In Reply Refer To: MS 5231 January 27, 2023

Alabama Department Of Environmental Management
Coastal Programs
4171 Commanders Drive
Mobile, AL 36615

Dear Sir or Madam:

In accordance with 30 CFR 550.232(a)(2), enclosed for your review and coastal zone consistency determination is the following plan and its accompanying documents:

Control #	-	N-10210
Type	-	Initial Exploration Plan
Lease(s)	-	OCS-G34902 Block - 608 Mississippi Canyon Area
Operator	-	Chevron U.S.A. Inc.
Description	-	Subsea wells A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, C4, RW-1, RW-2, RW-3

Please refer to the above control number in all communication and correspondence concerning the subject plan.

Your review and comments are requested by February 17, 2023.

Sincerely,

LAURA CHRISTENSEN

Digitally signed by LAURA CHRISTENSEN
Date: 2023.01.27 13:53:36 -06'00'

Laura Christensen
Plan Coordinator

UNITED STATES GOVERNMENT MEMORANDUM

January 27, 2023

To: Public Information (MS 5030)

From: Plan Coordinator, Plans Section

Subject: Public Information copy of plan

Control #	-	N-10210
Type	-	Initial Exploration Plan
Lease(s)	-	OCS-G34902 Block - 608 Mississippi Canyon Area
Operator	-	Chevron U.S.A. Inc.
Description	-	Subsea wells A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, C4, RW-1, RW-2, RW-3
Rig Type	-	Drillship

Attached is a copy of the subject plan.

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

Laura Christensen
Plan Coordinator

Site Type/Name	**Botm Lse/Area/Blk**	**Surface Location**	**Surf Lse/Area/Blk**
WELL/A1	G34902/MC/608	5145 FNL, 6568 FWL	G34902/MC/608
WELL/A2	G34902/MC/608	5145 FNL, 6568 FWL	G34902/MC/608
WELL/A3	G34902/MC/608	5145 FNL, 6568 FWL	G34902/MC/608
WELL/A4	G34902/MC/608	5145 FNL, 6568 FWL	G34902/MC/608
WELL/B1	G34902/MC/608	911 FNL, 746 FWL	G34902/MC/608
WELL/B2	G34902/MC/608	911 FNL, 746 FWL	G34902/MC/608
WELL/B3	G34902/MC/608	911 FNL, 746 FWL	G34902/MC/608
WELL/B4	G34902/MC/608	911 FNL, 746 FWL	G34902/MC/608
WELL/C1	G34902/MC/608	7548 FSL, 7020 FWL	G34902/MC/608
WELL/C2	G34902/MC/608	7548 FSL, 7020 FWL	G34902/MC/608
WELL/C3	G34902/MC/608	7548 FSL, 7020 FWL	G34902/MC/608
WELL/C4	G34902/MC/608	7548 FSL, 7020 FWL	G34902/MC/608
WELL/RW1	G34902/MC/608	7218 FNL, 1687 FWL	G34902/MC/608
WELL/RW2	G34902/MC/608	7404 FNL, 7801 FEL	G34902/MC/608

INITIAL EXPLORATION PLAN

CHEVRON U.S.A. INC.

MISSISSIPPI CANYON BLOCK 608

OCS-G 34902

OFFSHORE LOUISIANA and ALABAMA

“POLYPHEMUS” PROSPECT

PUBLIC INFORMATION

Claire H. Morse
Assistant Secretary

January 5, 2023

Bureau of Ocean Energy Management
GOM Plans Section (MS – GM1053C)
1201 Elmwood Park Boulevard
New Orleans, Louisiana 70123-2394

Attention: Regional Supervisor, Leasing and Plans

Re: Initial Exploration Plan
Mississippi Canyon Area Block 608
Federal Lease OCS-G 34902
Offshore Louisiana and Alabama (Polyphemus)

Ladies and Gentlemen:

Chevron U.S.A. Inc. submits for the Bureau of Ocean Energy Management's review and approval this Exploration Plan (EP) for the drilling, completion, and /or abandonment of up to fifteen (15) wells in the Mississippi Canyon Area, Block 608, OCS-G 34902. We estimate operations on one of the wells listed in the EP could commence as early as May 1, 2023.

Enclosed are the following:

- One (1) Proprietary Paper Copy and One (1) Proprietary CD in PDF format of the EP
- One (1) Public Information Paper Copy and One (1) Public Information CD in PDF format of the EP
- One (1) Hard Copy and One (1) Digital Copy on CD of the proprietary: "Shallow Hazards Assessment, Block 608 and Vicinity, Mississippi Canyon Area, Gulf of Mexico", Geoscience Earth & Marine Services, Inc., December 2022 (Project No. 1122-3147)
- One (1) Digital Copy on CD of the proprietary: "Archaeological and Geohazard Assessment, Blocks 563, 564, 607 and 608, Mississippi Canyon Area, Gulf of Mexico", Oceaneering®, July 2022 (Document No. 216465-OII-AAG-01)
- Pay.gov Receipt in Confidential Copy of Plan

Should you have any questions or need additional information, please contact Philip Von Dullen, pvondullen@chevron.com, or call 832-854-3644.

Sincerely,
Chevron U.S.A. Inc.

Claire H. Morse

Assistant Secretary

Chevron U.S.A. Inc.
1400 Smith Street
Houston, Texas 77002
Tel 713 372 6308
morsech@chevron.com

INITIAL EXPLORATION PLAN

CHEVRON U.S.A. INC.

MISSISSIPPI CANYON BLOCK 608

OCS-G 34902

OFFSHORE LOUISIANA and ALABAMA

"POLYPHEMUS" PROSPECT

PUBLIC INFORMATION

SECTION A PLAN CONTENTS

(a) PLAN INFORMATION FORM
Included as attachment A-1 at the end of this section is Form BOEM-0137 “OCS Plan Information Form”.

This Exploration Plan (EP) describes the proposed activities for Mississippi Canyon (MC) Block 608; Lease OCS-G 34902.

Chevron U.S.A. Inc. (Chevron) is the designated operator of this lease.

Chevron plans to use a **Subsea BOP** in the drilling of the wells proposed in this plan.

The activities proposed in this plan will not utilize pile-driving, nor is Chevron proposing any new pipelines expected to make landfall.

Proposed Schedule
The proposed schedule includes drilling, completing, and/or abandoning any of the following wells from May 1, 2023 through December 31, 2025:

- MC 608 A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, C4
- MC 608 RW-1, RW-2, RW-3

Each well is expected to take approximately 125 days to drill, complete, and/or abandon. Of the fifteen (15) wells included in the plan, three are potential relief well locations (RW-1, RW-2, and RW-3). Of the remaining nine (9) wells, the plan is to drill the A1 location and if there is a discovery, possibly drill a sidetrack or drill an appraisal well at one of either the B or C locations. Additional locations also provide contingencies for potential re-spuds if needed.

(b) LOCATION / BATHYMETRY MAP
A location/bathymetry map at a scale of 1” =2,000’, showing the surface locations for the proposed wells, is included below.

(c) SAFETY and POLLUTION PREVENTION FEATURES
Chevron plans to use a dynamically positioned drillship to drill the wells proposed in this plan. The wells will be drilled using a Subsea BOP system. Rig specifications will be provided with the Applications for Permit to Drill. If another rig type is used, any differences regarding air emissions, safety, drilling or pollution control equipment will be addressed in a revised Exploration Plan.

In accordance with 30 CFR 250.406, safety features will include well control, pollution prevention, welding procedure, and blowout prevention equipment and as further clarified by the Bureau of Safety and Environmental Enforcement (BSEE) and the Bureau of Ocean Energy Management (BOEM) Notices to Lessees (NTL’s) and current policy making invoked by BSEE and BOEM.

The rig will be monitored daily by a Chevron drilling representative 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. Any spill will be reported to governmental agencies in accordance with applicable laws, rules, and regulations. Chevron will comply with all BSEE and BOEM regulations during the activities.

The rig is equipped with safety, firefighting, and lifesaving equipment required for compliance with USCG, ABS, SOLAS, and IMO code requirements.

Chevron will comply with all pertinent regulations in 30 CFR 250.203, NTLs, and all applicable federal and state requirements. Chevron will maintain compliance with the EPA NPDES Permit and lease agreement during these proposed activities.

(d) TABLE of STORAGE TANKS and PRODUCTION VESSELS

Information regarding representative storage tanks that may be used to conduct the proposed activities in this plan that will store oil, as defined at 30 CFR 254.6, is provided in the table below.

Storage Tank	Facility Type	Tank Capacity (bbls)	Tanks (no.)	Total Capacity (bbls)	Fluid Gravity (API)
Main Fuel Oil	Drillship	18,000	2	36,000	No. 2 diesel
Diesel Settling		837	2	1,674	
Diesel Day		837	2	1,674	
Emergency Diesel		100	1	100	
Diesel Overflow		823	1	823	
Diesel Oil Drain Aft		42	1	42	
Engine Oil Storage		182	1	182	26.2
Gear Oil Aft		62	1	62	27
Gear Oil Fwd		176	1	176	27
Hydraulic Oil Aft		84	1	84	31
Hydraulic Oil Fwd		87	1	87	31

(f) MEASURES to PREVENT DISCHARGE of OILS and GREASES DURING RAINFALL and ROUTINE OPERATIONS

The drillship is equipped with a comprehensive network of piping, drains and scuppers to minimize the risk of pollutants being discharged into the marine environment.

All drains and drain material are collected in various holding tanks and located in the ship and then processed by the oily water separator systems. Clean water, either from hazardous or nonhazardous sources, may be directed overboard according to regulatory requirements if the effluent discharge is within the environmental limits. Any remaining sludge and oil are directed to the necessary holding tanks for proper disposal according to regulatory requirements.

(g) ADDITIONAL SAFETY, POLLUTION PREVENTION, and EARLY SPILL DETECTION MEASURES

In addition to pollution prevention measures utilized by Chevron, the drillship has a comprehensive, proactive plan to address emergency situations that could result in an unanticipated oil/chemical release. The “Shipboard Oil Pollution Emergency Plan” has specific checklists and procedures to address accidental releases due to fuel/oil transfer, tank overflow, hull leakage, fire, explosion, collision and grounding. This plan is reviewed annually and oil pollution prevention drills are conducted as specified by MARPOL regulations. A fully stocked environmental equipment locker is located on the main deck, forward of the Moon-pool and numerous spill kits located throughout the main deck. The decks of the drillship are fully contained, a comprehensive scupper management plan in place, and any spills on the deck would be immediately cleaned up using absorbents or permitted solvents.

ATTACHMENTS TO SECTION A

- Form BOEM-0137 “OCS Plan Information Form” – Public Information Copy
- Location/Bathymetry Plat, Scale: 1” =2,000’

OCS PLAN INFORMATION FORM

General Information

Type of OCS Plan:	X Exploration Plan (EP)	Development Operations Coordination Document (DOCD)	
Company Name: Chevron U.S.A. Inc.		BOEM Operator Number: 00078	
Address:		Contact Person: Philip Von Dullen	
1500 Louisiana Street		Phone Number: 832-854-3644	
Houston , Texas 77002		E-Mail Address: pvondullen@chevron.com	
If a service fee is required under 30 CFR 550.125(a), provide the	Amount paid: $26,088	Receipt No.	76326901493

Project and Worst Case Discharge (WCD) Information

Lease(s): OCS-G 34902	Area: MC	Block(s): 608	Project Name (If Applicable): Polyphemus
Objective(s): X Oil, X Gas, Sulphur, Salt			Onshore Support Base(s): Port Fourchon and Galliano, LA
Platform/Well Name: MC 608 A1	Total Volume of WCD: 62,897,614		API Gravity: 37
Distance to Closest Land (Miles): 68	Volume from uncontrolled blowout: 465,144 STB/day		

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

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

Proposed Activity	Start Date	End Date	No. of Days
Exploration drilling	05/01/2023	12/31/2025	up to 365 days/year
Development drilling			
Well completion			details in Section A of EP
Well test flaring (for more than 48 hours)			
Installation or modification of structure			
Installation of production facilities			
Installation of subsea wellheads and/or manifolds			
Installation of lease term pipelines			
Commence production			
Other (Specify and attach description)			

Description of Drilling Rig

	Jackup	X	Drillship
	Gorilla Jackup		Platform rig
	Semisubmersible		Submersible
	DP Semisubmersible		Other (Attach Description)

Drilling Rig Name (If Known):

Description of Structure

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

Description of Lease Term Pipelines

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

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "A1"	Previously reviewed under an approved EP or DOCD?		Yes	X	No	
Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.	
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?	X	Yes		No		

WCD info	For wells, volume of uncontrolled blowout (Bbls/day): 465,269	For structures, volume of all storage and pipelines (Bbls):	API Gravity of fluid 37

	Surface Location	Bottom-Hole Location (For Wells)	Completion (For multiple completions, enter separate lines)
Lease No.	OCS G 34902	OCS	OCS OCS
Area Name	MISSISSIPPI CANYON		
Block No.	608		
Blockline Departures (in feet)	N/S Departure: F N L 5145	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L
	E/W Departure: F W L 6568	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L
Lambert X-Y coordinates	X: 1257928	X:	X: X: X:
	Y: 10306695	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude N 28 23 46.0517	Latitude	Latitude Latitude Latitude
	Longitude W 88 11 24.1015	Longitude	Longitude Longitude Longitude

Water Depth (Feet): -6678	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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "A2"		Previously reviewed under an approved EP or DOCD?			Yes	X	No
Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.		
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?				X	Yes		No

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

	Surface Location	Bottom-Hole Location (For Wells)	Completion (For multiple completions, enter separate lines)
Lease No.	OCS G 34902	OCS	OCS OCS
Area Name	MISSISSIPPI CANYON		
Block No.	608		
Blockline Departures (in feet)	N/S Departure: F N L 5145	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L
	E/W Departure: F W L 6568	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L
Lambert X-Y coordinates	X: 1257928	X:	X: X: X:
	Y: 10306695	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude N 28 23 46.0517	Latitude	Latitude Latitude Latitude
	Longitude W 88 11 24.1015	Longitude	Longitude Longitude Longitude

Water Depth (Feet): -6678	MD (Feet): 32088	TVD (Feet): 32081	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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "A3"	Previously reviewed under an approved EP or DOCD?		Yes	X	No

Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.	

Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?	X	Yes		No

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

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS G 34902	OCS	OCS OCS
Area Name	MISSISSIPPI CANYON		
Block No.	608		
Blockline Departures (in feet)	N/S Departure: F N L 5145	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L
	E/W Departure: F W L 6568	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L
Lambert X-Y coordinates	X: 1257928	X:	X: X: X:
	Y: 10306695	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude N 28 23 46.0517	Latitude	Latitude Latitude Latitude
	Longitude W 88 11 24.1015	Longitude	Longitude Longitude Longitude

Water Depth (Feet): -6678	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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "A4"	Previously reviewed under an approved EP or DOCD?		Yes	X	No	
Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.	
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?	X	Yes		No		

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

	Surface Location	Bottom-Hole Location (For Wells)	Completion (For multiple completions, enter separate lines)	
Lease No.	OCS G 34902	OCS	OCS OCS	
Area Name	MISSISSIPPI CANYON			
Block No.	608			
Blockline Departures (in feet)	N/S Departure: F N L 5145	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L	
	E/W Departure: F W L 6568	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L	
Lambert X-Y coordinates	X: 1257928	X:	X: X: X:	
	Y: 10306695	Y:	Y: Y: Y:	
Latitude/ Longitude	Latitude N 28 23 46.0517	Latitude	Latitude Latitude Latitude	
	Longitude W 88 11 24.1015	Longitude	Longitude Longitude Longitude	
Water Depth (Feet): -6678		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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "B1"	Previously reviewed under an approved EP or DOCD?		Yes	X	No	
Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.	
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?	X	Yes		No		

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

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS G 34902	OCS	OCS OCS
Area Name	MISSISSIPPI CANYON		
Block No.	608		
Blockline Departures (in feet)	N/S Departure: F N L 911	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L
	E/W Departure: F W L 746	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L
Lambert X-Y coordinates	X: 1252106	X:	X: X: X:
	Y: 10310929	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude N 28 24 27.4075	Latitude	Latitude Latitude Latitude
	Longitude W 88 12 29.7752	Longitude	Longitude Longitude Longitude

Water Depth (Feet): -6616	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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "B2"		Previously reviewed under an approved EP or DOCD?			Yes	X	No
Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.		
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?					X	Yes	No

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

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS G 34902	OCS	OCS OCS
Area Name	MISSISSIPPI CANYON		
Block No.	608		
Blockline Departures (in feet)	N/S Departure: F N L 911	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L
	E/W Departure: F W L 746	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L
Lambert X-Y coordinates	X: 1252106	X:	X: X: X:
	Y: 10310929	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude N 28 24 27.4075	Latitude	Latitude Latitude Latitude
	Longitude W 88 12 29.7752	Longitude	Longitude Longitude Longitude

Water Depth (Feet): -6616	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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "B3"		Previously reviewed under an approved EP or DOCD?			Yes	X	No
Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.		
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?				X	Yes		No
WCD info	For wells, volume of uncontrolled blowout (Bbls/day):		For structures, volume of all storage and pipelines (Bbls):		API Gravity of fluid		

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS G 34902	OCS	OCS OCS
Area Name	MISSISSIPPI CANYON		
Block No.	608		
Blockline Departures (in feet)	N/S Departure: F N L 911	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L
	E/W Departure: F W L 746	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L
Lambert X-Y coordinates	X: 1252106	X:	X: X: X:
	Y: 10310929	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude N 28 24 27.4075	Latitude	Latitude Latitude Latitude
	Longitude W 88 12 29.7752	Longitude	Longitude Longitude Longitude

Water Depth (Feet): -6616	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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "B4"	Previously reviewed under an approved EP or DOCD?		Yes	X	No

Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.	

Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?	X	Yes		No

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

	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS G 34902	OCS	OCS OCS
Area Name	MISSISSIPPI CANYON		
Block No.	608		
Blockline Departures (in feet)	N/S Departure: F N L 911	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L
	E/W Departure: F W L 746	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L
Lambert X-Y coordinates	X: 1252106	X:	X: X: X:
	Y: 10310929	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude N 28 24 27.4075	Latitude	Latitude Latitude Latitude
	Longitude W 88 12 29.7752	Longitude	Longitude Longitude Longitude

Water Depth (Feet): -6616	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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "C1"	Previously reviewed under an approved EP or DOCD?		Yes	X	No

Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.	

Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?	X	Yes		No

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

	Surface Location	Bottom-Hole Location (For Wells)	Completion (For multiple completions, enter separate lines)
Lease No.	OCS G 34902	OCS	OCS OCS
Area Name	MISSISSIPPI CANYON		
Block No.	608		
Blockline Departures (in feet)	N/S Departure: F S L 7548	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L
	E/W Departure: F W L 7020	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L
Lambert X-Y coordinates	X: 1258380	X:	X: X: X:
	Y: 10303548	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude N 28 23 14.9306	Latitude	Latitude Latitude Latitude
	Longitude W 88 11 18.6920	Longitude	Longitude Longitude Longitude

Water Depth (Feet): -6670	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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "C2"		Previously reviewed under an approved EP or DOCD?			Yes	X	No
Is this an existing well or structure?		Yes	No X	If this is an existing well or structure, list the Complex ID or API No.			
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?				X	Yes		No
WCD info	For wells, volume of uncontrolled blowout (Bbls/day):	For structures, volume of all storage and pipelines (Bbls):		API Gravity of fluid			

	Surface Location	Bottom-Hole Location (For Wells)	Completion (For multiple completions, enter separate lines)
Lease No.	OCS G 34902	OCS	OCS OCS
Area Name	MISSISSIPPI CANYON		
Block No.	608		
Blockline Departures (in feet)	N/S Departure: F S L 7548	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L
	E/W Departure: F W L 7020	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L
Lambert X-Y coordinates	X: 1258380	X:	X: X: X:
	Y: 10303548	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude N 28 23 14.9306	Latitude	Latitude Latitude Latitude
	Longitude W 88 11 18.6920	Longitude	Longitude Longitude Longitude

Water Depth (Feet): -6670	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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "C3"			Previously reviewed under an approved EP or DOCD?		Yes	X	No
Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.		
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?				X	Yes		No

WCD info	For wells, volume of uncontrolled blowout (Bbls/day):		For structures, volume of all storage and pipelines (Bbls):	API Gravity of fluid		
	Surface Location		**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**		
Lease No.	OCS G 34902		OCS	OCS OCS		
Area Name	MISSISSIPPI CANYON					
Block No.	608					
Blockline Departures (in feet)	N/S Departure: F S L 7548		N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L		
	E/W Departure: F W L 7020		E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L		
Lambert X-Y coordinates	X: 1258380		X:	X: X: X:		
	Y: 10303548		Y:	Y: Y: Y:		
Latitude/ Longitude	Latitude N 28 23 14.9306		Latitude	Latitude Latitude Latitude		
	Longitude W 88 11 18.6920		Longitude	Longitude Longitude Longitude		
Water Depth (Feet): -6670			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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "C4"		Previously reviewed under an approved EP or DOCD?		Yes	X	No
Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.	
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?			X	Yes		No

WCD info	For wells, volume of uncontrolled blowout (Bbls/day):	For structures, volume of all storage and pipelines (Bbls):	API Gravity of fluid:
	Surface Location	**Bottom-Hole Location (For Wells)**	**Completion (For multiple completions, enter separate lines)**
Lease No.	OCS G 34902	OCS	OCS OCS
Area Name	MISSISSIPPI CANYON		
Block No.	608		
Blockline Departures (in feet)	N/S Departure: F S L 7548	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L
	E/W Departure: F W L 7020	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L
Lambert X-Y coordinates	X: 1258380	X:	X: X: X:
	Y: 10303548	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude N 28 23 14.9306	Latitude	Latitude Latitude Latitude
	Longitude W 88 11 18.6920	Longitude	Longitude Longitude Longitude

Water Depth (Feet): -6670	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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

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

Proposed Well/Structure Location

Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "RW1"	Previously reviewed under an approved EP or DOCD?		Yes	X	No	
Is this an existing well or structure?		Yes		No X	If this is an existing well or structure, list the Complex ID or API No.	
Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?	X	Yes		No		

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

	Surface Location	Bottom-Hole Location (For Wells)	Completion (For multiple completions, enter separate lines)
Lease No.	OCS G 34902	OCS	OCS OCS
Area Name	MISSISSIPPI CANYON		
Block No.	608		
Blockline Departures (in feet)	N/S Departure: F N L 7218	N/S Departure: F____ L	N/S Departure: F____ L N/S Departure: F____ L N/S Departure: F____ L
	E/W Departure: F W L 1687	E/W Departure: F____ L	E/W Departure: F____ L E/W Departure: F____ L E/W Departure: F____ L
Lambert X-Y coordinates	X: 1253047	X:	X: X: X:
	Y: 10304622	Y:	Y: Y: Y:
Latitude/ Longitude	Latitude N 28 23 25.0420	Latitude	Latitude Latitude Latitude
	Longitude W 88 12 18.5295	Longitude	Longitude Longitude Longitude

Water Depth (Feet): -6639	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
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	
			X =	Y =	

OCS PLAN INFORMATION FORM (CONTINUED)

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

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<tr><th colspan="8">Proposed Well/Structure Location</th></tr>
<tr><td colspan="3">Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "RW2"</td><td colspan="2">Previously reviewed under an approved EP or DOCD?</td><td>Yes</td><td>X</td><td>No</td></tr>
<tr><td>Is this an existing well or structure?</td><td></td><td>Yes</td><td>No X</td><td colspan="2">If this is an existing well or structure, list the Complex ID or API No.</td><td colspan="2"></td></tr>
<tr><td colspan="4">Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?</td><td>X</td><td>Yes</td><td></td><td>No</td></tr>
<tr><td>WCD info</td><td>For wells, volume of uncontrolled blowout (Bbls/day):</td><td colspan="2">For structures, volume of all storage and pipelines (Bbls):</td><td colspan="2">API Gravity of fluid</td><td colspan="2"></td></tr>
<tr><td></td><td>Surface Location</td><td colspan="2">Bottom-Hole Location (For Wells)</td><td colspan="4">Completion (For multiple completions, enter separate lines)</td></tr>
<tr><td>Lease No.</td><td>OCS
G 34902</td><td colspan="2">OCS</td><td colspan="4">OCS
OCS</td></tr>
<tr><td>Area Name</td><td>MISSISSIPPI CANYON</td><td colspan="2"></td><td colspan="4"></td></tr>
<tr><td>Block No.</td><td>608</td><td colspan="2"></td><td colspan="4"></td></tr>
<tr><td rowspan="2">Blockline Departures (in feet)</td><td>N/S Departure: F N L
7404</td><td colspan="2">N/S Departure: F____ L</td><td colspan="4">N/S Departure: F____ L
N/S Departure: F____ L
N/S Departure: F____ L</td></tr>
<tr><td>E/W Departure: F E L
7801</td><td colspan="2">E/W Departure: F____ L</td><td colspan="4">E/W Departure: F____ L
E/W Departure: F____ L
E/W Departure: F____ L</td></tr>
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X:
X:</td></tr>
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10304436</td><td colspan="2">Y:</td><td colspan="4">Y:
Y:
Y:</td></tr>
<tr><td rowspan="2">Latitude/ Longitude</td><td>Latitude
N 28 23 23.8241</td><td colspan="2">Latitude</td><td colspan="4">Latitude
Latitude
Latitude</td></tr>
<tr><td>Longitude
W 88 11 07.3794</td><td colspan="2">Longitude</td><td colspan="4">Longitude
Longitude
Longitude</td></tr>
<tr><td colspan="2">Water Depth (Feet):
-6679</td><td>MD (Feet):</td><td>TVD (Feet):</td><td colspan="2" rowspan="2">MD (Feet):
MD (Feet):
MD (Feet):</td><td colspan="2" rowspan="2">TVD (Feet):
TVD (Feet):
TVD (Feet):</td></tr>
<tr><td colspan="3">Anchor Radius (if applicable) in feet:</td><td>NA</td></tr>
</table>

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

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

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

<table>
<tr><th colspan="9">Proposed Well/Structure Location</th></tr>
<tr><td colspan="3">Well or Structure Name/Number (If renaming well or structure, reference previous name): MC 608 "RW3"</td><td colspan="2">Previously reviewed under an approved EP or DOCD?</td><td></td><td>Yes</td><td>X</td><td>No</td></tr>
<tr><td>Is this an existing well or structure?</td><td></td><td>Yes</td><td>No X</td><td colspan="2">If this is an existing well or structure, list the Complex ID or API No.</td><td colspan="3"></td></tr>
<tr><td colspan="5">Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities?</td><td>X</td><td>Yes</td><td></td><td>No</td></tr>
<tr><td>WCD info</td><td colspan="2">For wells, volume of uncontrolled blowout (Bbls/day):</td><td colspan="2">For structures, volume of all storage and pipelines (Bbls):</td><td colspan="2">API Gravity of fluid</td><td colspan="2"></td></tr>
<tr><td></td><td colspan="2">Surface Location</td><td colspan="2">Bottom-Hole Location (For Wells)</td><td colspan="4">Completion (For multiple completions, enter separate lines)</td></tr>
<tr><td>Lease No.</td><td colspan="2">OCS
G 34902</td><td colspan="2">OCS</td><td colspan="4">OCS
OCS</td></tr>
<tr><td>Area Name</td><td colspan="2">MISSISSIPPI CANYON</td><td colspan="2"></td><td colspan="4"></td></tr>
<tr><td>Block No.</td><td colspan="2">608</td><td colspan="2"></td><td colspan="4"></td></tr>
<tr><td rowspan="2">Blockline Departures (in feet)</td><td colspan="2">N/S Departure: F N L
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N/S Departure: F____ L
N/S Departure: F____ L</td></tr>
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Y:
Y:</td></tr>
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Latitude
Latitude</td></tr>
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W 88 10 54.2688</td><td colspan="2">Longitude</td><td colspan="4">Longitude
Longitude
Longitude</td></tr>
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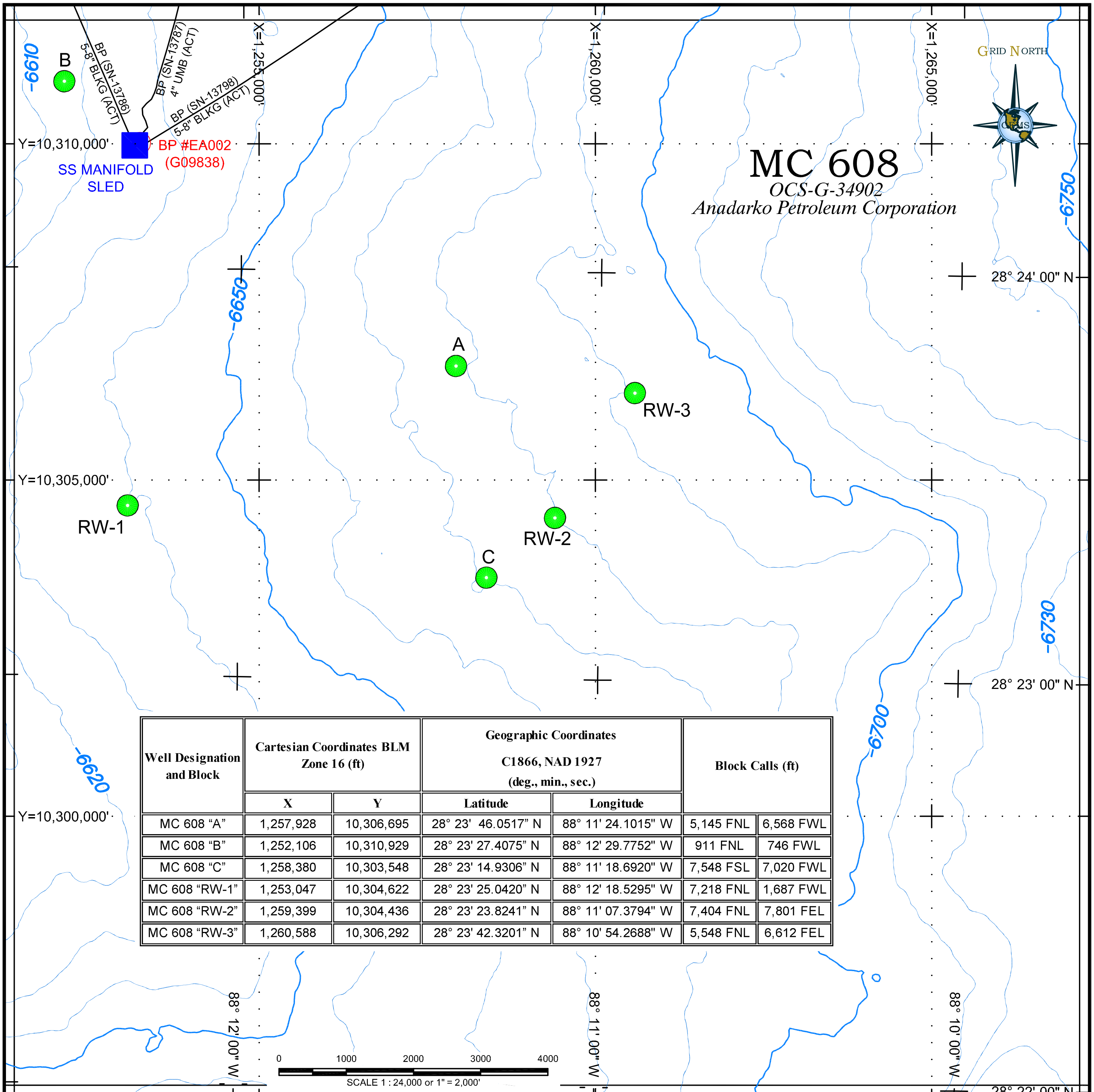
MD (Feet):
MD (Feet):</td><td colspan="2" rowspan="2">TVD (Feet):
TVD (Feet):
TVD (Feet):</td></tr>
<tr><td colspan="4">Anchor Radius (if applicable) in feet:</td><td>NA</td></tr>
</table>

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

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



Well Designation and Block	Cartesian Coordinates BLM Zone 16 (ft)		Geographic Coordinates C1866, NAD 1927 (deg., min., sec.)		Block Calls (ft)	
	X	Y	Latitude	Longitude		
MC 608 "A"	1,257,928	10,306,695	28° 23' 46.0517" N	88° 11' 24.1015" W	5,145 FNL	6,568 FWL
MC 608 "B"	1,252,106	10,310,929	28° 23' 27.4075" N	88° 12' 29.7752" W	911 FNL	746 FWL
MC 608 "C"	1,258,380	10,303,548	28° 23' 14.9306" N	88° 11' 18.6920" W	7,548 FSL	7,020 FWL
MC 608 "RW-1"	1,253,047	10,304,622	28° 23' 25.0420" N	88° 12' 18.5295" W	7,218 FNL	1,687 FWL
MC 608 "RW-2"	1,259,399	10,304,436	28° 23' 23.8241" N	88° 11' 07.3794" W	7,404 FNL	7,801 FEL
MC 608 "RW-3"	1,260,588	10,306,292	28° 23' 42.3201" N	88° 10' 54.2688" W	5,548 FNL	6,612 FEL

PROPOSED WELL LOCATION.

EXISTING SEAFLOOR STRUCTURE LOCATION, AS REPORTED BY BOEM.

EXISTING WELL LOCATION, AS REPORTED BY BOEM.

EXISTING PIPELINE/UMBILICAL/CABLE LOCATION, AS REPORTED BY BOEM.

WATER DEPTH CONTOUR IN FEET.

NOTE: CONTOURS DERIVED FROM MULTIBEAM BATHYMETRY (AUV).

DATE : 16 DECEMBER 2022
GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
PROJECTION: BLM
ZONE: 16 NORTH
GRID UNITS: US FEET

PROJECT NO.: 1122-3147

FILE NAME: 3147_PLAT.DWG

CHEVRON
U.S.A. INC.

POLYPHEMUS PROSPECT SURFACE LOCATION PLAT

BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

LOCATION MAP

SECTION B GENERAL INFORMATION

(a) APPLICATIONS AND PERMITS

In the table below, information is provided on the filing or approval status of the Federal, State, and local application approvals or permits that must be obtained to conduct the proposed activities. Only those individual or site-specific application approvals that must be obtained are listed.

Application/Permit	Issuing Agency	Status
NPDES Permit	EPA	Approved
EEP	U.S. Coast Guard	To be submitted
APD	BSEE	To be submitted

(b) DRILLING FLUIDS

(1) Information on the types (including chemical constituents) and amounts of the drilling fluids planned for use in drilling the proposed wells:

Type of Drilling Fluid	Est. Volume of Drilling Fluid (bbls/well)
Water based (seawater, brine, freshwater)	44,000
Synthetic based (internal olefin, ester)	35,000
Oil based (diesel, mineral oil)	0

(2) Major Components of Synthetic-based drilling fluid listed above:

Product Name	Amount to be Used	Reference Number	Haz Mat No
Lime (Calcium Hydroxide)	5,955 50-lb bags	SAP # 210265	HM001002
Calcium Chloride	4,230 50-lb bags	SAP # 201174	HM000142
Adapta	2,555 50-lb bags	SAP # 388827	HM004609
Suspension Package 1	3,946 50-lb bags	SAP # 102164339	HM007356
Aquagel Gold Seal	50.3 tons	SAP # 200584	HM003470
LE Supermul	52,711 gals	SAP # 201732	HM003680
Rhemod-L	5,392 gals	SAP # 101289484	HM004610
BaraVis 568	7,167 gals	SAP # 1008562	HM003503
Barite 325	5,006 tons	SAP # 959712	HM008002
Encore Base	12,059 bbls	SAP # 377938	HM005313
Baracarb	8,776 50-lb bags	SAP # 201312	HM003484
Barofibre O	1,913 25-lb bags	SAP # 101655984	HM006401
Barofibre	1,521 50-lb bags	SAP # 201600	HM003539
Steelseal	2,474 50-lb bags	SAP # 101618889	HM003768

(e) NEW OR UNUSUAL TECHNOLOGY
No new or unusual technology will be used to carry out the activities proposed in this plan.

(f) 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 part 556, subpart I (Bonding or Other Financial Assurance). Should BOEM require Chevron to post additional security in accordance with NTL No. 2016-N01 "Requiring Additional Security" or under 30 CFR part 556 subpart I, Chevron will either provide the required additional security or a third-party guarantee as soon as possible after receipt of such request from BOEM.

(g) OIL SPILL FINANCIAL RESPONSIBILITY (OSFR)
Chevron U.S.A. Inc., BOEM company number 00078, has demonstrated oil spill financial responsibility for the facilities proposed in this EP according to 30 CFR part 553, and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities."

(h) DEEPWATER WELL CONTROL STATEMENT
Chevron U.S.A. Inc., BOEM company number 00078, has the financial capability to drill a relief well and conduct other emergency well control operations.

(j) BLOWOUT SCENARIO
The MC 608 "A1" proposed location was chosen as the representative well for the Worst Case Discharge (WCD) scenario for this plan. The initial Open Flow Potential Rate was calculated with systems analysis using the Prosper™ nodal software package from Petroleum Experts, Ltd.

Estimated flow rate
Systems analysis indicates that an uncontrolled blowout in the 8-1/2" open hole section will lead to a maximum WCD scenario initial flow rate of 465,144 bopd.

Total volume and maximum duration of the potential blowout
The total time required to drill the relief well and conduct the kill operation in an uncontrolled blow-out is 162 days. Production decline is expected and assumed to occur however sand bridging has not been assumed in the calculations. Total Potential Spill Volume is estimated at 62,897,614 bbls.

Potential for well to bridge over
Although some sand is likely to be produced under a blowout scenario, Chevron expects that the amount of sand is small enough to be lifted to the seafloor without bridging.

Likelihood for surface intervention to stop the blowout
The likelihood of surface intervention to stop a blowout is based on the equipment specific to the MODU(s) or drillships that will drill the well(s). Chevron's contracted drillships and personnel have the following methods and equipment available to minimize the risk of an incident occurring:

- Deadman / Autoshear functions on the BOP;
- Permanently fixed ROV panels on the BOP to allow an ROV to function the BOP via standard hot stab interfaces;

- Acoustic Pods on the BOP to function the BOP in the event the primary BOP control system is compromised.

In the event of a well blowout, Chevron will act as soon as practical to reduce the overall risk of injury to personnel and damage to the environment and may consider potential actions that may have short term increases in effluent flow in the interest of reducing overall environmental impact or incident escalation. One such action that Chevron would consider is removal of any compromised or damaged equipment that may be restricting Chevron's ability to control the effluent flow (a BOP, LMRP, and / or riser) and to allow for installation of the appropriate response equipment (an alternate BOP or capping stack) to assist in controlling the well.

Initial response actions could include, but are not limited to:

- Actions necessary for personnel safety, including evacuation.
- ROV mobilization and tactics, including:
  - Identify the source(s) of hydrocarbon release
  - Assess the post incident geometry of equipment
- Identification of existing BOP / LMRP options and / or take action:
  - Status
  - Functionality
  - Actuate rams
  - Disconnection of existing BOP / LMRP / Riser to affect an appropriate connection point for capping / intervention options

Chevron will consider multiple capping stack alternatives to cap and contain a well during a loss of well control event. As a member of the Marine Well Containment Company (MWCC), Chevron has access to MWCC's Interim Containment System and Expanded Containment Systems (ECS). The Containment Systems includes two Modular Capture Vessels (MCVs), four capping stacks; Subsea Umbilical, Risers and Flowlines (SURF) equipment; and additional ancillary equipment. The system consists of equipment rated for 10,000 feet and up to 20k psi and 400 deg F. It has the capacity to contain up to 100,00 barrels of liquid per day (50k bopd per vessel) and handle up to 200 million standard cubic feet of gas per day. The system also has dispersant and injection capability.

In addition to MWCC's capping stacks, Chevron has access to additional capping options through the immediate availability of two complete 18 ¾" 15k BOP stacks, which are held as permanent secondary stacks located on two of Chevron's contracted drillships operating in the Gulf of Mexico. Access to both the MWCC and Chevron-specific equipment provides Chevron with increased flexibility in capping and containing a well blowing out. The selection of the appropriate capping method will be dependent upon the incident circumstances.

Time to contract rig, move it onsite and drill relief well

Chevron estimates ten (10) days to acquire and demobilize a rig, four (4) days to move the rig onsite, and 148 days to drill the relief well, intersect the blowout well, and conduct a kill operation for a total of 162 days.

Availability of a rig to drill a relief well and rig package constraints

Chevron has the capability to cease current operations and move one of our contracted drill ships to drill the relief well or contract a rig of opportunity. Our contracted drill ships do not have any equipment constraints with respect to drilling a relief well. The 10-1/8" casing shoe is selected as the intervention point for the relief well.

There are no platforms or other infrastructure nearby that would hamper relief well operations. Relief well surface locations were selected to avoid subsurface hazards. High resolution geophysical and 3-D seismic data was evaluated near the drilling location to identify surface hazards that might impact the selection of a relief well location. Surface locations to the south, southeast and east of the original hole are preferred because they avoid the maximum number of potential shallow hazards (seafloor faults and anomalous amplitudes) while maintaining an anticipated up-wind and up-current position with respect to the potential blowout well. Three potential relief well surface locations were selected. Selection of the actual location would be constrained by typical parameters such as planned inclination, benign water-bottom, wind and current direction, and subsurface hazard avoidance. Casing design for the relief well will be similar to that proposed for the exploration well.

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

In order to address its ability to prevent blowouts, reduce the likelihood of blowouts, and conduct effective/early intervention in the event of a blowout, Chevron has developed standards for well control, personnel safety, and emergency response plans. Chevron has also entered into agreements with industry Subject Matter Experts (SME).

At all times from planning through execution, Chevron takes the necessary steps to maintain primary well control to prevent the occurrence of blowouts as outlined in the Chevron Well Control Guide.

The drilling team works in conjunction with the geological and geophysical operations team and the exploration project team to use their knowledge and good judgment to create best possible well plans and program for any particular prospect. All relevant geological information is used to understand the risks and uncertainties that are unique to the location. Appropriate plans are then generated to eliminate or mitigate the identified risks. Special equipment for contingency plans is sourced, and qualified personnel are identified for conducting the various tasks.

Prior to the execution phase, all the well control equipment on the rig undergoes a rigorous inspection and acceptance process/procedure by the Chevron Well Intervention group.

To reduce the likelihood of a blowout, Chevron applies offset information to generate pore pressure models that predict localized high pore pressure zones. Maximum Anticipated Surface Pressure (MASP) is calculated to help avoid exceeding the working pressure of the BOP equipment at any time during well construction. Pressure While Drilling (PWD) and Log While Drilling (LWD) data, such as gamma ray, resistivity, sonic, are used during the drilling operation to monitor real time pore pressure variances.

Adjustments can then be made to the mud system to maintain the appropriate overbalance on the pore pressure. Mud tank volumes and trip tank volumes are monitored while drilling for early detection of changes in anticipated trends. Routine maintenance and testing of blowout prevention equipment help to confirm that the equipment is in good working condition during operations. Data sheets and critical wellbore information which are needed in well control situations are maintained at the well site.

Two (2) barriers shall be available during all normal well activities, operations, suspensions, and abandonments to prevent uncontrolled flow from the wellbore to the environment. Two mechanical barriers will be in place before removing the Blowout Preventer (BOP) from a well which has hydrocarbons.

Preliminary plans are developed for potential relief well locations(s) during the planning phase for the primary well(s). These preliminary plans can be used to develop detailed relief well drilling plans as needed in a timely manner. Relief well locations have been identified for the primary well location.

In addition to Chevron's contracted resources to assist in the event of a blowout, Chevron is a founding member of the Marine Well Containment Company, currently has access to MWCC's Interim Containment Response System (ICRS) and MWCC's Expanded Containment System (ECS). These resources, along with Chevron's own well containment and emergency response planning, give Chevron a high probability of regaining control of a blown out well.

Supplemental Worst Case Discharge Information to comply with NTL No. 2015-N01 is included as Appendix B in the confidential copy of this Plan.

SECTION C GEOLOGICAL AND GEOPHYSICAL INFORMATION

(a) GEOLOGICAL DESCRIPTION
Proprietary Information

(b) STRUCTURE CONTOUR MAPS
Proprietary Information

(c) INTERPRETED 2-D AND/OR 3-D SEISMIC LINES
Proprietary Information

(d) GEOLOGICAL STRUCTURE CROSS-SECTION
Proprietary Information

(e) SHALLOW HAZARDS REPORT
A Shallow Hazards Assessment was prepared by Geoscience Earth and Marine Service (GEMS) in December 2022 (Project No. 1122-3147). The Assessment describes seafloor and subsurface conditions in the "Polyphemus" Prospect Area, MC Block 608 and vicinity. The assessment is based on interpretation of high-resolution reprocessed 3-D exploration seismic data and high-resolution data collected by an AUV. A TGS multi-azimuth shot-based Reverse Time Migration (RTM) using an Orthorhombic TTI velocity model was the primary seismic volume used. The 3-D data was from the TGS MC and eMC regional survey acquisition in October 2002 to September 2003. The data has been processed using de-ghosting, SRME, phase only Q compensation, post-migration amplitude balance and spectral shaping.
The assessment complies with current BOEM NTL Nos. 2005-G07, 2008-G04, 2009-G40, 2022-G01 and the Pre-seabed disturbance mitigation.

One hard copy and one digital copy of the proprietary Shallow Hazards Assessment is being submitted as an enclosure with this plan.

An Archaeological and Geohazard Assessment was prepared by Oceaneering International, Inc. (OII) for Anadarko Petroleum Corporation (Anadarko) covering MC Blocks 563, 564, 607 and 608. Anadarko shared this assessment with Chevron. The assessment is based on high resolution geophysical data collected by an AUV between April 30 through May 6, 2022 and May 10 through 11, 2022. The AUV geophysical data include multibeam bathymetry, side scan sonar, and subbottom profiler. The archaeological and geohazard assessment and survey field work comply with BOEM NTL Nos. 2008-G05, 2005-G07, 2011-JOINT-G01, 2009-G34, 2014-G04 BOEM, and 2009-G40.

One digital copy of the proprietary OII Archaeological and Geohazard Assessment is being submitted as an enclosure with this plan.

(f) SHALLOW HAZARDS ASSESSMENT
Site Clearance Letters for the proposed wellsites were prepared by GEMS to comply with NTL Nos. 2008-G04, 2008-G05 and 2009-G40. The site-specific wellsite clearance letters are based on findings provided in the main body of the Shallow Hazards Assessment (Project No. 1122-3147) and the OII Archaeological and Geohazard Assessment (Document No. 216465-OII-RPT-AAG-01). The Site Clearance Letters were prepared in December 2022.

The Site Clearance Letters for the proposed wellsites are in Volume II: Wellsite Assessment of the main shallow hazard report.

(g) HIGH RESOLUTION SEISMIC LINES
Proprietary Information

(h) STRATIGRAPHIC COLUMN
Proprietary Information

(i) TIME vs. DEPTH TABLE
Proprietary Information

ATTACHMENTS TO SECTION C - Proprietary Information

- **C-1** - Depth Structure Contour Map
- **C-2** - Index Map with Lines of Cross Section
- **C-3, 5, 7** - Interpreted 3- D Seismic Lines
- **C-4, 6, 8** - Schematic Cross Sections
- **C-10** - Stratigraphic Column

PROPRIETARY ENCLOSURE TO PLAN

- Shallow Hazards Assessment, Block 608 and Vicinity, Mississippi Canyon Area, Gulf of Mexico, Geoscience Earth & Marine Services, Inc., December 2022 (Project No. 1122-3147) (One Hard Copy and One Digital Copy)

- Archaelogical and Geohazard Assessment, Blocks 563, 564, 607 and 608, Mississippi Canyon Area, Gulf of Mexico, Oceaneering International, Inc., July 2022 (Document No. 216465-OII-RPT-AAG-01) (One Digital Copy)

A non-proprietary copy of the GEMS site clearance letters for the proposed well surface locations is included below:

December 22, 2022

Project No. 1122-3147

Chevron U.S.A. Inc.
1500 Louisiana Street
Houston, TX 77002

Attention: Mr. Phillip Von Dullen III

Site Clearance Letter
Proposed Exploration Wellsite MC 608-A
Block 608 (OCS-G-34902)
Mississippi Canyon Area
Gulf of Mexico

Chevron U.S.A. Inc. (Chevron) contracted Geoscience Earth & Marine Services (GEMS) to provide an assessment of the seafloor and shallow geologic conditions to determine the favorability of drilling operations for the proposed location MC 608-A in Block 608 (OCS-G-34902), Mississippi Canyon Area (MC), Gulf of Mexico. Specific seafloor and subsurface conditions are addressed around the proposed location to the Limit of Investigation (LOI) ~6,000 ft below the mudline (bml).

Seafloor conditions appear favorable within the vicinity of the proposed surface location. There are no potential sites for deepwater benthic communities within 2,000 ft. An Archaeological Assessment prepared by Oceaneering International (OII) and based on high-resolution geophysical data (HR), detected no sonar contacts within 2,000 ft of the proposed wellsite. Based on seismic attributes and amplitude analysis there is a negligible to low potential for encountering significant shallow gas within the limit of investigation. There is a negligible to moderate potential for encountering overpressured sands within the Limit of Investigation (6,000 ft bml, -12,670 ft bsl)

This letter provides details specific to the well location, including available data, Notice to Lessees (NTL) requirements, man-made features, and wellsite conditions.

Proposed Well Location

The surface location for the Proposed Wellsite MC 608-A lies in the northwestern quadrant of MC 608 (Figure MC 608-A-1). Chevron provided the following coordinates:

Table 1. Proposed Wellsite MC 608-A Location Coordinates

Proposed Wellsite MC 608-A			
Spheroid & Datum: Clarke 1866 NAD27 Projection: UTM Zone 16 North		Line Reference	Block Calls (MC 608)
X: 1,257,928 ft	Latitude: 28° 23' 46.0517” N	Inline 11337	6,568 ft FWL
Y: 10,306,695 ft	Longitude: 88° 11' 24.1015" W	Crossline 11045	5,145 ft FNL

Chevron will drill this well using a dynamically positioned drilling vessel. Our assessment addresses the seafloor conditions within a 2,000-ft radius around the Proposed Wellsite MC 608-A.

Available Data

The following discussion is based on findings from the reports listed below:

- Archaeological and Geohazard Assessment, Blocks 563, 564, 607, and 608, Mississippi Canyon Area Gulf of Mexico (OII, 2022)
- Shallow Hazards Assessment, Block 608 and Vicinity Mississippi Canyon Area, Gulf of Mexico (GEMS, 2022)
- Shallow hazards assessment, Block 607 and Portions of 650 and 651, Mississippi Canyon Area, Gulf of Mexico, (GEMS, 2016).

The text, maps, and figures included in the report provide detail on the regional geology of the Study Area. Chevron provided a 3-D seismic time volume for the geohazard analysis, covering an approximate 163 square-mile area that includes all or portions of Federal lease Blocks 562-565, 606-609, 650-653, 694-697, and 738-741 in the Mississippi Canyon Area (Figure MC608 A-1). Digital well log images from the BP Well #1 in MC 607 were used to correlate lithological conditions at the proposed well.

Chevron obtained from Anadarko HR data that was collected by OII in 2022 over MC 563-564 and 607-608 (Figure MC608-A-1). The O-Surveyor III AUV system acquired 120 / 400 kHz side-scan sonar data, 1.5-10 kHz subbottom profiler data, 200 kHz 3 m (10 ft) bin multibeam bathymetry, and 1 m (3 ft) bin multibeam backscatter data. The data and the archaeological assessment were made available to GEMS.

Subsurface depths at the proposed wellsite were calculated using a 4th-order equation based on time-velocity values provided by Chevron (GEMS, 2016). The equation is as follows, where $\boldsymbol{x}$ is two-way travel time in seconds below the mudline:

$$\text{Depth (feet)} = 118.04 * \mathbf{x}^4 - 531.62 * \mathbf{x}^3 + 1062.1 * \mathbf{x}^2 + 2505.5 * \boldsymbol{x}$$

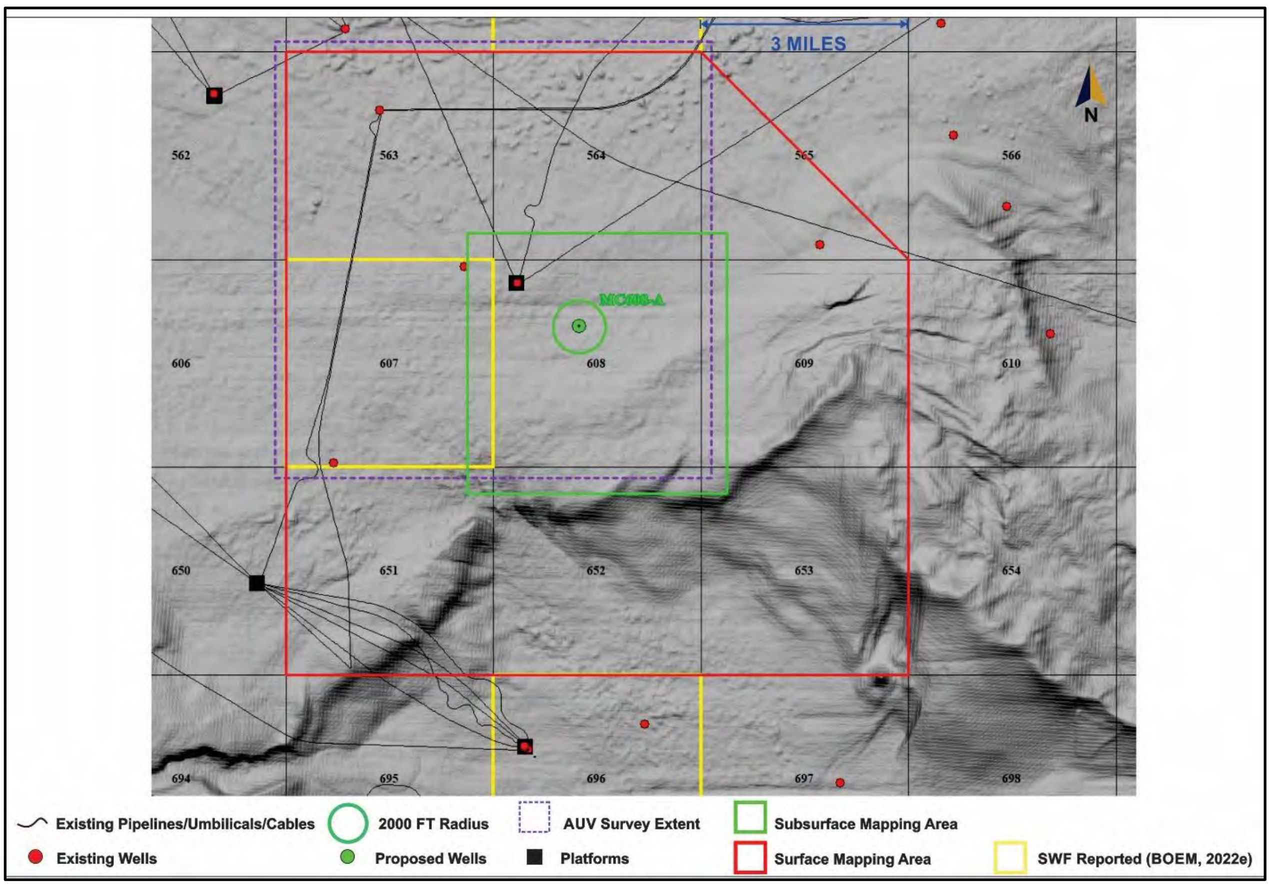


Figure MC 608-A-1. Seafloor Rendering Showing Proposed Wellsite MC 608-A.

Attachments

Wellsite maps are centered on the Proposed Wellsite MC 608-A location and are displayed at a 1 inch = 1,000 ft scale (1:12,000). The maps included in this letter are as follows:

Map No. MC 608-A-1:	Bathymetry Map
Map No. MC 608 A-2:	Seafloor Features Map
Map No. MC 608 A-3:	Side-Scan Sonar Mosaic
Map No. MC 608 A-4:	Seafloor Amplitude Rendering
Map No. MC 608 A-5:	Geologic Features Map

The accompanying illustrations were extracted from the available data sets and are listed below:

Illustration MC 608-A-1: Portion of Subbottom Profiler Line 133 Showing Near-Surface Conditions Beneath Proposed Wellsite MC 608-A

Illustration MC 608-A-2: Portions of Inline 11337 and Crossline 11045 Showing Conditions Beneath Proposed Wellsite MC 608-A

Illustration MC 608-A-3: Tophole Prognosis Chart, Proposed Wellsite MC 608-A, Mississippi Canyon Area, Block 608

Illustration MC 608-A-4: Correlation between Proposed Wellsite MC 608-A and Nearby Existing Wells.

NTL Requirements

The following letter complies with the Bureau of Ocean Energy Management (BOEM) Notice to Lessees (NTLs) 2008-G04, 2009-G40, and 2022-G01, (MMS, 2008, 2010, and BOEM, 2022a). BOEM's high probability archaeological blocks do not include MC 608 (BOEM, 2011). However, mitigation guidelines released by BOEM, entitled "Pre-Seabed Disturbance Survey Mitigation", historically requires an archaeological assessment of all surveyed blocks prior to any bottom disturbing activities (BOEMRE, 2011). An archaeological assessment of the area of potential effect around any proposed surface locations may be required as per NTL 2005-G07 (MMS, 2005). To adhere to these guidelines, Chevron obtained an archaeological assessment of HR data collected in and around MC 608 (OII,2022). The archaeological assessment is used in this evaluation of proposed wellsite MC 608-A.

As specified in NTL 2022-G01 (BOEM, 2022a), GEMS extracted the power spectrum diagram from the 3-D seismic data cube provided by Chevron (Figure MC 608-A-2). The extraction was generated from the seafloor to 1 second below the mudline. We converted the amplitude vs. frequency spectrum, generated by the IHS software, to power vs. frequency by squaring the amplitude values as described by J. A. Coffeen, 1978. The frequency bandwidth at 50% power ranges between 13 and 68 Hz.

Figure MC 608-A-2. Power Spectrum Analysis Curve, Proposed Wellsite MC 608-A

Man-Made Structures and Features

The surface location is clear of any wells, pipelines, or platforms within a 2,000 ft radius from the proposed wellsite. The closest existing well is the MC 608-EA002 (API #608174098400) approximately 5,750 ft to the northwest (Figure MC 608-A-1), BOEM, 2022b,c. The well was drilled by BP in 2002. The total vertical depth is reported as 16,443 ft. Production infrastructure is associated with the wellbore.

Two 8-inch, oil pipelines are connected to the EA002 well. S-13786 is a BP 8' pipeline extending to the north-northwest. A second BP 8" pipeline (S-13798) trends to the northeast. In addition, a 4" umbilical (S-13787) extends to the north-northeast from the EA002 well.

MC 608 is not in any Military Warning or Testing Areas.

Archaeological Assessment

The OII archaeologist reviewed the 2022 side-scan sonar, multibeam, and subbottom profiler data within MC 563-564 and 607-608 (OII, 2022). The data analysis detected 50 sonar contacts considered to be modern debris. The contacts do not have an acoustic signature indicative of archaeological resources. Sixteen (16) sonar contacts occur within the block border of MC 608. None of the contacts occur within 2,000 ft of the proposed MC 608-A wellsite location (Map MC608-A-4). Based on the archaeological review of available AUV data, the Area of Potential Effect around the proposed MC 608-A wellsite location appears clear of archaeological resources.

Wellsite Conditions

The proposed location is clear of any constraining seafloor conditions as defined by the AUV and 3-D seismic data sets. The near surface stratigraphy at the proposed well location consists of a relatively thick section of layered hemipelagic sediments intercalated with mass-transport deposits. At depth, the stratigraphy consists of stratified turbidite intervals and a series of slope channel fill complexes.

Water Depth and Seafloor Conditions. Seafloor conditions are favorable at the proposed wellsite location. The water depth at the surface location is approximately -6,678 ft (Map MC608-A-1) and the seafloor slopes to the east at about 0.87°. Overall, the seafloor in the vicinity of proposed wellsite MC 608 A is relatively smooth and benign (Map MC608 A-2).

The seafloor at the wellsite is covered by a ~15 ft hemipelagic clay drape (Illustration MC608 A-1). The low seafloor amplitude response and side-scan sonar reflectivity in the vicinity of the proposed wellsite suggests the seabed is covered by very soft clays and silty-clays (Maps MC608 A-3 and –A-4).

Deepwater Benthic Communities. MMS (2010) does not designate Federal Lease Block 608 as having sensitive high-density benthic communities. Deepwater benthic communities are not expected at the proposed wellsite. There are no interpreted features or areas capable of supporting densely-populated benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic (Map MC608 A-3) and Seafloor Amplitude Rendering (Map MC608 A-4) show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies within 2,000 ft of the location (BOEM, 2022e).

Stratigraphy. The stratigraphy at the proposed well location is depicted on Illustrations MC608 A-1 through MC608 A-4. The Tophole Prognosis Chart (Illustration MC608 A-3) shows the inline, annotated with calculated depths to the various horizons and predicted lithology of the sequences, along with their potential for shallow gas and shallow water flow. In general, the shallow stratigraphic sequences to the Limit of Investigation (6,000 ft bml) reflect alternating episodic deposition of hemipelagic clays and silty clays, turbidites, mass-transport, and slope-fan deposits. Overall, the seismic reflection character suggests that the sequences are composed of clays and silts interspersed with sands, primarily in the interbedded slope-fan units.

The subbottom profiler data define the stratigraphic section between the seafloor and approximately Horizon 10 (205 ft bml) in the area of the proposed wellsite (Illustration MC608 A-1). The uppermost 15 ft of sediment at the wellsite is a drape consisting of very soft, high water content, silty-clays. The sediments below the drape to 205 ft bml are stratified clays and silty clays with the exception of a relatively thin (25 ft) clay-rich mass-transport deposit between 118 ft to 143 ft bml.

The 3-D seismic data define the stratigraphy from the seafloor to the Limit of Investigation, about 6,000 ft bml (Illustrations MC608 A-2 and –A-3). Seven seismic reflections (Horizons 10, 15, 20, 30,40, 50, and 60) define the shallow section beneath the well.

The sedimentary section from Horizon 10 to Horizon 20 (Unit 2), between 205 ft and 447 ft bml, likely corresponds to the distal margin of the slope-fan sequence identified as the "Blue Unit". The Blue Unit is a regional basin-floor fan and the source of numerous shallow water flow incidents in the Mississippi Canyon Area (BOEM, 2022e). The sediments within this unit likely consist of clay-prone mass-transport deposits and turbidites. A high-amplitude reflector (Horizon 15) occurs mid-unit (about 357 ft bml) and divides the unit into sub-units 2A and 2B. A sand layer or a series of thin sands are possible at and just above Horizon 15. Gamma ray and resistivity well logs from the BP Well #1 in MC 607 indicate that about 30 ft of wet sand was encountered mid-unit and about 20 ft of wet sand was encountered at the base of the unit.

The proposed location lies north of a large, buried channel complex that affects Units 3 and 4 in the area (Illustration MC608 A-2 and Map MC608 A-5). Unit 3 sediments at the proposed wellsite (Horizons 20 to 30 between 447 ft and 978 ft bml) will likely contain levee/overbank and turbidite deposits comprised of clays, silts, and thin sand layers.

Unit 4 (Horizon 30 to 40), between 978 ft and 2,337 ft bml, likely corresponds to a sand-prone slope-fan channel complex. The facies within in this unit are variable from flat-lying layered turbidites, dipping clinoform like beds and amorphous mass-transport deposits. Gamma ray and resistivity logs from BP's Well #1 in MC 607 indicate the presence of sands in Unit 4.

Unit 5 (Horizon 40 to 50) between 2,337 ft and 3,499 ft bml, is also a slope fan-channel complex. The bulk of the channel complex lies to the northeast of the proposed location. The well bore will likely encounter bedded levee/overbank deposits, turbidites and clay-rich mass-transport deposits.

The sediments below Horizon 50 to the Limit of Investigation (Units 6 and 7), between 3,499 ft and 6,000 ft bml, are generally low-amplitude stratified reflectors interbedded with low-amplitude chaotic reflectors. These sediments are likely hemipelagic clays and silty clays interbedded with fine-grained turbidites and mass-transport deposits. The turbidites will consist of alternating layers of clay, silt, and thin sand.

Faults. The Proposed Wellsite MC 608 A is not expected to intersect any seafloor or buried faults in the shallow section to the Limit of Investigation.

Shallow Gas and Shallow Water Flow. Interval amplitude searches were completed between the mapped horizons to help identify facies trends and possible gas-related anomalies within the seismic stratigraphic units (GEMS, 2022). Two additional amplitude searches were conducted to ensure complete hazards analysis within the tophole section. Infill scans were completed within Units 3 and 5 where the bounding horizons were truncated by major channel structures (GEMS, 2022). Significant shallow gas is not expected to be encountered within the shallow sediments within the Limit of Investigation. The potential for shallow water flow is considered negligible to moderate.

Shallow Gas. There are no apparent high-amplitude anomalies or other direct hydrocarbon indicators directly below or in the immediate vicinity of the proposed wellsite (Map MC608 A-5 and Illustration MC608 A-2). The closest mapped subsurface high-amplitude event to the proposed borehole is approximately 340 ft southwest of the location. The anomaly is located at the edge of a channelized interval near the top of Unit 5. Unit 5 at this location consists of predominantly clay and silt rich levee/overbank deposits interlayered with mass-transport deposits. The event may represent a small sand pocket within Unit 5 at a depth of about 2,423 ft bml (Illustration MC608 A-3). The elevated event is not associated with other direct hydrocarbon indicators and may represent lithologic variations rather than shallow gas accumulations. The anomaly is not expected to impact the wellsite.

A low potential for encountering shallow gas exists within the slope-fan units 2, 4, and 5 and within the turbidite intervals of Units 6 and 7. A negligible potential for shallow gas exists in the predominantly fine-grained sediments of Units 1 and 3.

Shallow Water Flow. The potential for shallow water flow at this well location is considered negligible to moderate (Illustration MC608 A-3). Overpressured sand units in the Mississippi Canyon Protraction Area are generally associated with seismic facies representing Pleistocene intraslope fan complexes, and in some cases, channel or canyon sequences (Ostermeier et al., 2000). Three slope-fan or fan-channel sequences (Units 2, 4 and 5) will be encountered by the proposed location within the Limit of Investigation.

The closest reported shallow water flow was approximately 1.9 miles northwest of the proposed wellsite at the BP Well #1 in the northeast corner of MC 607 (Illustration MC608 A-4). The BP Well #1 encountered low flow while drilling the channelized slope fan deposits within the upper portion of Unit 4 at a depth of 1,246 ft bml (BOEM, 2022e; Illustration MC608 A-4). Additionally, Chevron's #001 well in MC 696, about 6.6 miles to the south-southwest reported low severity water flow at 1,971 ft bml (BOEM, 2022e). The depth of flow corresponds to the lower portion of the mapped Unit 4 at the proposed location. The recently drilled Chevron MC 608#1 and #2 wells did not report water flow conditions within Unit 4 or the other sequences within the Limit of Investigation (Chevron, personal communication). However, muds used in the wellbore may have mitigated any overpressures. Unit 4 (978 ft to 2,337 ft bml) at the Proposed Wellsite MC 608 A is designated with at least a moderate potential for shallow water flow.

No wells within the immediate vicinity of MC 608 reported shallow water flow in the presumed "Blue Unit" sequence within Unit 2 (205 ft to 447 ft bml). However, a shallow water flow was experienced in MC 476 about 10 miles to the north. The flow was reported at 448 ft bml (BOEM, 2022e). Given the high-amplitude response at and just above Horizon 15, the upper portion of Unit 2 ~357 ft bml has a moderate potential for overpressured sands.

Units 3, 5, 6, and 7 may have thin sands but generally a low potential for overpressures. There is a negligible potential for shallow water flow within the clay-rich sequences of Units 1 and 3.

Results

The proposed MC 608 A location in Mississippi Canyon Area, block 608, appears suitable for exploration drilling operations. No areas with the potential for deepwater benthic communities are identified within 2,000 ft of the proposed wellsite.

No unidentified sonar contacts are delineated in the side-scan sonar data within 2,000 ft of the proposed wellsite. However, if any wood, ceramics, textiles, or ferrous objects become exposed during the course of bottom disturbing operations, all activities must be halted and BOEM notified within 48 hours.

There is a moderate potential for encountering overpressured sands within the Blue Unit slope-fan interval at about 357 ft bml and within slope fan-channel complex of Unit 4 between 978 ft and 2,337 ft bml. Significant shallow gas is not expected between the seafloor and Limit of Investigation.

Closing

We appreciate the opportunity to be of service to Chevron U.S.A. Inc. and look forward to working with Chevron on future projects.

Sincerely,

GEOSCIENCE EARTH & MARINE SERVICES, INC.

Thomas W. Neurauter, PhD.
Senior Marine Geologist

Daniel Lanier
President

Erin Williams Janes
Project Manager/Senior Geoscientist

Attachments (4 Illustrations)

Distribution:
Mr. Phillip Von Dullen III, Houston, TX (1 copy)

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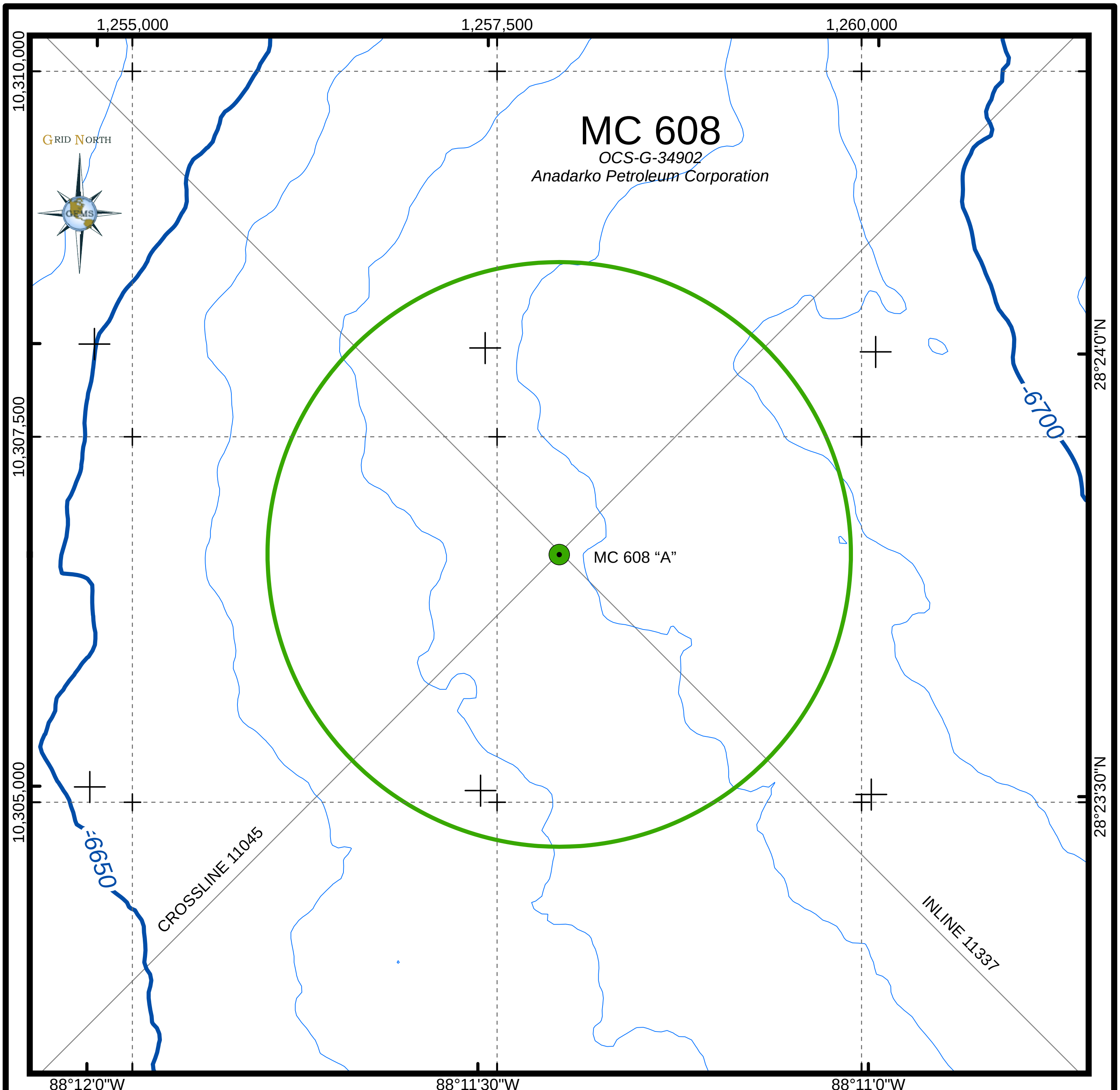


PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

WATER DEPTH IN FEET
CONTOUR INTERVAL = 10 FT.

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

CHEVRON U.S.A. INC.

BATHYMETRY MAP

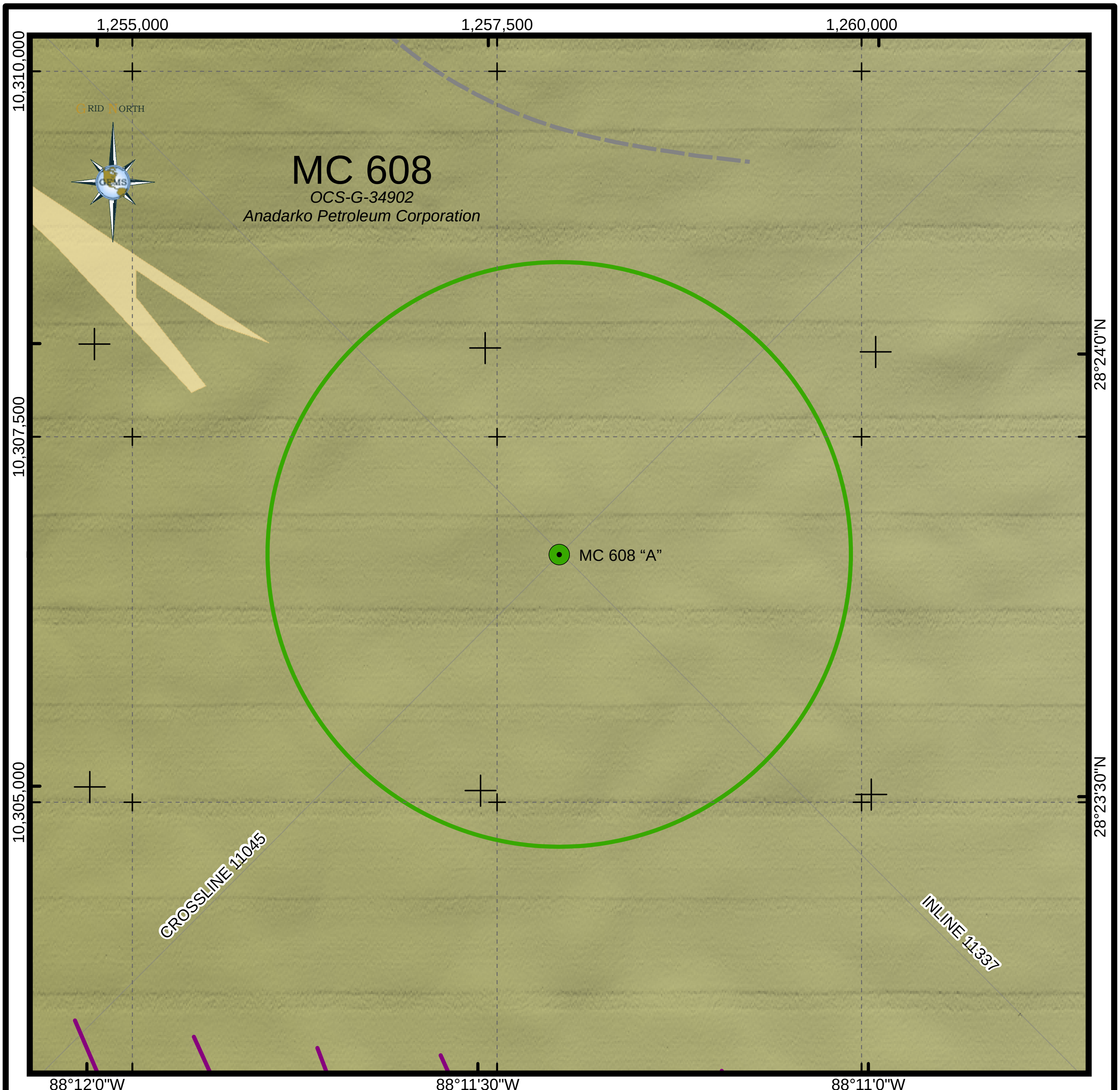
BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000 Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC.

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-A-1.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 A-1



PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

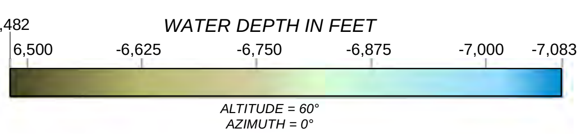
3-D SURVEY LINE.

LONG (500 FT TO 1100 FT), NARROW (~50 FT) STRIPS OF ELEVATED BACKSCATTER ALONG SEAFLOOR, POSSIBLY VARIATION IN SEDIMENT TYPE OR GRAIN-SIZE AND POSSIBLY RELATED TO BOTTOM CURRENTS.

DRAG SCAR (OII, 2022).

HIGH BACKSCATTER PATCHES REPRESENTING THIN APRONS OF DRILL MUDS AND CUTTINGS AROUND EXISTING WELLS.

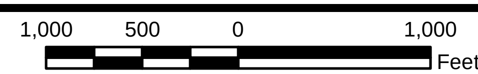
GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET



CHEVRON U.S.A. INC.

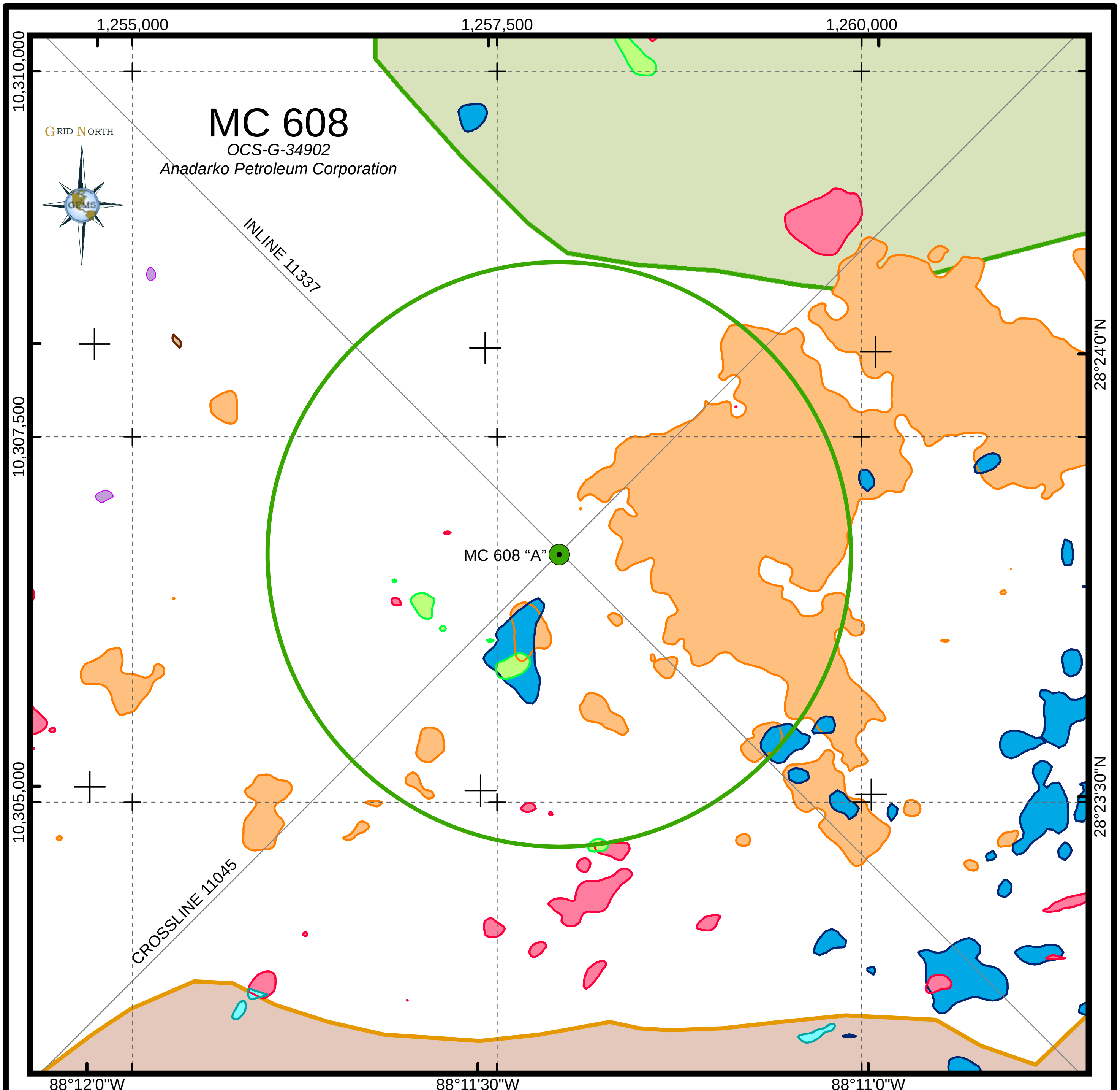
SEAFLOOR FEATURES MAP

BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO



DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-A-2.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 A-2



PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

BURIED SUBMARINE CHANNEL THAT AFFECTS UNITS 3 AND 4.

BURIED SUBMARINE CHANNEL THAT AFFECTS UNIT 5.

AMPLITUDE ANOMALIES

AMPLITUDE ANOMALIES BETWEEN HORIZON 10 TO HORIZON 15 (UNIT 2A).

AMPLITUDE ANOMALIES BETWEEN HORIZON 15 TO HORIZON 20 (UNIT 2B).

AMPLITUDE ANOMALIES BETWEEN HORIZON 20 TO HORIZON 30 (UNIT 3).

AMPLITUDE ANOMALIES BETWEEN HORIZON 30 TO HORIZON 40 (UNIT 4).

AMPLITUDE ANOMALIES BETWEEN HORIZON 40 TO HORIZON 50 (UNIT 5).

AMPLITUDE ANOMALIES BETWEEN HORIZON 50 TO HORIZON 60 (UNIT 6).

AMPLITUDE ANOMALIES BETWEEN HORIZON 60 TO LIMITS OF INVESTIGATION (UNIT 7).

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

Chevron

CHEVRON U.S.A. INC.

GEOLOGIC FEATURES MAP

BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC.

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-A-5.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 A-5

December 22, 2022

Project No. 1122-3147

Chevron U.S.A. Inc.
1500 Louisiana Street
Houston, TX 77002

Attention: Mr. Phillip Von Dullen III

Site Clearance Letter
Proposed Exploration Wellsite MC 608-B
Block 608 (OCS-G-34902)
Mississippi Canyon Area
Gulf of Mexico

Chevron U.S.A. Inc. (Chevron) contracted Geoscience Earth & Marine Services (GEMS) to provide an assessment of the seafloor and shallow geologic conditions to determine the favorability of drilling operations for the proposed location MC 608-B in Block 608 (OCS-G-34902), Mississippi Canyon Area (MC), Gulf of Mexico. Specific seafloor and subsurface conditions are addressed around the proposed location to the Limit of Investigation (LOI) ~6,000 ft below the mudline (bml).

Seafloor conditions appear favorable within the vicinity of the proposed surface location. There are no potential sites for deepwater benthic communities within 2,000 ft. An Archaeological Assessment prepared by Oceaneering International (OII) and based on high-resolution geophysical data (HR), detected two sonar contacts within 2,000 ft of the proposed wellsite. These contacts are believed to be modern debris and have not been assigned an avoidance radius. Based on seismic attributes and amplitude analysis there is a negligible to low/moderate potential for encountering significant shallow gas within the limit of investigation. There is a negligible to moderate potential for encountering overpressured sands within the Limit of Investigation (6,000 ft bml, -12,670 ft bsl)

This letter provides details specific to the well location, including available data, Notice to Lessees (NTL) requirements, man-made features, and wellsite conditions.

Proposed Well Location

The surface location for the Proposed Wellsite MC 608-B lies in the northwestern corner of MC 608 (Figure MC 608-B-1). Chevron provided the following coordinates:

Table 1. Proposed Wellsite MC 608-B Location Coordinates

Proposed Wellsite MC 608-B			
Spheroid & Datum: Clarke 1866 NAD27 Projection: UTM Zone 16 North		Line Reference	Block Calls (MC 608)
X: 1,252,106 ft	Latitude: 28° 24' 27.4075” N	Inline 11309	747 ft FWL
Y: 10,310,929 ft	Longitude: 88° 12' 29.7752" W	Crossline 11218	911 ft FNL

Chevron will drill this well using a dynamically positioned drilling vessel. Our assessment addresses the seafloor conditions within a 2,000-ft radius around the Proposed Wellsite MC 608-B.

Available Data

The following discussion is based on findings from the reports listed below:

- Archaeological and Geohazard Assessment, Blocks 563, 564, 607, and 608, Mississippi Canyon Area Gulf of Mexico (OII, 2022)
- Shallow Hazards Assessment, Block 608 and Vicinity Mississippi Canyon Area, Gulf of Mexico (GEMS, 2022)
- Shallow hazards assessment, Block 607 and Portions of 650 and 651, Mississippi Canyon Area, Gulf of Mexico, (GEMS, 2016).

The text, maps, and figures included in the report provide detail on the regional geology of the Study Area. Chevron provided a 3-D seismic time volume for the geohazard analysis, covering an approximate 163 square-mile area that includes all or portions of Federal lease Blocks 562-565, 606-609, 650-653, 694-697, and 738-741 in the Mississippi Canyon Area (Figure MC608 B-1). Digital well log images from the BP Well #1 in MC 607 were used to correlate lithological conditions at the proposed well.

Chevron obtained from Anadarko HR data that was collected by OII in 2022 over MC 563-564 and 607-608 (Figure MC608-B-1). The O-Surveyor III AUV system acquired 120 / 400 kHz side-scan sonar data, 1.5-10 kHz subbottom profiler data, 200 kHz 3 m (10 ft) bin multibeam bathymetry, and 1 m (3 ft) bin multibeam backscatter data. The data and the archaeological assessment were made available to GEMS.

Subsurface depths at the proposed wellsite were calculated using a 4th-order equation based on time-velocity values provided by Chevron (GEMS, 2016). The equation is as follows, where $\boldsymbol{x}$ is two-way travel time in seconds below the mudline:

$$\text{Depth (feet)} = 118.04*\mathbf{x^4} - 531.62*\mathbf{x^3} + 1062.1*\mathbf{x^2} + 2505.5*\mathbf{x}$$

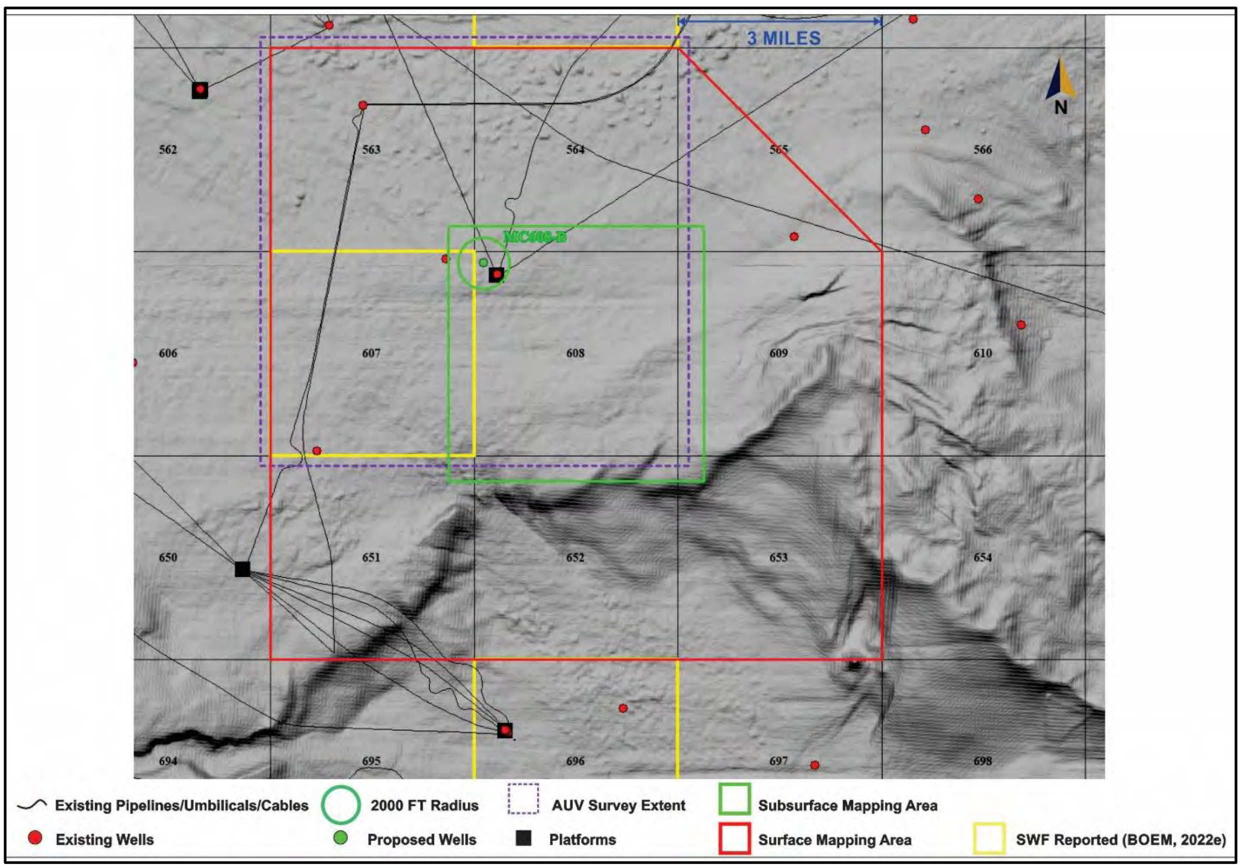


Figure MC 608-B-1. Seafloor Rendering Showing Proposed Wellsite MC 608-B.

Attachments

Wellsite maps are centered on the Proposed Wellsite MC 608-B location and are displayed at a 1 inch = 1,000 ft scale (1:12,000). The maps included in this letter are as follows:

Map No. MC 608-B-1: Bathymetry Map

Map No. MC 608 B-2: Seafloor Features Map

Map No. MC 608 B-3: Side-Scan Sonar Mosaic

Map No. MC 608 B-4: Seafloor Amplitude Rendering

Map No. MC 608 B-5: Geologic Features Map

The accompanying illustrations were extracted from the available data sets and are listed below:

Illustration MC 608-B-1: Portion of Subbottom Profiler Line 126 Showing Near-Surface Conditions Beneath Proposed Wellsite MC 608-B

Illustration MC 608-B-2: Portions of Inline 11309 and Crossline 11218 Showing Conditions Beneath Proposed Wellsite MC 608-B

Illustration MC 608-B-3: Tophole Prognosis Chart, Proposed Wellsite MC 608-B, Mississippi Canyon Area, Block 608

Illustration MC 608-B-4: Correlation between Proposed Wellsite MC 608-B and Nearby Existing Wells.

NTL Requirements

The following letter complies with the Bureau of Ocean Energy Management (BOEM) Notice to Lessees (NTLs) 2008-G04, 2009-G40, and 2022-G01, (MMS, 2008, 2010, and BOEM, 2022a). BOEM's high probability archaeological blocks do not include MC 608 (BOEM, 2011). However, mitigation guidelines released by BOEM, entitled "Pre-Seabed Disturbance Survey Mitigation", historically requires an archaeological assessment of all surveyed blocks prior to any bottom disturbing activities (BOEMRE, 2011). An archaeological assessment of the area of potential effect around any proposed surface locations may be required as per NTL 2005-G07 (MMS, 2005). To adhere to these guidelines, Chevron obtained an archaeological assessment of HR data collected in and around MC 608 (OII,2022). The archaeological assessment is used in this evaluation of proposed wellsite MC 608-B.

As specified in NTL 2022-G01 (BOEM, 2022a), GEMS extracted the power spectrum diagram from the 3-D seismic data cube provided by Chevron (Figure MC 608-B-2). The extraction was generated from the seafloor to 1 second below the mudline. We converted the amplitude vs. frequency spectrum, generated by the IHS software, to power vs. frequency by squaring the amplitude values as described by J. A. Coffeen, 1978. The frequency bandwidth at 50% power ranges between 28 and 69 Hz.

Figure MC 608-B-2. Power Spectrum Analysis Curve, Proposed Wellsite MC 608-B

Man-Made Structures and Features

The closest existing well and infrastructure is the MC 608-EA002 (API #608174098400) approximately 1.425 ft to the southeast (Figure MC 608-B-1, and Map MC608-B-1), BOEM, 2022b,c. The well was drilled by BP in 2002. The total vertical depth is reported as 16,443 ft. Production infrastructure is associated with the wellbore.

Two 8-inch, oil pipelines are connected to the EA002 well. S-13786 is a BP 8' pipeline extending to the north-northwest. This pipeline comes within 575 ft east of the proposed location. A second BP 8" pipeline (S-13798) trends to the northeast and is 1,580 ft to the southeast. In addition, a 4" umbilical (S-13787) extends to the north-northeast from the EA002 well and is within 1,245 ft of the proposed MC 680-B wellsite.

Approximately 2,945 ft west of the proposed location is the MC 607-001 well (API#608174057800). The well was drilled by BP in 1997 and reached a total vertical depth of 16,956 ft.

MC 608 is not in any Military Warning or Testing Areas.

Archaeological Assessment

The OII archaeologist reviewed the 2022 side-scan sonar, multibeam, and subbottom profiler data within MC 563-564 and 607-608 (OII, 2022). The data analysis detected 50 sonar contacts considered to be modern debris. The contacts do not have an acoustic signature indicative of archaeological resources. Sixteen (16) sonar contacts occur within the block borders of MC 608. Two of the contacts occur within 2,000 ft of the proposed MC 608-B wellsite location (Maps MC608-B-2 and MC608-B-3). Table 2 lists the sonar contacts within 2,000 ft of the proposed wellsite. The contacts occur within 500 ft of the EA002 facility and are likely debris from drilling or the installation of the production infrastructure.

Based on the archaeological review of available AUV data, the Area of Potential Effect around the proposed MC 608-B wellsite location appears clear of archaeological resources. BOEM guidelines (BOEM, 2022a) recommends a 100 ft avoidance of unidentified, non-cultural contacts.

Table 2. Side-Scan Sonar Contacts within 2,000 ft of Proposed Wellsite MC 608-B

CONTACT	AREA/BLOCK	LENGTH (FT)	WIDTH (FT)	HEIGHT (FT)	DESCRIPTION	X NAD 27 (FT)	Y NAD 27 (FT)	DISTANCE/DIRECTION FROM SITE
22	MC 608	19	5.2	0	rectangular	1,253,211	10,309,665	1,680 FT / SE
23	MC 608	8.6	4.3	0	Irregular	1,253,318	10,309,518	1,865 FT / SE

Wellsite Conditions

The proposed location is clear of any constraining seafloor conditions as defined by the AUV and 3-D seismic data sets. The near surface stratigraphy at the proposed well location consists of a relatively thick section of layered hemipelagic sediments intercalated with mass-transport deposits. At depth, the stratigraphy consists of stratified turbidite intervals and a series of slope channel fill complexes.

Water Depth and Seafloor Conditions. Seafloor conditions are favorable at the proposed wellsite location. The water depth at the surface location is approximately -6,616 ft (Map MC608-B-1) and the seafloor slopes to the east at about 0.6°. Overall, the seafloor in the vicinity of proposed wellsite MC 608 B is relatively smooth and benign (Map MC608 B-2).

The seafloor at the wellsite is covered by a ~18 ft thick, weakly stratified hemipelagic clay drape (Illustration MC608 B-1). The low seafloor amplitude response and side-scan sonar reflectivity in the vicinity of the proposed wellsite suggests the seabed is covered by very soft clays and silty-clays (Maps MC608 B-3 and –B-4).

The low seafloor amplitude response and side-scan sonar reflectivity in the vicinity of the proposed wellsite suggest the seabed is covered by soft clays (Maps MC 608-B-3 and MC 608-B-4). Drill muds and cuttings occur around existing wells to the west and southwest (Maps MC 608-B-2 and MC 608-B-3).

Deepwater Benthic Communities. MMS (2010) does not designate Federal Lease Block 608 as having sensitive high-density benthic communities. Deepwater benthic communities are not expected at the proposed wellsite. There are no interpreted features or areas capable of supporting high density benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic (Map MC608 B-3) and Seafloor Amplitude Rendering (Map MC608 B-4) show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies within 2,000 ft of the location (BOEM, 2022e).

Stratigraphy. The stratigraphy at the proposed well location is depicted on Illustrations MC608 B-1 through MC608 B-4. The Tophole Prognosis Chart (Illustration MC608 B-3) shows the inline, annotated with calculated depths to the various horizons and predicted lithology of the sequences, along with their potential for shallow gas and shallow water flow. In general, the shallow stratigraphic sequences to the Limit of Investigation (6,000 ft bml) reflect alternating episodic deposition of hemipelagic clays and silty clays, turbidites, mass-transport, and slope-fan deposits. Overall, the seismic reflection character suggests that the sequences are composed of clays and silts interspersed with sands, primarily in the interbedded slope-fan units.

The subbottom profiler data define the stratigraphic section between the seafloor and approximately Horizon 10 (220 ft bml) in the area of the proposed wellsite (Illustration MC608 B-1). The uppermost 18 ft of sediment at the wellsite is a drape consisting of very soft, high water content, silty-clays. The sediments below the drape to 220 ft bml are stratified clays and silty clays with the exception of a 34 ft-thick, clay-rich mass-transport deposit between 123 ft to 157 ft bml.

The 3-D seismic data define the stratigraphy from the seafloor to the Limit of Investigation, about 6,000 ft bml (Illustrations MC608 B-2 and –B-3). Seven seismic reflections (Horizons 10, 15, 20, 30,40, 50, and 60) define the shallow section beneath the well.

The sedimentary section from Horizon 10 to Horizon 20 (Unit 2), between 248 ft and 540 ft bml, likely corresponds to the distal margin of the slope-fan sequence identified as the “Blue Unit”. The Blue Unit is a regional basin-floor fan and the source of numerous shallow water flow incidents in the Mississippi Canyon Area (BOEM, 2022e). The sediments within this unit likely consist of clay-prone mass-transport deposits and turbidites. A high-amplitude reflector (Horizon 15) occurs mid-unit (about 370 ft bml) and divides the unit into sub-units 2A and 2B. A sand layer or a series of thin sands are possible at and just above Horizon 15. Gamma ray and resistivity well logs from the BP Well #1 in MC 607 indicate that about 30 ft of wet sand was encountered mid-unit and about 20 ft of wet sand was encountered at the base of the unit.

Unit 3 (Horizon 20 to Horizon 30) occurs between 540 ft and 968 ft bml (Illustrations MC608 B-2 and B-3). The sequenced consists of numerous, closely-spaced parallel reflections and will likely contain levee/overbank and turbidite deposits comprised of clays, silts, and thin sand layers.

Unit 4 (Horizon 30 to 40) occurs between 968 ft and 2,249 ft bml. The seismic facies is highly variable and includes flat-lying, layered turbidites, dipping clinoform like beds, and amorphous mass-transport deposits. Gamma ray and resistivity logs from BP’s Well #1 in MC 607 indicate the presence of sands in Unit 4. Unit 4 is a slope fan-channel complex.

Unit 5 (Horizon 40 to 50) between 2,249 ft and 3,373 ft bml, is also a slope fan-channel complex. The sequence exhibits a complex stratigraphy. The well bore will likely encounter bedded levee/overbank and turbidites deposits, thin channel fill, and mass-transport deposits. The sediments will be a mixture clay, silt, and sand.

The sediments below Horizon 50 to the Limit of Investigation (Units 6 and 7), between 3,373 ft and 6,000 ft bml, are generally low-amplitude stratified reflectors interbedded with low-amplitude chaotic reflectors. These sediments are likely hemipelagic clays and silty clays interbedded with fine-grained turbidites and mass-transport deposits. The turbidites will consist of alternating layers of clay, silt, and thin sand.

Faults. The Proposed Wellsite MC 608-B is not expected to intersect any seafloor faults in the near-surface. Two buried faults will be encountered near the base of Unit 4 (Illustrations MC608 B-2 and B-3). The fault planes will be crossed at about 1,760 ft and 2,060 ft bml. The faults are slump-faults confined to the fan-channel complex of Unit 4.

Shallow Gas and Shallow Water Flow. Interval amplitude searches were completed between the mapped horizons to help identify facies trends and possible gas-related anomalies within the seismic stratigraphic units (GEMS, 2022). Two additional amplitude searches were conducted to ensure complete hazards analysis within the tophole section. Infill scans were completed within Units 3 and 5 where the bounding horizons were truncated by major channel structures (GEMS, 2022). Significant shallow gas is not expected to be encountered within the shallow sediments within the Limit of Investigation. The potential for shallow water flow is considered negligible to moderate.

Shallow Gas. There are no apparent high-amplitude anomalies or other direct hydrocarbon indicators directly below the proposed wellsite (Map MC608 B-5 and Illustration MC608 B-3). The closest mapped subsurface high-amplitude event to the proposed borehole is approximately 175 ft northeast of the location. The anomaly is located within a stratified interval at the top of Unit 6. Unit 6, at this location, consists of turbidites interlayered with mass-transport deposits. The event may represent a thin sand within a turbidite interval at a depth of about 3,373 ft bml (Illustration MC608 B-3). The elevated event is not associated with other direct hydrocarbon indicators and may represent lithologic variations rather than shallow gas accumulations. Because the interval is 175 ft from the borehole, this interval has a low to moderate potential for shallow gas.

A low potential for encountering shallow gas exists within the slope-fan channel units 4 and 5 and within the turbidite intervals of Unit 7. A negligible potential for shallow gas exists in the predominantly fine-grained sediments of Units 1, 2, and 3.

Shallow Water Flow. The potential for shallow water flow at this well location is considered negligible to moderate (Illustration MC608 B-3). Overpressured sand units in the Mississippi Canyon Protraction Area are generally associated with seismic facies representing Pleistocene intraslope fan complexes, and in some cases, channel or canyon sequences (Ostermeier et al., 2000). Three slope-fan or fan-channel sequences (Units 2, 4 and 5) will be encountered by the proposed location within the Limit of Investigation.

The closest reported shallow water flow was only 2,945 ft west of the proposed wellsite at the BP Well #1 in the northeast corner of MC 607 (Illustration MC608 B-4). The BP Well #1 encountered low flow while drilling the channelized slope fan deposits within the upper portion of Unit 4 at a depth of 1,246 ft bml (BOEM, 2022e; Illustration MC608 B-4). Additionally, Chevron's #001 well in MC 696, about 10 miles to the south-southwest reported low severity water flow at 1,971 ft bml (BOEM, 2022e). The depth of flow corresponds to the lower portion of the mapped Unit 4 at the proposed location. The BP #1 well in MC 607 was drilled in 1997. The more recently drilled Chevron wells, MC 608#1 and EA002 wells did not report water flow conditions within Unit 4 or the other sequences within the Limit of Investigation (Chevron, personal communication). The drill mud programs used in recent wells likely mitigated any overpressures. Unit 4 (968 ft to 2,249 ft bml) at the Proposed Wellsite MC 608 B is assigned a moderate potential for shallow water flow because of the likelihood of sand-rich layers within Unit 4.

No wells within the immediate vicinity of MC 608 reported shallow water flow in the presumed "Blue Unit" sequence within Unit 2 (248 ft to 540 ft bml). However, a shallow water flow was experienced in MC 476 about 10 miles to the north. The flow was reported at 448 ft bml (BOEM, 2022e). Given the low-amplitude response of Unit 2 at and in the vicinity of MC 608-B and the lack of flow reported in near-by wells, Unit 2 is assigned a low potential for overpressured sands.

Units 3, 5, 6, and 7 may have thin sands but generally a low potential for overpressures. There is a negligible potential for shallow water flow within the clay-rich sequences of Units 1 and 3.

Results

The proposed MC 608 B location in Mississippi Canyon Area, block 608, appears suitable for exploration drilling operations. No areas with the potential for deepwater benthic communities are identified within 2,000 ft of the proposed wellsite.

Two unidentified sonar contacts are delineated in the side-scan sonar data within 2,000 ft of the proposed wellsite. The contacts are not archaeologically significant and are likely debris from the nearby production facility. If any wood, ceramics, textiles, or ferrous objects become exposed during the course of bottom disturbing operations, all activities must be halted and BOEM notified within 48 hours.

There is a moderate potential for encountering overpressured sands within slope fan-channel complex of Unit 4 between 968 ft and 2,249 ft bml. Significant shallow gas is not expected between the seafloor and Limit of Investigation, however, a minor amplitude event occurs within about 175 ft of the well bore in Unit 6.

Closing

We appreciate the opportunity to be of service to Chevron U.S.A. Inc. and look forward to working with Chevron on future projects.

Sincerely,

GEOSCIENCE EARTH & MARINE SERVICES, INC.

Thomas W. Neurauter, PhD.
Senior Marine Geologist

Daniel Lanier
President

Erin Williams Janes
Project Manager/Senior Geoscientist

Attachments (4 Illustrations)

Distribution:
Mr. Phillip Von Dullen III, Houston, TX (1 copy)

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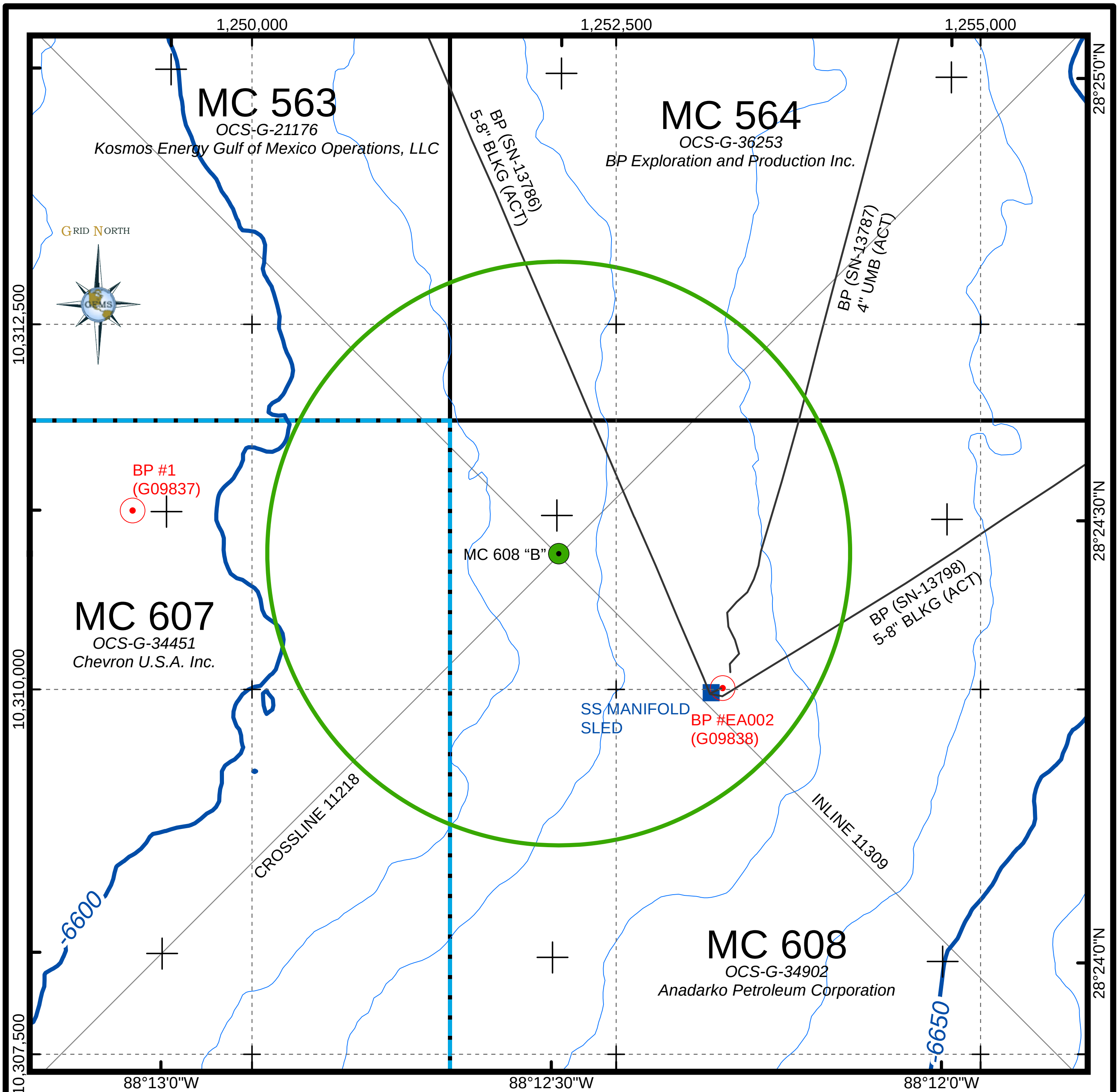


PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

EXISTING PIPELINE/UMBILICAL/CABLE LOCATION, AS REPORTED BY BOEM.

EXISTING WELL LOCATION, AS REPORTED BY BOEM.

EXISTING STRUCTURE LOCATION, AS REPORTED BY BOEM.

SHALLOW WATER FLOW BLOCK.

WATER DEPTH IN FEET
CONTOUR INTERVAL = 10 FT.

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

Chevron

CHEVRON U.S.A. INC.

BATHYMETRY MAP

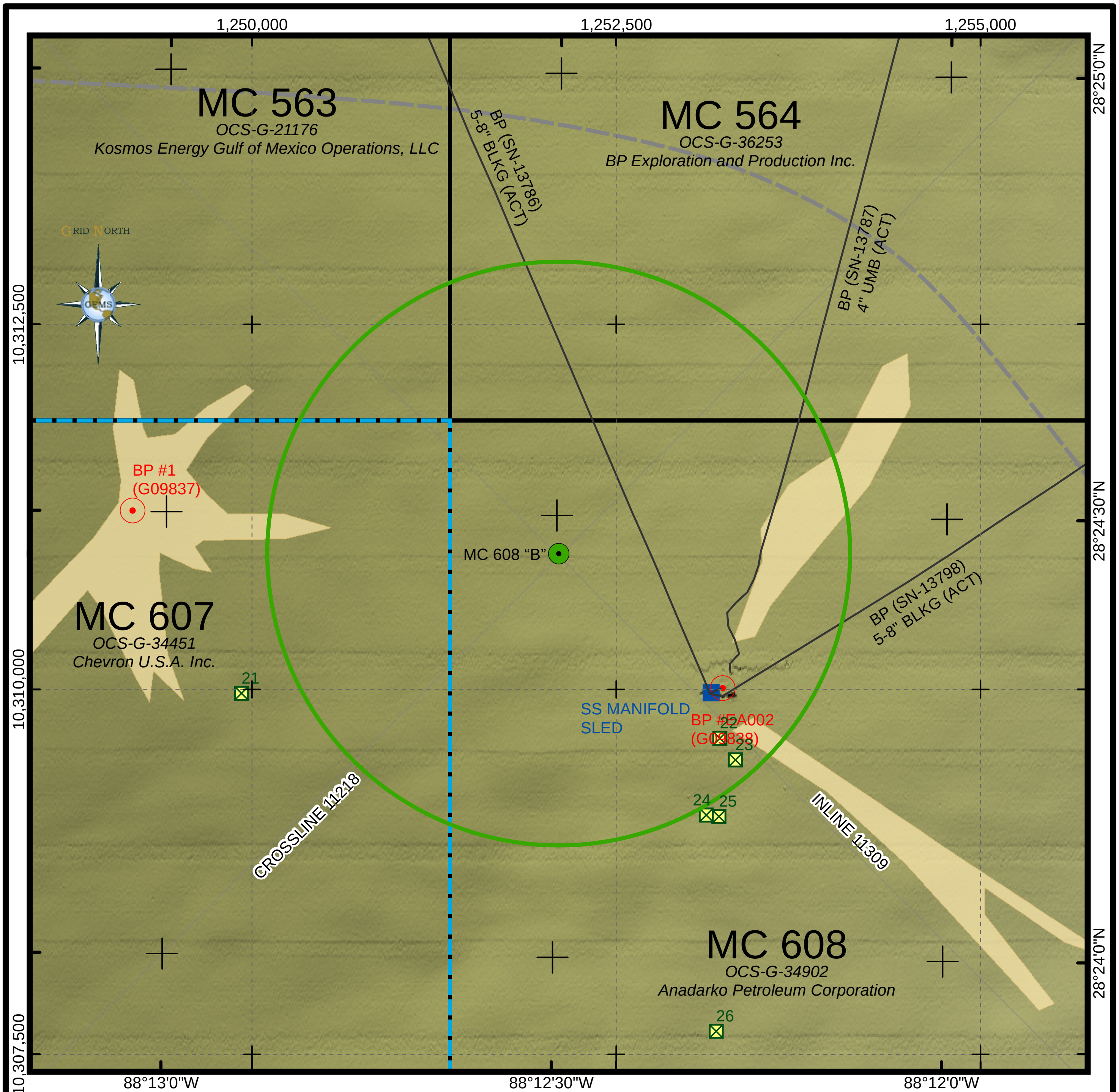
BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC.
GEMS

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-B-1.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 B-1



PROPOSED WELL LOCATION. CIRCLE REPRESENTS 2000 FT RADIUS AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

EXISTING PIPELINE/UMBILICAL/CABLE LOCATION, AS REPORTED BY BOEM.

EXISTING WELL LOCATION, AS REPORTED BY BOEM.

EXISTING STRUCTURE LOCATION, AS REPORTED BY BOEM.

SONAR CONTACT AND REFERENCE NUMBER (OII, 2022).

DRAG SCAR (OII, 2022).

SHALLOW WATER FLOW BLOCKS.

HIGH BACKSCATTER PATCHES REPRESENTING THIN APRONS OF DRILL MUDS AND CUTTINGS AROUND EXISTING WELLS.

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

WATER DEPTH IN FEET

6,482 | 6,500 | -6,625 | -6,750 | -6,875 | -7,000 | -7,083

ALTITUDE = 60°
AZIMUTH = 0°
V.E. = 4X

Chevron

CHEVRON U.S.A. INC.

SEAFLOOR FEATURES MAP

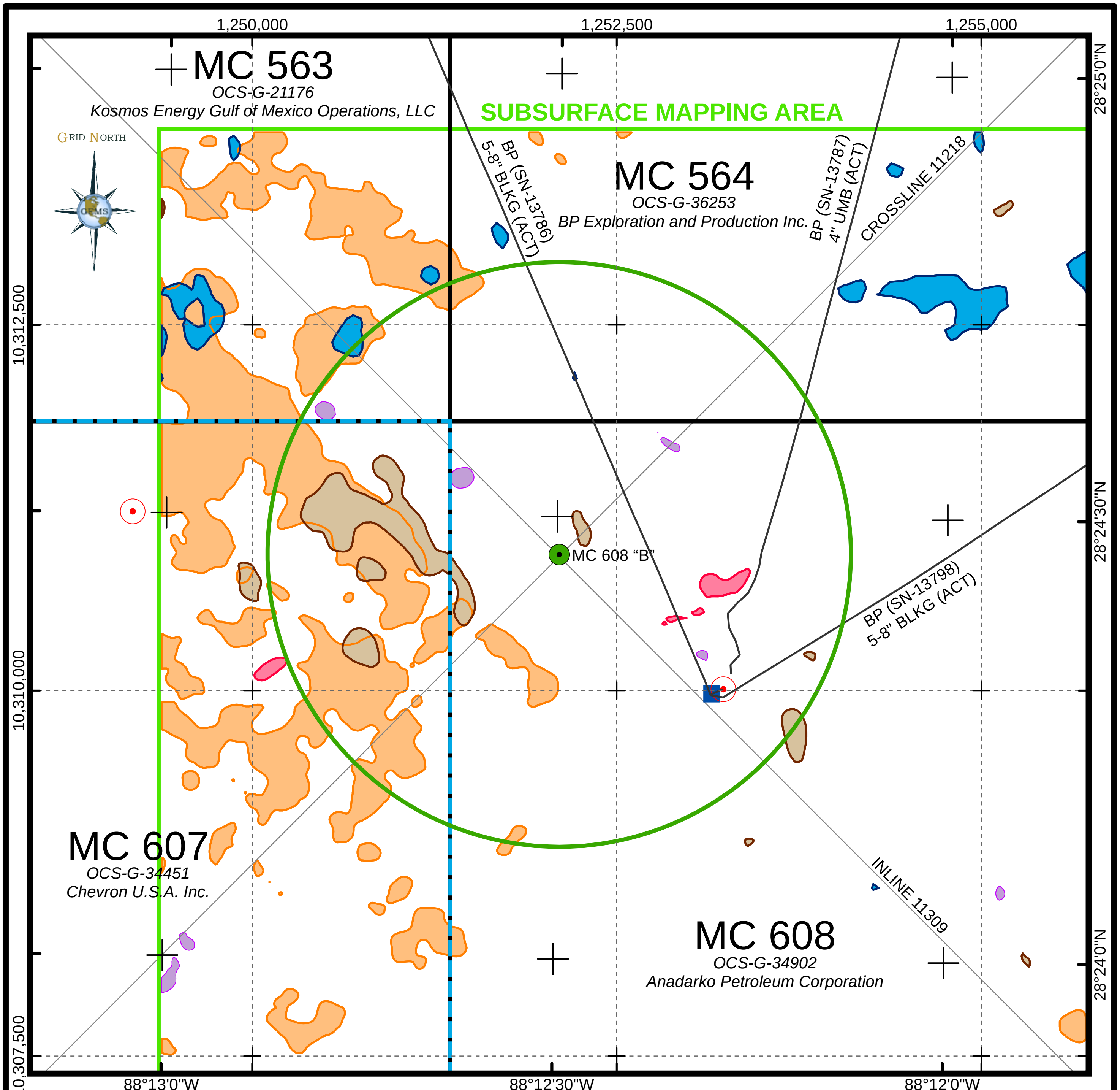
BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000 Feet

GEOSCIENCE EARTH & GEMS MARINE SERVICES, INC.

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-B-2.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 B-2



PROPOSED WELL LOCATION. CIRCLE REPRESENTS 2000 FT RADIUS AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

SHALLOW WATER FLOW BLOCKS.

AMPLITUDE ANOMALIES

AMPLITUDE ANOMALIES BETWEEN HORIZON 10 TO HORIZON 15 (UNIT 2A).

AMPLITUDE ANOMALIES BETWEEN HORIZON 30 TO HORIZON 40 (UNIT 4).

AMPLITUDE ANOMALIES BETWEEN HORIZON 40 TO HORIZON 50 (UNIT 5).

AMPLITUDE ANOMALIES BETWEEN HORIZON 50 TO HORIZON 60 (UNIT 6).

AMPLITUDE ANOMALIES BETWEEN HORIZON 60 TO LIMITS OF INVESTIGATION (UNIT 7).

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

Chevron

CHEVRON U.S.A. INC.

GEOLOGIC FEATURES MAP

BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000 Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC. GEMS

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-B-5.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 B-5

December 22, 2022 Project No. 1122-3147

Chevron U.S.A. Inc.
1500 Louisiana Street
Houston, TX 77002

Attention: Mr. Phillip Von Dullen III

Site Clearance Letter
Proposed Exploration Wellsite MC 608-C
Block 608 (OCS-G-34902)
Mississippi Canyon Area
Gulf of Mexico

Chevron U.S.A. Inc. (Chevron) contracted Geoscience Earth & Marine Services (GEMS) to provide an assessment of the seafloor and shallow geologic conditions to determine the favorability of drilling operations for the proposed location MC 608-C in Block 608 (OCS-G-34902), Mississippi Canyon Area (MC), Gulf of Mexico. Specific seafloor and subsurface conditions are addressed around the proposed location to the Limit of Investigation (LOI) ~6,000 ft below the mudline (bml).

Seafloor conditions appear favorable within the vicinity of the proposed surface location. There are no potential sites for deepwater benthic communities within 2,000 ft. An Archaeological Assessment prepared by Oceaneering International (OII) and based on high-resolution geophysical data (HR), detected one sonar contacts within 2,000 ft of the proposed wellsite. The contact is believed to be modern debris and has not been assigned an avoidance radius. Based on seismic attributes and amplitude analysis there is a negligible to low potential for encountering significant shallow gas within the limit of investigation. There is a negligible to moderate potential for encountering overpressured sands within the Limit of Investigation (6,000 ft bml, -12,670 ft bsl)

This letter provides details specific to the well location, including available data, Notice to Lessees (NTL) requirements, man-made features, and wellsite conditions.

Proposed Well Location

The surface location for the Proposed Wellsite MC 608-C lies near the center of MC 608 (Figure MC 608-C-1). Chevron provided the following coordinates:

Table 1. Proposed Wellsite MC 608-C Location Coordinates

Proposed Wellsite MC 608-C			
Spheroid & Datum: Clarke 1866 NAD27 Projection: UTM Zone 16 North		Line Reference	Block Calls (MC 608)
X: 1,258,380 ft	Latitude: 28° 23' 14.9306” N	Inline 11290	7,020 ft FWL
Y: 10,303,548 ft	Longitude: 88° 11' 18.6920" W	Crossline 10982	7,548 ft FSL

Chevron will drill this well using a dynamically positioned drilling vessel. Our assessment addresses the seafloor conditions within a 2,000-ft radius around the Proposed Wellsite MC 608-C.

Available Data

The following discussion is based on findings from the reports listed below:

- Archaeological and Geohazard Assessment, Blocks 563, 564, 607, and 608, Mississippi Canyon Area Gulf of Mexico (OII, 2022)
- Shallow Hazards Assessment, Block 608 and Vicinity Mississippi Canyon Area, Gulf of Mexico (GEMS, 2022)
- Shallow hazards assessment, Block 607 and Portions of 650 and 651, Mississippi Canyon Area, Gulf of Mexico, (GEMS, 2016).

The text, maps, and figures included in the report provide detail on the regional geology of the Study Area. Chevron provided a 3-D seismic time volume for the geohazard analysis, covering an approximate 163 square-mile area that includes all or portions of Federal lease Blocks 562-565, 606-609, 650-653, 694-697, and 738-741 in the Mississippi Canyon Area (Figure MC608 C-1). Digital well log images from the BP Well #1 in MC 607 were used to correlate lithological conditions at the proposed well.

Chevron obtained from Anadarko HR data that was collected by OII in 2022 over MC 563-564 and 607-608 (Figure MC608-C-1). The O-Surveyor III AUV system acquired 120 / 400 kHz side-scan sonar data, 1.5-10 kHz subbottom profiler data, 200 kHz 3 m (10 ft) bin multibeam bathymetry, and 1 m (3 ft) bin multibeam backscatter data. The data and the archaeological assessment were made available to GEMS.

Subsurface depths at the proposed wellsite were calculated using a 4th-order equation based on time-velocity values provided by Chevron (GEMS, 2016). The equation is as follows, where $\boldsymbol{x}$ is two-way travel time in seconds below the mudline:

$$\text{Depth (feet)} = 118.04*\mathbf{x}^4 - 531.62*\mathbf{x}^3 + 1062.1*\mathbf{x}^2 + 2505.5*\mathbf{x}$$

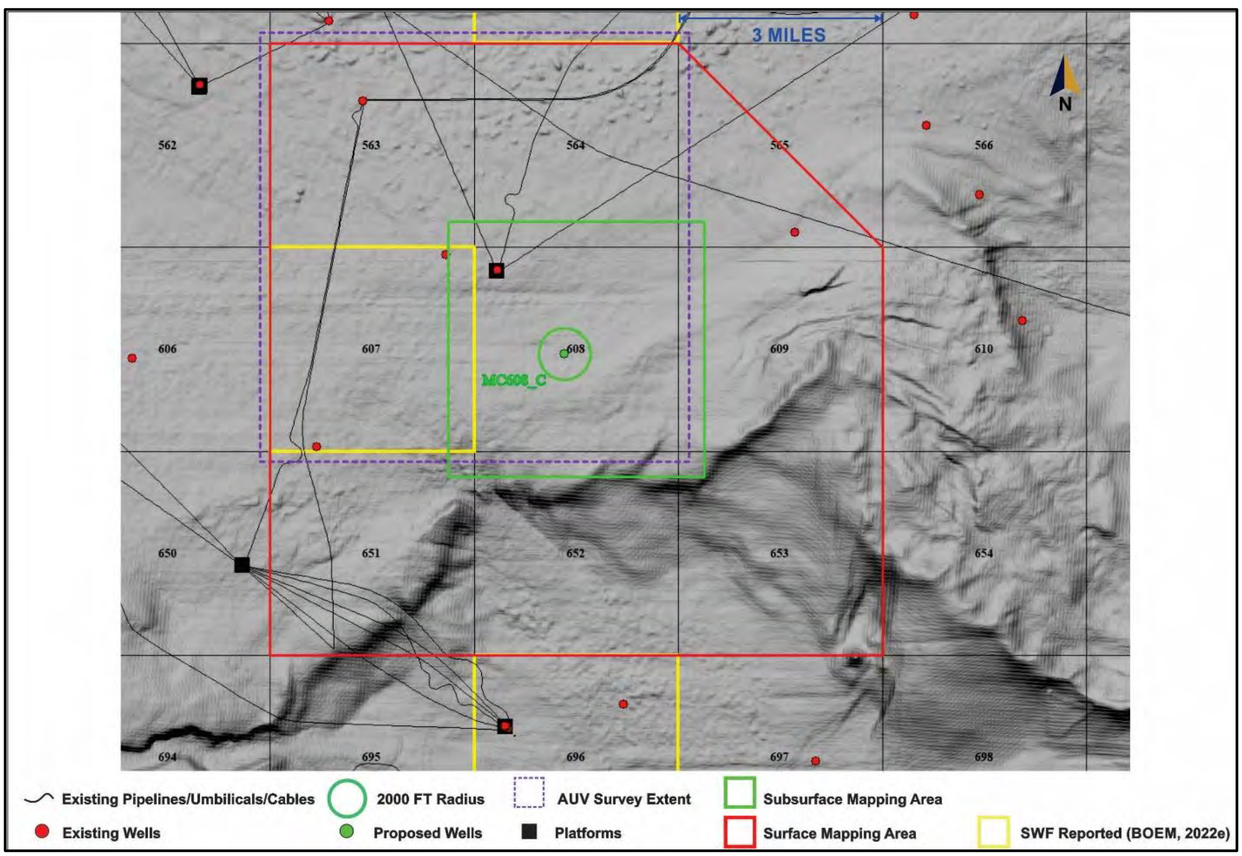


Figure MC 608-C-1. Seafloor Rendering Showing Proposed Wellsite MC 608-C.

Attachments

Wellsite maps are centered on the Proposed Wellsite MC 608-C location and are displayed at a 1 inch = 1,000 ft scale (1:12,000). The maps included in this letter are as follows:

Map No. MC 608-C-1:	Bathymetry Map
Map No. MC 608 C-2:	Seafloor Features Map
Map No. MC 608 C-3:	Side-Scan Sonar Mosaic
Map No. MC 608 C-4:	Seafloor Amplitude Rendering
Map No. MC 608 C-5:	Geologic Features Map

The accompanying illustrations were extracted from the available data sets and are listed below:

Illustration MC 608-C-1: Portion of Subbottom Profiler Line 138 Showing Near-Surface Conditions Beneath Proposed Wellsite MC 608-C

Illustration MC 608-C-2: Portions of Inline 11290and Crossline 10982 Showing Conditions Beneath Proposed Wellsite MC 608-C

Illustration MC 608-C-3: Tophole Prognosis Chart, Proposed Wellsite MC 608-C, Mississippi Canyon Area, Block 608

Illustration MC 608-C-4: Correlation between Proposed Wellsite MC 608-C and Nearby Existing Wells.

NTL Requirements

The following letter complies with the Bureau of Ocean Energy Management (BOEM) Notice to Lessees (NTLs) 2008-G04, 2009-G40, and 2022-G01, (MMS, 2008, 2010, and BOEM, 2022a). BOEM's high probability archaeological blocks do not include MC 608 (BOEM, 2011). However, mitigation guidelines released by BOEM, entitled "Pre-Seabed Disturbance Survey Mitigation", historically requires an archaeological assessment of all surveyed blocks prior to any bottom disturbing activities (BOEMRE, 2011). An archaeological assessment of the area of potential effect around any proposed surface locations may be required as per NTL 2005-G07 (MMS, 2005). To adhere to these guidelines, Chevron obtained an archaeological assessment of HR data collected in and around MC 608 (OII,2022). The archaeological assessment is used in this evaluation of proposed wellsite MC 608-C.

As specified in NTL 2022-G01 (BOEM, 2022a), GEMS extracted the power spectrum diagram from the 3-D seismic data cube provided by Chevron (Figure MC 608-C-2). The extraction was generated from the seafloor to 1 second below the mudline. We converted the amplitude vs. frequency spectrum, generated by the IHS software, to power vs. frequency by squaring the amplitude values as described by J. A. Coffeen, 1978. The frequency bandwidth at 50% power ranges between 13 and 69 Hz.

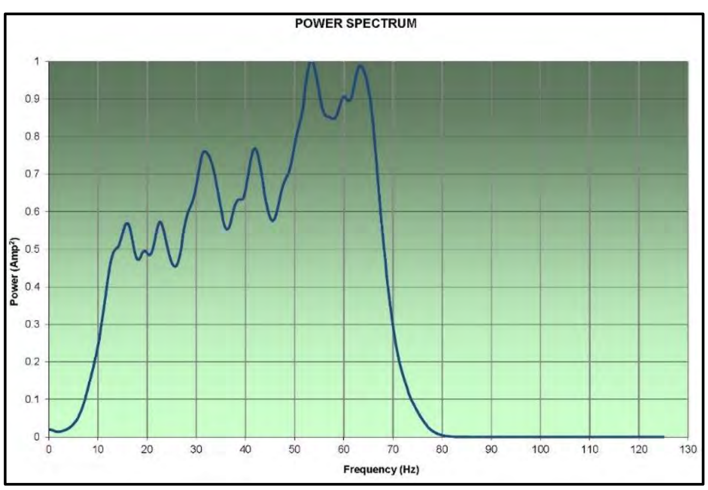


Figure MC 608-C-2. Power Spectrum Analysis Curve, Proposed Wellsite MC 608-C

Man-Made Structures and Features

The closest existing well and infrastructure is the MC 608-EA002 (API #608174098400) approximately 8,250 ft to the northwest (Figure MC 608-C-1, and Map MC608-C-1), BOEM, 2022b,c. The well was drilled by BP in 2002. The total vertical depth is reported as 16,443 ft. Production infrastructure is associated with the wellbore.

Two 8-inch, oil pipelines are connected to the EA002 well. S-13786 is a BP 8′ pipeline extending to the north-northwest. This pipeline is 1.6 miles to the northwest of the proposed location. A second BP 8″ pipeline (S-13798) trends to the northeast and is 1.5 miles to the northwest. In addition, a 4″ umbilical (S-13787) extends to the north-northeast from the EA002 well and is 1.6 miles of the proposed MC 680-C wellsite.

Approximately 2.3 miles northwest of the proposed location is the MC 607-001 well (API#608174057800). The well was drilled by BP in 1997 and reached a total vertical depth of 16,956 ft.

MC 608 is not in any Military Warning or Testing Areas.

Archaeological Assessment

The OII archaeologist reviewed the 2022 side-scan sonar, multibeam, and subbottom profiler data within MC 563-564 and 607-608 (OII, 2022). The data analysis detected 50 sonar contacts considered to be modern debris. The contacts do not have an acoustic signature indicative of archaeological resources. Sixteen (16) sonar contacts occur within the block borders of MC 608. One of the contacts (#35) occurs within 2,000 ft of the proposed MC 608-C wellsite location (Maps MC608-C-2 and MC608-C-3). Table 2 lists the sonar contact within 2,000 ft of the proposed wellsite.

Based on the archaeological review of available AUV data, the Area of Potential Effect around the proposed MC 608-C wellsite location appears clear of archaeological resources. BOEM guidelines (BOEM, 2022a) recommends a 100 ft avoidance of unidentified, non-cultural contacts.

Table 2. Side-Scan Sonar Contacts within 2,000 ft of Proposed Wellsite MC 608-C

CONTACT	AREA/BLOCK	LENGTH (FT)	WIDTH (FT)	HEIGHT (FT)	DESCRIPTION	X NAD 27 (FT)	Y NAD 27 (FT)	DISTANCE/DIRECTION FROM SITE
35	MC 608	17.1	9.0	0	irregular	1,257448	10,301,932	1865 FT / SW

Wellsite Conditions

The proposed location is clear of any constraining seafloor conditions as defined by the AUV and 3-D seismic data sets. The near surface stratigraphy at the proposed well location consists of a relatively thick section of layered hemipelagic sediments intercalated with mass-transport deposits. At depth, the stratigraphy consists of stratified turbidite intervals and a series of slope channel fill complexes.

Water Depth and Seafloor Conditions. Seafloor conditions are favorable at the proposed wellsite location. The water depth at the surface location is approximately -6,670 ft (Map MC608-C-1) and the seafloor slopes to the north-northeast at about 0.4°. Overall, the seafloor in the vicinity of proposed wellsite MC 608 C is relatively smooth and benign (Map MC608 C-2).

The seafloor at the wellsite is covered by a ~18 ft thick, weakly stratified hemipelagic clay drape (Illustration MC608 C-1). The low seafloor amplitude response and side-scan sonar reflectivity in the vicinity of the proposed wellsite suggests the seabed is covered by very soft clays and silty-clays (Maps MC608 C-3 and –C-4).

The low seafloor amplitude response and side-scan sonar reflectivity in the vicinity of the proposed wellsite suggest the seabed is covered by soft clays (Maps MC 608-C-3 and MC 608-C-4). Seafloor Lineations occur southeast and west-southwest of the proposed location (Maps MC 608-C-2 and MC 608-C-3). The lineations represent subtle changes in the seafloor lithology. These features are not related to seepage or hardgrounds and will not hamper installation of drilling equipment.

Deepwater Benthic Communities. MMS (2010) does not designate Federal Lease Block 608 as having sensitive high-density benthic communities. Deepwater benthic communities are not expected at the proposed wellsite. There are no interpreted features or areas capable of supporting high density benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic (Map MC608 C-3) and Seafloor Amplitude Rendering (Map MC608 C-4) show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies within 2,000 ft of the location (BOEM, 2022e).

Stratigraphy. The stratigraphy at the proposed well location is depicted on Illustrations MC608 C-1 through MC608 C-4. The Tophole Prognosis Chart (Illustration MC608 C-3) shows the inline, annotated with calculated depths to the various horizons and predicted lithology of the sequences, along with their potential for shallow gas and shallow water flow. In general, the shallow stratigraphic sequences to the Limit of Investigation (6,000 ft bml) reflect alternating episodic deposition of hemipelagic clays and silty clays, turbidites, mass-transport, and slope-fan deposits. Overall, the seismic reflection character suggests that the sequences are composed of clays and silts interspersed with sands, primarily in the interbedded slope-fan units.

The subbottom profiler data define the stratigraphic section between the seafloor and approximately Horizon 10 (220 ft bml) in the area of the proposed wellsite (Illustration MC608 C-1). The uppermost 18 ft of sediment at the wellsite is a drape consisting of very soft, high water content, silty-clays. The sediments below the drape to 220 ft bml are stratified clays and silty clays with the exception of a 27 ft-thick, clay-rich mass-transport deposit between 123 ft to 150 ft bml.

The 3-D seismic data define the stratigraphy from the seafloor to the Limit of Investigation, about 6,000 ft bml (Illustrations MC608 C-2 and –C-3). Seven seismic reflections (Horizons 10, 15, 20, 30,40, 50, and 60) define the shallow section beneath the well.

The sedimentary section from Horizon 10 to Horizon 20 (Unit 2), between 211 ft and 473 ft bml, likely corresponds to the distal margin of the slope-fan sequence identified as the "Blue Unit". The Blue Unit is a regional basin-floor fan and the source of numerous shallow water flow incidents in the Mississippi Canyon Area (BOEM, 2022e). The sediments within this unit likely consist of clay-prone mass-transport deposits and turbidites. A high-amplitude reflector (Horizon 15) occurs mid-unit (about 335 ft bml) and divides the unit into sub-units 2A and 2B. A sand layer or a series of thin sands are possible at and just above Horizon 15. Gamma ray and resistivity well logs from the BP Well #1 in MC 607 indicate that about 30 ft of wet sand was encountered mid-unit and about 20 ft of wet sand was encountered at the base of the unit.

Unit 3 (Horizon 20 to Horizon 30) occurs between 473 ft and 949 ft bml (Illustrations MC608 C-2 and C-3). The sequenced consists of numerous, closely-spaced parallel but discontinuous reflections and will likely contain levee/overbank and turbidite deposits comprised of clays, silts, and thin sand layers.

Unit 4 (Horizon 30 to 40), occurs between 949 ft and 2,302 ft bml. The seismic facies is highly variable and includes flat-lying, layered turbidites, dipping clinoform like beds, and amorphous mass-transport deposits. Gamma ray and resistivity logs from BP's Well #1 in MC 607 indicate the presence of sands in Unit 4. Unit 4 is a slope fan-channel complex.

Unit 5 (Horizon 40 to 50) between 2,302 ft and 3,581 ft bml, is also a slope fan-channel complex. The sequence exhibits a complex stratigraphy. The well bore will likely encounter bedded levee/overbank and turbidites deposits, thin channel fill, and mass-transport deposits. The sediments will be a mixture clay, silt, and sand.

The sediments below Horizon 50 to the Limit of Investigation (Units 6 and 7), between 3,581 ft and 6,000 ft bml, are generally low-amplitude stratified reflectors interbedded with low-amplitude chaotic reflectors. These sediments are likely hemipelagic clays and silty clays interbedded with fine-grained turbidites and mass-transport deposits. The turbidites will consist of alternating layers of clay, silt, and thin sand.

Faults. The Proposed Wellsite MC 608-C is not expected to intersect any seafloor faults in the near-surface. No buried faults are defined at depth on the 3-D data (Illustrations MC608 C-2 and C-3).

Shallow Gas and Shallow Water Flow. Interval amplitude searches were completed between the mapped horizons to help identify facies trends and possible gas-related anomalies within the seismic stratigraphic units (GEMS, 2022). Two additional amplitude searches were conducted to ensure complete hazards analysis within the tophole section. Infill scans were completed within Units 3 and 5 where the bounding horizons were truncated by major channel structures (GEMS, 2022). Significant shallow gas is not expected to be encountered within the shallow sediments within the Limit of Investigation. The potential for shallow water flow is considered negligible to moderate.

Shallow Gas. There are no apparent high-amplitude anomalies or other direct hydrocarbon indicators directly below the proposed wellsite (Map MC608 C-5 and Illustration MC608 C-3). The closest mapped subsurface high-amplitude event to the proposed borehole is approximately 310 ft northwest of the location. The anomaly is located within a channelized interval near the top of Unit 4. The event may represent a thin sand within a turbidite interval at a depth of about 1,365 ft bml (Illustration MC608 C-3). The elevated event is not associated with other direct hydrocarbon indicators and may represent lithologic variations rather than shallow gas accumulations.

A low potential for encountering shallow gas exists within the slope-fan channel units 4 and 5 and within the turbidite intervals of Units 6 and 7. A negligible potential for shallow gas exists in the predominantly fine-grained sediments of Units 1, 2, and 3.

Shallow Water Flow. The potential for shallow water flow at this well location is considered negligible to moderate (Illustration MC608 C-3). Overpressured sand units in the Mississippi Canyon Protraction Area are generally associated with seismic facies representing Pleistocene intraslope fan complexes, and in some cases, channel or canyon sequences (Ostermeier et al., 2000). Three slope-fan or fan-channel sequences (Units 2, 4 and 5) will be encountered by the proposed location within the Limit of Investigation.

The closest reported shallow water flow was 2.3miles nothwest of the proposed wellsite at the BP Well #1 in the northeast corner of MC 607 (Illustration MC608 C-4). The BP Well #1 encountered low flow while drilling the channelized slope fan deposits within the upper portion of Unit 4 at a depth of 1,246 ft bml (BOEM, 2022e; Illustration MC608 C-4). Additionally, Chevron's #001 well in MC 696, about 5.6 miles to the south-southwest reported low severity water flow at 1,971 ft bml (BOEM, 2022e). The depth of flow corresponds to the lower portion of the mapped Unit 4 at the proposed location. The BP #1 well in MC 607 was drilled in 1997. The more recently drilled Chevron wells, MC 608#1 and EA002 wells did not report water flow conditions within Unit 4 or the other sequences within the Limit of Investigation (Chevron, personal communication). The drill mud programs used in recent wells likely mitigated any overpressures. Unit 4 (949 ft to 2,302 ft bml) at the Proposed Wellsite MC 608-C is assigned a moderate potential for shallow water flow because of the likelihood of sand-rich layers within Unit 4.

No wells within the immediate vicinity of MC 608 reported shallow water flow in the presumed "Blue Unit" sequence within Unit 2 (248 ft to 540 ft bml). However, a shallow water flow was experienced in MC 476 about 10 miles to the north. The flow was reported at 448 ft bml (BOEM, 2022e). Given the low-amplitude response of Unit 2 at and in the vicinity of MC 608-C and the lack of flow reported in near-by wells, Unit 2 is assigned a low potential for overpressured sands.

Units 3, 5, 6, and 7 may have thin sands but generally a low potential for overpressures. There is a negligible potential for shallow water flow within the near-surface clay-rich Unit 1.

Results

The proposed MC 608-C location in Mississippi Canyon Area, block 608, appears suitable for exploration drilling operations. No areas with the potential for deepwater benthic communities are identified within 2,000 ft of the proposed wellsite.

One unidentified sonar contact is delineated in the side-scan sonar data within 2,000 ft of the proposed wellsite. The contact is not archaeologically significant and is likely modern debris. If any wood, ceramics, textiles, or ferrous objects become exposed during the course of bottom disturbing operations, all activities must be halted and BOEM notified within 48 hours.

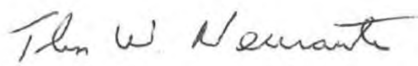
There is a moderate potential for encountering overpressured sands within slope fan-channel complex of Unit 4 between 949 ft and 2,302 ft bml. Significant shallow gas is not expected between the seafloor and Limit of Investigation.

Closing

We appreciate the opportunity to be of service to Chevron U.S.A. Inc. and look forward to working with Chevron on future projects.

Sincerely,

GEOSCIENCE EARTH & MARINE SERVICES, INC.



Thomas W. Neurauter, PhD.
Senior Marine Geologist

Daniel Lanier
President

Erin Williams Janes
Project Manager/Senior Geoscientist

Attachments (4 Illustrations)

Distribution:
Mr. Phillip Von Dullen III, Houston, TX (1 copy)

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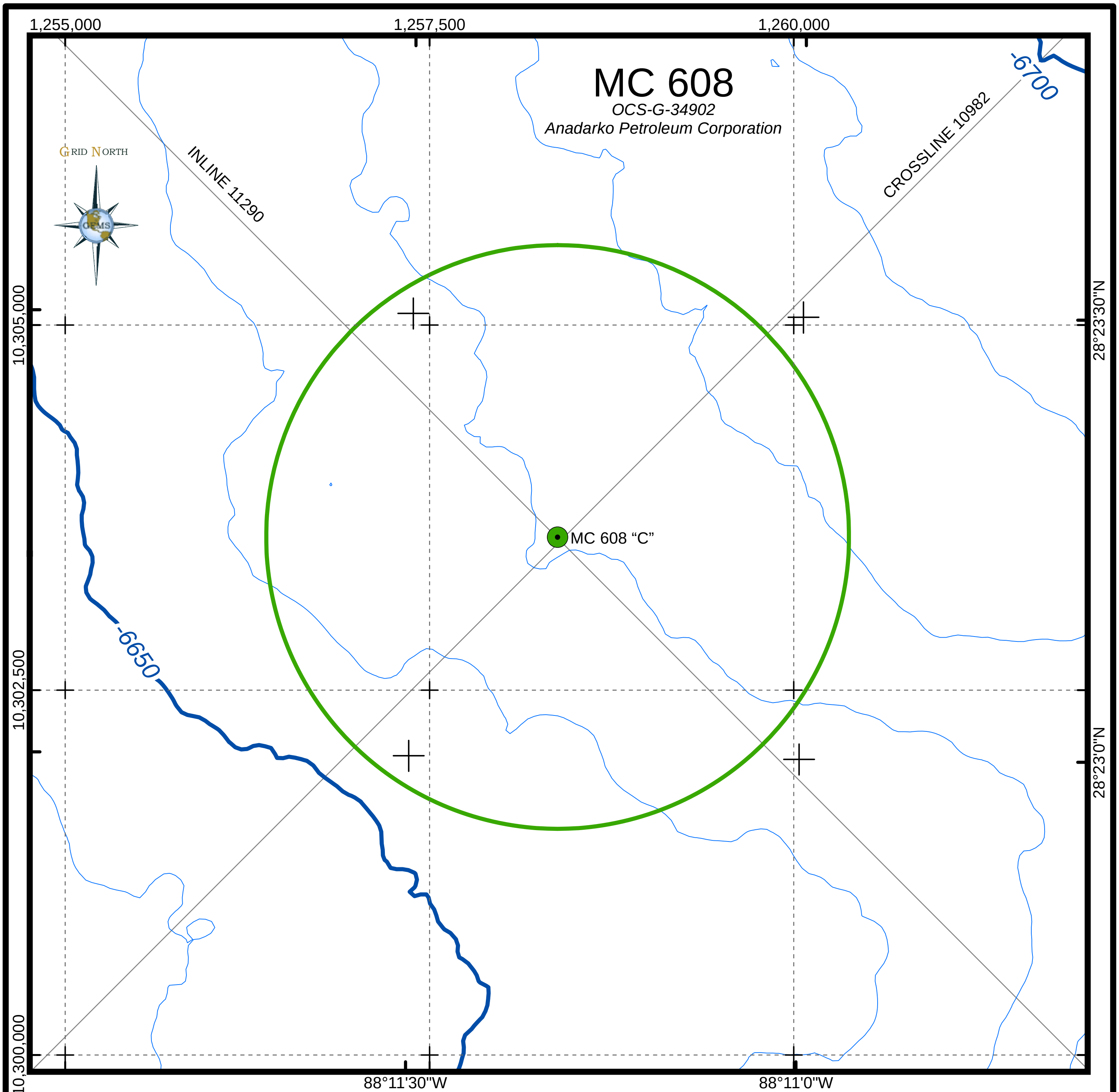


PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

WATER DEPTH IN FEET
CONTOUR INTERVAL = 10 FT.

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

Chevron

CHEVRON U.S.A. INC.

BATHYMETRY MAP

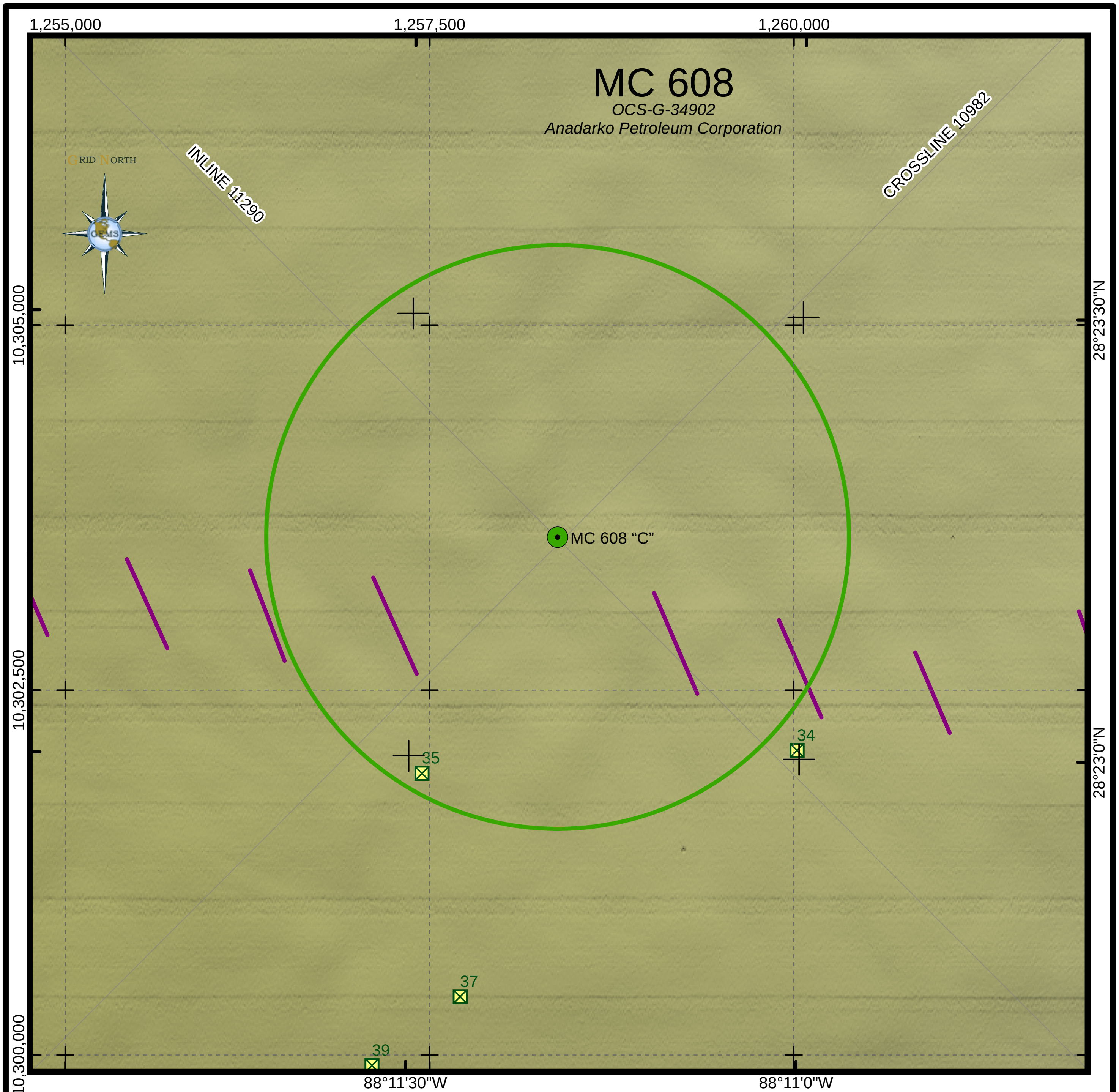
BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & GEMS MARINE SERVICES, INC.

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-C-1.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 C-1



PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

SONAR CONTACT AND REFERENCE NUMBER (OII, 2022).

LONG (500 FT TO 1100 FT), NARROW (~50 FT) STRIPS OF ELEVATED BACKSCATTER ALONG SEAFLOOR, POSSIBLY VARIATION IN SEDIMENT TYPE OR GRAIN-SIZE AND POSSIBLY RELATED TO BOTTOM CURRENTS.

WATER DEPTH IN FEET

6,482 | 6,500 | -6,625 | -6,750 | -6,875 | -7,000 | -7,083

ALTITUDE = 60°
AZIMUTH = 0°
V.E. = 4X

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

Chevron

CHEVRON U.S.A. INC.

SEAFLOOR FEATURES MAP

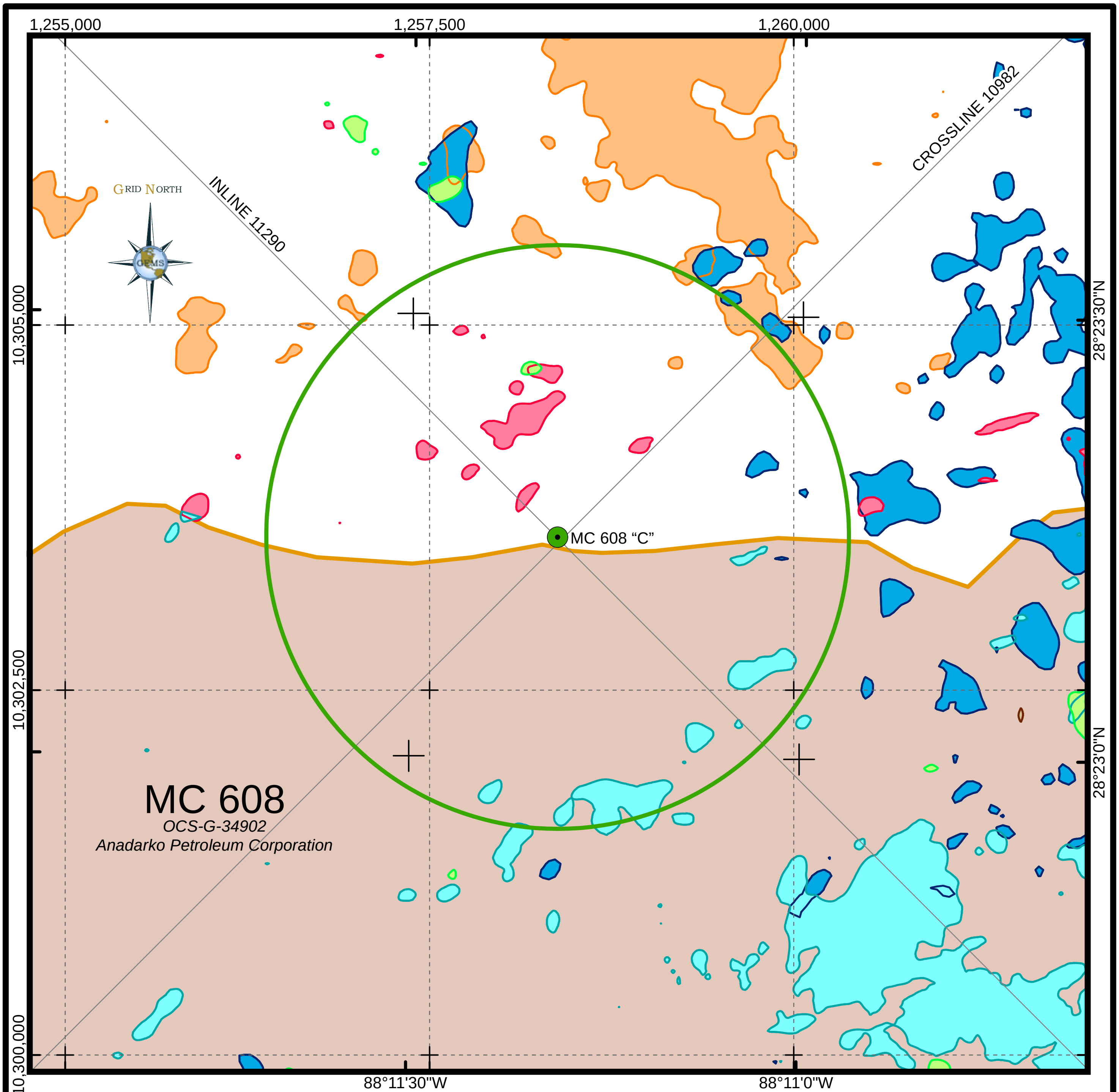
BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC.

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-C-2.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 C-2



PROPOSED WELL LOCATION. CIRCLE REPRESENTS 2000 FT RADIUS AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

BURIED SUBMARINE CHANNEL THAT AFFECTS UNITS 3 AND 4.

AMPLITUDE ANOMALIES

- AMPLITUDE ANOMALIES BETWEEN HORIZON 10 TO HORIZON 15 (UNIT 2A).
- AMPLITUDE ANOMALIES BETWEEN HORIZON 15 TO HORIZON 20 (UNIT 2B).
- AMPLITUDE ANOMALIES BETWEEN HORIZON 20 TO HORIZON 30 (UNIT 3).
- AMPLITUDE ANOMALIES BETWEEN HORIZON 30 TO HORIZON 40 (UNIT 4).
- AMPLITUDE ANOMALIES BETWEEN HORIZON 40 TO HORIZON 50 (UNIT 5).
- AMPLITUDE ANOMALIES BETWEEN HORIZON 50 TO HORIZON 60 (UNIT 6).

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

Chevron

CHEVRON U.S.A. INC.

GEOLOGIC FEATURES MAP

BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000 Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC.

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-C-5.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 C-5

December 22, 2022

Project No. 1122-3147

Chevron U.S.A. Inc.
1500 Louisiana Street
Houston, TX 77002

Attention: Mr. Phillip Von Dullen III

Site Clearance Letter
Proposed Exploration Wellsite MC 608-RW1
Block 608 (OCS-G-34902)
Mississippi Canyon Area
Gulf of Mexico

Chevron U.S.A. Inc. (Chevron) contracted Geoscience Earth & Marine Services (GEMS) to provide an assessment of the seafloor and shallow geologic conditions to determine the favorability of drilling operations for the proposed relief well location MC 608-RW1 in Block 608 (OCS-G-34902), Mississippi Canyon Area (MC), Gulf of Mexico. Specific seafloor and subsurface conditions are addressed around the proposed location to the Limit of Investigation (LOI) ~6,000 ft below the mudline (bml).

Seafloor conditions appear favorable within the vicinity of the proposed surface location. There are no potential sites for deepwater benthic communities within 2,000 ft. An Archaeological Assessment prepared by Oceaneering International (OII) and based on high-resolution geophysical data (HR), detected one sonar contacts within 2,000 ft of the proposed wellsite. The contact is believed to be modern debris and has not been assigned an avoidance radius. Based on seismic attributes and amplitude analysis there is a negligible to low potential for encountering significant shallow gas within the limit of investigation. There is a negligible to moderate potential for encountering overpressured sands within the Limit of Investigation (6,000 ft bml, -12,670 ft bsl)

This letter provides details specific to the well location, including available data, Notice to Lessees (NTL) requirements, man-made features, and wellsite conditions.

Proposed Well Location

The surface location for the Proposed Wellsite MC 608-RW1 lies in the northwestern quadrant of MC 608 (Figure MC 608-RW1-1). Chevron provided the following coordinates:

Table 1. Proposed Wellsite MC 608-RW1 Location Coordinates

Proposed Wellsite MC 608-RW1			
Spheroid & Datum: Clarke 1866 NAD27 Projection: UTM Zone 16 North		Line Reference	Block Calls (MC 608)
X: 1,253,047 ft	Latitude: 28° 23' 25.0420” N	Inline 11217	1,687 ft FWL
Y: 10,304,622 ft	Longitude: 88° 12' 18.5295" W	Crossline 11093	7,218 ft FNL

Chevron will drill this well using a dynamically positioned drilling vessel. Our assessment addresses the seafloor conditions within a 2,000-ft radius around the Proposed Wellsite MC 608-RW1.

Available Data

The following discussion is based on findings from the reports listed below:

- Archaeological and Geohazard Assessment, Blocks 563, 564, 607, and 608, Mississippi Canyon Area Gulf of Mexico (OII, 2022)
- Shallow Hazards Assessment, Block 608 and Vicinity Mississippi Canyon Area, Gulf of Mexico (GEMS, 2022)
- Shallow hazards assessment, Block 607 and Portions of 650 and 651, Mississippi Canyon Area, Gulf of Mexico, (GEMS, 2016).

The text, maps, and figures included in the report provide detail on the regional geology of the Study Area. Chevron provided a 3-D seismic time volume for the geohazard analysis, covering an approximate 163 square-mile area that includes all or portions of Federal lease Blocks 562-565, 606-609, 650-653, 694-697, and 738-741 in the Mississippi Canyon Area (Figure MC608 RW1-1). Digital well log images from the BP Well #1 in MC 607 were used to correlate lithological conditions at the proposed well.

Chevron obtained from Anadarko HR data that was collected by OII in 2022 over MC 563-564 and 607-608 (Figure MC608-RW1-1). The O-Surveyor III AUV system acquired 120 / 400 kHz side-scan sonar data, 1.5-10 kHz subbottom profiler data, 200 kHz 3 m (10 ft) bin multibeam bathymetry, and 1 m (3 ft) bin multibeam backscatter data. The data and the archaeological assessment were made available to GEMS.

Subsurface depths at the proposed wellsite were calculated using a 4^{th}-order equation based on time-velocity values provided by Chevron (GEMS, 2016). The equation is as follows, where ***x*** is two-way travel time in seconds below the mudline:

Depth (feet) = $118.04*\mathbf{x}^4 - 531.62*\mathbf{x}^3 + 1062.1*\mathbf{x}^2 + 2505.5*\mathbf{x}$

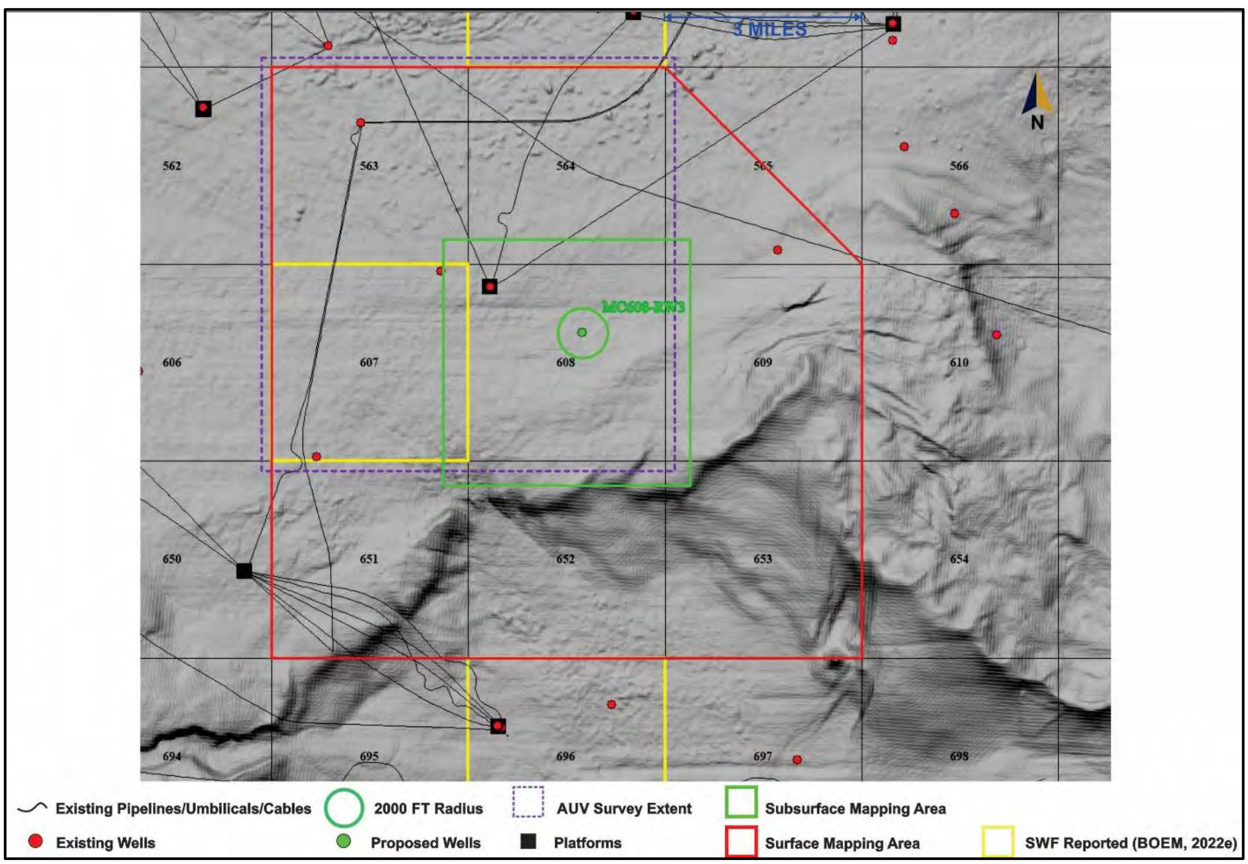


Figure MC 608-RW1-1. Seafloor Rendering Showing Proposed Wellsite MC 608-RW1.

Attachments

Wellsite maps are centered on the Proposed Wellsite MC 608-RW1 location and are displayed at a 1 inch = 1,000 ft scale (1:12,000). The maps included in this letter are as follows:

Map No. MC 608-RW1-1: Bathymetry Map

Map No. MC 608-RW1-2: Seafloor Features Map

Map No. MC 608-RW1-3: Side-Scan Sonar Mosaic

Map No. MC 608-RW1-4: Seafloor Amplitude Rendering

Map No. MC 608-RW1-5: Geologic Features Map

The accompanying illustrations were extracted from the available data sets and are listed below:

Illustration MC 608-RW1-1: Portion of Subbottom Profiler Line 136AShowing Near-Surface Conditions Beneath Proposed Wellsite MC 608-RW1

Illustration MC 608-RW1-2: Portions of Inline 11217 and Crossline 11093 Showing Conditions Beneath Proposed Wellsite MC 608-RW1

Illustration MC 608-RW1-3: Tophole Prognosis Chart, Proposed Wellsite MC 608-RW1, Mississippi Canyon Area, Block 608

Illustration MC 608-RW1-4: Correlation between Proposed Wellsite MC 608-RW1 and Nearby Existing Wells.

NTL Requirements

The following letter complies with the Bureau of Ocean Energy Management (BOEM) Notice to Lessees (NTLs) 2008-G04, 2009-G40, and 2022-G01, (MMS, 2008, 2010, and BOEM, 2022a). BOEM's high probability archaeological blocks do not include MC 608 (BOEM, 2011). However, mitigation guidelines released by BOEM, entitled "Pre-Seabed Disturbance Survey Mitigation", historically requires an archaeological assessment of all surveyed blocks prior to any bottom disturbing activities (BOEMRE, 2011). An archaeological assessment of the area of potential effect around any proposed surface locations may be required as per NTL 2005-G07 (MMS, 2005). To adhere to these guidelines, Chevron obtained an archaeological assessment of HR data collected in and around MC 608 (OII,2022). The archaeological assessment is used in this evaluation of proposed wellsite MC 608-RW1.

As specified in NTL 2022-G01 (BOEM, 2022a), GEMS extracted the power spectrum diagram from the 3-D seismic data cube provided by Chevron (Figure MC 608-RW1-2). The extraction was generated from the seafloor to 1 second below the mudline. We converted the amplitude vs. frequency spectrum, generated by the IHS software, to power vs. frequency by squaring the amplitude values as described by J. A. Coffeen, 1978. The frequency bandwidth at 50% power ranges between 10 and 70 Hz.

Figure MC 608-RW1-2. Power Spectrum Analysis Curve, Proposed Wellsite MC 608-RW1

Man-Made Structures and Features

The closest existing well and infrastructure is the MC 608-EA002 (API #608174098400) approximately 5360 ft to the north (Figure MC 608-RW1-1, and Map MC608-RW1-1), BOEM, 2022b,c. The well was drilled by BP in 2002. The total vertical depth is reported as 16,443 ft. Production infrastructure is associated with the wellbore.

Two 8-inch, oil pipelines are connected to the EA002 well. S-13786 is a BP 8' pipeline extending to the north-northwest. This pipeline is 1.02 miles to the north of the proposed location. A second BP 8" pipeline (S-13798) trends to the northeast and is 1.02 miles to the northwest of the proposed location. In addition, a 4" umbilical (S-13787) extends to the north-northeast from the EA002 well.

Approximately 7,600 ft northwest of the proposed location is the MC 607-001 well (API#608174057800). The well was drilled by BP in 1997 and reached a total vertical depth of 16,956 ft.

MC 608 is not in any Military Warning or Testing Areas.

Archaeological Assessment

The OII archaeologist reviewed the 2022 side-scan sonar, multibeam, and subbottom profiler data within MC 563-564 and 607-608 (OII, 2022). The data analysis detected 50 sonar contacts considered to be modern debris. The contacts do not have an acoustic signature indicative of archaeological resources. Sixteen (16) sonar contacts occur within the block borders of MC 608. One of the contacts (#33) occurs within 2,000 ft of the proposed MC 608-RW1 wellsite location (Maps MC608-RW1-2 and MC608-RW1-3). Table 2 lists the sonar contact within 2,000 ft of the proposed wellsite.

Based on the archaeological review of available AUV data, the Area of Potential Effect around the proposed MC 608-RW1 wellsite location appears clear of archaeological resources. BOEM guidelines (BOEM, 2022a) recommends a 100 ft avoidance of unidentified, non-cultural contacts.

Table 2. Side-Scan Sonar Contacts within 2,000 ft of Proposed Wellsite MC 608-RW1

CONTACT	AREA/BLOCK	LENGTH (FT)	WIDTH (FT)	HEIGHT (FT)	DESCRIPTION	X NAD 27 (FT)	Y NAD 27 (FT)	DISTANCE/DIRECTION FROM SITE
33	MC 608	6.8	4.3	0	irregular	1,251,706	10,303,455	1,780 FT / SW

Wellsite Conditions

The proposed location is clear of any constraining seafloor conditions as defined by the AUV and 3-D seismic data sets. The near surface stratigraphy at the proposed well location consists of a relatively thick section of layered hemipelagic sediments intercalated with mass-transport deposits. At depth, the stratigraphy consists of stratified turbidite intervals and a series of slope channel fill complexes.

Water Depth and Seafloor Conditions. Seafloor conditions are favorable at the proposed wellsite location. The water depth at the surface location is approximately -6,639 ft (Map MC608-RW1-1) and the seafloor slopes to the northeast at about 0.4°. Overall, the seafloor in the vicinity of proposed wellsite MC 608 RW1 is relatively smooth and benign (Map MC608 RW1-2).

The seafloor at the wellsite is covered by a ~18 ft thick, weakly stratified hemipelagic clay drape (Illustration MC608 RW1-1). The low seafloor amplitude response and side-scan sonar reflectivity in the vicinity of the proposed wellsite suggests the seabed is covered by very soft clays and silty-clays (Maps MC608 RW1-3 and – RW1-4).

The low seafloor amplitude response and side-scan sonar reflectivity in the vicinity of the proposed wellsite suggest the seabed is covered by soft clays (Maps MC 608-RW1-3 and MC 608-RW1-4). Seafloor Lineations occur south of the proposed location (Maps MC 608-RW1-2 and MC 608-RW1-3). The lineations represent subtle changes in the seafloor lithology. These features are not related to seepage or hardgrounds and will not hamper installation of drilling equipment.

Deepwater Benthic Communities. MMS (2010) does not designate Federal Lease Block 608 as having sensitive high-density benthic communities. Deepwater benthic communities are not expected at the proposed wellsite. There are no interpreted features or areas capable of supporting high density benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic (Map MC608 RW1-3) and Seafloor Amplitude Rendering (Map MC608 RW1-4) show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies within 2,000 ft of the location (BOEM, 2022e).

Stratigraphy. The stratigraphy at the proposed well location is depicted on Illustrations MC608 RW1-1 through MC608 RW1-4. The Tophole Prognosis Chart (Illustration MC608 RW1-3) shows the inline, annotated with calculated depths to the various horizons and predicted lithology of the sequences, along with their potential for shallow gas and shallow water flow. In general, the shallow stratigraphic sequences to the Limit of Investigation (6,000 ft bml) reflect alternating episodic deposition of hemipelagic clays and silty clays, turbidites, mass-transport, and slope-fan deposits. Overall, the seismic reflection character suggests that the sequences are composed of clays and silts interspersed with sands, primarily in the interbedded slope-fan units.

The subbottom profiler data define the stratigraphic section between the seafloor and approximately Horizon 10 (213 ft bml) in the area of the proposed wellsite (Illustration MC608 RW1-1). The uppermost 18 ft of sediment at the wellsite is a weakly stratified drape consisting of very soft, high water content, silty-clays. The sediments below the drape to 213 ft bml are stratified clays and silty clays with the exception of a 32 ft-thick, clay-rich mass-transport deposit between 115 ft to 147ft bml.

The 3-D seismic data define the stratigraphy from the seafloor to the Limit of Investigation, about 6,000 ft bml (Illustrations MC608 RW1-2 and –RW1-3). Seven seismic reflections (Horizons 10, 15, 20, 30,40, 50, and 60) define the shallow section beneath the well.

The sedimentary section from Horizon 10 to Horizon 20 (Unit 2), between 212 ft and 511 ft bml, likely corresponds to the distal margin of the slope-fan sequence identified as the "Blue Unit". The Blue Unit is a regional basin-floor fan and the source of numerous shallow water flow incidents in the Mississippi Canyon Area (BOEM, 2022e). The sediments within this unit likely consist of clay-prone mass-transport deposits and turbidites. A high-amplitude reflector (Horizon 15) occurs mid-unit (about 376 ft bml) and divides the unit into sub-units 2A and 2B. A sand layer or a series of thin sands are possible at and just above Horizon 15. Gamma ray and resistivity well logs from the BP Well #1 in MC 607 indicate that about 30 ft of wet sand was encountered mid-unit and about 20 ft of wet sand was encountered at the base of the unit.

Unit 3 (Horizon 20 to Horizon 30) occurs between 511 ft and 1,003 ft bml (Illustrations MC608 RW1-2 and RW1-3). The sequenced consists of numerous, closely-spaced parallel but discontinuous reflections and will likely contain levee/overbank and turbidite deposits comprised of clays, silts, and thin sand layers.

Unit 4 (Horizon 30 to 40), occurs between 1,003 ft and 2,407 ft bml. The seismic facies is highly variable and includes flat-lying, layered turbidites, dipping clinoform like beds, and amorphous mass-transport deposits. Gamma ray and resistivity logs from BP's Well #1 in MC 607 indicate the presence of sands in Unit 4. Unit 4 is a slope fan-channel complex.

Unit 5 (Horizon 40 to 50) between 2,407 ft and 3,443 ft bml, is also a slope fan-channel complex. The sequence exhibits a complex stratigraphy. The well bore will likely encounter bedded levee/overbank and turbidites deposits, thin channel fill, and mass-transport deposits. The sediments will be a mixture clay, silt, and sand.

The sediments below Horizon 50 to the Limit of Investigation (Units 6 and 7), between 3,443 ft and 6,000 ft bml, are generally low-amplitude stratified reflectors interbedded with low-amplitude chaotic reflectors. These sediments are likely hemipelagic clays and silty clays interbedded with fine-grained turbidites and mass-transport deposits. The turbidites will consist of alternating layers of clay, silt, and thin sand.

Faults. The Proposed Wellsite MC 608-RW1 is not expected to intersect any seafloor faults in the near-surface. No buried faults are defined at depth on the 3-D data (Illustrations MC608 RW1-2 and RW1-3).

Shallow Gas and Shallow Water Flow. Interval amplitude searches were completed between the mapped horizons to help identify facies trends and possible gas-related anomalies within the seismic stratigraphic units (GEMS, 2022). Two additional amplitude searches were conducted to ensure complete hazards analysis within the tophole section. Infill scans were completed within Units 3 and 5 where the bounding horizons were truncated by major channel structures (GEMS, 2022). Significant shallow gas is not expected to be encountered within the shallow sediments within the Limit of Investigation. The potential for shallow water flow is considered negligible to moderate.

Shallow Gas. There are no apparent high-amplitude anomalies or other direct hydrocarbon indicators directly below the proposed wellsite (Map MC608 RW1-5 and Illustration MC608 RW1-3). The closest mapped subsurface high-amplitude event to the proposed borehole is approximately 150 ft southwest of the location. The anomaly is located within the Blue Unit fan sequence. The event may represent a thin sand within a turbidite interval at a depth of about 300 ft bml (Illustration MC608 RW1-3). The elevated event is not associated with other direct hydrocarbon indicators and may represent lithologic variations rather than shallow gas accumulations. The amplitude event is less than 300 ft bml. the shallow depth of burial warrants a low potential for significant shallow gas.

A low potential for encountering shallow gas exists within the slope-fan channel units 4 and 5 and within the turbidite intervals of Units 6 and 7. A negligible potential for shallow gas exists in the predominantly fine-grained sediments of Units 1 and 3.

Shallow Water Flow. The potential for shallow water flow at this well location is considered negligible to moderate (Illustration MC608 RW1-3). Overpressured sand units in the Mississippi Canyon Protraction Area are generally associated with seismic facies representing Pleistocene intraslope fan complexes, and in some cases, channel or canyon sequences (Ostermeier et al., 2000). Three slope-fan or fan-channel sequences (Units 2, 4 and 5) will be encountered by the proposed location within the Limit of Investigation.

The closest reported shallow water flow was 7,600 ft northwest of the proposed wellsite at the BP Well #1 in the northeast corner of MC 607 (Illustration MC608 RW1-4). The BP Well #1 encountered low flow while drilling the channelized slope fan deposits within the upper portion of Unit 4 at a depth of 1,246 ft bml (BOEM, 2022e; Illustration MC608 RW1-4). Additionally, Chevron's #001 well in MC 696, about 5.7 miles to the south-southwest reported low severity water flow at 1,971 ft bml (BOEM, 2022e). The depth of flow corresponds to the lower portion of the mapped Unit 4 at the proposed location. The BP #1 well in MC 607 was drilled in 1997. The more recently drilled Chevron wells, MC 608#1 and EA002 wells did not report water flow conditions within Unit 4 or the other sequences within the Limit of Investigation (Chevron, personal communication). The drill mud programs used in recent wells likely mitigated any overpressures. Unit 4 (1,003 ft to 2,407 ft bml) at the Proposed Wellsite MC 608-RW1 is assigned a moderate potential for shallow water flow because of the likelihood of sand-rich layers within Unit 4.

No wells within the immediate vicinity of MC 608 reported shallow water flow in the presumed "Blue Unit" sequence within Unit 2 (212 ft to 511 ft bml). However, a shallow water flow was experienced in MC 476 about 10 miles to the north. The flow was reported at 448 ft bml (BOEM, 2022e). Given the high-amplitude response of Unit 2 at, and in the vicinity of, MC 608-RW1 Unit 2 is assigned a moderate potential for overpressured sands.

Units 3, 5, 6, and 7 may have thin sands but generally a low potential for overpressures. There is a negligible potential for shallow water flow within the near-surface clay-rich Unit 1.

Results

The proposed MC 608-RW1 location in Mississippi Canyon Area, block 608, appears suitable for exploration drilling operations. No areas with the potential for deepwater benthic communities are identified within 2,000 ft of the proposed wellsite.

One unidentified sonar contact is delineated in the side-scan sonar data within 2,000 ft of the proposed wellsite. The contact is not archaeologically significant and is likely modern debris. If any wood, ceramics, textiles, or ferrous objects become exposed during the course of bottom disturbing operations, all activities must be halted and BOEM notified within 48 hours.

There is a moderate potential for encountering overpressured sands within the slope fan sequences of Units 2A and 4. Significant shallow gas is not expected between the seafloor and Limit of Investigation.

Closing

We appreciate the opportunity to be of service to Chevron U.S.A. Inc. and look forward to working with Chevron on future projects.

Sincerely,

GEOSCIENCE EARTH & MARINE SERVICES, INC.

Thomas W. Neurauter, PhD.
Senior Marine Geologist

Daniel Lanier
President

Erin Williams Janes
Project Manager/Senior Geoscientist

Attachments (4 Illustrations)

Distribution:
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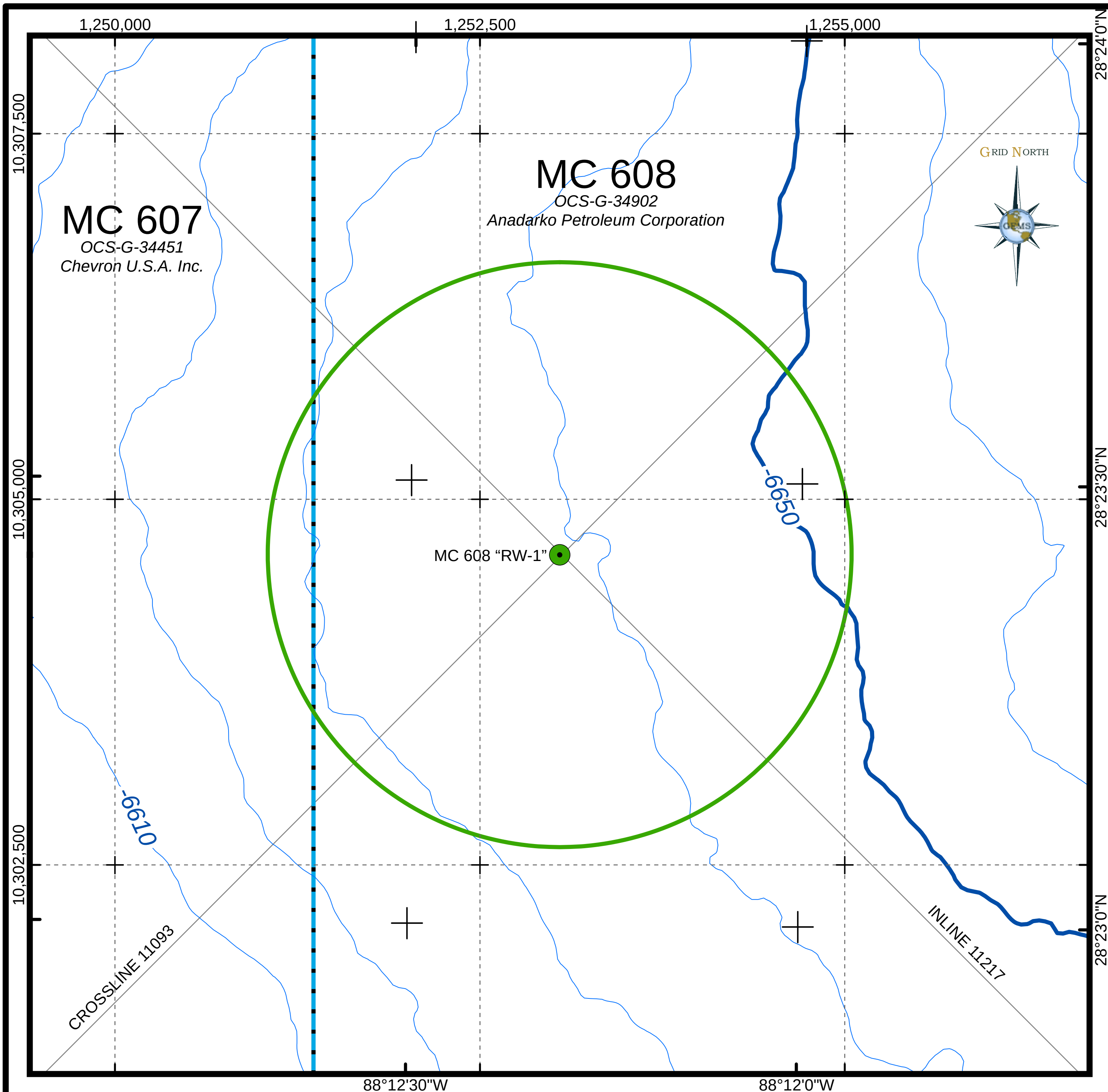


PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

SHALLOW WATER FLOW BLOCK (MC 607).

WATER DEPTH IN FEET
CONTOUR INTERVAL = 10 FT.

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

Chevron

CHEVRON U.S.A. INC.

BATHYMETRY MAP

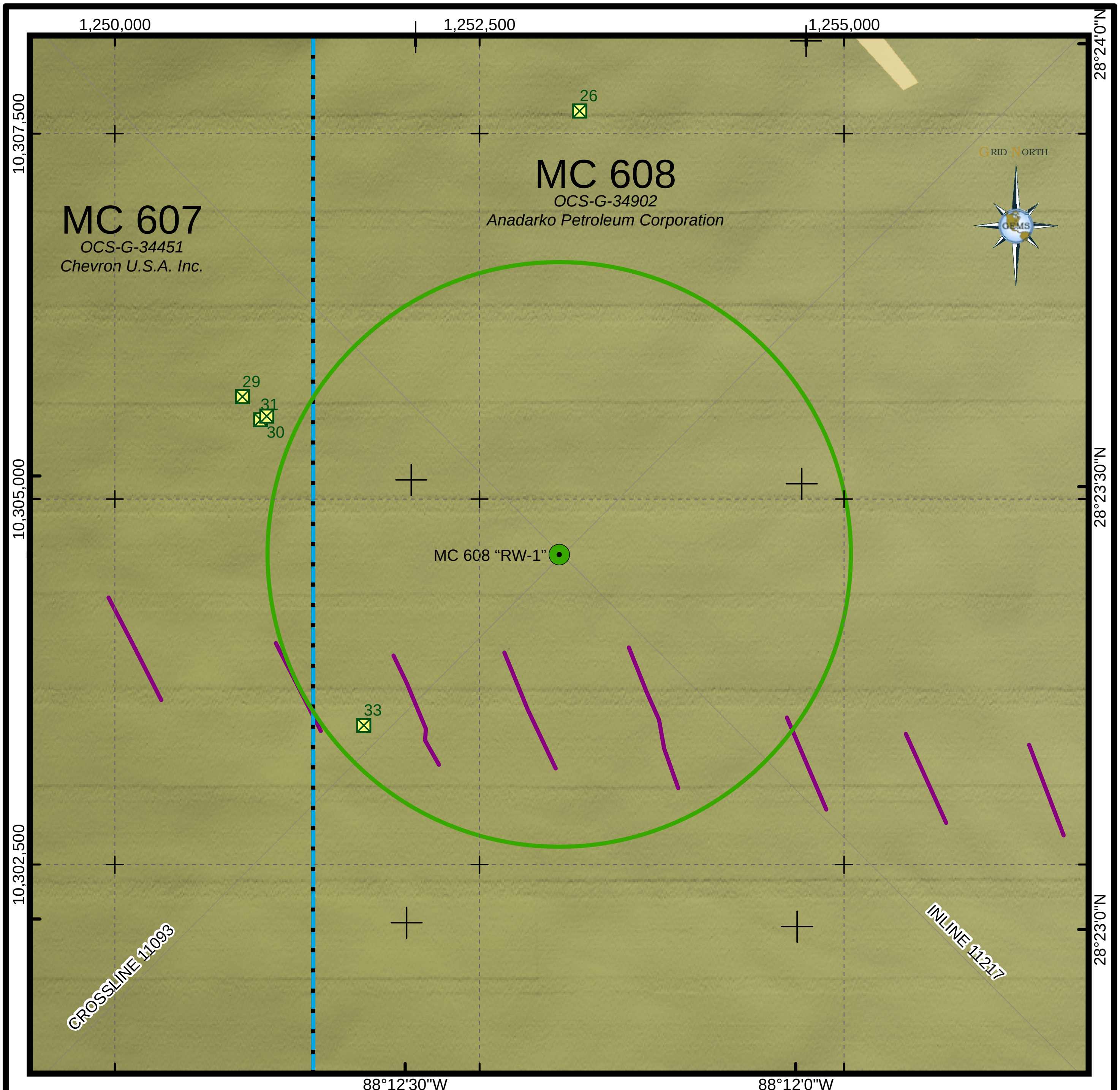
BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC.
GEMS

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-RW1-1.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 RW1-1



PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

SONAR CONTACT AND REFERENCE NUMBER (OII, 2022).

LONG (500 FT TO 1100 FT), NARROW (~50 FT) STRIPS OF ELEVATED
BACKSCATTER ALONG SEAFLOOR, POSSIBLY VARIATION IN SEDIMENT
TYPE OR GRAIN-SIZE AND POSSIBLY RELATED TO BOTTOM CURRENTS.

HIGH BACKSCATTER PATCHES REPRESENTING THIN APRONS OF
DRILL MUDS AND CUTTINGS AROUND EXISTING WELLS.

SHALLOW WATER FLOW BLOCK (MC 607).

WATER DEPTH IN FEET

6,482 | 6,500 | -6,625 | -6,750 | -6,875 | -7,000 | -7,083

ALTITUDE = 60°
AZIMUTH = 0°
V.E. = 4X

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

CHEVRON U.S.A. INC.

SEAFLOOR FEATURES MAP

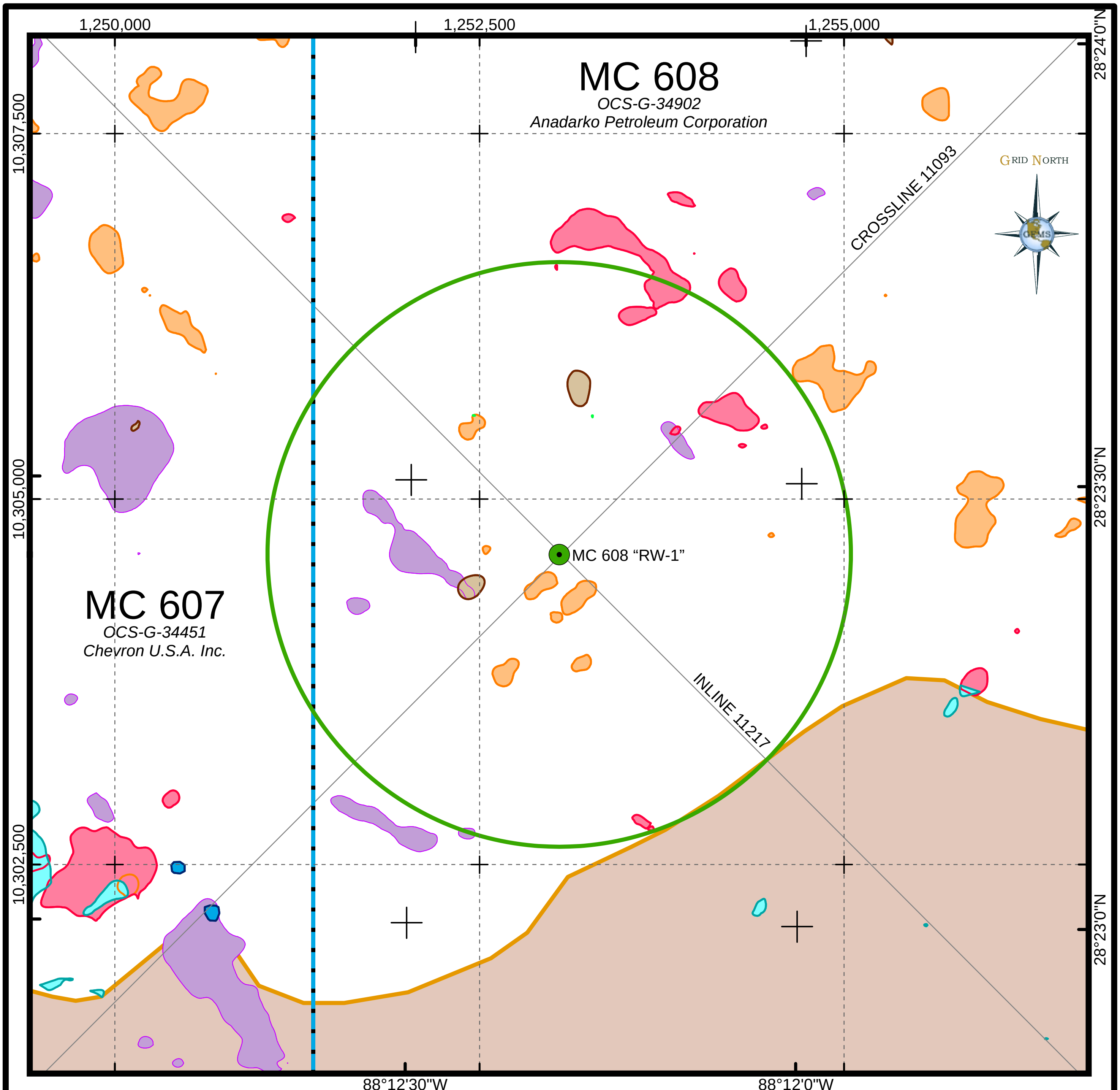
BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC.

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-RW1-2.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 RW1-2



PROPOSED WELL LOCATION. CIRCLE REPRESENTS 2000 FT RADIUS AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

BURIED SUBMARINE CHANNEL THAT AFFECTS UNITS 3 AND 4.

SHALLOW WATER FLOW BLOCK (MC 607).

AMPLITUDE ANOMALIES

AMPLITUDE ANOMALIES BETWEEN HORIZON 10 TO HORIZON 15 (UNIT 2A).

AMPLITUDE ANOMALIES BETWEEN HORIZON 15 TO HORIZON 20 (UNIT 2B).

AMPLITUDE ANOMALIES BETWEEN HORIZON 20 TO HORIZON 30 (UNIT 3).

AMPLITUDE ANOMALIES BETWEEN HORIZON 30 TO HORIZON 40 (UNIT 4).

AMPLITUDE ANOMALIES BETWEEN HORIZON 40 TO HORIZON 50 (UNIT 5).

AMPLITUDE ANOMALIES BETWEEN HORIZON 50 TO HORIZON 60 (UNIT 6).

AMPLITUDE ANOMALIES BETWEEN HORIZON 60 TO LIMITS OF INVESTIGATION (UNIT 7).

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

CHEVRON U.S.A. INC.

GEOLOGIC FEATURES MAP

BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000 Feet

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-RW1-5.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 RW1-5

December 22, 2022

Project No. 1122-3147

Chevron U.S.A. Inc.
1500 Louisiana Street
Houston, TX 77002

Attention: Mr. Phillip Von Dullen III

Site Clearance Letter
Proposed Exploration Wellsite MC 608-RW2
Block 608 (OCS-G-34902)
Mississippi Canyon Area
Gulf of Mexico

Chevron U.S.A. Inc. (Chevron) contracted Geoscience Earth & Marine Services (GEMS) to provide an assessment of the seafloor and shallow geologic conditions to determine the favorability of drilling operations for the proposed relief well location MC 608-RW2 in Block 608 (OCS-G-34902), Mississippi Canyon Area (MC), Gulf of Mexico. Specific seafloor and subsurface conditions are addressed around the proposed location to the Limit of Investigation (LOI) ~6,000 ft below the mudline (bml).

Seafloor conditions appear favorable within the vicinity of the proposed surface location. There are no potential sites for deepwater benthic communities within 2,000 ft. An Archaeological Assessment prepared by Oceaneering International (OII) and based on high-resolution geophysical data (HR), detected no sonar contacts within 2,000 ft of the proposed wellsite. Based on seismic attributes and amplitude analysis there is a negligible to low potential for encountering significant shallow gas within the limit of investigation. There is a negligible to moderate potential for encountering overpressured sands within the Limit of Investigation (6,000 ft bml, -12,670 ft bsl)

This letter provides details specific to the well location, including available data, Notice to Lessees (NTL) requirements, man-made features, and wellsite conditions.

Proposed Well Location

The surface location for the Proposed Wellsite MC 608-RW2 lies near the center of MC 608 (Figure MC 608-RW2-1). Chevron provided the following coordinates:

Table 1. Proposed Wellsite MC 608-RW2 Location Coordinates

Proposed Wellsite MC 608-RW2			
Spheroid & Datum: Clarke 1866 NAD27 Projection: UTM Zone 16 North		Line Reference	Block Calls (MC 608)
X: 1,259,399 ft	Latitude: 28° 23' 23.8241" N	Inline 11323	7,801 ft FEL
Y: 10,304,436 ft	Longitude: 88° 11' 07.3794" W	Crossline 10981	7,404 ft FNL

Chevron will drill this well using a dynamically positioned drilling vessel. Our assessment addresses the seafloor conditions within a 2,000-ft radius around the Proposed Wellsite MC 608-RW2.

Available Data

The following discussion is based on findings from the reports listed below:

- Archaeological and Geohazard Assessment, Blocks 563, 564, 607, and 608, Mississippi Canyon Area Gulf of Mexico (OII, 2022)
- Shallow Hazards Assessment, Block 608 and Vicinity Mississippi Canyon Area, Gulf of Mexico (GEMS, 2022)
- Shallow hazards assessment, Block 607 and Portions of 650 and 651, Mississippi Canyon Area, Gulf of Mexico, (GEMS, 2016).

The text, maps, and figures included in the report provide detail on the regional geology of the Study Area. Chevron provided a 3-D seismic time volume for the geohazard analysis, covering an approximate 163 square-mile area that includes all or portions of Federal lease Blocks 562-565, 606-609, 650-653, 694-697, and 738-741 in the Mississippi Canyon Area (Figure MC608 RW2-1). Digital well log images from the BP Well #1 in MC 607 were used to correlate lithological conditions at the proposed well.

Chevron obtained from Anadarko HR data that was collected by OII in 2022 over MC 563-564 and 607-608 (Figure MC608-RW2-1). The O-Surveyor III AUV system acquired 120 / 400 kHz side-scan sonar data, 1.5-10 kHz subbottom profiler data, 200 kHz 3 m (10 ft) bin multibeam bathymetry, and 1 m (3 ft) bin multibeam backscatter data. The data and the archaeological assessment were made available to GEMS.

Subsurface depths at the proposed wellsite were calculated using a 4th-order equation based on time-velocity values provided by Chevron (GEMS, 2016). The equation is as follows, where ***x*** is two-way travel time in seconds below the mudline:

$$\text{Depth (feet)} = 118.04 \cdot x^4 - 531.62 \cdot x^3 + 1062.1 \cdot x^2 + 2505.5 \cdot x$$

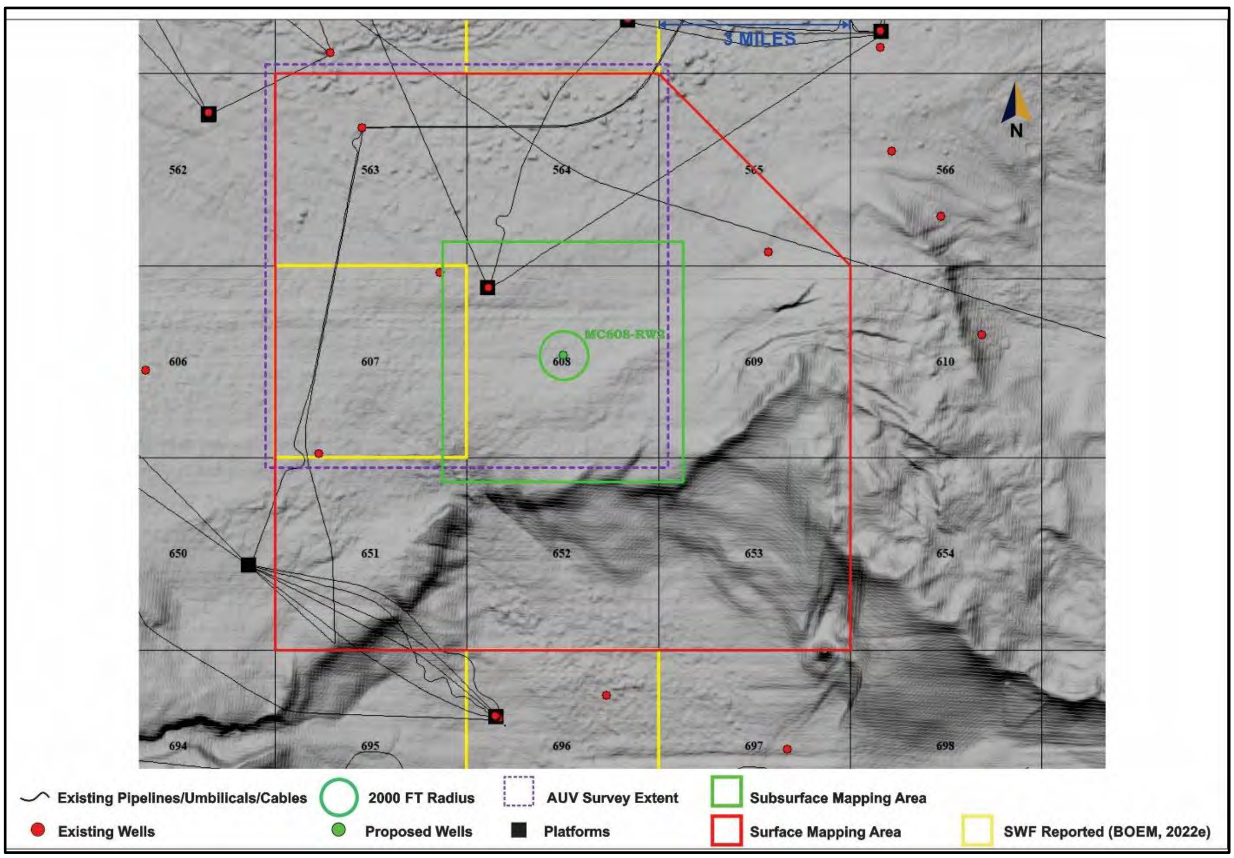


Figure MC 608-RW2-1. Seafloor Rendering Showing Proposed Wellsite MC 608-RW2.

Attachments

Wellsite maps are centered on the Proposed Wellsite MC 608-RW2 location and are displayed at a 1 inch = 1,000 ft scale (1:12,000). The maps included in this letter are as follows:

Map No. MC 608-RW2-1: Bathymetry Map

Map No. MC 608-RW2-2: Seafloor and Near-Surface Features Map

Map No. MC 608-RW2-3: Side-Scan Sonar Mosaic

Map No. MC 608-RW2-4: Seafloor Amplitude Rendering

Map No. MC 608-RW2-5: Geologic Features Map

The accompanying illustrations were extracted from the available data sets and are listed below:

Illustration MC 608-RW2-1: Portion of Subbottom Profiler Line 136A Showing Near-Surface Conditions Beneath Proposed Wellsite MC 608-RW2

Illustration MC 608-RW2-2: Portions of Inline 11323 and Crossline 10981 Showing Conditions Beneath Proposed Wellsite MC 608-RW2

Illustration MC 608-RW2-3: Tophole Prognosis Chart, Proposed Wellsite MC 608-RW2, Mississippi Canyon Area, Block 608

Illustration MC 608-RW2-4: Correlation between Proposed Wellsite MC 608-RW2 and Nearby Existing Wells.

NTL Requirements

The following letter complies with the Bureau of Ocean Energy Management (BOEM) Notice to Lessees (NTLs) 2008-G04, 2009-G40, and 2022-G01, (MMS, 2008, 2010, and BOEM, 2022a). BOEM's high probability archaeological blocks do not include MC 608 (BOEM, 2011). However, mitigation guidelines released by BOEM, entitled "Pre-Seabed Disturbance Survey Mitigation", historically requires an archaeological assessment of all surveyed blocks prior to any bottom disturbing activities (BOEMRE, 2011). An archaeological assessment of the area of potential effect around any proposed surface locations may be required as per NTL 2005-G07 (MMS, 2005). To adhere to these guidelines, Chevron obtained an archaeological assessment of HR data collected in and around MC 608 (OII,2022). The archaeological assessment is used in this evaluation of proposed wellsite MC 608-RW2.

As specified in NTL 2022-G01 (BOEM, 2022a), GEMS extracted the power spectrum diagram from the 3-D seismic data cube provided by Chevron (Figure MC 608-RW2-2). The extraction was generated from the seafloor to 1 second below the mudline. We converted the amplitude vs. frequency spectrum, generated by the IHS software, to power vs. frequency by squaring the amplitude values as described by J. A. Coffeen, 1978. The frequency bandwidth at 50% power ranges between 29 and 69Hz.

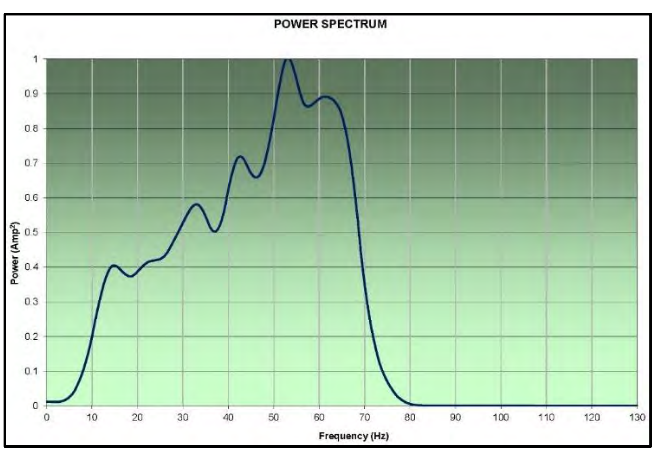


Figure MC 608-RW2-2. Power Spectrum Analysis Curve, Proposed Wellsite MC 608-RW2

Man-Made Structures and Features

The closest existing well and infrastructure is the MC 608-EA002 (API #608174098400) approximately 8,340 ft to the northwest (Figure MC 608-RW2-1, and Map MC608-RW2-1), BOEM, 2022b,c. The well was drilled by BP in 2002. The total vertical depth is reported as 16,443 ft. Production infrastructure is associated with the wellbore.

Two 8-inch, oil pipelines are connected to the EA002 well. S-13786 is a BP 8′ pipeline extending to the north-northwest. A second BP 8″ pipeline (S-13798) trends to the northeast and is 7,990 ft from the proposed location. In addition, a 4″ umbilical (S-13787) extends to the north-northeast from the EA002 well.

Approximately 2.3 northwest of the proposed location is the MC 607-001 well (API#608174057800). The well was drilled by BP in 1997 and reached a total vertical depth of 16,956 ft.

MC 608 is not in any Military Warning or Testing Areas.

Archaeological Assessment

The OII archaeologist reviewed the 2022 side-scan sonar, multibeam, and subbottom profiler data within MC 563-564 and 607-608 (OII, 2022). The data analysis detected 50 sonar contacts considered to be modern debris. The contacts do not have an acoustic signature indicative of archaeological resources. Sixteen (16) sonar contacts occur within the block borders of MC 608. No sonar contact occurs within 2,000 ft of the proposed MC 608-RW2 wellsite location (Maps MC608-RW2-2 and MC608-RW2-3).

Based on the archaeological review of available AUV data, the Area of Potential Effect around the proposed MC 608-RW2 wellsite location appears clear of archaeological resources. However, if any wood, ceramics, textiles, or ferrous objects become exposed during the course of bottom disturbing operations, all activities must be halted and BOEM notified within 48 hours.

Wellsite Conditions

The proposed location is clear of any constraining seafloor conditions as defined by the AUV and 3-D seismic data sets. The near surface stratigraphy at the proposed well location consists of a relatively thick section of layered hemipelagic sediments intercalated with mass-transport deposits. At depth, the stratigraphy consists of stratified turbidite intervals and a series of slope channel fill complexes.

Water Depth and Seafloor Conditions. Seafloor conditions are favorable at the proposed wellsite location. The water depth at the surface location is approximately -6,679 ft (Map MC608-RW2-1) and the seafloor slopes to the northeast at about 0.6°. Overall, the seafloor in the vicinity of proposed wellsite MC 608 RW2 is relatively smooth and benign (Map MC608 RW2-2).

The seafloor at the wellsite is covered by a ~18 ft thick, weakly stratified hemipelagic clay drape (Illustration MC608 RW2-1). The low seafloor amplitude response and side-scan sonar reflectivity in the vicinity of the proposed wellsite suggests the seabed is covered by very soft clays and silty-clays (Maps MC608 RW2-3 and –RW2-4).

The low seafloor amplitude response and side-scan sonar reflectivity in the vicinity of the proposed wellsite suggest the seabed is covered by soft clays (Maps MC 608-RW2-3 and MC 608-RW2-4). Seafloor Lineations occur south of the proposed location (Maps MC 608-RW2-2 and MC 608-RW2-3). The lineations represent subtle changes in the seafloor lithology. These features are not related to seepage or hardgrounds and will not hamper installation of drilling equipment.

Deepwater Benthic Communities. MMS (2010) does not designate Federal Lease Block 608 as having sensitive high-density benthic communities. Deepwater benthic communities are not expected at the proposed wellsite. There are no interpreted features or areas capable of supporting high density benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic (Map MC608 RW2-3) and Seafloor Amplitude Rendering (Map MC608 RW2-4) show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies within 2,000 ft of the location (BOEM, 2022e).

Stratigraphy. The stratigraphy at the proposed well location is depicted on Illustrations MC608 RW2-1 through MC608 RW2-4. The Tophole Prognosis Chart (Illustration MC608 RW2-3) shows the inline, annotated with calculated depths to the various horizons and predicted lithology of the sequences, along with their potential for shallow gas and shallow water flow. In general, the shallow stratigraphic sequences to the Limit of Investigation (6,000 ft bml) reflect alternating episodic deposition of hemipelagic clays and silty clays, turbidites, mass-transport, and slope-fan deposits. Overall, the seismic reflection character suggests that the sequences are composed of clays and silts interspersed with sands, primarily in the interbedded slope-fan units.

The subbottom profiler data define the stratigraphic section between the seafloor and approximately Horizon 10 (210 ft bml) in the area of the proposed wellsite (Illustration MC608 RW2-1). The uppermost 18 ft of sediment at the wellsite is a weakly stratified drape consisting of very soft, high water content, silty-clays. The sediments below the drape to 210 ft bml are stratified clays and silty clays with the exception of a 20 ft-thick, clay-rich mass-transport deposit between 123 ft and 143 ft bml.

The 3-D seismic data define the stratigraphy from the seafloor to the Limit of Investigation, about 6,000 ft bml (Illustrations MC608 RW2-2 and –RW2-3). Seven seismic reflections (Horizons 10, 15, 20, 30,40, 50, and 60) define the shallow section beneath the well.

The sedimentary section from Horizon 10 to Horizon 20 (Unit 2), between 205 ft and 462 ft bml, likely corresponds to the distal margin of the slope-fan sequence identified as the “Blue Unit”. The Blue Unit is a regional basin-floor fan and the source of numerous shallow water flow incidents in the Mississippi Canyon Area (BOEM, 2022e). The sediments within this unit likely consist of clay-prone mass-transport deposits and turbidites. A high-amplitude reflector (Horizon 15) occurs mid-unit (about 345 ft bml) and divides the unit into sub-units 2A and 2B. A sand layer or a series of thin sands are possible at and just above Horizon 15. Gamma ray and resistivity well logs from the BP Well #1 in MC 607 indicate that about 30 ft of wet sand was encountered mid-unit and about 20 ft of wet sand was encountered at the base of the unit.

Unit 3 (Horizon 20 to Horizon 30) occurs between 462 ft and 1,012 ft bml (Illustrations MC608 RW2-2 and RW2-3). The sequenced consists of numerous, closely-spaced parallel but discontinuous reflections and will likely contain levee/overbank and turbidite deposits comprised of clays, silts, and thin sand layers.

Unit 4 (Horizon 30 to 40), occurs between 1,012 ft and 2,312 ft bml. The seismic facies is highly variable and includes flat-lying, layered turbidites, dipping clinoform like beds, and amorphous mass-transport deposits. Gamma ray and resistivity logs from BP’s Well #1 in MC 607 indicate the presence of sands in Unit 4. Unit 4 is a slope fan-channel complex.

Unit 5 (Horizon 40 to 50) between 2,312 ft and 3,643 ft bml, is also a slope fan-channel complex. The sequence exhibits a complex stratigraphy. The well bore will likely encounter bedded levee/overbank and turbidites deposits, thin channel fill, and mass-transport deposits. The sediments will be a mixture clay, silt, and sand.

The sediments below Horizon 50 to the Limit of Investigation (Units 6 and 7), between 3,643 ft and 6,000 ft bml, are generally low-amplitude stratified reflectors interbedded with low-amplitude chaotic reflectors. These sediments are likely hemipelagic clays and silty clays interbedded with fine-grained turbidites and mass-transport deposits. The turbidites will consist of alternating layers of clay, silt, and thin sand.

Faults. The Proposed Wellsite MC 608-RW2 is not expected to intersect any seafloor faults in the near-surface. No buried faults are defined at depth on the 3-D data (Illustrations MC608 RW2-2 and RW2-3).

Shallow Gas and Shallow Water Flow. Interval amplitude searches were completed between the mapped horizons to help identify facies trends and possible gas-related anomalies within the seismic stratigraphic units (GEMS, 2022). Two additional amplitude searches were conducted to ensure complete hazards analysis within the tophole section. Infill scans were completed within Units 3 and 5 where the bounding horizons were truncated by major channel structures (GEMS, 2022). Significant shallow gas is not expected to be encountered within the shallow sediments within the Limit of Investigation. The potential for shallow water flow is considered negligible to moderate.

Shallow Gas. There are no apparent high-amplitude anomalies or other direct hydrocarbon indicators directly below the proposed wellsite (Map MC608 RW2-5 and Illustration MC608 RW2-3). The closest mapped subsurface high-amplitude event to the proposed borehole is approximately 325 ft north-northwest of the location. The anomaly is located within the Blue Unit fan sequence. The event may represent a thin sand within a turbidite interval at a depth of about 300 ft bml (Illustration MC608 RW2-3). The elevated event is not associated with other direct hydrocarbon indicators and may represent lithologic variations rather than shallow gas accumulations. The amplitude event is less than 300 ft bml. the shallow depth of burial warrants a low potential for significant shallow gas.

A low potential for encountering shallow gas exists within the slope-fan channel units 4 and 5 and within the turbidite intervals of Units 6 and 7. A negligible potential for shallow gas exists in the predominantly fine-grained sediments of Units 1 and 3.

Shallow Water Flow. The potential for shallow water flow at this well location is considered negligible to moderate (Illustration MC608 RW2-3). Overpressured sand units in the Mississippi Canyon Protraction Area are generally associated with seismic facies representing Pleistocene intraslope fan complexes, and in some cases, channel or canyon sequences (Ostermeier et al., 2000). Three slope-fan or fan-channel sequences (Units 2, 4 and 5) will be encountered by the proposed location within the Limit of Investigation.

The closest reported shallow water flow was 2.3 miles northwest of the proposed wellsite at the BP Well #1 in the northeast corner of MC 607 (Illustration MC608 RW2-4). The BP Well #1 encountered low flow while drilling the channelized slope fan deposits within the upper portion of Unit 4 at a depth of 1,246 ft bml (BOEM, 2022e; Illustration MC608 RW2-4). Additionally, Chevron's #001 well in MC 696, about 5.7 miles to the south-southwest reported low severity water flow at 1,971 ft bml (BOEM, 2022e). The depth of flow corresponds to the lower portion of the mapped Unit 4 at the proposed location. The BP #1 well in MC 607 was drilled in 1997. The more recently drilled Chevron wells, MC 608#1 and EA002 wells did not report water flow conditions within Unit 4 or the other sequences within the Limit of Investigation (Chevron, personal communication). The drill mud programs used in recent wells likely mitigated any overpressures. Unit 4 (1,012 ft to 2,312 ft bml) at the Proposed Wellsite MC 608-RW2 is assigned a moderate potential for shallow water flow because of the likelihood of sand-rich layers within Unit 4.

No wells within the immediate vicinity of MC 608 reported shallow water flow in the presumed "Blue Unit" sequence within Unit 2 (205 ft to 462 ft bml). However, a shallow water flow was experienced in MC 476 about 10 miles to the north. The flow was reported at 448 ft bml (BOEM, 2022e). Given the high-amplitude response of Unit 2 at, and in the vicinity of, MC 608-RW2 Unit 2 is assigned a moderate potential for overpressured sands.

Unit 5 (Horizon 40 to Horizon 50) from 2,312 and 3,643 ft bml is a slope fan-channel complex. Beneath the proposed wellsite exist discontinuous reflections indicative of sand-rich turbidites. Unit 5 has a moderate potential for overpressured sand layers.

Units 3, 6, and 7 may have thin sands but generally a low potential for overpressures. There is a negligible potential for shallow water flow within the near-surface clay-rich Unit 1.

Results

The proposed MC 608-RW2 location in Mississippi Canyon Area, block 608, appears suitable for exploration drilling operations. No areas with the potential for deepwater benthic communities are identified within 2,000 ft of the proposed wellsite.

No sonar contacts are delineated in the side-scan sonar data within 2,000 ft of the proposed wellsite. If any wood, ceramics, textiles, or ferrous objects become exposed during the course of bottom disturbing operations, all activities must be halted and BOEM notified within 48 hours.

There is a moderate potential for encountering overpressured sands within the slope fan sequences of Units 2 4, and 5. Significant shallow gas is not expected between the seafloor and Limit of Investigation.

Closing

We appreciate the opportunity to be of service to Chevron U.S.A. Inc. and look forward to working with Chevron on future projects.

Sincerely,

GEOSCIENCE EARTH & MARINE SERVICES, INC.

Thomas W. Neurauter, PhD.
Senior Marine Geologist

Daniel Lanier
President

Erin Williams Janes
Project Manager/Senior Geoscientist

Attachments (4 Illustrations)

Distribution:
Mr. Phillip Von Dullen III, Houston, TX (1 copy)

REFERENCES

Bureau of Ocean Energy Management (BOEM), 2011, Notice to lessees and operators (NTL) of federal oil and gas leases and pipeline right-of-way (ROW) holders on the outer continental shelf (OCS), Revisions to the list of OCS lease blocks requiring archaeological resource surveys and reports: U. S. Department of the Interior, Bureau of Ocean Energy Management, Bureau of Safety and Environmental Enforcement Gulf of Mexico Region (GOMR), NTL 2011-JOINT-G01. Effective Date December 29, 2011.

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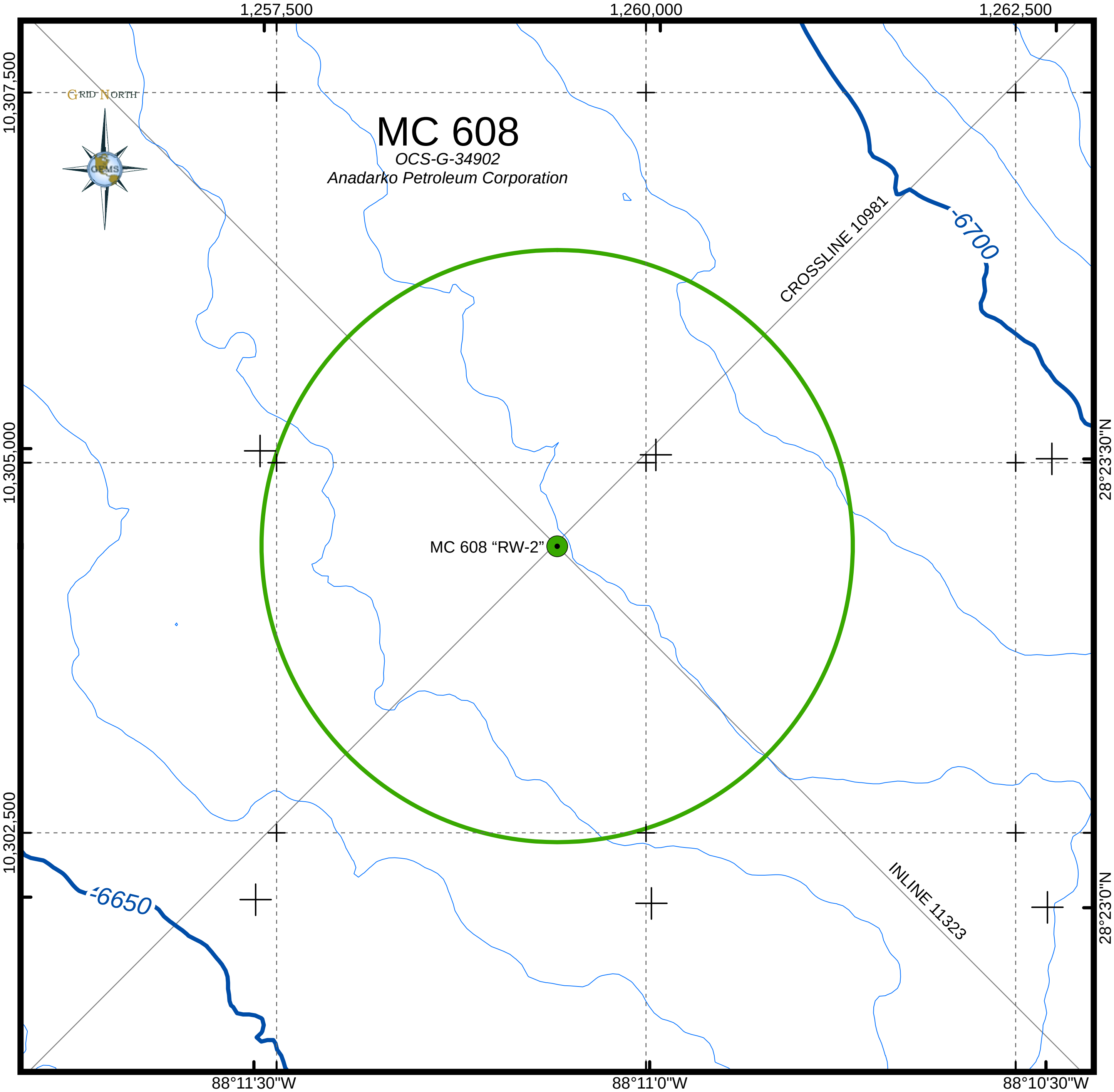
Minerals Management Service (MMS), 2010, Notice to lessees and operators of federal oil and gas leases in the outer continental shelf, Gulf of Mexico OCS region, deepwater benthic communities: U. S. Department of the Interior, Minerals Management Service, Gulf of Mexico, NTL 2009-G40. Effective Date January 27, 2010



PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

WATER DEPTH IN FEET
CONTOUR INTERVAL = 10 FT.

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

CHEVRON U.S.A. INC.

BATHYMETRY MAP

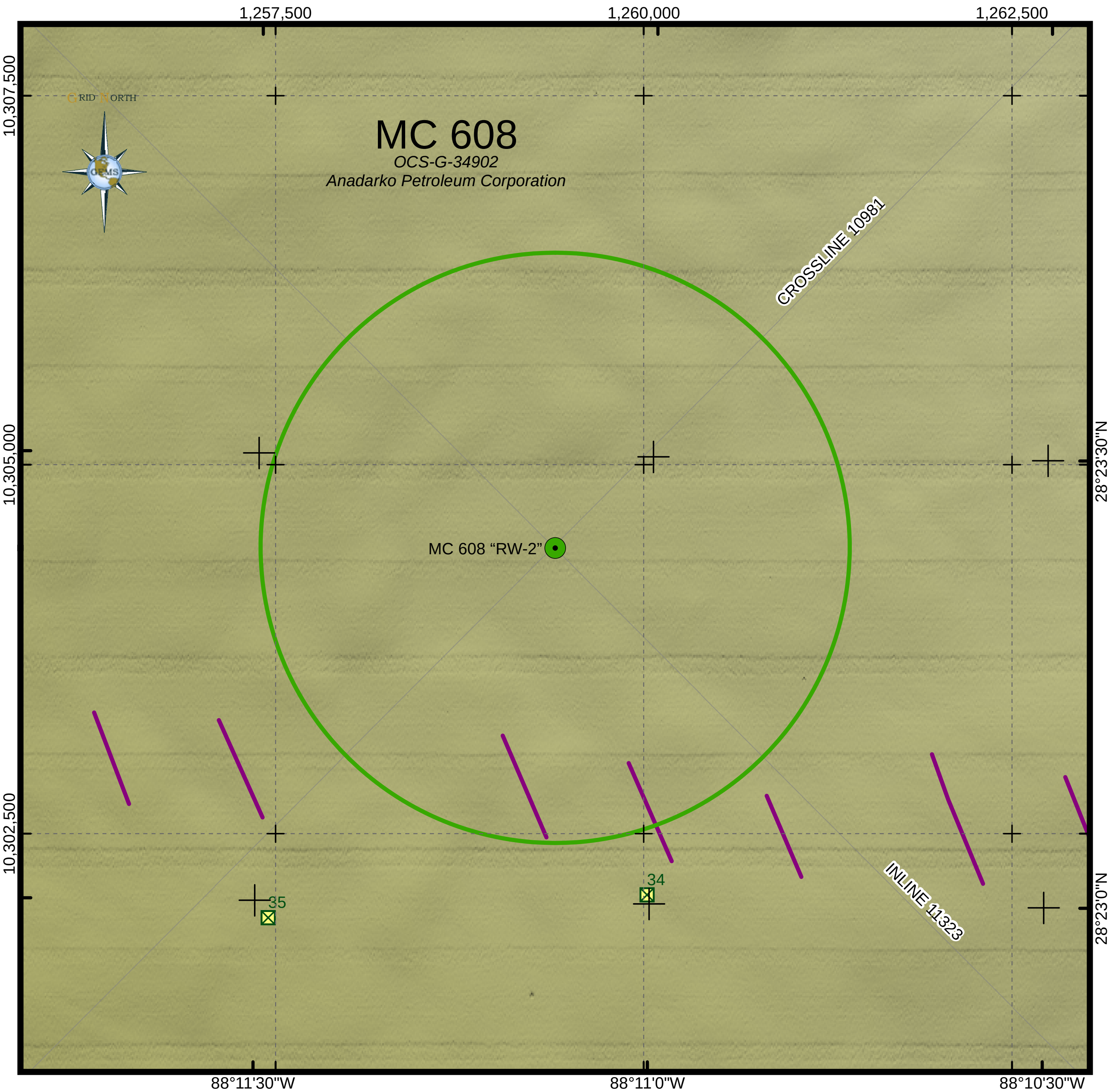
BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC.

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-RW2-1.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 RW2-1



PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

SONAR CONTACT AND REFERENCE NUMBER (OII, 2022).

LONG (500 FT TO 1100 FT), NARROW (~50 FT) STRIPS OF ELEVATED BACKSCATTER ALONG SEAFLOOR, POSSIBLY VARIATION IN SEDIMENT TYPE OR GRAIN-SIZE AND POSSIBLY RELATED TO BOTTOM CURRENTS.

WATER DEPTH IN FEET

6,482 | 6,500 | -6,625 | -6,750 | -6,875 | -7,000 | -7,083

ALTITUDE = 60°
AZIMUTH = 0°
V.E. = 4X

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

Chevron

CHEVRON U.S.A. INC.

SEAFLOOR FEATURES MAP

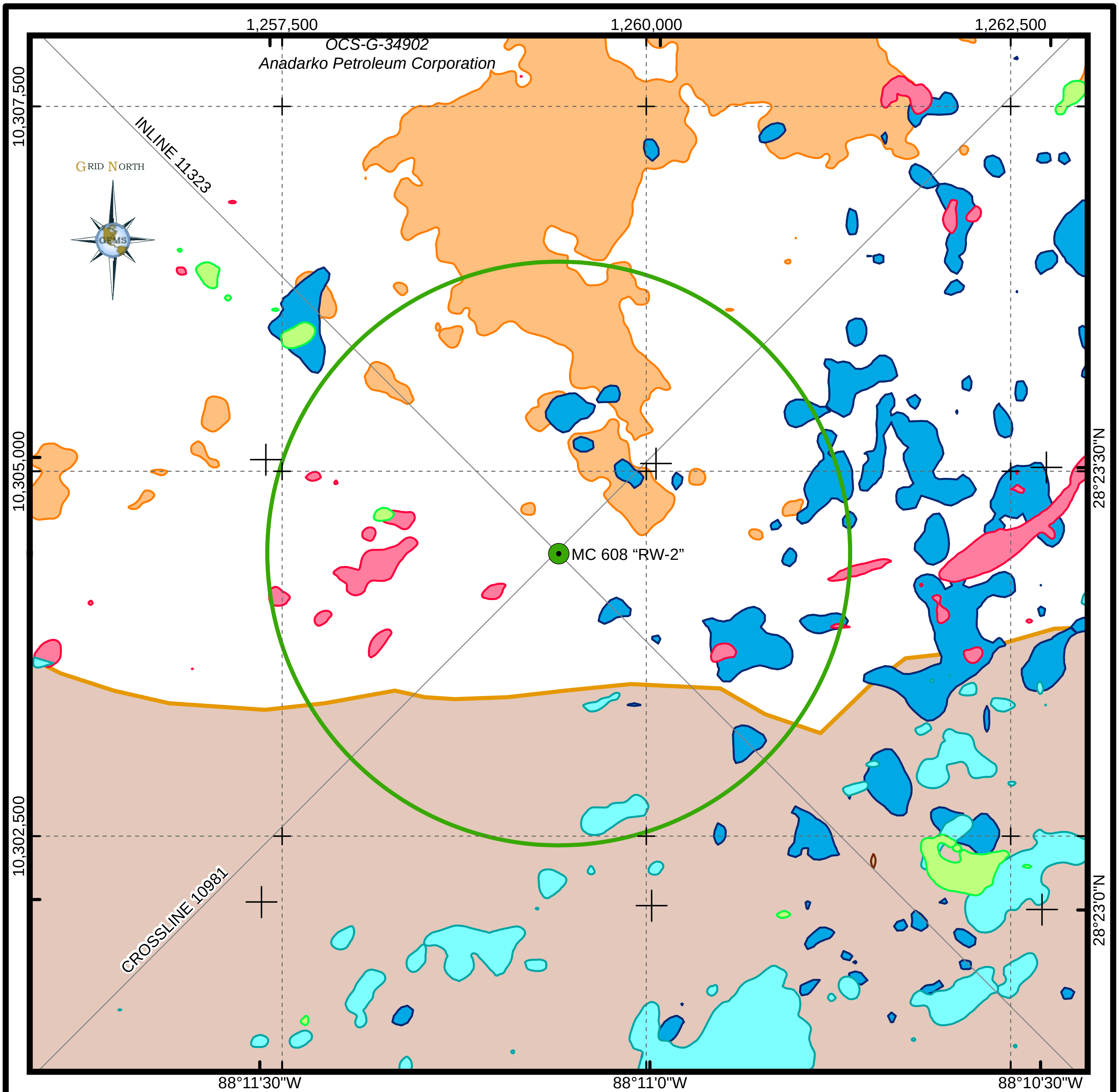
BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & GEMS MARINE SERVICES, INC.

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-RW2-2.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 RW2-2



PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

BURIED SUBMARINE CHANNEL THAT
AFFECTS UNITS 3 AND 4.

BURIED SUBMARINE CHANNEL
THAT AFFECTS UNIT 5.

AMPLITUDE ANOMALIES

AMPLITUDE ANOMALIES BETWEEN
HORIZON 10 TO HORIZON 15 (UNIT 2A).

AMPLITUDE ANOMALIES BETWEEN
HORIZON 15 TO HORIZON 20 (UNIT 2B).

AMPLITUDE ANOMALIES BETWEEN
HORIZON 20 TO HORIZON 30 (UNIT 3).

AMPLITUDE ANOMALIES BETWEEN
HORIZON 30 TO HORIZON 40 (UNIT 4).

AMPLITUDE ANOMALIES BETWEEN
HORIZON 40 TO HORIZON 50 (UNIT 5).

AMPLITUDE ANOMALIES BETWEEN
HORIZON 50 TO HORIZON 60 (UNIT 6).

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

Chevron

CHEVRON U.S.A. INC.

GEOLOGIC FEATURES MAP

BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC.
GEMS

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-RW2-5.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 RW2-5

December 22, 2022 Project No. 1122-3147

Chevron U.S.A. Inc.
1500 Louisiana Street
Houston, TX 77002

Attention: Mr. Phillip Von Dullen III

Site Clearance Letter
Proposed Exploration Wellsite MC 608-RW3
Block 608 (OCS-G-34902)
Mississippi Canyon Area
Gulf of Mexico

Chevron U.S.A. Inc. (Chevron) contracted Geoscience Earth & Marine Services (GEMS) to provide an assessment of the seafloor and shallow geologic conditions to determine the favorability of drilling operations for the proposed relief well location MC 608-RW3 in Block 608 (OCS-G-34902), Mississippi Canyon Area (MC), Gulf of Mexico. Specific seafloor and subsurface conditions are addressed around the proposed location to the Limit of Investigation (LOI) ~6,000 ft below the mudline (bml).

Seafloor conditions appear favorable within the vicinity of the proposed surface location. There are no potential sites for deepwater benthic communities within 2,000 ft. An Archaeological Assessment prepared by Oceaneering International (OII) and based on high-resolution geophysical data (HR), detected no sonar contacts within 2,000 ft of the proposed wellsite. Based on seismic attributes and amplitude analysis there is a negligible to low potential for encountering significant shallow gas within the limit of investigation. There is a negligible to moderate potential for encountering overpressured sands within the Limit of Investigation (6,000 ft bml, -12,670 ft bsl)

This letter provides details specific to the well location, including available data, Notice to Lessees (NTL) requirements, man-made features, and wellsite conditions.

Proposed Well Location

The surface location for the Proposed Wellsite MC 608-RW3 lies in the northeastern quadrant of MC 608 (Figure MC 608-RW3-1). Chevron provided the following coordinates:

Table 1. Proposed Wellsite MC 608-RW3 Location Coordinates

Proposed Wellsite MC 608-RW3			
Spheroid & Datum: Clarke 1866 NAD27 Projection: UTM Zone 16 North		Line Reference	Block Calls (MC 608)
X: 1,260,588 ft	Latitude: 28° 23' 42.3201” N	Inline 11375	6,612 ft FEL
Y: 10,306,292 ft	Longitude: 88° 10’ 54.2688 W	Crossline 10992	5,548 ft FNL

Chevron will drill this well using a dynamically positioned drilling vessel. Our assessment addresses the seafloor conditions within a 2,000-ft radius around the Proposed Wellsite MC 608-RW3.

Available Data

The following discussion is based on findings from the reports listed below:

- Archaeological and Geohazard Assessment, Blocks 563, 564, 607, and 608, Mississippi Canyon Area Gulf of Mexico (OII, 2022)
- Shallow Hazards Assessment, Block 608 and Vicinity Mississippi Canyon Area, Gulf of Mexico (GEMS, 2022)
- Shallow hazards assessment, Block 607 and Portions of 650 and 651, Mississippi Canyon Area, Gulf of Mexico, (GEMS, 2016).

The text, maps, and figures included in the report provide detail on the regional geology of the Study Area. Chevron provided a 3-D seismic time volume for the geohazard analysis, covering an approximate 163 square-mile area that includes all or portions of Federal lease Blocks 562-565, 606-609, 650-653, 694-697, and 738-741 in the Mississippi Canyon Area (Figure MC608 RW3-1). Digital well log images from the BP Well #1 in MC 607 were used to correlate lithological conditions at the proposed well.

Chevron obtained from Anadarko HR data that was collected by OII in 2022 over MC 563-564 and 607-608 (Figure MC608-RW3-1). The O-Surveyor III AUV system acquired 120 / 400 kHz side-scan sonar data, 1.5-10 kHz subbottom profiler data, 200 kHz 3 m (10 ft) bin multibeam bathymetry, and 1 m (3 ft) bin multibeam backscatter data. The data and the archaeological assessment were made available to GEMS.

Subsurface depths at the proposed wellsite were calculated using a 4th-order equation based on time-velocity values provided by Chevron (GEMS, 2016). The equation is as follows, where ***x*** is two-way travel time in seconds below the mudline:

$$\text{Depth (feet)} = 118.04*\mathbf{x}^4 - 531.62*\mathbf{x}^3 + 1062.1*\mathbf{x}^2 + 2505.5*\mathbf{x}$$

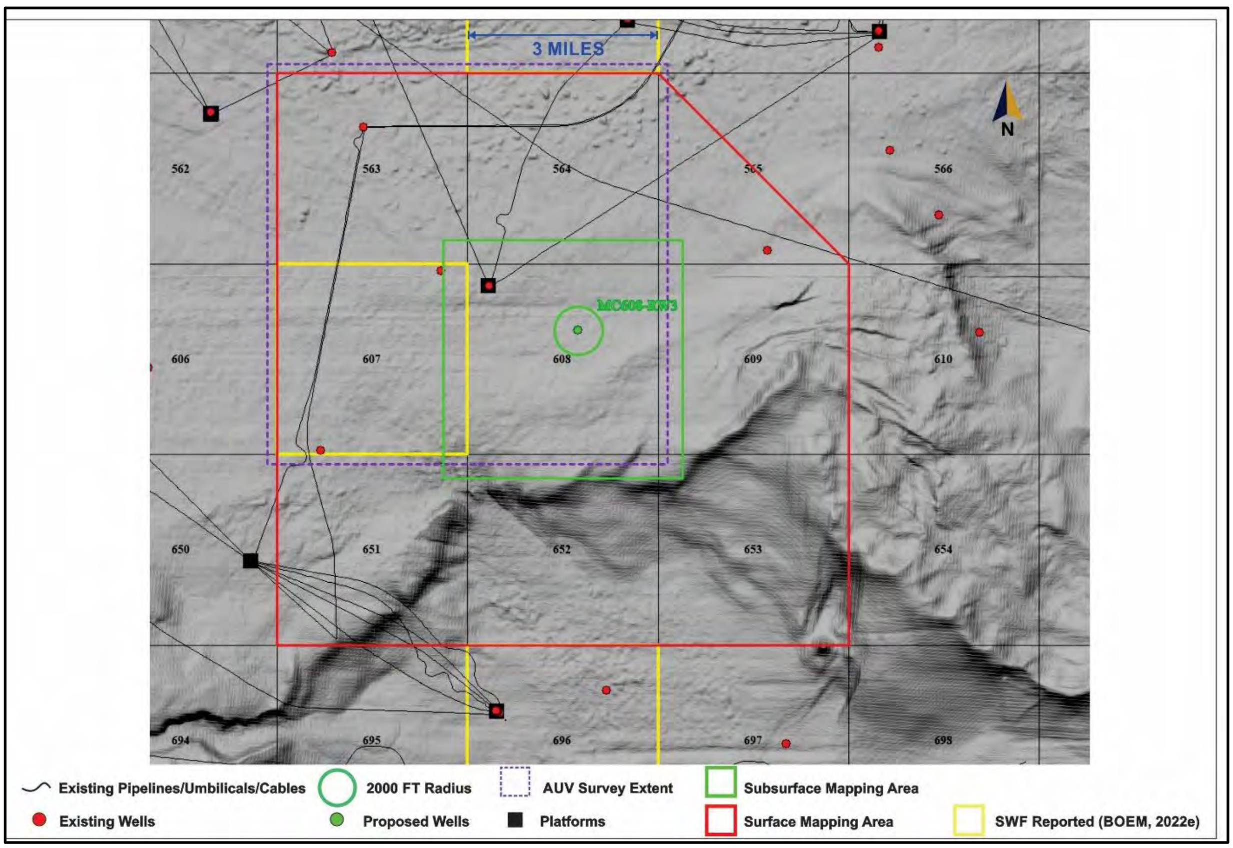


Figure MC 608-RW3-1. Seafloor Rendering Showing Proposed Wellsite MC 608-RW3.

Attachments

Wellsite maps are centered on the Proposed Wellsite MC 608-RW3 location and are displayed at a 1 inch = 1,000 ft scale (1:12,000). The maps included in this letter are as follows:

Map No. MC 608-RW3-1:	Bathymetry Map
Map No. MC 608-RW3-3:	Seafloor Features Map
Map No. MC 608-RW3-4:	Side-Scan Sonar Mosaic
Map No. MC 608-RW3-5:	Seafloor Amplitude Rendering
Map No. MC 608-RW3-6:	Geologic Features Map

The accompanying illustrations were extracted from the available data sets and are listed below:

Illustration MC 608-RW3-1: Portion of Subbottom Profiler Line 133 Showing Near-Surface Conditions Beneath Proposed Wellsite MC 608-RW3

Illustration MC 608-RW3-2: Portions of Inline 11375 and Crossline 10992 Showing Conditions Beneath Proposed Wellsite MC 608-RW3

Illustration MC 608-RW3-3: Tophole Prognosis Chart, Proposed Wellsite MC 608-RW3, Mississippi Canyon Area, Block 608

Illustration MC 608-RW3-4: Correlation between Proposed Wellsite MC 608-RW3 and Nearby Existing Wells.

NTL Requirements

The following letter complies with the Bureau of Ocean Energy Management (BOEM) Notice to Lessees (NTLs) 2008-G04, 2009-G40, and 2022-G01, (MMS, 2008, 2010, and BOEM, 2022a). BOEM's high probability archaeological blocks do not include MC 608 (BOEM, 2011). However, mitigation guidelines released by BOEM, entitled "Pre-Seabed Disturbance Survey Mitigation", historically requires an archaeological assessment of all surveyed blocks prior to any bottom disturbing activities (BOEMRE, 2011). An archaeological assessment of the area of potential effect around any proposed surface locations may be required as per NTL 2005-G07 (MMS, 2005). To adhere to these guidelines, Chevron obtained an archaeological assessment of HR data collected in and around MC 608 (OII,2022). The archaeological assessment is used in this evaluation of proposed wellsite MC 608-RW3.

As specified in NTL 2022-G01 (BOEM, 2022a), GEMS extracted the power spectrum diagram from the 3-D seismic data cube provided by Chevron (Figure MC 608-RW3-2). The extraction was generated from the seafloor to 1 second below the mudline. We converted the amplitude vs. frequency spectrum, generated by the IHS software, to power vs. frequency by squaring the amplitude values as described by J. A. Coffeen, 1978. The frequency bandwidth at 50% power ranges between 29 and 69Hz.

Figure MC 608-RW3-2. Power Spectrum Analysis Curve, Proposed Wellsite MC 608-RW3

Man-Made Structures and Features

The closest existing well and infrastructure is the MC 608-EA002 (API #608174098400) approximately 8,240 ft to the northwest (Figure MC 608-RW3-1 and Map MC608-RW3-1), BOEM, 2022b,c. The well was drilled by BP in 2002. The total vertical depth is reported as 16,443 ft. Production infrastructure is associated with the wellbore.

Two 8-inch, oil pipelines are connected to the EA002 well. S-13786 is a BP 8′ pipeline extending to the north-northwest. A second BP 8″ pipeline (S-13798) trends to the northeast and is 7,110 ft from the proposed location. In addition, a 4″ umbilical (S-13787) extends to the north-northeast from the EA002 well.

Approximately 2.4 northwest of the proposed location is the MC 607-001 well (API#608174057800). The well was drilled by BP in 1997 and reached a total vertical depth of 16,956 ft.

MC 608 is not in any Military Warning or Testing Areas.

Archaeological Assessment

The OII archaeologist reviewed the 2022 side-scan sonar, multibeam, and subbottom profiler data within MC 563-564 and 607-608 (OII, 2022). The data analysis detected 50 sonar contacts considered to be modern debris. The contacts do not have an acoustic signature indicative of archaeological resources. Sixteen (16) sonar contacts occur within the block borders of MC 608. No sonar contact occurs within 2,000 ft of the proposed MC 608-RW3 wellsite location (Maps MC608-RW3-2 and MC608-RW3-3).

Based on the archaeological review of available AUV data, the Area of Potential Effect around the proposed MC 608-RW3 wellsite location appears clear of archaeological resources. However, if any wood, ceramics, textiles, or ferrous objects become exposed during the course of bottom disturbing operations, all activities must be halted and BOEM notified within 48 hours.

Wellsite Conditions

The proposed location is clear of any constraining seafloor conditions as defined by the AUV and 3-D seismic data sets. The near surface stratigraphy at the proposed well location consists of a relatively thick section of layered hemipelagic sediments intercalated with mass-transport deposits. At depth, the stratigraphy consists of stratified turbidite intervals and a series of slope channel fill complexes.

Water Depth and Seafloor Conditions. Seafloor conditions are favorable at the proposed wellsite location. The water depth at the surface location is approximately -6,691 ft (Map MC608-RW3-1) and the seafloor slopes to the northeast at about 0.6°. Overall, the seafloor in the vicinity of proposed wellsite MC 608 RW3 is relatively smooth and benign (Map MC608 RW3-2).

The seafloor at the wellsite is covered by a ~15 ft thick, weakly stratified hemipelagic clay drape (Illustration MC608 RW3-1). The low seafloor amplitude response and side-scan sonar reflectivity in the vicinity of the proposed wellsite suggests the seabed is covered by very soft clays and silty-clays (Maps MC608 RW3-3 and –RW3-4).

The low seafloor amplitude response and side-scan sonar reflectivity in the vicinity of the proposed wellsite suggest the seabed is covered by soft clays (Maps MC 608-RW3-3 and MC 608-RW3-4).

Deepwater Benthic Communities. MMS (2010) does not designate Federal Lease Block 608 as having sensitive high-density benthic communities. Deepwater benthic communities are not expected at the proposed wellsite. There are no interpreted features or areas capable of supporting high density benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic (Map MC608 RW3-3) and Seafloor Amplitude Rendering (Map MC608 RW3-4) show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies within 2,000 ft of the location (BOEM, 2022e).

Stratigraphy. The stratigraphy at the proposed well location is depicted on Illustrations MC608 RW3-1 through MC608 RW3-4. The Tophole Prognosis Chart (Illustration MC608 RW3-3) shows the inline, annotated with calculated depths to the various horizons and predicted lithology of the sequences, along with their potential for shallow gas and shallow water flow. In general, the shallow stratigraphic sequences to the Limit of Investigation (6,000 ft bml) reflect alternating episodic deposition of hemipelagic clays and silty clays, turbidites, mass-transport, and slope-fan deposits. Overall, the seismic reflection character suggests that the sequences are composed of clays and silts interspersed with sands, primarily in the interbedded slope-fan units.

The subbottom profiler data define the stratigraphic section between the seafloor and approximately Horizon 10 (205 ft bml) in the area of the proposed wellsite (Illustration MC608 RW3-1). The uppermost 15 ft of sediment at the wellsite is a weakly stratified drape consisting of very soft, high water content, silty-clays. The sediments below the drape to 210 ft bml are stratified clays and silty clays with the exception of a 20 ft-thick, clay-rich mass-transport deposit between 117 ft and 137 ft bml.

The 3-D seismic data define the stratigraphy from the seafloor to the Limit of Investigation, about 6,000 ft bml (Illustrations MC608 RW3-2 and –RW3-3). Seven seismic reflections (Horizons 10, 15, 20, 30,40, 50, and 60) define the shallow section beneath the well.

The sedimentary section from Horizon 10 to Horizon 20 (Unit 2), between 198 ft and 510 ft bml, likely corresponds to the distal margin of the slope-fan sequence identified as the "Blue Unit". The Blue Unit is a regional basin-floor fan and the source of numerous shallow water flow incidents in the Mississippi Canyon Area (BOEM, 2022e). The sediments within this unit likely consist of clay-prone mass-transport deposits and turbidites. A high-amplitude reflector (Horizon 15) occurs mid-unit (about 339 ft bml) and divides the unit into sub-units 2A and 2B. A sand layer or a series of thin sands are possible at and just above Horizon 15. Gamma ray and resistivity well logs from the BP Well #1 in MC 607 indicate that about 30 ft of wet sand was encountered mid-unit and about 20 ft of wet sand was encountered at the base of the unit.

Unit 3 (Horizon 20 to Horizon 30) occurs between 510 ft and 1,029 ft bml (Illustrations MC608 RW3-2 and RW3-3). The sequenced consists of numerous, closely-spaced parallel but discontinuous reflections and will likely contain levee/overbank and turbidite deposits comprised of clays, silts, and thin sand layers.

Unit 4 (Horizon 30 to 40), occurs between 1,029 ft and 2,333 ft bml. The seismic facies is highly variable and includes flat-lying, layered turbidites, dipping clinoform like beds, and amorphous mass-transport deposits. Gamma ray and resistivity logs from BP's Well #1 in MC 607 indicate the presence of sands in Unit 4. Unit 4 is a slope fan-channel complex.

Unit 5 (Horizon 40 to 50) between 2,333 ft and 3,505 ft bml, is also a slope fan-channel complex. The sequence exhibits a complex stratigraphy. The well bore will likely encounter bedded levee/overbank and turbidites deposits, thin channel fill, and mass-transport deposits. The sediments will be a mixture clay, silt, and sand.

The sediments below Horizon 50 to the Limit of Investigation (Units 6 and 7), between 3,505 ft and 6,000 ft bml, are generally low-amplitude stratified reflectors interbedded with low-amplitude chaotic reflectors. These sediments are likely hemipelagic clays and silty clays interbedded with fine-grained turbidites and mass-transport deposits. The turbidites will consist of alternating layers of clay, silt, and thin sand.

Faults. The Proposed Wellsite MC 608-RW3 is not expected to intersect any seafloor faults in the near-surface. No buried faults are defined at depth on the 3-D data (Illustrations MC608 RW3-2 and RW3-3).

Shallow Gas and Shallow Water Flow. Interval amplitude searches were completed between the mapped horizons to help identify facies trends and possible gas-related anomalies within the seismic stratigraphic units (GEMS, 2022). Two additional amplitude searches were conducted to ensure complete hazards analysis within the tophole section. Infill scans were completed within Units 3 and 5 where the bounding horizons were truncated by major channel structures (GEMS, 2022). Significant shallow gas is not expected to be encountered within the shallow sediments within the Limit of Investigation. The potential for shallow water flow is considered negligible to moderate.

Shallow Gas. There are no apparent high-amplitude anomalies or other direct hydrocarbon indicators directly below the proposed wellsite (Map MC608 RW3-5 and Illustration MC608 RW3-3). The closest mapped subsurface high-amplitude event to the proposed borehole is approximately 300 ft south of the location. The anomaly is located within the Blue Unit fan sequence. The event may represent a thin sand within a turbidite interval at a depth of about 300 ft bml (Illustration MC608 RW3-3). The elevated event is not associated with other direct hydrocarbon indicators and may represent lithologic variations rather than shallow gas accumulations. The amplitude event is less than 300 ft bml. The shallow depth of burial warrants a low potential for significant shallow gas.

A low potential for encountering shallow gas exists within the slope-fan channel units 4 and 5 and within the turbidite intervals of Units 6 and 7. A negligible potential for shallow gas exists in the predominantly fine-grained sediments of Units 1 and 3.

Shallow Water Flow. The potential for shallow water flow at this well location is considered negligible to moderate (Illustration MC608 RW3-3). Overpressured sand units in the Mississippi Canyon Protraction Area are generally associated with seismic facies representing Pleistocene intraslope fan complexes, and in some cases, channel or canyon sequences (Ostermeier et al., 2000). Three slope-fan or fan-channel sequences (Units 2, 4 and 5) will be encountered by the proposed location within the Limit of Investigation.

The closest reported shallow water flow was 2.4 miles northwest of the proposed wellsite at the BP Well #1 in the northeast corner of MC 607 (Illustration MC608 RW3-4). The BP Well #1 encountered low flow while drilling the channelized slope fan deposits within the upper portion of Unit 4 at a depth of 1,246 ft bml (BOEM, 2022e; Illustration MC608 RW3-4). Additionally, Chevron's #001 well in MC 696, about 5.7 miles to the south-southwest reported low severity water flow at 1,971 ft bml (BOEM, 2022e). The depth of flow corresponds to the lower portion of the mapped Unit 4 at the proposed location. The BP #1 well in MC 607 was drilled in 1997. The more recently drilled Chevron wells, MC 608#1 and EA002 wells did not report water flow conditions within Unit 4 or the other sequences within the Limit of Investigation (Chevron, personal communication). The drill mud programs used in recent wells likely mitigated any overpressures. Unit 4 (1,029 ft to 2,333 ft bml) at the Proposed Wellsite MC 608-RW3 is assigned a moderate potential for shallow water flow because of the likelihood of sand-rich layers within Unit 4.

No wells within the immediate vicinity of MC 608 reported shallow water flow in the presumed "Blue Unit" sequence within Unit 2 (198 ft to 510 ft bml). However, a shallow water flow was experienced in MC 476 about 10 miles to the north. The flow was reported at 448 ft bml (BOEM, 2022e). Given the high-amplitude response of Unit 2 at, and in the vicinity of, MC 608-RW3, Unit 2 is assigned a moderate potential for overpressured sands.

Units 3, 5, 6, and 7 may have thin sands but generally a low potential for overpressures. There is a negligible potential for shallow water flow within the near-surface clay-rich Unit 1.

Results

The proposed MC 608-RW3 location in Mississippi Canyon Area, block 608, appears suitable for exploration drilling operations. No areas with the potential for deepwater benthic communities are identified within 2,000 ft of the proposed wellsite.

No sonar contacts are delineated in the side-scan sonar data within 2,000 ft of the proposed wellsite. If any wood, ceramics, textiles, or ferrous objects become exposed during the course of bottom disturbing operations, all activities must be halted and BOEM notified within 48 hours.

There is a moderate potential for encountering overpressured sands within the slope fan sequences of Units 2 and 4. Significant shallow gas is not expected between the seafloor and Limit of Investigation.

Closing

We appreciate the opportunity to be of service to Chevron U.S.A. Inc. and look forward to working with Chevron on future projects.

Sincerely,

GEOSCIENCE EARTH & MARINE SERVICES, INC.

Thomas W. Neurauter, PhD.
Senior Marine Geologist

Daniel Lanier
President

Erin Williams Janes
Project Manager/Senior Geoscientist

Attachments (4 Illustrations)

Distribution:
Mr. Phillip Von Dullen III, Houston, TX (1 copy)

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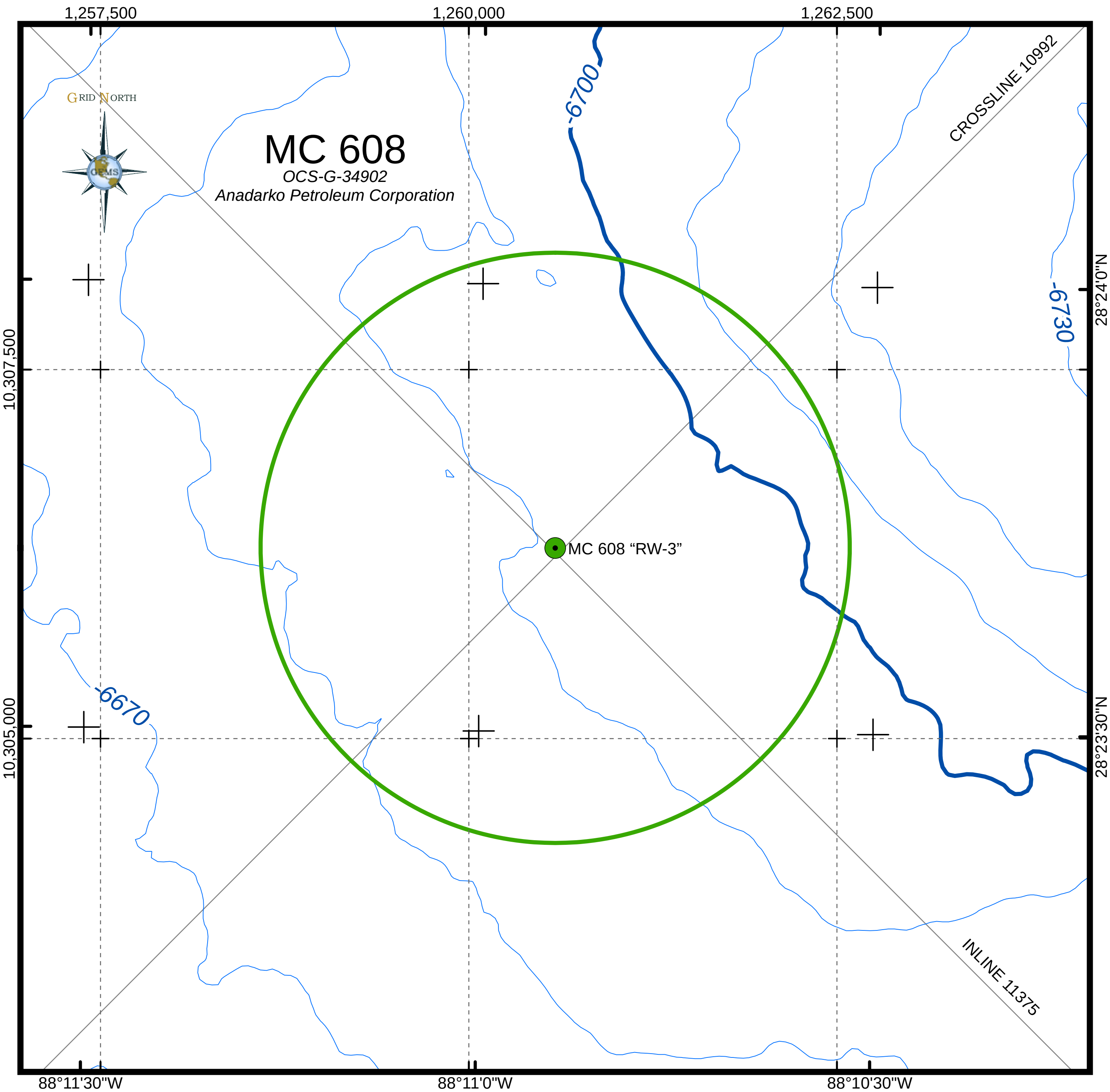


PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

WATER DEPTH IN FEET
CONTOUR INTERVAL = 10 FT.

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

CHEVRON U.S.A. INC.

BATHYMETRY MAP

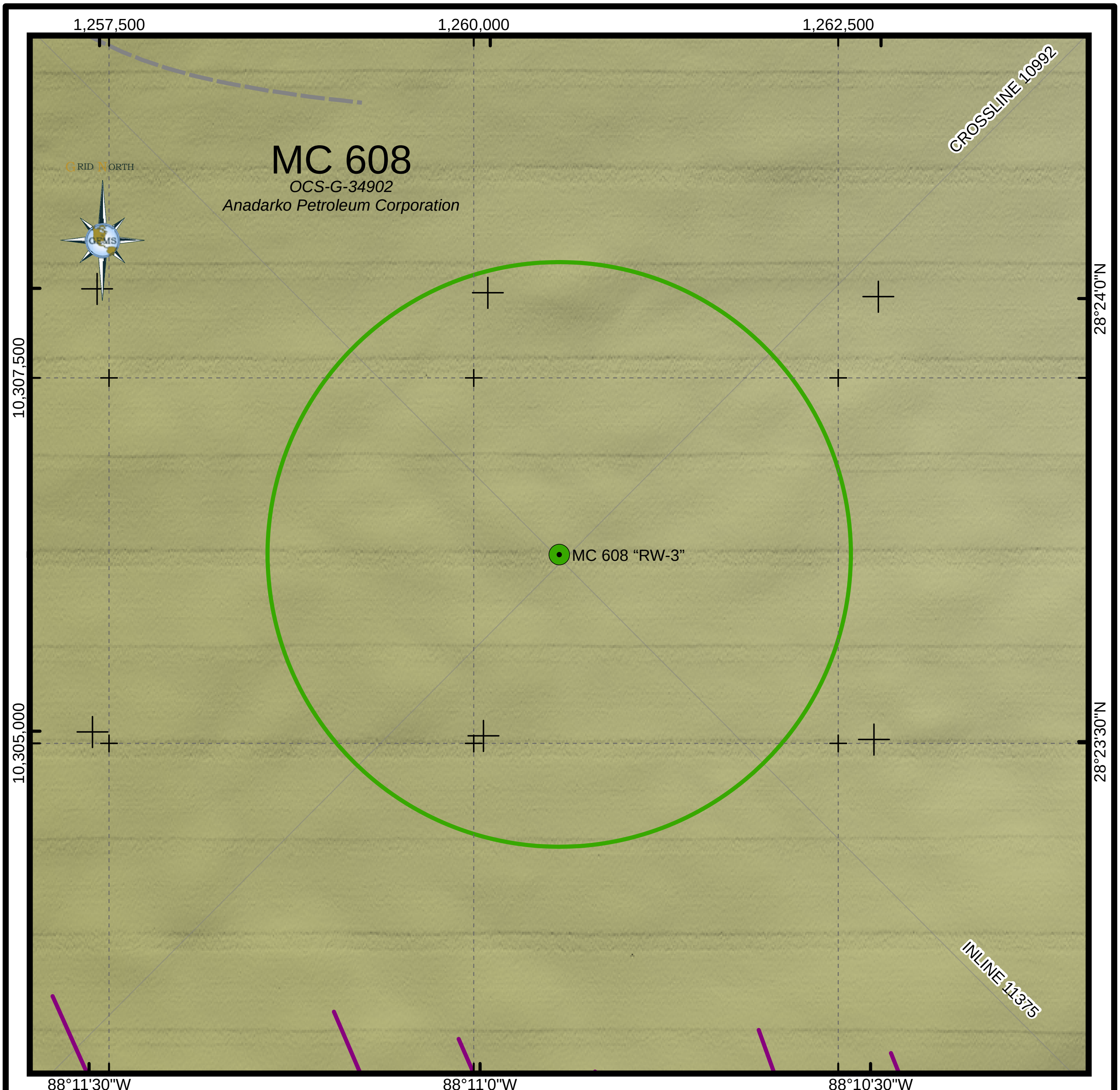
BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & GEMS MARINE SERVICES, INC.

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-RW3-1.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 RW3-1



PROPOSED WELL LOCATION.
CIRCLE REPRESENTS 2000 FT RADIUS
AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

LONG (500 FT TO 1100 FT), NARROW (~50 FT) STRIPS OF ELEVATED BACKSCATTER ALONG SEAFLOOR, POSSIBLY VARIATION IN SEDIMENT TYPE OR GRAIN-SIZE AND POSSIBLY RELATED TO BOTTOM CURRENTS.

DRAG SCAR (OII, 2022).

WATER DEPTH IN FEET

6,482 | 6,500 | -6,625 | -6,750 | -6,875 | -7,000 | -7,083

ALTITUDE = 60°
AZIMUTH = 0°
V.E. = 4X

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

Chevron

CHEVRON U.S.A. INC.

SEAFLOOR FEATURES MAP

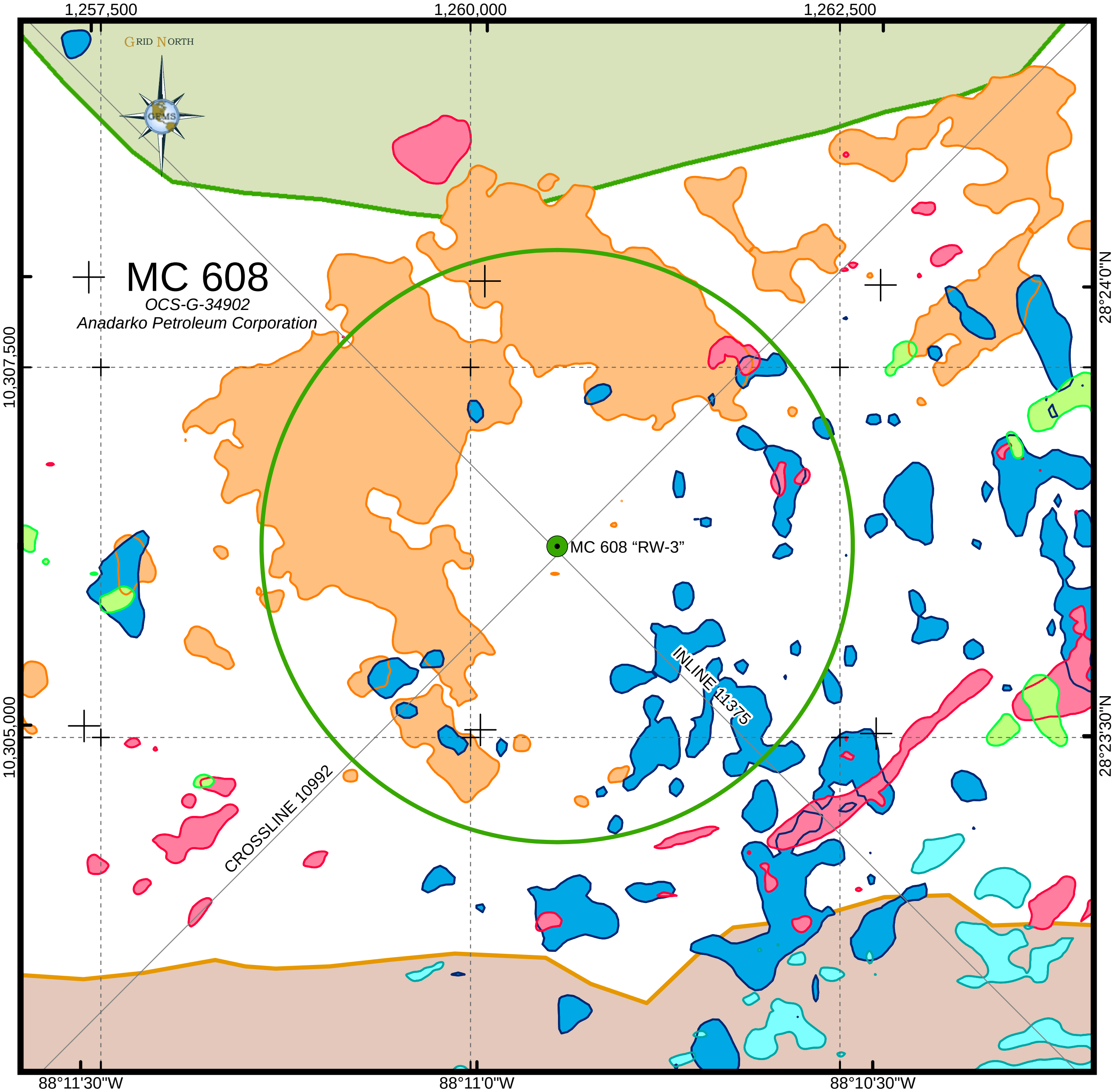
BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC.
GEMS

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-RW3-2.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 RW3-2



PROPOSED WELL LOCATION. CIRCLE REPRESENTS 2000 FT RADIUS AROUND PROPOSED WELLSITE.

3-D SURVEY LINE.

BURIED SUBMARINE CHANNEL THAT AFFECTS UNITS 3 AND 4.

BURIED SUBMARINE CHANNEL THAT AFFECTS UNIT 5.

AMPLITUDE ANOMALIES

AMPLITUDE ANOMALIES BETWEEN HORIZON 10 TO HORIZON 15 (UNIT 2A).

AMPLITUDE ANOMALIES BETWEEN HORIZON 15 TO HORIZON 20 (UNIT 2B).

AMPLITUDE ANOMALIES BETWEEN HORIZON 20 TO HORIZON 30 (UNIT 3).

AMPLITUDE ANOMALIES BETWEEN HORIZON 30 TO HORIZON 40 (UNIT 4).

AMPLITUDE ANOMALIES BETWEEN HORIZON 40 TO HORIZON 50 (UNIT 5).

GEODETIC DATUM: NAD 1927
ELLIPSOID: CLARKE 1866
ZONE: 16
GRID UNITS: US FEET

Chevron

CHEVRON U.S.A. INC.

GEOLOGIC FEATURES MAP

BLOCK 608
MISSISSIPPI CANYON AREA
GULF OF MEXICO

1,000 500 0 1,000
Feet

GEOSCIENCE EARTH & MARINE SERVICES, INC.

DATE: 22 DECEMBER 2022
FILE NAME: 3147_MC608-RW3-5.mxd
PROJECT NO.: 1122-3147

MAP NO. MC608 RW3-5

SECTION D HYDROGEN SULFIDE (H_2S) INFORMATION

(a) CONCENTRATION
An estimated H_2S concentration less than or equal to 22.2 ppm (measured at standard conditions) may be encountered while conducting the operations proposed under this Exploration Plan. H_2S concentrations were derived from regional data, models, and offset well data.

(b) CLASSIFICATION
Offset well fluid analysis has shown H_2S concentrations greater than 20 ppm at atmospheric conditions (per 30 CFR 250.490 (b) (2)) and based on the “H2S Classification Flow Chart” in NTL No. 2009-G31, Chevron is requesting that the proposed operations be classified as “H2S Present”.

(c) H_2S CONTINGENCY PLAN
Chevron will submit to the appropriate BSEE GOMR district office an H_2S Contingency Plan prepared according to 30 CFR 250.490 (f) before conducting the proposed operations under this Exploration Plan. This proposed contingency plan would accompany the Application for Permit to Drill (APD) for the respective proposed well(s).

(d) MODELING REPORT
H_2S concentrations greater than 500 parts per million (ppm) have not been determined or estimated to be encountered or handled while conducting the activities proposed in this plan, therefore a modeling report is not required for this plan based on the guidelines provided in NTL No. 2008-G04.

SECTION E BIOLOGICAL, PHYSICAL, AND SOCIOECONOMIC INFORMATION

(a) HIGH-DENSITY DEEPWATER BENTHIC COMMUNITIES INFORMATION

The proposed wells in this plan will be drilled with a dynamically positioned drillship, so no associated anchors, anchor chains, or wire ropes are involved.

High-Density Deepwater Benthic Communities Summary Statement from the GEMS Site Clearance Letters for the proposed surface locations:

MC 608 "A" Surface Location (A1, A2, A3, A4):
Deepwater benthic communities are not expected within 2,000 ft of the proposed wellsite surface location. There are no interpreted features or areas capable of supporting densely-populated benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic and Seafloor Amplitude Rendering show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies seabed anomalies within 2,000 ft of the proposed location.

MC 608 "B" Surface Location (B1, B2, B3, B4):
Deepwater benthic communities are not expected within 2,000 ft of the proposed wellsite surface location. There are no interpreted features or areas capable of supporting densely-populated benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic and Seafloor Amplitude Rendering show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies seabed anomalies within 2,000 ft of the proposed location.

MC 608 "C" Surface Location (C1, C2, C3, C4):
Deepwater benthic communities are not expected within 2,000 ft of the proposed wellsite surface location. There are no interpreted features or areas capable of supporting densely-populated benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic and Seafloor Amplitude Rendering show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies seabed anomalies within 2,000 ft of the proposed location.

MC 608 RW-1:
Deepwater benthic communities are not expected within 2,000 ft of the proposed wellsite surface location. There are no interpreted features or areas capable of supporting densely-populated benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic and Seafloor Amplitude Rendering show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies seabed anomalies within 2,000 ft of the proposed location.

MC 608 RW-2:

Deepwater benthic communities are not expected within 2,000 ft of the proposed wellsite surface location. There are no interpreted features or areas capable of supporting densely-populated benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic and Seafloor Amplitude Rendering show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies seabed anomalies within 2,000 ft of the proposed location.

MC 608 RW-3:

Deepwater benthic communities are not expected within 2,000 ft of the proposed wellsite surface location. There are no interpreted features or areas capable of supporting densely-populated benthic communities within 2,000 ft of the proposed location. The Side-Scan Sonar Mosaic and Seafloor Amplitude Rendering show normal or ambient returns along the seabed with no indication of any hard-bottom or fluid expulsion events within 2,000 ft of the proposed well. In addition, BOEM does not list any areas of positive or negative seafloor anomalies seabed anomalies within 2,000 ft of the proposed location.

(b) TOPOGRAPHIC FEATURES MAP

The proposed bottom disturbing activity is greater than 305 meters (1,000 feet) from the "No Activity Zone" of an identified topographic feature; therefore, the map described in Attachment 2, Section A, Item No. 1 of NTL No. 2004-G05 is not required for this plan based on the guidelines provided in NTL No. 2008-G04.

(c) TOPOGRAPHIC FEATURES STATEMENT (SHUNTING)

Chevron does not propose to drill two wells from the same surface location outside the 1-mile Zone but within the Protective Zone of an identified topographic feature. The statement described in Attachment 2, Section A, Item No.2 of NTL No. 2004-G05 is not required for this plan based on the guidelines provided in NTL No. 2008-G04.

(d) LIVE BOTTOMS (PINNACLE TREND) MAP

The leases in this proposed plan do not have the Live Bottoms (Pinnacle Trend) stipulation.

(e) LIVE BOTTOMS (LOW RELIEF) MAP

The leases in this proposed plan do not have the Live Bottoms (Low Relief) stipulation.

(f) POTENTIALLY SENSITIVE BIOLOGICAL FEATURES

No bottom disturbing activities will occur within 30 meters (100 feet) of potentially sensitive biological features. Therefore, the map described in Attachment 8, Section A of NTL No. 2004-G05 is not required for this plan based on the guidelines provided in NTL No. 2008-G04.

(g) REMOTELY OPERATED VEHICLE (ROV) MONITORING SURVEY PLAN

This plan is no longer required.

(h) THREATENED OR ENDANGERED SPECIES, CRITICAL HABITAT, AND MARINE MAMMAL INFORMATION

This section discusses species listed as endangered or threatened under the Endangered Species Act (ESA). In addition, it includes all marine mammal species in the region, which are protected under the Marine Mammal Protection Act (MMPA).

The sperm whale, five species of sea turtles, and the oceanic whitetip shark are the only endangered or threatened species likely to occur at or near the lease area. Critical habitat has been designated for the loggerhead turtle. No critical habitat has been designated in the Gulf of Mexico for the sperm whale or the other sea turtle species.

Coastal endangered or threatened species include the West Indian manatee, Piping Plover, Florida salt marsh vole, Whooping Crane, Gulf sturgeon, and four subspecies of beach mouse. Critical habitat has been designated for all of these species except the Florida salt marsh vole.

Federally listed endangered and threatened species potentially occurring in the lease area and along the northern Gulf Coast:

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in Gulf of Mexico
			Project Area	Coastal	
Marine Mammals					
Rice's whale	*Balaenoptera ricei*[1]	E	X	--	None
Sperm whale	*Physeter macrocephalus*	E	X	--	None
West Indian manatee	*Trichechus manatus*[2]	T	--	X	Florida (Peninsular)
Sea Turtles					
Loggerhead turtle	*Caretta caretta*	T,E[3]	X	X	Nesting beaches and nearshore reproductive habitat in Mississippi, Alabama, and Florida (Panhandle); *Sargassum* habitat including most of the central & western Gulf of Mexico.
Green turtle	*Chelonia mydas*	T	X	X	None
Leatherback turtle	*Dermochelys coriacea*	E	X	X	None
Hawksbill turtle	*Eretmochelys imbricata*	E	X	X	None
Kemp's ridley turtle	*Lepidochelys kempii*	E	X	X	None
Birds					
Piping Plover	*Charadrius melodus*	T	--	X	Coastal Texas, Louisiana, Mississippi, Alabama, and Florida (Panhandle)
Whooping Crane	*Grus americana*	E	--	X	Coastal Texas (Aransas National Wildlife Refuge)
Fishes					
Oceanic whitetip shark	*Carcharhinus longimanus*	T	X	--	None
Giant manta ray	*Mobula birostris*	T	X	X	None
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T	--	X	Coastal Louisiana, Mississippi, Alabama, and Florida (Panhandle)
Nassau grouper	*Epinephelus striatus*	T	--	X	None
Smalltooth sawfish	*Pristis pectinata*	E	--	X	Southwest Florida
Invertebrates					
Elkhorn coral	*Acropora palmata*	T	--	X	Florida Keys and the Dry Tortugas
Staghorn coral	*Acropora cervicornis*	T	--	X	Florida Keys and the Dry Tortugas
Pillar coral	*Dendrogyra cylindrus*	T	--	X	None
Rough cactus coral	*Mycetophyllia ferox*	T	--	X	None
Lobed star coral	*Orbicella annularis*	T	--	X	None
Mountainous star coral	*Orbicella faveolata*	T	--	X	None
Boulder star coral	*Orbicella franksi*	T	--	X	None
Terrestrial Mammals					
Beach mice (Alabama, Choctawhatchee, Perdido Key, St. Andrew)	*Peromyscus polionotus*	E	--	X	Alabama and Florida (Panhandle) beaches
Florida salt marsh vole	*Microtus pennsylvanicus dukecampbelli*	E	--	X	None

Abbreviations: E = Endangered; T = Threatened; X = potentially present; -- = not present.

1 In 2021, National Marine Fisheries Service recognized that what had previously been accepted as a subspecies of the Bryde's whale is actually a separate species. The reclassification is formerly recognized under 86 Federal Register (*FR)* 47022 effective date 22 October 2021 as the Rice's whale (*Balaenoptera ricei*).

2 There are two subspecies of West Indian manatee: the Florida manatee (*T. m. latirostris*), which ranges from the northern Gulf of Mexico to Virginia, and the Antillean manatee (*T. m. manatus*), which ranges from northern Mexico to eastern Brazil. Only the Florida manatee subspecies is likely to be found in the northern Gulf of Mexico.

3 The Northwest Atlantic Ocean Distinct Population Segment (DPS) of loggerhead turtles is designated as Threatened (76 *FR* 58868). The National Marine Fisheries Service and the U.S. Fish and Wildlife Service designated critical habitat for this DPS, including beaches and nearshore reproductive habitat in Mississippi, Alabama, and the Florida Panhandle as well as *Sargassum* spp. habitat throughout most of the central and western Gulf of Mexico (79 FR 39756 and 79 FR 39856).

(i) ARCHAEOLOGICAL REPORT

Oceaneering International, Inc. (OII) was contracted by Anadarko Petroleum Company to conduct a high-resolution geophysical survey in MC blocks 563, 564, 607 and 608 using an AUV. OII prepared an archaeological assessment of this data that Anadarko shared with Chevron and also with GEMS. The AUV was "O-Surveyor III" and was deployed from the M/V Ocean Project. The O-Surveyor III collected side-scan sonar, subbottom profiler, and multibeam bathymetric data. Data collection occurred between April 30 and May 11, 2022. The survey grid consisted of 31 east-west primary lines and 7 north-south tie lines. OII provided the report and digital datasets to GEMS. All data were examined to locate potential submerged archaeological resources within the area of potential effect (APE).

RESULTS and RECOMMENDATIONS

No archaeological constraints exist for drilling and development in MC 608.

The following information summarizes the archaeological assessment findings:

- No archaeological constraints exist for drilling and development within the 4-block mapping area which includes MC 608.
- A total of 50 sonar contacts were defined within the 4 blocks
- 16 of these sonar contacts occur in MC 608
- All sonar contacts were interpreted as modern debris and no contacts assigned archaeological avoidance

Due to the nature of acoustic data, it is possible that archaeological resources remain undetected within the Study Area. Should any potentially historic materials such as textiles, wood, ceramics, or other items be uncovered during exploration or production activities, all operations must cease and BOEM be notified within 48 hours.

PROPRIETARY ENCLOSURE TO PLAN

Archaeological and Geohazard Assessment, Blocks 563, 564, 607 and 608, Mississippi Canyon Area, Gulf of Mexico, Oceaneering®, July 2022 (Document No. 216465-OII-AAG-01) (One Digital Copy)

SECTION F WASTE AND DISCHARGE INFORMATION

(a) PROJECTED GENERATED WASTES
(b) PROJECTED OCEAN DISCHARGES

Water Quality Spreadsheets, included below, replace the Projected Generated Wastes and the Projected Generated Ocean Discharges Tables.

TABLE 1. WASTES YOU WILL GENERATE, TREAT AND DOWNHOLE DISPOSE OR DISCHARGE TO THE GOM ~ Polyphemus - 125 drilling days

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	**Composition**	**Projected Amount**	**Discharge rate**	**Discharge Method**	**Answer yes or no**
Will drilling occur ? If yes, you should list muds and cuttings					
Water-based drilling fluid	Water-based drilling muds	44,000 bbls/well	4,400 bbls/day	Discharge at mudline prior to riser installation.	No
Cuttings wetted with water-based fluid	Cuttings coated with water-based drilling muds	4,433 bbls/well	443 bbls/day	Discharge at mudline prior to riser installation.	No
Cuttings wetted with synthetic-based fluid	Cuttings coated with Synthetic drilling muds, including drilled out cement	5,966 bbls/well	52 bbls/day	Treated cuttings will be discharged overboard during drilling of SBM interval. Cuttings will pass through curttings dryer substantially reducing ROC percentage from worst case quoted below. Or stored in cutting boxes and transported to shore.	No
Will humans be there? If yes, expect conventional waste					
Domestic waste	Gray water from living quarters,control	47,125 bbls/well	377 bbls/day	Food grinder. Starboard Caisson.	No
Sanitary waste	Sanitary waste from living quarters,control rooms, and common	23,375 bbls/well	187 bbls/day	USCG-approved MSD with chlorination. Starboard Caisson.	No
Is there a deck? If yes, there will be Deck Drainage					
Deck Drainage	Deck drainage from drilling floor,	142,125 bbls/well	1,137 bbls/day	Hull discharge overboard.	No
Will you conduct well treatment, completion, or workover?					
Well completion fluids	NA	NA	0 N/A	NA	0 No
Miscellaneous discharges. If yes, only fill in those associated with your activity.					
Desalinization unit discharge	Rejected water from watermaker unit	228,375 bbls/well	1,827 bbls/day	Hull discharge overboard.	No
Blowout prevent fluid	Stackmagic 200/0/5% glycol based on 2% mixture with potable water	260 bbls/well	2.08 bbls/day	discharge at sea floor, or w/ deck drainage when tested on the surface	No
Ballast water	Uncontaminated seawater used to maintain proper draft	633,500 bbls/well	5,068 bbls/day	Hull discharge overboard.	No
Excess cement	Cement,Fluid Loss Additive,Cement Retarder,Free Water Control Additive,Defoamer,Surfacant	800 bbls/well	800 bbls/well	Discharged at seafloor during riserless drilling	No
Fire water	Seawater with no addition of chemicals	51,428 bbls/day when flaring	51,428 bbls/day when flaring	Hull discharge overboard.	No
Cooling water	Seawater with no addition of chemicals	62,500,000 bbls/well	500,000 bbls/day	Hull discharge overboard.	No
Hydrate control fluid	Glycol	25 gals/well	25 gals/well	Discharge at seafloor	No
Sub sea wellhead preservation fluid	Sub sea wellhead preservation fluid	2 bbls/well	2 bbls/well	Discharge at seafloor	No
Leak tracer dye	Lignite	21,000 lbs/well	21,000 lbs/well	Discharge at seafloor	No
Will you produce hydrocarbons? If yes fill in for produced water.					
Will you be covered by an individual or general NPDES permit ?		General			

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

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

please specify 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.					
EXAMPLE: Synthetic-based drilling fluid or mud	*internal olefin, ester*	*Below deck storage tanks on offshore support vessels*	*Newport Environmental Services Inc., Ingleside, TX*	*X bbl/well*	*Recycled*
Oil-based drilling fluid or mud	N/A	N/A	N/A	N/A	N/A
Synthetic-based drilling fluid or mud	Synthetic-based drilling muds	Internal mud tanks on motor vessel	Ecoserv, Port Fourchon, LA	44,000 bbls/well	Transport by boat in cutting bins to shorebase; truck to disposal facility. Recycled where possible, or injected.
Cuttings wetted with Water-based fluid	N/A	N/A	N/A	N/A	N/A
Cuttings wetted with Synthetic-based fluid	Cuttings coated with Synthetic drilling muds, including drilled out cement	Cuttings box on workboat/crewboat	Ecoserv, Port Fourchon, LA	1,000 bbs/well	Transport by boat in cutting bins to shorebase; truck to disposal facility. Treated and landfilled.
Cuttings wetted with oil-based fluids	N/A	N/A	N/A	N/A	N/A
Will you produce hydrocarbons? If yes fill in for produced sand.					
Produced sand	N/A	N/A	N/A	N/A	N/A
Will you have additional wastes that are not permitted for discharge? If yes, fill in the appropriate rows.					
EXAMPLE: trash and debris (recylables)	*Plastic, paper, aluminum*	*barged in a storage bin*	*ARC, New Iberia, LA*	*X lb/well*	*Recycled*
Trash and debris	Plastic, paper, aluminum, glass, and other refuse	Storage bins on crew boat	Total Waste Solutions, Port Fourchon, LA	1,800 lbs/day	Transport by boat in storage bins to shorebase. Landfilled.
Wash water		Transport by boat in tanks to shorebase	Ecoserv, Port Fourchon, LA	2-5 bbls/day	Transport by boat in cutting bins to shorebase; truck to disposal facility. Injected.
Chemical product wastes	Used oil, hazardous waste, and nonhazardous waste	Drums on crew boat	Chemical Waste Management, Sulfur, La; WMI Woodside, Walker, LA; Aaron Oil, Berwick,LA	3 bbls/day	Transport in portable tanks or drums on crew boat to shorebase; truck to disposal facility. Recycled where possible, otherwise landfilled or incinerated.
Completion Fluids	Calcium Bromide	Transport by boat in tanks back to vendor	Halliburton-Baroid, Golden Meadow, LA	10,000 bbls/well	Recycled

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

SECTION G AIR EMISSIONS INFORMATION

(a) EMISSIONS WORKSHEETS AND SCREENING QUESTIONS

The emissions for the drillship are based on the 2020 historical actual fuel usage for the Valaris DS-18 (formerly, Rowan Relentless) with a 250% contingency factor added. The historical actual fuel usage is based on the fuel usage recorded each day on the drilling reports. Attachment G-2 shows the actual fuel usage data for 2020 for the DS-18. An average fuel usage of 1,372 gals/hr (historical average daily fuel plus 250%) was utilized in the air emissions spreadsheets. The DS-18's actual fuel usage was used to calculate emissions in the AQR because this drillship had the highest fuel usage across the 2020 Chevron GOM drillship fleet. Therefore, any other drillship in the Chevron GOM fleet would be able to comply with the annual fuel usage limit. The actual daily fuel usage will be recorded on the daily drilling report and be kept on the drilling rig.

The activity proposed in this plan will occur in Mississippi Canyon 608. An AQR sheet was prepared to show exploratory drilling, completing, and abandoning operations in this surface block during each calendar year. Please note, 365 days of activity has been included in the AQR for all the years calculated. This is for contingency purposes to accommodate any schedule changes within the overall drilling schedule. MC 608 is within 200 km from the Breton National Wildlife Refuge (BNWR); however, the drillship will be on location for less than three years. The Complex Total Emissions are the same as the Plan Emissions, and therefore only one set of emissions calculations is included for each surface block.

MC 608

SCREENING QUESTIONS FOR EP'S	YES	NO
Is any calculated Complex Total (CT) Emission amount (in tons) associated with your proposed exploration activities more than 90% of the amounts calculated using the following formulas: CT = 3400D2/3 for CO, and CT = 33.3D for the other pollutants (where D = distances to shore in miles)?	☐	☒
Do your emissions calculations include any emission reduction measures or modified emissions factors?	☒	☐
Are your proposed exploration activities located east of 87.5° W longitude?	☐	☒
Do you expect to encounter H2S at concentrations greater than 20 parts per million (ppm)?	☐	☒
Do you propose to flare or vent natural gas for more than 48 continuous hours from any proposed well?	☐	☒
Do you propose to burn produced hydrocarbon liquids?	☐	☒

Emission Source	Reduction Control Method	Amount of Reduction	Annual Fuel Usage Limit for Drillship (gal/yr)	Monitoring System
DS-18	Actual fuel consumption	~1324 lb/hr NOx	12,016,345	Fuel log

CONTACT INFORMATION
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Covington, LA 70433
985-773-6230
kathysharp@chevron.com

MODELING REPORT
A Modeling Report is not required for activities proposed in this plan.

ATTACHMENTS TO SECTION G
•G-1 – Form BOEM-0138 "Gulf of Mexico Air Emissions Calculations for EP's"
•G-2 – Valaris DS-18 Historical Actual Fuel Usage

EP - AIR QUALITY

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

COMPANY	Chevron U.S.A. Inc.
AREA	Mississippi Canyon
BLOCK	608
LEASE	OCS- G 34902
FACILITY	NA - DP Drillship
WELL	A1,A2,A3,A4,B1,B2,B3,B4,C1,C2,C3,C4,RW1,RW2,RW3
COMPANY CONTACT	Kathy Sharp
TELEPHONE NO.	985-773-6230
REMARKS	DP Drillship - Emissions based on DS-18 fuel usage.

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

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

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

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

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

AIR EMISSIONS CALCULATIONS - 1ST YEAR

COMPANY	AREA		BLOCK	LEASE	FACILITY	WELL					CONTACT	PHONE	REMARKS
Chevron U.S.A. Inc.	Mississippi Canyon		608	OCS- G 34902	NA - DP Drillship	A1,A2,A3,A4,B1,B2,B3,B4,C1,C2,C3,C4,RW1,RW2,RW3					Kathy Sharp	985-773-6230	DP Drillship - Emissions based on DS-18 fuel usage.

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	DS-18*	26663.47091	1371.72893	32921.49	24	365	18.81	11.35	11.01	0.27	450.68	12.96	0.00	70.69	0.13	82.39	49.71	48.22	1.20	1974.00	56.76	0.01	309.62	0.58
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	VESSELS- Drilling - Propulsion Engine - Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels - Diesel Boiler		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Vessels – Drilling Prime Engine, Auxiliary		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FACILITY INSTALLATION	VESSELS - Heavy Lift Vessel/Derrick Barge Diesel		0	0	0.00	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			BPD																						
DRILLING	Liquid Flaring		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WELL TEST	COMBUSTION FLARE - no smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - light smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - medium smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
	COMBUSTION FLARE - heavy smoke			0		0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--
ALASKA-SPECIFIC SOURCES	**VESSELS**		kW			HR/D	D/YR																		
	VESSELS - Ice Management Diesel		0			0	0	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
2023-2025	**Facility Total Emissions**							**18.81**	**11.35**	**11.01**	**0.27**	**450.68**	**12.96**	**0.00**	**70.69**	**0.13**	**82.39**	**49.71**	**48.22**	**1.20**	**1,974.00**	**56.76**	**0.01**	**309.62**	**0.58**
EXEMPTION CALCULATION	**DISTANCE FROM LAND IN MILES**																**2,264.40**			**2,264.40**	**2,264.40**	**2,264.40**		**56,643.69**	
	68.0																								
DRILLING	VESSELS- Crew Diesel		10800	555.616801	13334.80	7	122	7.62	4.60	4.46	0.11	182.55	5.25	0.00	28.63	0.05	3.24	1.96	1.90	0.05	77.74	2.24	0.00	12.19	0.02
	VESSELS - Supply Diesel		6600	339.5436	8149.05	19	183	4.66	2.81	2.72	0.07	111.56	3.21	0.00	17.50	0.03	8.07	4.87	4.72	0.12	193.41	5.56	0.00	30.34	0.06
	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
2023-2025	**Non-Facility Total Emissions**							**12.28**	**7.41**	**7.18**	**0.18**	**294.11**	**8.46**	**0.00**	**46.13**	**0.09**	**11.32**	**6.83**	**6.62**	**0.16**	**271.15**	**7.80**	**0.00**	**42.53**	**0.08**

* Based on 2020 actual fuel usage plus contingency.

** This AQR includes additional drilling days each year for contingency purposes. Number of days included in AQR will not match Form 137.

NOx Emission Reduction 1324.32 lb/hr

Annual Fuel Limit 12,016,345 gallons

AIR EMISSIONS CALCULATIONS

COMPANY	AREA	BLOCK	LEASE	FACILITY	WELL
Chevron U.S.A. Inc.	Mississippi Canyon	608	OCS- G 34902	NA - DP Drillship	A1,A2,A3,A4,B1,B2,B3,B4,C1, C2,C3,C4,RW1,RW2,RW3

Year	Facility Emitted Substance								
	TSP	PM10	PM2.5	SOx	NOx	VOC	Pb	CO	NH3
2023-2025	82.39	49.71	48.22	1.20	1974.00	56.76	0.01	309.62	0.58
Allowable	2264.40			2264.40	2264.40	2264.40		56643.69	

Daily Fuel Usage (gallons)

January	24 Hr Usage
1-Jan-20	11447.70
2-Jan-20	11748.90
3-Jan-20	12620.50
4-Jan-20	12668.10
5-Jan-20	13608.40
6-Jan-20	12285.10
7-Jan-20	11762.10
8-Jan-20	12573.00
9-Jan-20	14778.50
10-Jan-20	12903.10
11-Jan-20	15074.40
12-Jan-20	12668.10
13-Jan-20	12094.90
14-Jan-20	11825.50
15-Jan-20	12995.60
16-Jan-20	11970.70
17-Jan-20	12889.90
18-Jan-20	11957.50
19-Jan-20	12470.00
20-Jan-20	12158.30
21-Jan-20	12615.20
22-Jan-20	11748.90
23-Jan-20	13447.30
24-Jan-20	12974.50
25-Jan-20	13883.10
26-Jan-20	13096.00
27-Jan-20	12657.50
28-Jan-20	12971.80
29-Jan-20	12942.80
30-Jan-20	15201.10
31-Jan-20	10927.40

February	24 Hr Usage
1-Feb-20	14522.30
2-Feb-20	12773.70
3-Feb-20	13019.40
4-Feb-20	12789.60
5-Feb-20	12374.90
6-Feb-20	13331.00
7-Feb-20	12039.40
8-Feb-20	12113.40
9-Feb-20	14662.30
10-Feb-20	10787.40
11-Feb-20	12554.50
12-Feb-20	10325.20
13-Feb-20	13782.70
14-Feb-20	15597.30
15-Feb-20	12779.00
16-Feb-20	11717.20
17-Feb-20	13370.70
18-Feb-20	12316.80
19-Feb-20	12417.10
20-Feb-20	22335.50
21-Feb-20	25655.70
22-Feb-20	7332.50
23-Feb-20	10483.60
24-Feb-20	9855.00
25-Feb-20	8890.90
26-Feb-20	11310.40
27-Feb-20	12023.60
28-Feb-20	1210.70
29-Feb-20	10301.40

March	24 Hr Usage
1-Mar-20	8547.50
2-Mar-20	9313.50
3-Mar-20	9981.80
4-Mar-20	13349.50
5-Mar-20	14628.00
6-Mar-20	12303.50
7-Mar-20	10687.00
8-Mar-20	13093.30
9-Mar-20	17451.60
10-Mar-20	23949.40
11-Mar-20	12992.90
12-Mar-20	15053.20
13-Mar-20	14083.80
14-Mar-20	13809.10
15-Mar-20	13043.10
16-Mar-20	13405.00
17-Mar-20	13288.80
18-Mar-20	12079.00
19-Mar-20	14025.70
20-Mar-20	13994.00
21-Mar-20	12499.00
22-Mar-20	11875.60
23-Mar-20	13444.60
24-Mar-20	16904.80
25-Mar-20	16183.70
26-Mar-20	12908.40
27-Mar-20	12649.60
28-Mar-20	12926.90
29-Mar-20	14847.20
30-Mar-20	15597.30
31-Mar-20	17552.00

April	24 Hr Usage
1-Apr-20	14366.50
2-Apr-20	13806.50
3-Apr-20	11265.50
4-Apr-20	14709.80
5-Apr-20	13706.10
6-Apr-20	13487.00
7-Apr-20	14075.90
8-Apr-20	11701.30
9-Apr-20	13135.60
10-Apr-20	15816.60
11-Apr-20	14300.40
12-Apr-20	15602.60
13-Apr-20	15792.80
14-Apr-20	16878.40
15-Apr-20	13196.30
16-Apr-20	14514.40
17-Apr-20	10348.90
18-Apr-20	11117.60
19-Apr-20	12911.10
20-Apr-20	14678.10
21-Apr-20	10354.20
22-Apr-20	15584.10
23-Apr-20	13920.10
24-Apr-20	13801.20
25-Apr-20	18421.00
26-Apr-20	14715.10
27-Apr-20	9440.30
28-Apr-20	19794.50
29-Apr-20	11585.10
30-Apr-20	15050.60

May	24 Hr Usage
1-May-20	11965.50
2-May-20	13838.20
3-May-20	10467.80
4-May-20	14469.10
5-May-20	13093.30
6-May-20	10108.60
7-May-20	12636.40
8-May-20	13502.70
9-May-20	14981.90
10-May-20	15507.50
11-May-20	11917.90
12-May-20	16196.90
13-May-20	17158.40
14-May-20	12953.30
15-May-20	10993.40
16-May-20	17721.00
17-May-20	13951.80
18-May-20	11357.90
19-May-20	11622.10
20-May-20	14865.70
21-May-20	14448.30
22-May-20	15209.10
23-May-20	15071.70
24-May-20	14947.60
25-May-20	12971.80
26-May-20	11381.70
27-May-20	12409.20
28-May-20	14403.40
29-May-20	15787.50
30-May-20	15436.20
31-May-20	13943.80

June	24 Hr Usage
1-Jun-20	13022.00
2-Jun-20	12290.30
3-Jun-20	13016.70
4-Jun-20	14437.80
5-Jun-20	22023.80
6-Jun-20	25510.40
7-Jun-20	14725.70
8-Jun-20	21717.40
9-Jun-20	12874.10
10-Jun-20	14340.10
11-Jun-20	14205.30
12-Jun-20	15061.10
13-Jun-20	14123.50
14-Jun-20	15219.60
15-Jun-20	35093.40
16-Jun-20	9445.60
17-Jun-20	10253.80
18-Jun-20	8325.60
19-Jun-20	7557.00
20-Jun-20	8275.40
21-Jun-20	6143.80
22-Jun-20	7535.90
23-Jun-20	7932.10
24-Jun-20	7308.70
25-Jun-20	7472.50
26-Jun-20	6162.30
27-Jun-20	7263.80
28-Jun-20	7258.50
29-Jun-20	7409.10
30-Jun-20	7710.20

July	24 Hr Usage
1-Jul-20	5436.00
2-Jul-20	7979.60
3-Jul-20	7189.80
4-Jul-20	7454.00
5-Jul-20	6658.90
6-Jul-20	10132.30
7-Jul-20	7158.10
8-Jul-20	7691.70
9-Jul-20	6994.40
10-Jul-20	8117.00
11-Jul-20	7332.50
12-Jul-20	9339.90
13-Jul-20	11109.60
14-Jul-20	7535.90
15-Jul-20	7448.70
16-Jul-20	8093.20
17-Jul-20	7361.50
18-Jul-20	7604.50
19-Jul-20	7443.40
20-Jul-20	9120.70
21-Jul-20	7897.70
22-Jul-20	7908.30
23-Jul-20	7644.20
24-Jul-20	7887.20
25-Jul-20	7686.40
26-Jul-20	7440.80
27-Jul-20	6938.90
28-Jul-20	8135.50
29-Jul-20	32879.90
30-Jul-20	10039.90
31-Jul-20	10306.70

August	24 Hr Usage
1-Aug-20	8711.30
2-Aug-20	10409.70
3-Aug-20	10050.50
4-Aug-20	10647.40
5-Aug-20	12174.10
6-Aug-20	10356.90
7-Aug-20	12995.60
8-Aug-20	11148.00
9-Aug-20	12231.10
10-Aug-20	13208.50
11-Aug-20	12944.30
12-Aug-20	12257.50
13-Aug-20	12785.80
14-Aug-20	13261.30
15-Aug-20	14106.70
16-Aug-20	13261.30
17-Aug-20	12336.70
18-Aug-20	11015.90
19-Aug-20	12204.70
20-Aug-20	12917.90
21-Aug-20	11782.00
22-Aug-20	22322.40
23-Aug-20	17329.60
24-Aug-20	11808.40
25-Aug-20	13499.10
26-Aug-20	16642.70
27-Aug-20	23247.00
28-Aug-20	14397.30
29-Aug-20	13499.10
30-Aug-20	14080.00
31-Aug-20	13261.30

September	24 Hr Usage	October	24 Hr Usage	November	24 Hr Usage	December	24 Hr Usage
1-Sep-20	14476.60	1-Oct-20	14265.20	1-Nov-20	10936.60	1-Dec-20	9906.40
2-Sep-20	13842.50	2-Oct-20	16220.00	2-Nov-20	10963.10	2-Dec-20	14159.50
3-Sep-20	14661.00	3-Oct-20	16563.50	3-Nov-20	12363.20	3-Dec-20	9932.90
4-Sep-20	12944.90	4-Oct-20	18016.40	4-Nov-20	13816.10	4-Dec-20	13182.10
5-Sep-20	13261.30	5-Oct-20	15136.90	5-Nov-20	13974.60	5-Dec-20	14925.60
6-Sep-20	12336.70	6-Oct-20	22877.10	6-Nov-20	12574.50	6-Dec-20	15797.40
7-Sep-20	13208.50	7-Oct-20	11834.80	7-Nov-20	13287.80	7-Dec-20	12706.60
8-Sep-20	16880.50	8-Oct-20	27922.80	8-Nov-20	12812.20	8-Dec-20	11148.00
9-Sep-20	17593.70	9-Oct-20	10883.70	9-Nov-20	18042.80	9-Dec-20	12151.80
10-Sep-20	17593.70	10-Oct-20	15401.10	10-Nov-20	12468.80	10-Dec-20	18280.60
11-Sep-20	17408.80	11-Oct-20	12099.00	11-Nov-20	9932.80	11-Dec-20	18174.90
12-Sep-20	12970.70	12-Oct-20	12310.30	12-Nov-20	11597.10	12-Dec-20	11782.00
13-Sep-20	19231.60	13-Oct-20	12759.40	13-Nov-20	15691.70	13-Dec-20	15480.40
14-Sep-20	14133.10	14-Oct-20	13419.80	14-Nov-20	13208.50	14-Dec-20	12099.00
15-Sep-20	14635.00	15-Oct-20	12759.40	15-Nov-20	9853.50	15-Dec-20	13261.30
16-Sep-20	14555.80	16-Oct-20	11861.20	16-Nov-20	12838.70	16-Dec-20	13446.30
17-Sep-20	13895.30	17-Oct-20	12838.80	17-Nov-20	14344.40	17-Dec-20	11966.90
18-Sep-20	18016.40	18-Oct-20	14185.90	18-Nov-20	13182.10	18-Dec-20	14344.40
19-Sep-20	16008.70	19-Oct-20	12363.20	19-Nov-20	13050.00	19-Dec-20	13974.60
20-Sep-20	14001.00	20-Oct-20	14740.70	20-Nov-20	12495.20	20-Dec-20	10698.90
21-Sep-20	16959.70	21-Oct-20	14133.10	21-Nov-20	13604.80	21-Dec-20	13974.60
22-Sep-20	19839.20	22-Oct-20	16008.70	22-Nov-20	10381.90	22-Dec-20	11068.70
23-Sep-20	17329.60	23-Oct-20	17356.00	23-Nov-20	12733.00	23-Dec-20	13816.10
24-Sep-20	14080.30	24-Oct-20	15718.10	24-Nov-20	13340.40	24-Dec-20	17223.90
25-Sep-20	14106.70	25-Oct-20	13895.30	25-Nov-20	14846.30	25-Dec-20	10778.10
26-Sep-20	16140.80	26-Oct-20	13367.00	26-Nov-20	13050.00	26-Dec-20	15242.60
27-Sep-20	12310.30	27-Oct-20	35345.90	27-Nov-20	10091.30	27-Dec-20	12891.50
28-Sep-20	12706.60	28-Oct-20	15242.60	28-Nov-20	20420.30	28-Dec-20	13023.60
29-Sep-20	14159.50	29-Oct-20	14529.40	29-Nov-20	13578.30	29-Dec-20	12627.30
30-Sep-20	13208.50	30-Oct-20	9880.00	30-Nov-20	13419.80	30-Dec-20	12812.20
		31-Oct-20	10963.10			31-Dec-20	13878.00

Fuel Usage: DS-18 2020
Table Summary

Month	gal/mth	avg gal/day
Jan-20	394965.90	12740.84
Feb-20	362673.20	12505.97
Mar-20	426468.80	13757.06
Apr-20	418077.60	13935.92
May-20	425319.70	13719.99
Jun-20	373715.50	12457.18
Jul-20	271967.20	8773.14
Aug-20	410894.10	13254.65
Sep-20	452497.00	15083.23
Oct-20	474898.40	15319.30
Nov-20	392899.80	13096.66
Dec-20	414756.20	13379.23
	Average	**13168.60**
	MAX	**15319.30**

SECTION H OIL SPILLS INFORMATION

(a) OIL SPILL RESPONSE PLANNING

REGIONAL OSRP INFORMATION

All the proposed activities in this plan will be covered by Chevron's Gulf of Mexico Regional Oil Spill Response Plan (OSRP), approved by BSEE on March 22, 2016; biennial review was deemed in compliance with 30 CFR 254 by BSEE on March 23, 2021. A revised OSRP was submitted in December 2022. Companies covered under this OSRP: Chevron Corporation (02335), Chevron U.S.A. Inc. (00078), Chevron Pipe Line Company (00400), Sabine Pipe Line Company Inc. (00835), Union Oil Company of California (00003), Unocal Pipeline Company (01113), PRS Offshore, L.P. (01767), and Noble Energy Inc. (02237).

SPILL RESPONSE SITES

In the table below, information is provided concerning the location of the primary spill response equipment and the location of the planned staging area(s) that would be used should an oil spill occur resulting from activities proposed in this plan.

Primary Response Equipment Locations	Preplanned Staging Location(s)
Ingleside, Galveston, and Port Arthur, TX; Lake Charles, Morgan City, Houma, Port Fourchon, Leeville, Venice, Fort Jackson, Harvey, Belle Chasse, and Baton Rouge, LA; Pascagoula, MS; Theodore, AL; Tampa, Miami, and Jacksonville, FL.	Ingleside, TX; Port Fourchon and Galliano, LA; Theodore, AL.

OIL SPILL REMOVAL ORGANIZATION (OSRO) INFORMATION

Clean Gulf Associates (CGA) and Marine Spill Response Corporation (MSRC) cooperatives are the primary surface response equipment providers for Chevron in the Gulf of Mexico Region. CGA & MSRC each maintain a dedicated fleet of vessels and other equipment strategically positioned along the Gulf Coast. CGA & MSRC each maintain a network trained Oil Spill Removal Organizations (OSROs) deploy and operate their equipment. CGA & MSRC have the capability to plan the mobilization and rapid deployment of spill response resources on a 24-hour, 7 days a week basis, year round.

Marine Well Containment Company (MWCC) is the primary subsea containment service provider for Chevron. MWCC equipment is available on a 24-hour, 7 days a week basis, year round.

Chevron's primary staging areas, marine transportation facilities and helicopter bases are located in Port Fourchon and Galliano, Louisiana. Chevron also can contract for additional staging areas throughout Gulf of Mexico coastal ports.

Chevron's primary command post for an oil spill is located in Covington, LA; however, Chevron has the ability to set up and effectively manage spills at Chevron facilities located in Houma and Lafayette, LA and Houston, TX. Chevron can also contract additional command posts facilities as necessary throughout Gulf Coast region.

WORST CASE DISCHARGE COMPARISON TABLE

The table below provides a comparison of the worst-case scenario from Chevron's Regional OSRP with the worst-case scenario from the proposed activities in this plan.

The Regional OSRP calculations and assumptions used to calculate the WCD volume from a blowout in accordance with NTL No. 2015-N01 was approved May 12, 2016 by the BOEM in Exploration Plan N-09930, Mississippi Canyon Blocks 122 and 166, OCS-G 34424 and 35318.

Category	Regional OSRP "Drilling > 10 miles" Worst-Case Discharge Scenario	EP
Type of Activity *(Types of activities include pipeline, platform, caisson, subsea completion or manifold, and mobile drilling rig)*	Exploratory Drilling	Exploratory Drilling
Facility Location (area/block)	Mississippi Canyon Block 122	Mississippi Canyon Block 608
Facility Designation *(e.g., Well No. 2, Platform JA, Pipeline Segment No. 6373)*	MC 122 "AA"	MC 608 "A1"
Distance to Nearest Shoreline	46 miles	68 miles
Volume Uncontrolled blowout (volume per day)	465,709 barrels	465,144 barrels
Type of Oil(s) - *(crude oil, condensate, diesel)*	Crude Oil	Crude Oil
Gravity(s) □API - *(Provide API gravity of all oils given under "Type of Oil(s)" above. Estimate for EP's)*	38.2 °	37.0°

Chevron has the capability to respond to the appropriate worst-case spill scenario included in its Regional OSRP. The worst-case scenario determined for this EP does not replace the appropriate worst-case scenario in our Regional OSRP. Therefore, Chevron hereby certifies that Chevron 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 Chevron's Plan.[1]

(b) OIL SPILL RESPONSE DISCUSSION

Given below is a discussion of the response to an oil spill resulting from the activities proposed in this plan. All the applicable information described in 30 CFR 254.26(b), (c), (d), and (e) is included.

Oil spill response-related activities for facilities included in this document are governed by the Chevron regional Gulf of Mexico Oil Spill Response Plan (OSRP). This OSRP meets all requirements contained in 30 CFR 250. The Chevron regional Gulf of Mexico OSRP was

[1] This certification is provided as required by NTL No. 2008-G04 at page 19.

approved by BSEE on March 22, 2016; biennial review was deemed in compliance with 30 CFR 254 by BSEE on March 23, 2021. The OSRP was last revised in December 2022. The Chevron regional Gulf of Mexico OSRP encompasses all facilities operated by Chevron U.S.A. Inc. and, herein, the jurisdiction of the BOEM and BSEE.

Upon notification of a major oil release from a Chevron facility or operation in the Gulf of Mexico, Chevron response personnel will make the initial notifications to all involved government agencies, Oil Spill Response Organizations (OSROs), and associated support services.

Chevron has a contract in effect with MWCC, MSRC and CGA, as well as other OSROs, to ensure availability of personnel, services, and equipment on a 24-hour-per-day basis. The OSROs can provide personnel, equipment, and materials in sufficient quantities and recovery capacity to respond effectively to oil spills from the facilities and leases covered by this plan, including the Worst Case Discharge scenarios. OSROs under contract with Chevron have oil spill response equipment located throughout the Gulf Coast area. Much of the equipment is in road-ready condition and is available to be transported on short notice to the nearest predetermined staging areas(s). The "road-ready condition" provides the shortest reasonable response times for transporting equipment to the staging areas.

These assets are listed in the Chevron Oil Spill Response Plan.

Trajectory Analysis
Land areas that could potentially be impacted by an oil spill were determined using the BOEM Oil Spill Risk Analysis Model (OSRAM) trajectory results. The OSRAM estimates the probability that oil spills from designated locations would contact shoreline and offshore natural resources. These probabilities indicate, in terms of percentage, the chance that an oil spill occurring in a particular launch area will contact a certain county or parish within 3, 10, and 30 days. OCS Launch Area C059 was used as the point of origin for Mississippi Canyon Block 608. Land segments identified by the model are listed below:

County Parish	Conditional Probability[a] of Contact (%)		
	3 Days	10 Days	30 Days
C13 Cameron LA	-	-	1
C14 Vermillion LA	-	-	1
C17 Terrebonne LA	-	-	2
C18 Lafourche LA	-	1	2
C19 Jefferson LA	-	-	1
C20 Plaquemines LA	-	5	11
C21 St. Bernard LA	-	-	2
C29 Walton FL	-	-	1
C30 Bay FL	-	-	1

[a] Conditional probability refers to the probability of contact within the stated time period, assuming that a spill has occurred (- indicates $<$0.5%).

Resource Identification
Resources of special economic or environmental importance found in land segments identified in the above paragraph can be found in the NOAA ESI Coastal Sensitivity Atlas (Maps). These maps can be accessed through NOAA and will be used during any spill occurring from the locations listed in this document.

Additionally, information on environmental sensitivities is contained in the Coast Guard Area Contingency Plans listed below. These plans will be accessed and followed during an oil spill that threatens the Gulf of Mexico shoreline.

- Corpus Christi, TX Area Contingency Plan
- Port Arthur, TX Area Contingency Plan
- Houston-Galveston, TX Area Contingency Plan
- Southeast Louisiana Area Contingency Plan
- Sector New Orleans, LA Area Contingency Plan
- Mobile, AL Area Contingency Plan
- St. Petersburg, FL Area Contingency Plan

Response Discussion

Chevron maintains numerous resources, equipment and expertise to respond to an oil spill in the Gulf of Mexico. Chevron has oil spill response service contracts with both local and international companies and cooperatives and has a large corps of dedicated Chevron emergency responders that can work in the Gulf of Mexico. Chevron has contracts with the following oil spill response service providers.

Oil Spill Removal Organizations (OSRO). These companies have on-hand shoreline protection and cleanup equipment to respond to a spill in the Gulf of Mexico.

- OMI LLC
- Clean Gulf Associates Services
- U.S. Environmental Services
- ES&H Consulting
- American Pollution Control
- T&T Marine
- Oil Spill Response (OSRL)

Oil Spill Cooperatives (OSC). OSCs have equipment pre-staged in the Gulf of Mexico, including Lake Charles, Intracoastal City, Houma, Fort Jackson and Venice, Louisiana; Galveston, Texas; and Pascagoula, Mississippi. OSCs provide resources to respond to offshore incidents including areas identified in this plan.

- Clean Gulf Associates (CGA) – This major cooperative is strictly dedicated to Gulf of Mexico oil and gas developers and producers.
- Marine Spill Response Corporation (MSRC) – This national cooperative has extensive dedicated offshore resources located in the Gulf of Mexico

Well Control Emergency Response Companies

- Wild Well Control Inc.
- Boots & Coots
- IWC Services, Inc.

Oil Spill Management and Response Consultants

- The Response Group (TRG)

Chemical Dispersant Companies (capable of delivering air and vessel dispersants)

- Airborne Support, Inc
- MSRC
- CCA
- OSRL

Chevron will use a layered approach to respond to a worst case discharge from the area by conducting simultaneous response operations at the **well site**, in the **offshore environment** and in **nearshore and shoreline areas**. Plans will be implemented, resources deployed and response operations established within these environmental areas to accomplish the following objectives:

- Provide for the safety of responders and the general public
- Intervene at the well site to stop the flow of oil
- Minimize the spread of oil at the surface
- Minimize encroachment to the coastline environment
- Protect coastal and natural resources

Upon notification of a worst case discharge oil spill at the locations listed in this plan, Chevron will mobilize resources listed in the attached enclosures. This information comes directly from the Chevron regional Gulf of Mexico Oil Spill Response Plan and applies to a worst case discharge volume of 465,709 barrels per day that could occur at a Chevron facility located in Mississippi Canyon Block 122. These same assets would be mobilized to all sites contained in this plan.

- Aerial Surveillance Equipment
- Offshore Recovery Equipment
- Nearshore Recovery Equipment
- In-Situ Burn Equipment
- Aerial Dispersant Equipment
- Shoreline Protection Equipment
- Offshore Storage Equipment

Chevron will also take the following general actions to mobilize and coordinate response operations:

- Set up and staff its command center in Covington, LA
- Set up a source control group in Houston, TX or Covington, LA
- Mobilize well site resources to cap, contain and disperse oil at the well head
- Mobilize assets to drill relief wells
- Mobilize assets to contain and collect surface oil at the well site and in the offshore environment
- Mobilize assets to disperse and burn surface oil at the well site and in the offshore environment
- Establish a deepwater staging area from a LA port or location
- Deploy assets to track the movement of oil on the surface

Follow up actions will include the following:

- Locate, monitor, track and project the movement of the oil spill
- Mobilize nearshore skimming and booming vessels, barges and systems to shorebase locations for rapid deployment in the nearshore environment
- Mobilize oil spill removal organization (OSRO) resources and assets to staging areas for rapid deployment of shoreline protection resources

- Mobilize wildlife protection and rehabilitation resources to staging areas for rapid deployment of resources
- Determine Incident Command Post (ICP) locations based on intervention operations and results and surface oil spill trajectories
- Determine ICP Operations Branch locations based on intervention operations and results and surface oil spill trajectories
- Determine additional staging areas based on the spill trajectory

Spill Response Resources and Deployment Time

Offshore Response: Offshore response operations will integrate simultaneous containment booming, mechanical recovery, aerial dispersants and in-situ burning. Response objectives within the offshore layer are to:

- Provide for the safety of responders and the general public
- Minimize wide-scale spread of oil
- Minimize encroachment to coastline environment

The strategy for offshore response will be to:

- Station mechanical recovery vessels and barges that are outfitted with ocean boom systems closest to the source to contain and collect as much oil as possible.
- Station mechanical recovery vessels and barges that deploy skimming systems on vessels of opportunity close to the source to rapidly contain and collect oil that strays from the main oil slick.
- Station in-situ burn assets close to the source to burn as much oil as possible.
- Aerially disperse oil that cannot be mechanically recovered.

Simultaneous implementation of these strategies is designed to effectively contain and recover an oil spill significantly offshore in order to minimize the potential impacts to public health, wildlife and the environment. Separate and distinct resources will be assigned for each operation. Based on the anticipated worst case discharge scenario, Chevron 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 24 hours.

The following sections provide more information on each operation needed to contain a worst case discharge to the maximum extent possible.

(1) Mechanical Recovery and Slick Containment. Offshore skimming and booming vessels, barges and systems will be deployed to the source of the spill and stationed in the thickest parts of the spill to enhance the encounter rate, collect and contain the oil. VHF radio communications will be established between skimming vessels and barges and spotter aircraft and surveillance systems to direct vessels to coordinates of thickest oil to maximize the effectiveness and efficiency of on-water recovery resources. Vessels operating in oil will relay spill characteristics (thickness, trajectory) to the Forward Operating Branch and Incident Command Post in order to station additional vessels and barges that are equipped with night-sensing systems in areas of recoverable oil prior to nightfall. This will again maximize the oil recovery encounter rate. MSRC Responder Class vessels, the CGA Hoss barge, Production Support Vessels, Dual Purpose Vessels and vessels of opportunity outfitted with KOSEQ

skimming systems will deploy J-boom or U-boom configurations that will maximize containment of oil to collect using skimmers. These vessels will work in tandem to cover as large of a geographic area as possible at the location of the surface spill where oil is thickest.

Vessels deployed with MSRC and CGA Fast Response Units and CGA Fast Response Vessels will be stationed to collect oil that moves past the front line mechanical assets. These units will deploy a J-boom configuration because it only requires one support vessel. Oil that escapes the above assets and moves shoreward will be collected by vessels of opportunity that deploy sorbent boom, collection nets or other types of equipment that absorbs surface oil. These assets will be deployed as task forces that can rapidly respond to light oil.

(2) In-Situ Burning. Offshore in-situ burn assets will be deployed as primary response resources for all locations within federal waters. Vessels of opportunity that can operate near the spill site will be used to deploy fire boom and trained in-situ burn responders. Fire boom will be configured in a “U” shape or similar to the NOFI Ocean Buster design.

(3) Aerial Dispersants. Aerial dispersants will be deployed as primary response resources for all locations that fall within the FOSC pre-approval process. Dispersant aircraft that arrive on-scene before mechanical recovery or in-situ burn resources will apply dispersants to areas until relieved by a different asset.

Vessel radar systems and infrared cameras will be used to detect and mechanically collect oil at night. This will allow surveillance operations to continue both day and night and through inclement weather. These systems also will be used to track the movement of oil which will assist with shoreline response planning.

Louisiana, Texas, and Florida resources potentially at risk may include but are not limited to the following: marine sensitivities, beaches, waterfowl, shoreline resources, marshes, marinas/piers, populated areas, and environmental sensitivities

The BOEM oil spill trajectory model indicates that Louisiana parishes and Texas and Florida counties could be impacted by an oil spill from areas listed in this plan. These areas are dominated by fine sand beaches, coarse sand beaches, swamps and salt water marshes. The four subsections below summarize potential concerns with each environment. This information is taken from various Coast Guard Area Contingency Plans.

Fine Sand Beach Environment

- Sensitivity: Fine sand beaches have a low sensitivity to oil spill impacts and cleanup methods.
- Oil Behavior: Oil typically stains and covers the beach sands with low permeability.
- Cleanup: The penetration is low to moderate depending on the water table and the position of the oiling on the shoreline. A potential environmental issue during beach cleanup is the protection of the dune habitat from the cleanup operations. Fine sand beaches typically have poor access, but good transportation ability. Fine sand beaches are relatively easier to clean in contrast to marshes. Large volumes of stained sand and debris can be generated by beach cleanup.

Coarse Sand Beach Environment

- Sensitivity: The environmental sensitivity of coarse sand beaches is low due to the limited animal and vegetation population.

- Oil Behavior: Spilled oil typically stains and coats coarse grain beach sands with moderate to high permeability.
- Cleanup: Sediment penetration on coarse grain beaches is moderate/high depending on the water table and the location of oil deposition. A potential environmental issue is the protection of the dune habitat from cleanup operations. The transit ability of this shoreline type is less than fine sand beaches because the bearing strength is lower, and this type of sand builds steep beach faces. Access is typically poor.

Swamp Environment

- Sensitivity: The environmental sensitivity is high for swamps because of the presence of wetland habitat.
- Oil Behavior: Oil usually coats and covers the sediment and vegetation with low sediment penetration.
- Cleanup: The sediment penetration potential is low due to the high water table and the water content of the sediments. A potential environmental issue is that the cleanup may be more damaging than the oil itself. The access to swamps is poor due to the soft sediment and the presence of dense tree growth.

Salt Marsh Environment

- Sensitivity: The environmental sensitivity is high for salt marsh because of the presence of wetland habitat.
- Oil Behavior: Oil usually coats and covers the sediment and vegetation with low sediment penetration.
- Cleanup: The sediment penetration potential is low/moderate due to the high water table and water content of the sediment. A potential environmental issue is that the cleanup may be more damaging than the oil itself. Access is typically poor in Louisiana.

The protection of waterfowl and wildlife during the course of an oil release is an essential element in every spill response operation. Federal and state natural resource trustees will be notified in the event that a wildlife habitat may be affected by a spill event. Information concerning methods to protect waterfowl and wildlife are contained in the Chevron OSRP. For fish and wildlife resources, the emphasis is on habitats where:

- Large numbers of animals are concentrated in small areas, such as bays where waterfowl concentrate during migration or for overwintering
- Early life stages are present in somewhat restricted areas or in shallow water, such as anadromous fish streams and turtle nesting beaches
- Habitats are extremely important to specific life stages or migration patterns such as foraging or overwintering
- Specific areas are vital sources for seed or propagation
- The species are on Federal or state threatened or endangered lists
- A significant percentage of the population is likely to be exposed to oil

Human-use resources of concern are listed in the Chevron OSRP. Areas of economic importance, like waterfront hotels, should also be considered when establishing resource protection priorities. Human-use resources are most sensitive when:

- Archaeological and cultural sites are located in the intertidal zones
- Oiling can result in potential significant commercial losses through fouling, tainting, or avoidance because of public perception of a problem
- The resource is unique, such as a historical site

- Oiling can result in potential human health concerns, such as tainting of water intakes and/or subsistence fisheries

Response Capability
Chevron is a member of both Clean Gulf Associates (CGA) and Marine Spill Response Corporation (MSRC) cooperatives. CGA & MSRC are the primary surface response equipment providers for Chevron in the Gulf of Mexico Region. CGA & MSRC each maintain a dedicated fleet of vessels and other equipment strategically positioned along the Gulf Coast. CGA & MSRC each maintain a network of trained Oil Spill Removal Organizations (OSROs) deploy and operate their equipment. CGA & MSRC have the capability to plan the mobilization and rapid deployment of spill response resources on a 24-hour, 7 days a week basis, year-round.

Chevron maintains service contracts with several private OSROs including American Pollution Control Corporation (AmPol), U.S. Environmental Services (USES), OMIES, ES&H Environmental Services and Airborne Support Inc.

Chevron's Aviation Group operates and maintains a private fleet of helicopters servicing our operation in the Gulf of Mexico. Chevron helicopters provide aerial surveillance.

Marine Well Containment Company (MWCC) is the designated subsea containment service provider for Chevron. MWCC equipment is available on a 24-hour, 7 days a week basis, year-round. MWCC equipment locations are Ingleside, TX and Theodore, AL.

Chevron's primary staging areas are located in Fourchon and Galliano, Louisiana. Chevron has the capability to contract for additional staging areas throughout Gulf of Mexico coastal ports.

Chevron's primary command post for an oil spill is located in Covington, LA; however, Chevron has the ability to set up and effectively manage spills at Chevron facilities located in Houma and Lafayette, LA and Houston, TX. Chevron has the capability to contract for additional command posts facilities as necessary throughout Gulf Coast region.

Estimated Initial Equipment Response Times

Capability	Equipment[1]	ETA	Source
Aerial Surveillance	Manned Aircraft (Helicopters and Fixed-wing)	~1 to 2 hours	Chevron Aviation (Galliano, LA & Picayune, MS)
On-water Containment, Skimming, & Storage	Response Vessels (w/ boom, skimmer and storage and surveillance technology)	~10 to 14 hours	CGA & MSRC: Venice, Fort Jackson, Harvey, Belle Chasse, Fourchon
Aerial Dispersant	Spotter and Spray aircraft	~4 to 6 hours	MSRC (Stennis) and/or CGA Airborne Support (Houma)
In-Situ Burn	Vessels, Boom and support equipment	~12 to 24 hours	CGA (Harvey) & MSRC (Fort Jackson)
Sub-sea Surveillance	Remote Operated Vehicles (ROVs)	~18 to 24 hours	Chouest Offshore (Fourchon)
Additional resources will continue to be deployed over subsequent days, weeks, and/or months as necessary			

([1]This includes supervisors and response technicians trained to operate all equipment listed.)

Response Technology
Chevron, through our cooperative response organizations (Clean Gulf Associates (CGA) and Marine Spill Response Corporation (MSRC)), we have developed high-tech surveillance capabilities with the primary objective of positioning on-water assets in the thickest parts of the spill by detection and classification of potential oil targets as recoverable, tracking moving oil, and expanding the operating window of skimming operations to low-light conditions.

This technology includes high-definition (HD) cameras, optical and thermal infrared imaging systems, and X-band radar oil detection. These systems are integrated into an electronic chart system that provides an exact geographic position and can project the image onto the electronic map for oil spill recovery.

This capability can be leveraged across the response zones and enables the on-water recovery task force strategy where multiple skimming vessels may be directed by a command and control vessel.

The above information is taken from the Chevron GOM Regional Oil Spill Response Plan (OSRP), submitted to BSEE in accordance with 30 CFR 254.

Suitability of Resources
All response equipment, materials, support vessels and strategies listed in this document and in the Chevron regional Gulf of Mexico Oil Spill Response Plan have proven suitable for the many environmental conditions existing at the locations listed in this plan. Chevron additionally conducts annual oil spill response training, drills and exercises and validates the content of the Oil Spill Response Plan. The Chevron regional Gulf of Mexico Oil Spill Response Plan is maintained by the Chevron Greater Gulf of Mexico Emergency Management Coordinator.

SECTION I ENVIRONMENTAL MONITORING INFORMATION

(a) MONITORING SYSTEMS

Moon Pool Monitoring and Reporting Operations

Chevron will document visual observation of the moon pool to confirm whether sea turtles or marine mammals are present. A log of observations will be maintained, including Vessel Identification, Vessel Location (Area, Block), Date of Observation, Time of Observation, Sea Turtle/Marine Mammal Observed, Type of Activity Occurring in Moonpool, Initials of Observer.

If sea turtle or marine mammals are observed in the moon pool, BSEE and NMFS will be contacted for additional guidance.

Moon Pool Requirements Before Transit

Document that the observation was made prior to closure of the hull door and no animals were present.

(b) INCIDENTAL TAKES

Chevron does not expect any “takes” of protected species as a result of the operations proposed under this Plan.

Chevron 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 Endangered Species Act (ESA) as a result of the operations conducted herein:

- 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” (Note: there are no seismic surveys proposed in this Plan)
- NTL No. 2015-BSEE-G03, “Marine Trash and Debris Awareness and Elimination”
- “Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico, Appendices to the Programmatic Biological Opinion on the Gulf of Mexico Oil and Gas Program”, Appendices A, B, C, and J

(c) FLOWER GARDEN BANKS NATIONAL MARINE SANCTUARY

No activities proposed in this plan will be conducted within the Protective Zones of the Flower Garden Banks and Stetson Bank.

SECTION J LEASE STIPULATIONS INFORMATION

Lease OCS-G 34902 has Stipulation Number 4- Protected Species assigned.

Stipulation Number 4, Protected Species:
The Endangered Species Act (16 U.S.C. 1531-1544) and the Marine Mammal Protection Act (MMPA) (16 U.S.C. 1361-1423h) are designed to protect threatened and endangered species and marine mammals and apply to activities on the Outer Continental Shelf (OCS). The OCS Lands Act (43 U.S.C. 1331-1356a) provides that the OCS should be made available for expeditious and orderly development subject to environmental safeguards, in a manner which is consistent with the maintenance of competition and other national needs (see 43 U.S.C. 1332).

Chevron will follow all guidelines:

1) Collect and remove flotsam resulting from activities related to exploration, development, and production of this lease;
2) 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;
3) 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;
4) 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; (Note: there are no seismic surveys proposed in this Plan)
5) 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
6) 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 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. Chevron and its operators, personnel, and subcontractors, while undertaking activities authorized under these leases, will implement and comply with the specific mitigation measures outlined in BOEM NTL No. 2016-G01 (Vessel Strike Avoidance and Injured/Dead Protected Species Reporting), BOEM NTL No. 2016-G02 (Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program) (Note: there are no seismic surveys proposed in this Plan) and BSEE NTL No. 2015-G03 (Marine Trash and Debris Awareness and Elimination). Chevron, 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 these leases, including, but not limited to, new or updated versions of the NTLs identified in this paragraph. Chevron 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 plans or permits.

SECTION K ENVIRONMENTAL MITIGATION MEASURES INFORMATION

(a) Measures Taken to Avoid, Minimize, and Mitigate Impacts

This plan does not propose activities for which the state of Florida is an affected state; however, Chevron will adhere to the requirements as set forth in the following documents, as applicable, to avoid or minimize impacts to any of the species listed in the ESA as a result of the operations conducted herein:

- NTL No. 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” (Note: there are no seismic surveys proposed in this Plan)
- NTL No. 2015-BSEE-G03, “Marine Trash and Debris Awareness and Elimination”
- “Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico, Appendices to the Programmatic Biological Opinion on the Gulf of Mexico Oil and Gas Program”, Appendices A, B, C, and J

Entanglement/Entrainment Reduction Measures

Chevron will ensure that all underwater lines will be stiff, taut, and non-looping, and no excess underwater line will be used.

Sea Turtle Resuscitation Guidelines

Chevron will follow the procedures provided under Appendix J. Sea Turtle Handling and Resuscitation Guidelines found in the Biological Opinion issued by the National Marine Fisheries Service on March 13, 2020.

If a turtle becomes trapped in the moon pool, no attempt to remove the turtle will be made without explicit direction to do so from BOEM/BSEE or NMFS.

Appendix J. Sea Turtle Handling and Resuscitation Guidelines

Any sea turtles taken incidentally during the course of fishing or scientific research activities must be handled with due care to prevent injury to live specimens, observed for activity, and returned to the water according to the following procedures:

I. Sea turtles that are actively moving or determined to be dead (as described in paragraph (B)(4) below) must be released over the stern of the boat. In addition, they must be released only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels.

II. Resuscitation must be attempted on sea turtles that are comatose or inactive by:

  i. Placing the turtle on its bottom shell (plastron) so that the turtle is right side up and elevating its hindquarters at least 6 inches (15.2 cm) for a period of 4 to 24 hours. The amount of elevation depends on the size of the turtle; greater elevations are needed for larger turtles. Periodically, rock the turtle gently left to right and right to left by holding the outer edge of the shell (carapace) and lifting one side about 3 inches (7.6 cm) then alternate to the other side. Gently touch the eye and pinch the tail (reflex test) periodically to see if there is a response.

  ii. Sea turtles being resuscitated must be shaded and kept damp or moist but under no circumstance be placed into a container holding water. A water-soaked towel placed over the head, carapace, and flippers is the most effective method in keeping a turtle moist.

iii. Sea turtles that revive and become active must be released over the stern of the boat only when fishing or scientific collection gear is not in use, when the engine gears are in neutral position, and in areas where they are unlikely to be recaptured or injured by vessels. Sea turtles that fail to respond to the reflex test or fail to move within 4 hours (up to 24, if possible) must be returned to the water in the same manner as that for actively moving turtles.

iv. A turtle is determined to be dead if the muscles are stiff (rigor mortis) and/or the flesh has begun to rot; otherwise, the turtle is determined to be comatose or inactive and resuscitation attempts are necessary.

Any sea turtle so taken must not be consumed, sold, landed, offloaded, transshipped, or kept below deck.

These requirements are excerpted from 50 CFR 223.206(d)(1). Failure to follow these procedures is therefore a punishable offense under the Endangered Species Act.

(b) Incidental Takes
Chevron does not expect any "takes" of protected species as a result of the operations proposed under this Plan.

Chevron 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 Endangered Species Act (ESA) as a result of the operations conducted herein:

- 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" (Note: there are no seismic surveys proposed in this Plan)
- NTL No. 2015-BSEE-G03, "Marine Trash and Debris Awareness and Elimination"
- "Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico, Appendices to the Programmatic Biological Opinion on the Gulf of Mexico Oil and Gas Program", Appendices A, B, C, and J

See SECTION E BIOLOGICAL, PHYSICAL, AND SOCIOECONOMIC INFORMATION for a list of Threatened and Endangered Species, Critical Habitat and Marine Mammal Information.

SECTION L SUPPORT VESSELS AND AIRCRAFT INFORMATION

(a) GENERAL
In the table below, information is provided regarding the vessels (e.g., tug boats, anchor-handling vessels, construction barges, lay barges, supply boats, crew boats) and aircraft you will use to support your proposed activities. If specific vessels have not yet been determined, use the maximum capacities, numbers, and trip frequencies for the types of vessels you will use.

Type	Maximum Fuel Tank Storage Capacity	Maximum No. in Area at Any Time	Trip Frequency or Duration
Crew Boat	47,382 gals.	One	Once per week
Supply Boat	303,093 gals.	Two	Every 2 to 3 days
Helicopter	2,800 lbs. / 430 gals.	One	7 trips per week

(b) DIESEL OIL SUPPLY VESSELS
Information on the vessels used to supply diesel oil. Any vessels that will transfer diesel oil you will use for purposes other than fuel.

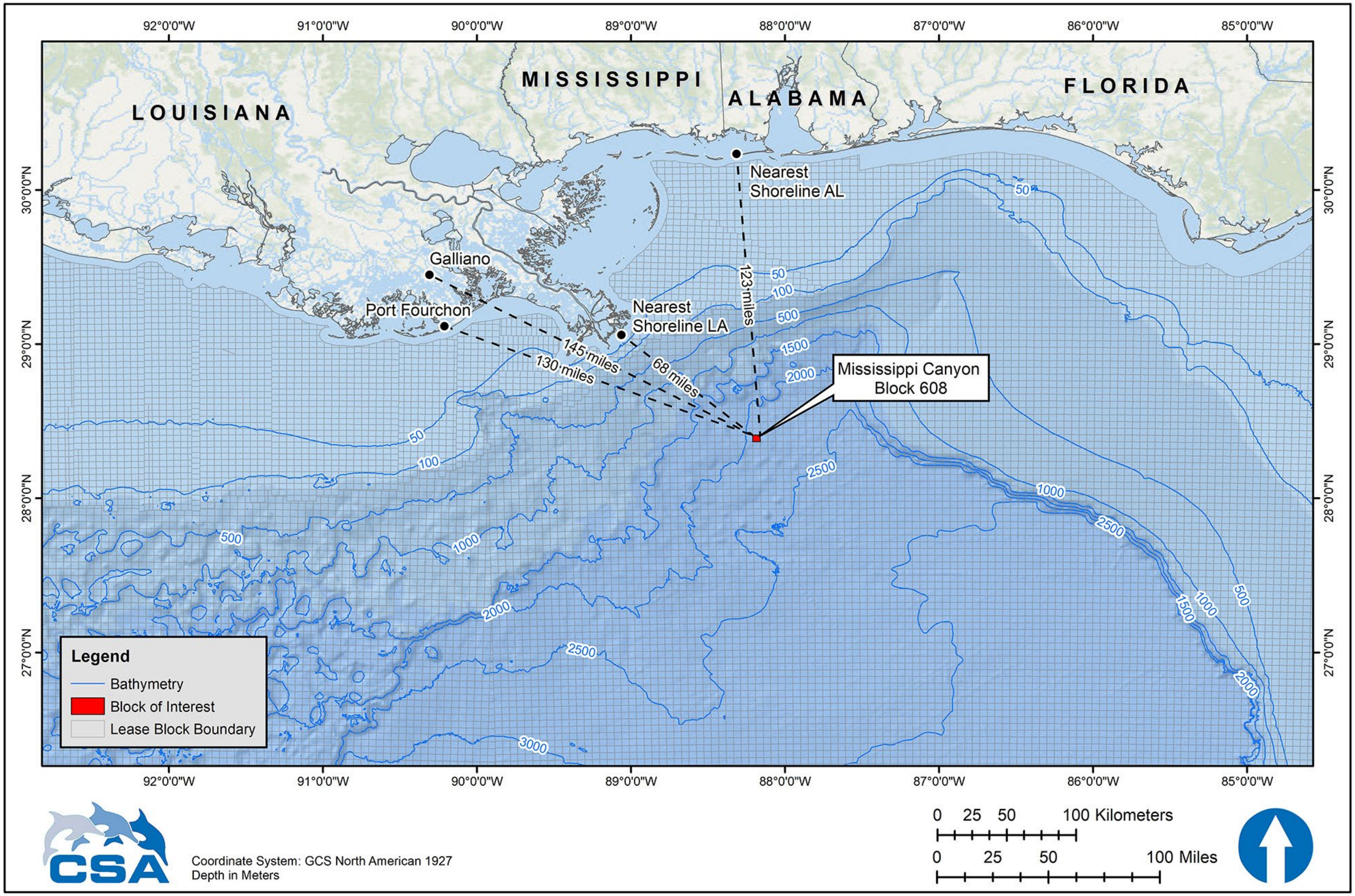
Size of Fuel Supply Vessel	Capacity of Fuel Supply Vessel	Frequency of Fuel Transfers	Route Fuel Supply Vessel Will Take
280 foot	860,000 gals	quarterly	From shore base to block
280 foot	275,000 gals	4-6 weeks	From shore base to block

(d) SOLID AND LIQUID WASTES TRANSPORTATION
Water Quality Spreadsheets replace the Solid and Liquid Wastes Transportation Table.

(e) VICINITY MAP
A map showing the location of the proposed activities relative to the shoreline, the distance of the proposed activities from the shoreline, and the primary route(s) of the support vessels and aircraft you will use when traveling between the onshore support facilities and the drilling unit is provided as attachment L-1 at the end of this section.

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.

ATTACHMENTS TO SECTION L
- **L-1** – Vicinity Map



L-1: Vicinity Map

SECTION M ONSHORE SUPPORT FACILITIES INFORMATION

(a) GENERAL

The table below provides a listing of the onshore facilities that will be used to provide supply and service support for the proposed activities.

Name	Location	Existing/New/Modified
C-Port Shorebase - Port Fourchon	Port Fourchon, Louisiana	Existing
Chevron Galliano Airbase	Galliano, Louisiana	Existing

(b) SUPPORT BASE CONSTRUCTION OR EXPANSION

Chevron will use its existing onshore base facilities located in Port Fourchon and Galliano, Louisiana. The bases have adequate facilities for marine and air transportation to accommodate the activities proposed in this plan. The proposed operations do not require expansion or modifications to the bases.

(d) WASTE DISPOSAL

Water Quality Spreadsheets replace the Waste Disposal Table.

SECTION N COASTAL ZONE MANAGEMENT ACT (CZMA) INFORMATION

(a) CONSISTENCY CERTIFICATION

Coastal Zone Management Act consistency certifications are attached at the end of this section as **N-1** for the State of Louisiana and **N-2** for the State of Alabama.

(b)OTHER INFORMATION

To the best of our knowledge, the set of findings included in the Environmental Impact Analysis and this Exploration Plan indicate that the proposed activity and its associated facilities and effects are all consistent with, and comply with, the provisions and guidelines of the Louisiana Coastal Resources Program (LCRP) and the Alabama Coastal Area Management Program (ACAMP). The proposed activity will be conducted in a manner consistent with such programs.

Evaluations of consistency with the Louisiana Coastal Resources Program and the Alabama Coastal Area Management Program are included below:

COASTAL ZONE MANAGEMENT
CONSISTENCY CERTIFICATION
State of Louisiana

INITIAL EXPLORATION PLAN
Type of OCS Plan

Mississippi Canyon Block 608
Area and Block

OCS-G 34902
Lease Number

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

CHEVRON U.S.A. INC.
Lessee and Operator

Claire H. Moore
Assistant Secretary

Certifying Official

January 5, 2023

COASTAL ZONE MANAGEMENT
CONSISTENCY CERTIFICATION
State of Alabama

INITIAL EXPLORATION PLAN
Type of OCS Plan

Mississippi Canyon Block 608
Area and Block

OCS-G 34902
Lease Number

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

CHEVRON U.S.A. INC.
Lessee and Operator

Claire H. Moore

Assistant Secretary

Certifying Official

January 5, 2023

Coastal Zone Management Consistency Certification
State of Alabama

DOCUMENT NO. CSA-CHEVRON-FL-23-3889-02-REP-01-FIN

Internal review process					
Version	Date	Description	Prepared by:	Reviewed by:	Approved by:
INT-01	12/16/2022	Initial draft for science and TE review	J. Tiggelaar	K. Gifford	J. Tiggelaar

Client deliverable			
Version	Date	Description	Project Manager Approval
01	12/20/2022	Client deliverable	J. Tiggelaar
FIN	01/04/23	Client deliverable	J. Tiggelaar

Evaluation of Consistency with the Enforceable Policies of the Louisiana Coastal Resource Program

1 Background

Chevron U.S.A Inc. (Chevron) is submitting an Initial Exploration Plan (EP) to the Bureau of Ocean Energy Management (BOEM). The EP covers the drilling and completion of 15 wells from six surface hole locations in Mississippi Canyon (MC) Block 608. This document evaluates Chevron's EP for any reasonably foreseeable coastal effects on the land, water uses, or natural resources of the coastal zone of Louisiana, and evaluates the consistency of Chevron's EP with the enforceable policies of the Louisiana Coastal Resource Program (LCRP). The analysis, compliant with the Coastal Zone Management Act, is submitted pursuant to 15 Code of Federal Regulations (CFR) 930.76 and is supported by documentation provided in the Environmental Impact Analysis (EIA). The EIA provides an environmental impacts analysis for the drilling activities based on the surface hole locations in MC 608 and is included in EP Appendix A. The EIA was prepared in accordance with applicable regulations, including 30 CFR 550.212(o) and 550.227 as well as Notice to Lessees and Operators (NTL) 2008-G04, extended by NTL BOEM 2015-N02, and BOEM 2015-N01.

The proposed activities will be conducted in accordance with BOEM, Bureau of Safety and Environmental Enforcement, and U.S. Environmental Protection Agency regulations, applicable NTLs, conditions in the approved permits, and lease stipulations. Required federal permits will be obtained, and activities are expected to be conducted in compliance with such regulations, NTLs, conditions, and stipulations.

The proposed activities will occur in Federal Outer Continental Shelf (OCS) waters, approximately 68 statute miles (109 km) from the nearest Louisiana shoreline (**Figure 1**). A dynamically positioned drillship is anticipated to be on site for up to 125 days per well for drilling and completion activities.

All land-based support activities, including transport to and from the site, will be from Louisiana. No new expansion of facilities or personnel for shorebases is anticipated to result from this exploration project. No significant impacts on the State of Louisiana are expected from routine activities as described in Chevron's EP.

Spill response-related activities for the proposed activities under Chevron's EP are governed by the Chevron Regional Oil Spill Response Plan (OSRP) was filed on behalf of several affiliated companies. Companies covered under this OSRP include Chevron Corporation (02335), Chevron U.S.A. Inc. (00078), Chevron Pipe Line Company (00400), Sabine Pipe Line Company Inc. (00835), Union Oil Company of California (00003), Unocal Pipeline Company (01113), and PRS Offshore, L.P. (01767). The OSRP was approved by BSEE on 22 March 2016 and the biennial review was received and acknowledged by BSEE on 23 March 2021. Chevron has demonstrated oil spill financial responsibility for the facilities proposed in the EP, according to 30 CFR Part 553 and NTL No. 2008-N05, "Guidelines for Oil Spill Financial Responsibility for Covered Facilities."

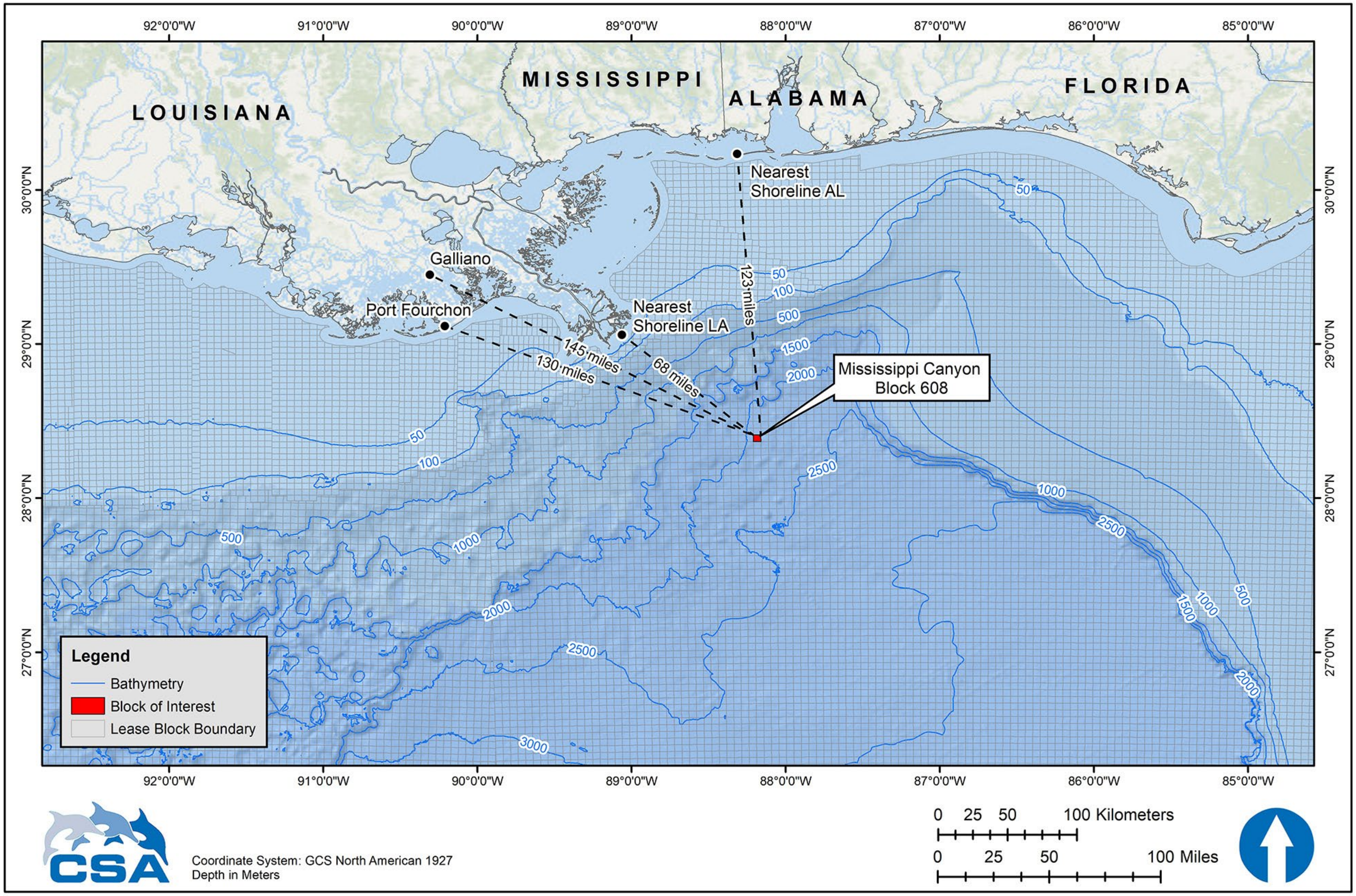


Figure 1. Location of Mississippi Canyon Block 608 relative to the Louisiana shoreline and offshore bathymetric contours.

As discussed in Section A.9.2 of the EIA (Large Oil Spill [Worst Case Discharge]), the trajectory of a hypothetical spill in MC 608, projected using information in the 30-day Oil Spill Risk Analysis model for the Gulf of Mexico (see Ji et al., 2004), indicates there is up to an 11% conditional probability of a spill contacting the Louisiana shoreline (Plaquemines Parish) within 30 days of a spill. Using Launch Point 59 (as indicated in Ji et al., 2004), the model predicts potential shoreline contact within 30 days of a spill ranging from Cameron Parish, Louisiana to Bay County, Florida.

BOEM (2017) presented additional OSRA modeling to simulate a spill that continues for 90 consecutive days, with each trajectory tracked for 60 days during four seasons from five launch points across the Gulf of Mexico. From Launch Point 3, seasonally, the highest probability of shoreline contact (based on a shoreline segment [county/parish] basis) within 60 days of a spill were estimated to be:

- 10% in winter (January to March), Matagorda County, Texas;
- 13% in spring (April to June), Terrebonne Parish, Louisiana;
- 5% in summer (July to September), Kenedy and Brazoria counties, Texas; and
- 5% in fall (October to December), Matagorda County, Texas.

The sum of the conditional probabilities of contact across all state shoreline segments (counties or parishes) values equals the overall seasonal conditional probability value of contact for any statewide shoreline presented in Section A.9.2 of the EIA for the 60-day OSRA. For Louisiana, the model predicts a 52% conditional probability of contact in spring, a 12% conditional probability of contact in summer and winter, and a 4% conditional probability of contact in fall within 60 days of a spill.

2 Louisiana Coastal Resource Program Guidelines

Pursuant to the Louisiana State and Local Resources Management Act of 1978, as amended (Act 361, La. R.S. 49:214.21 et seq.), the Office of Coastal Management of the Louisiana Department of Natural Resources has created guidelines to implement the LCRP (LAC 43:I.Chapter 7). The guidelines are organized as a set of performance standards that are used to evaluate the impacts of a proposed action on coastal resources. All guidelines applicable to Chevron's proposed project in MC 608 is summarized in the following sections.

§701. Guidelines Applicable to All Uses

A. The guidelines must be read in their entirety. Any proposed use may be subject to the requirements of more than one guideline or section of guidelines and all applicable guidelines must be complied with.

The guidelines have been read in their entirety in preparation of this consistency analysis for the MC 608 project, and Chevron expects to comply with all applicable guidelines.

B. Conformance with applicable water and air quality laws, standards, and regulations, and with those other laws, standards and regulations which have been incorporated into the coastal resources program shall be deemed in conformance with the program except to the extent that these guidelines would impose additional requirements.

Addressed in EP Sections F, G, and Appendix A.

C. *The guidelines include both general provisions applicable to all uses and specific provisions applicable only to certain types of uses. The general guidelines apply in all situations. The specific guidelines apply only to the situations they address. Specific and general guidelines should be interpreted to be consistent with each other. In the event there is an inconsistency, the specific should prevail.*

The guidelines have been read in their entirety, and all applicable guidelines are summarized and addressed herein.

F. *Information regarding the following general factors shall be utilized by the permitting authority in evaluating whether the proposed use is in compliance with the guidelines:*

1. *type, nature, and location of use;*
2. *elevation, soil, and water conditions and flood and storm hazard characteristics of site;*
3. *techniques and materials used in construction, operation, and maintenance of use;*
4. *existing drainage patterns and water regimes of surrounding area including flow, circulation, quality, quantity, and salinity; and impacts on them;*
5. *availability of feasible alternative sites or methods of implementing the use;*
6. *designation of the area for certain uses as part of a local program;*
7. *economic need for use and extent of impacts of use on economy of locality;*
8. *extent of resulting public and private benefits;*
9. *extent of coastal water dependency of the use;*
10. *existence of necessary infrastructure to support the use and public costs resulting from use;*
11. *extent of impacts on existing and traditional uses of the area and on future uses for which the area is suited;*
12. *proximity to and extent of impacts on important natural features such as beaches, barrier islands, tidal passes, wildlife and aquatic habitats, and forest lands;*
13. *the extent to which regional, state, and national interests are served including the national interest in resources and the siting of facilities in the coastal zone as identified in the coastal resources program;*
14. *proximity to, and extent of impacts on, special areas, particular areas, or other areas of particular concern of the state program or local programs;*
15. *likelihood of; and extent of impacts of; resulting secondary impacts and cumulative impacts;*
16. *proximity to and extent of impacts on public lands or works, or historic, recreational, or cultural resources;*
17. *extent of impacts on navigation, fishing, public access, and recreational opportunities;*
18. *extent of compatibility with natural and cultural setting; and*
19. *extent of long-term benefits or adverse impacts.*

Addressed in EP Sections B, E, I, and Appendix A.

G. *It is the policy of the coastal resources program to avoid the following adverse impacts. To this end, all uses, and activities shall be planned, sited, designed, constructed, operated, and maintained to avoid to the maximum extent practicable significant:*

1. *reductions in the natural supply of sediment and nutrients to the coastal system by alterations of freshwater flow;*
2. *adverse economic impacts on the locality of the use and affected governmental bodies;*
3. *detrimental discharges of inorganic nutrient compounds into coastal waters;*
4. *alterations in the natural concentration of oxygen in coastal waters;*
5. *destruction or adverse alterations of streams, wetland, tidal passes, inshore waters and water bottoms, beaches, dunes, barrier islands, and other natural biologically valuable areas or protective coastal features;*
6. *adverse disruption of existing social patterns;*
7. *alterations of the natural temperature regime of coastal waters;*
8. *detrimental changes in existing salinity regimes;*
9. *detrimental changes in littoral and sediment transport processes;*
10. *adverse effects of cumulative impacts;*
11. *detrimental discharges of suspended solids into coastal waters, including turbidity resulting from dredging;*
12. *reductions or blockage of water flow or natural circulation patterns within or into an estuarine system or a wetland forest;*
13. *discharges of pathogens or toxic substances into coastal waters;*
14. *adverse alteration or destruction of archaeological, historical, or other cultural resources;*
15. *fostering of detrimental secondary impacts in undisturbed or biologically highly productive wetland areas;*
16. *adverse alteration or destruction of unique or valuable habitats, critical habitat for endangered species, important wildlife or fishery breeding or nursery areas, designated wildlife management or sanctuary areas, or forestlands;*
17. *adverse alteration or destruction of public parks, shoreline access points, public works, designated recreation areas, scenic rivers, or other areas of public use and concern;*
18. *adverse disruptions of coastal wildlife and fishery migratory patterns;*
19. *land loss, erosion, and subsidence;*
20. *increases in the potential for flood, hurricane, and other storm damage, or increases in the likelihood that damage will occur from such hazards; and*
21. *reduction in the long-term biological productivity of the coastal ecosystem.*

Addressed in EP Sections E, I, and Appendix A.

I. *Uses shall to the maximum extent practicable be designed and carried out to permit multiple concurrent uses which are appropriate for the location and to avoid unnecessary conflicts with other uses of the vicinity.*

Addressed in EP Section B and Appendix A.

§703. Guidelines for Levees

Not applicable.

§705. Guidelines for Linear Facilities

Not applicable.

§707. Guidelines for Dredged Spoil Deposition

Not applicable.

§709. Guidelines for Shoreline Modification

Not applicable.

§711. Guidelines for Surface Alterations

Not applicable. Surface alterations to shorebases are not required for this project.

§713. Guidelines for Hydrologic and Sediment Transport Modifications

Not applicable.

§715. Guidelines for Disposal of Wastes

A. *The location and operation of waste storage, treatment, and disposal facilities shall be avoided in wetlands to the maximum extent practicable, and best practical techniques shall be used to minimize adverse impacts which may result from such use.*

Addressed in EP Section F and Appendix A.

B. *The generation, transportation, treatment, storage, and disposal of hazardous wastes shall be pursuant to the substantive requirements of the Department of Environmental Quality adopted pursuant to the provisions of R.S. 30:217, et seq.; as amended and approved pursuant to the Resource Conservation and Recovery Act of 1976 P.L. 94-580, as amended, and of the Office of Conservation for injection below surface.*

Addressed in EP Sections F, K, and Appendix A.

C. *Waste facilities located in wetlands shall be designed and built to withstand all expectable adverse conditions without releasing pollutants.*

Not applicable.

D. *Waste facilities shall be designed and constructed using best practical techniques to prevent leaching, control leachate production, and prevent the movement of leachate away from the facility.*

Not applicable.

E. *The use of overland flow systems for nontoxic, biodegradable wastes, and the use of sump lagoons and reservoirs utilizing aquatic vegetation to remove pollutants and nutrients shall be encouraged.*

Not applicable.

F. *All waste disposal sites shall be marked and, to the maximum extent practicable, all components of waste shall be identified.*

Not applicable.

G. *Waste facilities in wetlands with identifiable pollution problems that are not feasible and practical to correct shall be closed and either removed or sealed and shall be properly revegetated using the best practical techniques.*

Not applicable.

H. *Waste shall be disposed of only at approved disposal sites.*

Addressed in EP Section F and Appendix A.

I. *Radioactive wastes shall not be temporarily or permanently disposed of in the coastal zone.*

Not applicable.

§717. Guidelines for Uses that Result in the Alteration of Waters Draining into Coastal Waters

Not applicable.

§719. Guidelines for Oil, Gas, and Other Mineral Activities

A. *Geophysical surveying shall utilize the best practical techniques to minimize disturbance or damage to wetlands, fish and wildlife, and other coastal resources.*

Not applicable; all geophysical survey work related to this project was conducted on the OCS in MC 608, approximately 68 statute miles (109 km) from the nearest Louisiana shoreline.

B. *To the maximum extent practicable, the number of mineral exploration and production sites in wetland areas requiring floatation access shall be held to the minimum number, consistent with good recovery and conservation practices and the need for energy development, by directional drilling, multiple use of existing access canals, and other practical techniques.*

Not applicable; all drilling activities related to this project will be conducted on the OCS in MC 608, approximately 68 statute miles (109 km) from the nearest Louisiana shoreline.

C. *Exploration, production, and refining activities shall, to the maximum extent practicable, be located away from critical wildlife areas and vegetation areas. Mineral operations in wildlife preserves and management areas shall be conducted in strict accordance with the requirements of the wildlife management body.*

Addressed in EP Sections B, E, I, and Appendix A. No activities will be conducted in wildlife preserves or management areas. All drilling activities related to this project will be conducted on the OCS in MC 608. Shore-based support will originate from Louisiana. The nearest Louisiana shoreline is approximately 68 statute miles (109 km) from the project area.

During a large-scale incident, a list of the Louisiana Wildlife Refuges, Wilderness Areas, and State and National Parks that could potentially be affected by oiling within 30 days of a large spill, along with the natural resources found in each area, is provided in **Table 1**.

D. *Mineral exploration and production facilities shall be to the maximum extent practicable designed, constructed, and maintained in such a manner to maintain natural water flow regimes, avoid blocking surface drainage, and avoid erosion.*

Not applicable; all drilling activities related to this project will be conducted on the OCS in MC 608, approximately 68 statute miles (109 km) from the nearest Louisiana shoreline.

E. *Access routes to mineral exploration, production, and refining sites shall be designed and aligned so as to avoid adverse impacts on critical wildlife and vegetation areas to the maximum extent practicable.*

Addressed in EP Sections L, M, and Appendix A.

F. *Drilling and production sites shall be prepared, constructed, and operated using the best practical techniques to prevent the release of pollutants or toxic substances into the environment.*

Addressed in EP Sections B, F, G, H, and K.

Table 1. Louisiana Wildlife Refuges, Wilderness Areas, State Parks, and other protected areas and natural resources within the geographic range of potential shoreline oil contact within 30 days of a large discharge event based on Oil Spill Risk Analysis Launch Point 59 (as referenced from Ji et al., 2004).

Wildlife Refuge, Wilderness Area, State or National Park	Resource Description
Cameron Parish	
Lacassine National Wildlife Refuge (NWR)	Established in 1937, Lacassine NWR is approximately 35,000 acres of freshwater marsh. Approximately half of the acreage of the NWR is natural freshwater marsh and open water. Notable wildlife includes nesting colonies of wading and water birds, alligators, eagles, falcons, and Louisiana black bears as well as wintering populations of several species of ducks. The NWR is known for vast numbers of pintails congregating each winter. The NWR is available for a multitude of recreational opportunities, including fishing, hunting, boating, and hiking (U.S. Fish and Wildlife Service [USFWS], n.d. - a.
Peveto Woods Bird and Wildlife Sanctuary	A bird sanctuary owned by the Baton Rouge Audubon Society; this sanctuary is a 40-acre tract of coastal land in Cameron Parish. During the spring and fall migrations, the sanctuary is home to numerous species of songbirds. It is estimated that nearly 2 million birds seek refuge in the sanctuary each year before and after their trans-Gulf migrations. The sanctuary is also used by numerous species of butterflies, including the migratory Monarch butterfly (Baton Rouge Audubon Society, 2022).
Rockefeller Wildlife Refuge and Game Preserve	Rockefeller Wildlife Refuge, located in eastern Cameron and western Vermilion Parishes, is owned, and maintained by the State of Louisiana. The refuge is a flat, treeless area with highly organic soils that are capable of producing immense quantities of waterfowl foods in the form of annual emergent and submerged aquatics. When deeded to the state, the refuge encompassed approximately 86,000 acres, but beach erosion has taken a heavy toll, and the most recent surveys indicate only 76,042 acres remain. This area borders the Gulf of Mexico for 26.5 miles and extends inland toward the Grand Chenier ridge, a stranded beach ridge 6 miles (10 km) from the Gulf of Mexico. Common resident animals include Mottled Ducks, nutria, muskrat, rails, raccoon, mink, otter, opossum, white-tailed deer, and alligators. An abundant fisheries population provides recreational opportunities to fishermen seeking shrimp, redfish, speckled trout, black drum, and largemouth bass, among others (Louisiana Department of Wildlife and Fisheries, n.d. – a).
Sabine NWR	Sabine NWR includes 124,511 acres of fresh, intermediate, and brackish marshes that provide habitat for waterfowl and other birds. Designated as an Internationally Important Bird Area, the refuge is known to provide habitat for more than 300 species of birds, 26 species of mammals, 41 species of reptiles and amphibians, 132 species of fish, and 68 species of marine invertebrates. Common bird species include Mottled Ducks, Great Egrets, Neotropic Cormorants, Snowy Egrets, and various species of wading birds and shorebirds. American alligators are known to be very common in the refuge as well (USFWS, n.d. - b).
Vermilion Parish	
Paul J. Rainey Wildlife Refuge and Game Preserve	Paul J. Rainey Wildlife Refuge and Game Preserve is a privately owned 26,000-acre coastal wetland in Vermilion Parish owned by the National Audubon Society. Formerly open to gas drilling, hydrocarbon exploration ended in 1999. Notable faunae include deer, muskrats, otters, geese, and numerous other species of birds. No hunting or fishing is currently allowed in the Preserve (National Audubon Society, n.d.).
Rockefeller Wildlife Refuge and Game Preserve	See description under Cameron Parish.
State Wildlife Refuge	State Wildlife Refuge is a 13,000-acre tract owned by the State of Louisiana. Located on the southwest shore of Vermilion Bay, the focus of the refuge is on natural resource conservation. The refuge is an important waterfowl wintering area and serves as habitat for numerous species of shorebirds, wading birds, alligators, shrimp, fish, and crabs. Mammals such as raccoons, muskrats, nutria, mink, and deer are common as well (Louisiana Department of Wildlife and Fisheries, n.d. – b).

Table 1. (Continued).

Wildlife Refuge, Wilderness Area, State or National Park	Resource Description
Terrebonne Parish	
Isle Dernieres Barrier Islands Refuge	This refuge is made up of three barrier islands offshore of Terrebonne Parish: Wine Island, Whiskey Island, and Raccoon Island, for a total of approximately 630 acres. The primary management goal of the refuge is to provide and protect habitat for nesting waterbirds. Raccoon Island is one of the most important waterbird nesting sites on the Gulf coast (Louisiana Department of Wildlife and Fisheries, n.d. – c).
Mandalay NWR	Mandalay NWR was established in 1996 as 4,419 acres of freshwater marsh and cypress-tupelo swamp. Access to the refuge is by boat only. Popular activities in the refuge include wildlife observation, boating, fishing, and hunting. The refuge proves important habitat for wintering waterfowl of the Mississippi flyway. Other notable wildlife includes ducks, white tailed deer, alligators, and numerous bird species, including herons, egrets, and eagles (USFWS, n.d. - c).
Point-aux-Chenes Wildlife Management Area (WMA)	Point-aux-Chenes WMA is a 35,000-acre marshland owned and operated by the Louisiana Department of Wildlife and Fisheries. Access to the WMA typically is limited to boats as there are no roads through the marshland. Notable game species present in the WMA include waterfowl, deer, rabbit, squirrels, rails, gallinules, and snipe. Both saltwater and freshwater fishing in the WMA is considered excellent due to the nearby Timbalier and Terrebonne Bay watersheds. Annual lotteries are held by the Louisiana Department of Wildlife and Fisheries for a waterfowl hunt exclusively for physically challenged hunters and a deer hunt for youth (Louisiana Department of Wildlife and Fisheries, n.d. - d).
Lafourche Parish	
Wisner WMA	Owned by the Edward Wisner Donation Advisory Committee, the WMA is approximately 21,000 acres of bayous and canals. The WMA is open seasonally for small game and waterfowl hunting.
Point-aux-Chenes WMA	See description under Terrebonne Parish.
Jefferson Parish	
Grand Isle State Park	Grand Isle State Park is a beach ridge that serves as a breakwater between the Gulf of Mexico and channels that connect to tributaries of the Mississippi River. The park is a well-known location for excellent fishing, birding, crabbing, hiking, and boating, including a departure point for deep sea fishing in the Gulf of Mexico (Louisiana Office of Tourism, 2022). Grand Isle State Park was heavily damaged by Hurricane Ida in August 2021 and as of December 2022, remains closed to the public.
Plaquemines Parish	
Delta NWR	The Delta NWR was established in 1935 and covers 49,000 acres formed by the deposition of sediment from the Mississippi River. Its lush vegetation is the food source for a multitude of fish, waterfowl, and animals. The Delta NWR is the winter home for hundreds of thousands of snow geese, coots, and ducks. Endangered and threatened species in the NWR include the Piping Plover and the American alligator, which was de-listed as an endangered species in 1987 but remains listed as threatened due to similarity in appearance to the endangered American crocodile. The Delta NWR supports a wide variety of non-listed wildlife species. Tens of thousands of wintering waterfowl utilize the food resources found in the Delta NWR. Large numbers of other bird species can be found in the NWR, with numbers peaking during the spring and fall migrations. Large numbers of wading birds nest on the refuge, and thousands of shorebirds can be found on tidal mudflats and deltaic splays. Numerous furbearers and game mammals are year-round residents, and the marshes and waterways provide year-round and seasonal habitat for a diversity of fish and shellfish species (USFWS, n.d. - d).
Pass-a-Loutre WMA	The Pass-a-Loutre WMA is located in southern Plaquemines Parish at the mouth of the Mississippi River, approximately 10 miles (16 km) south of Venice and is accessible only by boat. The area is characterized by river channels with attendant channel banks, natural bayous, and man-made canals interspersed with intermediate and fresh marshes. The area is owned by the Louisiana Department of Wildlife and Fisheries and encompasses approximately 115,000 acres. The area is home to numerous species of shorebirds and other waterfowl. Alligators and small mammals are abundant. The inland waters provide habitat for fish, shrimp, and crabs (Louisiana Department of Wildlife and Fisheries, n.d. - e).

Table 1. (Continued).

Wildlife Refuge, Wilderness Area, State or National Park	Resource Description
Breton NWR	Established in 1904, the Breton NWR is the second oldest NWR in the United States. Historically, the Breton NWR has been the site of a lighthouse station (destroyed by Hurricane Katrina), a quarantine station, a small fishing village, and an oil production facility. The Chandeleur Islands (where Breton NWR is located) are designated as critical habitat (as defined by NMFS) for the Endangered Piping Plover, which is a common visitor to the refuge during fall, winter, and spring. The Western Gulf Coast population of Brown Pelicans was de-listed under the Endangered Species Act in 2009. The Brown Pelican is a year-round resident of southeast Louisiana, and the Breton NWR serves as important breeding grounds for these birds. The Breton NWR also provides habitat for colonies of nesting wading birds and seabirds as well as wintering shorebirds and waterfowl. Twenty-three species of seabirds and shorebirds frequently use the refuge, and 13 species nest on the various islands. The most abundant nesters are Brown Pelicans, Laughing Gulls, Royal Gulls, and Caspian and Sandwich Terns. Waterfowl winter near the refuge islands and use the adjacent shallows, marshes, and sounds for feeding and for protection during inclement weather. Redheads and Lesser Scaup account for the majority of waterfowl on the refuge. Other wildlife species found in the NWR include nutria, raccoons, and several species of sea turtles (USFWS, n.d. - e).
St. Bernard Parish	
Biloxi WMA	Biloxi WMA is a brackish and saline marsh encompassing more than 35,000 acres. Due to the large number of bays and bayous, the WMA is home to numerous species of fish, crabs, waterfowl, and furbearers. Popular activities in the WMA include hunting, trapping, fishing, boating, and birding. Game species present in the WMA include rabbits, rails, gallinules, snipe, ducks, geese, and deer (Louisiana Department of Wildlife and Fisheries, n.d.-f).
Breton NWR	See description under Plaquemines Parish.

G. *All drilling activities, supplies, and equipment shall be kept on barges, on drilling rigs, within ring levees, or on the well site.*

Addressed in EP Section B.

H. *Drilling ring levees shall to the maximum extent practicable be replaced with small production levees or removed entirely.*

Not applicable; no drilling ring levees will be used during the proposed activities.

I. *All drilling, and production equipment, structures, and storage facilities shall be designed and constructed utilizing best practical techniques to withstand all expectable adverse conditions without releasing pollutants.*

Addressed in EP Section B and Appendix A.

J. *Mineral exploration, production, and refining facilities shall be designed and constructed using best practical techniques to minimize adverse environmental impacts.*

Addressed in EP Appendix A.

K. *Effective environmental protection and emergency or contingency plans shall be developed and complied with for all mineral operations.*

Addressed in EP Sections E, H, I, K, and Appendix A.

L. *The use of dispersants, emulsifiers, and other similar chemical agents on oil spills is prohibited without the prior approval of the Coast Guard or Environmental Protection Agency on-scene coordinator, in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan.*

Addressed in EP Section H and Appendix A.

M. *Mineral exploration and production sites shall be cleared, revegetated, detoxified, and otherwise restored as near as practicable to their original condition upon termination of operations to the maximum extent practicable.*

Addressed in EP Section K and Appendix A.

N. *The creation of underwater obstructions which adversely affect fishing or navigation shall be avoided to the maximum extent practicable.*

Addressed in EP Section B.

3 Consistency Certification

The analysis indicates that Chevron's EP for MC 608 is consistent with the enforceable policies of the LCRP according to the guidelines provided by the LCRP. Routine operations will have limited environmental impacts in the immediate vicinity of the drilling activities. Land-based support activities will originate from Louisiana.

In the event of an accidental spill, Chevron will implement the measures of its OSRP, which details plans and procedures for containment, recovery, and removal of an oil spill. This project is expected to conform to existing regulatory requirements. The EP describes the project and related activities, and the EIA analyzes potential environmental impacts from an unplanned release. The intent and requirements of enforceable Louisiana Statutes have been considered and discussed as well as other information requirements of Louisiana. A Coastal Zone Management Act consistency certification according to 16 U.S.C. 1456(c)(3)(B) and 15 CFR 930.76(c) for Louisiana is provided on the cover page.

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U.S. Fish and Wildlife Service. n.d. - c. Mandalay National Wildlife Refuge. https://www.fws.gov/refuge/mandalay.

U.S. Fish and Wildlife Service. n.d. - d. Delta National Wildlife Refuge. http://www.fws.gov/delta/.

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Coastal Zone Management Consistency Certification
State of Alabama

DOCUMENT NO. CSA-CHEVRON-FL-23-3889-03-REP-01-FIN

Internal review process					
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INT-01	12/16/2022	Initial draft for science and TE review	J. Tiggelaar	K. Gifford	J. Tiggelaar

Client deliverable			
Version	Date	Description	Project Manager Approval
01	12/20/22	Client deliverable	J. Tiggelaar
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Evaluation of Consistency with Alabama Enforceable Policies

1 Background

Chevron U.S.A. Inc. (Chevron) is submitting an Initial Exploration Plan (EP) to the Bureau of Ocean Energy Management (BOEM). Under this EP, Chevron proposes to drill and complete 15 wells from six surface hole locations, all of which will be located in MC 608. A dynamically positioned (DP) semisubmersible drilling rig or a DP drillship is anticipated to be on site for approximately 125 drilling days per well.

This regulatory analysis and consistency determination evaluates Chevron's EP for any reasonably foreseeable coastal effects on the land, water uses, or natural resources of the coastal zone of Alabama, pursuant to the enforceable policies of the Alabama Coastal Area Management Program (ACAMP). The analysis is submitted pursuant to 15 Code of Federal Regulations (CFR) 930.76 and is supported by documentation provided in the accompanying Environmental Impact Analysis (EIA) prepared in accordance with applicable regulations, including 30 CFR 550.212(o) and 550.227 as well as Notice to Lessees and Operators (NTL) 2008-G04, extended by NTL 2015-N02, and 2015-N01.

MC 608 is located within the Central Gulf of Mexico Outer Continental Shelf (OCS) Planning Area, approximately 123 statute miles (198 km) from the nearest Alabama shoreline. Chevron does not expect the proposed activities to affect the State of Alabama. The proposed activities will be conducted in accordance with the regulations of BOEM, the Bureau of Safety and Environmental Enforcement, and the U.S. Environmental Protection Agency as well as applicable NTLs, conditions in the approved permits, and lease stipulations.

2 Evaluation

Table 1 evaluates the proposed activities with respect to the enforceable policies of the ACAMP according to 15 CFR 930.76 (b), (c), and (d). The ACAMP was approved and has been in effect since 1979 (National Oceanic and Atmospheric Administration and Alabama Coastal Area Board, 1979), and was most recently updated in 2017 (Alabama Department of Conservation & Natural Resources, 2017). Its purpose is to promote, improve, and safeguard the lands and waters located in Alabama's coastal area through a comprehensive and cooperative program designed to preserve, enhance, and develop these valuable resources for present and future generations. The enforceable policies of the program regulate various activities on coastal lands and waters in Baldwin and Mobile Counties of Alabama.

3 Consistency Certification

The analysis indicates that Chevron's EP for MC 608 is consistent with the relevant guidelines and coastal planning policies provided by the ACAMP. Routine operations will have limited environmental impacts in the project area. All land-based support activities, including transport to and from the project area, is expected to be from Louisiana.

Table 1. Evaluation of the Initial Exploration Plan (EP) relative to the relevant coastal planning policies of the Alabama Coastal Area Management Program (ACAMP).

Policy	Cross Reference to the EP	Comments	Consistent with ACAMP Policies? (Yes/No)
Coastal Resource Use Policies			
Coastal Development	EP Section A – Plan Contents	Routine activities are not anticipated to affect Alabama's coastal development. The proposed activities will occur in Federal Outer Continental Shelf (OCS) waters approximately 123 statute miles (198 km) from the nearest Alabama shoreline, and Chevron will use existing onshore support facilities in Louisiana. No impacts on coastal development in Alabama are expected.	Yes
Mineral Resource Exploration and Extraction	EP Section A – Plan Contents	Routine activities are not anticipated to affect mineral resource exploration and extraction in Alabama's coastal zone. The proposed activities will occur in Federal OCS waters approximately 123 statute miles (198 km) from the nearest Alabama shoreline and do not include any extraction of minerals from the Alabama coastal zone.	Yes
Commercial Fishing	EP Section H – Oil Spills Information EP Appendix A – Environmental Impact Analysis (C.8.1 – Recreational and Commercial Fishing)	Routine activities are not anticipated to affect commercial fishing in Alabama's coastal zone. Routine activities may have limited environmental impacts in Federal OCS waters, approximately 123 statute miles (198 km) from the nearest Alabama shoreline. Pelagic longlining activities in the lease area and other commercial fishing activities in the northern Gulf of Mexico, including Alabama's coastal zone, could be interrupted in the event of a large oil spill. A spill may or may not result in fishery closures depending on the duration of the spill, the oceanographic and meteorological conditions at the time, and the effectiveness of spill response measures. The potential impacts of an oil spill on Alabama's coastal zone are analyzed in the EIA. In the event of a spill, Chevron will implement the plans and procedures of its Regional Oil Spill Response Plan (OSRP). The precautions addressed in Chevron's standard safety and environmental operating procedures and Regional OSRP are consistent with the protection of Alabama's fishery resources and commercial fishing industry.	Yes
Coastal Hazard Management	EP Section C – Geological and Geophysical Information EP Section H – Oil Spills Information EP Appendix A – Environmental Impact Analysis (D. Environmental Hazards)	Site clearance surveys indicated seafloor conditions are suitable for proposed activities in the project area. Routine activities are not anticipated to increase the susceptibility of Alabama's coastal zone to natural hazards due to the location of the proposed activities in Federal OCS waters, approximately 123 statute miles (198 km) from the nearest Alabama shoreline. No new development in coastal areas, construction, dredging, or filling on Alabama's lands or waters are anticipated. In the event of a spill, Chevron will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize shoreline impacts.	Yes

Table 1. (Continued).

Policy	Cross Reference to the EP	Comments	Consistent with ACAMP Policies? (Yes/No)
Shoreline Erosion	EP Appendix A – Environmental Impact Analysis (C.7 Coastal Habitats and Protected Areas)	Routine activities are not anticipated to affect Alabama's shoreline due to the location of the proposed activities in Federal OCS waters, approximately 123 statute miles (198 km) from the nearest Alabama shoreline. No new development in coastal areas, construction, dredging, or filling on Alabama's lands or waters are anticipated that could cause shoreline erosion. In the event of a spill, any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize shoreline erosion, as addressed in Chevron's Regional OSRP.	Yes
Recreation	EP Section H – Oil Spills Discussion EP Appendix A – Environmental Impact Analysis (C.8.4 Recreation and Tourism)	There will be no routine activities in the Alabama coastal zone that could interfere with or diminish public access to coastal lands and waters for recreation. Recreational resources and tourism in coastal areas should not be affected by any routine activities due to the distance from shore. There are no known recreational uses of the lease area. Compliance with NTL BSEE-2015-G03 will minimize the chance of trash or debris being lost overboard and subsequently washing up on beaches. In the event of a spill, Chevron will implement the plans and procedures of its Regional OSRP. The precautions addressed in Chevron's standard safety and environmental operating procedures and its Regional OSRP are consistent with the ACAMP policy of safeguarding public access to coastal lands and waters for recreation.	Yes
Transportation	EP Section J – Lease Stipulations Information EP Appendix A – Environmental Impact Analysis (C.8.6 Other Marine Uses)	Routine activities are not anticipated to affect transportation. The lease area is not located within any United States Coast Guard-designated fairway or shipping lane, or within any Military Warning Area. Chevron will comply with the Bureau of Ocean Energy Management requirements and lease stipulations to avoid impacts on uses of the area by military vessels and aircrafts. Existing onshore support facilities located in Alabama may be utilized; however, no impacts on Alabama transportation routes or infrastructure are expected to occur.	Yes
Natural and Cultural Resource Protection Policies			
Biological Productivity	EP Section F – Wastes and Discharges Information EP Section H – Oil Spills Discussion EP Appendix A – Environmental Impact Analysis (C.7 Coastal Habitats and Protected Areas)	Routine activities are not anticipated to affect biologically productive coastal habitats, including estuaries. The proposed activities will be conducted in Federal OCS waters approximately 123 statute miles (198 km) from the nearest Alabama shoreline. In the event of a spill, Chevron will implement the plans and procedures of its Regional OSRP. The precautions addressed in Chevron's standard safety and environmental operating procedures and its Regional OSRP are consistent with the ACAMP policy of protecting and preserving biologically productive coastal habitats.	Yes

Table 1. (Continued).

Policy	Cross Reference to the EP	Comments	Consistent with ACAMP Policies? (Yes/No)
Water Quality and Water Resources	EP Section H – Oil Spills Discussion EP Appendix A – Environmental Impact Analysis (C.1.2 Water Quality)	Routine activities are not anticipated to affect Alabama's coastal water quality or water resources. The proposed activities will be conducted in Federal OCS waters, approximately 123 statute miles (198 km) from the nearest Alabama shoreline. All discharges for the proposed activity will be governed by a National Pollutant Discharge Elimination System General Permit or by U.S. EPA Vessel General Permits and MARPOL. The authorized overboard discharges during the proposed activities will be localized in offshore waters and are not expected to affect Alabama's water quality or water resources. Chevron will be using onshore support facilities in Louisiana. In the event of a spill, Chevron will implement the plans and procedures of its Regional OSRP. The precautions addressed in Chevron's standard safety and environmental operating procedures and its Regional OSRP are consistent with the core policies of conserving surface and ground waters for full beneficial use.	Yes
Air Quality	EP Section G – Air Emissions Information EP Appendix A – Environmental Impact Analysis (C.1.1 Air Quality)	Routine activities are not anticipated to affect Alabama's coastal air quality. The proposed activities will be conducted in Federal OCS waters, approximately 123 statute miles (198 km) from the nearest Alabama shoreline. In the event of a spill, Chevron will implement the plans and procedures of its Regional OSRP. The precautions addressed in Chevron's standard safety and environmental operating procedures and its Regional OSRP are consistent with the protection of coastal air quality.	Yes
Wetlands and Endemic Submerged Aquatic Vegetation	EP Section E – Biological, Physical, and Socioeconomic Information EP Section H – Oil Spills Discussion EP Appendix A – Environmental Impact Analysis (C.7 Coastal Habitats and Protected Areas)	Routine activities are not anticipated to affect Alabama's wetlands and endemic submerged aquatic vegetation. The proposed activities will be conducted in Federal OCS waters approximately 123 statute miles (198 km) from the nearest Alabama shoreline. There will be no new construction, dredging, or filling on Alabama's lands or waters that could affect wetlands or submerged seagrass beds. In the event of a spill, Chevron will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize impacts on wetlands, grass beds, and other coastal habitats.	Yes
Beach and Dune Protection	EP Section E – Biological, Physical, and Socioeconomic Information EP Section H – Oil Spills Discussion EP Appendix A – Environmental Impact Analysis (C.7 Coastal Habitats and Protected Areas)	Routine activities are not anticipated to affect Alabama's beaches and dunes. The proposed activities will be conducted in Federal OCS waters approximately 123 statute miles (198 km) from the nearest Alabama shoreline. There will be no new construction, dredging, or filling on Alabama's lands or waters that could weaken, damage, or destroy the integrity of the coastal areas or cause erosion of beaches or dunes. In the event of a spill, Chevron will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize shoreline erosion and impacts on beach and dune systems.	Yes

Table 1. (Continued).

Policy	Cross Reference to the EP	Comments	Consistent with ACAMP Policies? (Yes/No)
Wildlife Habitat Protection	EP Section E – Biological, Physical, and Socioeconomic Information EP Section H – Oil Spills Discussion EP Appendix A – Environmental Impact Analysis (C.3 Threatened, Endangered, and Protected Species and Critical Habitat and C.7 Coastal Habitats and Protected Areas)	Routine activities are not anticipated to affect Alabama's wildlife habitat. The proposed activities will be conducted in Federal OCS waters approximately 123 statute miles (198 km) from the nearest Alabama shoreline. There will be no new construction, dredging, or filling on Alabama's lands or waters that could affect coastal wildlife habitats, including critical habitats for endangered or threatened species. In the event of a spill, Chevron will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize impacts on wildlife habitats.	Yes
Threatened and Endangered Species	EP Section E – Biological, Physical, and Socioeconomic Information EP Section K – Environmental Mitigation Measures Information EP Section H – Oil Spills Discussion EP Appendix A – Environmental Impact Analysis (C.3 Threatened, Endangered, and Protected Species and Critical Habitat)	Routine activities are not anticipated to affect Alabama's endangered species. The proposed activities will be conducted in Federal OCS waters approximately 123 statute miles (198 km) from the nearest Alabama shoreline. There will be no new construction, dredging, or filling on Alabama's lands or waters that could affect endangered or threatened species or their coastal wildlife habitats. In the event of a spill, Chevron will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize impacts on endangered and threatened species and their habitats.	Yes
Cultural Resources Protection	EP Section E – Biological, Physical, and Socioeconomic Information EP Section H – Oil Spills Discussion EP Appendix A – Environmental Impact Analysis (C.6 Archaeological Resources)	Routine activities are not anticipated to affect Alabama's cultural resources located within the coastal zone. The proposed activities will be conducted in Federal OCS waters approximately 123 statute miles (198 km) from the nearest Alabama shoreline. Chevron does not anticipate the proposed activities will affect any sunken or abandoned ships or objects of historical or archaeological value located on Alabama lands or waters. In the event of a spill, Chevron will implement the plans and procedures of its Regional OSRP. Any cleanup or recovery activities in Alabama would be conducted using applicable best management practices to minimize impacts to sensitive resources.	Yes

EIA = Environmental Impact Analysis; EP = Exploration Plan.

4 References Cited

Alabama Department of Conservation & Natural Resources. 2017. Alabama Coastal Area Management Program IV. Effective January 25, 2017.

National Oceanic and Atmospheric Administration and Alabama Coastal Area Board. 1979. The Alabama Coastal Area Management Program and Final Environmental Impact Statement.

SECTION O ENVIRONMENTAL IMPACT ANALYSIS (EIA)

The project-specific EIA is included at the end of this plan as Appendix A.

SECTION P ADMINISTRATIVE INFORMATION

(a) EXEMPTED INFORMATION

Proprietary information included in the confidential copy of this EP:

- BHL, TVD, MD and Worst Case Discharge Well Information (pages 3 and 4) on Form BOEM-0137 (OCS Plan Information Form)
- Supplemental Worst Case Discharge Information to comply with NTL No. 2015-N01 in Appendix B
- Correlative well names and information in H_2S Classification
- All items and enclosures under Geological and Geophysical Information
- Seafloor Rendering Figure, Illustration of Portion of Subbottom Profiler Line, Illustration of 3D Seismic Inline/Crossline, Tophole Prognosis Chart, Illustration of Seismic Correlation, Seafloor Rendering Map, Side Scan Sonar Mosaic Map, Seafloor Amplitude Rendering Map in the Wellsite Clearance Letters included as an enclosure in the Confidential Copy

(b) BIBLIOGRAPHY

Any previously submitted EP, DPP, or DOCD; study report; survey report; or other material referenced in this EP or its accompanying information, is listed below:

- Chevron's Regional Oil Spill Response Plan (Regional OSRP)
- Chevron Initial EP N-09930, MC Blocks 122 and 166, OCS-G 34424 and 35318, approved May 12, 2016.

Environmental Impact Analysis

for an

INITIAL EXPLORATION PLAN
for
Mississippi Canyon Block 608 (OCS-G-34902)

Offshore Alabama

January 2023

Prepared for:

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Environmental Impact Analysis

DOCUMENT NO. CSA-Chevron-FL-23-3889-01-REP-01-FIN

Internal review process					
VERSION	DATE	DESCRIPTION	PREPARED BY:	REVIEWED BY:	APPROVED BY:
INT-01	12/15/2022	Initial draft for science review	J. Tiggelaar	J. Landgraf	J. Tiggelaar
INT-02	12/19/2022	TE review	J. Tiggelaar	K. Metzger	J. Tiggelaar

Client deliverable			
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01	12/20/2022	Client deliverable	J. Tiggelaar
FIN	01/04/2023	Client deliverable	J. Tiggelaar

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Acronyms and Abbreviations

§	section
μPa	micropascal
ac	acre
bbl	barrel
BOEM	Bureau of Ocean Energy Management
BOEMRE	Bureau of Ocean Energy Management, Regulation and Enforcement
BOP	blowout preventer
BOPD	barrels of oil per day
BSEE	Bureau of Safety and Environmental Enforcement
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CFR	Code of Federal Regulations
Chevron	Chevron U.S.A. Inc.
dB	decibel
DP	dynamically positioned
DPS	distinct population segment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIA	Environmental Impact Analysis
EIS	Environmental Impact Statement
EP	Exploration Plan
ESA	Endangered Species Act
FAD	fish aggregating device
FR	*Federal Register*
GPS	global positioning system
GMFMC	Gulf of Mexico Fishery Management Council
H_2S	hydrogen sulfide
ha	hectare
HAPC	Habitat Area of Particular Concern
Hz	hertz
IPF	impact-producing factor
IMT	Incident Management Team
MARPOL	International Convention for the Prevention of Pollution from Ships
MC	Mississippi Canyon
MMC	Marine Mammal Commission
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
NAAQS	National Ambient Air Quality Standards

NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRDA	Natural Resource Damage Assessment
NTL	Notice to Lessees and Operators
NWR	National Wildlife Refuge
OCS	Outer Continental Shelf
OSRA	Oil Spill Risk Analysis
PAH	polycyclic aromatic hydrocarbons
PK	zero-to-peak sound pressure level
PM	particulate matter
PSD	Prevention of Significant Deterioration
re	referenced to
OSRP	Oil Spill Response Plan
SBM	synthetic-based drilling muds
SEL_{24h}	sound exposure level over 24 hours
SEMS	Safety and Environmental Management system
SO_x	sulfur oxides
SPL	root-mean-square sound pressure level
SWSS	Sperm Whale Seismic Study
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WCD	worst case discharge

Introduction

Chevron U.S.A. Inc. (Chevron) is submitting an Initial Exploration Plan (EP) for Mississippi Canyon (MC) Block 608 (MC 608), Gulf of Mexico, Outer Continental Shelf (OCS)-G 34902. Under this EP, Chevron proposes to drill and complete 15 wells from six surface hole locations, all of which will be located in MC 608. The Environmental Impact Analysis (EIA) provides information on potential impacts to environmental, archaeological, and socioeconomic resources that could be affected by Chevron's proposed activities in the project area under this EP.

MC 608 is located within the Central Gulf of Mexico OCS Planning Area, approximately 68 statute miles (109 kilometers [km]) from the nearest shoreline (Plaquemines Parish, Louisiana), 130 statute miles (209 km) from the regional onshore support base (Port Fourchon, Louisiana), and 145 statute miles (233 km) from the helicopter base at Galliano, Louisiana (**Figure 1**). The water depth at the proposed surface hole locations ranges from 2,017 to 2,039 m (6,616 to 6,691 ft). A dynamically positioned (DP) drillship is anticipated to be on site for approximately 125 drilling days per well.

The EIA for this EP was prepared for submittal to the Bureau of Ocean Energy Management (BOEM) in accordance with applicable regulations, including Title 30 Code of Federal Regulations (CFR) § 550.212(o) and § 550.227. The EIA is a project- and site-specific analysis of the potential environmental impacts of Chevron's planned activities. The EIA complies with guidance provided in existing Notices to Lessees and Operators (NTLs) issued by BOEM and its predecessors, Minerals Management Service (MMS) and Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), including NTLs 2008-G04 (extended by 2015-N02) and 2015-N01. Potential impacts have been analyzed at a broader level in the 2017-2022 Programmatic Environmental Impact Statement (EIS) for the OCS Oil and Gas Leasing Program (BOEM, 2016a) and in multisale EISs for the Western and Central Gulf of Mexico Planning Areas (BOEM, 2012a,b; 2013; 2014a; 2015; 2016b; 2017a). The most recent multisale EIS contains updated environmental baseline information in light of the Macondo (*Deepwater Horizon*) incident and addresses potential impacts of a catastrophic spill (BOEM, 2012a,b; 2013; 2014a; 2015; 2016b; 2017a). The NMFS Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico assesses impacts and requires additional mitigation measures for protected species (NMFS, 2020a). The analyses and relevant information from those documents are incorporated in this EIA by reference.

All the proposed activities in this plan will be covered by Chevron's Gulf of Mexico Regional Oil Spill Response Plan (OSRP), approved by BSEE on 22 March 2016. The biennial review was received by BSEE and deemed in compliance with 30 CFR 254 on 23 March 2021. A revised OSRP was submitted in December 2022. Companies covered under this OSRP: Chevron Corporation (02335), Chevron U.S.A. Inc. (00078), Chevron Pipe Line Company (00400), Sabine Pipe Line Company Inc. (00835), Union Oil Company of California (00003), Unocal Pipeline Company (01113), PRS Offshore, L.P. (01767), and Noble Energy Inc. (02237). The OSRP details Chevron's plan to rapidly and effectively manage oil spills that may result from drilling and production operations. Chevron has designed its spill response program based on a regional capability of response to spills ranging from small operational spills to a worst-case discharge (WCD) from a well blowout.

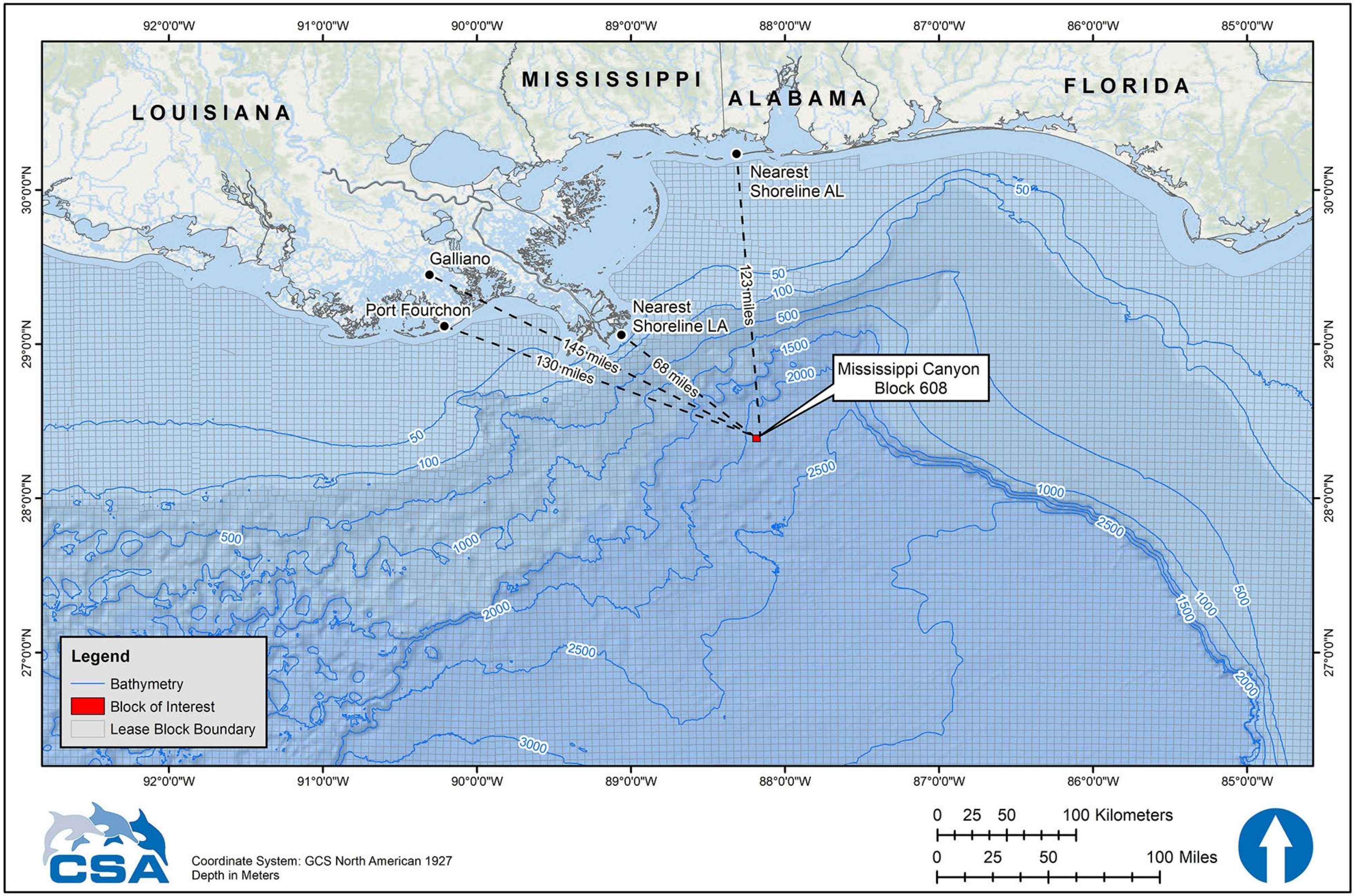

Figure 1. Location of Mississippi Canyon Block 608 relative to the Louisiana and Alabama shorelines and offshore bathymetric contours.

Chevron's spill response program meets the response planning requirements of the relevant coastal states and applicable federal oil spill planning regulations. The OSRP also includes information regarding Chevron's regional oil spill organization and dedicated response assets, potential spill risks, local environmental team organization, and an overview of actions and notifications that will be taken in the event of a spill.

The EIA is organized into **Sections A** through **I** corresponding to the information required by NTLs 2008-G04 and 2015-N01. The main impact-related discussions are in **Section A** (Impact-Producing Factors) and **Section C** (Impact Analysis). **Table 1** lists and summarizes the NTLs applicable to the EIA.

Table 1. Notices to Lessees and Operators (NTLs) applicable to the Environmental Impact Analysis (EIA).

NTL	Title	Summary
BOEM-2020-G01	Air Quality Information Requirements for Exploration Plans, Development Operations Coordination Documents, and Development and Production Plans in the Gulf of Mexico Region	Cancels and supersedes the air emission information portion of NTL 2008-G04, Information Requirement for Exploration Plans and Development Operations Coordination Documents, effective date May 5, 2008.
BOEM-2016-G01 or Appendix C (NMFS, 2020a)	Vessel Strike Avoidance and Injured/Dead Protected Species Reporting	Recommends protected species identification training; recommends that vessel operators and crews maintain a vigilant watch for marine mammals and slow down or stop their vessel movement to avoid colliding with protected species; and requires operators to report sightings of any injured or dead protected species. Reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with this NTL.
BOEM-2016-G02 or Appendix A (NMFS, 2020a)	Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program	Summarizes seismic survey mitigation measures, updates regulatory citations, and provides clarification on how the measures identified in the NTL will be used by BOEM, BSEE, and operators in order to comply with the Endangered Species Act and the Marine Mammals Protection Act. Reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with this NTL.
BSEE-2015-G03 or Appendix B (NMFS 2020a)	Marine Trash and Debris Awareness and Elimination	Instructs operators to exercise caution in the handling and disposal of small items and packaging materials; requires the posting of instructional placards at prominent locations on offshore vessels and structures; and mandates a yearly marine trash and debris awareness training and certification process.
BOEM 2015-N02	Elimination of Expiration Dates on Certain Notices to Lessees and Operators Pending Review and Reissuance	Eliminates expiration dates (past or upcoming) of all NTLs currently posted on the BOEM website.
BOEM 2015-N01	Information Requirements for Exploration Plans, Development and Production Plans, and Development Operations Coordination Documents on the OCS for Worst Case Discharge and Blowout Scenarios	Provides guidance regarding information required in WCD descriptions and blowout scenarios.

Table 1. (Continued).

NTL	Title	Summary
BOEM 2014-G04	Military Warning and Water Test Areas	Provides contact links to individual command headquarters for the military warning and water test areas in the Gulf of Mexico.
BSEE 2014-N01	Elimination of Expiration Dates on Certain Notices to Lessees and Operators Pending Review and Reissuance	Eliminates expiration dates (past or upcoming) of all NTLs currently posted on the BSEE website.
BSEE-2012-N06	Guidance to Owners and Operators of Offshore Facilities Seaward of the Coast Line Concerning Regional Oil Spill Response Plans	Provides clarification, guidance, and information for preparation of regional Oil Spill Response Plans. Recommends description of response strategy for worst-case discharge scenarios to ensure capability to respond to oil spills is both efficient and effective.
2010-N10	Statement of Compliance with Applicable Regulations and Evaluation of Information Demonstrating Adequate Spill Response and Well Containment Resources	Informs operators using subsea blowout preventers (BOPs) or surface BOPs on floating facilities that applications for well permits must include a statement signed by an authorized company official stating that the operator will conduct all activities in compliance with all applicable regulations, including the increased safety measures regulations (75 *Federal Register* [FR] 63346). Informs operators that the Bureau of Ocean Energy Management will be evaluating whether each operator has submitted adequate information demonstrating that it has access to and can deploy containment resources to respond promptly to a blowout or other loss of well control.
2009-G40	Deepwater Benthic Communities	Provides guidance for avoiding and protecting high-density deepwater benthic communities (including chemosynthetic and deepwater coral communities) from damage caused by OCS oil and gas activities in water depths greater than 300 m (984 ft). Prescribes separation distances of 610 m (2,000 ft) from each mud and cuttings discharge location and 76 m (250 ft) from all other seafloor disturbances.
2009-G39	Biologically Sensitive Underwater Features and Areas	Provides guidance for avoiding and protecting biologically sensitive features and areas (i.e., topographic features, pinnacles, low relief live bottom areas, and other potentially sensitive biological features) when conducting OCS operations in water depths less than 300 m (984 ft) in the Gulf of Mexico.
2008-G04	Information Requirements for Exploration Plans and Development Operations Coordination Documents	Provides guidance on information requirements for OCS plans, including EIA requirements and information regarding compliance with the provisions of the Endangered Species Act and Marine Mammal Protection Act.
2008-N05	Guidelines for Oil Spill Financial Responsibility (OSFR) for Covered Facilities	Provides clarification and guidance to operators/lessees on policies for submitting required OSFR documents to the Gulf of Mexico OCS Region as required under 30 CFR Part 253.
2005-G07	Archaeological Resource Surveys and Reports	Provides guidance on regulations regarding archaeological discoveries, specifies requirements for archaeological resource surveys and reports, and outlines options for protecting archaeological resources. Reissued in June 2020 to comply with Executive Order 13891 of 9 October 2019 and to rescind NTL 2011-JOINT-G01.

A. Impact-Producing Factors

Based on the description of Chevron's proposed activities, a series of impact-producing factors (IPFs) have been identified as presented in **Table 2**. **Table 2** provides a matrix of environmental resources that may be affected in the left column and sources of impacts (i.e., IPFs) associated with the proposed project across the top. **Table 2**, adapted from Form BOEM-0142, has been developed *a priori* to focus the impact analysis on those environmental resources that may be impacted as a result of one or more IPFs. The tabular matrix indicates which of the routine activities and accidental events could affect specific resources. An "X" indicates that an IPF could reasonably be expected to affect a certain resource, and a dash (--) indicates no impact or negligible impact (**Table 2**). Where there may be an effect, an impact analysis by resource is provided in **Section C**. Potential IPFs for the proposed activities are listed below and briefly discussed in the following sections:

- Drilling rig presence (including noise and lights);
- Physical disturbance to the seafloor;
- Air pollutant emissions;
- Effluent discharges;
- Water intake;
- Onshore waste disposal;
- Marine debris;
- Support vessel and helicopter traffic (includes vessel collisions with resources and marine noise); and
- Accidents.

A.1 Drilling Rig Presence, Marine Noise, and Lights

The 15 wells proposed in this EP will be drilled using a DP drillship. DP vessels use a global positioning system (GPS), specific computer software, and sensors in conjunction with a series of thrusters to maintain position. Through satellite navigation and position reference sensors, the location of the drilling rig is precisely monitored while thrusters, positioned at various locations about the rig pontoons, are activated to maintain position. This allows operations at sea in areas where mooring or anchoring may not best suited or feasible. Consequently, there will be no anchoring of the drilling rig during this project. The selected drilling rig is expected to be on site for an estimated 125 drilling days per well. The drilling rig will maintain exterior lighting in accordance with applicable federal navigation and aviation safety regulations (International Regulations for Preventing Collisions at Sea, 1972 [72 COLREGS], Part C).

Potential impacts to marine resources from the drilling rig include the physical presence of the drilling rig in the ocean, entanglement and entrapment from moon pools and equipment in the water, working and safety lighting on the rig, and underwater noise produced during operations.

During the physical presence of the drilling rig and associated drilling-associated activities, there may occasion where equipment may be suspended in the water column. Entanglement and entrapment of protected species can occur from equipment with slack or looping lines and cables in the water. Marine mammals and sea turtles can become entangled in vessel lines in the water with loops or sufficient looping to trap the animals if they come into contact with them. Entanglement and entrapment can be minimized with proper maintenance of equipment lines in the water by encasing flexible lines, removing excess lines, and keeping lines taught to remove slack and line loops.

Table 2. Matrix of impact-producing factors (IPF) and affected environmental resources. X = potential impact; dash (--) = no impact or negligible impact.

Environmental Resources	Impact-Producing Factors									
	Drilling Rig Presence (incl. noise & lights)	Physical Disturbance to Seafloor	Air Pollutant Emissions	Effluent Discharges	Water Intake	Onshore Waste Disposal	Marine Debris	Support Vessel/ Helicopter Traffic	Accidents	
									Small Fuel Spill	Large Oil Spill
Physical/Chemical Environment										
Air quality	--	--	--**X**	--	--	--	--	--	**X**(6)	**X**(6)
Water quality	--	--	--	**X**	--	--	--	--	**X**(6)	**X**(6)
Seafloor Habitats and Biota										
Soft bottom benthic communities	--	**X**	--	**X**	--	--	--	--	--	**X**(6)
High-density deepwater benthic communities	--	--(4)	--	--(4)	--	--	--	--	--	**X**(6)
Designated topographic features	--	--(1)	--	--(1)	--	--	--	--	--	--
Pinnacle trend area live bottoms	--	--(2)	--	--(2)	--	--	--	--	--	--
Eastern Gulf live bottoms	--	--(3)	--	--(3)	--	--	--	--	--	--
Threatened, Endangered, and Protected Species and Critical Habitat										
Sperm whale (Endangered)	**X**(8)	--	--	--	--	--	--	**X**(8)	**X**(6,8)	**X**(6,8)
Rice's whale (Endangered)	**X**(8)	--	--	--	--	--	--	**X**(8)	**X**(6,8)	**X**(6,8)
West Indian manatee (Threatened)	--	--	--	--	--	--	--	**X**(8)	--	**X**(6,8)
Non-endangered marine mammals (protected)	**X**	--	--	--	--	--	--	**X**	**X**(6)	**X**(6)
Sea turtles (Endangered/Threatened)	**X**(8)	--	--	--	--	--	--	**X**(8)	**X**(6,8)	**X**(6,8)
Piping Plover (Threatened)	--	--	--	--	--	--	--	--	--	**X**(6)
Whooping Crane (Endangered)	--	--	--	--	--	--	--	--	--	**X**(6)
Oceanic whitetip shark (Threatened)	**X**	--	--	--	--	--	--	--	--	**X(6)**
Giant manta ray (Threatened)	**X**	--	--	--	--	--	--	--	--	**X** (6)
Gulf sturgeon (Threatened)	--	--	--	--	--	--	--	--	--	**X**(6)
Nassau grouper (Threatened)	--	--	--	--	--	--	--	--	--	**X**(6)
Smalltooth sawfish (Endangered)	--	--	--	--	--	--	--	--	--	**X**(6)
Beach mice (Endangered)	--	--	--	--	--	--	--	--	--	**X**(6)
Florida salt marsh vole (Endangered)	--	--	--	--	--	--	--	--	--	**X**(6)
Panama City Crayfish (Threatened)	--	--	--	--	--	--	--	--	--	**X**(6)
Threatened coral	--	--	--	--	--	--	--	--	--	**X**(6)
Coastal and Marine Birds										
Marine birds	**X**	--	--	--	--	--	--	**X**	**X**(6)	**X**(6)
Coastal Birds	--	--	--	--	--	--	--	**X**	--	**X**(6)
Fisheries Resources										
Pelagic communities and ichthyoplankton	**X**	--	--	**X**	**X**	--	--	--	**X**(6)	**X**(6)
Essential Fish Habitat	**X**	--	--	**X**	**X**	--	--	--	**X**(6)	**X**(6)
Archaeological Resources										
Shipwreck sites	--	--(7)	--	--	--	--	--	--	--	**X**(6)
Prehistoric archaeological sites	--	--(7)	--	--	--	--	--	--	--	**X**(6)
Coastal Habitats and Protected Areas										
Coastal habitats and protected areas	--	--	--	--	--	--	--	**X**	--	**X**(6)

Table 2. (Continued).

Environmental Resources	Impact-Producing Factors									
	Drilling Rig Presence (incl. noise & lights)	Physical Disturbance to Seafloor	Air Pollutant Emissions	Effluent Discharges	Water Intake	Onshore Waste Disposal	Marine Debris	Support Vessel/ Helicopter Traffic	Accidents	
									Small Fuel Spill	Large Oil Spill
Socioeconomic and Other Resources										
Recreational and commercial fishing	**X**	--	--	--	--	--	--	--	**X**(6)	**X**(6)
Public health and safety	--	--	--	--	--	--	--	--	--	**X**(5,6)
Employment and infrastructure	--	--	--	--	--	--	--	--	--	**X**(6)
Recreation and tourism	--	--	--	--	--	--	--	--	--	**X**(6)
Land use	--	--	--	--	--	--	--	--	--	**X**(6)
Other marine uses	--	--	--	--	--	--	--	--	--	**X**(6)

*numbers refer to table footnotes.

Table 2 Footnotes and Applicability to this Program:

*Footnotes are numbered to correspond to entries in **Table 2**; applicability to each case is noted by a bullet point following the footnote.*

(1) Activities that may affect a marine sanctuary or topographic feature. Specifically, if the well, rig site, or any anchors will be on the seafloor within the following:
  (a) 4-mile zone of the Flower Garden Banks, or the 3-mile zone of Stetson Bank;
  (b) 1,000-m, 1-mile, or 3-mile zone of any topographic feature (submarine bank) protected by the Topographic Features Stipulation attached to an Outer Continental Shelf (OCS) lease;
  (c) Essential Fish Habitat (EFH) criteria of 152 m (500 ft) from any no-activity zone; or
  (d) Proximity of any submarine bank (152-m [500-ft] buffer zone) with relief greater than 2 m (7 ft) that is not protected by the Topographic Features Stipulation attached to an OCS lease.
  - None of these conditions (a through d) are applicable. The project area is not within or near any marine sanctuary, topographic feature, submarine bank, or no-activity zone.

(2) Activities with any bottom disturbance within an OCS lease block protected through the Live Bottom (Pinnacle Trend) Stipulation attached to an OCS lease.
  - The Live Bottom (Pinnacle Trend) Stipulation is not applicable to the project area.

(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.
  - The Live Bottom (Low-Relief) Stipulation is not applicable to the project area.

(4) Activities on blocks designated by the BOEM as being in water depths 400 m or greater.
  - No impacts on high-density deepwater benthic communities are anticipated. There are no features indicative of seafloor hard bottom that could support high-density chemosynthetic communities or coral communities within 610 m (2,000 ft) of the proposed wellsite locations (GEMS, 2022a,b,c,d,e,f).

(5) Exploration or production activities where Hydrogen Sulfide (H_2S) concentrations greater than 500 ppm might be encountered.
  - Chevron is requesting BOEM classify MC 608 as H_2S present. An estimated H_2S concentration less than or equal to 22.2 ppm (measured at standard conditions) may be encountered while conducting the operations proposed under this Exploration Plan. H_2S concentrations were derived from regional data, models, and offset well data. Chevron will submit an H_2S Contingency Plan as required by 30 CFR § 250.490(f).

(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.
  - Accidental hydrocarbon spills could affect the resources marked (X) in the matrix, and impacts are analyzed in **Section C**.

(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 prehistoric site that no impact would occur, the EIA can note that in a sentence or two.
  - No impacts to archaeological resources are expected. The project area is well beyond the 60-meter depth contour used by BOEM as the seaward extent for prehistoric archaeological site potential in the Gulf of Mexico. The site clearance letters (GEMS, 2022a,b,c,d,e,f), reported that the area of potential effect around the proposed wellsites appears clear of archeological resources.

(8) All activities that you determine might have an adverse effect on endangered or threatened marine mammals or sea turtles or their critical habitats.
  - IPFs that may affect marine mammals, sea turtles, or their critical habitats include drilling rig presence, support vessel and helicopter traffic, and accidents. See **Section C**.

(9) Production activities that involve transportation of produced fluids to shore using shuttle tankers or barges.
  - Not applicable.

The physical presence of the drilling rig in the ocean can attract and potentially impact pelagic marine resources, as discussed in **Section C.5.1**. DP drillships and semisubmersible drilling rigs maintain exterior lighting for working at night and for navigational and aviation safety in accordance with applicable federal safety regulations. This artificial lighting may also attract and directly or indirectly impact natural resources. Drilling operations produce underwater sounds that may impact certain marine resources. Sources of drilling-related sounds include, for example, riser rotation, DP thrusters, remotely operated vehicle (ROV) operations, and seabed mounted active acoustics (such as ultra-short baseline systems) for positioning. Of the aforementioned sources, only DP thruster activity is expected to produce sound at levels which could result in potential impacts on marine life.

The drilling rig operations and equipment can be expected to produce noise associated with propulsion machinery that transmits directly to the water during station keeping, drilling, and maintenance operations. Additional sound and vibration are transmitted through the hull to the water from auxiliary machinery, such as generators, pumps, and compressors onboard the drilling rig (Richardson et al., 1995). The noise levels produced by DP vessels for station-keeping are largely dependent on the level of thruster activity required to keep position and, therefore, vary based on local ocean currents, vessel thruster specifications, and operational requirements. Representative source levels for vessels in DP mode range from 184 to 190 decibels (dB) referenced to (re) 1 micropascal (µPa) m with a primary frequency below 600 Hz (Blackwell and Greene Jr., 2003; McKenna et al., 2012; Kyhn et al., 2014). Zykov (2016) characterized a noisier drillship thruster with a source level, expressed as root-mean-square sound pressure level (SPL), of 190 to 195 dB re 1 µPa m. The source level for the thrusters used by Zykov (2016) were estimated for power output close to the nominal value (the maximum sustainable) for all thrusters; it is highly unlikely that all the thrusters of all vessels will be operated at such conditions for a prolonged period of time.

Drilling operations produce noise that includes strong tonal components at low frequencies. When drilling, the drill string represents a long vertical sound source (McCauley, 1998). Source levels associated with drilling activities have a maximum broadband (10 Hz to 10 kHz) energy of approximately 190 dB re 1 µPa m (Hildebrand, 2005). Based on available data, source levels generated from drillships during drilling and in the absence of thrusters can be expected to range between 154 and 176 dB re 1 µPa m (Nedwell et al., 2001). The use of thrusters, whether drilling or not, can elevate sound source levels from a drillship or semisubmersible to approximately 188 dB re 1 µPa m (Nedwell and Howell, 2004).

Positioning of the drilling rig requires the use of a vessel-mounted transducer and a series of transceivers placed on the seafloor. The transducer employs a high frequency acoustic signal (i.e., main energy between 21 and 31 kHz) throughout the operation. While the acoustic signal emitted by the transducer is similar to that emitted by a commercial echosounder, its source level will vary depending upon water depth (i.e., higher source levels required in deeper water). Source levels for the vessel-mounted transceiver, expressed as SPL, are estimated to be >200 dB re 1 µPa m, with the energy focused towards the seafloor (Equinor, 2019). The directionality and frequency of the source results in minimal propagation outside the main beam of the pulse.

The response of marine mammals, sea turtles, and fishes to a perceived marine sound depends on a range of factors, including 1) SPL, frequency, duration, and novelty of the sound; 2) the physical and behavioral state of the animal at the time of perception; and 3) the ambient acoustic features of the environment (Hildebrand, 2009). Additionally, the sound detection capabilities of a particular species or group of species can make them more or less susceptible to potential impacts from sound sources (BOEM, 2014b).

A.2 Physical Disturbance to the Seafloor

In water depths of 600 m (1,969 ft) or greater, DP drilling rigs disturb only a very small area of the seafloor around the wellbore where the bottom template and blowout preventer (BOP) are located. Depending on the specific well configuration, the total disturbed area is estimated to be 0.25 hectares (ha) (0.62 acres [ac]) per well (BOEM, 2012a).

A.3 Air Pollutant Emissions

The air pollutant emissions are calculated in accordance with BOEM requirements for screening air impacts and summarized in the Air Quality Emissions Report in EP Section G. The primary air pollutants typically associated with OCS activities are suspended particulate matter ($PM_{2.5}$ and PM_{10}), sulfur oxides (SOx), nitrogen oxides (NOx), volatile organic compounds (VOCs), and carbon monoxide (CO) (Reşitoğlu et al., 2015), as well as ammonia (NH_3) and lead (Pb) per NTL 2020-G01. These emissions occur mainly from combustion diesel and aviation fuel, also known as Jet-A.

The Air Quality Emissions Report demonstrates that the projected emissions are below exemption levels set by the applicable regulations in 30 CFR § 550.303. Based on this and the distance from shore, it can be concluded that the emissions will not significantly affect the air quality of the onshore area for any of the criteria pollutants.

A.4 Effluent Discharges

The discharges will include treated sanitary and domestic wastes, deck drainage, desalination unit brine, BOP fluid, uncontaminated ballast and bilge water, noncontact cooling water, fire water, water-based drilling muds (WBM) and cuttings, cuttings wetted with synthetic-based drilling muds (SBM), hydrate control fluid, subsea wellhead preservation fluid, leak tracer dye, and excess cement. All offshore discharges are expected to meet the requirements of the National Pollutant Discharge Elimination System (NPDES) General Permit issued by the U.S. Environmental Protection Agency (USEPA) and any applicable U.S. Coast Guard (USCG) regulations such as International Sewage Pollution Prevention Certificates and maintenance logs/records for marine sanitation devices.

Water-based drilling muds and cuttings are expected to be released at the seafloor during the initial well-drilling intervals before the marine riser that enables the return of drilling muds and cuttings to the surface is installed and set. Excess cement slurry will also be released at the seafloor during casing installation for the riserless portion of the drilling operations. Synthetic-based drilling muds (SBMs) will be collected on the rig and will either be reused by the vendor or transported to Port Fourchon, Louisiana, for recycling and/or disposal at an approved facility. Drill cuttings wetted with some residual SBMs will be discharged at the surface in accordance with the NPDES permit conditions. Well treatment fluids, well completion fluids, and blowout prevention fluids also are expected to be discharged in accordance with the specified conditions, terms, or limitations in the Offshore Subcategory of the NPDES permit.

Other effluent discharges are expected from the drillship marine operations and include, but are not limited to treated sewage sludge, filter backwash domestic wastes, deck drainage, and other substances removed from wastewater to be disposed of in a manner to prevent pollution. Miscellaneous discharges will consist of uncontaminated seawater/freshwater, such as uncontaminated ballast/bilge water, fire water, cooling water, potable water, off-specification potable water and desalination unit discharge. Seawater/freshwater to which treatment chemicals such as biocides or corrosion inhibitors have been added, and effluents passed through the drillship oil-water separator, are expected to be discharged in accordance with the conditions in the NPDES permit or USGC – MARPOL 73/78 Annex IV & V regulations.

Under certain circumstances, the drilling rig may relocate to a safe zone which is not located within the leased area to avoid severe weather, loop currents, or to conduct routine maintenance while idled from drilling activities. During these limited times of safe zone harboring, incidental vessel discharges may occur. These discharges are expected to be within the limits represented in the waste and water discharge table estimates submitted as part of this EP.

A.5 Water Intake

Seawater will be drawn from the ocean for once-through, non-contact cooling of machinery on the drilling rig. Section 316(b) of the Clean Water Act requires NPDES permits to ensure that the location, design, construction, and capacity of cooling water intake structures reflect the best technology available to minimize adverse environmental impact from impingement and entrainment of aquatic organisms. The General NPDES Permit specifies design requirements for facilities for which construction commenced after 17 July 2006 with a cooling water intake structure having a design intake capacity of greater than two million gallons of water per day, of which at least 25% is used for cooling purposes. It is expected that the drilling rig ultimately selected for this project will be in compliance with all applicable cooling water intake structure design requirements, monitoring, and limitations. Where applicable, the drilling rig operator takes responsibility for obtaining necessary NPDES permit coverage for its cooling water intake structure and associated permit compliance.

A.6 Onshore Waste Disposal

A list of the solid and liquid wastes generated during this project to be disposed of onshore are tabulated in EP Section F. A total of approximately 1,800 lbs per day of trash and debris will be generated over the life of the project. Wastes generated during the proposed project are expected to be properly stored and segregated on the drilling rig. Wastes are to be packaged in appropriate non-hazardous or hazardous waste containers for transportation to shore for disposal in an appropriately permitted facility. All wastes will be transported to shore in containers approved by the U.S. Department of Transportation for re-use, recycling, or disposal in accordance with applicable regulations. Compliance with these requirements is expected to result in either no or negligible impacts from this factor.

A.7 Marine Debris

Chevron will comply with all applicable regulations relating to solid waste handling, transportation, and disposal, including the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) Annex V requirements, and USEPA, U.S. Coast Guard (USCG), BSEE, and BOEM regulations. These regulations include prohibitions and compliance requirements regarding the deliberate discharging of containers and other similar materials (i.e., trash and debris) into the marine environment as well as the protective measures to be implemented to prevent the accidental loss of solid material into the marine environment. For example, BSEE regulations 30 CFR § 250.300(a) and (b)(6) prohibit operators from deliberately discharging containers and other similar materials (i.e., trash and debris) into the marine environment, and 30 CFR § 250.300(c) requires durable identification markings on equipment, tools, containers (especially drums), and other material. The USEPA and USCG regulations require operators to be proactive in avoiding accidental loss of solid materials by developing waste management plans, posting informational placards, manifesting trash sent to shore, and using special precautions such as covering outside trash bins to prevent accidental loss of solid waste. Additionally, the debris awareness training, instruction, and placards required by the Protected Species Lease Stipulation should minimize the amount of debris that is accidentally lost overboard by offshore personnel (NMFS [2020a] Appendix B). In compliance with NTL BSEE-2015-G03, Chevron and its contractors intend to exercise caution in the handling and disposal of small items and packaging materials, requires the posting of informational placards at prominent locations on offshore vessels and structures, and mandates a yearly marine trash and debris awareness training and certification process. Compliance with these requirements is expected to result in minimal and only accidental loss of solid waste. Consequently, there will be either no or negligible impacts from this factor.

A.8 Support Vessel and Helicopter Traffic

A.8.1 Physical Presence

IPFs associated with support vessel and helicopter traffic include their physical presence and operational noise. The existing shorebase facilities at Port Fourchon, Louisiana, will be used by Chevron for support vessel activities. Support helicopters are expected to be based at heliport facilities in Galliano, Louisiana. No terminal expansion or construction is planned at either location.

NMFS (2020a) has found that support vessel traffic has the potential to disturb protected species (e.g., marine mammals, sea turtles, fishes) and creates a risk of vessel collisions. The probability of a vessel collision depends on the number, size, and speed of vessels as well as the distribution, abundance, and behavior of the species (Laist et al., 2001; Jensen and Silber, 2004; Hazel et al., 2007; Vanderlaan and Taggart, 2007; Conn and Silber, 2013; NMFS, 2020a). To reduce the potential for vessel collisions, BOEM issued NTL BOEM-2016-G01, which recommends protected species identification training and that vessel operators and crews maintain a vigilant watch for marine mammals and slow down or stop their vessel to avoid striking protected species and requires operators to report sightings of any injured or dead protected species. This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with the NTL.

The project will be supported by onshore crew boats and supply vessels. The crew boat is expected to make approximately one trip per week between the shorebase and the project area. The supply boat is expected to make a trip between the shorebase and the project area every two to three days. The boats typically move to the project area via the most direct route from the shorebase.

A helicopter will make approximately seven round trips per week between the drilling rig and the heliport. The helicopter will be used to transport personnel and small supplies and will normally take the most direct route of travel between the shorebase and the project area when air traffic and weather conditions permit. Offshore support helicopters typically maintain a minimum altitude of 213 m (700 ft) while in transit offshore, 305 m (1,000 ft) over unpopulated areas or across coastlines, and 610 m (2,000 ft) over populated areas and sensitive habitats such as wildlife refuges and park properties. Additional guidelines and regulations specify that helicopters maintain an altitude of 305 m (1,000 ft) within 100 m (328 ft) of marine mammals (NMFS, 2020a).

A.8.2 Operational Noise

Offshore support vessels associated with the proposed project will contribute to the overall acoustic environment by transmitting noise through both air and water. The support vessels will use conventional diesel-powered screw propulsion. Vessel noise is a combination of narrow band (tonal) and broadband noise (Richardson et al., 1995; Hildebrand, 2009; McKenna et al., 2012). Tones typically dominate up to approximately 50 Hz, whereas broadband sounds may extend to 100 kHz. The primary sources of vessel noise are propeller cavitation, propeller singing, and propulsion; other sources include engine noise, flow noise from water dragging along the hull, and bubbles breaking in the vessel's wake (Richardson et al., 1995). The intensity of noise from support vessels is roughly related to ship size, weight, and speed. Broadband source levels for smaller boats (a category that include supply and other service vessels) are in the range of 150 to 180 dB re 1 µPa m (Richardson et al., 1995; Hildebrand, 2009; McKenna et al., 2012).

Penetration of aircraft noise below the sea surface is greatest directly below the aircraft. Aircraft noise produced at angles greater than 13 degrees from vertical is mostly reflected from the sea surface and does not propagate into the water (Richardson et al., 1995). The duration of underwater noise from passing aircraft is much shorter in water than air; for example, a helicopter passing at an altitude of 152 m (500 ft) that is audible in air for 4 minutes may be detectable under water for only 38 seconds at 3 m (10 ft) depth and for 11 seconds at 18 m (59 ft) depth (Richardson et al., 1995).

Dominant tones for helicopters are generally below 500 Hz with source levels ranging from approximately 149 to 151 dB re 1 µPa m (for a Bell 212 helicopter) (Richardson et al., 1995). However, underwater noise levels received from passing aircraft depend on the aircraft's altitude, the aspect (direction and angle) of the aircraft relative to the receiver, receiver depth, water depth, and seafloor type (Richardson et al., 1995). The received level diminishes with increasing receiver depth when an aircraft is directly overhead, but may be stronger at mid-water than at shallow depths when an aircraft is not directly overhead (Richardson et al., 1995). Because of the relatively high expected airspeeds during transits and these physical variables, aircraft-related noise (including both airborne and underwater noise) is expected to be very brief in duration.

A.9 Accidents

The accidents addressed in the EIA focuses on the following two potential types:

- a small fuel spill, which is the most likely type of spill during OCS exploration activities; and
- a large oil spill, up to and including the WCD for this EP, which is an oil spill resulting from an uncontrolled blowout.

The following subsections summarize assumptions about the sizes and fates of these spills as well as Chevron's spill response plans. Impacts from these accidents are analyzed in **Section C**.

Recent EISs (BOEM, 2012a,b; 2013; 2014a; 2015; 2016b; 2017a) analyzed three types of accidents relevant to drilling operations that could lead to potential impacts to the marine environment: loss of well control, vessel collision, and chemical and drilling fluid spills. These types of accidents, along with dropped objects and an H_2S release, are discussed briefly below.

Loss of Well Control. A loss of well control is the uncontrolled flow of a reservoir fluid that may result in the release of gas, condensate, oil, drilling fluids, sand, and/or water. Loss of well control includes incidents from the very minor up to the most serious well control incidents, while blowouts are considered to be a subset of more serious incidents with greater risk of oil spill or human injury (BOEM, 2016a; 2017a). Loss of well control may result in the release of drilling fluid and/or loss of oil. Not all loss of well control events result in blowouts (BOEM, 2012a). In addition to the potential release of gas, condensate, oil, sand, and/or water, the loss of well control can also resuspend and disperse bottom sediments (BOEM, 2012a; 2017a). BOEM (2016a) noted that most OCS blowouts have resulted in the release of gas.

Chevron has a robust system in place to prevent loss of well control. Measures to prevent a blowout, reduce the likelihood of a blowout, and conduct effective and early intervention in the event of a blowout are described in the NTL 2015-N01 package submitted with this EP, as required by BOEM (as discussed in **Section A.9.1**). The potential for a loss of well control event will be minimized by adhering to the requirements of applicable regulations and NTL 2010-N10, which specifies additional safety measures for OCS activities.

Vessel Collisions. BSEE data show that there were 188 OCS-related collisions between 2007 and 2020 (BSEE, 2020). Most collision mishaps are the result of service vessels colliding with platforms or vessel collisions with pipeline risers. Approximately 10% of vessel collisions with platforms in the OCS resulted in diesel spills, and during several collision incidents, fires resulted from hydrocarbon releases. To date, the largest diesel spill associated with a collision occurred in 1979 when an anchor-handling boat collided with a drilling platform in the Main Pass Lease Area, spilling 1,500 barrels (bbl). Diesel fuel is the product most frequently spilled, but oil, natural gas, corrosion inhibitor, hydraulic fluid, and lube oil have also been released as the result of vessel collisions. Human error accounted for approximately half of all reported vessel collisions from 2006 to 2009. As summarized by BOEM (2017a), vessel collisions occasionally occur during routine operations. Some of these collisions have caused spills of diesel fuel or chemicals. Chevron and its contractors intend to comply with all applicable USCG and BOEM safety requirements to minimize the potential for vessel collisions.

Dropped Objects. Objects dropped overboard the DP drilling rig could potentially pose a risk to existing live subsea pipelines or other infrastructure. If a dropped pipe or other subsea equipment landed on existing seafloor infrastructure, loss of integrity of seafloor pipelines, umbilicals, etc. could result in a spill. Dropped objects could also result in seafloor disturbance and potential impacts to benthic communities. Chevron and its contractors intend to comply with all BOEM and BSEE safety requirement to minimize the potential for objects dropped overboard.

Chemical Spills. Chemicals are stored and used for pipeline hydrostatic testing, leak and pressure testing of subsea equipment and during drilling and in well completion operations. The relative quantities of their use is reflected in the largest volumes spilled (BOEM, 2017b) with completion, workover, and treatment fluids comprising the largest releases. Any potential leak due to pressure testing failure will be limited to a single line leak and would be limited to less than 1 bbl. Between 2007 and 2014, an average of two chemical spills <50 bbl in volume and three chemical spills >50 bbl in volume occurred each year (BOEM, 2017a).

Drilling Fluid Spills. There is the potential for drilling fluids, specifically SBMs, to be spilled due to an accidental riser disconnect (BOEM, 2017a). SBMs are relatively nontoxic to the marine environment and have the potential to biodegrade (BOEM, 2014a). The majority of SBM releases are <50 bbl in size, but accidental riser disconnects may result in the release of medium (238 to 2,380 bbl) to large (>2,381 bbl) quantities of drilling fluids. In the event of an SBM spill, there could be short-term localized impacts on water quality and the potential for localized benthic impacts due to SBM deposition on the seafloor. Benthic impacts would be similar to those described in **Section C.2.1**. The potential for riser disconnect and subsequent SBM spills will be minimized by adhering to the requirements of applicable regulations.

H_2S Release. Chevron is requesting BOEM classify MC 608 as H_2S present. An estimated H_2S concentration less than or equal to 22.2 ppm (measured at standard conditions) may be encountered while conducting the operations proposed under this Exploration Plan. H_2S concentrations were derived from regional data, models, and offset well data. Chevron will submit an H_2S Contingency Plan as required by 30 CFR § 250.490(f).

A.9.1 Small Fuel Spill

Spill Size. According to the analysis by BOEM (2017b), the most likely type of small spill (<1,000 bbl) resulting from OCS activities is a failure related to the storage of oil or diesel fuel. Historically, most diesel spills have been ≤1 bbl, and this is predicted to be the most common spill volume in ongoing and future OCS activities in the Western and Central Gulf of Mexico Planning Areas (Anderson et al., 2012). As the spill volume increases, the incident rate declines dramatically (BOEM, 2017a). The median size for spills ≤1 bbl is 0.024 bbl, and the median volume for spills of 1 to 10 bbl is 3 bbl (Anderson et al., 2012). For the EIA, a small diesel fuel spill of 3 bbl is used. Operational experience suggests that the most likely cause of such a spill would be a rupture of the fuel transfer hose resulting in a loss of contents (3 bbl of fuel) (BOEM, 2012a).

Spill Fate. The fate of a small fuel spill in the project area would depend on meteorological and oceanographic conditions at the time of the spill as well as the effectiveness of spill response activities. However, given the open ocean location of the project area and response actions, it is expected that impacts from a small spill would be minimal (BOEM, 2016a).

The water-soluble fractions of diesel are dominated by two- and three-ringed polycyclic aromatic hydrocarbons (PAHs), which are moderately volatile (National Research Council, 2003a). The constituents of these oils are light to intermediate in molecular weight and can be readily degraded by aerobic microbial oxidation. Due to its light density, diesel will not sink to the seafloor. Diesel dispersed in the water column can adhere to suspended sediments, but this generally occurs only in coastal areas with high amounts of suspended solids (National Research Council, 2003a) and would not be expected to occur to any appreciable degree in offshore waters of the Gulf of Mexico. Diesel fuel is readily and completely degraded by naturally occurring microbes (National Oceanic and Atmospheric Administration [NOAA], 2006).

Sheens from small fuel spills are expected to persist for relatively short periods of time, ranging from minutes (<1 bbl) to hours (<10 bbl) to a few days (10 to 1,000 bbl), and rapidly spread out, evaporate, and disperse into the water column (BOEM, 2012a).

For purposes of the EIA, the fate of a small diesel fuel spill of 3 bbl was estimated using WebGNOME, a publicly available oil spill trajectory and fate model developed by NOAA (NOAA, 2022). This model uses the physical properties of oils in its database to predict the rate of evaporation and dispersion over time as well as changes in the density, viscosity, and water content of the product spilled. It is estimated that over 90% of a small diesel spill would be evaporated or dispersed within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it during this 24-hour period would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

The WebGNOME results, coupled with spill trajectory information discussed below for a large spill, indicate that a small fuel spill would not impact coastal or shoreline resources. The project area is 60 statute miles (97 km) from the nearest shoreline (Plaquemines Parish, Louisiana). Slicks from small fuel spills are expected to persist for relatively short periods of time ranging from minutes (<1 bbl) to hours (<10 bbl) to a few days (10 to 1,000 bbl) and rapidly spread out, evaporate, and disperse into the water column (BOEM, 2012a). Because of the distance from shore of these potential spills on the OCS and their lack of persistence, it is unlikely that a spill would make landfall prior to dissipation (BOEM, 2012a).

<u>Spill Response</u>. In the unlikely event the shipboard procedures fail to prevent a fuel spill, response equipment and trained personnel would be activated so that any spill effects would be localized and would result only in short-term environmental consequences. A discussion of Chevron’s response efforts if a spill were to occur during operational activities is provided in EP Section H.

<u>Weathering</u>. Following a diesel fuel spill, several physical, chemical, and biological processes, collectively called weathering, interact to change the physical and chemical properties of the diesel, and thereby influence its harmful effects on marine organisms and ecosystems. The most important weathering processes include spreading, evaporation, dissolution, dispersion into the water column, formation of water-in-oil emulsions, photochemical oxidation, microbial degradation, adsorption to suspended particulate matter, and stranding on shore or sedimentation to the seafloor (National Research Council, 2003a; International Tanker Owners Pollution Federation Limited, 2018).

Weathering decreases the concentration of diesel fuel and produces changes in its chemical composition, physical properties, and toxicity. The more toxic, light aromatic and aliphatic hydrocarbons are lost rapidly by evaporation and dissolution from the slick on the water surface. Evaporated hydrocarbons are degraded rapidly by sunlight.

Biodegradation of diesel fuel on the water surface and in the water column by marine bacteria removes first the n-alkanes and then the light aromatics. Other petroleum components are biodegraded more slowly (National Research Council, 2003a). Diesel fuel spill response-related activities for facilities included in this EP are governed by Chevron's OSRP, which meets the requirements contained in 30 CFR Part 254.

A.9.2 Large Oil Spill (Worst Case Discharge)

Spill Size. The WCD scenario for this project is defined as an uncontrollable oil discharge from the subsea wellbore resulting from a blowout incident during drilling operations. The initial Open Flow Potential Rate was calculated with systems analysis using the Prosper nodal software package from Petroleum Experts, Ltd. The Worst-Case Discharge Scenario initial flow rate for the Norphlet interval in the 8-1/2" open hole section is calculated at 465,144 bopd by nodal analysis using Prosper. At this rate, severe pressure depletion is expected to occur in the case of an uncontrolled blow-out during the time it would take to drill the relief well. Chevron estimates 162 days to mobilize a rig, drill a relief well to intersect the blowout well and conduct a kill operation. During this time, the total potential spill volume is estimated at 62,897,614 bbl.

Spill Probability. Statistics from offshore drilling in the U.S. Gulf of Mexico provide a reasonable basis for evaluating oil spill risk during exploratory drilling. Historically, blowouts are rare events and most do not result in oil spills. A 2010 analysis using the SINTEF[1] database estimates a blowout frequency of 0.0017 per exploratory well for non-North Sea locations (International Association of Oil & Gas Producers, 2010). BOEM has updated spill frequencies to include the *Deepwater Horizon* incident and found that spill rates (bbl spilled per bbl produced) for OCS platform spills were unchanged for spills >1,000 bbl when compared with previously published data (Anderson et al., 2012). According to the BSEE analysis conducted for the Final Drilling Safety Rule issued in 2010, the baseline risk of a catastrophic blowout is estimated to be once every 26 years (75 *Federal Register* [FR] 63365).

Spill Trajectory. The fate of a large oil spill in the project area would depend on meteorological and oceanographic conditions at the time of and during the spill. The Oil Spill Risk Analysis (OSRA) model is a computer simulation of oil spill transport that uses realistic data for winds and currents to predict spill trajectory. The OSRA report by Ji et al. (2004) provides conditional contact probabilities for shoreline segments in the Gulf of Mexico.

The results for Launch Area 59 (where MC 608 is located) are presented in **Table 3**. The model predicts a <0.5% chance of contact with any shoreline within 3 days of the spill. Within 10 days, the model predicts a 1% conditional probability of shoreline contact in Lafourche Parish, Louisiana and a 5% conditional probability of shoreline contact in Plaquemines Parish, Louisiana. Shoreline contact is predicted within 30 days for shorelines ranging from Cameron Parish, Louisiana to Bay County, Florida. The conditional probability of shoreline contact is low (1% to 11%) for all shorelines with predicted contact within 30 days, with the highest probability of contact in Plaquemines Parish, Louisiana.

[1] Stiftelsen for industriell og teknisk forskning (Foundation for Scientific and Industrial Research, Norwegian Institute of Technology).

Table 3. Conditional probabilities of a spill in Mississippi Canyon Block 608 contacting shoreline segments based on the 30-day Oil Spill Risk Analysis (OSRA) (From: Ji et al., 2004). Values are conditional probabilities that a hypothetical spill in MC 608 (represented by OSRA Launch Area 59) could contact shoreline segments (as referenced from Ji et al., 2004) within 3, 10, or 30 days.

Shoreline Segment	County or Parish and State	Conditional Probability of Contact[1] (%)		
		3 Days	10 Days	30 Days
C13	Cameron Parish, Louisiana	--	--	1
C14	Vermilion Parish, Louisiana	--	--	1
C17	Terrebonne Parish, Louisiana	--	--	2
C18	Lafourche Parish, Louisiana	--	1	2
C19	Jefferson Parish, Louisiana	--	--	1
C20	Plaquemines Parish, Louisiana	--	5	11
C21	St. Bernard Parish, Louisiana	--	--	2
C29	Walton County, Florida	--	--	1
C30	Bay County, Florida	--	--	1

1 Conditional probability refers to the probability of contact within the stated time period, assuming that a spill has occurred (-- indicates <0.5%). Values are conditional probabilities that a hypothetical spill in the project area (represented by OSRA Launch Area 59) could contact shoreline segments within 3, 10, or 30 days.

The original OSRA modeling runs reported by Ji et al. (2004) did not evaluate the fate of a spill over time periods exceeding 30 days, nor did they estimate the fate of a release that continues over a period of weeks or months. As noted by Ji et al. (2004), the OSRA model does not consider the chemical composition or biological weathering of oil spills, the spreading and splitting of oil spills, or spill response activities. The model does not specify a particular spill size but has been used by BOEM to evaluate contact probabilities for spills greater than 1,000 bbl.

BOEM presented additional OSRA modeling to simulate a spill that continues for 90 consecutive days, with each trajectory tracked for 60 days during four seasons. In this updated OSRA model (herein referred to as the 60-day OSRA model), 60 days was chosen as a conservative estimate of the maximum duration that spilled oil would persist on the sea surface following a spill (BOEM, 2017b). The spatial resolution is limited, with five launch points in the entire Western and Central Planning Areas of the Gulf of Mexico. These launch points were deliberately located in areas identified as having a high possibility of containing large oil reserves. The 60-day OSRA model launch point most appropriate for modeling a spill in the project area is Launch Point 3 (located in the Central Planning Area shelf area). The 60-day OSRA results for Launch Point 3 are presented in **Table 4**.

Table 4. Shoreline segments with a 1% or greater conditional probability of contact from a spill starting at Launch Point 3 based on the 60-day Oil Spill Risk Analysis (OSRA). Values are conditional probabilities that a hypothetical spill in the project area could contact shoreline segments within 60 days. Modified from: BOEM (2017a).

Season	Spring				Summer				Fall				Winter			
Day	3	10	30	60	3	10	30	60	3	10	30	60	3	10	30	60
County or Parish	Conditional Probability of Contact[1] (%)															
Cameron, Texas	--	--	--	--	--	--	--	2	--	--	--	1	--	--	--	1
Willacy, Texas	--	--	--	--	--	--	--	1	--	--	--	1	--	--	--	2
Kenedy, Texas	--	--	--	--	--	--	1	5	--	--	--	2	--	--	--	3
Kleberg, Texas	--	--	--	--	--	--	1	3	--	--	1	2	--	--	--	2
Nueces, Texas	--	--	--	--	--	--	--	2	--	--	1	2	--	--	--	3
Aransas, Texas	--	--	--	--	--	--	--	2	--	--	1	2	--	--	--	3
Calhoun, Texas	--	--	--	--	--	--	--	3	--	--	1	2	--	--	1	4
Matagorda, Texas	--	--	3	5	--	--	1	4	--	--	2	5	--	--	3	10
Brazoria, Texas	--	--	3	3	--	--	2	5	--	--	1	2	--	--	3	8
Galveston, Texas	--	--	3	5	--	--	2	3	--	--	1	2	--	--	2	5
Jefferson, Texas	--	--	4	5	--	--	1	1	--	--	--	--	--	--	1	2
Cameron, Louisiana	--	--	9	11	--	--	1	3	--	--	--	2	--	--	1	3
Vermilion, Louisiana	--	1	5	6	--	--	1	1	--	--	--	--	--	--	1	2
Iberia, Louisiana	--	1	3	3	--	--	--	--	--	--	--	--	--	--	--	1
St. Mary, Louisiana		--	1	1	--	--	--	--	--	--	--	--	--	--	--	--
Terrebonne, Louisiana	--	5	12	13	--	--	1	2	--	--	1	1	--	1	2	2
Lafourche, Louisiana	--	2	5	6	--	--	1	2	--	--	--	--	--	--	1	2
Jefferson, Louisiana	--	--	1	1	--	--	--	1	--	--	--	--	--	--	--	--
Plaquemines, Louisiana	--	3	10	10	--	--	2	3	--	--	--	--	--	--	2	2
St. Bernard, Louisiana	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--
Baldwin, Alabama	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--
Escambia, Florida	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--
Okaloosa, Florida	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--
Bay, Florida	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--
Miami-Dade, Florida	--	--	--	--	--	--	--	1	--	--	--	--	--	--	--	--
State Coastline	Conditional Probability of Contact (%)															
Texas	--	--	13	19	--	--	7	30	--	--	7	21	--	--	11	44
Louisiana	--	12	46	52	--	2	6	12	--	1	2	4	--	2	8	12
Mississippi	--	--	1	1	--	--	--	1	--	--	--	--	--	--	--	--
Alabama	--	--	1	1	--	--	--	--	--	--	--	--	--	--	--	--
Florida	--	--	2	5	--	--	--	2	--	--	--	--	--	--	--	1

[1] Conditional probability refers to the probability of contact within the stated time period assuming that a spill has occurred (-- indicates <0.5%). Values are conditional probabilities that a hypothetical spill in the project area could contact shoreline segments within 60 days.

From Launch Point 3, potential shoreline contacts within 60 days range from Cameron County, Texas, to Miami-Dade County, Florida. Based on statewide contact probabilities within 60 days, Texas has the highest likelihood of contact during summer, fall, and winter (ranging from 21% to 44% within 60 days), while Louisiana has the highest contact probability in spring (52% within 60 days). The model predicts potential contact with Mississippi shorelines during spring or summer with contact probabilities of 1% (within 60 days of a spill). Alabama shorelines are predicted to be potentially contacted only during spring with a contact probability of 1% within 60 days. Florida shorelines are predicted to be potentially contacted during all seasons except fall, with contact probabilities of up to 5% (during spring). Based on the 60-day trajectories, counties or parishes with a 10% or greater contact probability during any season include Matagorda County, Texas; and Cameron, Terrebonne, and Plaquemines parishes in Louisiana (**Table 4**).

OSRA is a preliminary risk assessment model. In the event of an actual oil spill, real-time monitoring and trajectory modeling would be conducted using current and wind data available from the rigs and permanent production structures in the area. Satellite and aerial monitoring of the plume and real-time deterministic trajectory modeling using wind and current data would continue on a daily basis to help position equipment and human resources throughout the duration of any major spill or uncontrolled release.

Weathering. In the event of a diesel fuel spill, it is expected that weathering and evaporation will occur quickly. The constituents of diesel fuel are light to intermediate in molecular weight and can be readily degraded by aerobic microbial oxidation. NOAA has reported that diesel fuel is readily and completely degraded by naturally occurring microbes (NOAA, 2006).

Weathering decreases the concentration of oil and produces changes in its chemical composition, physical properties, and toxicity. The more toxic, light aromatic and aliphatic hydrocarbons are lost rapidly by evaporation and dissolution from a slick on the water surface. For example, the light, paraffinic crude oil spilled during the *Deepwater Horizon* incident lost approximately 55 wt. % to evaporation during the first 3 to 5 days while floating on the sea surface (Daling et al., 2014). Evaporated hydrocarbons are degraded rapidly by sunlight. Biodegradation of oil on the water surface and in the water column by marine bacteria removes first the n-alkanes and then the light aromatics from the oil. Other petroleum components are biodegraded more slowly (National Research Council, 2003a). Photo-oxidation attacks mainly the medium and high molecular weight PAHs in the oil on the water surface (Prince, 2014).

Spill Response. See EP Section H for a detailed description of Chevron’s site-specific response to the WCD for this EP. These sections, along with Chevron’s OSRP, also include a description of surface and subsea containment capabilities that could be implemented in the event of the WCD for this EP.

All the proposed activities in this plan will be covered by Chevron’s Gulf of Mexico Regional OSRP, approved by BSEE on 22 March 2016; biennial review received by BSEE and deemed in compliance with 30 CFR 254 on 23 March 2021. A revised OSRP was submitted in December2022. Companies covered under this OSRP: Chevron Corporation (02335), Chevron U.S.A. Inc. (00078), Chevron Pipe Line Company (00400), Sabine Pipe Line Company Inc. (00835), Union Oil Company of California (00003), Unocal Pipeline Company (01113), PRS Offshore, L.P. (01767), and Noble Energy Inc. (02237). Chevron has certified that it has the capability to respond to the maximum extent practical to a WCD from all Chevron facilities in the Gulf of Mexico.

B. Affected Environment

The project area is in the central Gulf of Mexico, approximately 68 statute miles (109 km) from the nearest shoreline (Plaquemines Parish, Louisiana), 130 statute miles (209 km) from the onshore support base at Port Fourchon, Louisiana, and 145 statute miles (233 km) from the helicopter base at Galliano, Louisiana (**Figure 1**). The water depth at the location of the proposed wellsites ranges from 2,017 to 2,039 m (6,616 to 6,691 ft) (**Figure 2**).

Based on side-scan sonar, the seafloor in the vicinity of the proposed wellsite consists of hemipelagic clay drapes. The proposed wellsites will not intersect any subsurface faults (GEMS, 2022a,b,c,d,e,f).

A detailed description of the regional affected environment, including meteorology, oceanography, geology, air and water quality, benthic communities, threatened and endangered species, biologically sensitive resources, archaeological resources, socioeconomic conditions, and other marine uses is provided in recent EISs (BOEM, 2012a; 2013; 2014a; 2015; 2016b; 2017a). These regional descriptions, applicable to MC 608, remain valid and are incorporated by reference. General background information is presented in the following sections, and brief descriptions of each potentially affected resource, including site-specific and new information if available, are presented in **Section C**.

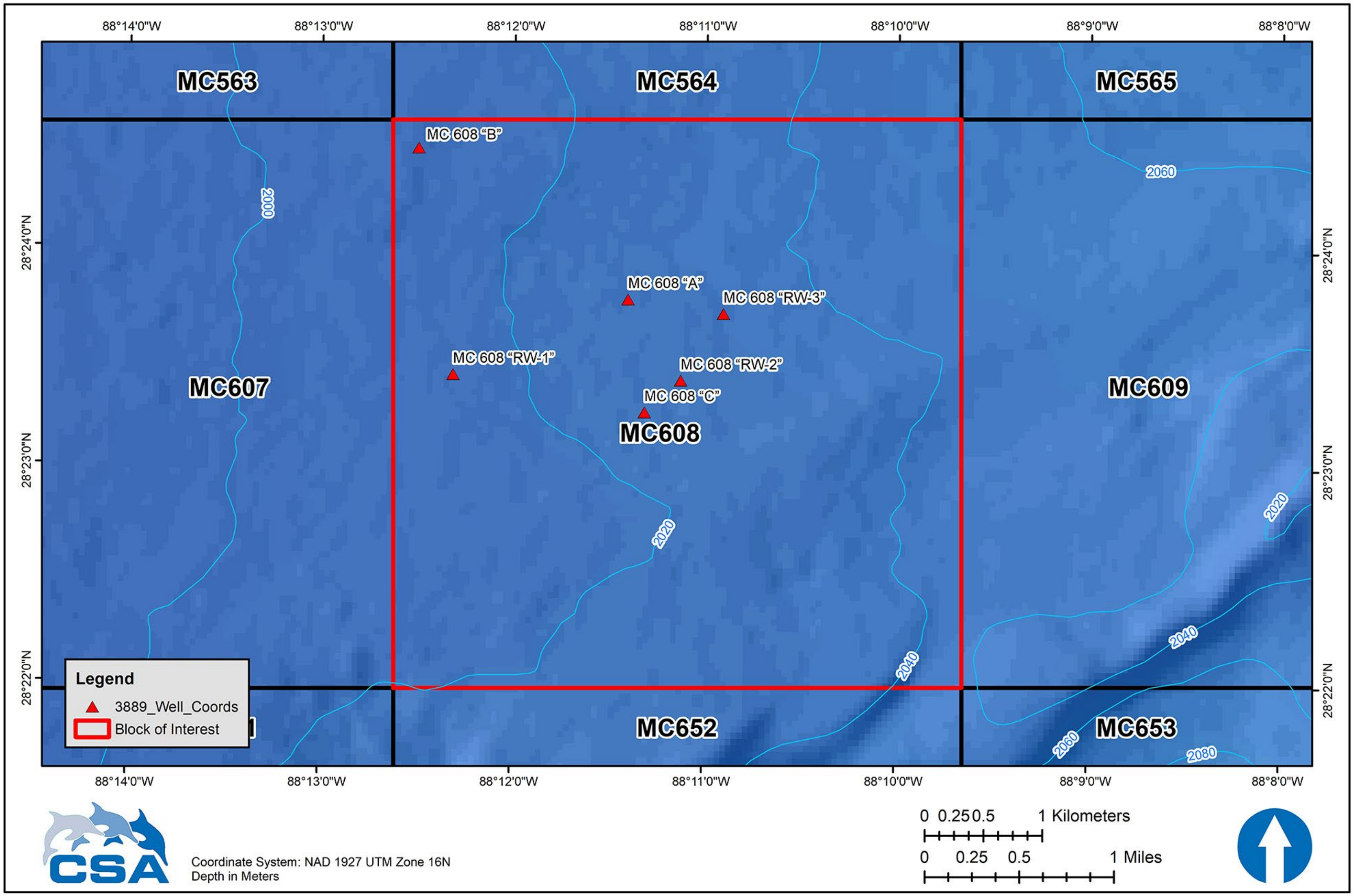

Figure 2. Bathymetric map of the project area showing the proposed wellsite surface hole location in Mississippi Canyon Block 608.

C. Impact Analysis

This section analyzes the potential direct and indirect impacts of routine activities and accidents. Impacts have been analyzed extensively in lease sale EISs for the Central and Western Gulf of Mexico Planning Areas (BOEM, 2013; 2014a; 2015; 2016a,b; 2017a) and this information in these documents is incorporated by reference. This section is organized by the environmental resources identified in **Table 2** and addresses each IPF potentially affecting the resource.

C.1 Physical/Chemical Environment

C.1.1 Air Quality

There are no site-specific air quality data for the project area due to the distance from shore. Because of the distance from shore-based pollution sources and the minimally dispersed sources offshore, air quality at the wellsite is expected to be good. The attainment status, (i.e., meeting air quality standards set by the USEPA) of federal OCS waters is unclassified because there is no provision in the Clean Air Act for classification of areas outside state waters (BOEM, 2012a).

In general, ambient air quality of coastal counties along the Gulf of Mexico is relatively good (BOEM, 2012a). As of October 2022, Mississippi, Alabama, and Florida Panhandle coastal counties, in proximity to the project area, are in attainment of the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants (USEPA, 2022). St. Bernard Parish in Louisiana is a nonattainment area for sulfur dioxide based on the 2010 standard. One coastal metropolitan area in Texas (Houston-Galveston-Brazoria) is a nonattainment area for 8-hour ozone (2015 Standard).

Winds in the region are driven by the anticyclonic (clockwise) atmospheric circulation around the Bermuda High, a semi-permanent, subtropical area of high pressure in the North Atlantic Ocean off the East Coast of North America that migrates east and west with varying central pressure (BOEM, 2017a). The Gulf of Mexico is located to the southwest of this circulation center, resulting in a prevailing southeasterly to southerly flow, which is conducive to transporting emissions toward shore. However, circulation is also affected by tropical cyclones (hurricanes) during summer and fall and by extratropical cyclones (cold fronts) during winter.

As noted earlier, based on calculations made pursuant to applicable regulations and guidance in NTL BOEM-2020-G01, emissions from drilling activities are not expected to be significant. Therefore, the only potential effects to air quality would be from air pollutant emissions associated with routine operations and accidental spills (a small fuel spill or a large oil spill). These IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Air Pollutant Emissions

Air pollutant emissions are the only routine IPF likely to affect air quality. Offshore air pollutant emissions result primarily from the drilling operations and service vessels. These emissions occur mainly from combustion or burning of diesel and Jet-A aircraft fuel. The combustion of fuels occurs primarily in generators, pumps, or motors and from lighter fuel motors. Primary air pollutants typically associated with OCS activities are suspended PM, SOx, NOx, VOCs, CO, NH_3, and Pb. As noted by BOEM (2017b), emissions from routine activities are projected to have minimal impacts to onshore air quality because of the prevailing atmospheric conditions, anticipated emission rates, anticipated heights of emission sources, and the distance to shore of the proposed activities. However, support vessel and helicopter traffic entering or departing coastal facilities will release air pollutants in these areas during the project period. The incremental contribution to cumulative impacts from activities described in Chevron's EP is minimal and is not expected to cause or contribute to a violation of NAAQS.

Greenhouse gas emissions may contribute to climate change, with important effects on temperature, rainfall, frequency of severe weather, ocean acidification, and sea level rise (Intergovernmental Panel on Climate Change, 2014). Greenhouse gas emissions from this proposed project represent a negligible contribution to the total greenhouse gas emissions from reasonably foreseeable activities in the Gulf of Mexico and are not expected to significantly alter or exceed any of the climate change impacts evaluated in the Programmatic EIS (BOEM, 2016a). Carbon dioxide (CO_2) and methane (CH_4) emissions from the project would constitute a small incremental contribution to greenhouse gas emissions from all OCS activities. According to Programmatic and OCS lease sale EISs (BOEM, 2016a; 2017a), estimated CO_2 emissions from OCS oil and gas sources are 0.4% of the U.S. total. Because of the distance from shore, routine operations in the project area are not expected to have any impact on air quality conditions along the coast, including nonattainment areas.

As noted in the lease sale EIS (BOEM, 2017a), emissions of air pollutants from routine activities in the Central Gulf of Mexico Planning Area are projected to have minimal impacts to onshore air quality because of the prevailing atmospheric conditions, emission rates, and the distance of these emissions from the coastline. The Air Quality Emissions Report indicates that the projected project emissions are below exemption levels set by the applicable regulations in 30 CFR § 550.303. Based on this and the distance from shore, it can be concluded that the emissions will not significantly affect the air quality of the onshore area for any of the criteria pollutants.

The Breton Wilderness Area, which is part of the Breton National Wildlife Refuge (NWR), is designated under the Clean Air Act as a Prevention of Significant Deterioration (PSD) Class I air quality area. BOEM is required to notify the National Park Service and U.S. Fish and Wildlife Service (USFWS) if emissions from proposed projects may affect the Breton Class I area. The project area is approximately 96 statute miles (154 km) from the Breton Wilderness Area. Chevron and its contractors intend to comply with all BOEM requirements regarding air emissions.

There are three Class I air quality areas on the west coast of Florida: St Mark's Wildlife Refuge in Wakulla County, Chassahowitzka Wilderness Area in Hernando County, and Everglades National Park in Monroe, Miami-Dade, and Collier counties. The project area is approximately 248 miles (399 km) from the closest Florida Class I air quality area (Saint Mark's Wildlife Refuge Class I Air Quality Area).

Impacts of a Small Fuel Spill

Potential impacts of a small spill on air quality are expected to be consistent with those analyzed and discussed by BOEM (2012a; 2015; 2016b; 2017a). The probability of a small spill would be minimized by Chevron's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of Chevron's OSRP is expected to reduce the potential impacts. EP Section H includes a detailed discussion of the spill response measures that would be employed.

The EIA small spill scenario is proposed to occur in offshore waters at or near the drilling rig. A small fuel spill would affect air quality near the spill site by introducing VOCs into the atmosphere through evaporation. The webGNOME model (see **Section A.9.1**) indicates that over 90% of a small diesel spill would be evaporated or dispersed within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

Because of the offshore location of the proposed small fuel spill, coastal air quality would not be affected because the spill would be expected to be degraded by weathering processes and dissipate prior to making landfall or reaching coastal waters (see **Section A.9.1**).

Impacts of a Large Oil Spill

Potential impacts of a large oil spill on air quality are expected to be consistent with those analyzed and discussed by BOEM (2012a; 2015; 2016b; 2017a). A large oil spill could potentially affect air quality by introducing VOCs into the atmosphere through evaporation. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the spill and the effectiveness of spill response measures. Real-time wind and current data from the project area would be available at the time of a spill and would be used to assess the fate and effects of VOCs released. Additional air quality impacts could occur if response measures included *in situ* burning of floating oil. Burning would generate a plume of black smoke and result in emissions of NO_x, SO_x, CO, and PM as well as greenhouse gases. However, *in situ* burning would occur only after authorization from the USCG Federal On-Scene Coordinator. This approval would also be based upon consultation with the regional response team, including the USEPA.

Because of the project area's location (68 statute miles [109 km]) from the nearest shoreline, most air quality impacts would occur in offshore waters with minimal chance to affect onshore air quality. However, depending on the spill trajectory and the effectiveness of spill response measures, coastal air quality could be affected if oil on the sea surface approaches or contacts the coast.

C.1.2 Water Quality

There are no site-specific baseline water quality data for the project area. Deepwater areas in the northern Gulf of Mexico are relatively similar with respect to patterns of water column temperature, salinity, and oxygen (BOEM, 2017a). Kennicutt (2000) noted that the deepwater region has little evidence of contaminants in the dissolved or particulate phases of the water column. Within the northern Gulf of Mexico, there are localized areas (termed natural seeps) that release oil, gas, and brines from sub-surface deposits into near surface sediments and up through the water column. No natural seeps were noted within 610 m (2,000 ft) of the proposed wellsites (GEMS, 2022a,b,c,d,e,f).

The only IPFs that may affect water quality are effluent discharges associated with routine operations and two types of accidents (a small fuel spill and a large oil spill) as discussed below.

Impacts of Effluent Discharges

Discharges of treated cuttings with some limited amount of residual SBM may produce temporary, localized increases in suspended solids in the water column around the drilling rig. In general, turbid water can be expected to extend between a few hundred meters and several kilometers down current from the discharge point for water-based drilling muds and cuttings (Neff, 1987). SBMs will be collected on the rig and either reused by the vendor or transported to Port Fourchon, Louisiana, for recycling and disposal at an approved facility. Cuttings wetted with SBMs and SBM discharges associated with weekly safety diverter valve testing on the drillship are expected to be treated to reduce SBM levels at or below NPDES requirements and discharged overboard at the drillsite in accordance with all NPDES permit limitations and requirements. After discharge, SBMs retained on cuttings would be expected to adhere tightly to the cuttings particles and, consequently, would not produce substantial turbidity in the water column (Neff et al., 2000). No persistent impacts on water quality in the project area are expected from drill cutting discharges.

Water-based drilling muds and cuttings will be released at the seafloor during the initial well intervals before the marine riser, which allows returns to the surface, is set. Excess cement slurry also will be released at the seafloor during casing installation for the riserless portion of the drilling operations. The seafloor discharges of WBM and associated drill cuttings will result in seafloor disturbances that will produce locally turbid conditions in the water column near the seafloor. The turbidity plume will be carried away from the well by near-bottom currents and, based on current speed(s), may be detectable within tens to hundreds of meters of the wellbore. As suspended WBM and resuspended sediments settle to the seafloor, the water clarity will return to background conditions within minutes to a few hours after drilling of these well intervals ceases (Neff, 1987). Discharges of WBM and cuttings are likely to have little or no impact on water quality due to the low toxicity and rapid dispersion of these discharges (National Research Council, 1983; Neff, 1987; Hinwood et al., 1994).

Treated sanitary and domestic wastes, including those from support vessels, may have a transient effect on water quality in the immediate vicinity of the discharge at the sea surface. Treated sanitary and domestic wastes may have elevated levels of nutrients, organic matter, and chlorine but should dilute rapidly to undetectable levels within tens to hundreds of meters from the source. All NPDES permit limitations and requirements as well as USCG regulations (as applicable) are expected to be met during proposed activities; therefore, little or no impact on water quality from the overboard releases of treated sanitary and domestic wastes is anticipated.

Deck drainage includes all effluents resulting from rain, deck washings, and runoff from curbs, gutters, and drains (including drip pans) in work areas. Rainwater that falls on uncontaminated areas of the drilling rig will flow overboard without treatment. However, rainwater that falls on the drilling rig deck and other areas such as chemical storage areas and places where equipment is exposed (such as drip or containment pans) will be collected, and oil and water will be separated to meet NPDES permit requirements. Based on expected adherence to permit limits and applicable regulations, little or no impact on water quality from deck drainage is anticipated.

Other discharges in accordance with the NPDES permit, such as desalination unit brine; BOP water-based hydraulic fluids; and uncontaminated cooling water, firewater, ballast water, bilge water, and other discharges of seawater and freshwater to which treatment chemicals have been added are expected to dilute rapidly and have little or no impact on offshore water quality.

Support vessels will discharge treated sanitary and domestic wastes. These are not expected to have a significant impact on water quality in the vicinity of the discharges. Support vessel discharges are expected be in accordance with USCG and MARPOL 73/78 regulations and, as applicable, the NPDES Vessel General Permit, and therefore are not expected to cause significant impacts on water quality.

Impacts of a Small Fuel Spill

Potential impacts of a small spill on water quality are expected to be consistent with those analyzed and discussed by BOEM (2012a; 2015; 2016b; 2017a). The EIA small spill scenario is proposed to occur in offshore waters at or near the drilling rig. The probability of a small spill would be minimized by Chevron's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of Chevron's OSRP is expected to potentially help mitigate and reduce the impacts. EP Section H provides details on spill response measures in addition to the summary information provided in the EIA.

The water-soluble fractions of diesel are dominated by two- and three-ringed PAHs, which are moderately volatile (National Research Council, 2003a). The molecular weight of diesel fuel constituents is light to intermediate and can be readily degraded by physiochemical weathering processes (e.g., evaporation, dissolution, dispersion, photochemical oxidation) and biological processes (microbial degradation). Diesel fuel is much lighter than water (specific gravity is between 0.83 and 0.88, compared to 1.03 for seawater). When spilled on water, diesel fuel spreads very quickly to a thin film of rainbow and silver sheens, except for marine diesel, which may form a thicker film of dull or dark colors. However, because diesel fuel has a very low viscosity, it is readily dispersed into the water column when winds reach 5 to 7 knots or with breaking waves (NOAA, 2017a). It is possible for the diesel fuel that is dispersed by wave action to form droplets that are small enough be kept in suspension and moved by the currents.

Diesel dispersed in the water column can adhere to suspended sediments, but this generally occurs only in coastal areas with high levels of suspended solids (National Research Council, 2003a) and would not be expected to occur to any appreciable degree in offshore waters of the Gulf of Mexico.

The extent and persistence of water quality impacts from a small diesel fuel spill would depend on the meteorological and oceanographic conditions at the time of the spill and the effectiveness of spill response measures. It is estimated that more than 90% of a small diesel spill would evaporate or disperse within 24 hours (NOAA, 2022) (see **Section A.9.1**). The sea surface area covered with a very thin layer of diesel fuel would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions. In addition to removal by evaporation, constituents of diesel fuel are readily and completely degraded by naturally occurring microbes (NOAA, 2006; 2017a). Given the open ocean location of the project area, the extent and duration of water quality impacts from a small spill would not be significant.

Impacts of a Large Oil Spill

Potential impacts of a large oil spill on water quality are expected to be consistent with those analyzed and discussed by BOEM (2012a; 2015; 2016b; 2017a). Most of the spilled oil would be expected to form a slick at the surface, although information from the *Deepwater Horizon* incident indicates that submerged oil droplets can be produced when subsea dispersants are applied at the wellhead (Camilli et al., 2010; Hazen et al., 2010; NOAA, 2011a,b,c). Dispersants would be applied only after approval from the Federal On-Scene Coordinator with collaboration from the USEPA and Regional Response Team Region 6.

The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the release and the effectiveness of spill response measures. Real-time wind and current data from the project area would be available at the time of a spill and would be used to assess the fate and effects of released hydrocarbons. Weathering processes that affect spilled oil on the sea include adsorption (sedimentation), biodegradation, dispersion, dissolution, emulsification, evaporation, and photo oxidation. Most crude oil blends will emulsify quickly when spilled, creating a stable mousse that presents a more persistent cleanup and removal challenge (NOAA, 2017b).

Hazen et al. (2010) studied the impacts and fate of oil released in the deepwater environment after the 2010 *Deepwater Horizon* incident. Initial studies suggested that the potential exists for rapid intrinsic bioremediation (bacterial degradation) of subsea dispersed oil in the water column by deep-sea indigenous microbial activity without significant oxygen depletion (Hazen et al., 2010), although other studies showed that oil bioremediation caused oxygen drawdown in deep waters (Kessler et al., 2011; Dubinsky et al., 2013). Additional studies investigated the effects of deepwater dissolved hydrocarbon gases (e.g., methane, propane, ethane) and the microbial response to a deepwater oil spill suggest dissolved hydrocarbon gases may promote rapid hydrocarbon respiration by low-diversity bacterial blooms, thus priming indigenous bacterial populations for rapid hydrocarbon degradation of subsea oil (Kessler et al., 2011; Du and Kessler, 2012; Valentine et al., 2014). A 2017 study identified water temperature, taxonomic composition of initial bacterial community, and dissolved nutrient levels as factors that may regulate oil degradation rates by deep-sea indigenous microbes (Liu et al., 2017).

Due to the project area being located approximately 68 statute miles (109 km) from the nearest shoreline (Plaquemines Parish, Louisiana), it is expected that most water quality impacts would occur in offshore waters before low molecular weight alkanes and volatiles are weathered (Operational Science Advisory Team, 2011), especially in the event of a spill lasting less than 30 days. The 30-day OSRA modeling (**Table 3**) indicates nearshore waters and embayments of Plaquemines Parish, Louisiana, is the coastal area with the most potential for water quality to be affected (5% conditional probability within 10 days and 11% conditional probability within 30 days of a spill). Other Louisiana or Florida shorelines may also be affected within 30 days. The 60-day OSRA model predicts contact of shorelines between Cameron County, Texas, and Miami-Dade County, Florida, with a maximum conditional probability of contact of 13% in Terrebonne Parish, Louisiana (**Table 4**).

C.2 Seafloor Habitats and Biota

The water depth at the location of the proposed wellsites ranges from approximately 2,017 to 2,039 m (6,616 to 6,691 ft). According to BOEM (2016a), existing information for the deepwater Gulf of Mexico indicates that the seafloor is composed primarily of soft sediments; exposed hard substrate habitats and associated biological communities are rare. The site clearance letter did not note the presence of hard bottom communities or potential seepage locations within 610 m (2,000 ft) of the proposed wellsite location (GEMS, 2022a,b,c,d,e,f). The IPFs with potential impacts listed in **Table 2** are discussed below.

C.2.1 Soft Bottom Benthic Communities

There are no site-specific benthic community data from the project area. However, data from the Northern Gulf of Mexico Continental Slope Habitats and Benthic Ecology Study (Wei, 2006; Rowe and Kennicutt, 2009; Wei et al., 2010; Carvalho et al., 2013; Spies et al., 2016) can be used to describe typical baseline benthic communities in the area. **Table 5** summarizes data collected at two nearby stations in water depths similar to those in the proposed project area.

Table 5. Baseline benthic community data from stations near the project area in similar depths sampled during the Northern Gulf of Mexico Continental Slope Habitats and Benthic Ecology Study (Adapted from: Wei, 2006; Rowe and Kennicutt, 2009).

Station	Water Depth (m)	Abundance		
		Meiofauna (individuals m^{-2})	Macroinfauna (individuals m^{-2})	Megafauna (individuals ha^{-1})
S37	2,384	291,179	2,192	1,451
S38	2,627	157,164	1,445	1,577

Meiofaunal and megafaunal abundances from Rowe and Kennicutt (2009); macroinfaunal abundance from Wei (2006). m = meter, ha = hectare.

Densities of meiofauna (animals passing through a 0.5-mm sieve but retained on a 0.062-mm sieve) at stations in the vicinity of the project area ranged from approximately 157,000 to 291,000 individuals m^{-2} (**Table 5**) (Rowe and Kennicutt, 2009). Nematodes, nauplii, and harpacticoid copepods were the three dominant meiofaunal groups, accounting for about 90% of total abundance.

The benthic macroinfauna is characterized by small mean individual sizes and low densities, both of which reflect the meager primary production in surface waters of the Gulf of Mexico continental slope (Wei, 2006). Densities decrease exponentially with water depth.

Polychaetes are typically the most abundant macroinfaunal group on the northern Gulf of Mexico continental slope, followed by amphipods, tanaids, bivalves, and isopods. Carvalho et al. (2013) found polychaete abundance to be higher in the central region of the northern Gulf of Mexico when compared to the eastern and western regions. Wei (2006) recognized four depth-dependent faunal zones (1 through 4), two of which are divided horizontally. The project area is on the border of Zones 2E and 3E. Zone 2E encompasses the mis Texas-Louisiana slope. The most abundant species in this zone were the polychaetes *Aricidea suecica*, *Litocorsa antennata*, *Paralacydonia paradoxa*, and *Tharyx marioni*; and the bivalve *Heterodonta* spp. Zone 3E is a broad zone that encompasses the west flank of the lower Mississippi Fan, the lower Mississippi Canyon, the lower DeSoto Canyon, the lower West Florida

Terrace, the deep Mississippi Fan, and the base of the Sigsbee Escarpment. The most abundant species in this zone were the polychaetes *Paraonella monilaris* and *Tharyx marioni*; the bivalves *Heterodonta* spp.; and the isopod *Macrostylis* sp.

The megafaunal density at stations in the vicinity of the project area ranged from 1,451 to 1,577 individuals ha^{-1}. Common megafauna included motile taxa such as decapod crustaceans, holothurian echinoderms, and demersal fishes as well as sessile taxa such as sponges and octocorals (Rowe and Kennicutt, 2009).

Bacteria also are an important component in terms of biomass and cycling of organic carbon (Cruz-Kaegi, 1998). For example, in deep sea sediments, Main et al. (2015) observed that microbial oxygen consumption rates increased and bacterial biomass decreased with hydrocarbon contamination. Bacterial biomass at the depth range of the project area typically is about 1 to 2 g C m^{-2} in the top 15 cm of sediments (Rowe and Kennicutt, 2009).

IPFs that potentially may affect benthic communities are physical disturbance to the seafloor, effluent discharges (drilling muds and cuttings), and potential effects from large oil spill resulting from a well blowout at the seafloor. A small fuel spill would not affect benthic communities because the diesel fuel is expected to float and dissipate on the sea surface.

Impacts of Physical Disturbance to the Seafloor

In water depths such as those in the project area, DP drilling rigs disturb the seafloor only around the wellbore (surface hole location) where the bottom template and BOP are located. Depending upon the specific well configuration, this area of disturbance is generally about 0.25 ha (0.62 ac) per well (BOEM, 2012a).

The areal extent of these impacts from the DP drilling rig are expected to be small compared to the project area itself, and these types of soft bottom communities are ubiquitous along the northern Gulf of Mexico continental slope (Gallaway, 1988; Gallaway et al., 2003; Rowe and Kennicutt, 2009). Impacts from the physical disturbance of the seafloor during this project are expected be spatially localized and temporally short term. Therefore, these disturbances will not likely have a significant impact on soft bottom benthic communities in the region.

Impacts of Effluent Discharges

Drilling mud and cuttings are the only effluents that could be present in vicinity of the wellsite that are likely to affect local soft bottom benthic communities. During initial well drilling interval(s) before the marine riser is set, cuttings and water-based mud will be released at the seafloor. Excess cement slurry will also be released at the seafloor during casing installation for the riserless portion of the drilling operations. Cement slurry components typically include cement mix and some of the same chemicals used in water-based drilling muds (Boehm et al., 2001; Fink, 2016). The main impacts will be burial and smothering of benthic organisms within several meters to tens of meters around the wellbore where cuttings and water-based muds physically contact the seafloor. Soft bottom sediments disturbed by cuttings, drilling muds, and cement slurry will eventually be recolonized through larval settlement and migration from adjacent areas. Because some deep-sea biota grow and reproduce slowly, recovery may require several years for the affected area within meters to tens of meters of the wellbore.

Discharges of treated SBM cuttings from the rig may affect benthic communities, primarily within several hundred meters of the wellsite. The fate and effects of SBM cuttings have been reviewed by Neff et al. (2000), and monitoring studies have been conducted in the Gulf of Mexico by Continental Shelf Associates (2004; 2006). In general, treated cuttings with adhering SBMs tend to clump together and form piles close to the drillsite. Areas of SBM cuttings deposition may develop elevated organic carbon concentrations and anoxic conditions (Continental Shelf Associates, 2006). Where SBM cuttings accumulate in concentrations of approximately 1,000 mg kg^{-1} or higher, benthic infaunal communities may be adversely affected due to both the toxicity of the base fluid and organic enrichment (with resulting anoxia) (Neff et al., 2000). Infauna numbers may increase and diversity may decrease as opportunistic species that tolerate low oxygen and high H_2S levels predominate (Continental Shelf Associates, 2006). As the base synthetic fluid is decomposed by microbes, the area will gradually return to pre-drilling conditions. Disturbed sediments will be recolonized through larval settlement and migration from adjacent areas.

The areal extent of impacts from drilling discharges will be small. Assuming a typical effect radius of 500 m (1,640 ft), the affected area around the wellsite would represent about 3% of the seafloor within a lease block. Impacts from drilling discharges are expected to have no significant impact on these ubiquitous soft bottom benthic communities in the region. It is expected that the rig will move to safe zones for short periods of time to perform maintenance on critical equipment. All discharges during these times are expected to meet NPDES permit requirements.

Impacts of a Large Oil Spill

The most likely effects of a subsea blowout on benthic communities would be within a few hundred meters of the wellsite. BOEM (2012a) estimated that a severe subsurface blowout could resuspend and disperse sediments within a 300-m (984-ft) radius. While coarse sediments (sands) would probably settle at a rapid rate within 400 m (1,312 ft) from the blowout site, fine sediments (silts and clays) could be resuspended for more than 30 days and dispersed over a wider area. Based on previous studies, surface sediments at the project area are assumed to largely be silt and clay (Rowe and Kennicutt, 2009).

While impacts from a large oil spill are anticipated to be confined to the immediate vicinity of the wellhead, depending on the specific circumstances of the incident, additional benthic community impacts could extend beyond the immediate vicinity of the wellhead (BOEM, 2017a). During the *Deepwater Horizon* incident, subsurface oil plumes were reported in water depths of approximately 1,100 m (3,600 ft), extending at least 22 miles (35 km) from the wellsite and persisting for more than a month (Camilli et al., 2010).

C.2.2 High-Density Deepwater Benthic Communities

As defined by NTL 2009-G40, high-density deepwater benthic communities are features or areas that could support high-density chemosynthetic communities or high-density hard bottom communities, including deepwater coral-dominated communities. Chemosynthetic communities were discovered in the central Gulf of Mexico in 1984 and have been studied extensively (MacDonald, 2002). Deepwater coral communities are also known from numerous locations in the Gulf of Mexico (Brooke and Schroeder, 2007; CSA International, 2007; Brooks et al., 2012). In the Gulf of Mexico, deepwater coral communities occur almost exclusively on exposed authigenic carbonate rock created by a biogeochemical (microbial) process.

Monitoring programs on the Gulf of Mexico continental slope have shown that benthic impacts from drilling discharges typically are concentrated within approximately 500 m (1,640 ft) of the wellsite, although detectable deposits may extend beyond this distance (Continental Shelf Associates, 2004; Neff et al., 2005; Continental Shelf Associates, 2006). In water depths such as those encountered in the project area, DP drilling vessels disturb the seafloor only around the wellbore where the bottom template and BOP are located. Depending on the specific well configuration, this area is approximately 0.25 ha (0.62 ac) per well (BOEM, 2012a).

The only IPF identified for this project that could affect high-density deepwater benthic communities is a large oil spill from a well blowout at the seafloor. A small fuel spill would not affect benthic communities because the diesel fuel would float and dissipate on the sea surface. Physical disturbance and effluent discharge are not considered IPFs for deepwater benthic communities because these communities are not expected to be present down current of the proposed wellsite.

Impacts of a Large Oil Spill

A large oil spill caused by a seafloor blowout could cause direct impacts (i.e., caused by the physical impacts of a blowout) on benthic communities within approximately 300 m (984 ft) of the wellhead (BOEM, 2012a; 2013). However, based on the site clearance letter for the proposed wellsites (GEMS, 2022a,b,c,d,e,f), there are no seafloor features that could support high-density deepwater benthic communities within 610 m (2,000 ft). Therefore, this type of impact is not expected.

Additional benthic community impacts could extend beyond the immediate vicinity of the wellhead, depending on the specific circumstances (BOEM, 2017a). During the *Deepwater Horizon* spill, subsurface plumes were reported at a water depth of approximately 1,100 m (3,600 ft), extending at least 22 miles (35 km) from the wellsite and persisting for more than a month (Camilli et al., 2010). Oil plumes that contact sensitive benthic communities before degrading could potentially impact the resource (BOEM, 2017a). Potential impacts on sensitive resources would be an integral part of the decision and approval process for the use of dispersants, and such approval would be obtained from the Federal On-Scene Coordinator upon consultation with the regional response team, including USEPA, prior to the use of dispersants.

The biological effects and fate of the oil remaining in the Gulf of Mexico from the *Deepwater Horizon* incident are still being studied, but numerous papers have been published discussing the nature of subsea oil plumes (e.g., Ramseur, 2010; Reddy et al., 2012; Valentine et al., 2014). Hazen et al. (2010) reported changes in plume hydrocarbon composition with distance from the source. Incubation experiments with environmental isolates demonstrated faster than expected hydrocarbon biodegradation rates at 5°C (41°F). Based on these results, Hazen et al. (2010) suggested the potential exists for intrinsic bioremediation of the oil plume in the deepwater column without substantial oxygen drawdown.

Potential impacts of oil on high-density deepwater benthic communities are discussed in recent EISs (BOEM, 2012a; 2015; 2016b; 2017a). Oil droplets or oiled sediment particles could come into contact with chemosynthetic organisms or deepwater corals in the vicinity of the spill site. Impacts could include loss of habitat, biodiversity, and live coral coverage; destruction of hard substrate; reduction or loss of one or more commercial and recreational fishery habitats; or changes in sediment characteristics (BOEM, 2012a; 2017a).

C.2.3 Designated Topographic Features

MC 608 is not within or near a designated topographic feature or a no-activity zone as identified in NTL 2009-G39. The nearest designated Topographic Feature Stipulation Block is located approximately 79 statute miles (127 km) from the project area. There are no IPFs associated with routine operations that could cause impacts to designated topographic features.

Due to the distance from the project area, it is unlikely that designated topographic features could be affected by an accidental spill. A small fuel spill would float and dissipate on the surface and would not reach these seafloor features. In the event of an oil spill from a well blowout, a surface slick would not contact these seafloor features. If a subsurface plume were to occur, impacts on these features would be unlikely due to the distance and the difference in water depth from the source. Near-bottom currents in the region are predicted to flow along the isobaths (Nowlin et al., 2001) and typically would not carry a plume upward onto the continental shelf edge.

C.2.4 Pinnacle Trend Area Live Bottoms

The project area is not covered by the Live Bottom (Pinnacle Trend) Stipulation. As defined by NTL 2009-G39, the nearest Pinnacle Stipulation Block is located approximately 54 statute miles (87 km) from the project area. There are no IPFs associated with routine operations that could cause impacts to pinnacle trend area live bottoms due to the distance from the project area.

Due to the distance from the project area, it is unlikely that pinnacle trend live bottom areas would be affected by an accidental spill. A small fuel spill would float on the surface and would not reach these seafloor features. In the event of an oil spill from a well blowout, a surface slick would not contact these seafloor features. If a subsurface plume were to occur, impacts on these features would be unlikely due to the distance and the difference in water depth from the source. Near-bottom currents in the region are predicted to flow along the isobaths (Nowlin et al., 2001) and typically would not carry a plume upward onto the continental shelf edge.

C.2.5 Eastern Gulf Live Bottoms

The project area is not covered by the Live Bottom (Low-Relief) Stipulation, which applies to seagrass communities and low-relief hard bottom reef within the Eastern Gulf of Mexico Planning Area leases in water depths of 100 m (328 ft) or less and portions of Pensacola and Destin Dome Area blocks in the Central Gulf of Mexico Planning Area. The nearest block covered by the Live Bottom Stipulation, as defined by NTL 2009-G39, is located approximately 70 statute miles (113 km) from the project area. There are no IPFs associated with routine operations that could cause impacts to eastern Gulf live bottom areas due to the distance from the project area.

Because of the distance from the project area, it is unlikely that Eastern Gulf live bottom areas would be affected by an accidental spill. A small fuel spill would float and dissipate on the surface and would not reach these seafloor features. In the event of an oil spill from a well blowout, a surface slick would not contact these seafloor features. If a subsurface plume were to occur, impacts on these features would be unlikely due to the distance and the difference in water depth from the source. Near-bottom currents in the region are predicted to flow along the isobaths (Nowlin et al., 2001) and typically would not carry a plume upward onto the continental shelf.

C.3 Threatened, Endangered, and Protected Species and Critical Habitat

This section discusses species listed as Endangered or Threatened under the Endangered Species Act (ESA). In addition, it includes all marine mammal species in the region, all of which are protected under the Marine Mammal Protection Act (MMPA).

Endangered or Threatened species that may occur in the project area and/or along the northern Gulf Coast are listed in **Table 6**. The table also indicates the location of critical habitat (if designated in the Gulf of Mexico). Critical habitat is defined as (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation. The NMFS has jurisdiction for ESA-listed marine mammals (cetaceans), sea turtles, and fishes in the Gulf of Mexico. The USFWS has jurisdiction for ESA-listed birds, the West Indian manatee, and sea turtles while on their nesting beaches.

Table 6. Federally listed Endangered and Threatened species potentially occurring in the project area and along the northern Gulf Coast. Adapted from: U.S. Fish and Wildlife Service (2020) and National and Oceanic Atmospheric Administration Fisheries (2020).

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in Gulf of Mexico
			Project Area	Coastal	
Marine Mammals					
Rice's whale[1]	*Balaenoptera ricei*	E	X	--	None
Sperm whale	*Physeter macrocephalus*	E	X	--	None
West Indian manatee	*Trichechus manatus*[2]	T	--	X	Florida (Peninsular)
Sea Turtles					
Loggerhead turtle	*Caretta caretta*	T,E[3]	X	X	Nesting beaches and nearshore reproductive habitat in Mississippi, Alabama, and Florida (Panhandle); *Sargassum* habitat including most of the central & western Gulf of Mexico.
Green turtle	*Chelonia mydas*	T	X	X	None
Leatherback turtle	*Dermochelys coriacea*	E	X	X	None
Hawksbill turtle	*Eretmochelys imbricata*	E	X	X	None
Kemp's ridley turtle	*Lepidochelys kempii*	E	X	X	None
Birds					
Piping Plover	*Charadrius melodus*	T	--	X	Coastal Texas, Louisiana, Mississippi, Alabama, and Florida (Panhandle)
Whooping Crane	*Grus americana*	E	--	X	Coastal Texas (Aransas National Wildlife Refuge)

Table 6. (Continued).

Species	Scientific Name	Status	Potential Presence		Critical Habitat Designated in Gulf of Mexico
			Project Area	Coastal	
Fishes					
Oceanic whitetip shark	*Carcharhinus longimanus*	T	X	--	None
Giant manta ray	*Mobula birostris*	T	X	X	None
Gulf sturgeon	*Acipenser oxyrinchus desotoi*	T	--	X	Coastal Louisiana, Mississippi, Alabama, and Florida (Panhandle)
Nassau grouper	*Epinephelus striatus*	T	--	X	None
Smalltooth sawfish	*Pristis pectinata*	E	--	X	Southwest Florida
Invertebrates					
Elkhorn coral	*Acropora palmata*	T	--	X	Florida Keys and the Dry Tortugas
Staghorn coral	*Acropora cervicornis*	T	--	X	Florida Keys and the Dry Tortugas
Pillar coral	*Dendrogyra cylindrus*	T	--	X	None
Rough cactus coral	*Mycetophyllia ferox*	T	--	X	None
Lobed star coral	*Orbicella annularis*	T	--	X	None
Mountainous star coral	*Orbicella faveolata*	T	--	X	None
Boulder star coral	*Orbicella franksi*	T	--	X	None
Panama City crayfish	*Procambarus econfinae*	T	--	X	South-central Bay County, Florida
Terrestrial Mammals					
Beach mice (Alabama, Choctawhatchee, Perdido Key, St. Andrew)	*Peromyscus polionotus subsp. Ammobates, allophrys, trissyllepsis, and peninsularis, respectively*	E	--	X	Alabama and Florida (Panhandle) beaches
Florida salt marsh vole	*Microtus pennsylvanicus dukecampbelli*	E	--	X	None

E = Endangered; T = Threatened; X = potentially present; -- = not present.

1 In 2021, National Marine Fisheries Service recognized that what had previously been accepted as a subspecies of the Bryde's whale is actually a separate species. The reclassification is formerly recognized under 86 Federal Register [*FR*] 47022 effective date 22 October 2021 as the Rice's whale (Balaenoptera ricei).

2 There are two subspecies of West Indian manatee: the Florida manatee (T. m. latirostris), which ranges from the northern Gulf of Mexico to Virginia, and the Antillean manatee (T. m. manatus), which ranges from northern Mexico to eastern Brazil. Only the Florida manatee subspecies is likely to be found in the northern Gulf of Mexico.

3 The Northwest Atlantic Ocean Distinct Population Segment (DPS) of loggerhead turtles is designated as Threatened (76 *FR* 58868). The National Marine Fisheries Service and the U.S. Fish and Wildlife Service designated critical habitat for this DPS, including beaches and nearshore reproductive habitat in Mississippi, Alabama, and the Florida Panhandle as well as Sargassum spp. habitat throughout most of the central and western Gulf of Mexico (79 *FR* 39756 and 79 *FR* 39856).

Coastal Endangered or Threatened species that may occur along the U.S. Gulf Coast include the West Indian manatee, Piping Plover (*Charadrius melodus*), Florida salt marsh vole (*Microtus pennsylvanicus dukecampbelli*), Panama City crayfish (*Procambarus econfinae*), Whooping Crane (*Grus americana*), Gulf sturgeon (*Acipenser oxyrinchus desotoi*), smalltooth sawfish (*Pristis pectinata*), and four subspecies of beach mouse. Critical habitat has been designated for all of these species (except the Florida salt marsh vole) as indicated in **Table 6** and discussed in individual sections. Two other coastal bird species (Bald Eagle [*Haliaeetus leucocephalus*] and Brown Pelican [*Pelecanus occidentalis*]) are no longer federally listed as Endangered or Threatened; these are discussed in **Section C.4.2**.

Five sea turtle species, the Rice's whale (*Balaenoptera ricei*), sperm whale (*Physeter macrocephalus*), oceanic whitetip shark (*Carcharhinus longimanus*), and giant manta ray (*Mobula birostris*) are the only Endangered or Threatened species that could potentially occur within the project area. The listed sea turtles include the leatherback turtle (*Dermochelys coriacea*), Kemp's ridley turtle (*Lepidochelys kempii*), hawksbill turtle (*Eretmochelys imbricata*), loggerhead turtle (*Caretta caretta*), and green turtle (*Chelonia mydas*) (Pritchard, 1997). Effective 11 August 2014, NMFS has designated certain marine areas as critical habitat for the Northwest Atlantic Distinct Population Segment (DPS) of the loggerhead sea turtle (see **Section C.3.5**). No critical habitat has been designated in the Gulf of Mexico for the leatherback turtle, Kemp's ridley turtle, hawksbill turtle, green turtle, or the sperm whale.

Four Endangered mysticetes (blue whale, fin whale, North Atlantic right whale, and sei whale) have been reported in the Gulf of Mexico, and are considered rare or extralimital (Würsig, 2017). These species are not included in the most recent NMFS stock assessment report (Hayes et al., 2022) nor in the most recent BOEM multisale EIS (BOEM, 2017a); therefore, they are not considered further in the EIA.

The Rice's whale exists in the Gulf of Mexico as a small, resident population. This species was formally known as a subspecies to the Bryde's whale (*Balaenoptera edeni brydei*) until a DNA study identified it as a separate species (Rosel et al., 2021). It is the only baleen whale known to be resident to the Gulf of Mexico. The species is severely restricted in range, being found only in the northeastern Gulf in the waters of the DeSoto Canyon (Waring et al., 2016, Rosel et al., 2021) and are therefore not likely to occur within the project area. The giant manta ray could occur in the project area but is most commonly observed in the Gulf of Mexico at the Flower Garden Banks. The Nassau grouper (*Epinephelus striatus*) has been observed in the Gulf of Mexico at the Flower Garden Banks but is most commonly observed in shallow tropical reefs of the Caribbean and is not expected to occur in the project area. The smalltooth sawfish is a coastal species limited to shallow areas off the west coast of Florida and is not expected to occur in the project area.

Seven Threatened coral species are known from the northern Gulf of Mexico: elkhorn coral (*Acropora palmata*), staghorn coral (*Acropora cervicronis*), lobed star coral (*Orbicella annularis*), mountainous star coral (*Orbicella faveolata*), boulder star coral (*Orbicella franksi*), pillar coral (*Dendrogyra cylindrus*), and rough cactus coral (*Mycetophyllia ferox*). These corals are shallow water, zooxanthellate species (containing symbiotic photosynthetic zooxanthellae which contribute to their nutritional needs) and so are not present in the deepwater project area (see **Section C.3.16**).

There are no other Threatened or Endangered species in the Gulf of Mexico that are likely to be adversely affected by either routine or accidental events. The IPFs with potential impacts listed in **Table 2** are discussed below.

C.3.1 Sperm Whale (Endangered)

The Endangered marine mammal likely to be present at or near the project area is the sperm whale. Resident populations of sperm whales occur within the Gulf of Mexico; a species description is presented in the recovery plan for this species (NMFS, 2010b). Gulf of Mexico sperm whales are classified as an Endangered species and a "strategic stock" (defined as a stock that may have unsustainable human-caused impacts) by NOAA Fisheries (Waring et al., 2016). A "strategic stock" is defined by the MMPA as a marine mammal stock that meets the following criteria:

- The level of direct human-caused mortality exceeds the potential biological removal level;
- Based on the best available scientific information, is in decline and is likely to be listed as a Threatened species under the ESA within the foreseeable future; or
- Is listed as a Threatened or Endangered species under the ESA or is designated as depleted under the MMPA.

Current threats to sperm whale populations are defined as "any factor that could represent an impediment to recovery." Current threats to sperm whale populations worldwide include fisheries interactions, anthropogenic marine noise, vessel interactions, contaminants and pollutants, disease, injury from marine debris, research, predation and natural mortality, direct harvest, competition for resources, loss of prey base due to climate change and ecosystem change, and cable laying. In the Gulf of Mexico, the impacts from many of these threats are identified as either low or unknown (BOEM, 2012a).

The distribution of sperm whales in the Gulf of Mexico is correlated with mesoscale physical features such as eddies associated with the Loop Current (Jochens et al., 2008). Sperm whale populations in the north-central Gulf of Mexico are present throughout the year (Davis et al., 2000). Results of a multi-year tracking study show female sperm whales are typically concentrated along the upper continental slope between the 200- and 1,000-meter (656- and 3,280-ft) depth contours (Jochens et al., 2008). Male sperm whales were more variable in their movements and were documented in water depths greater than 3,000 m (9,843 ft). Generally, groups of sperm whales observed in the Gulf of Mexico during the MMS-funded Sperm Whale Seismic Study (SWSS) consisted of mixed-sex groups comprising adult females with juveniles, and groups of bachelor males. Typical group size for mixed groups was 10 individuals (Jochens et al., 2008).

A review of PSO sighting reports from seismic mitigation surveys in the Gulf of Mexico conducted over a 6-year period found a mean group size for sperm whales of 2.5 individuals (Barkaszi et al., 2012). In these mitigation surveys, sperm whales were the most common large cetacean encountered. Tagging and observation data from the SWSS also showed that sperm whales transit through the vicinity of the project area. Movements of satellite-tracked individuals suggest that this area of the continental slope is within the home range of the Gulf of Mexico population (within the 95% utilization distribution) (Jochens et al., 2008).

IPFs that may potentially affect sperm whales include drilling rig presence, underwater noise, and lights; support vessel and helicopter marine noise; support vessel collisions; and two types of accidents (a small fuel spill and a large oil spill). Effluent discharges are likely to have negligible impacts on sperm whales due to rapid dilution, the small area of ocean affected, the intermittent nature of the discharges, and the mobility of these marine mammals. Compliance with NTL BSEE-2015-G03 is intended to minimize the potential for marine debris-related impacts on sperm whales.

Though NMFS (2020a) stated marine debris as an IPF, compliance with BSEE NTL 2015-G03 and NMFS (2020a) Appendix B will minimize the potential for marine debris-related impacts on sperm whales. NMFS (2020a) estimates that no more than three sperm whales will be non-lethally taken, with one sperm whale lethally taken through the ingestion of marine debris over 50 years of proposed action. Therefore, marine debris is likely to have negligible impacts on sperm whales and is not discussed further (See **Table 2**).

Impacts of Drilling Rig Presence, Marine Noise, and Lights

Noise from routine drilling activities (see **Section A.1**) has the potential to disturb individuals or groups of sperm whales or mask the sounds they would normally produce or hear. Behavioral responses to noise by marine mammals vary widely and overall, are short-term and include, temporary displacement or cessation of feeding, resting, or social interactions (NMFS, 2009a; Gomez et al., 2016). Additionally, behavioral changes resulting from auditory masking sounds may induce an animal to produce more calls, longer calls, or shift the frequency of the calls. For example, masking caused by vessel noise was found to result in a reduced number of whale calls in the Gulf of Mexico (Azzara et al., 2013).

NMFS (2018a) lists sperm whales in the same functional hearing group (i.e., mid frequency cetaceans) as most dolphins and other toothed whales (i.e., odontocetes), with an estimated hearing sensitivity from 150 Hz to 160 kHz. Therefore, DP vessel-related noise is likely to be audible to sperm whales. Frequencies <150 Hz produced by the drilling operations may be audible but are not likely to be perceived with any significance by mid-frequency cetaceans. The sperm whale may possess better low frequency hearing than some of the other odontocetes, although not as low as many baleen whale species whose vocalizations between 30 Hz and 5 kHz (Wartzok and Ketten, 1999). Generally, most of the vocalizations produced by sperm whales occur at frequencies below 10 kHz, although diffuse energy up to and past 20 kHz is common, with source levels up to 236 dB re1 µPa m (Møhl et al., 2003).

It is expected that, due to the relatively stationary nature of the proposed drilling operations, sperm whales would move away from the proposed operations area, and noise levels that could cause auditory injury would be avoided. Noise associated with proposed vessel operations may cause behavioral disturbances to sperm whales. Observations of behavioral responses of marine mammals to anthropogenic noise, in general, have been limited to short term behavioral responses, which included the temporary cessation of feeding, resting, or social interactions (NMFS, 2015a). Animals can determine the direction from which a sound arrives based on cues, such as differences in arrival times, sound levels, and phases at the two ears. Thus, an animal's directional hearing capabilities have a bearing on its ability to avoid noise sources.

NMFS (2018a) presents criteria that are used to determine physiological (i.e., injury) thresholds for marine mammals. Behavioral disturbance thresholds have not been updated in the most recent acoustic guidance (NMFS, 2018a) and therefore, revert to thresholds established and published by NMFS in *FR* 70(7): 1871-1875 (NMFS and NOAA, 2005). Behavioral disturbance thresholds for marine mammals and are applied equally across all functional hearing groups. Received SPL of 120 dB re 1 µPa from a non-impulsive source is considered high enough to elicit the onset of a behavioral reaction in some marine mammal species. The 120-dB isopleth may extend tens to hundreds of kilometers from the source depending on the propagation environment. However, in the case of behavioral responses, exposure to above-threshold noise levels alone do not indicate a behavioral response and, more importantly, do not equate to biologically important responses (Southall et al., 2016; Ellison et al., 2012).

For mid-frequency cetaceans exposed to non-impulsive sources, acoustic injury such as permanent threshold shifts are estimated to occur when the mammal has received a sound exposure level over 24 hours (SEL_{24h}) of 198 dB re 1 μPa^2 s. Similarly, temporary threshold shifts are estimated to occur when the mammal has received an SEL_{24h} of 178 dB re 1 μPa^2 s. Due to transient nature of sperm whales and the stationary nature of installation activities, it is not expected that any sperm whales will remain in proximity to the source for a full 24-hour period to receive an SEL_{24h} necessary for the onset of auditory threshold shifts.

There are other OCS facilities and activities near the project area, and the region as a whole has a large number of similar marine noise sources. Drilling-related marine noise associated with this project may contribute to increases in the marine sound environment within the region, but it is not expected to be at amplitudes sufficient to result in auditory injuries to sperm whales. The proposed activity may cause behavioral effects, primarily avoidance or temporary displacement from the project area, but are not expected to be biologically significant for the population. Drilling rig lighting and presence are not expected to impact sperm whales (NMFS, 2007; BOEM, 2016a; 2017a). DP drilling rig lighting and rig presence are not identified as IPFs for sperm whales (NMFS, 2007, 2020b; BOEM, 2017a).

Impacts of Support Vessel and Helicopter Traffic

Support vessel traffic has the potential to disturb sperm whales, and there is also a risk of vessel collisions, which are identified as a threat in the recovery plan for this species (NMFS, 2010b). To reduce the potential for vessel collisions, BOEM issued BOEM-2016-G01. This NTL recommends that vessel operators and crews receive protected species identification training. This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with the NTL. Vessel operators are required to maintain a vigilant watch for and report sightings of any injured or dead protected species. In addition, when sperm whales are sighted, vessel operators and crews are required to maintain a distance of 100 m (328 ft) or greater whenever possible (NTL BOEM 2016-G01 and NMFS, 2020a).

Vessel operators are required to reduce vessel speed to 10 knots or less, as safety permits, when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel (NTL BOEM-2016-G01). When sperm whales are sighted while a vessel is underway, the vessel should take action (e.g., attempt to remain parallel to the whale’s course, avoid excessive speed or abrupt changes in direction until the whale has left the area) as necessary to avoid violating the relevant separation distance. However, if the sperm whale is sighted within this distance, the vessel should reduce speed and shift the engine to neutral and not re-engage until the whale is outside of the separation area. This does not apply to any vessel towing gear (NMFS [2020a] Appendix C). Compliance with these mitigation measures will minimize the likelihood of vessel collisions as well as reduce the chance for disturbing sperm whales. However, this mitigation is effective only during daylight hours and during periods of adequate visibility.

NMFS (2020a) analyzed the potential for vessel collisions and harassment of sperm whales in its Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico. NMFS concluded that the observed avoidance of passing vessels by sperm whales is an advantageous response to avoid a potential threat and is not expected to result in any significant effect on migration, breathing, nursing, breeding, feeding, or sheltering to individuals, or have any consequences at the level of the population. With the implementation of the NMFS vessel collision protocols listed in Appendix C of NMFS (2020a) in addition to the NTL BOEM-2016-G01, NMFS concluded that the likelihood of collisions between vessels and sperm whales would be reduced during daylight hours. During nighttime and during periods of poor visibility, it is assumed that vessel noise and sperm whale avoidance of moving vessels would reduce the chance of vessel collisions with this species. It is, however, likely that a collision between a sperm whale and a moving support vessel would result in severe injury or mortality of the stricken animal. The current Potential Biological Removal (PBR) level for the Gulf of Mexico stock of sperm whales is 2.0 (Hayes et al., 2021). The PBR level is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population. Mortality of a single sperm whale would constitute a significant impact to the local (Gulf of Mexico) stock of sperm whales but would not likely be significant at the species level.

Helicopter traffic also has the potential to disturb sperm whales. Smultea et al. (2008) documented responses of sperm whales offshore Hawaii to fixed wing aircraft flying at an altitude of 245 m (800 ft). A reaction to the initial pass of the aircraft was observed during 3 (12%) of 24 sightings. All three responses consisted of a hasty dive and occurred at less than 360 m (1,180 ft) lateral distance from the aircraft. Additional reactions were seen when aircraft circled certain whales to make further observations. Based on other studies of cetacean responses to sound, the authors concluded that the observed reactions to brief overflights by the aircraft were short-term and limited to behavioral disturbances.

While flying offshore in the Gulf of Mexico, support helicopters maintain altitudes above 213 m (700 ft) during transit to and from the working area. In the event that a whale is observed during transit, the helicopter will not approach or circle the animals. Although whales may respond to helicopters (Smultea et al., 2008), NMFS (2020a) concluded that this altitude would minimize the potential for disturbing sperm whales. Therefore, no significant impacts are expected.

Impacts of a Small Fuel Spill

Potential spill impacts on marine mammals, including sperm whales, are discussed by NMFS (2020a) and BOEM (2017a). Oil impacts on marine mammals are discussed by Geraci and St. Aubin (1990) and by the Marine Mammal Commission (MMC) (2011) with discussions germane to the Gulf of Mexico populations concerning composition and fate of petroleum and spill-treating agents in the marine environment, aspects of cetacean ecology, and physiological and toxic effects of oil on cetaceans. For this EP, there are no unique site-specific issues with respect to spill impacts on these animals that were not analyzed in the previous documents.

A small fuel spill in offshore waters would produce a thin sheen on the water surface and introduce concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the spill and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would be evaporated or dispersed naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

Direct physical and physiological effects of exposure to diesel fuel could include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil directly or via contaminated prey; and stress from the activities and marine noise of response vessels and aircraft (MMC, 2011). However, due to the limited areal extent and short duration of water quality impacts from a small fuel spill as well as the mobility of sperm whales, no significant impacts would be expected.

The probability of a fuel spill will be minimized by Chevron's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of Chevron's OSRP will mitigate and lessen the potential for impacts on sperm whales. Given the open ocean location of the project area, the duration of a small spill is expected to be brief and therefore potential for impacts to be minimal.

Impacts of a Large Oil Spill

Potential spill impacts on marine mammals, including sperm whales, are discussed by NMFS (2020a) and BOEM (2017a). Oil impacts on marine mammals are discussed by Geraci and St. Aubin (1990) and by the MMC (2011). For this EP, there are no unique site-specific issues with respect to spill impacts on sperm whales.

Impacts of oil spills on sperm whales can include direct impacts from oil exposure as well as indirect impacts due to response activities and materials (e.g., vessel traffic, marine noise, dispersants) (MMC, 2011). Direct physical and physiological effects can include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil (and dispersants) directly or via contaminated prey; and stress from the activities and marine noise of response vessels and aircraft. The level of impact of oil exposure depends on the amount, frequency, and duration of exposure; route of exposure; and type or condition of petroleum compounds or chemical dispersants (Hayes et al., 2020). Complications of the above may lead to dysfunction of immune and reproductive systems, physiological stress, declining physical condition, and death. Behavioral responses can include displacement of animals, including displacement from prime habitat, disruption of social structure, changing prey availability and foraging distribution and/or patterns, changing reproductive behavior/productivity, and changing movement patterns or migration (MMC, 2011).

In the event of a large spill, the level of vessel and aircraft activity associated with spill response could disturb sperm whales and potentially result in vessel collisions, entanglement, or other injury or stress. Response vessels are expected to operate in accordance with NTL BOEM-2016-G01 to reduce the potential for colliding with or disturbing these animals. This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with the NTL. Based on the current PBR level for the Gulf of Mexico stock of sperm whales (2.0), mortality of a single sperm whale would constitute a significant impact to the local (Gulf of Mexico) stock of sperm whales but would not likely be significant at the species level.

C.3.2 Rice's Whale (Endangered)

A recent study by Rosel et al. (2021), identified the genetically distinct Northern Gulf of Mexico Bryde's whale stock as a new species of baleen whale named the Rice's whale through DNA analysis. The reclassification was approved by NMFS under 86 *FR* 47022 and was effective 22 October 2021. The Rice's whale is the only year-round resident baleen whale in the northern Gulf of Mexico. The Rice's whale is sighted most frequently in the waters over DeSoto Canyon between the 100-m (328-ft) and 1,000-m (3,280-ft) isobaths (**Figure 3**; Rosel et al., 2016; Hayes et al., 2021). Most sightings have been made in the DeSoto Canyon region and off western Florida, although there have been some in the west-central portion of the northeastern Gulf of Mexico. Based on the available data, it is possible, but unlikely, that Rice's whales could occur in the project area.

In 2014, a petition was submitted to designate the northern Gulf of Mexico population as a DPS and list it as Endangered under the ESA (Natural Resources Defense Council, 2014). This petition received a 90-day positive finding by NMFS in 2015 and a proposed rule to list was published in 2016 (Hayes et al., 2019). On 15 April 2019, NMFS issued a final rule to list the Gulf of Mexico DPS of Bryde's whale as Endangered under the ESA. NMFS final rule on the reclassification (86 *FR* 47022) does not affect the ESA standing; thus, the Rice's whale is listed as an Endangered species.

Although it is unlikely that the Rice's whales would occur in the project area, IPFs that could affect the Rice's whales, if present, include drilling rig presence, marine noise, and lights; support vessel and helicopter traffic; and both types of spill accidents: a small fuel spill and a large oil spill. Effluent discharges are likely to have negligible impacts on Rice's whales due to rapid dispersion, the small area of ocean affected, the intermittent nature of the discharges, and the mobility and low abundance of Rice's whales in the Gulf of Mexico.

Though NMFS (2020a) stated marine debris as an IPF, compliance with BSEE NTL 2015-G03 and NMFS (2020a) Appendix B will minimize the potential for marine debris-related impacts on Rice's whales. NMFS (2020a) estimated one sublethal take and no lethal takes of Rice's whale (Bryde's whales at the time of publication) from marine debris over 50 years of proposed action. Therefore, marine debris is likely to have negligible impacts on Rice's whales and is not further discussed (See **Table 2**).

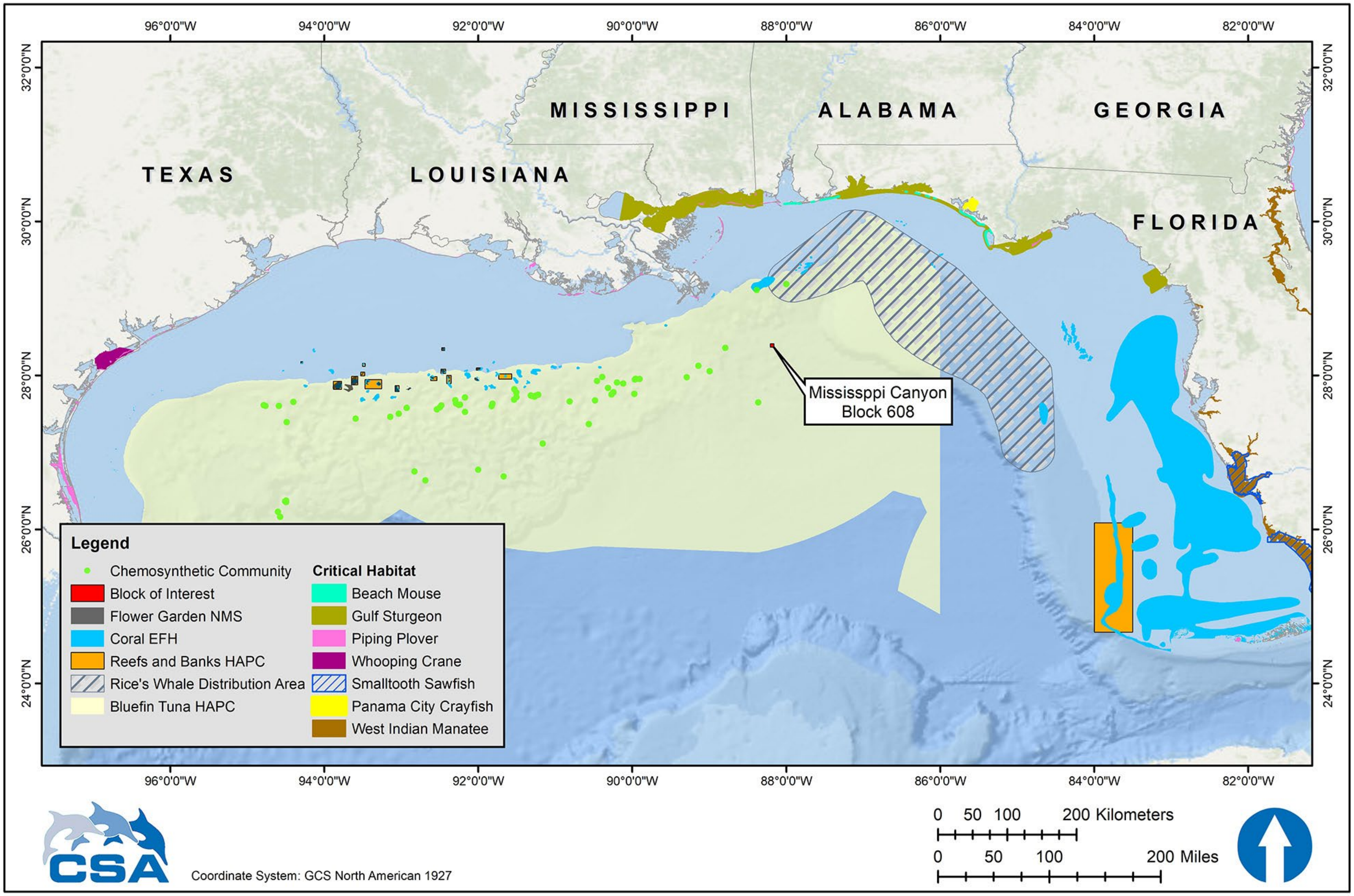

Figure 3. Location of selected environmental features in relation to the project area. EFH = Essential Fish Habitat; HAPC = Habitat of Particular Concern; NMS = National Marine Sanctuary.

Impacts of Drilling Rig Presence, Marine Noise, and Lights

NMFS (2018a) lists Rice's whales in the functional hearing group of low frequency cetaceans (baleen whales), with an estimated hearing sensitivity from 7 Hz to 35 kHz. Noise produced by the drilling rig and drilling-associated vessels may be emitted at levels that could potentially disturb individual whales or mask the sounds animals would normally produce or hear. Noise associated with drilling and installation activities is relatively low in intensity relative to impulsive sources such as airgun noise, and an individual animal's sound exposure would be transient. As discussed in **Section A.1**, an actively drilling rig may produce broadband (10 Hz to 10 kHz) source levels ranging from approximately 180 to 190 dB re 1 µPa m (Hildebrand, 2005). Frequencies <1,000 Hz produced by the drilling operations are more likely to be perceived by low-frequency cetaceans, such as the Rice's whale.

It is expected that, due to the relatively stationary nature of the drilling operations, Rice's whales would move away from the proposed operations area, and noise levels that could cause auditory injury would be avoided. Noise associated with proposed vessel operations may cause behavioral disturbance effects to individual Rice's whales. NMFS (2018a) presents criteria that are used to determine physiological (i.e., acoustic injury) thresholds for marine mammals. Behavioral disturbance thresholds have not been updated in the most recent acoustic guidance (NMFS, 2018a) and therefore, revert to thresholds established and published by NMFS in 70 *FR* 1871. Received SPL of 120 dB re 1 µPa from non-impulsive sources are considered high enough to elicit the onset of a behavioral reaction in some marine mammal species. The 120-dB isopleth may extend tens to hundreds of kilometers from the source depending on the propagation environment. However, exposure to SPL of 120 dB re 1 µPa does not alone equate to a behavioral response or a biological consequence; rather it represents the level at which onset of a behavioral response may occur that, more importantly, may not result in biologically significant responses (Southall et al., 2016; Ellison et al., 2012).

Although it is unlikely that the Rice's whales would occur in the project area, IPFs that could affect the Rice's whales, if present, include drilling rig presence, marine noise, and lights; support vessel and helicopter traffic; and both types of spill accidents: a small fuel spill and a large oil spill. Effluent discharges are likely to have negligible impacts on Rice's whales due to rapid dispersion, the small area of ocean affected, the intermittent nature of the discharges, and the mobility and low abundance of Rice's whales in the Gulf of Mexico.

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transient. As discussed in **Section A.1**, an actively drilling rig may produce broadband (10 Hz to 10 kHz) source levels ranging from approximately 180 to 190 dB re 1 µPa m (Hildebrand, 2005). Frequencies <1,000 Hz produced by the drilling operations are more likely to be perceived by low-frequency cetaceans, such as the Rice's whale.

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For low-frequency cetaceans, specifically the Rice's whale, permanent and temporary threshold shift onset is estimated to occur at SEL_{24h} of 199 dB re 1 μPa^2 s and 179 re 1 μPa^2 s, repectively. Sounds generated by drilling operations, located within a deep-water, open ocean environment, will be generally non-impulsive, with some variability in sound level and frequency, and are not expected to reach permanent or temporary threshold shift values. This analysis assumes that the continuous nature of sounds produced by the drilling rig will provide individual whales with cues relative to the direction and relative distance of the sound source, and the fixed position of the drilling rig will allow for active avoidance of potential physical impacts. Drilling-related noise associated with this project may contribute to increases in the ambient noise environment of the region but are not expected to cause noise-related impacts to Rice's whales. Drilling rig lighting and presence are not expected to impact Rice's whales (BOEM, 2017a).

Impacts of Support Vessel and Helicopter Traffic

Support vessel traffic has the potential to disturb Rice's whales and create the potential for vessel collisions. To reduce the potential for vessel collisions, BOEM has issued NTL BOEM-2016-G01, which recommends protected species identification training and that vessel operators and crews maintain a vigilant watch for marine mammals and slow down or stop their vessel to avoid colliding with protected species and requires operators to report sightings of any injured or dead protected species. This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with the NTL. When whales are sighted, vessel operators and crews are required to maintain a distance of 500 m (1,640 ft) or greater whenever possible (NTL BOEM-2016-G01; NMFS, 2020a). Vessel operators are required to reduce vessel speed to 10 knots or less, as safety permits, when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel (NTL BOEM-2016-G01). When a Rice's whale is sighted while a vessel is underway, the vessel should take action (e.g., attempt to remain parallel to the whale's course, avoid excessive speed or abrupt changes in direction until the whale has left the area) as necessary to avoid violating the relevant separation distance. However, if the whale is sighted within this distance, the vessel should reduce speed and shift the engine to neutral and not re-engage until the whale is outside of the separation area. This does not apply to any vessel towing gear (NMFS [2020a] Appendix C).

Compliance with these mitigation measures will minimize the likelihood of vessel collisions as well as reduce the chance for disturbing Rice's whales. The current PBR level for the Gulf of Mexico stock of Rice's whale is 0.1 (Hayes et al., 2021). Mortality of a single Rice's whale would constitute a significant impact to the local (Gulf of Mexico) stock of Rice's whales. However, it is very unlikely that Rice's whale occurs within the project area, including the transit corridor for support vessels; consequently, the probability of a vessel collision with this species is extremely low.

Helicopter traffic also has the potential to disturb Rice's whales and based on studies of cetacean responses to noise, the observed responses to brief overflights by aircraft were short-term and limited to behavioral disturbances (Smultea et al., 2008). Helicopters maintain altitudes above 213 m (700 ft) during transit to and from the offshore working area. In the event that a whale is observed during transit, the helicopter will not approach or circle the animal(s). In addition, guidelines and regulations issued by NMFS under the authority of the MMPA specify that helicopters maintain an altitude of 305 m (1,000 ft) within 100 m (328 ft) of marine mammals (BOEM, 2016a; 2017a; NMFS, 2020a). Due to the brief potential for disturbance the low density of Rice's whales in the Gulf of Mexico, no significant impacts are expected.

Impacts of a Small Fuel Spill

Potential spill impacts on marine mammals are discussed by NMFS (2020a) and BOEM (2012a; 2015; 2016b; 2017a). Oil impacts on marine mammals are discussed by Geraci and St. Aubin (1990) and by the MMC (2011). In the unlikely event of a spill, implementation of Chevron's OSRP will mitigate and reduce the potential for impacts on Rice's whales. Given the open ocean location of the project area and the brief duration of a small spill, any impacts are expected to be minimal.

A small fuel spill in offshore waters would produce a thin slick on the water surface and introduce concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the spill as well as the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that more than 90% would evaporate or disperse naturally within 24 hours (NOAA, 2022). The area of diesel fuel on the sea surface would range from 1.2 to 12 ac (0.5 to 5 ha), depending on sea state and weather conditions at the time of a spill.

Direct physical and physiological effects of exposure to diesel fuel could include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil directly or via contaminated prey; and stress from the activities and sound of response vessels and aircraft (Marine Mammal Commission [MMC], 2011). However, due to the limited areal extent and short duration of water quality impacts from a small fuel spill, as well as the mobility of Rice's whales and the unlikelihood of occurrence in the project area, no significant impacts are expected.

Impacts of a Large Oil Spill

Potential spill impacts on marine mammals are discussed by BOEM (2012a; 2015; 2016b; 2017a), NMFS (2020a), Geraci and St. Aubin (1990), and the MMC (2011). Potential impacts of a large oil spill on Rice's whales could include direct impacts from oil exposure as well as indirect impacts due to response activities and materials (e.g., vessel traffic, sound, dispersants) (MMC, 2011). Direct physical and physiological effects could include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil (and dispersants) directly or via contaminated prey; and stress from the activities and sound of response vessels and aircraft. The level of impact of oil exposure depends on the amount, frequency, and duration of exposure; route of exposure; and type or condition of petroleum compounds or chemical dispersants (Hayes et al., 2019). Complications of the above may lead to dysfunction of immune and reproductive systems, physiological stress, declining physical condition, and death. Behavioral responses can include displacement of animals from prime habitat, disruption of social structure, changing prey availability and foraging distribution and/or patterns, changing reproductive behavior/productivity, and changing movement patterns or migration (MMC, 2011).

In the event of a large spill, the level of vessel and aircraft activity associated with spill response could disturb Rice's whales and potentially result in vessel collisions, entanglement, or other injury or stress. Response vessels are expected to operate in accordance with NTL BOEM-2016-G01 and NMFS (2020a) (see **Table 1**) to reduce the potential for colliding with or disturbing these animals. In the event of oil from a large spill contacting Rice's whales, it is expected that impacts resulting in the injury or death of individual Rice's whales would be significant based on the current PBR level for the Gulf of Mexico subspecies and stock (0.1). Mortality of a single Rice's whale would constitute a significant impact to the local (Gulf of Mexico) stock of Rice's whales. The core distribution area for Rice's whales is within the eastern Gulf of Mexico OCS Planning Area; therefore, it is very unlikely that Rice's whales would occur within the project area. Consequently, the probability of spilled oil from a project-related well blowout reaching Rice's whales is extremely low.

C.3.3 West Indian Manatee (Threatened)

Most of the Gulf of Mexico manatee population is located in peninsular Florida, but manatees have been seen as far west as Texas during the summer (USFWS, 2001a). A species description is presented in the West Indian manatee recovery plan (USFWS, 2001a). Critical habitat of the West Indian manatee has been designated in southwest Florida.

Manatee sightings in Louisiana have increased as the species extends its presence farther west of Florida in the warmer months (Wilson, 2003). Manatees are typically found in coastal and riverine habitats, but have been seen on rare occasions in deepwater areas, during colder months when they seek refuge from colder coastal waters (USFWS, 2001a; Fertl et al., 2005; Pabody et al., 2009). There have been three verified reports of Florida manatee sightings by PSOs on the OCS during seismic mitigation surveys in mean water depths of over 600 m (1,969 ft) (Barkaszi and Kelly, 2019).

IPFs that potentially may affect manatees include support vessel and helicopter traffic and a large oil spill. A small fuel spill in the project area would be unlikely to affect manatees, as the project area is approximately 68 statute miles (109 km) from the nearest shoreline (Louisiana). As explained in **Section A.9.1**, a small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating. Compliance with BSEE-NTL 2015-G03 is intended to minimize the potential for marine debris-related impacts on manatees.

Impacts of Support Vessel and Helicopter Traffic

Support vessel traffic has the potential to disturb manatees, and there is also a risk of vessel collisions, which are identified as a threat in the recovery plan for this species (USFWS, 2001a). Manatees are expected to be limited to shelf and coastal waters, and impacts are expected to be limited to transits of these vessels and helicopters through these waters. To reduce the potential for vessel collisions, BOEM issued NTL 2016-G01, which recommends protected species identification training for vessel operators and that vessels slow down or stop their vessel to avoid colliding with protected species. NTL 2016-G01 was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with the NTL. Vessel collision avoidance measures described in NMFS (2020a) for the marine mammal species managed by that agency may also provide some additional indirect protections to manatees. If a manatee is sighted, vessels associated with the operation should operate at "no wake/idle speed within that area, follow routes in deep water whenever possible, and attempt to maintain a distance of 50 m if practical. This does not apply to any vessel towing gear (e.g., source towed array, site clearance trawling).

Compliance with these mitigation measures will minimize the likelihood of vessel collisions as well as reduce the chance for disturbing manatees during daylight hours. The current PBR level for the Florida subspecies of West Indian manatee is 14 (USFWS, 2014). In the event of a vessel collision during support vessel transits, the mortality of a single manatee would constitute an adverse but insignificant impact to the subspecies.

Helicopter traffic has the potential to disturb manatees and Rathbun (1988) reported that manatees were disturbed more by low-flying 20 to 160 m (66 to 525 ft) helicopters than by fixed-wing aircraft. Helicopters used in support operations maintain a minimum altitude of 213 m (700 ft) while in transit offshore, 305 m (1,000 ft) over unpopulated areas or across coastlines, and 610 m (2,000 ft) over populated areas and sensitive habitats such as wildlife refuges and park properties. In addition, guidelines and regulations specify that helicopters maintain an altitude of 305 m (1,000 ft) within 100 m (328 ft) of marine mammals (BOEM, 2017a; NMFS, 2020a). This helicopter traffic mitigation measure will minimize the potential for disturbing manatees and results in no expected impacts.

Impacts of a Large Oil Spill

The potential for significant impacts to manatees from a large oil spill would be most likely associated with coastal oiling in areas of manatee habitats. The 30-day OSRA results summarized in **Table 3** predict that nearshore waters and embayments of Plaquemines Parish, Louisiana is the coastal area with the most potential for water quality to be affected (5% conditional probability within 10 days and 11% conditional probability within 30 days of a spill). Other Louisiana or Florida shorelines may also be affected within 30 days. The 60-day OSRA model predicts contact of shorelines between Cameron County, Texas, and Miami-Dade County, Florida, with a maximum conditional probability of contact of 13% in Terrebonne Parish, Louisiana (**Table 4**). This range includes manatee critical habitat on the west coast of Florida but is predicted by the 60-day OSRA model to have <0.5% chance of shoreline contact within 60 days of a spill.

In the event that manatees were exposed to oil, effects could include direct impacts from oil exposure as well as indirect impacts due to response activities and materials (e.g., vessel traffic, marine noise, dispersants) (MMC, 2011). Direct physical and physiological effects can include asphyxiation, acute poisoning, lowering of tolerance to other stress, nutritional stress, and inflammation from infection (BOEM, 2017a). Indirect impacts include stress from the activities and sound of response vessels and aircraft. Complications of the above may lead to dysfunction of immune and reproductive systems, physiological stress, declining physical condition, and death. Behavioral responses can include displacement of animals from prime habitat, disruption of social structure, changing foraging distribution and/or patterns, changing reproductive behavior/productivity, and changing movement patterns or migration (MMC, 2011).

In the event that a large spill reached coastal waters where manatees were present, the level of vessel and aircraft activity associated with spill response could disturb manatees and potentially result in vessel collisions, entanglement, or other injury or stress. Response vessels would be expected to operate in accordance with NTL BOEM-2016-G01 and NMFS (2020a) (see **Table 1**) to reduce the potential for colliding with or disturbing these animals. The current PBR level for the Florida subspecies of West Indian manatee is 14 (USFWS, 2014). It is not anticipated that groups of manatees would occur in coastal waters of the north central Gulf of Mexico; therefore, in the event of mortality of individual manatees from a large oil spill would constitute an adverse but insignificant impact to the subspecies.

C.3.4 Non-Endangered Marine Mammals (Protected)

Excluding the three Endangered or Threatened species that have been cited previously, there are 20 additional species of whales and dolphins (cetaceans) that may be found in the Gulf of Mexico, including dwarf and pygmy sperm whales, four species of beaked whales, and 14 species of delphinid whales (dolphins). All marine mammals are protected species under the MMPA. The most common non-endangered cetaceans in the deepwater environment are small odontocetes such as the pantropical spotted dolphin, spinner dolphin, and bottlenose dolphin. A brief summary is presented below, and additional information on these groups is presented by BOEM (2017a).

Dwarf and pygmy sperm whales. At sea, it is difficult to differentiate dwarf sperm whales (*Kogia sima*) from pygmy sperm whales (*Kogia breviceps*), and sightings are often grouped together as *Kogia* spp. Both species have a worldwide distribution in temperate to tropical waters. In the Gulf of Mexico, both species occur primarily along the continental shelf edge and in deeper waters off the continental shelf (Mullin et al., 1991; Mullin, 2007; Waring et al., 2016). Either species could occur in the project area.

Beaked whales. Four species of beaked whales are known to occur in the Gulf of Mexico: Blainville’s beaked whale (*Mesoplodon densirostris*), Sowerby’s beaked whale (*Mesoplodon bidens*), Gervais’ beaked whale (*Mesoplodon europaeus*), and Cuvier’s beaked whale (*Ziphius cavirostris*). Stranding records as well as passive acoustic monitoring in the Gulf of Mexico (Hildebrand et al., 2015) suggest that Gervais’ beaked whale and Cuvier’s beaked whale are the most common species in the region. The Sowerby’s beaked whale is considered extralimital, with one documented stranding reported in the Gulf of Mexico by Bonde and O'Shea (1989). There are a number of extralimital strandings and sightings reported beyond the recognized range of Sowerby’s beaked whale (e.g., Canary Islands, Mediterranean Sea), including from the eastern Gulf of Mexico (Pitman and Brownell, 2020). Blainville’s beaked whales are rare, with only four documented strandings in the northern Gulf of Mexico (Würsig et al., 2000) and three sightings in the Gulf of Mexico (Hayes et al., 2021).

Due to the difficulties of at sea identification, beaked whales in the Gulf of Mexico are identified either as Cuvier's beaked whales or are grouped into an undifferentiated species complex (*Mesoplodon* spp.). In the northern Gulf of Mexico, they are broadly distributed in water depths greater than 1,000 m (3,281 ft) over lower slope and abyssal landscapes (Davis et al., 2000; Hldebrand et al., 2015). Any of these species could occur in the project area (Hayes et al., 2021).

Delphinids. Fourteen species of delphinids are known from the Gulf of Mexico, including Atlantic spotted dolphin (*Stenella frontalis*), bottlenose dolphin (*Tursiops truncatus*), Clymene dolphin (*Stenella clymene*), false killer whale (*Pseudorca crassidens*), Fraser's dolphin (*Lagenodelphis hosei*), killer whale (*Orcinus orca*), melon-headed whale (*Peponocephala electra*), pantropical spotted dolphin (*Stenella attenuata*), pygmy killer whale (*Feresa attenuata*), short-finned pilot whale (*Globicephala macrorhynchus*), Risso's dolphin (*Grampus griseus*), rough-toothed dolphin (*Steno bredanensis*), spinner dolphin (*Stenella longirostris*), and striped dolphin (*Stenella coeruleoalba*). Any of these species could occur in the project area (Hayes et al., 2021).

The bottlenose dolphin (*Tursiops truncatus*) is a common inhabitant of the northern Gulf of Mexico, particularly within continental shelf waters. There are two ecotypes of bottlenose dolphins, a coastal form and an offshore form, which are genetically isolated from each other (Waring et al., 2016). The offshore form of the bottlenose dolphin may occur within the project area. Inshore populations of coastal bottlenose dolphins in the northern Gulf of Mexico are separated into 31 geographically distinct population units, or stocks, for management purposes by NMFS (Hayes et al., 2021).

IPFs that potentially may affect non-endangered marine mammals include drilling rig presence, marine noise, and lights; support vessel and helicopter traffic; and two types of accidents (a small fuel spill and a large oil spill). Effluent discharges are likely to have negligible impacts on marine mammals due to rapid dispersion, the small area of ocean affected, the intermittent nature of the discharges, and the mobility of marine mammals. Compliance with NTL BSEE-2015-G03 is expected to minimize the potential for marine debris-related impacts on marine mammals.

Impacts of Drilling Rig Presence, Marine Noise, and Lights

The presence of the drilling rig presents an attraction to pelagic food sources that may attract cetaceans. Some odontocetes have shown increased feeding activity around lighted platforms at night (Todd et al., 2009). Therefore, prey congregation could pose an attraction to protected species that exposes them to higher levels or longer durations of noise that might otherwise be avoided. Drilling and support vessel presence and lighting are not considered as IPFs for marine mammals (BOEM, 2017a).

If the vessel is equipped with a moon pool, a trained crew member or company representative must monitor the moon pool area for marine mammals during operations. If a marine mammal is detected in the moon pool, immediate reporting to NMFS, BOEM, and BSEE is required (NMFS, 2020a).

Noise, from routine drilling and well completion operations, has the potential to disturb marine mammals. As discussed in **Section A.1**, noise impacts would be expected at greater distances when DP thrusters are in use than with vessel and drilling noise alone and are dependent on variables relating to sea state conditions, thruster type and usage. Three functional hearing groups are represented in the 20 non-endangered cetaceans found in the Gulf of Mexico. Eighteen of the 20 odontocete species are considered to be in the mid-frequency functional hearing group and two species (*Kogia* spp.) are in the high frequency functional hearing group, (NMFS, 2018a). Thruster and drilling noise will affect each group differently depending on the frequency bandwidths produced by operations. Generally, noise produced by drilling rigs on DP is dominated by frequencies below 10 kHz. Thus, drilling rig DP noise sources are out of the audible range for the high frequency group.

For mid frequency cetaceans exposed to a non-impulsive source (like drilling operations), permanent threshold shifts are estimated to occur when the mammal has received an SEL of 198 dB re 1 μPa^2 s over a 24-hour period. Simlarly, temporary threshold shifts are estimated to occur when the mammal has received an SEL of 178 dB re 1 μPa^2 s over a 24-hour period. Due to the transient nature of marine mammals and the stationary nature of the proposed activites, it is not expected that any marine mammals will remain within the ensonified area for a full 24-hour period to receive SEL necessary for the onset of auditory threshold shifts.

NMFS (2018a) presents criteria used to determine physiological (i.e., injury) thresholds for marine mammals but the behavioral disturbance thresholds were not updated in this most recent acoustic guidance; these behavioral disturbance thresholds are established and published by NMFS in 70 *FR* 1871. Received SPL of 120 dB re 1 µPa from a non-impulsive, continuous source is considered high enough to elicit a behavioral reaction in some marine mammal species. The 120-dB isopleth may extend tens to hundreds of kilometers from the source depending on the propagation environment. However, in the case of behavioral responses, received levels alone do not indicate a behavioral response and, more importantly, do not equate to biologically important responses (Southall et al., 2016; Ellison et al., 2012).

There are other OCS facilities and activities near the project area, and the region as a whole has a large number of similar sources. Marine mammal species in the northern Gulf of Mexico have been exposed to noise from anthropogenic sources for a long period of time and over large geographic areas and likely do not represent a naïve population with regard to sound (National Research Council, 2003b). Due to the limited scope, timing, and geographic extent of installation activities, this project would represent a small, temporary contribution to the overall soundscape, and any short-term behavioral impacts are not expected to be biologically significant to marine mammal populations. Drilling rig and support vessel lighting and presence are not identified as IPFs for marine mammals by BOEM (2017a).

Impacts of Support Vessel and Helicopter Traffic

Support vessel traffic has the potential to disturb marine mammals, and there is also a risk of vessel collisions. Data concerning the frequency of vessel collisions are presented by BOEM (2012a). To reduce the potential for vessel collisions, BOEM issued NTL 2016-G01, which recommends protected species identification training for vessels operators and that vessels slow down or stop to avoid colliding with protected species. This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with the NTL. The NTL also requires that operators and crews maintain a vigilant watch for marine mammals and report sightings of any injured or dead protected species. Vessel operators and crews are required to attempt to maintain a distance of 100 m (328 ft) or greater when toothed whales are sighted and 50 m (164 ft) when small cetaceans are sighted (NMFS, 2020a). When cetaceans are sighted while a vessel is underway, vessels must attempt to remain parallel to the animal's course and avoid excessive speed or abrupt changes in direction until the cetacean has left the area. Vessel operators are required to reduce vessel speed to 10 knots or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. These mitigation measures are only effective during daylight hours, or in sea and weather conditions where cetaceans are sighted. All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all "other aquatic protected species" including sea turtles, with an exception made for those animals that approach the vessel. Vessel speeds must also be reduced to 10 kn or less when mother/calf pairs, pods, or large assemblages (greater than three) of any marine mammal are observed near a vessel. Although vessel strike avoidance measures described in NMFS (2020a) are only applicable to ESA-listed species, complying with them may provide additional indirect protections to non-listed species as well.

When aquatic protected species are sighted while a vessel is underway, the vessel should take action as necessary to avoid violating the relevant separation distance (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If aquatic protected species are sighted within the relevant separation distance, the vessel should reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear (e.g., source towed array, site clearance trawling). Use of these measures will minimize the likelihood of vessel collisions as well as reduce the chance for disturbing marine mammals, and therefore no significant impacts are expected.

The current PBR level for several non-endangered cetacean species in the Gulf of Mexico are less than 3 individuals (e.g., rough-toothed dolphin = undetermined, Clymene dolphin = 2.5, Fraser's dolphin = 1.0, killer whale = 1.5, pygmy and false killer whales = 2.8, dwarf and pygmy sperm whales = 2.5) (Hayes et al., 2021). Mortality of individuals equal to or in excess of their PBR level would constitute a significant impact at a population level to the local (Gulf of Mexico) stocks of these species.

Helicopter traffic has the potential to disturb marine mammals (Würsig et al., 1998) but relatively high-altitude flying is conducted to minimize the potential for disturbances. While flying offshore, helicopters maintain altitudes above 213 m (700 ft) during transit to and from the working area. In addition, guidelines and regulations specify that helicopters maintain an altitude of 305 m (1,000 ft) within 100 m (328 ft) of marine mammals (BOEM, 2012a; 2016a). Maintaining these altitudes during helicopter operations will minimize the potential for disturbing marine mammals, and no significant impacts are expected (BOEM, 2017a; NMFS, 2020a).

Impacts of a Small Fuel Spill

Potential spill impacts on marine mammals are discussed by BOEM (2012a; 2015; 2016b). Oil impacts on marine mammals in general are discussed by Geraci and St. Aubin (1990). For this EP, there are no unique site-specific issues with respect to spill impacts on these animals.

The probability of a fuel spill is expected to be minimized by Chevron's preventative measures during fuel transfer. In the unlikely event of a spill, implementation of Chevron's OSRP is expected to lessen the potential for impacts on marine mammals. EP Section H provides detail on spill response measures, and those measures are summarized in the EIA. Given the open ocean location of the project area, the limited duration of a small spill, and response efforts, it is expected that any impacts would be brief and minimal.

A small fuel spill in offshore waters would produce a thin slick on the water surface and introduce the concentrations of petroleum hydrocarbons and their degradation products. Direct physical and physiological effects of exposure to diesel fuel could include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil directly or via contaminated prey; and stress from the activities and sound of response vessels and aircraft (MMC, 2011). The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time and the effectiveness of spill response measures. A small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating (**Section A.9.1**). Therefore, due to the limited areal extent and short duration of water quality impacts from a small fuel spill as well as the mobility of marine mammals, no significant impacts would be expected.

Impacts of a Large Oil Spill

Potential spill impacts on marine mammals are discussed by BOEM (2017a). For this EP, there are no unique site-specific issues. Impacts of oil spills on marine mammals can include direct impacts from oil exposure as well as indirect impacts due to response activities and materials (e.g., vessel traffic, marine noise, dispersants) (MMC, 2011). Direct physical and physiological effects can include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil (and dispersants) directly or via contaminated prey. Complications of the above may lead to dysfunction of immune and reproductive systems (De Guise et al., 2017), physiological stress, declining physical condition, and death. Indirect impacts could include stress from the activities and sound of response vessels and aircraft. Behavioral responses can include displacement of animals from prime habitat (McDonald et al., 2017), disruption of social structure, change in prey availability and foraging distribution or patterns, change in reproductive behavior/productivity, and change in movement patterns or migration (MMC, 2011).

In the event of a large spill, response activities that may impact marine mammals include increased vessel traffic and remediation activities (e.g., use of dispersants, controlled burns, skimmers, boom) (BOEM, 2017a). The increased level of vessel and aircraft activity associated with spill response could disturb marine mammals, potentially resulting in behavioral changes. The large number of response vessels could result in vessel collisions, entanglement or other injury, or stress. Response vessels are expected to operate in accordance with NTL BOEM-2016-G01 to reduce the potential for colliding with or disturbing these animals, and therefore no significant impacts are expected. This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with the NTL. The application of dispersants greatly reduces exposure risks to marine mammals as the dispersants would remove oil from the surface thereby reducing the risk of contact and rendering it less likely to adhere to skin, baleen plates, or other body surfaces (BOEM, 2017a). Based on the current PBR level for several non-endangered cetacean species in the Gulf of Mexico that are less than 3 individuals (e.g., rough-toothed dolphin = undetermined, Clymene dolphin = 2.5, Fraser's dolphin = 1.0, killer whale = 1.5, pygmy and false killer whales = 2.8, dwarf and pygmy sperm whales = 2.5) (Hayes et al., 2021), mortality of individuals equal to or in excess of their PBR level would constitute a significant impact at the population level to the local (Gulf of Mexico) stocks of these species.

C.3.5 Sea Turtles (Endangered/Threatened)

Five species of Endangered or Threatened sea turtles may be found near the project area. Endangered species include the leatherback (*Dermochelys coriacea*), Kemp's ridley (*Lepidochelys kempii*), and hawksbill (*Eretmochelys imbricata*) turtles. As of 6 May 2016, the entire North Atlantic DPS of the green turtle (*Chelonia mydas*) is listed as Threatened (81 *FR* 20057). The DPS of loggerhead turtles (*Caretta caretta*) that occurs in the Gulf of Mexico is listed as Threatened.

Critical habitat has been designated for the loggerhead turtle in the Gulf of Mexico as shown in **Figure 4**. Loggerhead turtles in the Gulf of Mexico are part of the Northwest Atlantic Ocean DPS (76 *FR* 58868). In July 2014, NMFS and the USFWS designated critical habitat for this DPS (NMFS, 2014a). The USFWS designation (79 *FR* 39756) includes nesting beaches in Jackson County, Mississippi; Baldwin County, Alabama; and Bay, Gulf, and Franklin Counties in the Florida Panhandle as well as several counties in southwest Florida and the Florida Keys (and other areas along the Atlantic coast). The NMFS designation (79 *FR* 39856) includes nearshore reproductive habitat within 0.99 miles (1.6 km) seaward of the mean high-water line along these same nesting beaches. NMFS also designated a large area of shelf and oceanic waters, termed *Sargassum* habitat, in the Gulf of Mexico (and Atlantic Ocean) as critical habitat. *Sargassum* is a brown algae (Class Phaeophyceae) that takes on a planktonic, often pelagic existence after being removed from reefs during rough weather. Rafts of *Sargassum* serve as important foraging and developmental habitat for numerous fishes, and young sea turtles, including loggerhead turtles. NMFS designated three other categories of critical habitat; of these, two (migratory habitat and overwintering habitat) are along the Atlantic coast and the third (breeding habitat) is found in the Florida Keys and along the Florida east coast (NMFS, 2014a).

The nearest designated nearshore reproductive critical habitat for loggerhead sea turtles is approximately 123 statute miles (198 km) from the project area. The project area is located approximately 9 statute miles (14 km) from the designated *Sargassum* critical habitat for loggerhead sea turtles (**Figure 4**).

Leatherbacks are the species most likely to be present near the project area, as they are the most pelagic of the sea turtles and feed on populations of gelatinous plankton, such as jellyfish and salps in all water depths. Loggerhead, green, hawksbill, and Kemp's ridley turtles are typically inner-shelf and nearshore species but may be found transiting in oceanic waters during seasonal migrations. Loggerheads are more likely to occur or be attracted to offshore structures than the other species. Hatchlings or juveniles of any of the sea turtle species may be present in deepwater areas, including the project area, where they may be associated with *Sargassum* rafts and other flotsam. All five sea turtle species in the Gulf of Mexico are migratory and use different marine habitats according to their life stage. These habitats include high-energy beaches for nesting females and emerging hatchlings and pelagic convergence zones for hatchling and juvenile turtles. As adults, green, hawksbill, and loggerhead turtles forage primarily in shallow, benthic habitats.

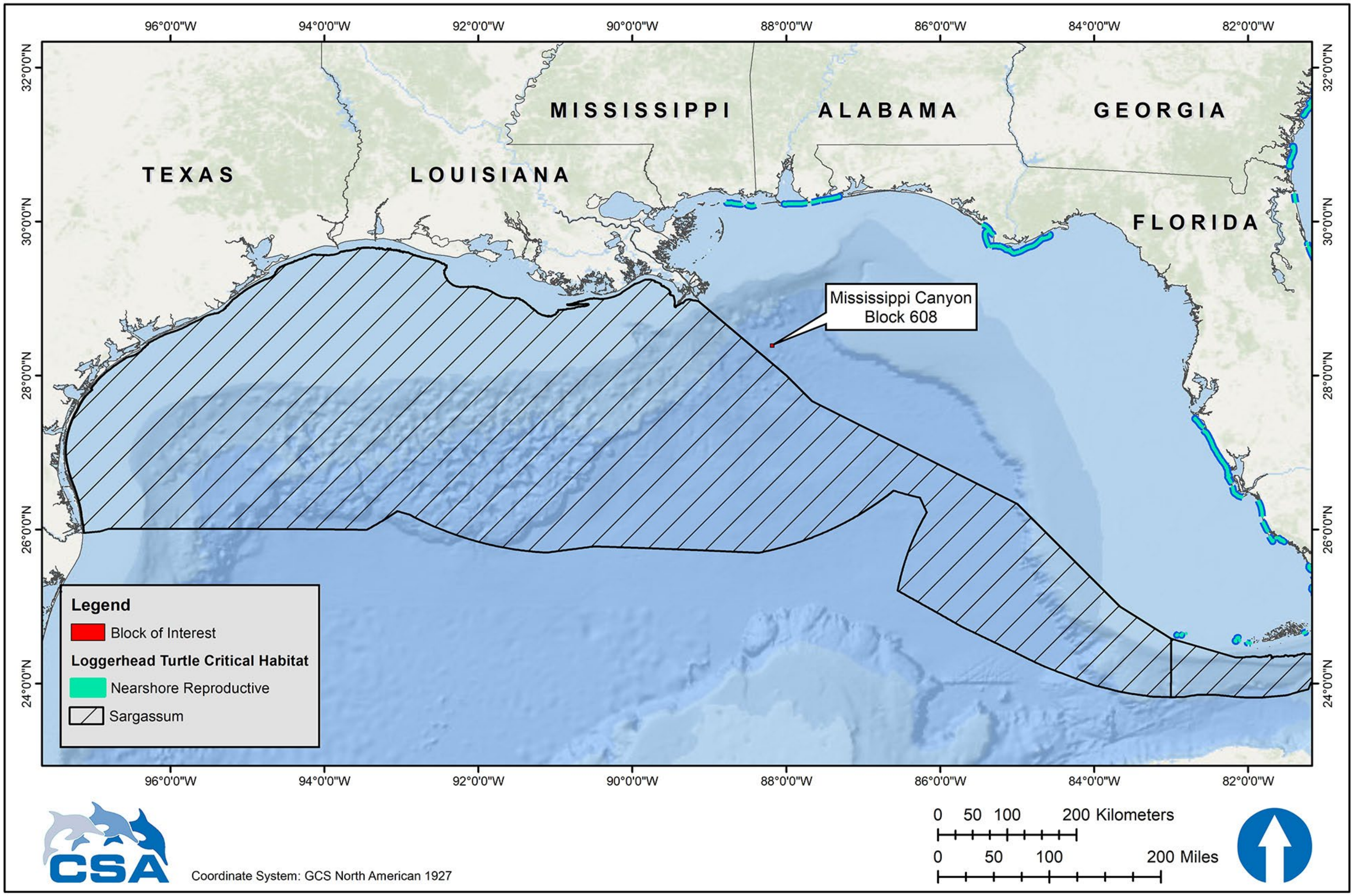

Figure 4. Location of loggerhead turtle designated *Sargassum* critical habitat and nearshore reproductive critical habitat in relation to the project area.

Sea turtle nesting in the northern Gulf of Mexico can be summarized by species as follows:

- Loggerhead turtles – Loggerhead turtles nest in significant numbers along the Florida Panhandle (Florida Fish and Wildlife Conservation Commission, nd-a) and, to a lesser extent, from Texas through Alabama (NMFS and USFWS, 2008).
- Green and leatherback turtles – Green and leatherback turtles infrequently nest on Florida Panhandle beaches (Florida Fish and Wildlife Conservation Commission, nd-b; nd-c).
- Kemp's ridley turtles – The critically endangered Kemp's ridley turtle nests almost exclusively on a 16-mile (26-km) stretch of coastline near Rancho Nuevo in the Mexican state of Tamaulipas (NMFS et al., 2011). A much smaller population nests in Padre Island National Seashore, Texas, mostly as a result of reintroduction efforts (NMFS et al., 2011). A total of 284 Kemp's ridley turtle nests were counted on Texas beaches for the 2022 nesting season (Turtle Island Restoration Network, 2022). Padre Island National Seashore along the coast of Willacy, Kenedy, and Kleberg Counties in southern Texas, is the most important nesting location for this species in the United States; and
- Hawksbill turtles – Hawksbill turtles typically do not nest anywhere near the project area, with most nesting in the region located in the Caribbean Sea and on the beaches of the Yucatán Peninsula (USFWS, 2016a).

IPFs that could potentially affect sea turtles include drilling rig presence, marine noise, and lights; support vessel and helicopter traffic; and two types of accidents (a small fuel spill and a large oil spill). Effluent discharges are likely to have negligible impacts on sea turtles due to rapid dispersion, the small area of ocean affected, and the intermittent nature of the discharges.

Though NMFS (2020a) stated marine debris as an IPF, compliance with NTL BSEE 2015-G013 (See Table 1) and NMFS (2020a) Appendix B will minimize the potential for marine debris-related impacts on sea turtles. NMFS (2020a) estimated a small proportion of individual sea turtles would be adversely affected from exposure to marine debris. Therefore, marine debris is likely to have negligible impacts on sea turtles and is not further discussed in this EIA (See Table 2).

Impacts of Drilling Rig Presence, Marine Noise, and Lights

Drilling activities produce a broad array of sounds at frequencies and intensities that may be detected by sea turtles (Samuel et al., 2005, Popper et al., 2014). Potential impacts may include behavioral disruption and temporary or permanent displacement from the area near the sound source. Sea turtles can hear low to mid-frequency sounds and they appear to hear best between 200 and 750 Hz; they do not respond well to sounds above 2,000 Hz, although primary hearing frequency ranges vary per species and life stage (Ketten and Bartol, 2005; Dow Piniak et al., 2012a,b; Martin et al., 2012; Piniak et al., 2016).

The currently accepted hearing and response estimates for sea turtles are based on work conducted by the U.S. Navy (Finneran et al., 2017). These are applied in the NMFS Biological Opinion (NMFS, 2020a) which uses a zero-to-peak sound pressure level (PK) permanent threshold shift (i.e., acoustic injury) threshold of 232 dB re 1 µPa, and an SEL_{24h} threshold of 204 dB re 1 μPa^2 s. Behavioral thresholds for sea turtles are also based on work by the U.S. Navy (Blackstock et al., 2018) which recommends an SPL threshold of 175 dB re 1 µPa. Based on transmission loss calculations (see Urick, 1983), open water propagation of noise produced by typical sources with DP thrusters in use during drilling, are not expected to produce SPL greater than 175 dB re 1 µPa beyond a few meters from the source. Certain sea turtles, especially loggerheads, may be attracted to offshore structures (Lohoefener et al., 1990; Gitschlag et al., 1997; Colman et al., 2020) and thus may be more susceptible to impacts from sounds produced during routine drilling activities. Any impacts would likely be short-term behavioral changes such as diving and evasive swimming, disruption of activities, or departure from the area. Because of the limited scope and short duration of drilling activities, these short-term impacts are not expected to be biologically significant to sea turtle populations.

Artificial lighting can disrupt the nocturnal orientation of sea turtle hatchlings (Tuxbury and Salmon, 2005; Berry et al., 2013; Simões et al., 2017). However, hatchlings may rely less on light cues when they are offshore than when they are emerging on the beach (Salmon and Wyneken, 1990). NMFS (2007) concluded that the effects of lighting from offshore structures on sea turtles are insignificant.

NMFS (2020a) stated sea turtles have the potential to be entangled or entrapped in moon pools, and though many sea turtles could exit the moon pool under their own volition, sublethal effects could occur. If the vessel is equipped with a moon pool, a trained crew member or company representative will monitor the moon pool area for sea turtles during operations. If a sea turtle is detected in the moon pool, it will be immediately reported to agencies including NMFS, BOEM, and BSEE per NMFS (2020a); compliance with ensuing agency guidance is expected. Resuscitation of any trapped sea turtles is expected to occur in compliance with NMFS (2020a) Appendix J. Based on the moon pool entrapment cases of sea turtles reported and successful rescues and releases that have occurred, NMFS (2020a) estimated approximately about one sea turtle will be sub lethally entrapped in moon pools every year. Therefore, no significant impacts are expected.

Impacts of Support Vessel and Helicopter Traffic

Support vessel traffic has the potential to disturb sea turtles, and there is also a risk of vessel collisions. Data show that vessel traffic is one cause of sea turtle mortality in the Gulf of Mexico (Lutcavage et al., 1997). While adult sea turtles are visible at the surface during the day and in clear weather, they can be difficult to spot from a moving vessel when resting below the water surface, during nighttime, or during periods of inclement weather. To reduce the potential for vessel collisions, BOEM issued NTL BOEM-2016-G01, which addresses 1) protected species identification training; 2) vessel operators' and crews' observational vigilance and protected species collision avoidance; and 3) reporting of sightings of any injured or dead protected species. This NTL was reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with the NTL. When sea turtles are sighted, vessel operators and crews must, to the maximum extent possible, attempt to maintain a distance of 50 m (164 ft) or greater whenever possible (NMFS [2020a] Appendix C). When sea turtles are sighted while a vessel is underway, the vessel should take action as necessary to avoid violating the relevant separation distance (e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area). If aquatic protected species are sighted within the relevant separation distance, the vessel should reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear (e.g., source towed array, site clearance trawling). Compliance with these mitigation measures will minimize the likelihood of vessel collisions as well as reduce the chance for disturbing sea turtles. Therefore, no significant impacts are expected.

Noise generated from support helicopter traffic has the potential to disturb sea turtles but relatively high-altitude flying is conducted to minimize the potential for disturbances. While flying offshore, helicopters maintain altitudes above 213 m (700 ft) during transit to and from the working area. This altitude is intended to minimize the potential for disturbing sea turtles, and no significant impacts are expected (NMFS, 2007; BOEM, 2012a).

Impacts of a Small Fuel Spill

Potential spill impacts on sea turtles are discussed by NMFS (2020a) and BOEM (2017a). For this EP, there are no unique site-specific issues with respect to spill impacts on sea turtles.

The probability of a fuel spill is expected to be minimized by Chevron's preventative measures during fuel transfer. In the unlikely event of a spill, implementation of Chevron's OSRP is expected to minimize potential impacts on sea turtles. EP Section H provides details on spill response measures. Given the open ocean location of the project area, the duration of a small spill would be brief and the potential for impacts to occur would be minimal.

A small fuel spill in offshore waters would produce a thin slick on the water surface and introduce concentrations of petroleum hydrocarbons and their degradation products. Direct physical and physiological effects of exposure to diesel fuel could include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes; ingestion of oil directly or via contaminated prey; and stress from the activities and sound of response vessels and aircrafts (NMFS, 2020b). The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the release and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would be evaporated or dispersed naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions. Therefore, due to the limited areal extent and short duration of water quality impacts from a small fuel spill, no significant impacts to sea turtles from direct or indirect exposure would be expected.

Loggerhead Critical Habitat – Nesting Beaches. A small fuel spill in the project area would be unlikely to affect sea turtle nesting beaches due to the distance from the nearest shoreline. Loggerhead turtle nesting beaches and nearshore reproductive habitat designated as critical habitat are located in Mississippi, Alabama, and the Florida Panhandle, at least 123 statute miles (198 km) from the project area. As explained in **Section A.9.1**, a small fuel spill would not be expected to make landfall or reach coastal waters prior to natural dispersion and degradation.

Loggerhead Critical Habitat – *Sargassum.* The project area is approximately 9 statute miles (14 km) from the designated *Sargassum* critical habitat for the loggerhead turtles (**Figure 4**). A small diesel fuel spill in the project area would not likely affect *Sargassum* and juvenile turtles in this habitat due to the rapid dispersion and evaporation of diesel fuel (see **Section A.9.1**). If juvenile sea turtles did come into contact with or ingest diesel fuel, impacts could include death, injury, or other sublethal effects. However, effects of a small spill on *Sargassum* critical habitat for loggerhead turtles would be limited to the small area (0.5 to 5 ha [1.2 to 12 ac]) likely to be impacted by a small spill. An impact area of 5 ha (12 ac) would represent a negligible portion of the approximately 40,662,810 ha (100,480,000 ac) designated *Sargassum* critical habitat for loggerhead turtles in the northern Gulf of Mexico. However, if juvenile sea turtles are present in the area impacted, significant impacts to the regional population could occur.

Impacts of a Large Oil Spill

Impacts of oil spills on sea turtles can include direct impacts from oil exposure as well as indirect impacts due to response activities (e.g., vessel traffic, marine noise, dispersant use). Direct physical and physiological effects can include skin irritation, inflammation, or necrosis; chemical burns of skin, eyes, and mucous membranes; inhalation of toxic fumes and smoke (e.g., from *in situ* burning of oil); ingestion of oil (and dispersants) directly or via contaminated food; and stress from the activities and marine noise of response vessels and aircraft. Complications of the above may lead to dysfunction of immune and reproductive systems, physiological stress, declining physical condition, and death. Behavioral responses can include displacement of animals from prime habitat, disruption of social structure, changing food availability and foraging distribution and/or patterns, changing reproductive behavior/productivity, and changing movement patterns or migration (NOAA, 2010; NMFS, 2020b). In the unlikely event of a spill, implementation of Chevron's OSRP is expected to minimize the potential for these types of impacts on sea turtles. EP Section H provides further details on spill response measures.

Studies of oil effects on loggerhead turtles in a controlled setting (NOAA, 2010, Lutcavage et al., 1995) suggest that sea turtles show no avoidance behavior when they encounter an oil slick, and any sea turtle in an affected area would be expected to be exposed. Sea turtles' diving behaviors also put them at risk. Sea turtles rapidly inhale a large volume of air before diving and continually resurface over time, which may result in repeated exposure to volatile vapors and oiling (NMFS, 2007).

<u>Loggerhead Critical Habitat – Nesting Beaches</u>. If spilled oil reaches sea turtle nesting beaches, nesting sea turtles and egg development could be affected (NMFS, 2020a). An oiled beach could affect nest site selection or result in no nesting at all (e.g., false crawls). Upon hatching and successfully reaching the water, hatchlings are subject to the same types of oil spill exposure hazards as adults. Hatchlings that contact oil residues while crossing a beach can exhibit a range of effects, from acute toxicity to impaired movement and normal bodily functions (NMFS, 2007).

The OSRA results summarized in **Table 3** predict that nearshore waters and embayments of Plaquemines Parish, Louisiana is the coastal area with the most potential for water quality to be affected (5% conditional probability within 10 days and 11% conditional probability within 30 days of a spill). Other Louisiana or Florida shorelines may also be affected within 30 days. The 60-day OSRA model predicts contact of shorelines between Cameron County, Texas, and Miami-Dade County, Florida, with a maximum conditional probability of contact of 13% in Terrebonne Parish, Louisiana (**Table 4**). The nearest nearshore reproductive critical habitat for the loggerhead turtle in Baldwin County, Alabama is 123 miles (198 km) from the project area and is predicted by the 60-day OSRA model to have an 1% or less conditional probability of contact within 60 days of a spill.

<u>Loggerhead Critical Habitat – *Sargassum*</u>. The project area is approximately 9 statute miles (14 km) from the loggerhead turtle critical habitat designated as *Sargassum* habitat, which includes most of the Western and Central Planning Areas in the Gulf of Mexico and parts of the southern portion of the Eastern Planning Area (**Figure 4**) (NMFS, 2014a). Because of the large area covered by the designated *Sargassum* critical habitat for loggerhead turtles, a large spill could result in a substantial part of the *Sargassum* critical habitat in the northern Gulf of Mexico being oiled. The 2010 *Deepwater Horizon* spill affected approximately one-third of the *Sargassum* habitat in the northern Gulf of Mexico (BOEM, 2014a). It is extremely unlikely that

the entire *Sargassum* critical habitat would be affected by a large spill. Because *Sargassum* is a floating, pelagic species, it would only be affected by impacts that occur near the surface.

The effects of oiling on *Sargassum* vary with spill severity, but moderate to heavy oiling that could occur during a large spill could cause complete mortality to floating *Sargassum* and its associated communities (BOEM, 2017a). *Sargassum* also has the potential to sink during a large spill, thus temporarily removing the habitat and possibly being an additional pathway of exposure to the benthic environment (Powers et al., 2013). Lower levels of oiling may cause sub-lethal affects, including a reduction in growth, productivity, and recruitment of organisms associated with the *Sargassum.* The *Sargassum* algae itself could be less impacted by light to moderate oiling than associated organisms because of a waxy outer layer that might help protect it from oiling (BOEM, 2016b). *Sargassum* has a yearly seasonal cycle of growth and a yearly cycle of migration from the Gulf of Mexico to the western Atlantic. A large spill could affect a large portion of the annual crop of the algae; however, because of its ubiquitous distribution and seasonal cycle, recovery of the *Sargassum* community would be expected to occur within one to two years (BOEM, 2017a).

Impacts to sea turtles from a large oil spill and associated cleanup activities would depend on spill extent, duration, and season (relative to turtle nesting season); the amount of oil reaching the shore; the importance of specific beaches to sea turtle nesting; and the level of cleanup vessel and beach crew activity required. In the event of oil from a large spill, it is expected that impacts resulting in the injury or death of individual sea turtles would be adverse but not likely significant at the population level. In the event that spilled oil reached nesting beaches during nesting period(s), the level of mortality (and impact) would increase.

C.3.6 Piping Plover (Threatened)

The Piping Plover is a migratory shorebird that overwinters along the southeastern U.S. and Gulf of Mexico coasts. This Threatened species experienced declines in population as a result of hunting, habitat loss and modification, predation, and disease (USFWS, 2003). However, as a result of intensive conservation and management, populations of Piping Plover appear to have been increasing since 1991 throughout its range (BirdLife International, 2020). Critical overwintering habitat has been designated, including beaches in Texas, Louisiana, Mississippi, Alabama, and Florida (**Figure 3**). Piping Plovers inhabit coastal sandy beaches and mudflats, feeding by probing for invertebrates at or just below the surface. They use beaches adjacent to foraging areas for roosting and preening (USFWS, nd).

A large oil spill is the only IPF that potentially may affect Piping Plovers. There are no IPFs associated with routine project activities that could affect these birds. A small fuel spill in the project area would be unlikely to affect Piping Plovers because a small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating (see explanation in **Section A.9.1**). Noise from helicopters would be unlikely to significantly affect piping plover populations, because it is assumed that helicopters will maintain an altitude of 305 m (1,000 ft) over unpopulated areas or across coastlines.

Impacts of a Large Oil Spill

The project area is approximately 69 statute miles (111 km) from the nearest shorelines designated as critical habitat for the Piping Plover (**Figure 3**).

The 30-day OSRA modeling (**Table 3**) predicts that Piping Plover critical habitat in Louisiana and Florida could be contacted within 30 days of a spill (1% to 11% conditional probability). The 60-day OSRA modeling (**Table 4**) predicts that during the spring, there is up to 13% conditional probability that an oil spill from the project area would reach a shoreline designated as critical habitat for the Piping Plover within 60 days of a spill.

Plovers could physically oil themselves while foraging on oiled shores or secondarily contaminate themselves through ingestion of oiled intertidal sediments and prey (BOEM, 2017a). Piping Plovers congregate and feed along tidally-exposed banks and shorelines, following the tidal boundary and foraging at the water's edge. It is possible that some deaths of Piping Plovers could occur, especially if spills occur during winter months when plovers are most common along the coastal Gulf or if spills contacted critical habitat. Impacts could also occur from vehicular traffic on beaches and other activities associated with spill cleanup. Extensive Chevron resources will be available to protect and rehabilitate wildlife in the event of a spill reaching the shoreline, as detailed in the OSRP.

However, a large spill that contacts shorelines would not necessarily substantially impact Piping Plovers. In the aftermath of the *Deepwater Horizon* incident, Gibson et al. (2017) completed thorough surveys of coastal Piping Plover habitat in coastal Louisiana, Mississippi, and Alabama and found that only 0.89% of all observed Piping Plovers were visibly oiled, leaving the authors to conclude that the *Deepwater Horizon* incident did not substantially affect Piping Plover populations.

C.3.7 Whooping Crane (Endangered)

The Whooping Crane is a large omnivorous wading bird listed as an Endangered species. Three wild populations live in North America (National Wildlife Federation, 2016). One population overwinters along the Texas coast at Aransas NWR and summers at Wood Buffalo National Park in Canada. This population represents the majority of the world's population of free-ranging Whooping Cranes, reaching an estimated population of 543 at Aransas NWR during the 2021 to 2022 winter (USFWS, 2022), an increase of an estimated 506 individuals counted in the 2019 to 2020 winter survey. Whooping Cranes breed, migrate, winter, and forage in a variety of habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, and agricultural fields (USFWS, 2007). About 9,000 ha (22,240 ac) of salt flats on Aransas NWR and adjacent islands comprise the principal wintering grounds of the Whooping Crane. Aransas NWR is designated as critical habitat for the species.

A large oil spill is the only IPF that potentially may affect Whooping Cranes. A small fuel spill in the project area would also be unlikely to affect Whooping Cranes, due to the distance of the project area from Aransas NWR. As explained in **Section A.9.1**, a small fuel spill would not be expected to make landfall or reach coastal waters prior natural dispersion and degradation.

Impacts of a Large Oil Spill

A large oil spill is unlikely to affect Whooping Cranes as the project area is approximately 502 statute miles (808 km) from the Aransas NWR, which is the nearest designated critical habitat. The 30-day OSRA modeling (**Table 3**) predicts a <0.5% chance of oil contacting Whooping Crane critical habitat within 30 days of a spill. The 60-day OSRA model (**Table 4**) predicts that there is a 4% or less chance oil contacting Whooping Crane critical habitat within 60 days of a spill.

In the event of oil exposure, Whooping Cranes could physically oil themselves while foraging in oiled areas or secondarily contaminate themselves through ingestion of contaminated shellfish, frogs, and fishes. It is possible that some Whooping Crane deaths could occur, especially if a spill occurred during winter months when Whooping Cranes are most common along the Texas coast and if the spill contacts their critical habitat in Aransas NWR. Impacts could also occur from vehicular traffic on beaches and other activities associated with spill cleanup. In the event of a spill, Chevron would work with the applicable state and federal agencies to prevent impacts on Whooping Cranes. Extensive Chevron resources will be available to protect and rehabilitate wildlife in the event of a spill reaching the shoreline, as detailed in the OSRP.

C.3.8 Oceanic Whitetip Shark (Threatened)

The oceanic whitetip shark was listed as Threatened under the ESA on 30 January 2018 (effective 30 March 2018) by NMFS (83 *FR* 4153). Oceanic whitetip sharks are found worldwide in offshore waters between approximately 30° N and 35° S latitude, and historically were one of the most widespread and abundant species of shark (Rigby et al., 2019). However, based on reported oceanic whitetip shark catches in several major long-line fisheries, the global population appears to have suffered substantial declines (Camhi et al., 2008) and the species is now only occasionally reported in the Gulf of Mexico (Rigby et al., 2019).

Oceanic whitetip shark management is complicated due to it being globally distributed, highly migratory, and overlapping in areas of high fishing pressure; thus, leaving assessment of population trends on fishery dependent catch-and-effort data rather than scientific surveys (Young and Carlson, 2020). A comparison of historical shark catch rates in the Gulf of Mexico by Baum and Myers (2004) noted that most recent papers dismissed the oceanic whitetip shark as rare or absent in the Gulf of Mexico. NMFS (2018b) noted that there has been an 88% decline in abundance of the species in the Gulf of Mexico since the mid-1990s due to commercial fishing pressure.

IPFs that could affect the oceanic whitetip shark include drilling rig presence, noise, and lights, and a large oil spill. Though NMFS (2020a) lists a small diesel fuel spill as an IPF, in the project area, a small diesel fuel spill would be unlikely to affect oceanic whitetip sharks due to rapid natural dispersion of diesel fuel and the low density of oceanic whitetip sharks potentially present in the project area. Therefore, no significant impacts are expected from small diesel fuel spills and they are not further discussed (**Table 2**).

Impacts of Drilling Rig Presence, Marine Noise, and Lights

Offshore drilling activities produce a broad array of noise at frequencies and intensities that may be detected by sharks including the Threatened oceanic whitetip shark. The general frequency range for elasmobranch hearing is approximately between 20 Hz and 1 kHz (Ladich and Fay, 2013) which includes sensitivities for individual species to SPLs between approximately 134 to 148 dB re 1 µPa in nurse sharks (*Ginglymostoma cirratum*) at frequencies between 100 and 1,000 Hz (Casper and Mann, 2006). These frequencies overlap with noise associated with drilling activities (source levels of 195 dB re 1 µPa m with peak frequencies at 40 to 100 Hz) (Hildebrand, 2005). Impacts from offshore drilling activities (i.e., non-impulsive sound) could include masking or behavioral changes (Popper et al., 2014). However, because of the limited propagation distances of high SPLs from the drilling rig, impacts would be limited in geographic scope.

It is anticipated that animals would move away from the static sound source and avoid auditory injury or disturbances. Therefore, no population level impacts on oceanic whitetip sharks are expected.

Impacts of a Large Oil Spill

Information regarding the direct effects of oil on elasmobranchs, including the oceanic whitetip shark are largely unknown. However, in the event of a large oil spill, oceanic whitetip sharks could be affected by direct ingestion, ingestion of oiled prey, or the absorption of dissolved petroleum products through the gills. Because oceanic whitetip sharks may be found in surface waters, they could be more likely to be impacted by floating oil than other species which only reside at depth.

It is possible that a large oil spill could affect individual oceanic whitetip sharks and result in injuries or deaths. However, due to the low density of oceanic whitetip sharks thought to exist in the Gulf of Mexico, it is unlikely that a large spill would result in population level effects.

C.3.9 Giant Manta Ray (Threatened)

The giant manta ray is a Threatened elasmobranch species that is a slow-growing, migratory, planktivorous species than inhabits tropical, subtropical, and temperate bodies of water worldwide (NOAA, 2018). The giant manta ray became listed as Threatened under the ESA in 2018.

Commercial fishing is the primary threat to giant manta rays (NOAA, 2018). The species is targeted and caught as bycatch in several global fisheries throughout its range. Although protected in U.S. waters, protection of populations is difficult as they are highly migratory with sparsely distributed and fragmented populations throughout the world. Some estimated regional population sizes are small (between 100 to 1,500 individuals) (Marshall et al., 2018; NOAA, 2018). Stewart et al. (2018) recently reported that the Flower Garden Banks serves as nursery habitat for aggregations of juvenile manta rays. Approximately 100 unique individuals have been positively identified at the Flower Garden Banks based on unique underbelly coloration (Belter et al., 2020). Genetic and photographic evidence in the Flower Garden Banks over 25 years of monitoring showed that 95% of identified giant manta ray male individuals were smaller than mature size (Stewart et al., 2018).

IPFs that may impact giant manta rays include drilling rig presence, marine noise, and lights, and a large oil spill. Though NMFS (2020a) lists a small diesel fuel spill as an IPF, in the project area a small diesel fuel spill would be unlikely to affect giant manta rays due to rapid natural dispersion of diesel fuel and the low density of giant manta rays potentially present in the project area. Therefore, no significant impacts are expected from small diesel fuel spills and they are not further discussed (See **Table 2**).

Impacts of Drilling Rig Presence, Marine Noise, and Lights

Offshore drilling activities produce a broad array of noise at frequencies and intensities that may be detected by elasmobranchs including the Threatened giant manta ray. The general frequency range for elasmobranch hearing is approximately between 20 Hz and 1 kHz (Ladich and Fay, 2013). Studies indicate sensitivities to SPLs between approximately 139 and 153 dB re 1 µPa in yellow stingray (*Urobatis jamaicensis*) and SPLs between approximately 120 and 145 dB re 1 µPa in little skate (*Leucoraja erinaceus*) at frequencies from 100 to 1,000 Hz (Casper et al., 2003;

Casper and Mann, 2006). These frequencies overlap with noise associated with drilling activities (source levels of 195 dB re 1 µPa m with peak frequencies at 40 to 100 Hz) (Hildebrand, 2005). Impacts from offshore drilling activities (i.e., non-impulsive sound) could include masking or behavioral changes (Popper et al., 2014). However, because of the limited propagation distances of high SPLs from the drilling rig, impacts would be limited in geographic scope. It is anticipated that animals would move away from the static sound source and avoid auditory injury or disturbances. Therefore, no population level impacts on giant manta rays are expected.

Impacts of a Large Oil Spill

A large oil spill in the project area could reach coral reefs at the Flower Garden Banks which is the only known location of giant manta ray aggregations in the Gulf of Mexico, although individuals may occur anywhere in the Gulf. In the unlikely event of a large oil spill impacting areas with giant manta rays, individual rays could be affected by direct ingestion of oil which could cover their gill filaments or gill rakers, or by ingestion of oiled plankton. Giant manta rays typically feed in shallow waters of less than 10 m (33 ft) depth (NOAA, 2018). Because of this shallow water feeding behavior, giant manta rays would be more likely to be impacted by floating oil than other species which most typically reside at depth.

In the event of a large oil spill, due to the distance between the project area and the Flower Garden Banks, it is unlikely that oil would impact the threatened giant manta ray nursery habitat. It is possible that a large oil spill could contact individual giant manta rays, but due to the low density of individuals thought to occur in the Gulf of Mexico, there would not likely be any population-level impacts.

C.3.10 Gulf Sturgeon (Threatened)

The Gulf sturgeon (*Acipenser oxyrinchus desotoi*) is a Threatened fish species that inhabits major rivers and inner shelf waters from the Mississippi River to the Suwannee River, Florida (Barkuloo, 1988; Wakeford, 2001). Sturgeon are anadromous fish that migrate from the ocean upstream into coastal rivers to spawn in freshwater.

The historic range of the species extended from the Mississippi River to Charlotte Harbor, Florida (Wakeford, 2001). This range has contracted to encompass major rivers and inner shelf waters from the Mississippi River to the Suwannee River, Florida. Populations have been depleted or even extirpated throughout this range by fishing, shoreline development, dam construction, water quality changes, and other factors (Barkuloo, 1988; Wakeford, 2001). These declines prompted the listing of the Gulf sturgeon as a Threatened species in 1991. The best-known populations occur in the Apalachicola and Suwannee Rivers in Florida (Carr, 1996; Sulak and Clugston, 1998), the Choctawhatchee River in Alabama (Fox et al., 2000), and the Pearl River in Mississippi/Louisiana (Morrow et al., 1998). Rudd et al. (2014) reconfirmed the spatial distribution and movement patterns of Gulf Sturgeon by surgically implanting acoustic telemetry tags. Critical habitat in the Gulf extends from Lake Borgne, Louisiana (St. Bernard Parish), to Suwannee Sound, Florida (Levy County) (NMFS, 2014b) (**Figure 3**). A species description is presented by BOEM (2012a) and in the recovery plan for this species (USFWS et al., 1995).

A large oil spill is the only IPF that potentially may affect Gulf sturgeon. There are no IPFs associated with routine project activities that could affect these fish. A small fuel spill in the project area would be unlikely to affect Gulf sturgeon because a small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating (see explanation in **Section A.9.1**). Vessel collisions to Gulf sturgeon would be unlikely based on the location of the support vessel base and that NMFS (2020a) estimated one non-lethal Gulf sturgeon collision in the 50 years of proposed action.

Impacts of a Large Oil Spill

Potential spill impacts on Gulf sturgeon are discussed by NMFS (2007) and BOEM (2012a; 2017a). For this EP, there are no unique site-specific issues with respect to this species.

The project area is approximately 123 statute miles (198 km) from the nearest Gulf sturgeon critical habitat. The 30-day OSRA modeling (**Table 3**) predicts that a spill in the project area has a 2% or less conditional probability of contacting any coastal areas containing Gulf sturgeon critical habitat within 30 days of a spill. The 60-day OSRA modeling (**Table 4**) predicts that a spill in the project areas has a 1% or less conditional probability of contacting any coastal areas containing Gulf sturgeon critical habitat within 60 days of a spill.

In the event of oil reaching Gulf sturgeon habitat, the fish could be affected by direct ingestion, ingestion of oiled prey, or the absorption of dissolved petroleum products through the gills. Based on the life history of this species, subadult and adult Gulf sturgeon would be most vulnerable to an estuarine or marine oil spill, and would be vulnerable from approximately October through April when this species is foraging in estuarine and shallow marine habitats (NMFS, 2020a).

C.3.11 Nassau Grouper (Threatened)

The Nassau grouper is a Threatened, long-lived reef fish typically associated with hard bottom structures such as natural and artificial reefs, rocks, and underwater ledges (NOAA, nd). Once one of the most common reef fish species in the coastal waters of the United States and Caribbean (Sadovy, 1997), the Nassau grouper been subject to overfishing and is considered extinct in much of its historical range. Observations of current spawning aggregations compared with historical landings data suggest that the Nassau grouper population is substantially smaller than its historical size (NOAA, nd). The Nassau Grouper was listed as Threatened under the ESA in 2016 (81 *FR* 42268).

Nassau groupers are found mainly in the shallow tropical and subtropical waters of eastern Florida, the Florida Keys, Bermuda, the Yucatán Peninsula, and the Caribbean, including the U.S. Virgin Island and Puerto Rico (NOAA, nd). There has been one confirmed sighting of Nassau grouper from the Flower Garden Banks in the Gulf of Mexico at a water depth of 36 m (118 ft) (Foley et al., 2007). Three additional unconfirmed reports (i.e. lacking photographic evidence) of Nassau grouper have also been documented from mooring buoys and the coral cap region of the West Flower Garden flats (Foley et al., 2007).

There are no IPFs associated with routine project activities that could affect Nassau grouper. A small fuel spill would not affect Nassau grouper because the fuel would float and dissipate on the sea surface and would not be expected to reach the Flower Garden Banks or Florida Keys. A large hydrocarbon spill is the only relevant IPF.

Impacts of a Large Oil Spill

Based on the 60-day OSRA modeling results (**Table 4**), a large oil spill would be unlikely (<0.5% probability) to reach Nassau grouper habitat in the Florida Keys (Monroe County, Florida). A spill would be unlikely to contact the Flower Garden Banks based on the distance between the project area and the Flower Garden Banks (approximately 327 statute miles [526 km]), and the difference in water depth between the project area (2,017 to 2,039 m [6,616 to 6,691 ft]) and the Banks (approximately 17 to 145 m [56 to 476 ft]). While on the surface, hydrocarbons would not be expected to contact subsurface fish.

In the unlikely event that hydrocarbons contact Nassau grouper habitat, hydrocarbon droplets or contaminated sediment particles could come into contact with Nassau grouper present on the reefs. Individual fish could be affected by direct ingestion of hydrocarbons which could cover their gill filaments or gill rakers, result in ingestion of oiled prey, or the absorption of dissolved petroleum products through the gills.

C.3.12 Smalltooth Sawfish (Endangered)

The smalltooth sawfish, named due to their flat, saw-like rostrum, is an elasmobranch ray which lives in shallow coastal tropical seas and estuaries where they feed on fish and invertebrates such as shrimp and crabs (NOAA Fisheries, nd). Once found along most of the northern Gulf of Mexico coast from Texas to Florida, their current range in Gulf of Mexico is restricted to areas primarily in southwest Florida (Brame et al., 2019) where several areas of critical habitat have been designated (**Figure 3**). A species description is presented in the recovery plan for this species (NMFS, 2009b).

Listed as Endangered under the ESA in 2003, population numbers have drastically declined over the past century primarily due to accidental bycatch (Seitz and Poulakis, 2006). Although there are no reliable estimates for smalltooth sawfish population numbers throughout its range (NMFS, 2018c), data from 1989 to 2004 indicated a slight increasing trend in population numbers in Everglades National Park during that time period (Carlson et al., 2007). More recent data resulted in a similar conclusion, with indications that populations were stable or slightly increasing in southwest Florida (Carlson and Osborne, 2012).

There are no IPFs associated with routine project activities that could affect smalltooth sawfish. A small fuel spill would not affect smalltooth sawfish because the fuel would float and dissipate on the sea surface and would not be expected to reach smalltooth sawfish habitat in coastal areas (see **Section A.9.1**). A large oil spill is the only relevant IPF.

Impacts of a Large Oil Spill

The project area is approximately 375 miles (604 km) from the nearest smalltooth sawfish critical habitat in Charlotte County, Florida. Based on the 30-day OSRA modeling (**Table 3**), coastal areas containing smalltooth sawfish critical habitat are unlikely to be affected within 30 days of a spill (<0.5% conditional probability). The 60-day OSRA modeling (**Table 4**) predicts a <0.5% probability of shoreline contact to coastal areas containing smalltooth sawfish critical habitat within 60 days of a spill.

Information regarding the direct effects of oil on elasmobranchs, including the smalltooth sawfish are largely unknown. A recent study by Cave and Kajiura (2018) reported that when exposed to crude oil, the Atlantic stingray (*Hypanus sabinus*) experienced impaired olfactory function which could lead to decreased fitness. In the event of oil reaching smalltooth sawfish habitats, the smalltooth sawfish could be affected by direct ingestion, ingestion of oiled prey, or the absorption of dissolved petroleum products through the gills. Based on the shallow, coastal habitats preferred by smalltooth sawfish, individuals in areas subject to coastal oiling could be more likely to be impacted than other species that reside at depth.

C.3.13 Beach Mice (Endangered)

Four subspecies of Endangered beach mouse occur on the barrier islands of Alabama and the Florida Panhandle: the Alabama (*Peromyscus polionotus ammobates*), Choctawhatchee (*P. p. allophrys*), Perdido Key (*P. p. trissyllepsis*), and St. Andrew beach mouse (*P. p. peninsularis*). Critical habitat has been designated for all four subspecies and is shown combined in **Figure 3**. One additional subspecies of *Peromyscus* beach mouse inhabiting dunes on the western Florida Panhandle, the Santa Rosa beach mouse (*P. p. leucocephalus*), is not listed under the ESA. A large oil spill is the only IPF that potentially may affect beach mice. There are no IPFs associated with routine project activities that could affect these animals due to the distance from shore and the lack of any onshore support activities near their habitat. A small fuel spill in the project area would not affect beach mice because a small fuel spill would not be expected to reach beach mice habitat prior to dissipating (see **Section A.9.1**).

Impacts of a Large Oil Spill

Potential spill impacts on Endangered beach mice are discussed by BOEM (2017a). For this EP, there are no unique site-specific issues with respect to these species that were not analyzed in these documents.

Beach mouse critical habitat in Baldwin County, Alabama, is approximately 125 statute miles (201 km) from the project area. The 30-day OSRA modeling (**Table 3**) predicts that a spill in the project area has <0.5% conditional probability of contacting any coastal areas containing beach mouse critical habitat within 30 days. The 60-day OSRA modeling (**Table 4**) predicts that a spill in the project area has a 1% or less conditional probability of contacting any coastal areas containing beach mouse critical habitat within 60 days of a spill.

In the event of oil contacting these beaches, beach mice could experience several types of direct and indirect impacts. Contact with spilled oil could cause skin and eye irritation and subsequent infection; matting of fur; irritation of sweat glands, ear tissues, and throat tissues; disruption of sight and hearing; asphyxiation from inhalation of fumes; and toxicity from ingestion of oil and contaminated food. Indirect impacts could include reduction of food supply, destruction of habitat, and fouling of nests. Impacts could also occur from vehicular traffic and other activities associated with spill cleanup. However, any such impacts are unlikely due to the distance from shore and response actions that would occur in the event of a spill.

C.3.14 Florida Salt Marsh Vole (Endangered)

The Florida salt marsh vole (*Microtus pennsylvanicus dukecampbelli*) is a small, dark brown or black rodent found only in saltgrass (*Distichlis spicata*) meadows in the Big Bend region of Florida that was listed as Endangered under the ESA in 1991. Only two populations of Florida salt marsh vole are known to exist: one near Cedar Key in Levy County, Florida and one in the Lower Suwanee National Wildlife Refuge in Dixie County, Florida (Florida Fish and Wildlife Conservation Commission, nd-e). No critical habitat has been established for the Florida salt marsh vole in part due to concerns over illegal trapping or trespassing if the location of the populations were publicly disclosed (USFWS, 2001b).

A large oil spill is the only IPF that potentially may affect the Florida salt marsh vole. There are no IPFs associated with routine project activities that could affect these animals due to the distance from the project area to their habitat and the lack of any onshore support activities near their habitat. A small fuel spill in the project area would not affect the Florida salt marsh vole because a small fuel spill would not be expected to reach their habitat prior to dissipating (see **Section A.9.1**).

Impacts of a Large Oil Spill

Florida salt marsh vole habitat in Levy and Dixie counties, Florida is approximately 294 miles (473 km) from the project area. The 30-day OSRA modeling (**Table 3**) predicts that a spill in the project area has <0.5% conditional probability of contacting any coastal areas containing Florida salt marsh vole habitat within 30 days. The 60-day OSRA modeling (**Table 4**) predicts that a spill in the project area has <0.5% conditional probability of contacting any coastal areas containing Florida salt marsh vole habitat within 60 days of a spill.

In the event of oil contacting beaches containing these animals, Florida salt marsh voles could experience several types of direct and indirect impacts. Contact with spilled oil could cause skin and eye irritation and subsequent infection; matting of fur; irritation of sweat glands, ear tissues, and throat tissues; disruption of sight and hearing; asphyxiation from inhalation of fumes; and toxicity from ingestion of oil and contaminated food. Indirect impacts could include reduction of food supply, destruction of habitat, and fouling of nests. Impacts could also occur from vehicular traffic and other activities associated with spill cleanup. Impacts associated with an extensive oiling of coastal habitat containing Florida salt marsh voles from a large oil spill are expected to be significant. Due to the extremely low population numbers, extensive oiling of Florida salt marsh vole habitat could result in the extinction of the species. However, any such impacts are unlikely due to the distance from the project area to Florida salt marsh vole habitat and response actions that would occur in the event of a spill.

C.3.15 Panama City Crayfish (Threatened)

The USFWS issued a Final Rule designating the Panama City crayfish as Threatened under the ESA on 5 January 2022 (effective 4 February 2022). The Panama City crayfish is a semi-terrestrial crayfish that grows up to 2 inches (51 mm) in size and is found in south-central Bay County, Florida. Medium to dark brown in color, the crayfish prefers areas dominated by herbaceous vegetation and shallow or fluctuating water levels (Keppner and Keppner, 2004). Historically prevalent in shallow freshwater bodies in pine and prairie communities, urban development has largely replaced these habitats. The Panama City crayfish is now generally found in wet or semi-wet swales, ditches, slash pine plantations, undeveloped utility rights-of-way, and remnant wetlands (Florida Fish and Wildlife Conservation Commission, 2016).

A large oil spill is the only IPF that potentially may affect the Panama City crayfish. There are no IPFs associated with routine project activities that could affect these animals due to the distance from the project area to their habitat and the lack of any onshore support activities near their habitat. A small fuel spill in the project area would not affect the Panama City crayfish because a small fuel spill would not be expected to reach their habitat prior to dissipating (see **Section A.9.1**).

Impacts of a Large Oil Spill

Panama City crayfish critical habitat in Bay County, Florida is approximately 190 miles (306 km) from the project area. The 30-day OSRA modeling (**Table 3**) predicts that a spill in the project area has a 1% or less conditional probability of contacting any coastal areas containing Panama City crayfish critical habitat within 30 days. The 60-day OSRA modeling (**Table 4**) predicts that a spill in the project area has 1% or less conditional probability of contacting any coastal areas containing Panama City crayfish critical habitat within 60 days of a spill.

Effects of oiling on the Panama City crayfish are largely unknown. In general, crayfishes use chemoreception to orient themselves in their environmental, to find food, and to avoid predators (Bergman and Moore, 2005). Exposure to hydrocarbons has been shown to damage receptor cells that crayfish use for chemoreception, thus decreasing their fitness (Tierney et al., 2010).

Indirect impacts of oiling of Panama City crayfish habitat could include reduction of food supply, destruction of habitat, and fouling of burrows. Impacts could also occur from vehicular traffic and other activities associated with spill cleanup. Impacts associated with an extensive oiling of coastal habitat containing Panama City crayfish from a large oil spill are expected to be significant. Due to the low population numbers and restricted range, extensive oiling of Panama City crayfish habitat could be significant at the species level. However, any such impacts are unlikely due to the distance from the project area to Panama City crayfish habitat and response actions that would occur in the event of a spill.

C.3.16 Threatened Coral Species

Seven Threatened coral species are known from the northern Gulf of Mexico: elkhorn coral, staghorn coral, lobed star coral, mountainous star coral, boulder star coral, pillar coral, and rough cactus coral. Elkhorn coral, lobed star coral, mountainous star coral, and boulder star coral have been reported from the coral cap region of the Flower Garden Banks (NOAA, 2014), but are unlikely to be present with a widespread distribution in the northern Gulf of Mexico because they typically inhabit coral reefs in shallow, clear tropical, or subtropical waters. Staghorn coral, pillar coral, and rough cactus coral are only known from the Florida Keys and Dry Tortugas (Florida Fish and Wildlife Conservation Commission, nd-d). Other Caribbean coral species evaluated by NMFS in 2014 (79 *FR* 53852) either do not meet the criteria for ESA listing or are not known from the Flower Garden Banks, Florida Keys, or Dry Tortugas. Critical habitat has been designated for elkhorn coral and staghorn coral in the Florida Keys (Monroe County, Florida) and Dry Tortugas, but none has been designated for the other threatened coral species included here. A species description of elkhorn coral is presented in the recovery plan for the species (NMFS, 2015).

In November 2020, NMFS proposed to designate critical habitat for the boulder star coral, lobed star coral, mountainous star coral, pillar coral, and rough cactus coral in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. For the areas in the Gulf of Mexico this includes the Flower Garden Banks and the waters near Miami-Dade and Monroe counties, Florida, and the Dry Tortugas.

There are no IPFs associated with routine project activities that could affect threatened corals in the northern Gulf of Mexico. A small fuel spill would not affect threatened coral species because the oil would float and dissipate on the sea surface. A large oil spill is the only relevant IPF.

Impacts of a Large Oil Spill

Based on the 60-day OSRA modeling results (**Table 4**), a large oil spill would be unlikely (<0.5% probability) to reach elkhorn or staghorn coral critical habitat in the Florida Keys (Monroe County, Florida). A spill would be unlikely to contact the corals of the Flower Garden Banks based on the distance between the project area and the Flower Garden Banks (approximately 327 statute miles [526 km]), and the difference in water depth between the project area (2,017 to 2,039 m [6,616 to 6,691 ft]) and the Banks (approximately 17 to 145 m [56 to 476 ft]). While on the surface, oil would not be expected to contact corals on the seafloor. Natural or chemical dispersion of oil could cause a subsurface plume which would have the remote possibility of contacting seafloor corals.

If a subsurface plume were to occur, impacts on the Flower Garden Banks would be unlikely due to the distance between the project area and corals within the Flower Garden Banks and the shallow location of the coral cap of the Banks. Near-bottom currents in the region are predicted to flow along the isobaths (Nowlin et al., 2001) and typically would not carry a plume upward onto the continental shelf. Valentine et al. (2014) observed the spatial distribution of excess hopane, a crude oil tracer from *Deepwater Horizon* spill sediment core samples, to be in the deeper waters and not transported up the shelf, thus confirming that near-bottom currents flow along the isobaths.

In the unlikely event that a subsurface plume reached reefs at the Flower Garden Banks or other Gulf of Mexico reefs, oil droplets or oiled sediment particles could come into contact with reef organisms or corals. As discussed by BOEM (2017a), impacts relevant to these corals could include loss of habitat, biodiversity, and live coral coverage. Sub-lethal effects could be long-lasting and affect the resilience of coral colonies to natural disturbances (e.g., elevated water temperature, diseases) (BOEM, 2017a).

Due to the distance between the project area and coral habitats, there is a low chance of oil contacting threatened coral habitat in the event of a spill, and no significant impacts on threatened coral species are expected.

C.4 Coastal and Marine Birds

C.4.1 Marine Birds

Marine birds include seabirds and other species that may occur in the pelagic environment of the project area (Clapp et al., 1982a; Clapp et al., 1982b; 1983; Davis and Fargion, 1996; Davis et al., 2000). Seabirds spend much of their lives offshore over the open ocean, except during breeding season when they nest along the coast (on the mainland and on barrier islands). In addition, other birds such as waterfowl, marsh birds, and shorebirds may occasionally be present over open ocean areas. No Endangered or Threatened bird species are likely to occur at the project area due to the distance from shore. For a discussion of shorebirds and coastal nesting birds, see **Section C.4.2**.

Seabirds of the northern Gulf of Mexico were surveyed from ships during the GulfCet II program (Davis et al., 2000) which reported that terns, storm-petrels, shearwaters, and jaegers were the most frequently sighted seabirds in deepwater areas of the Gulf of Mexico. From these surveys, four ecological categories of seabirds were documented in the deepwater areas of the Gulf: summer migrants (shearwaters, storm petrels, boobies); summer residents that breed in the Gulf (Sooty Tern, Least Tern, Sandwich Tern, Magnificent Frigatebird); winter residents (gannets, gulls, jaegers); and permanent resident species (Laughing Gulls, Royal Terns, Bridled Terns) (Davis et al., 2000).

Common marine bird species include Wilson's Storm-Petrel (*Oceanites oceanicus*), Magnificent Frigatebird (*Fregata magnificens*), Northern Gannet (*Morus bassanus*), Masked Booby (*Sula dactylatra*), Brown Booby (*Sula leucogaster*), Cory's Shearwater (*Calonectris diomedea*), Greater Shearwater (*Puffinus gravis*), and Audubon's Shearwater (*Puffinus lherminieri*). Seabirds are distributed Gulf-wide and are not specifically associated with the project area.

Relationships with hydrographic features were found for several marine bird species, possibly due to effects of hydrography on nutrient levels and productivity of surface waters where birds forage. The GulfCet II study did not estimate bird densities; however, Haney et al. (2014) indicated that marine bird densities over the open ocean were estimated to be 1.6 birds km^{-2}.

IPFs that potentially may affect marine birds include drilling rig presence, marine noise, lighting, support vessel and helicopter traffic; and two types of accidents (a small fuel spill and a large oil spill). Effluent discharges permitted under the NPDES are likely to have negligible impacts on the birds due to rapid dispersion, the small area of ocean affected, the intermittent nature of the discharges, and the mobility of these animals. Compliance with NTL BSEE-2015-G03 is expected to minimize the potential for marine debris-related impacts on birds. The IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Drilling Rig Presence, Marine Noise, and Lights

Marine birds that frequent offshore drilling operations may be exposed to contaminants including air pollutants and routine discharges, but significant impacts are unlikely due to rapid dispersion. Birds migrating over water have been known to collide with offshore structures, resulting in injury and/or death (Wiese et al., 2001; Russell, 2005). Mortality of migrant birds at tall towers and other land-based structures has been reviewed extensively, and the mechanisms involved in rig collisions appear to be similar. In some cases, migrants simply do not see a part of the rig until it is too late to avoid it. In other cases, navigation may be disrupted by marine noise (Russell, 2005). On the other hand, offshore structures are suitable stopover perches for most trans-Gulf migrant species, and most of the migrants that stop over on rigs probably benefit from their stay, particularly in spring (Russell, 2005). Due to the limited scope and short duration of drilling activities described in this EP, any impacts on populations of either seabirds or trans-Gulf migrant birds are not expected to be significant.

Trans-Gulf migrant birds including shorebirds, wading birds, and terrestrial birds may also be present in the project area. Migrant birds may use offshore structures, including platforms and semisubmersibles for resting, feeding, or as temporary shelter from inclement weather (Russell, 2005). Some birds may be attracted to offshore structures because of the lights and the fish populations that aggregate around these structures. A study in the North Sea indicated that rig lighting causes circling behavior in various birds, especially on cloudy nights; apparently the birds' geomagnetic compass is upset by the red part of the spectrum from the lights currently in use (Van de Laar, 2007; Poot et al., 2008). The numbers varied greatly, from none to some tens of thousands of birds per night per rig, with an apparent effect radius of up to 3 miles (5 km) (Poot et al., 2008). A study in the Gulf of Mexico also noted the phenomenon but did not recommend mitigation (Russell, 2005). One factor to consider in evaluating this impact in the

Gulf of Mexico would include the lower incidence of cloudy and foggy days in the Gulf of Mexico versus the North Sea. In laboratory experiments, Poot et al. (2008) found the magnetic compass of migratory birds to be wavelength dependent. Migratory birds require light from the blue-green part of the spectrum for magnetic compass orientation, whereas red light (visible long-wavelength) disrupts their magnetic orientation. They designed a field study to test if and how changing light color influenced migrating birds under field conditions. During field studies they found that nocturnally migrating birds were disoriented and attracted by red and white light (containing visible long-wavelength radiation), whereas they were clearly less disoriented by blue and green light (containing less or no visible long-wavelength radiation) (Poot et al., 2008). Overall, potential negative impacts to birds from drilling rig lighting, noise, collisions, or other adverse effects are highly localized (considering the single structure) and may affect individual birds during migration periods. Noise generated from the drilling rig is not expected to impact marine birds. Therefore, these potential impacts are not expected to affect marine birds at the population or species level and are not significant.

Impacts of Support Vessel and Helicopter Traffic

Support vessels and helicopters are unlikely to significantly disturb marine birds in open, offshore waters. Schwemmer et al. (2011) showed that several marine bird species showed behavioral responses and altered distribution patterns in response to ship traffic, which could potentially cause loss of foraging time and resting habitat. However, it is likely that individual birds would experience, at most, only short-term behavioral disruption, and the impact would not be significant.

Impacts of a Small Fuel Spill

Potential spill impacts on marine birds are discussed by BOEM (2017a). For this EP, there are no unique site-specific issues with respect to spill impacts on these animals.

The probability of a fuel spill is expected to be minimized by Chevron's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of Chevron's OSRP is expected to reduce the potential for impacts on marine birds. EP Section H provides detail on spill response measures. Given the open ocean location of the project area and the expected short duration of a small fuel spill, the potential exposure period for marine birds would be brief.

A small fuel spill in offshore waters would produce a slick on the water surface and increase the concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would be evaporated or dispersed naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

Marine birds exposed to oil on the sea surface could experience direct physical and physiological effects including skin irritation; chemical burns of skin, eyes, and mucous membranes; and inhalation of VOCs. Due to the limited areal extent and short duration of water quality impacts from a small fuel spill, secondary impacts due to ingestion of oil via contaminated prey or reductions in prey abundance are unlikely. Due to the low densities of birds in open ocean areas, the small area affected, and the brief duration of the surface slick, minimal if any impacts on pelagic birds would be expected.

Impacts of a Large Oil Spill

Potential spill impacts on marine and pelagic birds are discussed by BOEM (2017a). For this EP, there are no unique site-specific issues with respect to spill impacts on these animals.

Pelagic seabirds could be exposed to oil from a spill at the project area. Davis et al. (2000) reported that terns, storm-petrels, shearwaters, and jaegers were the most frequently sighted seabirds in the deepwater Gulf of Mexico (>200 m). Haney et al. (2014) estimated that seabird densities over the open ocean were approximately 1.6 birds km^{-2}. The number of pelagic birds that could be affected in open, offshore waters would depend on the extent and persistence of the oil slick.

Data following the *Deepwater Horizon* incident provide relevant information about the species of pelagic birds that may be affected in the event of a large oil spill. Birds that were treated for oiling include several pelagic species such as the Northern Gannet, Magnificent Frigatebird, and Masked Booby. The Northern Gannet is among the species with the largest numbers of birds affected by the spill. Exposure of marine birds to oil can result in adverse health with severity, depending on the level of oiling. Effects can range from plumage damage and loss of buoyancy from external oiling to more severe effects, such as organ damage, immune suppression, endocrine imbalance, reduced aerobic capacity, and death as a result of oil inhalation or ingestion (NOAA, 2016).

C.4.2 Coastal Birds

Threatened and Endangered bird species (Piping Plover and Whooping Crane) have been discussed previously in **Sections C.3.6** and **C.3.7**. Various species of non-endangered birds are also found along the northern Gulf Coast, including diving birds, shorebirds, marsh birds, wading birds, and waterfowl. Gulf Coast marshes and beaches also provide important feeding and nesting habitats. Species that nest on beaches, flats, dunes, bars, barrier islands, and similar coastal and nearshore habitats include the Sandwich Tern, Wilson's Plover, Black Skimmer, Forster's Tern, Gull-Billed Tern, Laughing Gull, Least Tern, and Royal Tern. Additional information is presented by BOEM (2017a).

The Eastern Brown Pelican (*Pelecanus occidentalis*) was delisted from federal Endangered status in 2009 (USFWS, 2016b) and was delisted from state species of special concern status by the State of Florida in 2017 (Florida Fish and Wildlife Conservation Commission, 2021) and Louisiana (Louisiana Wildlife and Fisheries, 2020). However, this species remains listed as endangered by the state of Mississippi (Mississippi Natural Heritage Program, 2018). Brown Pelicans inhabit coastal habitats and forage within both coastal waters and waters of the inner continental shelf. Aerial and shipboard surveys, including GulfCet and GulfCet II, indicate that Brown Pelicans do not occur in deep offshore waters (Fritts and Reynolds, 1981; Davis and Fargion, 1996; Davis et al., 2000). Nearly half the southeastern population of Brown Pelicans lives in the northern Gulf Coast, generally nesting on protected islands.

The Bald Eagle (*Haliaeetus leucocephalus*) was delisted from its Threatened status in the lower 48 states on 28 June 2007, but still receives protection under the Migratory Bird Treaty Act of 1918 and the Bald and Golden Eagle Protection Act of 1940. The Bald Eagle is a terrestrial raptor widely distributed across the southern U.S., including coastal habitats along the Gulf of Mexico. The Gulf Coast is inhabited by both wintering migrant and resident Bald Eagles (Johnsgard, 1990; Ehrlich et al., 1992).

IPFs that potentially may affect shorebirds and coastal nesting birds include support vessel and helicopter traffic and a large oil spill. A small fuel spill in the project area would be unlikely to affect shorebirds or coastal nesting birds, as the project area is 68 statute miles (109 km) from the nearest shoreline. As explained in **Section A.9.1**, a small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating. Compliance with NTL BSEE-2015-G03 is expected to minimize the potential for marine debris-related impacts on shorebirds.

Impacts of Support Vessel and Helicopter Traffic

Support vessels and helicopters will transit coastal areas near Port Fourchon and Galliano, Louisiana, where shorebirds and coastal nesting birds may be found. These activities could periodically disturb individuals or groups of birds within coastal habitats (e.g., wetlands that may support feeding, resting, or breeding birds).

Vessel traffic may disturb some foraging and resting birds with flushing distances varying among species and among individuals (Rodgers and Schwikert, 2002; Schwemmer et al., 2011; Mendel et al., 2019). The disturbances will be limited to flushing birds away from vessel pathways; known distances are from 20 to 49 m (65 to 160 ft) for personal watercrafts and 23 to 58 m (75 to 190 ft) for outboard-powered boats (Rodgers and Schwikert, 2002). Support vessels will not approach nesting or breeding areas on the shoreline, so disturbances to nesting birds, eggs, and chicks is not expected. Vessel operators are expected to use designated navigation channels and comply with posted speed and wake restrictions while transiting sensitive inland waterways. Due to the limited scope and short duration of drilling activities, any short-term impacts are not expected to be significant to coastal bird populations.

Helicopter traffic can cause some disturbance to birds onshore and offshore. Responses are highly dependent on the type of aircraft, the bird species, the activities that the animals were previously engaged in, and previous exposures to overflights (Efroymson et al., 2003). Helicopters seem to cause the most intense responses over other human disturbances (Bélanger and Bédard, 1989; Rojek et al., 2008; Fuller et al., 2018). The Federal Aviation Administration recommends (Advisory Circular No. 91-36D) that pilots maintain a minimum altitude of 610 m (2,000 ft) when flying over marine noise-sensitive areas such as parks, forest, primitive areas, wilderness areas, National Seashores, or National Wildlife Refuges, and maintain flight paths to reduce aircraft marine noise in these marine noise-sensitive areas.

The 2,000-feet altitude minimum is greater than the distance (slant range) at which aircraft overflights have been reported to cause behavioral effects on most species of birds studied by Efroymson et al. (2000). It is assumed that adherence to these guidelines would reduce potential behavioral disturbances (such as temporary displacement or avoidance behavior) of individual birds in coastal and inshore areas. The potential impacts from helicopter traffic are not expected to be significant to coastal bird populations or species in the project area.

Impacts of Large Oil Spill

The 30-day OSRA results summarized in **Table 3** estimate that shorelines in Louisiana and Florida could be contacted within 30 days (1% to 11% conditional probability). The 60-day OSRA modeling (**Table 4**) predicts that shorelines between Cameron County, Texas, and Miami-Dade County, Florida, have up to a 13% probability of contact within 60 days of a spill.

Coastal birds can be exposed to oil as they float on the water surface, dive during foraging, or wade in oiled coastal waters. Oil interferes with the water repellency of feathers and can cause hypothermia in the right conditions. As birds groom themselves, they can ingest and inhale the oil on their bodies. Scavengers such as Bald Eagles and gulls can be exposed to oil by feeding on carcasses of contaminated fish and wildlife. While ingestion can kill animals immediately, more often it results in lung, liver, and kidney damage, which can lead to death (BOEM, 2017a). Bird eggs may be damaged if an oiled adult sits on the nest.

Brown and White Pelicans are especially at risk from direct and indirect impacts from spilled oil within inner shelf and inshore waters, such as embayments. The range of these species is generally limited to these waters and surrounding coastal habitats. Brown Pelicans feed on mid-sized fish that they capture by diving from above ("plunge diving") and then scooping the fish into their expandable gular pouch, while White Pelicans feed from the surface by dipping their beaks in the water. These behaviors make pelicans susceptible to plumage oiling if they feed in areas with surface oil or an oil sheen. They may also capture prey that has been physically contaminated with oil or has ingested oil. Issues for Brown and White Pelicans include direct contact with oil, disturbance by cleanup activities, and long-term habitat contamination (BOEM, 2017a).

The Bald Eagle may also be at risk from direct and indirect impacts from spilled oil. This species often captures fish within shallow water areas (snatching prey from the surface or wading into shallow areas to capture prey with their bill) and so may be susceptible to plumage oiling and, as with the Brown and White Pelicans, they may also capture prey that has been physically contaminated with oil or has ingested oil (BOEM, 2017a). It is expected that impacts to coastal birds from a large oil spill resulting in the death of individual birds would be adverse but not significant at population levels.

C.5 Fisheries Resources

C.5.1 Pelagic Communities and Ichthyoplankton

Biggs and Ressler (2000) reviewed the biology of pelagic communities in the deepwater environment of the northern Gulf of Mexico. The biological oceanography of the region is dominated by the influence of the Loop Current, whose surface waters are among the most oligotrophic in the world's oceans. Superimposed on this low-productivity condition is productive "hot spots" associated with entrainment of nutrient-rich Mississippi River water and mesoscale oceanographic features. Anticyclonic and cyclonic hydrographic features play an important role in determining biogeographic patterns and controlling primary productivity in the northern Gulf of Mexico (Biggs and Ressler, 2000).

Most fishes inhabiting shelf or oceanic waters of the Gulf of Mexico have planktonic eggs and larvae (Ditty, 1986; Ditty et al., 1988; Richards et al., 1989; Richards et al., 1993). A study by Ross et al. (2012) on midwater fauna to characterize vertical distribution of mesopelagic fishes in selected deepwater areas in the Gulf of Mexico substantiated high species richness but general domination by relatively few families and species.

IPFs that potentially may affect pelagic communities and ichthyoplankton include drilling rig presence, marine noise, and lights; effluent discharges; water intake; and two types of accidents (a small fuel spill and a large oil spill). These IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Drilling Rig Presence, Marine Noise, and Lights

The drilling rig, as a floating structure in the deepwater environment, will act as a fish aggregating device (FAD). In oceanic waters, the FAD effect would be most pronounced for epipelagic fishes such as tunas, dolphin, billfishes, and jacks, which are commonly attracted to fixed and drifting surface structures (Holland, 1990; Higashi, 1994; Relini et al., 1994). Positive fish associations with offshore rigs and platforms in the Gulf of Mexico are well documented (Gallaway and Lewbel, 1982; Wilson et al., 2003; 2006; Edwards and Sulak, 2006). The FAD effect could possibly enhance the feeding of epipelagic predators by attracting and concentrating smaller fish species. Drilling rig noise could potentially cause masking in fishes, thereby reducing their ability to hear biologically relevant sounds (Radford et al., 2014). The only defined acoustic threshold levels for non-impulsive noise are given by Popper et al. (2014) and apply only to species of fish with swim bladders that provide some hearing (pressure detection) function. Popper et al. (2014) estimated an SPL threshold level of 170 dB re 1 µPa over a 48-hour period for onset of recoverable injury and 158 dB re 1 µPa over a 12-hour period for onset temporary auditory threshold shifts. However, no consistent behavioral thresholds for fish resulting from non-impulsive noise have been established (Hawkins and Popper, 2014) and the current recommended behavioral threshold for fish is SPL of 150 dB re 1 µPa defined by the Fisheries Hydroacoustic Working Group (2008) for impulsive sound sources. Noise may also influence fish behaviors, such as predator-avoidance, foraging, reproduction, and intraspecific interactions (Picciulin et al., 2010; Bruintjes and Radford, 2013; McLaughlin and Kunc, 2015). Fish aggregating is likely to occur to some degree due to the presence of the drilling rig, but the impacts would be limited in geographic scope and no population level impacts are expected.

Few data exist regarding the impacts of noise on pelagic larvae and eggs. Generally, it is believed that larval fish will have similar hearing sensitivities as adults, but may be more susceptible to barotrauma injuries associated with impulsive noise (Popper et al., 2014). Larval fish were experimentally exposed to simulated impulsive sounds by Bolle et al. (2012). The controlled playbacks produced SEL_{24h} of 206 dB re 1 μPa^2 s but resulted in no increased mortality between the exposure and control groups. Non-impulsive noise sources (such as drilling rig operations) are expected to be far less injurious than impulsive noise. Because of the periodic and transient nature of ichthyoplankton, they are not expected to remain in proximity to the source for a full 24-hour period to receive above-threshold sound, and no impacts to these life stages are expected.

Impacts of Effluent Discharges

Muds and cuttings discharges may have a slight effect on the benthic environment near the wellsite, including a localized increase in water turbidity, the limited blanketing of seafloor sediments and slightly increased concentrations of hydrocarbons and metals. Treated cuttings are monitored for visible sheen prior to discharge. Contaminants released into the water column will be diluted rapidly within the open ocean environment. Minimal impacts on pelagic communities are anticipated.

Treated sanitary and domestic wastes may have a slight effect on the pelagic environment in the immediate vicinity of these discharges. These wastes may have elevated levels of nutrients, organic matter, and chlorine, but should be diluted rapidly to undetectable levels within tens to hundreds of meters from the source. Minimal impacts on water quality, plankton, and nekton are anticipated.

Deck drainage may have a slight effect on the pelagic environment in the immediate vicinity of these discharges. Deck drainage from contaminated areas will be passed through an oil-and-water separator prior to release, and discharges will be monitored for visible sheen. The discharges may have slightly elevated levels of hydrocarbons but should be diluted rapidly to undetectable levels within tens to hundreds of meters from the source. Minimal impacts on water quality, plankton, and nekton are anticipated.

Other discharges in accordance with the NPDES permit, such as desalination unit brine and uncontaminated cooling water, fire water, and ballast water, are expected to be diluted rapidly and have little or no impact on pelagic communities.

Impacts of Water Intake

Seawater will be drawn from the ocean for once-through, non-contact cooling of machinery on the drilling rig. The intake of seawater for cooling water will entrain plankton. The low intake velocity should allow most strong-swimming juvenile fishes and smaller adults to escape entrainment or impingement (Electric Power Research Institute, 2000). However, drifting plankton would not be able to escape entrainment with the exception of a few fast-swimming larvae of certain taxonomic groups. Those organisms entrained may be stressed or killed (Cada, 1990; Mayhew et al., 2000), primarily through changes in water temperature during the route from cooling intake structure to discharge structure and mechanical damage (turbulence in pumps and condensers). Due to the limited scope and short duration of drilling activities, any short-term impacts of entrainment are not expected to be significant to plankton or ichthyoplankton populations (BOEM, 2017a). The drilling rig ultimately chosen for this project is expected to be in compliance with all cooling water intake requirements.

Impacts of a Small Fuel Spill

Potential spill impacts on fisheries resources are discussed by BOEM (2017a). For this EP, there are no unique site-specific issues with respect to spill impacts.

The probability of a fuel spill is expected to be minimized by Chevron's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of Chevron's OSRP is expected to mitigate the potential for impacts on pelagic communities, including ichthyoplankton. EP Section H provides detail on spill response measures. Given the open ocean location of the project area, the duration of a small spill will be brief and the potential for impacts to occur would be minimal.

A small fuel spill in offshore waters would produce a slick on the water surface and increase the concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the release and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would dissipate naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

A small fuel spill could have localized impacts on phytoplankton, zooplankton, and nekton. Due to the limited areal extent and short duration of water quality impacts, a small fuel spill would be unlikely to produce detectable impacts on pelagic communities and ichthyoplankton.

Impacts of a Large Oil Spill

Potential spill impacts on pelagic communities and ichthyoplankton are discussed by BOEM (2017a). A large oil spill could affect water column biota including phytoplankton, zooplankton, ichthyoplankton, and nekton. A large spill that persisted for weeks or months would be more likely to affect these communities. While adult and juvenile fishes may actively avoid a large spill, planktonic eggs and larvae would be unable to avoid contact. Eggs and larvae of fishes are especially vulnerable to oiling because they inhabit the upper layers of the water column, and they will die if exposed to certain toxic fractions of spilled oil. Impacts potentially would be greater if local-scale currents retained planktonic larval assemblages (and the floating oil slick) within the same water mass. Impacts to ichthyoplankton from a large spill would be greatest during spring and summer when shelf concentrations peak (BOEM, 2016b).

Oil spill impacts to phytoplankton include changes in community structure and increases in biomass, which have been attributed to the effects of oil contamination and of decreased predation due to zooplankton mortality (Abbriano et al., 2011; Ozhan et al., 2014). Ozhan et al. (2014) reported that the formation of oil films on the water surface can limit gas exchange through the air-sea interface and can reduce light penetration into the water column which will limit phytoplankton photosynthesis. Determining the impact of a diesel spill on phytoplankton is a complex issue as some phytoplankton species are more tolerant of oil exposure than others (Ozhan et al., 2014). Phytoplankton populations can change quickly on small temporal and spatial scales, making it difficult to predict how a phytoplankton community as a whole will respond to an oil spill.

Mortality of zooplankton has been shown to be positively correlated with oil concentrations (Lennuk et al., 2015). Spills that are not immediately lethal can have short- or long-term impacts on biomass and community composition, behavior, reproduction, feeding, growth and development, immune response and respiration (Harvell et al., 1999; Wootton et al., 2003; Auffret et al., 2004; Hannam et al., 2010; Bellas et al., 2013; Blackburn et al., 2014). Zooplankton are especially vulnerable to acute oil pollution, showing increased mortality and sublethal changes in physiological activities (e.g., egg production; Moore and Dwyer, 1974; Linden, 1976; Lee et al., 1978; Suchanek, 1993). Zooplankton may also accumulate PAHs through diffusion from surrounding waters, direct ingestion of micro-droplets (e.g., Berrojalbiz et al., 2009; Lee et al., 2012; Lee, 2013), and by ingestion of droplets that are attached to phytoplankton (Almeda et al., 2013). Bioaccumulation of hydrocarbons can lead to additional impacts among those higher trophic level consumers that rely on zooplankton as a food source (Almeda et al., 2013; Blackburn et al., 2014).

Planktonic communities have a high capacity for recovery from the effects of oil spill pollution due to their short life cycle and high reproductive capacity (Abbriano et al., 2011). Planktonic communities drift with water currents and recolonize from adjacent areas. Because of these attributes, plankton usually recover relatively rapidly to normal population levels following hydrocarbon spill events. Research in the aftermath of the *Deepwater Horizon* incident found that phytoplankton population recovered within weeks to months and zooplankton populations may have only been minimally affected (Abbriano et al., 2011).

C.5.2 Essential Fish Habitat

Essential Fish Habitat (EFH) is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, and growth to maturity. Under the Magnuson-Stevens Fishery Conservation and Management Act, as amended, federal agencies are required to consult on activities that may adversely affect EFH designated in Fishery Management Plans developed by the regional Fishery Management Councils.

The Gulf of Mexico Fishery Management Council (GMFMC) has prepared Fishery Management Plans for corals and coral reefs, shrimps, spiny lobster, reef fishes, coastal migratory pelagic fishes, and red drum. In 2005, the EFH for these managed species was redefined in Generic Amendment No. 3 to the various Fishery Management Plans (GMFMC, 2005). The EFH for most of these GMFMC-managed species is on the continental shelf in waters shallower than 183 m (600 ft). The shelf edge is the outer boundary for coastal migratory pelagic fishes, reef fishes, and shrimps. EFH for corals and coral reefs includes some shelf-edge topographic features on the Texas-Louisiana OCS located approximately 48 statute miles (77 km) from the project area (**Figure 3**).

Highly migratory pelagic fishes, which occur as transients in the project area, are the only remaining group for which EFH has been identified in the deepwater Gulf of Mexico. Species in this group, including tunas, swordfishes, billfishes, and sharks, are managed by NMFS. **Table 7** lists the highly migratory fish species and their life stages with EFH at or near the project area.

Table 7. Migratory fish species with designated Essential Fish Habitat (EFH) at or near Mississippi Canyon Block 608, including life stage(s) potentially present within the project area.

Common Name	Scientific Name	Life Stage(s) Potentially Present Within or Near the Project Area
Atlantic bluefin tuna	Thunnus thynnus	Spawning, eggs, larvae, adults
Bigeye thresher shark	Alopias superciliosus	All
Bigeye tuna	Thunnus obesus	Juveniles, adults
Blue marlin	Makaira nigricans	Juveniles, adults
Longbill spearfish	Tetrapturus pfluegeri	Juveniles, adults
Longfin mako shark	Isurus paucus	All
Oceanic whitetip shark	Carcharhinus longimanus	All
Skipjack tuna	Katsuwonus pelamis	Spawning
Swordfish	*Xiphias gladius*	Larvae, juveniles, adults
Whale shark	Rhincodon typus	All
White marlin	Kajikia albida	Juveniles, adults
Yellowfin tuna	Thunnus albacares	Spawning, juveniles, adults

Research indicates the central and western Gulf of Mexico may be important spawning habitat for Atlantic bluefin tuna (*Thunnus thynnus*), and (NMFS, 2009c) has designated a Habitat Area of Particular Concern (HAPC) for this species. The HAPC covers much of the deepwater Gulf of Mexico, including the project area (**Figure 3**). The areal extent of the HAPC is approximately 300,000 km^2 (115,831 mi^2). Atlantic bluefin tuna follow an annual cycle of foraging in June through March off the eastern U.S. and Canadian coasts, followed by migration to the Gulf of Mexico to spawn in April, May, and June (NMFS, 2009c). The Atlantic bluefin tuna has also been designated as a species of concern (NMFS, 2011). An amendment to the original EFH Generic Amendment was finalized in 2005 (GMFMC, 2005). One of the most significant proposed changes in this amendment reduced the extent of EFH relative to the 1998 Generic Amendment by removing the EFH description and identification from waters between 100 fathoms and the seaward limit of the Exclusive Economic Zone (EEZ). The Highly Migratory Species Fisheries Management Plan was amended in 2009 to update EFH and HAPC to include the bluefin tuna spawning area (NMFS, 2009c).

NTLs 2009-G39 and 2009-G40 that provide guidance and clarification of the regulations with respect to biologically sensitive underwater features and areas and benthic communities that are considered EFH. As part of an agreement between BOEM and NMFS to complete a new programmatic EFH consultation for each new Five-Year Program, an EFH consultation was initiated between BOEM's Gulf of Mexico Region and NOAA's Southeastern Region during the preparation, distribution, and review of BOEM's 2017-2022 WPA/CPA Multisale EIS (BOEM, 2017a). The EFH assessment was completed and there is ongoing coordination among NMFS, BOEM, and BSEE, including discussions of mitigation (BOEM, 2016c).

Other HAPCs have been identified by the GMFMC (2005). These include the Florida Middle Grounds, Madison-Swanson Marine Reserve, Tortugas North and South Ecological Reserves, Pulley Ridge, and several individual reefs and banks of the northwestern Gulf of Mexico. Madison-Swanson Marine Reserve is the HAPC located nearest to the project area (approximately 149 statute miles [240 km]).

IPFs that potentially may affect EFH include drilling rig presence, marine noise, and lights; effluent discharges; water intake; and two types of accidents (a small fuel spill and a large oil spill).

Impacts of Drilling Rig Presence, Marine Noise, and Lights

The drilling rig, as a floating structure in the deepwater environment, will act as a FAD with most pronounced effects on epipelagic fishes that include species with EFH designation (Holland, 1990; Higashi, 1994; Relini et al., 1994; Gates et al., 2017). The FAD effect would likely attract and concentrate smaller fish species and thus enhance feeding of epipelagic predators.

Drilling rig vessel noise could potentially cause acoustic masking for fishes, thereby reducing their ability to hear biologically relevant sounds (Radford et al., 2014). Noise may also influence fish behaviors such as predator avoidance, foraging, reproduction, and intraspecific interactions (Picciulin et al., 2010; Bruintjes and Radford, 2013; McLaughlin and Kunc, 2015). The only defined acoustic threshold levels for non-impulsive noise are given by Popper et al. (2014) and apply only to species of fish with swim bladders, including some species with EFH designation, that provide some hearing (pressure detection) function. Popper et al. (2014) recommended SPL threshold levels of 170 dB re 1 μPa over a 48-hour period for onset of recoverable injury and an

SPL threshold of 158 dB re 1 µPa over a 12-hour period for onset temporary auditory threshold shifts. No consistent behavioral thresholds for fish resulting from non-impulsive noise have been established (Hawkins and Popper, 2014) and the current recommended behavioral threshold for fish is SPL of 150 dB re 1 µPa defined by the Fisheries Hydroacoustic Working Group (2008) for impulsive sound sources. Because the drilling rig is a temporary structure, any impacts on EFH for managed species are considered negligible.

Impacts of Effluent Discharges

Other effluent discharges affecting EFH by diminishing ambient water quality include drilling muds and cuttings, treated sanitary and domestic wastes, deck drainage, and miscellaneous discharges such as desalination unit brine and uncontaminated cooling water, fire water, and ballast water. Impacts on water quality have been discussed previously. No detectable impacts on EFH for managed species are expected from these discharges.

Impacts of Water Intake

As noted previously, cooling water intake will cause entrainment and impingement of plankton, including fish eggs and larvae (ichthyoplankton). Due to the limited scope and short duration of drilling activities, any short-term impacts on EFH for highly migratory pelagic fishes are not expected to be biologically significant. The recent lease sale EIS (BOEM, 2017a) discusses cooling water discharge. Water with an elevated temperature may accumulate around the discharge pipe. However, the warmer water should be diluted rapidly to ambient temperature levels within 100 m (328 ft) of the discharge pipe. Any impacts to pelagic species would be localized and brief (BOEM, 2014a).

Impacts of a Small Fuel Spill

Potential spill impacts on EFH are discussed by BOEM (2017a). For this EP, there are no unique site-specific issues with respect to spill impacts.

The probability of a fuel spill is expected to be minimized by Chevron’s preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of Chevron’s OSRP is expected to help diminish the potential for impacts on EFH. EP Section H provides detail on spill response measures. Given the open ocean location of the project area, the duration of a small spill would be brief and the potential for impacts to EFH minimal.

A small fuel spill in offshore waters would produce a slick on the water surface and increase the concentrations of petroleum hydrocarbons and their degradation products. The extent and persistence of impacts would depend on the meteorological and oceanographic conditions at the time of the release and the effectiveness of spill response measures. **Section A.9.1** discusses the likely fate of a small fuel spill and indicates that over 90% would be dissipated naturally within 24 hours (NOAA, 2022). The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions.

A small fuel spill could have localized impacts on EFH for highly migratory pelagic fishes, including tunas, swordfishes, billfishes, and sharks. These species occur as transients in the project area. A spill would produce short-term impact on water quality in the HAPC for spawning bluefin tuna, which covers much of the deepwater Gulf of Mexico. The areal extent of impact from a small fuel spill would represent a negligible portion of the HAPC.

A small fuel spill would not likely affect EFH for corals and coral reefs, the nearest EFH being the topographic features located approximately 48 statute miles (77 km) from the project area. A small fuel spill would float and dissipate on the sea surface and would not contact these features.

Impacts of a Large Oil Spill

Potential spill impacts on EFH are discussed by BOEM (2017a). For this EP, there are no unique site-specific issues with respect to EFH.

An oil spill in offshore waters would temporarily increase hydrocarbon concentrations on the water surface and potentially in the subsurface as well. Given the extent of EFH designations in the Gulf of Mexico (Gulf of Mexico Fishery Management Council, 2005; NMFS, 2009c), some impact from a large oil spill on EFH would be unavoidable.

A large spill could affect EFH for many managed species including shrimps, stone crab, spiny lobster, reef fishes, coastal migratory pelagic fishes, and red drum. It would result in adverse impacts on water quality and consequentially on water column biota including phytoplankton, zooplankton, and nekton. In coastal waters, sediments could be contaminated and result in persistent degradation of the seafloor habitat for managed demersal fish and shellfish species.

The project area is within the HAPC for spawning Atlantic bluefin tuna (NMFS, 2009c). A large spill could temporarily degrade the HAPC due to increased hydrocarbon concentrations in the water column, with the potential for lethal or sublethal impacts on spawning tuna. Potential impacts would depend in part on the timing of a spill, as this species migrates to the Gulf of Mexico to spawn in April, May, and June (NMFS, 2009c).

The topographic features located 48 statute miles (77 km) from the project area are designated as EFH under the corals and coral reefs management plan (Gulf of Mexico Fishery Management Council, 2005). An accidental spill would be unlikely to affect these features, since an oil spill plume or surface slick would be unlikely to reach them due to their shallower depth relative to the project area.

C.6 Archaeological Resources

C.6.1 Shipwreck Sites

The archeological assessment identified no archaeologically significant artifacts or shipwrecks within 610 m (2,000 ft) of the proposed wellsites (GEMS, 2022a,b,c,d,e,f). Chevron and its contractors will abide by the applicable requirements of NTL 2005-G07 and 30 CFR § 550.194(c), which stipulate that work be stopped at the project site if any previously undetected archaeological resource is discovered after work has begun until appropriate surveys and evaluations have been completed.

Because there are no shipwreck sites within 610 m (2,000 ft) of the proposed wellsite, there are no routine IPFs that are likely to affect shipwrecks. The only IPF of relevance to shipwrecks is a large oil spill as listed in **Table 2** are discussed below. A small fuel spill would not affect shipwrecks because the fuel would float and dissipate on the sea surface.

Impacts of a Large Oil Spill

The 2017-2025 Lease Sale EIS (BOEM, 2017a) estimated that a severe subsurface blowout could resuspend and disperse sediments within a 300-meter (984-feet) radius. Because there are no historic shipwrecks within a 300-meter radius of the proposed wellsite, this impact would not be relevant. Should there be any indication that potential shipwreck sites could be affected, in accordance with NTL 2005-G07, Chevron will immediately halt drilling or other project operations, take steps to ensure that the site is not disturbed in any way, and contact the BOEM Regional Supervisor, Leasing and Environment, within 48 hours of its discovery. Following shipwreck discovery, all operations within 305 m (1,000 ft) of the site would cease until the Regional Supervisor provides instructions on steps to take to protect the site and assess the potential historic significance.

Beyond this 300-meter (984-feet) radius, there is the potential for impacts from oil, dispersants, and depleted oxygen levels. These impacts could include chemical contamination, alteration of the rates of microbial activity (BOEM, 2017a), and reduced biodiversity at shipwreck-associated sediment microbiomes (Hamdan et al., 2018). During the *Deepwater Horizon* incident, subsurface plumes were reported at a water depth of about 1,100 m (3,600 ft), extending at least 22 miles (35 km) from the wellsite and persisting for more than a month (Camilli et al., 2010). While the behavior and impacts of subsurface plumes are not well known, a subsurface plume could have the potential to contact shipwreck sites beyond the 300-meter (984-feet) radius estimated by BOEM (2012a), depending on its extent, trajectory, and persistence.

A spill entering shallow coastal waters could conceivably contaminate an undiscovered or known coastal shipwreck site. BOEM (2012a) stated that if an oil spill contacted a coastal historic site, such as a fort or a lighthouse, the major impact would be a visual impact from oil contact and contamination of the site and its environment.

C.6.2 Prehistoric Archaeological Sites

With a water depth at the location of the proposed wellsites of approximately 2,017 to 2,039 m (6,616 to 6,691 ft), the proposed wellsites are well beyond the 60-meter (197-feet) depth contour used by BOEM as the seaward extent for potential prehistoric archaeological sites in the Gulf of Mexico. Because prehistoric archaeological sites are not found in the project area, the only relevant IPF is a large oil spill. A small fuel spill would not affect prehistoric archaeological resources because the oil would float and dissipate on the sea surface.

Impacts of a Large Oil Spill

Because prehistoric archaeological sites are not found in the project area, they would not be affected by the physical effects of a subsea blowout. BOEM (2012a) estimated that a severe subsurface blowout could resuspend and disperse sediments within a 300-meter (984-feet) radius.

Along the northern Gulf Coast, prehistoric sites exist along the barrier islands and mainland coast and along the margins of bays and bayous (BOEM, 2017a). The 30-day OSRA results summarized in **Table 3** estimate that shorelines in Louisiana and Florida could be contacted within 30 days (1% to 11% conditional probability). The 60-day OSRA modeling (**Table 4**) predicts that shorelines between Cameron County, Texas, and Miami-Dade County, Florida, have up to a 13% probability of contact within 60 days of a spill.

If a spill did reach a prehistoric site along these shorelines, it could coat fragile artifacts or site features and compromise the potential for radiocarbon dating of organic materials (other dating methods are available, and it is possible to decontaminate an oiled sample for radiocarbon dating). Coastal prehistoric sites could also be damaged by spill cleanup operations (e.g., by destroying fragile artifacts and disturbing the provenance of artifacts and site features).

C.7 Coastal Habitats and Protected Areas

Coastal habitats in the northeastern Gulf of Mexico that may be affected by oil and gas activities are described by BOEM (2017a) and by Mendelssohn et al (2017). Coastal habitats inshore of the project area include barrier beaches and dunes, wetlands, oyster reefs and submerged seagrass beds. Generally, most of the northeastern Gulf of Mexico is fringed by barrier beaches, with wetlands, oyster reefs and/or submerged seagrass beds occurring in sheltered areas behind the barrier islands and in estuaries.

Due to the distance from shore, the only IPF associated with routine activities in the project area that potentially may affect beaches and dunes, wetlands, oyster reefs, seagrass beds, coastal wildlife refuges, wilderness areas, or any other managed or protected coastal area is support vessel traffic from support bases at Port Fourchon and Galliano, Louisiana that are not in wildlife refuges or wilderness areas. Potential impacts of support vessel traffic are addressed briefly below.

The only other IPF of relevance for coastal habitats and protected areas is an accidental large oil spill. A small fuel spill in the project area would be not affect coastal habitats, as the project area is 68 statute miles (109 km) from the nearest shoreline (Louisiana). As explained in **Section A.9.1**, a small fuel spill would not be expected to make landfall or reach coastal waters prior to dissipating. These IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Support Vessel Traffic

Support operations, including crew boats and supply boats as detailed in EP Section L, may have a minor incremental impact on barrier beaches and dunes, wetlands, oyster reefs and protected areas. Over time, with a large number of vessel trips, vessel wakes can erode shorelines along inlets, channels, and harbors, resulting in localized land loss. Impacts to barrier beaches and dunes, wetlands, oyster reefs and protected areas will be minimized by following the speed and wake restrictions in harbors and channels.

Support operations, including crew boats and supply boats are not anticipated to have a significant impact on submerged seagrass beds. While submerged seagrass beds could be uprooted, scarred, or lost due to direct contact from vessels, use of navigation channels and adherence to local requirements and implemented programs will decrease the likelihood of impacts to these resources (BOEM, 2017a).

Impacts of a Large Oil Spill

Potential spill impacts on coastal habitats are discussed by BOEM (2017a). Coastal habitats inshore of the project area include barrier beaches and dunes, wetlands, oyster reefs and submerged seagrass beds. For this EP, there are no unique site-specific issues with respect to coastal habitats.

The 30-day OSRA results summarized in **Table 3** estimate that shorelines in Louisiana and Florida could be contacted within 30 days of a spill (1% to 11% conditional probability). The 60-day OSRA modeling (**Table 4**) predicts that shorelines between Cameron County, Texas, and Miami-Dade County, Florida, have up to a 13% probability of contact within 60 days of a spill.

NWRs and other protected areas along the coast are discussed in BOEM (2017a) and Chevron's OSRP. Coastal and near-coastal wildlife refuges, wilderness areas, and state and national parks within the geographic range of the potential shoreline contacts based on the 30-day OSRA model (**Table 3**) are presented in **Table 8**. The level of impacts from oil spills on coastal habitats depends on many factors, including the oil characteristics, the geographic location of the landfall, and the weather and oceanographic conditions at the time of the spill (BOEM, 2017a,b).

Table 8. Wildlife refuges, wilderness areas, and state and national parks within the geographic range of the potential shoreline contacts after 30 days of a hypothetical spill from Launch Area 59 based on the 30-day OSRA model.

County or Parish, State	Wildlife Refuge, Wilderness Area, or State/National Park
Cameron, Louisiana	Lacassine National Wildlife Refuge
	Sabine National Wildlife Refuge
	Rockefeller State Wildlife Refuge and Game Preserve
	Peveto Woods Sanctuary
Vermilion, Louisiana	Paul J. Rainey Wildlife Refuge and Game Preserve
	Rockefeller State Wildlife Refuge and Game Preserve
	State Wildlife Refuge
Terrebonne, Louisiana	Isles Dernieres Barrier Islands Refuge
	Pointe aux Chenes Wildlife Management Area
	Mandalay National Wildlife Refuge
Lafourche, Louisiana	Pointe aux Chenes Wildlife Management Area
	Wisner Wildlife Management Area (Includes Picciola Tract)
Jefferson, Louisiana	Grand Isle State Park
Plaquemines, Louisiana	Breton National Wildlife Refuge
	Delta National Wildlife Refuge
	Pass a Loutre Wildlife Management Area
St. Bernard, Louisiana	Biloxi Wildlife Management Area
	Breton National Wildlife Refuge
Walton, Florida	Choctawhatchee River Delta Preserve
	Choctawhatchee River Water Management Area
	Deer Lake State Park
	Grayton Beach State Park
	Point Washington State Forest
	Topsail Hill Preserve State Park
Bay, Florida	Camp Helen State Park
	SS Tarpon Underwater Archaeological Preserve
	St. Andrews Aquatic Preserve
	St. Andrews State Park
	Vamar Underwater Archaeological Preserve

Coastal wetlands are highly sensitive to oiling and can be significantly affected because of the inherent toxicity of hydrocarbon and non-hydrocarbon components of the spilled substances (Beazley et al., 2012; Lin and Mendelssohn, 2012; Mendelssohn et al., 2012). Numerous variables such as oil concentration and chemical composition, vegetation type and density, season or weather, preexisting stress levels, soil types, and water levels may influence the impacts of oil exposure on wetlands. Impacts to slightly oiled vegetation are considered short term and reversible as recent studies suggest that they will experience plant die-back, followed by recovery without replanting (BOEM, 2012a). Vegetation exposed to oil that persists in wetlands could take years to recover (BOEM, 2017a). Vegetation coated with oil experiences the highest mortality rates due to decreased photosynthesis (BOEM, 2012a). A recent review of the literature and new studies indicated that oil spill impacts to seagrass beds are often limited and may be limited to when oil is in direct contact with these plants (Fonseca et al., 2017).

In addition to the direct impacts of oil, cleanup activities in marshes may accelerate rates of erosion and retard recovery rates (BOEM, 2017a). Impacts associated with an extensive oiling of coastal wetland habitat from a large oil spill are expected to be significant.

C.8 Socioeconomic and Other Resources

C.8.1 Recreational and Commercial Fishing

Potential impacts to recreational and commercial fishing were assessed by BOEM (2017a). The main commercial fishing activity in deep waters of the northern Gulf of Mexico is pelagic longlining for tunas, swordfishes, and other billfishes (Continental Shelf Associates, 2002; Beerkircher et al., 2009). Pelagic longlining has occurred historically in the project area, primarily during spring and summer seasons. In August 2000, the federal government closed two areas, outside the project area, in the northeastern Gulf of Mexico to longline fishing (65 *FR* 47214).

Longline gear consists of monofilament line deployed from a moving vessel and generally allowed to drift for 4 to 5 hours (Continental Shelf Associates, 2002). As the mainline is put out, baited leaders and buoys are clipped in place at regular intervals. It takes 8 to 10 hours to deploy a longline and about the same time to retrieve it. Longlines are often set near oceanographic features such as fronts or downwellings, with the aid of sophisticated on-board temperature sensors, depth finders, and positioning equipment. Vessels typically are 10 to 30 m (33 to 98 ft) long, and their fishing trips last from about 1 to 3 weeks.

It is unlikely that any commercial fishing activity other than longlining occurs at or near the project area. Benthic species targeted by commercial fishers occur predominantly on the upper continental slope, well inshore of the project area. Royal red shrimp (*Pleoticus robustus*) are caught by trawlers in water depths of about 250 to 550 m (820 to 1,804 ft) (Stiles et al., 2007). Tilefishes (primarily *Lopholatilus chamaeleonticeps*) are caught by bottom longlining in water depths from about 165 to 450 m (540 to 1,476 ft) (Continental Shelf Associates, 2002).

Most recreational fishing activity in the region occurs in water depths less than 200 m (656 ft) (Continental Shelf Associates, 1997; 2002; Keithly and Roberts, 2017). In deeper water, the main attraction to recreational fishers would be petroleum platforms offshore Texas and Louisiana. Due to the distance from shore, it is unlikely that recreational fishing activity is occurring in the project area.

The only IPFs associated with routine operations that potentially may affect fishing is drilling rig presence which may present an entanglement risk for pelagic longlining. Two types of potential accidents (a small fuel spill and a large oil spill) are the other IPFs of relevance. These IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Drilling Rig Presence, Marine Noise, and Lights

There is a slight possibility of pelagic longlines drifting into and becoming entangled in the drilling rig. For example, in January 1999, a portion of a pelagic longline snagged on the acoustic Doppler current profiler of a drillship working in the Gulf of Mexico (Continental Shelf Associates, 2002) and the line was removed without incident. Generally, longline fishers use radar and are aware of offshore structures and ships when placing their sets. Therefore, little or no impact on pelagic longlining is expected.

Because it is unlikely that any recreational fishing activity is occurring in the project area, no adverse impacts are anticipated. Other rig-related factors such as marine noise and lights are not relevant IPFs to commercial or recreational fishing.

Impacts of a Small Fuel Spill

The probability of a fuel spill is expected to be minimized by Chevron's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of Chevron's OSRP is expected to potentially mitigate and reduce the potential for impacts. EP Section H provides detail on spill response measures. Given the open ocean location of the project area, the duration of a small spill would be brief and opportunity for impacts to fishing activities would be minimal.

Pelagic longlining activities in the project area, if any, could be interrupted in the event of a small fuel spill. The area of the sea surface with diesel fuel on it would range from 0.5 to 5 ha (1.2 to 12 ac), depending on sea state and weather conditions (see **Section A.9.1**). Fishing activities could be interrupted due to the activities of response vessels operating in the project area. A small fuel spill would not affect coastal water quality because the spill would not be expected to make landfall or reach coastal waters prior to dissipating (see **Section A.9.1**).

Impacts of a Large Oil Spill

Potential spill impacts on fishing activities are discussed by BOEM (2017a). For this EP, there are no unique site-specific issues with respect to this activity.

Pelagic longlining activities in the project area and other fishing activities in the northern Gulf of Mexico could be interrupted in the event of a large oil spill. A spill may or may not result in fishery closures, depending on the duration of the spill, the oceanographic and meteorological conditions at the time of the spill, and the effectiveness of spill response measures. The *Deepwater Horizon* incident provides information about the maximum potential extent of fishery closures in the event of a large oil spill in the Gulf of Mexico (NMFS, 2010a). At its peak on 12 July 2010, closures encompassed 217,821 km^2 (84,101 mi^2), or 34.8% of the U.S. Gulf of Mexico EEZ.

According to BOEM (2012a; 2017a), the potential impacts on commercial and recreational fishing activities from an accidental oil spill are anticipated to be minimal because the potential for oil spills is very low, the most typical events are small and of short duration, and the effects are so localized that fishers are typically able to avoid the affected area. Fish populations may be affected by an oil spill event should it occur, but they would be primarily affected if the oil reaches the productive shelf and estuarine areas where many fishes spend a portion of their life cycle (BOEM, 2012a). The probability of an offshore spill affecting these nearshore environments is also low. Should a large oil spill occur, economic impacts on commercial and recreational fishing activities would likely occur, but are difficult to predict because impacts would differ by fishery and season (BOEM, 2016b).

C.8.2 Public Health and Safety

There are no IPFs associated with routine operations that are expected to affect public health and safety. A small fuel spill would be unlikely to cause any impacts on public health and safety because it would affect only a small area of the open ocean 68 statute miles (109 km) from the nearest shoreline, and nearly all of the diesel fuel would evaporate or disperse naturally within 24 hours (see **Section A.9.1**). Impacts of a large oil spill are addressed below.

Impacts of a Large Oil Spill

In the event of a large spill from a blowout, the main safety and health concerns are those of the offshore personnel involved in the incident and those responding to the spill. Once released into the water column, crude oil weathers rapidly (National Research Council, 2003a). Depending on many factors such as spill rate and duration, the physical/chemical characteristics of the oil, meteorological, and oceanographic conditions at the time, and the effectiveness of spill response measures, weathered oil may remain present on the sea surface and reach coastal shorelines.

Based on data collected during the *Deepwater Horizon* incident, the health risks resulting from a large oil spill appear to be minimal (Centers for Disease Control and Prevention, 2010). Health risks for spill responders and wildlife rehabilitation workers responding to a major oil spill are similar to the health risks incurred by response personnel during any large-scale emergency or disaster response (U.S. Department of Homeland Security, 2014), which includes the following:

- Possible accidents associated with response equipment;
- Hand, shoulder, or back pain, along with scrapes and cuts;
- Itchy or red skin or rashes due to potential chemical exposure;
- Heat or cold stress depending upon the working environment; and
- Possible upper respiratory symptoms due to potential dust inhalation, allergies, or potential chemical exposure.

C.8.3 Employment and Infrastructure

There are no IPFs associated with routine operations that are expected to affect employment and infrastructure. The project involves drilling with support from existing shorebase facilities in Louisiana. No new or expanded facilities will be constructed, and no new employees are expected to move permanently into the area. The project will have a negligible impact on socioeconomic conditions such as local employment, existing offshore and coastal infrastructure (including major sources of supplies, services, energy, and water), and minority and lower income groups. A small fuel spill that dissipates within a few days would have little or no economic impact as the spill response would use existing facilities, resources, and personnel. Impacts of a large oil spill are addressed below.

Impacts of a Large Oil Spill

Potential socioeconomic impacts of an oil spill are discussed by BOEM (2017a). For this EP, there are no unique site-specific issues with respect to employment and coastal infrastructure. A large spill could cause economic impacts in several ways: it could result in extensive fishery closures that put fishermen out of work; it could result in temporary employment as part of the response effort (including the establishment of spill response staging areas); it could result in adverse publicity that affects employment in coastal recreation and tourism industries; and it could result in suspension of OCS drilling activities, including service and support operations that are an important part of local economies.

Non-market effects such as traffic congestion, strains on public services, shortages of commodities or services, and disruptions to the normal patterns of activities or expectations could also occur in the short-term. These negative, short-term social and economic consequences of a spill are expected to be modest in terms of projected cleanup expenditures and the number of people employed in cleanup and remediation activities (BOEM, 2017a). Net employment impacts from a spill would not be expected to exceed 1% of baseline employment in any given year (BOEM, 2017a).

C.8.4 Recreation and Tourism

There are no known recreational uses of the project area. Recreational resources and tourism in coastal areas would not be affected by any routine activities due to the distance from shore. Compliance with NTL BSEE-2015-G03 is intended to minimize the chance of trash or debris being lost overboard from the drilling rig and subsequently washing up on beaches. A small fuel spill in the project area would be unlikely to affect recreation and tourism because, as explained in **Section A.9.1**, it would not be expected to make landfall or reach coastal waters prior to dispersing naturally.

Impacts of a Large Oil Spill

Potential impacts of an oil spill on recreation and tourism are discussed by BOEM (2017a). For this EP, there are no unique site-specific issues with respect to these impacts.

Impacts on recreation and tourism would vary depending on the duration of the spill and its fate including the effectiveness of response measures. A large spill that reached coastal waters and shorelines could adversely affect recreation and tourism by contaminating beaches and wetlands, resulting in negative publicity that encourages people to stay away. The 30-day OSRA results summarized in **Table 3** estimate that shorelines in Louisiana and Florida could be contacted within 30 days of a spill (1% to 11% conditional probability). The 60-day OSRA modeling (**Table 4**) predicts that shorelines between Cameron County, Texas, and Miami-Dade County, Florida, have up to a 13% probability of contact within 60 days of a large spill.

According to BOEM (2017a), should an oil spill occur and contact a beach area or other recreational resource, it could cause some disruption during the impact and cleanup phases of the spill. In the unlikely event that a spill occurs that is sufficiently large to affect large areas of the coast and, through public perception, have effects that reach beyond the damaged area, effects to recreation and tourism could be significant (BOEM, 2012a).

C.8.5 Land Use

Land use along the northern Gulf coast is discussed by BOEM (2017a). There are no routine IPFs that potentially may affect land use. The project will use existing onshore support facilities in Louisiana where land use is industrial. The project will not involve any new construction or changes to existing land use and, therefore, will not have any impacts. Levels of boat and helicopter traffic as well as demand for goods and services including scarce coastal resources, will represent a small fraction of the level of activity occurring at the shorebases.

A large oil spill is the only relevant IPF. A small fuel spill should not have any impacts on land use, as the response would be staged out of existing shorebases and facilities.

Impacts of a Large Oil Spill

The initial response for a large oil spill would be staged out of existing facilities, with no expected effects on land use. A large spill could have limited temporary impacts on land use along the coast if additional staging areas were needed. For example, during the *Deepwater Horizon* incident, temporary staging areas were established in Louisiana, Mississippi, Alabama, and Florida for spill response and cleanup efforts. In the event of a large spill in the project area, similar temporary staging areas could be needed. These areas would eventually return to their original use as the response is demobilized. It is not expected that a large oil spill and subsequent cleanup would substantially reduce available space in nearby landfills or decrease their usable life (BOEM, 2014a).

An accidental oil spill is not likely to significantly affect land use and coastal infrastructure in the region, in part because an offshore spill would have a small probability of contacting onshore resources. BOEM (2016b) states that landfill capacity would probably not be an issue at any phase of an oil spill event or the long-term recovery. In the case of the *Deepwater Horizon* incident and response, the USEPA reported that existing landfills receiving oil spill waste had plenty of capacity to handle waste volumes; the wastes that were disposed of in landfills represented less than 7% of the total daily waste normally accepted at these landfills (USEPA, 2016).

C.8.6 Other Marine Uses

The project area is not located within any USCG-designated fairway, shipping lane, or Military Warning Area. Chevron intends to comply with BOEM requirements and lease stipulations to avoid impacts on uses of the area by military vessels and aircraft. The site clearance letters for the proposed wellsites did not identify any existing infrastructure within 610 m (2,000 ft) of the proposed wellsites except for wellsite MC 608-B, which is located within 434 m (1,425 ft) of an existing well (GEMS, 2022a,b,c,d,e,f).

There are no IPFs from routine project activities that are likely to affect other marine uses of the project area. A large oil spill is the only relevant IPF. A small fuel spill would not have any impacts on other marine uses because spill response activities would be mainly within the project area and the duration would be brief.

Impacts of a Large Oil Spill

A large accidental spill would be unlikely to significantly affect shipping or other marine uses. The project area is not located within any USCG-designated fairway, shipping lane, or Military Warning Area. In the event of a large spill requiring numerous response vessels, coordination would be required to manage the vessel traffic for safe operations. Chevron and its contractor intend to comply with BOEM requirements and lease stipulations to avoid impacts on uses of the area by military vessels and aircraft.

C.9 Cumulative Impacts[2]

Prior Studies. BOEM prepared a multi-lease sale EIS in which it analyzed the environmental impact of activities that might occur in the multi-lease sale area. The level and types of activities planned in Chevron's EP are within the range of activities described and evaluated by BOEM in the 2017 to 2022 Programmatic Environmental Impact Statement for the OCS Oil and Gas Leasing Program (BOEM, 2016a), and the Final Programmatic EIS for Gulf of Mexico OCS Oil and Gas Lease Sales 2017-2022 (BOEM, 2017a). Past, present, and reasonably foreseeable activities were identified in these documents, which are incorporated by reference. The proposed action should not result in any additional impacts beyond those evaluated in the multi-lease sale and Final EISs (BOEM, 2012a; 2013; 2014a; 2015; 2016b; 2017a).

Description of Activities Reasonably Expected to Occur in the Vicinity of Project Area. Other exploration and development activities may occur in the vicinity of the project area but Chevron does not anticipate other projects beyond the types analyzed in the lease sale and Supplemental EISs (BOEM, 2012a; 2013; 2014a; 2015; 2016b; 2017a).

Cumulative Impacts of Planned Actions. The BOEM (2017a) Final EIS included a discussion of cumulative impacts, which analyzed the incremental environmental and socioeconomic impacts of the 10 proposed lease sales, in addition to all activities (including non-OCS activities) projected to occur from past, proposed, and future lease sales. The EIS considered exploration, delineation, and development wells; platform installation; service vessel trips; and oil spills. The EIS examined the potential cumulative effects on each specific resource for the entire Gulf of Mexico.

The level and type of activity proposed in Chevron's EP are within the range of activities described and evaluated in the recent lease sale EISs. The EIA incorporates and builds on these analyses by examining the potential impacts on physical, biological, and socioeconomic resources from the work planned in Chevron's EP, in conjunction with the other reasonably foreseeable activities expected to occur in the Gulf of Mexico. For all impacts, the incremental contribution of Chevron's proposed actions to the analyses in these prior reports are not expected to be significant.

[2] On May 20, 2022, the National Environmental Policy Act (NEPA) original requirements came into effect and were reinstated by the Council on Environmental Quality (CEQ), which is responsible for Federal agency implementation of NEPA.

D. Environmental Hazards

D.1 Geologic Hazards

The site clearance letters did not identify geologic hazards at the location of the proposed wellsites (GEMS, 2022a,b,c,d,e,f). See EP Section C for supporting geological and geophysical information.

D.2 Severe Weather

Under most circumstances, weather is not expected to have any effect on the proposed activities. Extreme weather, including high winds, strong currents, and large waves, was considered in the design criteria for the drilling rig selected for this project. High winds and limited visibility during a severe storm could disrupt support activities (vessel and helicopter traffic) and make it necessary to implement Chevron contingency plans to suspend some activities on the drilling rig for safety reasons until the storm or weather event passes.

D.3 Currents and Waves

Metocean conditions such as sea states, wind speed, ocean currents, etc. will be continuously monitored. Under most circumstances, physical oceanographic conditions are not expected to have any effect on the proposed activities. Strong currents (e.g., caused by Loop Current eddies and intrusions) and large waves were considered in the design criteria for the drilling rig selected for this project. High waves during a severe storm could disrupt support activities (i.e., vessel and helicopter traffic), and risks to the drilling program brought on by such conditions would be closely monitored and managed by the team managing the project. In some cases, it may be necessary to suspend some activities on the drilling rig for safety reasons until the storm or weather event passes.

E. Alternatives

No formal alternatives were evaluated in the EIA for the proposed project. However, various technical and operational options, including the location of the wellsite and the selection of a potential drilling unit, were considered by Chevron. The activity being proposed is the result of a rigorous screening and right-scoping process. It was selected as the best design candidate to reduce risk and optimize deliverability, chosen from numerous options with varying well locations, trajectories, construction designs, and drilling strategies, amongst other variables.

F. Mitigation Measures

The proposed action includes numerous mitigation measures required by laws, regulations, and BSEE and BOEM lease stipulations and NTLs (**Table 1**). The project will comply with all applicable federal, state, and local requirements concerning air pollutant emissions, discharges to water, and solid waste disposal. All project activities will be conducted under guidance by Chevron's OSRP and Safety and Environmental Management System. Additional information can be found in EP Section H.

G. Consultation

No persons or agencies other than those listed as Preparers (**Section H**) were consulted during the preparation of the EIA.

H. Preparers

The EIA was prepared by CSA Ocean Sciences Inc. Contributors included:

- John M. Tiggelaar II (Project Scientist);
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