UNITED STATES GOVERNMENT MEMORANDUM

Pipeline Installation P-20341 and P-20349

To: Regional Environmental Officer, GOMR, Office of Environmental Compliance, Bureau of Safety and Environmental Enforcement (MS GE466 MS G)

From: Chief, Environmental Operations Section, Office of Environment, GOM OCS Region (MS 881A

Subject: National Environmental Policy Act Review of BP Exploration & Production Inc.'s Pipeline Installation Application Numbers P-20341 and P-20349.

Our National Environmental Policy Act (NEPA) review of the subject action is complete and results in a recommendation that the proposed action be approved with a Finding of No Significant Impact (FONSI), conditioned as indicated below:

The Bureau of Ocean Energy Management (BOEM) has prepared a Site-Specific Environmental Assessment (SEA) (No. P-20341 and P-20349) complying with the NEPA regulations under the Council on Environmental Quality (40 C.F.R. § 1501.3 and § 1508.9), the Department of the Interior, NEPA implementing regulations (43 C.F.R. § 46), and BOEM policy, which require an evaluation of proposed major federal actions, which under BOEM jurisdiction includes pipeline installation activity on the Outer Continental Shelf (OCS). We make the following recommendation to Bureau of Safety and Environmental Enforcement (BSEE) in concordance with the Memorandum of Agreement between BOEM and BSEE regarding "*NEPA and Environmental Compliance*," dated October 1, 2018.

The Proposed Action: BP Exploration & Production Inc. (BP) has submitted right of way (ROW) and lease term pipeline installation applications to support the Manuel Drill Center in Mississippi Canyon Block 520. Pipeline Applications ROW P-20341 and Lease Term P-20349 were submitted by BP to; 1) Tie back Manuel Drill center wells 003 and 004 located in Mississippi Canyon Block 520 (OCS-G09821) to the Na Kika Floating Production System (FPS) facility located in Mississippi Canyon Block 474 (OCS-G35825) via jumpers, flowlines, umbilicals, and associated infrastructure; and 2) Install flowlines and associated infrastructure to facilitate future activities in the Hershel Drill Center area approximately two miles south of the Manuel Drill Center area.

ROW application P-20341 (segments 20341 and 20342) proposes to install, operate, and maintain an 8 inch bulk oil pipe-in-pipe flowline with an outer diameter of 12.75 inches and an associated 5 inch infield umbilical. The segment details are as follows:

Pipeline segment P-20341 is an 8 inch by 12.75 inch pipe-in-pipe flowline, 30,245 ft (9,219 m) in length, utilizing electrically heat traced flowline (EHTF) technology. The EHTF runs from the Manuel pipeline end manifold (PLEM) located in Mississippi Canyon Block 520 traveling northwest, passing through Mississippi Canyon Blocks 519, and 475 to an inline power inlet system (ILPIS) located east of the Na Kika FPDS facility in Mississippi Canyon Block 474. The water depth of the flowline ranges from 6,340 – 6.697 ft (1,932 – 2,041 m).

Pipeline segment P-20342 is a 5 inch infield hydraulic/chemical/electrical/optical umbilical, 59,918 ft (18,263 m) in length, from the Ariel Drill Center in Mississippi Canyon Block 429 (OCS-G07944), traveling southeast through Mississippi Canyon Blocks 430, 431, 475, and 519 to the umbilical termination assembly (UTA) northwest of the Manuel PLEM located in Mississippi Canyon Block 520.

Lease Term application P-20349 (segments 20345, 20346, 20347, 20348, and 20349) proposes to install, operate, and maintain two well jumpers, one flowline jumper, one PLEM, two pipeline end terminals (PLET), one flowline extension pipeline, an ILPIS structure, and one electric and hydraulic umbilical, all located within Mississippi Canyon Blocks 474 and 520. The segment details are as follows:

Pipeline Segment P-20345 is a 6 inch bulk oil well jumper, 75 (23 m) feet in length, traveling from well 003 to the Manuel PLEM located in Mississippi Canyon Block 520.

Pipeline Segment P-20346 is a 6 inch bulk oil well jumper, 75 (23 m) feet in length, traveling from well 004 to the Manuel PLEM located in Mississippi Canyon Block 520.

Pipeline Segment P-20347 is a 8 inch bulk oil flowline jumper, 105 ft (32 m) in length, traveling east southeast from the Manuel PLEM to the Manuel Extension PLET all located in Mississippi Canyon Block 520.

Pipeline Segment P-20348 is an 8 inch by 12.75 inch pipe-in-pipe flowline, 10,220 ft (3,115 m) in length, utilizing electrically heat traced flowline (EHTF) technology. The EHTF runs east from the Manuel Extension PLET to the Hershel Deep PLET, all located in Mississippi Canyon Block 520.

Pipeline Segment P-20349 is a 9 inch electrical/hydraulic power umbilical, 24,222 ft (7,383 m) in length, running in a loop from the Na Kika facility to the ILPIS located east of the facility all located in Mississippi Canyon Block 474.

The water depth at wells 003 and 004 in the Manuel Drill Center located in Mississippi Canyon Block 520 is approximately 6,625 ft (2,019 m) and the distance to nearest shore from the well locations is approximately 66 miles (105 km) from the nearest Louisiana shore in Plaquemines Parish, Louisiana. BP proposes to use DP vessels for the installation activities and there is no anchor radius. The following vessels will be utilized for the installations: the *Seven Arctic* (Construction Vessel); the *Seven Pacific* (Construction/Flex-Lay Vessel); the *Seven Vega* (Pipeline Reel-Lay Vessel); and the *Harvey Intervention* (Survey and Light Construction Vessel) (BP, 2020).

Resources and Impacts Considered: The impact analysis for the proposed activity focused on the installation activities and the resources that may be potentially impacted. The impact producing factors (IPFs) include: (1) emissions from installation vessels/equipment; (2) vessel discharges and turbidity; and (3) seafloor disturbances from pipelaying and infrastructure installation activities.

In this SEA BOEM has considered two alternatives: (1) No Action, (2) Proposed Action as Submitted with additional conditions of approval as required under the ESA Consultation with NMFS that concluded March 13, 2020 (NMFS 2020 BO). BOEM has assessed the impacts of the proposed action on the following significant resources

1) Air Quality;
2) Water Quality;
3) Deepwater Benthic Communities;
4) Marine Mammals;
5) Sea turtles;
6) Fish resources and essential fish habitat; and
7) Archaeological Resources.

Potential impacts on these resources are summarized below. Direct contact is potentially the most disruptive impact for resources fixed or lying on the sea bottom, and it is weighted most heavily out of all other potentially impacting factors. Pre-activity surveys of the sea bottom required by BOEM may identify potentially sensitive deepwater benthic communities and archaeological resources. At this time no deepwater benthic communities or archaeological resources on the sea bottom are known that could be disturbed by the proposed activity. In the event that either type of resource is encountered, the operator is instructed to avoid impacts to these resources and notify BOEM per the regulations. By operators following the regulations and the regulatory guidance found in the notices to lessees and operators, lease stipulations, and mitigation measures in the NMFS 2020 BO and FWS 2018 BO, potential impacts to air quality, water quality, deepwater benthic communities, marine mammals, sea turtles, fish resources and essential fish habitat, and archaeological resources from the proposed activities were determined to be negligible and BOEM will require no additional conditions of approval.

Our evaluation in this SEA has selected Alternative 2 and serves as the basis for approving the proposed action. Alternative 2 is the Proposed Action as Submitted with additional mitigation and monitoring measures as required under the Endangered Species Act (ESA) Consultation with NMFS that concluded March 13, 2020 (2020 BO). BOEM concludes that no potentially significant adverse impacts are expected to occur to any affected resources by allowing the proposed action to proceed, provided that the specific conditions of approval as part of the ESA Consultation process with NMFS as identified below are met by the operator.

- **COMPLIANCE WITH BIOLOGICAL OPINION TERMS AND CONDITIONS AND REASONABLE AND PRUDENT MEASURES:** This approval is conditioned upon compliance with the Reasonable and Prudent Measures and implementing Terms and Conditions of the Biological Opinion issued by the National Marine Fisheries Service on March 13, 2020. This includes mitigation, particularly any appendices to Terms and Conditions applicable to the plan, as well as record-keeping and reporting sufficient to allow BOEM and BSEE to comply with reporting and monitoring requirements under the BiOp; and any additional reporting required by BOEM or BSEE developed as a result of BiOp implementation. The NMFS Biological Opinion may be found here: (https://www.fisheries.noaa.gov/resource/document/biological-opinion-federally-regulated-oil-and-gas-program-activities-gulf-mexico). The Appendices and protocols may be found here: (https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico).

- **SUPPORT BASES AND VESSEL TRANSIT ROUTES:** Approval of your plan is conditioned upon your use of the support bases and vessel transit routes as described in your plan. BOEM/BSEE must be notified at least 15 days prior to any vessel route changes that require transit of the Bryde's Whale area, and you must receive prior approval for that transit from BOEM/BSEE.

- **SEISMIC SURVEY OPERATION, MONITORING, AND REPORTING GUIDELINES:** The applicant will follow the guidance provided under Appendix A: Seismic Survey Mitigation and Protected Species Observer Protocols found in the Biological Opinion issued by the National Marine Fisheries Service on March 13, 2020. The guidance can be accessed on NOAA Fisheries internet website at https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico.

- **MARINE TRASH AND DEBRIS AWARENESS AND ELIMINATION:** The applicant will follow the protocols provided under Appendix B. Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols found in the Biological Opinion issued by the National Marine Fisheries Service on March 13, 2020. The guidance can be accessed on NOAA Fisheries internet website at https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico.

- **VESSEL-STRIKE AVOIDANCE/REPORTING:** The applicant will follow the protocols provided under Appendix C. Gulf of Mexico Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols found in the Biological Opinion issued by the National Marine Fisheries Service on March 13, 2020. The guidance can be accessed on the NOAA Fisheries internet site at https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico.

- **SEA TURTLE RESUSCITATION GUIDELINES:** The applicant will follow the guidance provided under Appendix J. Sea Turtle Handling and Resuscitation Guidelines found in the Biological Opinion issued by the National Marine Fisheries Service on March 13, 2020. The guidance can be accessed on the NOAA Fisheries internet site at https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico.

- **MOON POOL MONITORING AND REPORTING:** A moon pool has been identified during review of your plan submittal. If any sea turtle or other marine mammal is detected, you are required to contact NMFS at nmfs.psoreview@noaa.gov and BSEE at protectedspecies@bsee.gov for additional guidance and incidental report information.

Additional NMFS Moon Pool Requirements:

- Moon pools with hull doors should attempt to keep doors closed when no activity is occurring within the moon pool, unless the safety of crew or vessel require otherwise. This will prevent animals from entering the confined area.
- Use of a moon pool requires regular monitoring while open to the water column and if a vessel is not underway. Regular monitoring means 24-hour video monitoring with at hourly recurring checks for at least five minutes of the video feed, or at hourly recurring visual checks of the moon pool for at least five minutes by a dedicated crew observer with no other tasks during that visual check. If water conditions are such that observers are unable to see within a meter of the surface, operations requiring the lowering or retrieval of equipment through the moon pool should be conducted at a rate that will minimize potential harm, if safety permits.

- Closing the hull door
    - Should the moon pool have a hull door that can be closed, then prior to closure the moon pool must be monitored continuously by a dedicated crew observer with no other tasks, prior to closure and following closure to ensure that no individual ESA-listed species is trapped within the hull closed moon pool doors. If visibility is not clear to the hull door from above (e.g., turbidity or low light), 30 minutes of monitoring is required prior to hull door closure.

- Movement of the vessel (without closed hull door) and equipment deployment/retrieval
    - Prior to movement of the vessel and/or deployment/retrieval of equipment, the moon pool must be monitored continuously for a minimum of 30 minutes, by a dedicated crew observer with no other tasks, to ensure no ESA-listed species are present in the moon pool area.
    - If an ESA-listed species is observed in the moon pool, the vessel must not be moved and equipment must not be deployed or retrieved, to the extent practicable, unless the safety of crew or vessel requires otherwise. NMFS must be contacted immediately at nmfs.psoreview@noaa.gov. If the observed animal leaves the moon pool, the operator may commence activities.
    - Should an ESA-listed species be observed in a moon pool prior to activity commencement, recovery of the animal or other actions specific to the scenario may be required to prevent interaction with the animal. Operators shall not take such action except at the direction of and after contact with NMFS.

Should an interaction with equipment or entanglement/entrapment of any ESA-listed species occur (e.g., the animal cannot or does not leave the moon pool on its own volition), the interaction must be reported immediately. Any observation of a leatherback sea turtle within a moon pool, regardless of whether interaction with equipment or entanglement/entrapment is observed, must be reported immediately to the ESA Section 7 biologist at 301-427-8413 (nmfs.psoreview@noaa.gov). For minimum reporting information to include, see the REPORTING REQUIREMENTS FOR MOON POOL AND SLACK-LINE ENTANGLEMENT below.

- **SLACK-LINE PRECAUTIONS AND REPORTING REQUIREMENT:**

If operations require the use of flexible, small diameter (< 2 inch) lines to support operations (with or without divers), operators/contractors must reduce the slack in the lines to prevent

accidental entanglement of ESA-listed species. The following measures are required (noting that diver safety is paramount, and the following measures should be followed only in cases where they do not jeopardize human safety):

- Operators must utilize tensioning tools and/or other appropriate procedures to reduce unnecessary looseness in the lines and/or potential looping.
- The lines must remain taut, as long as additional safety risks are not created by this action.
- A line tender must be present at all times during dive operations and must monitor the line(s) the entire time a diver is in the water.
- Should the line tender and/or diver become aware of any ESA-listed species entanglement, the following protocols must be followed as soon as safety permits.

Should an ESA-listed species interaction resulting in entanglement, entrapment and/or injury occur, the interaction must be reported immediately or after diver safety (if present) is ensured.

- **REPORTING REQUIREMENTS FOR MOON POOL AND SLACK-LINE ENTANGLEMENT:**

  - **Reporting Requirements:** Should any of the following occur at any time, **immediate reporting** of the incident is required (after personnel and/or diver safety is ensured):

    - Entanglement or entrapment (i.e., an animal is entangled in a line or cannot or does not leave a moon pool of its own volition) of an ESA-listed species.
    - Injury of an ESA-listed species (e.g., the animal appears injured or lethargic).
    - Interaction, or contact with equipment by an ESA-listed species.
    - Contact information for reporting is as follows:
      - **Marine mammals** – Contact **Southeast Region's Marine Mammal Stranding Hotline at 1-877-433-8299**. If you do not receive a response, go to the following website to contact the relevant stranding networks for marine mammals: https://www.fisheries.noaa.gov/report.
      - **Sea turtles** – Contact **Brian Stacy, Veterinary Medical Officer at 352-283-3370**.
      - **Other ESA-listed species** (e.g., giant manta ray, oceanic whitetip shark, or Gulf sturgeon) **–** Contact the **ESA Section 7 biologist at 301-427-8413 (nmfs.psoreview@noaa.gov)**
      - **Report all incidents to** – takereport.nmfsser@noaa.gov.
      - **Any observation of a leatherback sea turtle** within a moon pool, (regardless of whether it appears injured, or an interaction with equipment or entanglement/entrapment is observed), must be reported immediately to **Brian Stacy, Veterinary Medical Officer at 352-283-3370**.

    After the appropriate contacts have been made for guidance/assistance, you may call BSEE at 985-722-7902 for questions or additional guidance on recovery assistance needs (if still required) and continued monitoring requirements. Minimum reporting information is described below.

    Within 24 hours of any event or observation within the moon pool if not previously contacted for a specific interaction, notify NMFS at nmfs.psoreview@noaa.gov and BSEE at protectedspecies@bsee.gov with the following information:

    1. Time, date, water depth, and location (latitude/longitude) of the first discovery of the interaction;
    2. Name, type, and call sign of the vessel in which the event occurred;

3. Size and location of moon pool within vessel (e.g. hull door or no hull door);
4. Equipment being utilized at time of interaction;
5. Species identification (if known) or description of the animal involved;
6. Approximate size of animal;
7. Condition of the animal during the event;
8. Photographs or video footage of the animal;
9. Stranding network line that was contacted for assistance;
10. General narrative and timeline describing the events that took place;
11. Whether activities in the moon pool were halted or changed upon observation of the animal: and
12. Whether the animal remains in the pool at the time of the report, or if not, the time/date the animal was last observed.

Conclusion: BOEM has evaluated the potential environmental impacts of the proposed action. Based on the SEA No. P-20341 and P-20349, a determination is made that the proposed action would have no significant impact on the marine, coastal, or human environment. Therefore, an Environmental Impact Statement will not be required.

PERRY BOUDREAUX

Digitally signed by PERRY BOUDREAUX
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Chief, Environmental Operations Section
Office of Environment,
New Orleans Office
Bureau of Ocean Energy Management

November 3, 2020
Date

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF OCEAN ENERGY MANAGEMENT
GULF OF MEXICO OCS REGION
NEW ORLEANS, LOUISIANA

SITE-SPECIFIC ENVIRONMENTAL ASSESSMENT

OF

RIGHT OF WAY/LEASE TERM PIPELINE INSTALLATION SEGMENT NUMBERS P-20341, AND P-20349

FOR

BP EXPLORATION & PRODUCTION INC.

November 2, 2020

RELATED ENVIRONMENTAL DOCUMENT

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

Gulf of Mexico OCS Lease Sale
Final Supplemental Environmental Impact Statement 2018
(OCS EIS/EA BOEM 2017-074)

Biological Opinion Oil and Gas Leasing, Exploration, Development, Production, Decommissioning, and All Related Activities in the Gulf of Mexico Outer Continental Shelf
(FWS April 20, 2018)

Biological Opinion of the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico
(NMFS March 13, 2020)

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1. OVERVIEW

The purpose of this Site-Specific Environmental Assessment (SEA) is to assess if the specific impacts associated with proposed pipeline installation activities, outlined in pipeline application Numbers P-20341 and P-20349 initially submitted by BP Exploration & Production Inc. (BP) onJanuary 6, 2020 will significantly affect the quality of the human environment within the meaning of Section 102(2)(c) of the National Environmental Policy Act (NEPA) and whether an Environmental Impact Statement (EIS) must be prepared. BP submitted right of way (ROW) and lease term pipeline applications to the Bureau of Safety and Environmental Enforcement (BSEE) to construct, maintain, and operate pipelines and associated infrastructure to tie back wells 003 and 004 located in the Manuel Drill Center in Mississippi Canyon Block 520 to the Na Kika Floating Production System (FPS) located in Mississippi Canyon Block 474. In addition, pipeline installations and associated infrastructure are proposed to connect the Manuel Drill Center to the Hershel Deepwater Drill Center, also located in Mississippi Canyon Block 520. The proposed actions cannot be categorically excluded because they include bulk oil flowlines with electrically heat traced flowline (EHTF) technology which is listed as a new or unusual technology (NUT)) (30 C.F.R. § 550.200) (516 DM Chapter 6, Appendix 10, C.15); therefore a SEA is prepared. This SEA is tiered from the current NEPA documents that evaluated a broad spectrum of potential impacts resulting from installation activities across the GOM Outer Continental Shelf (OCS) that include:

- Gulf of Mexico OCS Oil and Gas Lease Sales: 2017-2022 Gulf of Mexico Lease Sales 249, 250, 251, 252, 253, 256, 257, 259, and 261 Final Environmental Impact Statement (Multisale EIS) (USDOI, BOEM, 2017a);
- Gulf of Mexico OCS Lease Sale Final Supplemental Environmental Impact Statement 2018 (2018 SEIS) (USDOI, BOEM, 2017b);
- Biological Opinion Oil and Gas Leasing, Exploration, Development, Production, Decommissioning, and All Related Activities in the Gulf of Mexico Outer Continental Shelf (FWS 2018 BO) (Issued by United States Fish and Wildlife Service [FWS] April 20, 2018); and
- Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico (2020 BiOp) (Issued by National Marine Fisheries Service [NMFS] March 13, 2020).

The "tiering" process is provided for in the NEPA implementing regulations (40 C.F.R. § 1502.20 and § 1508.28) and is designed to reduce and simplify the size of subsequent environmental analyses of actions included within the broader program previously examined in NEPA compliance documents by eliminating discussions of impacts that would be repetitive to allow focus on those site-specific concerns and effects related to the specific action proposed. Document tiering in the Bureau of Ocean Energy Management (BOEM) is subject to additional guidance under Department of the Interior (DOI) regulations at 43 C.F.R. § 46.140 wherein the site-specific analysis must note which conditions and effects addressed in the programmatic document remain valid and which conditions and effects require additional review.

Although the analyses of pipeline installation related impacts prepared in the Multisale EIS and 2018 SEIS are comprehensive, new information has become available with respect to the following:

- **Noise/Vessel-Strike Impacts on Marine Mammals –** the environmental baseline since completion of the Multisale EIS, 2018 SEIS, FWS 2018 BO, and NMFS 2020 BO may have experienced slight changes and new information has become available since the preparation of the programmatic analyses;
- **Noise/Vessel-Strike Impacts on Sea Turtles –** the environmental baseline since completion of the Multisale EIS, 2018 SEIS, FWS 2018 BO, and NMFS 2020 BO may have experienced slight changes and new information has become available since the preparation of the programmatic analyses; and
- **Discharge Impacts/Disturbances to Fish and Fisheries –** the environmental baseline since completion of the Multisale EIS, 2018 SEIS, FWS 2018 BO, and NMFS 2020 BO may have experienced slight changes and new information has become available since the preparation of the programmatic analyses.

Therefore, **Chapter 3** of this SEA focuses on how the new information, including a discussion of the known effects of the *Deepwater Horizon* explosion, spill, and response activities on the analyzed resources, relates to the routine, accidental, and cumulative environmental effects of this proposed action. Where applicable, relevant affected environment discussions and impact analyses from the Multisale EIS, 2018 SEIS, FWS 2018 BO, and NMFS 2020 BO are summarized and utilized for this site-specific analyses, and are incorporated by reference into this SEA. Relevant condition(s) of approval identified in this SEA, Multisale EIS, the 2018 SEIS, FWS 2018 BO, and NMFS 2020 BO have been considered in the evaluation of the proposed action.

1.1. BACKGROUND

BOEM and the Bureau of Safety and Environmental Enforcement (BSEE) are mandated to manage and oversee the exploration and development of OCS oil, gas, and mineral resources while ensuring safe operations and the protection of the human, marine, and coastal environments. BOEM and BSEE issue oil and gas leases and regulates exploration, development, production, and decommissioning. Prior to authorizing activities related to these phases, BOEM conducts the appropriate NEPA review. The BSEE Office Field Operations, Pipeline Section, oversees the submittal and permit approval process pursuant to 30 C.F.R. § 250 subpart J.

During the development of a lease, lessees and operators submit exploration plans (EPs) and development plans (DOCDs) to provide BOEM with information needed to adequately evaluate the overall potential impacts on OCS resources prior to seeking any individual permit approvals, such as an application for permit to drill (APD). Once drilling is complete and if there is a commercial discovery of hydrocarbons, lesses and operators would submit a pipeline application to transport hydrocarbons to the shore for commercial uses. Most of the information in the application is presented in basic statements, figures, lists, design, and tables that simply provide the necessary details on the proposed transportation operations and what types of product the pipeline would transport to the shore.

During every stage of exploration, development, and production of oil, gas, and mineral (sulfur) operations, structures are set on or into the seafloor to:

- Aid with and/or facilitate well operations and protection;
- Emplace drilling and production platforms and vessel moorings;
- Install pipelines; and
- Deploy subsea equipment.

To satisfy the regulatory requirements and lease agreements for the eventual removal of these pipelines, installation and decommissioning operations employ a wide range of activities that oversee any installation or removal activities including seafloor severing, component lifting and loading, site-clearance verification work, and final transportation of the structure back to shore for salvage or to an alternate OCS site for reuse or reefing.

The scope of the effects on the environment in the GOM from the activities proposed in BP's pipeline installation permit applications were fully discussed and analyzed in the Multisale EIS, 2018 SEIS, FWS 2018 BO, and NMFS 2020 BO and the specific locations, equipment, methodologies, and the duration of the proposed activities will result in impacts similar to those discussed in the Multisale EIS, 2018 SEIS, FWS 2018 BO, and NMFS 2020 BO. This SEA was prepared by BOEM to evaluate the activity-specific issues related to the applicant's proposed activities in addition to the new information.

1.2. PURPOSE OF AND NEED FOR THE PROPOSED ACTION

BP has submitted this pipeline permit applications as part of their production installation developmental activities on the Outer Continental Shelf. The purpose of the proposed action as outlined by BP in their pipeline applications is to construct, operate, and maintain the proposed pipelines and associated infrastruture. Production and transportation of hydrocarbon resources and production related waste on the OCS would help satisfy the Nation's need for energy.

The need for this action is established by BOEM's responsibility under the Outer Continental Shelf Lands Act (OCSLA) to make OCS lands available for expeditious and orderly development, subject to environmental safeguards, in a manner that is consistent with the maintenance of competition and other

national needs. Consistent with its ROW and lease term obligations, BP has submitted these pipeline applications. Permit application are sumitted for various reasons as follows: (a) a lease term is limited to a minimum of 5 years and a maximum of 10 years, and failure to identify and develop resources could lead to loss of the investment costs to acquire the lease as well as yearly rentals to maintain access to the lease; (b) leaseholders are obligated via lease terms to diligently develop the resources; (c) commercial quantities of hydrocarbons have been encountered; and (d) leaseholders have a legal right to pursue the production and transportation of hydrocarbon resources and production related waste.

1.3. DESCRIPTION OF THE PROPOSED ACTION

BP has submitted right of way (ROW) and lease term pipeline installation applications to support the Manuel Drill Center in Mississippi Canyon Block 520. Pipeline Applications ROW P-20341 and Lease Term P-20349 were submitted by BP to; 1) Tie back Manuel Drill center wells 003 and 004 located in Mississippi Canyon Block 520 (OCS-G09821) to the Na Kika FPS facility located in Mississippi Canyon Block 474 (OCS-G35825) via jumpers, flowlines, umbilicals, and associated infrastructure; and 2) Install flowlines and associated infrastructure to facilitate future activities in the Hershel Drill Center area approximately two miles south of the Manuel Drill Center area.

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Pipeline Segment P-20349 is a 9 inch electrical/hydraulic power umbilical, 24,222 ft (7,383 m) in length, running in a loop from the Na Kika facility to the ILPIS located east of the facility all located in Mississippi Canyon Block 474.

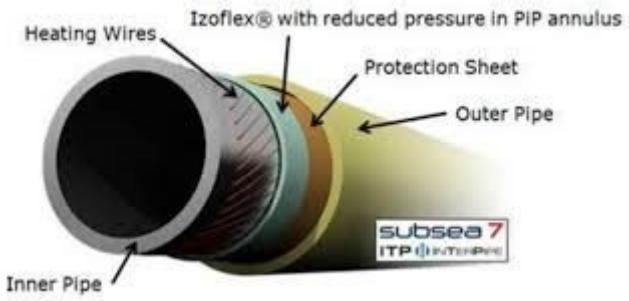
Electrically Heat Traced Flowlines (P-20341 and P-20348) are identified as New or Unusual Technology (NUT). This EHTF technology has not been used previously or extensively in a BOEM OCS region or has not been used previously under the anticipated operating conditions and will be referred as a new or unusual technology (NUT) (see 30 C.F.R. § 550.200). BOEM's Office of Environment conducted a technical review of this technology for this plan. This technology has been reviewed based upon information provided by BP, the potential effect on the marine environment and safety from this technology present no greater risk than conventional technology. A detailed discussion on this technology is included in Section 2.5 of the associated development operations coordination document

(DOCD) plan S-7993 and is included as well in the subject pipeline applications P-20341 and P-20349 (BP, 2020).

The water depth at wells 003 and 004 in the Manuel Drill Center located in Mississippi Canyon Block 520 is approximately 6,625 ft (2,019 m) and the distance to nearest shore from the well locations is approximately 66 miles (105 km) from the nearest Louisiana shore in Plaquemines Parish, Louisiana. BP proposes to use DP vessels for the installation activities and there is no anchor radius. The following vessels will be utilized for the installations: the *Seven Arctic* (Construction Vessel); the *Seven Pacific* (Construction/Flex-Lay Vessel); the *Seven Vega* (Pipeline Reel-Lay Vessel); and the *Harvey Intervention* (Survey and Light Construction Vessel). Supply and crewboat facilities to support the proposed action are to be located in existing facilities in Port Fourchon, Louisiana, approximately 120 mi (193 km) northwest of the project location. Air operations (helicopter) to support the proposed action are to be located in existing facilities in Houma, Louisiana, approximately 161 mi (259 km) northwest of the project location. Installation vessels to support the proposed action are to be located in existing facilities in Mobile, Alabama, approximately 111 mi (179 km) north northeast of the project location. Pre-Lay activities will commence in August 2020, and the installation of the pipelines and associated infrastructure will take approximately 236 days to complete (BP, 2020).

Electrically Heat Traced Flowline (EHTF):

The Manuel EHTFs is an 8-inch X 12-inch API 5L X70 pipe-in-pipe system in which heating wires are wrapped helically around (not bonded to) the inner pipe. The EHTF PIP includes a 5.8-mile ILPIS-Manuel PLEM section and 1.9-mile Manuel Extension PLET to Herschel Deep PLET section. This system will use izoflex insulation material and an EHTF system to manage the risk of hydrates and reduce flow assurance concerns. The EHTFs utilize a pipe-in-pipe design with an internal annular space. The EHTF system is made of heating wires floated along the inner pipe that are connected as 3-phase 3-wire balanced power triplets in a star configuration with no neutral return, thus providing power from a single end. The heating wires are installed in the annulus of the pipe, between the inner pipe and the izoflex insulation material. In operation, the annulus is a dry environment, leak tight relative to the internal production fluid and external water environment. The EHTFs will be installed using the reel-lay method (BP, 2020). Below is a cartoon cross section of the EHTF:



1.4. IMPACT-PRODUCING FACTORS

The major issues of concern considered and/or analyzed in this SEA include many of the same issues identified during scoping and preparation for previous BOEM NEPA documents covering OCS oil and gas exploration, development, and abandonment activities. Impact-producing factors from the proposed pipeline installation activities include: (1) air emissions; (2) seafloor disturbance from installation activities; (3) vessel traffic and noise; (4) waste discharges from vessel operations; and (5) marine trash and debris. Potential impacts from accidents include: (1) vessel collisions with marine mammals and sea turtles, (2) vessel collisions with coastal and marine birds, (3) oil spills, and (3) bottom disturbances from lost/jettisoned debris.

The routine IPFs are expected to occur during the operations conducted under the proposed action and are addressed in each of the site-specific analyses in **Chapter 3** under "Routine Activities", whereas the accidental IPFs are detailed and addressed in each of the site-specific analyses under "Accidental Events." The impact-producing factors described above have been considered in the Multisale EIS, and 2018 SEIS and is incorporated here by reference.

Accidental Spill Concerns

Since spills are unplanned, unforeseeable events, BOEM is required to rely on past experiences to predict many factors regarding oil-spill risks. Based on experience and the operations proposed in BP's pipeline application, the potential sources of hydrocarbon spills from the proposed activity would include a leak resulting from damage to the fuel tanks on the pipeline lay vessels or pipeline construction vessels.

Potential Spills from Vessels

As indicated above, offshore spills from BP's proposed action are possible if an accident were to damage a storage tank onboard the pipeline lay vessel or pipeline construction vessel. Historically, accidents of this nature have resulted from unintentional vessel collisions. A worst-case discharge scenario from a rupture and spill from the vessels are:

	Total Diesel Oil Capacity
DP Flexible Lay Vessel	21,361 bbl
DP Construction/Flex-Lay Vessel (1)	12,780 bbl
DP Construction/Flex-Lay Vessel (2)	21,764 bbl

Additionally, the supply boat proposed to support the pipeline installation operations has an estimated fuel tank capacity of 5,000 bbl, and the Flotel at the FPDS facility (Nakika) has an estimated fuel tank capacity of 280,257 gal (6,673 bbl). The helicopter proposed to support activities has an estimated fuel tank capacity of 760 gal (18.1 bbl) (BP, 2020).

Summary

In the event of a spill, there is no single method of containing and removing the spilled materials that would be 100 percent effective. Removal and containment efforts to respond to an ongoing spill would likely require multiple technologies, including mechanical cleanup, burning of the slick, and chemical dispersants. Even with the deployment of all of these technologies, it is likely that, with the operating limitations of today's spill response technology, not all of the oil could be contained and removed from offshore. It is likely that larger spills under the right conditions would require the simultaneous use of all available cleanup methods (mechanical cleanup, dispersant application, and in-situ burning). That being said, when one considers the historical/statistical data, the recent subsea containment improvements, BOEM's and BSEE's enhanced oversight, and industry's heightened safety awareness since the *Deepwater Horizon* spill, it is reasonable to conclude that an accidental spill event is not likely to occur.

2. ALTERNATIVES CONSIDERED

2.1. NO ACTION ALTERNATIVE

Alternative 1 - If selected, the operator would not undertake the proposed activities. If the proposed activities are not undertaken, all environmental impacts, including additional routine, accidental, or cumulative impacts to the environmental and cultural resources described in the Multisale EIS, 2018 SEIS, FWS 2018 BO, NMFS 2020 BO, and this SEA would not occur.

2.2. THE PROPOSED ACTION AS SUBMITTED

Alternative 2 This is BOEM's *Preferred Alternative* - If selected, the operator would undertake the proposed activities as requested in their plan. This alternative assumes that the operator will conduct their operations in accordance with their lease stipulations, the OCSLA and all applicable regulations (as per 30 C.F.R. § 550.101(a)), and guidance provided in all appropriate NTLs (as per 30 C.F.R. § 550.103), conditions of approval as required under the Endangered Species Act (ESA) Consultation with National Marine Fisheries (NMFS) that concluded March 13, 2020 (2020 Biological Opinion [BO] and with FWS that concluded on April 20, 2018 (FWS 2018 BO). However, no additional, site-specific condition(s) of approval would be required by BOEM.

2.3. SUMMARY AND COMPARISON OF THE ALTERNATIVES

If selected, Alternative 1, the No Action Alternative, would result in the operator not exercising its rights under the lease and conducting their proposed activities. Alternative 1 would not result in any impacts to the environmental resources analyzed in **Chapter 3**; however, the lessee would not develop the oil and gas resources of its lease for the benefit of the U.S. economy.

Alternative 2 is the Preferred Alternative because it meets the objectives of the purpose and need and will allow the proposed action to be conducted safely and with the necessary conditions to limit or negate potential environmental impacts.

Conditions of Approval Required under the Preferred Alternative

The need for and utility of the following conditions of approval is discussed in the relevant impact analysis section of this SEA. Alternative 2 is the proposed action as submitted with additional conditions of approval as required under the ESA Consultation with NMFS that concluded March 13, 2020 (2020 BO). To ensure adequate environmental protection, the following conditions of approval are applied:

COMPLIANCE WITH BIOLOGICAL OPINION TERMS AND CONDITIONS AND REASONABLE AND PRUDENT MEASURES: This approval is conditioned upon compliance with the Reasonable and Prudent Measures and implementing Terms and Conditions of the Biological Opinion issued by the National Marine Fisheries Service on March 13, 2020. This includes mitigation, particularly any appendices to Terms and Conditions applicable to the plan, as well as record-keeping and reporting sufficient to allow BOEM and BSEE to comply with reporting and monitoring requirements under the BiOp; and any additional reporting required by BOEM or BSEE developed as a result of BiOp implementation. The NMFS Biological Opinion may be found here: (https://www.fisheries.noaa.gov/resource/document/biological-opinion-federally-regulated-oil-and-gas-program-activities-gulf-mexico). The Appendices and protocols may be found here: (https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico).

SUPPORT BASES AND VESSEL TRANSIT ROUTES: Approval of your plan is conditioned upon your use of the support bases and vessel transit routes as described in your plan. BOEM/BSEE must be notified at least 15 days prior to any vessel route changes that require transit of the Bryde's Whale area, and you must receive prior approval for that transit from BOEM/BSEE.

SEISMIC SURVEY OPERATION, MONITORING, AND REPORTING GUIDELINES: The applicant will follow the guidance provided under Appendix A: Seismic Survey Mitigation and Protected Species Observer Protocols found in the Biological Opinion issued by the National Marine Fisheries Service on March 13, 2020. The guidance can be accessed on NOAA Fisheries internet website at https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico.

MARINE TRASH AND DEBRIS AWARENESS AND ELIMINATION: The applicant will follow the protocols provided under Appendix B. Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols found in the Biological Opinion issued by the National Marine Fisheries Service on March 13, 2020. The guidance can be accessed on NOAA Fisheries internet website at

https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico.

VESSEL-STRIKE AVOIDANCE/REPORTING: The applicant will follow the protocols provided under Appendix C. Gulf of Mexico Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols found in the Biological Opinion issued by the National Marine Fisheries Service on March 13, 2020. The guidance can be accessed on the NOAA Fisheries internet site at https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico.

SEA TURTLE RESUSCITATION GUIDELINES: The applicant will follow the guidance provided under Appendix J. Sea Turtle Handling and Resuscitation Guidelines found in the Biological Opinion issued by the National Marine Fisheries Service on March 13, 2020. The guidance can be accessed on the NOAA Fisheries internet site at https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico.

MOON POOL MONITORING AND REPORTING: A moon pool has been identified during review of your plan submittal. If any sea turtle or other marine mammal is detected, you are required to contact NMFS at nmfs.psoreview@noaa.gov and BSEE at protectedspecies@bsee.gov for additional guidance and incidental report information.

Additional NMFS Moon Pool Requirements:

- Moon pools with hull doors should attempt to keep doors closed when no activity is occurring within the moon pool, unless the safety of crew or vessel require otherwise. This will prevent animals from entering the confined area.
- Use of a moon pool requires regular monitoring while open to the water column and if a vessel is not underway. Regular monitoring means 24-hour video monitoring with at hourly recurring checks for at least five minutes of the video feed, or at hourly recurring visual checks of the moon pool for at least five minutes by a dedicated crew observer with no other tasks during that visual check. If water conditions are such that observers are unable to see within a meter of the surface, operations requiring the lowering or retrieval of equipment through the moon pool should be conducted at a rate that will minimize potential harm, if safety permits.

- Closing the hull door
    - Should the moon pool have a hull door that can be closed, then prior to closure the moon pool must be monitored continuously by a dedicated crew observer with no other tasks, prior to closure and following closure to ensure that no individual ESA-listed species is trapped within the hull closed moon pool doors. If visibility is not clear to the hull door from above (e.g., turbidity or low light), 30 minutes of monitoring is required prior to hull door closure.

- Movement of the vessel (without closed hull door) and equipment deployment/retrieval
    - Prior to movement of the vessel and/or deployment/retrieval of equipment, the moon pool must be monitored continuously for a minimum of 30 minutes, by a dedicated crew observer with no other tasks, to ensure no ESA-listed species are present in the moon pool area.
    - If an ESA-listed species is observed in the moon pool, the vessel must not be moved and equipment must not be deployed or retrieved, to the extent practicable, unless the safety of crew or vessel requires otherwise. NMFS must be contacted immediately at nmfs.psoreview@noaa.gov. If the observed animal leaves the moon pool, the operator may commence activities.

- Should an ESA-listed species be observed in a moon pool prior to activity commencement, recovery of the animal or other actions specific to the scenario may be required to prevent interaction with the animal. Operators shall not take such action except at the direction of and after contact with NMFS.

Should an interaction with equipment or entanglement/entrapment of any ESA-listed species occur (e.g., the animal cannot or does not leave the moon pool on its own volition), the interaction must be reported immediately. Any observation of a leatherback sea turtle within a moon pool, regardless of whether interaction with equipment or entanglement/entrapment is observed, must be reported immediately to the ESA Section 7 biologist at 301-427-8413 (nmfs.psoreview@noaa.gov). For minimum reporting information to include, see the REPORTING REQUIREMENTS FOR MOON POOL AND SLACK-LINE ENTANGLEMENT below.

SLACK-LINE PRECAUTIONS AND REPORTING REQUIREMENT: If operations require the use of flexible, small diameter (< 2 inch) lines to support operations (with or without divers), operators/contractors must reduce the slack in the lines to prevent accidental entanglement of ESA-listed species. The following measures are required (noting that diver safety is paramount, and the following measures should be followed only in cases where they do not jeopardize human safety):

- Operators must utilize tensioning tools and/or other appropriate procedures to reduce unnecessary looseness in the lines and/or potential looping.
- The lines must remain taut, as long as additional safety risks are not created by this action.
- A line tender must be present at all times during dive operations and must monitor the line(s) the entire time a diver is in the water.
- Should the line tender and/or diver become aware of any ESA-listed species entanglement, the following protocols must be followed as soon as safety permits.

Should an ESA-listed species interaction resulting in entanglement, entrapment and/or injury occur, the interaction must be reported immediately or after diver safety (if present) is ensured.

REPORTING REQUIREMENTS FOR MOON POOL AND SLACK-LINE ENTANGLEMENT:

- **Reporting Requirements:** Should any of the following occur at any time, **immediate reporting** of the incident is required (after personnel and/or diver safety is ensured):
  - Entanglement or entrapment (i.e., an animal is entangled in a line or cannot or does not leave a moon pool of its own volition) of an ESA-listed species.
  - Injury of an ESA-listed species (e.g., the animal appears injured or lethargic).
  - Interaction, or contact with equipment by an ESA-listed species.
  - Contact information for reporting is as follows:
    - **Marine mammals** – Contact **Southeast Region's Marine Mammal Stranding Hotline at 1-877-433-8299**. If you do not receive a response, go to the following website to contact the relevant stranding networks for marine mammals: https://www.fisheries.noaa.gov/report.
    - **Sea turtles** – Contact **Brian Stacy, Veterinary Medical Officer at 352-283-3370**.
    - **Other ESA-listed species** (e.g., giant manta ray, oceanic whitetip shark, or Gulf sturgeon) **–** Contact the **ESA Section 7 biologist at 301-427-8413 (nmfs.psoreview@noaa.gov)**

- **Report all incidents to** – takereport.nmfsser@noaa.gov.
- **Any observation of a leatherback sea turtle** within a moon pool, (regardless of whether it appears injured, or an interaction with equipment or entanglement/entrapment is observed), must be reported immediately to **Brian Stacy, Veterinary Medical Officer at 352-283-3370**.

After the appropriate contacts have been made for guidance/assistance, you may call BSEE at 985-722-7902 for questions or additional guidance on recovery assistance needs (if still required) and continued monitoring requirements. Minimum reporting information is described below.

Within 24 hours of any event or observation within the moon pool if not previously contacted for a specific interaction, notify NMFS at nmfs.psoreview@noaa.gov and BSEE at protectedspecies@bsee.gov with the following information:

1. Time, date, water depth, and location (latitude/longitude) of the first discovery of the interaction;
2. Name, type, and call sign of the vessel in which the event occurred;
3. Size and location of moon pool within vessel (e.g. hull door or no hull door);
4. Equipment being utilized at time of interaction;
5. Species identification (if known) or description of the animal involved;
6. Approximate size of animal;
7. Condition of the animal during the event;
8. Photographs or video footage of the animal;
9. Stranding network line that was contacted for assistance;
10. General narrative and timeline describing the events that took place;
11. Whether activities in the moon pool were halted or changed upon observation of the animal: and
12. Whether the animal remains in the pool at the time of the report, or if not, the time/date the animal was last observed.

3. DESCRIPTION OF THE AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

3.1. INTRODUCTION

The discussion below will: (1) briefly describe/summarize the pertinent affected resources; (2) discuss whether proposed activities and their IPFs would have significant impacts to the human environment of the GOM; and (3) identify significant impacts, if any that would require further NEPA analysis in an EIS. The description of the affected environment and impact analysis are presented together in this section for each resource. For the impact analysis, resource-specific significance criteria were developed for each category of the affected environment. The criteria reflect consideration of both the context and intensity of the impact at issue (see 40 C.F.R. § 1508.27). For the sake of this document, the criteria for impacts to environmental resources are classified into one of the three following levels:

- Significant Impact (including those that could be mitigated to non-significance);
- Adverse but Not Significant Impact; or
- Negligible Impact

Preliminary screening for this assessment was based on a review of this relevant literature; previous SEAs, the Multisale EIS and 2018 SEIS, and statistics/data pertinent to historic and projected activities. The BOEM initially considered the following resources for impact analysis:

- marine mammals (including Endangered Species Act (ESA) listed species and strategic stocks);
- sea turtles (all are ESA listed species);
- fishes (including listed species and ichthyoplankton);
- commercial and recreational fisheries;
- coastal and marine birds (including ESA listed species);
- benthic communities (including deepwater benthic communities, live bottoms, and topographic features);
- archaeological resources;
- military uses;
- recreational and commercial diving;
- socioeconomic conditions (including employment, marine transportation, and infrastructure);
- geology/sediments; and
- air and water quality.

The impact analyses focus on a broad group of oil and gas activities including pipeline installation activities and resources with the potential for non-negligible impacts. Routine, accidental, and cumulative impacts from oil and gas development activities including pipeline installation similar to those proposed by BP are analyzed in the Multisale EIS, 2018 SEIS, FWS 2018 BO, and NMFS 2020 BO that considered the proposed activities as well as impacts to resources relevant to the proposal. The level of impacts associated with each interaction was analyzed and described in the Multisale EIS, 2018 SEIS, FWS 2018 BO, and NMFS 2020 BO and is incorporated by reference.

The Multisale EIS, 2018 SEIS, FWS 2018 BO, and NMFS 2020 BO provides a comprehensive characterization of biological and socioeconomic resources that may be adversely affected by oil and gas exploration and development activities including pipeline installation. For this SEA BOEM evaluated the potential impacts resulting from the operator's proposed activities that were not considered in the Multisale EIS and 2018 SEIS. This section concentrates on the potential impacts of the proposed action on the following affected resources:

- air quality;
- offshore water quality;
- deepwater benthic communities;
- marine mammals (including Endangered Species Act [ESA] listed species);
- sea turtles (all are ESA listed species);
- fish (including ESA listed species) and essential fish habitat (EFH); and
- archaeological resources.

Other environmental and socioeconomic conditions identified in the initial list of resources considered for impact analysis above, such as military uses, were considered and the potential impacts that could occur from activities, such as the proposed activities, were fully addressed in the Multisale EIS and 2018 SEIS and deemed negligible (40 C.F.R. § 1508.27) and are not discussed in this SEA. Space-use conflicts with recreational and commercial fishing vessels will be negligible compared to the area

available for these activities, and there is a potential for an increase in some types of fishing activity due to development. There are no known recreational and/or commercial diving operations regularly occurring in the area. Although development could necessitate a negligible increase in commercial dive activity, potential impact levels do not warrant further analysis. Coastal and marine birds were not further analyzed due to the distance from shore and the temporary nature of the proposed activities. Topographic and pinnacle features were not further analyzed due to the distance from the proposed activities to the nearest topographic and/or pinnacle features (~79 mi and ~49 mi (~127 km and ~79 km) respectively)). No socioeconomic effects were further analyzed due to the type, the temporary nature, and employment size, of the proposed activity. There is no expansion or modification of support bases proposed as a result of this activity. Additionally, support vessel operations are comparable to that described and analyzed in the Multisale EIS and 2018 SEIS for similar activities. Additionally, support vessel operations are comparable to that described and analyzed in the Multisale EIS and 2018 SEIS for similar activities. The potential impacts of a low-probability, Catastrophic Oil-Spill event, such as the *Deepwater Horizon* spill to the environmental resources and socioeconomic conditions listed above are fully addressed in the Catastrophic Spill Event Analysis (Appendix B of the 2012-2017 WPA/CPA Multisale EIS (USDOI, BOEM, 2012)). This analysis was later updated and published as a "Catastrophic Spill Event Analysis" white paper (USDOI, BOEM, 2017c) and a respective resource summary of that analysis is provided in each impact review below.

Deepwater Horizon Impacts Incorporated into SEA Analyses

BOEM, in conjunction with the well operator and other Federal and State agencies, continues to monitor and evaluate both the short-term and long-term impacts of the accidental spill. There is ongoing research to assess the impacts to resources from the *Deepwater Horizon* blowout, spill, and response efforts. For many resources, the data are still being collected and analyzed through the National Resource Damage Assessment (NRDA) process. BOEM continues to seek data and research results from the NRDA process and the scientific community. Results of this research are forthcoming, and BOEM subject matter experts are continuing to update their analyses as this information becomes available.

Chapter 3 of this document describes the environmental and archaeological resources and the potential routine, accidental, and cumulative impacts of the proposed action on the resources that could be affected by the proposed activities. These descriptions present environmental resources as they are now, thus providing new baseline information that is informed by the *Deepwater Horizon* spill for analyses of potential impacts from the proposed activities.

3.2. AIR QUALITY

3.2.1. Affected Environment

The complete description of the air quality in the Gulf of Mexico region is set forth in in Chapters 4.1 of the Multisale EIS, and 2018 SEIS, and is incorporated by reference. The following information is a summary of the description incorporated from the Multisale EIS, and 2018 SEIS. Mississippi Canyon Blocks 474 and 520 are west of 87.5° W. longitude and hence, falls under BOEM jurisdiction for enforcement of the Clean Air Act (CAA). The air over the OCS water is not classified, but it is presumed to be better than the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants (USDOI, BOEM, 2017a and b). BP's proposed pipeline installation/decommissioning activities in Mississippi Canyon Blocks 474 and 520 are located approximately 66 mi (105 km) from the nearest Louisiana coastline (from wellsites in MC 520), an area that is in attainment of the NAAQS for carbon monoxide, nitrogen oxides, sulphur oxides, ozone, and particulate matter and that, for Prevention of Significant Deterioration (PSD) purposes, is classified as a Class II Area. The Houston/Galveston, Texas area is in nonattainment for the 2008 ozone 8-hour standard. As of October 1, 2015, the United States Environmental Protection Agency (USEPA) strengthened NAAQS for ozone and will release new designated areas in the future after a comprehensive assessment of science, human health risk and exposure and alternative policy options before a rulemaking is proposed. Two new 1-hour NAAQS standards went into effect in 2010. They are the 1-hour NO_2 standard of 100 ppb and the 1-hour SO_2 standard of 75 ppb. The entire St. Bernard Parish, Louisiana is in nonattainment for the 2010 1-hr sulfur dioxide (SO_2) standard, and part of the Evangeline Parish is in nonattainment for the same pollutant standard. Other than these areas, the coastal areas are in attainment of the NAAQS for ozone, carbon

monoxide, nitrogen oxides, sulphur oxides, and particulate matter. For Prevention of Significant Deterioration (PSD) purposes, the coastal areas are classified as a Class II Areas.

Influences to onshore air quality are dependent upon meteorological conditions and air pollution emitted from operational activities. The pertinent meteorological conditions regarding air quality are the wind speed and direction, the atmospheric stability, and the mixing height (which govern the dispersion and transport of emissions). The typical, large-scale wind flow for the GOM area is driven by the clockwise circulation around the Bermuda High, resulting in a prevailing southeasterly to southerly wind flow, which is conducive to transporting air pollution emissions toward shore. However, superimposed upon this large-scale circulation are smaller scale wind-flow patterns, such as the land/sea breeze phenomenon. In addition, there are other large-scale weather features that occur periodically, namely tropical cyclones, and mid-latitude frontal systems. Because of the routine occurrence of these various conditions, the winds blow from all directions in the area of concern (MacDonald et al., 2004).

3.2.2. Impact Analysis

A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed activities on air quality can be found in Chapter 4.1 of the Multisale EIS and 2018 SEIS and is incorporated by reference. The following information is a summary of the impact analyses.

3.2.2.1. Alternative 1

If selected, Alternative 1, the No Action alternative, would result in the operator not undertaking the proposed activities as described in the plan. Therefore, the IPFs to air quality would not occur. For example, there would be no volatile organic compound (VOC) emissions that would result in potential localized degradation of air quality.

3.2.2.2. Alternative 2

If selected, Alternative 2, the Proposed Action as Submitted with additional conditions of approval as required under the NMFS 2020 BO, would result in the operator undertaking the proposed activities, as requested and conditioned in the plan. As described in the analyses below, impacts to air quality from the proposed action are expected to be short-term, localized, and not lead to significant impacts.

Routine Activities

Air quality would be affected in the immediate vicinity of the proposed activities and service vessels. The impact from emissions for the proposed activities described in this proposed action will not exceed BOEM's exemption levels per 30 C.F.R. § 550.303(d), which would exempt the operator from additional air quality modeling. The pipeline installation activities are not expected to significantly affect onshore air quality due to the distance from shore and the distance from the area of the proposed action to any PSD Class I air quality area such as the Breton National Wildlife Refuge.

Accidental Events

Should a spill of oil occur, the volatile organic compounds (VOCs), which would escape to the atmosphere from a surface slick, are precursors to photochemically produced ozone. A spike in VOCs could contribute to a corresponding spike in ozone, especially if the release were to occur on a hot sunny day in a NO_2-rich environment. The corresponding onshore area is in attainment for ozone. Due to the distance from shore, the proposed activities are not expected to have any impacts to onshore air quality, including nonattainment areas. If a fire occurs, prior to containment, particulate and combustible emissions will be released in addition to the VOCs. Emissions of pollutants into the atmosphere from routine activities associated with the proposed activities are projected to have minimal impacts to onshore air quality because of the prevailing atmospheric conditions, emission heights, emission rates, and the distance of these emissions from onshore.

Cumulative Impacts

Cumulative impacts on air quality within the offshore area would come primarily from non-OCS oil/gas activities in the Gulf as well as sources on land such as generated outside the OCS and include emissions

from industrial plants, power generation, and urban transportation. The location of the proposed action is far removed from coastal populations or industrial activity. The proposed pipeline installation activities are located approximately 66 mi (105 km) from shore (MC 520 wellsites), and would not affect the overall quality of air over the Louisiana coast because of the temporary nature of the proposed activity and the distance to shore. Figure 4-1 of the Multisale EIS and 2018 SEIS (USDOI, BOEM, 2017a and b) shows the Texas and Louisiana ozone attainment status (USEPA, 2020a). Except for Southeast Texas (Houston-Galveston-Brazoria), which is in nonattainment for ozone, and St. Bernard Parish, and part of Evangeline Parish, Louisiana, which is in nonattainment for SO_2, the Gulf's coastal areas are currently designated as "attainment" for all of the NAAQS regulated pollutants (USEPA, 2020b). Minor to moderate cumulative impacts on air quality are expected as a result of the proposed activities when added to the impacts of past, present, or reasonably foreseeable oil and gas development in the area, as well as other activities in the area, though the incremental impacts from the proposed activities are expected to be **minor**.

Conclusion

The air quality in the immediate vicinity of the proposed activities would be affected by the projected emissions, but the 66 mi (105 km) distance between the area of the proposed action and the nearest shoreline results in substantial dilution factors for point-source emissions from the proposed action so that onshore air quality impacts would be well below levels considered to be significant.

3.3. OFFSHORE WATER QUALITY

3.3.1. Affected Environment

The description of water quality in offshore waters of the Gulf of Mexico is set forth in Chapter 4.2 of the Multisale EIS, and 2018 SEIS and is incorporated by reference. The following information is a summary of the description incorporated from the Multisale EIS, and 2018 SEIS.

The GOM is the ninth largest waterbody in the world. The Mississippi River Basin drains 41 percent of the contiguous United States. The basin covers more than 1,245,000 square miles, and includes all or parts of 31 states and two Canadian provinces (USACE, 2020).

The physical oceanography of the deep Gulf can be approximated as a two-layer system with an upper layer about 800- to 1,000-m (2,625- to 3,281-ft) deep that is dominated by the Loop Current and associated clockwise (anticyclonic) eddies (Welsh et al., 2009; Inoue et al., 2008); and the lower layer below ~1,000 m (3,281 ft) that has near uniform currents (Welsh et al., 2009; Inoue et al., 2008).

Deep waters east of the Mississippi River are affected by the Loop Current and associated warm-core anticyclonic eddies, which consist of clear, low-nutrient water (Muller-Karger et al., 2001). Cold-core cyclonic eddies also form at the edge of the Loop Current and are associated with upwelling and nutrient-rich, high-productivity waters. More details on the physical oceanography of the GOM are available in Chapter 4.2 of the Multisale EIS, and 2018 SEIS.

Typical water quality parameters that are considered important to the health of coastal and marine environments include temperature, salinity, dissolved oxygen, nutrients, pH, turbidity, and pollutants.

Surface water temperatures in the Gulf of Mexico vary seasonally from about 29 ºC (84 ºF) in the summer to about 19 ºC (65 ºF) in the winter (Gore, 1992). In the summer, warm water may be found from the surface down to a thermocline at depths to about 160 ft (50 m) deep. Minimum water temperatures at the deep seafloor approach 4º C (39 ºF).

The salinity at the sea surface in the offshore central GOM is generally 36 parts per thousand (ppt) (Gore, 1992). Lower salinities are characteristic nearshore where fresh water from the rivers mix with shallow Gulf waters. For example, salinity in open water near the coast may vary between 29 and 32 ppt during fall and winter, but it may decline to 20 ppt during spring and summer due to increased runoff (USDOI, MMS, 2000).

Dissolved oxygen (DO) concentrations in seawater vary as a function of temperature and barometric pressure. In general, cold water supports higher DO concentrations than warm water. DO concentrations between 5 and 10 milligrams per liter (mg/l) are considered beneficial to aquatic life. The Gulf of Mexico hypoxic zone is a band of oxygen-stratified water that stretches along the Texas-Louisiana shelf each summer where the DO concentrations are less than 2 mg/l. It is the largest hypoxic area in the entire western Atlantic Ocean (Turner et al., 2005). The hypoxic zone is the result of excess nutrients, primarily

nitrogen, carried downstream by rivers to discharge to coastal waters. Density stratification results where the less dense, nutrient-rich fresh water spreads on top of the denser seawater and prevents oxygen from replenishing the bottom waters. The excess nutrients cause phytoplankton blooms which eventually die and sink to the bottom, where bacterial decomposition consumes DO.

Seawater generally averages pH 8 at the surface due to marine systems being buffered by carbonates and bicarbonates. However, in the open waters of the Gulf of Mexico, pH ranges from approximately 8.1 to 8.3 at the surface (Gore, 1992). The pH decreases to approximately 7.9 at a depth of 700 m (2,297 ft), and in deeper waters, it increases again to approximately 8.0 (Gore, 1992).

GOM coastal waters offshore of Texas, Louisiana, Mississippi, and Alabama exhibit high turbidity due to suspended sediment in river discharge, especially during seasonal periods of heavy precipitation. High turbidity may extend up to 50 mi offshore the Mississippi River and lesser distances to the east and west along the coast. Storms may also resuspend soft bottom sediments on the continental shelf, causing an increase in turbidity near the seafloor. Stratified water normally restricts this turbid water to within 20 m (66 ft) from the seafloor up into the water column (Bright et al., 1976; Bright and Rezak, 1978). Warm-core eddies can entrain and transport high turbidity shelf waters to farther offshore over deep Gulf waters. Outside of these areas, water clarity in the GOM is good to excellent, with low levels of suspended sediment.

River runoff may include any number of pollutants such as nutrients, pesticides and other organic chemicals, and metals. The Mississippi River introduces approximately 3,680,938 bbl of oil and grease per year from land-based sources (NRC, 2003) into the waters of the Gulf of Mexico. Offshore waters, especially deeper waters, are more directly affected by natural seeps. Hydrocarbons enter the Gulf of Mexico through natural seeps at a rate of approximately 980,392 bbl per year (a range of approximately 560,224-1,400,560 bbl per year) (NRC, 2003).

The National Research Council estimated that, on average, approximately 26,324 bbl of oil per year entered Gulf waters from petrochemical and oil refinery industries in Louisiana and Texas. Spills to coastal waters include pipeline releases (annual estimate of 6,230 bbl), tank vessel incidents (5390 bbl), and coastal facility releases (5,180 bbl); while spills to offshore waters include pipeline releases (annual estimate of 420 bbl) and tank vessel incidents (10,500 bbl) (NRC, 2003).

The April 2010 *Deepwater Horizon* oil spill resulted from failures of a cement well seal and subsea blowout preventer. The Government estimated that approximately 4.9 million barrels of oil were released during the event (Oil Spill Commission, 2011a), and that 1.84 million gallons of dispersant were used subsea at the wellhead and on the surface (Oil Spill Commission, 2011b). Additionally, the corresponding emission of methane from the wellhead during the event was estimated between 9.14×10^9 and 1.25×10^{10} moles (Kessler et al., 2011). Short-term and long-term effects from the *Deepwater Horizon* oil spill are discussed in "*Catastrophic Spill Event Analysis*" white paper (USDOI, BOEM, 2017c).

3.3.2. Impact Analysis

A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed activities on offshore water quality can be found in Chapter 4.2 of the Multisale EIS and 2018 SEIS, and is incorporated by reference. The IPFs associated with the proposed activities included in the subject applications that could affect marine water quality include: (1) turbidity from bottom disturbances from pipeline and infrastructure installation activities; (2) waste discharges from vessel operations; and (3) accidental spills of diesel fuel from vessels in offshore waters. As explained below, due to the type and the temporary nature of the proposed activities, no substantive impacts would be expected from the proposed action.

3.3.2.1. Alternative 1

If selected, Alternative 1, the No Action Alternative, would result in the operator not undertaking the proposed activities as described in the plan. Therefore, the IPFs to offshore water quality would not occur. There would be no turbidity issues related to pipeline installation activities that would result in potential localized degradation of water quality, no discharges from vessel operations, and no accidental spills of diesel fuel from vessels in marine waters.

3.3.2.2. Alternative 2

If selected, Alternative 2, the Proposed Action as Submitted with additional conditions of approval as required under the NMFS 2020 BO, would result in the operator undertaking the proposed activities as requested and conditioned in the plan. As described in the analyses below, impacts to water quality from the proposed action, as submitted by the operator, are expected to be short-term, localized and not lead to significant impacts.

Routine Operations

Impacts to water quality from routine activities associated with pipeline installation include turbidity from bottom disturbance as result of anchoring and jetting activities and service-vessel discharges.

During the pipeline installation, the sea floor is impacted by the pipeline itself and associated infrastructure. The common impacts are increased turbidity that leads to re-suspension of bottom sediments and possible physical and chemical changes in water column. These disturbances would be temporary and local in nature and most cases would occur during the construction phase.

The primary discharges that generated from pipeline lay barge and anchor handling vessel during pipeline installation include various waters (e.g., bilge, ballast, fire, and cooling), deck drainage, sanitary wastes, and domestic wastes.

The USEPA (Regions 4 and 6) regulates all waste streams generated from offshore oil and gas activities. Section 403 of the Clean Water Act requires that National Pollutant Discharge Elimination System (NPDES) permits be issued for discharges to the territorial seas (baseline to 3 mi [5 km]), the contiguous zone, and the ocean in compliance with USEPA's regulations for preventing unreasonable degradation of the receiving waters. Water Quality Standards consist of the waterbody's designated uses, water quality criteria to protect those uses and to determine if they are being attained, and antidegradation policies to help protect high-quality waterbodies. Discharges from offshore activities near State water boundaries must comply with all applicable State Water Quality Standards. In general, waste streams that can be discharged overboard include water-based drilling fluids and drill cuttings, synthetic-based fluid-wetted drill cuttings, cement slurries, various treated waters and sanitary wastes, and uncontaminated freshwater and saltwater provided they meet the criteria of the applicable NPDES permit.

Discharged water may not cause a sheen on the water surface, and the oil/grease concentration may not exceed 42 milligrams per liter daily maximum, or 29 mg/L monthly average. The discharge must also be characterized for toxicity. The NPDES permits require no discharge within 1,000 m (3,281 ft) of an area of biological concern. Region 4 also requires no discharge within 1,000 m (3,281 ft) of any federally designated dredged material ocean disposal site.

Impacts to offshore waters from routine activities associated with the subject plan should be minimal. A detailed impact analysis of the routine impacts to offshore waters due to OCS activities can be found in Chapter 4.2 the Multisale EIS and 2018 SEIS.

Accidental Events

Accidental events associated with the subject plan that could impact offshore water quality include spills of diesel oil from pipeline lay barge and anchor handling vessel, collisions, or other malfunctions that would result in such spills. Spills from collisions are not expected to be significant. Overall, potential impacts to offshore water quality are not expected to be significant except in the rare case of a catastrophic event. Although response efforts may decrease the amount of oil in the environment, the response efforts may also impact the environment through, for example, increased vessel traffic and the application of dispersants. Natural degradation processes will also decrease the amount of spilled oil over time. Chemicals used in the oil and gas industry are not a significant risk to water quality because they are either nontoxic, are used in minor quantities, or are only used on a noncontinuous basis. A detailed impact analysis of the accidental impacts that may be associated with the proposed action on offshore waters can be found in Chapter 4.2 of the Multisale EIS and 2018 SEIS

Cumulative Impacts

Exploration, development, production, and pipeline installation activities contribute to cumulative water quality degradation in offshore waters. Spills of oil, diesel fuel, and other materials may occur from vessels transporting crude oil and petroleum products; from vessels involved in commercial fishing,

freight or passenger transport; and from OCS operations. Such spills are low volume and are readily dispersed on the water surface. Well blowouts can disturb the bottom, increase turbidity, and put hydrocarbons into the sea. Should an oil spill ≥1,000 bbl (but not catastrophic) occur, localized, short-term changes in water quality would be expected; however, cumulative impacts on water quality over the long term would be **negligible**.

Therefore, no significant cumulative impacts on offshore water quality would be expected as a result of the proposed activities when added to the impacts of past, present, or reasonably foreseeable oil and gas development; as well as other activities in the area.

Conclusion

Impacts on offshore water quality from the operational discharges that would be expected to result from the proposed action are negligible because of: 1) existing USEPA regulations; 2) water depth; 3) distance of the project from the coast; 4) weathering; and 5) dilution factors. Spilled oil originating from the project is not expected to be ≥1,000 bbl and is expected to be substantially recovered/weathered while still at sea. Operator-initiated activities to contain and clean up an oil spill would begin as soon as possible after an event. Small quantities of unrecovered oil would weather and largely biodegrade within two weeks.

No significant long-term impacts on offshore water quality would be expected from the subject permit applications because of the type of and temporary nature of the proposed activity. Near-bottom water quality would be affected by increased turbidity and disturbed substrates during the period of pipeline installation activities. Any effects from the elevated turbidity would be short term, localized, and reversible.

3.4. DEEPWATER BENTHIC COMMUNITIES

For purposes of OCS activity impact analyses, BOEM defines "deepwater benthic communities," to include chemosynthetic and deepwater coral communities in the GOM as those typically found in water depths of 984 ft (300 m) and greater (USDOI, BOEM, 2017a and b).

3.4.1. Affected Environment

A description of chemosynthetic and deepwater coral communities in the GOM region can be found in Chapter 4.4 of the Multisale EIS and 2018 SEIS. The following information is a summary of the descriptions in the EISs, and are incorporated by reference into this SEA.

The continental slope in the GOM extends from the edge of the continental shelf at a depth of about 656 ft (200 m) to a water depth of approximately 9,840 ft (3,000 m) (USDOI, BOEM, 2017a and b). The vast majority of the GOM has a soft, muddy bottom in which burrowing infauna are the most abundant invertebrates. Mississippi Canyon Blocks 474, and 520 fall into this category and the water depth of the proposed activity ranges from approximately 6,340 – 6,697 ft (1,932 – 2,041 m).

A remarkable assemblage of invertebrates is found in association with hydrocarbon seeps in the GOM. Chemosynthetic communities can occur at or near hydrocarbon seeps and are defined as persistent, largely sessile assemblages of marine organisms dependent upon symbiotic chemosynthetic bacteria as their primary food source (MacDonald, 1992). Invertebrate taxa in these communities include tube worms and bivalves, among others. Symbiotic chemosynthetic bacteria live within specialized cells in the invertebrate organisms and are supplied with oxygen and chemosynthetic compounds (methane and sulfides) by the host via specialized blood chemistry (Fisher, 1990). Chemosynthetic bacteria, which live on mats, in sediment, and in symbiosis with chemosynthetic invertebrates, use a carbon source independent of photosynthesis to make sugars and amino acids. The host, in turn, lives off the organic products subsequently released by the chemosynthetic bacteria and may even feed on the bacteria themselves. Chemosynthetic communities can become established when a hard substrate is available for colonization at or near a seep. Depending on the situation, sessile benthic invertebrates can settle on and colonize carbonate substrate. These organisms form additional structure upon the seafloor, increasing the complexity of the habitat that may provide support to a variety of deepwater corals, invertebrates and fishes.

Some deepwater corals form communities occurring at or near hydrocarbon seeps, or on exposed outcrops, and may be found in association with chemosynthetic communities. Deepwater coral communities are also found on shipwrecks, and deepwater oil and gas infrastructure. These coral

communities are distinctive and provide three-dimensional habitat for a range of fishes and invertebrates. Hard-bottom habitats in deep water include communities dominated by *Lophelia pertusa*, with other corals such as the bamboo coral (*Keratoisis flexibilis*) and zigzag coral (*Madrepora oculata*). Numerous other invertebrates are also associated with these benthic habitats (Sulak et al., 2008; Cordes et al., 2008; Fisher et al., 2007; Schroeder et al., 2005).

Hydrocarbon seep communities in the GOM have been reported to occur at water depths greater than 300 m (984 ft) (USDOI, BOEM, 2017a and b). To date, there are over 300 documented deepwater benthic communities comprised of chemosynthetic organisms and/or deepwater corals. Once thought rare, research suggests that deepwater faunal communities are regularly associated with seafloor features commonly found in the vicinity of the primary geophysical signatures of the seabed for hydrocarbon migration to the seafloor. These areas include those where hydrocarbons percolate through sediments or where hydrocarbons move along faults that reach the seafloor. More than 23,000 positive anomalies have been identified from seismic survey data and each may represent a habitat where a hard substrate and a deepwater community may be found. However, until an anomaly has been visited and confirmed, it is unknown if hard substrates are exposed and capable of supporting deepwater benthic communities.

To map areas of probable habitat for deepwater benthic communities, scientists at BOEM analyzed decades of three-dimensional seismic data to classify seafloor returns exhibiting anomalously high or low reflectivity. The areas of high reflectivity represent patches of anomalous seafloor returns that likely indicate patches of hard seafloor that would provide substrate for deepwater benthic communities. Most confirmed hard bottoms in the deepwater GOM were created by the precipitation of calcium carbonate substrate by chemosynthetic bacterial activity and are capable of supporting deepwater benthic communities. However, non-biogenic hard bottoms are also found at escarpments, seafloor-reaching faults, or where salt formations reach the surface. Investigations of the seafloor at patches of high reflectivity indicate that chemosynthetic and coral communities are much more common in the deepwater GOM than previously known (USDOI, BOEM, 2017a and b). Also, areas of low reflectivity (negative anomalies) can be indicative of gassy sediments and mud volcanoes with a high flux of hydrocarbons from the seafloor. Although uncommon, chemosynthetic bivalves may be found in areas with a high flux of hydrocarbons.

3.4.2. Impact Analysis

A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed activities on chemosynthetic communities and deepwater coral communities can be found in Chapter 4.4 of the Multisale EIS and 2018 SEIS. The following information is a summary of the impact analyses in the Multisale EIS and 2018 SEIS and it is incorporated by reference into this SEA.

Any hard substrate communities located in deep water would be particularly sensitive to impacts from OCS activities restulting in bottom disturbances and increased turbidity. Such impacts to these habitats could permanently prevent recolonization by similar organisms requiring hard substrate. The IPFs associated with the proposed activities in Mississippi Canyon Blocks 474, and 520 that could affect deepwater benthic communities include physical impacts from: (1) pipeline installation activities; (2) marine debris; and (3) oil spills and oil spill response activities.

3.4.2.1. Alternative 1

If selected, Alternative 1, the No Action Alternative, would result in the operator not undertaking the proposed activities as described in the plan. Therefore, the IPFs to deepwater benthic communities would not occur. For example, there would be no pipeline installation activities that could result in physical damage to the deepwater benthic communities or their substrates, no accidental loss of debris from pipeline installation vessels, and no risk of accidental oil spills from installation and support vessels.

3.4.2.2. Alternative 2

If selected, Alternative 2, the Proposed Action as Submitted with additional conditions of approval as required under the NMFS 2020 BO, would result in the operator undertaking the proposed activities as requested and conditioned in the plan. Examples of potential impacts to possible deepwater benthic communities include, but are not limited to, damage from pipeline installation activities, accidental loss of marine debris, and accidental oil spills. Because the operator is required to follow all existing lease stipulations as well as the applicable regulations as clarified by NTLs (the operator reaffirmed compliance

in its plan as cited above), conditions outlined in the following analyses related to NTL No. 2009-G40 will result in reducing the probability of impacts to deepwater benthic communities.

Routine Operations

The NTL No. 2009-G40, (*Deepwater Benthic Communities*) provides guidance related to BOEM's regulations implementing a policy of avoidance of sensitive deepwater benthic communities or areas that have a high potential for supporting these community types, as interpreted from geophysical records. According to NTL No. 2009-G40, all plans submitted for deep water (984 ft, 300 m or greater) will be reviewed for the presence of deepwater benthic communities that may be affected by the proposed activity. Wells must be located a distance of at least 2,000 ft (610 m) from possible and known deepwater benthic communities to prevent cuttings from smothering the communities, and any seafloor disturbance (anchors, anchor chains, cables) must be at least 250 ft (76 m) from a possible or known deepwater benthic community. Lessees intending to explore or develop in water depths >984 ft (300 m) are required to provide information about geophysical surveys of the area of proposed activities and to evaluate the data for indications of conditions that may support sensitive deepwater benthic communities.

Pipeline Installation Activities: The installation of pipelines, umbilicals, and associated infrastructure can cause disturbances with lethal and sub-lethal effects such as (1) physical impacts; (2) impacts from lost marine debris; and (3) impacts to resources from accidental spills.

For this permit applications, BP proposes to use DP pipeline lay vessels and constuction vessels to conduct their installation activities; therefore, there are no anchors associated with the proposed operations. Also, the site-specific deepwater benthic communities review conducted for the proposed activities determined that there were no potential sensitive deepwater benthic communities or habitat that could support such communities within 2,000 ft (610 m) of the proposed pipelines and associated infrastructure.

Accidental Events

Impacts of any disturbance from routine activities would be local and short-term. Accidental loss of debris and accidental oil spills from the pipeline installation and support vessels represent the risks associated with the proposed activities. The deepwater benthic communities review conducted for this proposal did not identify any potential, high-density deepwater benthic communities or habitat that could support such communities within 2,000 ft (610 m) of the proposed pipelines and associated infrastructure. Therefore, impacts to deepwater benthic communities from accidental oil spills are not expected.

Cumulative Impacts

Considering the remote location of these habitats, the operator's proposed activities would constitute the primary effect on the resources that may exist in the area of the proposed action. As such, the potential cumulative impacts from all other GOM activities would be identical to a combination of the Routine and Accidental Events described above. Given the negligible impacts on deepwater benthic communities because of the application of BOEM avoidance criteria as described in NTL No. 2009-G40, the cumulative impacts are also **negligible**.

Conclusion

As mentioned earlier, DP pipeline lay vessels and construction vessels will be used for the proposed activities, anchors will not be required and the potential for bottom-disturbing activities will be reduced during routine activities. Although deepwater benthic community components could potentially occur in the vicinity of the proposed activities in Mississippi Canyon Blocks 474, and 520 the deepwater benthic communities review conducted for the proposed activities did not identify any sensitive deepwater benthic communities or habitat that could support such communities within 2,000 ft (610 m) of the proposed pipelines or associated infrastructure.

3.5. MARINE MAMMALS

3.5.1. Affected Environment

The marine mammal community is diverse and distributed throughout the northern Gulf waters. The GOM's marine mammals are represented by members of the taxonomic order Cetacea, including suborders Mysticeti (i.e., baleen whales) and Odontoceti (i.e., toothed whales), as well as the order Sirenia (i.e., manatee). Twenty-one species of cetaceans and one species of Sirenia regularly occur in the GOM and are identified in the NMFS Stock Assessment Reports (SAR) (Jefferson et al., 1992; Davis et al., 2000; Roberts et al., 2016; Hayes et al., 2018, 2019, and 2020). A complete description of marine mammals can be found in Chapter 4.9 of the Multisale EIS and 2018 SEIS, and in the NMFS 2017 and 2018 SAR (Hayes et al., 2018, 2019, and 2020) and NMFS 2020 BO, and are incorporated by reference.

Threatened or Endangered Marine Mammal Species

Only two cetaceans, the sperm whale (*Physeter macrocephalus*) and the GOM Bryde's whale (*Balaenoptera edeni*), regularly occur in the GOM and are listed as endangered under the ESA. On January 8, 2016 (81 FR 999), the United States Fish and Wildlife Service (FWS) issued a proposed rule and notice to reclassify the West Indian manatee from endangered to threatened (*Federal Register*, 2016a) which was later issued as a Final Rule (82 FR 16668) on April 5, 2017 (*Federal Register*, 2017). On December 2, 1970, in the Final Rule (35 FR 18319), the sperm whale was listed as endangered throughout its range. The Final Rule (84 FR 15446) to list the GOM Bryde's whale as endangered was issued and became effective on May 15, 2019 (*Federal Register*, 2019). The only commonly occurring baleen whale in the northern GOM is the Bryde's whale. Most sightings have been made in the De Soto Canyon region and off western Florida, although there have been some in the west-central portion of the northeastern GOM. The best estimate of abundance for Bryde's whales in the northern GOM is 33 individuals, which is the last estimate from a 2009 survey (Hayes et al., 2018, and 2020). Sperm whales in the GOM are not evenly distributed, showing greater densities in areas associated with oceanic features that provide the best foraging opportunities (USDOC, NMFS, 2020a).

Non-ESA-Listed Marine Mammal Species

Nineteen toothed cetaceans (including beaked whales and dolphins) regularly occur in the GOM but are not ESA-listed. Despite being non-listed, the Marine Mammal Protection Act (MMPA) of 1972 protects all marine mammals.

Unusual Mortality Events (UME)

An UME is defined under the Marine Mammal Protection Act as a "stranding that is unexpected, involves a significant die-off of any marine mammal population, and demands immediate response." A list of active and closed UMEs with updated information can be found at the following website: https://www.fisheries.noaa.gov/national/marine-life-distress/active-and-closed-unusual-mortality-events.

2018-2020 Southwest Florida Bottlenose Dolphin UME (UME 66)

Since July 2018, the 2018-2019 Southwest Florida Bottlenose Dolphin UME was issued because of elevated bottlenose dolphin mortalities. Southwest Florida has been experiencing an ongoing severe bloom of a red tide organism since November 2017. The results from several necropsies showed positive findings of red tide toxin (brevetoxin) indicating this UME is related to the bloom. Other species such as fish, sea turtles, and manatees have also been impacted by the algal bloom (USDOC, NMFS, 2020b).

3.5.2. Impact Analysis

A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed activities on marine mammals can be found in Chapters 4.9 of the Multisale EIS,and 2018 SEIS, and is incorporated by reference. The IPFs with the proposed activities in Mississippi Canyon Blocks 474, and 520 that could affect marine mammals include: (1) vessel noise and collisions; (2) marine debris; (3) water-quality degradation from service vessel effluents; and (4) oil spills and spill-response activities.

3.5.2.1. Alternative 1

If selected, Alternative 1, the No Action Alternative, would result in the operator not undertaking the proposed activities as described in the permit applications. Therefore, the site-specific IPFs to marine mammals would not occur. Activities related to previously issued leases and permits (as well as those that may be issued in the future under a separate decision) related to the OCS activities would not increase. The No Action alternative would not significantly change the environmental impacts of overall OCS oil and gas related activity as described in the Multisale EIS, 2018 SEIS, 2018 FWS BO, and NMFS 2020 BO and routine, accidental, and cumulative impacts would still occur from other activities.

3.5.2.2. Alternative 2

If selected, Alternative 2, the Proposed Action as Submitted with additional conditions of approval as required under the 2020 BO, would result in the operator undertaking the proposed activities as requested and conditioned in the permit applications and required as part of lease stipulations. The operator is required to adhere with the mitigation and monitoring measures provided in the Reasonable and Prudent Measures and implementing Terms and conditions in the 2020 BO and protocols found under Appendix A: Seismic Survey Mitigation and Protected Species Observer Protocols; Appendix B: Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols; and Appendix C: Gulf of Mexico Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols. Compliance with the Reasonable and Prudent Measures and implementing Terms and conditions in the 2020 BO and protocols found in the Appendices should negate or lessen the chance of significant impacts to marine mammals under this alternative.

Routine Operations

Vessel Traffic

The proposed activities are expected to require several roundtrip supply-vessel and crew-vessel trips per week. Slow-moving cetaceans or those that spend extended periods of time at the surface might be expected to be the most vulnerable (Vanderlaan and Taggert, 2007). Smaller delphinids often approach vessels that are in transit to bow-ride; however, vessel strikes are less common for these faster moving mammals or are underreported (Wells and Scott, 1997). Florida manatees are commonly found in shallow coastal waters of Florida, but they have been found along the entire northern GOM from Florida to Texas (Fertl et al., 2005), though some recent deepwater sightings have occurred. Vessel strikes are the most common cause of human-induced mortality for manatees (State of Florida, Fish and Wildlife Conservation Commission, 2020), and most manatees bear prop scars from contact with vessels. The vast majority of strikes to manatees result from recreational and fishing vessels, not those related to oil and gas activities.

Worldwide, most vessel strikes of large whales occur when vessels are traveling at speeds greater than approximately 10 knots (Conn and Silber, 2013; Jensen and Silber, 2004; Laist et al., 2001; Vanderlaan and Taggart, 2007). If a vessel strike occurs, the animal may experience no injuries, minor non-serious injuries, serious injuries, or death, which largely depends on the size and speed of the vessel (NMFS, 2020a). Both Gulf of Mexico Bryde's whale and sperm whales are vulnerable to vessel strikes. One confirmed vessel strike to a GOM Bryde's whale occurred in 2009. While there are no known recent vessel strikes to sperm whales, one possible lethal strike occurred in 1990 and a non-lethal strike in 2005. Additionally, a sperm whale is believed to have been struck by a U.S. Navy vessel in 2001 (USDOC, NMFS, 2020a).

The lack of response by sperm whales to oncoming vessels suggest the whales may not hear or see ships approaching or the whales are habituated to the high level of vessel operation activity in the GOM. The Bryde's whale spends much of its' time within 15 m of the water surface and at night on the surface, which makes it more likely to be struck by a vessel. With the Bryde's whale vessel strike mitigation measures required by the 2020 BO in place and as proposed under Alternative 2, NMFS estimated an annual rate of zero lethal Bryde's whale vessel strikes per year from oil and gas vessels traffic greater than 10 knots (USDOC, NMFS, 2020a).The proposed activities are located outside of the area where the Bryde's whale is likely to be present. The operator has not proposed any service vessels or vessel traffic within the Bryde's whale habitat area. Under Alternative 2, the operator is required to notify BOEM 15

days prior to any vessel transit within the Bryde's whale area; approval from BOEM is required prior to any vessel transit changes.

In their 2020 BO, NMFS estimated an annual rate of 0.10 vessel strikes likely to result in no or minor injuries to sperm whales per year from oil and gas activities (USDOC, NMFS, 2020a).

By selecting Alternative 2, the operator is required to follow mitigation and monitoring measures in Appendix C: Gulf of Mexico Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols outlined in the 2020 BO. With these mitigation and monitoring measures in place, the impacts to the sperm whales, the Bryde's whale, and other marine mammals is determined to be **minor**.

Noise

Marine mammals, including the Bryde's whale and sperm whales, use sound in their environmental to detect prey, predators, and habitat types, as well as navigation and communication. Constant sounds in the environmental can mask an animal's ability to communicate and hear important sounds within their environment (USDOC, NMFS, 2020a). In general, acute injury, or Permanent Threshold Shift (PTS), and disturbance would occur with the animal in close proximity to the sound. Temporary Threshold Shift (TTS) are short durations of auditory impairment that is usually recoverable within days or hours (USDOC, NMFS, 2020a).

The NMFS sets the 180-dB root-mean-squared (rms) isopleth where on-set of auditory injury or mortality (level A harassment) to cetaceans may occur. Southall et al. (2007) suggests this level should rather be at 230 dB rms for a nonpulsed sound, such as drilling noise. The source levels from drilling are relatively low (154 dB and below, as cited by Greene, 1986 in Richardson et al., 1995), below the level B (behavioral) harassment threshold of 160 dB set by NMFS under the MMPA. According to Southall et al. (2007), for behavioral responses to nonpulses (such as drill noise), data indicate considerable variability in received levels associated with behavioral responses. Contextual variables (such as novelty of the sound to the marine mammal and operation features of the sound source) appear to have been at least as important as exposure level in predicting response type and magnitude. While there are some data from the Arctic on baleen whales, there is little information on the behavioral responses by marine mammals to drilling noise in the GOM. Southall et al. (2007) summarized the existing research, stating that the probability of avoidance and other behavioral effects increases when received levels increase from 120 to 160 dB. Marine mammals may exhibit some avoidance behaviors, but their behavioral or physiological responses to noise associated with the proposed project are unlikely to have population-level impacts in the northern GOM.

Vessel Noise

Vessel noise can have acute effects such as short-term behavioral and stress response. The nature of behavioral response cetaceans exhibit to vessels may depend on vessel speed, size, and distance from the animal, as well as the number and frequency of vessel encounters (USDOC, NMFS, 2020a). The dominant source of vessel sound from the proposed action is propeller cavitation, although other ancillary sounds may be produced. The intensity of sound from vessels is related to size and speed. Large ships tend to be noisier than small ones and ships underway with a full load or towing/pushing produce more sound than unladen vessels (USDOC, NMFS, 2020a). Noise from service-vessel traffic may elicit a startle and/or avoidance reaction from whales and dolphins or mask their sound reception. Vessel noise from the proposed action will produce low levels of noise, generally in the 150 to 170 dB re 1 µPa-m at frequencies below 1,000 Hz. Vessel noise is transitory and generally does not propagate at great distances from the vessel. The NMFS 2020 BO concluded that the effects of vessel noise to sperm whales are not likely to adversely affect the species and Bryde's whales are likely to be adversely affected from vessel noise (USDOC, NMFS, 2020a). The behavioral disruptions potentially caused by noise and the presence of service-vessel traffic will have **negligible** effects on cetacean populations in the northern GOM.

Aircraft Noise

The noise and the shadow from helicopter overflights, take-offs, and landings can cause a startle response and can interrupt whales and dolphins while resting, feeding, breeding, or migrating (Richardson et al., 1995). The Federal Aviation Administration's Advisory Circular 91-36D (September 17, 2004) encourages pilots to maintain higher than minimum altitudes over noise-sensitive areas. Guidelines and regulations put in place by NOAA Fisheries under the authority of the MMPA include provisions specifying that helicopter pilots maintain an altitude of 1,000 ft (305 m) within 300 ft (91 m) of marine mammals. The proposed action is expected to have helicopter support with multiple transits between the pipeline installation vessels, and airbase. The duration of the effects resulting from a startle response is expected to be short-term during routine flights, and the potential effects will be insignificant and not likely to adversely affect sperm and Bryde's whales (USDOC, NMFS, 2020a). Since these occurrences would be temporary and pass within seconds, marine mammals are not expected to be adversely affected by routine helicopter traffic operating at prescribed altitudes and impacts are considered **negligible**.

Dynamically Positioned Vessels

The potential effects that water-transmitted noise has on marine mammals include disturbance (subtle changes in behavior, interruption of previous activities, or short- or long-term displacement), masking of sounds (calls from conspecifics, reverberations from own calls, and other natural sounds such as surf or predators), physiological stress, and hearing impairment. Individual marine mammals exposed to recurring disturbance could be negatively affected. The temporary and transient noise associated with drilling and production is not expected to produce more than negligible to minor impacts on marine mammals since they are not expected in amplitudes sufficient to cause hearing behavioral effects and due to the wide-ranging behavior of marine mammal species. NMFS determined stationary and localized effects of platform-associated sounds, sperm whale encounters near platforms would be very brief as they swim by, and the potential effects of these sounds to disturb sperm whales will be insignificant. Construction and operation sounds other than pile driving will have insignificant effects on Bryde's whales.

Marine Debris

Marine debris has the potential to adversely affect marine mammals through ingestion and entanglement. These effects could result in reduced feeding, reduced reproductive success, and potential injury, infection, or death. NMFS concluded marine debris is likely to adversely affect sperm and Bryde's whales. Implementation of Appendix B: Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols and the International Convention for the Prevention of Pollution form Ships (MARPOL) requirements under the United States Coast Guard (USCG) may reduce, but not eliminate the risk of marine debris (USDOC, NMFS, 2020a). Without implementation of mitigations, marine mammals would be more vulnerable to direct impacts from entanglement in or ingestion of OCS marine debris. The impacts from OCS marine debris with implementation of mitigations are expected to be **negligible**.

Water Degradation

The USEPA regulates discharges from oil and gas operations to offshore marine waters in the Gulf of Mexico through NPDES general permits. Discharges of produced water, drilling fluids, drill cuttings, and chemically treated miscellaneous discharges under the NPDES general permit will be required to meet the whole effluent toxicity requirements. NMFS determined because of USEPA regulation, most of the routinely discharged chemicals are not expected to result in exposure intensities that would adversely affect listed species because they are diluted and dispersed when released in marine waters. Without implementation of discharge requirements under the NPDES permit, marine mammals would be more vulnerable to direct impacts from degraded water quality; therefore, potential impacts to marine mammals from water quality impacts are expected to be **negligible**.

Accidental Events

Oil Spills and Response Activities

BOEM defines a very large spill, as any spill volume greater than or equal to 10,000 bbl, and provided NMFS with information projecting that two oil spills greater than or equal to 10,000 bbl may occur over the duration of 10 years (through 2029); however, a defined an upper volume for such a spill size can not be predicted. BOEM "does not consider an extremely large event as reasonably certain to occur" over the time frame of the 2020 BO, although BOEM does acknowledge that impacts from the *Deepwater Horizon* spill warranted inclusion in NMFS 2020 consultation and BO as part of the environmental baseline.

The oil from an oil spill can adversely affect cetaceans by causing soft tissue irritation, fouling of baleen plates, respiratory stress from inhalation of toxic fumes, food reduction or contamination, direct ingestion of oil and/or tar, and temporary displacement from preferred habitats. The long-term impacts to marine mammal populations are poorly understood but could include decreased survival and lowered reproductive success. The range of toxicity and degree of sensitivity to oil hydrocarbons and the effects of cleanup activities on cetaceans are unknown. One notion concerning the use of dispersants is that chemical dispersion of oil will considerably reduce the impacts to aquatic mammals, primarily by reducing their exposure to petroleum hydrocarbons (French-McCay 2004; NRC, 2005). Dispersants are chemicals that reduce surface tension between oil and water, leading to oil droplet formation, so that the oil will more readily disperse into the water column. Dispersants typically contain surfactants and solvents and are used to entrain oil in the water column so as to protect shorelines from floating oil, but in turn, increases exposure to underwater organisms (USDOC, NMFS, 2020a). Chemical dispersant application during an oil spill may lower the amount of oil to which an aquatic mammal is exposed while increasing the potential loss of the insulative properties of fur through the reduction of surface tension at the fur-water interface (NRC, 2005).

Impacts from the dispersants are unknown but dispersants may contain ingredients that are known to irritate sensitive tissues of marine mammals (NRC, 2005). There have been no experimental studies and only a handful of observations suggesting that oil has harmed any manatees (St. Aubin and Lounsbury, 1990). Types of impacts to manatees from contact with oil include: (1) asphyxiation due to inhalation of hydrocarbons; (2) acute poisoning due to contact with fresh oil; (3) lowering of tolerance to other stressors due to the incorporation of sublethal amounts of petroleum components into body tissues; (4) nutritional stress through damage to food sources; and (5) inflammation or infection and difficulty eating due to oil sticking to the sensory hairs around their mouths (Preen, 1989, in Sadiq and McCain, 1993, AMSA, 2003). For a population whose environment is already under great pressure, even a localized incident could be population level (St. Aubin and Lounsbury, 1990). Spilled oil might affect the quality or availability of aquatic vegetation, including seagrasses, upon which manatees feed.

In the event of catastrophic spill similar to the *Deepwater Horizon* spill, the "Catastrophic Spill Event Analysis" white paper (USDOI, BOEM, 2017c) discusses the most likely and most significant impacts to marine mammals as it relates to the four phases of a major spill/blowout:

1) **Initial Event** (Section 2.2.2.3.; Page B-6);
2) **Offshore Spill** (Section 3.2.2.3; Page B-18);
3) **Onshore Contact** (Section 4.2.2.3; Page B-32); and
4) **Post-Spill, Long-Term Recovery** (Section 5.2.2.3; Page B-41).

More detailed information can be found in the Multisale EIS and 2018 SEIS.

Cumulative Impact Analysis

The proposed action may cumulatively affect cetaceans when viewed in light of the *Deepwater Horizon* explosion, spill, and response. Oil and gas leasing, exploration, development and production activities could impact marine mammals from the degradation of water quality resulting from operational discharges; vessel traffic; noise generated by platforms, drilling rigs, helicopters, and vessels; seismic surveys; explosive structure removals; oil spills; oil-spill-response activities; and loss of debris from service vessels and OCS structures. The cumulative impact on marine mammals is expected to result in a

number of chronic and sporadic sublethal effects (i.e., behavioral effects and nonfatal exposure to or intake of OCS-related contaminants or discarded debris) that may stress and/or weaken individuals of a local group or population and predispose them to infection from natural or anthropogenic sources (Harvey and Dahlheim, 1994).

Few deaths are expected from chance vessel collisions and ingestion of plastic material. Disturbance (noise from vessel traffic and drilling operations, etc.) and/or exposure to sublethal levels of toxins and anthropogenic contaminants may stress animals, weaken their immune systems, and make them more vulnerable to parasites and diseases that normally would not be fatal (Harvey and Dahlheim, 1994). The net result of any disturbance will depend upon the size and percentage of the population likely to be affected, the ecological importance of the disturbed area, the environmental and biological parameters that influence an animal's sensitivity to disturbance and stress, and the accommodation time in response to prolonged disturbance (Geraci and St. Aubin, 1980).

The effects of the proposed action, when viewed in light of the effects associated with other relevant activities, may impact marine mammals in the GOM. However, the operator is required to follow all existing lease stipulations, regulations, NTLs, and mitigation and monitoring measures provided in the 2020 BO under Appendix B: Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols; Appendix C: Gulf of Mexico Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols; Appendix E: Summary of Oil Industry Discharges to the OCS Authorized by USEPA General NPDES Permits; and Appendix H: Cetacean and Sea Turtle Wildlife Response Guidance for the Gulf of Mexico. Because of the operator's reaffirmed compliance regulatory requirments, as well as the limited scope, timing, and geographic extent of the proposed action, effects from the proposed activities on marine mammals will be **negligible**. Therefore, no population level cumulative impacts to marine mammals would be expected as a result of the proposed activities when added to the impacts of past, present, or reasonably foreseeable oil and gas development in the area as well as other activities in the area. More detailed information can be found in the Multisale EIS and 2018 SEIS.

Conclusion

The sections above discuss the potential range of effects to marine mammals from the proposed activity and any of these effects has the potential individually or cumulatively to result in impacts to marine mammal species commonly found in the GOM and proposed action area. However, BOEM finds that the potential for such effects from the proposed action are unlikely to rise to significant levels for the following reasons:

- Mysticetes, as low-frequency hearing specialists, are the species groups most likely to be susceptible to impacts from nonpulse sound (intermittent or continuous) given that their hearing ranges overlap most closely with the noise frequencies produced from drilling (Southall et al., 2007). However, most mysticete species that may occur in the GOM (i.e., North Atlantic right, blue, fin, sei, humpback, and minke) are considered either "extralimital," "rare," or "uncommon" within the GOM (Wursig et al., 2000; Hayes et al., 2019). The only commonly occurring baleen whale in the northern GOM is the Bryde's whale which is limited in its range. Given the small geographic scope of the proposed action, the presence of these species within the action area is not anticipated.
- The operator proposes adherence with the guidance provided under the NMFS 2020 BO Appendix B: Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols, which appreciably reduces the likelihood of marine mammals encountering marine debris from the proposed activity.

The geographic scope of the proposed action is small in relation to the ranges of marine mammals in the GOM. The proposed activities are not expected to cause long-term or permanent displacement of the animals from preferred habitats, nor will they result in the destruction or adverse modification of any habitats. In conclusion, because of the scope, timing, and transitory nature of the proposed action and the condition(s) of approval and monitoring requirements in place, the noise related to the proposed pipeline installation activities is not expected to result in PTS, TTS, behavioral change, masking, or non-auditory effects to marine mammals in the GOM that would rise to the population level.

3.6. SEA TURTLES

3.6.1. Affected Environment

The life history, population dynamics, status, distribution, behavior, and habitat use of sea turtles can be found in Chapters 4.9 of the Multisale EIS, and 2018 SEIS, and is incorporated by reference. Of the extant species of sea turtles, five are known to inhabit the waters of the GOM (Pritchard, 1997): the leatherback, green, hawksbill, Kemp's ridley, and loggerhead. These five species are all highly migratory, and individual animals will migrate into nearshore waters as well as other areas of the North Atlantic Ocean, GOM, and Caribbean Sea. All five species of sea turtles found in the Gulf of Mexico have been federally listed as endangered or threatened since the 1970's. Critical habitat has been designated for the Northwest Atlantic Ocean Loggerhead sea turtle population segment (DPS) in the GOM (*Federal Register*, 2014).

In 2007, FWS and NMFS published 5-year status reviews for all federally listed sea turtles in the GOM (USDOC, NMFS and USDOI, FWS, 2007a-e). A 5-year review is an ESA-mandated process that is conducted to ensure that the listing classification of a species as either threatened or endangered is still accurate. As of 2013, two 5-year reviews have been updated for the Leatherback and Hawksbill sea turtles (USDOC, NMFS and USDOI, FWS, 2013a and b). Both agencies share jurisdiction for federally listed sea turtles and jointly conducted the reviews. After reviewing the best scientific and commercially available information and data, agencies determined that the current listing classification for the five sea turtle species remain unchanged.

3.6.2. Impact Analysis

A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed activities on sea turtles can be found in Chapters 4.9 of the Multisale EIS, and 2018 SEIS, and is incorporated by reference. The diversity of a sea turtle's life history leaves it susceptible to many natural and human impacts, including impacts while it is on land, in the benthic environment, and in the pelagic environment. The IPFs associated with the proposed activities in Mississippi Canyon Blocks 474, and 520 that could affect sea turtles include: (1) vessel noise and collisions; (2) marine debris; (3) water-quality degradation from vessel discharges; and (4) oil spills and spill-response activities.

3.6.2.1. Alternative 1

If selected, Alternative 1, the No Action Alternative, would result in the operator not undertaking the proposed activities as described in the permit applications. Therefore, the site specific IPFs to sea turtles would not occur. Activities related to previously issued leases and permits (as well as those that may be issued in the future under a separate decision) related to the OCS activities would not increase. The No Action Alternative would not significantly change the environmental impacts of overall OCS oil and gas related activity as described in the Multisale EIS and 2018 SEIS and routine, accidental, and cumulative impacts would still occur from other activities.

3.6.2.2. Alternative 2

If selected, Alternative 2, the Proposed Action as Submitted with additional conditions of approval as required under the NMFS 2020 BO, would result in the operator undertaking the proposed activities as requested and conditioned in the permit applications and required as part of lease stipulations. The operator is required to adhere with the mitigation and monitoring measures provided in the NMFS 2020 BO under Appendix A: Seismic Survey Mitigation and Protected Species Observer Protocols; Appendix B: Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols; and Appendix C: Gulf of Mexico Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols. Compliance with the regulations as clarified in the NMFS 2020 BO should negate or lessen the chance of significant impacts to sea turtles under this alternative (USDOC, NMFS, 2020a).

Routine Operations

Vessel Noise and Collisions

The first IPF associated with the proposed action that could affect ESA-listed sea turtles is impacts from vessel noise and vessel collisions. The dominant source of noise from vessels is propeller operation, and the intensity of this noise is largely related to ship size and speed. Vessel noise from the proposed action would produce low levels of noise, generally in the 150 to 170 dB re 1 µPa-m at frequencies below 1,000 Hz. Vessel noise is transitory and generally does not propagate at great distances from the vessel. Also, available information indicates that sea turtles do not greatly utilize environmental sound. As a result, the NMFS 2007 Biological Opinion concluded that effects to sea turtles from vessel noise are discountable (USDOC, NMFS, 2007). The NMFS 2020 BO similarly concluded that sound sources associated with vessel movement were not likely to adversely affect sea turtles (USDOC, NMFS 2020a).

Sea turtles spend at least 3-6 percent of their time at the surface for respiration and perhaps as much as 26 percent of time at the surface for basking, feeding, orientation, and mating (Lutcavage et al., 1997). Based on the behavioral observations of turtle avoidance of small vessels, green turtles may be susceptible to vessel strikes at speeds as low as two knots (Hazel et al. 2007). Although there have been hundreds of thousands of vessel trips that have been made in support of offshore operations during the past 40 years of OCS oil and gas operations, there have been no reports of OCS-related vessels having struck sea turtles. This is most likely because a strike with a turtle would probably go undetected by larger vessels and strikes are not reported. Despite the lack of on-water reporting, stranding records show that interactions between vessels and sea turtles in the GOM are quite common (USDOC, NMFS, 2020a). Data show that collisions with all types of commercial and recreational vessels are a cause of sea turtle mortality in the GOM (Lutcavage et al., 1997). Stranding data for the U.S. Gulf and Atlantic Coasts, Puerto Rico, and the U.S. Virgin Islands show that between 1986 and 1993 about 9 percent of living and dead stranded sea turtles had boat strike injuries (Lutcavage et al., 1997). Vessel-related injuries were noted in 13 percent of stranded turtles examined from the GOM and the Atlantic during 1993 (Teas, 1994), but this figure includes those that may have been struck by boats post-mortem. Large numbers of loggerheads and 5-50 Kemp's ridley turtles are estimated to be killed by vessel traffic per year in the U.S. (NRC, 1990; Lutcavage et al., 1997).

There have been no known documented sea turtle collisions with drilling and service vessels in the GOM; however, collisions with small or submerged sea turtles may go undetected. Based on sea turtle density estimates in the GOM, the encounter rates between sea turtles and vessels would be expected to be greater in water depths less than 200 m (USDOC, NMFS, 2007). Additionally, recent satellite tracking studies have provided data to support that larger turtles often remain closer to shore to feed, nest and/or migrate; for loggerheads (Hart et al., 2013 and 2014) and Kemp's ridleys (Shaver et al., 2014). By selecting Alternative 2, the operator is required to follow mitigation and monitoring measures in Appendix C: Gulf of Mexico Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols outlined in the NMFS 2020 BO. With these mitigation and monitoring measures in place, the impacts to sea turtles is determined to be **minor**.

With implementation of these measures and the avoidance of potential strikes from OCS vessels, the NMFS 2020 BO concluded that the risk of collisions between oil/gas-related vessels (including those for geological and geophysical [G&G], drilling, production, decommissioning, and transport) and sea turtles is appreciably reduced, but strikes may still occur. BOEM monitors for any takes that have occurred as a result of vessel strikes and also requires that any operator immediately report the striking of any animal.

Given the scope, timing, and transitory nature of the proposed action and with this established condition(s) of approval, effects to sea turtles from drilling vessel collisions is expected to be **negligible**.

Marine Debris

Many types of plastic materials end up as solid waste during drilling, production operations, and pipeline installation operations. Some of this material is accidentally lost overboard where sea turtles could consume it or become entangled in it. The incidental ingestion of marine debris and entanglement could adversely affect sea turtles. Marine debris is a continuing problem for sea turtles. Sea turtles living in the pelagic environment commonly eat or become entangled in marine debris (e.g. tar balls, plastic

bags/pellets, balloons, and ghost fishing gear) as they feed along oceanographic fronts where debris and their natural food items converge. This is especially problematic for sea turtles that spend all or significant portions of their life cycle in the pelagic environment (i.e., leatherbacks, juvenile loggerheads, and juvenile green turtles) (USDOC, NMFS, 2020a). Implementation of Appendix B: Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols and the International Convention for the Prevention of Pollution form Ships (MARPOL) requirements under the United States Coast Guard (USCG) may reduce, but not eliminate the risk of marine debris (USDOC, NMFS, 2020a). Without implementation of mitigations, sea turtles would be more vulnerable to direct impacts from entanglement in or ingestion of OCS marine debris. The impacts from OCS marine debris with implementation of mitigations are expected to be **negligible**.

Water Degradation

Most operational discharges are diluted and dispersed when released in offshore areas and are considered to have sublethal effects (NRC, 1983; API, 1989; Kennicutt, 1995; Kennicutt et al., 1996). Any potential impacts from drilling fluids would be indirect, either as a result of impacts to prey species or possibly through ingestion via the food chain (Neff et al., 1989). The USEPA regulates discharges from oil and gas operations to offshore marine waters in the GOM through NPDES general permits. Discharges of produced water, drilling fluids, drill cuttings, and chemically treated miscellaneous discharges under the NPDES general permit will be required to meet the whole effluent toxicity requirements. NMFS determined that because of USEPA regulation, most of the routinely discharged chemicals are not expected to result in exposure intensities that would adversely affect listed species being that they are diluted and dispersed when released in marine waters. Without implementation of discharge requirements under the NPDES permit, sea turtles would be more vulnerable to direct impacts from degraded water quality. Impacts from water degradation are expected to be negligible due to the localized nature of the proposed activity and the wide-ranging habits of sea turtle species in the GOM.

Accidental Events

Oil Spills and Response Activities

The oil from an oil spill can adversely affect sea turtles by causing soft tissue irritation, respiratory stress from inhalation of toxic fumes, food reduction or contamination, direct ingestion of oil and/or tar, and temporary displacement from preferred habitats (Lutz and Lutcavage, 1989). The long-term impacts to sea turtle populations are poorly understood but could include decreased survival and lowered reproductive success. The range of toxicity and degree of sensitivity to oil hydrocarbons and the effects of cleanup activities on sea turtles are unknown. Impacts from the dispersants are unknown, but may have similar irritants to tissues and sensitive membranes as they are known to have had on seabirds and marine mammals (NRC, 2005).

In the event of a catastrophic spill similar to the *Deepwater Horizon* spill, the "Catastrophic Spill Event Analysis" white paper (USDOI, BOEM, 2017c) discusses the most likely and most significant impacts to sea turtles as it relates to the four phases of a major spill/blowout:

1) **Initial Event** (Section 2.2.2.4.; Page B-7);
2) **Offshore Spill** (Section 3.2.2.4; Page B-19);
3) **Onshore Contact** (Section 4.2.2.4; Page B-33); and
4) **Post-Spill, Long-Term Recovery** (Section 5.2.2.4; Page B-41).

In the event of a catastrophic spill similar to the *Deepwater Horizon* spill, any substantive impact to sea turtles is very unlikely because the potential impacts from a catastrophic spill would be similar to the aforementioned routine and accidental issues. However, despite the *Deepwater Horizon* spill, historical trends in the GOM (see **Chapter 1.4**) indicate that catastrophic spill events are not likely to occur as a result of the activities associated with the proposed action.

Cumulative Impact Analysis

Activities considered under the cumulative scenario, including the proposed action, may affect sea turtles. Sea turtles may be impacted by oil and gas leasing, exploration, development and production

activities including the degradation of water quality resulting from operational discharges; vessel traffic; noise generated by platforms, drilling rigs, helicopters, and vessels; seismic surveys; explosive structure removals; oil spills; oil-spill-response activities; loss of debris from service vessels and OCS structures; commercial fishing; capture and removal; and pathogens. The cumulative impact of these ongoing OCS activities on sea turtles is expected to result in a number of chronic and sporadic sublethal effects (i.e., behavioral effects and nonfatal exposure to or intake of OCS-related contaminants or discarded debris) because that may stress and/or weaken individuals of a local group or population and that may predispose them to infection from natural or anthropogenic sources.

Few deaths are expected from chance collisions with OCS service vessels, ingestion of plastic material, commercial fishing, and pathogens. Disturbance (noise from vessel traffic and drilling operations, etc.) and/or exposure to sublethal levels of toxins and anthropogenic contaminants may stress animals, weaken their immune systems, and make them more vulnerable to parasites and diseases that normally would not be fatal during their life cycle. The net result of any disturbance depends upon the size and percentage of the population likely to be affected, the ecological importance of the disturbed area, the environmental and biological parameters that influence an animal's sensitivity to disturbance and stress, and the accommodation time in response to prolonged disturbance (Geraci and St. Aubin, 1980). As discussed above, lease stipulations and regulations are in place to reduce vessel strike mortalities.

Incremental injury effects from the proposed action on sea turtles are expected to be negligible for drilling and vessel noise and minor for vessel collisions, and will not rise to the level of significance because of the limited scope, duration, and geographic area of the proposed pipeline installation and vessel activities and the relevant regulatory requirements.

The effects of the proposed action, when viewed in light of the effects associated with other relevant activities, may affect sea turtles occurring in the GOM. With the enforcement of regulatory requirements for drilling and vessel operations and the scope of the proposed action, incremental effects from the proposed activities on sea turtles will be **negligible** (pipeline installation and vessel noise) to **minor** (vessel strikes). The best available scientific information indicates that sea turtles do not greatly use sound in the environment for survival; therefore, disruptions in environmental sound would have little effect. Consequently, no significant cumulative impacts would be expected from the proposed activities or as the result of past, present, or reasonably foreseeable oil and gas leasing, exploration, development and production in the GOM.

Conclusion

The sections above discuss the potential range of effects to sea turtles from the proposed action, including: (1) vessel noise and collisions; (2) marine debris; (3) water-quality degradation from drilling rig effluents; (4) oil spills and spill-response activities; and (5) drilling noise. The potential effects of the proposed activity on sea turtles will not rise to the level of significance for the following reasons:

- The best available scientific information indicates that sea turtles do not greatly use sound in the environment for survival; therefore, disruptions in environmental sound would have little effect.
- The scope, timing, and transitory nature of the proposed action will produce limited amounts of drilling noise in the environment. As described, effects of vessel noise on sea turtles are considered "discountable" (USDOC, NMFS, 2020a).
- Implementation of Appendix B: Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols and the International Convention for the Prevention of Pollution form Ships (MARPOL) requirements under the United States Coast Guard (USCG), appreciably reduces the likelihood of sea turtles encountering marine debris from the proposed activity.

The risk of collisions between sea turtles and vessels associated with the proposed action exists but would not rise to the level of significance given:

- Under 30 CFR § 550.282, as clarified by mitigation and monitoring measures in Appendix C: Gulf of Mexico Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols outlined in the NMFS 2020 BO , BOEM provides guidelines for the monitoring programs designed to minimize the risk of vessel strikes to sea turtles and other protected species and the reporting of any observations of injured or dead protected species.
- The NMFS 2020 BO determined that monitoring measures should appreciably reduce the potential for vessel strikes. The NMFS issued an Incidental Take Statement on sea turtle species;

the Statement contains reasonable and prudent measures (RPMs) with implementing terms and conditions to help minimize take. As the operator has indicated that the vessel strike avoidance guidance (Appendix C: Gulf of Mexico Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols) will be followed, there should be appreciably reduced numbers of sea turtles that may be incidentally taken from routine offshore vessel operations; however, the available information on the relationship between these species and OCS oil and gas activities indicates that sea turtles may be killed or injured by vessel strikes. Therefore, pursuant to Section 7(b)(4) of the ESA, NMFS anticipates incidental take and granted a limited number of Incidental Take Authorizations to BOEM for sea turtle mortalities by vessel strikes. BOEM continues to monitor for any strikes to ensure this authority is not exceeded and to date, none have been reported. The scope, timing, and transitory nature of the proposed action will result in limited opportunity for vessel strikes to sea turtles during operations.

3.7. FISH RESOURCES AND ESSENTIAL FISH HABITAT

3.7.1. Affected Environment

A detailed description of the Fish Resources and Essential Fish Habitat (EFH) of the GOM may be found in Chapter 4.7 of the Multisale EIS and 2018 SEIS, and is incorporated by reference into this SEA. The following section provides a summary of the information found in the Multisale EIS and 2018 SEIS.

The NMFS 2020 BO identified the following Federally listed threatened fish species in the GOM: the Gulf sturgeon, the oceanic whitetip shark and the giant manta ray. The Gulf sturgeon (*Acipenser oxyrinchus oxyrinchus*) was listed as threatened October 30, 1991 (56 CFR §49653, September 30, 1991). The oceanic whitetip shark (*Carcharhinus longimanus*) was listed as threatened January 30, 2018 under the ESA (83 FR 4153). The giant manta ray (*Manta birostris*) was listed as threatened January 22, 2018 under the ESA (83 FR 2916). A detailed description of the Gulf sturgeon and critical habitat, and oceanic white tip shark and giant manta ray may be found in Sections 6.2.11 to 6.2.14 of the NMFS 2020 BO.

The NMFS and USFWS jointly designated Gulf sturgeon critical habitat on April 18, 2003 (50 CFR §226.214). Seven of the marine and estuarine units of the Gulf sturgeon critical habitat (Units 8-14) are found along the states of Louisiana, Mississippi, Alabama, and Florida (Figure 90 of the NMFS 2020 BO).

EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, and growth to maturity" [16 U.S.C. § 1801(10)]. These habitats are crucial for maintaining healthy fish resources and fishery stocks. Due to the wide variation of habitat requirements for all life history stages of managed species, NOAA and the Gulf of Mexico Fishery Management Council initially identified EFH throughout the GOM to include all coastal and marine waters and substrates from the shoreline to the seaward limit of the Exclusive Economic Zone (200 mi [322 km] from shore). The EFH final rule summarizing EFH regulation (50 CFR § 600) outlines additional interpretation of the EFH definition. Waters, as defined previously, include "aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include aquatic areas historically used by fish where appropriate." Substrate includes "sediment, hard bottom, structures underlying the waters, and associated biological communities." Necessary is defined as "the habitat required to supporting a sustainable fishery and the managed species' contribution to a healthy ecosystem." "Fish" includes "finfish, mollusks, crustaceans, and all other forms of marine animal and plant life other than marine mammals and birds," whereas "spawning, breeding, feeding or growth to maturity" covers the complete life cycle of those species of interest.

The EFH for the oceanic whitetip shark in the project area includes localized areas in the central GOM and Florida Keys. Although no EFH or critical habitat has been designated, the giant manta rays are widespread in the GOM. Giant manta rays occupy tropical, subtropical, and temperate oceanic waters and productive coastlines and are commonly found offshore in oceanic waters, but are sometimes found feeding in shallow waters (less than 10 meters) during the day (Miller, 2017).

The GOM supports a great diversity of fish species, including a wide variety of commercially and recreationally valuable fishes, most of which are linked either directly or indirectly to the estuaries ringing the Gulf. The life history of estuarine-dependent species involves spawning on the continental shelf; the transportation of eggs, larvae, or juveniles back to the estuary nursery grounds; and the migration of the adults back to the sea for spawning. Monthly ichthyoplankton collections over the years 2004-2006

offshore of Alabama confirmed that peak seasons for ichthyoplankton concentrations on the shelf are spring and summer (Hernandez et al., 2010). Additionally, the waters of the northern GOM support many coastal pelagic fishes and highly migratory species, some of which spawn exclusively in this region. The distribution of fish species is related to ecological factors (e.g., salinity, temperature, bottom type, primary production and availability of prey) which vary, sometimes widely, across the Gulf and between inshore and offshore waters. Characteristic fish resources are associated with various environments and are not randomly distributed.

Although a generalized analysis suggests, for locations off the continental shelf, species richness and abundance decrease with depth, Rowe and Kennicutt (2001) found food resources are a dominant factor controlling distribution of deepwater benthos in the GOM. Inputs such as the Mississippi River and hydrocarbon seep communities influence local densities of fauna associated with a given depth zone. Descriptions of ecological groups of fishes that occur in the region, including oceanic pelagics and mesopelagics, can be found in Chapter 4.7 of the Multisale EIS and 2018 SEIS.

3.7.2. Impact Analysis

A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed activities on fish and essential fish habitat can be found in Chapters 4.7 of the Multisale EIS and 2018 SEIS, and is incorporated by reference. A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed activities on federally listed threatened species can be found in Sections 8.4, 8.7, 8.8, 10, 11.3 and 11.4 of the NMFS 2020 BO, and is incorporated by reference. The IPFs associated with activities proposed that could affect EFH and fish resources include: (1) coastal and marine environmental degradation from vessel discharges; (2) noise form pipeline installation; and (3) accidental oil spill. The NMFS 2020 BO identified IPFs associated with activities proposed that could affect federally listed threatened species including: (1) marine trash and debris; (2) vessel collisions; and (3) oil spills.

3.7.2.1. Alternative 1

If selected, Alternative 1, No Action Alternative, would result in the operator not undertaking the proposed activities as described in the plan. Therefore, the IPFs to fish and EFH would not occur. For example, there would be no noise from the pipeline installation that would result in behavioral change, masking, or non-auditory effects to the fish resources, no long-term or permanent displacement of fish resources from preferred habitats, and no destruction or adverse modification of any habitats. No IPFs to ESA listed species would result from marine trash and debris, vessel collisions, or oil spills.

3.7.2.2. Alternative 2

If selected, Alternative 2, the Proposed Action as Submitted with additional conditions of approval as required under the NMFS 2020 BO, would result in the operator undertaking the proposed activities as requested and conditioned in the permit applications. As described in the analyses below, impacts to fish and EFH from the proposed action are expected to be short-term, localized and not lead to significant impacts. Impacts from the proposed activities are not expected to reduce appreciably, the likelihood of both the survival and recovery of federally listed threatened species.

Routine Activities

Routine activities, such as the discharges from service vessels would contribute to localized temporary marine environmental degradation. Pipeline installation operations are restricted in time, and pelagic species in the area could easily avoid discharge plumes. Routine discharges from the service vessels would be highly diluted in the open marine environment. The presence of the pipeline installation vessels will act as a fish-attracting device for the short period of time the vessels are on site; however, routine discharges on fish resources will be very limited in duration.

In the last five year NMFS species review, vessel strikes were identified as an emerging threat for Gulf sturgeon. The NMFS 2020 BO *Effects Analysis* for Gulf sturgeon estimated one nonlethal and 21 lethal vessel strikes would occur over 50 years as a result of vessels associated with the proposed action. The effects to Giant manta rays and Oceanic white tip sharks from vessel strikes are discountable. The operator is required to adhere with the mitigation and monitoring measures provided in the NMFS 2020

BO under Appendix C: Gulf of Mexico Vessel Strike Avoidance and Injured/Dead Aquatic Protected Species Reporting Protocols. Compliance with the regulations as clarified in the NMFS 2020 BO should reduce or avoid impacts from vessel strikes under this alternative. Many types of plastic materials end up as solid waste during drilling and production operations. Some of this material is accidentally lost overboard where fish or federally listed threatened species could consume it or become entangled in it. The incidental ingestion of marine debris and entanglement could adversely affect fish and federally listed threatened species. Implementation of Appendix B: Gulf of Mexico Marine Trash and Debris Awareness and Elimination Survey Protocols and the International Convention for the Prevention of Pollution from Ships (MARPOL) requirements under the United States Coast Guard (USCG) may reduce, but not eliminate the risk of marine debris (USDOC, NMFS, 2020a). The NMFS 2020 BO determined that Gulf sturgeon, oceanic whitetip sharks, and giant manta rays are not likely to be adversely affected by marine debris resulting from the proposed action.

Accidental Events

Accidental blowouts and spills with limited quantities of hydrocarbons also have the potential to affect fish resources and EFH, but there is no evidence to date that fish or EFH in the Gulf have been adversely affected at a population level by spills or chronic contamination. At the scale of this EA, any accidental impact would be limited in scope and affected fishes would likely be replaced by organisms from beyond the area of impact or would be colonized during the next recruitment event. Early life stages of fishes may be more sensitive than adults to potentially adverse impacts resulting from exposure to hydrocarbons. For this reason, BOEM considers eggs and larval fishes to be at greater risk than adults in the event of exposure to contamination resulting from a spill or blowout. The specific effects of oil on fish can include direct lethal toxicity, sublethal disruption of physiological processes (internal lesions), suffocation due to oil coating gills, incorporation of hydrocarbons causing tainting or accumulation in the food chain, and changes in biological habitat (Moore and Dwyer, 1974; Incardona et al., 2014; Murawski et al., 2014). However, due to typically high fecundity and relatively wide distribution of eggs and larvae, it is unlikely spilled contaminants would overlap spatially and temporally with a fraction of eggs and larvae large enough to significantly impact populations. Furthermore, most adult fishes are expected to avoid adverse environmental conditions, minimizing the potential for impacts resulting from oil and dispersants. Estuaries are important nursery areas (EFH) for fish and aquatic life. Impacts related to oiling of these areas could result in the destruction of marsh habitat, facilitate in the erosion of coastlines, and increase the potential for adversely impacting juvenile fishes. A discussion of the impacts of oil on adult fish, fish eggs, and larvae can be found in Chapter 4.7 of the Multisale EIS and 2018 SEIS. Given that the potential for a blowout or a spill is small, there is a limited possibility for large amounts of oil released from a blowout or spill reaching shore. Additional sensitive habitat features and potential impacts to these habitats are discussed in **Chapter 3.4** (Deepwater Benthic Communities) of this document.

Accidental blowouts and spills also have the potential to affect federally listed species, but there is no evidence to date that there have been adverse impacts to population levels by spills or chronic contamination. Considering the location of Gulf sturgeon critical habitat in relation to oil and gas activities, the likely dilution of oil reaching nearshore areas, and the on-going weathering and dispersal of oil over time, it is not anticipated that the effects from oil spills will appreciably diminish the value of Gulf sturgeon designated critical habitat for the conservation of the species.

The likelihood of an individual giant manta ray or oceanic white tip shark being in the area of an oil spill is small and only those individuals found in the footprint of an oil spill would be affected. A small number of giant manta rays or oceanic white tip sharks are likely to be exposed to oil, and those exposures would likely result in effects similar to other marine species. Because data related to abundance estimates for oceanic whitetip sharks and giant manta rays in the GOM is limited, NMFS is not able to quantify an estimated number of oil spill exposures or mortalities for this species.

Cumulative Impacts

Cumulative activities that could impact fish, EFH, and federally listed threatened species in the area of the proposed action include State oil and gas activity, coastal development, crude oil imports by tanker, commercial and recreational fishing, hypoxia (i.e., red or brown tides), removal of OCS structures, vessel strikes, and offshore discharges of drilling muds and produced waters. It is expected that environmental degradation from the proposed action and non-OCS activities would affect fish populations, EFH, and

federally listed threatened species; however, the incremental contribution of the proposed action to these cumulative impacts would be small and almost undetectable for fish and EFH and discountable for federally listed threatened species. Therefore, no significant cumulative impacts on EFH, fish resources, of federally listed threatened species would be expected as a result of the proposed activities when added to the impacts of past, present, or reasonably foreseeable oil and gas development in the area as well as other activities in the area.

Conclusion

The proposed action is expected to have little impact on any fish, EFH, or federally listed threatened species endemic to the northern GOM. Specific effects from any one oil spill would depend on several factors, including timing, location, volume and type of oil, environmental conditions, and countermeasures used. If a blowout occurred, ichthyoplankton, fish eggs, or larvae would suffer mortality in areas where their numbers are concentrated and where oil concentrations are high. However, impacts are still expected to be minimal to nonexistent based on the low probability of a spill occurring (see **Chapter 1.4**).

3.8. ARCHAEOLOGICAL RESOURCES

3.8.1. Affected Environment

Archaeological resources are defined in 30 C.F.R. § 250.105 as "any material remains of human life or activity that are at least 50 years of age and that are of archaeological interest." Archaeological resources on the OCS can be divided into two types: prehistoric and historic. Detailed descriptions of these resource types are provided in Chapters 4.13 of the Multisale EIS, and 2018 SEIS. The following information is a summary of these descriptions, which are hereby incorporated by reference into this SEA.

Prehistoric

Geologic features that have a high probability for associated prehistoric sites in the northwestern and north central Gulf (from Texas to Alabama) include barrier islands and back barrier embayments, river channels and associated floodplains and terraces, and salt dome features. Also, a high probability for prehistoric resources may exist landward of a line that roughly follows the 60-m bathymetric contour, which represents the Pleistocene shoreline during the last glaciation some 12,000 years ago when the coastal area of Texas and Louisiana is generally considered to have been populated. BOEM is currently reviewing evidence to determine if a change in the currently accepted area of prehistoric site probability is warranted. The water depth in the area of the proposed action precludes the potential for prehistoric sites or artifacts.

Historic

Historic archaeological resources on the federal OCS include shipwrecks and a single light house (Ship Shoal Light). Historic research has identified over 4,000 potential shipwreck locations in the Gulf, with nearly 1,500 of these potential shipwreck locations on the OCS (Garrison et al., 1989). The historic record, however, is by no means complete, and the current ability to predict potential sites has proven inaccurate. As demonstrated by several studies (e.g., Pearson et. al., 2003; Lugo-Fernandez et al., 2007; Krivor et al., 2011; Rawls and Bowker-Lee, 2011), many more shipwrecks are likely to exist on the seafloor than have been accounted for in available historic literature. Currently a high-resolution remote sensing survey is the most reliable method for identifying and avoiding historic archaeological resources.

A 2003 study recommended including some deepwater areas, primarily on the approach to the Mississippi River, among those lease areas requiring archaeological investigation. With this in mind, BOEM revised its guidelines for conducting archaeological surveys in 2005 and added about 1,200 lease blocks to the list of blocks requiring an archaeological survey and assessment. Archaeological survey blocks were further expanded in 2011 and current requirements are posted on the BOEM website under NTL No. 2005-G07 and Joint NTL No. 2011-G01. At present, high-resolution geophysical, ROV, and/or diver survey is required for all new bottom disturbing activities.

Historic shipwrecks have, with the exception of three significant vessels found by treasure salvers, been primarily discovered through oil industry sonar surveys in water depths up to 9,000 ft (2,743 m). In fact, in the last five years, over four dozen potential shipwrecks have been located and several of these ships have been confirmed visually as historic vessels. Many of these wrecks were not previously suspected to exist in these areas, based on the historic record. The preservation of historic wrecks found in deep water has been outstanding because of a combination of environmental conditions and limited human access.

The *Deepwater Horizon* spill released an estimated 53,000-62,000 bbl of oil per day for almost three months. Much of the oil was treated with dispersant at the sea surface and at the source in a water depth of 5,000 ft (1,524 m). In Chapter 4.13 of the Multisale EIS, it was concluded that "impacts [from an oil spill] to historic resources would be limited to visual impacts and, possibly, physical impacts associated with spill cleanup operations." This analysis did not anticipate the use of dispersants at the wellhead that could result in currently unknown effects from dispersed oil droplets settling to the seafloor and that could possibly contaminate exposed artifacts and wood or steel hulls such as those observed on many deepwater sites (Atauz et al., 2006; Church et al., 2007; Church and Warren, 2008; Ford et al., 2008).

The best available information does not provide a complete understanding of the effects, if any, of the spilled oil from the Macondo reservoir and potential response/cleanup activities on archaeological resources that may be located in deep water. Though information on the actual impacts to submerged archaeological resources is non-existent at this time, oil settling to the seafloor due to dispersant use at the wellhead could come into contact with archaeological resources. At present, there is no evidence of this having occurred. An experimental study has suggested that while the degradation of wood in terrestrial environments is initially retarded by contamination with crude oil; at later stages, the biodeterioration of wood is accelerated (Ejechi, 2003). While there are different environmental constraints that affect the degradation of wood in terrestrial and waterlogged environments, soft-rot fungal activity, one of the primary wood degrading organisms in submerged environments, was shown to be increased in the presence of crude oil.

3.8.2. Impact Analysis

A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed activities on historic archeological resources can be found in Chapters 4.13 of the Multisale EIS, and 2018 SEIS, and is incorporated by reference. The IPF associated with the proposed action that could affect submerged archaeological resources is seafloor disturbance. These discussions also are summarized below and hereby incorporated by reference into this SEA.

The routine IPF associated with BP's proposed installation activities in the area of the proposed action that could affect archaeological resources is limited to direct contact or disturbance during the installation of pipelines, umbilicals, and associated infrastructure.

The historically-available literature is not sufficient to identify historic shipwreck losses in the area of the proposed action as historic records of losses occurring this far offshore are not location-specific (Pearson et. al., 2003; Lugo-Fernandez et al., 2007; Krivor et al., 2011; and Rawls and Bowker-Lee, 2011). However, if a historic resource exists in the area of pipeline installation activities, direct physical contact with a shipwreck site could destroy fragile materials, such as hull remains or artifacts, and could disturb the site context (Atauz et al., 2006; Church and Warren, 2008). To date, two historically-significant shipwrecks were found to have suffered damage from oil- and gas-related activities because of a lack of knowledge of their presence.

The IPFs that could be associated with accidental events include seafloor disturbances from jettisoned/lost debris and deterioration from potential oil spills. Similar to routine impacts, discarded/lost material that falls to the seabed has the potential to damage and/or disturb archaeological resources. Oil spills and their remediation efforts could also accelerate deterioration of archaeological resources. A detailed discussion of all potential impacts is found below.

3.8.2.1. Alternative 1

If selected, Alternative 1, the No Action Alternative, would result in the operator not undertaking the proposed activities as described in the plan. Therefore, the IPFs mentioned above (i.e., bottom disturbance associated with the installation of pipelines, umbilicals, and associated infrastructure) would not take place, and any impact that these actions could cause would not occur. Likewise, under the No

Action Alternative, there would be no possibility of a spill. As a result, whatever archaeological resources may be present in the area of potential effect (APE) would not be affected in any way if the no-action alternative was selected.

3.8.2.2. Alternative 2

If selected, Alternative 2, the Proposed Action as Submitted with additional conditions of approval as required under the NMFS 2020 BO, would result in the operator undertaking the proposed activities as requested and conditioned in the plan. Examples of potential impacts to archaeological resources would include, but are not limited to, damage to potential resources from pipeline installation activities, lost/discarded material, and potential impacts from an accidental oil spill. As described in the proposed plan and discussed below, the proposed activities are not expected to have significant impacts on known or unknown historical archaeological resources.

Routine Activities

Impacts to a historic site could result from direct physical contact causing irreversible damage. The undisturbed provenience of archaeological data (i.e., the 3-dimensional location of archaeological artifacts) allows archaeologists to accumulate a record of where every item is found, and to develop a snapshot as to how artifacts relate to other items or the site as a whole. The analysis of artifacts and their provenience is one critical element used to make a determination of eligibility to the National Register of Historic Places and is essential in understanding past human behavior and ways of life. Impacts from the proposed operations could alter the provenience and destroy fragile remains, such as the hull, wood, glass, ceramic artifacts and possibly even human remains, or information related to the operation or purpose of the vessel. The destruction and loss of this data eliminate the ability of the archaeologist to fully and accurately detail activity areas found at the site, variation and technological advances lost to history, the age, function, and cultural affiliation of the vessel, and its overall contribution to understanding and documenting the maritime heritage and culture of the region.

BOEM's regulation at 30 C.F.R. § 550.194 requires that an archaeological survey be conducted prior to development of leases within the high-probability zones for historic and prehistoric archaeological resources. Currently, Mississippi Canyon Blocks 474, and 520 are designated as high-probability blocks. At present, some form of survey is required for new bottom disturbing activities. No targets that may represent significant archaeological resources were identified in the high-resolution geophysical survey near/within the area of BP's proposed activity.

Accidental Events

Although unlikely, accidental blowouts and spills from the proposed action could lead to oil contact with submerged archaeological resources. While there is no information on the actual impacts of the *Deepwater Horizon* spill on submerged archaeological resources, should an accidental blowout and spill occur during the operator's proposed action, oil may settle on the seafloor due to dispersant use at the wellhead and could come into contact with archaeological resources. Although there is uncertainty and limited data on the effects of an oil spill at depth on submerged archaeological resources, a recent experimental study has suggested that while the degradation of wood in terrestrial environments is initially retarded by contamination with crude oil; at later stages, the biodeterioration of wood is accelerated (Ejechi, 2003). While there are different environmental constraints that affect the degradation of wood in terrestrial and waterlogged environments, soft-rot fungal activity, one of the primary wood degrading organisms in submerged environments, was shown to be increased in the presence of crude oil. No impacts are expected from marine remediation efforts because bottom-disturbing activities are not anticipated due to the water depth.

Another IPF that could result from an accidental event is from the loss of debris from the pipelay and construction vessels during pipeline installation operations. Debris such as structural components (i.e., grating, wire, tubing, etc.), boxes, pallets, and other loose items can become dislodged during heavy seas or storm events and fall to the seabed. Similarly, joints of pipes are used during the installation of pipelines; requiring regular transport out to the pipeline laybarge via workboats. There is the potential to lose pieces of pipes during transfer operations. Similar to the impacts noted under Routine Activities, if lost pipe or debris were to fall onto an unknown archaeological resource near the pipeline route, damage could destroy fragile materials, such as hull remains and artifacts, and could disturb the site's context and

associated artifact assemblage. Additionally, lost material could result in the masking of actual archaeological resources or the introduction of false targets that could be mistaken in the remote sensing record as historic resources.

In the event of a catastrophic spill similar to the *Deepwater Horizon* spill, any substantive impact to archaeological resources is very unlikely because the potential impacts from a catastrophic spill would be similar to aforementioned routine and accidental issues. However, despite the recent *Deepwater Horizon* spill, historical trends in the GOM (see **Chapter 1.4**) indicate that catastrophic spill events are not likely to occur as a result of the proposed action.

Cumulative Analysis

Cumulative impacts on unknown archaeological resources that may be present in the area of the proposed action could result from other GOM activities. Water depth along the proposed pipeline route ranges from approximately 6,340 - 6,697 ft (1,932 - 2,041 m) and the origin location of the pipelines at the 003 and 004 wellsites in Mississippi Canyon Block 520 is approximately 66 mi (105 km) from shore. Activities would be limited to commercial and recreational fishing, marine transportation, and adjacent oil and gas exploration, development, and production operations.

During adjacent oil and gas operations, commercial fishing, and maritime transportation activities, there is associated the loss or discard of debris that could result in the masking of archaeological resources or the introduction of false targets that could be mistaken in the remote sensing record as historic resources. Future exploration, development, and production operations and/or any related infrastructure support could lead to bottom disturbances in the area of the proposed action; however, no additional activities have been proposed or are under review at this time. Similarly, geological and geophysical (G&G) surveys have been permitted near the area of the proposed action. These surveys may involve the seabed deployment of receivers attached to degradable concrete anchors that are deployed from the sea surface. These anchors have the potential to damage unknown archaeological resources that may exist in the area of the proposed action as they descend through the water column; however, their small size and relatively light weight (~65 lbs [34 kg]) is not expected to cause significant impacts.

Any known or unknown archaeological resources that may be present in Mississippi Canyon Blocks 474 and 520 could be impacted by contact with oil from an accidental spill from pipelay and construction vessels. Similarly, cumulative impacts from accidental oil spills and remediation efforts for adjacent oil and gas operations are not expected because of historically low probability of a loss of well control/blowout.

Considering the potential cumulative impacts from all other GOM activities, the operator's proposed activities would constitute the primary effect, if any, on any known or unknown archaeological resource that may exist in the area of the proposed action. However, based on the archaeological assessment conclusions, there is no reason to believe that the proposed action would result in the disturbance of archaeological resources. Therefore, no significant cumulative impacts are expected as a result of the proposed action when added to the impacts of past, present, or reasonably foreseeable oil and gas development in the area as well as other proximal activities.

Conclusion

Based on the previous information and the survey conclusions, there is no reason to believe that archaeological resources could be present in the area of the proposed action. If an unknown archaeological resource were to exist where bottom-disturbing operations are proposed to occur, and the operator were unaware of its existence prior to disturbing the bottom, the operator's activities might have a significant impact on that resource. Such impact would result in damage and/or disturbance to the resource from an accidental spill or loss of debris from pipelay or construction vessels.

4. CONSULTATION AND COORDINATION

The Endangered Species Act of 1973 (ESA) (16 U.S.C. §§ 1531 *et seq*.), as amended, establishes a national policy designed to protect and conserve threatened and endangered species and the ecosystems upon which they depend. Section 7(a)(2) of the ESA requires each Federal agency to ensure that any action that they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the adverse modification of designated critical habitat. On April 20, 2018, the U.S.

Fish and Wildlife Service (FWS) issued its 10-year programmatic BO for BOEM and BSEE's oil and gas activities in the GOM. The FWS BO does not include any terms and conditions for the protection of endangered species that the Bureaus, lessees, or operators must implement but did provide recommendations for Oil Spill Contingency Plan information, aircraft, marine debris and trash, information needs, and future coordination. The FWS 2018 BO also noted that any future consultations may be informal, dependent upon the likelihood of take.

On March 13, 2020, the National Marine Fisheries Service (NMFS) issued a BO and related terms and conditions for oil and gas activities in the GOM for the protection of these species, including holding lease sales. The NMFS programmatic BO addresses any future lease sales and any approvals issued by BOEM and BSEE, under both existing and future OCS oil and gas leases in the GOM, over a 10-year period. Applicable terms and conditions and reasonable and prudent measures from the NMFS 2020 BO will be applied at the lease sale stage; other specific conditions of approval will also be applied to post-lease approvals. The NMFS 2020 BO may be found here: https://www.fisheries.noaa.gov/resource/document/biological-opinion-federally-regulated-oil-and-gas-program-activities-gulf-mexico. The Appendices and protocols may be found here: https://www.fisheries.noaa.gov/resource/document/appendices-biological-opinion-federally-regulated-oil-and-gas-program-gulf-mexico. BOEM petitioned NMFS for rulemaking under the Marine Mammal Protection Act, to assist industry in obtaining incidental take coverage for marine mammals due to oil and gas & geological and geophysical (G&G) surveys in the Gulf of Mexico. If NMFS issues a final rule as a result of the petition, the NMFS programmatic BO may be amended and additional mitigation measures beyond what is currently within Appendix A and C may be imposed through Letters of Authorizations under the rulemaking for MMPA.

In accordance with the National Historic Preservation Act (54 U.S.C. §§ 300101 *et seq*.), Federal agencies are required to consider the effects of their undertakings on historic properties. The implementing regulations for Section 106 of the National Historic Preservation Act, issued by the Advisory Council on Historic Preservation (36 CFR § 800), specify the required review process. In accordance with 36 CFR § 800.8(c), BOEM intends to use the NEPA substitution process and documentation for preparing an EIS/ROD or an EA/FONSI to comply with Section 106 of the National Historic Preservation Act in lieu of 36 CFR §§ 800.3-800.6

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