

UNITED STATES GOVERNMENT
MEMORANDUM

November 17, 2023

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

Subject: Public Information copy of plan

Control #	-	S-08116
Type	-	Supplemental Development Operations Coordinations Document
Lease(s)	-	OCS-G22868 Block - 300 Mississippi Canyon Area OCS-G24064 Block - 255 Mississippi Canyon Area OCS- Block - 254 Mississippi Canyon Area
Operator	-	Murphy Exploration & Production Company - USA
Description	-	Well SS003 - Install jumper and produce
Rig Type	-	Drillship or DP Semisubmersible

Attached is a copy of the subject plan.

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

Ronald O'Connor
Plan Coordinator

**SUPPLEMENTAL
DEVELOPMENT OPERATIONS
COORDINATION DOCUMENT**



**MURPHY EXPLORATION & PRODUCTION COMPANY -
USA**

MISSISSIPPI CANYON BLOCKS 255 / 300

LEASES OCS-G 24064 / 22868

OFFSHORE ALABAMA AND LOUISIANA

"MARMALARD 3" PROJECT

SUBMITTED BY:

Murphy Exploration & Production Company - USA
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Houston, Texas 77024

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17-A	Environmental Impact Analysis (EIA)

SECTION 1 PLAN CONTENTS

1.1 PLAN INFORMATION

Murphy Exploration & Production Company - USA (Murphy) is the designated operator of Leases OCS-G 24064 and OCS-G 22868, Mississippi Canyon (MC) Blocks 255 and 300 (Marmalard Project). These leases comprise part of the Mississippi Canyon 300 Unit, Unit Agreement No. 754312006.

The Marmalard field is being developed using subsea wells tied back to the Murphy operated A-Delta House Floating Production System (FPS), Complex ID No. 2513, located in MC Block 254, Right-of-Use and Easement (RUE) OCS-G 30372. Under this Development Operations Coordination Document (DOCD), Murphy proposes to install one (1) lease term well jumper pipeline, provide for future well intervention operations and place MC 255, Well No. Subsea 003 on production.

MC Block 255, Well No. Subsea 003 (Well Location "A") will be drilled and completed from a surface location in MC Block 300 on/or about August 2023, under Murphy's Revised Exploration Plan (EP), Control No. R-7056 approved by the Bureau of Ocean Energy Management (BOEM) on July 14, 2023.

These development operations are in approximately 5,746 feet of water. The lease term pipeline will be installed using a dynamically positioned pipelay vessel.

No drilling or completion operations are proposed under this DOCD.

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

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

1.2 LOCATION

A Well Location Plat depicting the surface location and bottomhole location of the proposed well, measured depth/true vertical depth and water depth is included as **Attachment 1-B**.

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

1.3 SAFETY AND POLLUTION PREVENTION FEATURES

No drilling operations are proposed in this plan. Safety of personnel and protection of the environment during the proposed operations is one of the primary concerns of Murphy. Murphy mandates regulatory compliance with the contractors and vendors associated with the proposed operations as follows:

The Bureau of Ocean Energy Management (BOEM) mandates that the operations described in this DOCD comply with well control, pollution prevention, construction, welding procedures, and training described in the Bureau of Safety and Environmental Enforcement (BSEE) regulations 30 CFR 250 C, D, E, O and S; and as further clarified by BSEE Notice to Lessees.

BSEE conducted periodic announced and unannounced onsite inspections of offshore facilities to confirm operators are complying with lease stipulations, regulatory requirements, approved plans, and other conditions, and complying with pollution prevention requirements. The National Potential Incident of Noncompliance (PINC) List serves as the baseline for these inspections.

United States Coast Guard (USCG) regulations contained in Title 33 CFR Part 144 mandate that appropriate life rafts, life jackets, ring buoys, etc. be maintained on the facilities at all times. U.S. Environmental Protection Agency (EPA) regulations contained in the NPDES General Permit for Region VI mandate that supervisory and certain designated personnel on board the facility be familiar with the effluent limitations and guidelines for overboard discharges into the receiving waters.

There will be no disposal of equipment, cables, chains, containers, or other materials into offshore waters.

1.4 STORAGE TANKS AND PRODUCTION VESSELS

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

Type of Storage Tank	Type of Facility	Tank Capacity (bbl)	Number of Tanks	Total Capacity (bbl)	Fluid Gravity (API)
Production	Condensate Stabilizer	33	1	33	Avg 122° API
Production	Dry / Wet Oil Tank	562	1	562	Avg 37° API
Production	Flotation Cell	59	1	50	Avg 11° API
Production	HP Flare Scrubber	142	1	142	Avg 26° API
Production	HP Oil Separator	38	1	38	Avg 66° API
Production	HP Oil Separator	38	1	38	Avg 34° API
Production	HP Oil Separator	50	1	50	Avg 66° API
Production	IP Separator	79	1	79	Avg 46° API
Production	LP Flare Scrubber	25	1	25	Avg 26° API
Production	LP Separator	380	1	380	Avg 43° API

Type of Storage Tank	Type of Facility	Tank Capacity (bbl)	Number of Tanks	Total Capacity (bbl)	Fluid Gravity (API)
Production	LP Separator Degasser	35	1	35	Avg 43° API
Production	Open Drain Sump	225	2	450	Avg 26° API
Production	Oil Treater Degasser	45	2	90	Avg 39° API
Production	Oil Treater	350	2	700	Avg 39° API
Production	Test Separator	69	1	69	Avg 66° API
Production	Diesel Day Tank	47	1	47	Avg 42° API
Storage	Hull Diesel Tank	673	2	1,346	Avg 42° API

1.5 POLLUTION PREVENTION MEASURES

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

1.6 ADDITIONAL MEASURES

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

1.7 COST RECOVERY FEE

Documentation of the \$5,017.00 cost recovery fee payment is included as **Attachment 1-C**.

ATTACHMENT 1-A

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

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

OCS PLAN INFORMATION FORM

General Information											
Type of OCS Plan:	<input checked="" type="checkbox"/>	Exploration Plan (EP)		Development Operations Coordination Document (DOCD)							
Company Name: Murphy Exploration & Production Company - USA				BOEM Operator Number: 02647							
Address: 9805 Katy Freeway				Contact Person: Kelley Pisciola							
Houston, Texas 77024				Phone Number: (281) 698-8519							
				E-Mail Address: kelley.pisciola@jccteam.com							
If a service fee is required under 30 CFR 550.125(a), provide the				Amount paid	\$5,017.00	Receipt No.		2753ESJK			
Project and Worst Case Discharge (WCD) Information											
Leases: RUE OCS-G 30372				Areas: Mississippi Canyon		Blocks: 254		Project Name: Marmalard / Delta House			
Objectives	<input checked="" type="checkbox"/>	Oil	<input type="checkbox"/>	Gas	<input type="checkbox"/>	Sulphur	<input type="checkbox"/>	Salt	Onshore Support Base: Fourchon, LA		
Platform / Well Name: A-Delta House				Total Volume of WCD: 31,278 bbls				API Gravity: 36.6°			
Distance to Closest Land (Miles): 60				Volume from uncontrolled blowout: 28,034 bbls							
Have you previously provided information to verify the calculations and assumptions for your WCD?								<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No
If so, provide the Control Number of the EP or DOCD with which this information was provided								N-9700			
Do you propose to use new or unusual technology to conduct your activities?								<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Do you propose to use a vessel with anchors to install or modify a structure?								<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Do you propose any facility that will serve as a host facility for deepwater subsea development?								<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	No
Description of Proposed Activities and Tentative Schedule (Mark all that apply)											
Proposed Activity				Start Date		End Date		No. of Days			
Install lease term jumper pipeline				09/01/2023		09/09/2023		8 days			
Produce Well No. SS003				09/30/2023		09/30/2038		15 years			
Future Well Intervention Operations				2024		2034		100 days/year			
Description of Drilling Rig						Description of Structure					
<input type="checkbox"/>	Jackup	<input checked="" type="checkbox"/>	Drillship	<input type="checkbox"/>	Caisson	<input type="checkbox"/>	Tension leg platform				
<input type="checkbox"/>	Gorilla Jackup	<input type="checkbox"/>	Platform rig	<input type="checkbox"/>	Fixed platform	<input type="checkbox"/>	Compliant tower				
<input type="checkbox"/>	Semisubmersible	<input type="checkbox"/>	Submersible	<input type="checkbox"/>	Spar	<input type="checkbox"/>	Guyed tower				
<input checked="" type="checkbox"/>	DP Semisubmersible	<input type="checkbox"/>	Other (Attach description)	<input checked="" type="checkbox"/>	Floating production system	<input type="checkbox"/>	Other (Attach description)				
Drilling Rig Name (If known):											
Description of Lease Term Pipelines											
From (Facility/Area/Block)		To (Facility/Area/Block)		Diameter (Inches)		Length (Feet)					
MC 255 SS003		MC 300 Manifold		6.625-Inches		90 feet					

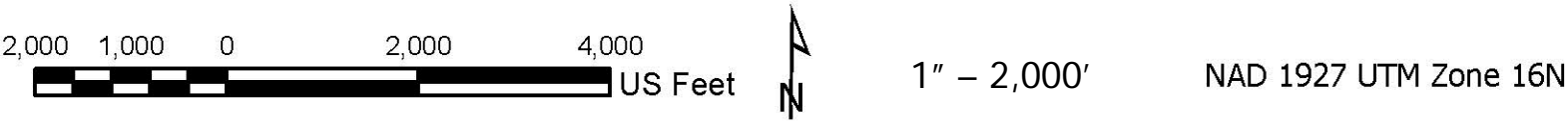
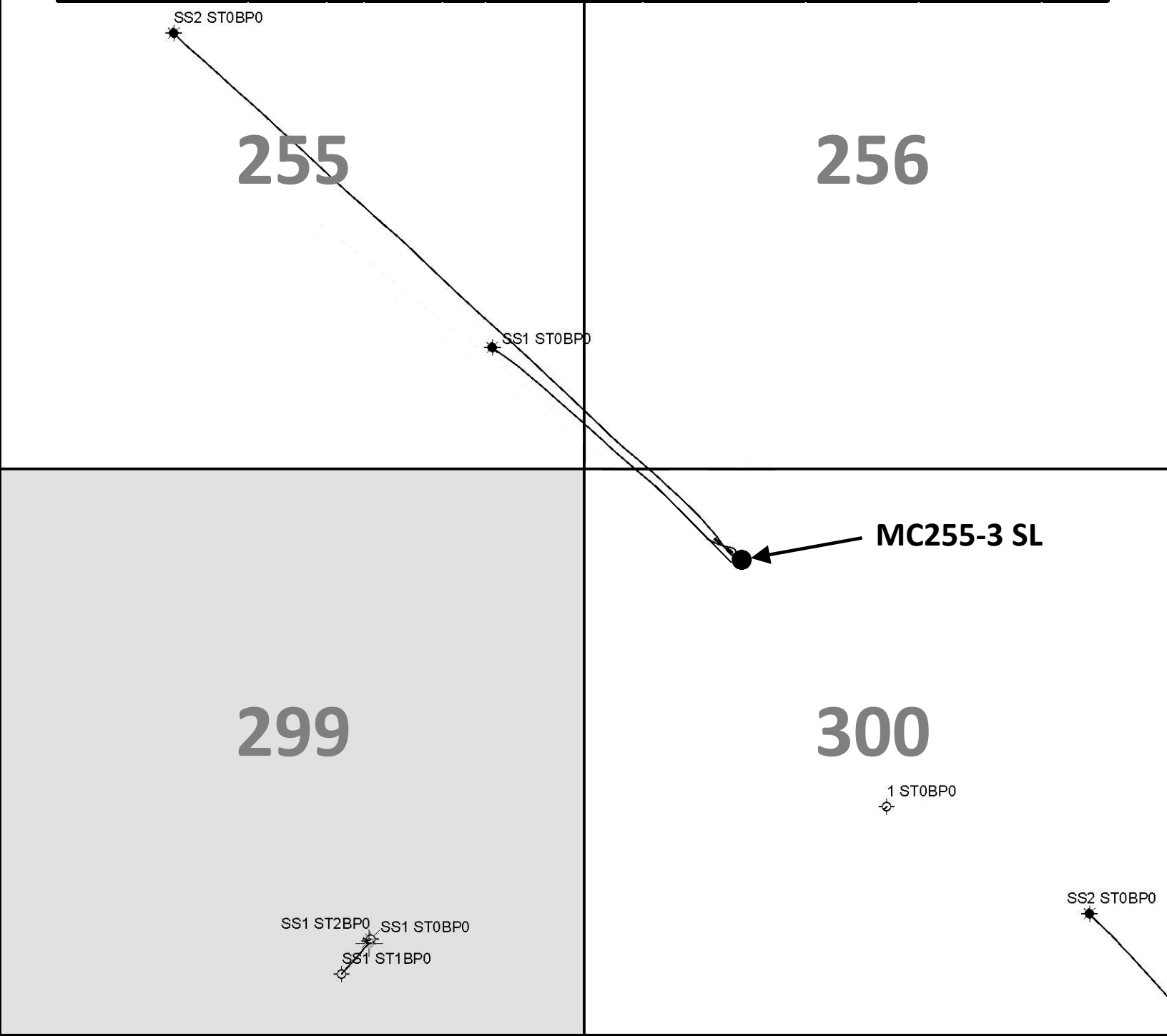
OCS PLAN INFORMATION FORM (CONTINUED)
Include one copy of this page for each proposed well/structure

Proposed Well/Structure Location									
Well or Structure Name Number (If renaming well reference previous name) A-Delta House FPS				Previously reviewed under an approved EP or DOCD?			XX	Yes	No
Is this an existing well or structure?	XX	Yes	No	If this is an existing well or structure, list the Complex ID or API No.			2513		
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?							XX	Yes	No
WCD info	For wells, volume of uncontrolled blowout (Bbls day):			For structures, volume of all storage and pipelines (Bbls): 3,244 bbls			API Gravity of fluid		36.6°
	Surface Location			Bottom-Hole Location (For Wells)			Completion (For multiple completions, enter separate lines)		
Lease No.	RUE OCS-G 30372								
Area Name	Mississippi Canyon								
Block No.	254								
Blockline Departures (in feet)	N S Departure: 1,349' FNL						N Departure: F__L N Departure: F__L N Departure: F__L		
	E W Departure: 1,057' FEL						E W Departure: F__L E W Departure: F__L E W Departure: F__L		
Lambert X-Y coordinates	X: 1,234,463'						X: X: X:		
	Y: 10,437,211'						Y: Y: Y:		
Latitude/ Longitude	Latitude 28° 45' 16" N						Latitude Latitude Latitude		
	Longitude 88° 16' 2" W						Longitude Longitude Longitude		
Water Depth (Feet): 4,400'				MD (Feet):		TVD (Feet):		MD (Feet): MD (Feet): MD (Feet):	
Anchor Radius (if applicable) in feet:								TVD (Feet): TVD (Feet): TVD (Feet):	
Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)									
Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate			Length of Anchor Chain on Seafloor		
			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 reference previous name) SS003 (Well Loc. A)					Previously reviewed under an approved EP or DOCD?		<input checked="" type="checkbox"/>	Yes	No
Is this an existing well or structure?		<input type="checkbox"/>	Yes	<input checked="" type="checkbox"/>	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?							<input checked="" type="checkbox"/>	Yes	No
WCD info	For wells, volume of uncontrolled blowout (Bbls day): 28,034 bbls / day				For structures, volume of all storage and pipelines (Bbls):		API Gravity of fluid		36.6°
	Surface Location				Bottom-Hole Location (For Wells)		Completion (For multiple completions, enter separate lines)		
Lease No.	G-22868								
Area Name	Mississippi Canyon								
Block No.	300								
Blockline Departures (in feet)	N S Departure: 1,322' FNL				N S Departure:		N Departure: F__L N Departure: F__L N Departure: F__L		
	E W Departure: 2,294' FWL				E W Departure:		E W Departure: F__L E W Departure: F__L E W Departure: F__L		
Lambert X-Y coordinates	X: 1,253,654.00'				X:		X: X: X:		
	Y: 10,421,397.70'				Y:		Y: Y: Y:		
Latitude/Longitude	Latitude 28° 42' 41.5172" N				Latitude		Latitude Latitude Latitude		
	Longitude 88° 12' 24.8992" W				Longitude		Longitude Longitude Longitude		
Water Depth (Feet): 5,746'					MD (Feet):		TVD (Feet):		MD (Feet): MD (Feet): MD (Feet):
Anchor Radius (if applicable) in feet:									TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary)									
Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor				
			X =	Y =					
			X =	Y =					
			X =	Y =					
			X =	Y =					

Location	Block Calls				Latitude	Longitude	X	Y	WD (ft)
MC255-3 SL	1,322	FNL	2,294	FWL	28° 42' 41.5172" N	88° 12' 24.8992" W	1,253,654.00	10,421,397.70	5,746



Attachment 1-B



Mississippi Canyon
Block 255 OCS-G24064
Block 300 OCS-G22868

Marmalard
MC255-3
Locator Map
Public

ATTACHMENT 1-C

From: notification@pay.gov
To: [Sara Dingwall](#)
Subject: [EXTERNAL] Pay.gov Payment Confirmation: BOEM Development/DOCD Plan - BD
Date: Thursday, April 20, 2023 7:17:16 AM

CAUTION: This email originated from outside of Murphy Oil. Do not click links or open attachments unless you recognize the sender and know the content is safe.



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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 Development/DOCD Plan - BD
Pay.gov Tracking ID: 2753ESJK
Agency Tracking ID: 76407092567

Account Holder Name: Murphy Oil Corporation
Transaction Type: ACH Debit
Transaction Amount: \$5,017.00
Payment Date: 04/21/2023

Account Type: Business Checking
Routing Number: 061000052
Account Number: *****5473

Transaction Date: 04/20/2023 08:17:10 AM EDT
Total Payments Scheduled: 1
Frequency: OneTime

Region: Gulf of Mexico
Contact: Sara Dingwall (281) 546-4036
Company Name/No: Murphy Exploration & Production Company - USA, 02647
Lease Number(s): 24064

Area-Block: Mississippi Canyon MC, 255
Type-Wells: Supplemental Plan, 1

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SECTION 2 GENERAL INFORMATION

2.1 APPLICATIONS AND PERMITS

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

Application/Permit	Issuing Agency	Status
Deepwater Operations Plan	BSEE	To be submitted
Conservation Information Document	BOEM	To be submitted
Lease Term Pipeline Application	BSEE	To be submitted

2.2 DRILLING FLUIDS

No drilling operations are proposed in this DOCD.

2.3 PRODUCTION

Proprietary Information.

2.4 OIL CHARACTERISTICS

Proprietary Information.

2.5 NEW OR UNUSUAL TECHNOLOGY

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

2.6 BONDING STATEMENT

The bond requirements for the activities and facilities proposed in this DOCD are satisfied by an area-wide bond, furnished and maintained according to 30 CFR 556.900 (a) and 30 CFR 556.901 (a) and (b) and NTL No. 2015-BOEM-N04, "General Financial Assurance"; and additional security under 30 CFR 556.901(d) – (f) and NTL No. 2016—BOEM-N01, "Requiring Additional Security" as required by BOEM.

2.7 OIL SPILL FINANCIAL RESPONSIBILITY (OSFR)

Murphy Exploration & Production Company – USA (Company No. 02647) has demonstrated oil spill financial responsibility for the facilities proposed in this DOCD according to 30 CFR Part 553.15 (a); and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities".

2.8 DEEPWATER WELL CONTROL STATEMENT

Murphy Exploration & Production Company – USA (Company No. 02647) has the financial capability to drill a relief well and conduct other emergency well control operations.


2.9 SUSPENSION OF PRODUCTION

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

2.10 BLOWOUT SCENARIO AND WORST CASE DISCHARGE CALCULATIONS

No drilling or completion operations are proposed in this plan. The blowout scenario was previously reviewed and approved under EP (Control No. N-9560) and is included for reference as **Attachment 2-A**.

Attachment 2-A

	BLOWOUT SCENARIO MC 255-256-300	Created by: S.L. Stegeman Last Revised: 7/6/2011 Page 1 of 7 Confidential
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BLOWOUT SCENARIO

Pursuant with 30 CFR 250.213(g), 250.219, 250,250 and NTL 2010-N06 the following attachment provides a blowout scenario description, information regarding any oil spill, WCD results and assumptions of potential spill and additional measures taken to firstly enhance the ability to prevent a blowout and secondly to manage a blowout scenario if it occurred.

INFORMATION REQUIREMENTS

PROPOSED PROSPECT INFORMATION

Well Surface Location	WD	X (NAD 27)	Y (NAD 27)	Latitude	Longitude
MC 255 "A" OCS-G-24064	5647	1,250,316'	10,424,241'	28° 43' 09.34"	88° 13' 02.72"
MC 256 "A" OCS-G-22865	5703	1,256,396'	10,423,952'	28° 43' 07.08"	88° 11' 54.69"
MC 300 "A" OCS-G-22868	5723	1,253,530'	10,421,464'	28° 42' 42.16"	88° 12' 26.30"
MC 300 "B" OCS-G-22868	5834	1,257,516'	10,417,542'	28° 42' 03.72"	88° 11' 41.09"
MC 300 "C" OCS-G-22868	6113	1,263,573'	10,411,124'	28° 41' 00.76"	88° 10' 32.35"

INFORMATION REQUIREMENTS

A) Blowout scenario

The MC 300-1 to be drilled to potential outlined in the Geological and Geophysical Information Section of this plan utilizing a typical subsea wellhead system, conductor, surface and intermediate casing strings from a pre-existing wellbore and a MODU rig with marine riser and a subsea BOP system. A hydrocarbon influx and a well control event occurring from the objective sand is modeled with no drill pipe or obstructions in the wellbore followed by a failure of the subsea BOP's and loss of well control at the seabed. The simulated flow and worst case discharge (WCD) results for all wells are calculated and the highest WCD is used for this unrestricted blowout scenario.

B) Estimated flow rate of the potential blowout

Category	Revised EP
Type of Activity	Drilling
Facility Location (area / block)	MC 300
Facility Designation	MODU
Distance to Nearest Shoreline (miles)	~53
Uncontrolled Blowout (Volume per day)	219,852 bbls
Type of Fluid	Crude

C) Total volume and maximum duration of the potential blowout

Duration of Flow (days)	99 days total (see Relief Well Response Estimate below)
Total Volume of Spill (bbls)	21.8 MMBO based on 99 days of uncontrolled flow

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

Omitted from Public Information Copies

E) Potential for the well to bridge over

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

F) Likelihood for intervention to stop blowout

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

- Secondary Acoustic BOP Control System – typically fitted on DP MODU's presently operating in the GOM. This system has the ability to communicate and function specific BOP controls from the surface in the event of a failure of the primary umbilical control system. This system typically can establish BOP controls from the surface acoustic system package on the rig or by deploying a second acoustic package from a separate vessel of opportunity. This system may not be included on all MODU's such as 4th generation moored rigs. This system is typically configured to function the following:
 - Blind/shear ram close
 - Pipe ram close
 - LMRP disconnect
- ROV Intervention BOP Control System – includes one or more ROV intervention panels mounted on the subsea BOP's located on the seabed allows a ROV utilizing standard ROV stabs to access and function the specific BOP controls. These functions will be tested at the surface as part of the required BOP stump test and selectively at the seafloor to ensure proper functionality. These function include the following (at a minimum):
 - Blind/shear ram close
 - Pipe ram close
 - LMRP disconnect
 - WH disconnect
- Deadman / Autoshear function – typically fitted on DP MODU's and but to be on all MODU's operating in the GOM according to new requirements, this equipment allows for an automated pre-programmed sequence of functions to close the casing shear rams and the blind/shear rams in the event of an inadvertent or emergency disconnect of the LMRP or loss of both hydraulic and electrical supply from the surface control system.

In the event that the intervention systems for the subsea BOP's fail, LLOG will initiate call out of a secondary containment / surface intervention system supported by the Helix Well Containment Group (HWCG) of which LLOG is a member. This system incorporates a capping stack capable of being deployed from the back of a vessel of opportunity equipped with an ROV or from the Helix Q4000 DP MODU. Based on the potential integrity concerns of the well, a "cap and flow" system can be deployed which may include the Helix Producer 1 capable of handling up to 55,000 BOPD flowback. The vertical intervention work is contingent upon the condition of the blowing out well and what equipment is intact to access the wellbore for kill or containment operations. The available

intervention equipment may also require modifications based on actual wellbore conditions. Standard equipment is available through the Helix Deepwater Containment System to fit the wellhead and BOP stack profiles used for the drilling of the above mentioned well.

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

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

With the current activity level in the GOM, 25 to 35 deepwater MODU'S are potentially available to support the relief well drilling operations. Rig share and resource sharing agreements are in place between members of the Helix Well Containment Group. The ability to negotiate and contract an appropriate rig or rigs to drill relief wells is highly probable in a short period of time. If the rig or rigs are operating, the time to properly secure the well and move the rig to the relief well site location is estimated to be about 14 to 21 days. Dynamically positioned (DP) MODU's would be the preferred option due to the logistical advantage versus a moored MODU which may add complications due to the mooring spread.

VESSELS OF OPPORTUNITY

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

OPERATION	SPECIFIC VESSEL OF OPPORTUNITY
Intervention and Containment	<ul style="list-style-type: none"> • Helix Q4000 (DP Semi) • Helix Producer 1 (DP FPU)
Relief Well Drilling Rigs	<ul style="list-style-type: none"> • Diamond Ocean Victory (Moored Semi) • Ensco 8502 (DP Semi) • Transocean Enterprise (DP Drillship)
ROV / Multi-Purpose Service Vessels	<ul style="list-style-type: none"> • Oceaneering (numerous DP ROV vessels) • HOS Achiever, Iron Horse 1 and 2 (DP MPSV) • Helix Pipe Lay Vessel (equipped w/ 6" PL – 75,000') • Other ROV Vessels – (Chouest, HOS, Fugro, Subsea 7)
Shuttle Tanker / Barge Support	<ul style="list-style-type: none"> • OSG Ship Management

H) Measures taken to enhance ability to prevent blowout

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

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

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

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

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

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

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

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

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

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

site assessment of the seafloor conditions for intervention operations. Relief well equipment such as backup wellhead equipment and tubulars will be available in LLOG's inventory for immediate deployment as needed to address frilling the relief well(s).

SITE SPECIFIC PROPOSED RELIEF WELL AND INTERVENTION PLANNING

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

Relief well sites have been initially identified to address blowout scenarios for the potential geologic targets for the proposed wells. A total of 10 relief well surface locations are proposed for the 5 Proposed Exploration Plan wells. Some of the relief well sites are common to different Proposed Exploration Plan wells. Based on actual seafloor state unforeseen at this time, the final location(s) may need to be revised. The locations have been selected based on proximity to the targets sands and potential shallow hazards.

Proposed EP Well	Proposed Relief Well	X (NAD 27)	Y (NAD 27)
MC 255 "A" OCS-G-24064	MC 255 R1	1,249,237'	10,425,093'
	MC 256 R1*	1,253,519'	10,424,148'
	MC 300 R1*	1,251,996'	10,422,623'
MC 256 "A" OCS-G-22865	MC 256 R1*	1,253,519'	10,424,148'
	MC 256 R2	1,259,011'	10,424,135'
	MC 300 R2*	1,256,548'	10,420,753'
MC 300 "A" OCS-G-22868	MC 300 R1*	1,251,996'	10,422,623'
	MC 300 R2*	1,256,548'	10,420,753'
	MC 256 R1*	1,253,519'	10,424,148'
MC 300 "B" OCS-G-22868	MC 300 R2*	1,256,548'	10,420,753'
	MC 300 R3	1,259,365'	10,417,005'
	MC 300 R4	1,256,476'	10,416,553'
MC 300 "C" OCS-G-22868	MC 300 R5	1,263,555'	10,412,177'
	MC 300 R6	1,261,980'	10,410,573'
	MC 300 R7	1,263,547'	10,409,764'

"**" indicates common relief well site to more than 1 exploration plan well

RELIEF WELL RESPONSE TIME ESTIMATE

OPERATION	TIME ESTIMATE (DAYS)
IMMEDIATE RESPONSE <ul style="list-style-type: none"> • safeguard personnel, render first-aid • make initial notifications • implement short term intervention (if possible) • implement spill control • develop Initial Action Plan 	1
INTERIM RESPONSE <ul style="list-style-type: none"> • establish Onsite Command Center and Emergency Management Team • assess well control issues • mobilize people and equipment (Helix DW Containment System) • implement short term intervention and containment (if possible) • develop Intervention Plan • initiate relief well planning • continue spill control measures 	4



**BLOWOUT SCENARIO
MC 255-256-300**

Created by: S.L. Stegeman
Last Revised: 7/6/2011
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INTERVENTION AND CONTAINMENT OPERATIONS <ul style="list-style-type: none"> • mobilize equipment and initiate intervention and containment operations • perform TA operations and mobilize relief wells rig(s) • finalize relief well plans, mobilize spud equipment, receive approvals • continue spill control measures 	14
RELIEF WELL(S) OPERATIONS <ul style="list-style-type: none"> • continue intervention and containment measures • continue spill control measures • drill relief well (s) 	60
PERFORM HYDRAULIC KILL OPERATIONS / SECURE BLOWNOUT WELL <ul style="list-style-type: none"> • continue intervention and containment measures • continue spill control measures • perform hydraulic kill operations, monitor well, secure well 	20
ESTIMATED TOTAL DAYS OF UNCONTROLLED FLOW	99
SECURE RELIEF WELL(S) / PERFORM P&A / TA OPERATIONS / DEMOBE	30
TOTAL DAYS	129

SECTION 3

GEOLOGICAL AND GEOPHYSICAL INFORMATION

3.1 GEOLOGICAL DESCRIPTION

Proprietary Information.

3.2 STRUCTURE CONTOUR MAPS

Proprietary Information.

3.3 INTERPRETED SEISMIC LINES

Proprietary Information.

3.4 GEOLOGICAL STRUCTURE CROSS-SECTIONS

Proprietary Information.

3.5 SHALLOW HAZARDS REPORT

The proposed operations will be conducted from a previously approved surface location as provided for in EP (Control No. R-7056); therefore, in accordance with NTL No. 2008-G05, "Shallow Hazards Program," a shallow hazards report is not provided.

3.6 SHALLOW HAZARDS ASSESSMENT

The proposed operations will be conducted from a previously approved surface location as provided for in EP (Control No. R-7056), approved on July 14, 2023; therefore, in accordance with NTL No. 2008-G05, "Shallow Hazards Program," a site-specific shallow hazards assessment is not provided.

3.7 HIGH-RESOLUTION SEISMIC LINES

Proprietary Information.

3.8 STRATIGRAPHIC COLUMN

Proprietary Information.

3.9 TIME VS DEPTH TABLES

Proprietary Information.

SECTION 4

HYDROGEN SULFIDE INFORMATION

4.1 CONCENTRATION

Murphy anticipates encountering 0 ppm H₂S during the proposed operations.

4.2 CLASSIFICATION

By letter dated July 14, 2023, BOEM determined the area of proposed operations as H₂S absent.

4.3 H₂S CONTINGENCY PLAN

An H₂S Contingency Plan is not required for the activities proposed in this plan.

4.4 MODELING REPORT

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

SECTION 5

MINERAL RESOURCE CONSERVATION INFORMATION

5.1 TECHNOLOGY & RESERVOIR ENGINEERING PRACTICES AND PROCEDURES

Proprietary Information.

5.2 TECHNOLOGY AND RECOVERY PRACTICES AND PROCEDURES

Proprietary Information.

5.3 RESERVOIR DEVELOPMENT

Proprietary Information.

SECTION 6

BIOLOGICAL, PHYSICAL AND SOCIOECONOMIC INFORMATION

6.1 DEEPWATER BENTHIC COMMUNITIES

The proposed operations will be conducted within 500 feet of a previously approved surface location as provided for in EP (Control No. R-7056) approved on July 14, 2023.

6.2 TOPOGRAPHIC FEATURES (BANKS)

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

6.3 TOPOGRAPHIC FEATURES STATEMENT (SHUNTING)

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

6.4 LIVE-BOTTOMS (PINNACLE TREND FEATURES)

MC Blocks 255/300 are not located within 61 meters (200 feet) of any pinnacle trend feature; therefore, a separate bathymetric map is not required per NTL No. 2009-G39, “Biologically Sensitive Underwater Features and Areas.”

6.5 LIVE BOTTOMS (LOW RELIEF)

MC Blocks 255/300 are not located within 30 meters (100 feet) of any live bottom (low relief) feature with vertical relief equal to or greater than 8 feet; therefore, live bottom (low relief) maps are not required per NTL No. 2009-G39, “Biologically Sensitive Underwater Features and Areas.”

6.6 POTENTIALLY SENSITIVE BIOLOGICAL FEATURES

MC Blocks 255/300 are not located within 30 meters (100 feet) of potentially sensitive biological features. In accordance with NTL No. 2009-G39, “Biologically Sensitive Underwater Features and Areas,” biologically sensitive area maps are not required.

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

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

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in the Gulf of Mexico
			Lease Area	Coastal	
Marine Mammals					
Manatee, West Indian	<i>Trichechus manatus latirostris</i>	T	--	X	Florida (peninsular)
Whale, Blue	<i>Balaenoptera masculus</i>	E	X ¹	--	None
Whale, Bryde's ⁴	<i>Balaenoptera brydei/edeni</i>	E	X	--	None

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in the Gulf of Mexico
			Lease Area	Coastal	
Whale, Fin	<i>Balaenoptera physalus</i>	E	X ¹	--	None
Whale, Humpback	<i>Megaptera novaeangliae</i>	E	X ¹	--	None
Whale, North Atlantic Right	<i>Eubalaena glacialis</i>	E	X ¹	--	None
Whale, Rice's ⁴	<i>Balaenoptera ricei</i>	E	X	--	None
Whale, Sei	<i>Balaenoptera borealis</i>	E	X ¹	--	None
Whale, Sperm	<i>Physeter catodon</i> (=macrocephalus)	E	X	--	None
Terrestrial Mammals					
Mouse, Beach (Alabama, Choctawatchee, Perdido Key, St. Andrew)	<i>Peromyscus polionotus</i>	E	-	X	Alabama, Florida (panhandle) beaches
Birds					
Plover, Piping	<i>Charadrius melodus</i>	T	-	X	Coastal Texas, Louisiana, Mississippi, Alabama and Florida (panhandle)
Crane, Whooping	<i>Grus Americana</i>	E	-	X	Coastal Texas
Crane, Mississippi sandhill	<i>Grus canadensis pulla</i>	E	-	X	Coastal Mississippi
Curlew, Eskimo	<i>Numenius borealis</i>	E	-	X	none
Falcon, Northern Aplomado	<i>Falco femoralis septentrionalis</i>	E	-	X	none
Knot, Red	<i>Calidris canutus rufa</i>	T	-	X	None
Stork, Wood	<i>Mycteria americana</i>	T	-	X	None
Reptiles					
Sea Turtle, Green	<i>Chelonia mydas</i>	T/E ³	X	X	None
Sea Turtle, Hawksbill	<i>Eretmochelys imbricata</i>	E	X	X	None
Sea Turtle, Kemp's Ridley	<i>Lepidochelys kempli</i>	E	X	X	None
Sea Turtle, Leatherback	<i>Dermochelys coriacea</i>	E	X	X	None
Sea Turtle, Loggerhead	<i>Caretta caretta</i>	T	X	X	Texas, Louisiana, Mississippi, Alabama, Florida
Fish					
Sturgeon, Gulf	<i>Acipenser oxyrinchus</i> (=oxyrhynchus) desotoi	T	X	X	Coastal Louisiana, Mississippi, Alabama and Florida (panhandle)
Shark, Oceanic Whitetip	<i>Carcharhinus longimanus</i>	E	X	—	None
Sawfish, Smalltooth	<i>Pristis pectinate</i>	E	-	X	None
Grouper, Nassau	<i>Epinephelus striatus</i>	T	-	X	None
Ray, Giant Manta	<i>Manta birostris</i>	E	X	--	None
Corals					

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in the Gulf of Mexico
			Lease Area	Coastal	
Coral, Elkhorn	<i>Acopora palmate</i>	T	X ²	X	Florida Keys and Dry Tortugas
Coral, Staghorn	<i>Acopora cervicornis</i>	T	X	X	Florida
Coral, Boulder Star	<i>Orbicella franksi</i>	T	X	X	none
Coral, Lobed Star	<i>Orbicella annularis</i>	T	X	X	None
Coral, Mountainous Star	<i>Orbicella faveolate</i>	T	X	X	None
Coral, Rough Cactus	<i>Mycetophyllia ferox</i>	T	-	X	None

Abbreviations: E = Endangered; T = Threatened

1 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.

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

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

4 The Bryde's whale, also known as the Bryde's whale complex, is a collection of baleen whales that are still being researched to determine if they are the same species or if they are individual species of whales. In 2021, the Rice's whale, formerly known as the Gulf of Mexico Bryde's whale, was determined to be a separate species. There are less than 100 Rice's whales living in the Gulf of Mexico year-round. These whales retain all the protections of the Gulf of Mexico Bryde's whale under the Endangered Species Act while the regulations are being updated to reflect the name change. Other Bryde's whales are migratory and may enter the Gulf of Mexico; however, the migratory Bryde's whales are rare or extralimital in the Gulf of Mexico and are unlikely to be present in the lease area.

6.8 ARCHAEOLOGICAL REPORT

The proposed operations will be conducted from a previously approved surface location as provided for in EP (Control No. R-7056); therefore, in accordance with NTL No. 2005-G07, "Archaeological Resource Surveys and Reports," and NTL No. 2011-JOINT-G01, "Revisions to the List of OCS Lease Blocks Requiring Archaeological Resource Surveys and Reports," an archaeological resource survey report is not provided.

6.9 AIR AND WATER QUALITY INFORMATION

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

6.10 SOCIOECONOMIC INFORMATION

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

SECTION 7

WASTES AND DISCHARGES INFORMATION

7.1 PROJECTED GENERATED WASTES

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

7.2 MODELING REPORT

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

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

NO DRILLING ACTIVITIES

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

Projected generated waste			Projected ocean discharges		Projected Downhole Disposal
Type of Waste	Composition	Projected Amount	Discharge rate	Discharge Method	Answer yes or no
Will drilling occur ? If yes, you should list muds and cuttings					
EXAMPLE: Cuttings wetted with synthetic based fluid	Cuttings generated while using synthetic based drilling fluid.	X bbl/well	X bbl/day/well	discharge overboard	No
Water-based drilling fluid	NO DRILLING ACTIVITIES	NA	NA	NA	No
Cuttings wetted with water-based fluid	NO DRILLING ACTIVITIES	NA	NA	NA	No
Cuttings wetted with synthetic-based fluid	NO DRILLING ACTIVITIES	NA	NA	NA	No
Will humans be there? If yes, expect conventional waste					
Domestic waste	Misc waste generated during daily operations of 50 man living quarters	110,804 bbls (total)	1.5 bbls/hr (Maximum)	Remove oil & grease, oxidize & discharge overboard in accordance with USCG standards.	No
Sanitary waste	Sanitation waste generated during daily operations of 50 man living quarters	73,869 bbls (total)	1.0 bbls/hr (Maximum)	Grind solids, electrolyze, hold 30 min to oxidize then discharge overboard in accordance with USCG standards.	No
Is there a deck? If yes, there will be Deck Drainage					
Deck Drainage	Accumulated drainage due to rainfall.	785,566 bbls (total)	0 to 924 bbls/hr	Treat for oil & grease & discharge overboard.	No
Will you conduct well treatment, completion, or workover?					
Well treatment fluids	NPDES approved treatment fluid used for well operations.	5,957 bbls (total)	0.01 bbls/hr/well	Treat for oil & grease & discharge overboard.	No
Well completion fluids	Clear Brine Type	800 bbls (total)	12 bbl/yr/well	Most completion fluids will be recovered at a remote drill rig, excess returned to shore. Residual fluids recovered at the production facility and discharged overboard.	No
Workover fluids	Clear Brine Type	800 bbls (total)	12 bbl/yr/well	Most workover fluids will be recovered at a remote drill rig, excess returned to shore. Residual fluids recovered at the production facility and discharged overboard.	No
Miscellaneous discharges. If yes, only fill in those associated with your activity.					
Desalinization unit discharge	Uncontaminated spent saltwater used for potable water generation unit.	759,492 (total)	5.1 bbls/hr	Discharge overboard	No
Blowout prevent fluid	NA	NA	N/A	NA	No
Ballast water	Uncontaminated seawater	0 bbls/well	0 bbls/well	Fixed ballast system with water moved between tanks to trim the hull, no discharge	No
Bilge water	Uncontaminated freshwater & seawater overflow/leakage accumulated from machinery operation - NPDES allowed.	2,482 bbls (total)	0 to 0.4 bbls/day	treat for oil & grease & discharge overboard	No
Excess cement at seafloor	NA	NA	N/A	NA	No
Fire water	Seawater	53,186,000 bbls (total)	8,571 bbls/day	Uncontaminated seawater discharged overboard	No
Cooling water	Circulated by jockey pumps for cooler system	351,026,000 bbls (total)	56,571 bbls/day	Uncontaminated seawater discharged overboard	No
Will you produce hydrocarbons? If yes fill in for produced water.					
Produced water	Produced Water	39,530,000 bbls (total)	6371 bbls/day (average)	Treat for oil & grease, test & discharge overboard	No
Please enter individual or general to indicate which type of NPDES permit you will be covered by?			General	(GMG290000)	
NOTE: If you will not have a type of waste for the activity being applied for, enter NA for all columns in the row.			NOTE: All discharged wastes should comply with the requirements of the NPDES permit.		

SECTION 8

AIR EMISSIONS INFORMATION

8.1 EMISSIONS WORKSHEETS AND SCREENING QUESTIONS

Screen Questions for DOCD's	Yes	No
Is any calculated Complex Total (CT) Emission amount (tons) associated with your proposed development 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
Does or will the facility complex associated with your proposed development and production activities process production from eight or more wells?		X
Do you expect to encounter H ₂ S at concentrations greater than 20 parts per million (ppm)?		X
Do you propose to flare or vent natural gas for more than 48 continuous hours from any proposed well?		X
Do you propose to burn produced hydrocarbon liquids?		X
Are your proposed development and production activities located within 25 miles (40 kilometers) from shore?		X
Are your proposed development and production activities located within 124 miles (200 kilometers) of the Breton Wilderness Area?	X	

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 8-A**.

This information was calculated by: Kelley Pisciola
 281.578.3388
Kelley.pisciola@jccteam.com

COMPANY	Murphy Exploration & Production Company - USA
AREA	Mississippi Canyon
BLOCK	300 (Surface Location)
LEASE	OCS-G 22868 (Surface Location)
FACILITY	NA - Installation Vessel/DP Drillship
WELL	MC 300 (SL) / 255 (BHL) #SS003
COMPANY CONTACT	Kelley Pisciola
TELEPHONE NO.	281-698-8519
REMARKS	

LEASE TERM PIPELINE CONSTRUCTION INFORMATION:		
YEAR	NUMBER OF PIPELINES	TOTAL NUMBER OF CONSTRUCTION DAYS
2023	1	8
2024		
2025		
2026		
2027		
2028		
2029		
2030		
2031		
2032		

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-nai-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
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.apiwebstore.org/publications/item.cfm?9879d38a-8bc0-4abc-bb5c-9b6233870125d
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 422.1-12	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	https://www.epa.gov/moves/nonroad2008a-installation-and-updates
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	
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-nai-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-nai-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

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

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

COMPANY	AREA		BLOCK	LEASE	FACILITY	WELL			CONTACT	PHONE	REMARKS																								
Murphy Exploration & Production Company - USA	Mississippi Canyon		300 (Surface Location)	OCS-G 22868	NA - Installation Vessel/DP Drillship	MC 300 (SL / 25L (BHL) #SS003	(Surface Location)		Kelley Piscida	281-696-8519																									
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		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-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										
PIPELINE	VESSELS - Pipeline Laying Vessel - Diesel		27035	1390.843	33380.22	24	8	19.07	11.51	11.16	0.28	456.96	13.14	0.00	71.67	0.13	1.83	1.10	1.07	0.03	43.87	1.26	0.00	6.88	0.01										
INSTALLATION	VESSELS - Construction - 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 - Pipeline Burying - 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										
	MISC.		TPD	SCF/HR	COUNT																														
	WASTE INCINERATOR - Vessels Pipeline Laying Vessel		0.0			0	0	-	0.00	0.00	0.00	0.00	-	-	0.00	-	-	0.00	0.00	0.00	0.00	-	-	0.00	-										
	WASTE INCINERATOR - Vessels - Construction		0			0	0	-	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										
	VESSELS - Light Construction 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										
	MISC.		TPD	SCF/HR	COUNT																														
	WASTE INCINERATOR - Vessels - Light Construction		0.0			0	0	-	0.00	0.00	0.00	0.00	-	-	0.00	-	-	0.00	0.00	0.00	0.00	-	-	0.00	-										
PRODUCTION	RECIP -<600hp Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	-										
	RECIP ->600hp Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	-										
	VESSELS - Shuttle Tankers		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 - Well Stimulation		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										
	Natural Gas Turbine		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	-										
	Diesel Turbine		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										
	Dual Fuel Turbine		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										
	RECIP, 2 Cycle Lean Natural Gas		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	-										
	RECIP, 4 Cycle Lean Natural Gas		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	-										
	RECIP, 4 Cycle Rich Natural Gas		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	-										
	Diesel Boiler		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										
	Natural Gas Heater/Boiler/Burner		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										
	MISC.		BPD	SCF/HR	COUNT																														
	DRILLING WELL TEST	STORAGE TANK			0		1	1	-	-	-	-	-	0.00	-	-	-	-	-	-	-	0.00	-	-	-	-									
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	-											
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	-											
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	-											
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	-											
COLD VENT					0	1	1	-	-	-	-	-	0.00	-	-	-	-	-	-	-	0.00	-	-	-											
FUGITIVES			0		0	0	0	-	-	-	-	-	0.00	-	-	-	-	-	-	-	0.00	-	-	-											
WASTE COOL DEHYDRATOR			0		0	1	1	-	-	-	-	-	0.00	-	-	-	-	-	-	-	0.00	-	-	-											
GLYCOL INCINERATOR			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	-											
Liquid Flaring			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											
COMBUSTION FLARE - no smoke				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	-											
COMBUSTION FLARE - light smoke				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	-											
COMBUSTION FLARE - medium smoke				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	-											
COMBUSTION FLARE - heavy smoke				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	-											
ALASKA-SPECIFIC SOURCES	VESSELS					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											
2023 Facility Total Emissions												19.07	11.51	11.16	0.28	456.96	13.14	0.00	71.67	0.13	1.83	1.10	1.07	0.03	43.87	1.26	0.00	6.88	0.01						
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES																																		
	60.0											1,998.00													1,998.00	1,998.00	1,998.00		52,109.04						
DRILLING	VESSELS- Crew Diesel (2 x week)		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 (2 x week)		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 - 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										
PIPELINE INSTALLATION	VESSELS - Support Diesel, Laying		0	0	0.00	0	8	0.00	0.00	0.00	0.00	0.00	0.00	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 - Support Diesel, Laying		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 - Support Diesel, Burying		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 - 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		13750	707.3825	16977.18	24	8	9.70	5.85	5.68	0.14	232.41	6.68	0.00	36.45	0.07	0.93	0.56	0.54	0.01	22.31	0.64	0.00	3.50	0.01										
	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										
PRODUCTION	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 - Diving 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										
	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										
ALASKA-SPECIFIC SOURCES	On-Ice Equipment			GAL/HR	GAL/D																														

COMPANY	AREA	BLOCK	LEASE	FACILITY	WELL	CONTACT	PHONE	REMARKS																		
Murphy Exploration & Production Company - USA	Mississippi Canyon	300 (Surface Location)	OCS-G 22868 (Surface Location)	NA - Installation Vessel/OP Drilling	MC 300 (SL) / 255 (BHL) #SS003	Kelley Placida	281-696-8519																			
OPERATIONS	EQUIPMENT	EQUIPMENT ID	RATING	MAX. FUEL	ACT. FUEL	RUN TIME	MAXIMUM POUNDS PER HOUR										ESTIMATED TONS									
	Diesel Engines		HP	GAL/HR	ACT. GAL/D		TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3		TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3	
	Nat. Gas Engines		HP	SCF/HR	SCF/D																					
	Burners		MMBTU/HR	SCF/HR	SCF/D	HR/D	D/YR																			
DRILLING	VESSELS- Drilling - Propulsion Engine - Diesel		61800	3179.363	76304.71	24	100	43.60	26.30	25.51	0.63	1044.59	30.03	0.00	163.84	0.30	52.32	31.56	30.62	0.76	1253.50	36.04	0.00	196.61	0.37	
	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		
	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		
	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		
	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		
	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		
PIPELINE INSTALLATION	VESSELS - Pipeline Laying Vessel - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	VESSELS - LCV - 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		
	VESSELS - Pipeline Burying - 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		
	MISC.		TPD	SCF/HR	COUNT																					
	WASTE INCINERATOR - Vessels - Construction		0			0	0	--	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		
	VESSELS - Light Construction 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		
	MISC.		TPD	SCF/HR	COUNT																					
	WASTE INCINERATOR - Vessels - Light Construction		0.0			0	0	--	0.00	0.00	0.00	0.00	--	--	0.00	--	--	0.00	0.00	0.00	0.00	--	--	0.00	--	
PRODUCTION	RECIP. >600hp Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	
	RECIP. >600hp Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	
	VESSELS - Shuttle Tankers		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		
	VESSELS - Well Stimulation		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		
	Natural Gas Turbine		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	--		
	Diesel Turbine		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		
	Dual Fuel Turbine		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		
	RECIP. 2 Cycle Lean Natural Gas		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	--		
	RECIP. 4 Cycle Lean Natural Gas		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	--		
	RECIP. 4 Cycle Rich Natural Gas		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	--		
	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	--	
	Natural Gas Heater/Boiler/Burner		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		
	MISC.		BPD	SCF/HR	COUNT																					
	STORAGE TANK				0	1	1	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	0.00	--	--	--	
	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	--		
	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	--		
	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	--		
	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	--		
	COLD VENT				0	1	1	--	--	--	--	0.00	--	--	--	--	--	--	--	--	0.00	--	--	--		
	FUGITIVES				0	0	0	--	--	--	--	0.00	--	--	--	--	--	--	--	--	0.00	--	--	--		
	GLYCOL DEHYDRATOR				0	1	1	--	--	--	--	0.00	--	--	--	--	--	--	--	--	0.00	--	--	--		
	WASTE INCINERATOR		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		
DRILLING WELL TEST	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		
	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	--		
	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	--		
	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	--		
	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	--		
ALASKA-SPECIFIC SOURCES	VESSELS					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		
2024-2034	Facility Total Emissions							43.60	26.30	25.51	0.63	1,044.59	30.03	0.00	163.84	0.30	52.32	31.56	30.62	0.76	1,253.50	36.04	0.00	196.61	0.37	
EXEMPTION CALCULATION	DISTANCE FROM LAND IN MILES																1,998.00			1,998.00	1,998.00	1,998.00		52,109.04		
	60.0																									
DRILLING	VESSELS - Crew Diesel (2 x week)		5200	267.5192	6420.46	12	29	3.67	2.21	2.15	0.05	87.89	2.53	0.00	13.79	0.03	0.64	0.39	0.37	0.01	15.29	0.44	0.00	2.40	0.00	
	VESSELS - Supply Diesel (2 x week)		7200	370.4112	8869.87	12	29	5.08	3.06	2.97	0.07	121.70	3.50	0.00	19.99	0.04	0.88	0.53	0.52	0.01	21.18	0.61	0.00	3.32	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		
PIPELINE INSTALLATION	VESSELS - Support Diesel, Laying		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		
	VESSELS - Support Diesel, Laying		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		
	VESSELS - Support Diesel, Burying		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		
	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		
	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		
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		
	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		
	VESSELS - Diving 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		
	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		
PRODUCTION	VESSELS - Support Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00															

AIR EMISSIONS CALCULATIONS

COMPANY	AREA	BLOCK	LEASE	FACILITY	WELL
Murphy Exploration & Production Company - USA	Mississippi Canyon	300 (Surface Location)	OCS-G 22868 (Surface Location)	NA - Installation Vessel/DP Drillship	MC 300 (SL) / 255 (BHL) #SS003

Year	Facility Emitted Substance								
	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
2023	1.83	1.10	1.07	0.03	43.87	1.26	0.00	6.88	0.01
2024-2034	52.32	31.56	30.62	0.76	1253.50	36.04	0.00	196.61	0.37
Allowable	2147.85			2147.85	2147.85	2147.85		54682.97	

SECTION 9 OIL SPILL INFORMATION

9.1 OIL SPILL RESPONSE PLANNING

All the proposed activities and facilities in this DOCD will be covered by the Regional OSRP filed by Murphy Exploration & Production Company – USA (Company No. 02647), last approved on November 6, 2023 (OSRP Control No. O-521).

9.2 SPILL RESPONSE SITES

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

9.3 OSRO INFORMATION

Murphy's primary equipment providers are Clean Gulf Associates (CGA) and Marine Spill Response Corporation (MSRC). Clean Gulf Associates Services, LLC (CGAS) will provide closest available personnel, as well as a CGAS supervisor to operate the equipment. MSRC personnel are responsible for operating MSRC response equipment.

9.4 WORST-CASE DISCHARGE SCENARIO DETERMINATION

Category	Production	
	Regional OSRP WCD - Production	DOCD WCD - Production
Type of Activity	>10 Miles Production	>10 Miles Production
Facility location (Area/Block)	MC 254	MC 254
Facility designation	A-Delta House	A-Delta House
Distance to nearest shoreline (miles)	60	60
Storage tanks & flowlines (bbl)	3,244	3,244
Lease term pipelines (bbl)		
Uncontrolled blowout (bbl)	28,034	28,034
Total Volume (bbl)	31,278	31,278
Type of oil(s) (crude, condensate, diesel)	Crude	Crude
API gravity	36.6°	36.6°

Murphy has determined that the production worst-case scenario from the activities proposed in this DOCD does not supersede the production worst-case scenario from our approved Regional OSRP.

All the proposed activities and facilities in this DOCD will be covered by the Oil Spill Response Plan (OSRP) filed by Murphy Exploration & Production Company – USA (Company No. 02647), last approved on November 6, 2023 (OSRP Control No. O-521).

Since Murphy has the capability to respond to the worst-case spill scenario included in our Regional OSRP approved on November 6, 2023, and since the worst-case scenario determined for our DOCD does not replace the worst-case scenario in our Regional OSRP, Murphy hereby certifies that Murphy has the capability to respond, to the maximum extent practicable, to a worst-case discharge, or a substantial threat of such a discharge, resulting from the activities proposed in this DOCD.

9.5 OIL SPILL RESPONSE DISCUSSION

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

9.6 MODELING REPORT

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

ATTACHMENT 9-A

SPILL RESPONSE DISCUSSION

For the purpose of NEPA and Coastal Zone Management Act analysis, the largest spill volume originating from the proposed activity would be a loss of well control during production operations, estimated to be 31,278 barrels of crude oil with an API gravity of 36.6°.

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 21% probability of impact to the shorelines of Plaquemines Parish, Louisiana within 30 days. Plaquemines Parish includes Barataria Bay, the Mississippi River Delta, Breton Sound and the affiliated islands and bays. This region is an extremely sensitive habitat and serves as a migratory, breeding, feeding and nursery habitat for numerous species of wildlife. Beaches in this area vary in grain particle size and can be classified as fine sand, shell or perched shell beaches. Sandy and muddy tidal flats are also abundant.

Response

Murphy 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 44% or approximately 13,762 barrels of crude oil would be evaporated/dispersed within 24 hours, with approximately 17,516 barrels remaining.

Natural Weathering Data: MC300, Well SS003	Barrels of Oil
WCD Volume	31,278
Less 44% natural evaporation/dispersion	13,762
Remaining volume	17,516

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.

Murphy's Oil Spill Response Plan includes alternative response technologies such as dispersants and in-situ burn. Strategies will be decided by Unified Command based on an operations safety analysis, the size of the spill, weather and potential impacts. If aerial dispersants are utilized, 8 sorties (9,600 gallons) from two of the DC-3 aircrafts and 4 sorties (8,000 gallons) from the Basler aircraft would provide a daily dispersant capability of 7,540 barrels. If the conditions are favorable for in-situ burning, the proper approvals have been obtained and the proper planning is in place, in-situ burning of oil may be attempted. Slick containment boom would be immediately called out and on-scene as soon as possible. Offshore response strategies may include attempting to skim utilizing CGA's and MSRC's spill response equipment with a total derated skimming capacity of 327,176 barrels. Temporary storage associated with skimming equipment equals 112,298 barrels. If additional storage is needed, various tank barges with a total of 268,000+ barrels of storage capacity 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 Plaquemines Parish, Louisiana would depend upon existing environmental conditions. Shoreline protection would include the use of CGA's and MSRC's near shore and shallow water skimmers with a totaled derated skimming capacity of 160,168 barrels. Temporary storage associated with skimming equipment equals 5,862 barrels. If additional storage is needed, various tank barges with a total of 273,000+ barrels of storage capacity 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. Contracts with OMI Environmental and MSRC will ensure access to 133,700 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 the 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. Murphy's contract Incident Management Team has access to the applicable ACP(s) and GRP(s).

Based on the anticipated worst case discharge scenario, Murphy can be onsite with contracted oil spill recovery equipment with adequate response capacity to contain and recover surface hydrocarbons, and prevent land impact, to the maximum extent practicable, within an estimated 60 hours (based on the equipment's Effective Daily Recovery Capacity (EDRC)).

Initial Response Considerations

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

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

Murphy 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 Supervisor 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 offshore 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 offshore as safely possible

CGA FRUs

- To the area of the thickest oil
- Use as far offshore 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 offshore 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 tugboat 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 Murphy'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 ≥ 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 (C³)

- Publish, implement, and fully evaluate an appropriate communications plan
- Design an operational scheme, maintaining a manageable span of control
- Designate and mark C³ vessels for easy aerial identification
- Designate and employ C³ aircraft for task forces, groups, etc.
- Use reconnaissance aircraft 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: <ul style="list-style-type: none">• 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): Murphy 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 the 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.

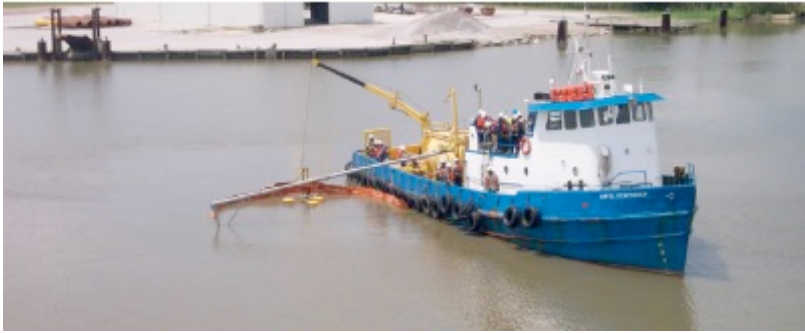
Tactical Overview

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 are 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.

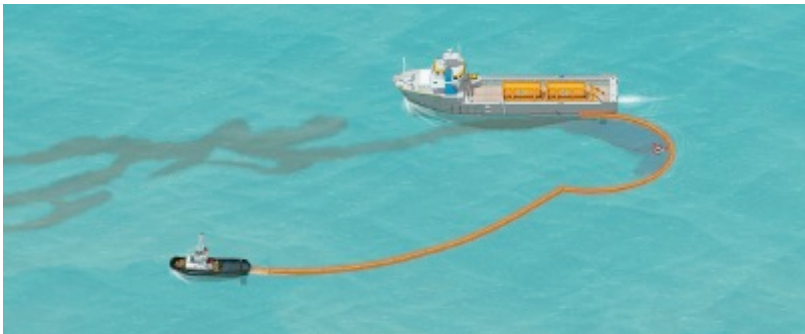
Maximum Sea Conditions – Under most circumstances the FRU can maintain standard oil spill recovery operations in 2' to 4' seas. Ultimately, the Coast Guard licensed Captain in charge of the VOO (with input from the CGAS Supervisor assigned) will be responsible to determine when the sea conditions have 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

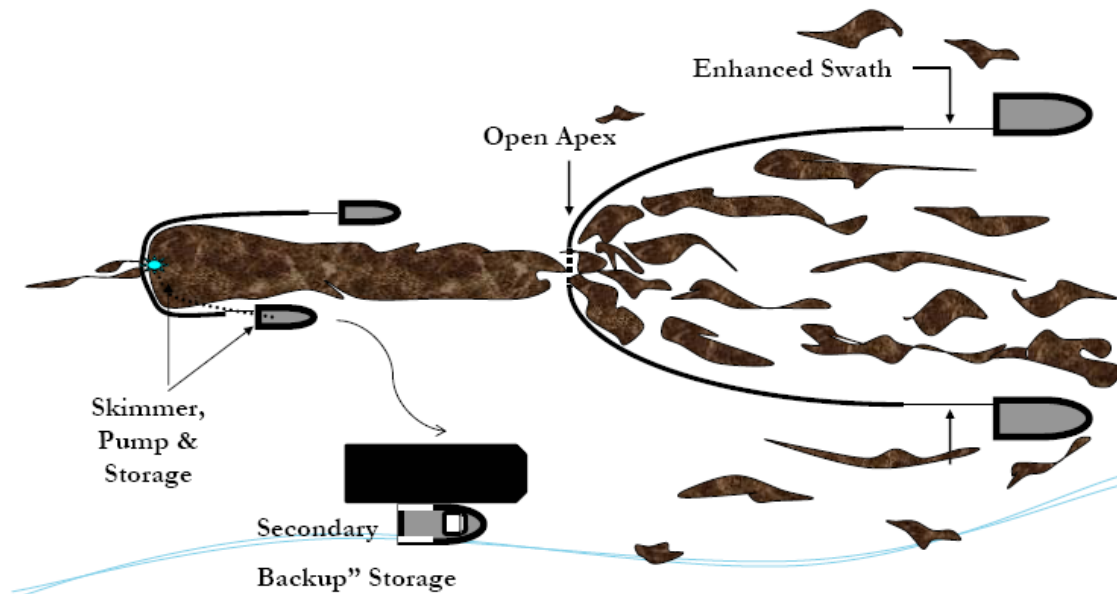
Mechanical Recovery – Deployed on large vessels of opportunity (VOO) the Koseq Rigid Sweeping Arms are high volume surge capacity deployed to increase recovery capacity at the source of a large oil spill in the offshore and outer nearshore environment of the Gulf of Mexico. They are highly mobile and 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 through 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 ≥ 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
- Egmpol and Marco SWS
- Operate with aerial spotter directing systems to observed oil slicks

VOO

- Use Murphy'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 that 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 the 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., landowners, 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 cleanup of marshes should be 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 roadways
- 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 is 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. The 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 every 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

<p>Trajectory of a spill and the probability of it impacting a land segment have been projected utilizing Murphy'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.</p>				
Area/Block	OCS-G	Launch Area	Land Segment and/or Resource	Conditional Probability (%)
<p>MC 300</p> <p>Well SS003</p> <p><i>58.5 miles from shore</i></p>	G22868	C057	<p>Cameron, LA</p> <p>Vermilion, LA</p> <p>Terrebonne, LA</p> <p>Lafourche, LA</p> <p>Plaquemines, LA</p> <p>St. Bernard, LA</p> <p>Hancock & Harrison, MS</p> <p>Jackson, MS</p> <p>Mobile, AL</p> <p>Baldwin, AL</p> <p>Escambia, AL</p> <p>Okaloosa, FL</p> <p>Walton, FL</p> <p>Bay, FL</p>	<p>1</p> <p>1</p> <p>2</p> <p>2</p> <p>21</p> <p>3</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>

WCD Scenario– BASED ON WELL BLOWOUT DURING DRILLING OPERATIONS (58.5 miles from shore)

17,516 bbls of crude oil (Volume considering natural weathering)

API Gravity 36.6°

FIGURE 2 – Equipment Response Time to MC300, Well SS003*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	0.6	4.6
DC 3	1200	2	Houma	2	2	0.8	4.8
Aero Commander	NA	2	Houma	2	2	0.6	4.6
MSRC							
737-500	4,125	4	Weyers Cave	4	0	1.6	5.6

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	8	Harvey	6	0	10	15	2	33
95' FRV	22885	249	NA	6	Leeville	2	0	2	5	1	10
95' FRV	22885	249	NA	6	Venice	2	0	2	4	1	9
Boom Barge (CGA-300) 42" Auto Boom (25000')	NA	NA	1 Tug 50 Crew	4 (Barge) 2 (Per Crew)	Leeville	8	0	4	20	2	34

Recovered Oil Storage 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
Enterprise Marine Services LLC (Available through contract with CGA)											
CTCo 2603	NA	25000	1 Tug	6	Amelia	16	0	6	25	1	48
CTCo 2604	NA	20000	1 Tug	6	Amelia	16	0	6	25	1	48
CTCo 2605	NA	20000	1 Tug	6	Amelia	16	0	6	25	1	48
CTCo 2606	NA	20000	1 Tug	6	Amelia	16	0	6	25	1	48
CTCo 2607	NA	23000	1 Tug	6	Amelia	16	0	6	25	1	48

Recovered Oil Storage 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
Kirby Offshore (available through contract with CGA)											
RO Barge	NA	80000+	1 Tug	6	Venice	40	0	4	15	1	60
RO Barge	NA	80000+	1 Tug	6	Venice	40	0	4	15	1	60

Offshore Equipment Pre-determined Staging	EDRC	Storage Capacity	VOO	Persons Required	From	Hrs to Procure	Hrs to Loadout	Hrs to GOM	Travel to Spill Site	Hrs to Deploy	Total Hrs
MSRC											
Louisiana Responder 1 Transrec 3502,640' 67" <i>Curtain Pressure Boom</i>	10567	4000	NA	10	Fort Jackson, LA	2	1	4	5	1	13
MSRC 452 Offshore Barge 1 Crucial Disk 88/302,640' 67" <i>Curtain Pressure Boom</i>	11122	45000	3 Tugs	9	Fort Jackson, LA	4	1	6	12	1	24
Mississippi Responder 1 Transrec 350 2,640' 67" <i>Curtain Pressure Boom</i>	10567	4000	NA	10	Pascagoula, MS	2	1	2	6	1	12
MSRC 402 Offshore Barge 1 Crucial Disk 88/30 2,640' 67" <i>Curtain Pressure Boom</i>	11122	40300	3 Tugs	9	Pascagoula, MS	4	1	3	14	1	23
S.T. Benz Responder 1 LFF 100 Brush 2,640' 67" <i>Curtain Pressure Boom</i>	18086	4000	NA	10	Grand Isle, LA	3	1	1	6	1	12

Staging Area: Venice

Offshore Equipment With Staging	EDRC	Storage Capacity	VOO	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Site	Hrs to Deploy	Total Hrs
CGA											
FRU (3) + 100 bbl Tank (6)	12753	600	3 Utility	18	Leeville	2	5	4.5	8	1	20.5
FRU (2) + 100 bbl Tank (4)	8502	400	2 Utility	12	Venice	2	5	2	8	1	18

Staging Area: Venice

Offshore Equipment Preferred Staging	EDRC	Storage Capacity	VOO	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Site	Hrs to Deploy	Total Hrs
MSRC											
Stress I Skimmer (1)	15840	500	1 Utility	5	Grand Isle	1	2	5	10	1	19
LFF 100 Brush Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i>	18086	1000	1 PSV	9	Houma	1	2	3.5	10	1	17.5
Foilex 250 Skimmer (1)	3977	500	1 Utility	5	Belle Chasse	1	2	2	10	1	16
Foilex 200 Skimmer (1)	1989	500	1 Utility	5	Belle Chasse	1	2	2	10	1	16
Crucial Disk 56/30 Skimmer (1)	5671	500	1 Utility	5	Belle Chasse	1	2	2	10	1	16
GT-185 Skimmer w Adaptor (1)	1371	500	1 Utility	5	Fort Jackson	1	2	0.5	10	1	14.5
Walosep W4 Skimmer (1)	3017	500	1 Utility	5	Fort Jackson	1	2	0.5	10	1	14.5
Desmi Skimmer (1)	3017	500	1 Utility	5	Fort Jackson	1	2	0.5	10	1	14.5
Stress I Skimmer (1)	15840	500	1 Utility	5	Fort Jackson	1	2	0.5	10	1	14.5
Crucial Disk 88/30 Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i>	11122	1000	1 PSV	9	Fort Jackson	1	2	0.5	10	1	14.5
Crucial Disk 88/30 Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i>	11122	1000	1 PSV	9	Fort Jackson	1	2	0.5	10	1	14.5
GT-185 Skimmer (1)	1371	500	1 Utility	5	Pascagoula	1	2	5.5	10	1	19.5
Crucial Disk 88/30 Skimmer (1)	11122	1000	1 PSV	9	Pascagoula	1	2	5.5	10	1	19.5
Stress I Skimmer (1)	15840	500	1 Utility	5	Pascagoula	1	2	5.5	10	1	19.5
Stress II Skimmer (1)	3017	500	1 Utility	5	Pascagoula	1	2	5.5	10	1	19.5

Staging Area: Venice

Offshore Equipment Preferred Staging	EDRC	Storage Capacity	VOO	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Site	Hrs to Deploy	Total Hrs
CGA											
Hydro-Fire Boom	NA	NA	8 Utility	40	Harvey	0	24	2	10	6	42
MSRC											
67" Curtain Pressure Boom	NA	NA	80*	160	Houston	1	2	12	10	1	26
1000' Fire Resistant Boom	NA	NA	3*	6	Galveston	1	4	13	10	6	34
16000' Fire Resistant Boom	NA	NA	3*	6	Houston	1	4	12	10	6	33
2000' Hydro Fire Boom	NA	NA	8*	8	Lake Charles	1	4	8	10	6	29

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

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
Trinity SWS	21500	249	NA	4	Leeville	2	0	N/A	48	1	51
Trinity SWS	21500	249	NA	4	Vermilion	2	0	N/A	48	1	51
46' FRV	15257	65	NA	4	Leeville	2	0	2	2	1	7
46' FRV	15257	65	NA	4	Venice	2	0	2	2	1	7
Enterprise Marine Services LLC (Available through contract with CGA)											
CTCo 2608	NA	23000	1 Tug	6	Amelia	25	0	6	16	1	48
CTCo 2609	NA	23000	1 Tug	6	Amelia	25	0	6	16	1	48
CTCo 5001	NA	47000	1 Tug	6	Amelia	25	0	6	16	1	48

Recovered Oil Storage 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
Kirby Offshore (available through contract with CGA)											
RO Barge	NA	80000+	1 Tug	6	Venice	40	0	4	15	1	60
RO Barge	NA	100000+	1 Tug	6	Venice	40	0	4	15	1	60

Staging Area: Venice

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 Egmpopol	1810	100	NA	3	Leeville	2	2	4.5	2	1	11.5
SWS Marco	3588	20	NA	3	Vermilion	2	2	8	2	1	15
SWS Marco	3588	34	NA	3	Leeville	2	2	4.5	2	1	11.5
SWS Marco	3588	34	NA	3	Venice	2	2	2	2	1	9
Foilex Skim Package (TDS 150)	1131	50	NA	3	Vermilion	4	12	8	2	2	28
Foilex Skim Package (TDS 150)	1131	50	NA	3	Harvey	4	12	2	2	2	22
4 Drum Skimmer (Magnum	680	100	1 Crew	3	Vermilion	2	2	8	2	1	15
4 Drum Skimmer (Magnum	680	100	1 Crew	3	Harvey	2	2	2	2	1	9
2 Drum Skimmer (TDS 118)	240	100	1 Crew	3	Vermilion	2	2	8	2	1	15
2 Drum Skimmer (TDS 118)	240	100	1 Crew	3	Harvey	2	2	2	2	1	9
MSRC											
30 ft. Kvichak <i>Marco I Skimmer</i>	3588	24	NA	2	Belle Chasse	1	1	2	2	1	7
30 ft. Kvichak <i>Marco I Skimmer</i>	3588	24	NA	2	Pascagoula	1	1	5.5	2	1	10.5
AardVac Skimmer (1)	3840	400	1 Utility	4	Lake Charles	1	1	8	2	1	13
AardVac Skimmer (1)	3840	400	1 Utility	4	Pascagoula	1	1	5.5	2	1	10.5
Queensboro Skimmer (5)	4525	2000	5 Utility	20	Lake Charles	1	1	8	2	1	13
Queensboro Skimmer (1)	905	400	1 Utility	4	Belle Chasse	1	1	2	2	1	7
Queensboro Skimmer (1)	905	400	1 Utility	4	Pascagoula	1	1	5.5	2	1	10.5
WP 1 Skimmer (1)	3017	400	1 Utility	4	Pascagoula	1	1	5.5	2	1	10.5

Shoreline Protection

Shoreline Protection Boom	VOO	Persons Req.	Storage/Warehouse Location	Hrs to Procure	Hrs to Loadout	Travel to Venice	Travel to Deployment Site	Hrs to Deploy	Total Hrs
MSRC									
50' 18" Boom	1 Crew	2	Port Arthur, TX	1	1	10	2	3	17
150' 18" Boom	1 Crew	2	Galveston, TX	1	1	13	2	3	20
50' 18" Boom	1 Crew	2	Ingleside, TX	1	1	18	2	3	25
9,700' 18" Boom	5 Crew	10	Lake Charles, LA	1	1	8	2	3	15
100' 18" Boom	1 Crew	2	Belle Chasse, LA	1	1	2	2	3	9
6,950' 18" Boom	4 Crew	8	Pascagoula, MS	1	1	5	2	3	12
50' 18" Boom	1 Crew	2	Tampa, FL	1	1	21	2	3	28
2,950' 18" Boom	3 Crew	6	Miami, FL	1	1	27	2	3	34

Shoreline Protection Boom	VOO	Persons Req.	Storage/Warehouse Location	Hrs to Procure	Hrs to Loadout	Travel to Venice	Travel to Deployment Site	Hrs to Deploy	Total Hrs
OMI Environmental (available through Letter of Intent)									
3,500' 18" Boom	2 Crew	4	Belle Chasse, LA	1	1	2	2	3	9
2,000' 18" Boom	1 Crew	2	Sulfur, LA	1	1	4	2	3	11
4,100' 18" Boom	1 Crew	2	Gonzalez, LA	1	1	4	2	3	11
10,000' 18" Boom	5 Crew	10	Harvey, LA	1	1	2	2	3	9
14,000' 18" Boom	6 Crew	12	Cut Off, LA	1	1	4	2	3	11
2,300' 18" Boom	2 Crew	4	Morgan City, LA	1	1	5	2	3	12
32,200' 18" Boom	10 Crew	20	New Iberia, LA	1	1	6	2	3	13
3,500' 18" Boom	1 Crew	2	Venice, LA	1	1	0	2	3	7
16,000' 18" Boom	6 Crew	12	Deer Park, TX	1	1	12	2	3	19
6,100' 18" Boom	3 Crew	6	La Marque, TX	1	1	13	2	3	20
20,000' 18" Boom	6 Crew	12	Port Arthur, TX	1	1	10	2	3	17

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	2	1	2	9
Bird Scare Guns (24)	NA	NA	NA	2	Harvey	2	2	2	1	2	9
Bird Scare Guns (12)	NA	NA	NA	2	Galveston	2	2	13	1	2	20
Bird Scare Guns (12)	NA	NA	NA	2	Aransas Pass	2	2	18	1	2	25
Bird Scare Guns (24)	NA	NA	NA	2	Vermilion	2	2	8	1	2	15
Bird Scare Guns (24)	NA	NA	NA	2	Leeville	2	2	4.5	1	2	11.5

Response Asset	Total (bbls)
Offshore EDRC	327,176
Offshore Recovered Oil Storage	380,298+
Nearshore / Shallow Water EDRC	160,168
Nearshore / Shallow Water Recovered Oil Storage	278,862+

SECTION 10

ENVIRONMENTAL MONITORING INFORMATION

10.1 MONITORING SYSTEMS

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

10.2 INCIDENTAL TAKES

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

Operations proposed in this plan may utilize a moon pool(s) to conduct various subsea activities. Accordingly, Murphy will adhere with the requirements set forth in the Appendices to the Biological Opinion on the Federally Regulated Oil and Gas Program in the Gulf of Mexico issued on March 13, 2020, and the amendment issued on April 26, 2021.

Moon pool(s) will be regularly monitored while open to the water column and when the vessel is not underway. If water conditions are such that observers are unable to see within a meter of the surface, operations requiring lowering or retrieval of equipment through the moon pool will be conducted at a rate that will minimize potential harm, if safety allows.

Prior to and following hull door closure, the moon pool will be monitored continuously by a dedicated crew observer with no other tasks to ensure that no ESA listed species is present in the moon pool area. If visibility is not clear to the hull door from above (e.g., turbidity or low light), 30 minutes of monitoring will be conducted prior to hull door closure. Prior to movement of the vessel and/or deployment/retrieval of equipment, the moon pool will be monitored continuously for a minimum of 30 minutes, by a dedicated crew observer with no other tasks, to ensure no individual protected species are present in the moon pool area.

If an ESA listed species is observed in the moon pool, the vessel will not be moved and equipment will not be deployed or retrieved, to the extent practicable unless the safety of crew or vessel requires otherwise. NMFS will be contacted immediately at nmfs.psoreview@noaa.gov. If the observed animal leaves the moon pool, activities will commence.

Should an ESA listed species be observed in a moon pool prior to commencement of activity, recovery of the animal or other actions specific to the scenario may be required to prevent interaction with the animal. No action will be taken except at the direction of and after contact with NMFS.

Should an interaction with equipment or entanglement/entrapment of any ESA listed species occur (e.g., the animal cannot or does not leave the moon pool on its own volition), the interaction will be reported immediately. Any observation of a leatherback sea turtle within a moon pool, regardless of whether interaction with equipment or entanglement/entrapment is observed, will

be reported immediately to the ESA Section 7 biologist at (301) 427-8413 (nmfs.psoreview@noaa.gov).

Further, any interaction with equipment or entanglement/entrapment of any ESA listed species (i.e., the animal cannot or does not leave the pool of its own volition) will be reported immediately. For assistance with marine mammals and sea turtles, the stranding network listed at www.fisheries.noaa.gov/report and BSEE at protectedspecies@bsee.gov will be contacted for additional guidance on continued monitoring requirements, recovery assistance needs (if required), and incidental report information. Other ESA listed species (e.g., giant manta ray) will be reported to relevant state agency wildlife lines, the ESA Section 7 biologist, and BSEE at protectedspecies@bsee.gov. The vessel will not be moved and equipment will not be deployed or retrieved to/from the pool, to the extent practicable, until NMFS and BSEE are contacted and provide input on how to proceed.

Any individual protected species listed species observed within a moon pool that then leaves the moon pool of its own volition will be reported within 24 hours to NMFS at nmfs.psoreview@noaa.gov and BSEE at protectedspecies@bsee.gov. If the observed animal is no longer observed in the moon pool, monitoring will take place for at least 30 minutes to ensure it has left the moon pool. After 30 minutes, activities will commence.

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.

Murphy and/or its contractor representatives 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, and the amendment issued on April 26, 2021
 - 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"

10.3 FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY

MC Block 255 / 300 are not located in the Flower Garden Banks National Marine Sanctuary; therefore, relevant information is not required in this DOCD.

SECTION 11

LEASE STIPULATIONS INFORMATION

Development activities are subject to the following stipulations attached to Leases OCS-G 24064 and OCS-G 22868, MC Blocks 255 and 300.

11.1 MILITARY WARNING AREA

Although lease document OCS-G 22868, MC Block 300 indicates the block is located within designated Eglin Water Test Area (EWTA), the most current BOEM MWA Boundary Map does not show the block in a Military Warning Area.

11.2 MARINE PROTECTED SPECIES

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

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

BOEM and BSEE issue Notices to Lessees (NTLs), which more fully describe measures implemented in support of the above-mentioned implementing statutes and regulations, as well as measures identified by the U.S. Fish and Wildlife Service and NMFS arising from, among

others, conservation recommendations, rulemakings pursuant to the MMPA, or consultation. The lessee and its operators, personnel, and subcontractors, while undertaking activities authorized under this lease, must implement and comply with the specific mitigation measures outlined in NTL No. 2016-BOEM-G01, "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting;" NTL No. 2016-BOEM-G02, "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program;" and NTL No. 2015-BSEE-G03, "Marine Trash and Debris Awareness and Elimination." At the lessee's option, the lessee, its operators, personnel, and contractors may comply with the most current measures to protect species in place at the time an activity is undertaken under this lease, including but not limited to new or updated versions of the NTLs identified in this paragraph. The lessee and its operators, personnel, and subcontractors will be required to comply with the mitigation measures, identified in the above referenced NTLs, and additional measures in the conditions of approvals for their plans or permits.

SECTION 12

ENVIRONMENTAL MITIGATION MEASURES INFORMATION

12.1 MEASURES TAKEN TO AVOID, MINIMIZE, AND MITIGATE IMPACTS

Murphy will adhere to the requirements as set forth in the following documents, as applicable, to avoid or minimize impacts to any marine and coastal environments and habitats, biota, and threatened and endangered species:

- Appendices to the Biological Opinion on the Federally Regulated Oil and Gas Program in the Gulf of Mexico issued on March 13, 2020, and the amendment issued on April 26, 2021
 - 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”

12.2 INCIDENTAL TAKES

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

- Appendices to the Biological Opinion on the Federally Regulated Oil and Gas Program in the Gulf of Mexico issued on March 13, 2020, and the amendment issued on April 26, 2021
 - 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”

See **Section 6.7** for a list of Threatened and Endangered Species, Critical Habitat and Marine Mammal Information.

SECTION 13

RELATED FACILITIES AND OPERATIONS INFORMATION

13.1 RELATED OCS FACILITIES AND OPERATIONS

The subject well will be protected by a subsea wellhead and tree and will tie-in to the existing Marmalard subsea manifold via a proposed 6.625-inch lease term well jumper pipeline (*to be submitted*) approximately 70 to 90 feet in length to an existing Right-of-Way bulk pipeline which will transport produced hydrocarbons from the manifold to Murphy's A-Delta House FPS in MC 254.

Origination Point	Flow Rates	Shut In Time
MC 255 Well SS003	8000 BOPD/15.4 MMCFD	<20 Minutes

13.2 TRANSPORTATION SYSTEM

Produced hydrocarbons from Murphy's A-Delta House FPS are transported through existing pipeline SN 18814 (gas) and pipeline SN 18815 (oil) for ultimate delivery to shore.

13.3 PRODUCED LIQUID HYDROCARBONS TRANSPORTATION VESSELS

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

SECTION 14

SUPPORT VESSELS AND AIRCRAFT INFORMATION

14.1 GENERAL

The most practical, direct route from the shorebase as permitted by weather and traffic conditions will be utilized. Murphy does not anticipate that these routes will transit within the Rice's whale core area for the operations covered under this plan as designated by the March 13, 2020 NMFS programmatic Biological Opinion. In the event the vessel routes change, BSEE/BOEM will be contacted 15 days in advance.

Information regarding the vessels and aircraft to be used to support the proposed activities is provided in the table below.

Type	Maximum Fuel Tank Capacity	Maximum Number in Area at Any Time	Trip Frequency or Duration
DP Pipelay Vessel	766,099 gals	1	8 days total (only during subsea installation)
Supply boat	275,067 gals	1	8 days total (only during subsea installation)
Helicopter	760 gals	1	As Needed

14.2 DIESEL OIL SUPPLY VESSELS

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

Size of Fuel Supply Vessel (ft)	Capacity of Fuel Supply Vessel	Frequency of Fuel Transfers	Route Fuel Supply Vessel Will Take
260'	4,500 gals	weekly	Shortest route from Shorebase to block

14.3 DRILLING FLUID TRANSPORTATION

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

14.4 SOLID AND LIQUID WASTE TRANSPORTATION

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

14.5 VICINITY MAP

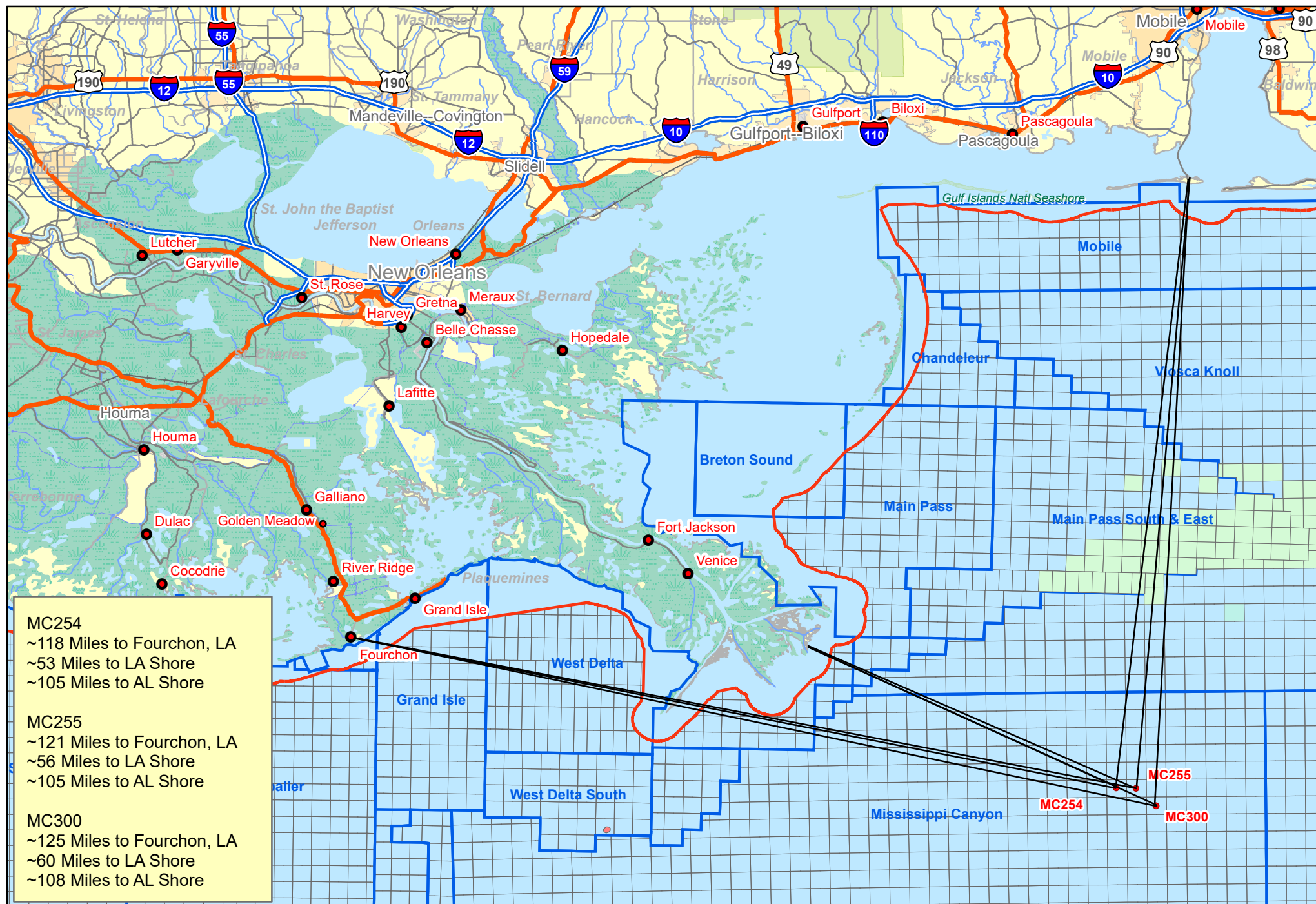
A vicinity map showing the location of the activities proposed herein relative to the shoreline with the distance of the proposed activities from the shoreline and the primary route of the support vessels and aircraft that will be used when traveling between the onshore support facilities and the well is included as **Attachment 14-B**.

ATTACHMENT 14-A - WASTE AND SURPLUS ESTIMATED TO BE TRANSPORTED AND/OR DISPOSED OF ONSHORE **NO DRILLING**

ACTIVITY

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

Projected Generated Waste		Solid and Liquid Wastes Transportation	Waste Disposal		
Type of Waste	Composition		Transport Method	Name/Location of Facility	Amount
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	Newport Environmental Services Inc., Ingleside, TX	X bbl/well	Recycled
Oil-based drilling fluid or mud	NO DRILLING ACTIVITY	NA	NA	NA	NA
Synthetic-based drilling fluid or mud	NO DRILLING ACTIVITY	NA	NA	NA	NA
Cuttings wetted with Water-based fluid	NO DRILLING ACTIVITY	NA	NA	NA	NA
Cuttings wetted with Synthetic-based fluid	NO DRILLING ACTIVITY	NA	NA	NA	NA
Cuttings wetted with oil-based fluids	NO DRILLING ACTIVITY	NA	NA	NA	NA
Will you produce hydrocarbons? If yes fill in for produced sand.					
Produced sand	Oil contaminated produced sand.	N/A	N/A	N/A	N/A
Will you have additional wastes that are not permitted for discharge? If yes, fill in the appropriate rows.					
EXAMPLE: trash and debris (recyclables)	Plastic, paper, aluminum	barge in a storage bin	ARC, New Iberia, LA	X lb/well	Recycled
Trash and debris	Miscellaneous solid trash & debris from operations	Transported by supply vessel in storage bins to Fourchon Shorebase.	Total Waste picks up & transport to River Birch Landfill In Avondale, LA	80 tons/year	Landfill
Used oil	Spent oil from machinery	Transported by supply vessel in 25bbl tanks and/or 550/350 gallon tote tanks to Fourchon Shorebase.	C-Port Stoine or Martin Energy Co. pick up & transport to American Recovery in Houma, LA	100 bbls/year	Recycled
Washwater	Wash water with sand blast material, residue and surfactants	Wash water Transported by supply vessel in 25 bbl cutting boxes or 25 bbl. MPT Tanks	R360 Port Fourchon, La.	200 bbls/year	approved disposal well injection
Spent sand blast material	Spent blasting sand	Transported by supply vessel in chemical tote tanks.	Send sample to Element for Analysis/ American Recovery dispose of at River Birch in Avondale, La.	10 tons/year	Landfill
Chemical product wastes	Spent treatment or damaged chemicals used in operations	Transported by supply vessel in chemical tote tanks.	Returned to chemical supplier or disposed of through approved Vendor (American Recovery)	10 bbls/year	Recycled/Disposal
NOTE: If you will not have a type of waste, enter NA in the row.					



SECTION 15

ONSHORE SUPPORT FACILITIES INFORMATION

15.1 GENERAL

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

Name	Location	Existing/New/Modified
C-Logistics	Fourchon, Louisiana	Existing
ERA Heliport	Fourchon, Louisiana	Existing

15.2 SUPPORT BASE CONSTRUCTION OR EXPANSION

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

15.3 SUPPORT BASE CONSTRUCTION OR EXPANSION TIMETABLE

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

15.4 WASTE DISPOSAL

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

SECTION 16

COASTAL ZONE MANAGEMENT (CZM) INFORMATION

Under direction of the Coastal Zone Management Act (CZMA), the states of Alabama and Louisiana 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 affect the Alabama and Louisiana coastal zones.

Proposed activities are ~108 miles from the Alabama shore and ~60 miles from the Louisiana shore. Measures will be taken to avoid or mitigate the probable impacts. Murphy will operate in compliance with existing federal and state laws, regulations, and resultant enforceable program policies in Alabama's and Louisiana's Coastal Zone Management Programs.

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

A Certificate of Coastal Zone Management Consistency for the state of Louisiana was previously obtained under DOCD, Control No. N-9700. Relevant enforceable policies were considered in certifying consistency for Alabama. A Certificate of Coastal Zone Management Consistency for the state of Alabama is included as **Attachment 16-A**.

COASTAL ZONE MANAGEMENT

CONSISTENCY CERTIFICATION

DEVELOPMENT OPERATIONS COORDINATION DOCUMENT

MISSISSIPPI CANYON BLOCKS 255 / 300

OCS-G 24064 / 22868

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

Murphy Exploration & Production Company - USA

Lessee or Operator

A handwritten signature in black ink, appearing to read "Sara D. [unclear]", is written over a horizontal line.

Certifying Official

04 / 18 / 2023

Date

The policies and corresponding sections within this DOCD identified by the State of Alabama Coastal Area Management Program (ACAMP) as being related to OCS Plans are provided in the table below.

Enforceable Program Policies of the Alabama Coastal Area Management Program (ACAMP)

Policy	Plan Section	Comments
Coastal Resource Use Policies		
Coastal Development		Dock and port facilities in Louisiana will be used. There will be no new construction, dredging, or filling in Alabama state waters. There will be no new commercial development, capital improvements nor employment effects in Alabama's coastal zone.
Mineral Resource Exploration and Extraction		No conflicts with any other mineral resource exploration and extraction are expected. Proposed development operations are approximately 108 miles from the Alabama shore.
Commercial Fishing	9	
Hazard Management	3	A Shallow Hazards Report has previously been submitted to BOEM in order to identify and assess the seafloor and shallow geologic conditions in this block.
Shoreline Erosion	9	
Recreation	9	
Transportation	13	
Natural Resource Protection Policies		
Biological Productivity	9	
Water Quality	9	
Water Resources	9	
Air Quality	8	
Wetlands and Submerged Grassbeds	9	
Beach and Dune Protection	9	
Wildlife Habitat Protection	9	
Endangered Species	9	
Cultural Resources Protection	6	The proposed operations will be conducted from a previously approved surface location as provided from in EP (Control No. R-7056) approved on July 14, 2023.

SECTION 17 ENVIRONMENTAL IMPACT ANALYSIS (EIA)

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

Murphy Exploration & Production Company – USA (Murphy)

Supplemental Development Operations Coordination Document Mississippi Canyon Block 300 OCS-G 22868

(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 ₂ S releases)	Discarded Trash & Debris
Site-specific at Offshore Location						
Designated topographic features		(1)	(1)		(1)	
Pinnacle Trend area live bottoms		(2)	(2)		(2)	
Eastern Gulf live bottoms		(3)	(3)		(3)	
Benthic communities			(4)			
Water quality					X	
Fisheries					X	
Marine Mammals	X(8)				X(8)	X
Sea Turtles	X(8)				X(8)	X
Air quality	X(9)					
Shipwreck sites (known or potential)			(7)			
Prehistoric archaeological sites			(7)		X	
Vicinity of Offshore Location						
Essential fish habitat					X(6)	
Marine and pelagic birds	X				X	X
Public health and safety					(5)	
Coastal and Onshore						
Beaches					X(6)	X
Wetlands					X(6)	
Shore birds and coastal nesting birds					X(6)	X
Coastal wildlife refuges					X	
Wilderness areas					X	

Footnotes for Environmental Impact Analysis Matrix

- 1) Activities that may affect a marine sanctuary or topographic feature. Specifically, if the well or platform site or any anchors will be on the seafloor within the:
 - 4-mile zone of the Flower Garden Banks, or the 3-mile zone of Stetson Bank;
 - 1000-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 H₂S concentrations greater than 500 ppm might be encountered.
- 6) All activities that could result in an accidental spill of produced liquid hydrocarbons or diesel fuel that you determine would impact these environmental resources. If the proposed action is located a sufficient distance from a resource that no impact would occur, the EIA can note that in a sentence or two.
- 7) All activities that involve seafloor disturbances, including anchor emplacements, in any OCS block designated by the BOEM as having high probability for the occurrence of shipwrecks or prehistoric sites, including such blocks that will be affected that are adjacent to the lease block in which your planned activity will occur. If the proposed activities are located a sufficient distance from a shipwreck or a prehistoric site that no impact would occur, the EIA can note that in a sentence or two.
- 8) All activities that you determine might have an adverse effect on endangered or threatened marine mammals or sea turtles or their critical habitats.
- 9) Production activities that involve transportation of produced fluids to shore using shuttle tankers or barges.

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	<i>Trichechus manatus latirostris</i>	T	--	X	Florida (peninsular)	Coastal Louisiana, Mississippi, Alabama, and Florida
Whale, Blue	<i>Balaenoptera masculus</i>	E	X ¹	--	None	GOM
Whale, Bryde’s ⁴	<i>Balaenoptera brydei/edeni</i>	E	X	--	None	Eastern GOM
Whale, Fin	<i>Balaenoptera physalus</i>	E	X ¹	--	None	GOM
Whale, Humpback	<i>Megaptera novaeangliae</i>	E	X ¹	--	None	GOM
Whale, North Atlantic Right	<i>Eubalaena glacialis</i>	E	X ¹	--	None	GOM
Whale, Rice’s ⁴	<i>Balaenoptera ricei</i>	E	X	--	None	GOM
Whale, Sei	<i>Balaenopiera borealis</i>	E	X ¹	--	None	GOM
Whale, Sperm	<i>Physeter catodon</i> (= <i>macrocephalus</i>)	E	X	--	None	GOM
Terrestrial Mammals						
Mouse, Beach (Alabama, Choctawatchee, Perdido Key, St. Andrew)	<i>Peromyscus polionotus</i>	E	-	X	Alabama, Florida (panhandle) beaches	Alabama, Florida (panhandle) beaches
Birds						
Plover, Piping	<i>Charadrius melodus</i>	T	-	X	Coastal Texas, Louisiana, Mississippi, Alabama, and Florida (panhandle)	Coastal GOM
Crane, Whooping	<i>Grus Americana</i>	E	-	X	Coastal Texas	Coastal Texas and Louisiana
Crane, Mississippi sandhill	<i>Grus canadensis pulla</i>	E	-	X	Coastal Mississippi	Coastal Mississippi
Curlew, Eskimo	<i>Numenius borealis</i>	E	-	X	none	Coastal Texas
Falcon, Northern Aplomado	<i>Falco femoralis septentrionalis</i>	E	-	X	none	Coastal Texas

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in the Gulf of Mexico	Gulf of Mexico Range
			Lease Area	Coastal		
Knot, Red	<i>Calidris canutus rufa</i>	T	-	X	None	Coastal GOM
Stork, Wood	<i>Mycteria americana</i>	T	-	X	None	Coastal Alabama and Florida
Reptiles						
Sea Turtle, Green	<i>Chelonia mydas</i>	T/E ³	X	X	None	GOM
Sea Turtle, Hawksbill	<i>Eretmochelys imbricata</i>	E	X	X	None	GOM
Sea Turtle, Kemp's Ridley	<i>Lepidochelys kempli</i>	E	X	X	None	GOM
Sea Turtle, Leatherback	<i>Dermochelys coriacea</i>	E	X	X	None	GOM
Sea Turtle, Loggerhead	<i>Caretta caretta</i>	T	X	X	Texas, Louisiana, Mississippi, Alabama, Florida	GOM
Fish						
Sturgeon, Gulf	<i>Acipenser oxyrinchus (=oxyrhynchus) desotoi</i>	T	X	X	Coastal Louisiana, Mississippi, Alabama, and Florida (panhandle)	Coastal Louisiana, Mississippi, Alabama, and Florida (panhandle)
Shark, Oceanic Whitetip	<i>Carcharhinus longimanus</i>	E	X	-	None	GOM
Sawfish, Smalltooth	<i>Pristis pectinate</i>	E	-	X	None	Florida
Grouper, Nassau	<i>Epinephelus striatus</i>	T	-	X	None	Florida
Ray, Giant Manta	<i>Manta birostris</i>	E	X	--	None	GOM
Corals						
Coral, Elkhorn	<i>Acopora palmate</i>	T	X ²	X	Florida Keys and Dry Tortugas	Flower Garden Banks, Florida, and the Caribbean
Coral, Staghorn	<i>Acopora cervicornis</i>	T	X	X	Florida	Flower Garden Banks, Florida, and the Caribbean
Coral, Boulder Star	<i>Orbicella franksi</i>	T	X	X	none	Flower Garden Banks and Florida
Coral, Lobed Star	<i>Orbicella annularis</i>	T	X	X	None	Flower Garden Banks and Caribbean
Coral, Mountainous Star	<i>Orbicella faveolate</i>	T	X	X	None	Flower Garden Banks and Gulf of Mexico
Coral, Rough Cactus	<i>Mycetophyllia ferox</i>	T	-	X	None	Florida and Southern Gulf of Mexico

Abbreviations: E = Endangered; T = Threatened

1 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.

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

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

4 The Bryde's whale, also known as the Bryde's whale complex, is a collection of baleen whales that are still being researched to determine if they are the same species or if they are individual species of whales. In 2021, the Rice's whale, formerly known as the Gulf of Mexico Bryde's whale, was determined to be a separate species. There are less than 100 Rice's whales living in the Gulf of Mexico year-round. These whales retain all the protections of the Gulf of Mexico Bryde's whale under the Endangered Species Act while the regulations are being updated to reflect the name change. Other Bryde's whales are migratory and may enter the Gulf of Mexico; however, the migratory Bryde's whales are rare or extralimital in the Gulf of Mexico and are unlikely to be present in the lease area.

(B) Analysis

Site-Specific at Mississippi Canyon Block 300

Proposed operations consist of the production of MC 255 (MC 300 SL), Well No. SS003, installation of one (1) 6.625-inch lease term jumper pipeline in MC 300, and provide for future well intervention activities for MC 255, Well No. SS003.

Operations will be conducted with a dynamically-positioned Pipelay Vessel & Light Construction Vessel.

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 include accidents.

Mississippi Canyon Block 300 is 82.6 miles from the closest designated Topographic Features Stipulation Block (Sackett Bank); therefore, no adverse impacts are expected.

Accidents: It is unlikely that an accidental surface or subsurface spill would occur from the proposed activities (refer to statistics in **Item 5**, Water Quality). Oil spills cause damage to benthic organisms only if the oil contacts the organisms. Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 10-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 Murphy's Regional OSRP (refer to information submitted in **Section 9**).

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 Murphy's Regional OSRP (refer to information submitted in **Section 9**), impacts to topographic features from surface or sub-surface oil spills are not expected.

There are no other IPFs (including emissions, effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or 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 include emissions (noise / sound) and accidents.

Mississippi Canyon Block 300 is 34.5 miles from the closest live bottom (pinnacle trend) area; therefore, no adverse impacts are expected.

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, Mississippi Canyon Block 300 is 34.5 miles from the closest live bottom (pinnacle trend) area; therefore, no adverse impacts are expected.

Accidents: It is unlikely that an accidental surface or subsurface spill would occur from the proposed activities (refer to statistics in **Item 5**, Water Quality). Oil spills have the potential to foul benthic communities and cause lethal and sublethal effects on live bottom organisms. Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 10-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 activities proposed in this plan will be covered by Murphy's Regional OSRP (refer to information submitted in **Section 9**).

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 effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed activities that are likely to impact a live bottom (pinnacle trend) area.

3. Eastern Gulf Live Bottoms

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

Physical disturbances to the seafloor: Mississippi Canyon Block 300 is not located in an area characterized by the existence of live bottoms, and this lease does not contain a Live-Bottom Stipulation requiring a photo documentation survey and survey report. Additionally, a dynamically-positioned Pipelay Vessel & Light Construction Vessel is being used for the proposed activities; 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, Mississippi Canyon Block 300 is not located in an area characterized by the existence of live bottoms; therefore, no adverse impacts are expected.

Accidents: It is unlikely that an accidental surface or subsurface spill would occur from the proposed activities (refer to statistics in **Item 5**, Water Quality). Oil spills cause damage to live bottom organisms only if the oil contacts the organisms. Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 10-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 activities proposed in this plan by Murphy's Regional OSRP (refer to information submitted in **Section 9**).

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 effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed activities that are likely to impact an Eastern Gulf live bottom area.

4. Deepwater Benthic Communities

There are no IPFs (including emissions, noise / sound, physical disturbances to the seafloor, wastes sent to shore for treatment or disposal, and accidents) from the proposed activities that are likely to impact deepwater benthic communities.

Mississippi Canyon Block 300 is located in water depths of 300 meters or greater. At such depth high-density, deepwater benthic communities may sometimes be found. However, Mississippi Canyon Block 300 is approximately 18.1 miles from a known deepwater benthic community site (MC426), listed in NTL 2009-G40. Additionally, a dynamically-positioned Pipelay Vessel & Light Construction Vessel is being used for the proposed activities; therefore, only an insignificant amount of seafloor will be disturbed. Due to the distance from the closest known deepwater benthic community and because physical disturbances to the seafloor will be minimized by the use of a dynamically-positioned Pipelay Vessel & Light Construction Vessel, Murphy's proposed operations in Mississippi Canyon Block 300 are not 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

Potential IPFs that could result in water quality degradation from the proposed operations in Mississippi Canyon Block 300 include physical disturbances to the seafloor 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. Since a dynamically-positioned Pipelay Vessel & Light Construction Vessel is being used for the proposed activities; therefore, only an insignificant amount of seafloor will be disturbed.

Accidents: Impact-producing factors related to OCS oil- and gas-related accidental events primarily involve drilling fluid spills, chemical and waste 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 ($\geq 1,000$ 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 activities. 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 6 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's 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 activities proposed in this plan will be covered by Murphy's Regional Oil Spill Response Plan, which discusses potential response actions in more detail (refer to information submitted in **Section 9**).

There are no other IPFs (including emissions, physical disturbances to the seafloor, effluents and wastes sent to shore for treatment or disposal) from the proposed activities that are likely to cause impacts to 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 that could cause impacts to fisheries as a result of the proposed operations in Mississippi Canyon Block 300 include physical disturbances to the seafloor, emissions (noise / sound), 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 dynamically-positioned Pipelay Vessel & Light Construction Vessel is being used for the proposed activities; 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 $\frac{1}{2}$ and $\frac{1}{4}$ 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, Murphy 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 activities (refer to **Item 5**, Water Quality). The effects of oil on mobile adult finfish or shellfish would likely be sublethal and the extent of damage would be reduced to the capacity of adult fish and shellfish to avoid the spill, to metabolize hydrocarbons, and to excrete both metabolites and parent compounds. The activities proposed in this plan will be covered by Murphy's Regional OSRP (refer to information submitted in **Section 9**).

There are no IPFs (including effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed activities 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 Rice's whale (née Gulf of Mexico 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 Rice's whale can be found in **Item 20.1** below. Potential IPFs that could cause impacts to marine mammals as a result of the proposed operations in Mississippi Canyon Block 300 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 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 Rice'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. There were also 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 Rice's whale.

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 marine mammals being subject to the increased noise level of a service vessel in very close proximity.

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

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

Discarded trash and debris: Both entanglement in and ingestion of debris have caused the death or serious injury of marine mammals (Laist, 1997; MMC, 1999). The limited amount of marine debris, if any, resulting from the proposed activities is not expected to substantially harm marine mammals. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V, 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).

Murphy 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. Murphy 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 Murphy 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.nmfs@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.

These proposed operations may utilize a moon pool(s) to conduct various subsea activities. Details on moon pool descriptions, operations, monitoring, and reporting for potential observations and interactions with marine mammals are included in **Section 10** of the Plan. Murphy will contact NMFS at nmfs.psoreview@noaa.gov and BSEE at protectedspecies@bsee.gov and 985-722-7902 for additional guidance and incident report information as indicated in **Section 10** of the Plan.

Oil spills have the potential to cause sublethal oil-related injuries and spill-related deaths to marine mammals. However, it is unlikely that an accidental oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Oil spill response activities may increase vessel traffic in the area, which could 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 Murphy’s OSRP is considered to be low when compared with the constituents and fractions of crude oils and diesel products. The activities

proposed in this plan will be covered by Murphy's OSRP (refer to information submitted in accordance with **Section 9**).

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 and effluents) from the proposed activities 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; Lohoefer 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 that could cause impacts 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 vessels and helicopters may elicit a startle reaction from sea turtles, but this is a temporary disturbance. As a result, sound sources associated with vessel movement as part of the proposed operations are not likely to adversely affect sea turtles. Exposure to sound from pile driving activities may result in hearing loss and temporary loss of available habitat for sea turtles, including some local displacement from the area for as long as the pile driving activity is occurring. The impact of this exposure is not anticipated to be significant for adult sea turtles because the continuous "banging" of a pile should provide ample warning to avoid the immediate pile-driving area. Juvenile sea turtles may be motivated to remain in *Sargassum* habitat and may not leave the area, which could cause hearing loss; the juveniles that do leave the area may be adversely affected by being displaced from *Sargassum* habitat. The annual number of predicted disturbances of oceanic juveniles is relatively low.

Discarded trash and debris: Both entanglement in, and ingestion of, debris have caused the death or serious injury of sea turtles (Balazs, 1985). The limited amount of marine debris, if any,

resulting from the proposed activities is not expected to substantially harm sea turtles. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V, 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).

Murphy 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. Murphy 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 Murphy 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.nmfs@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.

These proposed operations may utilize a moon pool(s) to conduct various subsea activities. Details on moon pool descriptions, operations, monitoring, and reporting for potential observations and interactions with sea turtles are included in **Section 10** of the Plan. Murphy will contact NMFS at nmfs.psoreview@noaa.gov and BSEE at protectedspecies@bsee.gov and 985-722-7902 for additional guidance and incident report information as indicated in **Section 10** of the Plan. The procedures found in Appendix J of the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion will be employed to free entrapped or entangled marine life safely.

All sea turtle species and their life stages are vulnerable to the harmful effects of oil through direct contact or by fouling of their food. Exposure to oil can be fatal, particularly to juveniles and hatchlings. However, it is unlikely that an accidental oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Oil spill response activities may increase vessel traffic in the area, which could add to the possibility of collisions with sea turtles. The activities proposed in this plan will be covered by Murphy's Regional Oil Spill Response Plan (refer to information submitted in accordance with **Section 9**).

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 and effluents) from the proposed activities that are likely to impact sea turtles.

9. Air Quality

Potential IPFs that could cause impacts to air quality as a result of the proposed operations include accidents.

Mississippi Canyon Block 300 is located 80 miles from the Breton Wilderness Area and 58.5 miles from shore. Applicable emissions data is included in **Section 8** of the Plan.

There would be a limited degree of air quality degradation in the immediate vicinity of the proposed activities. Plan Emissions for the proposed activities do not exceed the annual exemption levels as set forth by BOEM. Accidents and blowouts can release hydrocarbons or chemicals, which could cause the emission of air pollutants. However, these releases would not impact onshore air quality because of the prevailing atmospheric conditions, emission height, emission rates, and the distance of Mississippi Canyon Block 300 from the coastline. There are no other IPFs (including effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed activities which would impact air quality.

10. Shipwreck Sites (known or potential)

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

The proposed operations will be conducted from a previously approved surface location as provided for in EP (Control No. R-7056), approved on July 9, 2021; therefore, in accordance with NTL No. 2008-G05, “Shallow Hazards Program,” a site-specific shallow hazards assessment is not provided.

Potential IPFs that could impact known or unknown shipwreck sites as a result of the proposed operations in Mississippi Canyon Block 300 include disturbances to the seafloor and accidents. Mississippi Canyon Block 300 is not located in or adjacent to an OCS block designated by BOEM as having a high probability for occurrence of shipwrecks. Should Murphy 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, and accidents) from the proposed activities that are likely to impact shipwreck sites.

Physical disturbances to the seafloor: A dynamically-positioned Pipelay Vessel & Light Construction Vessel is being used for the proposed activities; therefore, only an insignificant amount of seafloor will be disturbed. Because physical disturbances to the seafloor will be minimized by the use of a dynamically-positioned Pipelay Vessel & Light Construction Vessel, Murphy’s proposed operations in Mississippi Canyon Block 300 are not likely to cause impacts to shipwreck sites.

Accidents: An accidental oil spill has the potential to cause some detrimental effects to shipwreck sites if the release were to occur subsea. However, it is unlikely that an accidental oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). The activities proposed in this plan will be covered by Murphy’s Regional Oil Spill Response Plan (refer to information submitted in accordance with **Section 9**).

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

11. Prehistoric Archaeological Sites

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

The proposed operations will be conducted from a previously approved surface location as provided for in EP (Control No. R-7056), approved on July 9, 2021; therefore, in accordance with NTL No. 2008-G05, “Shallow Hazards Program,” a site-specific shallow hazards assessment is not provided.

Potential IPFs that could cause impacts to prehistoric archaeological sites as a result of the proposed operations in Mississippi Canyon Block 300 include disturbances to the seafloor and accidents. Mississippi Canyon Block 300 is located outside the Archaeological Prehistoric high probability line, therefore, no adverse impacts are expected. Should Murphy 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: A dynamically-positioned Pipelay Vessel & Light Construction Vessel is being used for the proposed activities; therefore, only an insignificant amount of seafloor will be disturbed. Because physical disturbances to the seafloor will be minimized by the use of a dynamically-positioned Pipelay Vessel & Light Construction Vessel, Murphy’s proposed operations in Mississippi Canyon Block 300 are not likely to cause impacts to prehistoric archaeological sites.

Accidents: An accidental oil spill has the potential to cause some detrimental effects to prehistoric archaeological sites if the release were to occur subsea. However, it is unlikely that an accidental oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). The activities proposed in this plan will be covered by Murphy’s Regional Oil Spill Response Plan (refer to information submitted in accordance with **Section 9**).

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

Vicinity of Offshore Location

12. Essential Fish Habitat (EFH)

Potential IPFs that could cause impacts to EFH as a result of the proposed operations in Mississippi Canyon Block 300 include 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 dynamically-positioned Pipelay Vessel & Light Construction Vessel is being used for the proposed activities; therefore, only an insignificant amount of seafloor will be disturbed. Therefore, the bottom disturbing activities from the proposed operations should have a negligible impact on EFH.

Accidents: An accidental oil spill has the potential to cause some detrimental effects on EFH. Oil spills that contact coastal bays and estuaries, as well as OCS waters when pelagic eggs and larvae are present, have the greatest potential to affect fisheries. However, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). The activities proposed in this plan will be covered by Murphy's Regional OSRP (refer to information submitted in **Section 9**).

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

13. Marine and Pelagic Birds

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

Emissions:

Air Emissions

Emissions of pollutants into the atmosphere from these activities 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 activities (refer to **Item 5**, Water Quality). Marine and pelagic birds feeding at the spill location may experience chronic, nonfatal, physiological stress. It is expected that few, if any, coastal and marine birds would be affected to that extent. The activities proposed in this plan will be covered by Murphy's Regional OSRP (refer to information submitted in **Section 9**).

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, 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).

Murphy 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. Murphy 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 Murphy management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE. Debris, if any, from these proposed activities will seldom interact with marine and pelagic birds; therefore, the effects will be negligible.

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, and wastes sent to shore for treatment or disposal) from the proposed activities that are likely to impact marine and pelagic birds.

14. Public Health and Safety Due to Accidents.

There are no IPFs (including emissions, effluents, physical disturbances to the seafloor, wastes sent to shore for treatment or disposal and accidents, including an accidental H₂S release) from the proposed activities which could cause impacts to public health and safety. In accordance with NTL No.’s 2008-G04, 2009-G27, and 2009-G31, sufficient information is included in **Section 4** to justify our request that our proposed activities be classified by BSEE as H₂S absent.

Coastal and Onshore

15. Beaches

Potential IPFs from the proposed activities that could cause impacts to beaches 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 (58.5 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. The activities proposed in this plan will be covered by Murphy’s Regional OSRP (refer to information submitted in **Section 9**).

Discarded trash and debris: Trash on the beach is recognized as a major threat to the enjoyment and use of beaches. There will only be a limited amount of marine debris, if any, resulting from the proposed activities. Operators are prohibited from deliberately discharging debris as mandated

by MARPOL-Annex V, 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).

Murphy 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. Murphy 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 Murphy 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 emissions, effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed activities that are likely to impact beaches.

16. Wetlands

Potential IPFs from the proposed activities that could cause impacts to wetlands include accidents and discarded trash and debris.

Accidents: Oil spills could cause impacts to wetlands; however, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Due to the distance from shore (58.5 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Murphy’s Regional OSRP (refer to information submitted in **Section 9**).

Discarded trash and debris: There will only be a limited amount of marine debris, if any, resulting from the proposed activities. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V, 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).

Murphy 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. Murphy 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 Murphy 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 emissions, effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed activities that are likely to impact wetlands.

17. Shore Birds and Coastal Nesting Birds

Potential IPFs that could cause impacts 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 activities (refer to **Item 5**, Water Quality). Given the distance from shore (58.5 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Murphy’s Regional OSRP (refer to information submitted in **Section 9**).

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, 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).

Murphy 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. Murphy 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 Murphy 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 emissions, effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed activities that are likely to impact shore birds and coastal nesting birds.

18. Coastal Wildlife Refuges

Potential IPFs that could cause impacts 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 activities could cause impacts to coastal wildlife refuges. However, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Due to the distance from shore (58.5 miles) and the response capabilities that would be implemented, no impacts are expected. The activities proposed in this plan will be covered by Murphy’s Regional OSRP (refer to information submitted in **Section 9**).

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).

Murphy 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. Murphy 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 Murphy 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 emissions, effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed activities that are likely to impact coastal wildlife refuges.

19. Wilderness Areas

Potential IPFs that could cause impacts 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 activities could cause impacts to wilderness areas. However, it is unlikely that an oil spill would occur from the proposed activities (refer to **Item 5**, Water Quality). Due to the distance from the nearest designated Wilderness Area (80 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. The activities proposed in this plan will be covered by Murphy’s Regional OSRP (refer to information submitted in **Section 9**).

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).

Murphy 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. Murphy 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 Murphy 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 emissions, effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed activities that are likely to impact wilderness areas.

20. Other Environmental Resources Identified

20.1 – Rice’s Whale (née Gulf of Mexico Bryde’s Whale)

The Bryde’s whale, also known as the Bryde’s whale complex, is a collection of baleen whales that are still being researched to determine if they are the same species or if they are individual species of whales. In 2021, the Rice’s whale, formerly known as the Gulf of Mexico Bryde’s whale, was determined to be a separate species from other Bryde’s whales. There are less than 100 Rice’s whales living in the Gulf of Mexico year-round. These whales retain all the protections of the Gulf of Mexico Bryde’s whale under the Endangered Species Act while the regulations are being updated to reflect the name change.

The Rice’s whale (née Gulf of Mexico 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 Rice’s whale area is over 21.3 miles from the proposed operations. Additionally, vessel traffic associated with the proposed operations will not flow through the Rice’s whale area. Therefore, there are no IPFs from the proposed activities that are likely to impact the Rice’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 from the proposed activities that could cause impacts to the Gulf sturgeon 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, Murphy 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 (103.5 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 activities proposed in this plan will be covered by Murphy's Regional OSRP (refer to information submitted in **Section 9**).

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 activities. 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).

Murphy 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. Murphy 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 Murphy 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 activities 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. IPFs that could cause impacts to oceanic whitetip sharks as a result of the proposed operations in Mississippi Canyon Block 300 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.nmfs@noaa.gov. After making the appropriate notifications, Murphy 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.nmfs@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 activities (refer to **Item 5**, Water Quality). The activities proposed in this plan will be covered by Murphy's Regional OSRP (refer to information submitted in **Section 9**).

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 activities. 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).

Murphy 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. Murphy 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 Murphy 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 activities that are likely to impact fisheries.

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. IPFs that could cause impacts to giant manta rays as a result of the proposed operations in Mississippi Canyon Block 300 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, Murphy 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 (234.2 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 activities (refer to **Item 5**, Water Quality). The activities proposed in this plan will be covered by Murphy's Regional OSRP (refer to information submitted in **Section 9**).

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 activities. 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).

Murphy 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. Murphy 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 Murphy 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 activities that are likely to impact fisheries.

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 104.8 miles from Mississippi Canyon Block 300; 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 faveolata*). Potential IPFs from the proposed activities that could cause impacts to protected corals include accidents.

Accidents: It is unlikely that an accidental surface or subsurface spill would occur from the proposed activities (refer to statistics in **Item 5, Water Quality**). Oil spills cause damage to corals only if the oil contacts the organisms. Due to the distance from the Flower Garden Banks (234.2 miles) and other critical coral habitats, no adverse impacts are expected. The activities proposed in this plan will be covered by Murphy's Regional OSRP (refer to information submitted in **Section 9**).

There are no other IPFs (including emissions, effluents, physical disturbances to the seafloor, and wastes sent to shore for treatment or disposal) from the proposed activities 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 location of Mississippi Canyon Block 300 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 activities proposed in this plan.

(C) IMPACTS ON PROPOSED ACTIVITIES

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

(D) ENVIRONMENTAL HAZARDS

During the hurricane season, June through November, the Gulf of Mexico is impacted by an average of ten tropical storms (39-73 mph winds), of which six become hurricanes (> 74 mph winds). Due to its location in the Gulf, Mississippi Canyon Block 300 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. Platform / structure Installation
Operator will not conduct platform / structure installation operations during Tropical Storm or Hurricane threat.
2. Pipeline Installation
Operator will not conduct pipeline installation operations during Tropical Storm or Hurricane threat.

(E) ALTERNATIVES

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

(F) MITIGATION MEASURES

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

(G) CONSULTATION

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

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

- Hazard Surveys

SECTION 18

ADMINISTRATIVE INFORMATION

18.1 EXEMPTED INFORMATION DESCRIPTION

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

18.2 BIBLIOGRAPHY

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