UNITED STATES GOVERNMENT May 11, 2021
MEMORANDUM

To: Public Information

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

Subject: Public Information copy of plan

Control #	-	N-10164
Type	-	Initial Exploration Plan
Lease(s)	-	OCS-G 35080 Block - 271 Walker Ridge Area OCS-G 35733 Block - 315 Walker Ridge Area OCS-G 36084 Block - 316 Walker Ridge Area
Operator	-	Equinor Gulf of Mexico LLC
Description	-	Wells K, K-1, K-2, K-3, S & W
Rig Type	-	Drillship

Attached is a copy of the subject plan.

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

Nicole Martinez
Plan Coordinator

PUBLIC COPY
April 2021

INITIAL EXPLORATION PLAN

Walker Ridge Blocks 271, 315 and 316
Leases OCS-G 35080, 35733 and 36084

Monument Prospect
Affected State: Louisiana

Estimated Startup Date: November 15, 2021

SUBMITTED BY:
Equinor Gulf of Mexico LLC
2107 CityWest Boulevard
Houston, Texas. 77042
Erin Moore
EMOOR@equinor.com

AUTHORIZED REPRESENTATIVE:
Kelley Pisciola
J. Connor Consulting, Inc.
19219 Katy Freeway, Suite 200
Houston, Texas 77094
(281) 698-8519
Kelley.pisciola@jccteam.com

TABLE OF CONTENTS

SECTION ATTACHMENTS

Section 1	**Plan Contents**
1-A	OCS Plan Information Form
1-B	Well Location Plat
1-C	Bathymetry Map
1-D	Pay.gov Receipt
Section 3	**Geological, Geophysical Information**
3-A	Structure Contour Maps *(Proprietary Copy Only)*
3-B	Interpreted Seismic Lines *(Proprietary Copy Only)*
3-C	Geological Structure Cross Sections *(Proprietary Copy Only)*
3-D	Shallow Hazard Assessment
3-D	High-Resolution Seismic Lines
3-E	Stratigraphic Column *(Proprietary Copy Only)*
Section 6	**Wastes and Discharges Information**
6-A	Wastes You Will Generate, Treat and Downhole Dispose or Discharge to the GOM
Section 7	**Air Emissions Information**
7-A	Emissions Worksheets
Section 8	**Oil Spill Information**
8-A	Oil Spill Response Discussion
Section 12	**Support Vessels and Aircraft Information**
12-A	Waste You Will Transport and/or Dispose Onshore
12-B	Vicinity Map
Section 14	**Coastal Zone Management Act Information**
14-A	Coastal Zone Consistency Certification
Section 15	**Environmental Impact Analysis (EIA)**
15-A	Environmental Impact Analysis (EIA)

SECTION 1
PLAN CONTENTS

1.1 PLAN INFORMATION

Equinor Gulf of Mexico LLC (Equinor) is the designated operator of the leases included in this plan. Walker Ridge (WR) Blocks 271 (OCS-G 35080), 315 (OCS-G 35733) and 316 (OCS-G 36084) are part of the Monument Prospect.

An Initial Exploration Plan (EP) for the Monument Prospect, WR Blocks 271 and 272 (Control No. N-9886), and Revised EPs (Control Nos. R-6406 and R-6412) were previously approved by the Bureau of Ocean Energy Management (BOEM) on September 1, 2015, October 23, 2015 and November 4, 2015 respectively. Further, BOEM approved Initial EP (Control No. N-10060), WR Blocks 272 and 316 on August 28, 2019.

The Monument exploratory well WR 272, Well No. 001 was drilled and abandoned at the 'G' Well Location approved in Initial EP N-10060.

Under this Exploration Plan, Equinor proposes to drill and temporarily or permanently abandon Well Locations 'K', 'S' and 'W', WR 315 (Surface Location) / WR 271 (Bottom Hole Location). Well Location 'W' is a mirror location of Well Location 'K' and is included to provide an alternate wellsite should complications occur while drilling the planned 'K' Location.

Equinor further proposes to drill three sidetracks from the proposed 'K' surface location, WR 315. Sidetrack 'K' ST1 is proposed to bottomhole in WR 315, Sidetrack 'K' ST2 is proposed to bottomhole in WR 316, and Sidetrack 'K' ST3 is proposed to bottomhole in WR 271.

The wells will be drilled with a dynamically positioned drillship MODU, and are located in approximately 6,543 feet of water. Equinor is not proposing any new pipelines expected to make landfall.

The operations proposed will not utilize pile-driving.

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

1.2 LOCATION

Well Location Plats depicting the surface locations and bottomhole locations of the proposed wells, measured depths/true vertical depths and water depths are included as **Attachment 1-B**.

No anchors are associated with the activities proposed in this plan. A Bathymetry Map depicting the surface locations and water depths of the proposed wells is included as **Attachment 1-C**.

1.3 SAFETY AND POLLUTION PREVENTION FEATURES

Equinor proposes to drill the wells with a dynamically positioned drillship which is equipped with a Subsea BOP. Once a rig is determined, BOP information and schematics will be included as a part of the Application for Permit to Drill.

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

Safety features on the drilling unit will include well control, pollution prevention, and blowout prevention equipment as described in BSEE regulations 30 CFR 250 C, D, E, O, Q and S; and as further clarified by BSEE Notices to Lessees, and current policy making invoked by the BSEE, Environmental Protection Agency (EPA) and the USCG.

Pollution prevention measures include installation of curbs, gutters, drip pans, and drains on drilling deck areas to collect all contaminants and debris. Compliance will be maintained with the EPA NPDES Permit. The rig will be monitored daily and any waste or fuel resulting in pollution of the Gulf waters will be reported to the representative in charge for immediate isolation and correction of the problem. All spills will be reported to the appropriate governmental agencies.

1.4 STORAGE TANKS AND PRODUCTION VESSELS

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

Type of Storage Tank	Type of Facility	Tank Capacity (bbl)	Number of Tanks	Total Capacity (bbl)	Fluid Gravity (API)
Fuel oil	DP Drillship	34,721	1	34,721	28°
Crude oil		125,000	1	125,000	32°
Base oil		11,070	2	22,140	32°
Dirty oil		43	1	43	32°
Sludge		82	2	164	NA

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

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

1.7 COST RECOVERY FEE

Documentation of the $7,346.00 cost recovery fee payment is included as **Attachment 1-D.**

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:	XX	Exploration Plan (EP)		Development Operations Coordination Document (DOCD)

Company Name: Equinor Gulf of Mexico LLC	BOEM Operator Number: 02748
Address: 2107 CityWest Blvd.	Contact Person: Kelley Pisciola
Houston, Texas 77042	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	$7,346.00	Receipt No.	26RR52P7

Project and Worst Case Discharge (WCD) Information

Leases: OCS-G 35080, 35733, 36084	Areas: Walker Ridge	Blocks: 271, 315 and 316	Project Name: Monument

Objectives	X	Oil		Gas		Sulphur		Salt	Onshore Support Base: Fourchon, LA

Platform / Well Name: Well Location G	Total Volume of WCD: 17,410,184 bbls	API Gravity: 34°
Distance to Closest Land (Miles): 170 miles	Volume from uncontrolled blowout: 162,712 BOPD	

Have you previously provided information to verify the calculations and assumptions for your WCD?	XX	Yes		No
If so, provide the Control Number of the EP or DOCD with which this information was provided	N-10060			
Do you propose to use new or unusual technology to conduct your activities?		Yes	XX	No
Do you propose to use a vessel with anchors to install or modify a structure?		Yes	XX	No
Do you propose any facility that will serve as a host facility for deepwater subsea development?		Yes	XX	No

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

Proposed Activity	Start Date	End Date	No. of Days
Drill and TA/PA Well Location K	11/15/2021	03/15/2022	121
Sidetrack Drill and TA/PA Well Location K-ST1	03/16/2022	05/30/2022	75
Sidetrack Drill and TA/PA Well Location K-ST2	05/31/2022	08/14/2022	75
Sidetrack Drill and TA/PA Well Location K-ST3	08/15/2022	10/29/2022	75
Drill and TA/PA Well Location S	05/01/2023	08/29/2023	121
Drill and TA/PA Well Location W*	03/16/2024	07/14/2024	121

Note: Well Location Respud W is a mirror location and intended as a re-spud location only.

Description of Drilling Rig

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

Drilling Rig Name (If known):

Description of Structure

Description of Lease Term Pipelines

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

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): Location K					Previously reviewed under an approved EP or DOCD?		Yes	XX	No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						XX	Yes		No

WCD Info	For wells, volume of uncontrolled blowout (Bbls/Day): 162,712	For structures, volume of all storage and pipelines (Bbls): NA	API Gravity of fluid	34°

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS-G 35733		OCS OCS
Area Name	Walker Ridge		
Block No.	315		
Blockline Departures (in feet)	N/S Departure: 2,858’ FNL	N/S Departure:	N/S Departure F __ L N/S Departure F __ L N/S Departure F __ L
	E/W Departure: 2,399’ FEL	E/W Departure:	E/W Departure F __ L E/W Departure F __ L E/W Departure F __ L
Lambert X-Y coordinates	X: 2,104,320.6’	X:	X: X: X:
	Y: 9,675,382.2’	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude: 26° 39’ 25.0590” N	Latitude:	Latitude Latitude Latitude
	Longitude: 91° 34’ 45.2383” W	Longitude:	Longitude Longitude Longitude

Water Depth (Feet): 6,543’	MD (Feet):	TVD (Feet):	MD (Feet): MD (Feet): MD (Feet):	TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet:	NA			

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
NA	NA	NA	X: NA	Y: NA	NA
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): Location K ST-1				Previously reviewed under an approved EP or DOCD?		Yes	XX	No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.			
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						XX	Yes		No

WCD Info	For wells, volume of uncontrolled blowout (Bbls/Day): 162,712 BOPD	For structures, volume of all storage and pipelines (Bbls): NA	API Gravity of fluid	34°

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS-G 35733		OCS OCS
Area Name	Walker Ridge		
Block No.	315		
Blockline Departures (in feet)	N/S Departure: 2,858’ FNL	N/S Departure:	N/S Departure F __ L N/S Departure F __ L N/S Departure F __ L
	E/W Departure: 2,399’ FEL	E/W Departure:	E/W Departure F __ L E/W Departure F __ L E/W Departure F __ L
Lambert X-Y coordinates	X: 2,104,320.6’	X:	X: X: X:
	Y: 9,675,382.2’	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude: 26° 39’ 25.0590” N	Latitude:	Latitude Latitude Latitude
	Longitude: 91° 34’ 45.2383” W	Longitude:	Longitude Longitude Longitude

Water Depth (Feet): 6,543’	MD (Feet):	TVD (Feet):	MD (Feet): MD (Feet): MD (Feet):	TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet:	NA			

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
NA	NA	NA	X: NA	Y: NA	NA
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): Location K-ST2				Previously reviewed under an approved EP or DOCD?		Yes	XX	No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.			
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?					XX	Yes		No

WCD Info	For wells, volume of uncontrolled blowout (Bbls/Day): 162,712 BOPD	For structures, volume of all storage and pipelines (Bbls): NA	API Gravity of fluid	34°

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS-G 35733		OCS OCS
Area Name	Walker Ridge		
Block No.	315		
Blockline Departures (in feet)	N/S Departure: 2,858’ FNL	N/S Departure:	N/S Departure F __ L N/S Departure F __ L N/S Departure F __ L
	E/W Departure: 2,399’ FEL	E/W Departure:	E/W Departure F __ L E/W Departure F __ L E/W Departure F __ L
Lambert X-Y coordinates	X: 2,104,320.6’	X:	X: X: X:
	Y: 9,675,382.2’	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude: 26° 39’ 25.0590” N	Latitude:	Latitude Latitude Latitude
	Longitude: 91° 34’ 45.2383” W	Longitude:	Longitude Longitude Longitude

Water Depth (Feet): 6,543’	MD (Feet):	TVD (Feet):	MD (Feet): MD (Feet): MD (Feet):	TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet:	NA			

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
NA	NA	NA	X: NA	Y: NA	NA
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): Location K-ST3					Previously reviewed under an approved EP or DOCD?		Yes	XX	No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						XX	Yes		No

WCD Info	For wells, volume of uncontrolled blowout (Bbls/Day): 162,712 BOPD	For structures, volume of all storage and pipelines (Bbls): NA	API Gravity of fluid	34°

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS-G 35733		OCS OCS
Area Name	Walker Ridge		
Block No.	315		
Blockline Departures (in feet)	N/S Departure: 2,858’ FNL	N/S Departure:	N/S Departure F __ L N/S Departure F __ L N/S Departure F __ L
	E/W Departure: 2,399’ FEL	E/W Departure:	E/W Departure F __ L E/W Departure F __ L E/W Departure F __ L
Lambert X-Y coordinates	X: 2,104,320.6’	X:	X: X: X:
	Y: 9,675,382.2’	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude: 26° 39’ 25.0590” N	Latitude:	Latitude Latitude Latitude
	Longitude: 91° 34’ 45.2383” W	Longitude:	Longitude Longitude Longitude

Water Depth (Feet): 6,543’	MD (Feet):	TVD (Feet):	MD (Feet): MD (Feet): MD (Feet):	TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet:	NA			

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
NA	NA	NA	X: NA	Y: NA	NA
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): Location S					Previously reviewed under an approved EP or DOCD?		Yes	XX	No
Is this an existing well or structure?		Yes	X	No	If this is an existing well or structure, list the Complex ID or API No.				
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?						XX	Yes		No

WCD Info	For wells, volume of uncontrolled blowout (Bbls/Day): 162,712 BOPD	For structures, volume of all storage and pipelines (Bbls): NA	API Gravity of fluid	34°

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS-G 35733		OCS OCS
Area Name	Walker Ridge		
Block No.	315		
Blockline Departures (in feet)	N/S Departure: 3,685' FNL	N/S Departure:	N/S Departure F __ L N/S Departure F __ L N/S Departure F __ L
	E/W Departure: 2,941' FEL	E/W Departure:	E/W Departure F __ L E/W Departure F __ L E/W Departure F __ L
Lambert X-Y coordinates	X: 2,103,779.31'	X:	X: X: X:
	Y: 9,674,554.45'	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude: 26° 39' 16.9200" N	Latitude:	Latitude Latitude Latitude
	Longitude: 91° 34' 51.3062" W	Longitude:	Longitude Longitude Longitude

Water Depth (Feet): 6,539'	MD (Feet):	TVD (Feet):	MD (Feet): MD (Feet): MD (Feet):	TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet:	NA			

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
NA	NA	NA	X: NA	Y: NA	NA
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): Location W				Previously reviewed under an approved EP or DOCD?		Yes XX	No
Is this an existing well or structure?		Yes	X No	If this is an existing well or structure, list the Complex ID or API No.			
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?					XX	Yes	No

WCD Info	For wells, volume of uncontrolled blowout (Bbls/Day): 162,712 BOPD	For structures, volume of all storage and pipelines (Bbls): NA	API Gravity of fluid	34°

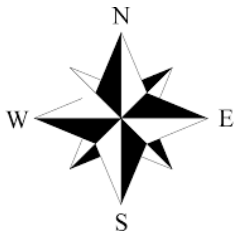
	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS-G 35733		OCS OCS
Area Name	Walker Ridge		
Block No.	315		
Blockline Departures (in feet)	N/S Departure: 2,565' FNL	N/S Departure:	N/S Departure F __ L N/S Departure F __ L N/S Departure F __ L
	E/W Departure: 2,285' FEL	E/W Departure:	E/W Departure F __ L E/W Departure F __ L E/W Departure F __ L
Lambert X-Y coordinates	X: 2,104,435'	X:	X: X: X:
	Y: 9,675,675'	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude: 26° 39' 27.9465" N	Latitude:	Latitude Latitude Latitude
	Longitude: 91° 34' 43.9413" W	Longitude:	Longitude Longitude Longitude

Water Depth (Feet): 6,543'	MD (Feet):	TVD (Feet):	MD (Feet): MD (Feet): MD (Feet):	TVD (Feet): TVD (Feet): TVD (Feet):
Anchor Radius (if applicable) in feet:	NA			

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

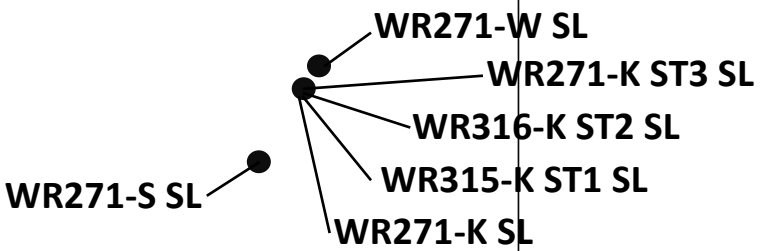
Anchor Name or No.	Area	Block	X Coordinate	Y Coordinate	Length of Anchor Chain on Seafloor
NA	NA	NA	X: NA	Y: NA	NA
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	
			X:	Y:	

Attachment 1-B



WR271

WR315



BLOCK	WELL	CALLS		UTM X	UTM Y	LATITUDE	LONGITUDE	WD
WR315	WR271-K SL	2399 FEL	2858 FNL	2104320.6	9675382.2	26°39'25.0590"N	91°34'45.2383"W	6543
WR315	WR315-K ST1 SL	2399 FEL	2858 FNL	2104320.6	9675382.2	26°39'25.0590"N	91°34'45.2383"W	6543
WR315	WR316-K ST2 SL	2399 FEL	2858 FNL	2104320.6	9675382.2	26°39'25.0590"N	91°34'45.2383"W	6543
WR315	WR271-K ST3 SL	2399 FEL	2858 FNL	2104320.6	9675382.2	26°39'25.0590"N	91°34'45.2383"W	6543
WR315	WR271-S SL	2941 FEL	3685 FNL	2103779.31	9674554.45	26°39'16.9200"N	91°34'51.3062"W	6539
WR315	WR271-W SL	2285 FEL	2565 FNL	2104435	9675675	26°39'27.9465"N	91°34'43.9413"W	6543

equinor

Scale: 1 in = 2,000 ft

0 1,000 2,000 3,000 4,000 (feet) 8,000

0 0.5 1.0 1.5 2.0 (inches) 4.0

MONUMENT

Walker Ridge 271/315/316

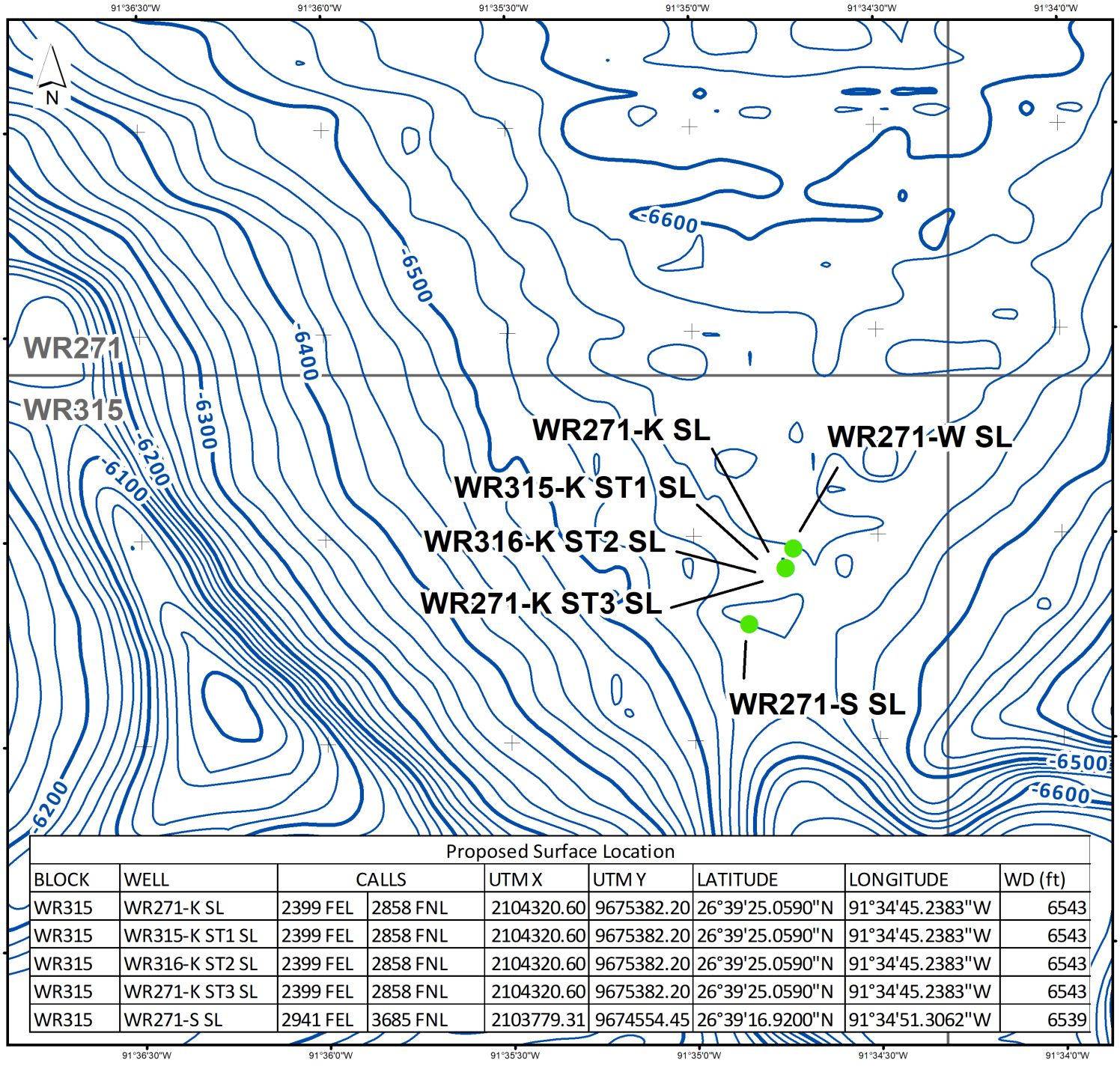
EP Location K, K ST1, K ST2, K ST3, S and W

OCS – G – 35080/35733/36084

Well Location Map

Public

Attachment 1-C



Proposed Surface Location								
BLOCK	WELL	CALLS		UTM X	UTM Y	LATITUDE	LONGITUDE	WD (ft)
WR315	WR271-K SL	2399 FEL	2858 FNL	2104320.60	9675382.20	26°39'25.0590"N	91°34'45.2383"W	6543
WR315	WR315-K ST1 SL	2399 FEL	2858 FNL	2104320.60	9675382.20	26°39'25.0590"N	91°34'45.2383"W	6543
WR315	WR316-K ST2 SL	2399 FEL	2858 FNL	2104320.60	9675382.20	26°39'25.0590"N	91°34'45.2383"W	6543
WR315	WR271-K ST3 SL	2399 FEL	2858 FNL	2104320.60	9675382.20	26°39'25.0590"N	91°34'45.2383"W	6543
WR315	WR271-S SL	2941 FEL	3685 FNL	2103779.31	9674554.45	26°39'16.9200"N	91°34'51.3062"W	6539

equinor

1 in = 2,000 ft

2,000 1,000 0 2,000 Feet

Countour Interval = 20 ft

NAD27 BLM15N

MONUMENT

Walker Ridge 271/315/316
EP Location K, K ST1, K ST2, K ST3, S and W

OCS - G - 35080/35733/36084
Well Location and Bathymetry Map

Public

FW: Pay.gov Payment Confirmation: BOEM Exploration Plan - BF

Erin Moore [EMOOR@equinor.com]
Sent: Wednesday, April 14, 2021 3:49 PM
To: Kelley Pisciola

From: notification@pay.gov <notification@pay.gov>
Sent: Wednesday, April 14, 2021 3:49 PM
To: Erin Moore <EMOOR@equinor.com>
Subject: Pay.gov Payment Confirmation: BOEM Exploration Plan - BF


An official email of the United States government

Pay.gov

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

Application Name: BOEM Exploration Plan - BF
Pay.gov Tracking ID: 26RR52P7
Agency Tracking ID: 76096385802

Account Holder Name: Equinor Gulf of Mexico LLC
Transaction Type: ACH Debit
Transaction Amount: $7,346.00
Payment Date: 04/15/2021

Account Type: Business Checking
Routing Number: 021000021
Account Number: **********7244

Transaction Date: 04/14/2021 04:49:03 PM EDT

Total Payments Scheduled: 1
Frequency: OneTime

Region: Gulf of Mexico
Contact: Erin Moore 346-234-0768
Company Name/No: Equinor Gulf of Mexico LLC, 02748
Lease Number(s): 35080, 35733, 36084, ,
Area-Block: Walker Ridge WR, 271: Walker Ridge WR, 315: Walker Ridge WR, 316: , : ,
Surface Locations: 2

THIS IS AN AUTOMATED MESSAGE. PLEASE DO NOT REPLY.

Pay.gov is a program of the U.S. Department of the Treasury, Bureau of the Fiscal Service

SECTION 2
GENERAL INFORMATION

2.1 APPLICATIONS AND PERMITS

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

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

2.2 DRILLING FLUIDS

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

Type of Drilling Fluid	Estimated Volume of Drilling Fluid to be Used per Well (bbl)
Water-based (seawater, freshwater, barite)	150,000 bbls
Oil-based (diesel, mineral oil)	NA
Synthetic-based (internal olefin, ester)	20,000 bbls

2.3 NEW OR UNUSUAL TECHNOLOGY

Managed Pressure Drilling (MPD) technology from a Mobile Offshore Drilling Unit (MODU) could potentially be used in drilling a well or wells proposed is this plan. If used, the MPD system will maintain a near constant bottom hole pressure (CBHP) above pore pressure at all times by using a combination of mud density, circulating friction, and surface applied back pressure. Gulf of Mexico (GoM) deepwater exploration wells, particularly sub-salt, face challenges such as:

- Tight operating window between pore pressure (PP) and fracture gradient (FG), which may potentially increase the risk of losses or well control issues
- PP/FG uncertainty, particularly with poor seismic imaging sub-salt
- Wellbore ballooning
- Equivalent circulating density challenges due to wellbore length, architecture, and mud rheology

Surface back pressure MPD is the most suitable MPD method to address GoM exploration challenges as the system can quickly and precisely adjust bottom hole pressure during changing well conditions. A surface back pressure MPD system consists of the following equipment:

- Integrated MPD riser joint including an active control device (ACD), annular, and flow spool
- MPD surface manifolds including buffer manifold, junk catcher manifold, choke manifold, metering manifold, and distribution manifold
- Valve and choke control modules
- High resolution pressure transducers
- Coriolis meters for flow/volume control

High resolution pressure management and coriolis flow measurement included in the MPD system also allow for early kick and loss detection, improving well control and safety while drilling. The MPD riser joint may also be installed on wells to provide a safer means of riser gas handling. In the unplanned event of gas in the riser, the annular and flow spool included in the MPD riser joint provide pressure control and riser degassing flow path with or without the ACD installed. The MPD riser joint will be located near surface but positioned below the riser tensioner ring and slip joint.

2.4 BONDING STATEMENT

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

2.5 OIL SPILL FINANCIAL RESPONSIBILITY (OSFR)

Equinor Gulf of Mexico LLC (Company No. 02748) will demonstrate oil spill financial responsibility for the facilities proposed in this EP according to 30 CFR 553.15 (a); and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities".

2.6 DEEPWATER WELL CONTROL STATEMENT

Equinor Gulf of Mexico LLC (Company No. 02748) has the financial capability to drill a relief well and conduct other emergency well control operations.

2.7 BLOWOUT SCENARIO AND WORST CASE DISCHARGE CALCULATIONS

In accordance with the requirements outlined in NTL No. 2015-BOEM-N01, “Information Requirements for Exploration Plans, Development and Production Plans, and Development Operations Coordinator Documents on the OCS for Worst Case Discharge and Blowout Scenarios,” **Equinor accepts the Monument Project Worst Case Discharge of 162,712 BOPD as approved under Initial Exploration Plan, Control No. N-10060**.

Blowout Scenario

Blowout scenario: The highest discharge rate of liquid hydrocarbons would occur if a kick was encountered while drilling the WCD hole section in the 12-1/4” hole size and the blowout prevention equipment failed.

Estimated spill flow rate: 162,712 BOPD at the seafloor
Total Volume 17.0 MMBBLS

Relief Rig Timing (Contract) and Rig Mobilization: A total of 107 days is planned for drilling the relief well and killing the well. This estimate includes 21 days for the selected rig to temporarily abandon the well it is on, mobilize to the Monument location, 81 days for drilling to the deepest exposed shoe and 5 days for kill operations. Equinor’s response to NTL 2010-N06 Blowout

Prevention and Intervention Measures and the Detail of Relief Well Days versus Activity Schedule Days to Drill is included in the Time Estimate Section below.

Likelihood for surface intervention to stop the blowout: Detailed analyses on dynamic well kill procedures and relief wells' drilling plans have been performed. The well would be killed dynamically.

Potential of wellbore to bridge over during a blowout: It's very poor, due to the lack of data to support it.

Relief Well

Statement whether possibility of using nearby platform was considered: There are no platforms in the area from which to drill a relief well. Any relief well will be drilling using a DP drilling vessel. Two locations have been assessed for drilling relief wells. These locations have been chosen based on: similar stratigraphy in order to assume a similar casing program, minimal risk of shallow hazards based on a shallow hazard assessment, and at least 500 m distance from the original hole with wind and current considerations. Directional plans for the relief well locations have been created to target the last shoe depth prior to entering the reservoir. The relief well casing depths and sizes are assumed to be the same as the original bore.

Rig type capable of drilling relief well at water depth and to TD / Rig Availability: There are several DP rigs capable of drilling at this water depth in the Gulf of Mexico. The DP drillship would be selected from the pool of suitable rigs available to Equinor through our Mutual Aid Agreement (MAA) with other operators to respond to a blowout.

Relief Rig Package Constraints: There are no rig constraints, as there are several rigs working in the GOM designed to drill in water depths up to 10,000 feet (some drillships 12,000 feet) and the rated drilling depth capacity is 40,000 feet. Equinor has access to these types of rigs through the MAA mentioned under Rig Availability. The Transocean *Deepwater Asgard* is an example of a suitable rig currently present in the GOM that could be used for relief well operations.

Time Estimate Section

Schedule of activity days

The total time of 121 days was estimated based on statistical analysis of previous analogous wells drilled by Equinor in the GOM. Wells used for this analysis included WR 272 Monument #1, MC 718 Martin, MC 814 Thorvald, MC 942 Powermap and WR 160 Yet 1 and 2.

Expected values were determined by section for mobilization, drilling operations, and plug and abandonment. Dryhole logging operations are expected to be two days based on anticipated runs. Total time from mobilization to demobilization is expected to be 121 days for the worst-case discharge design with 12-1/4" hole to TD.

Activity	Time Estimate (days)
Mobilization	1.5
Spud to TD	103
Wireline (dryhole)	2.5
Plug and Abandon	14
Total	**121**

Relief well operation times are based on time estimates from the expected case of the original hole drilling to the intersection point at the 11-7/8" shoe and setting a liner prior to kill operations. Time for spud to 11-7/8" casing point is 81 days.

The mobilization time for relief wells was calculated by assuming it takes 21 days for another rig to abandon the well it is currently drilling and mobilize to location. The days to reach the casing shoe above the open hole that is blowing out are assumed to be the same as the original well, including the non-productive time. Then 5 days are added to range in on the previous casing string and pump mud to kill the flow. This determined the maximum flowing Worst Case Discharge time of 107 days.

Activity	Time Estimate (days)
Mobilization	21
Drill relief well to deepest casing shoe	81
Range in and kill well	5
Total	**107**

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
Fugro Geoconsulting, Inc. (Fugro) was contracted by Equinor to provide a 3D Geo-hazard review to investigate seabed and sub-seabed Geo-hazards across the Monument Prospect. The shallow hazards survey was conducted over Walker Ridge Blocks 224-229, 268-273, and 312-317 (Fugro Report No. 27.1502-2831) and was previously provided. In April 2021, the report was updated to include a focus on the northern parts of WR 315 and 316 (Fugro Report No. 02-2101-0017 02, Fugro USA Marine, April 20, 2021). The updated report is provided with this plan.

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

3.7 HIGH-RESOLUTION SEISMIC LINES
Proprietary Information.

3.8 STRATIGRAPHIC COLUMN
Proprietary Information.

3.9 TIME VERSUS DEPTH TABLES
Proprietary Information.

Attachment 3-D

Wellsite Clearance Letter

Proposed Wellsite WR 271-K3 | Block 315, Walker Ridge, Gulf of Mexico

02.2101-0017-K3 02 | April 15, 2021

Final

Equinor

Document Control

Document Information

Project Title	Proposed Wellsite WR 271-K3
Document Title	Wellsite Clearance Letter
Fugro Project No.	02.2101-0017
Fugro Document No.	02.2101-0017-K3
Issue Number	02
Issue Status	Final
Fugro Legal Entity	Fugro USA Marine, Inc.
Issuing Office Address	6100 Hillcroft Ave., PO Box 740010, Houston, TX 77274

Client Information

Client	Equinor
Client Address	2107 City West Blvd., Suite 100, Houston, Texas 77042
Client Contact	Jon Basset and Gustavo Diaz
Client Document No.	02.2101-0017-K3

Document History

Issue	Date	Status	Comments on Content	Prepared By	Checked By	Approved By
01	April 14, 2021	For Review	Awaiting client comments	RB	DG	DG
02	April 15, 2021	Final		RB	DG	DG

Project Team

Initials	Name	Role
RB	Rebecca Boon	Senior Geoscientist
DG	Dean Gresham	Deputy Geoscience Group Manager
SG	Sean Garner	GIS Analyst

FUGRO
Fugro USA Marine, Inc.
6100 Hillcroft Ave
PO Box 740010
Houston, TX 77274
USA

Equinor US
2107 City West Blvd
Suite 100
Houston, TX 77042

April 15, 2021

Dear Mr. Basset and Mr. Diaz,

Equinor US has contracted Fugro USA Marine, Inc., to prepare a wellsite clearance letter addressing shallow hazards for proposed Wellsite WR 271-K3 with surface hole in Block 315, Walker Ridge (WR) Protraction Area, Gulf of Mexico (OCS-G-35733). The proposed well is planned to be vertical within the tophole section and will be drilled by a dynamically positioned rig.

This letter is intended to address specific seafloor conditions within a 2,000-foot radius and shallow geologic conditions within 3,000 feet of the proposed wellsite. The depth limit of investigation (DLI) is 4.164 seconds two-way-time below sea surface (11,777 ft vertical depth below sea surface).

We appreciate the opportunity to work with you on this project and look forward to continuing as your geohazards consultants. If you have any questions concerning this assessment, please do not hesitate to contact Dean Gresham at (+1) 337 268 3236.

Yours faithfully,

Rebecca Boon
Senior Geoscientist

Dean Gresham, P.G.
Deputy Geoscience Department Manager

Contents

Tables in the Main Text

List of Figures

1. Introduction

Equinor US (Equinor) has contracted Fugro USA Marine, Inc. (Fugro) to prepare a wellsite clearance letter addressing shallow hazards for proposed Wellsite WR 271-K3 with surface hole in Block 315 (OCS-G-35733) and deviation into Block 271, Walker Ridge (WR) Protraction Area, Gulf of Mexico. The proposed well is planned to be vertical within the tophole section and will be drilled by a dynamically positioned rig. This letter is intended to address specific seafloor conditions within a 2000-ft radius and shallow geologic conditions within 3,000 ft of the proposed wellsite. The depth limit of investigation (DLI) is 4.164 seconds two-way-time below sea surface (11,777 ft vertical depth below sea surface).

2. Graphics

The nearest 3D seismic inline (Figure 1) and 3D seismic crossline (Figure 2) are attached to illustrate shallow geologic conditions in the vicinity of the proposed location. A Water Depth and Seafloor Features Chart (Figure 3) showing the proposed wellsite, water depth contours, and seafloor features accompanies this wellsite assessment. A Seafloor Rendering Chart (Figure 4) shows general seafloor morphology. Additionally, a Seafloor Amplitude Chart (Figure 5) is included to aid in surficial authigenic carbonate interpretation and delineation of potential chemosynthetic communities. A 2000-ft radius around the proposed wellsite is shown on these charts as required by current United States Department of the Interior Bureau of Ocean Energy Management (BOEM) Notice to Lessees (NTLs). A 1:12,000-scale Subsurface Geologic Features Chart (Figure 6) is included to illustrate geologic conditions in the vicinity of the proposed wellbore down to the DLI. Interpreted shallow geologic conditions at the proposed wellbore are summarized on the attached Tophole Prognosis Chart (Figure 7). A 3D Seismic Power Spectrum (Figure 8) is included as an assessment of the frequency content of the 3D seismic time data around the proposed wellbore. All graphics included in this assessment are page size (8.5" x 11").

3. 3D Seismic Survey Parameters

Equinor provided one 3D seismic time-data volume for this assessment, CGG_Monument_Geo_Hazard_01Ta_KIR_enh_final_Dec14_16bit. Data coverage is approximately 90 mi^2 for the time volume in the Monument Prospect Area. The seismic data follow North

American polarity convention and demonstrate a near-balanced zero-phase wavelet based on analysis of the seafloor reflector; top-of-salt reflector; and low-impedance, high-amplitude anomalies indicative of gas sands.

Inlines are oriented nearly west–east, have a numerical increment of one and are spaced at intervals of 32.8 ft (10 m). Crosslines are oriented nearly north–south, have a numerical increment of one and are spaced at intervals of 41.0 ft (12.5 m). Inline and crossline annotations are included on the enclosed page-sized charts.

4. 3D Seismic Frequency

Based on power spectrum analysis of the time-migrated 3D seismic data at 50% power, the frequency bandwidth for the proposed WR 271-K3 wellsite ranges from about 16 Hz to 52 Hz (Figure 8). Using a dominant frequency of 30 Hz, the limit of separability (λ/4) is calculated to be ~47 ft, assuming an average velocity of 5,600 ft/sec in the shallow section. The quality and resolution of the data used for this assessment are considered adequate or better for shallow hazards identification and geologic interpretation at the proposed WR 271-K3 wellsite.

5. Depth Conversions

Water column time-to-depth conversions are based on a synthetic harmonic mean-velocity function by Advocate and Hood (1993) developed using velocimeter profile data from the northern Gulf of Mexico in water depths up to 6,000 ft. This velocity relationship is a seventh order polynomial function that is expressed in terms of time and depth as follows:

$$D = 0.1105 - 5066.9193T + 468.6693T^2 + 554.7107T^3 + 340.7019T^4 - 116.9910T^5 + 20.7280T^6 - 1.4658T^7$$

Equation 5.1

Where:

D = Water depth (in subsea feet)

T = One-way travel time (in seconds)

Equinor supplied time, depth and velocity information extracted from the processing velocity cube at the WR 271-K3 location. The survey was CGG Walker Ridge Reprocessing MCNV and the volume was CGG_Monument_TLFWI_Velocity_Pwave_Full_Track_16bit. This was used by Fugro to derive a fourth-order polynomial function for use in time-to-depth conversions for the sediment column.

The depth below mudline (BML) is calculated as follows:

$$Depth\ Below\ Mudline\ (ft) = 0.000000000155944363938797t^4 - 0.000000788373449927930t^3 + 0.00158718199777041t + 2.35578527985581\text{t}$$

Equation 5.2

Where:

t = Two-way travel time (sec) BML

6. Previous Work and Existing Data

Fugro provided Equinor with a shallow hazards assessment for the Monument Prospect Area in April 2015 as Fugro Report No. 27.1502-2831 (Fugro Geoconsulting, Inc., 2015), and in April 2021 updated that report to include a focus on the northern parts of WR 315 and 316 (Fugro Report No. 02.2101-0017 (Fugro USA Marine, 2021). This assessment is based on the same 3D seismic dataset used for that work and builds upon the results and conclusions presented in that report, with some additions. Please refer to the above-referenced report for additional details. An understanding of the regional shallow hazards assessment is assumed, and the material is not reiterated in this report. Equinor provided additional well information on the WR 313 #1 OCE well (Titan South prospect) drilled by Ocean Energy, the WR 225-1 MRO well (Solomon Prospect) drilled by Marathon, and the WR 272-1 EQNR well (Monument Prospect) that was incorporated into the 2021 shallow hazards assessment.

The shallow geology of the northwestern portion of Walker Ridge is well-documented in numerous published articles resulting from hydrate research conducted by the Gulf of Mexico Gas Hydrate Joint Industry Project (JIP), a cooperative research program between the U.S. Department of Energy and the National Energy Technology Laboratory in collaboration with the U.S. Geological Survey, the U.S. Minerals Management Service, and led by Chevron. Specifically, Leg II completed drilling and logging of two shallow wells in WR 313 as part of this gas hydrate drilling expedition. Fugro also has reviewed and included features that were previously mapped by the BOEM (Fugro USA Marine, 2021).

In addition, Fugro provided Equinor with an archaeological assessment for the Monument Prospect Area in January 2015 as Fugro Report No. 2414-5059 (Fugro GeoServices, Inc., 2015).

7. Proposed Well Location

The surface location for proposed Wellsite WR 271-K3 is in the northern portion of Walker Ridge Area, Block 315 as follows:

Table 1: Proposed Wellsite WR 271-K3, Block 315, Walker Ridge Area project information

X = 2 104 320.60 ft	Y = 9 675 382.20 ft
Latitude: 26° 39′ 25.0590″ N	Longitude: 91° 34′ 45.2383″ W
Nearest 3D Inline: 5921	Nearest 3D Crossline: 3177

8. Water Depth and Seafloor Gradient

The water depth at the proposed wellsite is about 6,543 ft with zero datum at sea surface. No tidal corrections were applied. The local seafloor gradient is about 0.3° to the northeast.

9. Seafloor and Near-Seafloor Features

The seafloor surrounding the proposed location appears to be smooth and stable (Figure 3 and Figure 4). 2,850 ft to the south, the seafloor drops off into a channel-like feature at the edge of the study area; this is not expected to represent a significant constraint to drilling operations. Approximately 8,400 ft to the west is a ridge associated with diapiric salt uplift; approximately 5,350 ft to the east is another ridge associated with eastern tabular salt; a prominent tabular salt escarpment lies approximately 8,100 ft to the east.

A few seafloor faults are associated with these structures, the closest of which is 3,190 ft to the southeast of the proposed wellbore. No fluid expulsion features, seafloor mounds, or likely hardgrounds are present within 2,000 ft of the proposed wellsite. Seafloor amplitudes in the

vicinity of the proposed wellsite are moderate and increase slightly approximately 1,300 ft to the east (Figure 5).

10. Potential High-Density Benthic Communities

There is no geophysical evidence of hardgrounds, hydrocarbon seepage sites, or areas that could potentially support high-density benthic communities within 2,000 ft of the proposed location. Therefore, there is a negligible potential for high-density communities of benthic and/or chemosynthetic organisms within 2,000 ft of the proposed wellsite, in accordance with BOEM NTL 2009-G40, extended by NTL 2015-N02 (BOEM 2009 and 2015, respectively).

11. Manmade Obstructions

According to the Fugro database of infrastructure and seafloor obstructions, no manmade features are located within 3,000 ft of the proposed wellsite. However, it is recommended that a remotely operated vehicle (ROV) be used to inspect the seafloor at the proposed wellsite immediately before drilling activities to confirm that there are no seafloor obstructions. No anthropogenic seafloor conditions that may adversely affect exploratory drilling were identified in the vicinity of the proposed wellsite.

12. Stratigraphy

The seafloor, four subsurface horizons (H10, H15, H20 and H30), and the top of salt were mapped to divide the tophole section into five stratigraphic units, Units 1 through 5, of distinct seismic character and inferred lithology at the proposed wellbore. Unit 5 was further divided into 4 subunits (5A, 5B, 5C, and 5D). The bases of subunits 5A and 5B are the inferred bases of mass-transport deposits (MTDs) seen in the seismic data. The base of subunit 5C is an estimated stratal correlation to overpressured sediment related to shallow water flow observed in the offset well WR 272 EQNR-1.

Exact sediment conditions along the proposed wellbore cannot be determined with the available data. Predicted depths and thicknesses associated with each of the mapped horizons and sequences for the proposed WR 271-K3 drilling location are displayed on the attached Tophole Prognosis Chart (Figure 7).

Unit 1 (Seafloor to Horizon 10) is interpreted as hemipelagic clays. The lower portion of this sequence likely contains ponded, clay-rich turbidites and small MTDs. Horizon 10 is a late Pleistocene unconformity. Unit 1 is 194 ft thick at the proposed well location.

Unit 2 (Horizon 10 to Horizon 15) is characterized by an upper portion of discontinuous reflectors with varying amplitude strength, interpreted as regional MTDs, lying above a section of relatively continuous reflectors with moderate amplitude strength, interpreted to be well stratified clays and thin turbidites. Although tentatively correlated to the JIP cores, the lithology interpretation is mainly based on seismic facies. Horizon 15 is a late Pleistocene erosional unconformity that appears to represent a regional hiatus in the southeastern lobe of the Terrebonne Basin. Unit 2 is about 375 ft thick at the proposed well location.

Unit 3 (Horizon 15 to Horizon 20) is interpreted to contain muddy turbidites interlayered with small-scale MTDs. Horizon 20 is a high-amplitude peak reflector that is relatively continuous across most of the study area. Unit 3 is about 714 ft thick at the proposed well location.

Unit 4 (Horizon 20 to Horizon 30) contains low-amplitude, poorly-bedded, discontinuous reflectors that are interpreted to represent muddy turbidites interlayered with small-scale MTDs. Horizon 30 is a moderate-amplitude trough reflector that marks the top of a thicker MTD package below Unit 4. Unit 4 is about 629 ft thick at the proposed well location.

Unit 5 (Horizon 30 to the DLI) is a complex interval divided into four subunits:

The upper subunit, Unit 5A, is interpreted to be a large and extensive MTD package that is approximately 727 ft thick at the proposed well location. The Unit includes large-scale slump deposits and channel features. There is a region of moderate amplitude reflectors within Unit 5A that could represent sand-prone layers. This MTD section could be a self-pressured unit with sealing pressures possible along Horizon 30 as well as at the base of the MTDs.

Unit 5B is interpreted as predominantly weakly bedded clays with small-scale MTDs. The MTDs of Unit 5A erode into this Unit. Unit 5B is 624 ft thick at the proposed well location. Units 5A and 5B could be a self-pressured unit with sealing pressures possible at the base of Unit 5B.

Unit 5C consists of low-amplitude hemipelagic clays, muds and silts with possible fine-grained MTDs. Unit 5C is about 1,475 ft thick at the proposed well location.

Unit 5D is interpreted to be comprised of hemipelagic clays, muds and silts with possible thin sand layers. The top of Unit 5D is a tentative correlation to overpressured strata that produced a

water flow in offset well WR 272-1 EQNR. At the proposed well location, Unit 5D is 496 ft thick from the top of Unit 5D to the DLI. There is 3,455 ft between the top of Unit 5D and the top of salt.

The DLI is 11,777 ft vertical depth below sea surface and the top of salt is 14,736 ft vertical depth below sea surface.

Unit 5 is 3,322 ft thick from Horizon 30 to the DLI, and there is 6,281 ft from Horizon 30 to the top of salt.

13. Fault Penetrations

No faults were identified in the immediate vicinity of the tophole section from the seafloor to the DLI. It is possible that faults exist below the resolution of the data used for the current study.

14. Gas Hydrates

Temperature and pressure conditions are favorable for the presence of gas hydrates within the study area; however, no amplitude anomalies indicative of gas hydrate were identified at the proposed wellbore. The JIP Leg II drilling results confirm that high saturation gas hydrates in sand-prone sediments can be identified with 3D seismic data in the WR 313 area by a fast velocity amplitude signature (Boswell, et al., 2012); no such anomalies are present along the proposed wellbore, nor within 3,000 ft of the well bore. Fracture filling gas hydrates in clays were identified in WR 313 but cannot be directly imaged with exploration 3D seismic data (Ibid, 2012). Nevertheless, disseminated gas hydrates generally do not cause serious problems for exploratory drilling operations.

15. Gas Hazards

Amplitude extractions were performed within each unit starting at the seafloor and extending to the DLI. No high amplitude anomalies interpreted to represent shallow gas will be penetrated by a vertical wellbore in the tophole section at the proposed wellsite. The nearest amplitude

anomaly lies within Unit 2 and is located approximately 703 ft northwest of the proposed wellbore (Figure 6). Units 5A and 5B are interpreted to contain moderate amplitude reflectors that could be indicative of sand-prone sediments (Figure 7).

As a conservative measure, Units 2, 5A and 5B are therefore assessed to have low potential for shallow gas while the rest of the wellbore is assessed to have negligible potential for shallow gas.

16. Shallow Water Flow (SWF)

Shallow water flow (SWF) zones are associated with over-pressured continuous or isolated sands overlain by a seal and a rapidly-deposited and buried overburden. Based on information from the WR 225-1 MRO well, roughly 7.58 miles to the northwest, the post-Miocene sediment accumulation rate is about 2,450 ft/Ma. This is a very high rate of sediment accumulation and is believed to be the result of the basinal setting. High sedimentation rates can be warning flags for shallow water flow potential in sand-prone sediments buried at 500 ft or greater below mudline. Nonetheless, the tophole section is mostly comprised of clays, and the thin, discontinuous nature of the silt or sand layers should limit the duration and severity of any shallow water flow. Structural deformation caused by salt uplifts may provide a conduit for the transmission of overpressure, if any, from depth to the near-seafloor sediments.

The WR 272-1 EQNR well, approximately 7,540 ft northeast of the WR 271-K3 location, encountered water flow at 9,446 ft measured depth (MD) rotary Kelly bushing (RKB) in a zone of interbedded silts and sands. This may be associated with sand and clay deformation in the suprasalt rubble section where salt uplift generated hydrostatic overpressures. SWF can also result when the pressure regime from the sub-basin is transferred up the sides of the basin, possibly with the aid of faults on the flanks of salt domes. The thickness of SWF-bearing sand in the WR 272-1 EQNR well was too low to resolve in the seismic and is difficult to correlate with seismic strata at that depth of the sub-basin. The peak reflector at the base of Unit 5C is only tentatively correlated from the overpressured strata in the WR 272-1 EQNR well to the proposed WR 271-K3 location. Nevertheless, the presence of SWF in the WR 272-1 EQNR well warrants a conservative prognosis for moderate possibility for SWF in Unit 5D.

Debris flows, which are present in the study area, can also create situations conducive to overpressure and can increase the risk of localized SWFs. Units 3 through 5C at the proposed well location contain MTDs of varying sizes, the bases of which are difficult to delineate in some areas. Although the MTDs are believed to be clay rich, the disrupted strata may contain hard material and discontinuous sand layers. MTD sections can be self-pressured units with sealing pressures possible along their tops and bases. Although Units 3 through 5C were drilled without incident in

the WR 272-1 EQNR well, as a conservative measure they are assessed to have low potential for shallow water flow. The most significant MTD package is Unit 5A, which is 727 ft thick; it is assessed as having low to moderate potential for shallow water flow due to its thickness. Units 1 and 2 contain MTDs, but those MTDs are buried at less than 500 ft BML and are not considered capable of inducing the pressure necessary for SWF in associated sands.

17. Suitability for Temporary Occupation for Drilling

Proposed well WR 271-K3 is suitable for temporary-occupation drilling provided that the aforementioned conditions and constraints are considered and planned for in the final well design.

18. References

Advocate, D.M. and Hood, K.C., 1993. An empirical time depth model for calculating water depth, northwest Gulf of Mexico. *Geo Marine Letters*, 13, pp. 207–211.

Boswell, R. and Collett, T. S. eds., 2012. Resource and hazard implications of gas hydrates in the Northern Gulf of Mexico: Results of the 2009 Joint Industry Project Leg II Drilling Expedition", *Marine and Petroleum Geology*, 34(1), p. 224.

Bureau of Ocean Energy Management, 2009. *Notice to lessees and operators of federal oil, gas, and sulphur leases in the outer continental shelf, Gulf of Mexico OCS region, deepwater benthic communities*. United States Department of the Interior, Minerals Management Service, Gulf of Mexico, NTL 2009-G40.

Bureau of Ocean Energy Management, 2011. *Updated SWF occurrence graphic, Mississippi Canyon, Gulf of Mexico*. April 15, 2009.

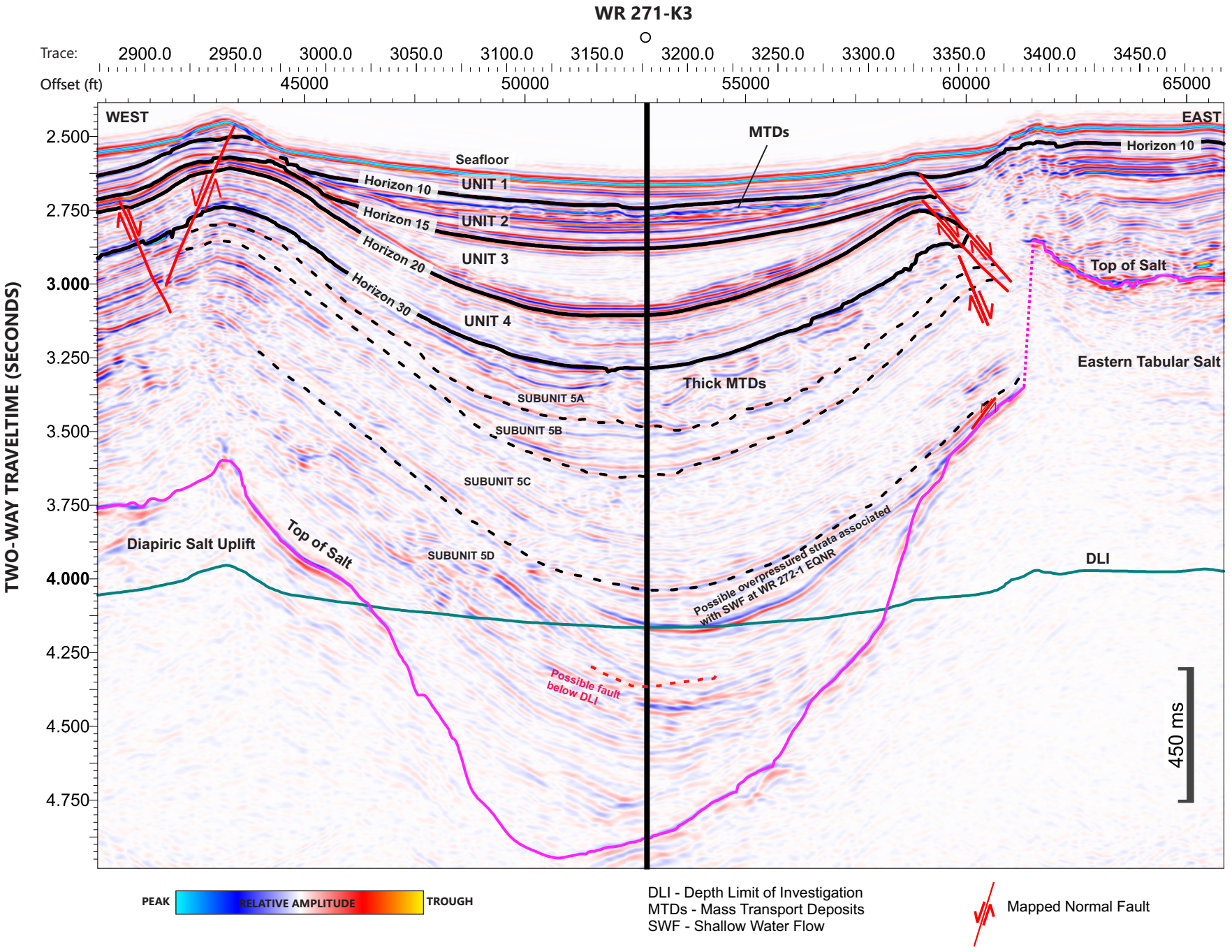
Bureau of Ocean Energy Management, 2015. *Notice to lessees and operators (NTL) of federal oil and gas leases in the outer continental shelf (OSC), elimination of expiration cates on certain notices to lessees and operators pending review and reissuance*, United States Department of the Interior, Gulf of Mexico, NTL 2015-N02.

Fugro USA Marine, 2021. *Shallow hazards assessment, monument prospect, blocks WR 224–229, WR 268–273, and WR 312–317, Fugro report No. 02.2101-0017, prepared for Equinor*.

Fugro GeoConsulting, Inc., 2015. *Shallow hazards assessment, monument prospect, blocks WR 224–229, WR 268–273, and WR 312–317, Fugro report No. 1502-2831, prepared for Statoil*.

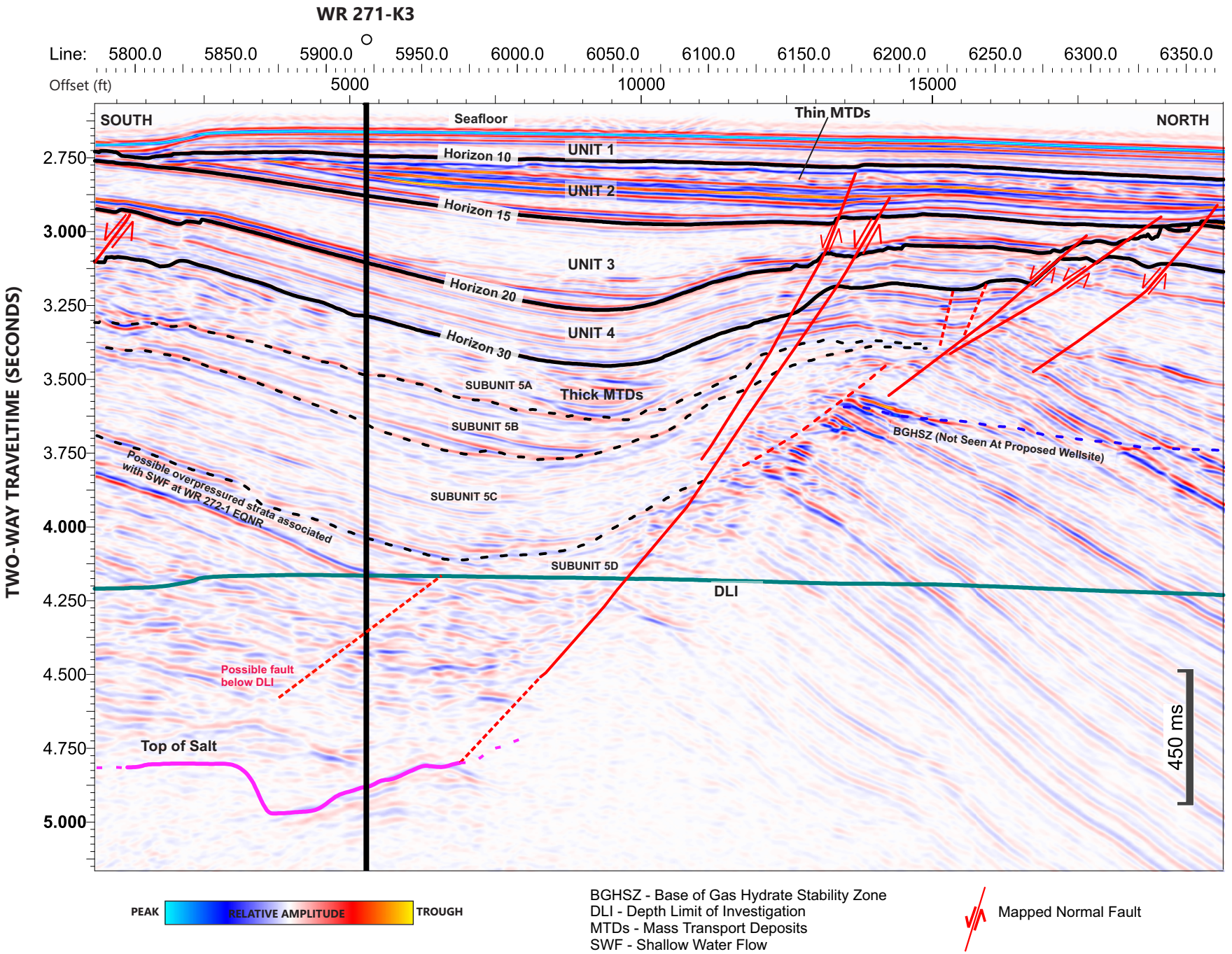
Fugro GeoServices, Inc., 2015. *Archaeological assessment, monument prospect, blocks 271 & 272, walker ridge area, Gulf of Mexico, Fugro report No. 2414-5059, prepared for Statoil*.

Figures



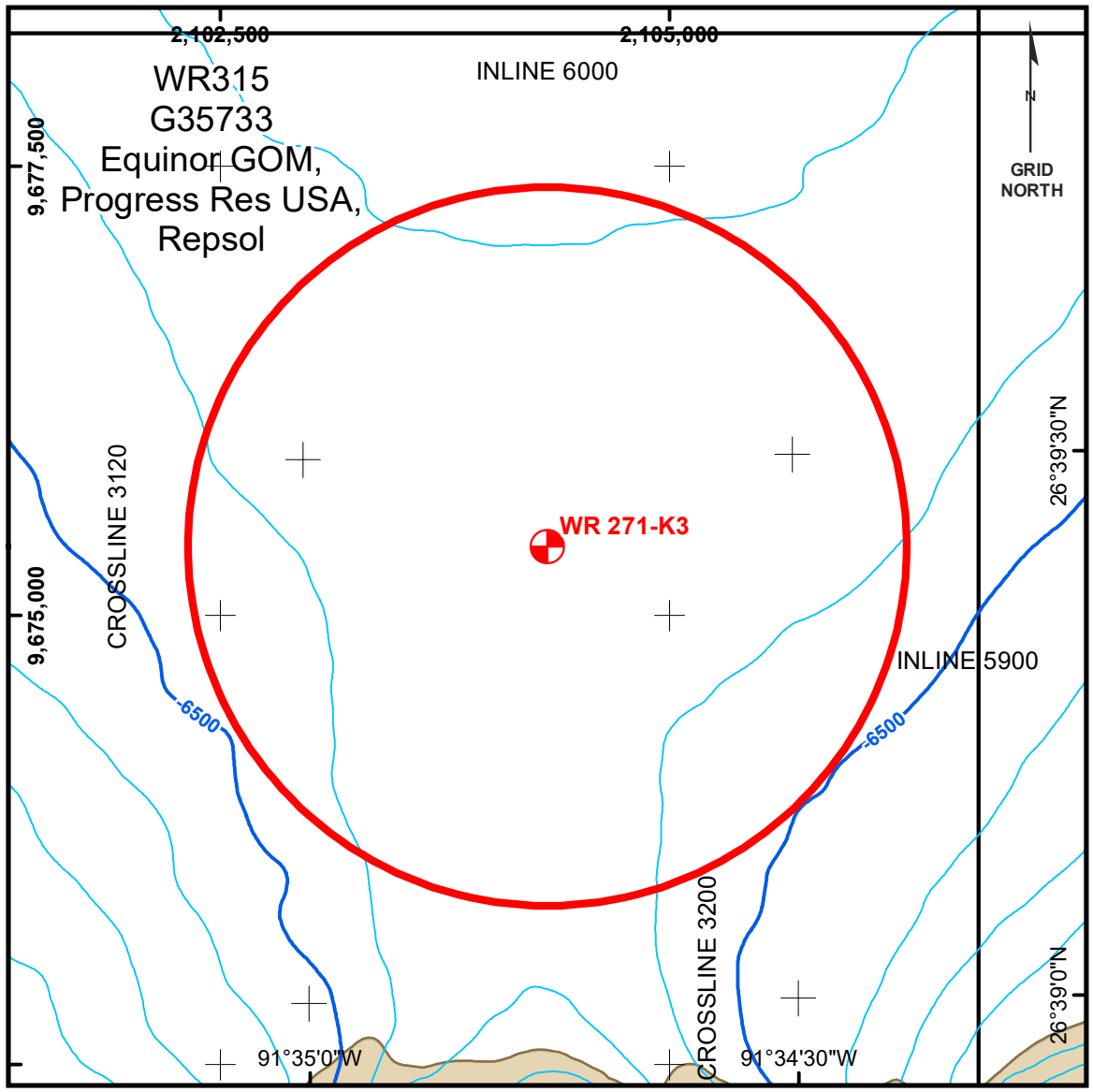
A PORTION OF 3D SEISMIC INLINE 5921

02.2101-0017-K3 02 | Proposed Wellsite WR 271-K3
Figure 1



A PORTION OF 3D SEISMIC CROSSLINE 3177

02.2101-0017-K3 02 | Proposed Wellsite WR 271-K3
Figure 2



PROPOSED WELLSITE LOCATION AND DESIGNATED 2,000-ft RADIUS CIRCLE IS SHOWN AROUND THE WELL SURFACE LOCATION AS REQUIRED BY NTL 2009-G40, EXTENDED BY NTL 2015-N02
X=2,104,320.60 Y=9,675,382.20 NAD27 UTM15N

-6500 WATER DEPTH CONTOUR, IN FEET.
MAJOR CONTOUR INTERVAL = 250 FEET
MINOR CONTOUR INTERVAL = 25 FEET

OCS BLOCK WITH LEASE INFORMATION

INLINE 5900 3D SURVEY LINE NUMBER

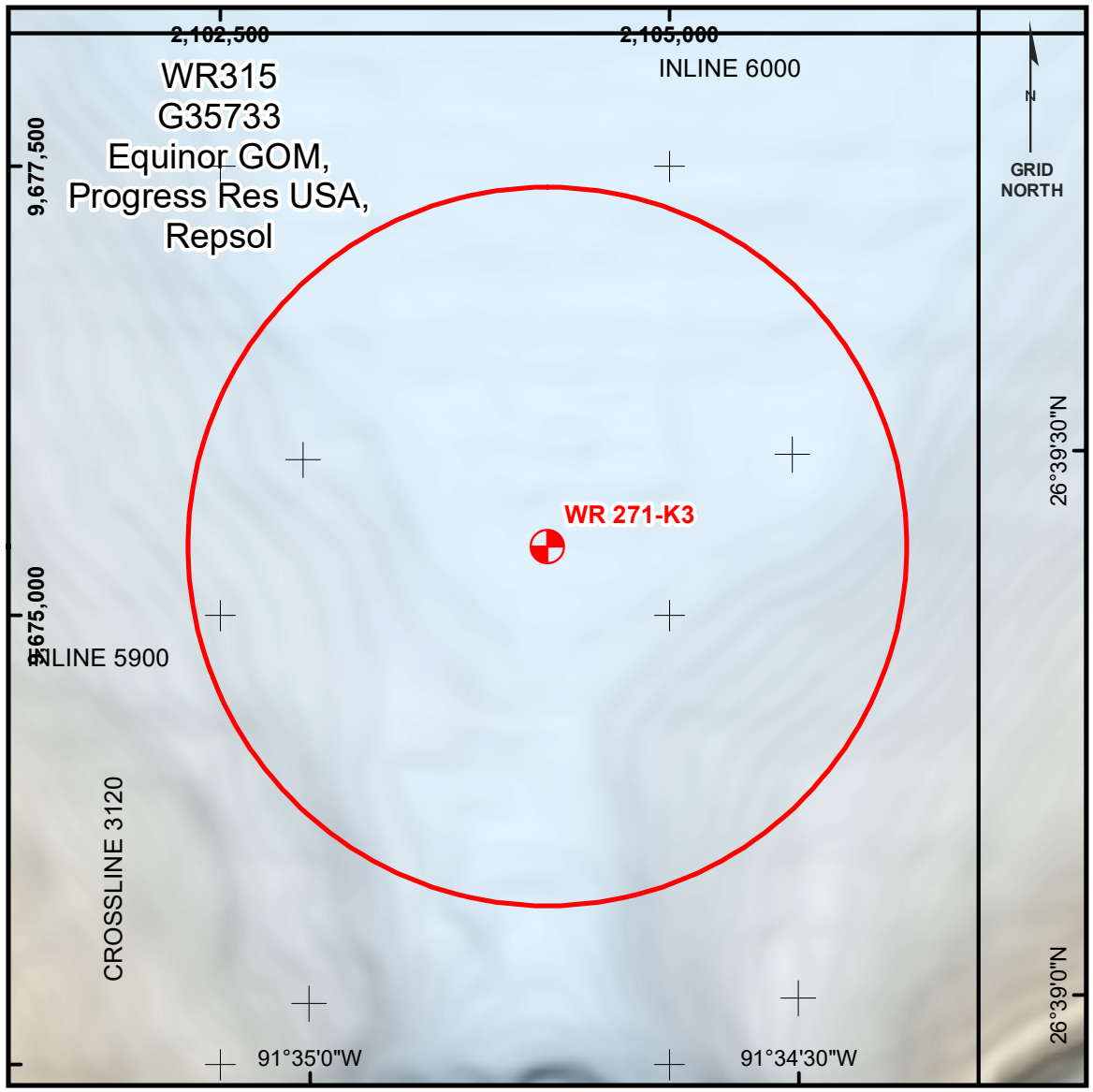
SEAFLOOR EROSIONAL ESCARPMENT

SCALE = 1:12,000

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

Feet

WATER DEPTH AND SEAFLOOR FEATURES CHART



PROPOSED WELLSITE LOCATION AND DESIGNATED 2,000-ft RADIUS CIRCLE IS SHOWN AROUND THE WELL SURFACE LOCATION AS REQUIRED BY NTL 2009-G40, EXTENDED BY NTL 2015-N02
X=2,104,320.60 Y=9,675,382.20 NAD27 UTM15N

OCS BLOCK WITH LEASE INFORMATION

INLINE 5900 3D SURVEY LINE NUMBER

WATER DEPTH (FEET) BELOW SEA LEVEL

SHALLOW: -5986.19

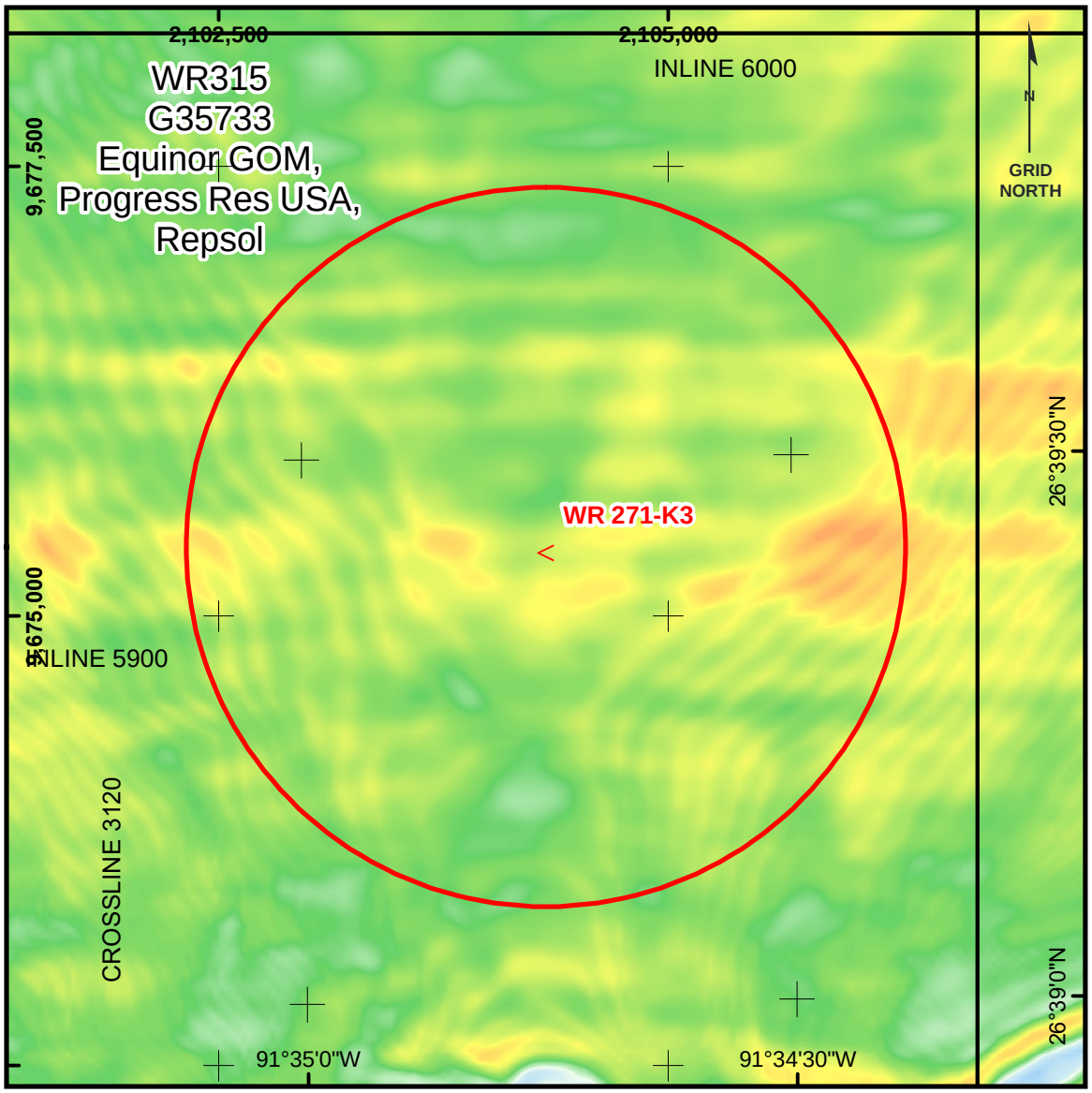
DEEP: -7142.89

SCALE = 1:12,000

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

Feet

SEAFLOOR RENDERING



PROPOSED WELLSITE LOCATION AND DESIGNATED 2,000-ft RADIUS CIRCLE IS SHOWN AROUND THE WELL SURFACE LOCATION AS REQUIRED BY NTL 2009-G40, EXTENDED BY NTL 2015-N02
X=2,104,320.60 Y=9,675,382.20 NAD27 UTM15N

OCS BLOCK WITH LEASE INFORMATION

INLINE 5900 3D SURVEY LINE NUMBER

RELATIVE SEAFLOOR AMPLITUDE

HIGH

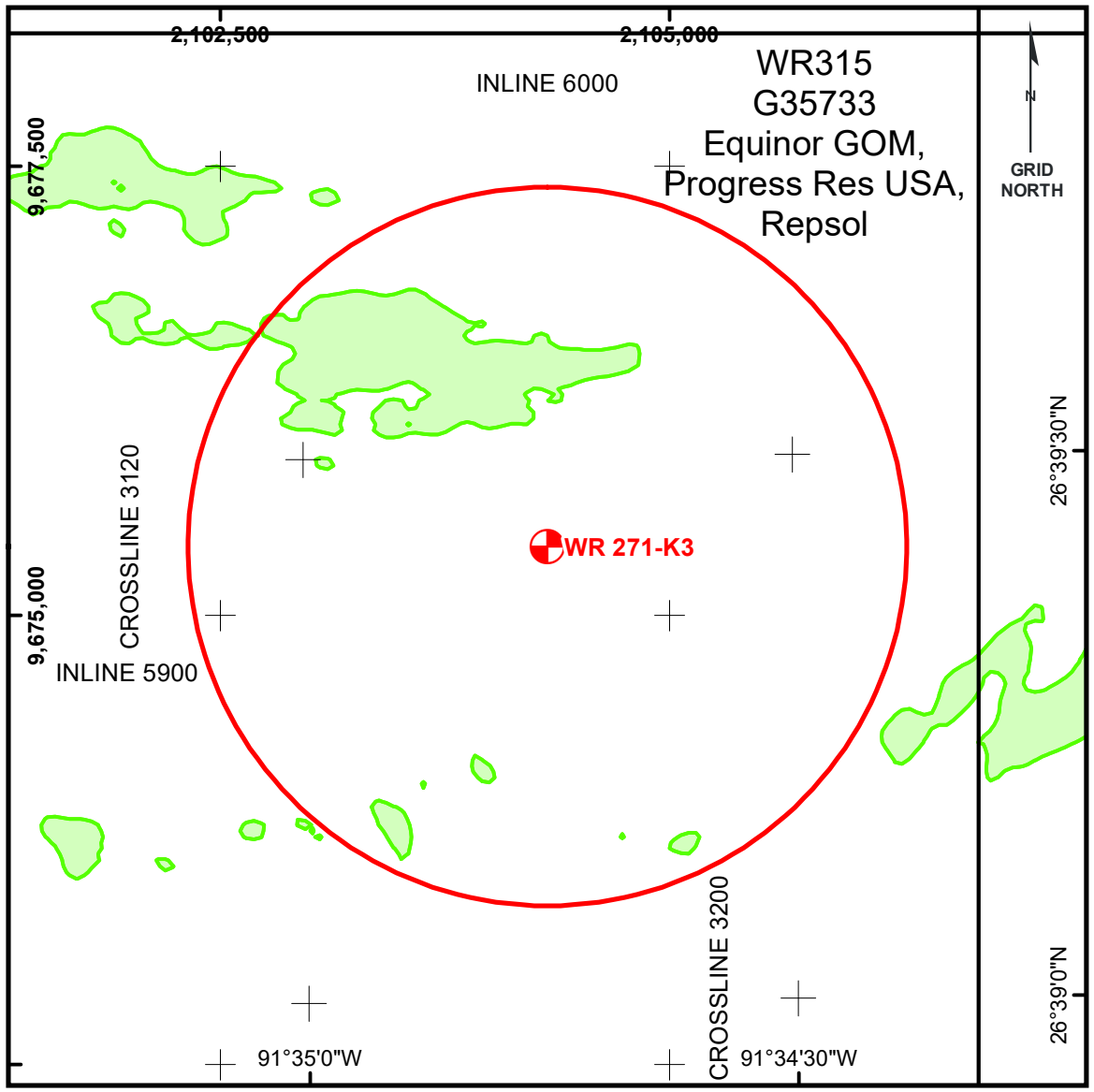
LOW

SCALE = 1:12,000

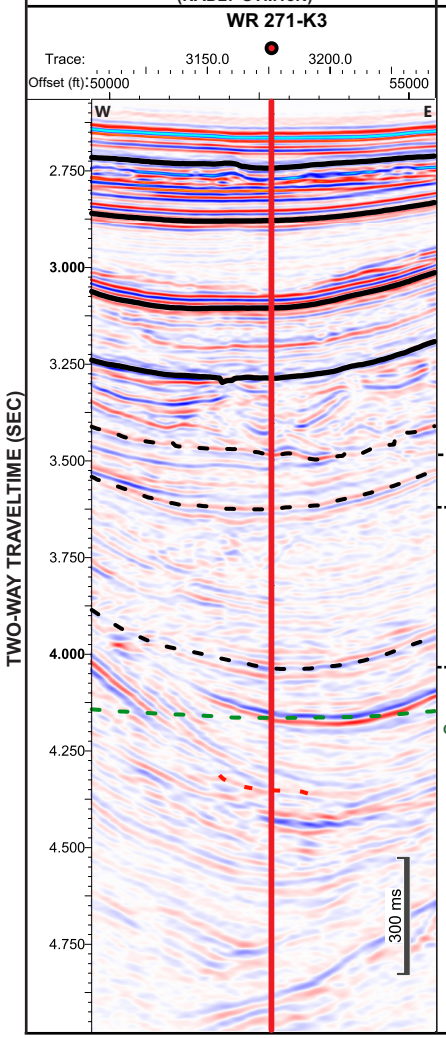
0 500 1,000 1,500 2,000 2,500

Feet

SEAFLOOR AMPLITUDE CHART



SUBSURFACE GEOLOGIC FEATURES CHART



HORIZON & UNIT DESIGNATION	INFERRED LITHOLOGY & TOPHOLE CONDITIONS	TWT SS (sec)	VERT. DEPTH BML (ft)	VERT. DEPTH BSS (ft)	THICK-NESS (ft)	SHALLOW GAS POTENTIAL	SHALLOW WATER FLOW POTENTIAL
	The seafloor is suitable for well siting in the immediate vicinity of the proposed location. The seafloor exhibits a slope of 0.3° to the northeast.					ASSUMES OPEN-HOLE DRILLING CONDITIONS	
SEAFLOOR		2.664	0	6543			
UNIT 1	Predominantly hemipelagic clays, turbidites and MTDs.				194	NEGLIGIBLE	NEGLIGIBLE
HORIZON 10		2.743	194	6737			
UNIT 2	Well bedded hemipelagic clays with thin turbidites and MTDs.				375	LOW	NEGLIGIBLE
HORIZON 15		2.878	569	7112			
UNIT 3	Muddy turbidites interlayered with small-scale MTDs.				714	NEGLIGIBLE	LOW
HORIZON 20		3.105	1283	7826			
UNIT 4	Muddy turbidites interlayered with small-scale MTDs.				629	NEGLIGIBLE	LOW
HORIZON 30		3.286	1912	8455			
UNIT 5A	Large-scale slump and mass transport deposits with variable sediment properties and possible discontinuous sands. Overpressure at base of MTD package possible.				727	LOW	LOW TO MODERATE
		3.485	2639	9182			
UNIT 5B	Weakly bedded clays with small-scale MTDs. Overpressure at base of MTD package possible.				624	LOW	LOW
		3.652	3263	9806			
UNIT 5C	Hemipelagic clays, muds and silts with possible fine-grained MTDs and discontinuous sands.				1475	NEGLIGIBLE	LOW
		4.037	4738	11281			
UNIT 5D	Hemipelagic clays,muds and silts with thin sand layers. Possible correlation to overpressured sediments and water flow observed in offset well WR 272 EQNR-1; possible overpressured basinal sediments.				496	NEGLIGIBLE	MODERATE
DEPTH LIMIT OF INVESTIGATION		4.164	5234	11777			
POSSIBLE FAULT							
					2959		
TOP OF SALT		4.880	8193	14736			
	DATE MADE: APRIL 2021						

3322

TWT: Two-way Time
BML: Below Mudline
BSS: Below Sea Surface
MTD: Mass Transport Deposit

Negligible: Not present or higly unlikely occurrence
Low: Unlikely presence or occurrence; not significant
Moderate: Possible presence or occurrence; mitigation measures recommended
High: Probable presence or occurrence; mitigation measures highly recommended

DEPTHS BASED ON SUBSURFACE DEPTH FUNCTION DERIVED FROM EQUINOR VELOCITY CUBE EXTRACTIONS

TOPHOLE PROGNOSIS CHART
PROPOSED WELLSITE WR 271-K3 (MONUMENT APPRAISAL)

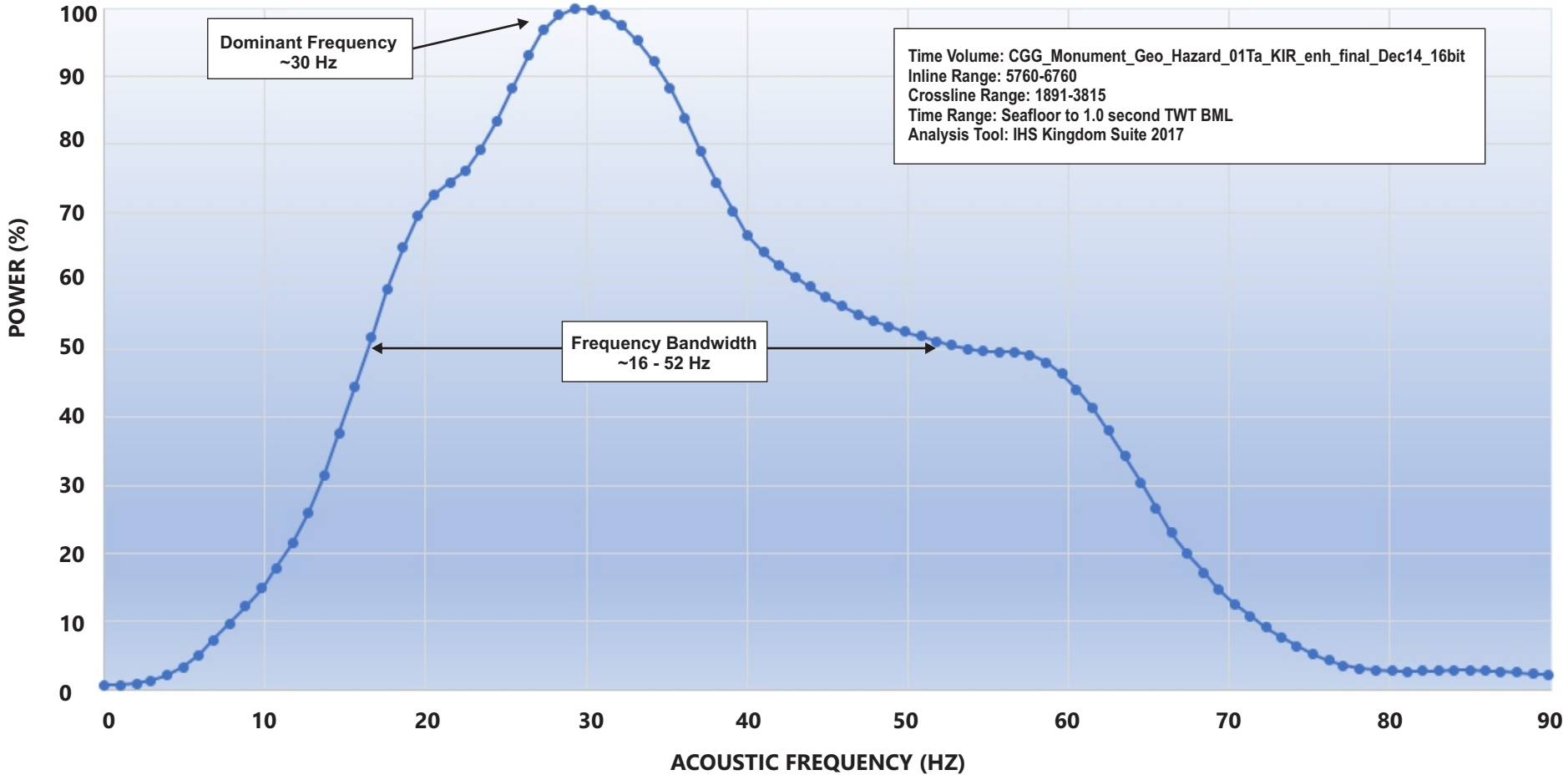


FIGURE 8. 3D SEISMIC POWER SPECTRUM CHART

Wellsite Clearance Letter

Proposed Wellsite WR 271-S1 | Block 315, Walker Ridge, Gulf of Mexico

02.2101-0017-S1 02 | April 15, 2021

Final

Equinor

Document Control

Document Information

Project Title	Proposed Wellsite WR 271-S1
Document Title	Wellsite Clearance Letter
Fugro Project No.	02.2101-0017
Fugro Document No.	02.2101-0017-S1
Issue Number	02
Issue Status	Final
Fugro Legal Entity	Fugro USA Marine, Inc.
Issuing Office Address	6100 Hillcroft Ave., PO Box 740010, Houston, TX 77274

Client Information

Client	Equinor
Client Address	2107 City West Blvd., Suite 100, Houston, Texas 77042
Client Contact	Jon Basset and Gustavo Diaz
Client Document No.	02.2101-0017-S1

Document History

Issue	Date	Status	Comments on Content	Prepared By	Checked By	Approved By
01	April 14, 2021	For Review	Awaiting client comments	RB	DG	DG
02	April 15, 2021	Final		RB	DG	DG

Project Team

Initials	Name	Role
RB	Rebecca Boon	Senior Geoscientist
DG	Dean Gresham	Deputy Geoscience Group Manager
SG	Sean Garner	GIS Analyst

FUGRO
Fugro USA Marine, Inc.
6100 Hillcroft Ave
PO Box 740010
Houston, TX 77274
USA

Equinor US
2107 City West Blvd
Suite 100
Houston, TX 77042

April 15, 2021

Dear Mr. Basset and Mr. Diaz,

Equinor US has contracted Fugro USA Marine, Inc., to prepare a wellsite clearance letter addressing shallow hazards for proposed Wellsite WR 271-S1 with surface hole in Block 315, Walker Ridge (WR) Protraction Area, Gulf of Mexico (OCS-G-35733). The proposed well is planned to be vertical within the tophole section and will be drilled by a dynamically positioned rig.

This letter is intended to address specific seafloor conditions within a 2,000-foot radius and shallow geologic conditions within 3,000 feet of the proposed wellsite. The depth limit of investigation (DLI) is 4.160 seconds two-way-time below sea surface (11,781 ft vertical depth below sea surface).

We appreciate the opportunity to work with you on this project and look forward to continuing as your geohazards consultants. If you have any questions concerning this assessment, please do not hesitate to contact Dean Gresham at (+1) 337 268 3236.

Yours faithfully,

Rebecca Boon
Senior Geoscientist

Dean Gresham, P.G.
Deputy Geoscience Department Manager

Contents

Tables in the Main Text

List of Figures

1. Introduction

Equinor US (Equinor) has contracted Fugro USA Marine, Inc. (Fugro) to prepare a wellsite clearance letter addressing shallow hazards for proposed Wellsite WR 271-S1 with surface hole in Block 315 (OCS-G-35733) and deviation into Block 271, Walker Ridge (WR) Protraction Area, Gulf of Mexico. The proposed well is planned to be vertical within the tophole section and will be drilled by a dynamically positioned rig. This letter is intended to address specific seafloor conditions within a 2000-ft radius and shallow geologic conditions within 3,000 ft of the proposed wellsite. The depth limit of investigation (DLI) is 4.160 seconds two-way-time below sea surface (11,781 ft vertical depth below sea surface).

2. Graphics

The nearest 3D seismic inline (Figure 1) and 3D seismic crossline (Figure 2) are attached to illustrate shallow geologic conditions in the vicinity of the proposed location. A Water Depth and Seafloor Features Chart (Figure 3) showing the proposed wellsite, water depth contours, and seafloor features accompanies this wellsite assessment. A Seafloor Rendering Chart (Figure 4) shows general seafloor morphology. Additionally, a Seafloor Amplitude Chart (Figure 5) is included to aid in surficial authigenic carbonate interpretation and delineation of potential chemosynthetic communities. A 2,000-ft radius around the proposed wellsite is shown on these charts as required by current United States Department of the Interior Bureau of Ocean Energy Management (BOEM) Notice to Lessees (NTLs). A 1:12,000-scale Subsurface Geologic Features Chart (Figure 6) is included to illustrate geologic conditions in the vicinity of the proposed wellbore down to the DLI. Interpreted shallow geologic conditions at the proposed wellbore are summarized on the attached Tophole Prognosis Chart (Figure 7). A 3D Seismic Power Spectrum (Figure 8) is included as an assessment of the frequency content of the 3D seismic time data around the proposed wellbore. All graphics included in this assessment are page size (8.5" x 11").

3. 3D Seismic Survey Parameters

Equinor provided one 3D seismic time-data volume for this assessment, CGG_Monument_Geo_Hazard_01Ta_KIR_enh_final_Dec14_16bit. Data coverage is approximately 90 mi^2 for the time volume in the Monument Prospect Area. The seismic data follow North

American polarity convention and demonstrate a near-balanced zero-phase wavelet based on analysis of the seafloor reflector; top-of-salt reflector; and low-impedance, high-amplitude anomalies indicative of gas sands.

Inlines are oriented nearly west–east, have a numerical increment of one and are spaced at intervals of 32.8 ft (10 m). Crosslines are oriented nearly north–south, have a numerical increment of one and are spaced at intervals of 41.0 ft (12.5 m). Inline and crossline annotations are included on the enclosed page-sized charts.

4. 3D Seismic Frequency

Based on power spectrum analysis of the time-migrated 3D seismic data at 50% power, the frequency bandwidth for the proposed WR 271-S1 wellsite ranges from about 16 Hz to 52 Hz (Figure 8). Using a dominant frequency of 30 Hz, the limit of separability (λ/4) is calculated to be ~47 ft, assuming an average velocity of 5,600 ft/sec in the shallow section. The quality and resolution of the data used for this assessment are considered adequate or better for shallow hazards identification and geologic interpretation at the proposed WR 271-S1 wellsite.

5. Depth Conversions

Water column time-to-depth conversions are based on a synthetic harmonic mean-velocity function by Advocate and Hood (1993) developed using velocimeter profile data from the northern Gulf of Mexico in water depths up to 6,000 ft. This velocity relationship is a seventh order polynomial function that is expressed in terms of time and depth as follows:

$$D = 0.1105 - 5066.9193T + 468.6693T^2 + 554.7107T^3 + 340.7019T^4 - 116.9910T^5 + 20.7280T^6 - 1.4658T^7$$

Equation 5.1

Where:

D = Water depth (in subsea feet)

T = One-way travel time (in seconds)

Equinor supplied time, depth and velocity information extracted from the processing velocity cube at the WR 271-S1 location. The survey was CGG Walker Ridge Reprocessing MCNV and the volume was CGG_Monument_TLFWI_Velocity_Pwave_Full_Track_16bit. This was used by Fugro to derive a fourth-order polynomial function for use in time-to-depth conversions for the sediment column.

The depth below mudline (BML) is calculated as follows:

$$Depth\ Below\ Mudline\ (ft) = 0.000000000075504779771418 3t^4 - 0.000000441631303439542t^3 + 0.00114065561165333t + 2.52682754492434\text{t}$$

Equation 5.2

Where:

t = Two-way travel time (sec) BML

6. Previous Work and Existing Data

Fugro provided Equinor with a shallow hazards assessment for the Monument Prospect Area in April 2015 as Fugro Report No. 27.1502-2831 (Fugro Geoconsulting, Inc., 2015), and in April 2021 updated that report to include a focus on the northern parts of WR 315 and 316 (Fugro Report No. 02.2101-0017 (Fugro USA Marine, 2021). This assessment is based on the same 3D seismic dataset used for that work and builds upon the results and conclusions presented in that report, with some additions. Please refer to the above-referenced report for additional details. An understanding of the regional shallow hazards assessment is assumed, and the material is not reiterated in this report. Equinor provided additional well information on the WR 313 #1 OCE well (Titan South prospect) drilled by Ocean Energy, the WR 225-1 MRO well (Solomon Prospect) drilled by Marathon, and the WR 272-1 EQNR well (Monument Prospect) that was incorporated into the 2021 shallow hazards assessment.

The shallow geology of the northwestern portion of Walker Ridge is well-documented in numerous published articles resulting from hydrate research conducted by the Gulf of Mexico Gas Hydrate Joint Industry Project (JIP), a cooperative research program between the U.S. Department of Energy and the National Energy Technology Laboratory in collaboration with the U.S. Geological Survey, the U.S. Minerals Management Service, and led by Chevron. Specifically, Leg II completed drilling and logging of two shallow wells in WR 313 as part of this gas hydrate drilling expedition. Fugro also has reviewed and included features that were previously mapped by the BOEM (Fugro USA Marine, 2021).

In addition, Fugro provided Equinor with an archaeological assessment for the Monument Prospect Area in January 2015 as Fugro Report No. 2414-5059 (Fugro GeoServices, Inc., 2015).

7. Proposed Well Location

The surface location for proposed Wellsite WR 271-S1 is in the northern portion of Walker Ridge Area, Block 315 as follows:

Table 1: Proposed Wellsite WR 271-S1, Block 315, Walker Ridge Area project information

X = 2 103 779.31 ft	Y = 9 674 554.45 ft
Latitude: 26° 39′ 16.9199″ N	Longitude: 91° 34′ 51.3061″ W
Nearest 3D Inline: 5896	Nearest 3D Crossline: 3164

8. Water Depth and Seafloor Gradient

The water depth at the proposed wellsite is about 6,533 ft with zero datum at sea surface. No tidal corrections were applied. The local seafloor gradient is about 0.9° to the northeast.

9. Seafloor and Near-Seafloor Features

The seafloor surrounding the proposed location appears to be smooth and stable (Figure 3 and Figure 4). 2,100 ft to the south, the seafloor drops off into a channel-like feature at the edge of the study area; this is not expected to represent a significant constraint to drilling operations. Approximately 7,500 ft to the west is a ridge associated with diapiric salt uplift; approximately 6,000 ft to the east is another ridge associated with eastern tabular salt; a prominent tabular salt escarpment lies approximately 8,200 ft to the east.

A few seafloor faults are associated with these structures, the closest of which is 2,940 ft to the southeast of the proposed wellbore. No fluid expulsion features, seafloor mounds, or likely hardgrounds are present within 2,000 ft of the proposed wellsite. Seafloor amplitudes in the vicinity of the proposed wellsite are low to moderate and generally uniform (Figure 5).

10. Potential High-Density Benthic Communities

There is no geophysical evidence of hardgrounds, hydrocarbon seepage sites, or areas that could potentially support high-density benthic communities within 2,000 ft of the proposed location. Therefore, there is a negligible potential for high-density communities of benthic and/or chemosynthetic organisms within 2,000 ft of the proposed wellsite, in accordance with BOEM NTL 2009-G40, extended by NTL 2015-N02 (BOEM 2009 and 2015, respectively).

11. Manmade Obstructions

According to the Fugro database of infrastructure and seafloor obstructions, no manmade features are located within 3,000 ft of the proposed wellsite. However, it is recommended that a remotely operated vehicle (ROV) be used to inspect the seafloor at the proposed wellsite immediately before drilling activities to confirm that there are no seafloor obstructions. No anthropogenic seafloor conditions that may adversely affect exploratory drilling were identified in the vicinity of the proposed wellsite.

12. Stratigraphy

The seafloor, four subsurface horizons (H10, H15, H20 and H30), and the top of salt were mapped to divide the tophole section into five stratigraphic units, Units 1 through 5, of distinct seismic character and inferred lithology at the proposed wellbore. Unit 5 was further divided into 4 subunits (5A, 5B, 5C, and 5D). The bases of subunits 5A and 5B are the inferred bases of mass-transport deposits (MTDs) seen in the seismic data. The base of subunit 5C is an estimated stratal correlation to overpressured sediment related to shallow water flow observed in the offset well WR 272 EQNR-1.

Exact sediment conditions along the proposed wellbore cannot be determined with the available data. Predicted depths and thicknesses associated with each of the mapped horizons and sequences for the proposed WR 271-S1 drilling location are displayed on the attached Tophole Prognosis Chart (Figure 7).

Unit 1 (Seafloor to Horizon 10) is interpreted as hemipelagic clays. The lower portion of this sequence likely contains ponded, clay-rich turbidites and small MTDs. Horizon 10 is a late Pleistocene unconformity. Unit 1 is 196 ft thick at the proposed well location.

Unit 2 (Horizon 10 to Horizon 15) is characterized by an upper portion of discontinuous reflectors with varying amplitude strength, interpreted as regional MTDs, lying above a section of relatively continuous reflectors with moderate amplitude strength, interpreted to be well stratified clays and thin turbidites. Although tentatively correlated to the JIP cores, the lithology interpretation is mainly based on seismic facies. Horizon 15 is a late Pleistocene erosional unconformity that appears to represent a regional hiatus in the southeastern lobe of the Terrebonne Basin. Unit 2 is about 337 ft thick at the proposed well location.

Unit 3 (Horizon 15 to Horizon 20) is interpreted to contain muddy turbidites interlayered with small-scale MTDs. Horizon 20 is a high-amplitude peak reflector that is relatively continuous across most of the study area. Unit 3 is about 645 ft thick at the proposed well location.

Unit 4 (Horizon 20 to Horizon 30) contains low-amplitude, poorly-bedded, discontinuous reflectors that are interpreted to represent muddy turbidites interlayered with small-scale MTDs. Horizon 30 is a moderate-amplitude trough reflector that marks the top of a thicker MTD package below Unit 4. Unit 4 is about 591 ft thick at the proposed well location.

Unit 5 (Horizon 30 to the DLI) is a complex interval divided into four subunits:

The upper subunit, Unit 5A, is interpreted to be a large and extensive MTD package that is approximately 681 ft thick at the proposed well location. The Unit includes large-scale slump deposits and channel features. There is a region of moderate amplitude reflectors within Unit 5A that could represent sand-prone layers. This MTD section could be a self-pressured unit with sealing pressures possible along Horizon 30 as well as at the base of the MTDs.

Unit 5B is interpreted as predominantly weakly bedded clays with small-scale MTDs. The MTDs of Unit 5A erode into this Unit. Unit 5B is 585 ft thick at the proposed well location. Units 5A and 5B could be a self-pressured unit with sealing pressures possible at the base of Unit 5B.

Unit 5C consists of low-amplitude hemipelagic clays, muds, and silts with possible fine-grained MTDs. Unit 5C is about 1,455 ft thick at the proposed well location.

Unit 5D is interpreted to be comprised of hemipelagic clays, muds, and silts with possible thin sand layers. The top of Unit 5D is a tentative correlation to overpressured strata that produced a water flow in offset well WR 272-1 EQNR. At the proposed well location, Unit 5D is 758 ft thick from the top of Unit 5D to the DLI. There is 4,220 ft between the top of Unit 5D and the top of salt.

The DLI is 11, 781 ft vertical depth below sea surface and the top of salt is 15,243 ft vertical depth below sea surface.

Unit 5 is 3,479 ft thick from Horizon 30 to the DLI, and there is 6,941 ft from Horizon 30 to the top of salt.

13. Fault Penetrations

No faults were identified in the immediate vicinity of the tophole section from the seafloor to the DLI. It is possible that faults exist below the resolution of the data used for the current study.

14. Gas Hydrates

Temperature and pressure conditions are favorable for the presence of gas hydrates within the study area; however, no amplitude anomalies indicative of gas hydrate were identified at the proposed wellbore. The JIP Leg II drilling results confirm that high saturation gas hydrates in sand-prone sediments can be identified with 3D seismic data in the WR 313 area by a fast velocity amplitude signature (Boswell, et al., 2012); no such anomalies are present along the proposed wellbore, nor within 3,000 ft of the well bore. Fracture filling gas hydrates in clays were identified in WR 313 but cannot be directly imaged with exploration 3D seismic data (Ibid, 2012). Nevertheless, disseminated gas hydrates generally do not cause serious problems for exploratory drilling operations.

15. Gas Hazards

Amplitude extractions were performed within each unit starting at the seafloor and extending to the DLI. No high amplitude anomalies interpreted to represent shallow gas will be penetrated by a vertical wellbore in the tophole section at the proposed wellsite. The nearest amplitude anomaly lies within Unit 2 and is located approximately 365 ft southeast of the proposed wellbore (Figure 6). Units 5A and 5B are interpreted to contain moderate amplitude reflectors that could be indicative of sand-prone sediments (Figure 7).

As a conservative measure, Units 2, 5A, and 5B are therefore assessed to have low potential for shallow gas while the rest of the wellbore is assessed to have negligible potential for shallow gas.

16. Shallow Water Flow (SWF)

Shallow water flow (SWF) zones are associated with over-pressured continuous or isolated sands overlain by a seal and a rapidly-deposited and buried overburden. Based on information from the WR 225-1 MRO well, roughly 7.57 miles to the northwest, the post-Miocene sediment accumulation rate is about 2,450 ft/Ma. This is a very high rate of sediment accumulation and is believed to be the result of the basinal setting. High sedimentation rates can be warning flags for shallow water flow potential in sand-prone sediments buried at 500 ft or greater below mudline. Nonetheless, the tophole section is mostly comprised of clays, and the thin, discontinuous nature of the silt or sand layers should limit the duration and severity of any shallow water flow. Structural deformation caused by salt uplifts may provide a conduit for the transmission of overpressure, if any, from depth to the near-seafloor sediments.

The WR 272-1 EQNR well, approximately 8,320 ft northeast of the WR 271-S1 location, encountered water flow at 9,446 ft measured depth (MD), rotary Kelly bushing (RKB) in a zone of interbedded silts and sands. This may be associated with sand and clay deformation in the suprasalt rubble section where salt uplift generated hydrostatic overpressures. SWF can also result when the pressure regime from the sub-basin is transferred up the sides of the basin, possibly with the aid of faults on the flanks of salt domes. The thickness of SWF-bearing sand in the WR 272-1 EQNR well was too low to resolve in the seismic and is difficult to correlate with seismic strata at that depth of the sub-basin. The peak reflector at the base of Unit 5C is only tentatively correlated from the overpressured strata in the WR 272-1 EQNR well to the proposed WR 271-S1 location. Nevertheless, the presence of SWF in the WR 272-1 EQNR well warrants a conservative prognosis for moderate possibility for SWF in Unit 5D.

Debris flows, which are present in the study area, can also create situations conducive to overpressure and can increase the risk of localized SWFs. Units 3 through 5C at the proposed well location contain MTDs of varying sizes, the bases of which are difficult to delineate in some areas. Although the MTDs are believed to be clay rich, the disrupted strata may contain hard material and discontinuous sand layers. MTD sections can be self-pressured units with sealing pressures possible along their tops and bases. Although Units 3 through 5C were drilled without incident in the WR 272-1 EQNR well, as a conservative measure they are assessed to have low potential for shallow water flow. The most significant MTD package is Unit 5A, which is 681 ft thick; it is assessed as having low to moderate potential for shallow water flow due to its thickness. Units 1 and 2

contain MTDs, but those MTDs are buried at less than 500 ft BML and are not considered capable of inducing the pressure necessary for SWF in associated sands.

17. Suitability for Temporary Occupation for Drilling

Proposed well WR 271-S1 is suitable for temporary-occupation drilling provided that the aforementioned conditions and constraints are considered and planned for in the final well design.

18. References

Advocate, D.M. and Hood, K.C., 1993. An empirical time depth model for calculating water depth, northwest Gulf of Mexico. *Geo Marine Letters*, 13, pp. 207–211.

Boswell, R. and Collett, T. S. eds., 2012. Resource and hazard implications of gas hydrates in the Northern Gulf of Mexico: Results of the 2009 Joint Industry Project Leg II Drilling Expedition", *Marine and Petroleum Geology*, 34(1), p. 224.

Bureau of Ocean Energy Management, 2009. *Notice to lessees and operators of federal oil, gas, and sulphur leases in the outer continental shelf, Gulf of Mexico OCS region, deepwater benthic communities*. United States Department of the Interior, Minerals Management Service, Gulf of Mexico, NTL 2009-G40.

Bureau of Ocean Energy Management, 2011. *Updated SWF occurrence graphic, Mississippi Canyon, Gulf of Mexico*. April 15, 2009.

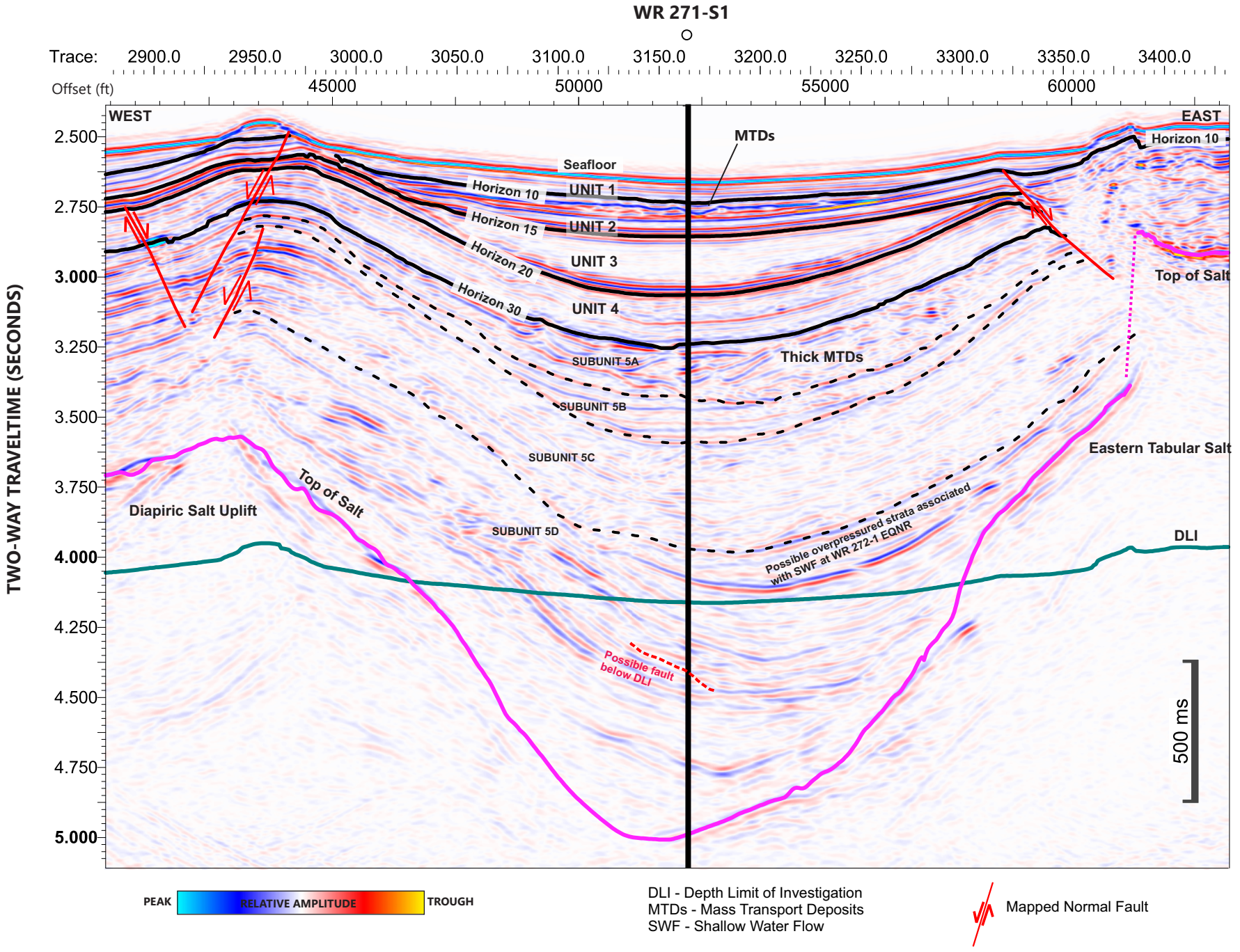
Bureau of Ocean Energy Management, 2015. *Notice to lessees and operators (NTL) of federal oil and gas leases in the outer continental shelf (OSC), elimination of expiration cates on certain notices to lessees and operators pending review and reissuance*, United States Department of the Interior, Gulf of Mexico, NTL 2015-N02.

Fugro USA Marine, 2021. *Shallow hazards assessment, monument prospect, blocks WR 224–229, WR 268–273, and WR 312–317, Fugro report No. 02.2101-0017, prepared for Equinor*.

Fugro GeoConsulting, Inc., 2015. *Shallow hazards assessment, monument prospect, blocks WR 224–229, WR 268–273, and WR 312–317, Fugro report No. 27.1502-2831, prepared for Statoil*.

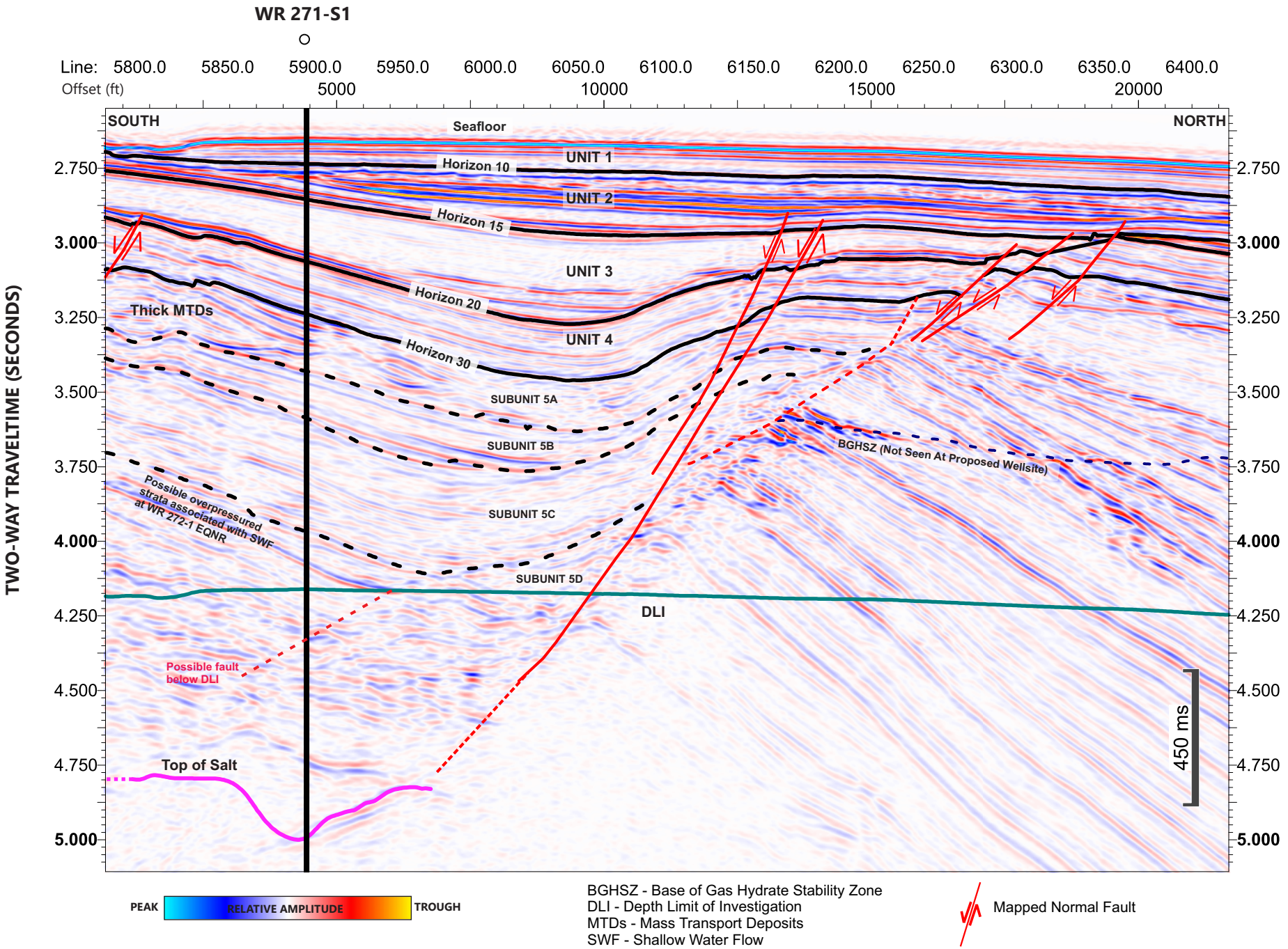
Fugro GeoServices, Inc., 2015. *Archaeological assessment, monument prospect, blocks 271 & 272, walker ridge area, Gulf of Mexico, Fugro report No. 2414-5059, prepared for Statoil*.

Figures

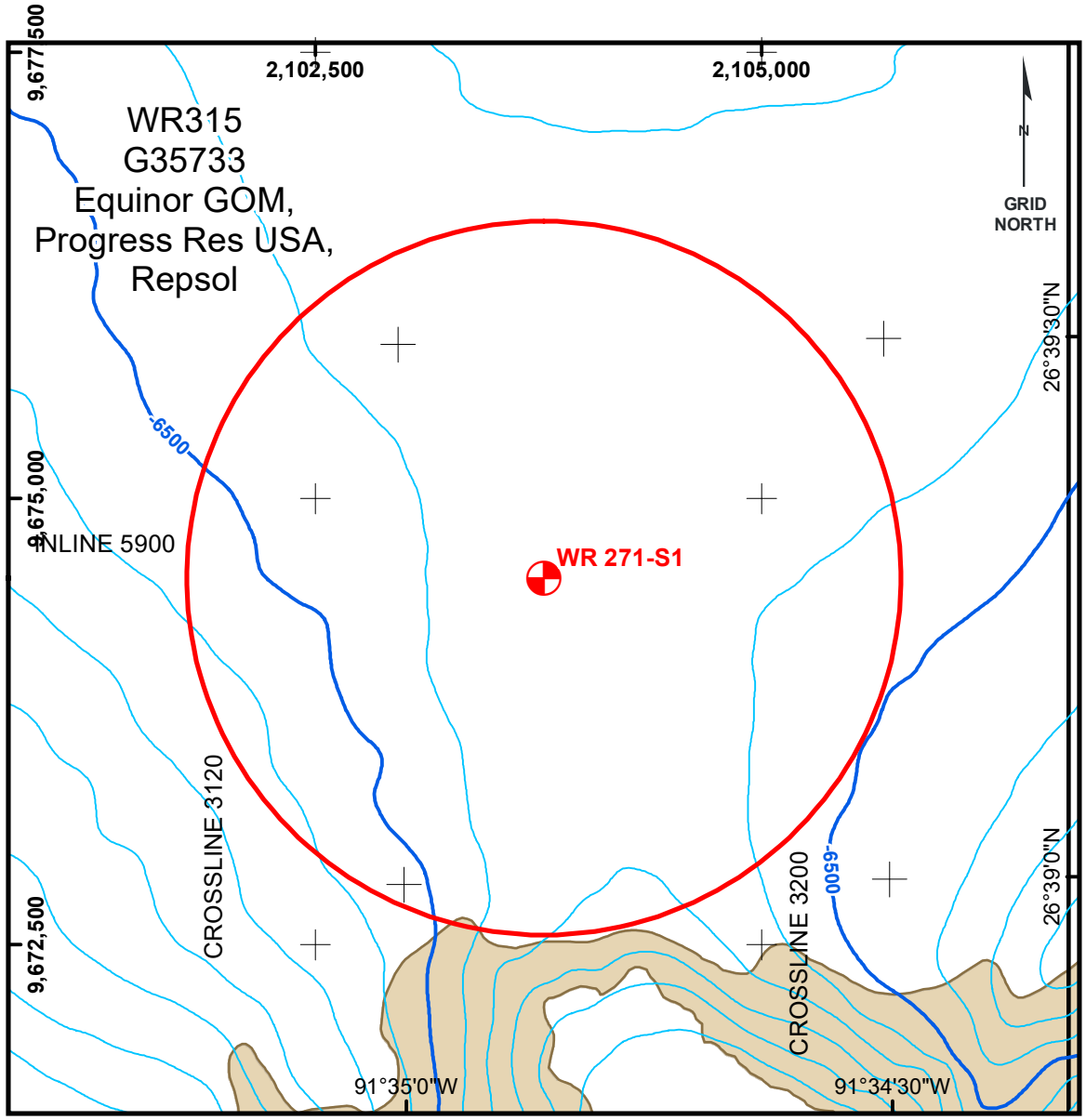


A PORTION OF 3D SEISMIC INLINE 5896

02.2101-0017-S1 02 | Proposed Wellsite WR 271-S1
Figure 1



A PORTION OF 3D SEISMIC CROSSLINE 3164



PROPOSED WELLSITE LOCATION AND DESIGNATED 2,000-ft RADIUS CIRCLE IS SHOWN AROUND THE WELL SURFACE LOCATION AS REQUIRED BY NTL 2009-G40, EXTENDED BY NTL 2015-N02
X=2,103,779.31 Y=9,674,554.45 NAD27 UTM15N

-6500 WATER DEPTH CONTOUR, IN FEET.
MAJOR CONTOUR INTERVAL = 250 FEET
MINOR CONTOUR INTERVAL = 25 FEET

OCS BLOCK WITH LEASE INFORMATION

INLINE 5900 3D SURVEY LINE NUMBER

SEAFLOOR EROSIONAL ESCARPMENT

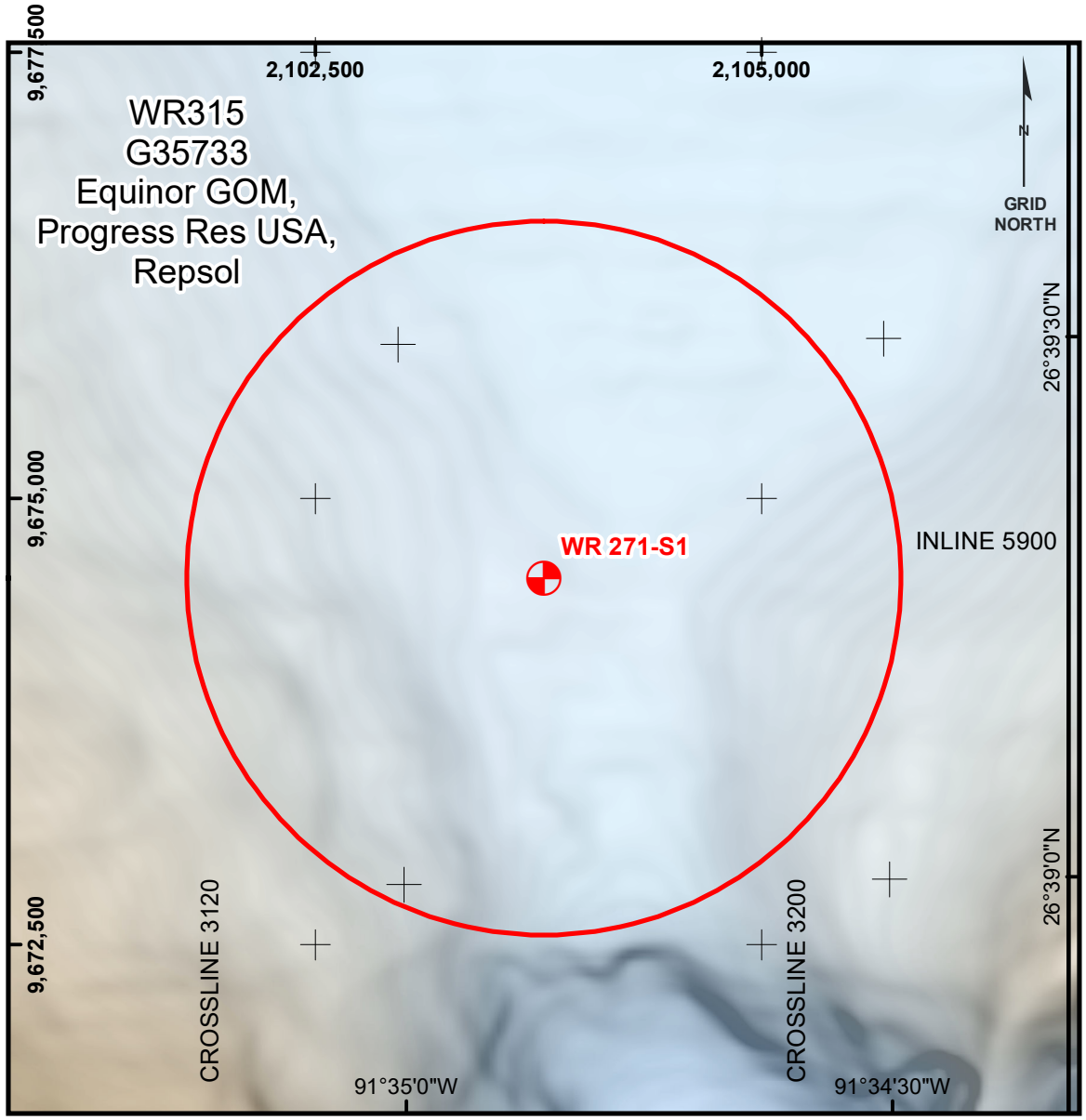
SCALE = 1:12,000

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

Feet

WATER DEPTH AND SEAFLOOR FEATURES CHART

FUGRO



PROPOSED WELLSITE LOCATION AND DESIGNATED 2,000-ft RADIUS CIRCLE IS SHOWN AROUND THE WELL SURFACE LOCATION AS REQUIRED BY NTL 2009-G40, EXTENDED BY NTL 2015-N02
X=2,103,779.31 Y=9,674,554.45 NAD27 UTM15N

OCS BLOCK WITH LEASE INFORMATION

INLINE 5900 3D SURVEY LINE NUMBER

WATER DEPTH (FEET) BELOW SEA LEVEL

SHALLOW: -5986.19

DEEP: -7142.89

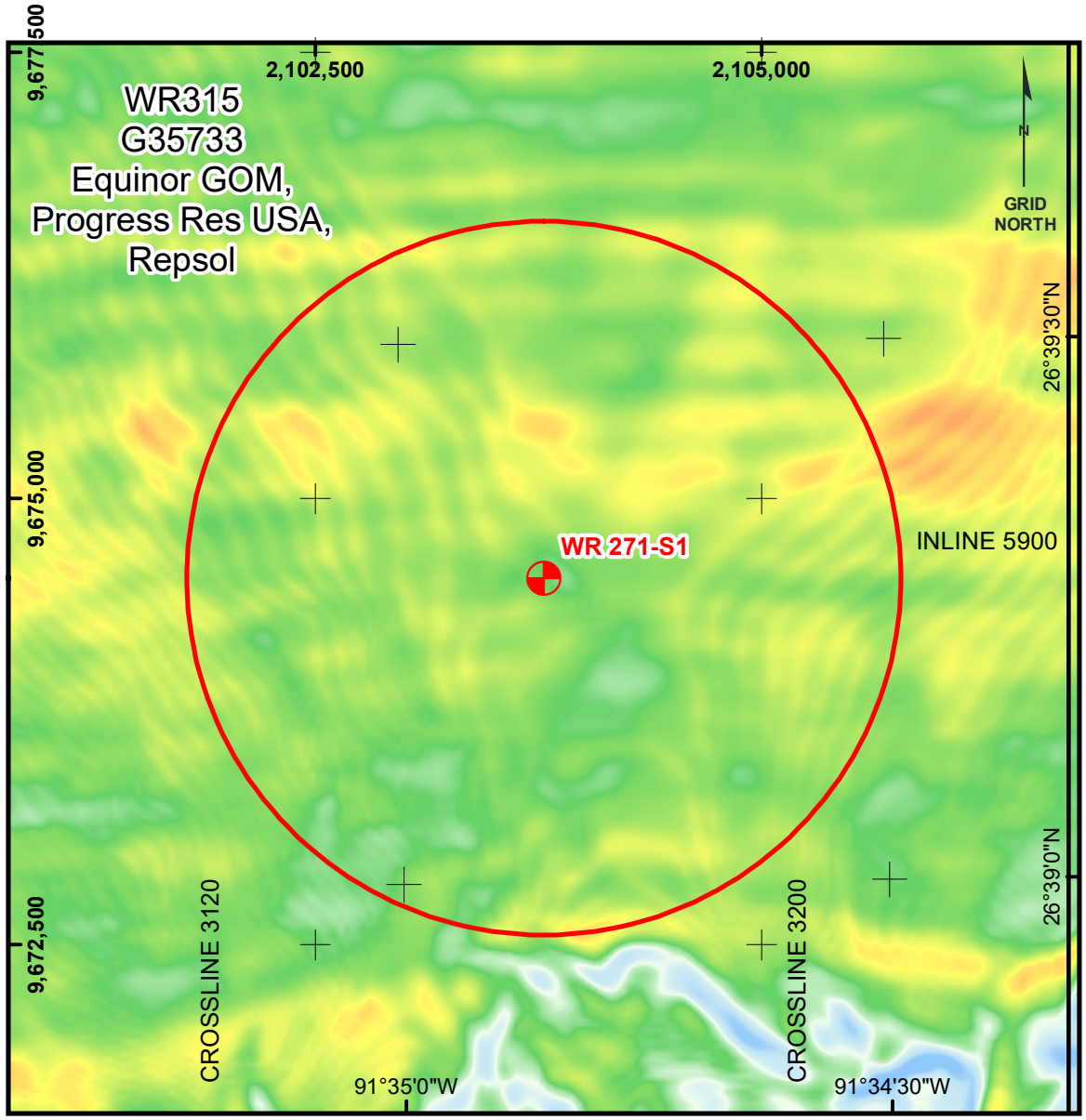
SCALE = 1:12,000

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

Feet

SEAFLOOR RENDERING

FUGRO



PROPOSED WELLSITE LOCATION AND DESIGNATED 2,000-ft RADIUS CIRCLE IS SHOWN AROUND THE WELL SURFACE LOCATION AS REQUIRED BY NTL 2009-G40, EXTENDED BY NTL 2015-N02
X=2,103,779.31 Y=9,674,554.45 NAD27 UTM15N

OCS BLOCK WITH LEASE INFORMATION

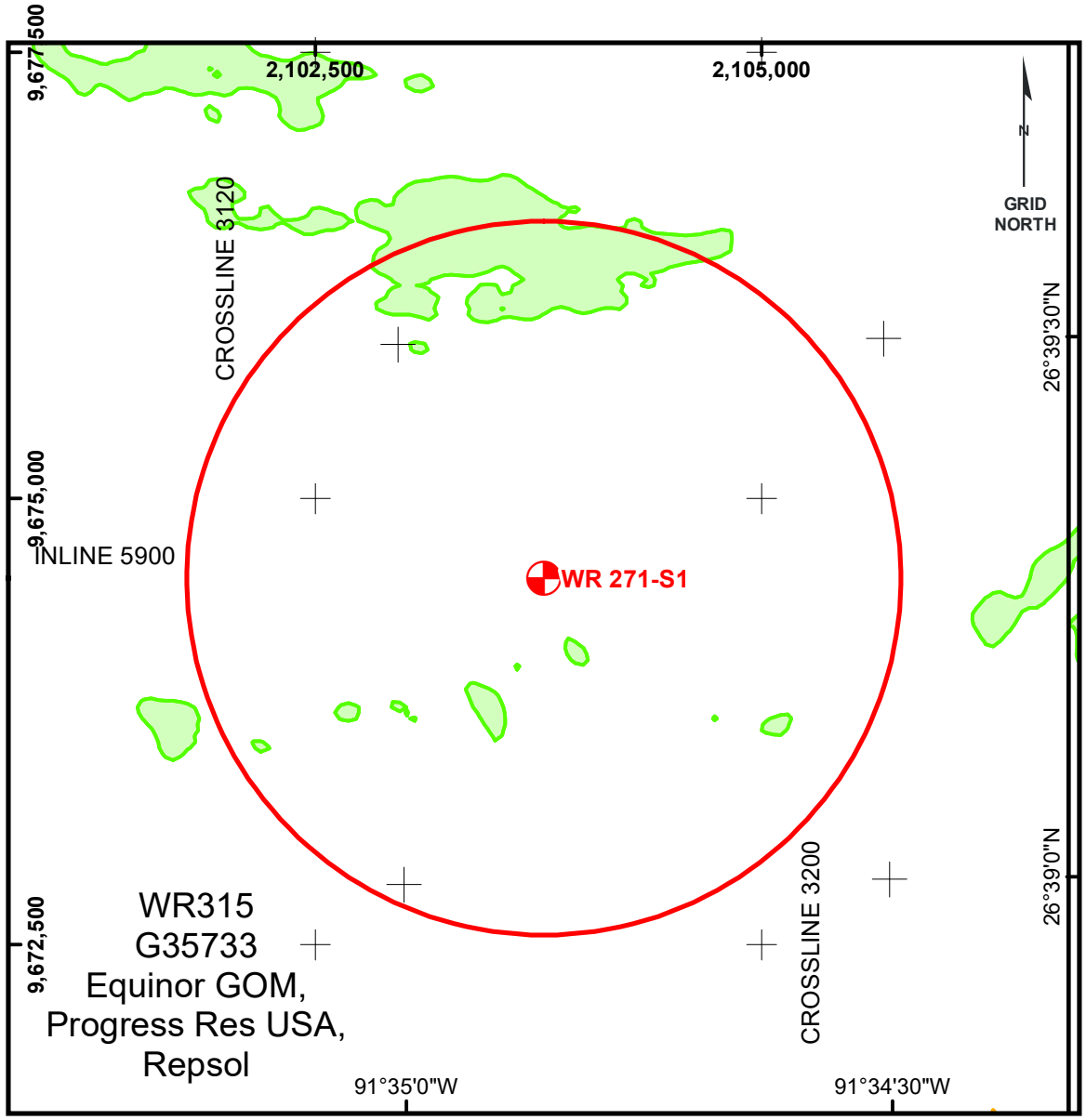
INLINE 5900 3D SURVEY LINE NUMBER

RELATIVE SEAFLOOR AMPLITUDE
HIGH
LOW

SCALE = 1:12,000

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

SEAFLOOR AMPLITUDE CHART



PROPOSED WELLSITE LOCATION AND DESIGNATED 2,000-ft RADIUS CIRCLE IS SHOWN AROUND THE WELL SURFACE LOCATION AS REQUIRED BY NTL 2009-G40, EXTENDED BY NTL 2015-N02
X=2,103,779.31 Y=9,674,554.45 NAD27 UTM15N

OCS BLOCK WITH LEASE INFORMATION

INLINE 5900 3D SURVEY LINE NUMBER

HIGH-NEGATIVE AMPLITUDE ANOMALIES INDICATIVE OF POSSIBLE GAS ACCUMULATION

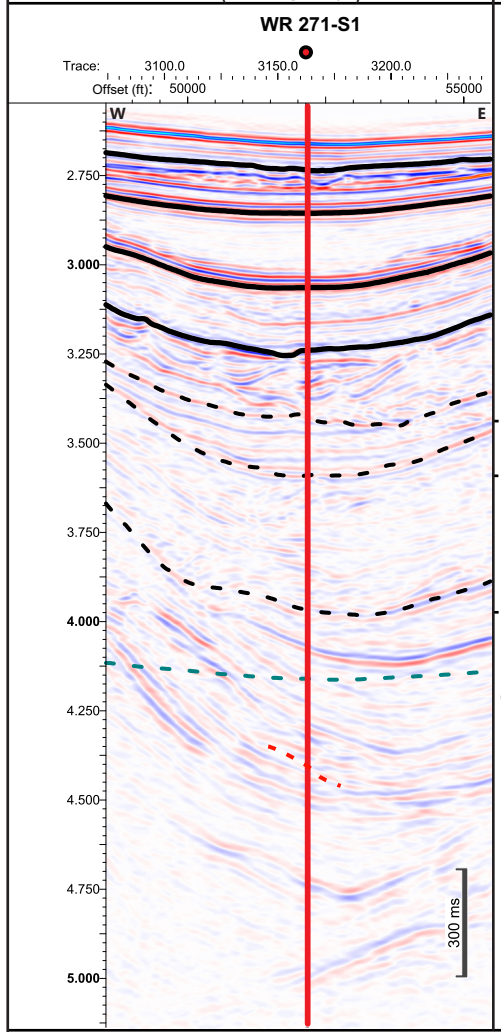
HORIZON 10 TO HORIZON 15 (UNIT 2)

SCALE = 1:12,000

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

Feet

SUBSURFACE GEOLOGIC FEATURES CHART



3D SEISMIC SECTION PROPOSED WR 271-S1 WELL INLINE 5896 AT CROSSLINE 3164 X = 2103779.31 ft , Y = 9674554.45 ft (NAD27 UTM15N)	HORIZON & UNIT DESIGNATION	INFERRED LITHOLOGY & TOPHOLE CONDITIONS	TWT SS (sec)	VERT. DEPTH BML (ft)	VERT. DEPTH BSS (ft)	THICK-NESS (ft)	SHALLOW GAS POTENTIAL	SHALLOW WATER FLOW POTENTIAL
		The seafloor is suitable for well siting in the immediate vicinity of the proposed location. The seafloor exhibits a slope of 0.9° to the northeast.					ASSUMES OPEN-HOLE DRILLING CONDITIONS	
	SEAFLOOR		2.660	0	6533			
	UNIT 1	Predominantly hemipelagic clays, turbidites and MTDs.				196	NEGLIGIBLE	NEGLIGIBLE
	HORIZON 10		2.736	196	6729			
	UNIT 2	Well bedded hemipelagic clays with thin turbidites and MTDs.				337	LOW	NEGLIGIBLE
	HORIZON 15		2.855	533	7066			
	UNIT 3	Muddy turbidites interlayered with small-scale MTDs.				645	NEGLIGIBLE	LOW
	HORIZON 20		3.064	1178	7711			
	UNIT 4	Muddy turbidites interlayered with small-scale MTDs.				591	NEGLIGIBLE	LOW
	HORIZON 30		3.240	1769	8302			
	UNIT 5A	Large-scale slump and mass transport deposits with variable sediment properties and possible discontinuous sands. Overpressure at base of MTD package possible.				681	LOW	LOW TO MODERATE
			3.431	2450	8983			
	UNIT 5B	Weakly bedded clays with small-scale MTDs. Overpressure at base of MTD package possible.				585	LOW	LOW
			3.589	3035	9568			
	UNIT 5C	Hemipelagic clays, muds and silts with possible fine-grained MTDs and discontinuous sands.				1455	NEGLIGIBLE	LOW
			3.968	4490	11023			
	UNIT 5D	Hemipelagic clays,muds and silts with thin sand layers. Possible correlation to overpressured sediments and water flow observed in offset well WR 272 EQNR-1; possible overpressured basinal sediments.				758	NEGLIGIBLE	MODERATE
	DEPTH LIMIT OF INVESTIGATION		4.160	5248	11781			
	POSSIBLE FAULT							
	TOP OF SALT		4.988	8710	15243			
		DATE MADE: APRIL 2021						

3479

3462

TWT: Two-way Time
BML: Below Mudline
BSS: Below Sea Surface
MTD: Mass Transport Deposit

Negligible: Not present or higly unlikely occurrence
Low: Unlikely presence or occurrence; not significant
Moderate: Possible presence or occurrence; mitigation measures recommended
High: Probable presence or occurrence; mitigation measures highly recommended

DEPTHS BASED ON SUBSURFACE DEPTH FUNCTION DERIVED FROM EQUINOR VELOCITY CUBE EXTRACTIONS

TOPHOLE PROGNOSIS CHART
PROPOSED WELLSITE WR 271-S1

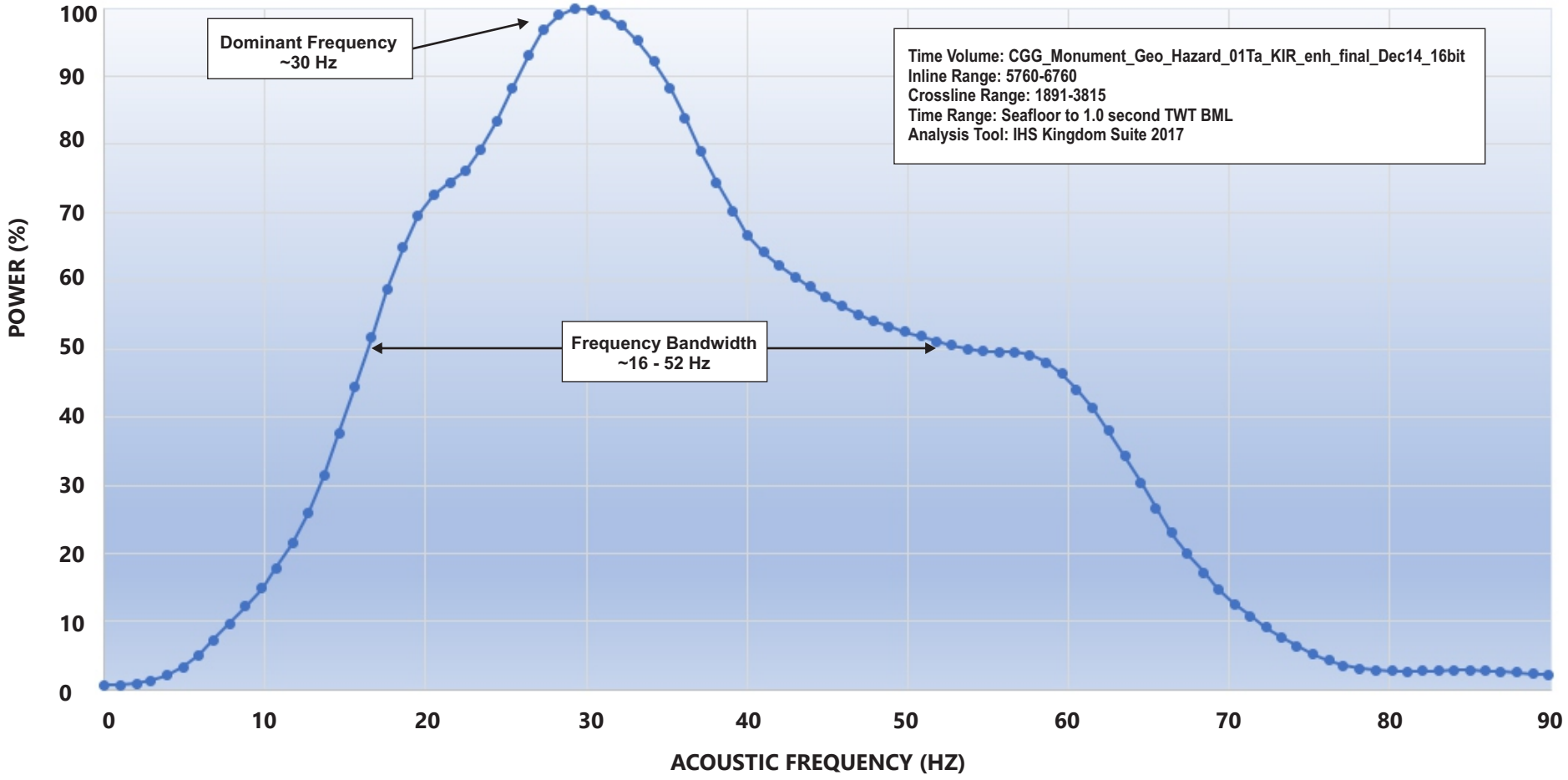


FIGURE 8. 3D SEISMIC POWER SPECTRUM CHART

SECTION 4
HYDROGEN SULFIDE INFORMATION

4.1 CONCENTRATION

Equinor anticipates encountering zero ppm H_2S during the proposed operations.

4.2 CLASSIFICATION

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

4.3 H2S CONTINGENCY PLAN

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

4.4 MODELING REPORT

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

SECTION 5
BIOLOGICAL, PHYSICAL AND SOCIOECONOMIC INFORMATION

5.1 DEEPWATER BENTHIC COMMUNITIES

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

5.2 TOPOGRAPHIC FEATURES (BANKS)

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

5.3 TOPOGRAPHIC FEATURES STATEMENT (SHUNTING)

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

5.4 LIVE BOTTOMS (PINNACLE TREND FEATURES)

WR 271, 315 and 316 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."

5.5 LIVE BOTTOMS (LOW RELIEF)

WR 271, 315 and 316 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."

5.6 POTENTIALLY SENSITIVE BIOLOGICAL FEATURES MAP

WR 271, 315 and 316 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.

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

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

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in the Gulf of Mexico
			Lease Area	Coastal	
Marine Mammals					
Manatee, West Indian	*Trichechus manatus latirostris*	T	--	X	Florida (peninsular)
Whale, Blue	*Balaenoptera masculus*	E	X*	--	None
Whale, Bryde's	*Balaenoptera edeni*	E	X	--	None
Whale, Fin	*Balaenoptera physalus*	E	X*	--	None
Whale, Humpback	*Megaptera novaeangliae*	E	X*	--	None
Whale, North Atlantic Right	*Eubalaena glacialis*	E	X*	--	None
Whale, Sei	*Balaenopiera borealis*	E	X*	--	None
Whale, Sperm	*Physeter catodon (=macrocephalus)*	E	X	--	None
Terrestrial Mammals					
Mouse, Beach (Alabama, Choctawatchee, Perdido Key, St. Andrew)	*Peromyscus polionotus*	E	-	X	Alabama, Florida (panhandle) beaches
Birds					
Plover, Piping	*Charadrius melodus*	T	-	X	Coastal Texas, Louisiana, Mississippi, Alabama and Florida (panhandle)
Crane, Whooping	*Grus Americana*	E	-	X	Coastal Texas
Mississippi sandhill crane	*Grus Canadensis pulla*	E	-	X	Coastal Mississippi
Eskimo curlew	*Numenius borealis*	E	-	X	None
Northern Aplomado Falcon	*Falco femoralis septentrionalis*	E	-	X	None
Red Knot	*Calidris canutus rufa*	T	-	X	None
Wood stork	*Mycteria americana*	T	-	X	None
Reptiles					
Sea Turtle, Green	*Chelonia mydas*	T	X	X	None
Sea Turtle, Hawksbill	*Eretmochelys imbricata*	E	X	X	None
Sea Turtle, Kemp's Ridley	*Lepidochelys kempli*	E	X	X	None
Sea Turtle, Leatherback	*Dermochelys coriacea*	E	X	X	None
Sea Turtle, Loggerhead	*Caretta caretta*	T	X	X	Texas, Louisiana, Mississippi, Alabama, Florida
Fish					
Sturgeon, Gulf	*Acipenser oxyrinchus (=oxyrhynchus) desotoi*	T	X	X	Coastal Louisiana, Mississippi, Alabama and Florida (panhandle)
Oceanic Whitetip Shark	Carcharhinus longimanus	E	X	_	None
Smalltooth Sawfish	*Pristis pectinata*	E	-	X	None

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in the Gulf of Mexico
			Lease Area	Coastal	
Nassau Grouper	*Epinephelus striatus*	T	-	X	None
Giant Manta Ray	*Manta birostris*	E	X	-	None
Corals					
Coral, Elkhorn	*Acopora palmate*	T	X**	X	Florida Keys and Dry Tortugas
Coral, Staghorn	*Acopora cervicornis*	T	-	X	Florida
Boulder Star Coral	*Orbicella franksi*	T	X	X	None
Lobed Star Coral	*Orbicella annularis*	T	X	X	None
Mountainous Star Coral	*Orbicella faveolata*	T	X	X	None
Rough Cactus Coral	*Mycetophyllia ferox*	T	-	X	None

Abbreviations: E = Endangered; T = Threatened

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

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

5.8 ARCHAEOLOGICAL REPORT

Walker Ridge Blocks 271, 315 and 316 have been determined to have a high potential for containing archaeological properties. 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 was previously submitted.

5.9 AIR AND WATER QUALITY INFORMATION

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

5.10 SOCIOECONOMIC INFORMATION

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

SECTION 6
WASTES AND DISCHARGES INFORMATION

6.1 PROJECTED GENERATED WASTES

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

6.2 MODELING REPORT

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

Attachment 6-A

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

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

Projected generated waste			Projected ocean discharges		Projected Downhole Disposal
Type of Waste and Composition	**Composition**	**Projected Amount**	**Discharge rate per well**	**Discharge Method**	**Answer yes or no**
Will drilling occur ? If yes, you should list muds and cuttings					
Water-based drilling fluid	16.0 ppg base fluid	50,000 bbls/well	5,000 bbls/day/well	seafloor	No
Cuttings wetted with water-based fluid	Cuttings w\gel\mud\fresh and salt water	3,917 bbls/well	391 bbls/day/well	seafloor	No
Cuttings wetted with synthetic-based fluid	Cuttings w\SBM 8.6 - 17.0 ppg SBM	5,054 bbls/well	40 bbls/day/well	overboard	No
Will humans be there? If yes, expect conventional waste					
Domestic waste (kitchen water, shower water)	grey water	18,060 bbls/well	129 bbls/day/well	remove floating solids and discharge	No
Sanitary waste (toilet water)	treated sanitary waste	12,040 bbls/well	86 bbls/day/well	chlorinate and discharge	No
Is there a deck? If yes, there will be Deck Drainage					
Deck Drainage	Rainfall & Potable Water	14,280 bbls/well	102 bbls/day/well	filter oil & grease and discharge	No
Will you conduct well treatment, completion, or workover?					
well treatment fluids	NA	NA	NA	NA	No
well completion fluids	NA	NA	NA	NA	No
workover fluids	NA	NA	NA	NA	No
Miscellaneous discharges. If yes, only fill in those associated with your activity.					
Desalinization unit discharge	Max Capacity	15,400 bbls/well	110 bbls/day/well	discharge overboard	No
Blowout preventer fluid	Stack Magic ECO-FV2	243 bbls/well	1.8 bbls/day/well	discharge at seafloor	No
Ballast water	Sea Water	7,000 bbls/well	50 bbl/day/well	discharge overboard	No
Bilge water	Oil/Water Mixture	1,820 bbls/well	13 bbls/day/well	discharge overboard	No
Excess cement at seafloor	Class H	1,500 bbls/well	8 bbls/min/well	discharge at seafloor	No
Fire water	Sea Water	21,000 bbls/well	150 bbls/day/well	discharge overboard	No
Cooling water	Sea Water	186,415,320 bbls/well	1,331,538 bbls/day/well	discharge overboard	No
Will you produce hydrocarbons? If yes fill in for produced water.					
Produced water	NA	NA	NA	NA	

Will you be covered by an individual or general NPDES permit ? **GMG290000**

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

Attachment 6-A

SECTION 7
AIR EMISSIONS INFORMATION

7.1 EMISSIONS WORKSHEETS AND SCREENING QUESTIONS

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

7.2 SUMMARY INFORMATION

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

This information was calculated by:

Kelley Pisciola
281-698-8519
kelley.pisciola@jccteam.com

COMPANY	Equinor Gulf of Mexico LLC
AREA	Walker Ridge
BLOCK	315 (Surface Location)
LEASE	G-35733 (Surface Location)
FACILITY	NA
WELL	K, K-ST1, K-ST-2, K-ST-3, S AND W
COMPANY CONTACT	Kelley Pisciola
TELEPHONE NO.	281-698-8519
REMARKS	Drill and TA or PA Well Locations K, K-ST-1, K-ST-2, K-ST-3, S AND W (Surface Location-WR 315) (NOTE: Well Location W is a mirror location of Well Location K and is intended as a respud location only).

AIR EMISSIONS COMPUTATION FACTORS

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

Equipment/Emission Factors	units	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3	REF.	DATE	Reference Links
Natural Gas Turbine	g/hp-hr		0.0086	0.0086	0.0026	1.4515	0.0095	N/A	0.3719	N/A	AP42 3.1-1& 3.1-2a	4/00	https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s01.pdf
RECIP. 2 Cycle Lean Natural Gas	g/hp-hr		0.1293	0.1293	0.0020	6.5998	0.4082	N/A	1.2009	N/A	AP42 3.2-1	7/00	https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s02.pdf
RECIP. 4 Cycle Lean Natural Gas	g/hp-hr		0.0002	0.0002	0.0020	2.8814	0.4014	N/A	1.8949	N/A	AP42 3.2-2	7/00	https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s02.pdf
RECIP. 4 Cycle Rich Natural Gas	g/hp-hr		0.0323	0.0323	0.0020	7.7224	0.1021	N/A	11.9408	N/A	AP42 3.2-3	7/00	https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s02.pdf
Diesel Recip. < 600 hp	g/hp-hr	1	1	1	0.0279	14.1	1.04	N/A	3.03	N/A	AP42 3.3-1	10/96	https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s03.pdf
Diesel Recip. > 600 hp	g/hp-hr	0.32	0.182	0.178	0.0055	10.9	0.29	N/A	2.5	N/A	AP42 3.4-1 & 3.4-2	10/96	https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf
Diesel Boiler	lbs/bbl	0.0840	0.0420	0.0105	0.0089	1.0080	0.0084	5.14E-05	0.2100	0.0336	AP42 1.3-6; Pb and NH3: WebFIRE (08/2018)	9/98 and 5/10	https://cfpub.epa.gov/webfire/
Diesel Turbine	g/hp-hr	0.0381	0.0137	0.0137	0.0048	2.7941	0.0013	4.45E-05	0.0105	N/A	AP42 3.1-1 & 3.1-2a	4/00	https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s01.pdf
Dual Fuel Turbine	g/hp-hr	0.0381	0.0137	0.0137	0.0048	2.7941	0.0095	4.45E-05	0.3719	0.0000	AP42 3.1-1& 3.1-2a; AP42 3.1-1 & 3.1-2a	4/00	https://cfpub.epa.gov/webfire/
Vessels – Propulsion	g/hp-hr	0.320	0.1931	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022	USEPA 2017 NEI;TSP refer to Diesel Recip. > 600 hp reference	3/19	
Vessels – Drilling Prime Engine, Auxiliary	g/hp-hr	0.320	0.1931	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022	USEPA 2017 NEI;TSP refer to Diesel Recip. > 600 hp reference	3/19	https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data
Vessels – Diesel Boiler	g/hp-hr	0.0466	0.1491	0.1417	0.4400	1.4914	0.0820	3.73E-05	0.1491	0.0003	USEPA 2017 NEI;TSP (units converted) refer to Diesel Boiler Reference	3/19	
Vessels – Well Stimulation	g/hp-hr	0.320	0.1931	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022	USEPA 2017 NEI;TSP refer to Diesel Recip. > 600 hp reference	3/19	
Natural Gas Heater/Boiler/Burner	lbs/MMscf	7.60	1.90	1.90	0.60	190.00	5.50	5.00E-04	84.00	3.2	AP42 1.4-1 & 1.4-2; Pb and NH3: WebFIRE (08/2018)	7/98 and 8/18	https://www3.epa.gov/ttnchie1/ap42/ch01/final/c01s04.pdf
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	https://www3.epa.gov/ttn/chief/ap42/ch13/final/C13S05_02-05-18.pdf
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	
Combustion Flare (medium smoke)	lbs/MMscf	10.50	10.50	10.50	0.57	71.40	35.93	N/A	325.5	N/A	AP42 13.5-1, 13.5-2	2/18	
Combustion Flare (heavy smoke)	lbs/MMscf	21.00	21.00	21.00	0.57	71.40	35.93	N/A	325.5	N/A	AP42 13.5-1, 13.5-2	2/18	
Liquid Flaring	lbs/bbl	0.42	0.0966	0.0651	5.964	0.84	0.01428	5.14E-05	0.21	0.0336	AP42 1.3-1 through 1.3-3 and 1.3-5	5/10	https://www3.epa.gov/ttnchie1/ap42/ch01/final/c01s03.pdf
Storage Tank	tons/yr/tank						4.300				2014 Gulfwide Inventory; Avg emiss (upper bound of 95% CI)	2017	https://www.boem.gov/environment/environmental-studies/2014-gulfwide-emission-inventory
Fugitives	lbs/hr/component						0.0005				API Study	12/93	https://www.api.org/
Glycol Dehydrator	tons/yr/dehydrator						19.240				2011 Gulfwide Inventory; Avg emiss (upper bound of 95% CI)	2014	https://www.boem.gov/environment/environmental-studies/2011-gulfwide-emission-inventory
Cold Vent	tons/yr/vent						44.747				2014 Gulfwide Inventory; Avg emiss (upper bound of 95% CI)	2017	https://www.boem.gov/environment/environmental-studies/2014-gulfwide-emission-inventory
Waste Incinerator	lb/ton		15.0	15.0	2.5	2.0	N/A	N/A	20.0	N/A	AP 42 2.1-12	10/96	https://www3.epa.gov/ttnchie1/ap42/ch02/final/c02s01.pdf
On-Ice – Loader	lbs/gal	0.043	0.043	0.043	0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model; TSP (units converted) refer to Diesel Recip. <600 reference	2009	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-nei-data
Vessels - Hovercraft Diesel	g/hp-hr	0.320	0.1931	0.1873	0.0047	7.6669	0.2204	2.24E-05	1.2025	0.0022	USEPA 2017 NEI;TSP refer to Diesel Recip. > 600 hp reference	3/19	https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inventory-nei-data

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

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

Heat Value of Natural Gas		
Heat Valu	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	%

AIR EMISSIONS CALCULATIONS - 1ST YEAR

COMPANY	AREA		BLOCK	LEASE	FACILITY	WELL				CONTACT	PHONE	REMARKS
Equinor Gulf of Mexico LLC	Walker Ridge		315 (Surface Location)	G-35733 (Surface Location)	NA	K, K-ST1, K-ST-2, K-ST-3, S AND W				Kelley Pisciola	281-698-8519	Drill and TA or PA Well Locations K, K-ST-1, K-ST-2, K-ST-3, S AND W (Surface Location-WR 315) (NOTE: Well Location W is a mirror location of Well Location K and is intended as a respud location only).

OPERATIONS	EQUIPMENT	EQUIPMENT ID	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR									ESTIMATED TONS								
	Diesel Engines		HP	GAL/HR	GAL/D																				
	Nat. Gas Engines		HP	SCF/HR	SCF/D																				
	Burners		MMBTU/HR	SCF/HR	SCF/D	HR/D	D/YR	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
DRILLING	VESSELS- Drilling - Propulsion Engine - Diesel		61800	3179.363	76304.71	24	47	43.60	26.30	25.51	0.63	1044.59	30.03	0.00	163.84	0.30	24.59	14.84	14.39	0.36	589.15	16.94	0.00	92.41	0.17
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels - Diesel Boiler		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels – Drilling Prime Engine, Auxiliary		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATI	VESSELS - Heavy Lift Vessel/Derrick Barge Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			BPD																						
DRILLING	Liquid Flaring		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	COMBUSTION FLARE - no smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - light smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - medium smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - heavy smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
ALASKA-SPECIFIC SOURCES	**VESSELS**		kW			**HR/D**	**D/YR**																		
	VESSELS - Ice Management Diesel		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
2021	**Facility Total Emissions**							**43.60**	**26.30**	**25.51**	**0.63**	**1,044.59**	**30.03**	**0.00**	**163.84**	**0.30**	**24.59**	**14.84**	**14.39**	**0.36**	**589.15**	**16.94**	**0.00**	**92.41**	**0.17**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**																**5,661.00**			**5,661.00**	**5,661.00**	**5,661.00**		**104,338.57**	
	170.0																								
DRILLING	VESSELS- Crew Diesel	3 x week	7200	370.4112	8889.87	8	20	5.08	3.06	2.97	0.07	121.70	3.50	0.00	19.09	0.04	0.41	0.25	0.24	0.01	9.74	0.28	0.00	1.53	0.00
	VESSELS - Supply Diesel	3 x week	9468	487.0907	11690.18	12	20	6.68	4.03	3.91	0.10	160.03	4.60	0.00	25.10	0.05	0.80	0.48	0.47	0.01	19.20	0.55	0.00	3.01	0.01
	VESSELS - Tugs Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	VESSELS - Material Tug Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Crew Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Supply Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	VESSELS - Support Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALASKA-SPECIFIC SOURCES	**On-Ice Equipment**			**GAL/HR**	**GAL/D**																				
	Man Camp - Operation (maximum people per day)		**PEOPLE/DAY**																						
	VESSELS		kW			**HR/D**	**D/YR**																		
	On-Ice – Loader			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Other Construction Equipment			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Other Survey Equipment			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Tractor			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Truck (for gravel island)			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Truck (for surveys)			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	Man Camp - Operation		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	
	VESSELS - Hovercraft Diesel		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2021	**Non-Facility Total Emissions**							**11.76**	**7.09**	**6.88**	**0.17**	**281.73**	**8.10**	**0.00**	**44.19**	**0.08**	**1.21**	**0.73**	**0.71**	**0.02**	**28.94**	**0.83**	**0.00**	**4.54**	**0.01**

AIR EMISSIONS CALCULATIONS - 2ND YEAR

COMPANY	AREA		BLOCK	LEASE	FACILITY	WELL				CONTACT	PHONE	REMARKS
Equinor Gulf of Mexico LLC	Walker Ridge		315 (Surface Location)	G-35733 (Surface Location)	NA	K, K-ST1, K-ST-2, K-ST-3, S AND W				Kelley Pisciola	281-698-8519	Drill and TA or PA Well Locations K, K-ST-1, K-ST-2, K-ST-3, S AND W (Surface Location-WR 315) (NOTE: Well Location W is a mirror location of Well Location K and is intended as a respud location only).

OPERATIONS	EQUIPMENT	EQUIPMENT ID	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR									ESTIMATED TONS								
	Diesel Engines		HP	GAL/HR	GAL/D																				
	Nat. Gas Engines		HP	SCF/HR	SCF/D																				
	Burners		MMBTU/HR	SCF/HR	SCF/D	HR/D	D/YR	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
DRILLING	VESSELS- Drilling - Propulsion Engine - Diesel		61800	3179.363	76304.71	24	302	43.60	26.30	25.51	0.63	1044.59	30.03	0.00	163.84	0.30	158.00	95.33	92.47	2.30	3785.58	108.84	0.01	593.76	1.10
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels - Diesel Boiler		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels – Drilling Prime Engine, Auxiliary		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATI	VESSELS - Heavy Lift Vessel/Derrick Barge Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			BPD																						
DRILLING	Liquid Flaring		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	COMBUSTION FLARE - no smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - light smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - medium smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - heavy smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
ALASKA-SPECIFIC SOURCES	**VESSELS**		kW			HR/D	D/YR																		
	VESSELS - Ice Management Diesel		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
2022	**Facility Total Emissions**							**43.60**	**26.30**	**25.51**	**0.63**	**1,044.59**	**30.03**	**0.00**	**163.84**	**0.30**	**158.00**	**95.33**	**92.47**	**2.30**	**3,785.58**	**108.84**	**0.01**	**593.76**	**1.10**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**																**5,661.00**			**5,661.00**	**5,661.00**	**5,661.00**		**104,338.57**	
	170.0																								
DRILLING	VESSELS- Crew Diesel	3 x week	7200	370.4112	8889.87	8	129	5.08	3.06	2.97	0.07	121.70	3.50	0.00	19.09	0.04	2.62	1.58	1.53	0.04	62.80	1.81	0.00	9.85	0.02
	VESSELS - Supply Diesel	3 x week	9468	487.0907	11690.18	12	129	6.68	4.03	3.91	0.10	160.03	4.60	0.00	25.10	0.05	5.17	3.12	3.03	0.08	123.87	3.56	0.00	19.43	0.04
	VESSELS - Tugs Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY	VESSELS - Material Tug Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INSTALLATION	VESSELS - Crew Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Supply Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	VESSELS - Support Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALASKA-SPECIFIC SOURCES	**On-Ice Equipment**			GAL/HR	GAL/D																				
	Man Camp - Operation (maximum people per day)		PEOPLE/DAY																						
	VESSELS		kW			HR/D	D/YR																		
	On-Ice – Loader			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Other Construction Equipment			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Other Survey Equipment			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Tractor			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Truck (for gravel island)			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Truck (for surveys)			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	Man Camp - Operation		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	
	VESSELS - Hovercraft Diesel		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2022	**Non-Facility Total Emissions**							**11.76**	**7.09**	**6.88**	**0.17**	**281.73**	**8.10**	**0.00**	**44.19**	**0.08**	**7.79**	**4.70**	**4.56**	**0.11**	**186.66**	**5.37**	**0.00**	**29.28**	**0.05**

AIR EMISSIONS CALCULATIONS - 3RD YEAR

COMPANY	AREA	BLOCK	LEASE	FACILITY	WELL	CONTACT	PHONE	REMARKS
Equinor Gulf of Mexico LLC	Walker Ridge	315 (Surface Location)	G-35733 (Surface Location)	NA	K, K-ST1, K-ST-2, K-ST-3, S AND W	Kelley Pisciola	281-698-8519	Drill and TA or PA Well Locations K, K-ST-1, K-ST-2, K-ST-3, S AND W (Surface Location-WR 315) (NOTE: Well Location W is a mirror location of Well Location K and is intended as a respud location only).

OPERATIONS	EQUIPMENT	EQUIPMENT ID	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR									ESTIMATED TONS								
	Diesel Engines		HP	GAL/HR	GAL/D																				
	Nat. Gas Engines		HP	SCF/HR	SCF/D																				
	Burners		MMBTU/HR	SCF/HR	SCF/D	HR/D	D/YR	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
DRILLING	VESSELS- Drilling - Propulsion Engine - Diesel		61800	3179.363	76304.71	24	121	43.60	26.30	25.51	0.63	1044.59	30.03	0.00	163.84	0.30	63.31	38.19	37.05	0.92	1516.74	43.61	0.00	237.90	0.44
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels - Diesel Boiler		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels – Drilling Prime Engine, Auxiliary		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATI	VESSELS - Heavy Lift Vessel/Derrick Barge Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			BPD																						
DRILLING	Liquid Flaring		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	COMBUSTION FLARE - no smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - light smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - medium smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - heavy smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
ALASKA-SPECIFIC SOURCES	**VESSELS**		kW			HR/D	D/YR																		
	VESSELS - Ice Management Diesel		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
2023	**Facility Total Emissions**							**43.60**	**26.30**	**25.51**	**0.63**	**1,044.59**	**30.03**	**0.00**	**163.84**	**0.30**	**63.31**	**38.19**	**37.05**	**0.92**	**1,516.74**	**43.61**	**0.00**	**237.90**	**0.44**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**																**5,661.00**			**5,661.00**	**5,661.00**	**5,661.00**		**104,338.57**	
	170.0																								
DRILLING	VESSELS- Crew Diesel	3 x week	7200	370.4112	8889.87	8	52	5.08	3.06	2.97	0.07	121.70	3.50	0.00	19.09	0.04	1.06	0.64	0.62	0.02	25.31	0.73	0.00	3.97	0.01
	VESSELS - Supply Diesel	3 x week	9468	487.0907	11690.18	12	52	6.68	4.03	3.91	0.10	160.03	4.60	0.00	25.10	0.05	2.08	1.26	1.22	0.03	49.93	1.44	0.00	7.83	0.01
	VESSELS - Tugs Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	VESSELS - Material Tug Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Crew Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Supply Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	VESSELS - Support Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALASKA-SPECIFIC SOURCES	**On-Ice Equipment**			GAL/HR	GAL/D																				
	Man Camp - Operation (maximum people per day)		PEOPLE/DAY																						
	VESSELS		kW			HR/D	D/YR																		
	On-Ice – Loader			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Other Construction Equipment			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Other Survey Equipment			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Tractor			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Truck (for gravel island)			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Truck (for surveys)			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	Man Camp - Operation		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	
	VESSELS - Hovercraft Diesel		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2023	**Non-Facility Total Emissions**							**11.76**	**7.09**	**6.88**	**0.17**	**281.73**	**8.10**	**0.00**	**44.19**	**0.08**	**3.14**	**1.89**	**1.84**	**0.05**	**75.24**	**2.16**	**0.00**	**11.80**	**0.02**

AIR EMISSIONS CALCULATIONS - 4TH YEAR

COMPANY	AREA		BLOCK	LEASE	FACILITY	WELL				CONTACT	PHONE	REMARKS
Equinor Gulf of Mexico LLC	Walker Ridge		315 (Surface Location)	G-35733 (Surface Location)	NA	K, K-ST1, K-ST-2, K-ST-3, S AND W				Kelley Pisciola	281-698-8519	Drill and TA or PA Well Locations K, K-ST-1, K-ST-2, K-ST-3, S AND W (Surface Location-WR 315) (NOTE: Well Location W is a mirror location of Well Location K and is intended as a respud location only).

OPERATIONS	EQUIPMENT	EQUIPMENT ID	RATING	MAX. FUEL	ACT. FUEL	RUN TIME		MAXIMUM POUNDS PER HOUR									ESTIMATED TONS								
	Diesel Engines		HP	GAL/HR	GAL/D																				
	Nat. Gas Engines		HP	SCF/HR	SCF/D																				
	Burners		MMBTU/HR	SCF/HR	SCF/D	HR/D	D/YR	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
DRILLING	VESSELS- Drilling - Propulsion Engine - Diesel		61800	3179.363	76304.71	24	121	43.60	26.30	25.51	0.63	1044.59	30.03	0.00	163.84	0.30	63.31	38.19	37.05	0.92	1516.74	43.61	0.00	237.90	0.44
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels - Diesel Boiler		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels – Drilling Prime Engine, Auxiliary		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATI	VESSELS - Heavy Lift Vessel/Derrick Barge Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			BPD																						
DRILLING	Liquid Flaring		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	COMBUSTION FLARE - no smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - light smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - medium smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - heavy smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
ALASKA-SPECIFIC SOURCES	**VESSELS**		kW			HR/D	D/YR																		
	VESSELS - Ice Management Diesel		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
2024	**Facility Total Emissions**							**43.60**	**26.30**	**25.51**	**0.63**	**1,044.59**	**30.03**	**0.00**	**163.84**	**0.30**	**63.31**	**38.19**	**37.05**	**0.92**	**1,516.74**	**43.61**	**0.00**	**237.90**	**0.44**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**																**5,661.00**			**5,661.00**	**5,661.00**	**5,661.00**		**104,338.57**	
	170.0																								
DRILLING	VESSELS- Crew Diesel	3 x week	7200	370.4112	8889.87	8	52	5.08	3.06	2.97	0.07	121.70	3.50	0.00	19.09	0.04	1.06	0.64	0.62	0.02	25.31	0.73	0.00	3.97	0.01
	VESSELS - Supply Diesel	3 x week	9468	487.0907	11690.18	12	52	6.68	4.03	3.91	0.10	160.03	4.60	0.00	25.10	0.05	2.08	1.26	1.22	0.03	49.93	1.44	0.00	7.83	0.01
	VESSELS - Tugs Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	VESSELS - Material Tug Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Crew Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS - Supply Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PRODUCTION	VESSELS - Support Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ALASKA-SPECIFIC SOURCES	**On-Ice Equipment**			GAL/HR	GAL/D																				
	Man Camp - Operation (maximum people per day)		PEOPLE/DAY																						
	VESSELS		kW			HR/D	D/YR																		
	On-Ice – Loader			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Other Construction Equipment			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Other Survey Equipment			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Tractor			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Truck (for gravel island)			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	On-Ice – Truck (for surveys)			0	0.0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
	Man Camp - Operation		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	
	VESSELS - Hovercraft Diesel		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2024	**Non-Facility Total Emissions**							**11.76**	**7.09**	**6.88**	**0.17**	**281.73**	**8.10**	**0.00**	**44.19**	**0.08**	**3.14**	**1.89**	**1.84**	**0.05**	**75.24**	**2.16**	**0.00**	**11.80**	**0.02**

AIR EMISSIONS CALCULATIONS

COMPANY	AREA	BLOCK	LEASE	FACILITY	WELL	
Equinor Gulf of Mexico LLC	315 (Surface Location)	G-35733 (Surface Location)	NA	K, K-ST1, K-ST-2, K-ST-3, S AND W		

Year	Facility Emitted Substance								
	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
2021	24.59	14.84	14.39	0.36	589.15	16.94	0.00	92.41	0.17
2022	158.00	95.33	92.47	2.30	3785.58	108.84	0.01	593.76	1.10
2023	63.31	38.19	37.05	0.92	1516.74	43.61	0.00	237.90	0.44
2024	63.31	38.19	37.05	0.92	1516.74	43.61	0.00	237.90	0.44
Allowable	5661.00			5661.00	5661.00	5661.00		104338.57	

SECTION 8
OIL SPILL INFORMATION

8.1 OIL SPILL RESPONSE PLANNING

All the proposed activities and facilities in this EP will be covered by the Oil Spill Response Plan (OSRP) filed by Equinor Gulf of Mexico LLC (Company No. 02748) dated April, 2019 and last approved on March 27, 2020 (OSRP Control No. O-735).

8.2 SPILL RESPONSE SITES

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

8.3 OSRO INFORMATION

Equinor's primary equipment provider is Clean Gulf Associates (CGA). Clean Gulf Associates Services, LLC (CGAS) will provide closest available personnel, as well as a CGAS supervisor to operate the equipment.

8.4 WORST CASE SCENARIO DETERMINATION

Category	Regional OSRP WCD - Drilling	EP WCD - Drilling
Type of activity	Drilling	Drilling
Facility location (area/block)	MC 801	WR 316 (SL)
Facility designation	A	G
Distance to nearest shoreline (miles)	55	170
Storage tanks (bbl)	NA	NA
Uncontrolled blowout (bbl)	295,203	162,712
Total volume (bbl)	**295,203**	**162,712**
Type of oil(s) (crude, condensate, diesel)	Crude	Crude
API gravity	29°	34°

The EP Drilling WCD calculations were accepted under Exploration Plan Control No. N-10060 approved August 28, 2019.

The Regional OSRP Drilling WCD calculations were accepted under Plan Control No. N-10098 approved June 11, 2020.

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

Since Equinor has the capability to respond to the worst-case spill scenario included in our Regional OSRP approved on March 27, 2020, and since the worst-case scenario determined for

our EP does not replace the worst-case scenario in our Regional OSRP, Equinor hereby certifies that Equinor 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 EP.

8.5 OIL SPILL RESPONSE DISCUSSION

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

8.6 MODELING REPORT

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

Attachment 8-A

SPILL RESPONSE DISCUSSION

For the purpose of NEPA and Coastal Zone Management Act analysis, the largest spill volume originating from the proposed activity would be a well blowout during drilling operations, estimated to be 162,712 barrels of crude oil with an API gravity of 34°.

Land Segment and Resource Identification

Trajectories of a spill and the probability of it impacting a land segment have been projected utilizing information in the BOEM Oil Spill Risk Analysis Model (OSRAM) for the Central and Western Gulf of Mexico available on the BOEM website. The results are shown in **Figure 1.** The BOEM OSRAM identifies a 3% probability of impact to the shorelines of Cameron Parish, Louisiana within 30 days. Cameron Parish includes the east side of Sabine Lake, Sabine National Wildlife Refuge, Calcasieu Lake, Lacassine National Wildlife Refuge (inland) and Grand Lake. Cameron Parish also includes the area along the coastline from Sabine Pass to Big Constance Lake in Rockefeller Wildlife Refuge. This region is composed of open public beaches, marshlands and swamps. It serves as a habitat for numerous birds, finfish and other animals, including several rare, threatened and endangered species.

Response

Equinor 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 16% or approximately 26,034 barrels of crude oil would be evaporated/dispersed within 24 hours, with approximately 136,678 barrels remaining.

Natural Weathering Data: WR 316, Well Location G	**Barrels of Oil**
WCD Volume	162,712
Less 16% natural evaporation/dispersion	26,034
Remaining volume	136,678

Table 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. **Table 2** also indicates how operations will be supported.

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

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

If the spill went unabated, shoreline impact in Cameron Parish, Louisiana would depend upon existing environmental conditions. Shoreline protection would include the use of CGA's near shore and shallow water skimmers with a totaled derated skimming capacity of 235,300 barrels. Temporary storage associated with skimming equipment equals 2,841 barrels. If additional storage is needed, various storage barges with a total capacity 235,000+ bbls may be mobilized and centrally located to provide temporary storage and minimize off-loading time. Onshore response may include the deployment of shoreline boom on beach areas, or protection and sorbent boom on vegetated areas. A Letter of Intent from AMPOL will ensure access to 63,750 feet of 18" shoreline protection boom. **Table 2** outlines individual times needed for procurement, load out, travel time to the site and deployment. Strategies would be based upon surveillance and real time trajectories that depict areas of potential impact given actual sea and weather conditions. Applicable Area Contingency Plans (ACPs), Geographic Response Plans (GRPs), and Unified Command (UC) will be consulted to ensure that environmental and special economic resources are correctly identified and prioritized to ensure optimal protection. Shoreline protection strategies depict the protection response modes applicable for oil spill clean-up operations. As a secondary resource, the State of Louisiana Initial Oil Spill Response Plan will be consulted as appropriate to provide detailed shoreline protection strategies and describe necessary action to keep the oil spill from entering Louisiana's coastal wetlands. The UC should take into consideration all appropriate items detailed in Tactics discussion of this Appendix. The UC and their personnel have the option to modify the deployment and operation of equipment to allow for a more effective response to site-specific circumstances. Equinor's contract Incident Management Team has access to the applicable ACP(s) and GRP(s).

Based on the anticipated worst case discharge scenario, Equinor 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 78 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

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

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

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

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

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

Offshore Response Actions

Equipment Deployment

Surveillance

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

Dispersant application assets

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

Containment boom

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

Oceangoing Boom Barge

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

In-situ Burn assets

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

Dedicated off-shore skimming systems
General

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

CGA HOSS Barge

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

CGA 95' Fast Response Vessels (FRVs)

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

CGA FRUs

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

T&T Koseq Skimming Systems

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

Storage Vessels

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

Vessels of Opportunity (VOO)

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

Adverse Weather Operations:

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

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

Maximization of skimmer-oil encounter rate

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

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

Maximize skimmer system efficiency

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

Recovered Oil Storage

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

Command, Control, and Communications (C^3)

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

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

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

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

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

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

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

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

Initial set-up and potential actions:

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

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

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

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

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

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

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

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

TF 4

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

TF 5

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

TF 6

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

TF 7

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

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

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

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

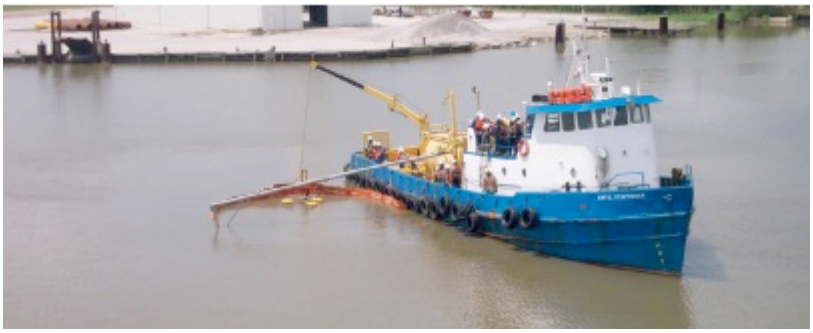
Skimming Operations: PIDVs are the preferred VOO skimming platform. OSROs are more versed in operating on these platforms and the vessels are generally large enough with crews more likely versed in spill response operations. They also have a greater possibility of having on-board storage capacity and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

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

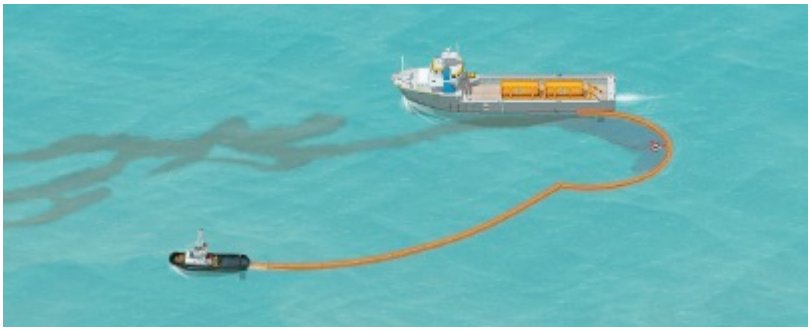
Tactical Overview

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

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



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



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

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

Tactical Overview

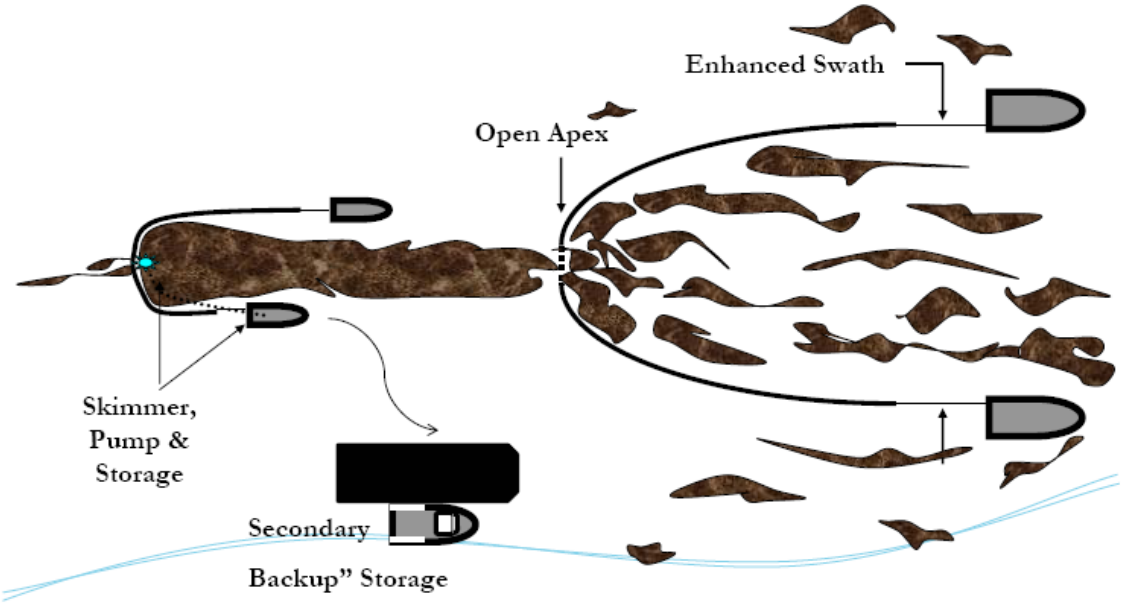
Mechanical Recovery – Deployed on large vessels of opportunity (VOO) the Koseq Rigid Sweeping Arms are high volume surge capacity deployed to increase recovery capacity at the source of a large oil spill in the offshore and outer nearshore environment of the Gulf of Mexico. They are highly mobile and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

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

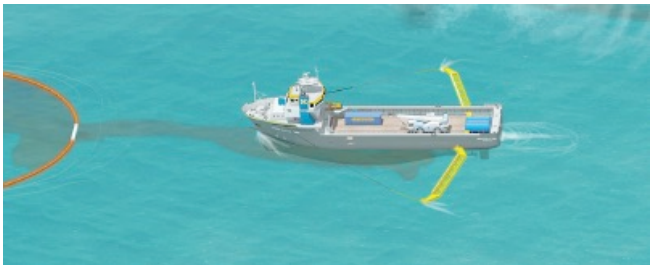
Command and Control – The large OSVs in many cases have state of the art communication and electronic systems, as well as the accommodations to support the function of directing all skimming operations offshore and reporting back to the command post.

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

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



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



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

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

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

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

Near Shore Response Actions

Timing

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

Considerations

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

Surveillance

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

Dispersant Use

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

Dedicated Near Shore skimming systems

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

VOO

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

Shoreline Protection Operations

Response Planning Considerations

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

Placement of boom

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

Beach Preparation - Considerations and Actions

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

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

Inland and Coastal Marsh Protection and Response Considerations and Actions

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

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

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

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

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

Environmental Conditions in the GOM

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

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

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

FIGURE 1
TRAJECTORY BY LAND SEGMENT

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

Area/Block	OCS-G	Launch Area	Land Segment and/or Resource	Conditional Probability (%)
Drill and abandon Well Location G **WR 316, Well Location G** *167 miles from shore*	G36084	C47	Matagorda, TX Brazoria, TX Galveston, TX Jefferson, TX **Cameron, LA** Vermilion, LA Terrebonne, LA Plaquemines, LA	1 1 2 1 **3** 1 1 1

WCD Scenario– <u>BASED ON WELL BLOWOUT DURING DRILLING OPERATIONS</u> (167 miles from shore)
136,678 bbls of crude oil (Volume considering natural weathering)
API Gravity 34°

FIGURE 2 – Equipment Response Time to WR 316, Well Location G

Dispersants/Surveillance

Dispersant/Surveillance	Dispersant Capacity (gal)	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to site	Total Hrs
ASI							
Basler 67T	2000	2	Houma	2	2	1.1	5.1
DC 3	1200	2	Houma	2	2	1.4	5.4
DC 3	1200	2	Houma	2	2	1.4	5.4
Aero Commander	NA	2	Houma	2	2	1.1	5.1

Offshore Response

Offshore Equipment Pre-Determined Staging	EDRC	Storage Capacity	VOO	Persons Required	From	Hrs to Procure	Hrs to Loadout	Hrs to GOM	Travel to Spill Site	Hrs to Deploy	Total Hrs
CGA											
HOSS Barge	76285	4000	3 Tugs	12	Harvey	6	0	12	21	2	41
95' FRV	22885	249	NA	6	Leeville	2	0	2	9.5	1	14.5
95' FRV	22885	249	NA	6	Venice	2	0	3	11	1	17
95' FRV	22885	249	NA	6	Vermilion	2	0	3	9	1	15
95' FRV	22885	249	NA	6	Galveston	2	0	2	13.5	1	18.5
Boom Barge (CGA-300) 42" Auto Boom (25000')	NA	NA	1 Tug 50 Crew	4 (Barge) 2 (Per Crew)	Leeville	8	0	4	27	2	41
Enterprise Marine Services LLC (Available through contract with CGA)											
CTCo 2608	NA	23000	1 Tug	6	Amelia	18	0	6	23	1	48
CTCo 2609	NA	23000	1 Tug	6	Amelia	18	0	6	23	1	48
Kirby Offshore (available through contract with CGA)											
RO Barge	NA	80000+	1 Tug	6	Venice	27	0	4	28	1	60
RO Barge	NA	130000+	1 Tug	6	Venice	27	0	4	28	1	60
RO Barge	NA	140000+	1 Tug	6	Venice	27	0	4	28	1	60
RO Barge	NA	150000+	1 Tug	6	Venice	27	0	4	28	1	60
RO Barge	NA	160000+	1 Tug	6	Venice	27	0	4	28	1	60

Staging Area: Fourchon

Offshore Equipment With Staging	EDRC	Storage Capacity	VOO	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Site	Hrs to Deploy	Total Hrs
T&T Marine (available through direct contract with CGA)											
Aqua Guard Triton RBS (1)	22323	2000	1 Utility	6	Galveston	4	12	12	16	2	46
Aqua Guard Triton RBS (1)	22323	2000	1 Utility	6	Harvey	4	12	3	16	2	37
Koseq Skimming Arms (10) Lamor brush	228850	10000	5 OSV	30	Galveston	24	24	12	16	2	78
Koseq Skimming Arms (6) MariFlex 150 HF	108978	6000	3 OSV	18	Galveston	24	24	12	16	2	78
Koseq Skimming Arms (2) Lamor brush	45770	2000	1 OSV	6	Harvey	24	24	3	16	2	69
Koseq Skimming Arms (4) MariFlex 150 HF	72652	4000	2 OSV	12	Harvey	24	24	3	16	2	69
CGA											
FRU (2) + 100 bbl Tank (4)	8502	400	2 Utility	12	Vermilion	2	6	5.5	16	1	30.5
FRU (1) + 100 bbl Tank (2)	4251	200	1 Utility	6	Galveston	2	6	12	16	1	37
FRU (1) + 100 bbl Tank (2)	4251	200	1 Utility	6	Aransas Pass	2	6	16.5	16	1	41.5
FRU (3) + 100 bbl Tank (6)	12753	600	3 Utility	18	Leeville	2	6	2	16	1	27
FRU (2) + 100 bbl Tank (4)	8502	400	2 Utility	12	Venice	2	6	5	16	1	30
Hydro-Fire Boom	NA	NA	8 Utility	40	Harvey	0	24	3	16	6	49

Nearshore Response

Nearshore Equipment Pre-determined Staging	EDRC	Storage Capacity	VOO	Persons Required	From	Hrs to Procure	Hrs to Loadout	Hrs to GOM	Travel to Spill Site	Hrs to Deploy	Total Hrs
CGA											
Mid-Ship SWS	22885	249	NA	4	Leeville	2	0	N/A	48	1	51
Mid-Ship SWS	22885	249	NA	4	Venice	2	0	N/A	48	1	51
Mid-Ship SWS	22885	249	NA	4	Galveston	2	0	N/A	48	1	51
Trinity SWS	21500	249	NA	4	Leeville	2	0	N/A	48	1	51
Trinity SWS	21500	249	NA	4	Venice	2	0	N/A	48	1	51
Trinity SWS	21500	249	NA	4	Vermilion	2	0	N/A	48	1	51
Trinity SWS	21500	249	NA	4	Galveston	2	0	N/A	48	1	51
46' FRV	15257	65	NA	4	Aransas Pass	2	0	2	16	1	21
46' FRV	15257	65	NA	4	Morgan City	2	0	2	6	1	11
46' FRV	15257	65	NA	4	Vermilion	2	0	2	2.5	1	7.5
46' FRV	15257	65	NA	4	Venice	2	0	2	11	1	16
Kirby Offshore (Available through contract with CGA)											
RO Barge	NA	80000+	1 Tug	6	Venice	34	0	4	21	1	60
Enterprise Marine Services LLC (Available through contract with CGA)											
CTCo 2603	NA	25000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 2604	NA	20000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 2605	NA	20000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 2606	NA	20000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 2607	NA	23000	1 Tug	6	Amelia	26	0	6	15	1	48
CTCo 5001	NA	47000	1 Tug	6	Amelia	26	0	6	15	1	48

Staging Area: Cameron

Nearshore Equipment With Staging	EDRC	Storage Capacity	VOO	Persons Req.	From	Hrs to Procure	Hrs to Load Out	Travel to Staging	Travel to Deployment	Hrs to Deploy	Total Hrs
CGA											
SWS Egmopol	1810	100	NA	3	Galveston	2	2	5	2	1	12
SWS Egmopol	1810	100	NA	3	Leeville	2	2	7	2	1	14
SWS Marco	3588	20	NA	3	Vermilion	2	2	2	2	1	9
SWS Marco	3588	34	NA	3	Leeville	2	2	7	2	1	14
SWS Marco	3588	34	NA	3	Venice	2	2	9.5	2	1	16.5
Foilex Skim Package (TDS 150)	1131	50	1 Utility	3	Vermilion	4	12	2	2	2	22
Foilex Skim Package (TDS 150)	1131	50	1 Utility	3	Galveston	4	12	5	2	2	25
Foilex Skim Package (TDS 150)	1131	50	1 Utility	3	Harvey	4	12	7	2	2	27
4 Drum Skimmer (Magnum 100)	680	100	1 Crew	3	Vermilion	2	2	2	2	1	9
4 Drum Skimmer (Magnum 100)	680	100	1 Crew	3	Harvey	2	2	7	2	1	14
2 Drum Skimmer (TDS 118)	240	100	1 Crew	3	Vermilion	2	2	2	2	1	9
2 Drum Skimmer (TDS 118)	240	100	1 Crew	3	Harvey	2	2	7	2	1	14

Shoreline Protection

Staging Area: Cameron

Shoreline Protection Boom	VOO	Persons Req.	Storage/Warehouse Location	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Deployment	Hrs to Deploy	Total Hrs
AMPOL (available through Letter of Intent)									
34,050' 18" Boom	13 Crew	26	New Iberia, LA	2	2	3.5	2	12	21.5
12,850' 18" Boom	7 Crew	14	Chalmette, LA	2	2	7.5	2	6	19.5
900' 18" Boom	1 Crew	2	Morgan City, LA	2	2	5	2	2	13
3,200' 18" Boom	2 Crew	4	Venice, LA	2	2	9	2	2	17
12,750' 18" Boom	7 Crew	14	Port Arthur, TX	2	2	1.5	2	6	13.5

Wildlife Response	EDRC	Storage Capacity	VOO	Persons Req.	From	Hrs to Procure	Hrs to Loadout	Travel to Staging	Travel to Deployment	Hrs to Deploy	Total Hrs
CGA											
Wildlife Support Trailer	NA	NA	NA	2	Harvey	2	2	7	1	2	14
Bird Scare Guns (24)	NA	NA	NA	2	Harvey	2	2	7	1	2	14
Bird Scare Guns (12)	NA	NA	NA	2	Galveston	2	2	5	1	2	12
Bird Scare Guns (12)	NA	NA	NA	2	Aransas Pass	2	2	9.5	1	2	16.5
Bird Scare Guns (48)	NA	NA	NA	2	Vermilion	2	2	2	1	2	9
Bird Scare Guns (24)	NA	NA	NA	2	Leeville	2	2	7	1	2	14

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

SECTION 9
ENVIRONMENTAL MONITORING INFORMATION

9.1 MONITORING SYSTEMS

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

At the time of this submission, the MODU contractor is not yet selected. Equinor will utilize a DP drillship, which will have a typical moon pool utilized in all Deepwater DP drillships. Accordingly, Equinor will comply with the Reasonable and Prudent Measures implementing Terms and Conditions of the Biological Opinion issued by the National Marine Fisheries Service (NMFS) on March 13, 2020.

The moon pool 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.

Equinor and/or its contractor representatives will attempt to keep hull doors closed when no activity is occurring within the moon pool, unless the safety of the crew or vessel require otherwise. This will prevent protected species from entering the confined area during periods of non-activity.

Prior to and following hull door closure, the moon pool will be monitored continuously for a minimum of 30 minutes, by a dedicated crew observer with no other tasks to ensure that no individual Endangered Species Act (ESA) listed species is trapped within the hull closed moon pool doors. 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 through the moon pool during riserless operations, 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 ESA listed species are present in the moon pool area.

If an ESA listed species is observed in the moon pool, prior to movement of the vessel, the vessel will not be moved and equipment will not be deployed or retrieved, to the extent practicable, unless the safety of the crew or vessel requires otherwise. If the observed animal leaves the moon pool, activities will commence. If the observed animal remains in the moon pool, Equinor will contact BSEE prior to planned movement of the vessel according to reporting requirements.

Should an ESA listed species be observed in a moon pool prior to activity commencement, 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 moon 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 monitoring requirements, recovery assistance (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 ESA 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.

9.2 INCIDENTAL TAKES

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

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

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

- Appendices to the Biological Opinion on the Federally Regulated Oil and Gas Program in the Gulf of Mexico issued on March 13, 2020
  - Appendix A: "Seismic Survey Mitigation and Protected Species Observer Protocols"
  - Appendix B: "Marine Trash and Debris Awareness and Elimination Survey Protocols"
  - Appendix C: "Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols"
  - Appendix J: "Sea Turtle Handling and Resuscitation Guidelines"

9.3 FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY

WR 271, 315 and 316 are not located in the Flower Garden Banks National Marine Sanctuary; therefore, relevant information is not required in this EP.

SECTION 10
LEASE STIPULATIONS INFORMATION

Exploration activities are subject to the following stipulations attached to Leases OCS-G 35083, 35733 and 36084, WR Blocks 271, 315 and 316.

10.1 MARINE PROTECTED SPECIES

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

(a) Collect and remove flotsam resulting from activities related to exploration, development, and production of this lease;

(b) Post signs in prominent places on all vessels and platforms used as a result of activities related to exploration, development, and production of this lease detailing the reasons (legal and ecological) why release of debris must be eliminated;

(c) Observe for marine mammals and sea turtles while on vessels, reduce vessel speed to 10 knots or less when assemblages of cetaceans are observed, and maintain a distance of 90 meters or greater from whales, and a distance of 45 meters or greater from small cetaceans and sea turtles;

(d) Employ mitigation measures prescribed by BOEM/BSEE or the National Marine Fisheries Service (NMFS) for all seismic surveys, including the use of an “exclusion zone” based upon the appropriate water depth, ramp-up and shutdown procedures, visual monitoring, and reporting;

(e) Identify important habitats, including designated critical habitat, used by listed species (e.g., sea turtle nesting beaches, piping plover critical habitat), in oil spill contingency planning and require the strategic placement of spill cleanup equipment to be used only by personnel trained in less-intrusive cleanup techniques on beaches and bay shores; and

(f) Immediately report all sightings and locations of injured or dead protected species (e.g., marine mammals and sea turtles) to the appropriate stranding network. If oil and gas industry activity is responsible for the injured or dead animal (e.g., because of a vessel strike), the responsible parties should remain available to assist the stranding network. If the injury or death was caused by a collision with the lessee’s vessel, the lessee must notify BOEM within 24 hours of the strike.

BOEM and BSEE issue Notices to Lessees (NTLs), which more fully describe measures implemented in support of the above-mentioned implementing statutes and regulations, as well as measures identified by the U.S. Fish and Wildlife Service and NMFS arising from, among others, conservation recommendations, rulemakings pursuant to the MMPA, or consultation. The lessee and its operators, personnel, and subcontractors, while undertaking activities authorized under this lease, must implement and comply with the specific mitigation measures outlined in NTL No. 2016-BOEM-G01, “Vessel Strike Avoidance and Injured/Dead Protected Species Reporting;” NTL No. 2016-BOEM-G02, “Implementation of Seismic Survey Mitigation Measures

and Protected Species Observer Program;" and NTL No. 2015-BSEE-G03, "Marine Trash and Debris Awareness and Elimination." At the lessee's option, the lessee, its operators, personnel, and contractors may comply with the most current measures to protect species in place at the time an activity is undertaken under this lease, including but not limited to new or updated versions of the NTLs identified in this paragraph. The lessee and its operators, personnel, and subcontractors will be required to comply with the mitigation measures, identified in the above referenced NTLs, and additional measures in the conditions of approvals for their plans or permits.

SECTION 11
ENVIRONMENTAL MITIGATION MEASURES INFORMATION

11.1 MEASURES TAKEN TO AVOID, MINIMIZE, AND MITIGATE IMPACTS

Equinor 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
  - 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"

11.2 INCIDENTAL TAKES

Equinor 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
  - 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 5.7** for a list of Threatened and Endangered Species, Critical Habitat and Marine Mammal Information.

SECTION 12
SUPPORT VESSELS AND AIRCRAFT INFORMATION

12.1 GENERAL

The most practical, direct route from the shorebase as permitted by weather and traffic conditions will be utilized.

The drilling unit, vessels, crew boats and supply boats associated with the operations proposed in this plan will not transit the Bryde's whale area.

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
Crew boat	28,000 – 38,000 gals	1	3 x week
Supply boat	203,000 gals	2	3 x week
Helicopter	440 - 760 gals	1	7 x week

12.2 DIESEL OIL SUPPLY VESSELS

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

Size of Fuel Supply Vessel (ft)	Capacity of Fuel Supply Vessel	Frequency of Fuel Transfers	Route Fuel Supply Vessel Will Take
280'	203,000	Every 10 days	Shortest route from Shorebase to block

12.3 DRILLING FLUID TRANSPORTATION

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

12.4 SOLID AND LIQUID WASTE TRANSPORTATION

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

12.5 VICINITY MAP

A vicinity map showing the location of the activities proposed herein relative to the shoreline with the distance of the proposed activities from the shoreline and the primary route of the support vessels and aircraft that will be used when traveling between the onshore support facilities and the drilling unit is included as **Attachment 12-B.**

Attachment 12-A

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

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

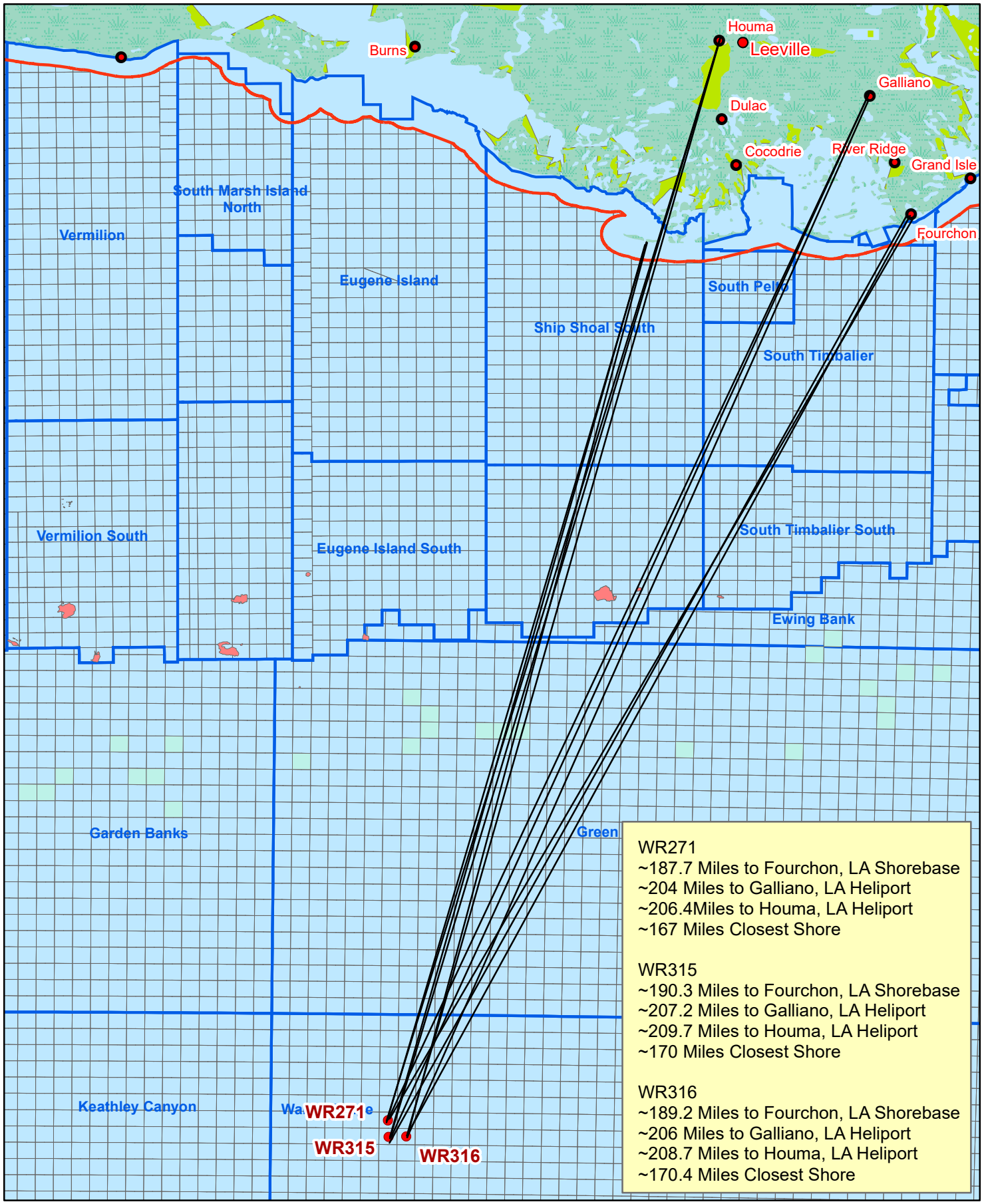
	Projected generated waste		Solid and Liquid Wastes transportation	Waste Disposal		
Type of Waste	**Composition**		**Transport Method**	**Name/Location of Facility**	**Amount**	**Disposal Method**
Will drilling occur ? If yes, fill in the muds and cuttings.						
Cuttings wetted with Water-based fluid	NA		NA	NA	NA	NA
Oil-based drilling fluid or mud	NA		NA	NA	NA	NA
Cuttings wetted with oil-based fluid	NA		NA	NA	NA	NA
Synthetic-based drilling fluid or mud	Whole mud sent back in after well has been abandoned for reconditioning & reuse		Below deck storage tanks on offshore supply vessels	Port Fourchon, LA	8,000 bbls/well	Recycled
Synthetic-based drilling fluid or mud	Tank washings from offshore supply boats		Below deck storage tanks on offshore supply vessels	Port Fourchon, LA	600 bbls/well	Recycled
Cuttings wetted with Synthetic-based fluid	NA		NA	NA	NA	NA
Will you produce hydrocarbons? If yes fill in for produced sand.						
Produced sand	NA		NA	NA	NA	NA
Will you have additional wastes that are not permitted for discharge? If yes, fill in the appropriate rows.						
Trash and Debris	non-recyclable/ non- hazardous refuse generated by personnel on the MODU		transport in bags / baskets on vessels toshorebase - picked up at shorebase and trucked to private facility	Port Fourchon, LA	2 cu yds/day	landfill
Trash and Debris	non- hazardous recyclables and scrap metal		transport in bags / baskets on vessels to shorebase - picked up at shorebase and trucked to private facility	Port Fourchon, LA	657 lbs/day	recycle
Waste and Used Oil	oil filters, rags, pads, empty drums		transport for disposal at private facility	Port Fourchon, LA	1/bbl/day	incinerate
wash water	water with trace amounts of O&G		Picked up at shorebase & trucked to private facility	Port Fourchon, LA	1,000 bbls/well	injected
chemical product wastes	NA			NA	NA	NA

NOTE: If you will not have a type of waste, enter NA in the row. **Attachment 12-A**

Attachment 12-B

Equinor Gulf of Mexico LLC

Vicinity Map
Walker Ridge Block 271/315/316



WR271
~187.7 Miles to Fourchon, LA Shorebase
~204 Miles to Galliano, LA Heliport
~206.4Miles to Houma, LA Heliport
~167 Miles Closest Shore

WR315
~190.3 Miles to Fourchon, LA Shorebase
~207.2 Miles to Galliano, LA Heliport
~209.7 Miles to Houma, LA Heliport
~170 Miles Closest Shore

WR316
~189.2 Miles to Fourchon, LA Shorebase
~206 Miles to Galliano, LA Heliport
~208.7 Miles to Houma, LA Heliport
~170.4 Miles Closest Shore

SECTION 13
ONSHORE SUPPORT FACILITIES INFORMATION

13.1 GENERAL

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

Name	Location	Existing/New/Modified
C-Port and MI Swaco	Fourchon, Louisiana	Existing
Bristow Heliport	Houma or Galliano, Louisiana	Existing

13.2 SUPPORT BASE CONSTRUCTION OR EXPANSION

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

13.3 SUPPORT BASE CONSTRUCTION OR EXPANSION TIMETABLE

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

13.4 WASTE DISPOSAL

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

SECTION 14
COASTAL ZONE MANAGEMENT ACT (CZMA) INFORMATION

Under direction of the Coastal Zone Management Act (CZMA), the state of Louisiana developed a Coastal Zone Management Program (CZMP) to allow for the supervision of significant land and water use activities that take place within or that could significantly affect the Louisiana coastal zone.

Proposed activities are approximately 170 miles from the Louisiana shore. Measures will be taken to avoid or mitigate the probable impacts. Equinor will operate in compliance with existing federal and state laws, regulations, and resultant enforceable program policies in Louisiana's Coastal Zone Management Program.

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

Relevant enforceable policies were considered in certifying consistency for Louisiana. A certificate of Coastal Zone Management Consistency for the state of Louisiana is included as **Attachment 14-A.**

Attachment 14-A

COASTAL ZONE MANAGEMENT
CONSISTENCY CERTIFICATION
INITIAL EXPLORATION PLAN

WALKER RIDGE BLOCKS 271, 315 AND 316
LEASES OCS-G 35080, 35733 AND 36084

The proposed activities comply with the enforceable policies of the Louisiana approved management program and will be conducted in a manner consistent with such program.

Equinor Gulf of Mexico, LLC (Company No. 02748)
Lessee or Operator

Erin Moore
Regulatory Advisor

April 15, 2021
Date

SECTION 15
ENVIRONMENTAL IMPACT ANALYSIS

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

Attachment 15-A

Equinor Gulf of Mexico LLC (Equinor)

Exploration Plan
Walker Ridge Blocks 271/315/316
OCS-G 35080/35733/36084

(A) IMPACT PRODUCING FACTORS

ENVIRONMENTAL IMPACT ANALYSIS WORKSHEET

Environment Resources	Impact Producing Factors (IPFs) Categories and Examples Refer to recent GOM OCS Lease Sale EIS for a more complete list of IPFs					
	Emissions (air, noise, light, etc.)	**Effluents (muds, cutting, other discharges to the water column or seafloor)**	**Physical disturbances to the seafloor (rig or anchor emplacements, etc.)**	**Wastes sent to shore for treatment or disposal**	**Accidents (e.g., oil spills, chemical spills, H_2S releases)**	**Discarded Trash & Debris**
Site-specific at Offshore Location						
Designated topographic features		(1)	(1)		(1)	
Pinnacle Trend area live bottoms		(2)	(2)		(2)	
Eastern Gulf live bottoms		(3)	(3)		(3)	
Benthic communities			(4)			
Water quality		X	X		X	
Fisheries		X	X		X	
Marine Mammals	X(8)	X			X(8)	X
Sea Turtles	X(8)	X			X(8)	X
Air quality	X(9)					
Shipwreck sites (known or potential)			(7)			
Prehistoric archaeological sites			(7)			
Vicinity of Offshore Location						
Essential fish habitat		X	X		X(6)	
Marine and pelagic birds	X				X	X
Public health and safety					(5)	
Coastal and Onshore						
Beaches					X(6)	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 H_2S concentrations greater than 500 ppm might be encountered.
6) All activities that could result in an accidental spill of produced liquid hydrocarbons or diesel fuel that you determine would impact these environmental resources. If the proposed action is located a sufficient distance from a resource that no impact would occur, the EIA can note that in a sentence or two.
7) All activities that involve seafloor disturbances, including anchor emplacements, in any OCS block designated by the BOEM as having high-probability for the occurrence of shipwrecks or prehistoric sites, including such blocks that will be affected that are adjacent to the lease block in which your planned activity will occur. If the proposed activities are located a sufficient distance from a shipwreck or a prehistoric site that no impact would occur, the EIA can note that in a sentence or two.
8) All activities that you determine might have an adverse effect on endangered or threatened marine mammals or sea turtles or their critical habitats.
9) Production activities that involve transportation of produced fluids to shore using shuttle tankers or barges.

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

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

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

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

Abbreviations: E = Endangered; T = Threatened

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

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

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

(B) ANALYSIS

Site-Specific at Walker Ridge Blocks 271, 315, and 316
Proposed operations consist of the drilling and temporary abandonment of Locations WR 271-K, WR 315-K ST1, WR 316-K ST2, WR 271-K ST3, WR 271-S, and WR 271-W. Operations will be conducted with a DP Drillship.

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 as a result of the proposed operations include physical disturbances to the seafloor, effluents, and accidents.

Physical disturbances to the seafloor: Walker Ridge Blocks 271, 315, and 316 are 88.6 miles from the closest designated Topographic Features Stipulation Block (Jakkula Bank); therefore, no adverse impacts are expected.

Effluents: Walker Ridge Blocks 271, 315, and 316 are 88.6 miles from the closest designated Topographic Features Stipulation Block (Jakkula 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 Equinor's Regional OSRP (refer to information submitted in **Section 8**).

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 Equinor's Regional OSRP (refer to information submitted in **Section 8**), impacts to topographic features from surface or sub-surface oil spills are not expected.

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

2. Pinnacle Trend Area Live Bottoms

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

Physical disturbances to the seafloor: Walker Ridge Blocks 271, 315, and 316 are 258.4 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 from 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, Walker Ridge Blocks 271, 315, and 316 are 258.4 miles from the closest live bottom (pinnacle trend) area; therefore, no adverse impacts are expected.

Effluents: Walker Ridge Blocks 271, 315, and 316 are 258.4 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 as a result of the proposed operations (refer to statistics in **Item 5**, Water Quality). Oil spills have the potential to foul benthic communities and cause lethal and sublethal effects on live bottom organisms. Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 10 meter depth. At this depth, the oil is found only at concentrations several orders of magnitude lower than the amount shown to have an effect on marine organisms. Oil from a subsurface spill is not expected to impact pinnacle trend area live bottoms due to the distance of these blocks from a live bottom (pinnacle trend) area and the coverage of the operations proposed in this plan by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

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

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

3. Eastern Gulf Live Bottoms

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

Physical disturbances to the seafloor: Walker Ridge Blocks 271, 315, and 316 are not located in an area characterized by the existence of live bottoms, and this lease does not contain a Live-Bottom Stipulation requiring a photo documentation survey and survey report.

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 from 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, Walker Ridge Blocks 271, 315, and 316 are not located in an area characterized by the existence of live bottoms; therefore, no adverse impacts are expected.

Effluents: Walker Ridge Blocks 271, 315, and 316 are not located in an area characterized by the existence of live bottoms; therefore, no adverse impacts are expected.

Accidents: It is unlikely that an accidental surface or subsurface spill would occur as a result of the proposed operations (refer to statistics in **Item 5**, Water Quality). Oil spills cause damage to live bottom organisms only if the oil contacts the organisms. Oil from a surface spill can be driven into the water column; measurable amounts have been documented down to a 10 meter depth. At this depth, the oil is found only at concentrations several orders of magnitude lower than the amount shown to have an effect on marine invertebrates. Oil from a subsurface spill is not expected to impact Eastern Gulf live bottoms due to the distance of these blocks from a live bottom area and coverage of the operations proposed in this plan by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

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

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

4. Deepwater Benthic Communities

There are no IPFs (including emissions (noise / sound), effluents, physical disturbances to the seafloor, wastes sent to shore for treatment or disposal, and accidents) as a result of the proposed operations to deepwater benthic communities.

Walker Ridge Blocks 271, 315, and 316 are located in water depths of 984 feet (300 meters) or greater. At such depth high-density, deepwater benthic communities may sometimes be found. However, Walker Ridge Blocks 271, 315, and 316 are approximately 23 miles from a known deepwater benthic community site (Keathley Canyon Block 216), listed in NTL 2009-G40. Therefore, Equinor's proposed operations in Walker Ridge Blocks 271, 315, and 316 are not expected to cause impacts to 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 as a result of the proposed operations in Walker Ridge Blocks 271, 315, and 316 include physical disturbances to the seafloor, effluents, and accidents.

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

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

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

Drilling Fluid Spills

Water-based fluid (WBF) and Synthetic-based fluid (SBF) spills may result in elevated turbidity, which would be short term, localized, and reversible. The WBF is normally discharged to the seafloor during riserless drilling, which is allowable due to its low toxicity. For the same reasons, a spill of WBF would have negligible impacts. The SBF has low toxicity, and the discharge of SBF is allowed to the extent that it adheres onto drill cuttings. Both USEPA Regions 4 and 6 permit the discharge of cuttings wetted with SBF as long as the retained SBF amount is below a prescribed percent, meets biodegradation and toxicity requirements, and is not contaminated with the formation oil or PAH. A spill of SBF may cause a temporary increase in biological oxygen demand and locally result in lowered dissolved oxygen in the water column. Also, a spill of SBF may release an oil sheen if formation oil is present in the fluid. Therefore, impacts from a release of SBF are considered to be minor. Spills of SBF typically do not require mitigation because SBF sinks in water and naturally biodegrades, seafloor cleanup is technically difficult, and SBF has low toxicity. (BOEM 2017-009)

Chemical Spills

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

Oil Spills

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

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

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

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

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

Oil that is chemically dispersed at the surface move into the top six meters (20 feet) of the water column where it mixes with surrounding waters and begins to biodegrade (U.S. Congress, Office of Technology Assessment, 1990). Dispersant use, in combination with natural processes, breaks up oil into smaller components that allows them to dissipate into the water and degrade more rapidly (Nalco, 2010). Dispersant use must be in accordance with an RRT Preapproved Dispersant Use Manual and with any conditions outlined within a RRT's site-specific, dispersant approval given after a spill event. Consequently, dispersant use must be in accordance with the restrictions for specific water depths, distances from shore, and monitoring requirements. At this time, neither the Region IV nor the Region VI RRT dispersant use manuals, which cover the GOM region, give preapproval for the application of dispersant use subsea (BOEM 2017-009).

The operations proposed in this plan will be covered by Equinor's Regional Oil Spill Response Plan, which discusses potential response actions in more detail (refer to information submitted in **Section 8**).

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

6. Fisheries

There are multiple species of fish in the Gulf of Mexico, including the endangered and threatened species listed in **Table 1** at the beginning of this Environmental Impact Assessment. More information regarding the endangered Gulf sturgeon (**Item 20.2**), oceanic whitetip shark (**Item 20.3**), and giant manta ray (**Item 20.4**) can be found below. Potential IPFs to fisheries as a result of the proposed operations in Walker Ridge Blocks 271, 315, and 316 include physical disturbances to the seafloor, emissions (noise / sound), effluents, and accidents.

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

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

Sound detection capabilities among fishes vary. For most fish species, it is reasonable to assume hearing sensitivity to frequencies below 500 Hertz (Hz) (Popper et al., 2003 and 2014; Popper and

Hastings, 2009; Slabbekoorn et al., 2010; Radford et al., 2014). The band of greatest interest to this analysis, low-frequency sound (30-500 Hz), has come to be dominated by anthropogenic sources and includes the frequencies most likely to be detected by most fish species. For example, the noise generated by large vessel traffic typically results from propeller cavitation and falls within 40-150 Hz (Hildebrand, 2009; McKenna et al., 2012). This range is similar to that of fish vocalizations and hearing and could result in a masking effect.

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

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

Support vessel traffic, drilling, production facilities, and other sources of continuous sounds contribute to a chronic increase in background noise, with varying areas of effect that may be influenced by the sound level, frequencies, and environmental factors (Hildebrand, 2009; Slabbekoorn et al., 2010; McKenna et al., 2012). These sources have a low potential for causing physiological injury or injuring hearing in fishes and invertebrates (Popper et al., 2014). However, continuous sounds have an increased potential for masking biologically relevant sounds than do pulsed signals. The potential effects of masking on fishes and invertebrates are difficult to assess in the natural setting for communities and populations of species, but evidence indicates that the increase to background noise from 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 event; 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, Equinor 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 as a result of the proposed operations (refer to **Item 5**, Water Quality). The effects of oil on mobile adult finfish or shellfish would likely be sublethal and the extent of damage would be reduced to the capacity of adult fish and shellfish to avoid the spill, to metabolize hydrocarbons, and to excrete both metabolites and parent compounds. The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

There are no other IPFs (including wastes sent to shore for treatment or disposal) from the proposed operations that are likely to cause impacts to fisheries.

7. Marine Mammals

The latest population estimates for the Gulf of Mexico revealed that cetaceans of the continental shelf and shelf-edge were almost exclusively bottlenose dolphin and Atlantic spotted dolphin. Squid eaters, including dwarf and pygmy killer whale, Risso's dolphin, rough-toothed dolphin, and Cuvier's beaked whale, occurred most frequently along the upper slope in areas outside of anticyclones. The Bryde's whale is the only commonly occurring baleen whale in the northern Gulf of Mexico and has been sighted off western Florida and in the De Soto Canyon region. Florida manatees have been sighted along the entire northern GOM but are mainly found in the shallow coastal waters of Florida, which are unassociated with the proposed actions. A complete list of all endangered and threatened marine mammals in the GOM may be found in **Table 1** at the beginning of this Environmental Impact Assessment. More information regarding the endangered Gulf of Mexico Bryde's whale can be found in **Item 20.1** below. Potential IPFs that could cause impacts to marine mammals as a result of the proposed operations in Walker Ridge Blocks 271, 315, and 316 include emissions (noise / sound), effluents, discarded trash and debris, and accidents.

Emissions (noise / sound): Noises from drilling activities, support vessels and helicopters (i.e. non-impulsive anthropogenic sound) may elicit a startle reaction from marine mammals. This reaction may lead to disruption of marine mammals' normal activities. Stress may make them more vulnerable to parasites, disease, environmental contaminants, and/or predation (Majors and Myrick, 1990). Responses to sound exposure may include lethal or nonlethal injury,

temporary hearing impairment, behavioral harassment and stress, or no apparent response. Noise-induced stress is possible, but it is little studied in marine mammals. Tyack (2008) suggests that a more significant risk to marine mammals from sound are these less visible impacts of chronic exposure. There is little conclusive evidence for long-term displacements and population trends for marine mammals relative to noise.

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

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

environmental impact statement for sirenians related to GOM OCS operations (BOEM 2017-009). See **Item 20.1** for details on the Bryde's whale.

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 operations proposed under this plan.

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

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

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

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

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

These proposed operations will utilize a moon pool to conduct various subsea activities (refer to information submitted in **Section 9** and **Section 11**). Equinor's contractor or company representative will provide a dedicated crew member to monitor and continually survey the

moon pool area during the operations for marine mammals. If any marine mammal is detected in the moon pool, Equinor will cease operations and contact NMFS at nmfs.psoreview@noaa.gov and BSEE at protectedspecies@bsee.gov and 985-722-7902 for additional guidance and incidental report information.

Oil spills have the potential to cause sublethal oil-related injuries and spill-related deaths to marine mammals. However, it is unlikely that an accidental oil spill would occur as a result of the proposed operations (refer to **Item 5**, Water Quality). Oil spill response activities may increase vessel traffic in the area, which could impact cetacean behavior and/or distribution, thereby causing additional stress to the animals. The effect of oil dispersants on cetaceans is not known. Removing oil from the surface would reduce the likelihood of oil adhering to marine mammals. Laboratory experiments have shown that the dispersants used during the Deepwater Horizon response are cytotoxic to sperm whale cells; however, it is difficult to determine actual exposure levels in the GOM. Therefore, dispersants will only be used if approved by the Regional Response Team in coordination with the RRT Dispersant Plan and RRT Biological Assessment for Dispersants. The acute toxicity of oil dispersant chemicals included in Equinor's OSRP is considered to be low when compared with the constituents and fractions of crude oils and diesel products. The operations proposed in this plan will be covered by Equinor's OSRP (refer to information submitted in accordance with **Section 8**).

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

NMFS Protected Resources Contacts for the Gulf of Mexico:

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

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

8. Sea Turtles

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

loggerhead sea turtle's critical habitat in the GOM are located in **Item 20.5**. Potential IPFs 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 drilling activities, support vessels, and helicopters (i.e. non-impulsive anthropogenic sound) may elicit a startle reaction from sea turtles, but this is a temporary disturbance. Responses to sound exposure may include lethal or nonlethal injury, temporary hearing impairment, behavioral harassment and stress, or no apparent response. Vessels are the greatest contributors to increases in low-frequency ambient sound in the sea (Andrew et al. 2011). Sound levels and tones produced are generally related to vessel size and speed. Larger vessels generally emit more sound than smaller vessels, and vessels underway with a full load, or those pushing or towing a load, are noisier than unladen vessels. Routine OCS helicopter traffic would not be expected to disturb animals for extended periods, provided pilots do not alter their flight patterns to more closely observe or photograph marine mammals. Helicopters, while flying offshore, generally maintain altitudes above 700 feet during transit to and from a working area, and at an altitude of about 500 feet between platforms. The duration of the effects resulting from a startle response is expected to be short-term during routine flights and the potential effects will be insignificant to sea turtles. Therefore, we find that any disturbance that may result from aircraft associated with the proposed action is not likely to adversely affect sea turtles. Construction and operational sounds other than pile driving should have insignificant effects on sea turtles; effects would be limited to short-term avoidance of construction activity itself rather than the sound produced. As a result, sound sources associated with support vessel movement as part of the proposed operations are insignificant and therefore are not likely to adversely affect sea turtles.
Overall noise impacts on sea turtles as a result of the proposed operations are expected to be negligible to minor depending on the location of the animal(s) relative to the sound source and the frequency, intensity, and duration of the source. The National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion Appendix C explains how operators must implement measures to minimize the risk of vessel strikes to protected species and report observations of injured or dead protected species. This guidance should also minimize the chance of sea turtles being subject to the increased noise level of a service vessel in very close proximity.

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

Discarded trash and debris: Both entanglement in, and ingestion of, debris have caused the death or serious injury of sea turtles (Balazs, 1985). The limited amount of marine debris, if any, resulting from the proposed operations is not expected to substantially harm sea turtles.

Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V, 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).

Equinor 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 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. Equinor 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 Equinor management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

Vessel crews must report sightings of any injured or dead protected sea turtle species immediately, regardless of whether the injury or death is caused by their vessel, to the State Coordinators for the Sea Turtle Stranding and Salvage Network (STSSN) at http://www.sefsc.noaa.gov/species/turtles/stranding_coordinators.htm (phone numbers vary

by state). Additional information may be found at the following website: https://www.fisheries.noaa.gov/report. Any injured or dead protected species should also be reported to takereport.nmfsser@noaa.gov. In addition, if the injury or death was caused by a collision with the operator's vessel, an entrapment within the operator's equipment or vessel (e.g. moon pool), or an entanglement within the operator's equipment, the operator must further notify BOEM and BSEE within 24 hours of the strike or entrapment/entanglement by email to protectedspecies@boem.gov and protectedspecies@bsee.gov. If the vessel is the responsible party, it is required to remain available to assist the respective salvage and stranding network as needed.

These proposed operations will utilize a moon pool to conduct various subsea activities (refer to information submitted in **Section 9** and **Section 11**. Equinor's contractor or company representative will provide a dedicated crew member to monitor and continually survey the moon pool area during the operations for sea turtles. If any sea turtle is detected in the moon pool, Equinor will cease operations and contact NMFS at nmfs.psoreview@noaa.gov and BSEE at protectedspecies@bsee.gov and 985-722-7902 for additional guidance and incidental report information. 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 as a result of the proposed operations (refer to **Item 5**, Water Quality). Oil spill response activities may increase vessel traffic in the area, which could add to the possibility of collisions with sea turtles. The operations proposed in this plan will be covered by Equinor's Regional Oil Spill Response Plan (refer to information submitted in accordance with **Section 8**).

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

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

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

9. Air Quality

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

The projected air emissions identified in **Section 7** are not expected to affect the OCS air quality primarily due to distance to the shore or to any Prevention of Significant Deterioration Class I air quality area such as the Breton Wilderness Area. Walker Ridge Blocks 271, 315, and 316 are beyond the 200 kilometer (124 mile) buffer for the Breton Wilderness Area and are 170 miles from the coastline. Therefore, no special mitigation, monitoring, or reporting requirements apply with respect to air emissions.

Accidents and blowouts can release hydrocarbons or chemicals, which could cause the emission of air pollutants. However, these releases should not impact onshore air quality because of the prevailing atmospheric conditions, emission height, emission rates, and the distance of Walker Ridge Blocks 271, 315, and 316 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 operations that are likely to impact air quality.

10. Shipwreck Sites (known or potential)

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

Potential IPFs to known or unknown shipwreck sites as a result of the proposed operations in Walker Ridge Blocks 271, 315, and 316 include physical disturbances to the seafloor and accidents. Should Equinor 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.

Physical Disturbances to the seafloor: Walker Ridge Blocks 271, 315, and 316 are not located in or adjacent to an OCS block designated by BOEM as having a high probability for occurrence of shipwrecks; therefore, no adverse impacts are expected.

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 as a result of the proposed operations (refer to **Item 5**, Water Quality). The operations proposed in this plan will be covered by Equinor's Regional Oil Spill Response Plan (refer to information submitted in accordance with **Section 8**).

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

11. Prehistoric Archaeological Sites

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

Potential IPFs to prehistoric archaeological sites as a result of the proposed operations in Walker Ridge Blocks 271, 315, and 316 include physical disturbances to the seafloor and accidents. Walker Ridge Blocks 271, 315, and 316 are located outside the Archaeological Prehistoric high probability line, therefore, no adverse impacts are expected. Should Equinor 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: Walker Ridge Blocks 271, 315, and 316 are not located in or adjacent to an OCS block designated by BOEM as having a high probability for occurrence of archaeological sites; therefore, no adverse impacts are expected.

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 as a result of the proposed operations (refer to **Item 5**, Water Quality). The operations proposed in this plan will be covered by Equinor's Regional Oil Spill Response Plan (refer to information submitted in accordance with **Section 8**).

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

Vicinity of Offshore Location

12. Essential Fish Habitat (EFH)

Potential IPFs to EFH as a result of the proposed operations in Walker Ridge Blocks 271, 315, and 316 include physical disturbances to the seafloor, effluents, and accidents. EFH includes all estuarine and marine waters and substrates in the Gulf of Mexico.

Physical disturbances to the seafloor: Turbidity and sedimentation resulting from the bottom disturbing activities included in the proposed operations would be short term and localized. Fish are mobile and would avoid these temporarily suspended sediments. Additionally, the Live Bottom Low Relief Stipulation, the Live Bottom (Pinnacle Trend) Stipulation, and the Eastern Gulf Pinnacle Trend Stipulation have been put in place to minimize the impacts of bottom disturbing activities. Therefore, the bottom disturbing activities from the proposed operations would most likely have a negligible impact on EFH.

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

Accidents: An accidental oil spill has the potential to cause some detrimental effects on EFH. Oil spills that contact coastal bays and estuaries, as well as OCS waters when pelagic eggs and larvae are present, have the greatest potential to affect fisheries. However, it is unlikely that an oil spill would occur as a result of the proposed operations (refer to **Item 5**, Water Quality). The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

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

13. Marine and Pelagic Birds

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

Emissions:

Air Emissions

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

Noise / Sound Emissions

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

The use of explosives for decommissioning activities may potentially kill one or more birds from barotrauma if a bird (or several birds because birds may occur in a flock) is present at the location of the severance. For the impact of underwater sound, a threshold of 202 dB sound exposure

level (SEL) for injury and 208 dB SEL for barotrauma was recommended for the Brahyramphus marmoratus, a diving seabird (USDOI, FWS, 2011). However, the use of explosive severance of facilities for decommissioning are not included in these proposed operations, therefore these impacts are not expected.

Accidents: An oil spill would cause localized, low-level petroleum hydrocarbon contamination. However, it is unlikely that an oil spill would occur as a result of the proposed operations (refer to **Item 5**, Water Quality). Marine and pelagic birds feeding at the spill location may experience chronic, nonfatal, physiological stress. It is expected that few, if any, coastal and marine birds would actually be affected to that extent. The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

Discarded trash and debris: Marine and pelagic birds could become entangled and snared in discarded trash and debris, or ingest small plastic debris, which can cause permanent injuries and death. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V, 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).

Equinor 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. Equinor 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 Equinor management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE. Debris, if any, from these proposed operations will seldom interact with marine and pelagic birds; therefore, the effects 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 operations 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 H_2S releases) as a result of the proposed operations that are likely to cause impacts to public health and safety. In accordance with NTL No.'s 2008-G04, 2009-G27, and 2009-G31, sufficient information is included in **Section 4** to justify our request that our proposed operations be classified by BSEE as H_2S absent.

Coastal and Onshore

15. Beaches

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

Accidents: Oil spills contacting beaches would have impacts on the use of recreational beaches and associated resources. Due to the distance from shore (170 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

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

Equinor 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 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. Equinor 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 Equinor 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 operations that are likely to impact beaches.

16. Wetlands

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

Accidents: It is unlikely that an oil spill would occur as a result of the proposed operations (refer to **Item 5**, Water Quality). Due to the distance from shore (170 miles) and the response capabilities that would be implemented, no impacts are expected. The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

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

Equinor 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. Equinor 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 Equinor 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 operations that are likely to impact wetlands.

17. Shore Birds and Coastal Nesting Birds

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

Accidents: Oil spills could cause impacts to shore birds and coastal nesting birds. However, it is unlikely that an oil spill would occur as a result of the proposed operations (refer to **Item 5**, Water Quality). Given the distance from shore (170 miles) and the response capabilities that would be implemented, no impacts are expected. The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

Discarded trash and debris: Coastal and marine birds are highly susceptible to entanglement in floating, submerged, and beached marine debris: specifically plastics. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V, 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).

Equinor 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 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. Equinor 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 Equinor 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 operations that are likely to impact shore birds and coastal nesting birds.

18. Coastal Wildlife Refuges

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

Accidents: An accidental oil spill as a result of the proposed operations could cause impacts to coastal wildlife refuges. However, it is unlikely that an oil spill would occur as a result of the proposed operations (refer to **Item 5**, Water Quality). Due to the distance from shore (170 miles) and the response capabilities that would be implemented, no impacts are expected. The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

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

Equinor 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 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. Equinor 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 Equinor 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 operations that are likely to impact coastal wildlife refuges.

19. Wilderness Areas

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

Accidents: An accidental oil spill as a result of the proposed operations could cause impacts to wilderness areas. However, it is unlikely that an oil spill would occur as a result of the proposed operations (refer to **Item 5**, Water Quality). Due to the distance from the nearest designated Wilderness Area (239.5 miles) and the response capabilities that would be implemented, no significant adverse impacts are expected. The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8).**

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

Equinor 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 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. Equinor 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 Equinor 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 operations that are likely to impact wilderness areas.

20. Other Environmental Resources Identified

20.1 – Bryde's Whale

The Bryde's whale is the only commonly occurring baleen whale in the northern Gulf of Mexico and has been sighted off western Florida and in the De Soto Canyon region. The Bryde's whale area is over 265 miles from the proposed operations. Additionally, vessel traffic associated with the proposed operations will not flow through the Bryde's whale area. Therefore, there are no IPFs that are likely to impact the Bryde's whale as a result of the proposed operations. Additional information on marine mammals may be found in **Item 7**.

20.2 – Gulf Sturgeon

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

Accidents: Collisions between support vessels and the Gulf sturgeon would be unusual events: however, should one occur, death or injury to the Gulf sturgeon is possible. Contract vessel operators can avoid protected aquatic species and reduce potential deaths by maintaining a vigilant watch and a distance of 50 meters or greater, with the exception of animals that approach the vessel. Vessel personnel should use a Gulf of Mexico reference guide that includes identifying information on marine mammals, sea turtles, and other marine protected species

(i.e., Endangered Species Act listed species such as Gulf sturgeon, giant manta ray, or oceanic whitetip shark) that may be encountered in the Gulf of Mexico Outer Continental Shelf (OCS).

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

Should an ESA-listed fish (e.g. giant manta ray, oceanic whitetip shark, or Gulf sturgeon) be entrapped, entangled, or injured, personnel should contact the ESA Section 7 biologist at (301) 427-8413 (nmfs.psoreview@noaa.gov) and report all incidents to takereport.nmfsser@noaa.gov. After making the appropriate notifications, Equinor 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 (245.8 miles) and the response capabilities that would be implemented during a spill, no significant adverse impacts are expected to the Gulf sturgeon. Considering the information from the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion, the location of this critical habitat in relation to proposed operations, the likely dilution of oil reaching nearshore areas, and the on-going weathering and dispersal of oil over time, we do not anticipate the effects from oil spills will appreciably diminish the value of Gulf sturgeon designated critical habitat for the conservation of the species. The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8)**.

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 from human activities has the potential to affect marine organisms**.** The National Marine Fisheries Service Endangered Species Act (ESA) Section

7 Biological Opinion found that construction and operational sounds other than pile driving will have insignificant effects on Gulf sturgeon (NMFS, 2020). There are no pile driving activities associated with the proposed operations, therefore noise impacts are not expected to significantly affect Gulf sturgeon.

Discarded trash and debris: Trash and debris are not expected to impact the Gulf sturgeon. There will only be a limited amount of marine debris, if any, resulting from the proposed operations. Operators are prohibited from deliberately discharging debris as mandated by MARPOL-Annex V, the Marine Plastic Pollution Research and Control Act, and regulations imposed by various agencies, including the United States Coast Guard (USCG) and the Environmental Protection Agency (EPA).

Equinor 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 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. Equinor 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 Equinor management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

20.3 – Oceanic Whitetip Shark

Oceanic whitetip sharks may be found in tropical and subtropical waters around the world, including the Gulf of Mexico (Young 2016). According to the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion, Essential Fish Habitat (EFH) for the oceanic whitetip shark includes localized areas in the central Gulf of Mexico and Florida Keys.

Oceanic whitetip sharks were listed as threatened under the Endangered Species Act in 2018 due to worldwide overfishing. Oceanic whitetip sharks had an abundant worldwide population, which has been threatened in recent years by inadequate regulatory measures governing fisheries; therefore, there is little research regarding the impact of oil and gas operations on oceanic whitetip sharks (NMFS, 2020). IPFs that have been determined by NMFS to be discountable to oceanic whitetip sharks include vessel strike, emissions (noise / sound), discharges, entanglement and entrapment, and marine debris. Potential IPFs to oceanic whitetip sharks as a result of the proposed operations in Walker Ridge Blocks 271, 315, and 316 include accidents. Additional information on ESA-listed fish may be found in **Item 6**.

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

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

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

There is little information available on the impacts of oil spills or dispersants on oceanic whitetip sharks. It is expected that exposure of oil or dispersants to oceanic whitetip sharks would likely result in effects similar to other marine species, including fitness reduction and the possibility of mortality (NMFS, 2020). Due to the sparse population in the Gulf of Mexico, it is possible that a small number of oceanic whitetip sharks could be impacted by an oil spill. However, it is unlikely that such an event would occur as a result of the proposed operations (refer to **Item 5**, Water Quality). The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

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

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

Equinor 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 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. Equinor 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 Equinor management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

20.4 – Giant Manta Ray

According to the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion, the giant manta ray lives in tropical, subtropical, and temperate oceanic waters and productive coastlines throughout the Gulf of Mexico. While uncommon in the Gulf of Mexico, there is a population of approximately 70 giant manta rays in the Flower Garden Banks National Marine Sanctuary (Miller and Klimovich 2017). Giant manta rays were listed as threatened under the Endangered Species Act in 2018 due to worldwide overfishing. Giant manta rays had an abundant worldwide population, which has been threatened in recent years by inadequate regulatory measures governing fisheries; therefore, there is little research regarding the impact of oil and gas operations on giant manta rays (NMFS, 2020). IPFs that have been determined by NMFS to be discountable to giant manta rays include vessel strike, emissions (noise / sound), discharges, entanglement and entrapment, and marine debris. Potential IPFs to giant manta rays as a result of the proposed operations in Walker Ridge Blocks 271, 315, and 316 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, Equinor 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 (89.4 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 as a result of the proposed operations (refer to **Item 5**, Water Quality). The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

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

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

Equinor 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 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. Equinor 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 Equinor management or the designated lease operator management that emphasizes their commitment to waste management in accordance with NTL No. 2015-G03-BSEE.

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

20.5 – Loggerhead Sea Turtle

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

There are multiple IPFs that may impact loggerhead sea turtles (see **Item 8**). However, the closest loggerhead critical habitat is located 299.1 miles from Walker Ridge Blocks 271, 315, and 316; therefore, no adverse impacts are expected to the critical habitat. Additionally, considering the information from the National Marine Fisheries Service Endangered Species Act (ESA) Section 7 Biological Opinion, we do not expect proposed operations to affect the ability of *Sargassum* to support adequate prey abundance and cover for loggerhead turtles.

20.6 - Protected Corals

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

Flower Garden Banks along with three additional coral species, boulder star coral (Orbicella franksi), lobed star coral (Orbicella annularis), and mountainous star coral (Orbicella faveolatta). Potential IPFs to protected corals as a result of the proposed operations include accidents.

Accidents: It is unlikely that an accidental surface or subsurface spill would occur as a result of the proposed operations (refer to statistics in **Item 5**, Water Quality). Oil spills cause damage to corals only if the oil contacts the organisms. Due to the distance from the Flower Garden Banks (89.4 miles) and other critical coral habitats, no adverse impacts are expected. The operations proposed in this plan will be covered by Equinor's Regional OSRP (refer to information submitted in **Section 8**).

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 operations that are likely to impact protected corals.

20.7 - Endangered Beach Mice

There are four subspecies of endangered beach mouse that are found in the dune systems along parts of Alabama and northwest Florida. Due to the location of Walker Ridge Blocks 271, 315, and 316 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 from the operations proposed in this plan.

(C) IMPACTS ON PROPOSED ACTIVITIES

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

(D) ENVIRONMENTAL HAZARDS

During the hurricane season, June through November, the Gulf of Mexico is impacted by an average of ten tropical storms (39-73 mph winds), of which six become hurricanes (> 74 mph winds). Due to their location in the Gulf, Walker Ridge Blocks 271, 315, and 316 may experience hurricane and tropical storm force winds and related sea currents. These factors can adversely impact the integrity of the operations covered by this plan. A significant storm may present

physical hazards to operators and vessels, damage exploration or production equipment, or result in the release of hazardous materials (including hydrocarbons). Additionally, the displacement of equipment may disrupt the local benthic habitat and pose a threat to local species.

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

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

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

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

(E) ALTERNATIVES

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

(F) MITIGATION MEASURES

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

(G) CONSULTATION

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

(H) PREPARER(S)

Stephen Depew
J. Connor Consulting, Inc.
19219 Katy Freeway, Suite 200
Houston, Texas 77094
281-578-3388
Stephen.depew@jccteam.com

(I) REFERENCES

Authors:

ABS Consulting Inc. 2016. 2016 Update of Occurrence Rates for Offshore Oil Spills. July 13, 2016. Contract #E15PX00045, Deliverable 7 (ABS, 2016)

Adcroft, A., R. Hallberg, J.P. Dunne, B.L. Samuels, J. A. Galt, C.H. Barker, and B. Payton. 2010. Simulations of underwater plumes of dissolved oil in the Gulf of Mexico. Geophysical Research Letters, Vol. 37, L18605, 5 pp. doi: 10.1029/2010GL044689. (Adcroft et al., 2010)

American Petroleum Institute (API). 1989. Effects of offshore petroleum operations on cold water marine mammals: a literature review. Washington, DC: American Petroleum Institute. 385 pp.

Andrew, R. K., B. M. Howe, and J. A. Mercer. 2011. Long-time trends in ship traffic noise for four sites off the North American West Coast. Journal of the Acoustical Society of America 129(2):642-651.

Balazs, G.H. 1985. Impact of ocean debris on marine turtles: entanglement and ingestion. In: Shomura, R.S. and H.O. Yoshida, eds. Proceedings, Workshop on the Fate and Impact of Marine Debris, 26-29 November 1984, Honolulu, HI. U.S. Dept. of Commerce. NOAA Tech. Memo. NOAA-TM-NMFS-SWFC-54. Pp 387-429.

Burke, C.J. and J.A. Veil. 1995. Potential benefits from regulatory consideration of synthetic drilling muds. Environmental Assessment Division, Argonne National Laboratory, ANL/EAD/TM-43.

Catastrophic Spill Event Analysis: High-Volume, Extended-Duration Oil Spill Resulting from Loss of Well Control on the Gulf of Mexico Outer Continental Shelf, 1st Revision (BOEM 2017-007)

Daly, J.M. 1997. Controlling the discharge of synthetic-based drilling fluid contaminated cuttings in waters of the United States. U.S. Environmental Protection Agency, Office of Water. Work Plan, June 24, 1997.

Engås, A., S. Løkkeborg, E. Ona, and A.V. Soldal. 1996. Effects of seismic shooting on local abundance and catch rates of cod (Gadus morhua) and haddock (Melanogrammusaeglefinus). Canadian Journal of Fisheries and Aquatic Science 53:2238-2249 (Engås et al., 1996)

GOM Deepwater Operations and Activities. Environmental Assessment. BOEM 2000-001.

GOM Central and Western Planning Areas Sales 166 and 168 Final Environmental Impact Statement. BOEM 96-0058.

Gulf of Mexico OCS Oil & Gas Lease Sales: 2017-2022, Gulf of Mexico Lease Sales 249, 250, 251, 252, 253, 254, 256, 257, 259, and 261, Final Multisale Environmental Impact Statement. (BOEM 2017-009)

Haddad, R. and S. Murawski. 2010. Analysis of hydrocarbons in samples provided from the cruise of the R/V Weatherbird II, May 23-26, 2010. U.S. Dept. of Commerce, National Oceanographic and Atmospheric Administration, Silver Spring, MD. 14 pp. (Haddad and Murawski, 2010)

Hansen, D.J. 198l. The relative sensitivity of seabird populations in Alaska to oil pollution. U.S. Dept. of the Interior, Bureau of Land Management, Alaska OCS Region, Anchorage. BLM-YK-ES-81-006-1792.

Hildebrand, J.A. 2009. Anthropogenic and natural sources of ambient noise in the ocean. Marine Ecology Progress Series 395:5-20. Internet website: http://www.int-res.com/articles/theme/m395p005.pdf. (Hildebrand, 2009)

Joint Analysis Group. 2010. Review of R/V Brooks McCall data to examine subsurface oil. 58 pp. (Joint Analysis Group, 2010)

Ladich, F. 2013. Effects of noise on sound detection and acoustic communication in fishes. In: Brumm, H., ed. Animal communication and noise. Berlin Heidelberg: Springer-Ver lag. Pp. 65- (Ladich, 2013)

Laist, D.W. 1997. Impacts of marine debris: entanglement of marine life in marine debris including a comprehensive list of species with entanglement and ingestion records. In: Coe, J.M. and D.B. Rogers, eds. Marine debris: sources, impacts, and solutions. New York, NY: Springer-Verlag. Pp. 99-139.

Lee, K., T. Nedwed, R. C. Prince, and D. Palandro. 2013a. Lab tests on the biodegradation of chemically dispersed oil should consider the rapid dilution that occurs at sea. Marine Pollution Bulletin 73(1):314-318. DOI: 10.1016/j.marpolbul.2013.06.005. (Lee et al., 2013a)

Lee, K., M. Boufadel, B. Chen, J. Foght, P. Hodson, S. Swanson, and A. Venosa. 2015. The Behaviour and Environmental Impacts of Crude Oil Released into Aqueous Environments. https://www.cepa.com/wp-content/uploads/2014/01/OIWReport.compressed.pdf. (Lee et al., 2015)

Lewis, A. and D. Aurand. 1997. Putting dispersants to work: Overcoming obstacles. 1997 International Oil Spill Conference. API 4652A. Technical Report IOSC-004. (Lewis and Aurand, 1997)

Løkkeborg, S., E. Ona, A. Vold, and A. Salthaug. 2012. Sounds from seismic air guns: gear-and species specific effects on catch rates and fish distribution. Canadian Journal of Fisheries and Aquatic Sciences 69:1,278-1,291. (Løkkeborg et al., 2012)

Lubchenco, J., M. McNutt, B. Lehr, M. Sogge, M. Miller, S. Hammond, and W. Conner. 2010. BP Deepwater Horizon oil budget: What happened to the oil? 5 pp. (Lubchenco et al. 2010)

Luksenburg, J. and E. Parsons, 2009. The effects of aircraft on cetaceans: implications for aerial whale watching. Proceedings of the 61st Meeting of the International Whaling Commission.

Majors, A.P. and A.C. Myrick, Jr. 1990. Effects of noise on animals: implications for dolphins exposed to seal bombs in the eastern tropical Pacific purse-seine fishery–an annotated bibliography. NOAA Administrative Report LJ-90-06.

Marine Mammal Commission. 1999. Annual report to Congress – 1998.

McAuliffe, C.D., B.L. Steelman, W.R. Leek, D.F. Fitzgerald, J. P. Ray, and C.D. Barker. 1981. The 1979 southern California dispersant treated research oil spills. In: Proceedings 1981 Oil Spill Conference. March 2-5, 1981, Atlanta, GA. Washington, DC: American Petroleum Institute. Pp. 269-282. (McAuliffe et al, 1981)

McKenna, M.F., D. Ross, S.M. Wiggins, and J.A. Hildebrand. 2012. Underwater radiated noise from modern commercial ships. Journal of the Acoustical Society of America 131(1):92-103. (McKenna et al., 2012)

Miller, M. H., and C. Klimovich. 2017. Endangered Species Act Status Review Report: Giant Manta Ray (Manta birostris) and Reef Manta Ray (Manta alfredi). NMFS.

National Academies of Sciences, Engineering, and Medicine 2020. The Use of Dispersants in Marine Oil Spill Response. Washington, DC: The National Academies Press. https://doi.org/10.17226/25161. (NAS 2020)

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)

NMFS. 2017b. Biological and Conference Opinion on the Issuance of Permit No. 20465 to NMFS Alaska Fisheries Science Center Marine Mammal Laboratory for Research on Cetaceans. Office of Protected Resources, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, FPR-2017-9186, Silver Spring, Maryland.

NMFS. 2017f. Letter of concurrence on the issuance of Permit No. 20527 to Ann Pabst for vessel and aerial surveys of blue, fin, North Atlantic right, sei, and sperm whales. Office of Protected Resources, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, FPR-2017-9199, Silver Spring, Maryland.

NRC. 2005. Oil Spill Dispersants: Efficacy and Effects. Washington, DC: The National Academies Press. (NRC, 2005)

Patenaude, N. J., W. J. Richardson, M. A. Smultea, W. R. Koski, G. W. Miller, B. Wursig, and C. R. Greene. 2002. Aircraft sound and disturbance to bowhead and beluga whales during spring migration in the Alaskan Beaufort Sea. Marine Mammal Science 18(2):309-335.

Piatt, J.F., C.J. Lensink, W. Butler, M. Kendziorek, and D.R. Nysewander. 1990. Immediate impact of the Exxon Valdez oil spill on marine birds. The Auk. 107 (2): 387-397.

Popper, A.N., R.R. Fay, C. Platt, and O. Sand. 2003. Sound detection mechanisms and capabilities of teleost fishes. In: Collin, S.P. and N.J. Marshall, eds. Sensory processing in aquatic environments. New York, NY: Springer-Verlag. Pp. 3-3 (Popper et al., 2003)

Popper, A.N., M.E. Smith, P.A. Cott, B.W. Hanna, A.O. MacGillivray, M.E. Austin, and D.A. Mann. 2005. Effects of exposure to seismic airgun use on hearing of three fish species. Journal of the Acoustical Society of America 117(6):3958-3971. (Popper et al., 2005)

Popper, A.N., A.D. Hawkins, R.R. Fay, D.A. Mann, S. Bartol, T.J. Carlson, S. Coombs, W.T. Ellison, R. Gentry, M.B. Halvorsen, S. Lokkeborg, P. Rogers, B.L. Southall, D.G. Zeddies, and W.N. Tavolga. 2014. ASA S3/SC1. 4 TR -2014 sound exposure guidelines for fishes and sea turtles. A technical report prepared by ANSI-Accredited Standards Committee S3/SC1 and Registered with ANSI. New York, NY: Springer. 78 pp. (Popper et al., 2014)

Popper, A.N. and M.C. Hastings. 2009. Effects of anthropogenic sources of sound on fishes. Journal of Fish Biology 75:455-498 (Popper and Hastings, 2009)

Radford, A.N., E. Kerridge, and S.D. Simpson. 2014. Acoustic communication in a noisy world: Can fish compete with anthropogenic noise? Behavioral Ecology 00(00):1-9. doi:10.1093/beheco/aru029 (Radford et al., 2014)

Richter, C., S. Dawson, and E. Slooten. 2006. Impacts of commercial whale watching on male sperm whales at Kaikoura, New Zealand. Marine Mammal Science 22(1):46-63. (Richter et al. 2006)

Silva, M., P.J. Etnoyer, and I.R. MacDonald. 2015. Coral injuries observed at mesophotic reefs after the Deepwater Horizon oil discharge. Deep Sea Research Part II: Topical studies in oceanography. doi: 10.1016/j.dsr2.2015.05.013. (Silva et al., 2015)

Slabbekoorn, H., N. Bouton, I. van Opzeeland, A. Coers, C. ten Cate, and A.N. Popper. 2010. A noisy spring: The impact of globally rising underwater sound levels on fish. Trends in Ecology & Evolution 25:419-427. (Slabbekoorn et al., 2010)

Smultea, M. A., J. J. R. Mobley, D. Fertl, and G. L. Fulling. 2008a. An unusual reaction and other observations of sperm whales near fixed-wing aircraft. Gulf and Caribbean Research 20:75-80.

Tyack, P.L. 2008. Implications for marine mammals of large-scale changes in the marine acoustic environment. Journal of Mammology 89(3):549-558 (Tyack, 2008)

U.S. Dept. of Commerce. National Marine Fisheries Service. 2010b. Final recovery plan for the sperm whale (Physeter macrocephalus). U.S. Dept. of Commerce, National Marine Fisheries Service, Silver Spring, MD. 165 pp. Internet website: http://www.nmfs.noaa.gov/pr/pdfs/recovery/final_sperm_whale_recovery_plan_21dec.pdf (USDOC, NMFS, 2010b)

U.S. Dept. of the Interior. Fish and Wildlife Service. 2011. Endangered Species Act – Section 7 consultation on the construction of a second explosive handling wharf at Bangor Navy Base, Kitsap County. Conducted by the U.S. Dept. of the Interior, Fish and Wildlife Service, Lacey, WA . 137 pp. (USDOI, FWS, 2011)

Vauk , G., E. Hartwig, B. Reineking, and E. Vauk-Hentzelt. 1989. Losses of seabirds by oil pollution at the German North Sea coast. Topics in Marine Biology. Ros, J.D, ed. Scient. Mar. 53 (2-3): 749-754.

Vermeer, K. and R. Vermeer, 1975 Oil threat to birds on the Canadian west coast. The Canadian Field-Naturalist. 89:278-298.

Wardle, C.S., T.J. Carter, G.G. Urquhart, A.D.F. Johnstone, A.M. Ziolkowski, G. Hampson, and D. Mackie. 2001. Effects of seismic air guns on marine fish. Continental Shelf Research21(8):1005-1027 (Wardle et al., 2001)

Wursig, B., S. K. Lynn, T. A. Jefferson, and K. D. Mullin. 1998. Behaviour of cetaceans in the northen Gulf of Mexico relative to survey ships and aircraft. Aquatic Mammals 24(1):41-50.

Wysocki, L.E. and F. Ladich. 2005. Hearing in fishes under noise conditions. Journal of the Association for Research in Otolaryngology 6:28-36. (Wysocki and Ladich, 2005)

Young, C. N., Carlson, J., Hutchinson, M., Hutt, C., Kobayashi, D., McCandless, C.T., Wraith, J. 2016. Status Review Report: oceanic whitetip shark (Carcharhinius longimanus). Final report to the National Marine Fisheries Service, Office of Protected Resourses.:162.

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

- Hazard Surveys

SECTION 16
ADMINISTRATIVE INFORMATION

16.1 EXEMPTED INFORMATION DESCRIPTION

The proposed bottomhole locations of the planned wells have been removed from the Public Information copy of this EP as well as any discussions of the target objectives, geologic or geophysical data, and interpreted geology.

16.2 BIBLIOGRAPHY

1. Initial Exploration Plan (Control No. N-9886).
2. Revised Exploration Plan (Control No. R-6406).
3. Revised Exploration Plan (Control No. 6412).
4. Initial Exploration Plan (Control No. N-10060).
5. Fugro Report 27.1502-2831 (Fugro Geoconsulting, Inc., 2015).
6. Fugro Report 02.2101-0017 02 (Fugro USA Marine, April 20, 2021).
7. Regional Oil Spill Response Plan (Control No. O-735).