13.5
WP 1 Skimmer (1)	3017	400	1 Utility	4	Pascagoula	1	1	9.5	2	0	13.5
WP 1 Skimmer (1)	3017	400	1 Utility	4	Tampa	1	1	25	2	0	29
WP 1 Skimmer (1)	3017	400	1 Utility	4	Miami	1	1	31	2	0	35

Shoreline Protection

Staging Area: Cameron

Shoreline Protection Boom	VOO	Persons Req.	Storage/Warehouse Location	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Deployment Site	Hrs to Deploy	Total Hrs
AMPOL (available through Letter of Intent)									
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
3,200' 18" Boom	2 Crew	4	Venice, LA	2	2	9	2	2	17
12,750' 18" Boom	7 Crew	14	Port Arthur, TX	2	2	1.5	2	6	13.5

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 Totals	Total (bbls)
Offshore EDRC	1,189,841
Offshore Recovered Oil Storage	1,585,796+
Nearshore / Shallow Water EDRC	294,320
Nearshore / Shallow Water Recovered Oil Storage	370,437+

APPENDIX I
ENVIRONMENTAL MONITORING INFORMATION
(30 CFR PART 550.221 AND 550.252)

A. 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 such as tropical depressions, storms and/or hurricanes entering the Gulf of Mexico.

LLOG also relies on the National Weather Service to support the aforementioned subscribed service. During impending inclement weather conditions, LLOG closely coordinates the activity with our contractors and field personnel to ensure the safety of people for evacuation; measures to prepare the facility for evacuation to ensure protection of the environment and the facility/equipment.

Walker Ridge Block 21 is in water depths greater than 400 meters (1,312'); therefore LLOG will follow the guidelines of the applicable NTL 2018-G01 by monitoring and gathering ocean current data using Acoustic Doppler Current Profile (ADCP) while the MODU is on location.

B. Incidental Takes

LLOG does not anticipate the incidental taking of any species as a result of the proposed activities based on the implementation of, and adherence to, the BSEE NTL No. 2015-G03 "Marine Trash and Debris Awareness Training and Elimination" and BOEM NTL No. 2012-G01-JOINT "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting", and BOEM NTL No. 2004-G01 "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program".

C. Flower Garden Banks National Marine Sanctuary

This section of the plan is not applicable to the proposed operations.

APPENDIX J
LEASE STIPULATIONS/SPECIAL CONDITIONS INFORMATION
(30 CFR PART 550.222 AND 550.253)

A. Lease Stipulations

Minerals Management Service (BOEM) invoked Stipulation No. 8 – Protected Species on Lease OCS-G-35893, Walker Ridge Block 21.

Lease Stipulation No. 8 is to reference measures to minimize or avoid potential adverse impacts to protected species (sea turtles, marine mammals, gulf sturgeon, and other federally protected species). BOEM has issued Notice to Lessees BOEM NTL No. 2016-G02 "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program", BSEE NTL No. 2015-G03 "Marine Trash and Debris Awareness Training and Elimination"; BOEM NTL No. 2012-G01-JOINT "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting"; BOEM NTL No. 2016-G02 "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program."

APPENDIX K
ENVIRONMENTAL MITIGATION MEASURES INFORMATION
(30 CFR Part 550.23 and 550.54)

A. Measures Taken to Avoid, Minimize, and Mitigate Impacts

This section does not apply to the operations as proposed herein.

B. Incidental Takes

LLOG does not anticipate the incidental taking of any species as a result of the proposed activities based on the implementation of, and adherence to, the BSEE NTL No. 2015-G03 "Marine Trash and Debris Awareness Training and Elimination"; BOEM NTL No. 2012-G01-JOINT "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting"; and BOEM NTL No. 2016-G02 "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program".

APPENDIX L
RELATED FACILITIES AND OPERATIONS INFORMATION
(30 CFR PART 550.256)

A. Produced Liquid Hydrocarbon Transportation Vessels

Not applicable to proposed operations.

APPENDIX M
SUPPORT VESSELS AND AIRCRAFT INFORMATION
(30 CFR PART 550.224 AND 550.257)

A. General

Personnel involved in the proposed operations will typically use their own vehicles as transportation to and from the selected onshore base; whereas the selected vendors will transport the equipment by a combination of trucks, boats and/or helicopters to the onshore base. The personnel and equipment will then be transported to the drilling rig via the transportation methods and frequencies shown, taking the most direct route feasible as mandated by weather and traffic conditions:

Drillship and DP Semisubmersible Rig:

Type	Maximum Fuel Tank Storage Capacity	Maximum No. 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 gallons	1	As Needed

B. Diesel Oil Supply Vessels

Size of Fuel Supply Vessel	Capacity of fuel Supply Vessel	Frequency of Fuel Transfers	Route Fuel Supply Vessel Will Take
180' OSV	1900 bbls	1/weekly	Fourchon, LA to **Walker Ridge Block 21**

C. Drilling Fluids Transportation

See Table 2 – Wastes you will Transport and/or Dispose of Onshore, located in Appendix F of this Plan.

D. Solid and Liquid Wastes Transportation

See Table 2 – Wastes you will Transport and/or Dispose of Onshore, located in Appendix F of this Plan.

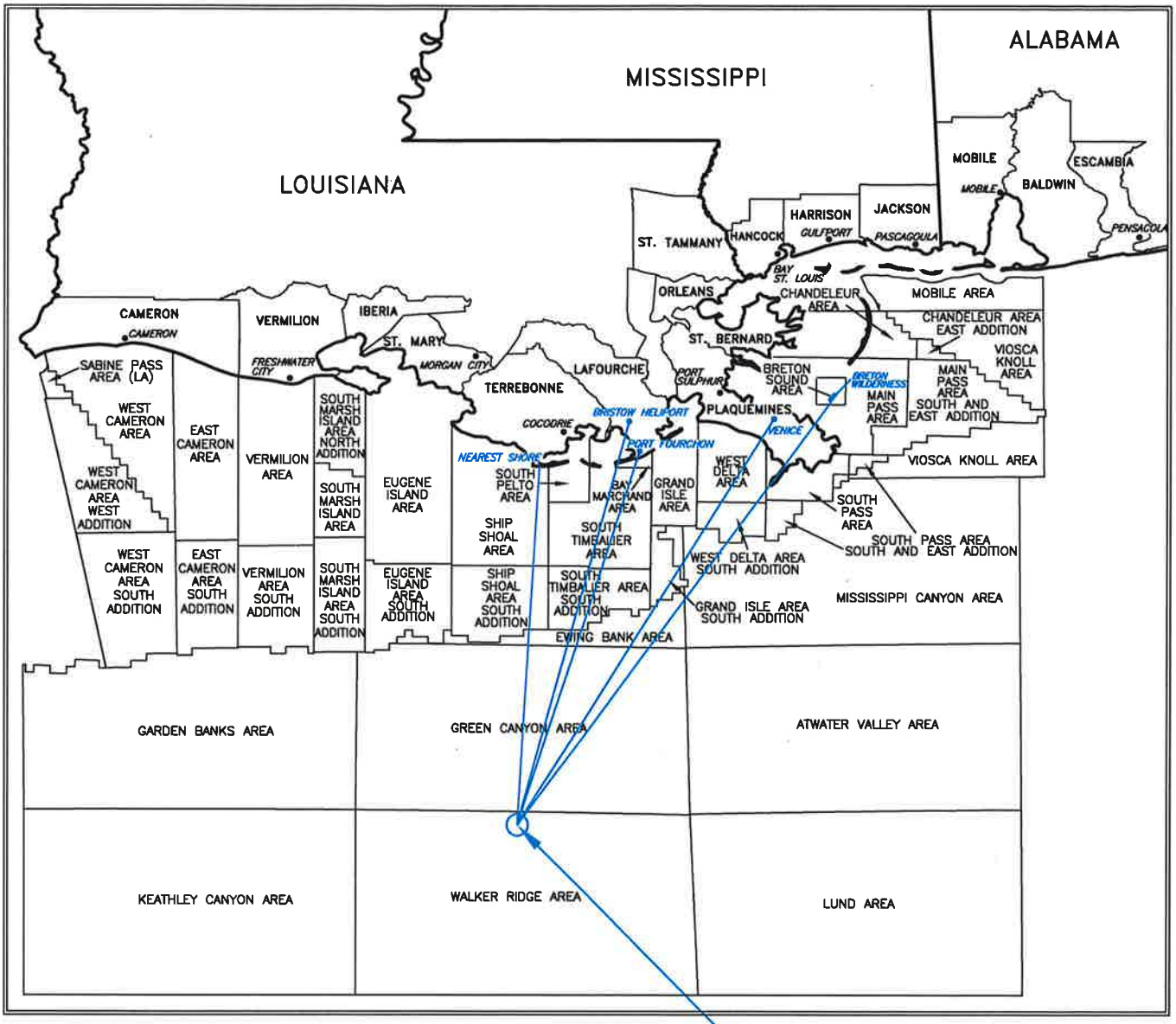
E. Vicinity Map

Vicinity Plat showing the location of **Walker Ridge Block 21** relative to the nearest shoreline and onshore base is included as ***Attachment M-1.***

Vicinity Map

Attachment M-1
(Public Information)

LOUISIANA GULF COAST INDEX
BOEM O.C.S. LEASING AREAS



VICINITY MAP

WELLS 'A', 'A' ALT & 'B'

~145 STATUTE (126 NAUTICAL) MILES TO TERREBONNE PARISH (NEAREST SHORE)
~156 STATUTE (136 NAUTICAL) MILES TO PORT FOURCHON, LA
~175 STATUTE (152 NAUTICAL) MILES TO BRISTOW HELIPORT, GALLIANO, LA
~187 STATUTE (163 NAUTICAL) MILES TO VENICE, LA
326 KILOMETERS TO BRETON WILDERNESS

COORDINATE TO NEAREST POINT ON SHORELINE X = 2,337,330 Y = 10,544,939.

THE DISTANCES SHOWN HEREON ARE FROM THE PROPOSED WELL TO THE NEAREST COASTLINE POINT AS OBTAINED FROM NOAA, ENTITLED NOAA MEDIUM RESOLUTION SHORELINE. <HTTP://SHORELINE.NOAA.GOV/DATA/DATASHEETS/MEDRES.HTML>.

SHEET 1 OF 1

DATUM: NAD 27
SPHEROID: CLARKE 1866
PROJECTION: U.T.M.
ZONE: 15

Echo OFFSHORE LLC
36499 Perkins Road
Prairieville, Louisiana 70769
Tel: 225-673-2163

LLOG EXPLORATION OFFSHORE, L.L.C.

LLOG exploration

EXPLORATION PLAT

PROPOSED WELLS 'A', 'A' ALT & 'B'
OCS-G 35893 BLOCK 21
WALKER RIDGE AREA

GULF OF MEXICO

DRAWN BY:	DATE:	CHECKED BY:	DRAWING No.:
JFL	09/04/2019	RJN	18-013 EXP
REV. DATE:	REV. No.:	SCALE: N.T.S.	JOB No.: 18-013-41

APPENDIX N
ONSHORE SUPPORT FACILITIES INFORMATION
(30 CFR PART 550.225 AND 550.258)

A. General

The proposed surface disturbances in **Walker Ridge Block 21** will be located approximately 145 statute miles from the nearest Louisiana shoreline, and approximately 156 statute miles from the following onshore support base and 175 statute miles from Bristow Heliport and the proposed surface disturbances:

Name	Location	Existing/New/Modified
GIS Yard	Fourchon, LA	Existing
Bristow US LLC – Heliport	Venice, LA	Existing

LLOG will use an existing onshore base to accomplish the following routine operations:

- Loading/Offloading point for equipment supporting the offshore operations.
- Dispatching personnel and equipment, and does not anticipate the need for any expansion of the selected facilities as a result of the activities proposed in this Initial Plan.
- Temporary storage for materials and equipment.
- 24 Hour Dispatcher

B. Support Base Construction or Expansion

The proposed operations are temporary in nature and do not require any immediate action to acquire additional land or expand existing base facilities.

C. Support Base Construction or Expansion Timetable

This section of the plan is not applicable to the proposed operations.

D. Waste Disposal

See Table 2 – Wastes you will Transport and/or Dispose of Onshore, located in Appendix F of this Plan.

APPENDIX O
COASTAL ZONE MANAGEMENT ACT (CZMA) INFORMATION
(30 CFR PART 550.226 AND 550.260)

A. Consistency Certification

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A certificate of Coastal Zone Management Consistency for the State of Louisiana is enclosed as ***Attachment O-1***

B. Other Information

LLOG has considered all of Louisiana's enforceable policies and certifies the consistency for the proposed operations.

Coastal Zone Management Consistency Statement for the States of Louisiana

Attachment O-1
(Public Information)

Initial Exploration Plan
OCS-G-35893 Lease
Walker Ridge Block 21

COASTAL ZONE MANAGEMENT CONSISTENCY CERTIFICATION

INITIAL EXPLORATION PLAN

OCS-G-35893 Lease
WALKER RIDGE BLOCK 21

The proposed activities described in detail in the enclosed Initial Exploration Plan comply with Louisiana's approved Coastal Zone Management Program and will be conducted in a manner consistent with such Program.

By: **LLOG Exploration Offshore, L.L.C., Operator**

Signed by: Carol Eaton

Carol Eaton, Certifying Official

Date: **October 3, 2019**

APPENDIX P
ENVIRONMENTAL IMPACT ANALYSIS
(30 CFR PART 550.227 AND 550.261)

A. Impact Producing Factors (IPF's) From Proposed Activities

The following matrix is utilized to identify the affected environments that could be impacted by these IPF's. An "x" has been marked for each IPF category that LLOG has determined may impact a particular environment as a result of the proposed activities. For those cells which are footnoted, a statement is provided as to the applicability of the proposed activities, and where there may be an effect, an analysis of the effect is provided.

Environmental Resources	Impact Producing Factors (IPF's)					
	Emissions (air, noise, light, etc)	Effluents (muds, cuttings, other discharges to the water column or seafloor)	Physical disturbances to the seafloor (rig, anchor, structure emplacement, etc.)	Wastes sent to shore for treatment or disposal	Accidents (e.g., oil spills, chemical spills, H2S releases)	Other IPF's you Identify
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)	
Chemosynthetic communities			(4)		X	
Water quality		X	X		X	
Fisheries		X	X		X	
Marine mammals	X (8)	X		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		X (6)	
Marine and pelagic birds	X				X	X
Public health and safety					(5)	
Coastal and Onshore						
Beaches					X (6)	
Wetlands					X (6)	
Shorebirds and coastal nesting birds					X (6)	
Coastal wildlife refuge					X	
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:
    (a) 4-mile zone of the Flower Gardens Banks, or the 3-mile zone of Stetson Bank;
    (b) 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;
    (c) Essential Fish Habitat (EFH) criteria of 500 feet from any no-activity zone; or
    (d) Proximity of any submarine bank (500 ft buffer zone) with relief greater than 2 meters that is not protected by the Topographic 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 BOEMRE 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 BOEMRE as having high-probability for the occurrence of shipwrecks or prehistoric sites, including such blocks that will be affected that are adjacent to the lease block in which your planned activity will occur. If the proposed activities are located a sufficient distance from a shipwreck or prehistoric site that no impact would occur, the EIA can note that in a sentence or two.
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. Impact Analysis

LLOG does not anticipate any unforeseen incidents from the proposed activities which could significantly impact the associated environment. LLOG activities associated with this Exploration Plan (Plan) will be performed with prudent and industry accepted standards, and in compliance with the federal agency regulations and oversight.

The "Oil Spills Information" Section of this Plan details the potential worse case discharge volume which has been calculated based on the new Bureau of Ocean Energy Management, Regulation and Enforcement (BOEM) Notice to Lessees (NTL 2015-N01). Response details associated with an unanticipated spill from this site are detailed in our Regional Oil Spill Response Plan (OSRP) which outlines the potential spill scenario, spill volumes, anticipated trajectory of the spill, response equipment available, and actions to be taken to respond to the potential spill incident. Additional measures implemented by LLOG is trajectory analyses to be obtained prior to and during the proposed activities, contractual arrangements with well control specialists and preliminary reviews of potential well intervention scenarios, and to supplement existing contracted response/clean-up equipment with equipment offered by Helix which specializes in subsea deepwater well intervention, containment and processing.

Site Specific at Offshore Location

- **Designated Topographic Features**

There are no anticipated emissions, effluents, physical disturbances to the seafloor, wastes transported to shore, and/or accidents from the proposed activities that could cause impacts to topographic features.

The proposed surface disturbances within Walker Ridge Block 21 will not impact any topographic features within Walker Ridge 21 since the area is primarily flat within the 2,000' well radius; therefore, no adverse impacts are expected during the planned operations.

In the event of an unanticipated spill, LLOG would immediately implement its Regional Oil Spill Response Plan and active source control and countermeasures to minimize these potential impacts.

- **Pinnacle Trend Area Live Bottoms**

  There are no anticipated emissions, effluents, physical disturbances to the seafloor, wastes sent to shore and/or accidents from the proposed activities that could cause impacts to a pinnacle trend area.

  The nearest pinnacle trend live bottom stipulation occurs in the Viosca Knoll Area. The proposed surface disturbances within **Walker Ridge Block 21** are located southeast of Viosca Knoll Area Block 778, the nearest block where the Live Bottom (Pinnacle Trend) Stipulation applies. After review of impact-producing factors resulting from activities proposed in this Exploration Plan, there are no potential impacts to pinnacle trend live bottoms.

  During the surface location disturbance review, LLOG reviews potential surface impacts, and would be able to identify any pinnacles within the vicinity and would avoid placement of any surface disturbances such as a drilling rig and associated anchors. These surface location disturbance areas would be avoided and/or mitigated during the review and approval process by the BOEM.

  In the event of an unanticipated spill, LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Eastern Gulf Live Bottoms**

  There are no anticipated emissions, effluents, emissions physical disturbances to the seafloor, wastes sent to shore, and/or accidents from the proposed activities that could cause impacts to Eastern Gulf live bottoms.

  The proposed surface disturbances within **Walker Ridge Block 21** are located west of the nearest block protected by the eastern live bottom stipulation. After review of impact-producing factors resulting from activities proposed in this Exploration Plan, there are no potential impacts to eastern gulf live bottoms. During the surface location disturbance review, LLOG previews potential surface impacts, and would be able to identify any live bottom areas within the vicinity and would avoid placement of any surface disturbances such as a drilling rig and associated anchors.

  In the event of an unanticipated spill, LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Chemosynthetic Communities**

  Water depths at the surface locations in **Walker Ridge Block 21** range from 5,429 to 6,422 feet. As noted in the shallow hazards assessment benthic communities have not been reported in the seafloor assessment area within 2,000' of the surface locations.

- **Water Quality**

  Bottom disturbances which may result based on placement of drilling rigs during an exploratory phase could increase water column turbidity and redistribution of any accumulated pollutants in the water column; which could cause temporary impacts on water quality conditions in the immediate vicinity.

  Associated overboard effluents are regulated by the EPA Region VI NPDES General Permit GMG290000 which mandates volume discharge rate limitations, certain testing requirements for toxicity and oil and grease limitations. As such, it is not anticipated these discharges authorized under the approved EPA NPDES permit will cause significant adverse impacts to water quality.

  Certain wastes generated from the proposed activities will be manifested and sent to shore for treatment and/or disposal at approved facilities. Other waste which may be considered hazardous will be collected and transported in sealed containers and transported to approve disposal sites in accordance with the RCRA regulations and guidelines.

  An accidental oil spill release from the proposed activities, and cumulative similar discharge activity within the vicinity could potentially cause temporary impacts to water quality. In the event of such a release, the water quality would be temporarily affected by the dissolved components and small droplets. Currents and microbial degradation would remove the oil from the water column or dilute the constituents to background levels.

  In the event of an unanticipated blowout, LLOG will implement industry wide standards for using proven equipment and technology for such responses. LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Fisheries**

  Accidental oil spill releases from the proposed activities, and cumulative similar discharge activity within the vicinity may potentially cause some detrimental effects on fisheries. It is unlikely a spill would occur; however, such a release in open waters closed to mobile adult finfish or shellfish would likely be sub-lethal and the extent of damage would be reduced to the capability of adult fish and shellfish to

avoid a spill, to metabolize hydrocarbons, and to excrete both metabolites and parent compounds.

In the event of an unanticipated spill, LLOG will implement industry wide standards for using proven equipment and technology for such responses. LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Marine Mammals**

GulfCet II studies reveal that cetaceans of the continental shelf and shelf edge are comprised of bottlenose dolphin and Atlantic spotted dolphin. Squid eaters, including dwarf and pygmy killer whale, Risso's dolphin and Cuvier's beaked whale occur most frequently along the upper slope in areas outside of anticyclones.

As a result of the proposed activities, marine mammals may be adversely impacted by emissions, effluents, waste sent to shore and/or accidents.

Chronic and sporadic sub-lethal effects would occur that may stress and/or weaken individuals of a local group or population and make them more susceptible to infection from natural or anthropogenic sources. Few lethal effects are expected from an accidental oil spill, chance collisions with service vessels and ingestion of plastic material.

The net results of any disturbance would depend on the size and percentage of the population affected, ecological importance of the disturbed area, environmental and biological parameters that influence an animal's sensitivity to disturbance and stress, and the accommodation time in response to prolonged disturbance (Geraci and St. Aubin, 1980). Collisions between cetaceans and ship could cause serious injury or death (Laist et al., 2001).

Sperm whales are one of 11 whale species that are hit commonly by ships (Laist et al., 2001). Collisions between OCS vessels and cetaceans within the project area are expected to be unusual events.

LLOG does not anticipate the incidental taking of any marine mammals as the result of the proposed activities. The proposed activities will be conducted by our company and its contractors under the additional criteria addressed in BSEE NTL No. 2015-G03 "Marine Trash and Debris Awareness Training and Elimination", BOEM NTL No. 2012-G01-JOINT "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting" and BOEM NTL 2016-G02 "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program." The proposed operations will be conducted in accordance with the regulations via manifesting waste sent to shore and ensuring such wastes are contained to prevent loss. Informational placards will be maintained on the facility, and LLOG and the

associated contractors obtain training on at least an annual basis to ensure personnel are aware of the reporting and operational requirements.

LLOG will conduct the proposed activities under EPA's Region VI NPDES General Permit GMG290000 which authorizes the discharge of certain effluents, subject to certain limitations, prohibitions and recordkeeping requirements. As such, it is not anticipated these discharges authorized under the approved EPA NPDES permit will not cause significant adverse impacts to water quality.

In the event of an unanticipated blowout, LLOG will implement industry wide standards for using proven equipment and technology for such responses. LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Sea Turtles**

Small numbers of turtles could be killed or injured by chance collision with service vessels or by eating indigestible trash, particularly plastic items accidentally lost from drilling rigs, production facilities and service vessels. Drilling rigs and project vessels produce noise that could disrupt normal behavior patterns and create some stress to sea turtles, making them more susceptible to disease. Accidental oil spill releases are potential threats which could have lethal effects on turtles. Contact and/or consumption of this released material could seriously affect individual sea turtles. Most OCS related impacts on sea turtles are expected to be sub-lethal. Chronic and/or avoidance of affected areas could cause declines in survival or productivity, resulting in gradual population declines.

LLOG will conduct the proposed activities under EPA's Region VI NPDES General Permit GMG290000 which authorizes the discharge of certain effluents, subject to certain limitations, prohibitions and recordkeeping requirements. As such, it is not anticipated these discharges authorized under the approved EPA NPDES permit will not cause significant adverse impacts to water quality.

Additionally, LLOG and its contractors will conduct the proposed activities under the additional criteria addressed by BSEE NTL No. 2015-G03 "Marine Trash and Debris Awareness Training and Elimination", BOEM NTL No. 2012-G01-JOINT "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting" and BOEM NTL 2016-N03 "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program." The proposed operations will be conducted in accordance with the regulations via manifesting waste sent to shore and ensuring such wastes are contained to prevent loss. Informational placards will be maintained on the facility, and LLOG and the associated contractors obtain training on at least an annual basis to ensure personnel are aware of the reporting and operational requirements.

In the event of an unanticipated blowout, LLOG will implement industry wide standards for using proven equipment and technology for such responses. LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Air Quality**

  The proposed activities are located approximately 145 miles to the nearest shoreline. LLOG has addressed the air quality issues associated with the proposed activities in the "Air Emissions Information" section of this Plan as a result of the proposed activities.

- **Ship Wreck Sites (Known or Potential)**

  There are no physical disturbances to the seafloor which could impact known or potential shipwreck sites, as the review of high resolution shallow hazards data indicate there are no known or potential shipwreck sites located within the survey area. As such, LLOG does not anticipate any IPF's as a result of the proposed activities.

- **Prehistoric Archaeological Sites**

  There are no physical disturbances to the seafloor which could cause impacts to prehistoric archaeological sites, as the review of high resolution shallow hazards data and supporting studies did not reflect the occurrence of prehistoric archaeological sites. As such LLOG does not anticipate any IPF's as a result of the proposed activities.

Vicinity of Offshore Location

- **Essential Fish Habitat**

  As a result of the proposed activities, essential fish habitat may be adversely impacted by effluents and/or accidents.

  An Accidental oil spill that may occur as a result of the proposed activities has potential to cause some detrimental effects on essential fish habitat. It is unlikely that an accidental oil spill release would occur; however, if a spill were to occur in close proximity to finfish or shellfish, the effects would likely be sub-lethal and the extent of damage would be reduced to the capability of adult fish and shellfish to avoid a spill, to metabolize hydrocarbons and to excrete both metabolites and parent compounds.

In the event of an unanticipated blowout, LLOG will implement industry wide standards for using proven equipment and technology for such responses. LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Marine and Pelagic Birds**

  As a result of the proposed activities, marine and pelagic birds may be adversely impacted by an accidental oil spill, by the birds coming into contact with the released oil.

  In the event of an unanticipated blowout resulting in an oil spill, it is likely to have an impact based on the industry wide standards for using proven equipment and technology for such responses. In that event, LLOG will implement the Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Public Health and Safety**

  There are no anticipated emissions, effluents, wastes sent to shore, and/or accidents from the proposed activities that could cause impacts to the public health safety. LLOG has requested BOEM approval to classify the proposed objective area as absent of hydrogen sulfide.

Coastal and Onshore

- **Beaches**

  As a result of the proposed activities, beaches may be adversely impacted by an accidental oil spill. However, due to the distance from shore (approximately 145 miles), and the response capabilities that would be implemented, no significant adverse impacts are expected. Both historical spill data and the combined trajectory/risk calculations referenced in the publication of OCS EIA/EA BOEM 2017-009 indicate there is little risk of contact or impact to the coastline and associated environmental resources.

  In the event of an unanticipated blowout, LLOG will implement industry wide standards for using proven equipment and technology for such responses. LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Wetlands**

  As a result of the proposed activities, wetlands may be adversely impacted by an accidental oil spill. However, due to the distance from shore (approximately 145 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. Both historical spill data and the combined trajectory/risk calculations referenced in the publication of OCS EIA/EA BOEM 2017-009 indicate there is little risk of contact or impact to the coastline and associated environmental resources.

  In the event of an unanticipated blowout, LLOG will implement industry wide standards for using proven equipment and technology for such responses. LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Shore Birds and Coastal Nesting Birds**

  As a result of the proposed activities, shore birds and coastal nesting birds may be adversely impacted by an accidental oil spill. However, due to the distance from shore (approximately 145 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. Both historical spill data and the combined trajectory/risk calculations referenced in the publication of OCS EIA/EA BOEM 2017-009 indicate there is little risk of contact or impact to the coastline and associated environmental resources.

  In the event of an unanticipated blowout, LLOG will implement industry wide standards for using proven equipment and technology for such responses. LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Coastal Wildlife Refuges**

  As a result of the proposed activities, coastal wildlife refuges may be adversely impacted by an accidental oil spill. However, due to the distance from shore (approximately 145 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. Both historical spill data and the combined trajectory/risk calculations referenced in the publication of OCS EIA/EA BOEM 2017-009 indicate there is little risk of contact or impact to the coastline and associated environmental resources.

  In the event of an unanticipated blowout, LLOG will implement industry wide standards for using proven equipment and technology for such responses. LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

- **Wilderness Area**

  As a result of the proposed activities, wilderness areas may be adversely impacted by an accidental oil spill. However, due to the distance from shore (approximately 145 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. Both historical spill data and the combined trajectory/risk calculations referenced in the publication of OCS EIA/EA BOEM 2017-009 indicate there is little risk of contact or impact to the coastline and associated environmental resources.

  In the event of an unanticipated blowout, LLOG will implement industry wide standards for using proven equipment and technology for such responses. LLOG would immediately implement its Regional Oil Spill Response Plan and activate source control and countermeasures to minimize these potential impacts.

Other Resources Identified

LLOG has not identified any other environmental resources other than those addressed above.

C. Impacts of Proposed Activities

LLOG does not anticipate any impacts on the offshore site specific locations, offshore vicinity, and/or coastal and onshore environmental conditions based on the potential impacts identified in the EIA worksheets and historical operations in the exploration of this reservoir.

D. Environmental Hazards

The Gulf of Mexico may experience several hurricanes throughout the season which typically runs from June through November. A severe hurricane may impact the activities covered in this Plan. Such impacts may be damage to the drilling rig, the unanticipated release of hydrocarbons depending upon the current status of the well. Additionally, the surfaces located in **Walker Ridge Block 21** has the potential to be affected by the "Loop Current" which is a warm ocean current in the Gulf of Mexico that flows northward between Cuba and the Yucatan Peninsula, moves northward into the Gulf of Mexico, then loops east and south before exiting to the east through the Florida Straits. While the loop current is present approximately 95% of the time, it is most active in the summer and fall seasons.

To mitigate potential impacts to the well during impending hurricanes or loop currents, LLOG will take precautionary measures by securing the well, rig and evacuation of personnel; and will comply with the requirements of NTL's 2008-G09 and 2009-G10.

E. Alternatives

LLOG did not consider any alternatives to reduce environmental impacts as a result of the proposed activities.

F. Mitigation Measures

LLOG will not implement any mitigation measures to avoid, diminish or eliminate potential environmental resources, other than those required by regulation and policy.

G. Consultation

LLOG has not contacted any agencies or persons for consultation regarding potential impacts associated with the proposed activities. Therefore, a list of such entities is not being provided.

H. Preparers

Questions or requests for additional information should be made to LLOG's authorized representative of this Plan:

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I. References

The following documents were utilized in preparing the Environmental Impact Assessment:

Shallow Hazards Assessment and Benthic Communities Evaluation, Block 21, Walker Ridge Area	Berger Geosciences, LLC	2019
BOEM Environmental Impact Statement Report No. 2017-009	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2017
Title 30 CFR Part 250 Subpart B (250.216 / 250.221 / 250.223 / 250.227	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2006
NTL 2000-G16 "Guidelines for General Lease Surety Bonds"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2000
NTL 2005-G07 "Archaeological Resource Surveys and Reports"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2005
BOEM NTL No. 2016-G02 "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2016
BSEE NTL No. 2015-G03 "Marine Trash and Debris Awareness Training and Elimination"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2015
BOEM NTL No. 2016-G01 "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2016
NTL 2008-G04 "Information Requirements for Exploration Plans and Development Operations Coordination Documents"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2008
NTL 2008-N05 "Guidelines for Oil Spill Financial Responsibility for Covered Offshore Facilities"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2008
Joint NTL 2011-G01 "Revisions to the List of OCS Lease Blocks Requiring Archaeological Resource Surveys and Reports"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2011
NTL 2009-G27 "Submitting Exploration Plans and Development Operations Coordination Documents"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2009
NTL 2009-G29 "Implementation Plan for Transition from North American Datum 27 to North American Datum 83"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2009
NTL 2009-G31 "Hydrogen Sulphide"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2009
NTL 2009-G34 "Ancillary Activities"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2009
BOEM NTL 2012-G01 "Drilling Windows, Eastern Gulf of Mexico"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2012
NTL 2009-G39 "Biologically-Sensitive Underwater Features and Areas"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2009
NTL 2009-G40 "Deepwater Benthic Communities"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2009
NTL 2015-N01 "Information Requirements for EP's, DOCD's, DPP on the OCS"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2015
NTL 2016-N01 "Requiring Additional Security"	Bureau of Ocean Energy Management	2016
NPDES General Permit GMG290000	EPA – Region VI	2017
Regional Oil Spill Response Plan	LLOG Exploration Offshore, L.L.C.	2018
NTL 2018-G01 "Ocean Current Monitoring"	Bureau of Ocean Energy Management/Bureau of Safety and Environmental Enforcement	2018

APPENDIX Q
ADMINISTRATIVE INFORMATION
(30 CFR Part 550.228 and 550.262)

A. Exempted Information Description (Public Information Copies only)

Excluded from the Public Information copies are the following:

- Proposed bottom hole location information
- Proposed total well depths (measured and true vertical depth)
- Production Rates and Life of Reserves
- New and Unusual Technologies
- Geological and Geophysical Attachments

B. Bibliography

The following documents were utilized in preparing this Plan:

Document	Author	Dated
Shallow Hazards Assessment and Benthic Communities Evaluation, Block 21, Walker Ridge Area	Berger Geosciences, LLC	2019
BOEM Environmental Impact Statement Report – No. 2017-009	Bureau of Ocean Energy Management, Regulation, and Enforcement	2017
Regional Oil Spill Response Plan	LLOG Exploration Offshore, L.L.C.	2018