

UNITED STATES GOVERNMENT
MEMORANDUM

June 02, 2025

To: Public Information

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

Subject: Public Information copy of DOCD.

Control # - S-08189

Type - Supplemental Exploration Plan

Lease(s) - OCS-G19545 Block - 291 Keathley Canyon Area

OCS-G25790 Block - 247 Keathley Canyon Area

Operator - BP Exploration & Production Inc.

Description - Drilling of one well (A), Well B is only for re-spud.

Rig Type - Not Found

Attached is a copy of the subject plan.

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

Henry Emembolu
Plan Coordinator



Betsy Cleland

Regulatory Lead - Paleogene
Gulf of America Region

BP Exploration & Production Inc.

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May 8, 2025

Via Email

Ms. Michelle Uli Picou
Plans Section Chief MS GM 1053C
Bureau of Ocean Energy Management
1201 Elmwood Park Blvd.
New Orleans, LA 70123-2394

Reference: Supplemental Exploration Plan, West Bump
Keathley Canyon Blocks 247 and 291
Leases OCS-G 25790 and 19545
Keathley Canyon Block 292 Unit Agreement 7543070002

Dear Ms. Picou:

BP Exploration and Production Inc. (BP) submits for your review and approval a Supplemental Exploration Plan (EP) for the Kaskida West Bump Prospect, Keathley Canyon Blocks 247 and 291, Leases OCS-G 25790 and 19545. This EP provides for the drilling of one well (A) and performing a sidetrack (A ST01) as early as December 22, 2025. The primary well location 'A' has an alternate mirror location, 'B', which is included only for re-spud purposes. The mirror location 'B' ultimately targets the same production horizon and will encounter the same sands on the path to the targeted bottom-hole location.

Enclosed please find the following:

- One digital copy of the proprietary and public information versions of the EP for BOEM review.

Some of the supporting documentation/information was developed before the Executive Order dated January 20, 2025, changing the name from Gulf of Mexico to Gulf of America. Where Applicable, references have been updated within the EP to reflect Gulf of America

If you have any questions or need additional information, please don't hesitate to contact the undersigned at betsy.cleland@bp.com, or (281) 773-9088 cell.

Sincerely,

A handwritten signature in blue ink that reads "Betsy Cleland".

Betsy Cleland
Regulatory Lead - Paleogene



BP Exploration & Production Inc.
Supplemental Exploration Plan
Keathley Canyon Blocks 247, 291
(OCS-G 25790, 19545)

“West Bump”

PUBLIC INFORMATION COPY

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| B01 | 04/28/2025 | IFU | Betsy Cleland | Vashtie Bajnath |
| Rev | Date | Document Status | Custodian/Owner | Authority |

AMENDMENT RECORD

| Amendment Date | Revision Number | Amender Initials | Amendment |
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1 Plan Contents

1.1 Description of Activities

Under this Supplemental Exploration Plan for the Kaskida West Bump prospect, BP Exploration & Production Inc. (BP) proposes to drill in Keathley Canyon Block 247 (KC 247) and sidetrack a well in Keathley Canyon Block 291 (KC 291) at primary location 'A', sidetrack location A-ST with a backup location at 'B'. Surface locations will be in KC 291 and bottom hole locations at KC 247-1 (main bore) and KC 291-2 (sidetrack).

BP will not be utilizing pile-driving or installing pipelines in this plan.

OCS Plan Information Forms (Form BOEM-0137) are included in **Appendix A**.

1.2 Location

A map at a scale of 1-in = 2,000-feet on an 8.5-in X 11-in sheet of paper that depicts the surface locations and water depths of the proposed wells is included in **Appendix B**. A bathymetry plat is also included in **Appendix B**.

1.3 Safety and Pollution Prevention Features

Safety and pollution prevention features utilized during drilling operations will include the use of appropriately designed casing and cement programs; appropriate blowout preventers, diverters, and other associated well equipment, appropriate mud monitoring equipment and sufficient mud volumes for well control; and properly trained personnel as described in 30 CFR Part 250, Subparts C, D, E, F, G, O and S, 30 CFR Part 550, Subparts B and C, and as further described in Notices to Lessees (NTLs). Appropriate fire drills and abandon ship drills will be conducted, and navigational aids, lifesaving equipment, and all other shipboard safety equipment will be installed and maintained as mandated by the U.S. Coast Guard regulations contained in 33 CFR Part 144.

1.4 Storage Tanks and Production Vessels

Information regarding the storage tanks and production vessels located on the drilling rig and support vessels that will store oil, as defined at 30 CFR 254.6 are provided in the tables below. Only those tanks with a capacity of 25 barrels or more are included.

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1.4.1 Storage Tanks DP Drillship

| Type of Storage Tank | Type of Facility | Tank Capacity (bbls) | Tank Capacity (m3) | Number of Tanks | Fluid Gravity (API) |
|-----------------------|------------------|----------------------|--------------------|-----------------|---------------------|
| Port Storage | Drillship | 14247 | 2268.5 | 1 | 38.2 |
| Port Settling | Drillship | 1411 | 224.7 | 1 | 38.2 |
| Port Service | Drillship | 1144 | 182.1 | 1 | 38.2 |
| Center Storage | Drillship | 14937 | 2378.5 | 1 | 38.2 |
| Center Settling | Drillship | 1334 | 212.4 | 1 | 38.2 |
| Center Service | Drillship | 1334 | 212.4 | 1 | 38.2 |
| STBD Storage | Drillship | 14247 | 2268.5 | 1 | 38.2 |
| STBD Settling | Drillship | 1411 | 224.7 | 1 | 38.2 |
| STBD Service | Drillship | 1144 | 182.1 | 1 | 38.2 |
| Emergency Storage | Drillship | 121 | 19.2 | 1 | 38.2 |
| MDG L.O. Storage | Drillship | 371 | 59 | 1 | 32 |
| MDG L.O. Settling | Drillship | 124 | 19.6 | 1 | 32 |
| FWD Thr. L.O. Storage | Drillship | 183 | 29.1 | 1 | 32 |
| AFT Thr. L.O. Storage | Drillship | 164 | 26.1 | 1 | 32 |
| Base Oil | Drillship | 5050 | 804.1 | 1 | 41 |

1.4.2 Storage Tanks Support Vessels

| Type of Storage Tank | Type of Facility | Tank Capacity (bbls) | No. of Tanks | Total Capacity (bbls) | Fluid Gravity (API) |
|----------------------|-------------------------------|----------------------|--------------|---|---------------------|
| Fuel Oil | Supply Boat (Typical 280feet) | 450 | 16 | 7,200 bbls dependent on other cargo carried | 31.14 |

1.5 Additional Measures

In addition to the safety, pollution prevention and early spill detection measures that may be required by applicable regulations, BP will rely on its Operating Management System (OMS) to help deliver safe and reliable operations. OMS is a system of interdependent activities that drive how BP will actually perform work and comply with internal and external standards and regulations. Within OMS, BP has also implemented a Safety Environmental Management System (SEMS) in accordance with 30 CFR 250 Subpart S, which provides a systematic way to identify risks, potential impacts, and compliance requirements that need to be managed. BP presented to the BOEMRE a report entitled *Deepwater Horizon Containment and Response: Harnessing Capabilities and Lessons Learned*. This document assesses the capabilities that are now available to respond to oil spills in the GoA. Additionally, the measures described in Appendices A, B, C and J of the NMFS 2020 Biological Opinion, as amended 2021, will be implemented as applicable to the activities outlined in this document, specifically, with regards to any external hanging equipment that may present potential entanglement hazard for protected species.

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2 General Information

2.1 Applications and Permits

The table below provides information on the filing or approval status of the individual and/or site-specific Federal, State and local application approvals or permits, which must be obtained to conduct the proposed activities.

| Application / Permit | Issuing Agency | Status |
|---------------------------------|---------------------------|-------------------|
| General NPDES Permit | EPA | Existing |
| Application for Permit to Drill | BSEE – Lafayette District | Pending Submittal |
| Emergency Evacuation Plan | USCG | Pending Submittal |

2.2 Drilling Fluids

A table providing information on the types (including chemical constituents) and amounts of the drilling fluids that are planned to be used to drill the proposed wells is included below:

Drilling Fluids per Well (281 days)

| Type of Drilling Fluid | Estimated Volume of Drilling Fluid to be Used Per Well |
|--|--|
| Water based (seawater, freshwater, barite) | 165,000 bbls |
| Oil based (diesel, mineral oil) | NA |
| Synthetic based (internal olefin, ester) | 30,000 bbls |

NOTE: Water based mud (WBM) calculations include the option to re-spud the well. WBM volume is twice the anticipated amount required to drill to the TD of the surface casing. This value includes WBM and seawater as needed. Estimated volume is 82,500 bbls without re-spud.

2.3 New or Unusual Technology

In accordance with the definition of “new or unusual technology” set forth in 30 CFR § 550.200, exploration activities in West Bump (Keathley Canyon Blocks 247 & 291) will utilize the following:

- An installed Stemless Gate Valve (SGV) as a part of the riser or LMRP to trap pressure with MPD as required during well construction. The SGV will reduce BOP element cycles when trapping applied surface back pressure.

2.4 Bonding Information

The bonding requirements for the activities proposed in this Exploration Plan are satisfied by an area-wide bond, furnished and maintained according to 30 CFR Part 556, Subpart I, and NTL No. 2015-N04, and to the extent required under 30 CFR 556.901 and National NTL No. 2016-N01.

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2.5 Oil Spill Financial Responsibility (OSFR)

BP (Operator No. 02481) 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."

2.6 Deepwater Well Control

BP (Operator No. 02481) has the financial capability to drill a relief well and conduct other emergency well control operations.

2.7 Blowout Scenario

2.7.1 Blowout Scenario

The blowout scenario assumes that the pipe has been tripped out of the hole when a problem with the wellhead connector develops, resulting in the removal of the BOP stack. Due to the loss of riser margin, the well flows unrestricted. Day 1 worst case discharge (WCD) at location 'A' is 43,453 bopd, with the calculation support package for this rate attached as **Appendix F** in the Proprietary copy of this Exploration Plan. The maximum duration of the blowout is estimated at 115 days. The rate profile associated with the well blowout over this 115-day period (also included in **Appendix F** in the Proprietary copy of this Exploration Plan) results in a potential worst case spill volume estimated at 4.7 mmstbo cumulative oil rate and 41,125 STB/Day.

2.7.2 The Potential for the Well to Bridge Over (verify or modify)

While bridging is possible due to generally low formation strengths in the Gulf of America, no bridging was assumed in the 'worst case scenario'. The open hole intervals experienced on each well have multiple formations open simultaneously. The modeling of the failure point of the weakest interval includes many variables, and using no bridging yields a maximum flow potential.

2.7.3 The Likelihood for Surface Intervention to Stop the Blowout (Verify or modify)

The likelihood for above-mudline intervention to stop a blowout is dependent on the failure mechanism. Depending on the circumstances, BP may address a failure of the BOP stack by repairing the control system via ROVs, replacing the BOPs, or adding a BOP on top of the current BOP stack. Failure of the wellhead or casing would be more difficult and require clear access to the well below the failure point in order to run drill pipe and/or tools in the well.

In addition to BP's internal well containment and emergency response planning, BP has contracted resources to assist in the event of a blowout. Further, BP is a member of the Marine Well Containment Company ("MWCC"), currently has access to MWCC's Interim Containment Response System ("ICRS") and will have full access to MWCC's Expanded Containment Response System when it is available.

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2.7.4 The Availability and Timing of a Rig to Drill a Relief Well

The table below lists the Mobile Offshore Drilling Units (MODU) that are capable of drilling a relief well. The estimated time to spud is 3 to 10 days, pending requirements to safely secure the current operations of the MODU, required material logistics, mobilization to location, and regulatory approvals. The possibility of drilling a relief well from a neighboring platform or land is not applicable to operations proposed in this Exploration Plan; there is no existing infrastructure in the vicinity of Keathley Canyon Blocks 247 & 291, that would impede drilling a relief well.

| Parameters | Black Lion (Main Derrick) | Black Hornet (Main Derrick) | Stena IceMax (Main Derrick) |
|------------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Proposed Utility in Response | Wellbore Capping / Relief Well | Wellbore Capping / Relief Well | Wellbore Capping / Relief Well |
| Current Location | GoA | GoA | GoA |
| Contract Expire Date | 11/15/2027 | 06/15/2027 | 03/01/2028 |
| Rated WD (ft) | 12K | 12K | 10K |
| Rated TD (ft) | 40K | 40K | 35K |
| Rated BOPs (psi) | 15K | 15K | 15K |
| Derrick Capacity | 4MM | 4MM | 2MM |
| Moor Type | DP | DP | DP |
| Relevant Drill Package Limitations | SHDH4 connector | SHDH4 connector | SHDH4 connector |

The estimated time to drill a relief well is: 10 days to mobilize and spud, 70 days from spud to casing shoe above WCD zone, plus 35 days for ranging, intersection, and kill operation--for a total of 115 days.

2.7.5 Measures that Would Enhance the Ability to Prevent a Blowout

Measures employed to prevent a blowout include compliance with applicable regulations (30 CFR Parts 250 and 550) and current NTLs. Additional measures include the following:

1. Volume measurements relative to the well will be monitored at all times during all operations.
2. Flow checks before leaving bottom, after pulling into shoe, and before BHA enters stack.
3. BP representative shall observe well conditions prior to each trip and after well kills or testing.
4. BP representative shall be the only person authorized to initiate opening the well as part or at the conclusion of well control measures.

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5. On rig JSA/contingency plan before running any non-shearable tools or pipe through the BOP stack.
6. BP has a 24/7 monitoring center, Regional Collaboration Center (RCC) (formerly referred to as the 'Houston Monitoring Center (HMC)'), located at BP's Westlake Campus. Through continuous monitoring, onshore staff have the ability to communicate issues they observe on the well with the Wells Superintendent and Wells Engineer, as well as the rig. The rig team can then make corrective actions as necessary.

In addition to the additional measures listed above, BP has adopted the following performance standards:

1. BP will use and will require its contractors involved in drilling operations to use, subsea blowout preventers (BOPs) equipped with no fewer than two blind shear rams and a casing shear ram on all drilling rigs under contract to BP for deepwater service operating in dynamic position mode. With respect to moored drilling rigs under contract to BP for deepwater drilling service using subsea BOPs, the subsea BOP will be equipped with two shear rams, which will include at least one blind shear ram and either an additional blind shear ram or a casing shear ram.
2. Each time a subsea BOP from a moored or dynamically positioned drilling rig is brought to the surface and testing and maintenance on the BOP are conducted, BP will require that a third party verify that the testing and maintenance of the BOP were performed in accordance with manufacturer recommendations and API Std 53.

2.7.6 Measures that Would Reduce the Likelihood of a Blowout

Measures to reduce the likelihood of a blowout include compliance with applicable regulations (30 CFR Parts 250 and 550) and current NTLs. Additional measures:

1. Minimize any influx events to the wellbore by using the best pore pressure / fracture gradient predictions available, using down-hole tools when appropriate, such as PWD and/or LWD to monitor the wellbore and update pore pressure / fracture gradient predictions;
2. Management of Change process is in place for all procedure changes;
3. A Well Control Response Guide is in place; and
4. With the integration of the Regional Collaboration Center (RCC) (formerly referred to as the 'HMC'), BP has staff monitoring wells 24/7. Having a monitoring center away from the rig in a controlled environment gives BP the opportunity to evaluate data real time and communicate issues to the Wells Superintendent and Wells Engineer, as well as the rig.

2.7.7 Measures which Would Enhance the Ability to Conduct Early Intervention

Measures to enhance the ability to conduct early intervention in addition to the regulation and NTL requirements include:

1. Possible relief well locations have been identified and screened for general acceptability. In the event of a blow out or other event necessitating a relief well, data will be collected post-event to ensure that previously identified relief well locations are still valid, or to assist in determining alternate relief well locations if required;
2. Wellhead equipment and sufficient casing is identified and available for a relief well;
3. A rig(s) is identified and available for a relief well;
4. A Well Control Response Guide is in place; and

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5. An Incident Management System (IMS) is in place.
 - The BP IMS is comprised of government-approved plans covering various scenarios; Incident Management Teams are trained annually in the Incident Command System, which is a part of the National Incident Management System; BP has access to response capability through various contractors and technical specialists; and to pre-designated facilities, where the teams can provide adequate oversight to the response.

2.7.8 Other Measures

All proposed activities and facilities in this EP will be covered by the GoM Regional OSRP filed by BP America Inc. (Operator No. 21372) under cover letter dated October 7, 2024 on behalf of several companies listed in the plan including BP Exploration & Production Inc. (Operator No. 02481). The OSRP was confirmed in compliance and approved by BSEE on January 10, 2025.

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3 Geological and Geophysical Information

3.1 Geological Description

A discussion of the geological objectives, including a brief description of the hydrocarbon trapping elements, is included in **Appendix C** in the Proprietary Information copy of this Exploration Plan.

3.2 Structure Contour Maps

Current structure contour maps are included in **Appendix C** in the Proprietary Information copy of this Exploration Plan.

3.3 Interpreted 2-D and/or 3D Seismic Lines

Migrated and annotated 3-D seismic lines with depth scale within 152 meters (500 feet) of the proposed surface locations are enclosed with the site clearance letters included in **Appendix C** in the Proprietary Information copy of this Exploration Plan.

3.4 Geological Structure Cross-Section Maps

Interpreted geological structure cross-section maps are included in **Appendix C** in the Proprietary Information copy of this Exploration Plan.

3.5 Shallow Hazards Report

An AUV Hazard Survey Report of Blocks 246-248, 290-292, and 335-336, Keathley Canyon Area, was submitted with the previously filed Supplemental Exploration Plan (S-7364).

An integrated AUV and 3D seismic shallow hazards study (GEMS 2024) of Blocks 246-248, 290-292, and 335-336, Keathley Canyon Area, was submitted with the previously filed DOCD N-10256).

3.6 Shallow Hazards Assessments (Site Clearance Letters)

Shallow hazards assessment (site clearance letter) that evaluate the seafloor and subsurface geologic and manmade features and conditions, for the proposed location is included in **Appendix C** of this Exploration Plan.

3.7 High Resolution Seismic Lines

Seismic sections through the proposed well locations are included in the shallow hazards assessments (site clearance letters) in **Appendix C** of this Exploration Plan.

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3.8 Stratigraphic Column

A generalized biostratigraphic / lithostratigraphic column is included in **Appendix C** in the Proprietary Information copy of this Exploration Plan.

3.9 Time vs. Depth Information

Time vs. Depth information is included in **Appendix C** in the Proprietary Information copy of this plan.

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4 Hydrogen Sulfide (H₂S) Information

4.1 Concentration

Anticipated H₂S concentration is 0 ppm. Kaskida project had the estimated H₂S concentration and area classification in the KC292-336 Supplemental Exploration Plan (S-7451), approved October 21, 2011 as “H₂S absent”.

Based on previous drilling, no H₂S is known to occur in the project area. The following correlative wells in the area drilled to similar geologic horizons without encountering H₂S: KC 244#1 (31,462-ft MD), KC 291 #1 (32,250-ft MD), KC 292 #1 BP2 (32,499ft MD) and KC 292 #2 BP1 (34,381-ft MD). Other wells drilled to similar geologic horizons in the area without encountering H₂S are Unocal GB 941 #1 (21,207ft MD), Unocal KC 681 #1 (27,575-ft MD), Conoco KC511 #1 (30,082-ft MD), BP AC 739 #1 (23,847-ft MD), and Shell AC 557 #1 ST02 (19,618-ft MD).

4.2 Classification

Based on correlative information no H₂S is known to occur in the project area. BP requests BOEM confirm an “H₂S absent” classification.

4.3 H₂S Contingency Plan

No H₂S is documented in the offset wells in and around the project area, nor in nearby producing fields. Reservoirs have low temperature (< 100 C) and lack a sulfate source. Bottom-up model predicts no H₂S. Therefore, no H₂S contingency plans were needed.

4.4 Modeling Report

No H₂S is documented in the offset wells in and around the project area, nor in nearby producing fields. Reservoirs have low temperature (< 100 C) and are lack of sulfate source. Bottom-up model predicts no H₂S. Therefore, no further model reports were needed.

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5 Biological, Physical, and Socioeconomic Information

5.1 Benthic Communities Report

The BOEM requires site-specific surveys and reviews for proposed bottom-disturbing actions in water depths greater than 300-m in order to judge the potential of the region for supporting high density benthic communities, including chemosynthetic organisms. NTL No. 2009-G40 formalized the process. BP has conformed to this requirement and has located wells to avoid potential sites for benthic communities during the activities described by this plan.

Keathley Canyon Block 291 is located in water depths greater than 300-m; therefore, there is the potential for high-density benthic communities to be present. Site Clearance Letter in **Appendix C** provide a current review of available data confirming the absence of high-density benthic communities within the prescribed distances from the proposed well locations.

5.2 Topographic Features Map

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

5.3 Topographic Features Statement (Shunting)

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

5.4 Live Bottom (Pinnacle Trend) Information

Live Bottom (Pinnacle Trend) Stipulation in NTL No. 2009-G39 does not apply to these leases; therefore, a map is not required.

5.5 Live Bottom (Low Relief) Map

Live Bottom (low relief) Stipulation in NTL No. 2009-G39 does not apply to these leases; therefore, a map is not required.

5.6 Biologically Sensitive Underwater Features and Areas

The proposed activities will be conducted in water depths of approximately 5,722 ft. Therefore, requirements of NTL 2009-G39 for biologically sensitive underwater features and areas such as Topographic Features, Live Bottom (low-relief), Live Bottom (Pinnacle Trend) features, and other potentially sensitive biological features when conducting OCS operations in water depths less than 300-m (984-ft) in the Gulf of America do not apply to this plan.

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All proposed bottom-disturbing activities in this EP will occur outside of the nearest Topographic Features, “No Activity Zones”, Live Bottom (low Relief), and Live Bottom (Pinnacle Trend) Stipulation Blocks described in NTL 2009-G39 and shown on BOEM December 2012 Map: “Biologically Sensitive Areas (< 300-m)”.

5.7 Remotely Operated Vehicle (ROV) Monitoring Survey Plan

Keathley Canyon Area Blocks 247 and 291 fall within Grid 8. It has been determined by the BOEM that sufficient remotely operated vehicle (ROV) information has been gathered in Grid 8; therefore, no ROV monitoring survey is required.

5.8 Threatened or Endangered Species, Critical Habitat and Marine Mammal Information

Endangered or Threatened species that may occur in the project area and/or along the northern Gulf Coast are listed in the table below. The table also indicates the location of critical habitat (if designated in the Gulf of America). 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 America. The USFWS has jurisdiction for ESA-listed birds, the West Indian manatee (*Trichechus manatus*), and sea turtles while on their nesting beaches.

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 America |
|---------------------------|--|------------------|--------------------|---------|--|
| | | | Project Area | Coastal | |
| Marine Mammals | | | | | |
| Rice’s whale ¹ | <i>Balaenoptera ricei</i> | E | X | -- | None |
| Sperm whale | <i>Physeter macrocephalus</i> | E | X | -- | None |
| West Indian manatee | <i>Trichechus manatus</i> ² | T | -- | X | Florida (Peninsular) |
| Sea Turtles | | | | | |
| Loggerhead turtle | <i>Caretta caretta</i> | T,E ³ | X | X | Nesting beaches and nearshore reproductive habitat in Mississippi, Alabama, and Florida (Panhandle); <i>Sargassum</i> habitat including most of the central & western Gulf of America. |
| Green turtle | <i>Chelonia mydas</i> | T | X | X | None |
| Leatherback turtle | <i>Dermochelys coriacea</i> | E | X | X | None |
| Hawksbill turtle | <i>Eretmochelys imbricata</i> | E | X | X | None |
| Kemp’s ridley turtle | <i>Lepidochelys kempii</i> | E | X | X | None |
| Birds | | | | | |

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| Species | Scientific Name | Status | Potential Presence | | Critical Habitat Designated in Gulf of America |
|------------------------|-------------------------------------|--------|--------------------|---------|---|
| | | | Project Area | Coastal | |
| Piping Plover | <i>Charadrius melodus</i> | T | -- | X | Coastal Texas, Louisiana, Mississippi, Alabama, and Florida (Panhandle) |
| Whooping Crane | <i>Grus americana</i> | E | -- | X | Coastal Texas (Aransas National Wildlife Refuge) |
| Black-capped Petrel | <i>Pterodroma hasitata</i> | E | X | -- | None |
| Rufa Red Knot | <i>Calidris canutus rufa</i> | T | -- | X | None |
| Fishes | | | | | |
| Oceanic whitetip shark | <i>Carcharhinus longimanus</i> | T | X | -- | None |
| Giant manta ray | <i>Mobula birostris</i> | T | X | X | None |
| Gulf sturgeon | <i>Acipenser oxyrinchus desotoi</i> | T | -- | X | Coastal Louisiana, Mississippi, Alabama, and Florida (Panhandle) |
| Nassau grouper | <i>Epinephelus striatus</i> | T | -- | X | None |
| Smalltooth sawfish | <i>Pristis pectinata</i> | E | -- | X | Southwest Florida |
| Invertebrates | | | | | |
| Elkhorn coral | <i>Acropora palmata</i> | T | -- | X | Florida Keys and the Dry Tortugas |
| Staghorn coral | <i>Acropora cervicornis</i> | T | -- | X | Florida Keys and the Dry Tortugas |
| Pillar coral | <i>Dendrogyra cylindrus</i> | T | -- | X | Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, and Navassa Island |
| Rough cactus coral | <i>Mycetophyllia ferox</i> | T | -- | X | Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, and Navassa Island |
| Lobed star coral | <i>Orbicella annularis</i> | T | -- | X | Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank |
| Mountainous star coral | <i>Orbicella faveolata</i> | T | -- | X | Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank |
| Boulder star coral | <i>Orbicella franksi</i> | T | -- | X | Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank |
| Panama City crayfish | <i>Procambarus econfinae</i> | T | -- | X | South-central Bay County, Florida |
| Queen conch | <i>Aliger gigas</i> | T | -- | X | None |

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| Species | Scientific Name | Status | Potential Presence | | Critical Habitat Designated in Gulf of America |
|---|---|--------|--------------------|---------|--|
| | | | Project Area | Coastal | |
| Terrestrial Mammals | | | | | |
| Beach mice (Alabama, Choctawhatchee, Perdido Key, St. Andrew) | <i>Peromyscus polionotus</i> subsp. <i>Ammobates</i> , <i>allophrys</i> , <i>trissyllepsis</i> , and <i>peninsularis</i> , respectively | E | – | X | Alabama and Florida (Panhandle) beaches |
| Florida salt marsh vole | <i>Microtus pennsylvanicus dukecampbelli</i> | E | – | X | None |

E = Endangered; T = Threatened; X = potentially present; – = not present.

- 1 In 2021, the 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 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 America 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 America.
- 3 The Northwest Atlantic Ocean Distinct Population Segment (DPS) of loggerhead turtles is designated as Threatened (76 Federal Register [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 America (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*), Rufa Red Knot (*Calidris canutus rufa*) Florida salt marsh vole, Panama City crayfish, Whooping Crane (*Grus americana*), Gulf sturgeon (*Acipenser oxyrinchus desotoi*), smalltooth sawfish (*Pristis pectinata*), Queen conch (*Aliger gigas*) and four subspecies of beach mouse. Critical habitat has been designated for all of these species (except the Florida salt marsh vole, Rufa Red Knot, and Queen conch) 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.

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*), and the Black-capped Petrel (*Pterodroma hasitata*) 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. No critical habitat has been designated in the Gulf of America for the leatherback turtle, Kemp's ridley turtle, hawksbill turtle, green turtle, or the sperm whale.

Four Endangered mysticetes (blue whale [*Balaenoptera musculus*], fin whale [*Balaenoptera physalus*], North Atlantic right whale [*Eubalaena glacialis*], and sei whale [*Balaenoptera borealis*]) have been reported in the Gulf of America, and are considered rare or extralimital (Würsig et al., 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, 2017); therefore, they are not considered further in the EIA.

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The Rice’s whale exists in the Gulf of America 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 America. 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). However, recent work by Soldevilla et al. (2022a) suggests the range may be broader than previously thought.

In several recent acoustic studies in the Gulf of America (Soldevilla et al., 2022a,b; 2024), all Bryde’s whale complex individuals are assumed to be Rice’s whales. However, Bryde’s whales have a global tropical and sub-tropical range that can include the Gulf of America. Moreover, in the latest NMFS Rice’s whale Marine Mammal Stock Assessment Report (Hayes et al., 2023), all previous data of Gulf of America Bryde’s whales from studies that pre-dated the Rosel et al. (2021) study that determined that Rice’s whales are a distinct species were now assumed to all be Rice’s whales. However, it is unclear on what percentage of Bryde’s whale complex individuals that live or previously lived in Gulf of America are Rice’s whales vs Bryde’s whales due to having no DNA studies that analyzed a representative population of Gulf of America Bryde’s whale complex individuals.

The giant manta ray could occur in the project area but is most commonly observed in the Gulf of America at the Flower Garden Banks. The Nassau grouper (*Epinephelus striatus*) has been observed in the Gulf of America 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. The Panama City crayfish (*Procambarus econfinae*) is a coastal species in south-central Bay County, Florida and is not expected to occur in the project area.

Seven Threatened coral species are known from the northern Gulf of America: elkhorn coral (*Acropora palmata*), staghorn coral (*Acropora cervicornis*), 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.

There are no other Threatened or Endangered species in the Gulf of America that are likely to be adversely affected by either routine or accidental events. Additional information can be found in BP’s Environmental Impact Analysis attached as **Appendix I**.

5.9 Archaeological Report

An archaeological assessment was completed by Fugro in 2011 (Fugro, 2011) and reviewed by GEMS in 2024 (GEMS, 2024). No evidence of shipwrecks or sites of archaeological significance were reported at or within 2,000 ft of the proposed well locations. Sonar contacts are interpreted to be modern debris or geologic.

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6 Waste and Discharge Information

6.1 Projected Generated Wastes

A table providing information on the projected solid and liquid wastes likely to be generated by the proposed activities is included in **Appendix D**.

6.2 Projected Ocean Discharges

A table providing information on the projected ocean discharges likely to be generated during the proposed activities is included in **Appendix D**.

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7 Air Emissions Information

7.1 Screening Questions

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

7.2 Emissions Worksheet

An emission workbook (BOEM Form 0138) showing Plan total emissions associated with the activities proposed in this Exploration Plan document is included in **Appendix E**. Total Plan emissions are summarized in the Table below. The proposed Total plan emissions are less than BOEM's emission exemption thresholds and as a result, no further review or controls are required.

| COMPANY | AREA | BLOCK | LEASE | FACILITY | WELL | | | | | |
|----------------------------------|----------------------------|--------------|-------------------------|----------------|------------------------------------|---------|------|-----------|------|--|
| BP Exploration & Production Inc. | Keathley Canyon | KC 247 & 291 | OCS-G25790 & OCS-G19545 | Not Applicable | KC 247 "A" and "B", KC 291 "AST01" | | | | | |
| Year | Facility Emitted Substance | | | | | | | | | |
| | TSP | PM10 | PM2.5 | SOx | NOx | VOC | Pb | CO | NH3 | |
| 2025 | 99.61 | 60.09 | 58.29 | 1.45 | 2386.47 | 68.62 | 0.01 | 374.31 | 0.70 | |
| 2026 | 181.78 | 109.67 | 106.38 | 2.65 | 4355.31 | 125.22 | 0.01 | 683.12 | 1.27 | |
| Allowable | 6393.60 | | | 6393.60 | 6393.60 | 6393.60 | | 113156.56 | | |

7.3 Emission Reduction Measures

The project BOEM 0138 Form for this project does not include any emission reduction measures.

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7.4 Verification of Non-Default Emission Factors

The project BOEM 0138 Form for this project does not include any non-default emission factors or emission reduction measures.

7.5 Distance to Shore for Emission Exemption Thresholds (EET)

The distance to shore in statute miles is based on the same coordinate system used in the lease sale documents for the lease.

7.6 Non-Exempt Facilities

The calculated maximum projected emissions of the facility, with emissions reduction measures, is less than the respective EET calculated at 30 CFR § 550.303(d). The facility is therefore exempt from the requirements in 30 CFR § 550.303(e) through (i).

7.7 Hydrogen Sulfide

The requirements related to hydrogen sulfide (H₂S) are not repeated here as they are addressed in section 4 of the Plan.

7.8 Environmental Impact Analysis (EIA)

The requirements related to EIA are not repeated here as they are addressed in section 15 Appendix I of this Plan.

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8 Oil Spill Information

8.1 Oil Spill Response Planning

8.1.1 Regional OSRP Information

All proposed activities and facilities in this EP will be covered by the GoM Regional OSRP filed by BP America Inc. (Operator No. 21372) under cover letter dated October 7, 2024, on behalf of several companies listed in the plan including BP Exploration & Production Inc. (Operator No. 02481). The OSRP was confirmed in compliance and approved by BSEE on January 10, 2025.

BP has adopted additional performance standards:

- a. Provisions to maintain access to a supply of dispersant and fire boom for use in the event of an uncontrolled long-term blowout for the length of time required to drill a relief well;
- b. Contingencies for maintaining an ongoing response for the length of time required to drill a relief well;
- c. Description of measures and equipment necessary to maximize the effectiveness and efficiency of the response equipment used to recover the discharge on the water's surface, including methods to increase encounter rates;
- d. Information regarding remote sensing technology and equipment to be used to track oil slicks, including oil spill detection systems and remote thickness detection systems (e.g., X-band/infrared systems);
- e. Information regarding the use of communication systems between response vessels and spotter personnel;
- f. Shoreline protection strategy that is consistent with applicable area contingency plans; and
- g. For operations using a subsea BOP or a surface BOP on a floating facility, a discussion regarding strategies and plans related to source abatement and control for blowouts from drilling.

8.1.2 Spill Response Sites

| Primary Response Equipment Location | Preplanned Staging Location(s) |
|--|--------------------------------|
| Tampa, FL; Pascagoula, MS; Houma, LA.; Leeville, LA; Morgan City, LA; Lake Charles, LA.; Venice, LA; Galveston, TX; Ingleside, TX. | Fourchon, LA. |

8.1.3 OSRO Information

BP is a member of the Marine Spill Response Corporation (MSRC) and Clean Gulf Associates (CGA) and would utilize said Oil Spill Response Organization (OSRO) personnel and equipment in the event of an oil spill at Keathley Canyon Block 291.

| | | | |
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| Custodian/Owner: | Betsy Cleland | Issue Date: | 04/28/2025 |
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8.1.4 Worst-Case Scenario Determination

| Category | Regional OSRP Approved Jan. 10, 2025 | EP |
|--|---|---------------------|
| Type of Activity | Drilling >10 miles | Drilling > 10 miles |
| Facility Location | MC 778 | KC 291 (SL) |
| Facility Designation | Thunder Horse Well MC 778-15 | Well Loc "A" |
| Distance to Nearest Shoreline | 68-miles | 192 statute miles |
| Volume storage tanks and flowline (total) | 50,000-bbbls | 0-bbbls |
| Volume Lease term pipelines | 13,000-bbbls | 0-bbbls |
| Volume Uncontrolled Blowout (Day 1) | 360,000-bbbls | 43,453-bbbls |
| Total Volume | 423,000-bbbls | 43,453-bbbls |
| Type of Oil(s) – (Crude Oil, Condensate, Diesel) | Crude | Crude |
| API Gravity(s) | 32.0° | 19.8° |

BP has determined the worst-case discharge scenario from the activities proposed in this EP do not supersede the worst-case scenario in BXP's GoM Regional OSRP filed by BP America Inc. (Operator No. 21372) under cover letter dated October 7, 2024, on behalf of several companies listed in the plan including BP Exploration & Production Inc. (Operator No. 02481). The OSRP was confirmed in compliance and approved by BSEE on January 10, 2025, Pursuant to NTL No. 2008-G04, BP makes the following statement:

Since BP Exploration & Production Inc. has the capability to respond to the worst-case spill scenario included in its regional Oil Spill Response Plan approved on January 10, 2025, and since the worst-case scenario determined for our EP does not replace the worst-case scenario in our regional or sub-regional OSRP, BP certifies that it has the capability to respond, to the maximum extent practicable, to a worst-case discharge, or a substantial threat of such a discharge, resulting from the activities proposed in our EP.

Wellbore data, geologic data, reservoir data, and fluid data used in modeling and making the WCD determination are provided in **Appendix F** in the Proprietary Information copy of this Exploration Plan.

8.2 Oil Spill Response Discussion

A detailed discussion of a response to an oil spill is included in **Appendix G**. This Appendix addresses topics such as resource identification, release modeling, response technologies, and source containment / control.

| | | | |
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9 Environmental Monitoring and Mitigation Measures

9.1 Monitoring Systems

In addition to rig control engineered systems, operational personnel have been instructed to check for pollution frequently during their tour of duty and, if pollution is spotted, to identify and shut off the source and make immediate notifications as per instructions provided in Section 8 of BP's certified OSRP. In accordance with the measures described in Appendices A, B, C and J of the NMFS 2020 Biological Opinion, as amended on April 26, 2021 [*Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico*. Office of Protected Resources, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce (March 13, 2020, amended April 26, 2021)], a person onboard the vessel(s) will visually monitor the moonpool(s) using a remote camera system. Logs will be kept for each shift documenting the observed presence/absence of marine animals in the moonpool(s). If a protected species is observed in the moonpool(s), required reporting to the appropriate agencies will be made and BP will comply with ensuing guidance.

Also, in accordance with the provisions of Title 30 CFR § 250.713(g) and NTL 2018-G01 "Ocean Current Monitoring" dated August 7, 2018, the MODU will be equipped with an Acoustic Doppler Current Profile (ADCP) current monitoring system onboard to allow continuous monitoring and gathering of ocean current data on a real-time basis in the upper 1000 meters.

9.2 Incidental Takes

Mitigation measures described in Appendices A, B, C and J of the NMFS 2020 Biological Opinion, as amended in 2021, will be implemented to the extent they are applicable to the activities outlined in this plan. Monitoring activities are conducted by personnel on vessels to prevent accidental loss of materials overboard, and to report sightings of injured/dead protected species. Reporting of dead/injured protected species is addressed in Annex 2 of BP's "Incident Notification and Investigation Procedure - Attachment 1". Additionally, to mitigate against incidental takes, activities will be conducted in adherence to 2020 revisions of BSEE NTL 2015-G03 "Marine Trash and Debris Awareness Training and Elimination"; BOEM NTL 2016-G01 "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting" and BOEM NTL 2016-G02 "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program", as necessary. As required by BSEE NTL 2015-G03, BP submits an annual certification letter for its Marine Debris Awareness Training Process. The marine debris awareness training is required annually by the BSEE and is identified by "BP's Gulf of America (GoA) Environmental Training Matrix" and "BP's GoA Health, Safety, and Environmental (HSE) Training Needs Assessment", both of which are located on BP's GoA HSE website.

Further mitigation measures can be found throughout the supporting EIA found in **Appendix I**.

9.3 Flower Garden Banks National Marine Sanctuary

All proposed activities will occur outside of the Protective Zones of the Flower Garden Banks National Marine Sanctuary boundaries.

| | | | |
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10 Lease Stipulations

Oil and gas exploration activities on the OCS are sometimes subject to mitigations in the form of lease stipulations.

10.1 Lease Stipulation Information

Lease Stipulation for Protected Species

Mitigation measures described in Appendices A, B, C and J of the NMFS 2020 Biological Opinion, as amended in 2021, will be implemented to the extent they are applicable to the activities outlined in this plan. Additionally, all activities will be conducted in adherence to 2020 revisions of NTL 2015-G03 "Marine Trash and Debris Awareness Training and Elimination"; BOEM NTL 2016-G01 "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting" and BOEM NTL 2016-G02 "Implementation of Seismic Survey Mitigation Measures and Protected Species Observer Program", as necessary. Mitigation to prevent takes varies based on the activity underway and it can include worker training on waste management and trash and debris containment procedures to avoid accidental loss overboard and its potential impact on protected species, and training on reporting of dead/injured protected species addressed in BP's Incident Notification and Investigation Procedure.

| | | | |
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11 Related Facilities and Operations Information

11.1 Produced Liquid Hydrocarbons Transportation Vessels

There are no well tests proposed in this Exploration Plan.

| | | | |
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12 Support Vessels and Aircraft Information

12.1 General

| Type | Maximum Fuel Tank Storage Capacity | Maximum No. in Area at Any Time | Trip Frequency or Duration |
|--------------|------------------------------------|---------------------------------|----------------------------|
| Helicopter | 713-gals | 1 | 4 / week |
| Crew Boats | 1,000-bbls | 1 | 2 / week |
| Supply Boats | 5,000-bbls | 1 | 2 / week |

12.2 Diesel Oil Supply Vessels

| Size of Fuel Supply Vessel | Capacity of Fuel Supply Vessel | Frequency of Fuel Transfers | Route Fuel Supply Vessel will Take |
|----------------------------|--------------------------------|-----------------------------|---|
| 240-feet to 312-feet | 50,000-gallons (boat fuel) | Weekly / as needed | From the shorebase in Fourchon, LA, to Keathley Canyon Area Block 291 |

12.3 Solid and Liquid Wastes Transportation & Disposal

A table providing information on the transportation of solid and liquid wastes and the onshore facilities used for disposal of solid and liquid wastes generated by the proposed activities is included in Table 2 found in **Appendix D**.

12.4 Vicinity Map

A vicinity map depicting 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 when traveling between the onshore support facilities and the project areas is included in **Appendix B**. In accordance with Appendices A, B, C, and J of the NMFS 2020 Biological Opinion, as amended in 2021, transit routes will avoid the Rice's whale core distribution area. As outlined in the table below, vessels will transit from shorebases in Louisiana to the blocks where activities will occur under this plan.

| | | | |
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13 Onshore Support Facilities Information

13.1 General

The onshore support base for the proposed operations will be in Fourchon, Louisiana. Keathley Canyon Area Blocks 247 and 291 are located approximately 223 statute miles from the onshore support base located in Fourchon, Louisiana, as indicated on the vicinity map in **Appendix B**.

The following table provides information on the onshore facilities that will be used to provide supply and service support for the activities proposed in this plan.

| Name | Location | Existing / New / Modified |
|----------|--------------|---------------------------|
| C-Port | Fourchon, LA | Existing |
| Heliport | Houma, LA | Existing |

BP will primarily use the existing C-Port Fourchon Shorebase located in Fourchon, Lafourche Parish, Louisiana to support general vessel operations. No expansion of these physical facilities is expected to result from the proposed activities. The C-Port Fourchon facility is located approximately 223 miles from the general activity area, provides a vehicle parking lot, office space, radio communication equipment, outside and warehouse storage space, crane, forklifts, water and fueling facilities, and boat dock space. The base is in operation 24 hours each day. Helicopters will be based out of Houma, Louisiana.

A small amount of vessel and helicopter traffic may originate from bases other than those described above in order to address changes in weather conditions. It is expected that this vessel traffic will originate from bases and locations that are in the near vicinity of the bases previously described.

13.2 Support Base Construction or Expansion

BP will utilize existing support bases for the proposed activities and will not require the construction or expansion of additional support bases.

13.3 Waste Disposal

Information about the onshore facilities used to store and dispose of solid and liquid wastes generated by proposed activities has been included in Table 2 found in **Appendix D**.

| | | | |
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14 Coastal Zone Management Act (CZMA) Information

14.1 Consistency Certification

A Coastal Zone Management Act consistency certification, according to 15 CFR § 930.76(b) is included in Appendix H.

14.2 New or Unusual Technology

See Sections 2.7.5, 2.7.8, 8.1.1, and 8.1.3 within the EP for a discussion of voluntary performance standards and Oil Spill Response Organization (OSRO) participation. No new or unusual technology for spill prevention, control, or cleanup is proposed. The EP Section 2.7 Blowout Scenario describes prevention, control, and cleanup technologies that are currently available.

| | | | |
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15 Environmental Impact Analysis (EIA)

Attached as **Appendix I** is an Environmental Impact Analysis (EIA) prepared for the proposed project by CSA Ocean Sciences Inc. 8502 SW Kansas Ave, Stuart, FL 34997.

Mitigation measures described in Appendices A, B, C and J of the NMFS 2020 Biological Opinion, as amended in 2021, will be implemented to the extent they are applicable to the activities outlined in this plan. Additionally, BOEM (or its predecessor, the Minerals Management Service) has conducted extensive environmental analyses examining the possible impacts produced by oil and gas exploration and production activities, which evaluated impacts from similar activities on the areas in the Gulf of America covered by the present plan.

The EIA addresses potential impacts to environmental resources found in the deepwater Gulf of America (GoA), coastal habitats, protected areas, and onshore. Based on the activity set of the project, these included:

- Drilling rig presence, physical disturbance to the seafloor, air emissions, effluent discharges, water intake, onshore waste disposal, marine debris, support vessel/helicopter traffic, and unintended releases to the marine environment.

The EIA outlines high level mitigation measures that will be in place to reduce associated potential impacts.

| | | | |
|--|------------------------------|--|---------------------------|
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16 Administrative Information

16.1 Exempted Information Description

In accordance with 43 CFR Part 2, Appendix E, sections (4) and (9), the following information has been determined by the BOEM GOAR exempt from public disclosure:

- Geologic Objectives (BHL, TVD and MD) on Form BOEM-0137
- Production rates and life of reservoirs
- Proprietary New or Unusual Technology
- Geological and Geophysical Information (except for non-proprietary Shallow Hazard Assessment)
- Hydrogen Sulfide Correlative Well Information

This information is excluded from the "Public Information" copy of the submitted plan.

16.2 Bibliography

Any previously submitted EP, DPP, DOCD, study report, survey report, or any other material referenced in this EP are listed below:

| Plan Control No | Lease | Block | Operator Name | Operator Number | Plan Type Code | Received Date | Final Action Code | Final Action Date |
|-----------------|-----------------|--------------|----------------------------------|-----------------|----------------|---------------|-------------------|-------------------|
| S-7364 | G25792 | KC292 | BP Exploration & Production Inc. | 02481 | EP | 10/29/2009 | A | 12/9/2009 |
| N-10256 | G25792, Expired | KC292, KC293 | BP Exploration & Production Inc. | 02481 | DOCD | 02/18/2025 | | |

16.3 Other Reference Items

Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico. Office of Protected Resources, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce (March 13, 2020, amended April 24, 2021)

Deepwater Horizon Containment and Response: Harnessing Capabilities and Lessons Learned.

BP America, Inc., 2024, "Site Clearance Letter, Proposed Well Locations KC291-A and KC291-B, Block 291, OCS-G 19545, Keathley Canyon Area"

Geoscience Earth & Marine Services, Inc (GEMS), 2024, "Integrated Shallow Hazards Assessment, Blocks 246-248, 290-292, and 335-336, Keathley Canyon Area, Gulf of Mexico", GEMS Project No. GHZ3282.

Fugro Geoservices, Inc (FGSI), 2011, "AUV Archaeological Assessment, Kaskida Prospect, Blocks 246-248, 290-292 & 335-336, Keathley Canyon Area Gulf of Mexico", FGSI Report No. 2411-1025

| | | | |
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Environmental Impact Analysis for an Exploration Plan for Keathley Canyon Block 291, CSA Ocean Sciences Inc., March 2025

Coastal Zone Management Consistency Certification State of Louisiana for Keathley Canyon Block 291, CSA Ocean Sciences Inc., March 2025

| | | | |
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17 Appendixes

- Appendix A: Plan Information Forms – Form BOEM-0137
- Appendix B: Location Plat, Bathymetry Plat, and Vicinity Map
- Appendix C: Geological & Geophysical Information - Geological Description, Structure Contour Maps, Interpreted Seismic Lines, Geological Structure Cross-Section Maps, Shallow Hazards Assessments (Site Clearance Letters), Stratigraphic Column, Time vs. Depth Information
- Appendix D: Wastes and Discharges Tables (Projected Generated Wastes and Projected Ocean Discharges)
- Appendix E: Air Emissions Information – Form BOEM-0138
- Appendix F: WCD Modeling Report - Proprietary Copy
- Appendix G: Oil Spill Response Discussion
- Appendix H: Coastal Zone Management Act (CZMA) Consistency Certification
- Appendix I: Environmental Impact Analysis (EIA)
- Appendix J: Cost Fee Recovery

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Appendix A: Plan Information Forms – Form BOEM-0137

| | | | |
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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): "A" ST00 | | | | Previously reviewed under an approved EP or DOCD? | | | Yes | X | No |
| Is this an existing well or structure? | | Yes | X | No | If this is an existing well or structure, list the Complex ID or API No. | | | | |
| Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities? | | | | | | X | Yes | | No |
| WCD Info | For wells, volume of uncontrolled blowout (Bbls/Day): 43,453 | | | For structures, volume of all storage and pipelines (Bbls): | | API Gravity of fluid | | 19.8° | |
| | Surface Location | | | Bottom-Hole Location (For Wells) | | Completion (For multiple completions, enter separate lines) | | | |
| Lease No. | OCS-G 19545 | | | | | OCS OCS | | | |
| Area Name | Keathley Canyon | | | | | | | | |
| Block No. | 291 | | | | | | | | |
| Blockline Departures (in feet) | N/S Departure: 4,688' FNL | | | N/S Departure: | | N/S Departure | | F __ L | |
| | E/W Departure: 360' FWL | | | E/W Departure: | | N/S Departure | | F __ L | |
| Lambert X-Y coordinates | X: 1,758,600.00' | | | X: | | X: | | F __ L | |
| | Y: 9,689,392.00' | | | Y: | | Y: | | F __ L | |
| Latitude/ Longitude | Latitude: 26° 42' 07.773" N | | | Latitude: | | Latitude | | F __ L | |
| | Longitude: 92° 38' 16.384" W | | | Longitude: | | Longitude | | F __ L | |
| Water Depth (Feet): 5,722' | | | | MD (Feet): | | TVD (Feet): | | MD (Feet): | |
| Anchor Radius (if applicable) in feet: N/A | | | | | | | | TVD (Feet): | |
| | | | | | | | | TVD (Feet): | |
| Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary) | | | | | | | | | |
| Anchor Name or No. | Area | Block | X Coordinate | | Y Coordinate | | Length of Anchor Chain on Seafloor | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |

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

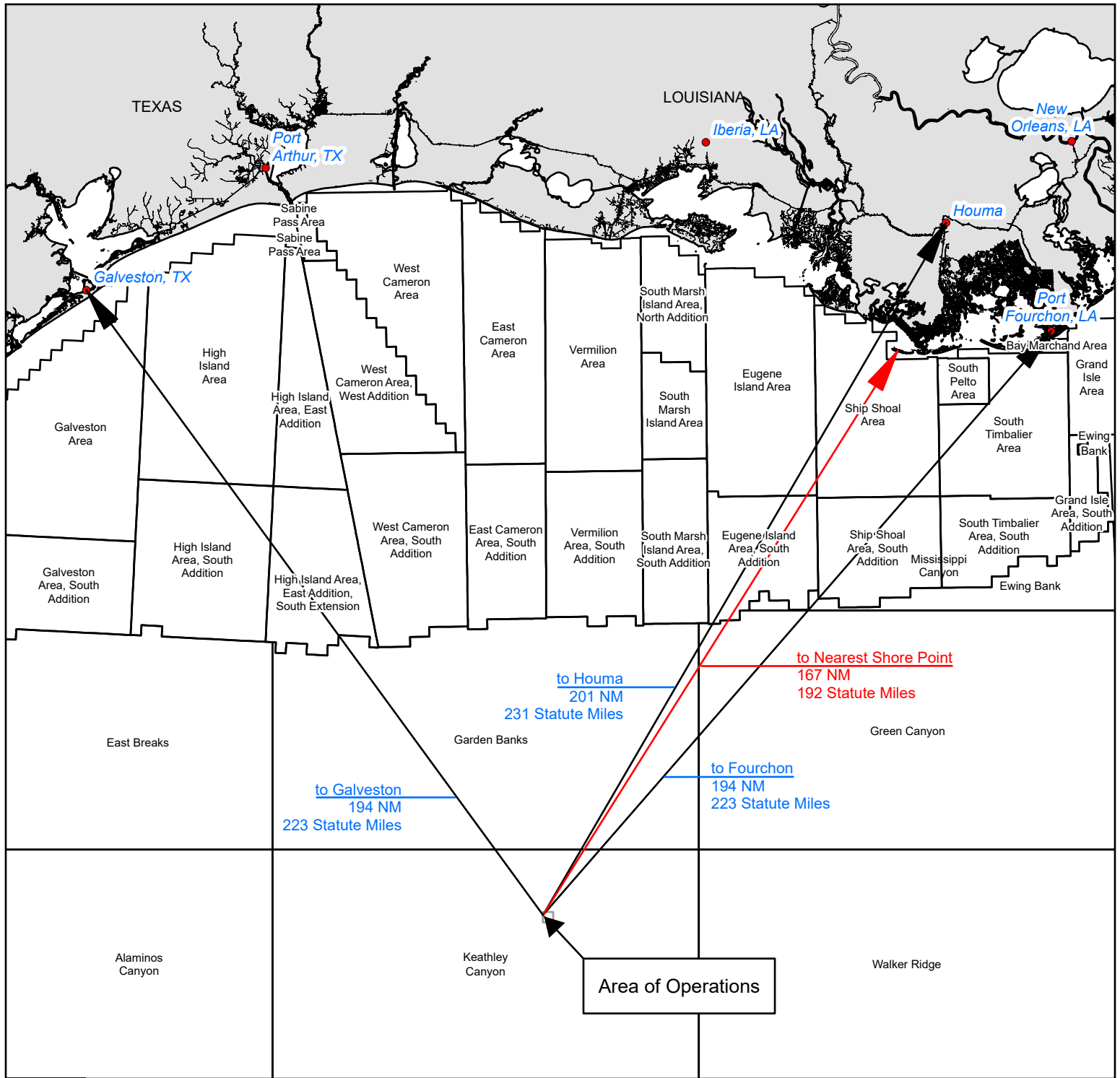
| Proposed Well/Structure Location | | | | | | | | | |
|--|--|-------|--------------|---|--|--|------------------------------------|-------------|----|
| Well or Structure Name/Number (If renaming well or structure, reference previous name): "A" ST01 | | | | Previously reviewed under an approved EP or DOCD? | | | Yes | X | No |
| Is this an existing well or structure? | | Yes | X | No | If this is an existing well or structure, list the Complex ID or API No. | | | | |
| Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities? | | | | | | X | Yes | | No |
| WCD Info | For wells, volume of uncontrolled blowout (Bbls/Day): 43,453 | | | For structures, volume of all storage and pipelines (Bbls): | | API Gravity of fluid | | 19.8° | |
| | Surface Location | | | Bottom-Hole Location (For Wells) | | Completion (For multiple completions, enter separate lines) | | | |
| Lease No. | OCS-G 19545 | | | | | OCS OCS | | | |
| Area Name | Keathley Canyon | | | | | | | | |
| Block No. | 291 | | | | | | | | |
| Blockline Departures (in feet) | N/S Departure: 4,688.00' FNL | | | N/S Departure: | | N/S Departure | | F _ L | |
| | E/W Departure: 360.00' FWL | | | E/W Departure: | | N/S Departure | | F _ L | |
| Lambert X-Y coordinates | X: 1,758,600.00' | | | X:' | | X: | | F _ L | |
| | Y: 9,689,392.00' | | | Y: | | X: | | F _ L | |
| Latitude/ Longitude | Latitude: 26° 42' 07.773" N | | | Latitude: | | Latitude | | F _ L | |
| | Longitude: 92° 38' 16.384" W | | | Longitude: | | Latitude | | F _ L | |
| Water Depth (Feet): 5,722' | | | | MD (Feet): | | TVD (Feet): | | MD (Feet): | |
| Anchor Radius (if applicable) in feet: N/A | | | | | | | | MD (Feet): | |
| | | | | | | | | TVD (Feet): | |
| | | | | | | | | TVD (Feet): | |
| Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary) | | | | | | | | | |
| Anchor Name or No. | Area | Block | X Coordinate | | Y Coordinate | | Length of Anchor Chain on Seafloor | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | 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): "B" ST00 | | | | Previously reviewed under an approved EP or DOCD? | | | Yes | X | No |
| Is this an existing well or structure? | | Yes | X | No | If this is an existing well or structure, list the Complex ID or API No. | | | | |
| Do you plan to use a subsea BOP or a surface BOP on a floating facility to conduct your proposed activities? | | | | | | X | Yes | | No |
| WCD Info | For wells, volume of uncontrolled blowout (Bbls/Day): 43,453 | | | For structures, volume of all storage and pipelines (Bbls): | | API Gravity of fluid | | 19.8° | |
| | Surface Location | | | Bottom-Hole Location (For Wells) | | Completion (For multiple completions, enter separate lines) | | | |
| Lease No. | OCS-G 19545 | | | | | OCS OCS | | | |
| Area Name | Keathley Canyon | | | | | | | | |
| Block No. | 291 | | | | | | | | |
| Blockline Departures (in feet) | N/S Departure: 4,729.00' FNL | | | N/S Departure: | | N/S Departure | | F _ L | |
| | E/W Departure: 330.00' FWL | | | E/W Departure: | | N/S Departure | | F _ L | |
| Lambert X-Y coordinates | X: 1,758,570.00' | | | X: | | X: | | F _ L | |
| | Y: 9,689,351.00' | | | Y: | | X: | | F _ L | |
| Latitude/ Longitude | Latitude: 26° 42' 07.367" N | | | Latitude: | | Latitude | | F _ L | |
| | Longitude: 92° 38' 16.716" W | | | Longitude: | | Latitude | | F _ L | |
| Water Depth (Feet): 5,723' | | | | MD (Feet): | | TVD (Feet): | | MD (Feet): | |
| Anchor Radius (if applicable) in feet: N/A | | | | | | | | MD (Feet): | |
| | | | | | | | | TVD (Feet): | |
| | | | | | | | | TVD (Feet): | |
| Anchor Locations for Drilling Rig or Construction Barge (If anchor radius supplied above, not necessary) | | | | | | | | | |
| Anchor Name or No. | Area | Block | X Coordinate | | Y Coordinate | | Length of Anchor Chain on Seafloor | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |
| | | | X: | | Y: | | | | |

Appendix B: Location Plat, Bathymetry Plat, and Vicinity Map

| | | | |
|--|------------------------------|--|---------------------------|
| Title of Document: | Exploration Plan – West Bump | Document Number: | GMEXP-DR-PRM-600-00377020 |
| Authority: | Vashtie Bajnath | Revision | B01 |
| Custodian/Owner: | Betsy Cleland | Issue Date: | 04/28/2025 |
| Retention Code: | ADM3000 | Next Review Date (if applicable): | N/A |
| Security Classification: | | Page: | |
| Warning: Check DW Docs revision to ensure you are using the correct revision. | | | |




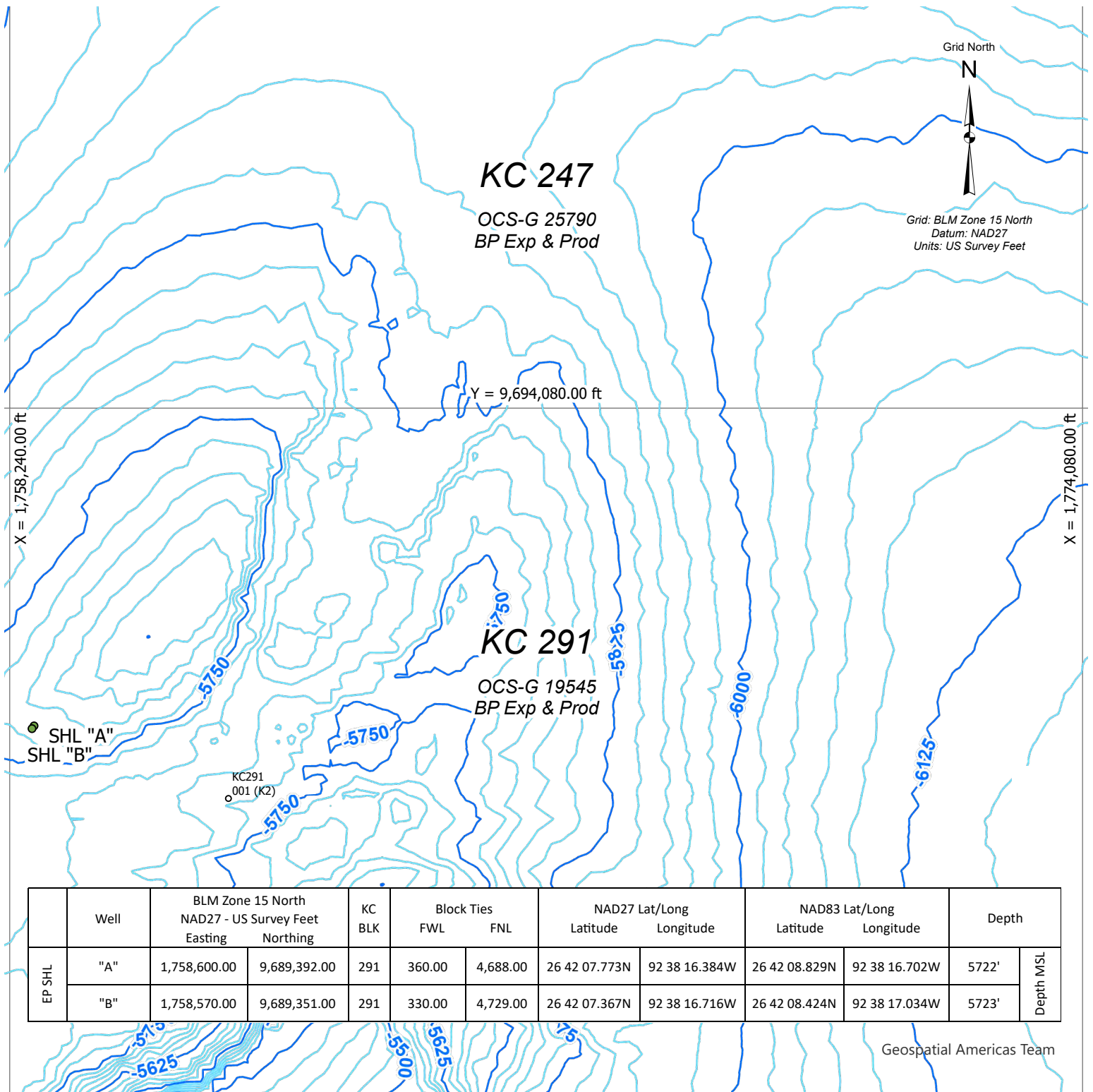
Note: SHL KC247-1 "A" and KC291-2 "A" used for distance calculations to the shoreline. The shoreline used is the NOAA 1:24K Continuously Updated Shoreline Product (CUSP).



Grid: BLM Zone 15 North
Datum: NAD27
Units: US Survey Feet

"Vicinity Chart"

| | | | |
|--|---|-------------------------|-----------------|
|  | BP EXPLORATION AND PRODUCTION | Scale 1" = 40 miles | |
| | <i>Proposed EP Locations OCS-G25790 KC247-1 "A", "B" & OCS-G19545 KC291-2 "A"</i> | | Date: 12/4/2024 |
| | <i>Keathley Canyon Area (OPD# NG15-05) Block 247 & 291</i> | <i>Offshore Federal</i> | |
| | <i>Plat prepared by: Ian Dootson (BP Solutions)</i> | | ID |




| EP SHL | Well | BLM Zone 15 North NAD27 - US Survey Feet | | KC BLK | Block Ties | | NAD27 Lat/Long | | NAD83 Lat/Long | | Depth |
|--------|------|---|--------------|-----------|------------|----------|----------------|---------------|----------------|---------------|-------|
| | | Easting | Northing | | FWL | FNL | Latitude | Longitude | Latitude | Longitude | |
| | "A" | 1,758,600.00 | 9,689,392.00 | 291 | 360.00 | 4,688.00 | 26 42 07.773N | 92 38 16.384W | 26 42 08.829N | 92 38 16.702W | 5722' |
| | "B" | 1,758,570.00 | 9,689,351.00 | 291 | 330.00 | 4,729.00 | 26 42 07.367N | 92 38 16.716W | 26 42 08.424N | 92 38 17.034W | 5723' |

Geospatial Americas Team

Notes:

- 1) All spatial data based on BLM Zone 15 North, NAD27, US Survey Feet, unless otherwise noted;
- 2) All geodetic transformations based on NADCON version 2.0 or better software;
- 3) All well SHL and BHL data based upon BSEE data as of November 2024 and internal BP sources;
- 4) Bathymetry source is 2008 AUV survey at 25 ft intervals;

"Bathymetry"

| | | |
|--|---|-------------------------|
|  | BP EXPLORATION AND PRODUCTION | Scale 1" = 2000 ft |
| | <i>Proposed EP Locations OCS-G25790 KC247-1 "A", "B" & OCS-G19545 KC291-2 "A"</i> | Date: 12/5/2024 |
| | <i>Keathley Canyon Area (OPD# NG15-05) Block 247 & 291</i> | <i>Offshore Federal</i> |
| | <i>Plat prepared by: Ian Dootson (BP Solutions)</i> | ID |

Grid North



Grid: BLM Zone 15 North
Datum: NAD27
Units: US Survey Feet

KC 247

OCS-G 25790
BP Exp & Prod

Y = 9,694,080.00 ft

X = 1,758,240.00 ft

X = 1,774,080.00 ft

KC 291

OCS-G 19545
BP Exp & Prod

● SHL "A"
● SHL "B"

KC291
001 (K2)

| | Well | BLM Zone 15 North NAD27 - US Survey Feet | | KC BLK | Block Ties | | NAD27 Lat/Long | | NAD83 Lat/Long | | Depth | |
|--------|------|---|--------------|-----------|------------|----------|----------------|---------------|----------------|---------------|-------|-----------|
| | | Easting | Northing | | FWL | FNL | Latitude | Longitude | Latitude | Longitude | Depth | MSL |
| EP SHL | "A" | 1,758,600.00 | 9,689,392.00 | 291 | 360.00 | 4,688.00 | 26 42 07.773N | 92 38 16.384W | 26 42 08.829N | 92 38 16.702W | 5722' | Depth MSL |
| | "B" | 1,758,570.00 | 9,689,351.00 | 291 | 330.00 | 4,729.00 | 26 42 07.367N | 92 38 16.716W | 26 42 08.424N | 92 38 17.034W | 5723' | |

Notes:

- 1) All spatial data based on BLM Zone 15 North, NAD27, US Survey Feet, unless otherwise noted;
- 2) All geodetic transformations based on NADCON version 2.0 or better software;
- 3) All well SHL and BHL data based upon BSEE data as of November 2024 and internal BP sources;

"Public"



BP EXPLORATION AND PRODUCTION

Scale 1" = 2000 ft

Proposed EP Locations OCS-G25790 KC247-1 "A", "B" & OCS-G19545 KC291-2 "A"

Date: 12/3/2024

Keathley Canyon Area (OPD# NG15-05) Block 247 & 291

Offshore Federal

Plat prepared by: Ian Dootson (BP Solutions)

ID

Appendix C: Geological & Geophysical Information - Geological Description, Structure Contour Maps, Interpreted Seismic Lines, Geological Structure Cross-Section Maps, Shallow Hazards Assessments (Site Clearance Letters) for Well Locations, Stratigraphic Column, Time vs. Depth Information

| | | | |
|--|------------------------------|--|---------------------------|
| Title of Document: | Exploration Plan – West Bump | Document Number: | GMEXP-DR-PRM-600-00377020 |
| Authority: | Vashtie Bajnath | Revision | B01 |
| Custodian/Owner: | Betsy Cleland | Issue Date: | 04/28/2025 |
| Retention Code: | ADM3000 | Next Review Date (if applicable): | N/A |
| Security Classification: | | Page: | |
| Warning: Check DW Docs revision to ensure you are using the correct revision. | | | |



SITE CLEARANCE LETTER

PROPOSED WELL LOCATIONS KC 291 "A" AND KC 291 "B" BLOCK 291, OCS-G-19545 KEATHLEY CANYON AREA

| PROPOSED SURFACE LOCATION - KC 291 "A" | |
|--|--------------------|
| 92° 38' 16.383" W | 26° 42' 07.773" N |
| X = 1,758,600 ft E | Y = 9,689,392 ft N |
| 4640 ft FNL | 332 ft FWL |
| Water Depth: | 5,722 ft below MSL |

| PROPOSED SURFACE LOCATION - KC 291 "B" | |
|--|--------------------|
| 92° 38' 16.716" W | 26° 42' 07.367" N |
| X = 1,758,570 ft E | Y = 9,689,351 ft N |
| 4681 ft FNL | 302 ft FWL |
| Water Depth: | 5,723 ft below MSL |

X and Y Coordinates in UTM 15N (US Survey ft)
Geodetic Datum: NAD 1927
Spheroid: Clarke 1866



PROPOSED WELL LOCATIONS KC 291 "A" AND "B"
BLOCK 291, OCS-G-19545
KEATHLEY CANYON AREA, GULF OF MEXICO, USA

Introduction. This wellsite clearance letter addresses the shallow hazards for proposed wellsites KC 291 "A" and KC 291 "B" in Block 291, Keathley Canyon, Gulf of Mexico (OCS-G-19545). This letter is intended to address specific seafloor and shallow geologic conditions within 2,000ft of the proposed wellsite from the seafloor (5,722 ft Total Vertical Depth Sub-Sea; TVDSS) to 4,978ft below seafloor based on 3D seismic, autonomous underwater vehicle (AUV) data, and limited offset well data.

The KC 291 "B" location is about 50ft to the southwest of the KC 291 "A" location and is not described separately in this letter as shallow geologic conditions are expected to be very similar. BP plans to drill the proposed well from a dynamically positioned vessel, therefore, an anchoring assessment is not required. The well is planned to be vertical in the riserless section.

This letter supplements the Exploration Plan (EP) and complies with Bureau of Ocean Energy Management (BOEM) guidelines provided in Notice to Lessees (NTL) 2022-G01, 2009-G40, 2008-G04 and 2005-G07 (BOEM 2022, 2009, 2008 and 2005). This letter is supported by a comprehensive regional shallow hazards study, based on 3D seismic and AUV site survey data by Geoscience Earth & Marine Services, Inc. (GEMS, 2024) and an Archaeological assessment by Fugro (Fugro, 2011). This letter is intended to supplement those reports with detailed site-specific interpretation conducted by BP at the proposed KC 291 "A" and "B" wellsites using 3D seismic data.

Attachments. Seafloor plates (1, 2, 3, 4 and 5) are centered on the proposed appraisal well KC 291 "A" and are displayed at a 1 inch = 1,000ft scale (1: 12,000). A 2,000ft radius circle around the proposed wellsite is also shown on the seafloor plates.

- AUV Seafloor Rendering
- AUV Water Depth and Seafloor Features
- AUV Seafloor Gradient
- AUV Multibeam Backscatter
- AUV Side Scan Sonar (SSS) Mosaic

The sub-surface plates (6, 7, 8, 9, 10, and 11) accompanying this letter were generated from the AUV data and 3D seismic volumes and are listed below.

- Sub-Surface Geologic Features Overlain on Top of Salt Depth
- Portion of AUV Subbottom Profiler Line BPUSAUV08KAS124
- 3D Seismic Power Spectrum
- Portion of 3D Seismic Inline 13776
- Portion of 3D Seismic Crossline 12595
- Top-hole Prognosis Chart, Proposed Wellsites KC 291 "A" and "B"

3D Seismic Parameters The 3D Seismic data used for this assessment is based on a Kirchhoff depth migration reprocessing of narrow azimuth towed streamer data acquired over the Kaskida area. The bandwidth of the data is approximately 13 - 67 Hz at 6dB (Plate 8). This frequency bandwidth corresponds to a limit of separability of about 38ft, assuming a representative frequency of 37Hz and an average velocity of 5,600 ft/sec in the shallow section.



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Proposed Wells KC 291 "A" and "B"

Autonomous Underwater Vehicle (AUV) Survey Data. The 2008 AUV survey was conducted for BP by Fugro in October, 2008. The survey data was acquired across all of Keathley Canyon (KC) Blocks 246, 247, 248, 290 ,291, 292, 335 and 336. The AUV survey acquired 200-kHz multibeam swath bathymetry, including backscatter (Plates 1 through 4), 120 kHz frequency side scan sonar achieving 200+% coverage over the study area (Plate 5), and sub-bottom profiler data (Plate 7). The AUV survey layout consisted of 73 primary lines running N-S and 16 tie lines running E-W. Line spacing was 200 m (656 ft) for the primary lines and tielines were spaced 900m (2,953 ft).

A 2024 AUV survey was acquired over the salt uplift area of the West Bump Prospect area. This data is not included in this assessment since the survey falls outside the vicinity of the proposed well location.

Offset Well Data. Relevant information from the KC244-1, KC291-1, KC292-1 and KC292-2, wells drilling history within the area was used to support the assessments made in this report.

Archaeological Resource Survey Requirement. An archaeological assessment was completed by Fugro in 2011 (Fugro, 2011) and reviewed by GEMS in 2024 (GEMS, 2024).

No evidence of shipwrecks or sites of archaeological significance were reported at or within 2,000 ft of the proposed well locations (Plates 1 and 5). Sonar contacts are interpreted to be modern debris or geologic.

SEAFLOOR CONDITIONS

Water Depth and Seafloor Gradient. The water depth at the proposed KC 291 "A" location is predicted to be 5,722ft MSL. The depth was derived from AUV Multibeam Bathymetry data (Plates 1 and 2). The local seafloor gradient is about 1.8 degrees to the southwest (Plate 3).

Seafloor Features. The seafloor is smooth at the proposed surface location (Plates 1, 2, 3 and 7), but is located on the northern edge of a northeast-southwest trending graben structure with several active and inactive normal faults, generally dipping to the southeast, that bound the proposed location (Plate 9). The closest synthetic faults are about 250ft from the proposed well and are interpreted to be buried. These buried faults display a surface expression of 10ft with approximately 25ft of sediment drape. Based on geochronology studies within the basin, these faults were last active approximately 17,000yrs ago. The proposed well bore does not penetrate any observable active seafloor fault within the planned conductor zone.

Based on AUV side scan sonar and backscatter data, and geotechnical data acquired in the area, the seafloor is comprised of soft marine clays. Soils are expected to become stiffer with depth to the depth of installation, but are not expected to pose any jetting constraints.

Man-Made Obstructions. The closest infrastructure to the proposed wellsite is the KC 291-1 well, over 3,000 ft to the east-southeast. The proposed KC 291 "A" well location does not lie within a Military Warning Area as defined by BOEM NTL 2014-G04 (BOEM, 2014). The proposed wellsite is not located within a known chemical or munitions dump site. Thus, hazardous wastes or unexploded ordnance are not expected, and nothing resembling such was detected on AUV data near the proposed well location.

Seafloor Debris. The nearest observed seafloor side scan sonar contact from the 2011 archaeological assessment is about 2,225ft to the southeast of the proposed wellsite and is classified as geologic, possible outcrop, so is not considered archaeologically significant. There is no debris within 2,000ft of the proposed wellsite.



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Site Clearance Letter
Proposed Wells KC 291 "A" and "B"

Slope Stability. There are no obvious examples of recent slope instability in the area. MTDs identified on the AUV SBP data are older buried features, dating to about 17,000yrs, that influence the gentle seafloor topography.

Potential High-Density Benthic Communities. There is no geophysical evidence of seafloor hardgrounds or active hydrocarbon seepage features that could potentially support high-density benthic communities within 2,000ft of the proposed location (Plates 1, 4 and 5). The closest potential hardground observed on the AUV data is about 2,225ft east of the proposed wellsite. This assessment is based primarily on the AUV multibeam bathymetry, backscatter, side-scan sonar and subbottom profiler data.

SUBSURFACE CONDITIONS

Stratigraphy. The stratigraphy of the top-hole section at the proposed KC 291 "A" location, as exhibited in AUV SBP and 3D seismic data, consists of approximately 2,812ft of deep-water sediments and about 2,100ft of salt between the seafloor and the depth limit of investigation (Plates 7, 9, 10, and 11). This interval is comprised of predominantly fine-grained, stacked sequences of laterally extensive clays and silts, with fine to coarse-grained mass transport deposits, interbedded sandy turbidities and sandy channel/turbidite deposits. The age of the sediments within the top-hole section is from recent to Pliocene.

The seafloor, seven primary horizons (Horizon 1-7) and the top of salt were mapped in the subsurface study area. These Horizons divide the supra-salt section into nine main units (Units 1 through 9). Of the horizons and units, it is interpreted that only Horizons 1 through 5 and Units 1-6 will be intersected by the proposed wellbore. Predicted depths and thicknesses associated with each of the intersected mapped horizons and sequences are displayed on the attached Top-hole Prognosis Chart for the proposed KC 291 "A" drilling location (Plate 11).

Plate 7 represents the closest N-S SBP line to the proposed location, which is about 234ft west of the proposed wells. The shallowest soils within Unit 1 are unresolvable on the 3D seismic data, but several sub-units were mapped on the AUV data (Plate 7) that correlate to the geotechnical soil data in the Kaskida basin area. Soils within Unit 1 are expected to comprise normally consolidated marine clays.

Shallow Gas. No high amplitude anomalies interpreted to represent shallow gas will be penetrated in the top-hole section by the proposed wellbore. The entire top-hole is assessed a ***Negligible*** potential for shallow gas. Several amplitude anomalies representing possible shallow gas in the top-hole section are scattered within 2,000 ft of the proposed wellbore and are illustrated on Plate 6. The closest amplitude anomaly indicative of shallow gas is an isolated anomaly located about 350 ft west within Unit 5. Larger anomalies are found over 1,000ft to the east in Unit 3 and to the north in Unit 4. Shallow gas bubbles were encountered in the offset well KC291-1 well while drilling through the equivalent Unit 3.

Shallow Oil. Shallow oil has been observed from cuttings while drilling the riserless section of offset wells. According to shallow hazards observation logs, the KC291-1 well observed oil droplets from cuttings at the wellhead while drilling ahead at about 1399ft BML. It is inferred that the oil observed at KC291-1 may not be stratigraphically bound but potentially migrated along the salt edge and through an extensive network of faults.

The supra salt sediments are much thicker at the proposed location than at KC291-1, and have a very different seismic character. For the purposes of this assessment, it is conservatively assessed as a ***Low*** potential for encountering oil, and if encountered, is interpreted to be



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Site Clearance Letter
Proposed Wells KC 291 "A" and "B"

within the lower section of Unit 6 (Plate 11). The remainder of the top-hole section of the proposed wells is ranked as ***Negligible*** potential for shallow oil.

Gas Hydrate. The potential for encountering massive gas hydrate accumulations that could result in wellbore instability is ranked as ***Negligible*** at the proposed wellbores. Bottom simulating reflectors (BSR) are observed in the area in the 3D seismic volume at various depths related to proximity to salt. While there is not an identifiable BSR at the proposed well location, the calculated depth to the base of gas hydrate stability (BGHS) is estimated to be about 1410ft BML.

Disseminated and fracture-filling gas hydrates, if present, may occur in fine-grained sediments above the base of BGHS. However, the potential for encountering massive subsurface gas hydrates is ranked as ***Negligible*** due primarily to the lack of coarse-grained sediments above the BGHS.

Shallow Water Flow (SWF). Slight SWF events have occurred at some offset wells in the general area. The shallow stratigraphy at the KC 291 "A" location consists of interbedded hemi-pelagic clays, turbidites, and rapidly deposited mass transport complexes interbedded with potentially sand-prone intervals. These rapidly deposited mass transport complexes could be locally over-pressured or have caused underlying sands to become over-pressured. In addition, the potentially sand-prone intervals at the proposed location may be connected to sands that extend down-dip to sand-prone intervals within deeper, thick basins. Pressures from the deeper sands may be translated up-dip to permeable intervals that may be present shallower BML at the proposed well location.

Potential permeable intervals within Units 4, lower part of Unit 5 and Unit 6 are assessed to have ***Low to Moderate*** potential for SWF (Plate 11). Unit 4 ties to intervals in offset wells that had a slight SWF event while drilling with seawater, and the lower portion of Unit 5 and Unit 6 may be connected to deeper channelized sands down-dip of the proposed wellbore. The remainder of the top-hole section in the proposed well is ranked as ***Negligible*** potential for SWF.

Fault Penetrations. Numerous faults are present near the proposed wellbore in the general area and were developed in response to episodes of salt activity (Plates 7 and 11). The major faults that the proposed wellbore will penetrate are at 6,132ft TVDSS and 8,400ft TVDSS. Faulting is unlikely to have any detrimental effect on drilling operations.

Closing. The proposed KC 291 "A" and "B" well locations appear to be generally favorable for drilling operations.

Prepared By:

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Reviewed By:

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BP America, Inc.

October, 2024



BP Western Hemisphere New Wells Solutions Team
Site Clearance Letter
Proposed Wells KC 291 "A" and "B"

REFERENCES:

Bureau of Ocean Energy Management, 2022, Notice to lessees and operators of federal oil and gas, and sulphur leases in the Gulf of Mexico outer continental shelf (OCS) region, shallow hazards program: U.S. Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico, NTL 2022-G01, Effective Date: October 1, 2022.

Bureau of Ocean Energy Management, 2015, Safety performance review – shallow waterflows can pose significant hazards to deepwater drilling , published on the BOEM Gulf of Mexico Region Homepage, <http://www.boem.gov/Oil-and-Gas-Energy-Program/Resource-Evaluation/Geological-and-Geophysical-Reviews/Reviews-Gulf-of-Mexico.aspx>

Bureau of Ocean Energy Management, 2014, "Notice to Lessees and Operators (NTL) of Federal Oil, Gas and Sulphur Leases in the Outer Continental Shelf (OCS), Gulf of Mexico OCS Region, Military Warning and Water Test Areas". United States Department of the Interior, Bureau of Ocean Energy Management, Gulf of Mexico OCS Region, NTL 2014-G04. Effective Date: June 1, 2014.

Bureau of Ocean Energy Management, Regulation, and Enforcement, 2011, Pre-Seabed Disturbance Survey Mitigation, Guidance for Compliance with Mitigation 3.20, Avoidance of Archaeological Resources, released by BOEMRE in March 2011.

Bureau of Ocean Energy Management, 2011, Notice to Lessees and Operators of Federal Oil and Gas Leases and Pipeline right-of-way holders on the Outer Continental Shelf, 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 OCS Region, NTL 2011-JOINT-G01. Effective Date: December 29, 2011.

Bureau of Ocean Energy Management, 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 OCS Region, NTL 2009-G40, Effective Date: January 27, 2010.

Bureau of Ocean Energy Management, 2005, Notice to lessees and operators of federal oil, gas and sulphur leases and pipeline right-of-way holders in the outer continental shelf, Gulf of Mexico OCS region, Archaeological resource surveys and reports: U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico, NTL 2005-G07, Effective Date: July 1, 2005.

Geoscience Earth & Marine Services, Inc (GEMS), 2024, "Integrated Shallow Hazards Assessment, Blocks 246-248, 290-292, and 335-336, Keathley Canyon Area, Gulf of Mexico", GEMS Project No. GHZ3282. Houston, Texas, USA.

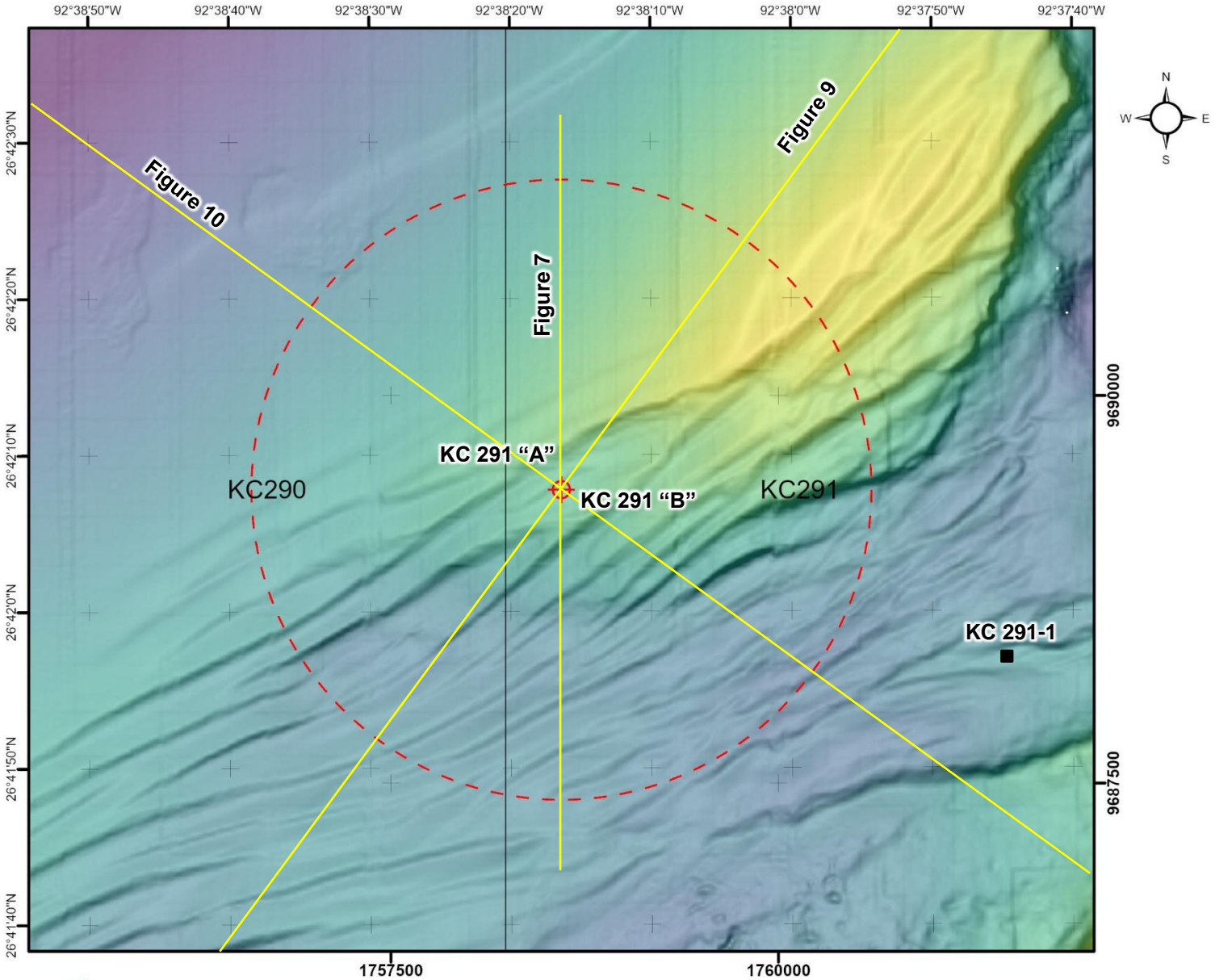
Fugro Geoservices, Inc (FGSI), 2011, "AUV Archaeological Assessment, Kaskida Prospect, Blocks 246-248, 290-292 & 335-336, Keathley Canyon Area Gulf of Mexico", FGSI Report No. 2411-1025



BP Western Hemisphere New Wells Solutions Team
Site Clearance Letter
Proposed Wells KC 291 "A" and "B"

ATTACHMENTS:

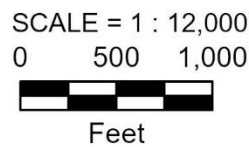
- Plate 1 AUV Seafloor Rendering, Kaskida West Bump Prospect, Block 291, Keathley Canyon Area, Proposed Wellsites KC 291 "A" and "B"
- Plate 2 AUV Water Depth and Seafloor Features, Kaskida West Bump Prospect, Block 291, Keathley Canyon Area, Proposed Wellsites KC 291 "A" and "B"
- Plate 3 AUV Seafloor Gradient, Kaskida West Bump Prospect, Block 291, Keathley Canyon Area, Proposed Wellsites KC 291 "A" and "B"
- Plate 4 AUV Multibeam Backscatter, Kaskida West Bump Prospect, Block 291, Keathley Canyon Area, Proposed Wellsites KC 291 "A" and "B"
- Plate 5 AUV Side Scan Sonar (SSS) Mosaic, Kaskida West Bump Prospect, Block 291, Keathley Canyon Area, Proposed Wellsites KC 291 "A" and "B"
- Plate 6 Sub-Surface Geologic Features Overlain on Top of Salt Depth, Kaskida West Bump Prospect, Block 291, Keathley Canyon Area, Proposed Wellsites KC 291 "A" and "B"
- Plate 7 Portion of AUV Subbottom Profiler Line BPUSAUV08KAS124, Kaskida West Bump Prospect, Block 291, Keathley Canyon Area, Proposed Wellsites KC 291 "A" and "B"
- Plate 8 3D Seismic Power Spectrum, Kaskida West Bump Prospect, Block 291, Keathley Canyon Area, Proposed Wellsites KC 291 "A" and "B"
- Plate 9 3D Seismic Section, Portion of Inline 13776, Kaskida West Bump Prospect, Block 291, Keathley Canyon Area, Proposed Wellsites KC 291 "A" and "B"
- Plate 10 3D Seismic Section, Portion of Crossline 12595, Kaskida West Bump Prospect, Block 291, Keathley Canyon Area, Proposed Wellsites KC 291 "A" and "B"
- Plate 11 Top-Hole Prognosis Chart, Kaskida West Bump Prospect, Block 291, Keathley Canyon Area, Proposed Wellsites KC 291 "A" and "B"



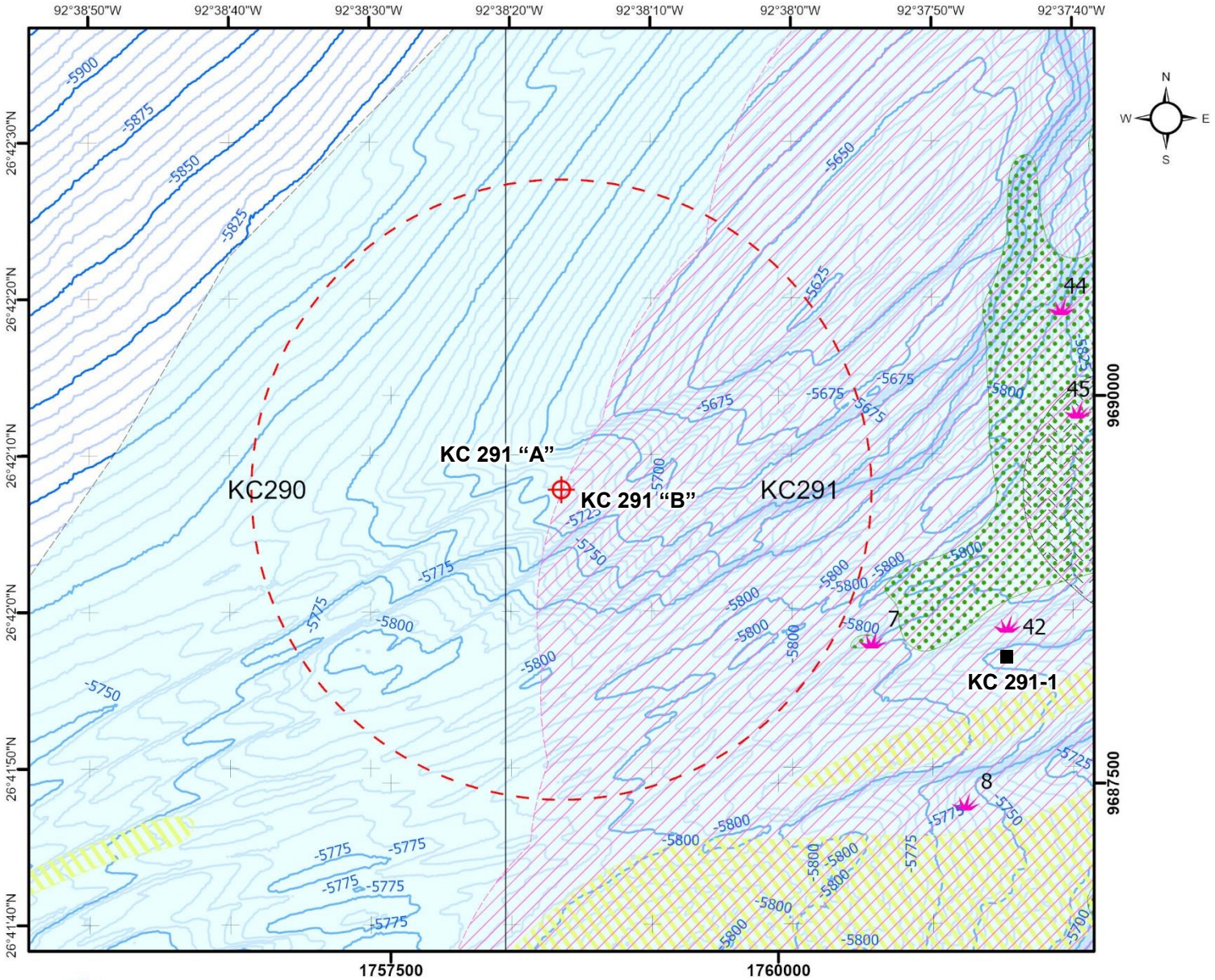
PROPOSED WELLSITE LOCATION AND DESIGNATION.
 A 2,000 FT RADIUS CIRCLE IS SHOWN AROUND THE WELL
 SURFACE LOCATION AS REQUIRED BY BOEM NTL 2009-G40

■ Existing Well

Water Depth (TVDSS; ft)



AUV SEAFLOOR RENDERING
KASKIDA WEST BUMP PROSPECT, BLOCK 291, KEATHLEY CANYON AREA
PROPOSED WELLSITES KC 291 "A" AND "B"



PROPOSED WELLSITE LOCATION AND DESIGNATION.
 A 2,000 FT RADIUS CIRCLE IS SHOWN AROUND THE WELL
 SURFACE LOCATION AS REQUIRED BY BOEM NTL 2009-G40

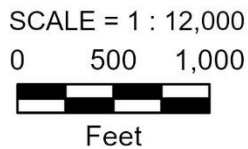
NAD 27 UTM Zone 15 N (US Survey feet)

Water Depth Contour

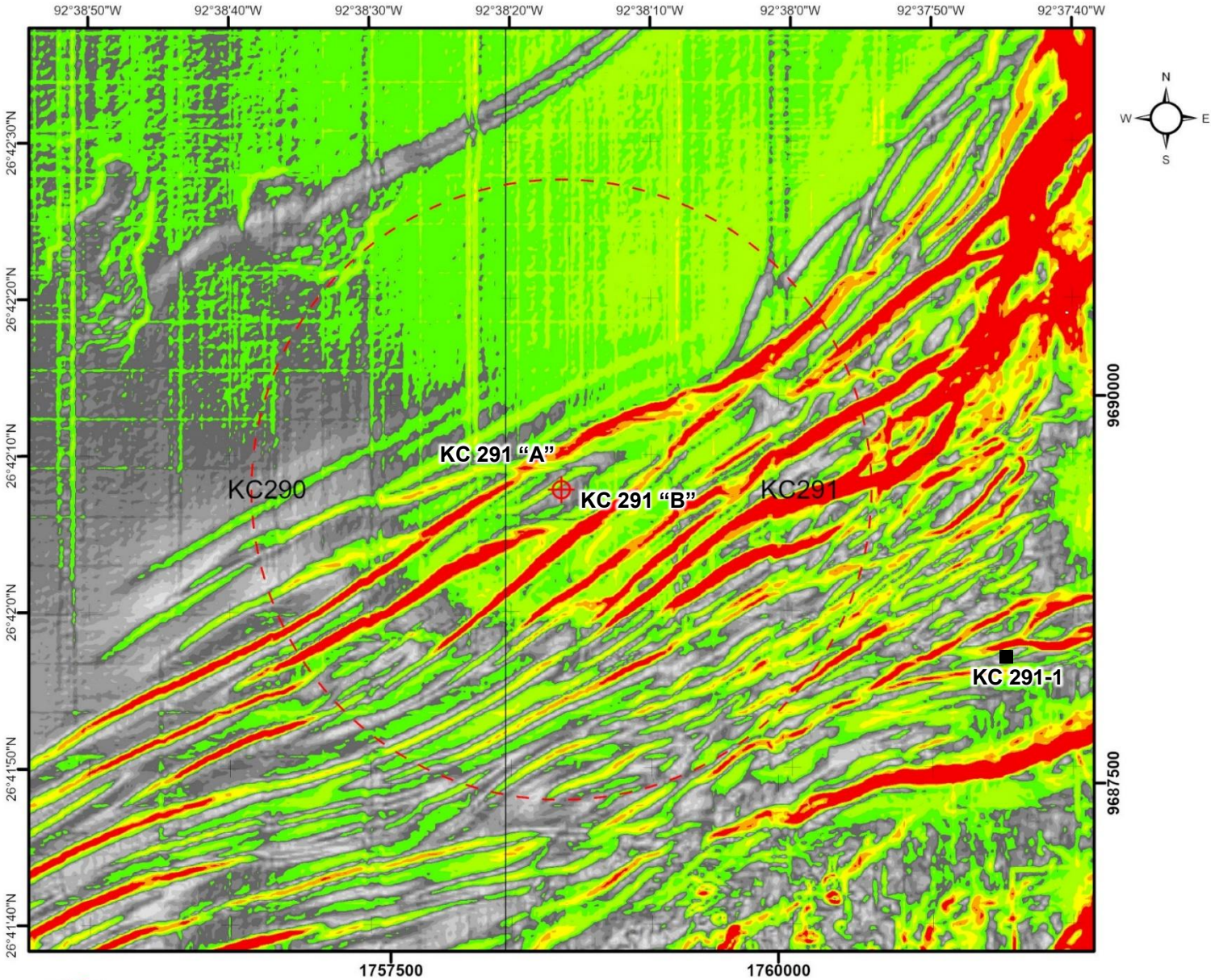
- Major CI = 25ft
- Minor CI = 5ft

Seabed Features

- Fault Zone
- Buried Mass Transport Deposits
- Seafloor Expulsion Mound
- High Backscatter potential high-density Benthic Communities
- 2000ft standoff distance from potential Benthic Communities
- Side Scan Sonar Contact
- Existing Well



AUV WATER DEPTH AND SEAFLOOR FEATURES
KASKIDA WEST BUMP PROSPECT, BLOCK 291, KEATHLEY CANYON AREA
PROPOSED WELLSITES KC 291 "A" AND "B"

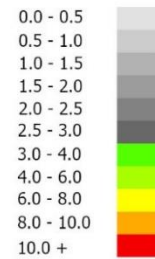


PROPOSED WELLSITE LOCATION AND DESIGNATION.
 A 2,000 FT RADIUS CIRCLE IS SHOWN AROUND THE WELL
 SURFACE LOCATION AS REQUIRED BY BOEM NTL 2009-G40

■ Existing Well

NAD 27 UTM Zone 15 N (US Survey feet)

Seafloor Slope
 (degrees)



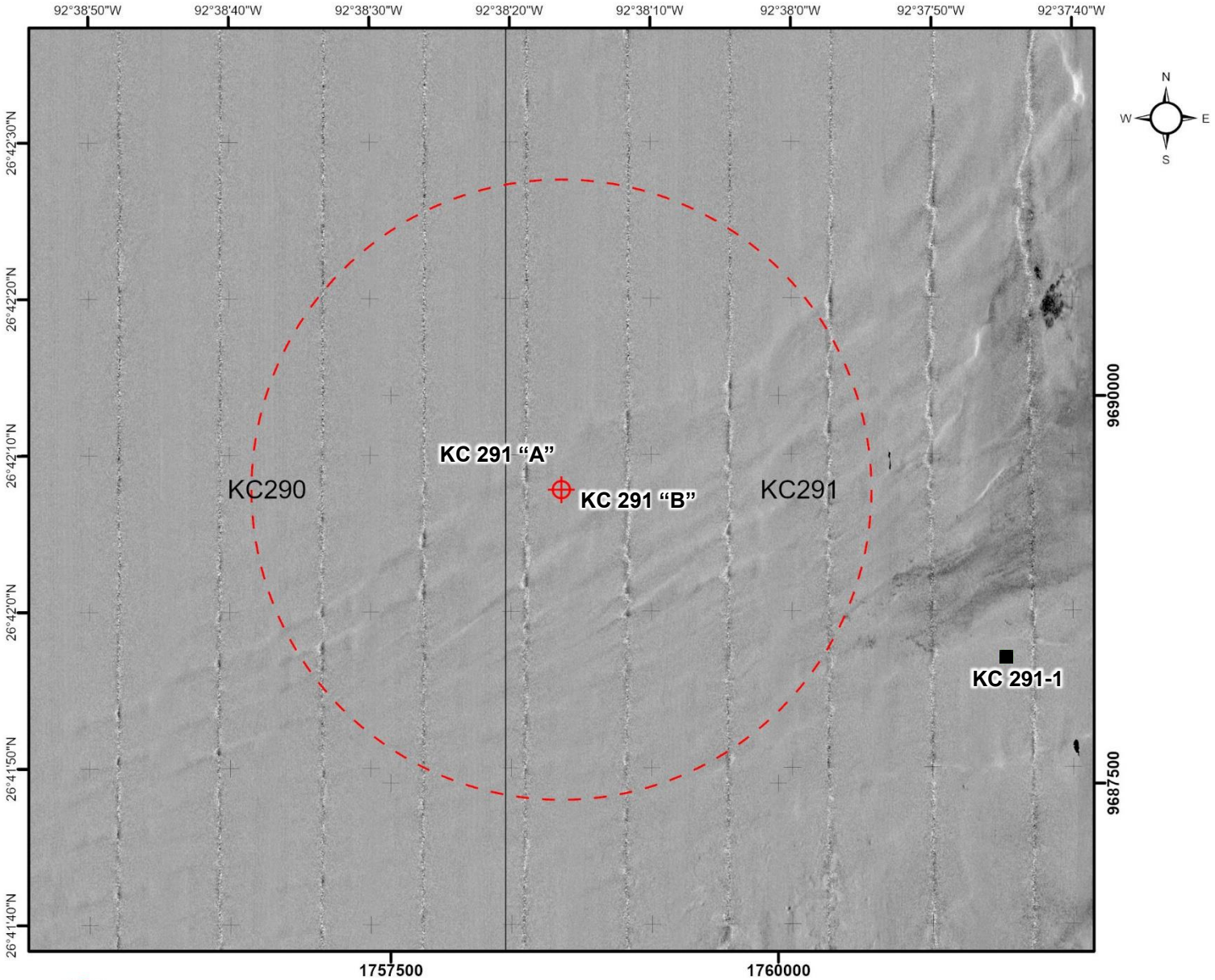
SCALE = 1 : 12,000

0 500 1,000



Feet

AUV SEAFLOOR GRADIENT
KASKIDA WEST BUMP PROSPECT, BLOCK 291, KEATHLEY CANYON AREA
PROPOSED WELLSITES KC 291 "A" AND "B"

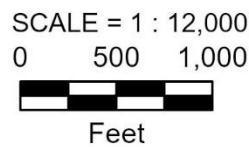


PROPOSED WELLSITE LOCATION AND DESIGNATION.
 A 2,000 FT RADIUS CIRCLE IS SHOWN AROUND THE WELL
 SURFACE LOCATION AS REQUIRED BY BOEM NTL 2009-G40

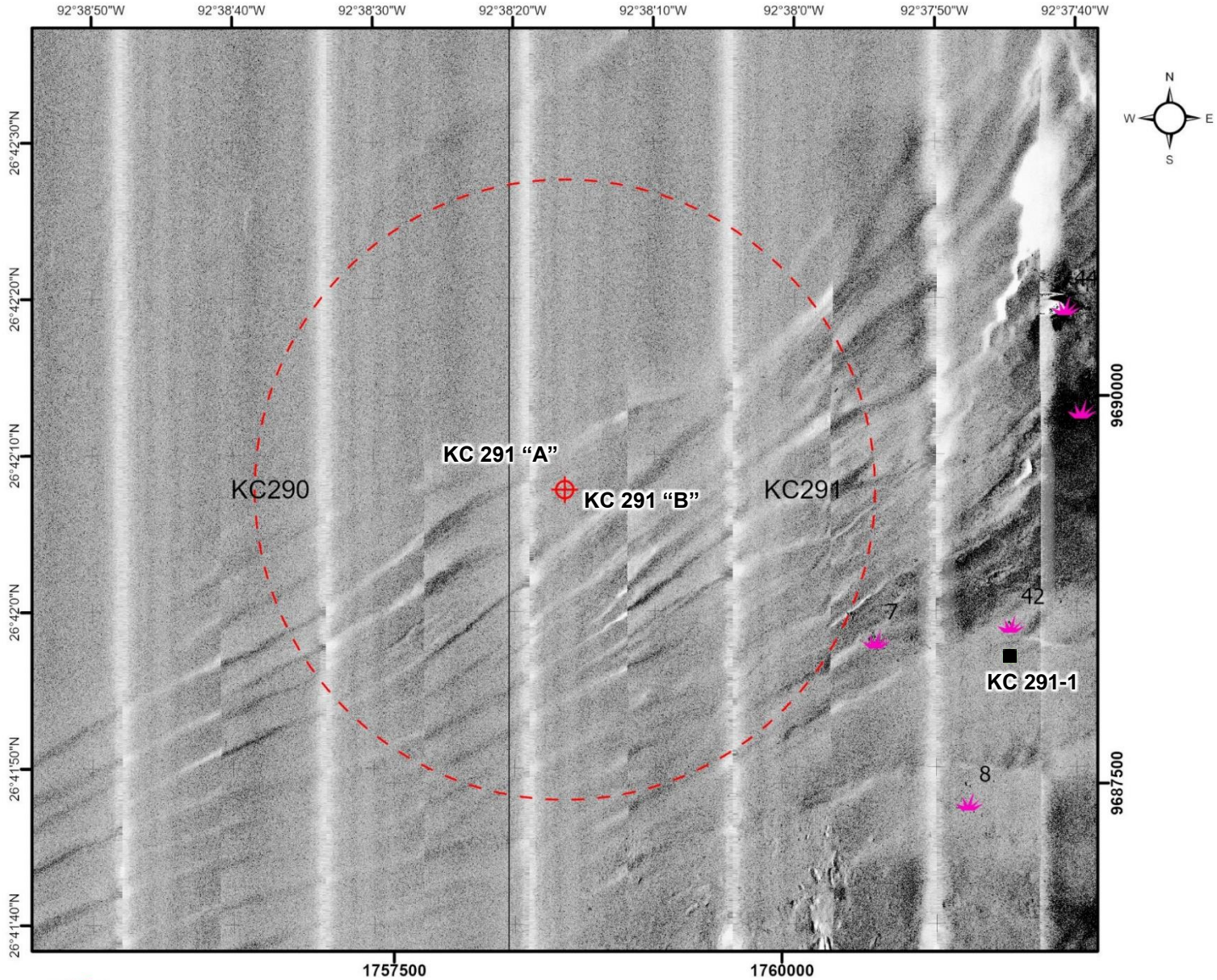
■ Existing Well

NAD 27 UTM Zone 15 N (US Survey feet)

Relative Seafloor
 Backscatter Intensity

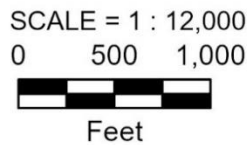


AUV MULTIBEAM BACKSCATTER
KASKIDA WEST BUMP PROSPECT, BLOCK 291, KEATHLEY CANYON AREA
PROPOSED WELLSITES KC 291 "A" AND "B"



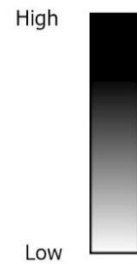
PROPOSED WELLSITE LOCATION AND DESIGNATION.
 A 2,000 FT RADIUS CIRCLE IS SHOWN AROUND THE WELL
 SURFACE LOCATION AS REQUIRED BY BOEM NTL 2009-G40

- Existing Well
- ✿ Side Scan Sonar Contact

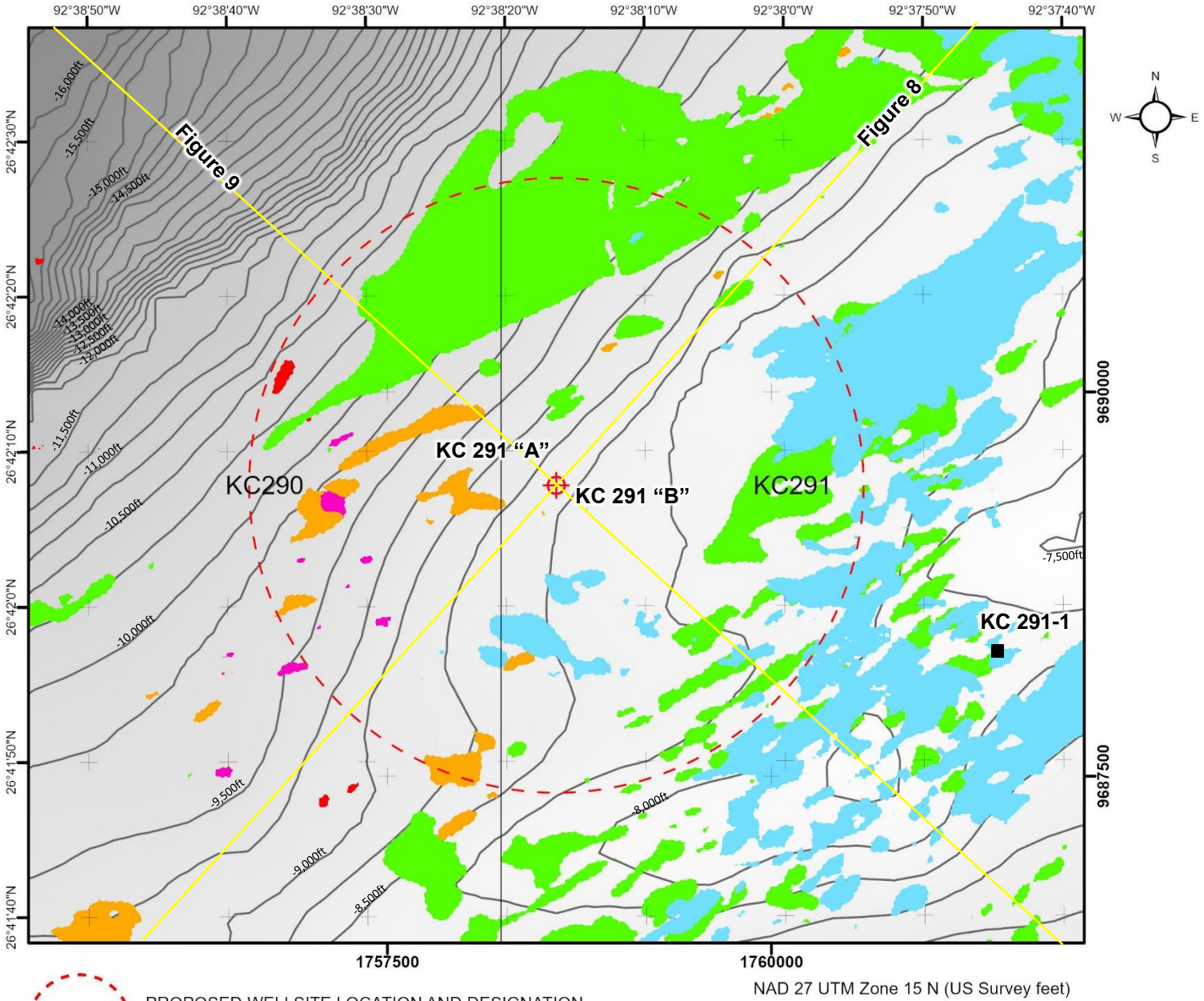


NAD 27 UTM Zone 15 N (US Survey feet)

Side Scan Sonar
 Reflectivity

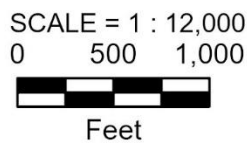


AUV SIDE SCAN SONAR (SSS) MOSAIC
KASKIDA WEST BUMP PROSPECT, BLOCK 291, KEATHLEY CANYON AREA
PROPOSED WELLSITES KC 291 "A" AND "B"

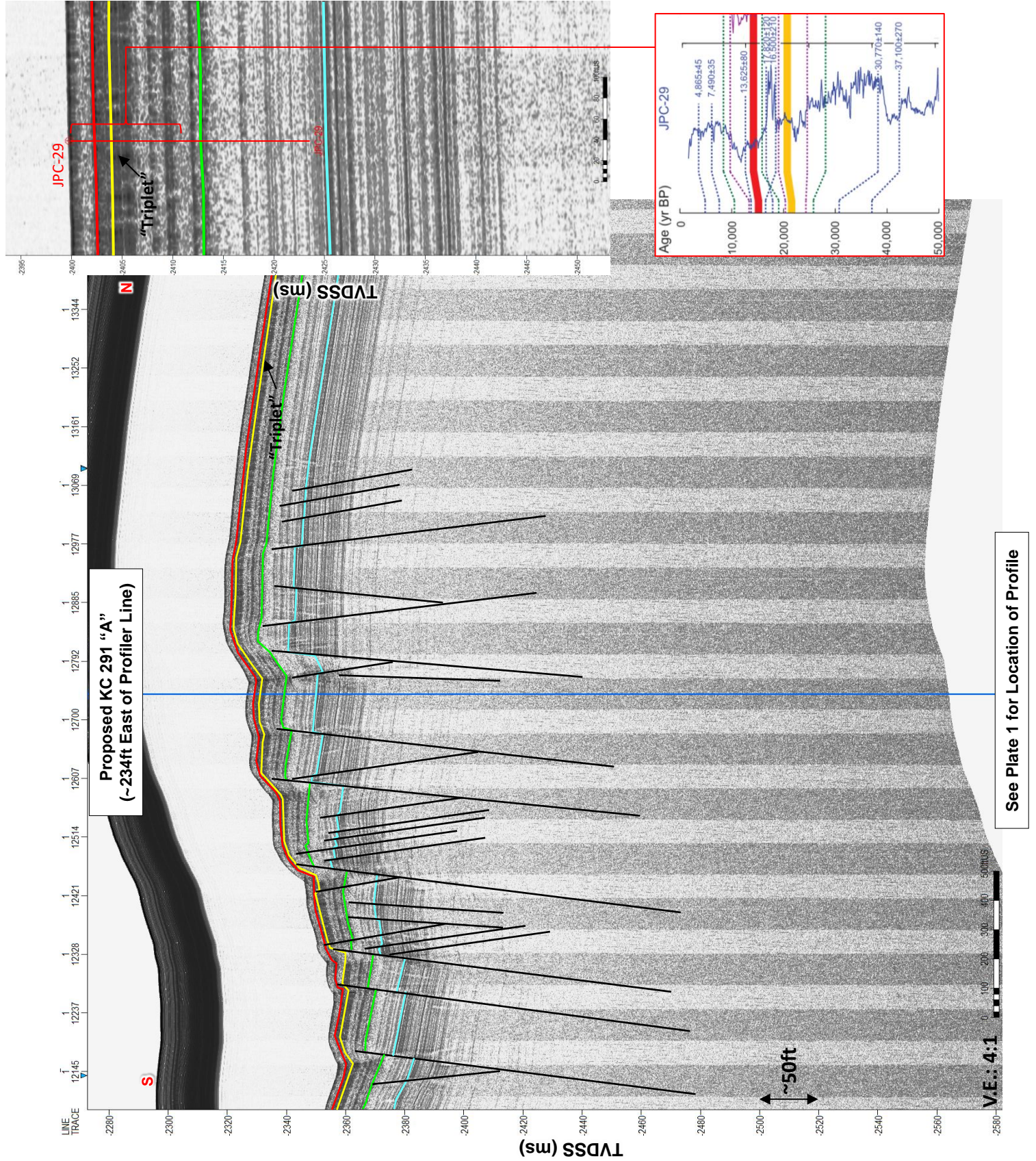


PROPOSED WELLSITE LOCATION AND DESIGNATION. A 2,000 FT RADIUS CIRCLE IS SHOWN AROUND THE WELL SURFACE LOCATION AS REQUIRED BY BOEM NTL 2009-G40

- | | | | |
|---|---|---|------------------------------------|
| Amplitude Anomalies between Horizons 1 and 2 (Unit 2) | Amplitude Anomalies between Horizons 3 and 4 (Unit 4) | Amplitude Anomalies between Horizons 5 and 6 (Unit 6) | Existing Well |
| Amplitude Anomalies between Horizons 2 and 3 (Unit 3) | Amplitude Anomalies between Horizons 4 and 5 (Unit 5) | Amplitude Anomalies between Horizons 6 and 7 (Unit 7) | Top of Salt Contour (-100ft TVDSS) |

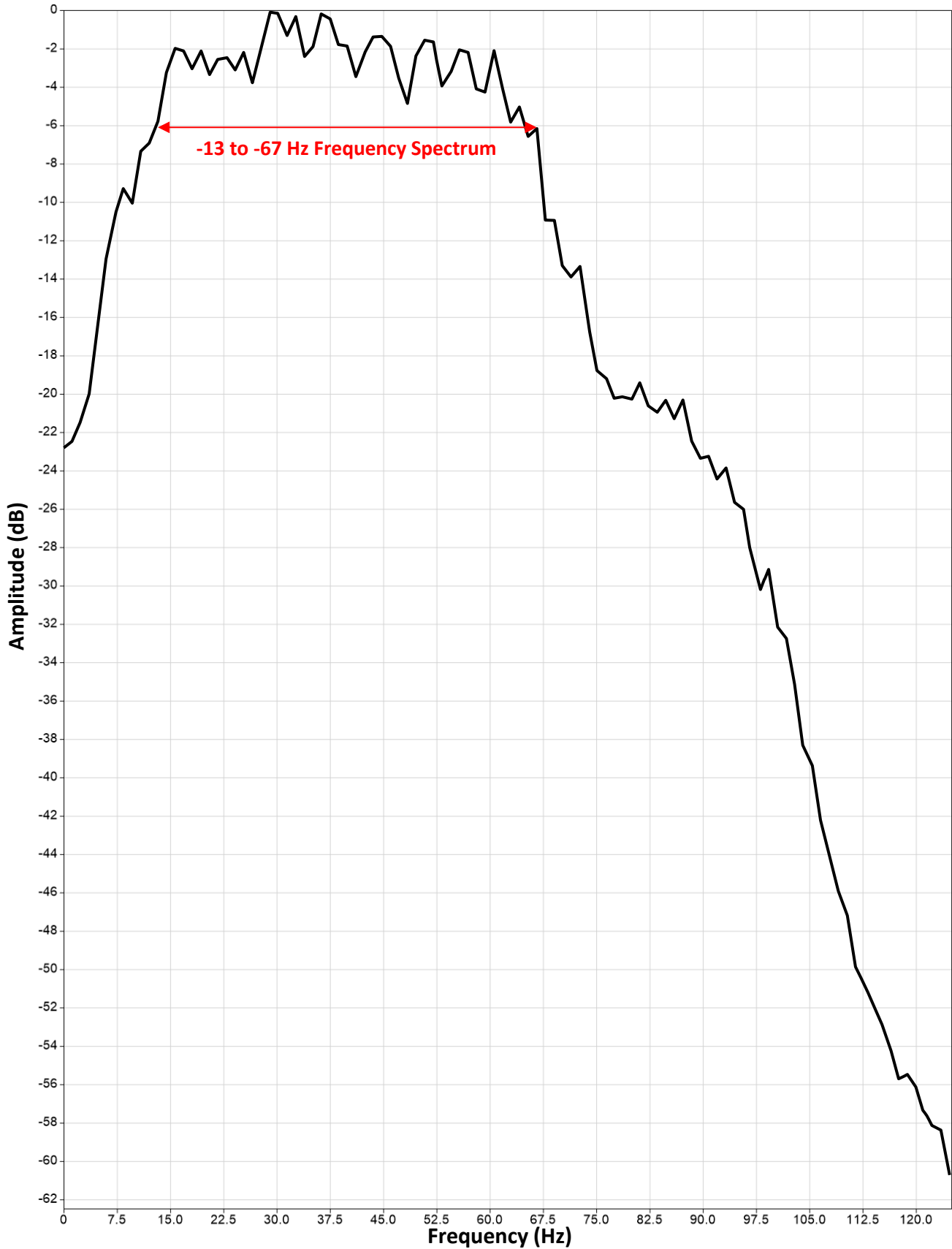


**SUB-SURFACE GEOLOGIC FEATURES OVERLAIN ON TOP OF SALT DEPTH
 KASKIDA WEST BUMP PROSPECT, BLOCK 291, KEATHLEY CANYON AREA
 PROPOSED WELLSITES KC 291 "A" AND "B"**

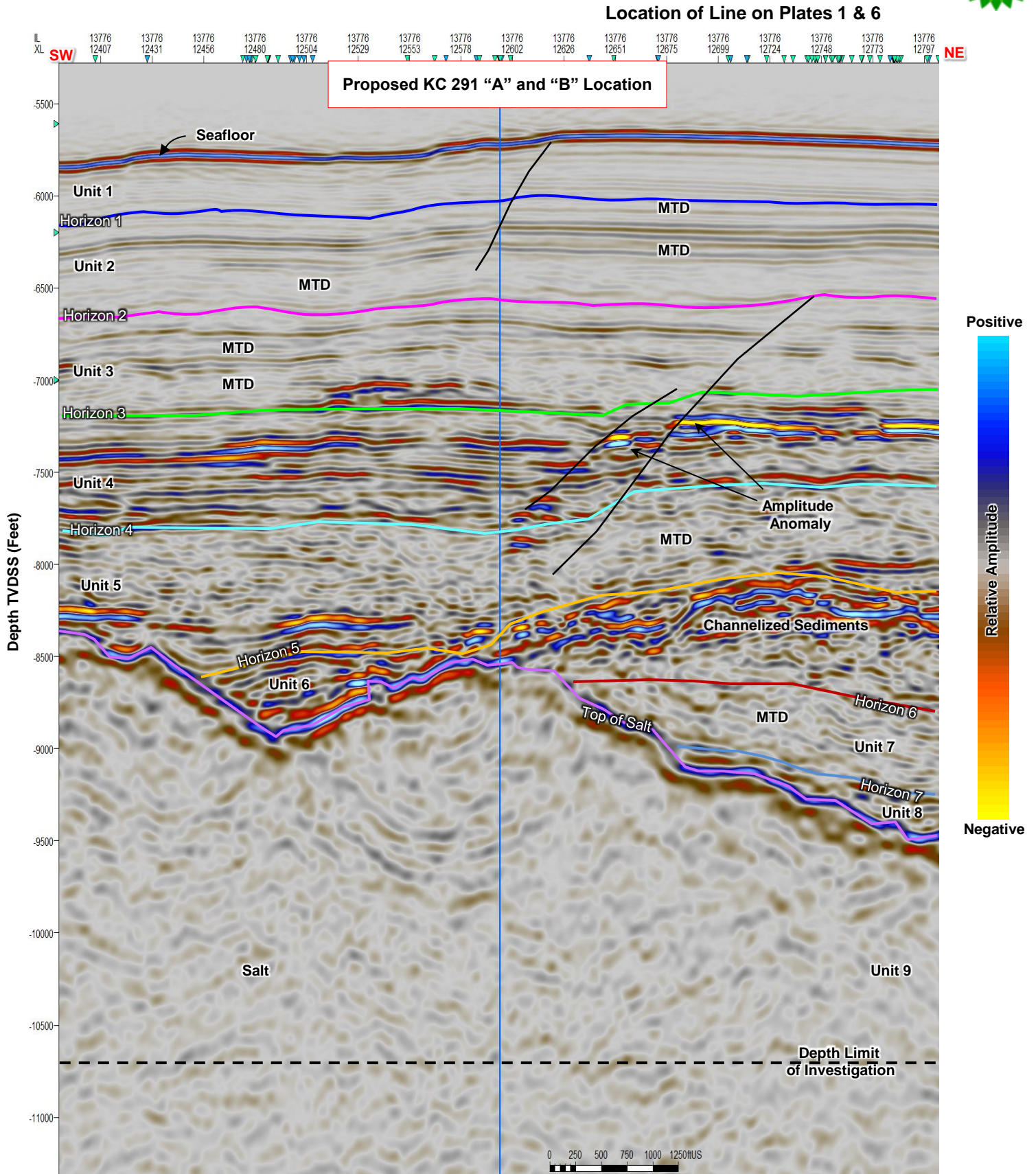


See Plate 1 for Location of Profile

**PORTION OF AUV SUBBOTTOM PROFILER LINE BPUSAUV08KAS124
 KASKIDA WEST BUMP PROSPECT, BLOCK 291, KEATHLEY CANYON AREA
 PROPOSED WELLSITES KC 291 "A" AND "B"**



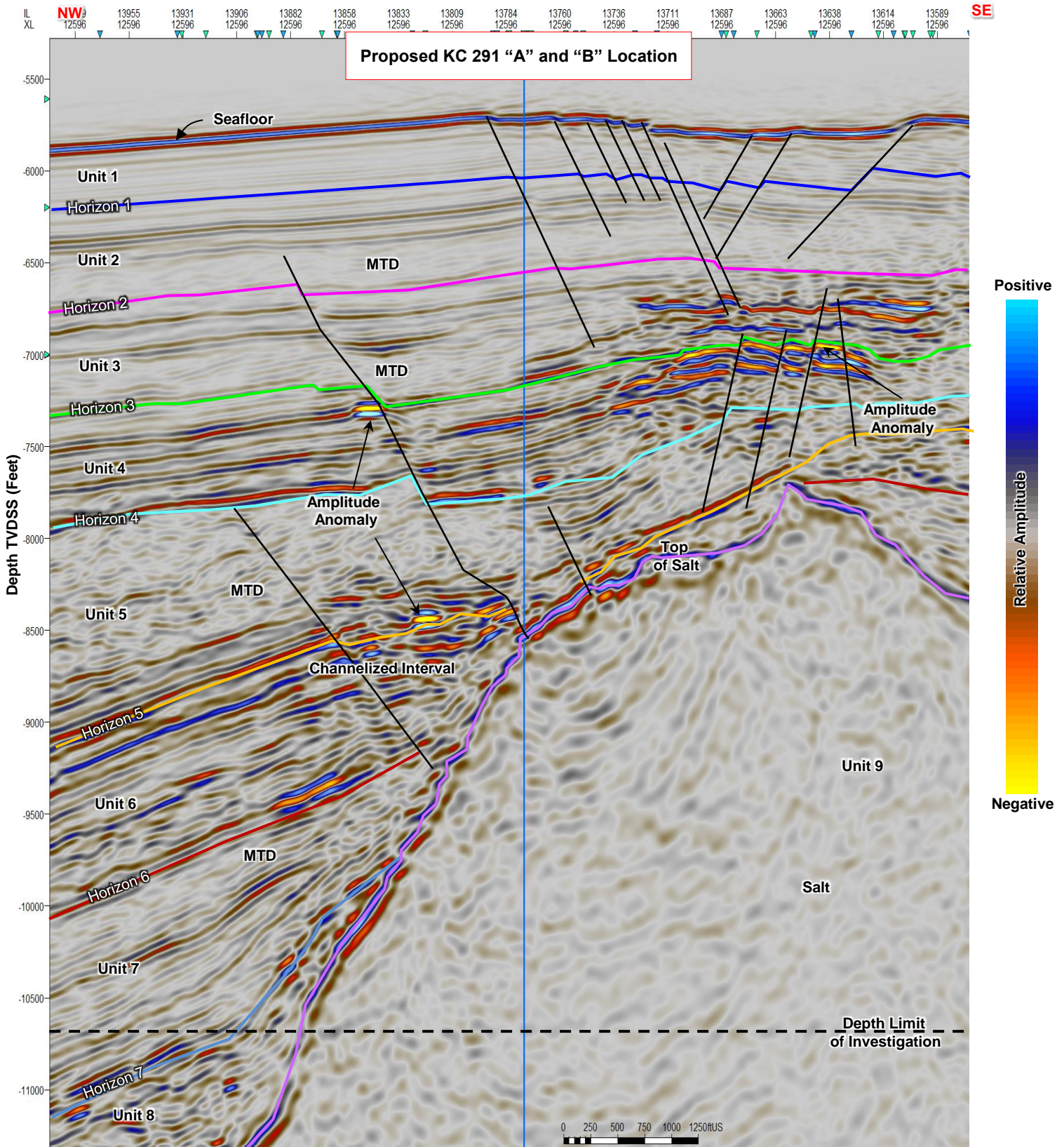
**3D SEISMIC POWER SPECTRUM
KASKIDA WEST BUMP PROSPECT, BLOCK 291, KEATHLEY CANYON AREA
PROPOSED WELLSITES KC 291 "A" AND "B"**



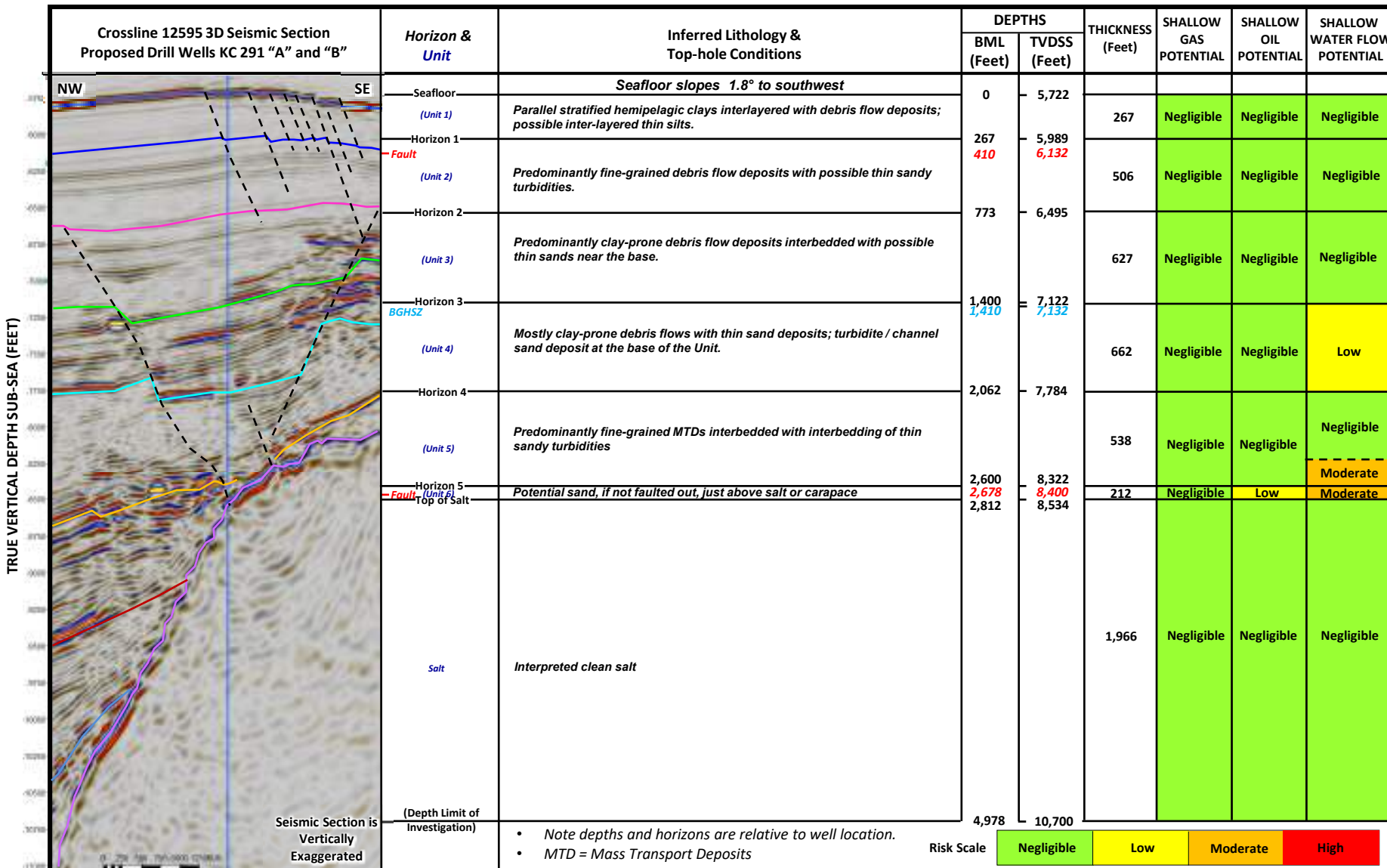
**3D SEISMIC SECTION, PORTION OF INLINE 13776
 KASKIDA WEST BUMP PROSPECT, BLOCK 291, KEATHLEY CANYON AREA
 PROPOSED WELLSITES KC 291 "A" AND "B"**



Location of Line on Plates 1 & 6



3D SEISMIC SECTION, PORTION OF CROSSLINE 12595
KASKIDA WEST BUMP PROSPECT, BLOCK 291, KEATHLEY CANYON AREA
PROPOSED WELLSITES KC 291 "A" AND "B"



Surface Locations at "A": X = 1,758,600 ft, Y = 9,689,392 ft;
 "B": X = 1,758,570 ft, Y = 9,689,351 ft;
 UTM Zone 15 N (US ft) Geodetic Datum: NAD 1927

BML = Below Mudline
 BGHSZ = Base of Gas Hydrate Stability Zone
 BSR = Bottom Simulating Reflector
 TVDSS = True Vertical Depth Subsea

**TOP-HOLE PROGNOSIS CHART,
 KASKIDA WEST BUMP PROSPECT, BLOCK 291, KEATHLEY CANYON AREA
 PROPOSED WELLS KC 291 "A" AND "B"**



Appendix D:Wastes and Discharges Tables (Projected Generated Wastes and Projected Ocean Discharges)

| | | | |
|--|------------------------------|--|---------------------------|
| Title of Document: | Exploration Plan – West Bump | Document Number: | GMEXP-DR-PRM-600-00377020 |
| Authority: | Vashtie Bajnath | Revision | B01 |
| Custodian/Owner: | Betsy Cleland | Issue Date: | 04/28/2025 |
| Retention Code: | ADM3000 | Next Review Date (if applicable): | N/A |
| Security Classification: | | Page: | |
| Warning: Check DW Docs revision to ensure you are using the correct revision. | | | |

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

| Well Name: West Bump | | Projected generated waste | Solid and Liquid Wastes transportation | Number of operational days: | 281 | Asset Name: | Invictus | |
|---|--|---|---|-----------------------------|---------------------------|--------------------------------------|----------|-----------------|
| Type of Waste | | | Composition | Transport Method | Name/Location of Facility | Quantity | Units | Disposal Method |
| Please specify whether the amount reported is a total or per well | | | | | | | | |
| Will drilling occur ? If yes, fill in the muds and cuttings. | | | | | | | | |
| Unused Synthetic-based drilling fluid | SBM from service - has not been downhole | Liquid mud storage on workboat | Baroid / MI Swaco Fouchon LA | 13500 | | For Reclamation & re-use | | |
| Synthetic-based drilling mud solids and barite | SBM and barite from pit cleanout | Barged in (15 or 25 barrel cutting boxes) | Ecoserv / R360 Fouchon, LA | 674.4 | bbls/well | Landfill/ Deepwell injection on land | | |
| Contaminated Synthetic base mud | SBM interface | Barged in (15 or 25 barrel cutting boxes) | Ecoserv / R360, Fouchon, LA | 4000 | bbls/well | Landfill/ Deepwell injection on land | | |
| Used Synthetic base mud - from downhole | SBM from downhole - sent in to vendor for reuse | Liquid mud storage on workboat | Baroid / MI Swaco Fouchon LA | 8000 | | For Reclamation & re-use | | |
| Drilling mud contaminated absorbents | Absorbent pads contaminated with drilling muds | Barged in (Omega 2 yard boxes) | Omega Waste Management, Patterson, LA | 15 | tons/well | Recycle | | |
| Excess barite | Excess barite from vessel tank cleaning | Barged in (supersacks) | River Birch Landfill, Avondale, LA | 5 | tons/well | Reuse / Landfill | | |
| Excess cement | Excess cement from vessel tank cleaning | Barged in (supersacks) | River Birch Landfill, Avondale, LA | 22.48 | tons/well | Reuse / Landfill | | |
| Rig Drilling washwater | Cleaning out of mud tanks | Barged in (15 or 25 barrel cutting boxes) | Ecoserv / R360, Fouchon LA | 4186.9 | bbls/well | Landfill/ Deepwell injection on land | | |
| Contaminated Completion Fluids | Used Completion fluids | Barged in (15 or 25 barrel cutting boxes) | Ecoserv / R360 Fouchon LA | NA | bbls/well | Landfill/ Deepwell injection on land | | |
| Completion Fluids | Used Completion fluids | Liquid storage tanks on workboat | Ecoserv / MI Swaco Fouchon LA | NA | bbls/well | Landfill/ Deepwell injection on land | | |
| Will you produce hydrocarbons? If yes fill in for produced sand. | | | | | | | | |
| Will you have additional wastes that are not permitted for discharge? If yes, fill in the appropriate rows. | | | | | | | | |
| Well Related Hazardous Waste | Rig lab titrations containing isopropanol alcohol, silver nitrate etc. | Barged in (5 gallon DOT containers) | Chemical Waste Management, Sulphur, LA | 0.1686 | ton/well | Incineration / Landfill | | |
| Rig Maintenance Wastes (painting, blasting) | Paint thinner, paint chips, blast media, aerosol cans | Barged in (drums or totes) | River Birch Landfill, Avondale, LA and Chemical Waste Management, Sulphur, LA | 84.3 | ton/well | Incineration / Landfill | | |
| Rig Maintenance Wastes (non hazardous) | Oily rags, pads, oil filters etc. | Barged in (totes) | Omega Waste Management, Patterson, LA | 39.34 | ton/well | Reuse / Landfill | | |
| Rig Used oil | Lube oil, hydraulic oil, glycol | Barged in (drums) | Omega Waste Management, Patterson, LA | 16.86 | bbls/well | Recycle | | |
| Domestic waste | Municipal trash | Barged in (supersacks) | River Birch Landfill, Avondale, LA | 7.025 | ton/well | Incineration / Landfill | | |
| Scrap Metal | scrap piping, grating and other metals | Barged in (scrap baskets) | Southern Scrap, Houma, LA | 64.63 | ton/well | Recycle | | |
| Universal Waste | Batteries | Barged in (DOT drums) | LEI, Hammond, LA | 1.124 | ton/well | Recycle | | |
| Universal Waste | Fluorescent light bulbs | Barged in (DOT drums) | LEI, Hammond, LA | 0.281 | ton/well | Recycle | | |
| Misc. unused chemical | Pills, spacers, additives etc. | Barged in (totes) | River Birch Landfill, Avondale, LA | 955.4 | bbls/well | Recycle | | |
| Oily water | Washwater rig equipment | Transported in (15 barrel cuttings boxes) | Omega Waste Management, Patterson, LA | 323.15 | bbls/well | Recycle | | |
| Recycled materials | Plastic, paper, aluminum | Barged in (supersacks) | RTG/Hoover Ferguson, Iberia, LA | 8.43 | ton/well | Recycle | | |

Appendix E: Air Emissions Information – Form BOEM-0138

| | | | |
|--|------------------------------|--|---------------------------|
| Title of Document: | Exploration Plan – West Bump | Document Number: | GMEXP-DR-PRM-600-00377020 |
| Authority: | Vashtie Bajnath | Revision | B01 |
| Custodian/Owner: | Betsy Cleland | Issue Date: | 04/28/2025 |
| Retention Code: | ADM3000 | Next Review Date (if applicable): | N/A |
| Security Classification: | | Page: | |
| Warning: Check DW Docs revision to ensure you are using the correct revision. | | | |

EP - AIR QUALITY

OMB Control No. 1010-0151
OMB Approval Expires: 10/31/2027

| | |
|------------------------|---|
| COMPANY | BP Exploration & Production Inc. |
| AREA | Keathley Canyon |
| BLOCK | KC 247 & 291 |
| LEASE | OCS-G25790 & OCS-G19545 |
| FACILITY | Not Applicable |
| WELL | KC247 "A" and "B", KC291 "AST01" |
| COMPANY CONTACT | Amy Baber (Air Quality Review)/ Betsy Cleland (Plans) |
| TELEPHONE NO. | Amy Baber (832-338-6424) / Betsy Cleland (832-702-8084) |
| REMARKS | Drill one well & sidetrack, drill second well |

EP - AIR QUALITY

OMB Control No. 1010-0151
OMB Approval Expires: 10/31/2027

| Fuel Usage Conversion Factors | Natural Gas Turbines | | | Natural Gas Engines | | | Diesel Recip. Engine | | Diesel Turbines | | REF. | DATE |
|--|----------------------|--------|--------|---------------------|--------|--------|----------------------|----------|-----------------|--------|--|---------------|
| | 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 | | |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| Storage Tank | tons/yr/tank | | | | | | 4.300 | | | | 2014 Gulfwide Inventory; Avg emiss (upper bound of 95% CI) | 2017 |
| Fugitives | lbs/hr/component | | | | | | 0.0005 | | | | API Study | 12/93 |
| Glycol Dehydrator | tons/yr/dehydrator | | | | | | 19.240 | | | | 2011 Gulfwide Inventory; Avg emiss (upper bound of 95% CI) | 2014 |
| Cold Vent | tons/yr/vent | | | | | | 44.747 | | | | 2014 Gulfwide Inventory; Avg emiss (upper bound of 95% CI) | 2017 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |

| 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 | % |

EP - AIR QUALITY

OMB Control No. 1010-0161
OMB Approval Expires: 10/31/2027

| COMPANY | AREA | BLOCK | LEASE | FACILITY | WELL | CONTACT | PHONE | REMARKS | ESTIMATED TONS | | | | | | | | | | | | | | | | | | | |
|--|--|----------|-----------|----------|------|---------|-------|---------|----------------|--------|-----------|-----------|----------|-------------------------|------|-------|-------|----------|------|----------|----------|----------|--------|------|------------|-----|--|--|
| | | | | | | | | | EQUIPMENT ID | RATING | MAX. FUEL | ACT. FUEL | RUN TIME | MAXIMUM POUNDS PER HOUR | | | | | | | | | | | | | | |
| OPERATIONS | EQUIPMENT | | | | | | | | TSP | PM10 | PM2.5 | SOx | NOx | VOC | Pb | CO | NH3 | TSP | PM10 | PM2.5 | SOx | NOx | VOC | Pb | CO | NH3 | | |
| BP Exploration & Production Inc Koolhahey Canyon | 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 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DRILLING - Invictus Drillship (Substitution likely with similar drillship/DP Semi-submersibles of same or lower horsepower) | Average Daily Fuel Usage Maximum Daily Fuel Usage | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Main Engines: 6 x Himsen 14H32/40V, 9383 hp ea. | VESSELS - Drilling - Propulsion Engine - Diesel | 56298 | 2896.3069 | 69511.37 | 24 | 200 | 39.72 | 23.96 | 23.24 | 0.58 | 951.59 | 27.36 | 0.00 | 149.25 | 0.28 | 95.32 | 57.51 | 53.78 | 1.39 | 2283.81 | 65.66 | 0.01 | 358.21 | 0.67 | | | | |
| E-Gen: 1 x Caterpillar 3516B DITA, 2533 hp | Vessels - Drilling Prime Engine, Auxiliary | 2533 | 130.31272 | 3127.51 | 2 | 29 | 1.79 | 1.08 | 1.05 | 0.03 | 42.81 | 1.23 | 0.00 | 6.72 | 0.01 | 0.05 | 0.03 | 0.03 | 0.00 | 1.24 | 0.04 | 0.00 | 0.19 | 0.00 | | | | |
| Temporary Large/ Small Auxiliary Engines | Vessels - Drilling Prime Engine, Auxiliary | 2500 | 128.615 | 3086.76 | 24 | 200 | 1.76 | 1.06 | 1.03 | 0.03 | 42.26 | 1.21 | 0.00 | 6.63 | 0.01 | 4.23 | 2.55 | 2.48 | 0.06 | 101.42 | 2.92 | 0.00 | 15.91 | 0.03 | | | | |
| | BPD | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2025 | Facility Total Emissions | | | | | | 43.27 | 26.10 | 25.32 | 0.63 | 1,036.66 | 29.81 | 0.00 | 162.60 | 0.30 | 99.61 | 60.09 | 58.29 | 1.45 | 2,386.47 | 68.62 | 0.01 | 374.31 | 0.70 | | | | |
| EXEMPTION CALCULATION | DISTANCE FROM LAND IN MILES | | | | | | | | | | | | | | | | | 6.393.60 | | | 6.393.60 | 6.393.60 | | | 113,156.56 | | | |
| | 192.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DRILLING | VESSELS - Supply Diesel | 7200 | 370.4112 | 8889.87 | 24 | 200 | 5.08 | 3.06 | 2.97 | 0.07 | 121.70 | 3.50 | 0.00 | 19.09 | 0.04 | 12.19 | 7.35 | 7.13 | 0.18 | 292.08 | 8.40 | 0.00 | 45.81 | 0.09 | | | | |
| | VESSELS - Supply Diesel | 7200 | 370.4112 | 8889.87 | 24 | 100 | 5.08 | 3.06 | 2.97 | 0.07 | 121.70 | 3.50 | 0.00 | 19.09 | 0.04 | 6.10 | 3.68 | 3.57 | 0.09 | 146.04 | 4.20 | 0.00 | 22.91 | 0.04 | | | | |
| | VESSELS - Supply Diesel | 7200 | 370.4112 | 8889.87 | 24 | 100 | 5.08 | 3.06 | 2.97 | 0.07 | 121.70 | 3.50 | 0.00 | 19.09 | 0.04 | 6.10 | 3.68 | 3.57 | 0.09 | 146.04 | 4.20 | 0.00 | 22.91 | 0.04 | | | | |
| 2025 | Non-Facility Total Emissions | | | | | | 15.24 | 9.19 | 8.92 | 0.22 | 365.10 | 10.50 | 0.00 | 57.26 | 0.11 | 24.38 | 14.71 | 14.27 | 0.35 | 584.16 | 16.80 | 0.00 | 91.62 | 0.17 | | | | |

EP - AIR QUALITY

OMB Control No. 1010-0151
OMB Approval Expires: 10/31/2027

| COMPANY | AREA | BLOCK | LEASE | FACILITY | WELL | CONTACT | PHONE | REMARKS | | | | | | | | | | | | | | | | | |
|--|--|--------------|--------------|----------------|--------------------------|----------------------------------|----------------------------------|---|-------|-------|------|----------|-------|------|--------|------|----------------|--------|--------|----------|----------|--------|------|------------|------|
| BP Exploration & Production Inc. | Keathley Canyon | KC 247 & 291 | CCS-226700 & | Not Applicable | KC247 "A" and "B", KC291 | Amy Baber (Air Quality Review) B | Amy Baber (332-333-6424) / Baber | Drill one well & sidetrack, drill second well | | | | | | | | | | | | | | | | | |
| OPERATIONS | EQUIPMENT | EQUIPMENT ID | RATING | MAX. FUEL | ACT. FUEL | RUN TIME | MAXIMUM POUNDS PER HOUR | | | | | | | | | | ESTIMATED TONS | | | | | | | | |
| | Diesel Engines | | HP | GAL/HR | GAL/D | | TSP | PM10 | PM2.5 | SOx | NOx | VOC | Pb | CO | NH3 | TSP | PM10 | PM2.5 | SOx | NOx | VOC | Pb | CO | NH3 | |
| | Nat. Gas Engines | | HP | SCF/HR | SCF/D | | | | | | | | | | | | | | | | | | | | |
| | Burners | | MMBTU/HR | SCF/HR | SCF/D | HR/D | D/YR | | | | | | | | | | | | | | | | | | |
| DRILLING - Invictus Drillship (Substitution likely with similar drillship/DP Semi-submersibles of same or lower horsepower) | Average Daily Fuel Usage Maximum Daily Fuel Usage | | | | | | | | | | | | | | | | | | | | | | | | |
| Main Engines: 6 x Himsen 14H32/40V | VESSLS- Drilling - Propulsion Engine - Diesel | | 56298 | 2896.31 | 69511.37 | 24 | 365 | 39.72 | 23.96 | 23.24 | 0.58 | 95.159 | 27.36 | 0.00 | 149.25 | 0.28 | 173.96 | 104.95 | 101.81 | 2.53 | 4167.96 | 119.84 | 0.01 | 653.73 | 1.22 |
| E-Gen: 1 x Caterpillar 3516B DITA, 253 | Vessels - Drilling Prime Engine, Auxiliary | | 2533 | 130.31 | 3127.51 | 2 | 53 | 1.79 | 1.08 | 1.05 | 0.03 | 42.81 | 1.23 | 0.00 | 6.72 | 0.01 | 0.09 | 0.06 | 0.06 | 0.00 | 2.27 | 0.07 | 0.00 | 0.36 | 0.00 |
| Temporary Large/ Small Auxiliary Eng | Vessels - Drilling Prime Engine, Auxiliary | | 2500 | 128.62 | 3086.76 | 24 | 365 | 1.76 | 1.06 | 1.03 | 0.03 | 42.26 | 1.21 | 0.00 | 6.63 | 0.01 | 7.73 | 4.66 | 4.52 | 0.11 | 185.08 | 5.32 | 0.00 | 29.03 | 0.05 |
| | | | BPD | | | | | 43.27 | 26.10 | 25.32 | 0.63 | 1,036.66 | 29.81 | 0.00 | 162.60 | 0.30 | 181.78 | 109.67 | 106.38 | 2.65 | 4,355.31 | 125.22 | 0.01 | 683.12 | 1.27 |
| 2026 Facility Total Emissions | | | | | | | | | | | | | | | | | 6,393.60 | | | 6,393.60 | 6,393.60 | | | 113,156.56 | |
| EXEMPTION CALCULATION | DISTANCE FROM LAND IN MILES | | | | | | | | | | | | | | | | | | | | | | | | |
| | 192.0 | | | | | | | | | | | | | | | | 6,393.60 | | | 6,393.60 | 6,393.60 | | | 113,156.56 | |
| DRILLING | VESSLS - Supply Diesel | | 7200 | 370.4112 | 8889.87 | 24 | 365 | 5.08 | 3.06 | 2.97 | 0.07 | 121.70 | 3.50 | 0.00 | 19.09 | 0.04 | 22.25 | 13.42 | 13.02 | 0.32 | 533.04 | 15.33 | 0.00 | 83.61 | 0.16 |
| | VESSLS - Supply Diesel | | 7200 | 370.4112 | 8889.87 | 24 | 183 | 5.08 | 3.06 | 2.97 | 0.07 | 121.70 | 3.50 | 0.00 | 19.09 | 0.04 | 11.12 | 6.71 | 6.51 | 0.16 | 266.52 | 7.66 | 0.00 | 41.80 | 0.08 |
| | VESSLS - Supply Diesel | | 7200 | 370.4112 | 8889.87 | 24 | 183 | 5.08 | 3.06 | 2.97 | 0.07 | 121.70 | 3.50 | 0.00 | 19.09 | 0.04 | 11.12 | 6.71 | 6.51 | 0.16 | 266.52 | 7.66 | 0.00 | 41.80 | 0.08 |
| 2026 Non-Facility Total Emissions | | | | | | | | 15.24 | 9.19 | 8.92 | 0.22 | 365.10 | 10.50 | 0.00 | 57.26 | 0.11 | 44.50 | 26.85 | 26.04 | 0.65 | 1,066.09 | 30.65 | 0.00 | 167.21 | 0.31 |

EP - AIR QUALITY

OMB Control No. 1010-0151
 OMB Approval Expires: 10/31/2027

| COMPANY | AREA | BLOCK | LEASE | FACILITY | WELL | | | | |
|----------------------------------|----------------------------|--------------|-------------------------|----------------|----------------------------------|---------|------|-----------|------|
| BP Exploration & Production Inc. | Keathley Canyon | KC 247 & 291 | OCS-G25790 & OCS-G19545 | Not Applicable | KC247 "A" and "B", KC291 "AST01" | | | | |
| Year | Facility Emitted Substance | | | | | | | | |
| | TSP | PM10 | PM2.5 | SOx | NOx | VOC | Pb | CO | NH3 |
| 2025 | 99.61 | 60.09 | 58.29 | 1.45 | 2386.47 | 68.62 | 0.01 | 374.31 | 0.70 |
| 2026 | 181.78 | 109.67 | 106.38 | 2.65 | 4355.31 | 125.22 | 0.01 | 683.12 | 1.27 |
| Allowable | 6393.60 | | | 6393.60 | 6393.60 | 6393.60 | | 113156.56 | |

Appendix F: WCD Modeling Report - Proprietary Copy

| | | | |
|--|------------------------------|--|---------------------------|
| Title of Document: | Exploration Plan – West Bump | Document Number: | GMEXP-DR-PRM-600-00377020 |
| Authority: | Vashtie Bajnath | Revision | B01 |
| Custodian/Owner: | Betsy Cleland | Issue Date: | 04/28/2025 |
| Retention Code: | ADM3000 | Next Review Date (if applicable): | N/A |
| Security Classification: | | Page: | |
| Warning: Check DW Docs revision to ensure you are using the correct revision. | | | |

Appendix G: Oil Spill Response Discussion

| | | | |
|--|------------------------------|--|---------------------------|
| Title of Document: | Exploration Plan – West Bump | Document Number: | GMEXP-DR-PRM-600-00377020 |
| Authority: | Vashtie Bajnath | Revision | B01 |
| Custodian/Owner: | Betsy Cleland | Issue Date: | 04/28/2025 |
| Retention Code: | ADM3000 | Next Review Date (if applicable): | N/A |
| Security Classification: | | Page: | |
| Warning: Check DW Docs revision to ensure you are using the correct revision. | | | |

SPILL RESPONSE DISCUSSION

1) Worst Case Discharge Scenario

Under this Exploration Plan (EP) for the Kaskida West Bump prospect, BP Exploration & Production Inc. (BP) proposes to drill one well from Surface Location Keathley Canyon (KC) Block 291 to pilot hole TD in KC Block 247. The operations will include a plug back and sidetrack into KC Block 291 and then abandonment activities.

The Kaskida Field is classified as a high-pressure (HP) development, and not high-temperature (HT), in accordance with the HP/HT definitions specified in 30 CFR §250.105. In this regard, BP intends to pursue the HP technology development and qualification in accordance with the applicable sections of the 30 CFR Part 250 and BSEE Notice to Lessee (NTL) 2019-G02 and 2019-G03.

The uncontrolled blowout scenario is for a potential blowout of the Well Location ‘KC247-A’, which BP calculates has the highest liquid hydrocarbons rate potential in the Keathley Canyon (KC) 247 area. The blowout scenario assumes that the pipe has been tripped out of the hole when a problem with the wellhead connector develops, resulting in the removal of the BOP stack. Due to the loss of riser margin, the well flows unrestricted and worst case discharge (WCD) is approximately 43,453 stbopd, with the calculation support package for this rate attached in the Proprietary Information copy of the EP. The maximum duration of the blowout is estimated at 115 days. The rate profile associated with the well blowout over this 115-day period results in a potential worst case spill volume estimated at 4.7 mmstbo.

2) Facility Information:

- Type of Operation: Drilling
- Facility Name/Well Name: Kaskida West Bump / ‘KC247-A’
- Area and Block: Keathley Canyon Block 291
- Latitude: 26°42’07.773” N
- Longitude: 92°38’16.384” W
- Distance to Shore: 200 statute miles
- Water Depth: 5,722
- API Gravity: 19.8°

3) Worst Case Discharge Volume

| Description | Barrels of Oil |
|------------------------------|----------------|
| 24 hour uncontrolled blowout | 43,453 bbls |

Oil spill response-related activities for wells to be drilled under BP’s EP are governed by the BP Regional Oil Spill Response Plan (OSRP). The OSRP was filed on behalf of several BP companies, including BP Exploration & Production Inc. (Operator No. 02481) and approved by BSEE on January 10th, 2025. The BP OSRP should meet the requirements contained in 30 CFR Part 254. BP (Operator No. 02481) 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.” The OSRP details BP’s plan for response to manage oil spills that may result from drilling and production operations. BP has designed its response program based on a regional capability of response to spills ranging from small operations-related spills to a worst-case discharge (WCD) from a well blowout. BP’s spill response program is intended to meet the response planning requirements of the relevant coastal states and applicable federal oil spill planning regulations. It also includes information regarding BP’s Incident Management Team (IMT) and dedicated response assets, potential spill risks, and local environmentally sensitive areas. The OSRP describes personnel and equipment mobilization, the incident management team organization, and an overview of strategies, actions and notifications to be taken in the event of a spill.

BP will make every effort to respond to the Worst Case Discharge as effectively as practicable. A description of the response equipment to contain and recover the Worst Case Discharge is shown in **Figure 4**, which outlines contracted equipment, personnel, materials and support vessels as well as temporary storage equipment to respond to the Worst Case Discharge. The list estimates individual times needed for procurement, load out, travel time to the site, and deployment. **Figure 4** also indicates how operations would be supported.

Using the estimated chemical and physical characteristics of crude oil, an ADIOS weathering model was run on a similar product from the ADIOS oil database. The results indicate 24% or approximately 10,429 barrels of crude oil would be evaporated/dispersed within 24 hours, with approximately 33,024 barrels remaining.

| Natural Weathering Data: KC 291, Well KC247-A | Barrels of Oil |
|--|----------------|
| WCD Volume | 43,453 |
| <i>Less 24% natural evaporation/dispersion</i> | 10,429 |
| Remaining volume | 33,024 |

4) Land Segment and Resource Identification

In compliance with NTL 2012-N06, BP has determined the land areas that could be potentially impacted by a potential oil spill using the BOEM Oil Spill Risk Analysis Model (OSRAM) for the Central and Western Gulf of America available on the BOEM website. The results are shown in **Figure 1** below. The BOEM OSRAM identifies the highest probability of impact to the shorelines of Cameron Parish, Louisiana. **Figure 2** contains a list of environmental sensitivities, areas of socio-economic concern, and protection priorities. **Figure 3** contains a list of shoreline types found.

Cameron Parish includes the east side of Sabine Lake, Sabine National Wildlife Refuge, Calcasieu Lake, Lacassine National Wildlife Refuge (inland) and Grand Lake. Cameron Parish also includes the area along the coastline from Sabine Pass to Big Constance Lake in Rockefeller Wildlife Refuge. This region is composed of open public beaches, marshlands and swamps. It serves as a habitat for numerous birds, finfish and other animals, including several rare, threatened and endangered species.

FIGURE 1

Trajectory by Land Segment

Conditional probabilities of a spill in Keathley Canyon Block 291 (KC 291) contacting shoreline segments have been projected utilizing BP's WCD and information in the BOEM Oil Spill Risk Analysis Model (OSRAM) (Ji et al., 2004) for the Central and Western Gulf of America available on the BOEM website using 3, 10, and 30 day impact. The results are tabulated below.

| Location | Shoreline Segment | County/Parish, State | Conditional Probability ¹ (%) | | |
|--|-------------------|----------------------|--|--------|----------|
| | | | 3 Day | 10 Day | 30 day |
| KC 291, Well 'KC247-A' 200 statute miles OCS-G: G19545 Launch Area: W-26 | C01 | Cameron, TX | -- | -- | 1 |
| | C03 | Kenedy, TX | -- | -- | 1 |
| | C04 | Kleberg, TX | -- | -- | 1 |
| | C06 | Aransas, TX | -- | -- | 1 |
| | C07 | Calhoun, TX | -- | -- | 1 |
| | C08 | Matagorda, TX | -- | -- | 3 |
| | C09 | Brazoria, TX | -- | -- | 1 |
| | C10 | Galveston, TX | -- | -- | 2 |
| | C12 | Jefferson, TX | -- | -- | 2 |
| | C13 | Cameron, LA | -- | -- | 4 |
| | C14 | Vermilion, LA | -- | -- | 2 |
| | C15 | Iberia, LA | -- | -- | 1 |
| | C17 | Terrebonne, LA | -- | -- | 1 |

¹ Conditional probability refers to the probability of contact within the stated time period, assuming that a spill has occurred (-- indicates <0.5%).

FIGURE 2

Environmental Sensitivities – Cameron Parish, Louisiana

| Sensitive Areas | Descriptions | Access | Wildlife | Contact |
|--|---|--|--|--|
| 1) CAMERON AREA | On the Calcasieu River and Ship Channel 2.5 miles north of the GOA shoreline. Only route for marine life to enter and/or leave Calcasieu Lake and River Basin. | Take TX Hwy 82 south and then east from Port Arthur to Cameron. Also accessible by boat from the Calcasieu Ship Channel from the GOA. Oil company landings, USCOE facility and helicopter landing/fueling facilities. | RTE: Brown pelican Others: Waterfowl (winter), long-billed curlew, peregrine falcon, marbled godwit, spotted sea trout (breeding), shrimp and blue crab (fall-spring), drum, southern flounder, gulf menhaden (spring-summer) | N/A |
| 2) LOUISIANA GULF COAST AND JOHNSON'S BAYOU | GOA coastline from Louisiana Point (east of Sabine Pass) extending easterly to the west bank of Johnson's Bayou. Primarily composed of marshland and swamps. | Shoreline accessible by shallow draft vessels. Vehicle access is limited to 4-wheel drive vehicles via LA Hwy 82. | RTE: Bald eagle (winter), piping plover (spring-summer) Others: Songbirds (spring), shorebirds, gulls, ruddy duck and other waterfowl (winter), finfish | N/A |
| 3) LOUISIANA GULF COAST MUD LAKE TO WHITE LAKE INLAND TO GIWW | Shoreline on the GOA from Mud Lake to White Lake inland to the GIWW. | LA Hwy 82 parallels the coast about 5 miles from the beach. The beach is marshy salt grass and accessible only by marsh buggy, helicopter or airboat. | RTE: None known Others: Waterfowl (winter), snowy egret, olivaceous cormorant, peregrine falcon, roseate spoonbill, white and brown shrimp, blue crab, finfish | N/A |
| 4) ROCKEFELLER STATE WILDLIFE REFUGE | 76,000 acres of brackish to saltwater marshes, shallow lakes and bayous in southwest LA. This area borders the Gulf of America for 26.5 miles and extends inland toward the Grand Chenier ridge, a stranded beach ridge, six miles from the Gulf. Surveys indicate a wintering waterfowl population reaching 160,000. | There are few roads on the refuge. Major access is by small boat, marsh buggy or amphibious vehicle. The best location for a remote command post is at headquarters located on LA Hwy 82 approximately 10 miles east of Grand Chenier, LA. Equipment available: 1 amphibious dragline with 0.5 yard bucket, 1 marsh buggy, small boats, air boats and farm tractors. | RTE: American alligator Others: Egrets and herons (breeding), dabbling ducks (winter), Canada goose and white-fronted goose (winter), peregrine falcon, roseate spoonbill, eastern oyster, menhaden, redfish, flounder, speckled trout, white and brown shrimp and blue crabs (nursery), furbearers (breeding) | Rockefeller SWR 5476 Grand Chenier Hwy Grand Chenier, LA 70643 Phone: (337) 491-2593 |
| 5) SABINE WILDLIFE REFUGE | 125,000 acres of freshwater and brackish marshes interspersed with low prairie ridges. Calcasieu Lake transects the refuge on the east, and Sabine Lake adjoins it on the west. | By small boat, airboat, amphibious vehicle or marsh buggy. Launching facilities are at Johnson's Bayou landing for the southwest part of the refuge, at refuge headquarters for the west | RTE: Bald eagle, brown pelican, Kemp's ridley sea turtle Others: Canada goose, white-fronted goose and other | Sabine NWR <i>Physical Location:</i> 3000 Holly Beach Hwy Hackberry, LA 70645 Phone: (337) 762-3816 <i>Office Address:</i> 1428 Highway 27 |

| Sensitive Areas | Descriptions | Access | Wildlife | Contact |
|-----------------|--------------|---|--|--|
| | | side of Calcasieu Lake, and on the east side of the Cameron Ferry crossing for the east side of Calcasieu Lake. Remote command post could be set up at the refuge headquarters. Equipment available: 1 airboat, 4 outboard boats. | waterfowl (winter), peregrine falcon (winter), shrimp, sunfish, bass, spotted sea trout, southern flounder, blue catfish, red drum, alligator gar, small mammals, snakes | Bell City, LA 70630 Phone: (337) 598-2216 |

Areas of Socio-Economic Concern in Cameron Parish:

- Commercial fishing in Sabine Lake area
- Gas field in SNWR just north of Mud Lake
- Gulf States Utilities (GSU) water intake canal at the end of Old River Cove on the north end of Sabine Lake
- Heavy vessel traffic in Lake Charles
- Pleasure Island Marina
- Public beaches and recreational areas (Martin Beach, Gulfview Beach, Holly Peveto Beach, Rutherford Beach)
- Sabine Pass Battleground historical site

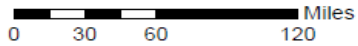
Protection Priorities for Cameron Parish:

- GSU intake canal
- Rockefeller Wildlife Refuge
- Sabine National Wildlife Refuge
- Other coastal marshlands

FIGURE 3

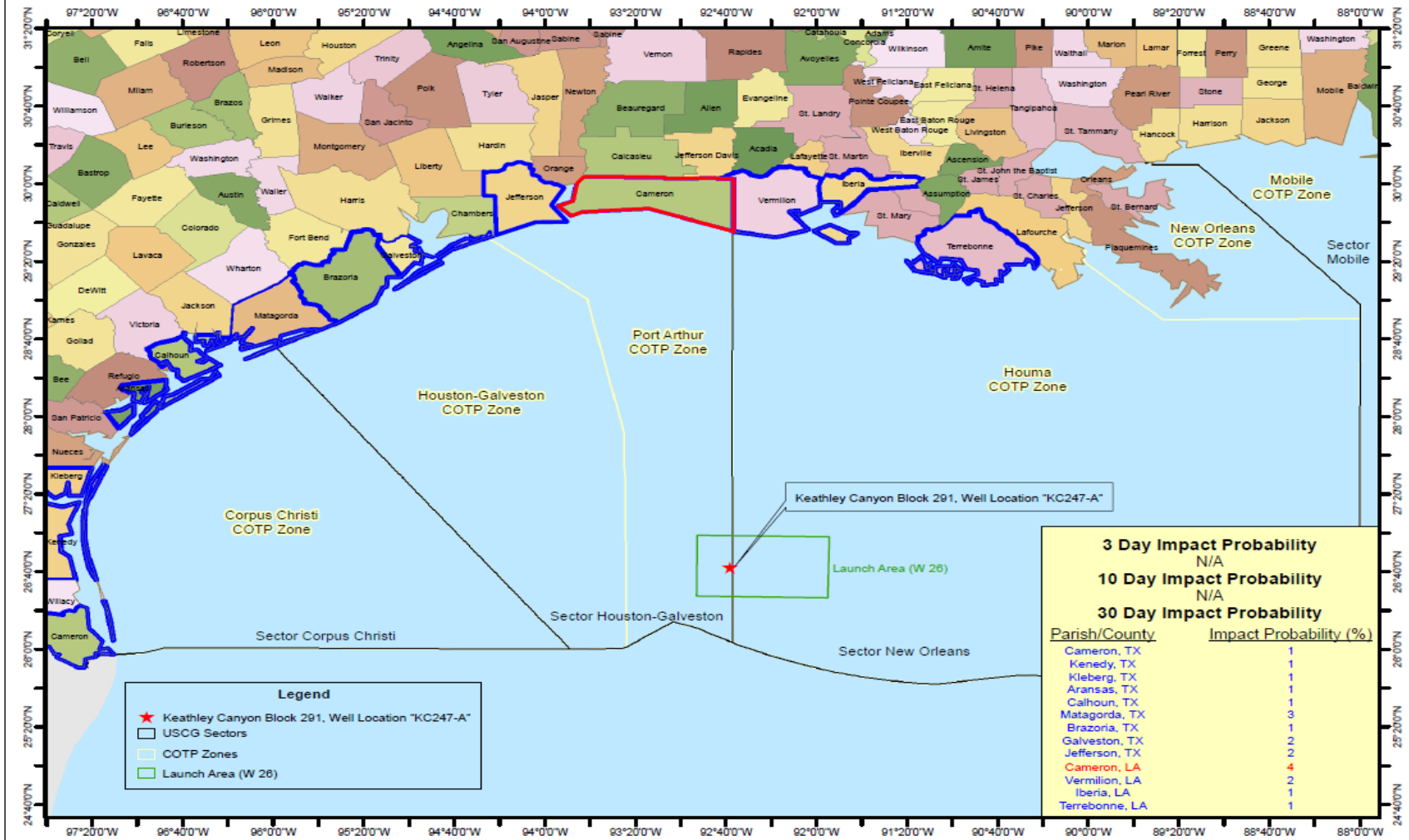
Cameron Parish– Shorelines

| Shoreline Type | Description |
|------------------------------|--|
| Fine Sand Beaches | Beaches with low slopes and a grain-size of 0.625 to 0.200 mm. Low percentage of shells and hash. Major fine sand beaches on the delta plain are found at Southwest Pass, Pelican Island and Chandeleur Island. |
| Perched Shell Beaches | Shoreline type where a thin shell beach overlies a fresh or salt marsh with an eroded marsh platform outcropping in the surf zone. Organic debris is common to this shoreline type. Where the marsh platform outcrops on the shoreline, it can become re-vegetated by marsh grass. |
| Shell Beaches | Shoreline types comprised of almost entirely of shell. Shell material may be in the form of shell hash or whole shells. Shell beaches form extremely steep beach faces. Major shell beaches on the delta plain are found at Point Au Fer and Shell Island. |
| Muddy Tidal Flats | Shoreline types comprised of broad intertidal areas consisting of mud and minor amounts of shell hash. The grain-size is smaller than 0.0625 mm. Muddy tidal flats are typically found in association with prograding river mouths. Major muddy tidal flats on the delta plain are found at the Mississippi and Atchafalaya River mouths. |
| Sandy Tidal Flats | Shoreline types comprised of broad intertidal areas consisting of fine and coarse grain sand and minor amounts of shell hash. Mean grain size is between 0.0625 and 0.4 mm. Typically found in association with barrier island and tidal inlet systems. This type of flat is submerged during each tidal cycle and at low tide may be 100-200 m wide. Slight changes in water levels can produce significant shoreline changes. Low water levels can expose extensive tidal flat areas to oiling. Major sandy tidal flats on the delta plain are found at Barataria Bay and the Mississippi River mouth. |



BP Exploration & Production Inc.
Keathley Canyon Block 291, Well Location "KC247-A"
Impact Probability Map

KC 291, Well Location "KC247-A"
26° 42' 07.773"
-92° 38' 16.384"

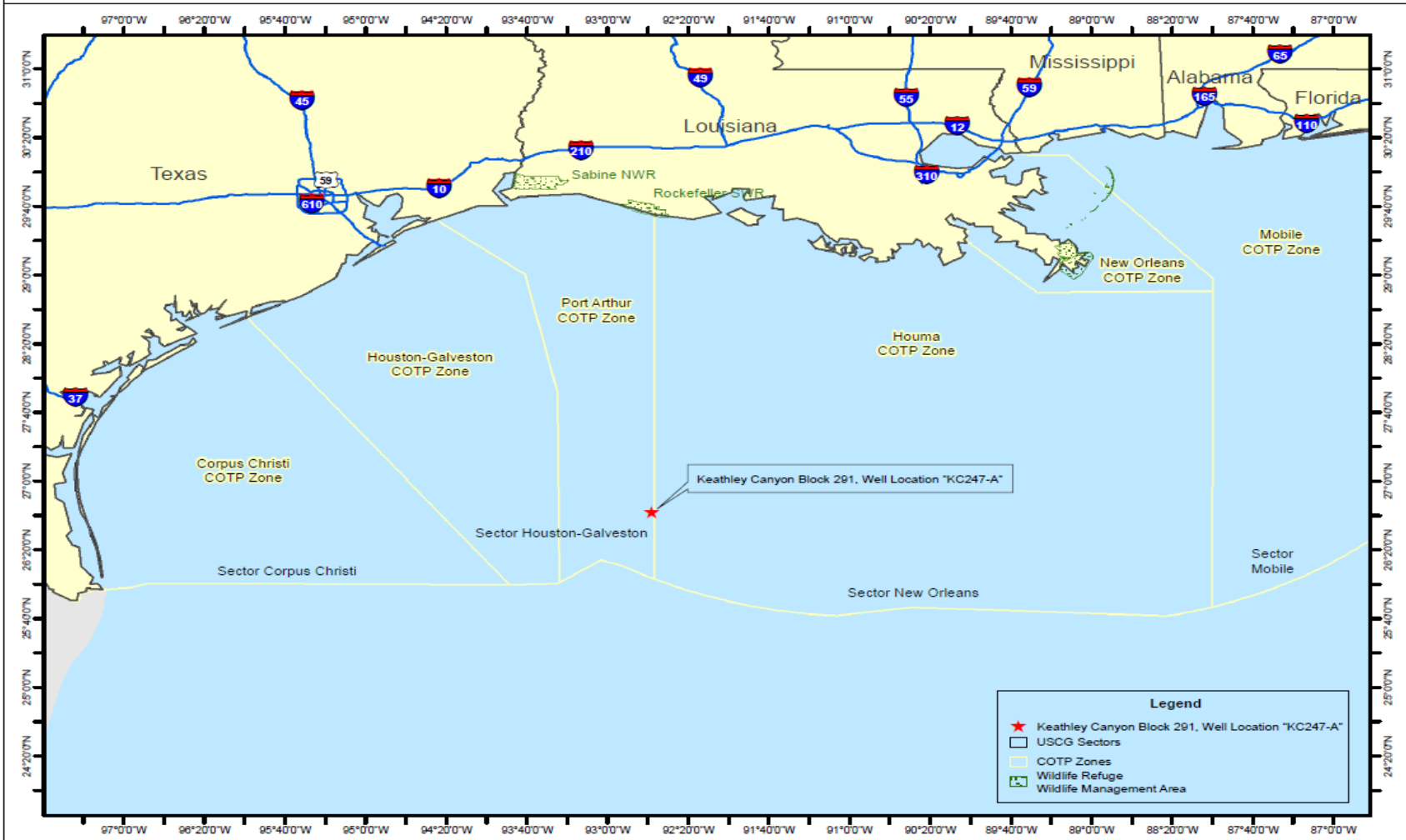


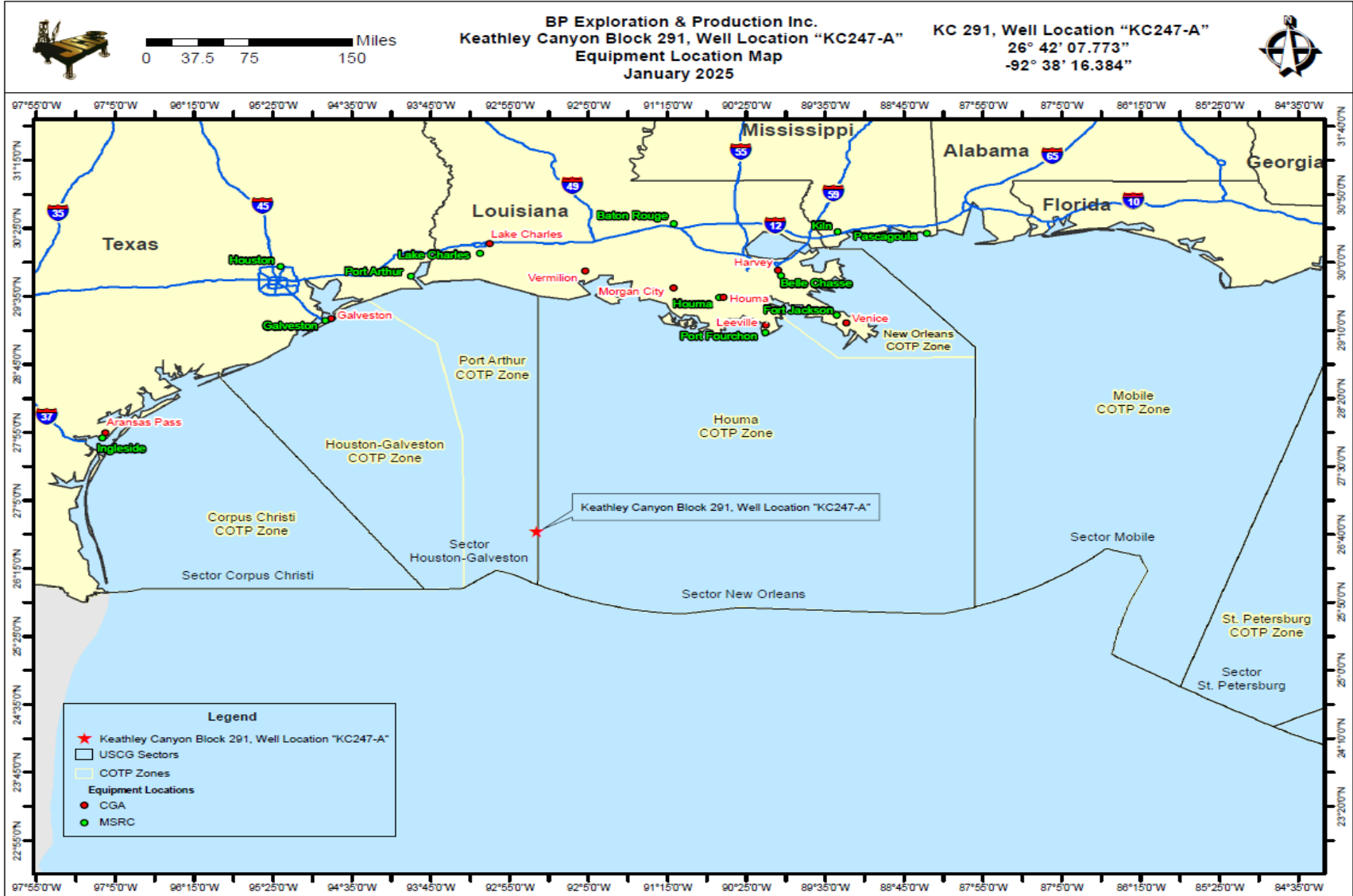


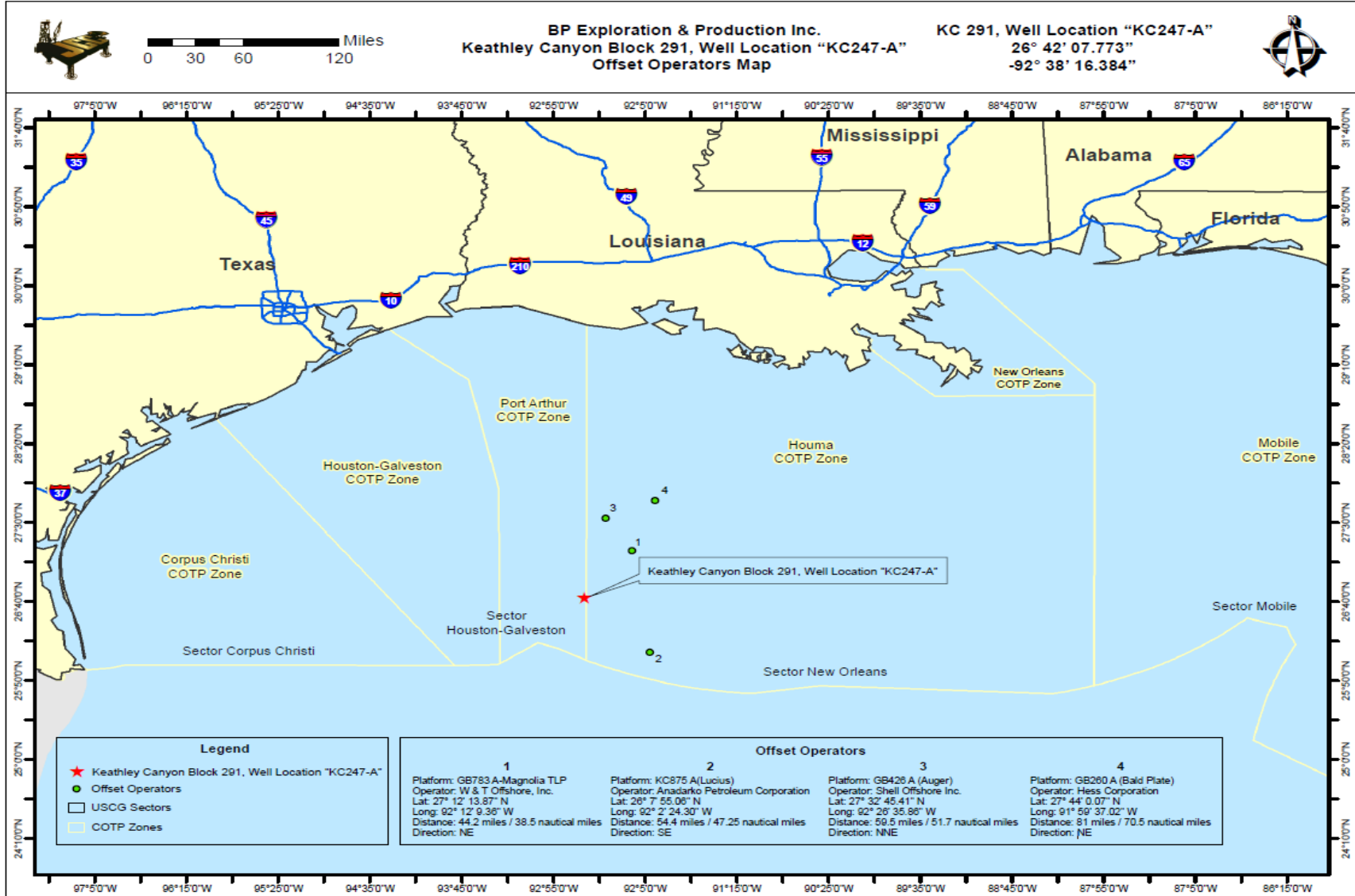
0 30 60 120 Miles

BP Exploration & Production Inc.
Keathley Canyon Block 291, Well Location "KC247-A"
Wildlife Refuge/Wildlife Management Areas Map
January 2025

KC 291, Well Location "KC247-A"
26° 42' 07.773"
-92° 38' 16.384"







5) General Considerations for all Oil Spill Recovery Operations

BP will use all appropriate measures possible to safely and efficiently recover oil spilled from its well. These include but are not limited to:

- Conducting detailed safety analyses on response operations and preparing/disseminating resulting safety plans to all response personnel.
- Use of tactics described in the most current *MSRC Gulf Area Tactics Guide Book* and *CGA Equipment Guide Book and Tactic Manual* and any other appropriate tactics developed during the event.
- Configuring surface recovery systems to achieve maximum throughput and recovery efficiency rates:
 - Maximization of the use of advanced and adverse weather recovery systems to increase oil to recovery system encounter rates.
 - Use of vessels with the largest possible onboard recovered oil storage to minimize off-load times.
 - Use of appropriate vessels to deploy ocean boom to form the widest practical width to maximize oil to recovery system encounter rate.
 - Use of appropriate recovery systems to maximize recovery rate in all operable environmental conditions.
- Deployment of CGA and MSRC spill response equipment to recover and store oil while minimizing rig/derig and transit time, maximizing onboard storage and on-station time.
- Obtaining approval for decanting of oil to maximize storage capacity.
- Use of the most efficient, high volume pumps for oil recovery and decanting, offloading and lightering.
- Use of advanced technology (such as thermal infrared and multi-spectral cameras) to detect oil on the water's surface and classify it as recoverable or non-recoverable. This will allow more efficient use of on-water recovery task forces, maximize recovery rates and expand operational windows. This advanced technology is effective in both day and night time surveillance activities depending upon atmospheric conditions.
- Early consideration of advanced oil removal methods (e.g. dispersant application and in-situ burning) and coordination/consultation with the USCG and appropriate Regional Response Team for obtaining permission to proceed as necessary.
- Providing effective communication systems to allow for the command and control of deployed resources to ensure safety, reduce response times, and collect information necessary to develop a comprehensive, timely, and accurate Common Operational Picture (COP).

6) Location Specific Worst Case Discharge Response

BP's Oil Spill Response Plan includes alternative response technologies such as dispersants and in-situ burn. Strategies will be decided by Unified Command based on an operations safety analysis, the size of the spill, weather and potential impacts. If the conditions are favorable for dispersant application and/or in-situ burning, once the proper approvals have been obtained and the proper planning is in place, dispersant application and/or in-situ burning of oil may be employed. Slick containment boom will be immediately called out and on scene as soon as possible. Offshore response strategies may include attempting to skim utilizing CGA and MSRC spill response equipment, with a total derated skimming capacity of 683,866 barrels. Temporary storage associated with skimming equipment equals 180,247 barrels. If additional storage is needed, various storage barges with a total capacity of 1,034,000+ barrels may be mobilized and centrally located to provide temporary storage and minimize off-loading time. **Safety is first priority. Air monitoring will be conducted, and operations deemed safe prior to the commencement of any containment/skimming operations.**

If the spill went unabated, shoreline impact in Cameron and/or Plaquemines Parish, Louisiana would depend upon existing environmental conditions. Shoreline protection will include the use of CGA and MSRC near shore and shallow water skimmers with a total derated skimming capacity of 221,675 barrels. Temporary storage associated with skimming equipment equals 7,815 barrels. If additional storage is needed, various storage barges with a total capacity of 677,000+ barrels may be mobilized and centrally located to provide temporary storage and minimize off-loading time. Onshore response may include the deployment of shoreline boom on beach areas, or protection and sorbent boom on vegetated areas. Contracts with AMPOL and MSRC will ensure access to 98,750 feet of 18" shoreline protection boom. **Figure 4** outlines individual times needed for procurement, load out, travel time to the site and deployment. Strategies will be based upon surveillance and real time trajectories that depict areas of potential impact given actual sea and weather conditions. Applicable Area Contingency Plans (ACPs), Geographic Response Plans (GRPs), federal and state agencies that oversee and manage some of the resources that may be at risk, and Unified Command (UC) will be consulted to ensure that environmental and special economic resources are correctly identified and prioritized to ensure optimal protection. BP's IMT has access to the applicable ACP(s) and GRP(s) Shoreline protection strategies that depict the protection response modes applicable for oil spill clean-up operations. As a secondary resource, the State of Louisiana Initial Oil Spill Response Plan will be consulted as appropriate to provide detailed shoreline protection strategies and describe necessary action to keep the oil spill from entering Louisiana's coastal wetlands. The UC should take into consideration all appropriate items detailed in the Tactics discussion below. The UC and their personnel have the option to modify the deployment and operation of equipment to allow for a more effective response to site-specific circumstances.

Based on the anticipated worst case discharge scenario, BP can estimate onsite arrival of 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 approximately 74 hours (based on the equipment's Effective Daily Recovery Capacity (EDRC) and expected travel time to spill site).

7) Response Strategies

BP will take action to provide a safe, coordinated response to contain and recover spilled oil in a timely manner. Response actions will be designed to provide protection strategies meant to recover oil and protect the responders, the public, wildlife and environmentally sensitive areas. Safety will take precedence over all other considerations during these operations.

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

In addition, these activities will be monitored by the IMT and UC via a structured COP established to track resource and slick movement in real time.

Offshore Response

Surveillance

- Aerial Observation:
 - Deployment of surveillance aircraft as soon as possible
 - Trained observer to provide on-site status reports
 - Aerial photography and visual confirmation
- Command and control platform at the site if needed
- Remote Sensing:
 - Use of thermal infrared and multi-spectral sensing systems or other technology to detect oil and classify it as recoverable or non-recoverable to enhance on-water recovery capability
 - Surveillance platforms should be appropriate for weather and atmospheric conditions to provide the greatest altitude (e.g. aircraft, aerostats or ship mounted)
 - Continued surveillance of oil movement by remote sensing systems
- Continuous monitoring of vessel assets using vessel monitoring systems

Dispersant application

- Place aerial dispersant providers on standby.
- Depending on the scenario, a Modular Subsea Dispersant Application Unit (MSDAU) may be ordered and installed at or adjacent to the spill site.
- Conduct analysis to determine appropriateness of dispersant application (refer to Section 18 of approved Oil Spill Response Plan).
- Obtain regulatory approval for use of surface and subsea dispersants.
- Caution will be taken to ensure safety of wildlife and avoid spraying over marine mammals, marine turtles, and flocks of birds.
- Conduct initial dispersant test to ensure effectiveness of dispersants.
- Confirm dispersant availability for current and long range operations.
- Coordinate deployment of a Special Monitoring of Applied Response Technologies (SMART) team as required.
- Coordinate movement of dispersants, aircraft, and support equipment and personnel.
- Initiate orders for additional dispersant stocks required for expected operations.

Dispersant monitoring

- BP will follow and comply with regulatory requirements in 40 CFR 300.913.

Containment boom

- Call out OSRO boom equipment early and expedite deployment.
- Ensure boom handling and mooring equipment is deployed with boom.
- Provide continuous reports to vessels to expedite their arrival at sites and provide for most effective containment.
- Use support vessels to deploy and maintain boom.

Dedicated offshore skimming systems

- Determine if weather conditions allow for skimming operations.
- Deployed to the highest concentration of oil.
- Assets deployed at safe distance from aerial dispersant and in-situ burn operations.
- Deploy OSRO's mechanical recovery equipment such as OSRVs, OSRBs, and VOSS.
- Vessels should be organized into task forces or groups with consideration for effective communication and control.
- The use of alternative spill surveillance technologies could be used to guide skimming vessels during night time operations.
- FOSC/SOSC approval will be requested prior to decanting operations.

Storage Vessels

- Establish availability of contracted assets (Appendix E of BP GoM OSRP).
- Early call out (to allow for tug boat acquisition and deployment speeds).
- Phase mobilization to allow storage vessels to arrive with skimming systems.
- Position as closely as possible to skimming assets to minimize offloading time.

In-situ Burn Assets

- Determine appropriateness of in-situ burning in coordination with the FOSC and affected SOSC.
- Conduct analysis to determine appropriateness of in-situ burn application (refer to Section 19 of approved Oil Spill Response Plan).
- Obtain regulatory approval to conduct in-situ burn operations.
- Determine availability of fire boom and select ignition systems.
- Determine assets to perform on-water operations.
- Build operations into safety plan.
- Initiate orders for additional fire boom stocks required for expected operations.
- Conduct initial test burn to ensure effectiveness.
- Conduct operations in accordance with an approved plan.

Adverse Weather Operations:

During adverse weather conditions, such as seas being greater than three (3) feet, the use of larger recovery and storage vessels, oleophilic skimmers, and large offshore boom will be maximized. Safety will be the overriding factor and operations will cease on the order of the UC or vessel captain. In an emergency, "stop work" may be directed by any crew member.

Near Shore Response Actions

Timing

- Put near shore assets on standby and deploy in accordance with planning based on the actual situation, real time trajectories and oil budgets.
- Support vessel identification and induction training in advance of spill nearing shoreline if possible.
- Outfitting of support vessels for specific missions.
- Deployment of assets based on actual movement of oil.

Considerations

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

Surveillance

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

Dispersant Use

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

Shoreline Protection Operations

Response Planning Considerations

- Review appropriate Area Contingency Plan(s).
- Locate and review appropriate Geographic Response and Site Specific Plans.
- Refer to associated Environmentally Sensitive Area Maps.
- Ensure capability of continuous analysis of trajectories run periodically during response.
- Order personnel and equipment.
- Perform aerial surveillance of oil movement.
- Perform Pre-impact beach cleaning and debris removal.
- Adhere to Shoreline Cleanup Assessment Team (SCAT) Plans.
- Determine requirements and availability of boom types, sizes and lengths.
- Consider need for in-situ burning in near shore areas.
- Assess current wildlife situation, especially status of migratory birds, threatened and endangered species
- Check for critical habitat in the area.
- Check for archeological sites and arrange assistance for the appropriate state agency when planning operations may impact these areas.

Placement of boom

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

Beach Preparation Considerations and Actions

- Review SCAT reports and recommendations.
- Monitor tide tables and weather to determine extent of high tides.
- Pre-clean beaches by moving waste/organic matter above high tide lines to minimize waste.
- Determine if it is considered a sensitive area or a critical habitat (i.e turtle nesting grounds).
- Determine logistical requirements of waste removal and disposal.
- Stage equipment and housing of response personnel as close to job site as possible to maximize on-site work time.
- Tend to boom, repair, replace and secure as needed (use of local assets may be advantageous).
- Maintain constant awareness of weather and oil movement for resource re-deployment as necessary.
- Consider earthen berms and shoreline protection boom to protect sensitive inland areas.
- Requisition earth moving equipment.
- Plan for efficient and safe use of personnel, ensuring:
 1. Assessment of remediation requirements, i.e., replacement of sands, rip rap, etc.
 2. Availability of surface washing agents and associated protocol requirements for their use (see National Contingency Plan (NCP) Product Schedule for list of possible agents).
 3. Discussion with all stakeholders, i.e., land owners, refuge/park managers, and others as appropriate, covering the following:
 - Access to areas.

- Possible response measures and impact of property and ongoing operations.
- Determination of any specific safety concerns.
- Any special requirements or prohibitions.
- Area security requirements.
- Handling of waste.
- Remediation expectations.
- Vehicle traffic control.
- Domestic animal safety concerns.
- Wildlife or exotic game concerns/issues.

Inland and Coastal Marsh Protection and Response Considerations and Actions

- All considered response methods will be weighed against the possible damage they may do to the marsh. Methods will be approved by Unified Command only after discussions with local Stakeholder, as identified above.
 - In-situ burn may be considered when marshes have been impacted.
- Passive clean-up of marshes should be considered and appropriate stocks of sorbent boom and/or sweep obtained.
- Response personnel must be briefed on methods to traverse the marsh, i.e.,
 - Use of appropriate vessels.
 - Use of temporary walkways or roadways.
- Discuss and gain approval prior to cutting or moving vessels through vegetation.
- Discuss use of vessels that may disturb wildlife, i.e, airboats.
- Ensure safe movement of vessels through narrow cuts and blind curves.
- Consider the possibility that no response in a marsh may be best.
- In the deployment of any response asset, actions will be taken to ensure the safest, most efficient operations possible. This includes, but is not limited to:
 - Planning for stockage of high use items for expeditious replacement.
 - Use of shallow water craft.
 - Use of communication systems appropriate ensure command and control of assets.
 - Use of appropriate boom in areas that can offer effective protection.
 - Planning of waste collection and removal to maximize cleanup efficiency.
- Consideration of on-site remediation of contaminated soils to minimize replacement operations and impact on the area.

8) Equipment Limitations

The capability for any spill response equipment, whether a dedicated or portable system, to operate in differing weather conditions will be directly in relation to the capabilities of the vessel the system is placed on. Most importantly, however, the decision to operate will be based on the judgment of the Unified Command and/or the Captain of the vessel, who will ultimately have the final say in terminating operations. Skimming equipment listed below may have operational limits which exceed those safety thresholds.

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

9) Environmental Conditions in the GOA

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

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

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

WCD Scenario– BASED ON WELL BLOWOUT DURING DRILLING OPERATIONS (200 statute miles from shore)

33,024 bbls of crude oil (Volume considering natural weathering, based on 24-hour estimate)

API Gravity 19.8°

FIGURE 4 – Equipment Response Time to KC 291 Well ‘KC247-A’

Surveillance Aircraft

| Dispersant/Surveillance | Dispersant Capacity (gal) | Persons Req. | From | Hrs to Procure | Hrs to Loadout | Travel to site | Total Hrs |
|---|---------------------------|--------------|-------|----------------|----------------|----------------|-----------|
| ASI (available through contract with CGA) | | | | | | | |
| Twin Commander | NA | 2 | Houma | 2 | 2 | 0.8 | 4.8 |

Dispersant Aircraft

| Name/Type | Dispersant Capacity (gal) | Persons Req. | From | Hrs to Procure | Hrs to Loadout | Travel to site | Total Hrs |
|---|---------------------------|--------------|-----------------------|----------------|----------------|----------------|-----------|
| ASI (available through contract with CGA) | | | | | | | |
| Basler 67T | 2000 | 2 | Houma, LA | 2 | 2 | 1 | 5 |
| DC 3 | 1200 | 2 | Houma, LA | 2 | 2 | 1.2 | 5.2 |
| DC 3 | 1200 | 2 | Houma, LA | 2 | 2 | 1.2 | 5.2 |
| MSRC | | | | | | | |
| 737 – N735Z | 4,125 | 3 | Shenandoah Valley, VA | 2 | 2 | 2.6 | 6.6 |
| 737 – N735T | 4,125 | 4 | Moses Lake, WA | 2 | 2 | 4.7 | 8.7 |

Offshore Response

| Offshore Equipment Pre-Determined Staging | EDRC | Storage Capacity | Support Vessel(s) | Persons Required | From | Hrs to Procure | Hrs to Loadout | Hrs to GOA | Travel to Spill Site | Hrs to Deploy | Total Hrs |
|--|-------|------------------|-------------------|---------------------------|---------------|----------------|----------------|------------|----------------------|---------------|-----------|
| CGA | | | | | | | | | | | |
| 95’ FRV | 22885 | 249 | NA | 6 | Venice, LA | 2 | 0 | 2 | 10 | 1 | 15 |
| 95’ FRV | 22885 | 249 | NA | 6 | Leeville, LA | 2 | 0 | 2 | 9 | 1 | 14 |
| 95’ FRV | 22885 | 249 | NA | 6 | Vermilion, LA | 2 | 0 | 2 | 9 | 1 | 14 |
| Boom Barge (CGA-300) 42” Auto Boom (25000’) | NA | NA | 1 Tug 50 Crew | 4 (Barge) 2 (Per Crew) | Leeville, LA | 8 | 0 | 4 | 27 | 2 | 41 |
| HOSS Barge | 76285 | 4000 | 3 Tugs | 8 | Harvey, LA | 6 | 0 | 10 | 50 | 2 | 68 |

| Offshore Equipment Pre-determined Staging | EDRC | Storage Capacity | VOO | Persons Required | From | Hrs to Procure | Hrs to Loadout | Hrs to GOA | Travel to Spill Site | Hrs to Deploy | Total Hrs |
|--|-------|---------------------|--------|---------------------|------------------|-------------------|-------------------|------------|-------------------------|------------------|--------------|
| MSRC | | | | | | | | | | | |
| Louisiana Responder 1 Transrec 350 2,640' 67" Curtain Pressure Boom | 10567 | 4000 | NA | 11 | Fort Jackson, LA | 2 | 1 | 4 | 20 | 1 | 28 |
| MSRC 401 Offshore Barge 1 Crucial Disk 88/30 2,640' 67" Curtain Pressure Boom | 11122 | 40000 | 3 Tugs | 9 | Fort Jackson, LA | 4 | 1 | 6 | 30 | 1 | 42 |
| S.T. Benz Responder 1 LFF 100 Brush 2,640' 67" Curtain Pressure Boom | 18086 | 4000 | NA | 11 | Grand Isle, LA | 3 | 1 | 1 | 20 | 1 | 26 |
| Gulf Coast Responder 1 Transrec 350 2,640' 67" Curtain Pressure Boom | 10567 | 4000 | NA | 11 | Lake Charles, LA | 2 | 1 | 4 | 24 | 1 | 32 |
| Texas Responder 1 Transrec 350 2,640' 67" Curtain Pressure Boom | 10567 | 4000 | NA | 11 | Galveston, TX | 2 | 1 | 1 | 21 | 1 | 26 |
| MSRC 570 Offshore Barge 1 Crucial Disk 88/30 2,640' 67" Curtain Pressure Boom | 11122 | 56900 | 3 Tugs | 9 | Galveston, TX | 4 | 1 | 2 | 30 | 1 | 38 |

| Recovered Oil Storage Pre-Determined Staging | EDRC | Storage Capacity | VOO | Persons Required | From | Hrs to Procure | Hrs to Loadout | Hrs to GOA | Travel to Spill Site | Hrs to Deploy | Total Hrs |
|--|------|------------------|-------|------------------|--------|----------------|----------------|------------|----------------------|---------------|-----------|
| Enterprise Marine Services LLC (Available through contract with CGA) | | | | | | | | | | | |
| CTCo 2603 | NA | 25000 | 1 Tug | 6 | Amelia | 11 | 0 | 6 | 30 | 1 | 48 |
| CTCo 2604 | NA | 20000 | 1 Tug | 6 | Amelia | 11 | 0 | 6 | 30 | 1 | 48 |
| CTCo 2605 | NA | 20000 | 1 Tug | 6 | Amelia | 11 | 0 | 6 | 30 | 1 | 48 |
| CTCo 2606 | NA | 20000 | 1 Tug | 6 | Amelia | 11 | 0 | 6 | 30 | 1 | 48 |
| CTCo 2607 | NA | 23000 | 1 Tug | 6 | Amelia | 11 | 0 | 6 | 30 | 1 | 48 |
| CTCo 2608 | NA | 23000 | 1 Tug | 6 | Amelia | 11 | 0 | 6 | 30 | 1 | 48 |
| CTCo 2609 | NA | 23000 | 1 Tug | 6 | Amelia | 11 | 0 | 6 | 30 | 1 | 48 |

| Offshore Recovered Oil Storage Pre-determined Staging | EDRC | Storage Capacity | Support Vessel(s) | Persons Required | From | Hrs to Procure | Hrs to Loadout | Hrs to GOA | Travel to Spill Site | Hrs to Deploy | Total Hrs |
|--|------|------------------|-------------------|------------------|--------|----------------|----------------|------------|----------------------|---------------|-----------|
| Kirby Offshore (available through contract with CGA and/or MSRC) | | | | | | | | | | | |
| RO Barge | NA | 80000+ | 1 Tug | 6 | Venice | 25 | 0 | 4 | 30 | 1 | 60 |
| RO Barge | NA | 80000+ | 1 Tug | 6 | Venice | 25 | 0 | 4 | 30 | 1 | 60 |
| RO Barge | NA | 80000+ | 1 Tug | 6 | Venice | 25 | 0 | 4 | 30 | 1 | 60 |
| RO Barge | NA | 100000+ | 1 Tug | 6 | Venice | 25 | 0 | 4 | 30 | 1 | 60 |
| RO Barge | NA | 100000+ | 1 Tug | 6 | Venice | 25 | 0 | 4 | 30 | 1 | 60 |
| RO Barge | NA | 130000+ | 1 Tug | 6 | Venice | 25 | 0 | 4 | 30 | 1 | 60 |
| RO Barge | NA | 150000+ | 1 Tug | 6 | Venice | 25 | 0 | 4 | 30 | 1 | 60 |
| RO Barge | NA | 160000+ | 1 Tug | 6 | Venice | 25 | 0 | 4 | 30 | 1 | 60 |

Staging Area: Fourchon

| Offshore Equipment With Staging | EDRC | Storage Capacity | VOO | Persons Req. | From | Hrs to Procure | Hrs to Loadout | Travel to Staging | Travel to Site | Hrs to Deploy | Total Hrs |
|---|-------|------------------|-----------|--------------|--------------|----------------|----------------|-------------------|----------------|---------------|-----------|
| T&T Marine (available through direct contract with CGA) | | | | | | | | | | | |
| Aqua Guard Triton RBS (1) | 22323 | 2000 | 1 Utility | 6 | Harvey | 4 | 12 | 3 | 21 | 2 | 42 |
| Aqua Guard Triton RBS (1) | 22323 | 2000 | 1 Utility | 6 | Galveston | 4 | 12 | 12 | 21 | 2 | 51 |
| Koseq Skimming Arms (2) Lamor brush | 45770 | 12000 | 2 OSV | 12 | Harvey | 24 | 24 | 3 | 21 | 2 | 74 |
| Koseq Skimming Arms (4) MariFlex 150 HF | 72652 | 24000 | 4 OSV | 24 | Harvey | 24 | 24 | 3 | 21 | 2 | 74 |
| CGA | | | | | | | | | | | |
| FRU (1) + 100 bbl Tank (4) | 4251 | 200 | 2 Utility | 6 | Vermilion | 2 | 5 | 5.5 | 21 | 1 | 34.5 |
| FRU (3) + 100 bbl Tank (6) | 12753 | 600 | 3 Utility | 18 | Leeville | 2 | 5 | 2 | 21 | 1 | 31 |
| FRU (2) + 100 bbl Tank (4) | 8502 | 400 | 2 Utility | 12 | Venice | 2 | 5 | 5 | 21 | 1 | 34 |
| FRU (1) + 100 bbl Tank (2) | 4251 | 200 | 1 Utility | 6 | Galveston | 2 | 5 | 12 | 21 | 1 | 41 |
| FRU (1) + 100 bbl Tank (2) | 4251 | 200 | 1 Utility | 6 | Lake Charles | 2 | 5 | 7 | 21 | 1 | 46 |

Staging Area: Fourchon

| Offshore Equipment Preferred Staging | EDRC | Storage Capacity | VOO | Persons Req. | From | Hrs to Procure | Hrs to Loadout | Travel to Staging | Travel to Site | Hrs to Deploy | Total Hrs |
|--|-------|------------------|-----------|--------------|--------------|----------------|----------------|-------------------|----------------|---------------|-----------|
| MSRC | | | | | | | | | | | |
| Crucial Disk 88/30 Skimmer (1) | 11122 | 500 | 1 PSV | 9 | Galveston | 1 | 1 | 12 | 21 | 1 | 36 |
| Crucial Disk 88/30 Skimmer (1) | 11122 | 500 | 1 PSV | 9 | Galveston | 1 | 1 | 12 | 21 | 1 | 36 |
| GT-185 Skimmer w Adaptor (2) | 2742 | 1000 | 2 Utility | 10 | Galveston | 1 | 1 | 12 | 21 | 1 | 36 |
| Walosep 4 Skimmer (1) | 3017 | 500 | 1 Utility | 5 | Galveston | 1 | 1 | 12 | 21 | 1 | 36 |
| Foilex 250 Skimmer (1) | 3977 | 500 | 1 Utility | 5 | Galveston | 1 | 1 | 12 | 21 | 1 | 36 |
| Stress I Skimmer (1) | 15840 | 500 | 1 Utility | 5 | Galveston | 1 | 1 | 12 | 21 | 1 | 36 |
| GT-185 Skimmer w Adaptor (1) | 1371 | 500 | 1 Utility | 5 | Port Arthur | 1 | 1 | 8.5 | 21 | 1 | 32.5 |
| Desmi Skimmer (1) | 3017 | 500 | 1 Utility | 5 | Lake Charles | 1 | 1 | 7 | 21 | 1 | 31 |
| Foilex 250 Skimmer (1) | 3977 | 500 | 1 Utility | 5 | Lake Charles | 1 | 1 | 7 | 21 | 1 | 31 |
| GT-185 Skimmer w Adaptor (1) | 1371 | 500 | 1 Utility | 5 | Lake Charles | 1 | 1 | 7 | 21 | 1 | 31 |
| Stress I Skimmer (1) | 15840 | 1000 | 2 Utility | 10 | Lake Charles | 1 | 1 | 7 | 21 | 1 | 31 |
| Stress I Skimmer (1) | 15840 | 1000 | 2 Utility | 10 | Lake Charles | 1 | 1 | 7 | 21 | 1 | 31 |
| Lamor LUF Brush Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i> | 18086 | 1000 | 1 PSV | 9 | Lake Charles | 1 | 1 | 7 | 21 | 1 | 31 |

| | | | | | | | | | | | |
|--|-------|------|-------|---|--------------|---|---|---|----|---|----|
| Lamor LUF Brush Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i> | 18086 | 1000 | 1 PSV | 9 | Lake Charles | 1 | 1 | 7 | 21 | 1 | 31 |
| Transrec 350 Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i> | 10567 | 1000 | 1 PSV | 9 | Lake Charles | 1 | 1 | 7 | 21 | 1 | 31 |
| Transrec 350 Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i> | 10567 | 1000 | 1 PSV | 9 | Lake Charles | 1 | 1 | 7 | 21 | 1 | 31 |

Staging Area: Fourchon

| Offshore Equipment Preferred Staging | EDRC | Storage Capacity | VOO | Persons Req. | From | Hrs to Procure | Hrs to Loadout | Travel to Staging | Travel to Site | Hrs to Deploy | Total Hrs |
|---|-------|------------------|-----------|--------------|--------------|----------------|----------------|-------------------|----------------|---------------|-----------|
| MSRC | | | | | | | | | | | |
| Stress I Skimmer (1) | 15840 | 500 | 1 Utility | 5 | Grand Isle | 1 | 1 | 1 | 21 | 1 | 25 |
| Lamor LUF Brush Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i> | 18086 | 1000 | 1 PSV | 9 | Grand Isle | 1 | 1 | 1 | 21 | 1 | 25 |
| Lamor LUF Brush Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i> | 18086 | 1000 | 1 PSV | 9 | Houma | 1 | 1 | 2 | 21 | 1 | 26 |
| Foilex 250 Skimmer (1) | 3977 | 500 | 1 Utility | 5 | Belle Chasse | 1 | 1 | 3 | 21 | 1 | 27 |
| Foilex 200 Skimmer (1) | 1989 | 500 | 1 Utility | 5 | Belle Chasse | 1 | 1 | 3 | 21 | 1 | 27 |
| Crucial Disk 56/30 Skimmer (1) | 5671 | 500 | 1 Utility | 5 | Belle Chasse | 1 | 1 | 3 | 21 | 1 | 27 |
| GT-185 Skimmer w Adaptor (1) | 1371 | 500 | 1 Utility | 5 | Fort Jackson | 1 | 2 | 0.5 | 21 | 1 | 25.5 |
| Walosep W4 Skimmer (1) | 3017 | 500 | 1 Utility | 5 | Fort Jackson | 1 | 2 | 0.5 | 21 | 1 | 25.5 |
| Desmi Skimmer (1) | 3017 | 500 | 1 Utility | 5 | Fort Jackson | 1 | 1 | 5 | 21 | 1 | 20 |
| Stress I Skimmer (1) | 15840 | 500 | 1 Utility | 5 | Fort Jackson | 1 | 1 | 5 | 21 | 1 | 20 |
| Crucial Disk 88/30 Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i> | 11122 | 1000 | 1 PSV | 9 | Fort Jackson | 1 | 1 | 5 | 21 | 1 | 20 |
| Crucial Disk 88/30 Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i> | 11122 | 1000 | 1 PSV | 9 | Fort Jackson | 1 | 1 | 5 | 21 | 1 | 20 |
| Crucial Disk 88/30 Skimmer (1) <i>1,320' 67" Curtain Pressure Boom</i> | 11122 | 1000 | 1 PSV | 9 | Fort Jackson | 1 | 1 | 5 | 21 | 1 | 20 |
| Stress II Skimmer (1) | 3017 | 500 | 1 Utility | 5 | Pascagoula | 1 | 1 | 6 | 11 | 1 | 20 |

Staging Area: Fourchon

| Offshore Equipment Preferred Staging | EDRC | Storage Capacity | VOO | Persons Req. | From | Hrs to Procure | Hrs to Loadout | Travel to Staging | Travel to Site | Hrs to Deploy | Total Hrs |
|--------------------------------------|------|------------------|-----------|--------------|--------------|----------------|----------------|-------------------|----------------|---------------|-----------|
| CGA | | | | | | | | | | | |
| Hydro-Fire Boom | NA | NA | 8 Utility | 40 | Harvey | 0 | 24 | 2 | 21 | 6 | 51 |
| MSRC | | | | | | | | | | | |
| 67" Curtain Pressure Boom (53570') | NA | NA | 80* | 160 | Houston | 1 | 2 | 11 | 21 | 1 | 36 |
| 1000' Fire Resistant Boom | NA | NA | 3* | 6 | Galveston | 1 | 4 | 12 | 21 | 6 | 44 |
| 16000' Fire Resistant Boom | NA | NA | 3* | 6 | Houston | 1 | 4 | 11 | 21 | 6 | 43 |
| 2000' Hydro Fire Boom | NA | NA | 8* | 8 | Lake Charles | 1 | 4 | 7 | 21 | 6 | 39 |

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

Nearshore Response for Cameron Parish

Staging Area: Fourchon

| Nearshore Equipment Pre-determined Staging | EDRC | Storage Capacity | VOO | Persons Required | From | Hrs to Procure | Hrs to Loadout | Hrs to GOA | Travel to Spill Site | Hrs to Deploy | Total Hrs |
|--|-------|---------------------|-------|---------------------|--------------|-------------------|-------------------|---------------|-------------------------|------------------|--------------|
| CGA | | | | | | | | | | | |
| Mid-Ship SWS | 22885 | 249 | NA | 4 | Leeville | 2 | 0 | N/A | 48 | 1 | 51 |
| Mid-Ship SWS | 22885 | 249 | NA | 4 | Venice | 2 | 0 | N/A | 48 | 1 | 51 |
| Trinity SWS | 21500 | 249 | NA | 4 | Morgan City | 2 | 0 | N/A | 48 | 1 | 51 |
| Trinity SWS | 21500 | 249 | NA | 4 | Lake Charles | 2 | 0 | N/A | 48 | 1 | 51 |
| Trinity SWS | 21500 | 249 | NA | 4 | Vermilion | 2 | 0 | N/A | 48 | 1 | 51 |
| 46' FRV | 15257 | 65 | NA | 4 | Aransas Pass | 2 | 0 | 2 | 21 | 1 | 26 |
| 46' FRV | 15257 | 65 | NA | 4 | Morgan City | 2 | 0 | 2 | 2.5 | 1 | 7.5 |
| 46' FRV | 15257 | 65 | NA | 4 | Lake Charles | 2 | 0 | 2 | 7 | 1 | 12 |
| 46' FRV | 15257 | 65 | NA | 4 | Venice | 2 | 0 | 2 | 3.5 | 1 | 8.5 |
| MSRC | | | | | | | | | | | |
| MSRC Quick Strike 2 LORI Brush Pack | 5000 | 50 | NA | 3 | Lake Charles | 2 | 0 | 1 | 8 | 1 | 12 |
| Enterprise Marine Services LLC (Available through contract with CGA) | | | | | | | | | | | |
| CTCo 5001 | NA | 47000 | 1 Tug | 6 | Amelia | 34.5 | 0 | 6 | 6.5 | 1 | 48 |

Staging Area: Fourchon

| Recovered Oil Storage Pre- Determined Staging | EDRC | Storage Capacity | VOO | Persons Required | From | Hrs to Procure | Hrs to Loadout | Hrs to GOA | Travel to Spill Site | Hrs to Deploy | Total Hrs |
|--|------|---------------------|-------|---------------------|--------|-------------------|-------------------|---------------|-------------------------|------------------|--------------|
| Kirby Offshore (available through contract with CGA) | | | | | | | | | | | |
| RO Barge | NA | 80000+ | 1 Tug | 6 | Venice | 35 | 0 | 4 | 20 | 1 | 60 |
| RO Barge | NA | 100000+ | 1 Tug | 6 | Venice | 35 | 0 | 4 | 20 | 1 | 60 |
| RO Barge | NA | 100000+ | 1 Tug | 6 | Venice | 35 | 0 | 4 | 20 | 1 | 60 |
| RO Barge | NA | 100000+ | 1 Tug | 6 | Venice | 35 | 0 | 4 | 20 | 1 | 60 |
| RO Barge | NA | 110000+ | 1 Tug | 6 | Venice | 35 | 0 | 4 | 20 | 1 | 60 |
| RO Barge | NA | 140000+ | 1 Tug | 6 | Venice | 35 | 0 | 4 | 20 | 1 | 60 |

Staging Area: Fourchon

| Nearshore Equipment With Staging | EDRC | Storage Capacity | VOO | Persons Req. | From | Hrs to Procure | Hrs to Load Out | Travel to Staging | Travel to Deployment | Hrs to Deploy | Total Hrs |
|---------------------------------------|------|------------------|------------|--------------|--------------|----------------|-----------------|-------------------|----------------------|---------------|-----------|
| CGA | | | | | | | | | | | |
| SWS Egmopol | 1810 | 100 | NA | 3 | Leeville | 2 | 2 | 2 | 2 | 1 | 8 |
| SWS Marco | 3588 | 20 | NA | 3 | Lake Charles | 2 | 2 | 7 | 2 | 1 | 14 |
| SWS Marco | 3588 | 34 | NA | 3 | Leeville | 2 | 2 | 2 | 2 | 1 | 8 |
| SWS Marco | 3588 | 34 | NA | 3 | Venice | 2 | 2 | 5 | 2 | 1 | 12 |
| Foilex Skim Package (TDS 150) | 1131 | 50 | NA | 3 | Lake Charles | 4 | 12 | 7 | 2 | 2 | 27 |
| Foilex Skim Package (TDS 150) | 1131 | 50 | NA | 3 | Harvey | 4 | 12 | 3 | 2 | 2 | 23 |
| 4 Drum Skimmer (Magnum 100) | 680 | 100 | 1 Crew | 3 | Lake Charles | 2 | 2 | 7 | 2 | 1 | 14 |
| 4 Drum Skimmer (Magnum 100) | 680 | 100 | 1 Crew | 3 | Harvey | 2 | 2 | 3 | 2 | 1 | 10 |
| 2 Drum Skimmer (TDS 118) | 240 | 100 | 1 Crew | 3 | Lake Charles | 2 | 2 | 7 | 2 | 1 | 14 |
| 2 Drum Skimmer (TDS 118) | 240 | 100 | 1 Crew | 3 | Harvey | 2 | 2 | 3 | 2 | 1 | 10 |
| MSRC | | | | | | | | | | | |
| 30 ft. Kvichak <i>Marco I Skimmer</i> | 3588 | 24 | NA | 2 | Galveston | 1 | 1 | 12 | 2 | 1 | 17 |
| 30 ft. Kvichak <i>Marco I Skimmer</i> | 3588 | 24 | NA | 2 | Belle Chasse | 1 | 1 | 3 | 2 | 1 | 8 |
| 30 ft. Kvichak <i>Marco I Skimmer</i> | 3588 | 24 | NA | 2 | Pascagoula | 1 | 1 | 6 | 2 | 1 | 11 |
| AardVac Skimmer (1) | 3840 | 500 | 1 Utility | 5 | Lake Charles | 1 | 1 | 7 | 2 | 1 | 12 |
| AardVac Skimmer (1) | 3840 | 500 | 1 Utility | 5 | Pascagoula | 1 | 1 | 6 | 2 | 1 | 11 |
| Queensboro Skimmer (1) | 905 | 500 | 1 Pushboat | 4 | Galveston | 1 | 1 | 12 | 2 | 1 | 17 |
| Queensboro Skimmer (5) | 4525 | 2500 | 5 Pushboat | 20 | Lake Charles | 1 | 1 | 7 | 2 | 1 | 12 |
| Queensboro Skimmer (1) | 905 | 500 | 1 Pushboat | 4 | Belle Chasse | 1 | 1 | 3 | 2 | 1 | 8 |
| Queensboro Skimmer (1) | 905 | 500 | 1 Pushboat | 4 | Pascagoula | 1 | 1 | 6 | 2 | 1 | 11 |
| WP 1 Skimmer (1) | 3017 | 500 | 1 Utility | 5 | Pascagoula | 1 | 1 | 6 | 2 | 1 | 11 |

Shoreline Protection Response for Cameron Parish

| Shoreline Protection Boom | VOO | Persons Req. | Storage/Warehouse Location | Hrs to Procure | Hrs to Loadout | Travel to Fourchon | Travel to Deployment | Hrs to Deploy | Total Hrs |
|-------------------------------|---------|--------------|----------------------------|----------------|----------------|--------------------|----------------------|---------------|-----------|
| MSRC | | | | | | | | | |
| 50 feet | 1 Crew | 2 | Port Arthur, TX | 1 | 1 | 10 | 2 | 3 | 17 |
| 150 feet | 1 Crew | 2 | Galveston, TX | 1 | 1 | 13 | 2 | 3 | 20 |
| 50 feet | 1 Crew | 2 | Ingleside, TX | 1 | 1 | 18 | 2 | 3 | 25 |
| 9,700' 18" Boom | 5 Crew | 10 | Lake Charles, LA | 1 | 1 | 8 | 2 | 3 | 15 |
| 100' 18" Boom | 1 Crew | 2 | Belle Chasse, LA | 1 | 1 | 2 | 2 | 3 | 9 |
| 6,950' 18" Boom | 4 Crew | 8 | Pascagoula, MS | 1 | 1 | 5 | 2 | 3 | 12 |
| 50' 18" Boom | 1 Crew | 2 | Tampa, FL | 1 | 1 | 21 | 2 | 3 | 28 |
| 2,950' 18" Boom | 3 Crew | 6 | Miami, FL | 1 | 1 | 27 | 2 | 3 | 34 |
| AMPOL (available through MSA) | | | | | | | | | |
| 34,050 feet | 13 Crew | 26 | New Iberia, LA | 2 | 2 | 4.1 | 2 | 12 | 22.1 |
| 16,000 feet | 7 Crew | 14 | Chalmette, LA | 2 | 2 | 3 | 2 | 6 | 15 |
| 900 feet | 1 Crew | 2 | Morgan City, LA | 2 | 2 | 3 | 2 | 2 | 11 |
| 11,800 feet | 5 Crew | 10 | Gonzales, LA | 2 | 2 | 5 | 2 | 2 | 13 |
| 16,000 feet | 7 Crew | 14 | Port Arthur, TX | 2 | 2 | 9 | 2 | 6 | 21 |

| Wildlife Response | EDRC | Storage Capacity | VOO | Persons Req. | From | Hrs to Procure | Hrs to Loadout | Travel to Staging | Travel to Deployment | Hrs to Deploy | Total Hrs |
|--------------------------|------|------------------|-----|--------------|------------------|----------------|----------------|-------------------|----------------------|---------------|-----------|
| CGA | | | | | | | | | | | |
| Wildlife Support Trailer | NA | NA | NA | 2 | Harvey | 2 | 2 | 3 | 1 | 2 | 10 |
| Bird Scare Guns (24) | NA | NA | NA | 2 | Harvey | 2 | 2 | 3 | 1 | 2 | 10 |
| Bird Scare Guns (12) | NA | NA | NA | 2 | Galveston | 2 | 2 | 12 | 1 | 2 | 19 |
| Bird Scare Guns (12) | NA | NA | NA | 2 | Aransas Pass | 2 | 2 | 16.5 | 1 | 2 | 23.5 |
| Bird Scare Guns (48) | NA | NA | NA | 2 | Lake Charles | 2 | 2 | 7 | 1 | 2 | 14 |
| Bird Scare Guns (24) | NA | NA | NA | 2 | Leeville | 2 | 2 | 2 | 1 | 2 | 9 |
| Wildlife Rehabilitation | N/A | N/A | N/A | 2 | Lake Charles, LA | 1 | 2 | 7 | N/A | 2 | 12 |

| Response Asset Totals | Total (bbls) |
|---|---------------------|
| Offshore EDRC | 683,866 |
| Offshore Recovered Oil Storage | 1,214,247+ |
| Nearshore / Shallow Water EDRC | 221,675 |
| Nearshore / Shallow Water Recovered Oil Storage | 684,815+ |

References

Ji, Zhen-Gang, Walter R. Johnson, Charles F. Marshall, and Eileen M. Lear. 2004. Oil-Spill Risk Analysis: Contingency Planning Statistics for Gulf of Mexico OCS Activities. OCS Report 2004-026, Herndon, VA: U.S. Dept. of the Interior, Minerals Management Service, Environmental Division.

Appendix H: Coastal Zone Management Act (CZMA) Consistency Certification

| | | | |
|--|------------------------------|--|---------------------------|
| Title of Document: | Exploration Plan – West Bump | Document Number: | GMEXP-DR-PRM-600-00377020 |
| Authority: | Vashtie Bajnath | Revision | B01 |
| Custodian/Owner: | Betsy Cleland | Issue Date: | 04/28/2025 |
| Retention Code: | ADM3000 | Next Review Date (if applicable): | |
| Security Classification: | | Page: | |
| Warning: Check DW Docs revision to ensure you are using the correct revision. | | | |

Coastal Zone Management Consistency Certification State of Louisiana

Supplemental Exploration Plan (EP)

Type of OCS Plan

Keathley Canyon Blocks 291 and 247

Area and Block

OCS-G 19545 and OCS-G 25790

Lease Numbers

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

BP Exploration & Production Inc.

Lessee or Operator



Certifying Official

04/28/25

Date

Evaluation of Consistency with the Enforceable Policies of the Louisiana Coastal Resource Program

1 Background

BP Exploration & Production Inc. (bp) is submitting a Supplemental Exploration Plan (EP) for Keathley Canyon (KC) Blocks 291 (KC 291) and KC 247, Gulf of America,¹ Outer Continental Shelf (OCS)-G-19545 and OCS-G 25790 Under this EP, bp proposes to drill two wells, one well including a side track and one well as back up.

This document evaluates bp'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 bp'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, and subsea installation activities based on the locations in KC 291 and KC 247 and is included in EP Appendix I. The EIA was prepared in accordance with applicable regulations, including 30 CFR 550.242 and 550.261 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 Bureau of Ocean Energy Management (BOEM), Bureau of Safety and Environmental Enforcement (BSEE), 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 OCS waters, approximately 192 statute miles (309 km) from the nearest Louisiana shoreline (**Figure 1**). A dynamic positioning (DP) drillship is anticipated to be on site for approximately 220 days per well for well drilling and temporary abandonment.

Land-based support activities 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 bp's EP.

¹ On 20 January 2025, President Trump signed Executive Order 14172 ("Restoring Names That Honor American Greatness") renaming the Gulf of Mexico as the Gulf of America. Usage of Gulf of America in this EIA refers to the water body formerly known as the Gulf of Mexico.

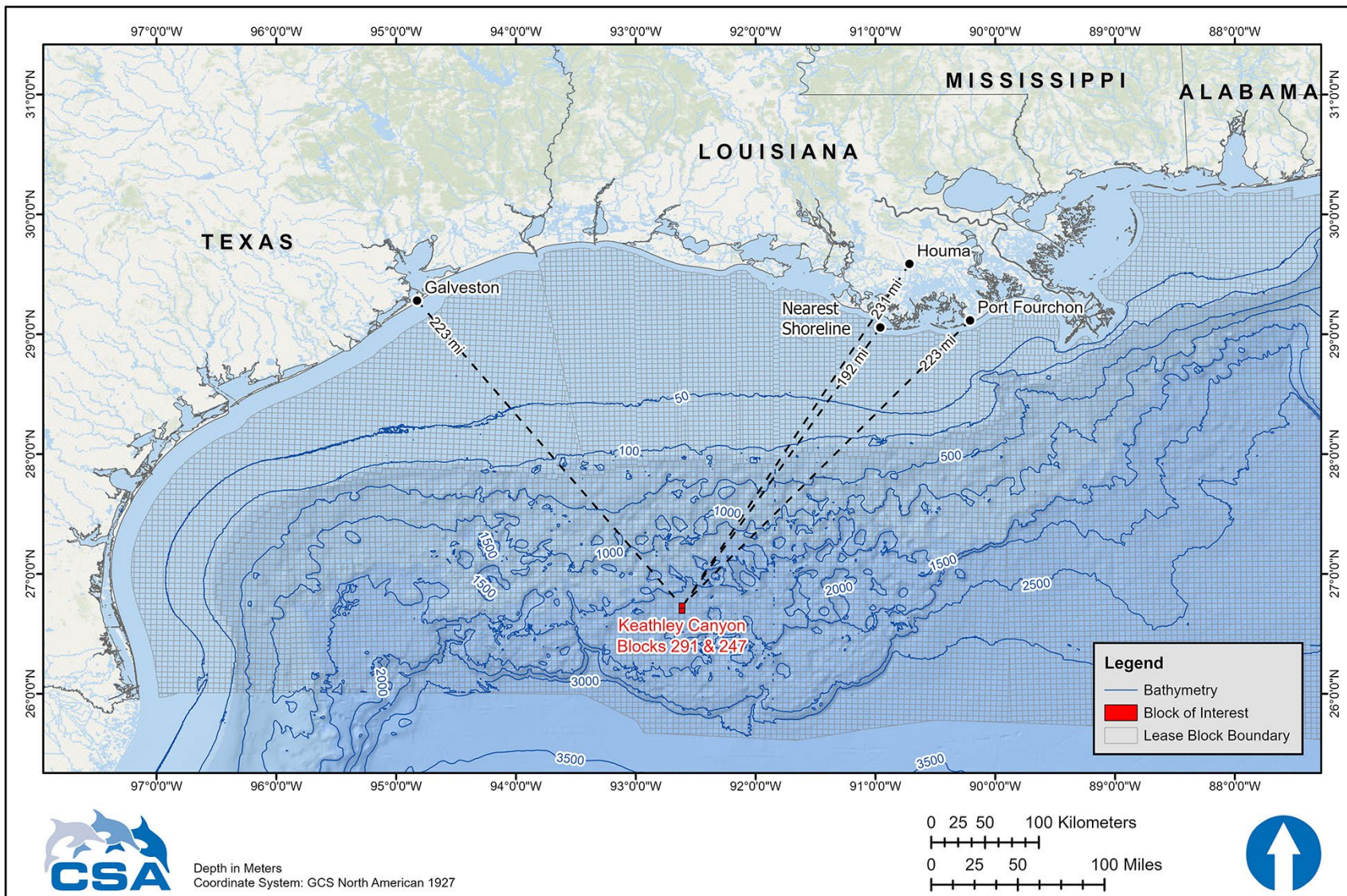


Figure 1. Location of Keathley Canyon Blocks 291 and 247 relative to the Texas and Louisiana shorelines and offshore bathymetric contours.

Oil spill response-related activities for the well to be drilled under this EP are governed by the bp Regional Oil Spill Response Plan (ROSRP), as filed by BP America Inc. (Operator No. 21372) under cover letter dated 9 December 2024. The ROSRP was filed on behalf of several affiliated companies, including BP Exploration & Production Inc. (Operator No. 02481). The ROSRP was confirmed in compliance and approved by the Bureau of Safety and Environmental Enforcement (BSEE) on 10 January 2025. The bp ROSRP should meet the requirements contained in 30 CFR Part 254 and as operator, bp (Operator No. 02481) 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."

As discussed in Section A.9.2 of the EIA (Large Oil Spill [Worst Case Discharge]), the trajectory of a hypothetical spill in KC 291 or 247, 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 a 4% conditional probability of a spill contacting the Louisiana shoreline within 30 days of a spill. Using Launch Point W026 (as indicated in Ji et al., 2004), the model predicts potential shoreline contact at >0.5% chance within 30 days of a spill ranging from Cameron County, Texas to Terrebonne Parish, Louisiana.

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 bp's proposed project are 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 KC 291 and 247 project, and bp 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 5, 6, and 7 and Appendix I.

- 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 1, 5, and 9, and Appendix I.

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 5 and 6, and Appendix I.

- 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 Sections 1 and 2.

§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 Sections 6 and 13, and Appendix I.

- 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 6 and 13, and Appendices G and I.

- 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 Sections 6 and 13, and Appendices D and I.

- I. *Radioactive wastes shall not be temporarily or permanently disposed of in the coastal zone.*

Radioactive wastes may be generated during the completion phase of the project and are addressed in EP Sections 6 and 13, and Appendix D.

§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 KC 291 and 247, approximately 192 statute miles (309 km) from the nearest Louisiana shoreline. Geological and geophysical information is provided in EP Section 3.

- 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 KC 291 and 247, approximately 192 statute miles (309 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 1, 5, and 9, and Appendix I. No activities will be conducted in wildlife preserves or management areas. All drilling and installation activities related to this project will be conducted on the OCS in KC 291 and 247. Shore-based support will originate from Louisiana. The nearest Louisiana shoreline is approximately 192 statute miles (309 km) from the project area.

During a large-scale incident, a few of Louisiana's Wildlife Refuges, Wilderness Areas, State Parks, and other protected areas could potentially be affected by oiling within 30 days of a large spill (per the 30-day Oil Spill Risk Analysis presented by Ji et al., 2004). Potentially affected areas, along with the natural resources found in each area, are 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 and installation activities related to this project will be conducted on the OCS in KC 291 and 247, approximately 192 statute miles (309 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 12 and 13, and Appendix I.

- 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 1, 2, 8, and 9.

- 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 1.

- 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 1 and Appendix I.

- J. *Mineral exploration, production, and refining facilities shall be designed and constructed using best practical techniques to minimize adverse environmental impacts.*

Addressed in EP Sections 1 and 2, and Appendix I.

- K. *Effective environmental protection and emergency or contingency plans shall be developed and complied with for all mineral operations.*

Addressed in EP Sections 1, 2, 4, and 8, and Appendices G and I.

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 Appendix I.

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 1 and Appendix I.

N. *The creation of underwater obstructions which adversely affect fishing or navigation shall be avoided to the maximum extent practicable.*

Addressed in EP Section 1.

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 W026 (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 America for 26.5 miles and extends inland toward the Grand Chenier Ridge, a stranded beach ridge 6 miles (10 km) from the Gulf of America. 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). |

Table 1. (Continued).

| Wildlife Refuge, Wilderness Area, State or National Park | Resource Description |
|--|---|
| 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). |
| Iberia Parish | |
| Shell Keys National Wildlife Refuge | Shell Keys National Wildlife Refuge has supported large-but-limited colonies of nesting seabirds. Because of erosion from hurricanes and other storms only one islet, composed almost entirely of seashells, remains. Birds known to nest here include Royal Terns, Sandwich Terns, Black Skimmers and Laughing Gulls. In addition, the islet is used as a loafing area by white pelicans, brown pelicans, terns and gulls. Storms have eroded the island to such an extent that no known nesting has occurred since 1992 (USFWS, n.d. - c). |
| Marsh Island Wildlife Refuge | Marsh Island is close to 71,000 acres; it currently measures approximately 20 miles east to west and 11 miles north to south. Habitat on this refuge is mainly brackish to intermediate marsh and flat, with very few remaining trees. Marsh Island is an extremely important refuge as it supports a wide array of animal species throughout the year. The island serves as crucial wintering habitat to numerous waterfowl, wading and shorebirds, and birds of prey. This refuge also serves as essential habitat for commercially important fish species, as well as alligators and furbearers. In the Vermilion Bay area, much of the recreational and commercial harvests of shrimp and blue crab depend on the nursery habitats provided by Marsh Island (Louisiana Department of Wildlife and Fisheries, n.d. - c). |
| 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. - d). |
| 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. - d). |

Table 1. (Continued).

| Wildlife Refuge, Wilderness Area, State or National Park | Resource Description |
|--|---|
| 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. - e). |

3 Consistency Certification

The analysis indicates that bp's EP for KC 291 and 247 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 and installation activities. Land-based support activities will originate from Louisiana.

In the event of an accidental spill, bp will implement the measures of its ROSRP, 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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Appendix I: Environmental Impact Analysis (EIA)

| | | | |
|--|------------------------------|--|---------------------------|
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Environmental Impact Analysis

for a

Supplemental Exploration Plan (EP) for
Keathley Canyon Blocks 291 and 247
(OCS-G-19545 and OCS-G 25790)

Offshore Louisiana

March 2025

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Acronyms and Abbreviations

| | | | |
|------------------|---|--------------------|---|
| § | section | NH ₃ | ammonia |
| μPa | micropascal | NMFS | National Marine Fisheries Service |
| ac | acre | | |
| bbl | barrel | NOAA | National Oceanic and Atmospheric Administration |
| BOEM | Bureau of Ocean Energy Management | NO _x | nitrogen oxides |
| BOEMRE | Bureau of Ocean Energy Management, Regulation and Enforcement | NPDES | National Pollutant Discharge Elimination System |
| BOP | blowout preventer | NTL | Notice to Lessees and Operators |
| BOPD | barrels of oil per day | NWR | National Wildlife Refuge |
| bp | bp Exploration & Production Inc. | OCS | Outer Continental Shelf |
| BSEE | Bureau of Safety and Environmental Enforcement | OSRA | Oil Spill Risk Analysis |
| CFR | Code of Federal Regulations | PAH | polycyclic aromatic hydrocarbons |
| CH ₄ | methane | Pb | lead |
| CO | carbon monoxide | PBR | potential biological removal |
| CO ₂ | carbon dioxide | PM | particulate matter |
| dB | decibel | PSO | protected species observer |
| DP | dynamically positioned | PTS | permanent threshold shift |
| DPS | distinct population segment | re | referenced to |
| EEZ | Exclusive Economic Zone | ROSRP | Regional Oil Spill Response Plan |
| EFH | Essential Fish Habitat | SBM | synthetic-based drilling muds |
| EIA | Environmental Impact Analysis | SEL _{24h} | sound exposure level over 24 hours |
| EIS | Environmental Impact Statement | SO _x | sulfur oxides |
| EP | Exploration Plan | SPL | root-mean-square sound pressure level |
| ESA | Endangered Species Act | SWSS | Sperm Whale Seismic Study |
| FAD | fish aggregating device | TTS | temporary threshold shift |
| FR | <i>Federal Register</i> | USCG | U.S. Coast Guard |
| GPS | global positioning system | USEPA | U.S. Environmental Protection Agency |
| GMFMC | Gulf of Mexico Fishery Management Council | USFWS | U.S. Fish and Wildlife Service |
| H ₂ S | hydrogen sulfide | VOC | volatile organic compound |
| ha | hectare | WBM | water-based drilling muds |
| HAPC | Habitat Area of Particular Concern | WCD | worst case discharge |
| Hz | hertz | | |
| IMT | Incident Management Team | | |
| IPF | impact-producing factor | | |
| KC | Keathley Canyon | | |
| kHz | kilohertz | | |
| MARPOL | International Convention for the Prevention of Pollution from Ships | | |
| MMC | Marine Mammal Commission | | |
| MMPA | Marine Mammal Protection Act | | |
| MMS | Minerals Management Service | | |
| NAAQS | National Ambient Air Quality Standards | | |

Introduction

BP Exploration & Production Inc. (bp) is submitting a Supplemental Exploration Plan (EP) for Keathley Canyon (KC) Blocks 291 (KC 291) and KC 247, Gulf of America,¹ Outer Continental Shelf (OCS)-G-19545 and OCS-G 25790 Under this EP, bp proposes to drill two wells, one well with side track and one well as back up (KC 291 A and KC 291 B).

The project area is located within the Central Gulf of America OCS Planning Area, approximately 192 statute miles (309 km) from the nearest shoreline (Isles Dernières, Louisiana), 223 statute miles (359 km) from the regional onshore support base (Port Fourchon, Louisiana), and 231 statute miles (372 km) from the helicopter base at Houma, Louisiana (**Figure 1**). The water depth at the proposed project location is approximately 1,744 m (5,722 ft).

A dynamically positioned (DP) semisubmersible drilling rig and/or a DP drillship is anticipated to be on site for approximately 220 days per well for well drilling and temporary abandonment.

The Environmental Impact Analysis (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) section (§) 550.211 and § 550.227. The EIA is a project- and site-specific analysis of the potential environmental impacts of bp's planned activities. The EIA complies with guidance provided in existing Notices to Lessees and Operators (NLTs) issued by BOEM and its predecessors, Minerals Management Service (MMS) and Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE), including NLTs 2008-G04 (extended by 2015-N02) and 2015-N01. Potential impacts have been analyzed at a broader level in the 2024–2029 Programmatic Environmental Impact Statement (EIS) for the OCS Oil and Gas Leasing Program (BOEM, 2023a)² and in multisale EISs for the Western and Central Gulf of America Planning Areas (BOEM, 2012a,b; 2013; 2014a; 2015; 2016b; 2017; 2023b). 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; 2017). The National Marine Fisheries Service (NMFS) Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of America 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.

¹ On 20 January 2025, President Trump signed Executive Order 14172 (“Restoring Names That Honor American Greatness”) renaming the Gulf of Mexico as the Gulf of America. Usage of Gulf of America in this EIA refers to the water body formerly known as the Gulf of Mexico.

² The National OCS oil and gas leasing program Final Programmatic EIS was ordered to be rescinded by Executive Order 3418, issued 3 February 2025. As of late March 2025, the EIS has yet to be formally rescinded.

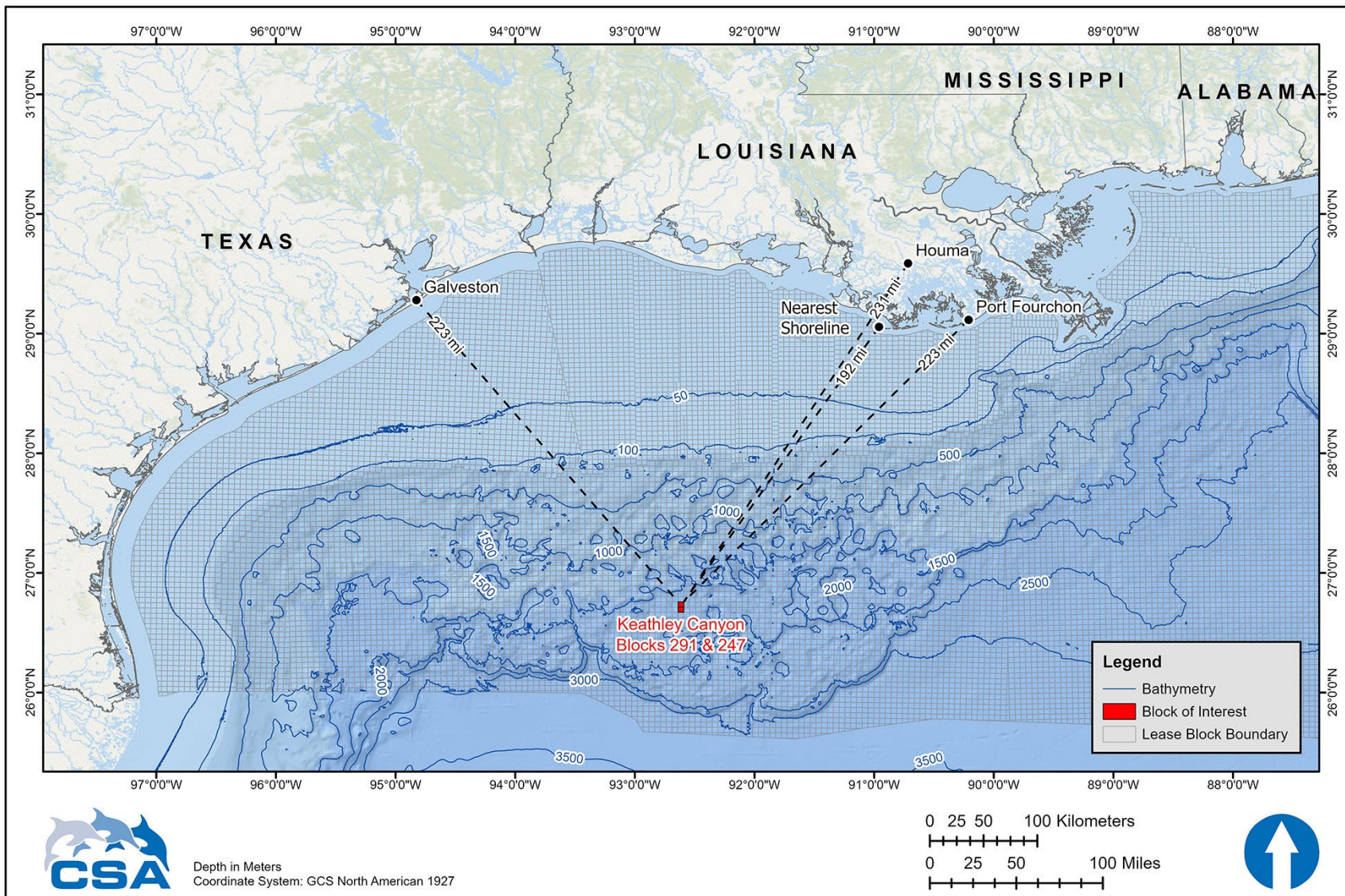


Figure 1. Location of Keathley Canyon Blocks 291 and 247 relative to the Texas and Louisiana shorelines and offshore bathymetric contours.

Oil spill response-related activities for the well to be drilled under this EP are governed by the bp Regional Oil Spill Response Plan (ROSRP), as filed by BP America Inc. (Operator No. 21372) under cover letter dated 9 December 2024. The ROSRP was filed on behalf of several affiliated companies, including BP Exploration & Production Inc. (Operator No. 02481). The ROSRP was confirmed in compliance and approved by the Bureau of Safety and Environmental Enforcement (BSEE) on 10 January 2025. The bp ROSRP should meet the requirements contained in 30 CFR Part 254 and as operator, bp (Operator No. 02481) 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.” The bp ROSRP details the plan for response to manage oil spills that may result from drilling and production operations with a designed response program based on regional capabilities to address spills ranging from small operations-related spills to a worst-case discharge (WCD) from a well blowout. The program, as detailed in bp’s ROSRP is intended to meet requirements of the relevant coastal states and applicable federal oil spill planning regulations. It also includes information regarding bp’s incident management team (IMT) and dedicated response assets, potential spill risks, and local environmentally sensitive areas. The ROSRP describes personnel and equipment mobilization, the IMT organization, and an overview of strategies, actions and notifications to 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, 2021a) | 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. |

Table 1. (Continued).

| NTL | Title | Summary |
|---|---|---|
| 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 Mammal Protection Act. Reissued in June 2020 to address instances where guidance in the 2020 NMFS Biological Opinion (NMFS, 2020a) replaces compliance with this NTL. |
| 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 (WCD) and Blowout Scenarios | Provides guidance regarding information required in WCD descriptions and blowout scenarios. |
| 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 America. |
| 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 WCD 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 <i>Federal Register</i> [FR] 63346). Informs operators that BOEM 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. |

Table 1. (Continued).

| NTL | Title | Summary |
|----------|--|---|
| 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 >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 <300 m (984 ft) in the Gulf of America. |
| 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 America OCS Region as required under 30 CFR Part 253. |

BOEM = Bureau of Ocean Energy Management; BSEE = Bureau of Safety and Environmental Enforcement; NMFS = National Marine Fisheries Service; OCS = Outer Continental Shelf.

A. Impact-Producing Factors

Based on the description of bp’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 sound 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 sound); and
- Accidents.

A.1 Drilling Rig Presence, Marine Sound, and Lights

The activities proposed in this EP will be completed using DP vessels. 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 associated project vessels 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 be best suited or feasible. The selected drilling rig is expected to be on site for up to 220 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 vessel in the ocean, entanglement and entrapment from moon pools and equipment in the water, working and safety lighting on the rig, and underwater sound produced during drilling operations.

During the physical presence of the vessel activities there may be occasions where equipment may be suspended in the water column. Entanglement and entrapment of protected species can occur from equipment or mooring lines 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 or mooring 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.

| Environmental Resources | Impact-Producing Factors | | | | | | | | | |
|---|--|----------------------------------|-------------------------|---------------------|--------------|------------------------|---------------|------------------------------------|------------------|-----------------|
| | Drilling Rig Presence (incl. sound & 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) |
| Black-capped Petrel (Endangered) | X | -- | -- | -- | -- | -- | -- | X(8) | X(6,8) | X(6,8) |
| Rufa Red Knot (Threatened) | -- | -- | -- | -- | -- | -- | -- | X(8) | X(6,8) | X(6,8) |
| 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) |

Table 2. (Continued).

| Environmental Resources | Impact-Producing Factors | | | | | | | | | |
|---|--|----------------------------------|-------------------------|---------------------|--------------|------------------------|---------------|------------------------------------|------------------|-----------------|
| | Drilling Rig Presence (incl. sound & 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 |
| Queen conch | -- | -- | -- | -- | -- | -- | -- | -- | -- | 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) |
| 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) |

(1-8) See table footnotes on the following page.

X = potential impact; dash (--) = no impact or negligible impact.

Table 2 Footnotes and Applicability to this Program:

Footnotes are numbered to correspond to entries in **Table 2**; project applicability to each case is specified in a bullet point following the respective 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) *3-mile zone of the Flower Garden Banks, or the 4-mile zone of East and West Flower Garden 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 project activities (bp, 2024).
- (5) *Exploration or production activities where Hydrogen Sulfide (H₂S) concentrations greater than 500 ppm might be encountered.*
 - KC 291 and KC 247 are classified as H₂S Absent. See EP Section 4 for H₂S management information.
- (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. Per the Final Rule outlined in 89 FR 71160, bp has previously submitted an archaeological report that determined that none of the sonar contacts in the project area were identified as being archaeologically significant.
- (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**. Offshore vessels 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.

Drilling operations can be expected to produce sound 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 sound 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 root-mean-square sound pressure levels (SPL) 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 hertz (Hz) (Blackwell and Greene Jr., 2003; McKenna et al., 2012; Kyhn et al., 2014). Zykov (2016) characterized a noisier drillship thruster with SPL source levels ranging from 190 to 195 dB re 1 μPa m. Estimated source levels from a drillship or semisubmersible using thrusters can reach approximately 188 dB re 1 μPa m (Nedwell and Howell, 2004). Nedwell and Edwards (2004) reported that the majority of noise from a semi-submersible drilling rig occurred below 600 Hz, and the SPLs increased by 10 to 20 dB when drilling was active.

Drilling operations produce sound 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 kilohertz [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 SPL 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). SPL source levels for the vessel-mounted transceiver 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, novelty of the sound, nature of the sound (i.e., continuous vs. intermittent and impulsive vs. non-impulsive); 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).

There will be minimal disturbance to the seafloor and soft bottom communities during positioning drilling operations. Physical disturbance of the seafloor will be limited to the proximal area near the drill site.

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 8 and EP Appendix E. The primary air pollutants typically associated with OCS activities are suspended particulate matter (PM_{2.5} and PM₁₀), sulfur oxides (SO_x), nitrogen oxides (NO_x), volatile organic compounds (VOCs), and carbon monoxide (CO) (Reşitoğlu et al., 2015), as well as ammonia (NH₃) and lead (Pb) per NTL BOEM-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 project emissions will not significantly affect the air quality of the onshore area for any of the criteria pollutants. No further analysis or control measures are required.

A.4 Effluent Discharges

Effluent discharges are summarized in EP Section 7.2 and EP Appendix D. 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) Region 6 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 (WBM) 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. Blowout prevention fluids also are expected to be discharged during the setting of the BOP, diverter systems testing after drilling fluids displacement, and at regular testing intervals at NPDES allowable de minimis levels. Drill cuttings generated during synthetic-based drilling mud

(SBM) operations will be collected on the rig in dry cuttings boxes. SBM will either be reused by the vendor on the rig or transported via bulk tank containers 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 Base Fluids Retained on Cuttings (RoC %) percentage as listed in NPDES permit conditions averaged over all well sections. Dry cuttings are sent ashore in cutting boxes for disposal at approved facilities. Well treatment fluids, well completion fluids, well workover fluids, residual drilling fluids adhered to marine risers and minor drips/splatters around mud and solids control equipment also are expected to be contained, handled or discharged in accordance with the specified conditions, terms, or limitations in the NPDES permit.

Drilling fluids or cuttings will not be discharged if they fail the static sheen test defined in Appendix 1 of 40 CFR 435, Subpart A.

Other marine vessel effluent discharges are expected from drilling activities and are expected to be discharged in accordance with the conditions in the NPDES permit or USCG regulations (33 CFR 151.51-151.79 and 33 CFR 159) that pertain to the International Convention for the Prevention for Pollution from Ships (MARPOL) 73/78 Annex IV & V. These marine operations effluents include miscellaneous discharges that are untreated, effluents that are treated before discharge, and substances removed during wastewater control. Miscellaneous discharges will consist of uncontaminated seawater/freshwater, such as uncontaminated ballast/bilge water, fire water, cooling water, potable water, graywater from dishwater, shower, laundry, bath, and washbasin drains, off-specification potable water and desalination unit discharge. Chemically treated effluents include seawater/freshwater to which treatment chemicals such as biocides or corrosion inhibitors have been added, sewage processed through a marine sanitation device, and deck drainage effluents passed through the drillship oil-water separator. Removed substances include, but are not limited to, solids, sewage sludges, filter backwash, and other pollutants removed from wastewater removed in the course of treatment or wastewater control shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

Waste streams that contain free oil will not be discharged as evidenced by the monitoring method specified for that particular stream (e.g., deck drainage) or miscellaneous discharges will not be discharged when they would cause a film or sheen upon or discoloration of the surface of the receiving water.

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 project vessels, including 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 >2 million gallons of water per day, of which at least 25% is used for cooling purposes. It is expected that the drilling rig and support vessels 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 7.1. Wastes generated during the proposed project are expected to be properly stored and segregated on the drilling rig and support vessels. Wastes are expected to be packaged in appropriate non-hazardous or hazardous waste containers for transportation to shore for disposal in an appropriately permitted facility. All other wastes generated by bp and its contractors are managed by their respective waste management procedures. Compliance with established bp waste management practices and procedures is expected to result in either no impacts or negligible impacts.

A.7 Marine Debris

All activities of bp and its contractors relating to solid waste handling, transportation, and disposal will intend to comply with all applicable regulations, including MARPOL 73/78 Annex V requirements, and USEPA, 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 materials. 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, bp and its contractors intend to exercise caution in the handling and disposal of small items and packaging materials, require the posting of informational placards at prominent locations on offshore vessels and structures, and mandate 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 impacts 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 sound. The existing shorebase facilities at Port Fourchon, Louisiana, will be used by bp for support vessel activities. Support helicopters are expected to be based at heliport facilities in Houma, 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, 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. In April 2021 (NMFS, 2021a), the 2020 NMFS Biological Opinion Appendix C Vessel Strike Avoidance and Dead/Injured Protected Species Reporting Protocols (NMFS, 2020a) was amended.

The project will be supported by onshore crew boats and supply vessels making trips two to four days per week, as well as a diesel oil supply vessel making weekly trips as needed. The boats typically move to the project area via the most direct route from the shorebase.

A helicopter will make approximately four 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) overpopulated 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).

Table 3 summarizes generalized and estimated fuel capacity and trip frequency of the support vessels and aircraft.

Table 3. Estimated support vessel and aircraft fuel capacity and trip frequency or duration in Keathley Canyon Blocks 291 and 247 during the proposed project.

| Vessel/Aircraft Type | Estimated Fuel Tank Storage Capacity | Estimated Trip Frequency or Duration |
|----------------------|--------------------------------------|--------------------------------------|
| Helicopter | 730 gal | 4 flights per week |
| Crew boats | 1,000 bbl | 2–4 per week |
| Supply boats | 5,000 bbl | 2–4 per week |

bbl = barrels; gal = gallons.

A.8.2 Operational Sound

Offshore support vessels associated with the proposed project will contribute to the overall acoustic environment by transmitting sound through both air and water. The support vessels will use conventional diesel-powered screw propulsion. Vessel sound is a combination of narrow band (tonal) and broadband sound (Richardson et al., 1995; Hildebrand, 2009; McKenna et al., 2012). Tones typically dominate frequencies up to approximately 60 Hz, whereas broadband sounds may extend to 100 kHz. The primary sources of vessel sound are propeller cavitation, propeller singing, and main population thrust bearing rhythmic pulses; other sources include engine sound, flow sound from water dragging along the hull, and bubbles breaking in the vessel’s wake (Richardson et al., 1995). The intensity of sound from support vessels is roughly related to ship size, weight, and speed. Broadband SPL source levels for smaller boats (a category that includes supply and other service vessels) are in the range of 150 to 180 dB re 1 μ Pa m (Richardson et al., 1995; Hildebrand, 2009; McKenna et al., 2012).

Dominant tones for helicopters are generally below 500 Hz with SPL source levels ranging from approximately 149 to 151 dB re 1 μ Pa m (for a Bell 212 helicopter) (Richardson et al., 1995). However, underwater sound 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). Penetration of aircraft sound below the sea surface is greatest directly below the aircraft. Aircraft sound produced at angles >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 sound 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).

Because of the relatively high expected airspeeds during transits and these physical variables, aircraft-related sound (including both airborne and underwater sound) is expected to be very brief in duration.

A.9 Accidents

The accidents addressed in the EIA focus 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 bp's spill response plans. Impacts from these accidents are analyzed in **Section C**.

Recent EISs (BOEM, 2012a,b; 2013; 2014a; 2015; 2016b; 2017) 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 H₂S 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; 2017). 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; 2017). BOEM (2016a) noted that most OCS blowouts have resulted in the release of gas.

The robust system bp has in place to prevent loss of well control includes measures to prevent a blowout, reduce the likelihood of a blowout, and conduct effective and early blowout intervention as described in the NTL 2015-N01 package submitted with this EP, as required by BOEM (as discussed in **Section A.9.2**). 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 205 OCS-related collisions between 2007 and 2023 (BSEE, 2024a). 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 (2017), vessel collisions occasionally occur during routine operations. Some of these collisions have caused spills of diesel fuel or chemicals. bp 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 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. bp and its contractors intend to comply with all BOEM and BSEE safety requirements 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, 2017) 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 <1 bbl. Potentially spilled fluids include Transaqua HT, monoethylene glycol 50/50, or methanol. 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, 2017).

Drilling Fluid Spills. There is the potential for drilling fluids, specifically SBMs, to be spilled due to an accidental riser disconnect (BOEM, 2017). 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.

H₂S Release. KC 291 and KC 247 are classified as H₂S Absent. See EP Section 4 for H₂S management information.

A.9.1 Small Fuel Spill

Spill Size. According to the analysis by BOEM (2017), 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 America Planning Areas (Anderson et al., 2012). As the spill volume increases, the incident rate declines dramatically (BOEM, 2017). 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 America. 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 192 statute miles (309 km) from the nearest shoreline (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).

Spill Response. 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 bp's response efforts if a spill were to occur during operational activities is provided in EP Appendix G.

Weathering. 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 bp's ROSRP, which meets the requirements contained in 30 CFR Part 254.

A.9.2 Large Oil Spill (Worst Case Discharge)

Under this EP, bp proposes to drill two wells (KC 291 A and KC 291 B). The uncontrolled blowout scenario is for a potential blowout of the well which bp calculates has the highest liquid hydrocarbons rate potential in the area.

Spill Size. Day 1 WCD is estimated to be 43,453 barrels of oil per day (BOPD). The maximum duration of the blowout is estimated at 115 days. The rate profile associated with the well blowout over this 115-day scenario results in a potential worst case spill volume estimated at 4.7 million bbl.

Spill Probability. Statistics from offshore drilling in the U.S. Gulf of America 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 SINTEF³ 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).

bp is expected to comply with NTL 2010-N10 and the drilling safety regulations in 30 CFR Part 250, Subparts D and G, which specify additional safety measures for OCS activities.

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 America.

The results for Launch Area W026 (where KC 291 and KC 247 are located) are presented in **Table 4**. The model predicts a <0.5% chance of contact with any shoreline within 10 days of a spill. Shoreline contact is predicted within 30 days for shorelines ranging from Cameron County, Texas to Terrebonne Parish, Louisiana. The conditional probability of shoreline contact is low (1 to 4%) for all shorelines with predicted contact within 30 days.

³ Stiftelsen for industriell og teknisk forskning (Foundation for Scientific and Industrial Research, Norwegian Institute of Technology).

Table 4. Conditional probabilities of a spill in the lease area contacting shoreline segments (From: Ji et al., 2004). Values are conditional probabilities that a hypothetical spill in the lease area (represented by Oil Spill Risk Analysis Launch Area W026) could contact shoreline segments within 3, 10, or 30 days.

| Shoreline Segment | County or Parish and State | Conditional Probability of Contact ¹ (%) | | |
|-------------------|------------------------------|---|---------|---------|
| | | 3 Days | 10 Days | 30 Days |
| C01 | Cameron County, Texas | -- | -- | 1 |
| C03 | Kenedy County, Texas | -- | -- | 1 |
| C04 | Kleberg County, Texas | -- | -- | 1 |
| C06 | Aransas County, Texas | -- | -- | 1 |
| C07 | Calhoun County, Texas | -- | -- | 1 |
| C08 | Matagorda County, Texas | -- | -- | 3 |
| C09 | Brazoria County, Texas | -- | -- | 1 |
| C10 | Galveston County, Texas | -- | -- | 2 |
| C12 | Jefferson County, Texas | -- | -- | 2 |
| C13 | Cameron Parish, Louisiana | -- | -- | 4 |
| C14 | Vermilion Parish, Louisiana | -- | -- | 2 |
| C15 | Iberia Parish, Louisiana | -- | -- | 1 |
| C17 | Terrebonne Parish, Louisiana | -- | -- | 1 |

¹ Conditional probability refers to the probability of contact within the stated time period, assuming that a spill has occurred (-- indicates <0.5%).

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 >1,000 bbl.

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. All proposed activities and facilities in this EP will be covered by the Gulf of Mexico ROSRP filed by BP America Inc. (Operator No. 21372) under cover letter dated 9 December 2024 on behalf of several companies listed in the plan including bp Exploration & Production Inc. (Operator No. 02481) and approved by BSEE on 10 January 2025.

The bp ROSRP includes information about enhanced measures for responding to a spill in open water, near shore spill response, and shoreline spill response based on lessons learned from the *Deepwater Horizon* oil spill. In compliance with the requirements of 30 CFR Part 254 and related NTLs, bp's ROSRP includes the following:

- Provisions to maintain access to a supply of dispersant and fire boom for use in the event of an uncontrolled, long-term blowout, for the length of time required to drill a relief well;
- Contingencies for maintaining an ongoing response for the length of time required to drill a relief well;
- A description of the measures and equipment necessary to maximize the effectiveness and efficiency of the response equipment used to recover the discharge on the water's surface. The description will include methods to increase encounter rates, the use of vessel tracking, and the use of remote sensing technologies;
- Information on remote sensing technology and equipment to be used to track oil slicks, including oil spill detection systems and remote thickness detection systems (such as X-band/infrared systems);
- Information pertaining to the use of vessel tracking systems and communication systems between response vessels and spotter personnel;
- A shoreline protection strategy that is consistent with applicable area contingency plans; and
- For operations using a subsea BOP or a surface BOP on a floating facility, a discussion regarding strategies and plans related to source abatement and control for blowouts from drilling.

As a member of the Marine Spill Response Corporation, Clean Gulf Associates, and a client of the National Response Corporation, bp would utilize oil spill response organization personnel and equipment in the event of an oil spill in the Gulf of America. Primary response equipment for the activation of bp's ROSRP is located in Houma, Louisiana; Lake Charles, Louisiana; Galveston, Texas; Pensacola, Florida; Mobile, Alabama; Pascagoula, Mississippi; Ft. Jackson, Louisiana; Venice, Louisiana; and Corpus Christi, Texas. The preplanned staging area for this EP is Port Fourchon, Louisiana.

See EP Appendix G for a detailed description of bp's ROSRP and site-specific response for an oil spill associated with this project.

B. Affected Environment

The project area is in the central Gulf of America, approximately 192 statute miles (309 km) from the nearest shoreline (Isles Dernières, Louisiana), 223 statute miles (359 km) from the onshore support base at Port Fourchon, Louisiana, and 231 statute miles (359 km) from the helicopter base at Houma, Louisiana (**Figure 1**). The water depth at the location of the proposed activities ranges from approximately 1,744 m (5,722 ft) (**Figure 2**).

The seafloor in the vicinity of the proposed activities is expected to be comprised of soft marine clays (bp, 2024). Additional information on autonomous underwater vehicle interpretation of the seafloor sediments is provided in bp (2024).

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 previously developed EISs (BOEM, 2012a; 2013; 2014a; 2015; 2016b; 2017, 2023a,b). These regional descriptions, applicable to KC 291 and KC 247, 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**.

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 America Planning Areas (BOEM, 2013; 2014a; 2015; 2016a,b; 2017; 2023b) 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 America is relatively good (BOEM, 2012a). As of December 2024, 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, 2024). 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). One coastal metropolitan area in Florida (Tampa) was reclassified in October 2018 from a nonattainment area to maintenance status for lead based on the 2008 Standard (USEPA, 2024). Hillsborough County, Florida was reclassified in 2019 from a nonattainment area to maintenance status for sulfur dioxide based on the 2010 standard (USEPA, 2024).

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, 2017). The Gulf of America 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 air emissions modeling undertaken by bp, the project is not expected to cause an exceedance of NAAQS at any receptor. 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 will result primarily from 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, SO_x, NO_x, VOCs, CO, NH₃, and Pb. As noted by BOEM (2017), emissions from routine activities are projected to have minimal impacts on 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 bp'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 America and are not expected to significantly alter or exceed any of the climate change impacts evaluated in the Programmatic EIS (BOEM, 2016a). Carbon dioxide (CO₂) and methane (CH₄) 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; 2017), estimated CO₂ emissions from OCS oil and gas sources are 0.4% of the U.S. total. Although estimated air emissions from the project will exceed BOEM thresholds, modeling has shown that project emissions are not expected to result in the exceedance of NAAQS for any receptor.

As noted in the lease sale EIS (BOEM, 2017), emissions of air pollutants from routine activities in the Central Gulf of America 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 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 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 293 statute miles⁴ (472 km) from the Breton Wilderness Area. bp and its contractors intend to comply with all BOEM requirements regarding air emissions.

⁴ Distance calculated based on the nearest point of Keathley Canyon Block 247.

There are three Class I air quality areas on the west coast of Florida: St. Marks NWR in Wakulla County, Chassahowitzka NWR in Hernando County, and Everglades National Park in Monroe, Miami-Dade, and Collier counties. The project area is approximately 541 statute miles (871 km) from the closest Florida Class I air quality area (St. Marks NWR Class I Air Quality Area). bp expects to comply with emissions requirements as directed by BOEM.

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; 2017, 2023a,b). The probability of a small spill would be minimized by bp's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of bp's ROSRP is expected to reduce the potential impacts. EP Appendix G 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; 2017; 2023a,b). 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 (192 statute miles [309 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 America are relatively similar with respect to patterns of water column temperature, salinity, and oxygen (BOEM, 2017), with the exception of the hypoxic zone off the coast of the Atchafalaya River and Mississippi River basin. 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 America, there are localized areas (termed natural seeps) that release oil, gas, and brines from subsurface 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 project activities (bp, 2024).

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 WBM 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.

WBM 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 and support vessels 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.

The drilling rig and 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 to 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; 2017, 2023a, b). 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 bp's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of bp's ROSRP is expected to potentially help mitigate and reduce the impacts. EP Appendix G 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 (i.e., ultra-low-sulfur marine 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, 2023). It is possible for the diesel fuel that is dispersed by wave action to form droplets that are small enough to 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 America.

Some vessels may contain heavy fuel oil (i.e., No. 6 Fuel Oil, Bunker C) that may sink or be suspended in the water column. This fuel can stick to surfaces and does not readily disperse or breakdown from weathering. However, encounters with these vessels are considered rare and not further discussed.

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; 2023). 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; 2017, 2023a,b). 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, 2017).

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 192 statute miles (309 km) from the nearest shoreline (Isles Dernières, 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 <30 days. The 30-day OSRA modeling (**Table 4**) indicates nearshore waters and embayments from Cameron County, Texas to Terrebonne Parish, Louisiana, could be affected within 30 days of a spill (1% to 4% conditional probability within 30 days).

C.2 Seafloor Habitats and Biota

The water depth at the location of the proposed wellsite is approximately 1,744 m (5,722 ft). According to BOEM (2016a), existing information for the deepwater Gulf of America indicates that the seafloor is composed primarily of soft sediments; exposed hard substrate habitats and associated biological communities are rare. The site clearance letters did not note the presence of hard bottom communities or potential seepage locations within 610 m (2,000 ft) of the proposed project activities (bp, 2024). 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 one station in a water depth similar to that in the proposed project area.

Table 5. Baseline benthic community data from a station near the project area in a similar depth 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 (>63 μm ; individuals m^{-2}) | Macrofauna (>300 μm ; individuals m^{-2}) | Megafauna (>1 cm; individuals ha^{-1}) |
| NB4 | 2,030 | 148,409 | 1,443 | -- |

Meiofaunal and megafaunal abundances from Rowe and Kennicutt (2009); macrofaunal abundance from Wei (2006). ha = hectare. -- = no data available.

Densities of meiofauna (animals passing through a 0.5-mm sieve but retained on a 0.062-mm sieve) at station in the vicinity of the project area was approximately 148,409 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 America continental slope (Wei, 2006). Densities decrease exponentially with water depth. Based on the Wei (2006) equation, the macroinfauna density in the project area is expected to be approximately 1,867 individuals m⁻².

Polychaetes are typically the most abundant macroinfaunal group on the northern Gulf of America 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 America 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 lease area is in Zones 2W and 3W. Zone 2W consists of stations on the middle Texas-Louisiana Slope. The most abundant species in this zone were the polychaetes *Aricidea suecica*, *Levinsenia uncinata*, *Macrochaeta clavicornis*, *Paraonella monilaris*, and *Tharyx marioni*. Zone 3W consists of stations on the mid Texas-Louisiana Slope. The most abundant species in this zone were the polychaetes *Levinsenia uncinata*, *Paraonella monilaris*, and *Tachytrypa* spp.; the bivalve *Heterodonta* spp.; and the isopod *Macrostylis* spp.

Common megafauna observed during the Northern Gulf of Mexico Continental Slope Habitats and Benthic Ecology Study included motile taxa such as echinoderms, cnidarians (sessile sea anemones, pens and whips), decapod crustaceans, and demersal fish (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 proposed project are expected to be small compared to the lease area itself, and these types of soft bottom communities are ubiquitous along the northern Gulf of America 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 to 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 WBM 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 WBM (Boehm et al., 2001; Fink, 2015). The main impacts will be burial and smothering of benthic organisms within several meters to tens of meters around the wellbore where cuttings and WBM 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 America 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 H₂S 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, 2017). 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 America in 1984 and have been studied extensively (MacDonald, 2002). Deepwater coral communities are also known from numerous locations in the Gulf of America (Brooke and Schroeder, 2007; CSA International, 2007; Brooks et al., 2012). In the Gulf of America, deepwater coral communities occur almost exclusively on exposed authigenic carbonate rock created by a biogeochemical (microbial) process.

Monitoring programs on the Gulf of America 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 wellsite clearance letter for the proposed wells (bp, 2024), there are no seafloor features that could support high-density deepwater benthic communities within 610 m (2,000 ft) of the proposed wellsites. 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, 2017). During the *Deepwater Horizon* spill, subsurface plumes were reported at a water depth of approximately 1,100 m (3,600 ft), extending at least 55 miles (89 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, 2017). 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 America 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, 2011; 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; 2017, 2023a,b). 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, 2023a).

C.2.3 Designated Topographic Features

KC 291 and KC 247 are 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 69 statute miles (111 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 302 statute miles (486 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 America 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 America Planning Area. The nearest block covered by the Live Bottom Stipulation, as defined by NTL 2009-G39, is located approximately 344 statute miles (554 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 America). 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, marine invertebrates, and fishes in the Gulf of America. The USFWS has jurisdiction for ESA-listed birds, terrestrial and freshwater species (e.g., beach mice, Florida salt marsh vole [*Microtus pennsylvanicus dukecampbelli*], Panama City crayfish [*Procambarus econfinae*]); the West Indian manatee (*Trichechus manatus*), 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 America |
|---------------------------|--|------------------|--------------------|---------|---|
| | | | Project Area | Coastal | |
| Marine Mammals | | | | | |
| Rice's whale ¹ | <i>Balaenoptera ricei</i> | E | X | -- | None |
| Sperm whale | <i>Physeter macrocephalus</i> | E | X | -- | None |
| West Indian manatee | <i>Trichechus manatus</i> ² | T | -- | X | Florida (Peninsular) |
| Sea Turtles | | | | | |
| Loggerhead turtle | <i>Caretta caretta</i> | T,E ³ | X | X | Nesting beaches and nearshore reproductive habitat in Mississippi, Alabama, and Florida (Panhandle); <i>Sargassum</i> habitat including most of the central & western Gulf of America |
| Green turtle | <i>Chelonia mydas</i> | T | X | X | None |
| Leatherback turtle | <i>Dermochelys coriacea</i> | E | X | X | None |
| Hawksbill turtle | <i>Eretmochelys imbricata</i> | E | X | X | None |
| Kemp's ridley turtle | <i>Lepidochelys kempii</i> | E | X | X | None |
| Birds | | | | | |
| Piping Plover | <i>Charadrius melodus</i> | T | -- | X | Coastal Texas, Louisiana, Mississippi, Alabama, and Florida (Panhandle) |
| Whooping Crane | <i>Grus americana</i> | E | -- | X | Coastal Texas (Aransas National Wildlife Refuge) |
| Black-capped Petrel | <i>Pterodroma hasitata</i> | E | X | -- | None |
| Rufa Red Knot | <i>Calidris canutus rufa</i> | T | -- | X | None |
| Fishes | | | | | |
| Oceanic whitetip shark | <i>Carcharhinus longimanus</i> | T | X | -- | None |
| Giant manta ray | <i>Mobula birostris</i> | T | X | X | None |
| Gulf sturgeon | <i>Acipenser oxyrinchus desotoi</i> | T | -- | X | Coastal Louisiana, Mississippi, Alabama, and Florida (Panhandle) |
| Nassau grouper | <i>Epinephelus striatus</i> | T | -- | X | None |
| Smalltooth sawfish | <i>Pristis pectinata</i> | E | -- | X | Southwest Florida |
| Invertebrates | | | | | |
| Elkhorn coral | <i>Acropora palmata</i> | T | -- | X | Florida Keys and the Dry Tortugas |
| Staghorn coral | <i>Acropora cervicornis</i> | T | -- | X | Florida Keys and the Dry Tortugas |
| Pillar coral | <i>Dendrogyra cylindrus</i> | T | -- | X | Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, and Navassa Island |

Table 6. (Continued).

| Species | Scientific Name | Status | Potential Presence | | Critical Habitat Designated in Gulf of America |
|---|---|--------|--------------------|---------|---|
| | | | Project Area | Coastal | |
| Rough cactus coral | <i>Mycetophyllia ferox</i> | T | -- | X | Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, and Navassa Island |
| Lobed star coral | <i>Orbicella annularis</i> | T | -- | X | Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank |
| Mountainous star coral | <i>Orbicella faveolata</i> | T | -- | X | Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank |
| Boulder star coral | <i>Orbicella franksi</i> | T | -- | X | Southeast Florida and Florida Keys, Puerto Rico, St. Thomas, St. John, St. Croix, Navassa Island, East and West Flower Garden Banks, Rankin Bright Bank, Geyer Bank, and McGrail Bank |
| Panama City crayfish | <i>Procambarus econfinae</i> | T | -- | X | South-central Bay County, Florida |
| Queen conch | <i>Aliger gigas</i> | T | -- | X | None |
| Terrestrial Mammals | | | | | |
| Beach mice (Alabama, Choctawhatchee, Perdido Key, St. Andrew) | <i>Peromyscus polionotus</i> subsp. <i>Ammobates</i> , <i>allophrys</i> , <i>trissyllepsis</i> , and <i>peninsularis</i> , respectively | E | -- | X | Alabama and Florida (Panhandle) beaches |
| Florida salt marsh vole | <i>Microtus pennsylvanicus dukecampbelli</i> | E | -- | X | None |

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

¹ In 2021, the 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 America 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 America.

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 America (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*), Rufa Red Knot (*Calidris canutus rufa*) Florida salt marsh vole, Panama City crayfish, Whooping Crane (*Grus americana*), Gulf sturgeon (*Acipenser oxyrinchus desotoi*), smalltooth sawfish (*Pristis pectinata*), queen conch (*Aliger gigas*) and four subspecies of beach mouse. Critical habitat has been designated for all of these species (except the Florida salt marsh vole, Rufa Red Knot, and queen conch) 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*), and the Black-capped Petrel (*Pterodroma hasitata*) 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 America for the leatherback turtle, Kemp's ridley turtle, hawksbill turtle, green turtle, or the sperm whale.

Four Endangered mysticetes (blue whale [*Balaenoptera musculus*], fin whale [*Balaenoptera physalus*], North Atlantic right whale [*Eubalaena glacialis*], and sei whale [*Balaenoptera borealis*]) have been reported in the Gulf of America, 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, 2017); therefore, they are not considered further in the EIA.

The Rice's whale exists in the Gulf of America 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 America. 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). However, recent work by Soldevilla et al. (2022a) suggests the range may be broader than previously thought (see **Section C.3.2**).

In several recent acoustic studies in the Gulf of America (Soldevilla et al., 2022a,b; 2024), all Bryde's whale complex individuals are assumed to be Rice's whales. However, Bryde's whales have a global tropical and subtropical range that can include the Gulf of America. Moreover, in the latest NMFS Rice's whale Marine Mammal Stock Assessment Report (Hayes et al., 2023), all previous data of Gulf of America Bryde's whales from studies that pre-dated the Rosel et al. (2021) study that determined that Rice's whales are a distinct species were now assumed to all be Rice's whales. However, it is unclear on what percentage of Bryde's whale complex individuals that live or previously lived in Gulf of America are Rice's whales vs Bryde's whales due to having no DNA studies that analyzed a representative population of Gulf of America Bryde's whale complex individuals.

The giant manta ray could occur in the project area but is most commonly observed in the Gulf of America at the Flower Garden Banks. The Nassau grouper (*Epinephelus striatus*) has been observed in the Gulf of America 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. The Panama City crayfish is a coastal species in south-central Bay County, Florida and is not expected to occur in the project area.

Seven Threatened coral species are known from the northern Gulf of America: elkhorn coral (*Acropora palmata*), staghorn coral (*Acropora cervicornis*), 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.3.18**).

There are no other Threatened or Endangered species in the Gulf of America 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 America; a species description is presented in the recovery plan for this species (NMFS, 2010b). Gulf of America 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 sound, 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 America, 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 America 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 America 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-m (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 >3,000 m (9,843 ft). Generally, groups of sperm whales observed in the Gulf of America 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 protected species observer (PSO) sighting reports from seismic mitigation surveys in the Gulf of America 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 America population (within the 95% utilization distribution) (Jochens et al., 2008).

IPFs that may potentially affect sperm whales include drilling rig presence, underwater sound, and lights; support vessel and helicopter marine sound; 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 Sound, and Lights

Sound 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 sound 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; Southall et al., 2021). Additionally, behavioral changes resulting from auditory masking may induce an animal to produce more calls, longer calls, or shift the frequency of the calls. For example, masking caused by vessel sound was found to result in a reduced number of sperm whale calls in the Gulf of America (Azzara et al., 2013).

NMFS (2024) lists sperm whales in the same functional hearing group (i.e., high frequency cetaceans) as most dolphins and other toothed whales (i.e., odontocetes), with an estimated hearing sensitivity from 150 Hz to 160 kHz. Therefore, the frequencies of drilling and DP vessel-related sound overlap with the hearing sensitivity range of sperm whales. Frequencies <150 Hz produced by the drilling operations may be audible but are not likely to be perceived with any significance by high 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 12 Hz and 28 kHz (Wartzok and Ketten, 1999; Southall et al., 2019). Generally, most of the vocalizations produced by sperm whales

vocalizations occur at frequencies below 10 kHz, although diffuse energy up to and past 20 kHz is common, with SPL source levels up to 236 dB re1 $\mu\text{Pa m}$ (Møhl et al., 2003).

Observations of sperm whales near offshore oil and gas operations suggest an inconsistent response to anthropogenic marine sound (Jochens et al., 2008). Most observations of behavioral responses of marine mammals to non-impulsive sources such as drilling sound, in general, involve short-term behavioral responses, which included onset of avoidance behavior and the cessation of feeding, resting, or social interactions (NMFS, 2010b; Southall et al., 2021). Animals can determine the direction from which underwater 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 sound sources (National Research Council, 2003b).

NMFS (2024) presents criteria that are used to determine auditory injury (i.e., permanent threshold shifts [PTS], temporary threshold shifts [TTS]) thresholds for marine mammals. Behavioral disturbance thresholds have not been updated in the most recent acoustic guidance (NMFS, 2024) and therefore, revert to thresholds established and published by NMFS in FR 70(7): 1871-1875 (NMFS and NOAA, 2005) and summarized in NMFS (2023a). For high frequency cetaceans exposed to non-impulsive sources (which include the proposed drilling operations), acoustic injury such as PTS estimated to occur when the animal has received a sound exposure level over 24 hours ($\text{SEL}_{24\text{h}}$) of 201 dB re 1 $\mu\text{Pa}^2 \text{ s}$. Similarly, TTS is estimated to occur when the animal has received an $\text{SEL}_{24\text{h}}$ of 181 dB re 1 $\mu\text{Pa}^2 \text{ s}$. Given the non-impulsive nature of drilling sound and the estimated source levels (**Section A.1**), sperm whales are unlikely to be exposed to sound above the PTS threshold. While sound during drilling rig operations may exceed the TTS threshold, it is expected that, due to the relatively stationary nature of these vessels, sperm whales would move away from the proposed operations area, reducing the duration that individuals are exposed to sound, further reducing the likelihood of TTS being realized. Therefore, due to transient nature of sperm whales and the stationary nature of drilling 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 $\text{SEL}_{24\text{h}}$ necessary for the onset of auditory threshold shifts.

Noise associated with proposed drilling operations may cause behavioral disturbance effects to sperm whales. Behavioral disturbance thresholds for marine mammals 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 sound levels alone does 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 marine sound sources (HDR [Athens, AL], 2022). Drilling-related marine sound 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 above ambient sound conditions sufficient enough to result in long-term behavioral effects 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; 2017) and therefore, are not identified as IPFs.

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 as well as the amendment in April 2021 (NMFS, 2021a). 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, 2021a).

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 (2021a) 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 sound 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 America stock of sperm whales is 2.0 (Hayes et al., 2022). 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 America) 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 <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 America, 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 (2017). 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 America 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 sound 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 bp's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of bp's ROSRP 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 (2017, 2023a,b). 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 sound, and 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 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., 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) and the amendment in April 2021 (NMFS, 2021a) replaces compliance with the NTL. Based on the current PBR level for the Gulf of America stock of sperm whales (2.0), mortality of a single sperm whale would constitute a significant impact to the local (Gulf of America) stock of sperm whales but would not likely be significant at the species level.

C.3.2 Rice's Whale (Endangered)

A study by Rosel et al. (2021), identified the genetically distinct northern Gulf of America 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 America. 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). **Figure 3** also shows the Rice's whale Biologically Important Area defined in 2015 after ESA Section 7 consultations between NMFS and other agencies, as well as the Rice's Whale Core Distribution Area defined in 2019 by NMFS.

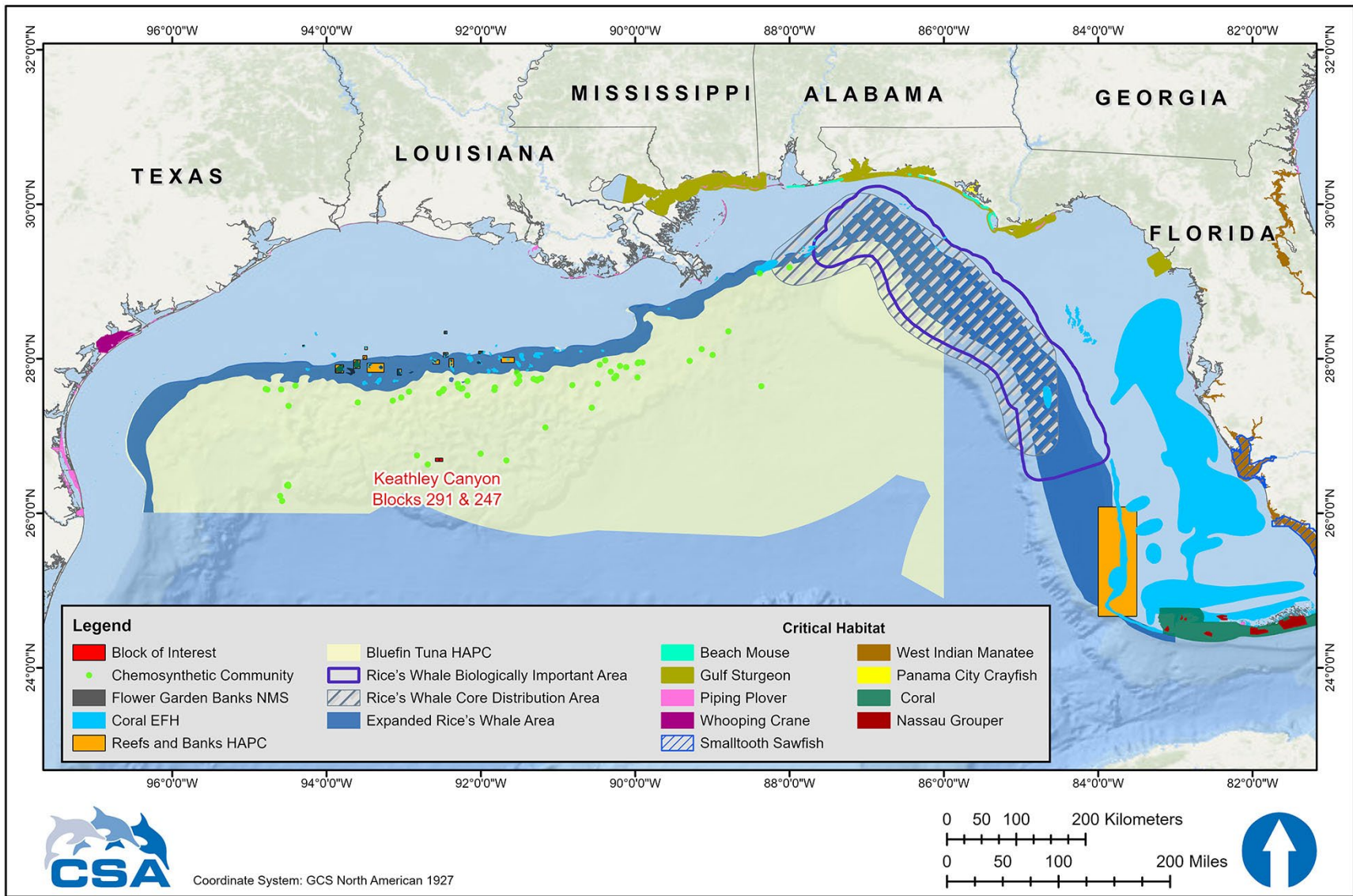


Figure 3. Location of selected environmental features in relation to the project area. EFH = Essential Fish Habitat; HAPC = Habitat Area of Particular Concern; NMS = National Marine Sanctuary.

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 America. Soldevilla et al. (2022a) identified new variants of long-moan calls along the northwestern Gulf of America shelf break that were determined to share distinctive features with typical eastern Gulf of America long-moan calls. A genetically confirmed sighting of a Rice's whale individual offshore Corpus Christi, Texas in 2017, along with the newly identified long-moan calls in the northwestern Gulf of America indicate that Rice's whales may occur in a broader range in the Gulf of America than previously known and this broader range should be considered when designating critical habitat. It is not currently possible to differentiate between Rice's whales and Bryde's whales without performing DNA sampling or by examining the skull from a deceased specimen. For the purposes of mitigation, any Bryde's whale complex individual detected would be treated as a possible Rice's whale.

Kiszka et al. (2023) studied the drivers of resource selection by Rice's whale in relation to prey availability and energy density. The study indicated that Rice's whales are selective predators consuming schooling prey with the highest energy content (i.e., silver rag [*Ariomma bondi*]). The silver rag is found at a depth range of 25 to 640 m (82 to 2,100 ft) primarily over muddy bottoms on the OCS though juveniles can be within the surficial waters (Smithsonian Tropical Research Institute, 2015). Therefore, it is unlikely that Rice's whales would occur in the project area. However, support vessels transiting through the 25 to 640 m (82 to 2,100 ft) water depths could encounter a Rice's whale, although unlikely given the rate of sightings of the whales.

In 2014, a petition was submitted to designate the northern Gulf of America 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 America 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 sound, 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 America.

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**).

Impacts of Drilling Rig Presence, Marine Sound, and Lights

NMFS (2024) lists Rice's whales in the functional hearing group of low-frequency cetaceans (baleen whales), with an estimated hearing sensitivity from 7 Hz to 36 kHz. Noise produced by the drilling rig and project-associated vessels may be emitted at levels that could potentially

disturb individual whales or mask the sounds animals would normally produce or hear. Sound associated with drilling activities are relatively weak in intensity relative to impulsive sources such as airgun sound, 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) SPL 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.

NMFS (2024) presents criteria that are used to determine physiological (i.e., auditory injury) thresholds for marine mammals. For low-frequency cetaceans, specifically the Rice's whale, permanent and temporary threshold shift onset from non-impulsive sources is estimated to occur at SEL_{24h} of 197 dB re 1 μPa^2 s and 177 re 1 μPa^2 s, respectively. Given the non-impulsive nature of drilling sound and the estimate source levels, Rice's whales are unlikely to be exposed to noise above the PTS threshold. While sound during drilling operations may exceed the TTS threshold, it is expected that, due to the relatively stationary nature of the drilling rig and support vessels, Rice's whales would move away from the proposed operations area, reducing the duration that individuals are exposed to project-related underwater sound, further reducing the likelihood of auditory injuries being realized. Additionally, the project area is in the Central Gulf of America OCS Planning Area, approximately 192 statute miles (309 kilometers [km]) from the nearest shoreline in Louisiana in water depths ranging from approximately 1,744 m (5,722 ft) which is outside the main distribution range identified for this species (88 FR 47453; NOAA Fisheries, 2023a) so it is unlikely this species will be exposed to drilling sound associated with the project. Therefore, due to the short propagation distance of above-threshold SEL_{24h}, the stationary nature of the proposed activities, and the low likelihood of encountering this species in the project area, it is not expected that any Rice's whales will receive exposure levels necessary for the onset of auditory threshold shifts.

Received SPL of 120 dB re 1 μPa from non-impulsive, continuous 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).

Drilling-related sound associated with this project may contribute to increases in the ambient sound environment of the region but are not expected to cause sound-related impacts to Rice's whales. Drilling rig lighting and presence are not expected to impact Rice's whales (BOEM, 2017).

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. Kiszka et al. (2023) indicated through Bayesian stable isotope mixing models that Rice's whales primarily feed on silver rag found between 25 and 640 m (82 and 2,100 ft) water depths. Although it is unlikely support vessels will encounter Rice's whale given that they are primarily found over DeSoto Canyon between the 100 m (328 ft) and 1,000 m (3,280 ft) isobaths (**Figure 2**; Rosel et al., 2016; Hayes et al., 2021).

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) and the amendment in April 2021 (NMFS, 2021) 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, 2021). 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, 2021).

The current PBR level for the Gulf of America stock of Rice's whale is 0.1 (Hayes et al., 2022). Mortality of a single Rice's whale would constitute a significant impact to the local (Gulf of America) 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 sound, 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; 2017; NMFS, 2020a). Due to the brief potential for disturbance the low density of Rice's whales in the Gulf of America, 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; 2017; 2023a,b). 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 bp's ROSRP 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 (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; 2017; 2023a,b), 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, and 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, 2021a) (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 America subspecies and stock (0.1). Mortality of a single Rice's whale would constitute a significant impact to the local (Gulf of America) stock of Rice's whales. The core distribution area for Rice's whales is within the eastern Gulf of America OCS Planning Area; therefore, it is 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 America 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 192 statute miles (309 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 and in an amendment published in April 2021 (NMFS, 2021a). Vessel collision avoidance measures described in NMFS (2020a, 2021) 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 (164 ft) if practical. This does not apply to any vessel towing gear (e.g., source towed array and site clearance trawling).

Compliance with these mitigation measures will minimize the likelihood of vessel collisions as well as reduce the chance of 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 on 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) overpopulated 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, 2017; NMFS, 2020a, 2021a). 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 modeling (Table 4) indicates nearshore waters and embayments from Cameron County, Texas to Terrebonne Parish, Louisiana could be affected within 30 days of spill (1 to 4% conditional probability).

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 sound, 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, 2017). 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, 2021a) (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 America; 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 discussed previously, there are 20 additional species of whales and dolphins (cetaceans) that may be found in the Gulf of America, including dwarf and pygmy sperm whales (*Kogia sima* and *K. breviceps*), 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 (*Stenella attenuata*), spinner dolphin (*S. longirostris*), and bottlenose dolphin (*Tursiops truncatus*). A brief summary is presented below, and additional information on these groups is presented by BOEM (2017).

Dwarf and pygmy sperm whales. At sea, it is difficult to differentiate dwarf sperm whales from pygmy sperm whales, and sightings are often grouped together as *Kogia* spp. Both species have a worldwide distribution in temperate to tropical waters. In the Gulf of America, 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; Hayes et al., 2023). Either species could occur in the project area.

Beaked whales. Four species of beaked whales are known to occur in the Gulf of America: Blainville's beaked whale (*Mesoplodon densirostris*), Sowerby's beaked whale (*M. bidens*), Gervais' beaked whale (*M. europaeus*), and Cuvier's beaked whale (*Ziphius cavirostris*).

Stranding records as well as passive acoustic monitoring in the Gulf of America (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 America 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 America (Pitman and Brownell, 2020). Blainville's beaked whales are rare, with only four documented strandings in the northern Gulf of America (Würsig et al., 2000) and three sightings in the Gulf of America (Hayes et al., 2021).

Due to the difficulties of at-sea identification, beaked whales in the Gulf of America are identified either as Cuvier's beaked whales or are grouped into an undifferentiated species complex (*Mesoplodon* spp.). In the northern Gulf of America, they are broadly distributed in water depths >1,000 m (3,281 ft) over lower slope and abyssal landscapes (Davis et al., 2000; Hildebrand et al., 2015). Any of these species could occur in the project area (Hayes et al., 2022).

Delphinids. Fourteen species of delphinids are known from the Gulf of America, including Atlantic spotted dolphin (*Stenella frontalis*), bottlenose dolphin, 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, pygmy killer whale (*Feresa attenuata*), short-finned pilot whale (*Globicephala macrorhynchus*), Risso's dolphin (*Grampus griseus*), rough-toothed dolphin (*Steno bredanensis*), spinner dolphin, and striped dolphin (*Stenella coeruleoalba*). Any of these species could occur in the project area (Hayes et al., 2022).

The bottlenose dolphin is a common inhabitant of the northern Gulf of America, 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 America are separated into 31 geographically distinct population units, or stocks, for management purposes by NMFS (Hayes et al., 2023).

IPFs that potentially may affect non-endangered marine mammals include drilling rig presence, marine sound, 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 Sound, 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 sound that might otherwise be avoided. Drilling and support vessel presence and lighting are not considered as IPFs for marine mammals (BOEM, 2017).

If the vessel(s) are 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).

Sound from routine drilling operations has the potential to disturb marine mammals. As discussed in **Section A.1**, sound impacts would be expected at greater distances when DP thrusters are in use than with vessel and drilling sound 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 America. Eighteen of the 20 odontocete species are considered to be in the high-frequency functional hearing group and two species (*Kogia* spp.) are in the very high-frequency functional hearing group (NMFS, 2024). Thruster and drilling sound will affect each group differently depending on the frequency bandwidths produced by operations. Generally, sound produced by drilling rigs on DP is dominated by frequencies below 10 kHz. Thus, drilling rig DP sound sources are out of the audible range for the high frequency group.

For high-frequency cetaceans exposed to a non-impulsive source (like drilling operations), PTS is estimated to occur when the mammal has received a sound exposure level (SEL) of 201 dB re 1 μPa^2 s over a 24-hour period (SEL_{24}). Similarly, TTS is estimated to occur when the mammal has received an SEL of 181 dB re 1 μPa^2 s over a 24-hour period. Given the non-impulsive nature of drilling sound and the estimate source levels, marine mammals are unlikely to be exposed to noise above the PTS threshold. While sound originating from drilling operations may exceed the TTS threshold, it is expected that marine mammals would move away from the operations area, reducing the duration that individuals are exposed to project-related underwater sound, further reducing the likelihood of auditory injuries being realized. Therefore, due to the short propagation distance of above-threshold $\text{SEL}_{24\text{h}}$, the transient nature of marine mammals and the stationary nature of the proposed activities, it is not expected that any marine mammals will receive exposure levels necessary for the onset of auditory threshold shifts.

NMFS (2024) 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 and summarized in NMFS (2023a). 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).

BOEM (2012a) stated the source level from oil and gas production platforms are low with a frequency range of 50 to 500 Hz. It is expected that marine mammals within or near the project area would be able to detect the presence of the drilling rig and avoid exposure to higher energy sounds, particularly within an open ocean environment.

There are other OCS facilities and activities near the project area, and the region as a whole has a large number of similar sources (HDR [Athens, AL], 2021). Marine mammal species in the northern Gulf of America have been exposed to sound 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 drilling 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 (2017).

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 (164 ft) 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 knots 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 America are less than three 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., 2022). Mortality of individuals equal to or in excess of their PBR level would constitute a significant impact at a population level on the local (Gulf of America) 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, 2017; NMFS, 2020a).

Impacts of a Small Fuel Spill

Potential spill impacts on marine mammals are discussed by BOEM (2017; 2023a,b). 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 bp's preventative measures during fuel transfer. In the unlikely event of a spill, implementation of bp's ROSRP is expected to lessen the potential for impacts on marine mammals. EP Appendix G provides details 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 (2017; 2023a,b). 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 sound, 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, 2017). 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) and amendment in April 2021 (NMFS, 2021a) 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, 2017). Based on the current PBR level for several non-endangered cetacean species in the Gulf of America that are less than three 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., 2022), 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 America) 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, Kemp's ridley, and hawksbill turtles. As of 6 May 2016, the entire North Atlantic DPS of the green turtle is listed as Threatened (81 FR 20057). The DPS of loggerhead turtles that occurs in the Gulf of America is listed as Threatened.

Critical habitat has been designated for the loggerhead turtle in the Gulf of America as shown in **Figure 4**. Loggerhead turtles in the Gulf of America 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, 2021b). 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 America (and Atlantic Ocean) as critical habitat. *Sargassum* is a brown algae (Class Phaeophyceae) that takes on a planktonic, often epipelagic 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, green, hawksbill, and Kemp's ridley turtles (Witherington et al., 2012). 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, 2021b).

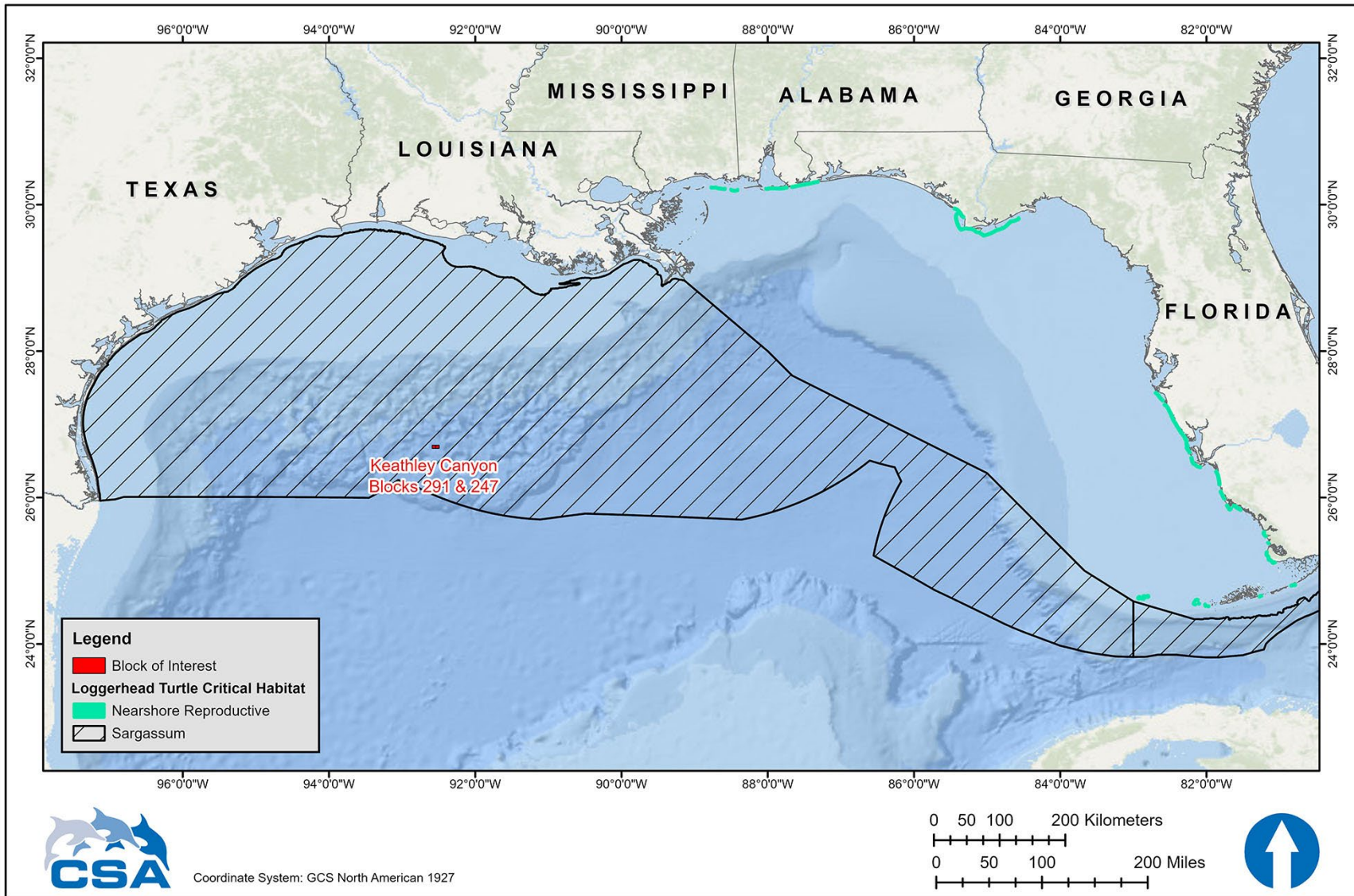


Figure 4. Location of loggerhead turtle designated *Sargassum* critical habitat and nearshore reproductive critical habitat in relation to the project area.

The nearest designated nearshore reproductive critical habitat for loggerhead sea turtles is approximately 332 statute miles (534 km) from the project area. The project area is located within 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 and green turtles 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 with the exception of leatherbacks may be present in deepwater areas, including the project area, where they may be associated with *Sargassum* rafts and other flotsam. Leatherbacks, while not specifically associated with *Sargassum*, do utilize similar pelagic habitats for foraging where *Sargassum* is routinely found. All five sea turtle species in the Gulf of America 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.

Sea turtle nesting in the northern Gulf of America 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 turtles – Green turtles are known to nest along the Florida Panhandle and in southwest Florida, from Tampa Bay south to Ten Thousand Island, and in the Florida Keys and Dry Tortugas (Florida Fish and Wildlife Conservation Commission, nd-b);
- Leatherback turtles – Leatherback turtles infrequently nest on Florida Panhandle beaches (Florida Fish and Wildlife Conservation Commission, 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 340 Kemp's ridley turtle nests were counted on Texas beaches in 2024 (Turtle Island Restoration Network, 2024). This is an increase from 2023 and 2022, when a total of 256 Kemp's ridley turtle nests were counted on Texas beaches in 2023 and a total of 284 Kemp's ridley turtle nests were counted during the 2022 nesting season. 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 sound, 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 Sound, 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 are derived from fish hearing data rather than from marine mammal hearing data in combination with the limited experimental data available (Popper et al., 2014). NMFS (2023a), which uses threshold estimates from Finneran et al. (2017), recommends SEL_{24h} PTS and TTS thresholds of 220 and 200 dB re 1 $\mu\text{Pa}^2 \text{ s}$, respectively, for non-impulsive sources, and an SPL behavioral threshold of 175 dB re 1 μPa for all sound sources. Based on the assessment conducted in the NMFS Biological Opinion (NMFS, 2020a), as well as the estimated source levels for drilling operations relative to the acoustic thresholds for sea turtles, there is a minimal likelihood of acoustic injury such as PTS in sea turtles, and behavioral responses to sounds produced by activities such as vessel operations are not expected beyond 10 m (33 ft) from the source. Certain sea turtles, especially loggerheads, may be attracted to offshore structures (Lohoefer 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(s) are 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 America (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) and amendment in April 2021 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, 2021). 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 and 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.

Sound 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 (2017; 2023a,b). 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 bp's preventative measures during fuel transfer. In the unlikely event of a spill, implementation of bp's ROSRP is expected to minimize potential impacts on sea turtles. EP Appendix G 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 332 statute miles (534 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 located within the designated *Sargassum* critical habitat for the loggerhead turtles (**Figure 4**). A small diesel fuel spill would likely affect *Sargassum* and juvenile turtles in this habitat. If juvenile sea turtles 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 America. However, if juvenile sea turtles are present in the area impacted, significant impacts on 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 sound, 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 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 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 bp's ROSRP is expected to minimize the potential for these types of impacts on sea turtles. EP Appendix G 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).

Loggerhead Critical Habitat – Nesting Beaches. 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 30-day OSRA modeling (**Table 4**) indicates nearshore waters and embayments from Cameron County Texas to Terrebonne Parish, Louisiana could be affected within 30 days of a spill (1 to 4% conditional probability).

Loggerhead Critical Habitat – *Sargassum*. The project area is located within the designated *Sargassum* critical habitat for the loggerhead turtles which includes most of the Western and Central Planning Areas in the Gulf of America and parts of the southern portion of the Eastern Planning Area (**Figure 4**) (NMFS, 2021b). 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 America being oiled. The 2010 *Deepwater Horizon* spill affected approximately one-third of the *Sargassum* habitat in the northern Gulf of America (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, 2017). *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 America 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, 2017).

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 America 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 2**). 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.

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**). Sound 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 187 statute miles (301 km) from the nearest shorelines designated as critical habitat for the Piping Plover (**Figure 3**). The 30-day OSRA modeling (**Table 4**) predicts that Piping Plover critical habitat in Texas and Louisiana could be contacted within 30 days of a spill (1 to 4% conditional probability).

Plovers could physically oil themselves while foraging on oiled shores or secondarily contaminate themselves through ingestion of oiled intertidal sediments and prey (BOEM, 2017). 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 bp resources will be available to protect and rehabilitate wildlife in the event of a spill reaching the shoreline, as detailed in the ROSRP.

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 536 at Aransas NWR during the 2022 to 2023 winter (USFWS, 2023a), a slight decrease from an estimated 543 individuals counted in the 2021 to 2022 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 to 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 259 statute miles (417 km) from the Aransas NWR, which is the nearest designated critical habitat. The 30-day OSRA modeling (**Table 4**) predicts a 1% or less chance of oil contacting Whooping Crane critical habitat within 30 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, bp would work with the applicable state and federal agencies to prevent impacts on Whooping Cranes. Extensive bp resources will be available to protect and rehabilitate wildlife in the event of a spill reaching the shoreline, as detailed in the ROSRP.

C.3.8 Black-capped Petrel

The Black-capped Petrel is a pelagic seabird that nests solely on Hispaniola that was listed as Endangered under the ESA in 2024. The species travels long distances to forage on fish, squid, crustaceans, and *Sargassum* (Simons et al., 2013) and have occasionally been sighted in the northern Gulf of America. While the Gulf of America is not their primary foraging grounds, the most recent species status review (USFWS, 2023b) reported 11 sightings in the Gulf of America from 2017 to 2018 during surveys as part of the Gulf of Mexico Marine Assessment Program for Protected Species. Overall, the population of Black-capped Petrels is declining, largely due to deforestation and urbanization on Hispaniola. Exact population numbers are unknown due to the difficulty in obtaining accurate counts and their nocturnal nature, but BirdLife International (2018) estimated a total of 1,000 to 2,000 mature individuals and an overall population of 2,000 to 4,000 individuals.

IPFs that potentially may affect the Black-capped Petrel include drilling rig presence, marine sound, and lights, 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. The IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Drilling Rig Presence, Marine Sound, and Lights

Marine birds that frequent offshore oil and gas 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). Black-capped Petrels may be attracted to lights on the drilling rig, which could increase the risk of a collision.

Mortality of migrant birds at tall towers and other land-based structures has been reviewed extensively, and the mechanisms involved in offshore vessel collisions appear to be similar. In some cases, birds simply do not see a part of the structure until it is too late to avoid it. In other cases, navigation may be disrupted by marine sound (Russell, 2005). On the other hand, offshore structures are suitable stopover perches for most species (Russell, 2005). Due to the limited scope and short duration of drilling activities described in this EP and the low density of Black-capped Petrels in the Gulf of America, no significant impacts are expected.

Impacts of Support Vessel and Helicopter Traffic

Support vessels and helicopters are unlikely to significantly disturb Black-capped Petrels 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 individuals would experience, at most, only short-term behavioral disruption, and the impact would not be significant on Black-capped Petrels.

Impacts of a Small Fuel Spill

Potential spill impacts on marine birds in general are discussed by BOEM (2017). For this EP, there are no unique site-specific issues with respect to spill impacts on Black-capped Petrels.

The probability of a fuel spill is expected to be minimized by bp's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of bp's ROSRP is expected to reduce the potential for impacts on Black-capped Petrels. EP Appendix G provides details 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 Black-capped Petrels 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.

Black-capped Petrels exposed to fuel 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 Black-capped Petrels, the small area affected, and the brief duration of the surface slick, minimal if any impacts would be expected.

Impacts of a Large Oil Spill

Potential spill impacts on marine and pelagic birds in general are discussed by BOEM (2017). For this EP, there are no unique site-specific issues with respect to spill impacts on Black-capped Petrels.

Black-capped Petrels could be exposed to oil from a spill at the project area; the number of individuals that could be affected in open, offshore waters would depend on the extent and persistence of the oil slick and the number of Black-capped Petrels in the area.

Following the *Deepwater Horizon* incident in 2010, no Black-capped Petrels were reported as oiled or recovered dead (USFWS, 2023b), but decomposition would likely have made positive identification difficult (Haney et al., 2014). 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). Other indirect impacts would also likely occur after a large oil spill, such as a reduction in suitable foraging habitat and the decline in population of prey species (USFWS, 2023b).

Overall, a large oil spill could cause significant impacts on Black-capped Petrel populations if there were numerous individuals in the area of the spill. However, due to the low number of individuals thought to frequent the northern Gulf of America, significant impacts on this species from a large spill are considered unlikely.

C.3.9 Rufa Red Knot (Threatened)

The Rufa Red Knot is a small to medium-sized migratory shorebird that transits each year between breeding grounds in Canada to wintering grounds in the southeast U.S., Caribbean, and along the Gulf of America coast (USFWS, 2020). Listed as Threatened under the ESA in 2015, their primary habitat during the winter along the Gulf of America is in the Laguna Madre estuary system in Mexico and Texas.

The primary threats that are faced by Rufa Red Knot include habitat loss, reduced food availability, and alterations of their migratory timing and patterns due to climate and weather conditions (USFWS, 2020). Precise population numbers are difficult to assess, but USFWS estimated in 2023 that the global population was approximately 42,000 individuals (The Wildlife Society, 2023). Critical habitat was proposed by USFWS in 2023 which includes numerous areas along the U.S. Gulf of America coastline.

IPFs that potentially may affect the Rufa Red Knots include support vessel and helicopter traffic; and two types of accidents (a small fuel spill and a large oil spill). Vessel presence, marine sound, and lights, and effluent discharges are not expected to have a significant impact because this species typically is not found in offshore waters and instead is more coastal in nature. The IPFs with potential impacts listed in **Table 2** are discussed below.

Impacts of Support Vessel and Helicopter Traffic

Support vessels and helicopters are unlikely to significantly disturb Rufa Red Knots in offshore waters where they are not common or in nearshore industrial areas near the shorebase. 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 individuals 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 coastal birds in general are discussed by BOEM (2017). For this EP, there are no unique site-specific issues with respect to spill impacts on Rufa Red Knots.

The probability of a fuel spill is expected to be minimized by bp's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of bp's ROSRP is expected to reduce the potential for impacts on Black-capped Petrels. EP Appendix G provides details on spill response measures. Given Rufa Red Knots are mostly found in coastal areas and the expected short duration of a small fuel spill, the potential exposure period for Rufa Red Knots would be brief.

A small fuel spill in coastal 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.

Rufa Red Knots exposed to fuel 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. It is not expected that a small fuel spill would substantially affect Rufa Red Knot populations.

Impacts of a Large Oil Spill

Potential spill impacts on coastal birds in general are discussed by BOEM (2017). For this EP, there are no unique site-specific issues with respect to spill impacts on Rufa Red Knots.

Rufa Red Knots could be exposed to oil from a spill at the project area that travels into coastal area; the number of individuals that could be affected would depend on the extent and persistence of the oil slick and the number of Rufa Red Knots in the area, which is largely seasonally based.

Following the *Deepwater Horizon* incident in 2010, only a single Rufa Red Knot was reported as oiled (USFWS, 2020), but decomposition would likely have made positive identification difficult (Haney et al., 2014). Exposure of marine and coastal 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, 2018a). Other indirect impacts would also likely occur after a large oil spill, such as a reduction in suitable foraging habitat and the decline in population of prey species (USFWS, 2023b).

Overall, a large oil spill could have significant impacts on Rufa Red Knot populations if there were numerous individuals in the area of the spill or in coastal areas that became oiled.

C.3.10 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 longline 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 America (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 America by Baum and Myers (2004) noted that most recent papers dismissed the oceanic whitetip shark as rare or absent in the Gulf of America. NMFS (2023b) noted that there has been an 88% decline in abundance of the species in the Gulf of America since the mid-1990s due to commercial fishing pressure.

IPFs that could affect the oceanic whitetip shark include vessel presence, sound, 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 Floating Production Unit and Vessel Presence, Marine Sound, and Lights

Offshore drilling activities produce a broad array of sound 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 μ Pa in nurse sharks (*Ginglymostoma cirratum*) at frequencies between 100 and 1,000 Hz (Casper and Mann, 2006). These frequencies overlap with sound associated with drilling activities (SPL source levels of 195 dB re 1 μ Pa 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). This is consistent with the results of the assessment in the NMFS Biological Opinion (NMFS, 2020a) which indicate that oceanic whitetip sharks may be able to detect drillship and vessel sound but are not likely to be adversely affected by it. Therefore, because the propagation distances of SPL sufficient to elicit behavioral disturbances from the drilling rig would be limited in geographic scope, 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 America, it is unlikely that a large spill would result in population level effects.

C.3.11 Giant Manta Ray (Threatened)

The giant manta ray is a Threatened elasmobranch species that is a slow-growing, migratory, planktivorous species that 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, 2023b). 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 sound, 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 Sound, and Lights

Offshore drilling activities produce a broad array of sound 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 μ Pa in yellow stingray (*Urobatis jamaicensis*) and SPLs between approximately 120 and 145 dB re 1 μ Pa in little skate (*Erinacea raja*) at frequencies from 100 to 1,000 Hz (Casper et al., 2003; Casper and Mann, 2006). These frequencies overlap with sound associated with drilling activities (SPL source levels of 195 dB re 1 μ Pa 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). This is consistent with the results of the assessment in the NMFS Biological Opinion (NMFS, 2020a) which indicate that giant manta rays may be able to detect drillship and vessel sound but are not likely to be adversely affected by it. Therefore, because the propagation distances of SPL sufficient to elicit behavioral disturbances from the drilling rig would be limited in geographic scope, 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 America, 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 <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 America, population-level impacts are not expected.

C.3.12 Gulf Sturgeon (Threatened)

The Gulf sturgeon 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, 2022) (**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 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; 2017). For this EP, there are no unique site-specific issues with respect to this species.

The project area is approximately 317 statute miles (510 km) from the nearest Gulf sturgeon critical habitat. The 30-day OSRA modeling (**Table 4**) predicts that a spill in the project area has a <0.5% or less conditional probability of contacting any coastal areas containing Gulf sturgeon critical habitat within 30 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.3.13 Nassau Grouper (Threatened)

The Nassau grouper (*Epinephelus striatus*) is a Threatened, long-lived reef fish typically associated with hard bottom structures such as natural and artificial reefs, rocks, and underwater ledges (NOAA, 2024a). 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, 2024a). 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 Islands and Puerto Rico within water depths up to 130 m (426 ft) (NOAA, 2024a). There has been one confirmed sighting of Nassau grouper from the Flower Garden Banks in the Gulf of America 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

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 97 statute miles [156 km]), and the difference in water depth between the project area (1,744 m [5,722 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.3.14 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, 2023b). Once found along most of the northern Gulf of America coast from Texas to Florida, their current range in Gulf of America 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, 2018), 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 634 miles (1,020 km) from the nearest smalltooth sawfish critical habitat in Charlotte County, Florida. Based on the 30-day OSRA modeling (**Table 4**), coastal areas containing smalltooth sawfish critical habitat are unlikely to be affected within 30 days of a spill (<0.5% conditional probability).

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 as well as impaired olfactory function. 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.3.15 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 (2017; 2023a,b). 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 390 statute miles (628 km) from the project area. The 30-day OSRA modeling (**Table 4**) predicts that a spill in the project area has a <0.5% or less conditional probability of contacting any coastal areas containing beach mouse critical habitat within 30 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.3.16 Florida Salt Marsh Vole (Endangered)

The Florida salt marsh vole 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 NWR 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 587 miles (945 km) from the project area. The 30-day OSRA modeling (**Table 4**) predicts that a spill in the project area has <0.5% or less conditional probability of contacting any coastal areas containing Florida salt marsh vole habitat within 30 days.

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.3.17 Panama City Crayfish (Threatened)

The USFWS issued a Final Rule designating the Panama City crayfish as Threatened under the ESA in 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 546 miles (879 km) from the project area. The 30-day OSRA modeling (**Table 4**) predicts that a spill in the project area has a <0.5% or less conditional probability of contacting any coastal areas containing Panama City crayfish critical habitat within 30 days.

Effects of oiling on the Panama City crayfish are largely unknown. In general, crayfishes use chemoreception to orient themselves in their environment, 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.3.18 Threatened Coral Species

Seven Threatened coral species are known from the northern Gulf of America: 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 America 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.

NMFS has designated 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 America, and Caribbean Sea per 88 FR 54026 and became effective in September 2023. For the areas in the Gulf of America, this includes the Flower Garden Banks and the waters near Miami-Dade and Monroe counties, Florida, and the Dry Tortugas (**Figure 3**).

There are no IPFs associated with routine project activities that could affect Threatened corals in the northern Gulf of America. 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

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 97 statute miles [156 km]), and the difference in water depth between the project area (1,744 m [5,722 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.

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 America reefs, oil droplets or oiled sediment particles could come into contact with reef organisms or corals. As discussed by BOEM (2017), impacts relevant to these corals could include loss of habitat, biodiversity, and live coral coverage. Sublethal effects could be long-lasting and affect the resilience of coral colonies to natural disturbances (e.g., elevated water temperature and diseases) (BOEM, 2017).

Due to the distance between the project area and coral habitats, there is a low chance of oil contacting Threatened coral critical habitat in the event of a spill, and no significant impacts on Threatened coral species are expected.

C.3.19 Queen Conch (Threatened)

The queen conch is a large gastropod that occurs throughout the Caribbean Sea, Gulf of America, and Bermuda which was listed as Threatened under the ESA in 2024 (NOAA, 2024b). The species is slow moving and found in a variety of habitats including seagrass beds, sands flats, algal beds, and rubble areas up to 30 m (98.4 ft) in water depth. Larval conch feed primarily on phytoplankton, while juvenile and adults feed on a mix of seagrass and macroalgae (Stoner and Appeldoorn, 2022). Overall, the population of queen conch is declining, largely due to overfishing and illegal fishing practices. Exact population numbers are unknown due to the difficulty in obtaining accurate counts. The majority of available density estimates suggest that conch populations are below minimum thresholds necessary to maintain or increase populations (Horn et al., 2022).

There are no IPFs associated with routine project activities that could affect queen conch. A small fuel spill would not affect queen conch because the fuel would float and dissipate on the sea surface. A large oil spill is the only relevant IPF.

Impacts of a Large Oil Spill

A large oil spill in the project area could potentially reach queen conch habitat and affect the substrate. These effects would be of particular concern where the species occurs in shallower waters. There is some information available on the effects of oil spills on seagrass meadows and other marine gastropods, but little information available on the direct effects of oil on queen conch (Horn et al., 2022). In the event of a large oil spill, due to the low density of individual queen conch thought to occur in the Gulf of America, any population-level impacts are considered unlikely.

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 America 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 America. 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 [*Onychoprion fuscatus*], Least Tern [*Sternula antillarum*], Sandwich Tern [*Thalasseus sandvicensis*], Magnificent Frigatebird [*Fregata magnificens*]); winter residents (gannets, gulls, jaegers); and permanent resident species (Laughing Gulls [*Leucophaeus atricilla*], Royal Terns [*Thalasseus maximus*], Bridled Terns [*Onychoprion anaethetus*]) (Davis et al., 2000).

Common marine bird species include Wilson's Storm-Petrel (*Oceanites oceanicus*), Magnificent Frigatebird, Northern Gannet (*Morus bassanus*), Masked Booby (*Sula dactylatra*), Brown Booby (*Sula leucogaster*), Cory's Shearwater (*Calonectris borealis*), 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 sound and lights, 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 Sound, and Lights

Marine birds that frequent offshore oil and gas 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 sound (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 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 America also noted the phenomenon but did not recommend mitigation (Russell, 2005). One factor to consider in evaluating this impact in the Gulf of America would include the lower incidence of cloudy and foggy days in the Gulf of America 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, sound, collisions, or other adverse effects are highly localized and may affect individual birds during migration periods.

Impacts of Support Vessel and Helicopter Traffic

Support vessels and helicopters are unlikely to significantly disturb marine birds in open, offshore waters, although bird strikes by helicopters could theoretically occur. 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 (2017). 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 bp's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of bp's ROSRP is expected to reduce the potential for impacts on marine birds. EP Appendix G provides details 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 (2017). 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 America (>200 m [656.2 ft]). 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 provides 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**. The western Gulf of America (in the US Exclusive Economic Zone [EEZ] from Texas to Mississippi) is a known wintering area for the Threatened Rufa Red Knot (USFWS, nd). 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 (*Charadrius wilsonia*), Black Skimmer (*Rynchops niger*), Forster's Tern (*Sterna forsteri*), Gull-Billed Tern (*Gelochelidon nilotica*), Laughing Gull, Least Tern, and Royal Tern. Additional information is presented by BOEM (2017).

The Eastern Brown Pelican 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).

The Bald Eagle 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 America. 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 192 statute miles (309 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 Houma, 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), and bird strikes could theoretically occur.

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 (Efroymsen 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 sound-sensitive areas such as parks, forest, primitive areas, wilderness areas, National Seashores, or NWRs, and maintain flight paths to reduce aircraft marine sound in these marine sound-sensitive areas. The 2,000-foot 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 Efroymsen 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 4** estimate that shorelines in Texas and Louisiana could be contacted within 30 days (1 to 4% conditional probability).

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, 2017). Bird eggs may be damaged if an oiled adult sits on the nest.

Brown and White Pelicans (*Pelecanus erythrorhynchos*) 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, 2017).

Coastal fishing birds of prey such as Bald Eagles, ospreys (*Pandion haliaetus*), etc. 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, 2017). 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 America. 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 America (Biggs and Ressler, 2000).

Most fishes inhabiting shelf or oceanic waters of the Gulf of America 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 America substantiated high species richness but general domination by relatively few families and species.

IPFs that potentially may affect pelagic communities and ichthyoplankton include vessel presence, marine sound, 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 Sound, and Lights

The drilling rig, as a floating structure in the deepwater environment, will act as 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 America 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 sound 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 sound are given by Popper et al. (2014) and apply only to species of fish with swim bladders that provide some hearing (pressure detection) function. All fishes can also detect particle motion, but the scientific understanding of detection thresholds and behavioral responses from particle motion is in its infancy and there are currently no accepted thresholds available (Hawkins et al., 2021).

Popper et al. (2014) estimated an SPL threshold level of 170 dB re 1 μ Pa over a 48-hour period for onset of recoverable injury and 158 dB re 1 μ Pa over a 12-hour period for onset temporary auditory threshold shifts. However, no consistent behavioral thresholds for fish resulting from non-impulsive sound have been established (Hawkins and Popper, 2014) and the most widely recommended behavioral threshold for fish for all sound sources is SPL of 150 dB re 1 μ Pa as defined by the Fisheries Hydroacoustic Working Group (2008). Sound may also influence fish behaviors, such as predator-avoidance, foraging, reproduction, and intraspecific interactions (Picciulin et al., 2010; Brintjes and Radford, 2013; McLaughlin and Kunc, 2015). Fish aggregation 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.

Limited data exist regarding the impacts of sound 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 sound (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 μ Pa² s but resulted in no increased mortality between the exposure and control groups. Non-impulsive sound sources (such as drilling rig operations) are expected to be far less injurious than impulsive sources given the characteristics of these source types. 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 though per the NPDES permit GMG290000 the linear velocities should be $<5 \text{ ft second}^{-1}$. 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). The cooling water systems and operating procedures are designed such that a maximum return temperature of the seawater being discharged back into the ocean does not exceed 120°F; thus, minimizing the chance that plankton will be stressed/killed. 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, 2017). The drilling rig ultimately chosen for this project is expected to be in compliance with all cooling water intake requirements including NPDES permit GMG290000.

Impacts of a Small Fuel Spill

Potential spill impacts on fisheries resources are discussed by BOEM (2017). 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 bp's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of bp's ROSRP is expected to mitigate the potential for impacts on pelagic communities, including ichthyoplankton. EP Appendix G provides details 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. 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. 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 (2017). 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.

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). 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 (Abbrignano 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 (Abbrignano 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, or 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 (*Panulirus argus*), reef fishes, coastal migratory pelagic fishes, and red drum (*Sciaenops ocellatus*). 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 70 statute miles (113 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 America. 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.

Research indicates the central and western Gulf of America 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 America, including the project area (**Figure 3**). The areal extent of the HAPC is approximately 300,000 km² (115,831 mi²). 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 America 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 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).

Table 7. Migratory fish species with designated Essential Fish Habitat (EFH) at or near Keathley Canyon Blocks 291 and 247, 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 | <i>Thunnus thynnus</i> | Spawning, eggs, larvae, adults |
| Bigeye tuna | <i>Thunnus obesus</i> | Adults |
| Bigeye thresher shark | <i>Alopias superciliosus</i> | All |
| Blue marlin | <i>Makaira nigricans</i> | Juveniles, adults |
| Common thresher shark | <i>Alopias vulpinus</i> | All |
| Longbill spearfish | <i>Tetrapturus pfluegeri</i> | Juveniles, adults |
| Longfin mako shark | <i>Isurus paucus</i> | All |
| Oceanic whitetip shark | <i>Carcharhinus longimanus</i> | All |
| Sailfish | <i>Istiophorus spp.</i> | Adults |
| Silky shark | <i>Carcharhinus falciformis</i> | All |
| Skipjack tuna | <i>Katsuwonus pelamis</i> | Spawning, juveniles, adults |
| Swordfish | <i>Xiphias gladius</i> | Larvae, juveniles, adults |
| White marlin | <i>Tetrapturus albidus</i> | Juveniles, adults |
| Yellowfin tuna | <i>Thunnus albacares</i> | Spawning, juveniles, adults |

NTLs 2009-G39 and 2009-G40 provide guidance and clarification of the regulations (i.e., 50 CFR 600 Subpart J) 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 America Region and NOAA’s Southeastern Region during the preparation, distribution, and review of BOEM’s 2024-2029 National OCS oil and gas leasing program Final Programmatic EIS (BOEM, 2023a).

Other HAPCs to protect corals and coral reefs 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 America. Geyer Bank is the HAPC located nearest to the project area (approximately 75 statute miles [121 km]).

IPFs that potentially may affect EFH include vessel presence, marine sound, 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 Sound, and Lights

The drilling rig, as a floating structure in the deepwater environment, will act as FADs 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 sound could potentially cause acoustic masking for fishes, thereby reducing their ability to hear biologically relevant sounds (Radford et al., 2014). Sound may also influence fish behaviors related to activities 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 sound 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 μ Pa over a 48-hour period for onset of recoverable injury and an SPL threshold of 158 dB re 1 μ Pa over a 12-hour period for onset temporary auditory threshold shifts. No consistent behavioral thresholds for fish resulting from non-impulsive sound have been established (Hawkins and Popper, 2014) and the most widely recommended behavioral threshold for fish for all sound sources is SPL of 150 dB re 1 μ Pa as defined by the Fisheries Hydroacoustic Working Group (2008). 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 multisale EIS (BOEM, 2017) 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 (2017). 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 bp's preventative measures during routine operations, including fuel transfer procedures. In the unlikely event of a spill, implementation of bp's ROSRP is expected to help diminish the potential for impacts on EFH. EP Appendix G 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 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 America. 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 70 statute miles (113 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 (2017; 2023). 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 America (GMFMC, 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 America to spawn in April, May, and June (NMFS, 2009c).

The topographic features located 70 statute miles (113 km) from the project area are designated as EFH under the corals and coral reefs management plan (GMFMC, 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 archaeological assessment identified no archaeologically significant artifacts or shipwrecks within 610 m (2,000 ft) of the proposed project activities based on an autonomous underwater vehicle survey (bp, 2024). bp and its contractors will abide by the applicable requirements of 30 CFR § 550.194I, 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. Per the Final Rule presented in 89 FR 71160, bp has previously submitted an archaeological report that determined that none of the sonar contacts in the project area were identified as being archaeologically significant.

Because there are no shipwreck sites within 610 m (2,000 ft) of the proposed wellsites, 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 2017–2023 EIS (BOEM, 2017) estimated that a severe subsurface blowout could resuspend and disperse sediments within a 300-m (984-ft) radius. Because there are no historic shipwrecks within a 300-m (984-ft) 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, bp 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-m (984-ft) 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, 2017), 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-m (984-ft) 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 1,744 m (5,722 ft), the proposed project area is well beyond the 60-m (197-ft) depth contour used by BOEM as the seaward extent for potential prehistoric archaeological sites in the Gulf of America. 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-m (984-ft) 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, 2017). The 30-day OSRA results summarized in **Table 4** estimate that shorelines in Texas and Louisiana could be contacted within 30 days (1 to 4% conditional probability).

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 America that may be affected by oil and gas activities are described by BOEM (2017) 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 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 Houma, 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 not affect coastal habitats, as the project area is 192 statute miles (309 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 13, 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, 2017).

Impacts of a Large Oil Spill

Potential spill impacts on coastal habitats are discussed by BOEM (2017; 2023a,b). 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 4** estimate that shorelines in Texas and Louisiana could be contacted within 30 days of a spill (1 to 4% conditional probability).

NWRs and other protected areas along the coast are discussed in BOEM (2017) and bp’s ROSRP. 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 4**) 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, 2017).

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 W026 based on the 30-day OSRA model.

| County or Parish, State | Wildlife Refuge, Wilderness Area, or State/National Park |
|-------------------------|--|
| Cameron County, Texas | Boca Chica State Park |
| | Brazos Island State Park |
| | Laguna Atascosa National Wildlife Refuge |
| | Laguna Madre Gulf Ecological Management Site |
| | Las Palomas Wildlife Management Area |
| | Lower Rio Grande Valley National Wildlife Refuge |
| Kenedy County, Texas | Laguna Madre Gulf Ecological Management Site |
| | Padre Island National Seashore |
| Kleberg County, Texas | Laguna Madre Gulf Ecological Management Site |
| | Padre Island National Seashore |

Table 8. (Continued).

| County or Parish, State | Wildlife Refuge, Wilderness Area, or State/National Park |
|--------------------------|--|
| Aransas County, Texas | Aransas National Wildlife Refuge |
| | Goose Island State Park |
| | Lydia Ann Island Audubon Sanctuary |
| | Rattlesnake Island, Ayres Island, and Roddy Island Audubon Sanctuary |
| | Redfish Bay State Scientific Area |
| | Mission-Aransas National Estuarine Research Reserve |
| Calhoun County, Texas | Aransas National Wildlife Refuge |
| | Chester Island Bird Sanctuary |
| | Guadalupe Delta Wildlife Management Area |
| | Matagorda Island Wildlife Management Area |
| | Welder Flats Wildlife Management Area |
| Matagorda, Texas | Big Boggy National Wildlife Refuge |
| | Matagorda Bay Nature Park |
| | San Bernard National Wildlife Refuge |
| | West Moring Dock Park |
| Brazoria, Texas | Brazoria National Wildlife Refuge |
| | Christmas Bay Coastal Preserve |
| | Justin Hurst Wildlife Management Area |
| | San Bernard National Wildlife Refuge |
| Galveston, Texas | Anahuac National Wildlife Refuge South unit |
| | Bolivar Flats Shorebird Sanctuary |
| | Fort Travis Seashore Park |
| | Galveston Island State Park |
| | Horseshoe Marsh Bird Sanctuary |
| | Mundy Marsh Bird Sanctuary |
| | R.A. Apffel Park |
| | Seawolf Park |
| Jefferson, Texas | McFaddin National Wildlife Refuge |
| | Sea Rim State Park |
| | Texas Point National Wildlife Refuge |
| 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 |
| Iberia Parish, Vermilion | Marsh Island Wildlife Refuge |
| | Shell Key National Wildlife Refuge |
| Terrebonne, Louisiana | Isle Dernières Barrier Islands Refuge |
| | Pointe aux Chenes Wildlife Management Area |
| | Delta National Wildlife Refuge |
| | Pass-a-Loutre Wildlife Management Area |

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 Mendelsohn, 2012; Mendelsohn et al., 2012). Numerous variables such as oil concentration and chemical composition, vegetation type and density, season or weather, pre-existing 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, 2017). Vegetation coated with oil experiences the highest mortality rates due to decreased photosynthesis (BOEM, 2012a). A 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). Entrained oil within the sediments of a submerged vegetation area may pose the risk of periodic re-releases of oil in the area, causing potential secondary impacts to the localized area (BOEM, 2023). In addition to the direct impacts of oil, cleanup activities in marshes may accelerate rates of erosion and retard recovery rates (BOEM, 2017). 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 (2017). The main commercial fishing activity in deep waters of the northern Gulf of America 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 America 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 <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 are 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 Sound, 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 America (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 sound 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 bp's preventative measures during routine operations, including fuel transfer. In the unlikely event of a spill, implementation of bp's ROSRP is expected to potentially mitigate and reduce the potential for impacts. EP Appendix G 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 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 (2017; 2023a,b). 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 America 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 America (NMFS, 2010a). At its peak on 12 July 2010, closures encompassed 217,821 km² (84,101 mi²), or 34.8% of the U.S. Gulf of America EEZ.

According to BOEM (2012a; 2017), 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 192 statute miles (309 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.

Krishnamurthy et al. (2019) identified that exposure to both crude oil and oil dispersant among USCG spill responders during the *Deepwater Horizon* incident was more strongly associated with the suite of acute neurological symptoms that were evaluated than was exposure to oil alone. Those acute neurological symptoms noted in 1 to 3% of responders surveyed included headaches, lightheadedness/dizziness, difficulty concentrating, numbness/tingling sensation, blurred/double vision, and memory loss/confusion. Krishnamurthy et al. (2019) did conduct sensitivity analyses to exclude responders in the highest environmental heat categories and responders with relevant pre-existing conditions due to the symptoms being similar to heat stress.

McGowan et al. (2017) found approximately 1% of responders surveyed were still experiencing symptoms of coughing, wheezing, tightness in chest, shortness of breath, burning in nose, throat, and lungs, burning eyes, itching eyes, and skin irritation within 30 days of the 2011 to 2013 study (1 to 3 years after the oil spill cleanup response).

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 (2017). 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, 2017). Net employment impacts from a spill would not be expected to exceed 1% of baseline employment in any given year (BOEM, 2017).

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 (2017; 2023). 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 4** estimate that shorelines in Texas and Louisiana could be contacted within 30 days (1 to 4% conditional probability).

According to BOEM (2017), 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 (2017; 2023a,b). 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 <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. bp intends to comply with BOEM requirements and lease stipulations to avoid impacts on uses of the area by military vessels and aircraft. The shallow hazards assessment did not identify existing wellsites or associated subsea infrastructure within 610 m (2,000 ft) of the proposed drill centers (bp, 2024).

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. bp 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 Impacts⁵

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 bp's EP are within the range of activities described and evaluated by BOEM in the 2024 to 2029 Programmatic EIS for the OCS Oil and Gas Leasing Program (BOEM, 2023a) and the 2017 to 2022 Programmatic EIS 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 to 2022 (BOEM, 2017). 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; 2017; 2023a,b).

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 bp does not anticipate other projects beyond the types analyzed in the lease sale and Supplemental EISs (BOEM, 2012a; 2013; 2014a; 2015; 2016b; 2017; 2023a,b).

⁵ 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.

Cumulative Impacts of Planned Actions. The BOEM (2017) 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 America.

The level and type of activity proposed in bp'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 bp's EP, in conjunction with the other reasonably foreseeable activities expected to occur in the Gulf of America. For all impacts, the incremental contribution of bp's proposed actions to the analyses in these prior reports are not expected to be significant.

D. Environmental Hazards

D.1 Geologic Hazards

The shallow hazards assessments did not identify geologic hazards at the location of the proposed project activities (bp, 2024). See EP Section 3 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 bp contingency plans to suspend some activities on the drilling rig for safety reasons until the storm or weather event passes. From 2011 to 2024, 22 tropical storms and/or hurricanes have shut down oil and gas activities in the Gulf of America (BSEE, 2024b). Damage was minimal from the storms in 2017 to 2023, and only Hurricane Ida in 2021 caused an accidental release from a ruptured pipeline and wellhead off the Louisiana coastline (BOEM, 2023b).

In the event of severe weather, guidance as outlined in bp's and/or bp's drilling contractor's site-specific Environmental Emergency Plan, its site-specific hurricane preparation checklist, and the Gulf of America Region Severe Weather Contingency Plan would be adhered to.

D.3 Currents and Waves

Meteorology and physical oceanography 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 bp. 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 program includes numerous processes and actions that are intended to mitigate potential impact on the environment. The project is expected to comply with applicable federal, state, and local requirements as well as permit conditions of approval concerning protected species, air pollutant emissions, discharges to water, and waste management.

In addition, bp and its drilling contractor intend to implement the following specific measures to prevent marine pollution:

- Proper job planning is an important overall mitigation measure. The fundamental concept and discussion in the pre-tour and pre-job safety meetings is the prevention of harm to people and the environment. Personnel are reminded daily to inspect work areas for safety issues as well as potential pollution issues.
- Per Safety and Environmental Management System requirements, the skills and knowledge of personnel are assessed prior to working offshore for bp.
- Equipment transferred to and from the drilling rig will be inspected to ensure pollution pans have been cleaned and to confirm that plugs have been installed prior to leaving the dock and prior to loading on the boat.
- Preventative maintenance of rig and vessel equipment and other service equipment, including visual inspection of hydraulic lines and reservoirs, will be conducted on a scheduled basis.

- Items deemed safety and environmentally critical are listed and managed on a schedule recommended by the manufacturer/operator.
- Waste generation and storage will be managed as per the bp Gulf of America Waste Management procedures and/or the drilling contractor's established waste management procedures. Wastes are expected to be categorized, packaged, labeled, stored, manifested, and shipped to an appropriately permitted disposal site.
- Municipal trash containers will be kept covered. Where applicable, trash destined for recycling will be compacted.
- Chemical drums and totes will be stored on containment skids in designated areas of the rig.
- Hazardous waste shall be placed in approved containers on the rig.
- Rig fuel vents will have containment boxes.
- All municipal, non-hazardous, hazardous, and universal wastes are placed in an applicable recycling bag or box, Omega bin, Department of Transportation Drum, cutting box, universal box, waste bin, E&P Drum, tote tank or NORM container, labeled, and shipped to shore via a rig support vessel.
- Tank overflow, discharge overflow spill prevention fittings, as well as quick disconnect hoses will be installed on hydrocarbon-based fluid hoses and liquid mud hoses to ensure isolation of any hose failures.
- On-site spill kits are inspected regularly and re-stocked as needed.
- Drills are conducted regularly, often engaging the IMT onshore to measure the effectiveness and quality of processes deployed to address oil spill scenarios.
- Fuel hoses and SBM hoses will be changed based on the maintenance schedule of the drilling rig and in accordance with USCG regulation annual inspection.

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:

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Appendix J: Cost Recovery Fee

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|--|------------------------------|--|---------------------------|
| Title of Document: | Exploration Plan – West Bump | Document Number: | GMEXP-DR-PRM-600-00377020 |
| Authority: | Vashtie Bajnath | Revision | B01 |
| Custodian/Owner: | Betsy Cleland | Issue Date: | 04/28/2025 |
| Retention Code: | ADM3000 | Next Review Date (if applicable): | |
| Security Classification: | | Page: | |
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Agency Tracking ID: 77025971604

Transaction Type: Sale

Transaction Date: 04/24/2025 12:24:38 PM EDT

Account Holder Name: Betsy Cleland

Transaction Amount: \$14,469.00

Card Type: MasterCard

Card Number: *****8137

Region: Gulf of America

Contact: Betsy Cleland (281) 773-9088

Company Name/No: BP Exploration & Production Inc., 02481

Lease Number(s): 25790, 19545

Area-Block: Keathley Canyon KC,247: Keathley Canyon KC,291

Surface Locations: 3

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