UNITED STATES GOVERNMENT
MEMORANDUM

February 16, 2021

To: Public Information

From: Plan Coordinator, OLP, Plans Section (GM 235D)

Subject: Public Information copy of plan

Control #	-	Control N-10152
Type	-	Initial Exploration Plan
Lease(s)	-	OCS-G 35655 Block - 166 Green Canyon Area OCS-G 36980 Block - 167 Green Canyon Area
Operator	-	EnVen Energy Ventures
Description	-	Subsea Wells E, F & G
Rig Type	-	Drillship or DP semi-submersible

Attached is a copy of the subject plan.

It has been deemed submitted and is under review for approval.

Nicole Martinez
Plan Coordinator

JOINT SUPPLEMENTAL/INITIAL EXPLORATION PLAN

GREEN CANYON BLOCKS 166/167

LEASES NO. OCS-G 35655/36980

OFFSHORE, LOUISIANA

Public Data

Prepared By:

Cheryl Powell
EnVen Energy Ventures, LLC
609 Main Street, St. 3200
Houston, Texas 77002
713-335-7041
cpowell@enven.com

Date of Submittal: January 29, 2021
Estimated Start-up Date: October 1, 2021

Cheryl Powell

From: notification@pay.gov
Sent: Thursday, January 28, 2021 3:06 PM
To: Cheryl Powell
Subject: Pay.gov Payment Confirmation: BOEM Exploration Plan - BF


An official email of the United States government

Your payment has been submitted to the designated government agency through Pay.gov and the details are below. Please note that this is just a confirmation of transaction submission. To confirm that the payment processed as expected, you may refer to your bank statement on the scheduled payment date. If you have any questions or wish to cancel this payment, you will need to contact the agency you paid at your earliest convenience.

Application Name: BOEM Exploration Plan - BF
Pay.gov Tracking ID: 26R3MC6M
Agency Tracking ID: 76071922990

Account Holder Name: EnVen Energy Ventures, LLC
Transaction Type: ACH Debit
Transaction Amount: $3,673.00
Payment Date: 01/29/2021

Account Type: Business Checking
Routing Number: 265270413
Account Number: **********5742

Transaction Date: 01/28/2021 04:06:16 PM EST
Total Payments Scheduled: 1
Frequency: OneTime

Region: Gulf of Mexico
Contact: Cheryl Powell 713-335-7041
Company Name/No: EnVen Energy Ventures, LLC, 03026
Lease Number(s): 33565, 36980, , ,
Area-Block: Green Canyon GC, 166: , 167: , : , : ,
Surface Locations: 1

Joint Supplemental/Initial Exploration Plan
Lease OCS-G 35655/36980, Green Canyon Blocks 166/167

TABLE OF CONTENTS

SECTION A
CONTENTS OF PLAN
(30 CFR 550.211 AND 550.241)

A. PLAN INFORMATION FORM

EnVen Energy Ventures, LLC submits this Joint Supplemental/Initial Exploration Plan to allow for the drilling, temporary abandonment, completion and installation of subsea wellheads and/or manifolds of Well Location(s) E thru G. Tentative schedules from start to completion of the activities and information regarding the proposed locations are included on the OCS Plan Information Forms BOEM-0137, **Attachment A-1.**

The operations will not utilize pile-driving, nor is EnVen proposing any new pipelines expected to make landfall.

B. LOCATION

A location/bathymetry plat, prepared in accordance with Notice to Lessees (NTL) 2008-G04, depicting the surface locations, bottom-hole locations and water depths of each proposed well are Included as **Attachment(s) A-2 through A-4.**

There will not be any anchors associated with the proposed operations.

C. SAFETY AND POLLUTION PREVENTION FEATURES

During the proposed exploration activities, EnVen will utilize a typical drillship or DP semi-submersible drilling rig. Rig specifications will be made part of each Application for Permit to Drill.

Safety features on the drilling unit will include well control, pollution prevention, welding procedure and blowout prevention equipment as described in Title 30 CFR Part 250, Subparts C, D, E, G and O and as further clarified by BOEM Notices to Lessees, and current policy making invoked by the BOEM.

Appropriate life rafts, life jackets, ring buoys, etc., will be maintained on the facility at all times as mandated by the U.S. Coast Guard regulations contained in Title 33 CFR.

Supervisory and certain designated personnel on-board the facility will be familiar with the effluent limitations and guidelines for overboard discharges into the receiving waters, as outlined in the NPDES General Permit GMG 290000.

Pollution prevention measures include installation of curbs, gutters, drip pans, and drains on drilling deck areas to collect all contaminants and debris and debris and compliance will be maintained under the EPA NPDES permit.

D. STORAGE TANKS AND/OR PRODUCTION VESSELS

Information regarding the storage tanks that will be used to conduct the drilling operations proposed in this plan that will store oil, as defined at 30 CFR 254.6 is provided in the table below. Only those tanks with a capacity of 25 barrels or more are included.

Type of Storage Tank	Type of Facility	Tank Capacity (bbls)	Number of Tanks	Total Capacity (bbls)	Fluid Gravity (API)
Fuel Oil	Semi/DP Semi	4541	2	9082	No. 2 Diesel
Fuel Oil	Semi/DP Semi	3396	2	6792	No. 2 Diesel
Lube Oil	Semi/DP Semi	116	1	116	26°
Waste Oil	Semi/DP Semi	38	2	66	26°
Oily Water	Semi/DP Semi	186	2	372	N/A
Oily Water	Semi/DP Semi	178	2	356	N/A
Fuel Oil	DPDS	4136	2	8272	33°
Fuel Oil	DPDS	9340	2	18680	33°
Fuel Oil	DPDS	9049	1	9049	33°
Fuel Oil	DPDS	9044	1	9044	33°
Fuel Oil	DPDS	446	2	892	33°
Fuel Oil	DPDS	320	2	640	33°
Fuel Oil	DPDS	360	1	360	33°
Fuel Oil	DPDS	435	1	435	33°
Fuel Oil	DPDS	60	1	60	33°
Base Oil	DPDS	3690	2	7380	31°
Lube Oil	DPDS	430	1	430	22.3°
Waste Oil	DPDS	132	1	132	20°
Waste Oil	DPDS	44	1	44	20°
Waste Oil	DPDS	143	1	143	20°
Waste Oil	DPDS	1366	1	1366	6 .5°

E. POLLUTION PREVENTION MEASURES

According to NTL 2008-G04, pollution prevention measures are not required for these proposed operations.

F. ADDITIONAL MEASURES

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

OCS PLAN INFORMATION FORM

General Information

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

Company Name: EnVen Energy Ventures, LLC	BOEM Operator Number: 03026
Address:	Contact Person: Cheryl Powell
609 Main St., Ste. 3200, Houston, TX 77002	Phone Number: 713-335-7041
	E-Mail Address: cpowell@enven.com

If a service fee is required under 30 CFR 550.125(a), provide the	Amount paid	$3673	Receipt No.	26R3MC6M

Project and Worst Case Discharge (WCD) Information

Lease(s): G 35655/G36980	Area: GC	Block: 166/167	Project Name (If Applicable): Dothraki						
Objective(s)	x	Oil	x	Gas		Sulphur		Salt	Onshore Support Base(s): Fourchon, LA
Platform/Well Name: Wells E thru G	Total Volume of WCD: 108,817 STB/D		API Gravity: 32.7°						
Distance to Closest Land (Miles): 89	Volume from uncontrolled blowout: 108,817 STB/D								

Have you previously provided information to verify the calculations and assumptions for your WCD?	X	Yes		No
If so, provide the Control Number of the EP or DOCD with which this information was provided	Plan Control No. N-10076			
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 table below		
Development drilling			
Well completion –	See table below		
Well test flaring (for more than 48 hours)			
Installation or modification of structure			
Installation of production facilities			
Installation of subsea wellheads and/or manifolds	See table below		
Installation of lease term pipelines			
Commence production			
Other (Specify and attach description)			

Description of Drilling Rig

	Jackup	x	Drillship
	Gorilla Jackup		Platform rig
	Semisubmersible		Submersible
x	DP Semisubmersible		Other (Attach Description)
Drilling Rig Name (If Known):			

Description of Structure

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

Description of Lease Term Pipelines

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

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

WCD info	For wells, volume of uncontrolled blowout (Bbls/day): 108,817	For structures, volume of all storage and pipelines (Bbls): N/A	API Gravity of fluid: 32.7°

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS-G 35655	OCS-G 35655	OCS OCS
Area Name	Green Canyon	Green Canyon	
Block No.	166	166	
Blockline Departures (in feet)	N/S Departure: 5175' FSL	N/S Departure:	N/S Departure: F____L N/S Departure: F____L N/S Departure: F____L
	E/W Departure: 931' FEL	E/W Departure:	E/W Departure: F____L E/W Departure: F____L E/W Departure: F____L
Lambert X-Y coordinates	X: 2,533,470.540'	X:	X: X: X:
	Y: 10,095,246.930'	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude 27°47'30.7281"	Latitude	Latitude Latitude Latitude
	Longitude -90°14'14.9228"	Longitude	Longitude Longitude Longitude

Water Depth (Feet): 2129'	MD (Feet):	TVD (Feet):	MD (Feet): MD (Feet): MD (Feet):	TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet: N/A				

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

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

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

WCD info	For wells, volume of uncontrolled blowout (Bbls/day): 108,817	For structures, volume of all storage and pipelines (Bbls):	API Gravity of fluid: 32.7°

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS-G 35655	OCS-G 36980	OCS OCS
Area Name	Green Canyon	Green Canyon	
Block No.	166	167	
Blockline Departures (in feet)	N/S Departure: 5175' FSL	N/S Departure:	N/S Departure: F____L N/S Departure: F____L N/S Departure: F____L
	E/W Departure: 931' FEL	E/W Departure:	E/W Departure: F____L E/W Departure: F____L E/W Departure: F____L
Lambert X-Y coordinates	X: 2,533,470.540'	X:	X: X: X:
	Y: 10,095,246.930'	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude 27°47'30.7281"	Latitude	Latitude Latitude Latitude
	Longitude -90°14'14.9228"	Longitude	Longitude Longitude Longitude

Water Depth (Feet): 2129'	MD (Feet):	TVD (Feet):	MD (Feet): MD (Feet): MD (Feet):	TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet: N/A				

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

Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
			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): G					Previously reviewed under an approved EP or DOCD?		Yes	x	No
Is this an existing well or structure?		Yes	x	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						x	Yes		No

WCD info	For wells, volume of uncontrolled blowout (Bbls/day): 108,817	For structures, volume of all storage and pipelines (Bbls):	API Gravity of fluid	32.7°

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS-G 35655	OCS-G 36980	OCS OCS
Area Name	Green Canyon	Green Canyon	
Block No.	166	167	
Blockline Departures (in feet)	N/S Departure: 5175' FSL	N/S Departure:	N/S Departure: F____L N/S Departure: F____L N/S Departure: F____L
	E/W Departure: 931' FEL	E/W Departure:	E/W Departure: F____L E/W Departure: F____L E/W Departure: F____L
Lambert X-Y coordinates	X: 2,533,470.540'	X:	X: X: X:
	Y: 10,095,246.930'	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude 27°47'30.7281"	Latitude	Latitude Latitude Latitude
	Longitude -90°14'14.9228"	Longitude	Longitude Longitude Longitude

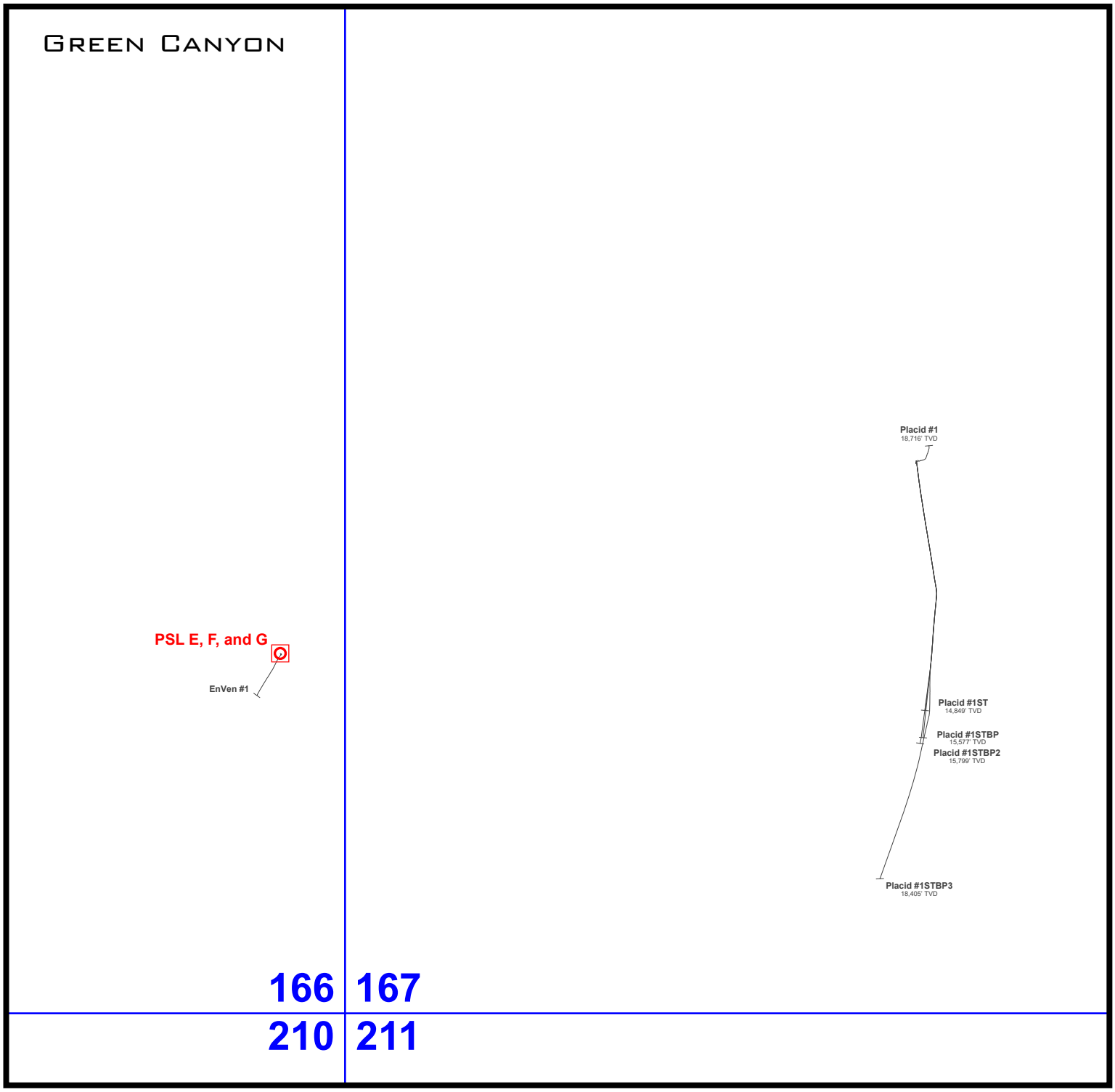
Water Depth (Feet): 2129'	MD (Feet):	TVD (Feet):	MD (Feet): MD (Feet): MD (Feet):	TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet: N/A				

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

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

Schedule to drill, complete & install subsea tree:

Drill & TA well E	10/1/21	90	12/30/21
Complete Well E & install subsea tree	3/1/22	30	3/31/22
Drill & complete Well F & install subsea tree	8/1/2022	120	11/29/22
Drill & complete Well G & install subsea tree	01/01/23	120	05/01/23



PSL E, F, and G

LAT: 27°47'30.7281" N
LONG: -90°14'14.9228" W
X = 2,533,470.540
Y = 10,095,246.930
931.34' FEL of GC 166
5,174.48' FSL of GC 166

SCALE

2,000' 0 2,000'

GREEN CANYON 166/167

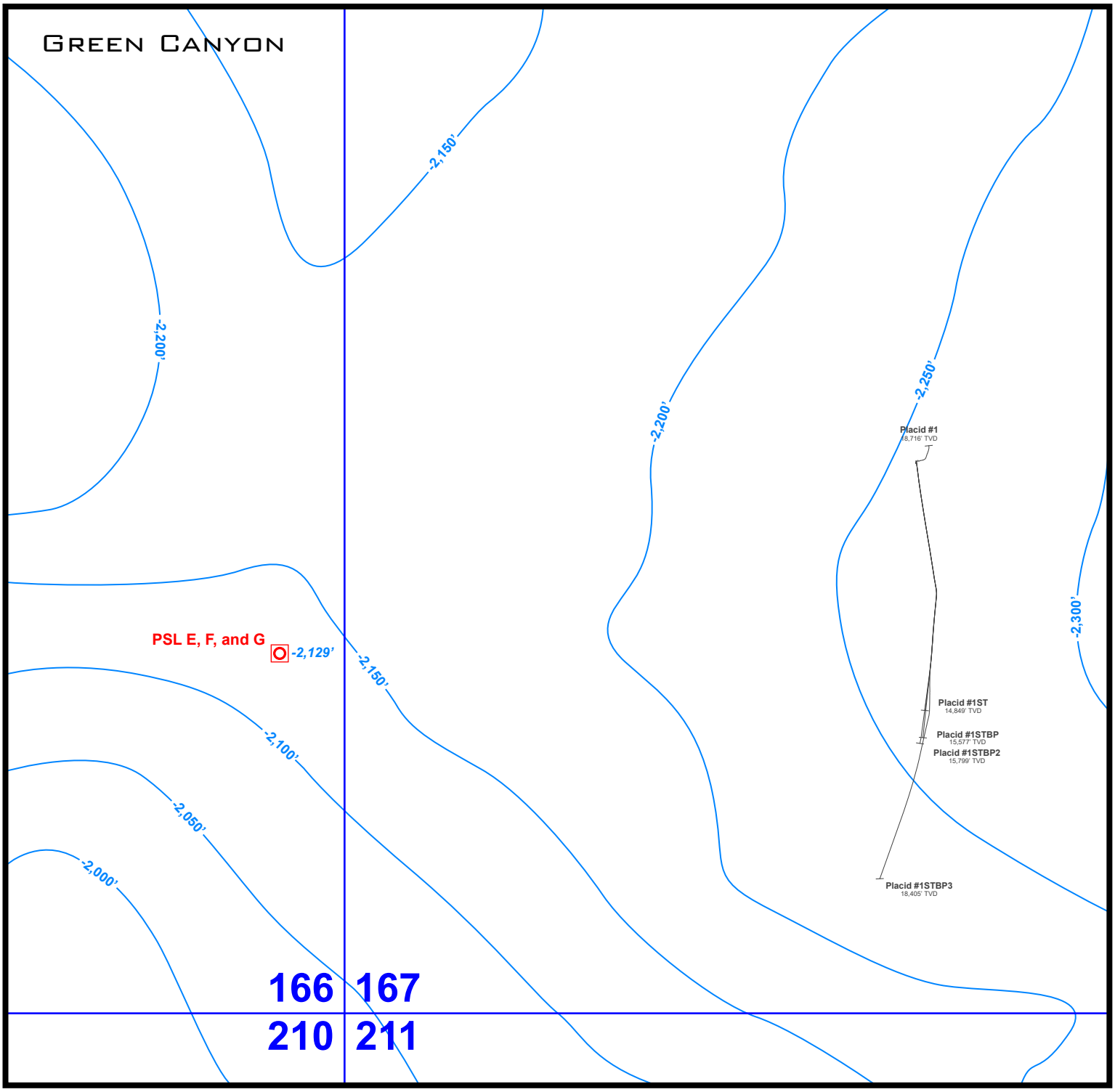
Offshore Louisiana

EXPLORATION PLAN

Surface Location Map

enven ENERGY CORPORATION

Attachment A-3



PSL A, B, and C

LAT: 27°47'30.7281" N
LONG: -90°14'14.9228" W
X = 2,533,470.540
Y = 10,095,246.930
931.34' FEL of GC 166
5,174.48' FSL of GC 166

SCALE

2,000' 0 2,000'

GREEN CANYON 166/167

Offshore Louisiana

EXPLORATION PLAN

Bathymetry Map

enven
ENERGY CORPORATION

Attachment A-4

SECTION B
GENERAL INFORMATION
(30 CFR 550.213 and 550.243)

A. APPLICATIONS AND PERMITS

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

B. DRILLING FLUIDS
See **Attachment F-1** for drilling fluids to be used during the proposed operations.

C. NEW OR UNUSUAL TECHNOLOGY
EnVen does not propose to use new techniques or unusual technology to carry out these proposed exploration activities; however, the best available and safest technologies (BAST) as referenced in Title 30 CFR 250 will be incorporated as standard operational procedures.

D. BONDING STATEMENT
The bond requirements for the activities and facilities proposed in this EP are satisfied by a $3,000,000.00 areawide bond, furnished and maintained according to 30 CFR 556.900 (a) and 30 CFR 556.901(a) and (b) and BOEM's NTL No. 2016-N01 "Requiring Additional Security".

E. OIL SPILL FINANCIAL RESPONSIBILITY (OSFR)
EnVen (BOEM company number 03026) will demonstrate oil spill financial responsibility for the facilities proposed in this EP according to 30 CFR Part 253; and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities".

F. DEEPWATER WELL CONTROL STATEMENT
EnVen (BOEM company number 03026) has the financial capability to drill a relief well and conduct other emergency well control operations.

G. BLOWOUT SCENARIO
The primary scenario considered is the well has been drilled to the Worst Case Discharge open-hole interval, the rig has sunk, and the rig and riser has been displaced with no debris on or near the wellbore. The well is flowing uncontrolled near the mud line.

Worst Case Discharge (Max Oil Flow Rate) / Max Duration / Total Volume

The Worst Case Discharge (WCD) is based on reservoir modeling and nodal analysis. The wellbore configuration and all properties and calculations are submitted in the EP. The results of the WCD as well as the duration and maximum total volumes estimated to be discharged in those scenarios is presented in the table below. Note that the WCD rate represents "worst case" and that duration and total volume are based on pre-event estimations with WCD throughout those durations.

Scenario	Max. Rate (BOPD)	Duration (Days)	Est. Total Volume (BBL)
Bridging	108,817	3	326,451
Surface Intervention	108,817	15	1,632,255
Relief Well	108,817	65	7,073,105

Potential of Wellbore to Bridge Over Due to Blowout (Resolve w/o Intervention)

Based on empirical results as well as our company's own experiences in the US Gulf of Mexico there are numerous examples of bridging events in drilling/completion/production scenarios. The BSEE historical incident database also confirms a high percentage of actual loss of well control incidents while drilling in the US GOM resolving with no containment intervention because of bridging. The majority of the hydrocarbon bearing intervals in the basin and the objective formations in this field are unconsolidated geologically young age sandstone intervals. These intervals offer both prolific production as well as high risk of sand/solids production, which in an open-hole environment result in a "bridge" or solids plug forming.

As a company, EnVen strives to limit the estimated total drawdown on a producing interval to reduce the risk of wellbore collapse and sand/fines migration into a well. This can vary depending on reservoir properties and completion techniques, but it is our experience that in the best case scenario a drawdown of 4,000 psi or greater will collapse most wellbores or introduce formation sand production. The referenced drawdown occurs in a controlled production environment through an engineered completion isolating a particular zone(s). The blowout scenario being discussed is in an uncontrolled open-hole scenario, with numerous zones contributing different fluid types at mixed rates and thus likely requires even less drawdown to create a wellbore collapse, which would form a bridge/plug. The WCD calculations submitted show the actual

drawdown that would occur in this blowout scenario and is more than sufficient to induce a bridging event.

Surface Intervention in the Event of a Blowout

Any blowout event will immediately trigger EnVen's incident management process, which will notify and establish its IMT (incident management team). This process also notifies and readies containment and oil spill response equipment and personnel through EnVen's membership agreements with Helix Well Containment Group (HWCG) and Clean Gulf Associates. EnVen has contractual service agreements with blowout consulting experts at Boots & Coots, Cudd Pressure Control, and Wild Well Control, which the established IMT will consult with or utilize as IMT team members.

This team and this process will guide the early assessment of the scenario and the intervention options based on the actual conditions. The process initiates simultaneously all containment options; utilization of the rig's subsea BOPs through ROV intervention, Helix Well Containment Group's capping and containment equipment, and relief well planning and execution. This ensures the quickest possible response during the assessment phase of the process. Once assessed this process will guide one of the above containment options to control the source and secure the well.

Details of the containment equipment and processes can be found in the submitted Well Containment Plan. Details on the well and rig technical specifications and limitations can be found in the WCST and WCST+ documents submitted with the APD.

Surface Intervention Time Estimates

As noted previously, all containment options initiate simultaneously and are performed in parallel. The fastest surface intervention response time would be utilizing the rig's subsea BOPs through ROV intervention, and this operation is estimated to take **3 days** or less to shut-in and secure the well. However, for the purposes of "worst case" we have assumed that this option is not viable and the HWCG's capping stack must be deployed. The table below describes the estimated time required to shut in and secure the well using the capping stack. The entire operation is estimated to take **15 days** from start of site assessment until the capping stack has been deployed and the well shut in.

Duration of a well capping operation

Operation	Estimated Duration (days)	Cumulative Time Since Event Start (days)
Assessment for surface intervention options. Notify regulatory agencies and contractors.	2	2

Site Preparation, mobilizing and deployment of the IWOCS system and Dispersant system.	5	5
Debris removal, mobilization of ROV boat and support vessels	7	7
Well capping and/or cap and flow operations mobilization, deployment, and installation of the well containment system.	15	**15**

Relief Well Planning

Surface Location: The location of nearest production platforms is such that it would not allow or expedite drilling a relief well. Multiple subsea surface relief well locations have been identified and a shallow hazards survey has been conducted at these locations.

Well Design and Equipment: The preferred surface location and directional well plan is submitted with the APD. All tangible equipment required by the well design, either is in hand or has been identified as available through contracted service providers. In general, the design/strategy will be to intersect the original wellbore just above the shoe of intermediate casing or liner (13-5/8/14in casing or 11-7/8in liner) or 9-7/8in production liner. This will allow ranging to find the original casing and is deep enough to provide pressure control/well design to handle the dynamic kill. Final actual surface location and well design is conducted and confirmed through the WCP process based on actual scenario and conditions.

Rig Selection/Rig Package Constraints: No constraints have been identified for selecting a rig capable of accessing the subsea surface location or executing the relief well design due to equipment, station keeping, or BOP pressure rating limitations.

Rig Availability**:**

Enven's membership in HWCG includes a "Mutual Aide" agreement that obligates all members to assist through making personnel and equipment available to respond to a blowout incident. This agreement takes precedent over any individual members own operations. This agreement makes any MODU's under contract to members of HWCG (currently 17) available to EnVen in the event of a blowout incident. In addition, EnVen has the relationships and financial means to contract MODU's with all major rig contractors with rigs in the Gulf of Mexico. At present, there are at least 25 rigs located in the GOM identified as capable of drilling this relief well.

Estimated Time to Drill a Relief Well and Dynamic Kill:

Below is the pre-event best estimate of general schedule and duration of drilling a relief well:

Description	Days	Cumulative Days
Access and select MODU/ Final Well Design	2	2
Contract /Permit / Mobilize Rig and Equipment	14	16
Spud/Drill/Case Top Hole Sections	5	21
Certify BOPs / Run BOPs and Riser/ Test	15	36
Drill and intercept original well	25	61
Dynamically kill well	4	**65**

Blowout Risk Prevention/Reduction

The following measures are employed to prevent the likelihood of a well control event.

Management and Direction Supervision:

- Current Well Control Certification from an accredited IWCF or WellCap organization for all Rig Site Supervisors (Drilling/Completion/Workover)

Well and Rig Equipment:

- All rigs utilized are to be compliant with 30 CRF 250 and 550 as well as all Notice to Lessees
- BOPE to be certified and maintained per regulations and operated wit All rigs utilized are to be compliant with 30 CRF 250 and 550 as well as all Notice to Lessees
- BOPE to be certified and maintained per regulations and operated within temperature and pressure limitations and per OEM's operating manuals
- When deployed and to the extent possible, MWD/LWD/PWD measurement tools will be utilized to assist in real time pore pressure prediction, kick detection and for additional well control data support

Operations/Practices:

- Fluid volume measurements will be made and accounted for at all times both in the wellbore and for surface transfers
- Taking Slow Pump Rate (SCRs.-.slow circulating rate) measurements during all open hole operations and critical cased hole operations
- Updating Kill Sheets during each tour and posting the same on the rig floor
- Maintain a current BOP to RKB spaceout Chart,

- Monitoring wellbore fill-ups and displacements during trips, by the Well Site Supervisor
- Maintain the necessary circulating swages, TIW Valves and IBOP on the rig floor at all times during operations and function test these valves during each tour

Measures for Early and Effective Well Control intervention

EnVen employs the following measures or has the following agreements/process to ensure early and effective intervention in the event of a blowout scenario:

- Enven's incident management process is immediately triggered establishing the Incident Management Team (IMT) and activates the Well Containment and Oil Spill Response plans
- The IMT immediately initiates all containment options while simultaneously working through the assessment phase to determine viable and best options for containment
- The HWCG Mutual Aide agreement notifies all members to ensure personnel and equipment is made ready for the containment response
- Through the IMT and its process a blowout specialty company (Boots & Coots, Cudd Pressure Control, or Wild Well Control) will be contacted and their expert consultants will be deployed as members of the IMT.

Additional Prevention & Mitigation Techniques

Pursuant to wellbore cementing and zonal isolation techniques, all cementing operations will be modeled and designed under the guidelines set forth in API Recommended Practice 65 Part 1 & 2. Operations will be dictated by the rules and requirements set forth in Federal Regulations, under the wellbore cementing requirements.

API Standard 53 Blowout Prevention Equipment Systems for Drilling Wells and Recommended Practice 16Q for Marine Drilling Risers will be used as the guidelines for installation, testing and maintenance of the surface and subsea Marine Risers and BOP systems.

SECTION C
GEOLOGICAL AND GEOPHYSICAL INFORMATION
(30 CFR 550.214 AND 550.244)

A. GEOLOGICAL DESCRIPTION
Proprietary Data

B. STRUCTURE CONTOUR MAPS
Proprietary Data

C. INTERPRETED SEISMIC LINE(S)
Proprietary Data

D. GEOLOGICAL STRUCTURE CROSS-SECTIONS
Proprietary Data

E. SHALLOW HAZARDS REPORT
A shallow hazards report and assessment was prepared utilizing 3D seismic data over the surface location in Green Canyon Blocks 166.

One hard copy and one CD of the Shallow Hazards Analysis Report was previously submitted with Plan Control No. N-10076.

F. SHALLOW HAZARDS ASSESSMENT

Utilizing the 3D seismic exploration data, a shallow hazards assessment was prepared for the proposed surface locations and was previously submitted in Plan Control No. N-10076.

G. HIGH-RESOLUTION SEISMIC LINES
Previously included as part of the detailed well clearance reports mentioned above.

H. STRATIGRAPHIC COLUMN

Proprietary Data

I. TIME VS DEPTH TABLES

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

SECTION D
HYDROGEN SULFIDE INFORMATION
(30 CFR 550.215 AND 550.245)

A. CONCENTRATION
EnVen does not anticipate encountering any H_2S during the proposed operations.

B. CLASSIFICATION
In accordance with Title 30 CFR 250.490(c), EnVen requests that Green Canyon Blocks 166/167 be classified by BSEE as H_2S absent.

C. H2S CONTINGENCY PLAN
EnVen is not required to provide an H2S contingency plan before conducting the proposed exploration activities.

D. MODELING REPORT
EnVen does not anticipate encountering H2S concentrations greater than 500 ppm, so therefore, a modeling report is not required.

SECTION E
BIOLOGICAL, PHYSICAL & SOCIOECONOMIC INFORMATION
(30 CFR 550.216 AND 550.247)

A. CHEMOSYNTHETIC COMMUNITIES REPORT

Activities proposed in this plan could disturb seafloor areas in deepwater. As a result, a summary letter addressing the proximity to potential sensitive sessile benthic community sites was prepared and previously submitted in Plan Control No. N-10076. The summary letters were issued as a supplement to the Echo Report No. 19-009-51/2019-131 entitled "3D Geohazard Assessment, Green Canyon Blocks 166/167" dated April, 2019. In addition, Biological, Physical and Socio-economic maps illustrating the areas of potential seabed impact were also submitted and included in Plan Control No. N-10076.

ANALYSIS

Using 3-D seismic information, all seafloor features and areas that could be disturbed by the activities proposed in this plan have been identified. The likelihood of these proposed activities disturbing these seafloor and shallow geologic features is discussed in the following summary statement:

No Associated Anchors – No Disturbances within 1500 Feet of Chemosynthetic Communities

Well Locations E thru G:

- Features or areas that could support high-density chemosynthetic communities are **not** located within 1,500 feet of the proposed muds and cuttings discharge location.

1. Sensitive Underwater Features

The activities proposed in this plan will not take place within 500 feet of any identified topographic feature; therefore topographic features information is not required.

2. Marine Sanctuaries

Green Canyon Blocks 166/167 are not located within 200 feet of any pinnacle trend feature with vertical relief equal to or greater than 8 feet; therefore, live bottom information is not required.

B. TOPOGRAPHIC FEATURES MAP

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

C. TOPOGRAPHIC FEATURES STATEMENT (SHUNTING)

All activities proposed under this EP will be conducted outside all Topographic Feature Protective Zones, therefore shunting of drill cuttings and drilling fluids is not required.

D. LIVE BOTTOMS (PINNACLE TREND) MAP

Green Canyon Blocks 166/167 are not located within 200 feet of any pinnacle trend feature with vertical relief equal to or greater than 8 feet; therefore, live bottom information is not required.

E. LIVE BOTTOMS (LOW RELIEF) MAP

Green Canyon Blocks 166/167 are not located within 200 feet of any pinnacle trend feature with vertical relief equal to or greater than 8 feet; therefore, live bottom (low relief) maps are not required.

F. POTENTIALLY SENSITIVE BIOLOGICAL FEATURES

Green Canyon Blocks 166/167 are not located within 200 feet of potentially sensitive biological features; therefore, biologically sensitive area maps are not required.

H. THREATENED AND ENDANGERED SPECIES, CRITICAL HABITAT, AND MARINE MAMMAL INFORMATION

Under Section 7 of the Endangered Species Act (ESA) all federal agencies must ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its designated critical habitat.

In accordance with the 30 CFR 250, Subpart B, effective May 14, 2007, and further outlined in Notice to Lessees (NTL) 2008-G04, lessees/operators are required to address site-specific information on the presence of federally listed threatened or endangered species and critical habitat designated under the ESA and marine mammals protected under the Marine Mammal Protection Act. The federally listed endangered and threatened species potentially occurring in the lease area and/or along the gulf coast are provided in the table below:

Gulf of Mexico's Threatened and Endangered Species

Species	Listing Status	Critical Habitat
Green sea turtle	Threatened - North and South Atlantic Distinct Population Segment (81 FR 20057; April 6, 2016)	63 FR 46693; September 2, 1998
Kemp's ridley sea turtle	Endangered (35 FR 18319; December 2, 1970)	None

Species	Listing Status	Critical Habitat
Leatherback sea turtle	Endangered (35 FR 8491; June 2, 1970)	44 FR 17710; March 23, 1979
Loggerhead sea turtle	Threatened - Northwest Atlantic Ocean Distinct Population Segment (76 FR 58868; September 22, 2011)	79 FR 39856; July 10, 2014
Hawksbill sea turtle	Endangered (35 FR 8491; June 2, 1970)	63 FR 46693; September 2, 1998
Smalltooth sawfish	U.S. Distinct Population Segment Endangered (68 FR 15674; April 1, 2003)	72 FR 45353; October 2, 2009
Gulf sturgeon	Threatened (56 FR 49653; September 30, 1991)	68 FR 13370; March 19, 2003
Nassau grouper	Threatened (81 FR 42268; June 29, 2016)	None
Oceanic whitetip shark	Threatened (83 FR 4153; January 30, 2018)	None
Giant manta ray	Threatened (83 FR 2916; January 22, 2018)	None
Elkhorn coral	Threatened (71 FR 26852; May 9, 2006)	73 FR 72210; November 26, 2008
Staghorn coral	Threatened (71 FR 26852; May 9, 2006)	73 FR 72210; November 26, 2008
Boulder star coral	Threatened (79 FR 53851; September 10, 2014)	None
Mountainous star coral	Threatened (79 FR 53851; September 10, 2014)	None
Lobed star coral	Threatened (79 FR 53851; September 10, 2014)	None
Rough cactus coral	Threatened (79 FR 53851; September 10, 2014)	None

Species	Listing Status	Critical Habitat
Pillar coral	Threatened (79 FR 53851; September 10, 2014)	None
Fin whale	Endangered (35 FR 18319/ December 2, 1970)	None
Sperm whale	Endangered (35 FR 18319; December 2, 1970)	None
Sei whale	Endangered (35 FR 12222; December 2, 1970)	None
Gulf of Mexico Bryde's whale	Endangered (84 FR 15446, April 15, 2019)	None

I. ARCHAEOLOGICAL REPORT

All seafloor disturbance activities associated with lease development in the Gulf of Mexico requires an archaeological assessment. Therefore, an archaeological investigation based on AUV geophysical data was performed and no interpreted archaeological resources are located in the vicinity area. An archaeological assessment was included in previously submitted Plan Control No. N-10076.

J. AIR AND WATER QUALITY INFORMATION

Per NTL No. 2008-G04 this information is not required.

K. SOCIOECONOMIC INFORMATION

Per NTL No. 2008-G04 this information is not required.

SECTION F
WASTES AND DISCHARGES INFORMATION
(30 CFR 550.217 AND 550.248)

A. PROJECTED GENERATED WASTES & OCEAN DISCHARGES

Projected solid and liquid wastes likely to be generated by the proposed activities and/or to be discharged overboard are included as **Attachment F-1**.

TABLE 2. WASTE AND SURPLUS ESTIMATED TO BE TRANSPORTED AND/OR DISPOSED OF ONSHORE/GC 166/OCS-G 35655

	Projected generated waste		Solid and Liquid Wastes transportation	Waste Disposal		
Type of Waste	**Composition**		**Transport Method**	**Name/Location of Facility**	**Amount**	**Disposal Method**
Will drilling occur ? If yes, fill in the muds and cuttings.						
EXAMPLE: Synthetic-based drilling fluid or mud	*internal olefin, ester*		*Below deck storage tanks on offshore support vessels*	*Newpark Environmental Services Inc., Ingleside, TX*	*X bbl/well*	*Recycled*
Oil-based drilling fluid or mud	**NA**		NA	NA		NA
Synthetic-based drilling fluid or mud	**IO 16/18 & product**		USCG approved 25 bbl boxes on transport vessel	EcoServe or R360, Fourchon, LA	750 bbls/well	Injected downhole or recycled
Cuttings wetted with Water-based fluid	Water Based/Shale/Sand		Overboard	NA		Overboard
Cuttings wetted with Synthetic-based fluid	IO 16/18 & product		USCG approved 25 bbl boxes on transport vessel	EcoServe or R360, Fourchon, LA	500 bbls/well	Injected downhole or recycled
Cuttings wetted with oil-based fluids	NA		NA	NA		NA
Will you produce hydrocarbons? If yes fill in for produced sand.						
Produced sand	NA					
Will you have additional wastes that are not permitted for discharge? If yes, fill in the appropriate rows.						
EXAMPLE: trash and debris (recylables)	*Plastic, paper, aluminum*		*barged in a storage bin*	*ARC, New Iberia, LA*	*X lb/well*	*Recycled*
Trash and debris	Domestic Trash		Storge bins on transport vessel	Approved disposal site, Fourchon, LA	250 bbls/well	Recycled or disposed
Used oil	Used Oil filter/Rags		Transport in DOT containers on supply	Martin fuel dock, Fourchon, LA	10 bbls/well	Recycled
Wash water	NA					
Chemical product wastes	NA					
Well completion fluid	CaBr2/ZnBr2		USCG approved 25 bbl boxes on transport vessel	EcoServe or R360, Fourchon, LA	500 bbls/well	Recycled or disposed
NOTE: If you will not have a type of waste, enter NA in the row.						

Waste you will generate, treat and downhole dispose or discharge to the GOM

Projected Generated Waste			Projected Ocean Discharges	
Type of Waste	**Composition**	**Projected Amount**	**Discharge Rate**	**Discharge Method**
Will drilling occur? If yes, you should list 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***
Water-based Drilling Fluids	Water based drilling fluid	30,000	8,000	Discharged overboard
Cuttings wetted with water-based fluid	Cuttings coated with water based drilling mud	1,860	620	Discharged overboard
Synthetic-based Drilling Fluids	Synthetic based drilling fluid - retained on cuttings	2,826	40	Discharged thru shunt pipe below water's surface
Cuttings wetted with synthetic-based fluid	Cuttings coated with synthetic based drilling fluid	5,652	81	Treated using solids control equipment and discharged thru shunt pipe 25' below water's surface.
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 & discharge overboard***
Domestic waste	Gray water (laundry, galley, lavatory)	30,000	200	Discharged overboard. Any associated food waste will be processed using an approved grinder
Sanitary waste	Treated human body waste from toilets	25,000	150	USCG approved MSD
Is there a deck? If yes, there will be Deck Drainage				
Deck Drainage	Wash and rainwater	3000 bbls/well	20 bbl/day	Treat for oil and drain overboard
Will you conduct well treatment, completion or workover? If yes, only fill in those associated with your activity				
Well treatment fluids	KCL/HCL/NaCL/NaBr	2,000	1000 bbl/day	Discharge overbaoard
Well completion fluids	CaBr2 / ZnBr2	N/A	N/A	N/A
Workover fluids	CaBr2 / ZnBr2	N/A	N/A	N/A
Miscellaneous discharges? If yes, only fill in those associated with your activity				
Desalinization unit discharge	Rejected water from water maker unit	125,000	60	Cuttings chute
Blowout prevent fluid	Stackmagic 200/0/5% glycol based on 2% mixture with potable water	200	12 per week with function test	Discharged from BOP near mudline
Ballast water	Uncontaminated seawater used to maintain proper draft	50,000	9	Discharged overboard
Bilge Water	Bilge water	600	0.1	Discharged overboard
Excess cement at seafloor	Cement slurry	1000	19	Discharged at the mudline during cementing conductor casing
Firewater	Seawater with no addition of chemicals	N/A	N/A	Discharged overboard
Cooling water	Seawater with no addition of chemicals	3,600,000	1,667	Discharged overboard
Will you produce hydrocarbons? If yes, fill in for produced water				
Produced water	N/A	N/A	N/A	N/A
Will you be covered by an individual or general NPDES permit:				
General - NPDES ID GMG290376				
NOTE: IF YOU WILL NOT HAVE A TYPE OF WASTE, ENTER "*NA*" IN THE ROW.				

SECTION G
AIR EMISSIONS INFORMATION
(30 CFR 550.218 AND 550.249)

EMISSIONS WORKSHEETS AND SCREENING QUESTIONS

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

Plan Emission amounts were calculated using the methodology, emission factors and worksheets in Form BOEM-0138 for Exploration Plans.

There are no existing facilities or activities co-located with the currently proposed activities, therefore the Complex Total Emissions are the same as the Plan Emissions and are provided in **Attachment G-1.**

OMB Control No. 1010-0151
OMB Approval Expires: 08/31/2023

COMPANY	EnVen Energy Ventures, LLC
AREA	Green Canyon
BLOCK	166/167
LEASE	G 35655/G36980
FACILITY	
WELL	E, F, G
COMPANY CONTACT	Cheryl Powell
TELEPHONE NO.	713-335-7041
REMARKS	Drill, temporary abandon, complete & install subsea wellheads for 3 wells.

AIR EMISSIONS COMPUTATION FACTORS

Fuel Usage Conversion Factors	Natural Gas Turbines				Natural Gas Engines		Diesel Recip. Engine		Diesel Turbines			
	SCF/hp-hr	9.524			SCF/hp-hr	7.143	GAL/hp-hr	0.0514	GAL/hp-hr	0.0514		

Equipment/Emission Factors	units	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3	REF.	DATE	Reference Links
Natural Gas Turbine	g/hp-hr		0.0086	0.0086	0.0026	1.4515	0.0095	N/A	0.3719	N/A	AP42 3.1-1& 3.1-2a	4/00	https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s01.pdf
RECIP. 2 Cycle Lean Natural Gas	g/hp-hr		0.1293	0.1293	0.0020	6.5998	0.4082	N/A	1.2009	N/A	AP42 3.2-1	7/00	https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s02.pdf
RECIP. 4 Cycle Lean Natural Gas	g/hp-hr		0.0002	0.0002	0.0020	2.8814	0.4014	N/A	1.8949	N/A	AP42 3.2-2	7/00	https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s02.pdf
RECIP. 4 Cycle Rich Natural Gas	g/hp-hr		0.0323	0.0323	0.0020	7.7224	0.1021	N/A	11.9408	N/A	AP42 3.2-3	7/00	https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s02.pdf
Diesel Recip. < 600 hp	g/hp-hr	1	1	1	0.0279	14.1	1.04	N/A	3.03	N/A	AP42 3.3-1	10/96	https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s03.pdf
Diesel Recip. > 600 hp	g/hp-hr	0.32	0.182	0.178	0.0055	10.9	0.29	N/A	2.5	N/A	AP42 3.4-1 & 3.4-2	10/96	https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf
Diesel Boiler	lbs/bbl	0.0840	0.0420	0.0105	0.0089	1.0080	0.0084	5.14E-05	0.2100	0.0336	AP42 1.3-6; Pb and NH3: WebFIRE (08/2018)	9/98 and 5/10	https://cfpub.epa.gov/webfire/
Diesel Turbine	g/hp-hr	0.0381	0.0137	0.0137	0.0048	2.7941	0.0013	4.45E-05	0.0105	N/A	AP42 3.1-1 & 3.1-2a	4/00	https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s01.pdf
Dual Fuel Turbine	g/hp-hr	0.0381	0.0137	0.0137	0.0048	2.7941	0.0095	4.45E-05	0.3719	0.0000	AP42 3.1-1& 3.1-2a; AP42 3.1-1 & 3.1-2a	4/00	https://cfpub.epa.gov/webfire/
Vessels – Propulsion	g/hp-hr	0.320	0.1931	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022	USEPA 2017 NEI;TSP refer to Diesel Recip. > 600 hp reference	3/19	
Vessels – Drilling Prime Engine, Auxiliary	g/hp-hr	0.320	0.1931	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022	USEPA 2017 NEI;TSP refer to Diesel Recip. > 600 hp reference	3/19	https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data
Vessels – Diesel Boiler	g/hp-hr	0.0466	0.1491	0.1417	0.4400	1.4914	0.0820	3.73E-05	0.1491	0.0003	USEPA 2017 NEI;TSP (units converted) refer to Diesel Boiler Reference	3/19	
Vessels – Well Stimulation	g/hp-hr	0.320	0.1931	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022	USEPA 2017 NEI;TSP refer to Diesel Recip. > 600 hp reference	3/19	
Natural Gas Heater/Boiler/Burner	lbs/MMscf	7.60	1.90	1.90	0.60	190.00	5.50	5.00E-04	84.00	3.2	AP42 1.4-1 & 1.4-2; Pb and NH3: WebFIRE (08/2018)	7/98 and 8/18	https://www3.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf https://cfpub.epa.gov/webfire/
Combustion Flare (no smoke)	lbs/MMscf	0.00	0.00	0.00	0.57	71.40	35.93	N/A	325.5	N/A	AP42 13.5-1, 13.5-2	2/18	
Combustion Flare (light smoke)	lbs/MMscf	2.10	2.10	2.10	0.57	71.40	35.93	N/A	325.5	N/A	AP42 13.5-1, 13.5-2	2/18	https://www3.epa.gov/ttn/chief/ap42/ch13/final/C13S05_02-05-18.pdf
Combustion Flare (medium smoke)	lbs/MMscf	10.50	10.50	10.50	0.57	71.40	35.93	N/A	325.5	N/A	AP42 13.5-1, 13.5-2	2/18	
Combustion Flare (heavy smoke)	lbs/MMscf	21.00	21.00	21.00	0.57	71.40	35.93	N/A	325.5	N/A	AP42 13.5-1, 13.5-2	2/18	
Liquid Flaring	lbs/bbl	0.42	0.0966	0.0651	5.964	0.84	0.01428	5.14E-05	0.21	0.0336	AP42 1.3-1 through 1.3-3 and 1.3-5	5/10	https://www3.epa.gov/ttnchie1/ap42/ch01/final/c01s03.pdf
Storage Tank	tons/yr/tank						4.300				2014 Gulfwide Inventory; Avg emiss (upper bound of 95% CI)	2017	https://www.boem.gov/environment/environmental-studies/2014-gulfwide-emission-inventory
Fugitives	lbs/hr/component						0.0005				API Study	12/93	https://www.api.org/
Glycol Dehydrator	tons/yr/dehydrator						19.240				2011 Gulfwide Inventory; Avg emiss (upper bound of 95% CI)	2014	https://www.boem.gov/environment/environmental-studies/2011-gulfwide-emission-inventory
Cold Vent	tons/yr/vent						44.747				2014 Gulfwide Inventory; Avg emiss (upper bound of 95% CI)	2017	https://www.boem.gov/environment/environmental-studies/2014-gulfwide-emission-inventory_
Waste Incinerator	lb/ton		15.0	15.0	2.5	2.0	N/A	N/A	20.0	N/A	AP 42 2.1-12	10/96	https://www3.epa.gov/ttnchie1/ap42/ch02/final/c02s01.pdf
On-Ice – Loader	lbs/gal	0.043	0.043	0.043	0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model; TSP (units converted) refer to Diesel Recip. <600 reference	2009	
On-Ice – Other Construction Equipment	lbs/gal	0.043	0.043	0.043	0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model; TSP (units converted) refer to Diesel Recip. <600 reference	2009	
On-Ice – Other Survey Equipment	lbs/gal	0.043	0.043	0.043	0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model; TSP (units converted) refer to Diesel Recip. <600 reference	2009	
On-Ice – Tractor	lbs/gal	0.043	0.043	0.043	0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model; TSP (units converted) refer to Diesel Recip. <600 reference	2009	https://www.epa.gov/moves/nonroad2008a-installation-and-updates
On-Ice – Truck (for gravel island)	lbs/gal	0.043	0.043	0.043	0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model; TSP (units converted) refer to Diesel Recip. <600 reference	2009	
On-Ice – Truck (for surveys)	lbs/gal	0.043	0.043	0.043	0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model; TSP (units converted) refer to Diesel Recip. <600 reference	2009	
Man Camp - Operation (max people/day)	tons/person/day		0.0004	0.0004	0.0004	0.006	0.001	N/A	0.001	N/A	BOEM 2014-1001	2014	https://www.boem.gov/sites/default/files/uploadedFiles/BOEM/BOEM_Newsroom/Library/Publications/2014-1001.pdf
Vessels - Ice Management Diesel	g/hp-hr	0.320	0.1931	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022	USEPA 2017 NEI;TSP refer to Diesel Recip. > 600 hp reference	3/19	https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data
Vessels - Hovercraft Diesel	g/hp-hr	0.320	0.1931	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022	USEPA 2017 NEI;TSP refer to Diesel Recip. > 600 hp reference	3/19	https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data

Sulfur Content Source	Value	Units
Fuel Gas	3.38	ppm
Diesel Fuel	0.0015	% weight
Produced Gas (Flare)	3.38	ppm
Produced Oil (Liquid Flaring)	1	% weight

Natural Gas Flare Parameters	Value	Units
VOC Content of Flare Gas	0.6816	lb VOC/lb-mol gas
Natural Gas Flare Efficiency	98	%

Density and Heat Value of Diesel Fuel		
Density	7.05	lbs/gal
Heat Value	19,300	Btu/lb

Heat Value of Natural Gas		
Heat Value	1,050	MMBtu/MMscf

AIR EMISSIONS CALCULATIONS - 1ST YEAR

COMPANY	AREA		BLOCK	LEASE	FACILITY	WELL					CONTACT		PHONE		REMARKS										
EnVen Energy Ventures, LLC	Green Canyon		166/167	G 35655/G36980		E, F, G					Cheryl Powell		713-335-7041		Drill, temporary abandon, complete & install subsea wellheads for 3 wells.										
OPERATIONS	EQUIPMENT	EQUIPMENT ID	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR									ESTIMATED TONS								
	Diesel Engines		HP	GAL/HR	GAL/D																				
	Nat. Gas Engines		HP	SCF/HR	SCF/D																				
	Burners		MMBTU/HR	SCF/HR	SCF/D	HR/D	D/YR	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
DRILLING	VESSELS- Drilling - Propulsion Engine - Diesel		61800	3179.3628	76304.71	24	90	43.60	26.30	25.51	0.63	1044.59	30.03	0.00	163.84	0.30	47.09	28.41	27.56	0.69	1128.15	32.44	0.00	176.95	0.33
	VESSELS- Drilling - Propulsion Engine - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels - Diesel Boiler		0			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	0.00	0.00	0.00	0.00	0.00
	Vessels – Drilling Prime Engine, Auxiliary		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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	VESSELS - Heavy Lift Vessel/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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			BPD																						
DRILLING	Liquid Flaring		0			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	0.00	0.00	0.00	0.00	0.00
WELL TEST	COMBUSTION FLARE - no smoke			0		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	--	0.00	--
	COMBUSTION FLARE - light smoke			0		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	--	0.00	--
	COMBUSTION FLARE - medium smoke			0		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	--	0.00	--
	COMBUSTION FLARE - heavy smoke			0		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	--	0.00	--
ALASKA-SPECIFIC SOURCES	**VESSELS**		kW			HR/D	D/YR																		
	VESSELS - Ice Management Diesel		0			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	0.00	--	0.00	0.00
2021	**Facility Total Emissions**							**43.60**	**26.30**	**25.51**	**0.63**	**1,044.59**	**30.03**	**0.00**	**163.84**	**0.30**	**47.09**	**28.41**	**27.56**	**0.69**	**1,128.15**	**32.44**	**0.00**	**176.95**	**0.33**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**																**2,963.70**			**2,963.70**	**2,963.70**	**2,963.70**		**67,775.43**	
	89.0																								
DRILLING	VESSELS- Crew Diesel		7200	370.411201	8889.87	12	39	5.08	3.06	2.97	0.07	121.70	3.50	0.00	19.09	0.04	1.18	0.71	0.69	0.02	28.16	0.81	0.00	4.42	0.01
	VESSELS - Supply Diesel		7200	370.411201	8889.87	12	39	5.08	3.06	2.97	0.07	121.70	3.50	0.00	19.09	0.04	1.18	0.71	0.69	0.02	28.16	0.81	0.00	4.42	0.01
	VESSELS - Tugs 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY	VESSELS - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INSTALLATION	VESSELS - Crew 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Supply 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	VESSELS - Support 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALASKA-SPECIFIC SOURCES	**On-Ice Equipment**			GAL/HR	GAL/D																				
	Man Camp - Operation (maximum people per day)		PEOPLE/DAY																						
	VESSELS		kW			HR/D	D/YR																		
	On-Ice – Loader			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Other Construction Equipment			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Other Survey Equipment			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Tractor			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Truck (for gravel island)			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Truck (for surveys)			0	0.0	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	0.00	--	0.00	0.00
	Man Camp - Operation		0			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	--	0.00	
	VESSELS - Hovercraft Diesel		0			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	0.00	0.00	0.00	0.00	0.00
2021	**Non-Facility Total Emissions**							**10.16**	**6.13**	**5.95**	**0.15**	**243.40**	**7.00**	**0.00**	**38.18**	**0.07**	**2.35**	**1.42**	**1.38**	**0.03**	**56.33**	**1.62**	**0.00**	**8.84**	**0.02**

AIR EMISSIONS CALCULATIONS - 2ND YEAR

COMPANY	AREA		BLOCK	LEASE	FACILITY	WELL					CONTACT		PHONE		REMARKS										
EnVen Energy Ventures, LLC	Green Canyon		166/167	G 35655/G3698(		E, F, G					Cheryl Powell		713-335-7041		Drill, temporary abandon, complete & install subsea wellheads for 3 wells.										
OPERATIONS	EQUIPMENT	EQUIPMENT ID	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR									ESTIMATED TONS								
	Diesel Engines		HP	GAL/HR	GAL/D																				
	Nat. Gas Engines		HP	SCF/HR	SCF/D																				
	Burners		MMBTU/HR	SCF/HR	SCF/D	HR/D	D/YR	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
DRILLING	VESSELS- Drilling - Propulsion Engine - Diesel		61800	3179.3628	76304.71	24	150	43.60	26.30	25.51	0.63	1044.59	30.03	0.00	163.84	0.30	78.48	47.35	45.93	1.14	1880.26	54.06	0.01	294.91	0.55
	VESSELS- Drilling - Propulsion Engine - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels - Diesel Boiler		0			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	0.00	0.00	0.00	0.00	0.00
	Vessels – Drilling Prime Engine, Auxiliary		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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	VESSELS - Heavy Lift Vessel/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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			BPD																						
DRILLING	Liquid Flaring		0			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	0.00	0.00	0.00	0.00	0.00
WELL TEST	COMBUSTION FLARE - no smoke			0		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	--	0.00	--
	COMBUSTION FLARE - light smoke			0		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	--	0.00	--
	COMBUSTION FLARE - medium smoke			0		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	--	0.00	--
	COMBUSTION FLARE - heavy smoke			0		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	--	0.00	--
ALASKA-SPECIFIC SOURCES	**VESSELS**		kW			HR/D	D/YR																		
	VESSELS - Ice Management Diesel		0			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	0.00	--	0.00	0.00
2022	**Facility Total Emissions**							**43.60**	**26.30**	**25.51**	**0.63**	**1,044.59**	**30.03**	**0.00**	**163.84**	**0.30**	**78.48**	**47.35**	**45.93**	**1.14**	**1,880.26**	**54.06**	**0.01**	**294.91**	**0.55**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**																**2,963.70**			**2,963.70**	**2,963.70**	**2,963.70**		**67,775.43**	
	89.0																								
DRILLING	VESSELS- Crew Diesel		7200	370.411201	8889.87	12	64	5.08	3.06	2.97	0.07	121.70	3.50	0.00	19.09	0.04	1.96	1.18	1.15	0.03	46.94	1.35	0.00	7.36	0.01
	VESSELS - Supply Diesel		7200	370.411201	8889.87	12	64	5.08	3.06	2.97	0.07	121.70	3.50	0.00	19.09	0.04	1.96	1.18	1.15	0.03	46.94	1.35	0.00	7.36	0.01
	VESSELS - Tugs 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	VESSELS - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Crew 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Supply 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	VESSELS - Support 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALASKA-SPECIFIC SOURCES	**On-Ice Equipment**			GAL/HR	GAL/D																				
	Man Camp - Operation (maximum people per day)		PEOPLE/DAY																						
	VESSELS		kW			HR/D	D/YR																		
	On-Ice – Loader			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Other Construction Equipment			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Other Survey Equipment			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Tractor			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Truck (for gravel island)			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Truck (for surveys)			0	0.0	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	0.00	--	0.00	0.00
	Man Camp - Operation		0			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	--	0.00	
	VESSELS - Hovercraft Diesel		0			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	0.00	0.00	0.00	0.00	0.00
2022	**Non-Facility Total Emissions**							**10.16**	**6.13**	**5.95**	**0.15**	**243.40**	**7.00**	**0.00**	**38.18**	**0.07**	**3.92**	**2.36**	**2.29**	**0.06**	**93.88**	**2.70**	**0.00**	**14.73**	**0.03**

AIR EMISSIONS CALCULATIONS - 3RD YEAR

COMPANY	AREA		BLOCK	LEASE	FACILITY	WELL	CONTACT	PHONE	REMARKS
EnVen Energy Ventures, LLC	Green Canyon		166/167	G 35655/G3698		E, F, G	Cheryl Powell	713-335-7041	Drill, temporary abandon, complete & install subsea wellheads for 3 wells.

OPERATIONS	EQUIPMENT	EQUIPMENT ID	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR									ESTIMATED TONS								
	Diesel Engines		HP	GAL/HR	GAL/D																				
	Nat. Gas Engines		HP	SCF/HR	SCF/D																				
	Burners		MMBTU/HR	SCF/HR	SCF/D	HR/D	D/YR	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
DRILLING	VESSELS- Drilling - Propulsion Engine - Diesel		61800	3179.3628	76304.71	24	120	43.60	26.30	25.51	0.63	1044.59	30.03	0.00	163.84	0.30	62.78	37.88	36.74	0.91	1504.21	43.25	0.00	235.93	0.44
	VESSELS- Drilling - Propulsion Engine - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels - Diesel Boiler		0			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	0.00	0.00	0.00	0.00	0.00
	Vessels – Drilling Prime Engine, Auxiliary		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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	VESSELS - Heavy Lift Vessel/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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			BPD																						
DRILLING	Liquid Flaring		0			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	0.00	0.00	0.00	0.00	0.00
WELL TEST	COMBUSTION FLARE - no smoke			0		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	--	0.00	--
	COMBUSTION FLARE - light smoke			0		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	--	0.00	--
	COMBUSTION FLARE - medium smoke			0		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	--	0.00	--
	COMBUSTION FLARE - heavy smoke			0		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	--	0.00	--
ALASKA-SPECIFIC SOURCES	**VESSELS**		**kW**			**HR/D**	**D/YR**																		
	VESSELS - Ice Management Diesel		0			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	0.00	--	0.00	0.00
2023	**Facility Total Emissions**							**43.60**	**26.30**	**25.51**	**0.63**	**1,044.59**	**30.03**	**0.00**	**163.84**	**0.30**	**62.78**	**37.88**	**36.74**	**0.91**	**1,504.21**	**43.25**	**0.00**	**235.93**	**0.44**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**																**2,963.70**			**2,963.70**	**2,963.70**	**2,963.70**		**67,775.43**	
	89.0																								
DRILLING	VESSELS- Crew Diesel		7200	370.411201	8889.87	12	51	5.08	3.06	2.97	0.07	121.70	3.50	0.00	19.09	0.04	1.57	0.95	0.92	0.02	37.55	1.08	0.00	5.89	0.01
	VESSELS - Supply Diesel		7200	370.411201	8889.87	12	51	5.08	3.06	2.97	0.07	121.70	3.50	0.00	19.09	0.04	1.57	0.95	0.92	0.02	37.55	1.08	0.00	5.89	0.01
	VESSELS - Tugs 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	VESSELS - 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Crew 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Supply 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	VESSELS - Support 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	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALASKA-SPECIFIC SOURCES	**On-Ice Equipment**			**GAL/HR**	**GAL/D**																				
	Man Camp - Operation (maximum people per day)		**PEOPLE/DAY**																						
	VESSELS		**kW**			**HR/D**	**D/YR**																		
	On-Ice – Loader			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Other Construction Equipment			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Other Survey Equipment			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Tractor			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Truck (for gravel island)			0	0.0	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	0.00	--	0.00	0.00
	On-Ice – Truck (for surveys)			0	0.0	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	0.00	--	0.00	0.00
	Man Camp - Operation		0			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	--	0.00	
	VESSELS - Hovercraft Diesel		0			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	0.00	0.00	0.00	0.00	0.00
2023	**Non-Facility Total Emissions**							**10.16**	**6.13**	**5.95**	**0.15**	**243.40**	**7.00**	**0.00**	**38.18**	**0.07**	**3.13**	**1.89**	**1.83**	**0.05**	**75.11**	**2.16**	**0.00**	**11.78**	**0.02**

AIR EMISSIONS CALCULATIONS

COMPANY	AREA	BLOCK	LEASE	FACILITY	WELL	
EnVen Energy Ventures, LLC	166/167	G 35655/G3698		E, F, G		

Year	Facility Emitted Substance								
	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
2021	47.09	28.41	27.56	0.69	1128.15	32.44	0.00	176.95	0.33
2022	78.48	47.35	45.93	1.14	1880.26	54.06	0.01	294.91	0.55
2023	62.78	37.88	36.74	0.91	1504.21	43.25	0.00	235.93	0.44
Allowable	2963.70			2963.70	2963.70	2963.70		67775.43	

SECTION H
OIL SPILLS INFORMATION
(30 CFR 550.219 AND 550.250)

A. OIL SPILL RESPONSE PLANNING

The proposed activities are in the Central Planning Area of the GOM. Therefore, a site-specific Oil Spill Response Plan (OSRP) is not required for this plan.

B. REGIONAL OSRP INFORMATION

All the proposed activities and facilities in this Exploration Plan will be covered by the Oil Spill Response Plan filed by EnVen Energy Ventures, LLC (BOEM Operator Number 03026) in accordance with 30 CFR 254 approved on 7/16/2018 and found in compliance on 7/28/2020.

1. SPILL RESPONSE SITES

Primary Response Equipment Location	Preplanned Staging Location
Houma, LA	Houma, LA
Leeville, LA	Port Fourchon, LA

C. OSRO INFORMATION

EnVen utilizes the Clean Gulf Associates (CGA) as the primary providers for oil spill removal equipment.

D. WORST-CASE SCENARIO COMPARISON

A comparison from EnVen's approved regional OSRP with the worst-case scenario from the proposed activities in this Exploration Plan is provided in the table below.

The proposed activities are greater than ten miles seaward of the coastline, therefore, the "far-shore" worst case scenario is provided as the "exploration" worst case scenario.

Category	Regional OSRP WCD	Exploration WCD
Type of Activity	Drilling	Drilling
Facility Location (Area/Block)	GC 767	GC 166
Facility Designation	Well #1	Well A
Distance to Nearest Shoreline (miles)	125	89
Volume Storage tanks (total) Uncontrolled blowout Total Volume	 0 131,386 **131,386**	 0 108,817 **108,817**
Type of Oil(s) (crude, condensate, diesel)	Oil	Oil
API Gravity	30.2	32.7°

Since EnVen has the capability to respond to the worst-case spill scenario included in our Regional OSRP approved on July 16, 2018, and since the worst-case scenario determined for our EP does not replace the worst-case scenario in our Regional OSRP, I hereby certify that EnVen has the capability to respond, to the maximum extent practicable, to a worst-case discharge, or a substantial threat of such a discharge, resulting from the activities proposed in our EP.

Supporting documentation for the worst case discharge information shown above was previously submitted and approved in Plan Control No. N-10076. The worst case discharge of the wells proposed in this plan does not exceed that which was previously permitted/approved.

E. OIL SPILL RESPONSE DISCUSSION (NEPA ANALYSIS)

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 108,817 barrels of crude oil with an API gravity of 32.7°.

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 5% 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

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

Using the estimated chemical and physical characteristics of crude oil, an ADIOS weathering model was run on a similar product from the ADIOS oil database. The results indicate 13% or approximately 14,146 barrels of crude oil would be evaporated/dispersed within 24 hours, with approximately 94,671 barrels remaining.

Natural Weathering Data: GC 166, Well A	**Barrels of Oil**
WCD Volume	108,817
Less 13% natural evaporation/dispersion	14,146
Remaining volume	94,671

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.

EnVen Energy Ventures, LLC's Oil Spill Response Plan includes alternative response technologies such as dispersants and in-situ burn. Strategies will be decided by Unified Command based on an operations safety analysis, the size of the spill, weather and potential impacts. If aerial

dispersants are utilized, 8 sorties (9,600 gallons) from two of the DC-3 aircrafts and 4 sorties (8,000 gallons) from the Basler aircraft would provide a daily dispersant capability of 7,540 barrels. If the conditions are favorable for in-situ burning, the proper approvals have been obtained and the proper planning is in place, in-situ burning of oil may be attempted. Slick containment boom would be immediately called out and on-scene as soon as possible. Offshore response strategies may include attempting to skim utilizing CGA spill response equipment, with a total derated skimming capacity of 706,980 barrels. Temporary storage associated with skimming equipment equals 32,796 barrels. If additional storage is needed, various storage barges with a total capacity 706,000+ bbls may be mobilized and centrally located to provide temporary storage and minimize off-loading time. **Safety is first priority. Air monitoring will be accomplished and operations deemed safe prior to any containment/skimming attempts.**

If the spill went unabated, shoreline impact in Cameron Parish, Louisiana would depend upon existing environmental conditions. Shoreline protection would include the use of CGA's near shore and shallow water skimmers with a totaled derated skimming capacity of 235,300 barrels. Temporary storage associated with skimming equipment equals 2,841 barrels. If additional storage is needed, various storage barges with a total capacity 235,000+ 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 94,250 feet of 18" shoreline protection boom. **Figure 2** outlines individual times needed for procurement, load out, travel time to the site and deployment. Strategies would be based upon surveillance and real time trajectories that depict areas of potential impact given actual sea and weather conditions. Applicable Area Contingency Plans (ACPs), Geographic Response Plans (GRPs), and Unified Command (UC) will be consulted to ensure that environmental and special economic resources are correctly identified and prioritized to ensure optimal protection. Shoreline protection strategies depict the protection response modes applicable for oil spill clean-up operations. As a secondary resource, the State of Louisiana Initial Oil Spill Response Plan will be consulted as appropriate to provide detailed shoreline protection strategies and describe necessary action to keep the oil spill from entering Louisiana's coastal wetlands. The UC should take into consideration all appropriate items detailed in Tactics discussion of this Appendix. The UC and their personnel have the option to modify the deployment and operation of equipment to allow for a more effective response to site-specific circumstances. EnVen Energy Ventures, LLC's contract Incident Management Team has access to the applicable ACP(s) and GRP(s).

Based on the anticipated worst case discharge scenario, EnVen Energy Ventures, LLC can be onsite with contracted oil spill recovery equipment with adequate response capacity to contain and recover surface hydrocarbons, and prevent land impact, to the maximum extent practicable, within an estimated 70 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

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

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

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

Adverse Weather Operations:

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

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

Maximization of skimmer-oil encounter rate

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

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

Maximize skimmer system efficiency

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

Recovered Oil Storage

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

Command, Control, and Communications (C^3)

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

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

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

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

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

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

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

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

Initial set-up and potential actions:

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

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

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

TF 1

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

TF 2

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

TF 3

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

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

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

TF 4

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

TF 5

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

TF 6

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

TF 7

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

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

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

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

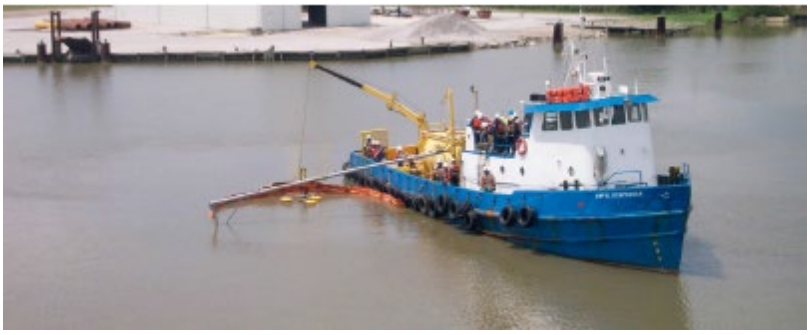
Skimming Operations: PIDVs are the preferred VOO skimming platform. OSROs are more versed in operating on these platforms and the vessels are generally large enough with crews more likely versed in spill response operations. They also have a greater possibility of having on-board storage capacity and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

The Fast Response Unit (FRU): A self-contained, skid based, skimming system that is deployed from the right side of a vessel of opportunity (VOO). An outrigger holds a 75' long section of air inflatable boom in place that directs oil to an apex for recovery via a Foilex 250 weir skimmer. The outrigger creates roughly a 40' swath width dependent on the VOO beam. The lip of the collection bowl on the skimmer is placed as close to the oil and water interface as possible to maximize oil recovery and minimize water retention. The skimmer then pumps all fluids recovered to the storage tank where it is allowed to settle, and with the approval of the Coast Guard, the water is decanted from the bottom of the tank back into the water ahead of the containment boom to be recycled through the system. Once the tank is full of as much pure recovered oil as possible it is offloaded to a storage barge for disposal in accordance with an approved disposal plan. A second 100 barrel storage tank can be added if the appropriate amount of deck space is available to use as secondary storage.

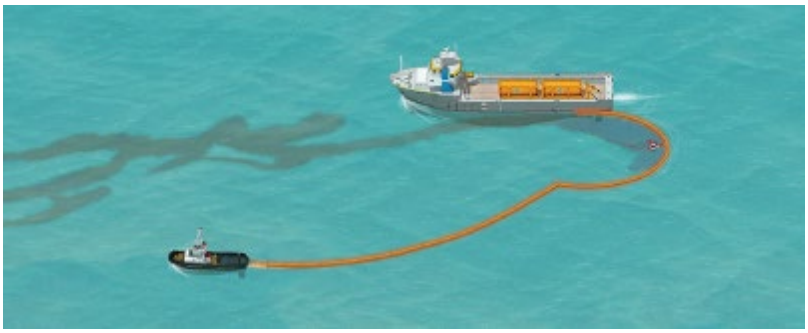
Tactical Overview

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

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



The VOSS (yellow) is being deployed and connected to an out-rigged arm. This is suitable for collection in both large pockets of oil and for recovery of streaming oil. The oil-to-skimmer encounter rate is limited by the length of the arm. Skimming pace is ≤ 1 knot.



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

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

Tactical Overview

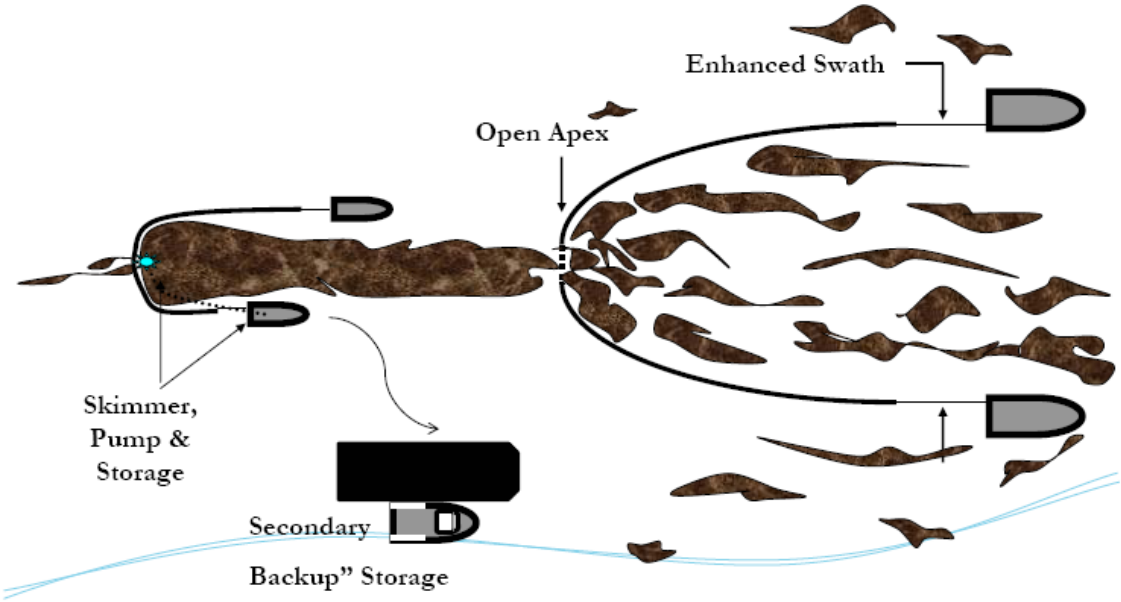
Mechanical Recovery – Deployed on large vessels of opportunity (VOO) the Koseq Rigid Sweeping Arms are high volume surge capacity deployed to increase recovery capacity at the source of a large oil spill in the offshore and outer nearshore environment of the Gulf of Mexico. They are highly mobile and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

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

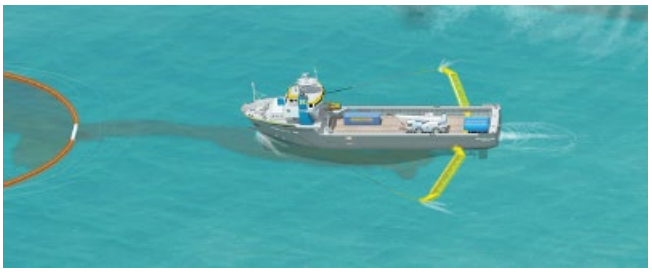
Command and Control – The large OSVs in many cases have state of the art communication and electronic systems, as well as the accommodations to support the function of directing all skimming operations offshore and reporting back to the command post.

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

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



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



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

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

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

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

Near Shore Response Actions

Timing

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

Considerations

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

Surveillance

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

Dispersant Use

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

Dedicated Near Shore skimming systems

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

VOO

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

Shoreline Protection Operations

Response Planning Considerations

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

Placement of boom

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

Beach Preparation - Considerations and Actions

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

- Staging of equipment and housing of response personnel as close to the job site as possible to maximize on-site work time
- Boom tending, repair, replacement and security (use of local assets may be advantageous)
- Constant awareness of weather and oil movement for resource re-deployment as necessary
- Earthen berms and shoreline protection boom may be considered to protect sensitive inland areas
- Requisitioning of earth moving equipment
- Plan for efficient and safe use 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

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 EnVen Energy Ventures, LLC's WCD and information in the BOEM Oil Spill Risk Analysis Model (OSRAM) for the Central and Western Gulf of Mexico available on the BOEM website using 30 day impact. The results are tabulated below.

Area/Block	OCS-G	Launch Area	Land Segment and/or Resource	Conditional Probability (%)
GC 166, Well A *89 miles from shore*	G35655	C44	Matagorda, TX Galveston, TX Jefferson, TX **Cameron, LA** Vermilion, LA Terrebonne, LA Lafourche, LA Jefferson, LA Plaquemines, LA	1 2 1 **5** 2 2 1 1 4

WCD Scenario– <u>BASED ON WELL BLOWOUT DURING DRILLING OPERATIONS</u> (89 miles from shore)
94,671 bbls of crude oil (Volume considering natural weathering)
API Gravity 32.7°

FIGURE 2 – Equipment Response Time to GC 166, Well A

Dispersants/Surveillance

Dispersant/Surveillance	Dispersant Capacity (gal)	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to site	Total Hrs
ASI							
Basler 67T	2000	2	Houma	2	2	0.7	4.7
DC 3	1200	2	Houma	2	2	0.9	4.9
DC 3	1200	2	Houma	2	2	0.9	4.9
Aero Commander	NA	2	Houma	2	2	0.7	4.7

Offshore Response

Offshore Equipment Pre-Determined Staging	EDRC	Storage Capacity	VOO	Persons Required	From	Hrs to Procure	Hrs to Loadout	Hrs to GOM	Travel to Spill Site	Hrs to Deploy	Total Hrs
CGA											
HOSS Barge	76285	4000	3 Tugs	12	Harvey	6	0	12	11	2	31
95' FRV	22885	249	NA	6	Galveston	2	0	2	15	1	20
95' FRV	22885	249	NA	6	Leeville	2	0	2	4.5	1	9.5
95' FRV	22885	249	NA	6	Venice	2	0	3	4.5	1	10.5
95' FRV	22885	249	NA	6	Vermilion	2	0	3	6	1	12
Boom Barge (CGA-300) 42" Auto Boom (25000')	NA	NA	1 Tug 50 Crew	4 (Barge) 2 (Per Crew)	Leeville	8	0	4	13	2	27
Enterprise Marine Services LLC (Available through contract with CGA)											
CTCo 2608	NA	23000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 2609	NA	23000	1 Tug	6	Amelia	26	0	6	15	1	48
Kirby Offshore (available through contract with CGA)											
RO Barge	NA	80000+	1 Tug	6	Venice	44	0	4	11	1	60
RO Barge	NA	130000+	1 Tug	6	Venice	44	0	4	11	1	60
RO Barge	NA	140000+	1 Tug	6	Venice	44	0	4	11	1	60
RO Barge	NA	150000+	1 Tug	6	Venice	44	0	4	11	1	60
RO Barge	NA	160000+	1 Tug	6	Venice	44	0	4	11	1	60

Staging Area: Fourchon

Offshore Equipment With Staging	EDRC	Storage Capacity	VOO	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Site	Hrs to Deploy	Total Hrs
T&T Marine (available through direct contract with CGA)											
Aqua Guard Triton RBS (1)	22323	2000	1 Utility	6	Galveston	4	12	12	8	2	38
Aqua Guard Triton RBS (1)	22323	2000	1 Utility	6	Harvey	4	12	3	8	2	29
Koseq Skimming Arms (10) Lamor brush	228850	10000	5 OSV	30	Galveston	24	24	12	8	2	70
Koseq Skimming Arms (6) MariFlex 150 HF	108978	6000	3 OSV	18	Galveston	24	24	12	8	2	70
Koseq Skimming Arms (2) Lamor brush	45770	2000	1 OSV	6	Harvey	24	24	3	8	2	61
Koseq Skimming Arms (4) MariFlex 150 HF	72652	4000	2 OSV	12	Harvey	24	24	3	8	2	61
CGA											
FRU (2) + 100 bbl Tank (4)	8502	400	2 Utility	12	Vermilion	2	6	5.5	8	1	22.5
FRU (1) + 100 bbl Tank (2)	4251	200	1 Utility	6	Galveston	2	6	12	8	1	29
FRU (1) + 100 bbl Tank (2)	4251	200	1 Utility	6	Aransas Pass	2	6	16.5	8	1	33.5
FRU (1) + 100 bbl Tank (2)	4251	200	1 Utility	6	Lake Charles	2	6	7	8	1	24
FRU (3) + 100 bbl Tank (6)	12753	600	3 Utility	18	Leeville	2	6	2	8	1	19
FRU (2) + 100 bbl Tank (4)	8502	400	2 Utility	12	Venice	2	6	5	8	1	22
Hydro-Fire Boom	NA	NA	8 Utility	40	Harvey	0	24	3	8	6	41

Nearshore Response

Nearshore Equipment Pre-determined Staging	EDRC	Storage Capacity	VOO	Persons Required	From	Hrs to Procure	Hrs to Loadout	Hrs to GOM	Travel to Spill Site	Hrs to Deploy	Total Hrs
CGA											
Mid-Ship SWS	22885	249	NA	4	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	Venice	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
46’ FRV	15257	65	NA	4	Aransas Pass	2	0	2	16	1	21
46’ FRV	15257	65	NA	4	Morgan City	2	0	2	6	1	11
46’ FRV	15257	65	NA	4	Vermilion	2	0	2	2.5	1	7.5
46’ FRV	15257	65	NA	4	Venice	2	0	2	11	1	16
Kirby Offshore (Available through contract with CGA)											
RO Barge	NA	80000+	1 Tug	6	Venice	25	0	4	30	1	60
Enterprise Marine Services LLC (Available through contract with CGA)											
CTCo 2603	NA	25000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 2604	NA	20000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 2605	NA	20000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 2606	NA	20000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 2607	NA	23000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 5001	NA	47000	1 Tug	6	Amelia	26	0	6	15	1	48

Staging Area: Cameron

Nearshore Equipment With Staging	EDRC	Storage Capacity	VOO	Persons Req.	From	Hrs to Procure	Hrs to Load Out	Travel to Staging	Travel to Deployment	Hrs to Deploy	Total Hrs
CGA											
SWS Egmopol	1810	100	NA	3	Galveston	2	2	5	2	1	12
SWS Egmopol	1810	100	NA	3	Leeville	2	2	7	2	1	14
SWS Marco	3588	20	NA	3	Vermilion	2	2	2.5	2	1	9.5
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	Vermilion	4	12	2.5	2	2	22.5
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	Vermilion	2	2	2.5	2	1	9.5
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	Vermilion	2	2	2.5	2	1	9.5
2 Drum Skimmer (TDS 118)	240	100	1 Crew	3	Harvey	2	2	7	2	1	14

Staging Area: Cameron

Shoreline Protection Boom	VOO	Persons Req.	Storage/Warehouse Location	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Deployment	Hrs to Deploy	Total Hrs
AMPOL (available through MSA)									
34,050’ 18” Boom	13 Crew	26	New Iberia, LA	2	2	3.5	2	12	21.5
12,850’ 18” Boom	7 Crew	14	Chalmette, LA	2	2	7.5	2	6	19.5
900’ 18” Boom	1 Crew	2	Morgan City, LA	2	2	5	2	2	13
30,000’ 18” Boom	13 Crew	26	Harvey, LA	2	2	7.5	2	12	25.5
1,700’ 18” Boom	2 Crew	4	Venice, LA	2	2	9	2	2	17
14,750’ 18” Boom	7 Crew	14	Port Arthur, TX	2	2	1.5	2	6	13.5

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	Vermilion	2	2	2.5	1	2	9.5
Bird Scare Guns (24)	NA	NA	NA	2	Leeville	2	2	7	1	2	14

Response Asset	Total
Offshore EDRC	706,980
Offshore Recovered Oil Capacity	738,796+
Nearshore / Shallow Water EDRC	235,300
Nearshore / Shallow Water Recovered Oil Capacity	237,841+

SECTION I
ENVIRONMENTAL MONITORING INFORMATION
(30 CFR 550.221 AND 550.252)

A. MONITORING SYSTEMS

At the time of this submission, the MODU contractor is not yet selected. EnVen will utilize either a DP semi-submersible rig or drillship, which will have a typical moon pool utilized in all Deepwater DP semi-submersible and drillships. The moon pool is located on or about the center of the rig, with a rectangular opening measuring approximately 30 feet x 120 feet, and approximately 5 feet in depth and approximately 53 feet above the water line for a DP semi-submersible and approximately 73.5 feet x 42 feet, and approximately 12 feet to 14 feet in depth for a DP drillship. The moon pool's purpose is to allow access to the water to drill, complete and workover wells. This also allows access to run Blowout Preventers to latch up to the well for well control in the event of an emergency. There is no closing mechanism for the moon pool as it is always open to the sea. In normal operating mode, the draft of the vessel is approximately 55 feet for a DP semi-submersible and approximately 36 feet for a DP drillship.

Including open water work and running the BOP stack, EnVen estimates a duration of approximately 6 to 12 days where equipment is lowered or raised through the moon pool, with the potential for contact with or injury to protected species as extremely low.

In the extremely rare instance that an ESA-Listed species would get entrapped or entangled by equipment in the moon pool, or by any other equipment on the rig, EnVen will contact NMFS at nmfs.psoreview@noaa.gov and BSEE at 985-722-7902 and protectedspecies@bsee.gov for additional guidance on any operation restrictions, continued monitoring requirements, recovery assistance needs (if required), and incidental report information.

Below are mitigations that EnVen will put in place to protect marine life in case of an incident:

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1. Any time heavy equipment is moved into or out of the moonpool area, crews will continuously monitor the moonpool for endangered marine life. Any signs of endangered marine life will be noted and documented on the daily drilling report.
2. During normal BOP connected operations a physical inspection of the moonpool area will be conducted at a minimum of 1 times per day and recorded on the daily drilling report. Additionally, the moonpool area will be monitored with multiple cameras at all times.

3. If endangered marine life is detected in the moon pool area prior to the start of operations, appropriate MODU personnel will be notified by the control room before operations will be allowed to begin.

If ongoing operations in the moon pool pose no potential threat of entrapment or entanglement to the listed species (e.g. drill pipe), operations will proceed and monitoring by MODU operations personnel will continue;

- If personnel determine that a potential threat exists, operations will pause until the threat is eliminated (e.g., the animal exists the moon pool on its own);
- If pausing operations cannot eliminate the threat (e.g., the animal cannot or will not exit the moon pool within a reasonable time on its own volition) and/or the animal is dead, in distress, or injured, personnel will immediately contact NMFS at nmfs.psoreview@noaa.gov and will immediately contact BSEE at 985-722-7902 and protectedspecies@bsee.gov for additional guidance on any operation restrictions, continued monitoring requirements, recovery assistance needs (if required), and incidental report information.

B. INCIDENTAL TAKES

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

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

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

· Appendices to the Biological Opinion on the Federally Regulated Oil and Gas Program in the Gulf of Mexico issued on March 13, 2020

- Appendix A: “Seismic Survey Mitigation and Protected Species Observer Protocols”
- Appendix B: “Marine Trash and Debris Awareness and Elimination Survey Protocols”
- Appendix C: “Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols”
- Appendix J: “Sea Turtle Handling and Resuscitation Guidelines”

C. FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY

Green Canyon Blocks 166/167 are not located in the Flower Garden Banks National Marine Sanctuary; therefore, the requested information is not required in this EP.

SECTION J
LEASE STIPULATIONS INFORMATION
(30 CFR 550.222 and 550.253)

Oil and gas exploration activities on the OCS are subject to stipulations developed before the lease sale and would be attached to the lease instrument, as necessary, in the form of mitigating measures. The BOEM is responsible for ensuring full compliance with stipulations.

Exploration activities are subject to the following stipulations attached to both Leases OCS-G 35655/36980, Green Canyon Blocks 166/167.

Stipulation No. 1 Military Warning Area (MWA)
Green Canyon Blocks 166/167 is located within designated MWA-W-92. The Fleet Area Control and Surveillance Facility will be contacted in order to coordinate and control the electromagnetic emissions during the proposed operations.

Stipulation No. 4 Marine Protected Species
Lease Stipulation No. 4 is meant to reduce the potential taking of marine protected species. EnVen will operate in accordance with NTL 2016-G02, to minimize the risk of vessel strikes to protected species and report observations of injured or dead protected species, and the prevention of intentional and/or accidental introduction of debris into the marine environment.

The following stipulation is attached only to Lease OCS-G 36980, Green Canyon Blocks 167:

Stipulation No. 11 Timeframe for Decisions on an Application for Permit to Drill and an Application for Permit to Modify
In order to provide for the prompt and efficient exploration and development of a lease area, Stipulation No. 11 is meant to provide a timeframe for a decision (approval, notification of modifications or disapproval) on an APD or APM.

SECTION K
ENVIRONMENTAL MITIGATION MEASURES INFORMATION
(30 CFR 550.224 and 550.257)

A. MEASURES TAKEN TO AVOID, MINIMIZE, AND MITIGATE IMPACTS
Activities in this Exploration Plan do not impact the State of Florida.

B. INCIDENTAL TAKES
There is no reason to believe that the protected species may be incidentally taken by the proposed activities.

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

- NTL 2012-JOINT-G01, “Vessel Strike Avoidance and Injured/Dead Protected Species Reporting
- NTL 2012-BSEE-G01, “Marine Trash and Debris Awareness and Elimination”
- NTL 2012-JOINT-G02, “Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program”

SECTION L
SUPPORT VESSELS AND AIRCRAFT INFORMATION
(30 CFR 550.224 and 550.257)

A. GENERAL
EnVen will travel the most practical, direct route from the shorebase to Green Canyon Blocks 166/167 as permitted by weather and traffic conditions.

Type	Maximum Fuel Tank Capacity	Maximum Number in Area at Any Time	Trip Frequency or Duration
Crew Boat	500 bbls	1	3/week
Supply Boat	2880 bbls	1	3/week
Helicopter	760 gallons	1	As Needed

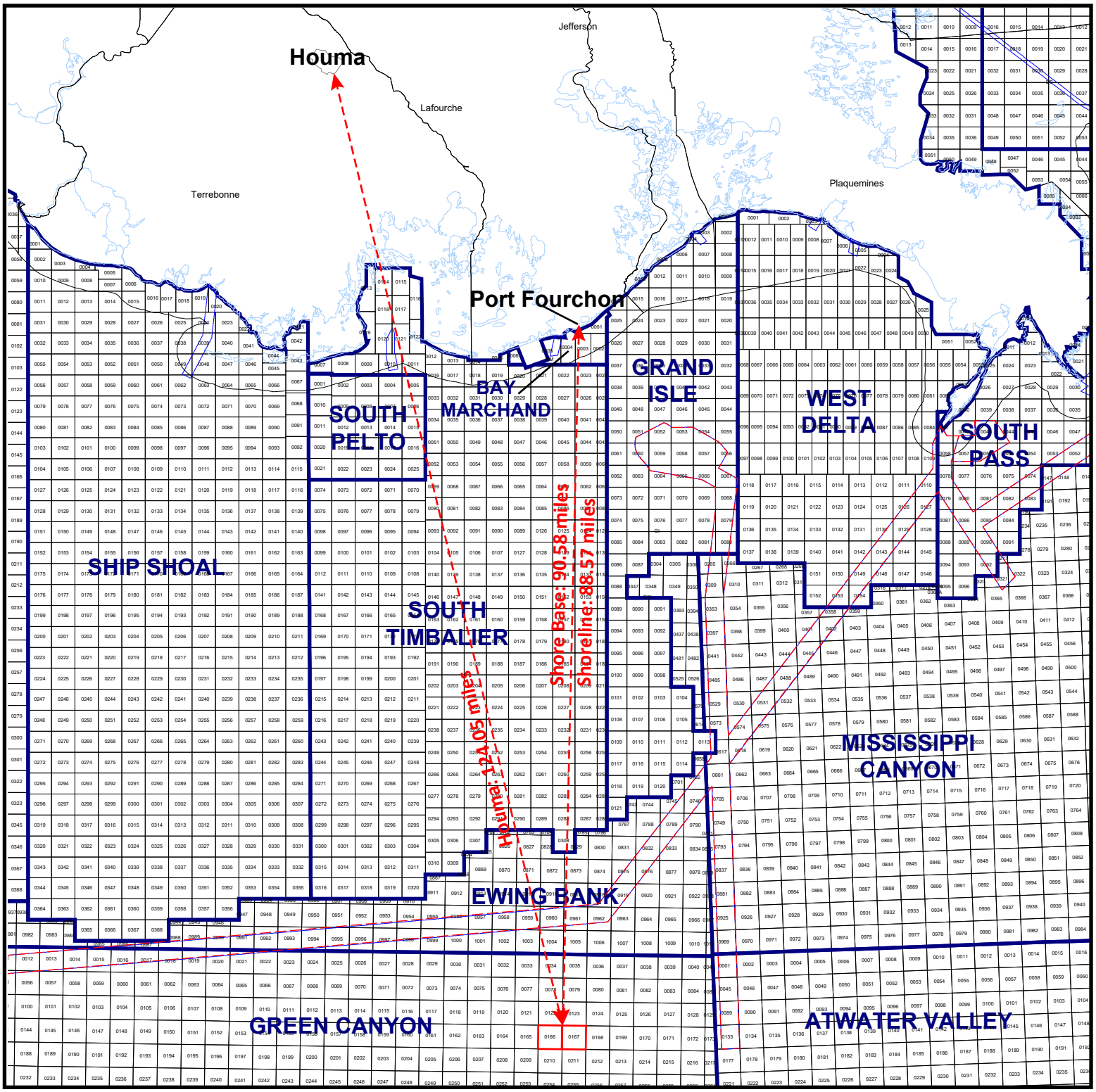
B. DIESEL OIL SUPPLY VESSELS

Size of Fuel Supply Vessel	Capacity of Fuel Supply Vessel	Frequency of Fuel Transfers	Route Fuel Supply Vessel Will Take
240’	2500 bbls	Weekly	From the shorebase in Fourchon to Green Canyon Blocks 166/167, then back to shorebase

C. DRILLING FLUID TRANSPORTATION
Not required for the proposed operations.

D. SOLID AND LIQUID WASTE TRANSPORTATION
Not required for the proposed operations.

E. VICINITY MAP
A vicinity map showing the location of the proposed activities relative to the shoreline, the distance of the proposed activities from the shoreline and the support base, and the primary route of the support vessels and aircraft that will be used when traveling between the onshore support facilities is included as **Attachment L-1**.



enven
ENERGY CORPORATION

GREEN CANYON 166/167

OFFSHORE LOUISIANA

Exploration Plan

Proposed Locations E, F, and G

Vicinity Location Map

CONTOUR INTERVAL	DATE:
INTERPRETATION BY:	DRAFTED BY: RHH
SCALE: 1"=90,000'	APPROVED BY: N/A
AREA: Green Canyon	FILE:

SECTION M
ONSHORE SUPPORT FACILITIES INFORMATION
(30 CFR 550.225 and 550.258)

A. GENERAL
Provided in the table below is a list of the onshore facilities that will be used to provide supply and service support for the proposed activities:

Name	Location	Existing/New/Modified
Fourchon	Port Fourchon, LA	Existing
Houma	Houma, LA	Existing

B. SUPPORT BASE CONSTRUCTION OR EXPANSION
EnVen does not propose any land acquisitions for the construction of an onshore support base, nor will we expand the existing shorebase as a result of the operations proposed in this Exploration Plan.

C. SUPPORT BASE CONSTRUCTION OR EXPANSION TIMETABLE
Not applicable for the proposed operations.

D. WASTE DISPOSAL
Please refer to **Attachment F-1.**

SECTION N
COASTAL ZONE MANAGEMENT (CZMA) INFORMATION
(30 CFR 550.226 and 550.260)

Under the direction of the Coastal Zone Management Act (CZMA), the states of Alabama, Florida, Louisiana, Mississippi and Texas developed Coastal Zone Management Programs (CZMP) to allow for the supervision of significant land and water use activities that take place within or that could significantly impact their respective coastal zones.

Relevant enforceable policies were considered in certifying consistency for Louisiana.

A certificate of Coastal Zone Management Consistency for the state of Louisiana is enclosed as **Attachment N-1**.

COASTAL ZONE MANAGEMENT
CONSISTENCY CERTIFICATION

JOINT SUPPLEMENTAL/INITIAL EXPLORATION PLAN

GREEN CANYON BLOCKS 166/167

LEASE OCS-G 35655/36980

The proposed activities described in detail in this OCS Plan comply with Louisiana's approved Coastal Management Program and will be conducted in a manner consistent with such Program.

EnVen Energy Ventures, LLC
Lessee or Operator

Cheryl Powell
_____
Certifying Official

1/29/2021
_____
Date

SECTION O
ENVIRONMENTAL IMPACT ANALYSIS (EIA)
(30 CFR 550.227 and 550.261)

EnVen Energy Ventures, LLC (EnVen)

Joint Supplemental / Initial Exploration Plan
Green Canyon Block 166 and 167
OCS-G 35655 / OCS-G 36980

(A) Impact Producing Factors

ENVIRONMENTAL IMPACT ANALYSIS WORKSHEET

Environment Resources	Impact Producing Factors (IPFs) Categories and Examples Refer to recent GOM OCS Lease Sale EIS for a more complete list of IPFs					
	Emissions (air, noise, light, etc.)	**Effluents (muds, cutting, other discharges to the water column or seafloor)**	**Physical disturbances to the seafloor (rig or anchor emplacements, etc.)**	**Wastes sent to shore for treatment or disposal**	**Accidents (e.g., oil spills, chemical spills, H_2S releases)**	**Discarded Trash & Debris**
Site-specific at Offshore Location						
Designated topographic features		(1)	(1)		(1)	
Pinnacle Trend area live bottoms		(2)	(2)		(2)	
Eastern Gulf live bottoms		(3)	(3)		(3)	
Benthic communities			X(4)			
Water quality		X			X	
Fisheries		X			X	
Marine Mammals	X(8)	X			X(8)	X
Sea Turtles	X(8)	X			X(8)	X
Air quality	X(9)					
Shipwreck sites (known or potential)			(7)			
Prehistoric archaeological sites			(7)			
Vicinity of Offshore Location						
Essential fish habitat		X			X(6)	
Marine and pelagic birds					X	X
Public health and safety					(5)	
Coastal and Onshore						
Beaches					X(6)	X
Wetlands					X(6)	
Shore birds and coastal nesting birds					X6)	
Coastal wildlife refuges						
Wilderness areas						

Footnotes for Environmental Impact Analysis Matrix

1) Activities that may affect a marine sanctuary or topographic feature. Specifically, if the well or platform site or any anchors will be on the seafloor within the:
   - 4-mile zone of the Flower Garden Banks, or the 3-mile zone of Stetson Bank;
   - 1000-meter, 1-mile or 3-mile zone of any topographic feature (submarine bank) protected by the Topographic Features Stipulation attached to an OCS lease;
   - Essential Fish Habitat (EFH) criteria of 500 feet. from any no-activity zone; or
   - Proximity of any submarine bank (500 foot. buffer zone) with relief greater than two meters that is not protected by the Topographic Features Stipulation attached to an OCS lease.
2) Activities with any bottom disturbance within an OCS lease block protected through the Live Bottom (Pinnacle Trend) Stipulation attached to an OCS lease.
3) Activities within any Eastern Gulf OCS block where seafloor habitats are protected by the Live Bottom (Low-Relief) Stipulation attached to an OCS lease.
4) Activities on blocks designated by the BOEM as being in water depths 300 meters or greater.
5) Exploration or production activities where H_2S concentrations greater than 500 ppm might be encountered.
6) All activities that could result in an accidental spill of produced liquid hydrocarbons or diesel fuel that you determine would impact these environmental resources. If the proposed action is located a sufficient distance from a resource that no impact would occur, the EIA can note that in a sentence or two.
7) All activities that involve seafloor disturbances, including anchor emplacements, in any OCS block designated by the BOEM as having high-probability for the occurrence of shipwrecks or prehistoric sites, including such blocks that will be affected that are adjacent to the lease block in which your planned activity will occur. If the proposed activities are located a sufficient distance from a shipwreck or a prehistoric site that no impact would occur, the EIA can note that in a sentence or two.
8) All activities that you determine might have an adverse effect on endangered or threatened marine mammals or sea turtles or their critical habitats.
9) Production activities that involve transportation of produced fluids to shore using shuttle tankers or barges.

TABLE 1: THREATENED AND ENDANGERED SPECIES, CRITICAL HABITAT, AND MARINE MAMMAL INFORMATION

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

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in the Gulf of Mexico	Gulf of Mexico Range
			Lease Area	Coastal		
Marine Mammals						
Manatee, West Indian	*Trichechus manatus latirostris*	T	--	X	Florida (peninsular)	Coastal Louisiana, Mississippi, Alabama, and Florida
Whale, Blue	*Balaenoptera masculus*	E	X*	--	None	GOM
Whale, Bryde's	*Balaenoptera edeni*	E	X	--	None	Eastern GOM
Whale, Fin	*Balaenoptera physalus*	E	X*	--	None	GOM
Whale, Humpback	*Megaptera novaeangliae*	E	X*	--	None	GOM
Whale, North Atlantic Right	*Eubalaena glacialis*	E	X*	--	None	GOM
Whale, Sei	*Balaenopiera borealis*	E	X*	--	None	GOM
Whale, Sperm	*Physeter catodon (=macrocephalus)*	E	X	--	None	GOM
Terrestrial Mammals						
Mouse, Beach (Alabama, Choctawatchee, Perdido Key, St. Andrew)	*Peromyscus polionotus*	E	-	X	Alabama, Florida (panhandle) beaches	Alabama, Florida (panhandle) beaches
Birds						
Plover, Piping	*Charadrius melodus*	T	-	X	Coastal Texas, Louisiana, Mississippi, Alabama and Florida (panhandle)	Coastal GOM
Crane, Whooping	*Grus Americana*	E	-	X	Coastal Texas	Coastal Texas and Louisiana
Crane, Mississippi sandhill	*Grus canadensis pulla*	E	-	X	Coastal Mississippi	Coastal Mississippi
Curlew, Eskimo	*Numenius borealis*	E	-	X	none	Coastal Texas
Falcon, Northern Aplomado	*Falco femoralis septentrionalis*	E	-	X	none	Coastal Texas
Knot, Red	*Calidris canutus rufa*	T	-	X	None	Coastal GOM
Stork, Wood	*Mycteria americana*	T	-	X	None	Coastal Alabama and Florida

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in the Gulf of Mexico	Gulf of Mexico Range
			Lease Area	Coastal		
Reptiles						
Sea Turtle, Green	*Chelonia mydas*	T/E***	X	X	None	GOM
Sea Turtle, Hawksbill	*Eretmochelys imbricata*	E	X	X	None	GOM
Sea Turtle, Kemp's Ridley	*Lepidochelys kempli*	E	X	X	None	GOM
Sea Turtle, Leatherback	*Dermochelys coriacea*	E	X	X	None	GOM
Sea Turtle, Loggerhead	*Caretta caretta*	T	X	X	Texas, Louisiana, Mississippi, Alabama, Florida	GOM
Fish						
Sturgeon, Gulf	*Acipenser oxyrinchus (=oxyrhynchus) desotoi*	T	X	X	Coastal Louisiana, Mississippi, Alabama and Florida (panhandle)	Coastal Louisiana, Mississippi, Alabama and Florida (panhandle)
Shark, Oceanic Whitetip	Carcharhinus longimanus	E	X	_	None	GOM
Sawfish, Smalltooth	Pristis pectinate	E	-	X	None	Florida
Grouper, Nassau	Epinephelus striatus	T	-	X	None	Florida
Ray, Giant Manta	Manta birostris	E	X	--	None	GOM
Corals						
Coral, Elkhorn	*Acopora palmate*	T	X**	X	Florida Keys and Dry Tortugas	Flower Garden Banks, Florida, and the Caribbean
Coral, Staghorn	*Acopora cervicornis*	T	X	X	Florida	Flower Garden Banks, Florida, and the Caribbean
Coral, Boulder Star	*Orbicella franksi*	T	X	X	none	Flower Garden Banks and Florida
Coral, Lobed Star	*Orbicella annularis*	T	X	X	None	Flower Garden Banks and Caribbean
Coral, Mountainous Star	*Orbicella faveolate*	T	X	X	None	Flower Garden Banks and Gulf of Mexico
Coral, Rough Cactus	*Mycetophyllia ferox*	T	-	X	None	Florida and Southern Gulf of Mexico

Abbreviations: E = Endangered; T = Threatened

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

** According to the 2017 EIS, Elkhorn Coral, while uncommon, has been found in the Flower Garden Banks. (BOEM 2017-009)

*** Green Sea Turtles are considered threatened throughout the Gulf of Mexico; however, the breeding population off the coast of Florida is considered endangered.

(B) Analysis

Site-Specific at Green Canyon Blocks 166 and 167

Proposed operations consist of the drilling, completion, testing and installation of subsea wellheads for three subsea Locations (E, F, and G).

The operations will be conducted with a drillship or dynamically positioned semi-submersible rig.

There are no seismic surveys, pile driving, or pipelines making landfall associated with the operations covered by this Plan.

1. Designated Topographic Features

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

Physical disturbances to the seafloor: Green Canyon Blocks 166 and 167 are approximately 34.4 miles from the closest designated Topographic Features Stipulation Block (Diaphus Bank); therefore, no adverse impacts are expected. Additionally, a drillship or dynamically positioned semi-submersible rig is being used for the proposed activities; therefore, only an insignificant amount of seafloor will be disturbed.

Effluents: Green Canyon Blocks 166 and 167 are approximately 34.4 miles from the closest designated Topographic Features Stipulation Block (Diaphus Bank); therefore, no adverse impacts are expected.

Accidents: It is unlikely that an accidental surface or subsurface spill would occur as a result of the proposed activities (refer to statistics in **Item 5**, Water Quality). Oil spills cause damage to benthic organisms only if the oil contacts the organisms. Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 10 meter depth. At this depth, the oil is found only at concentrations several orders of magnitude lower than the amount shown to have an effect on corals. Because the crests of topographic features in the Northern Gulf of Mexico are found below 10 meters, oil from a surface spill is not expected to reach their sessile biota. Oil from a subsurface spill is not applicable due to the distance of these blocks from a topographic area. The activities proposed in this plan will be covered by EnVen's Regional OSRP (refer to information submitted in **Section H**).

If dispersants were utilized as a response method, the fate and effects of spilled oil would be impacted. Dispersants have been utilized in previous spill response efforts and were used extensively in the response to the Deepwater Horizon oil spill, with both surface and sub-surface applications. Reports on dispersant usage on surface oil indicate that a majority of the dispersed oil remains in the top 10 meters of the water column, with 60 percent of the oil in the

top two meters of water (McAuliffe et al, 1981; Lewis and Aurand, 1997; OCS Report BOEM 2017-007). Lubchenco et al. (2010) report that most chemically dispersed surface oil from the Deepwater Horizon explosion and oil spill remained in the top six meters of the water column where it mixed with surrounding waters and biodegraded (BOEM 2017-007). None of the topographic features or potentially sensitive biological features in the GOM are shallower than 10 meters (33 feet), and only the Flower Garden Banks are shallower than 20 meters (66 feet).

In one extraordinary circumstance with an unusual combination of meteorological and oceanographic conditions, a tropical storm forced a large volume of Deepwater Horizon oil spill-linked surface oil/dispersant mixture to as deep as 75 meters (246 feet), causing temporary exposure to mesophotic corals in the Pinnacle Trend area and leading to some coral mortality and sublethal impacts (Silva et al., 2015; BOEM 2017-007).

Additionally, concentrations of dispersed and dissolved oil in the Deepwater Horizon oil-spill subsea plume were reported to be in the parts per million range or less and were generally lower away from the water's surface and away from the well head (Adcroft et al., 2010; Haddad and Murawski, 2010; Joint Analysis Group, 2010; Lubchenco et al, 2010; BOEM 2017-007).

In the case of subsurface spills like a blowout or pipeline leak, dispersants may be injected at the seafloor. This will increase oil concentrations near the source but tend to decrease them further afield, especially at the surface. Marine organisms in the lower water column will be exposed to an initial increase of water-soluble oil compounds that will dilute in the water column over time (Lee et al., 2013a; NAS 2020).

Dispersant application involves a trade-off between decreasing the risk to the surface and shoreline habitat and increasing the risk beneath the surface. The optimal trade-off must account for various factors, including the type of oil spilled, the spill volume, the weather and sea state, the water depth, the degree of turbulence, and the relative abundance and life stages of organisms (NRC, 2005; NAS 2020).

Chemical dispersants may increase the risk of toxicity to subsurface organisms by increasing bioavailability of the oil. However, it is important to note that at the 1:20 dispersant-to-oil ratio recommended for use during response operations, the dispersants currently approved for use are far less acutely toxic than oil is. Toxicity of chemically dispersed oil is primarily due to the oil itself and its enhanced bioavailability (Lee et al., 2015; NAS 2020).

With the exception of special Federal management areas or designated exclusion areas, dispersants have been preapproved for surface use, which provides the USCG On-Scene Coordinator with the authority to approve the use of dispersants. However, that approval would only be granted upon completion of the protocols defined in the appropriate Area

Contingency Plan (ACP) and the Regional Response Team (RRT) Dispersant Plan. The protocols include conducting an environmental benefit analysis to determine if the dispersant use will prevent a substantial threat to the public health or welfare or minimize serious environmental damage. The Regional Response Team would be notified immediately to provide technical support and guidance in determining if the dispersant use meets the established criteria and provide an environmental benefit. Additionally, there is currently no preapproval for subsea dispersant injection and the USCG On-Scene Coordinator must approve use of this technology before any subsea application. Due to the unprecedented volume of dispersants applied for an extended period of time, the U.S. National Response Team has developed guidance for atypical dispersant operations to ensure that planning and response activities will be consistent with national policy (BOEM 2017-007).

Dispersants were used extensively in the response to the Deepwater Horizon oil spill, both surface and sub-surface applications. However, during a May 2016 significant oil spill (approximately 1,926 barrels) in the Gulf of Mexico dispersants were not utilized as part of the response. The Regional Response Team was consulted and recommended that dispersants not be used, despite acknowledging the appropriate protocols were correctly followed and that there was a net environmental benefit in utilizing dispersants. This demonstrates that the federal authorities (USCG and RRT) will be extremely prudent in their decision-making regarding dispersant use authorizations.

Due to the distance of these blocks from a topographic area and the coverage of the activities proposed in this plan by EnVen's Regional OSRP (refer to information submitted in **Section H**), impacts to topographic features from surface or sub-surface oil spills are not expected.

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

2. Pinnacle Trend Area Live Bottoms

Potential IPFs on pinnacle trend area live bottoms from the proposed operations include physical disturbances to the seafloor, emissions (noise / sound), effluents, and accidents.

Physical disturbances to the seafloor: Green Canyon Blocks 166 and 167 are approximately 144.9 miles from the closest live bottom (pinnacle trend) area; therefore, no adverse impacts are expected. Additionally, a drillship or dynamically positioned semi-submersible rig is being used for the proposed operations; therefore, only an insignificant amount of seafloor will be disturbed.

Emissions (noise / sound): All routine OCS oil-and gas-related activities have some element of sound generation. Common sound sources include propeller cavitation, rotating machinery,

and reciprocating machinery, which are associated with routine OCS oil-and gas-related activities such as vessel traffic, drilling, construction, and oil and gas production, processing, and transport. Sound introduced into the marine environment as a result of human activities has the potential to affect marine organisms. Although there is little information available on sound detection and sound-mediated behaviors for marine invertebrates, the overall impacts on pinnacle and low-relief feature communities from anthropogenic noise are expected to be negligible (BOEM 2017-009). Additionally, Green Canyon Blocks 166 and 167 are approximately 144.9 miles from the closest live bottom (pinnacle trend) area; therefore, no adverse impacts are expected.

Effluents: Green Canyon Blocks 166 and 167 are approximately 144.9 miles from the closest live bottom (pinnacle trend) area; therefore, no adverse impacts are expected.

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

If dispersants were utilized as a response method, the fate and effects of spilled oil would be impacted. A detailed discussion on dispersants, their usage during the Deepwater Horizon oil spill, and their impacts on different levels of benthic communities can be found in **Item 1**.

There are no other IPFs (including wastes sent to shore for treatment or disposal) from the proposed operations that are likely to impact a live bottom (pinnacle trend) area.

3. Eastern Gulf Live Bottoms

Potential IPFs on Eastern Gulf live bottoms from the proposed operations include physical disturbances to the seafloor, emissions (noise / sound), effluents, and accidents.

Physical disturbances to the seafloor: Green Canyon Blocks 166 and 167 are not located in an area characterized by the existence of live bottoms and this lease does not contain a Live-Bottom Stipulation requiring a photo documentation survey and survey report. Additionally, a drillship or dynamically positioned semi-submersible rig is being used for the proposed operations; therefore, only an insignificant amount of seafloor will be disturbed.

Emissions (noise / sound): All routine OCS oil-and gas-related activities have some element of sound generation. Common sound sources include propeller cavitation, rotating machinery, and reciprocating machinery, which are associated with routine OCS oil-and gas-related activities such as vessel traffic, drilling, construction, and oil and gas production, processing, and transport. Sound introduced into the marine environment as a result of human activities has the potential to affect marine organisms. Although there is little information available on sound detection and sound-mediated behaviors for marine invertebrates, the overall impacts on pinnacle and low-relief feature communities from anthropogenic noise are expected to be negligible (BOEM 2017-009). Additionally, Green Canyon Blocks 166 and 167 are not located in an area characterized by the existence of live bottoms; therefore, no adverse impacts are expected.

Effluents: Green Canyon Blocks 166 and 167 are not located in an area characterized by the existence of live bottoms; therefore, no adverse impacts are expected.

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

If dispersants were utilized as a response method, the fate and effects of spilled oil would be impacted. A detailed discussion on dispersants, their usage during the Deepwater Horizon oil spill, and their impacts on different levels of benthic communities can be found in **Item 1**.

There are no other IPFs (including wastes sent to shore for treatment or disposal) from the proposed operations that are likely to impact an Eastern Gulf live bottom area.

4. Benthic Communities

Green Canyon Blocks 166 and 167 are located in water depths 984 feet (300 meters) or greater. Potential IPFs that could result in impacts to deepwater benthic communities from the proposed operations include physical disturbances to the seafloor and emissions (noise / sound).

Physical disturbances to the seafloor: Green Canyon Blocks 166 and 167 are approximately 0 miles from a known deepwater benthic community site (Green Canyon Block 166), listed in NTL 2009-G40. This Joint Supplemental / Initial Exploration Plan submittal includes the required maps, analyses, and statement(s). The proposed operations will be conducted in accordance with NTL 2009-G40, which will ensure that features or areas that could support high-density deepwater benthic communities will not be impacted. Additionally, a drillship or dynamically positioned semi-submersible rig is being used for the proposed operations; therefore, only an insignificant amount of seafloor will be disturbed. Because physical disturbances to the seafloor will be minimized by the use of a drillship or dynamically positioned semi-submersible rig, EnVen's proposed operations in Green Canyon Blocks 166 and 167 are not likely to impact deepwater benthic communities.

Emissions (noise / sound)*:* All routine OCS oil-and gas-related activities have some element of sound generation. Common sound sources include propeller cavitation, rotating machinery, and reciprocating machinery, which are associated with routine OCS oil-and gas-related activities such as vessel traffic, drilling, construction, and oil and gas production, processing, and transport. Sound introduced into the marine environment as a result of human activities has the potential to affect marine organisms. Although there is little information available on sound detection and sound-mediated behaviors for marine invertebrates, the overall impacts on deepwater benthic communities from anthropogenic noise are expected to be negligible (BOEM 2017-009). Additionally, the proposed operations will be conducted in accordance with NTL 2009-G40, which will ensure that features or areas that could support high-density deepwater benthic communities will not be impacted.

There are no other IPFs (including effluents, wastes sent to shore for treatment or disposal, and accidents) from the proposed operations that are likely to impact deepwater benthic communities.

Deepwater benthic communities would potentially be subject to detrimental effects from a catastrophic seafloor blowout due to sediment and oiled sediment from the initial event (BOEM 2017-007). However, this is unlikely due to the distancing requirements described in NTL 2009-G40. Additionally, the potential impacts would be localized due to the directional movement of oil plumes by water currents and the scattered, patchy distribution of sensitive habitats. Although widely dispersed, biodegraded particles of a passing oil plume might impact patchy habitats, no significant impacts would be expected to the Gulfwide population. Most deepwater benthic communities are expected to experience no impacts from a catastrophic seafloor blowout due to the directional movement of oil plumes by the water currents and their scattered, patchy distribution. Impacts may be expected if a spill were to occur close to a deepwater benthic habitat, however, beyond the localized area of impact particles would

become increasingly biodegraded and dispersed. Localized impacts to deepwater benthic organisms would be expected to be mostly sublethal (BOEM 2017-007).

If dispersants were utilized as a response method, the fate and effects of spilled oil would be impacted. A detailed discussion on dispersants, their usage during the Deepwater Horizon oil spill, and their impacts on different levels of benthic communities can be found in **Item 1**.

5. Water Quality

IPFs that could result in water quality degradation from the proposed operations in Green Canyon Blocks 166 and 167 include physical disturbances to the seafloor, effluents, and accidents.

Physical disturbances to the seafloor: Bottom area disturbances resulting from the emplacement of drill rigs, the drilling of wells and the installation of platforms and pipelines would increase water-column turbidity and re-suspension of any accumulated pollutants, such as trace metals and excess nutrients. This would cause short-lived impacts on water quality conditions in the immediate vicinity of the emplacement operations. Additionally, a drillship or dynamically positioned semi-submersible rig is being used for the proposed operations; therefore, only an insignificant amount of seafloor will be disturbed.

Effluents: Levels of contaminants in drilling muds and cuttings and produced water discharges, discharge-rate restrictions and monitoring and toxicity testing are regulated by the EPA NPDES permit, thereby eliminating many significant biological or ecological effects. Operational discharges are not expected to cause significant adverse impacts to water quality. Additionally, an analysis of the best available information from the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico (NMFS, 2020) concludes that exposures to toxicants in discharges from oil and gas activities are not likely to adversely affect ESA-listed species.

Accidents: Impact-producing factors related to OCS oil- and gas-related accidental events primarily involve drilling fluid spills, chemical spills, and oil spills.

Drilling Fluid Spills

Water-based fluid (WBF) and Synthetic-based fluid (SBF) spills may result in elevated turbidity, which would be short term, localized, and reversible. The WBF is normally discharged to the seafloor during riserless drilling, which is allowable due to its low toxicity. For the same reasons, a spill of WBF would have negligible impacts. The SBF has low toxicity, and the discharge of SBF is allowed to the extent that it adheres onto drill cuttings. Both USEPA Regions 4 and 6 permit the discharge of cuttings wetted with SBF as long as the retained SBF amount is below a

prescribed percent, meets biodegradation and toxicity requirements, and is not contaminated with the formation oil or PAH. A spill of SBF may cause a temporary increase in biological oxygen demand and locally result in lowered dissolved oxygen in the water column. Also, a spill of SBF may release an oil sheen if formation oil is present in the fluid. Therefore, impacts from a release of SBF are considered to be minor. Spills of SBF typically do not require mitigation because SBF sinks in water and naturally biodegrades, seafloor cleanup is technically difficult, and SBF has low toxicity. (BOEM 2017-009)

Chemical Spills

Accidental chemical spills could result in temporary localized impacts on water quality, primarily due to changing pH. Chemicals spills are generally small volume compared with spills of oil and drilling fluids. During the period of 2007 to 2014, small chemical spills occurred at an average annual volume of 28 barrels, while large chemical spills occurred at an average annual volume of 758 barrels. These chemical spills normally dissolve in water and dissipate quickly through dilution with no observable effects. Also, many of these chemicals are approved to be commingled in produced water for discharge to the ocean, which is a permitted activity. Therefore, impacts from chemical spills are considered to be minor and do not typically require mitigation because of technical feasibility and low toxicity after dilution (BOEM 2017-009).

Oil Spills

Oil spills have the greatest potential of all OCS oil-and gas-related activities to affect water quality. Small spills (<1,000 barrels) are not expected to substantially impact water quality in coastal or offshore waters because the oil dissipates quickly through dispersion and weathering while still at sea. Reasonably foreseeable larger spills (≥1,000 barrels), however, could impact water quality in coastal and offshore waters (BOEM 2017-007). However, based on data provided in the BOEM 2016 Update of Occurrence Rates for Offshore Oil Spills, it is unlikely that an accidental surface or subsurface spill of a significant volume would occur from the proposed operations. Between 2001 and 2015 OCS operations produced eight billion barrels of oil and spilled 0.062 percent of this oil, or one barrel for every 1,624 barrels produced. (The overall spill volume was almost entirely accounted for by the 2010 Deepwater Horizon blowout and subsequent discharge of 4.9 million barrels of oil. Additional information on unlikely scenarios and impacts from very large oil spills are discussed in the Catastrophic Spill Event Analysis white paper (BOEM 2017-007).

If a spill were to occur, the water quality of marine waters would be temporarily affected by the dissolved components and small oil droplets. Dispersion by currents and microbial degradation would remove the oil from the water column and dilute the constituents to background levels. Historically, changes in offshore water quality from oil spills have only been detected during the life of the spill and up to several months afterwards. Most of the components of oil are insoluble in water and therefore float. Dispersants will only be used if approved by the Regional

Response Team in coordination with the RRT Dispersant Plan and RRT Biological Assessment for Dispersants.

Oil spills, regardless of size, may allow hydrocarbons to partition into the water column in a dissolved, emulsion, and/or particulate phase. Therefore, impacts from reasonably foreseeable oil spills are considered moderate. Mitigation efforts for oil spills may include booming, burning, and the use of dispersants (BOEM 2017-009).

These methods may cause short-term secondary impacts to water quality, such as the introduction of additional hydrocarbon into the dissolved phase through the use of dispersants and the sinking of hydrocarbon residuals from burning. Since burning and the use of dispersants put additional hydrocarbons into the dissolved phase, impacts to water quality after mitigation efforts are still considered to be moderate, because dissolved hydrocarbons extend down into the water column. This results in additional exposure pathways via ingestion and gill respiration and may result in acute or chronic effects to marine life (BOEM 2017-009).

Most oil-spill response strategies and equipment are based upon the simple principle that oil floats. However, as evident during the Deepwater Horizon explosion, oil spill, and response, this is not always true. Sometimes it floats and sometimes it suspends within the water column or sinks to the seafloor (BOEM 2017-009).

Oil that is chemically dispersed at the surface moves into the top six meters of the water column where it mixes with surrounding waters and begins to biodegrade (U.S. Congress, Office of Technology Assessment, 1990). Dispersant use, in combination with natural processes, breaks up oil into smaller components that allows them to dissipate into the water and degrade more rapidly (Nalco, 2010). Dispersant use must be in accordance with an RRT Preapproved Dispersant Use Manual and with any conditions outlined within an RRT's site-specific, dispersant approval given after a spill event. Consequently, dispersant use must be in accordance with the restrictions for specific water depths, distances from shore, and monitoring requirements. At this time, neither the Region IV nor the Region VI RRT dispersant use manuals, which cover the GOM region, give preapproval for the application of dispersant use subsea (BOEM 2017-009).

The operations proposed in this plan will be covered by EnVen's Regional Oil Spill Response Plan, which discusses potential response actions in more detail (refer to information submitted in **Section H**).

There are no other IPFs (including emissions, and wastes sent to shore for disposal) from the proposed operations that are likely to impact water quality.

6. Fisheries

There are multiple species of fish in the Gulf of Mexico, including the endangered and threatened species listed in **Table 1** at the beginning of this Environmental Impact Assessment. More information regarding the endangered gulf sturgeon (**Item 20.2**), oceanic whitetip shark (**Item 20.3**), and giant manta ray (**Item 20.4**) can be found below. Potential IPFs to fisheries as a result of the proposed operations in Green Canyon Blocks 166 and 167 include physical disturbances to the seafloor, emissions (noise / sound), effluents, and accidents.

Physical disturbances to the seafloor: The emplacement of a structure or drilling rig results in minimal loss of bottom trawling area to commercial fishermen. Pipelines cause gear conflicts which result in losses of trawls and shrimp catch, business downtime and vessel damage. Most financial losses from gear conflicts are covered by the Fishermen's Contingency Fund (FCF). The emplacement and removal of facilities are not expected to cause significant adverse impacts to fisheries. Additionally, a drillship or dynamically positioned semi-submersible rig is being used for the proposed operations; therefore, only an insignificant amount of seafloor will be disturbed.

Emissions (noise / sound): All routine OCS oil-and gas-related activities have some element of sound generation. Common sound sources include propeller cavitation, rotating machinery, and reciprocating machinery, which are associated with routine OCS oil-and gas-related activities such as vessel traffic, drilling, construction, and oil and gas production, processing, and transport. Sound introduced into the marine environment as a result of human activities has the potential to affect marine organisms by stimulating behavioral response, masking biologically important signals, causing temporary or permanent hearing loss (Popper et al., 2005; Popper et al., 2014), or causing physiological injury (e.g., barotrauma) resulting in mortality (Popper and Hastings, 2009). The potential for anthropogenic sound to affect any individual organism is dependent on the proximity to the source, signal characteristics, received peak pressures relative to the static pressure, cumulative sound exposure, species, motivation, and the receiver's prior experience. In addition, environmental conditions (e.g., temperature, water depth, and substrate) affect sound speed, propagation paths, and attenuation, resulting in temporal and spatial variations in the received signal for organisms throughout the ensonified area (Hildebrand, 2009).

Sound detection capabilities among fishes vary. For most fish species, it is reasonable to assume hearing sensitivity to frequencies below 500 Hertz (Hz) (Popper et al., 2003 and 2014; Popper and Hastings, 2009; Slabbekoorn et al., 2010; Radford et al., 2014). The band of greatest interest to this analysis, low-frequency sound (30-500 Hz), has come to be dominated by anthropogenic sources and includes the frequencies most likely to be detected by most fish species. For example, the noise generated by large vessel traffic typically results from propeller

cavitation and falls within 40-150 Hz (Hildebrand, 2009; McKenna et al., 2012). This range is similar to that of fish vocalizations and hearing and could result in a masking effect.

Masking occurs when background noise increases the threshold for a sound to be detected; masking can be partial or complete. If detection thresholds are raised for biologically relevant signals, there is a potential for increased predation, reduced foraging success, reduced reproductive success, or other effects. However, fish hearing and sound production may be adapted to a noisy environment (Wysocki and Ladich, 2005). There is evidence that fishes are able to efficiently discriminate between signals, extracting important sounds from background noise (Popper et al., 2003; Wysocki and Ladich, 2005). Sophisticated sound processing capabilities and filtering by the sound sensing organs essentially narrows the band of masking frequencies, potentially decreasing masking effects. In addition, the low-frequency sounds of interest propagate over very long distances in deep water, but these frequencies are quickly lost in water depths between ½ and ¼ the wavelength (Ladich, 2013). This would suggest that the potential for a masking effect from low-frequency noise on behaviors occurring in shallow coastal waters may be reduced by the receiver's distance from sound sources, such as busy ports or construction activities.

Pulsed sounds generated by OCS oil-and gas-related activities (e.g., impact-driven piles and airguns) can potentially cause behavioral response, reduce hearing sensitivity, or result in physiological injury to fishes and invertebrate resources. However, there are no pulsed sound generation activities proposed for these operations.

Support vessel traffic, drilling, production facilities, and other sources of continuous sounds contribute to a chronic increase in background noise, with varying areas of effect that may be influenced by the sound level, frequencies, and environmental factors (Hildebrand, 2009; Slabbekoorn et al., 2010; McKenna et al., 2012). These sources have a low potential for causing physiological injury or injuring hearing in fishes and invertebrates (Popper et al., 2014). However, continuous sounds have an increased potential for masking biologically relevant sounds than do pulsed signals. The potential effects of masking on fishes and invertebrates are difficult to assess in the natural setting for communities and populations of species, but evidence indicates that the increase to background noise as a result of OCS oil and gas operations would be relatively minor. Therefore, it is expected that the cumulative impact to fishes and invertebrate resources would be minor and would not extend beyond localized disturbances or behavioral modification.

Despite the importance of many sound-mediated behaviors and the potential biological costs associated with behavioral response to anthropogenic sounds, many environmental and biological factors limit potential exposure and the effects that OCS oil-and gas-related sounds have on fishes and invertebrate resources. The overall impact to fishes and invertebrate

resources due to anthropogenic sound introduced into the marine environment by OCS oil-and gas-related routine activities is expected to be minor.

Effluents: Effluents such as drilling fluids and cuttings discharges contain components and properties which are detrimental to fishery resources. Moderate petroleum and metal contamination of sediments and the water column can occur out to several hundred meters down-current from the discharge point. Offshore discharges are expected to disperse and dilute to very near background levels in the water column or on the seafloor within 3,000 meters of the discharge point and are expected to have negligible effect on fisheries. Additionally, an analysis of the best available information from the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico (NMFS, 2020) concludes that exposures to toxicants in discharges from oil and gas activities are not likely to adversely affect ESA-listed species.

Accidents: Collisions between support vessels and ESA-listed fish, would be unusual events; however, should one occur, death or injury to ESA-listed fish is possible. Contract vessel operators can avoid protected aquatic species and reduce potential deaths by maintaining a vigilant watch and a distance of 50 meters or greater, with the exception of animals that approach the vessel. Vessel personnel should use a Gulf of Mexico reference guide that includes identifying information on marine mammals, sea turtles, and other marine protected species (i.e., Endangered Species Act listed species such as Gulf sturgeon, giant manta ray, or oceanic whitetip shark) that may be encountered in the Gulf of Mexico Outer Continental Shelf (OCS).

Contract vessel operators will comply with the measures included in Appendix C of the NMFS Biological Opinion and requirements of the Protected Species Lease Stipulation, except under extraordinary circumstances when the safety of the vessel or crew is in doubt or the safety of life at sea is in question.

Should an ESA-listed fish (e.g. giant manta ray, oceanic whitetip shark, or Gulf sturgeon) be entrapped, entangled, or injured, personnel should contact the ESA Section 7 biologist at (301) 427-8413 (nmfs.psoreview@noaa.gov) and report all incidents to takereport.nmfsser@noaa.gov. After making the appropriate notifications, EnVen may call BSEE at (985) 722-7902 for questions or additional guidance on recovery assistance needs, continued monitoring requirements, and incidental report information which at minimum is detailed below. Additional information may be found at the following website: https://www.fisheries.noaa.gov/report. Any injured or dead protected species should also be reported to takereport.nmfsser@noaa.gov. In addition, if the injury or death was caused by a collision with the operator's vessel, an entrapment within the operator's equipment or vessel

(e.g. moon pool), or an entanglement within the operator's equipment, the operator must further notify BOEM and BSEE within 24 hours of the strike or entrapment/entanglement by email to protectedspecies@boem.gov and protectedspecies@bsee.gov. If the vessel is the responsible party, it is required to remain available to assist the respective salvage and stranding network as needed.

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

There are no IPFs from wastes sent to shore for disposal from the proposed operations that are likely to cause impacts to fisheries.

7. Marine Mammals

The latest population estimates for the Gulf of Mexico revealed that cetaceans of the continental shelf and shelf-edge were almost exclusively bottlenose dolphin and Atlantic spotted dolphin. Squid eaters, including dwarf and pygmy killer whale, Risso's dolphin, rough-toothed dolphin, and Cuvier's beaked whale, occurred most frequently along the upper slope in areas outside of anticyclones. The Bryde's whale is the only commonly occurring baleen whale in the northern Gulf of Mexico and has been sighted off western Florida and in the De Soto Canyon region. Florida manatees have been sighted along the entire northern GOM but are mainly found in the shallow coastal waters of Florida, which are unassociated with the proposed actions. A complete list of all endangered and threatened marine mammals in the GOM may be found in **Table 1** at the beginning of this Environmental Impact Assessment. More information regarding the endangered Gulf of Mexico Bryde's whale can be found in **Item 20.1** below. Potential IPFs to marine mammals as a result of the proposed operations in Green Canyon Blocks 166 and 167 include emissions (noise/sound), effluents, discarded trash and debris, and accidents.

Emissions (noise / sound): Noises from drilling activities, support vessels and helicopters (i.e. non-impulsive anthropogenic sound) may elicit a startle reaction from marine mammals. This reaction may lead to disruption of marine mammals' normal activities. Stress may make them more vulnerable to parasites, disease, environmental contaminants, and/or predation (Majors and Myrick, 1990). Responses to sound exposure may include lethal or nonlethal injury, temporary hearing impairment, behavioral harassment and stress, or no apparent response. Noise-induced stress is possible, but it is little studied in marine mammals. Tyack (2008)

suggests that a more significant risk to marine mammals from sound are these less visible impacts of chronic exposure. There is little conclusive evidence for long-term displacements and population trends for marine mammals relative to noise.

Vessels are the greatest contributors to increases in low-frequency ambient sound in the sea (Andrew et al. 2011). Sound levels and tones produced are generally related to vessel size and speed. Larger vessels generally emit more sound than smaller vessels, and vessels underway with a full load, or those pushing or towing a load, are noisier than unladen vessels. Cetacean responses to aircraft depend on the animals' behavioral state at the time of exposure (e.g., resting, socializing, foraging or traveling) as well as the altitude and lateral distance of the aircraft to the animals (Luksenburg and Parsons 2009). The underwater sound intensity from aircraft is less than produced by vessels, and visually, aircraft are more difficult for whales to locate since they are not in the water and move rapidly (Richter et al. 2006). Perhaps not surprisingly then, when aircraft are at higher altitudes, whales often exhibit no response, but lower flying aircraft (e.g., approximately 500 meters or less) have been observed to elicit short-term behavioral responses (Luksenburg and Parsons 2009; NMFS 2017b; NMFS 2017f; Patenaude et al. 2002; Smultea et al. 2008a; Wursig et al. 1998). Thus, aircraft flying at low altitude, at close lateral distances and above shallow water elicit stronger responses than aircraft flying higher, at greater lateral distances and over deep water (Patenaude et al. 2002; Smultea et al. 2008a). Routine OCS helicopter traffic would not be expected to disturb animals for extended periods, provided pilots do not alter their flight patterns to more closely observe or photograph marine mammals. Helicopters, while flying offshore, generally maintain altitudes above 700 feet during transit to and from a working area, and at an altitude of about 500 feet between platforms. The duration of the effects resulting from a startle response is expected to be short-term during routine flights, and the potential effects will be insignificant to sperm whales and Bryde's whales. Therefore, we find that any disturbance that may result from aircraft associated with the proposed action is not likely to adversely affect ESA-listed whales.

Drilling and production noise would contribute to increases in the ambient noise environment of the GOM, but they are not expected in amplitudes sufficient to cause either hearing or behavioral impacts (BOEM 2017-009). There is the possibility of short-term disruption of movement patterns and/or behavior caused by vessel noise and disturbance; however, these are not expected to impact survival and growth of any marine mammal populations in the GOM. Additionally, the National Marine Fisheries Service published a final recovery plan for the sperm whale, which identified anthropogenic noise as either a low or unknown threat to sperm whales in the GOM (USDOC, NMFS, 2010b). Sirenians (i.e. manatees) are not located within the area of operations. Additionally, there were no specific noise impact factors identified in the latest BOEM environmental impact statement for sirenians related to GOM OCS operations (BOEM 2017-009). See Item 20.1 for details on the Bryde's whale.

Impulsive sound impacts (i.e. pile driving, seismic surveys) are not included among the operations proposed under this plan.

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

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

EnVen will operate in accordance with the regulations, agency guidance, and Appendix B of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. EnVen will also collect and remove flotsam resulting from activities related to proposed operations.

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

Accidents: Collisions between support vessels and marine mammals, including cetaceans, would be unusual events; however, should one occur, death or injury to marine mammals is possible. Contract vessel operators can avoid marine mammals and reduce potential deaths by maintaining a vigilant watch for marine mammals and maintaining a safe distance of 500 meters or greater from baleen whales, 100 meters or greater from sperm whales, and a

distance of 50 meters or greater from all other aquatic protected species, with the exception of animals that approach the vessel. If unable to identify the marine mammal, the vessel will act as if it were a baleen whale and maintain a distance of 500 meters or greater. If a manatee is sighted, all vessels in the area will operate at "no wake/idle" speeds in the area, while maintaining proper distance. When assemblages of cetaceans are observed, including mother/calf pairs, vessel speeds will be reduced to 10 knots or less. Vessel personnel should use a Gulf of Mexico reference guide that includes identifying information on marine mammals, sea turtles, and other marine protected species (i.e., Endangered Species Act listed species such as Gulf sturgeon, giant manta ray, or oceanic whitetip shark) that may be encountered in the Gulf of Mexico Outer Continental Shelf (OCS).

Contract vessel operators will comply with the measures included in Appendix C of the NMFS Biological Opinion and requirements of the Protected Species Lease Stipulation, except under extraordinary circumstances when the safety of the vessel or crew is in doubt or the safety of life at sea is in question.

Vessel personnel must report sightings of any injured or dead protected marine mammal species immediately, regardless of whether the injury or death is caused by their vessel, to the NMFS Southeast Marine Mammal Stranding Hotline at (877) WHALE-HELP (877-942-5343). Additional information may be found at the following website: https://www.fisheries.noaa.gov/report. Any injured or dead protected species should also be reported to takereport.nmfsser@noaa.gov. In addition, if the injury or death was caused by a collision with the operator's vessel, an entrapment within the operator's equipment or vessel (e.g. moon pool), or an entanglement within the operator's equipment, the operator must further notify BOEM and BSEE within 24 hours of the strike or entrapment/entanglement by email to protectedspecies@boem.gov and protectedspecies@bsee.gov. If the vessel is the responsible party, it is required to remain available to assist the respective salvage and stranding network as needed.

EnVen will utilize either a DP semi-submersible rig or drillship, which will have a typical moon pool utilized in all Deepwater DP semi-submersible rigs and drillships. The moon pool is located on or about the center of the rig, with a rectangular opening measuring approximately 30 feet by 120 feet, and approximately 5 feet in depth and approximately 53 feet above the water line for a DP semi-submersible rig and approximately 73.5 feet by 42 feet, and approximately 12 feet to 14 feet in depth for a DP drillship. The moon pool's purpose is to allow access to the water to drill, complete and workover wells. This also allows access to run Blowout Preventers to latch up to the well for well control in the event of an emergency. There is no closing mechanism for the moon pool as it is always open to the sea. In normal operating mode, the draft of the vessel is approximately 55 feet for a DP semi-submersible rig and approximately 36 feet for a DP drillship.

Including open water work and running the BOP stack, EnVen estimates a duration of approximately 6 to 12 days where equipment is lowered or raised through the moon pool, with the potential for contact with or injury to protected species as extremely low.

In the extremely rare instance that an ESA-Listed species would get entrapped or entangled by equipment in the moon pool, or by any other equipment on the rig, EnVen will contact NMFS at nmfs.psoreview@noaa.gov and BSEE at 985-722-7902 and protectedspecies@bsee.gov for additional guidance on any operation restrictions, continued monitoring requirements, recovery assistance needs (if required), and incidental report information. EnVen will put the following modifications in place to protect marine life in case of an incident:

1. Any time heavy equipment is moved into or out of the moon pool area, crews will continuously monitor the moonpool for endangered marine life. Any signs of endangered marine life will be noted and documented on the daily drilling report.
2. During normal BOP connected operations a physical inspection of the moon pool area will be conducted at a minimum of once per day and recorded on the daily drilling report. Additionally, the moonpool area will be monitored with multiple cameras at all times.
3. If marine life is detected in the moon pool area prior to the start of operations, appropriate MODU personnel will be notified by the control room before operations will be allowed to begin.

If ongoing operations in the moon pool pose no potential threat of entrapment or entanglement to the listed species (e.g. drill pipe), operations will proceed and monitoring by MODU operations personnel will continue:

- If personnel determine that a potential threat exists, operations will pause until the threat is eliminated (e.g., the animal exists the moon pool on its own).
- If pausing operations cannot eliminate the threat (e.g., the animal cannot or will not exit the moon pool within a reasonable time on its own volition) and/or the animal is dead, in distress, or injured, personnel will immediately contact NMFS at nmfs.psoreview@noaa.gov and will immediately contact BSEE at 985-722-7902 and protectedspecies@bsee.gov for additional guidance on any operation restrictions, continued monitoring requirements, recovery assistance needs (if required), and incidental report information.

Oil spills have the potential to cause sublethal oil-related injuries and spill-related deaths to marine mammals. However, it is unlikely that an accidental oil spill would occur from the proposed operations (refer to **Item 5**, Water Quality). Oil spill response activities may increase

vessel traffic in the area, which could impact cetacean behavior and/or distribution, thereby causing additional stress to the animals. The effect of oil dispersants on cetaceans is not known. Removing oil from the surface would reduce the likelihood of oil adhering to marine mammals. Laboratory experiments have shown that the dispersants used during the Deepwater Horizon response are cytotoxic to sperm whale cells; however, it is difficult to determine actual exposure levels in the GOM. Therefore, dispersants will only be used if approved by the Regional Response Team in coordination with the RRT Dispersant Plan and RRT Biological Assessment for Dispersants. The acute toxicity of oil dispersant chemicals included in EnVen's OSRP is considered to be low when compared with the constituents and fractions of crude oils and diesel products. The operations proposed in this plan will be covered by EnVen's OSRP (refer to information submitted in accordance with **Section H**).

The NMFS Office of Protected Resources coordinates agency assessment of the need for response and leads response efforts for spills that may impact cetaceans. If a spill may impact cetaceans, NMFS Protected Resources Contacts should be notified (see contact details below), and they will initiate notification of other relevant parties.

NMFS Protected Resources Contacts for the Gulf of Mexico:

- Marine mammals – Southeast emergency stranding hotline 1-877-433-8299
- Other endangered or threatened species – ESA section 7 consulting biologist: nmfs.ser.emergency.consult@noaa.gov

There are no other IPFs (including physical disturbances to the seafloor) from the proposed operations that are likely to impact marine mammals.

8. Sea Turtles

GulfCet II studies sighted most loggerhead, Kemp's ridley, and leatherback sea turtles over shelf waters. Historically these species have been sighted up to the shelf's edge. They appear to be more abundant east of the Mississippi River than they are west of the river (Fritts et al., 1983b; Lohoefener et al., 1990). Deep waters may be used by all species as a transitory habitat. A complete list of endangered and threatened sea turtles in the GOM may be found in **Table 1** at the beginning of this Environmental Impact Assessment. Additional details regarding the loggerhead sea turtle's critical habitat in the GOM are located in **Item 20.5**. Potential IPFs to sea turtles as a result of the proposed operations include emissions (noise / sound), effluents, discarded trash and debris, and accidents.

Emissions (noise / sound): Noise from drilling activities, support vessels, and helicopters (i.e. non-impulsive anthropogenic sound) may elicit a startle reaction from sea turtles, but this is a temporary disturbance. Responses to sound exposure may include lethal or nonlethal injury, temporary hearing impairment, behavioral harassment and stress, or no apparent response.

Vessels are the greatest contributors to increases in low-frequency ambient sound in the sea (Andrew et al. 2011). Sound levels and tones produced are generally related to vessel size and speed. Larger vessels generally emit more sound than smaller vessels, and vessels underway with a full load, or those pushing or towing a load, are noisier than unladen vessels. Routine OCS helicopter traffic would not be expected to disturb animals for extended periods, provided pilots do not alter their flight patterns to more closely observe or photograph marine mammals. Helicopters, while flying offshore, generally maintain altitudes above 700 feet during transit to and from a working area, and at an altitude of about 500 feet between platforms. The duration of the effects resulting from a startle response is expected to be short-term during routine flights and the potential effects will be insignificant to sea turtles. Therefore, we find that any disturbance that may result from aircraft associated with the proposed action is not likely to adversely affect sea turtles. Construction and operational sounds other than pile driving should have insignificant effects on sea turtles; effects would be limited to short-term avoidance of construction activity itself rather than the sound produced. As a result, sound sources associated with support vessel movement as part of the proposed operations are insignificant and therefore are not likely to adversely affect sea turtles.

Overall noise impacts on sea turtles from the proposed operations are expected to be negligible to minor depending on the location of the animal(s) relative to the sound source and the frequency, intensity, and duration of the source. The National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion Appendix C explains how operators must implement measures to minimize the risk of vessel strikes to protected species and report observations of injured or dead protected species. This guidance should also minimize the chance of sea turtles being subject to the increased noise level of a service vessel in very close proximity.

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

Discarded trash and debris: Both entanglement in, and ingestion of, debris have caused the death or serious injury of sea turtles (Balazs, 1985). The limited amount of marine debris, if any, resulting from the proposed operations is not expected to substantially harm sea turtles. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA).

EnVen will operate in accordance with the regulations, agency guidance, and Appendix B of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. EnVen will also collect and remove flotsam resulting from activities related to proposed operations.

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

Accidents: Collisions between support vessels and sea turtles would be unusual events; however, should one occur, death or injury to sea turtles is possible. Contract vessel operators can avoid sea turtles and reduce potential deaths by maintaining a vigilant watch for sea turtles and maintaining a safe distance of 50 meters or greater when they are sighted, with the exception of sea turtles that approach the vessel. Vessel crews should use a reference guide to help identify the five species of sea turtles that may be encountered in the Gulf of Mexico OCS as well as other marine protected species (i.e. Endangered Species Act listed species). Contract vessel operators will comply with the measures included in Appendix C of the NMFS Biological Opinion and requirements of the Protected Species Lease Stipulation, except under extraordinary circumstances when the safety of the vessel or crew is in doubt or the safety of life at sea is in question.

Vessel crews must report sightings of any injured or dead protected sea turtle species immediately, regardless of whether the injury or death is caused by their vessel, to the State Coordinators for the Sea Turtle Stranding and Salvage Network (STSSN) at http://www.sefsc.noaa.gov/species/turtles/stranding_coordinators.htm (phone numbers vary by state). Additional information may be found at the following website: https://www.fisheries.noaa.gov/report. Any injured or dead protected species should also be reported to takereport.nmfsser@noaa.gov. In addition, if the injury or death was caused by a collision with the operator's vessel, an entrapment within the operator's equipment or vessel (e.g. moon pool), or an entanglement within the operator's equipment, the operator must

further notify BOEM and BSEE within 24 hours of the strike or entrapment/entanglement by email to protectedspecies@boem.gov and protectedspecies@bsee.gov. If the vessel is the responsible party, it is required to remain available to assist the respective salvage and stranding network as needed.

EnVen will utilize either a DP semi-submersible rig or drillship, which will have a typical moon pool utilized in all Deepwater DP semi-submersible rigs and drillships. The moon pool is located on or about the center of the rig, with a rectangular opening measuring approximately 30 feet by 120 feet, and approximately 5 feet in depth and approximately 53 feet above the water line for a DP semi-submersible rig and approximately 73.5 feet by 42 feet, and approximately 12 feet to 14 feet in depth for a DP drillship. The moon pool's purpose is to allow access to the water to drill, complete and workover wells. This also allows access to run Blowout Preventers to latch up to the well for well control in the event of an emergency. There is no closing mechanism for the moon pool as it is always open to the sea. In normal operating mode, the draft of the vessel is approximately 55 feet for a DP semi-submersible rig and approximately 36 feet for a DP drillship.

Including open water work and running the BOP stack, EnVen estimates a duration of approximately 6 to 12 days where equipment is lowered or raised through the moon pool, with the potential for contact with or injury to protected species as extremely low.

In the extremely rare instance that an ESA-Listed species would get entrapped or entangled by equipment in the moon pool, or by any other equipment on the rig, EnVen will contact NMFS at nmfs.psoreview@noaa.gov and BSEE at 985-722-7902 and protectedspecies@bsee.gov for additional guidance on any operation restrictions, continued monitoring requirements, recovery assistance needs (if required), and incidental report information. EnVen will put the following modifications in place to protect marine life in case of an incident:

1. Any time heavy equipment is moved into or out of the moon pool area, crews will continuously monitor the moonpool for endangered marine life. Any signs of endangered marine life will be noted and documented on the daily drilling report.
2. During normal BOP connected operations a physical inspection of the moon pool area will be conducted at a minimum of once per day and recorded on the daily drilling report. Additionally, the moonpool area will be monitored with multiple cameras at all times.
3. If marine life is detected in the moon pool area prior to the start of operations, appropriate MODU personnel will be notified by the control room before operations will be allowed to begin.

If ongoing operations in the moon pool pose no potential threat of entrapment or entanglement to the listed species (e.g. drill pipe), operations will proceed and monitoring by MODU operations personnel will continue:

- If personnel determine that a potential threat exists, operations will pause until the threat is eliminated (e.g., the animal exists the moon pool on its own).
- If pausing operations cannot eliminate the threat (e.g., the animal cannot or will not exit the moon pool within a reasonable time on its own volition) and/or the animal is dead, in distress, or injured, personnel will immediately contact NMFS at nmfs.psoreview@noaa.gov and will immediately contact BSEE at 985-722-7902 and protectedspecies@bsee.gov for additional guidance on any operation restrictions, continued monitoring requirements, recovery assistance needs (if required), and incidental report information.

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

The NMFS Office of Protected Resources coordinates agency assessment of the need for response and leads response efforts for spills that may impact sea turtles. If a spill may impact sea turtles, the following NMFS Protected Resources Contacts should be notified, and they will initiate notification of other relevant parties.

- Dr. Brian Stacy at brian.stacy@noaa.gov and 352-283-3370 (cell); or
- Stacy Hargrove at stacy.hargrove@noaa.gov and 305-781-7453 (cell)

There are no other IPFs (including physical disturbances to the seafloor) from the proposed operations that are likely to impact sea turtles.

9. Air Quality

Potential IPFs to air quality as a result of the proposed operations include accidents.

The projected air emissions identified in **Section G** are not expected to affect the OCS air quality primarily due to distance to the shore or to any Prevention of Significant Deterioration Class I air quality area such as the Breton Wilderness Area. Green Canyon Blocks 166 and 167 are beyond the 200-kilometer (124-mile) buffer for the Breton Wilderness Area and are 89 miles

from the coastline. Therefore, no special mitigation, monitoring, or reporting requirements apply with respect to air emissions.

Accidents and blowouts can release hydrocarbons or chemicals, which could cause the emission of air pollutants. However, these releases would not impact onshore air quality because of the prevailing atmospheric conditions, emission height, emission rates, and the distances of Green Canyon Blocks 166 and 167 from the coastline. There are no other IPFs (including effluents, physical disturbances to the seafloor, wastes sent to shore for treatment or disposal) from the proposed operations that are likely to impact air quality.

10. Shipwreck Sites (known or potential)

In accordance with BOEM NTL 2005-G07, EnVen will submit an archaeological resource report per 30 CFR 550.194 if directed to do so by the Regional Director.

Potential IPFs to known or unknown shipwreck sites as a result of the proposed operations in Green Canyon Blocks 166 and 167 include physical disturbances to the seafloor.

Physical disturbances to the seafloor: A drillship or dynamically positioned semi-submersible rig is being used for the proposed operations; therefore, only an insignificant amount of seafloor will be disturbed. Because physical disturbances to the seafloor will be minimized by the use of a drillship or dynamically positioned semi-submersible rig, EnVen's proposed operations in Green Canyon Blocks 166 and 167 are not likely to impact shipwreck sites.

Additionally, Green Canyon Blocks 166 and 167 are not located in or adjacent to an OCS block designated by BOEM as having a high probability for occurrence of shipwrecks. Should EnVen discover any evidence of a shipwreck, they will immediately halt operations within a 1000-foot radius, report to BOEM within 48 hours, and make every reasonable effort to preserve and protect that cultural resource.

There are no other IPFs (including emissions, effluents, wastes sent to shore for treatment or disposal, or accidents) from the proposed operations that are likely to impact shipwreck sites.

11. Prehistoric Archaeological Sites

In accordance with BOEM NTL 2005-G07, EnVen will submit an archaeological resource report per 30 CFR 550.194 if directed to do so by the Regional Director.

Potential IPFs to prehistoric archaeological sites as a result of the proposed operations in Green Canyon Blocks 166 and 167 include physical disturbances to the seafloor and accidents. Should EnVen discover any object of prehistoric archaeological significance, they will immediately halt

operations within a 1000-foot radius, report to BOEM within 48 hours, and make every reasonable effort to preserve and protect that cultural resource.

Physical Disturbances to the seafloor: Although the operations proposed will be conducted by utilizing a drillship or dynamically positioned semi-submersible rig, which would cause only an insignificant amount of seafloor to be disturbed, Green Canyon Blocks 166 and 167 are located inside the Archaeological Prehistoric high probability lines. EnVen will report to BOEM the discovery of any object of prehistoric archaeological significance and make every reasonable effort to preserve and protect that cultural resource.

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

There are no other IPFs (including emissions, effluents or wastes sent to shore for treatment or disposal) from the proposed operations that are likely to impact prehistoric archeological sites.

Vicinity of Offshore Location

12. Essential Fish Habitat (EFH)

Potential IPFs to EFH as a result of the proposed operations in Green Canyon Blocks 166 and 167 include physical disturbances to the seafloor, effluents, and accidents. EFH includes all estuarine and marine waters and substrates in the Gulf of Mexico.

Physical disturbances to the seafloor: Turbidity and sedimentation resulting from the bottom disturbing activities included in the proposed operations would be short term and localized. Fish are mobile and would avoid these temporarily suspended sediments. Additionally, the Live Bottom Low Relief Stipulation, the Live Bottom (Pinnacle Trend) Stipulation, and the Eastern Gulf Pinnacle Trend Stipulation have been put in place to minimize the impacts of bottom disturbing activities. Additionally, a drillship or dynamically positioned semi-submersible rig is being used for the proposed operations; therefore, only an insignificant amount of seafloor will be disturbed. Therefore, the bottom disturbing activities from the proposed operations would likely only have a negligible impact on EFH.

Effluents: The Live Bottom Low Relief Stipulation, the Live Bottom (Pinnacle Trend) Stipulation, and the Eastern Gulf Pinnacle Trend Stipulation would prevent most of the potential impacts on live-bottom communities and EFH from operational waste discharges. Levels of contaminants in drilling muds and cuttings and produced-water discharges, discharge-rate restrictions, and

monitoring and toxicity testing are regulated by the EPA NPDES permit, thereby eliminating many significant biological or ecological effects. Operational discharges are not expected to cause significant adverse impacts to EFH.

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

There are no other IPFs (including emissions and wastes sent to shore for treatment or disposal) from the proposed operations that are likely to impact essential fish habitat.

13. Marine and Pelagic Birds

Potential IPFs to marine birds as a result of the proposed operations include emissions (air, noise/sound), accidents, and discarded trash and debris from vessels and the facilities.

Emissions:

Air Emissions

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

Noise / Sound Emissions

The OCS oil-and gas-related helicopters and vessels have the potential to cause noise and disturbance. However, flight altitude restrictions over sensitive habitat, including that of birds, may make serious disturbance unlikely. Birds are also known to habituate to noises, including airport noise. It is an assumption that the OCS oil-and gas-related vessel traffic would follow regular routes; if so, seabirds would find the noise to be familiar. Therefore, the impact of OCS oil-and gas-related noise from helicopters and vessels to birds would be expected to be negligible.

The use of explosives for decommissioning activities may potentially kill one or more birds from barotrauma if a bird (or several birds because birds may occur in a flock) is present at the location of the severance. For the impact of underwater sound, a threshold of 202 dB sound exposure level (SEL) for injury and 208 dB SEL for barotrauma was recommended for the Brahyramphus marmoratus, a diving seabird (USDOI, FWS, 2011). However, the use of explosive severance of facilities for decommissioning are not included in these proposed operations, therefore these impacts are not expected.

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

Discarded trash and debris: Marine and pelagic birds could become entangled and snared in discarded trash and debris, or ingest small plastic debris, which can cause permanent injuries and death. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA).

EnVen will operate in accordance with the regulations, agency guidance, and Appendix B of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. EnVen will also collect and remove flotsam resulting from activities related to proposed operations.

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

ESA bird species: Seven species found in the GOM are listed under the ESA. BOEM consults on these species and requires mitigations that would decrease the potential for greater impacts due to small population size.

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

14. Public Health and Safety Due to Accidents.

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

Coastal and Onshore

15. Beaches

Potential IPFs to beaches from the proposed operations include accidents and discarded trash and debris.

Accidents: Oil spills contacting beaches would have impacts on the use of recreational beaches and associated resources. Due to the distance from shore (89 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. The operations proposed in this plan will be covered by EnVen's Regional OSRP (refer to information submitted in **Section H**).

Discarded trash and debris: Trash on the beach is recognized as a major threat to the enjoyment and use of beaches. There will only be a limited amount of marine debris, if any, resulting from the proposed operations. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA).

EnVen will operate in accordance with the regulations, agency guidance, and Appendix B of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. EnVen will also collect and remove flotsam resulting from activities related to proposed operations.

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

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

16. Wetlands

Potential IPFs to wetlands from the proposed operations include accidents and discarded trash and debris.

Accidents: It is unlikely that an oil spill would occur from the proposed operations (refer to Item 5, Water Quality). Due to the distance from shore (89 miles) and the response capabilities that would be implemented, no impacts are expected. The operations proposed in this plan will be covered by EnVen's Regional OSRP (refer to information submitted in **Section H**).

Discarded trash and debris: There will only be a limited amount of marine debris, if any, resulting from the proposed operations. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V and the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA).

EnVen will operate in accordance with the regulations, agency guidance, and Appendix B of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. EnVen will also collect and remove flotsam resulting from activities related to proposed operations.

Informational placards will be posted on all vessels and facilities having sleeping or food preparation capabilities. All offshore personnel, including contractors and other support

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

There are no other IPFs (emissions, effluents, physical disturbances to the seafloor, or wastes sent to shore for treatment or disposal) from the proposed operations that are likely to impact wetlands.

17. Shore Birds and Coastal Nesting Birds

Potential IPFs to shore birds and coastal nesting birds as a result of the proposed operations include accidents and discarded trash and debris.

Accidents: Oil spills could cause impacts to shore birds and coastal nesting birds. However, it is unlikely that an oil spill would occur from the proposed operations (refer to Item 5, Water Quality). Given the distance from shore (89 miles) and the response capabilities that would be implemented, no impacts are expected. The operations proposed in this plan will be covered by EnVen's Regional OSRP (refer to information submitted in Section H).

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

EnVen will operate in accordance with the regulations, agency guidance, and Appendix B of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. EnVen will also collect and remove flotsam resulting from activities related to proposed operations.

Informational placards will be posted on vessels and every facility that has sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be

indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), "Think About It" (previously "All Washed Up: The Beach Litter Problem"). Thereafter, all personnel will view the marine trash and debris training video annually. Offshore personnel will also receive an explanation from EnVen management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

18. Coastal Wildlife Refuges

Potential IPFs to coastal wildlife refuges as a result of the proposed operations include accidents and discarded trash and debris.

Accidents: An accidental oil spill from the proposed operations could cause impacts to coastal wildlife refuges. However, it is unlikely that an oil spill would occur from the proposed operations (refer to Item 5, Water Quality). Due to the distance from shore (89 miles) and the response capabilities that would be implemented, no impacts are expected. The operations proposed in this plan will be covered by EnVen's Regional OSRP (refer to information submitted in **Section H**).

Discarded trash and debris: Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V, the Marine Plastic Pollution Research and Control Act and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA).

EnVen will operate in accordance with the regulations, agency guidance, and Appendix B of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. EnVen will also collect and remove flotsam resulting from activities related to proposed operations.

Informational placards will be posted on vessels and every facility that has sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint

presentation), “Think About It” (previously “All Washed Up: The Beach Litter Problem”). Thereafter, all personnel will view the marine trash and debris training video annually. Offshore personnel will also receive an explanation from EnVen management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

19. Wilderness Areas

Potential IPFs to wilderness areas as a result of the proposed operations include accidents and discarded trash and debris.

Accidents: An accidental oil spill from the proposed operations could cause impacts to wilderness areas. However, it is unlikely that an oil spill would occur from the proposed operations (refer to Item 5, Water Quality). Due to the distance from the nearest designated Wilderness Area (129.6 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. The operations proposed in this plan will be covered by EnVen’s Regional OSRP (refer to information submitted in **Section H).**

Discarded trash and debris: Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V, the Marine Plastic Pollution Research and Control Act and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA).

EnVen will operate in accordance with the regulations, agency guidance, and Appendix B of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. EnVen will also collect and remove flotsam resulting from activities related to proposed operations.

Informational placards will be posted on vessels and every facility that has sleeping or food preparation capabilities. All offshore personnel, including contractors and other support services-related personnel (e.g. helicopter pilots, vessel captains and boat crews) will be indoctrinated on waste procedures, and will view the video (or Microsoft PowerPoint presentation), “Think About It” (previously “All Washed Up: The Beach Litter Problem”).

Thereafter, all personnel will view the marine trash and debris training video annually. Offshore personnel will also receive an explanation from EnVen management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

20. Other Environmental Resources Identified

20.1 – Bryde's Whale

The Bryde's whale is the only commonly occurring baleen whale in the northern Gulf of Mexico and has been sighted off western Florida and in the De Soto Canyon region. The Bryde's whale area is over 152 miles from the proposed operations. Additionally, vessel traffic associated with the proposed operations will not flow through the Bryde's whale area. Therefore, there are no IPFs from the proposed operations that are likely to impact the Bryde's whale. Additional information on marine mammals may be found in **Item 7**.

20.2 – Gulf Sturgeon

The Gulf sturgeon resides primarily in inland estuaries and rivers from Louisiana to Florida and a small population of the species enters the Gulf of Mexico seasonally in western Florida. Potential IPFs to the Gulf sturgeon as a result of the proposed operations include accidents, emissions (noise / sound), and discarded trash and debris. Additional information on ESA-listed fish may be found in **Item 6**.

Accidents: Collisions between support vessels and the Gulf sturgeon would be unusual events; however, should one occur, death or injury to the Gulf sturgeon is possible. Contract vessel operators can avoid protected aquatic species and reduce potential deaths by maintaining a vigilant watch and a distance of 50 meters or greater, with the exception of animals that approach the vessel. Vessel personnel should use a Gulf of Mexico reference guide that includes identifying information on marine mammals, sea turtles, and other marine protected species (i.e., Endangered Species Act listed species such as Gulf sturgeon, giant manta ray, or oceanic whitetip shark) that may be encountered in the Gulf of Mexico Outer Continental Shelf (OCS).

Contract vessel operators will comply with the measures included in Appendix C of the NMFS Biological Opinion and requirements of the Protected Species Lease Stipulation, except under extraordinary circumstances when the safety of the vessel or crew is in doubt or the safety of life at sea is in question.

Should an ESA-listed fish (e.g. giant manta ray, oceanic whitetip shark, or Gulf sturgeon) be entrapped, entangled, or injured, personnel should contact the ESA Section 7 biologist at (301) 427-8413 (nmfs.psoreview@noaa.gov) and report all incidents to takereport.nmfsser@noaa.gov. After making the appropriate notifications, EnVen may call BSEE at (985) 722-7902 for questions or additional guidance on recovery assistance needs, continued monitoring requirements, and incidental report information which at minimum is detailed below. Additional information may be found at the following website: https://www.fisheries.noaa.gov/report. Any injured or dead protected species should also be reported to takereport.nmfsser@noaa.gov. In addition, if the injury or death was caused by a collision with the operator's vessel, an entrapment within the operator's equipment or vessel (e.g. moon pool), or an entanglement within the operator's equipment, the operator must further notify BOEM and BSEE within 24 hours of the strike or entrapment/entanglement by email to protectedspecies@boem.gov and protectedspecies@bsee.gov. If the vessel is the responsible party, it is required to remain available to assist the respective salvage and stranding network as needed.

Due to the distance from the nearest identified Gulf sturgeon critical habitat (146.4 miles) and the response capabilities that would be implemented during a spill, no significant adverse impacts are expected to the Gulf sturgeon. Considering the information from the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion, the location of this critical habitat in relation to proposed operations, the likely dilution of oil reaching nearshore areas, and the on-going weathering and dispersal of oil over time, we do not anticipate the effects from oil spills will appreciably diminish the value of Gulf sturgeon designated critical habitat for the conservation of the species. The operations proposed in this plan will be covered by EnVen's Regional OSRP (refer to information submitted in **Section H**).

Emissions (noise / sound): All routine OCS oil-and gas-related activities have some element of sound generation. Common sound sources include propeller cavitation, rotating machinery, and reciprocating machinery, which are associated with routine OCS oil-and gas-related activities such as vessel traffic, drilling, construction, and oil and gas production, processing, and transport. Sound introduced into the marine environment as a result of human activities has the potential to affect marine organisms. The National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion found that construction and operational sounds other than pile driving will have insignificant effects on Gulf sturgeon (NMFS, 2020). There are no pile driving activities associated with the proposed operations, therefore noise impacts are not expected to significantly affect Gulf sturgeon.

Discarded trash and debris: Trash and debris are not expected to impact the Gulf sturgeon. There will only be a limited amount of marine debris, if any, resulting from the proposed operations. Operators are prohibited from deliberately discharging debris as mandated by

MARPOL-Annex V, the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA).

EnVen will operate in accordance with the regulations, agency guidance, and Appendix B of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. EnVen will also collect and remove flotsam resulting from activities related to proposed operations.

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

There are no other IPFs (including effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed operations that are likely to impact the Gulf sturgeon.

20.3 – Oceanic Whitetip Shark

Oceanic whitetip sharks may be found in tropical and subtropical waters around the world, including the Gulf of Mexico (Young 2016). According to the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion, Essential Fish Habitat (EFH) for the oceanic whitetip shark includes localized areas in the central Gulf of Mexico and Florida Keys. Oceanic whitetip sharks were listed as threatened under the Endangered Species Act in 2018 due to worldwide overfishing. Oceanic whitetip sharks had an abundant worldwide population, which has been threatened in recent years by inadequate regulatory measures governing fisheries; therefore, there is little research regarding the impact of oil and gas operations on oceanic whitetip sharks (NMFS, 2020). IPFs that have been determined by NMFS to be discountable to oceanic whitetip sharks include vessel strike, emissions (noise / sound), discharges, entanglement and entrapment, and marine debris. Potential IPFs to oceanic

whitetip sharks as a result of the proposed operations in Green Canyon Blocks 166 and 167 include accidents. Additional information on ESA-listed fish may be found in **Item 6**.

Accidents: Collisions between support vessels and the oceanic whitetip shark would be unusual events, however, should one occur, death or injury to the oceanic whitetip shark is possible. Contract vessel operators can avoid protected aquatic species and reduce potential deaths by maintaining a vigilant watch and a distance of 50 meters or greater, with the exception of animals that approach the vessel. Vessel personnel should use a Gulf of Mexico reference guide that includes identifying information on marine mammals, sea turtles, and other marine protected species (i.e., Endangered Species Act listed species such as Gulf sturgeon, giant manta ray, or oceanic whitetip shark) that may be encountered in the Gulf of Mexico Outer Continental Shelf (OCS).

Contract vessel operators will comply with the measures included in Appendix C of the NMFS Biological Opinion and requirements of the Protected Species Lease Stipulation, except under extraordinary circumstances when the safety of the vessel or crew is in doubt or the safety of life at sea is in question.

Should an ESA-listed fish (e.g. giant manta ray, oceanic whitetip shark, or Gulf sturgeon) be entrapped, entangled, or injured, personnel should contact the ESA Section 7 biologist at (301) 427-8413 (nmfs.psoreview@noaa.gov) and report all incidents to takereport.nmfsser@noaa.gov. After making the appropriate notifications, EnVen may call BSEE at (985) 722-7902 for questions or additional guidance on recovery assistance needs, continued monitoring requirements, and incidental report information which at minimum is detailed below. Additional information may be found at the following website: https://www.fisheries.noaa.gov/report. Any injured or dead protected species should also be reported to takereport.nmfsser@noaa.gov. In addition, if the injury or death was caused by a collision with the operator's vessel, an entrapment within the operator's equipment or vessel (e.g. moon pool), or an entanglement within the operator's equipment, the operator must further notify BOEM and BSEE within 24 hours of the strike or entrapment/entanglement by email to protectedspecies@boem.gov and protectedspecies@bsee.gov. If the vessel is the responsible party, it is required to remain available to assist the respective salvage and stranding network as needed.

There is little information available on the impacts of oil spills or dispersants on oceanic whitetip sharks. It is expected that exposure of oil or dispersants to oceanic whitetip sharks would likely result in effects similar to other marine species, including fitness reduction and the possibility of mortality (NMFS, 2020). Due to the sparse population in the Gulf of Mexico, it is possible that a small number of oceanic whitetip sharks could be impacted by an oil spill. However, it is unlikely that such an event would occur from the proposed operations (refer to

Item 5, Water Quality). The operations proposed in this plan will be covered by EnVen's Regional OSRP (refer to information submitted in **Section H**).

Discarded trash and debris: There is little available information on the effects of marine debris on oceanic whitetip sharks. Since these sharks are normally associated with surface waters, they may be susceptible to entanglement. However, due to the small, widely dispersed, and highly mobile population in the Gulf of Mexico, and the localized and patchy distribution of marine debris, it is extremely unlikely that oceanic whitetip sharks would be impacted by marine debris.

There will only be a limited amount of marine debris, if any, resulting from the proposed operations. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V, the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies, including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA).

EnVen will operate in accordance with the regulations, agency guidance, and Appendix B of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. EnVen will also collect and remove flotsam resulting from activities related to proposed operations.

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

There are no IPFs (including effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed operations that are likely to impact oceanic whitetip sharks.

20.4 – Giant Manta Ray

According to the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion, the giant manta ray lives in tropical, subtropical, and temperate oceanic waters and productive coastlines throughout the Gulf of Mexico. While uncommon in the Gulf of Mexico, there is a population of approximately 70 giant manta rays in the Flower Garden Banks National Marine Sanctuary (Miller and Klimovich 2017). Giant manta rays were listed as threatened under the Endangered Species Act in 2018 due to worldwide overfishing. Giant manta rays had an abundant worldwide population, which has been threatened in recent years by inadequate regulatory measures governing fisheries; therefore, there is little research regarding the impact of oil and gas operations on giant manta rays (NMFS, 2020). IPFs that have been determined by NMFS to be discountable to giant manta rays include vessel strike, emissions (noise / sound), discharges, entanglement and entrapment, and marine debris. Potential IPFs to giant manta rays as a result of the proposed operations in Green Canyon Blocks 166 and 167 include accidents. Additional information on ESA-listed fish may be found in **Item 6**.

Accidents: Collisions between support vessels and the giant manta ray would be unusual events, however, should one occur, death or injury to the giant manta ray is possible. Contract vessel operators can avoid protected aquatic species and reduce potential deaths by maintaining a vigilant watch and a distance of 50 meters or greater, with the exception of animals that approach the vessel. Vessel personnel should use a Gulf of Mexico reference guide that includes identifying information on marine mammals, sea turtles, and other marine protected species (i.e., Endangered Species Act listed species such as Gulf sturgeon, giant manta ray, or oceanic whitetip shark) that may be encountered in the Gulf of Mexico Outer Continental Shelf (OCS).

Contract vessel operators will comply with the measures included in Appendix C of the NMFS Biological Opinion and requirements of the Protected Species Lease Stipulation, except under extraordinary circumstances when the safety of the vessel or crew is in doubt or the safety of life at sea is in question.

Should an ESA-listed fish (e.g. giant manta ray, oceanic whitetip shark, or Gulf sturgeon) be entrapped, entangled, or injured, personnel should contact the ESA Section 7 biologist at (301) 427-8413 (nmfs.psoreview@noaa.gov) and report all incidents to takereport.nmfsser@noaa.gov. After making the appropriate notifications, EnVen may call BSEE at (985) 722-7902 for questions or additional guidance on recovery assistance needs, continued monitoring requirements, and incidental report information which at minimum is detailed below. Additional information may be found at the following website: https://www.fisheries.noaa.gov/report. Any injured or dead protected species should also be reported to takereport.nmfsser@noaa.gov. In addition, if the injury or death was caused by a

collision with the operator's vessel, an entrapment within the operator's equipment or vessel (e.g. moon pool), or an entanglement within the operator's equipment, the operator must further notify BOEM and BSEE within 24 hours of the strike or entrapment/entanglement by email to protectedspecies@boem.gov and protectedspecies@bsee.gov. If the vessel is the responsible party, it is required to remain available to assist the respective salvage and stranding network as needed.

There is little information available on the impacts of oil spills or dispersants on giant manta rays. It is expected that exposure of oil or dispersants to giant manta rays would likely result in effects similar to other marine species, including fitness reduction and the possibility of mortality (NMFS, 2020). It is possible that a small number of giant manta rays could be impacted by an oil spill in the Gulf of Mexico. However, due to the distance to the Flower Garden Banks (107.7 miles), the low population dispersed throughout the Gulf of Mexico, and the response capabilities that would be implemented during a spill, no significant adverse impacts are expected to impact giant manta rays. Additionally, it is unlikely that such an event would occur from the proposed operations (refer to **Item 5**, Water Quality). The operations proposed in this plan will be covered by EnVen's Regional OSRP (refer to information submitted in **Section H**).

Discarded trash and debris: There is little available information on the effects of marine debris on giant manta rays. Since these sharks are normally associated with surface waters, they may be susceptible to entanglement. However, due to the small, widely dispersed, and highly mobile population in the Gulf of Mexico, and the localized and patchy distribution of marine debris, it is extremely unlikely that oceanic whitetip sharks would be impacted by marine debris.

There will only be a limited amount of marine debris, if any, resulting from the proposed operations. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V, the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies, including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA).

EnVen will operate in accordance with the regulations, agency guidance, and Appendix B of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion and also avoid accidental loss of solid waste items by maintaining waste management plans, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Special caution will be exercised when handling and disposing of small items and packaging materials, particularly those made of non-biodegradable, environmentally persistent materials such as plastic or glass. EnVen will also collect and remove flotsam resulting from activities related to proposed operations.

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

There are no other IPFs (including effluents, physical disturbances to the seafloor, and wastes sent to shore for disposal) from the proposed operations that are likely to impact giant manta rays.

20.5 – Loggerhead Sea Turtle

The loggerhead sea turtles are large sea turtles that inhabit continental shelf and estuarine environments throughout the temperate and tropical regions of the Atlantic Ocean, with nesting beaches along the northern and western Gulf of Mexico. NMFS issued a Final Rule in 2014 (79 FR 39855) designating a critical habitat including 38 marine areas within the Northwest Atlantic Ocean, with seven of those areas residing within the Gulf of Mexico. These areas contain one or a combination of habitat types: nearshore reproductive habitats, winter areas, breeding areas, constricted migratory corridors, and/or Sargassum habitats.

There are multiple IPFs that may impact loggerhead sea turtles (see **Item 8**). However, the closest loggerhead critical habitat is located approximately 190 miles from Green Canyon Blocks 166 and 167; therefore, no adverse impacts are expected to the critical habitat. Additionally, considering the information from the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion, we do not expect proposed operations to affect the ability of Sargassum to support adequate prey abundance and cover for loggerhead turtles.

20.6 - Protected Corals

Protected coral habitats in the Gulf of Mexico range from Florida, the Flower Garden Banks National Marine Sanctuary, and into the Caribbean, including Puerto Rico, the U.S. Virgin Islands, and Navassa Island. Four counties in Florida (Palm Beach, Broward, Miami-Dade, and Monroe Counties) were designated as critical habitats for elkhorn (Acropora palmata) and staghorn (Acropora cervicornis) corals. These coral habitats are located outside of the planning area and are not expected to be impacted by the proposed actions. Elkhorn coral can also be found in the Flower Garden Banks along with three additional coral species, boulder star coral (Orbicella franksi), lobed star coral (Orbicella annularis), and mountainous star coral (Orbicella

faveolatta). Potential IPFs to protected corals as a result of the proposed operations include accidents.

Accidents: It is unlikely that an accidental surface or subsurface spill would occur from the proposed operations (refer to statistics in **Item 5**, Water Quality). Oil spills cause damage to corals only if the oil contacts the organisms. Due to the distance from the Flower Garden Banks (107.7 miles) and other critical coral habitats, no adverse impacts are expected. The operations proposed in this plan will be covered by EnVen's Regional OSRP (refer to information submitted in **Section H**).

There are no other IPFs (including emissions, effluents, physical disturbances to the seafloor, and wastes sent to shore for disposal) from the proposed operations that are likely to impact protected corals.

20.7 - Endangered Beach Mice

There are four subspecies of endangered beach mouse that are found in the dune systems along parts of Alabama and northwest Florida. Due to the locations of Green Canyon Blocks 166 and 167 and the beach mouse critical habitat (above the intertidal zone), there are no IPFs that are likely to impact endangered beach mice.

20.8 - Navigation

The current system of navigation channels around the northern GOM is believed to be generally adequate to accommodate traffic generated by the future Gulfwide OCS Program. As exploration and development activities increase on deepwater leases in the GOM, port channels may need to be expanded to accommodate vessels with deeper drafts and longer ranges. However, current navigation channels will not be changed, and new channels will not be required as a result of the operations proposed in this plan.

(C) Impacts on proposed operations

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

(D) Environmental Hazards

During the hurricane season, June through November, the Gulf of Mexico is impacted by an average of ten tropical storms (39-73 mph winds), of which six become hurricanes (> 74 mph winds). Due to their locations in the gulf, Green Canyon Blocks 166 and 167 may experience hurricane and tropical storm force winds, and related sea currents. These factors can adversely impact the integrity of the operations covered by this plan. A significant storm may present physical hazards to operators and vessels, damage exploration or production equipment, or

result in the release of hazardous materials (including hydrocarbons). Additionally, the displacement of equipment may disrupt the local benthic habitat and pose a threat to local species.

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

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

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

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

(E) Alternatives
No alternatives to the proposed operations were considered to reduce environmental impacts.

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

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

(H) Preparer(s)
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Although not cited, the following were utilized in preparing this EIA:

- Hazard Surveys

SECTION P
ADMINISTRATIVE INFORMATION
(30 CFR Parts 550.228 and 550.262)

A. EXEMPTED INFORMATION DESCRIPTION
Included in the proprietary copy and removed from the public copy of this Exploration Plan are the proposed bottom-hole locations of the planned wells, discussions of the target objectives, geologic and/or geophysical data, and any interpreted geology.

B. BIBLIOGRAPHY
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