U.S. DEPARTMENT OF THE INTERIOR

MINERALS MANAGEMENT SERVICE

Gulf of Mexico OCS Region

New Orleans, Louisiana

Site-Specific Environmental Assessment

for

POLLUTION CONTAINMENT SYSTEM

INSTALLATION and OPERATION

Mississippi Canyon Area, Block 20

for

Taylor Energy Company, L.L.C.

October 2008

Related Environmental Documents

Environmental Assessment (EA) for *Approval of Alternate Procedures or Departures from MMS Regulatory Requirements – Platform A and Associated Wells; Mississippi Canyon Block 20 on the Gulf of Mexico Outer Continental Shelf* (April, 2008)
and
Environmental Impact Statement (EIS) for *Gulf of Mexico OCS Oil and Gas Lease Sales: 2007-2012; Western Planning Area Sales 204, 207, 210, 215, and 218; Central Planning Area Sales 205, 206, 208, 213, 216, and 222* (MMS, 2007)

SITE-SPECIFIC ENVIRONMENTAL ASSESSMENT DETERMINATION
FINDING OF NO SIGNIFICANT IMPACT

An analysis of the installation and operation of the proposed pollution containment system for Taylor Energy Company, L.L.C.'s (Taylor) Platform A and associated wells in Mississippi Canyon Block 20 (MC20) has been completed. Our site-specific environmental assessment (SEA) on the proposed action is complete and results in a Finding of No Significant Impact (FONSI). Based on the analyses conducted for this EA, MMS has concluded that the proposed action will not significantly affect the quality of the human environment (40 CFR 1508.27). Preparation of an environmental impact statement is not required. The following mitigation is considered necessary to ensure environmental protection, consistent environmental policy, and safety under the National Environmental Policy Act (NEPA), as amended, or are recommended measures needed for compliance with 40 CFR 1500.2(f) regarding the requirement for Federal agencies to avoid or minimize any possible adverse effects of their action upon the quality of the human environment.

Mitigation

Pre-Storm Offloading/Post-Storm Reporting Mitigation: Taylor will be required to conduct offloading operations on their pollution containment system at least 48-72 hours prior to a major storm entering the GOM to ensure that the system has been adequately flushed. Following the storm event, Taylor will schedule offloading operations at the earliest possible time to inspect the surface buoy and continue pumping activities. If pumping operations cannot resume for any reason (i.e., vessel contract, weather issues, service base impacts, system damage, etc.), MMS shall be notified within 24-hours and presented with a remedial program/inspection guidelines.

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ABBREVIATIONS AND ACRONYMS

AML	above the mudline
bbl	barrel
BML	below the mudline
BOPD	barrels of oil per day
CFR	Code of Federal Regulations
EA	environmental assessment
EIS	environmental impact statement
FMMG	Fugro-McClelland Marine Geosciences, Inc.
ft	feet
in	inch
mi	mile
MC	Mississippi Canyon Area
MMS	Minerals Management Service
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NRC	National Response Center
NTL	Notice to Lessees and Operators
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OD	outside diameter
OSRA	Oil-Spill Risk Analysis
OSRO	oil-spill-response organization
OSRP	oil-spill-response plan
P&A	plug and abandon
PCS	pollution control system
ROV	remotely operated vehicle
Taylor	Taylor Energy Company, L.L.C.
UC	Unified Command
U.S.	United States
U.S.C.	United States Code
USCG	U.S. Coast Guard
USDOI	U.S. Department of the Interior

INTRODUCTION

In September 2004, Hurricane Ivan crossed the northeastern Gulf of Mexico (GOM), making landfall west of Gulf Shores, Alabama. The hurricane caused a massive undersea mudslide south of the Mississippi River Delta. The destructive forces of this mudslide toppled an oil and gas platform (Platform A) owned by Taylor Energy L.L.C. (Taylor). The platform is located about 19 miles (mi) southeast of the Mississippi River Delta in Mississippi Canyon Block 20 (MC20) in about 445 feet (ft) of water (**Figure 1.1**).

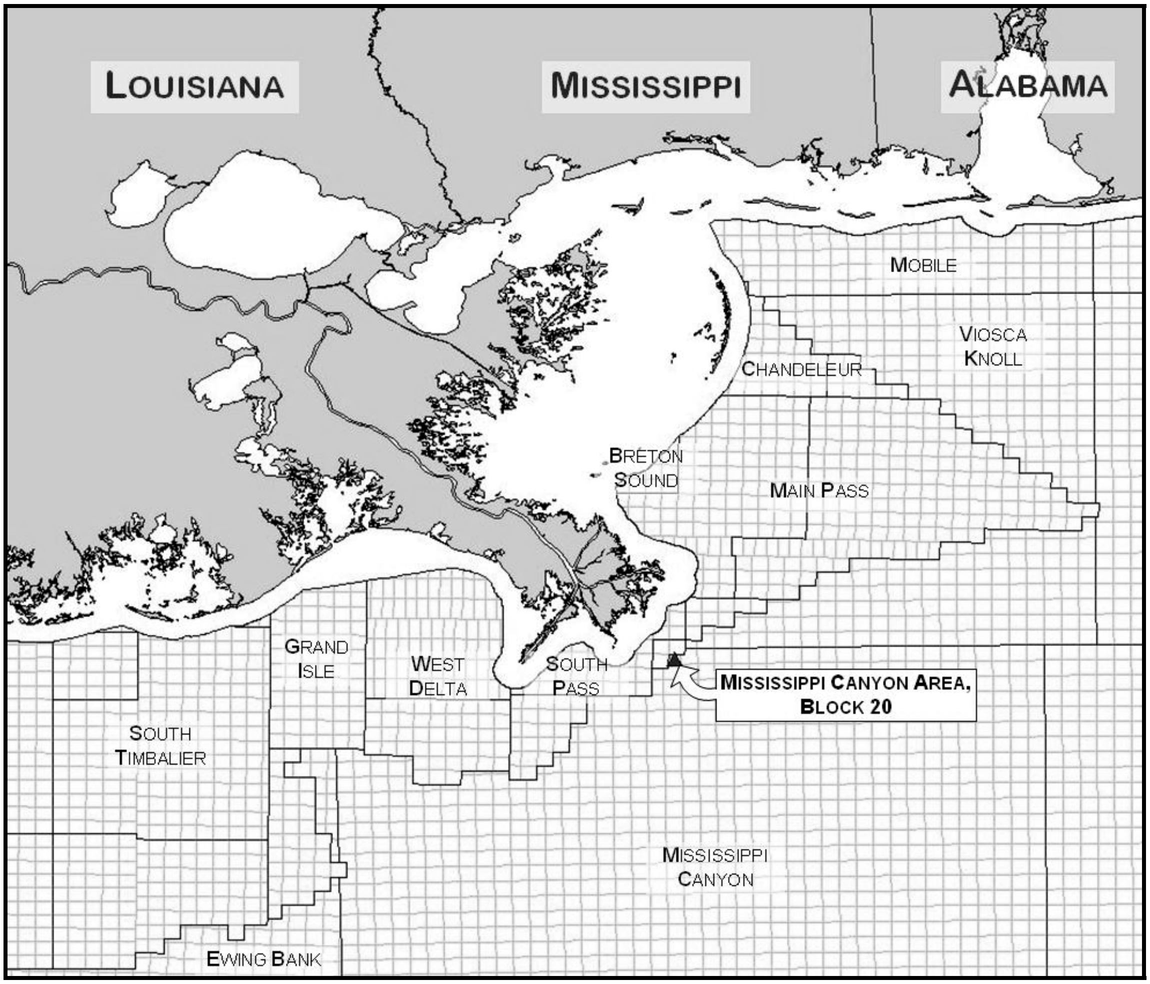

Figure 1.1. Location of Mississippi Canyon Block 20 on the Federal OCS.

The platform's well bay contained 28 separate 30-in-diameter well conductors. The upslope seabed failure resulting from Hurricane Ivan produced a mudflow lobe that toppled the platform, sheared the jacket piles, and bent/pulled the conductors from the jacket while depositing an average of 150 ft of sediments on the site (FMMG, 2007). The mostly-intact platform moved 450-700 ft downslope from its original location and lies in a horizontal position on the seabed (**Figure 1.2.**). Post-storm surveys indicate that the conductors were bent near the original well bay location and pulled in the direction of the jacket, which is currently buried from about 150 ft to 70 ft below the mudline (BML). The vast majority of the jacket is covered by mud; however, most of the deck assembly and the four legs of the jacket's "B" row are exposed with up to about 75 ft above the mudline (AML), and the tip of the flare boom extends about 145 ft AML.

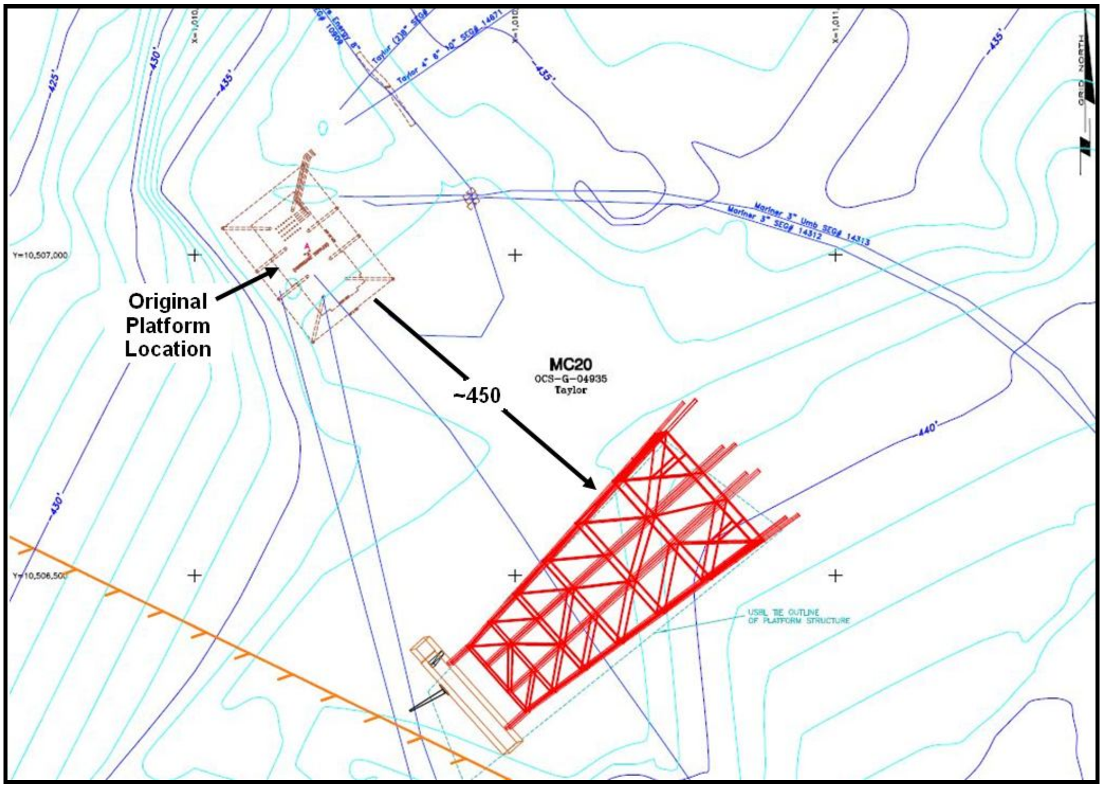

Figure 1.2. Post-mudslide placement of Platform A relative to the original location (FMMG, 2007).

Taylor estimated that approximately 624 bbl of crude oil, refined petroleum products, and chemicals were on the platform itself at the time of the incident. A breakdown of these products, their locations, and volumes is provided in **Table 1-1**. Taylor is unclear regarding how much of this volume may have been spilled since the tanks and production equipment have not been accessed.

Table 1-1

Oil and Chemical Products Contained on the Mississippi Canyon Block 20 Platform A

Location on Platform	Pollution	Volume (bbl)
Emulsion Treater	Crude Oil (API 26.6)	197
Wet/Dry Tank	Crude Oil (API 26.6)	180
Separators and Skimmer	Crude Oil (API 26.6)	33.2
Platform Leg, Crane Engine, and Diesel Generator	Diesel	55
1,000-Gallon Transporter	Jet Fuel	24
Engines, Pumps, and Transporter	Engine Oil Hydraulic Fluid Gear Oil	15.6 2.9 2.4
Reboiler, Separator, Contactor, Scrubber, and Glycol Storage Tank	Glycol	64.3
Tote Tanks	Water Clarifier	20.9
Tote Tanks	Acid	13
Tote Tanks	Demulsifier	7.9
Tote Tanks	Scale Inhibitor	7.9
Total Volume on Platform		624.1

API – American Petroleum Institute.

Since the mudslide incident occurred in 2004, there have been numerous spill reports made to the U.S. Coast Guard (USCG) and the Minerals Management Service (MMS) for slick sightings in the vicinity of MC20. In response, the USCG and MMS, working under a Unified Command (UC), have been coordinating to monitor the discharges and resultant sheen events. On July 8, 2008, the USCG, on behalf of the UC, informed Taylor via letter that they would be required to mitigate the actual/potential environmental impacts of the continual pollution event. In addition to several monitoring and planning requirements, Taylor was instructed to determine the source of the spill(s) and provide spill response capable of containing and recovering all pollution discharges in the block (USCG, 2008a).

After receiving the July 8th UC letter, Taylor contracted Oceaneering International Inc. (OII) to conduct a hydrocarbon survey in MC20 to locate the spill locations. Using a remotely-operated vehicle (ROV) equipped with a mass spectrometer and high-resolution sonar, OII was able to detect three distinct plumes (designated Plumes A, B, and C) of gas and oil coming from the seabed (OII, 2008). Plumes A and B are located nearly vertical above the original well bay site. Plume C is positioned near the current jacket location and was determined to be above one of the bent over wells buried beneath the mudline. The ROV survey also determined that the plumes were no larger than a few feet in diameter and remained fairly stable except for periods when a larger release/"burp" of hydrocarbons would occur (Couch, 2008).

Once the plume locations were located, Taylor had OII design a containment system to address the spill response requirements outlined in the USCG letter. Details related to the containment system design and OII testing was provided to the UC during a set of meetings in August/September 2008.

On September 23, 2008, the USCG issued Taylor Administrative Order No. 006-08, which highlighted that the damaged platform and wells were responsible for "a continuous, unsecured crude oil discharge" and directed the operator to install the pollution containment system by November 1, 2008 to "prevent any additional unlawful discharges of oil into the navigable waterway" (USCG, 2008b). In the process of responding to the Administrative Order, Taylor expressed concerns about the potential environmental impacts of their pollution containment system should it become damaged during future mudslide events. Based upon their own assessment, Taylor felt that their system presented a greater environmental risk than the ongoing pollution that the system was designed to stop. Citing these concerns and their interpretation of a geologic-hazards lease stipulation, Taylor has requested that MMS grant "express approval" for the installation and operation of the pollution containment system.

1. PROPOSED ACTION

1.1. PURPOSE OF THE PROPOSED ACTION

The primary purpose of the proposed action outlined by Taylor's request and mandated by USCG Administrative Order No. 006-08 (USCG, 2008b) is to capture all crude oil discharges in MC20 originating from the three identified plumes and allow for its safe recovery and onshore disposal. The secondary purpose of the proposed action is to end the continual spill event resulting from the discharges and the subsequent sheening incidents emanating from the block.

1.2. NEED FOR THE PROPOSED ACTION

The proposed action is needed to stop the constant discharge of crude oil into the marine ecosystem at the MC20 location that is resulting in a continual pollution event, which is causing- and/or could lead to- significant environmental impacts. Under the Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), the USCG is authorized to issue orders, as required, to protect the public health, welfare, and the environment. Under the Outer Continental Shelf Lands Act (OCSLA), the MMS, delegated with oversight authority by the Department of the Interior (DOI)/Secretary of the Interior, is required to balance orderly oil and gas resource development on the Outer Continental Shelf (OCS) with protection of the human, marine, and coastal environments. Additionally, as MC20 lessee, Taylor is required to use the best available technology to prevent/remediate any spill events resulting from their operations and ensure their compliance with the OCSLA, CWA, Oil Pollution Act of 1990 (OPA 90), and Coastal Zone Management Act (CZMA).

1.3. DECISION TO BE MADE WITH THIS EA

Since the activities proposed by Taylor and directed by the USCG are for the emergency remediation of an ongoing spill/pollution event, MMS does not require an approved plan or permit prior to commencing operations. However, since Taylor requested "express approval" from MMS based upon their assessment of potential environmental risks, the primary decision to be made with this EA is whether or not the installation and operation of Taylor's pollution containment system in MC20 has the potential to cause greater environmental impacts than the ongoing, unmitigated oil pollution event. The secondary decision is if an Environmental Impact Statement (EIS) must be prepared.

1.4. DESCRIPTION OF THE PROPOSED ACTION

1.4.1. The Proposed Action

The proposed action is to install and operate Taylor's multi-component pollution containment system (PCS) in MC20 to capture continuous crude oil discharges and allow for its safe recovery and onshore disposal. Also referred to as a ***subsea oil recovery system***, ***pollution domes***, and/or ***collection system***, the PCS is a based upon a proprietary design developed by OII to meet the spill response requirements of the July 8, 2008 UC letter (USCG, 2008a). The PCS works by capturing oil, gas, and associated water released from the three plume sites using collection domes that transfer the discharges via hose to the separator/collection unit where the hydrocarbons are separated and the oil stored. A modified surface buoy is connected to the collection unit and contains a retractable hose and boom assembly that allows for the drainage of all oil in the system using a crew boat/work vessel outfitted with a pump and necessary slop tanks.

1.4.2. Pollution Collection System Components

Though the PCS details are proprietary, a basic overview is provided below to outline the three primary elements, note component placement/installation on the OCS, and summarize system operation.

1.4.2.1 Collection Domes

The system will employ three collection domes; each one anchored to the seabed directly over the plume sites identified by the OII hydrocarbon survey. Relying upon a proprietary anchor design, the domes were developed to be large enough to cover the complete discharge area of their respective plumes and with sufficient weight to compensate for above-normal/sporadic discharges (i.e., "burps") without being dislodged from the seafloor. Serving as quasi-funnels, the domes will not allow for onboard hydrocarbon storage; instead, captured hydrocarbons and associated water is transferred through zero-discharge fittings and hoses to the separator/collection unit.

1.4.2.2. Seperator/Collection Unit

A single separator/collection unit will receive the outflow hoses from each of the three collection domes. Unlike the domes, the separator/collection unit will be suspended in the water column about 200 ft from the sea surface; moored to the jacket legs of the downed Platform A at four locations using oversized leg clamps, chain, and wire rope (Couch, 2008). The design of the unit allows for hydrocarbon separation without human interface or monitoring; wherein, the gas is effectively-discharged into the water column, the oil is stored in an inner tank, and any associated water is released thru the bottom of the unit (OII, 2008). Based upon volume calculations from sheen sightings and seepage-rate information collected during the OII hydrocarbon survey, the unit has a normal operation capacity of 17 bbl;

conservatively-developed for weekly offloading operations. To compensate for emergency situations related to excessive discharges or periods when sea conditions/scheduling will not allow for weekly system flushing, the collection unit is designed to hold up to three-times the standard volume (~50 bbl). To allow for the offloading operations, the separator/collection unit is connected by a check valve-protected hose to a surface/offloading buoy.

1.4.2.3. Surface/Offloading Buoy

The surface/offloading buoy is designed upon a standard sea buoy (i.e., WetTech® BL 826) equipped with navigation lights, batteries, related solar panel, and a global positioning system (GPS) receiver. The buoy is modified for offloading duties with a specially-designed retractable hose boom that allows for pumping operations to occur without boarding the buoy at sea. Similar to the separator/collection unit, the surface buoy will be moored to the downed platform's jacket at four locations using leg clamps, chain, subsea buoys, and synthetic rope (Couch, 2008). The use of subsea buoys and the four-location mooring will allow for up to 60 ft of surface movement in any direction. As with the three collection domes, no oil will be stored in the surface buoy and the connection hose between the separator/collection unit and the surface buoy will be flushed/filled with clean seawater following each offloading operation.

1.4.3. Offloading/Pumping Operations

The PCS offloading/pumping operations will use a contracted surface vessel (i.e., crewboat, workboat, etc.) equipped with a 2 in diaphragm pump with associated collection hose, gas buster, and sump/storage tanks (Couch, 2008). Once on location, the offloading vessel will stern-up to the surface buoy and grab the retractable hose boom with a boat hook. With the pump hose connected to the buoy's retractable hose, pumping will commence. The pumping action opens the check-valve at the top of the separator/collection unit, allowing the oil stored in the unit to travel up the hose to the surface buoy and into the sump tanks on the offloading vessel. Oceaneering calculated that pumping operations will take approximately 10 minutes to complete; assuming a standard capacity of 17 bbl at a rate of 150 gallons per minute (OII, 2008). Pumping will continue until clear seawater is drawn up through the entire system and into the sump tank, ensuring that separator/collection unit is completely flushed of any oil.

1.4.2. Schedule of Activities

Administrative Order No. 006-08 directed Taylor to install the PCS by November 1, 2008; a date based upon estimated fabrication times provided by Taylor and OII (USCG, 2008b). Subsequent request for MMS approval and possible delays regarding construction quotes could push the actual installation date back until late November or December. Once installed, Taylor's plugging and abandonment (P&A) group projected that the PCS will not be required after the completion of their first set of well intervention/P&A projects, since they believe that the initial wells are responsible for the continual spill event. Since the first initial P&A work is scheduled to be complete by late-spring/summer of 2009, the PCS is projected to be in operation from November 2008 to June 2009.

During normal operation, the PCS is designed to be offloaded on a weekly basis; approximately 32 pumping trips over the schedule of the proposed action. Active monitoring of the volumes collected each week will allow Taylor and/or their pumping contractor to modify their offloading trips for periods of increased or diminished discharge rates.

1.5. Regulatory and Administrative Framework

1.5.1. Regulatory Hierarchy Summary

The Secretary of the Interior has delegated the MMS responsibility for managing, regulating, and monitoring oil and natural gas exploration, development, and production operations on the OCS. All operations on the OCS must comply with all applicable Federal, State, and local laws and regulations.

Several Federal regulations establish specific consultation and coordination processes with Federal, State, and local agencies. The MMS regulatory framework is to ensure that OCS activities are conducted in a technically prudent and environmentally sound manner and allows MMS to achieve its safety management and stewardship goals. The major laws and regulations applicable to the proposed action are summarized below.

1.5.2. National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 *et seq.*) requires that all Federal agencies use a systematic, interdisciplinary approach to protect the human environment; this approach will ensure the integrated use of the natural and social sciences in any planning and decisionmaking that may have an impact upon the environment. In 1979, the Council on Environmental Quality (CEQ) established uniform guidelines for implementing the procedural provisions of NEPA. These regulations (40 CFR 1500-1508) provide for the use of the NEPA process to identify and assess the reasonable alternatives to proposed actions that avoid or minimize adverse effects of these actions upon the quality of the human environment. The CEQ guidelines under 40 CFR 1501.3 allows Federal agencies to prepare an EA on certain Federal actions in order to assist in the planning and decisionmaking process. If the results of the EA conclude that significant adverse environmental effects may occur and cannot be avoided with either mitigation or alternatives to the proposed action, the Federal agency must then prepare a detailed EIS.

1.5.3. Outer Continental Shelf Lands Act

The OCSLA of 1953 (43 U.S.C. 1331 *et seq.*), as amended, established Federal jurisdiction over submerged lands on the OCS seaward of State boundaries. The Act, as amended, provides for implementing an OCS oil and gas exploration and development program. The goals of the Act include the following:

- to establish policies and procedures for managing the oil and natural gas resources of the OCS that are intended to result in expedited exploration and development of the OCS in order to achieve national economic and energy policy goals, assure national security, reduce dependence on foreign sources, and maintain a favorable balance of payments in world trade;
- to preserve, protect, and develop oil and natural gas resources of the OCS in a manner that is consistent with the need;
- to make such resources available to meet the Nation’s energy needs as rapidly as possible;
- to balance orderly resource development with protection of the human, marine, and coastal environments; and
- to encourage development of new and improved technology for energy resource production, which will eliminate or minimize the risk of damage to the human, marine, and coastal environments.

Under the OCSLA, the Secretary of the Interior is responsible for the administration of mineral exploration and development of the OCS. Within the Department of the Interior (DOI), MMS is delegated with the responsibility of managing and regulating the development of OCS oil and gas resources in accordance with the provisions of the OCSLA. The MMS operating regulations are in 30 CFR 250, 30 CFR 251, and 30 CFR 254.

1.5.4. Clean Water Act

The Clean Water Act (CWA) is a 1977 amendment to the Federal Water Pollution Control Act of 1972. The CWA establishes the basic structure for regulating discharges of pollutants to waters of the United States. Under the CWA, it is unlawful for any person to discharge any pollutant from a point source into navigable waters without a National Pollution Discharge Elimination System (NPDES) permit. The USEPA may not issue a permit for a discharge into ocean waters unless the discharge complies with the guidelines established under Section 403(c). These guidelines are intended to prevent degradation of the marine environment and require an assessment of the effect of the proposed discharges on sensitive biological communities and aesthetic, recreation, and economic values, both directly and as a result of biological, physical, and chemical processes altering the discharges.

All waste streams generated from offshore oil and gas activities are regulated by the USEPA, primarily by general permits. Under Sections 301 and 304 of the CWA, USEPA issues technology-based effluent guidelines that establish discharge standards based on treatment technologies that are available and economically achievable. The most recent effluent guidelines for the oil and gas extraction point source category were published in 1993 (58 FR 12454). Within the Gulf of Mexico, USEPA Region 4 has jurisdiction over the eastern portion of the Gulf, including all of the OCS Eastern Planning Area and part of the CPA off the coasts of Alabama and Mississippi. The USEPA's Region 6 has jurisdiction over the majority of the CPA and all of the WPA. Each region has promulgated general permits for discharges that incorporate the 1993 effluent guidelines as a minimum. In some instances, a site-specific permit is required. The USEPA also published new guidelines for the discharge of synthetic-based drilling fluids (SBF) on January 22, 2001 (66 FR 6850).

Other sections of the CWA also apply to offshore oil and gas activities. Section 404 of the CWA requires a Corps of Engineers' (COE) permit for the discharge or deposition of dredged or fill material in all the waters of the United States. Approval by the COE, with consultation from other Federal and State agencies, is also required for installing and maintaining pipelines in coastal areas of the Gulf of Mexico. Section 303 of the CWA provides for the establishment of water quality standards that identify a designated use for waters (e.g., fishing/swimming). States have adopted water quality standards for ocean waters within their jurisdiction (waters of the territorial sea that extend out to 3 mi off Louisiana, Mississippi, and Alabama, and 3 leagues off Texas and Florida). Section 402(b) of the CWA authorizes USEPA approval of State permit programs for discharges from point sources.

1.5.5. Oil Pollution Act

The Oil Pollution Act of 1990 (OPA 90) expanded Federal spill-response authority, increased penalties for spills, established U.S. Coast Guard (USCG) prepositioned oil-spill response equipment sites, required vessel and facility response plans, and provided for interagency contingency plans. The Act also established USCG oil-spill district response groups (including equipment and personnel). The OPA 90 provides that parties responsible for offshore facilities demonstrate, establish, and maintain oilspill financial responsibility (OSFR) for those facilities. The MMS is responsible for OSFR certification. The minimum amount of OSFR is $35 million for covered offshore facilities (COF's) located on the OCS and $10 million for COF's located in State waters. A COF is any structure and all of its components, equipment, pipeline, or device (other than a vessel, a pipeline, or deepwater port licensed under the Deepwater Port Act of 1974) used for exploratory drilling or production of oil, or for the transportation of oil from such facilities. The USCG regulates the oil-spill financial responsibility program for vessels. A mobile offshore drilling unit (MODU) is classified as a vessel. A well drilled from a MODU, however, is classified as an offshore facility under this rule.

1.5.6. Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) (16 U.S.C. 1451 *et seq*.) was enacted by Congress in 1972 to develop a national coastal management program that comprehensively manages and balances competing uses of and impacts to any coastal use or resource. The national coastal management program is implemented by individual State coastal management programs in partnership with the Federal Government. The CZMA Federal consistency regulations require that Federal activities (e.g., OCS lease sales) be consistent to the maximum extent practicable with the enforceable policies of a State's coastal zone management program (CZMP). The Federal consistency also requires that other federally approved activities (e.g., activities requiring Federal permits or approval) be consistent with a State's CZMP. The Federal consistency requirement is an important mechanism to address coastal effects, to ensure adequate Federal consideration of all CZMP's, and to avoid conflicts between States and Federal agencies. The Coastal Zone Act Reauthorization Amendments of 1990 (CZARA), enacted November 5, 1990, as well as the Coastal Zone Protection Act of 1996 (CZPA), amended and reauthorized the CZMA. The CZMA is administered by the Office of Ocean and Coastal Resource Management (OCRM) within NOAA's National Ocean Service.

Three subparts of the CZMA regulations (15 CFR 930) are directly related to OCS oil and gas activities. Subpart C (15 CFR 930.30 to 15 CFR 930.46) concerns consistency requirements for major Federal actions (e.g., lease sales) and Subpart E (15 CFR 930.70 to 15 CFR 930.85) deals with the consistency review process of plans outlining OCS exploration and production activities. Subpart D (15 CFR 930.50 to 15 CFR 930.66) outlines the requirements for ensuring consistency of any activities requiring a Federal permit or license (e.g., pipeline installation permits and geological and geophysical permits). In accordance with Subpart D guidance, each State CZMP lists which federally licensed or permitted activities could affect their coastal zone.

1.6. IMPACT-PRODUCING FACTORS

Impact-producing factors from the proposed installation and operation of a pollution containment system in MC20 include (1) sediment disturbances during installation, (2) waste, discharges, and air emissions from vessels conducting the installation/offloading operations, and (3) noise from vessel transportation. Potential impacts from accidents include (1) vessel collisions with marine mammals and sea turtles and (2) an oil spill resulting from damage to the PCS (**Appendix A**). Because the proposed action was designed to facilitate the recovery/remediation of ongoing crude oil discharges in MC20, the positive benefits of the PCS include (1) cessation of a continuous, unmitigated pollution event in the marine ecosystem and (2) reduction/negation of potential impacts of oil exposure to protected marine resources.

2. ALTERNATIVES CONSIDERED

2.1. NONAPPROVAL OF THE PROPOSAL

If this alternative was selected, Taylor would not be allowed to undertake the proposed activities. This alternative would allow the pollution event to continue and prevent the remediation of continuous oil discharges into the marine environment, which would keep the USCG, MMS, and Taylor from attaining compliance with the OCSLA, CWA, and OPA 90. Considering this outcome and that the PCS is anticipated to provide for positive environmental benefits, this alternative was not selected for further analysis.

2.2. APPROVAL WITH EXISTING MITIGATION

The MMS's lease stipulations, OCS Operating Regulations, Notices to Lessees and Operators (NTLs), and other regulations and laws were identified throughout this environmental assessment as existing mitigation to avoid and minimize potential environmental effects associated with the proposed action. Since additional mitigations were identified to avoid or mitigate potential impacts with the proposed action, this alternative was not selected for further analysis.

2.3. Approval with Existing and/or Added Mitigation

The MMS's lease stipulations, OCS Operating Regulations, NTL's, and other regulations and laws were identified throughout this environmental assessment as existing mitigation to avoid and minimize potential environmental effects associated with the proposed action. Approval of the proposal with existing and additional mitigation is the selected alternative. The following additional mitigation has been identified.

2.3.1. Mitigations

2.3.1.1. Pre-Storm Offloading/Post-Storm Reporting Mitigation

> Taylor will be required to conduct offloading operations on their pollution containment system at least 48-72 hours prior to a major storm entering the GOM to ensure that the system has been adequately flushed. Following the storm event, Taylor will schedule offloading operations at the earliest possible time to inspect the surface buoy and continue pumping activities. If pumping operations cannot resume for any reason (i.e., vessel contract, weather issues, service base impacts, system damage, etc.), MMS shall be notified within 24-hours and presented with a remedial program/inspection guidelines.

3. DESCRIPTIONS AND ENVIRONMENTAL ANALYSES OF THE AFFECTED RESOURCES

This chapter describes the physical and biological resources and the potential impacts of the proposed action on these resources that could be potentially affected by installation and offloading operations for the proposed pollution containment system. The descriptions present environmental resources as they are now, including the presence of a continuous crude oil release in MC20, thus providing baseline information for analyses of potential impacts from the proposed action. The impact-producing factors described above have been considered in the most recent EIS for the area, *Gulf of Mexico OCS Oil and Gas Lease Sales: 2007-2012; Western Planning Area Sales 204, 207, 210, 215, and 218; Central Planning Area Sales 205, 206, 208, 213, 216, and 222 – Final Environmental Impact Statement* (Multisale EIS) (MMS, 2007). The environmental and socioeconomic resources that could be potentially affected by the proposed actions in this EA are described in detail in **Chapter 3** of the Multisale EIS (pp. 3-3 to 3-146). The site-specific protected resource analyses are found below.

3.1. Physical Resources

Descriptions of the following components of the physical environment are contained in the Multisale EIS (MMS, 2007) and are hereby incorporated by reference into this SEA. Summaries of these resources follow and include water quality and air quality.

3.1.1. Water Quality

3.1.1.1. Coastal Waters

3.1.1.1.1. Description

Coastal water quality along Louisiana is relevant to the proposed action since the service base for the installation of the PCS is located on the coast at Port Fourchon, Louisiana. Marine transportation to and from MC20 in support of offloading operations would also traverse coastal waters to reach shorebases, and accidental oil spills from the vessels themselves, however unlikely, could make landfall along this coastline.

The bays, estuaries, and nearshore coastal waters of the north-central Gulf are important in that they provide important feeding, breeding, and/or nursery habitat for many commercially important invertebrates and fishes, as well as sea turtles, birds, and marine mammals. Water quality governs the suitability of these waters for animal as well as human use. Furthermore, the egg, larval, and juvenile stages of marine biota dependent upon these coastal areas are typically more sensitive to water quality degradation than the adult stage.

Gulf Coast water quality was given a fair rating in the National Coastal Condition Report II (USEPA, 2004). Data from 2001-2002 was used in the evaluation. Five factors—dissolved oxygen, dissolved inorganic nitrogen, dissolved inorganic phosphorus, chlorophyll *a*, and water clarity—were used to rate water quality. Dissolved oxygen is essential for aquatic life, and low levels can result in mortality to benthic organisms and other organisms that cannot escape. The nutrients, nitrogen and phosphorous, are necessary in small amounts but can stimulate excessive phytoplankton growth. Chlorophyll *a* is a measurement of phytoplankton productivity and is one of several symptoms of eutrophic conditions. Water with greater clarity can support more submerged aquatic vegetation, which stabilizes the shoreline from erosion, reduces the impact of nonpoint-source pollution, and provides habitat for many species.

Estuaries with a poor water quality rating comprised 9 percent of the Gulf Coast estuaries, while those ranked fair to poor comprised 55 percent. In Louisiana, estuaries that received a poor water quality rating in the report had low water clarity and high dissolved inorganic phosphorus in comparison with levels expected for the region. Generally, dissolved oxygen levels in Gulf Coast estuaries are good and less than 1 percent of bottom waters exhibit hypoxia (dissolved oxygen (O_2) below 2 milligrams (mg) per liter (L)). However, areas of low dissolved oxygen form around Chandeleur and Breton Sounds, some shoreline regions of Lake Pontchartrain, and small estuaries associated with Mobile Bay and Mississippi Sound.

In June 2007, the U.S. Environmental Protection Agency (USEPA) issued the National Estuary Program Coastal Condition Report (USEPA, 2007). This report was the third in a series of coastal environmental assessments. However, the first two reports covered all U.S. coastal waters whereas this report assessed just those estuaries in the National Estuary Program. The report described conditions in Mobile Bay and the Barataria/Terrebonne Estuary. A water quality rating was determined and the Barataria/Terrebonne Estuary and Mobile Bay were ranked fair.

Sediments can serve as a sink for contaminants that were originally transported via water in either dissolved or particulate form or via atmospheric deposition. Sediments may contain pesticides, metals, and organic contaminants. The sediments of Gulf Coast estuaries were ranked as fair. Metals were the type of sediment contamination found to most frequently exceed toxicity guidance.

In the overall assessment of the Gulf's coastal condition, which includes indicators in addition to water quality, the coastal habitat index, the rating of wetlands habitat loss, was rated as poor. Wetlands can trap particulate material and nutrients transported by rainfall runoff and contribute to improved water quality.

The priority water quality issues identified by the Gulf of Mexico Alliance are bacteria-related beach and shellfish bed closures, estuarine hypoxia, harmful algal blooms, and seafood, particularly mercury, contamination. Several of these issues are linked to economic consequences for the Gulf States as well. Nutrient loading was also identified as a regional action item (Gulf of Mexico Alliance, 2005). The Alliance was organized in 2005 as a collaborative means to solve regional problems to implement the U.S. Ocean Action Plan.

Harmful algal blooms form intermittently in some areas of Gulf waters. Red tide occurs naturally and has reached bloom concentrations in the waters off Texas and Florida. A toxin is produced which, in sufficient concentrations, can result in fish kills and marine mammal deaths. When the bloom is transported towards the coast, beach and oyster bed closures may occur.

Other pollutant source categories include (1) agricultural runoff, (2) municipal point sources, (3) land fill leachate, (4) hydromodification, (5) petrochemical plants and refineries, (6) power plants, (7) pulp and paper mills, (8) fish or livestock processors, (9) nonrefinery industrial discharge, and (10) shipping. Hydromodification includes dredging and spoil disposal; channelization (channel straightening); dam, levee, or floodgate construction; and river bank and shoreline modifications that change river flow patterns or sediment load.

The National Research Council (NRC, 2003; Table I-4) estimated that 942 metric tons of oil/year (yr) (about 6,600 barrels (bbl)/yr) entered Gulf waters from petrochemical and oil refinery industries in Louisiana and Texas. Further, the NRC (2003) calculated an estimate for oil and grease loads from all land-based sources per unit of urban land area for rivers entering the sea. The Mississippi River introduced approximately 525,600 metric tons of oil/yr (about 3.7 million bbl/yr) (NRC, 2003) into the waters of the Gulf.

Vessels from the shipping and fishing industries, as well as recreational boaters, add contaminants to coastal water in the form of bilge water, liquid and solid waste, spills, and chemicals leached from antifouling paints. Many millions of cubic feet of sediments are moved each year in coastal areas as a result of channelization, dredging, spoil disposal, and other hydromodifications. Water quality may be affected by these activities because they can lead to saltwater intrusion, increased turbidity, and the release of contaminants.

3.1.1.1.2. Impact Analysis

A discussion of impacts to coastal and offshore water quality from OCS activity is provided in Chapters 4.1.3.4, 4.2.1.1.2, and 4.2.2.1.2 of the Multisale EIS (MMS, 2007) and is hereby incorporated by reference into this PEA.

The impact-producing factors associated with the proposed action in MC20 that could affect coastal water quality include (1) effluents from the installation/offloading vessels, such as sanitary and domestic wastes; (2) turbidity increases from the installation of the three containment domes; and (3) accidental spills of crude oil associated with potential damage to the separator/containment unit. .

Domestic and sanitary waste would be discharged from support vessels after the required treatment. Effects on coastal waters from the proposed action would primarily occur in heavy traffic areas such as navigation corridors and turning basins at Port Fourchon, Louisiana, which is the onshore support base for PCS installation. State or Federal regulations are in place to control contaminants associated with waste discharges that take place in coastal waters or onshore. Minor and transient changes in water quality caused by vessel or onshore discharges, such as enriched nutrient contents or oxygen depletion, would be intermittent.

Service vessels that use navigation channels, turning basins, shallow harbors, and docking facilities could cause increases in water turbidity from mud that is resuspended by propeller wash. Dredging and spoil dumping carried out to maintain, deepen, or straighten navigation channels could also increase the turbidity of coastal waters. Actions specifically attributed to vessels supporting the proposed action would have a negligible impact.

Nearly 85 percent of the 672,700 bbl of petroleum that enter North American ocean waters each year as a result of human activity comes from activities based on the consumption of petroleum such as (in relative order) (1) land-based runoff and polluted rivers; (2) recreational boats and jet skis, particularly those with 2-cycle engines; (3) deposition from the atmosphere; and (4) jettison of aircraft fuel (NRC, 2003; Table 3-2). Approximately 9 percent comes from transportation activity, such as tanker or pipeline spills, and only 3 percent from spills during oil exploration and extraction (NRC, 2003; pages 2-3).

The proposed action is located approximately 18 mi from the nearest Louisiana coastline. Spills that could affect coastal waters would originate from the installation and/or offloading vessels in transit to or from the coastal area. Though very unlikely, spills of crude oil and diesel fuel can occur in offshore waters from vessel accidents. However, the extremely small volume spill (~50 bbl) that could result from possible damage to the separator/collection unit in MC20 would not present any impacts on coastal water resources (**Appendix A**).

Conclusion

No significant long-term impacts on coastal water quality would be expected from the proposed action. Because the proposed action would use existing onshore support bases, only the discharges from these support bases or service vessels would result in effects to coastal waters. The contribution by the proposed action to the level of these effects is expected to be negligible, transient, and not contribute significantly to the decline in coastal water quality. Damage to the separator collection unit, though highly unlikely based on its configuration and mooring design, could result in a slightly larger instantaneous spill; however, it would be limited to 50 bbl, the unit's maximum possible volume. Furthermore, there would be not be an increased risk to coastal water quality from an instantaneous spill of even the maximum volume offshore, when compared to the known continuous spillage (of various sizes) from MC20, which has been released into the marine environment on a daily basis since September 2004. Since the collection system is designed to capture and store crude oil releases from ongoing spills, the proposed action is expected to stop the unmitigated pollution event and improve coastal water quality. Therefore, no special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.1.1.2. Offshore Waters

3.1.1.2.1. Description

The description of water quality in marine waters of the Gulf of Mexico can be found in Chapter 3.1.2.2 of the Multisale EIS (MMS, 2007). The following information is a summary of the description incorporated from the Multisale EIS.

The water offshore of the Gulf's coasts can be divided into two regions: the continental shelf and the slope (<305 m or 1,000 ft) and deep water (>305 m or 1,000 ft). The continental shelf off the modern Mississippi River Delta is narrow because of the outbuilding of sediment from the river onto the shelf. To the east and west the shelf broadens. Waters on the continental shelf and slope are heavily influenced by the Mississippi and Atchafalaya Rivers, the primary sources of freshwater, sediment, and pollutants from a huge drainage basin encompassing 55 percent of the continental U.S. (Murray, 1998). Lower salinities are characteristic nearshore where freshwater from the rivers mix with Gulf waters. While the average discharge from the Mississippi River exceeds the input of all other rivers along the Texas-Louisiana coast by a factor of 10, during low-flow periods the Mississippi River can have a flow less than all of these rivers combined (Nowlin et al., 1998).

In general, the Central Gulf has higher levels of hydrocarbons in sediment, particularly those from terrestrial sources, than the Western and Eastern Gulf (Gallaway and Kennicutt, 1988). Total organic carbon is also highest in the Central Gulf. Hydrocarbons in sediments have been determined to influence biological communities of the Gulf slope, even when present in trace amounts (Gallaway and Kennicutt, 1988).

Hydrocarbon seeps are extensive throughout the continental slope and contribute hydrocarbons to the surface sediments and water column, especially in the Central Gulf (Sassen et al., 1993a and b). Natural hydrocarbon seepage is considered to be a major source of petroleum into Gulf slope waters (Kennicutt et al., 1987; Gallaway et al., 2003), and the National Research Council (NRC, 2003) considers seeps to be the predominant source. MacDonald et al. (1993) observed 63 individual seeps using remote sensing and submarine observations. The NRC (2003) reported that estimates of the total volume of seeping oil in the Gulf of Mexico vary widely from 28,000 bbl/yr (MacDonald, 1998) to a range of between 280,000 and 700,000 bbl/yr (Mitchell et al., 1999). The NRC's own best estimate is an annual input of 980,000 bbl/yr for the entire Gulf (NRC, 2003), which is four times the volume of the *Exxon Valdez* spill per year (estimated to have been 260,000 bbl (NRC, 2003)).

In addition to hydrocarbon seeps, other fluids leak from the underlying sediments into the bottom water along the slope. These fluids have been identified to have three origins: (1) seawater trapped during the settling of sediments; (2) brine from dissolution of underlying salt diapirs; and (3) deep-seated formation waters (Fu and Aharon, 1998; Aharon et al., 2001).

3.1.1.2.2. Impact Analysis

A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed exploration activities on marine water quality can be found in Chapters 4.2.1.1.2.2, 4.4.2.2, and 4.5.2.2 of the Multisale EIS (MMS, 2007). The following information is a summary of the impact analysis incorporated from the Multisale EIS. The impact-producing factors associated with the proposed action that could affect marine water quality include (1) sediment disturbances during collection dome installation of and (2) discharges from vessels conducting the installation/offloading operations. A potential impact from accidents is limited to an oil spill resulting from damage to the PCS (**Appendix A**).

Installation/Offloading Operations

Jetting operations required to install the three collection domes and secure them to the seabed will lead to localized turbulence and sediment dispersal near Plumes A, B, and C. Since it assumed that the sediments near the plume sites are saturated with crude oil, minor spill releases could occur during jetting; however, compared to the continual crude oil discharge from the plumes, the impacts would be temporary and negligible. During installation and offloading activities, a range of effluents and wastes could be discharged overboard from the vessels supporting the operations. Collected oil and contaminated seawater from the offloading of the PCS will be sent to a service base for onshore disposal or recycling and pose no potential impacts to affected resources unless spilled.

Accidental Events

Should a mudslide event occur in MC20 after installation of the PCS, the primary damage to the system would be limited to the collection domes and associated hoses. The design of the containment system is such that no oil is stored in either the domes or their hoses; therefore, no collected discharges would be released. Since the separator/collection unit is designed to be moored to the partially-submerged jacket and Taylor reports concluded that the structure would not be impacted by future seafloor instability events, the potential for a release of the oil captured by the unit into marine waters is highly unlikely (MMS, 2008). Even if a release from the separator/collection unit were to occur, the minimal volumes of collected oil would be no more hazardous to marine waters than the continuous, unmitigated crude oil releases that have existed since the platform's destruction.

Conclusion

No significant long-term impacts on marine water quality would be expected from the proposed action. Near-bottom water quality would be affected by increased turbidity and disturbed substrates during dome installation; however, any effects from the elevated turbidity would be short term, localized, and reversible. Impacts on marine water quality from vessel discharges related to the proposed action would be insignificant because of existing environmental regulations and dilution factors. Damage to the separator/ collection unit, though highly unlikely based on its configuration and mooring design, could result in a slightly larger instantaneous spill; however, it would be limited to 50 bbl, the unit's maximum possible volume. Furthermore, there would be not be an increased risk to marine water quality from an instantaneous spill of even the maximum volume offshore, when compared to the known continuous spillage (of various sizes) from MC20, which has been released into the marine environment on a daily basis since September 2004 (**Appendix A**). Since the collection system is designed to capture and store ongoing crude oil releases, the proposed action is expected to stop the unmitigated pollution event and significantly-improve marine water quality. Therefore, no special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.1.2. Air Quality

3.1.2.1. Description

The description of the air quality in the Gulf of Mexico region can be found in Chapter 3.1.1 of the Multisale EIS (MMS, 2007). The following information is a summary of the description incorporated from the Multisale EIS.

Mississippi Canyon Block 20 is located west of 87.5° W. longitude and hence falls under the MMS's 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. The proposed action in MC20 is located approximately 19 mi southwest of the Mississippi River Delta off of the Louisiana coast, an area that, for prevention of significant deterioration (PSD) purposes, is classified as a Class I Area.

The influence to onshore air quality is 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). In addition, there are other synoptic scale patterns 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 (Florida A&M University, 1988).

3.1.2.2. Impact Analysis

A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed activity on air quality can be found in Chapter 4.5.1 of the Multisale EIS (MMS, 2007). The following information is a summary of the impact analysis incorporated from the Multisale EIS.

Air quality would be affected in the immediate vicinity of service vessels used for installation and subsequent offloading operations. The cumulative impact from emissions for this proposed action will not exceed MMS's exemption levels. The vessel operations are not expected to significantly affect onshore air quality despite being within the Breton National Wildlife Refuge PSD Class I air quality area.

Air quality in MC20 is currently being affected due to the continuous spill event. The volatile organic compounds (VOCs), which are currently escaping to the atmosphere from the 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. If a fire occurs, particulate and combustible emissions will be released in addition to the VOCs.

Conclusion

No significant long-term impacts on air quality would be expected from the proposed PCS installation and operations. The air quality in the immediate vicinity of the proposed activities would be temporarily affected by the emissions from the installation and pumping vessels, but any increases would soon be offset by the subsequent decrease in VOCs as the PCS contains the discharged crude oil and decreases/eliminates the surface slick. No special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.2. BIOLOGICAL RESOURCES

Biological resources that could be affected in MC20 are characterized in the Multisale EIS (MMS, 2007) and are hereby incorporated by reference into this SEA. Summaries of these resources follow.

3.2.1. Sensitive Coastal Resources

3.2.1.1. Coastal Barrier Beaches and Associated Dunes

3.2.1.1.1. Description

The description, physical location, and formative processes that create the various coastal beaches and barrier island complexes are described in Chapter 3.2.1.1 of the Multisale EIS (MMS, 2007). A description of integrated shoreline environments, the barrier islands, and the dune zones that comprise and delineate the various vegetated habitats along these mainland and barrier beaches can also be found in this section of the Multisale EIS. Therefore, the discussions that follow will only summarize the pertinent features of these resources in relation to their ability to allow, minimize, or neutralize the impact-producing factors associated with the proposed action. In addition, the post-hurricane condition of these island and beach resources, along with their integral protective features, will be described.

The Louisiana coastal barrier beaches and associated dunes form narrow, elongated landforms comprised of unconsolidated, predominantly coarse sediment, which results in sandy beaches with several interrelated environments (shore face, foreshore, and backshore) that are lower in profile and therefore more susceptible to wave washover and channeling. Louisiana has trangressive barriers (landward migration) to the east and regressive (seaward migration) barrier islands in the western waters. In coastal Louisiana, heights of dune lines range from 1.6 to 4.3 ft (0.5 to 1.3 m) above mean high tide levels.

Hurricane Katrina in August 2005 caused severe erosion and landloss for the coastal barrier islands of the deltaic plain. The pre-storm land area of the Chandeleur Islands was reduced to half of their size by Hurricane Katrina based on aerial post-storm surveys by the U.S. Geological Survey (USDOI, GS**,** 2005). Grand Isle was also heavily damaged by Hurricane Katrina. Although Hurricane Katrina made landfall more than 50 mi (80 km) to its east, Grand Isle received extremely high winds and a 12- to 20-ft (4- to 6-m) storm surge that caused tremendous structural damage to most of the island's camps, homes, and businesses (Louisiana Sea Grant, 2005). Boyd and Penland (1988) estimated that storms raise mean water levels 1.73-2.03 m (5.68-6.66 ft) above mean sea level 10-30 times per year. Under those conditions, the following would be overwashed: 67 percent of Timbalier Island; 100 percent of Isles Dernieres and the Barataria Bay Barriers (excluding Grand Isle); and 100, 89, and 64 percent of the southern, central, and northern portions of the Chandeleur Islands, respectively (USDOI, MMS, 2007). Hurricane Rita in September 2005 severely impacted the shoreface and beach communities of Cameron Parish in southwest Louisiana. Some small towns in this area have no standing structures remaining. A storm surge approaching 20 ft (6 m) caused beach erosion and overwash that flattened coastal dunes, depositing sand and debris well into the backing marshes. Barrier beaches and dune environments are further characterized in Chapter 3.2.1.1 of the Multisale EIS (MMS, 2007).

In summary, the barrier islands from Texas to Alabama incurred some type of damage from the combination of Hurricanes Katrina and Rita and, in some cases, in combination with Hurricanes Wilma and Ivan as well. While Louisiana barrier islands incurred most of the damage, all of the areas experienced varying degrees of erosion, land and vegetation loss, loss in elevation or beach profile, and, in some cases, movement toward shore as a result of the previous highly active hurricane season. The resulting change in elevation and island profiles reduces the ability of these features to provide the pre-storm coastal protection to the mainland beaches and wetlands. While these barriers can rebuild to some extent naturally over time, it is the intent of both Federal and State coastal restoration projects like the Coastal Wetlands Protection, Planning & Restoration Act, Louisiana Coastal Resources Program, and Coastal Impact Assistance Program to assist in these barrier island restorations.

3.2.1.1.2. Impact Analysis

The impact-producing factor associated with the proposed action that could affect coastal barrier beaches and associated dunes is limited to oil spills resulting from potential damage of the PCS or vessel accidents. Detailed discussions of the potential affects of all OCS activities on barriers and beach resources can be found in Chapters 4.2.2.2.3.1 and 4.2.2.3.2 of the Multisale EIS (MMS, 2007) and these discussions are hereby incorporated by reference into this SEA.

Should a mudslide event occur in MC20 after installation of the PCS, the primary damage to the system would be limited to the collection domes and associated hoses. The design of the containment system is such that no oil is stored in either the domes or their hoses; therefore, no collected discharges would be released. Since the separator/collection unit is designed to be moored to the partially-submerged jacket and Taylor reports concluded that the structure would not be impacted by future seafloor instability events, the potential for a release of the oil captured by the unit into marine waters is highly unlikely (MMS, 2008). Even if a release from the separator/collection unit were to occur, the minimal volume of collected oil (~50 bbl) would be so low that it is not projected to reach coastal barrier beaches and the associated dunes.

Minimal vessel support trips are needed for this activity; therefore, the possibility for accidental spills related to the transport of small quantities recovered oil and the vessels own diesel fuel would be unlikely. If a spill should occur it could be quickly contained and cleaned before damaging the barrier and beach environments. No maintenance of existing navigation channels is necessary since existing navigation routes will be used.

Conclusion

Environmental impacts to the physical shape and structure of coastal barrier beaches and associated dunes is not expected to occur from accidental spills of oil or diesel fuel related to the proposed action. Damage to the separator/ collection unit, though highly unlikely based on its configuration and mooring design, could result in a slightly larger instantaneous spill; however, it would be limited to 50 bbl, the unit's maximum possible volume. Furthermore, there would be not be an increased risk to coastal barrier beaches from an instantaneous spill of even the maximum volume offshore, when compared to the known continuous spillage (of various sizes) from MC20, which has been released into the marine environment on a daily basis since September 2004 (**Appendix A**). Since the collection system is designed to capture and store ongoing crude oil releases, the proposed action is expected to stop the unmitigated pollution event and prevent impacts to the coastal barrier beaches and associated dunes. Therefore, no special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.2.1.2. Wetlands

3.2.1.2.1. Description

Detailed descriptions and discussions of the various wetland types, values, and location within the potentially affected planning areas can be found in Chapter 3.2.1.2 of the Multisale EIS (MMS, 2007); therefore, these discussions are hereby incorporated by reference into this SEA. A general summary of the vegetation types and the current updated post-storm (Hurricanes Katrina and Rita) conditions that currently exist within these wetlands areas follows.

Wetland habitats found along the Gulf Coast include (1) fresh, intermediate, brackish, and saline marshes; (2) mud and sand flats; and (3) forested wetlands of mangrove swamps, cypress-tupelo swamps, and bottomland hardwoods. Coastal wetland habitats occur as bands around waterways and as broad expanses. Saline and brackish habitats support sharply delineated, segregated stands of single plant species. Fresh and very low salinity environments support more diverse and mixed communities of plants. These habitats are important as nursery and feeding areas for both recreational and commercial fish and game species as well as endangered and threatened species. These marshes also provide value as water storage and treatment areas, while capturing sediment and assisting in accretion of more landmass.

The post-storm (Hurricanes Katrina and Rita) estimates of land change made by the U.S. Geological Survey (Barras, 2006) indicated that there was an increase of 217 mi^2 (562 km^2) of water area following the storm primarily comprised of wetlands being replaced by open water. These estimates were made utilizing analysis of satellite imagery (Landsat TM imagery) combined with periodic groundtruthing to monitor accuracy. These new water areas represent landlosses caused by the direct removal of wetlands. They also indicate transitory changes in water area caused by remnant flooding, removal of aquatic vegetation, scouring of marsh vegetation, and water-level variation attributed to normal tidal and meteorological variation between satellite images. Permanent landlosses cannot be estimated until several growing seasons have passed and the transitory impacts of the hurricanes are minimized.

Comparison of the 2004 and 2005 imagery showed a total increase in water area of 300 mi^2 (777 km^2), but this measurement includes 83 mi^2 (215 km^2) of flooded lands consisting of flooded burned marsh and flooded agricultural and developed areas occurring after the hurricanes. Adjusting for these flooded lands, the estimated increase in water area (and decrease in land) is 217 mi^2 (562 km^2). Direct correlations of land and water area changes are assumed. This coast wide 217 mi^2 (562 km^2) area of new water occurring after the hurricanes contains (1) landlosses that may be permanent, caused by direct removal of wetlands by storm surge, and (2) transitory water area increases caused by (a) remnant flooding of marsh and impounded areas, including agricultural and developed areas, (b) removal of floating and submerged aquatic vegetation, (c) scouring of marsh vegetation, and (d) water-level variations caused by normal tidal and meteorological variation between images. The new land occurring after the hurricanes contains land gains caused by (1) wrack deposition, (2) rearrangement of existing marsh areas moved by storm surge, (3) aquatic vegetation that is possibly misclassified, and (4) water-level variations caused by normal tidal and meteorological variation between images. These transitory gains and losses are included in calculations of net land area change.

The fresh marsh and intermediate marsh communities' land areas decreased by 122 mi^2 (316 km^2) and 90 mi^2 (233 km^2), respectively, and the brackish marsh and saline marsh communities' land areas decreased by 33 mi^2 (86 km^2) and 28 mi^2 (73 km^2), respectively. These new water areas represent landlosses caused by direct removal of wetlands. They also indicate transitory changes in water area caused by remnant flooding, removal of aquatic vegetation, scouring of marsh vegetation, and water-level variation attributed to normal tidal and meteorological variation between satellite images. It was noted (Barras, 2006) that permanent losses cannot be estimated until several growing seasons have passed and the transitory impacts of the hurricanes are minimized. It is, however, too early to estimate the actual overall marsh loss.

3.2.1.2.2. Impact Analysis

The impact-producing factors associated with the proposed action that could affect wetlands include oil spills from vessel collisions or damage to the PCS and maintaining/constructing new navigation channels. Detailed discussions of the potential effects of OCS activities on wetlands can be found in Chapter 4.2.2.1.3.2 of the Multisale EIS (MMS, 2007); therefore, these discussions are hereby incorporated by reference into this EA.

Should a mudslide event occur in MC20 after installation of the PCS, the primary damage to the system would be limited to the collection domes and associated hoses. The design of the containment system is such that no oil is stored in either the domes or their hoses; therefore, no collected discharges would be released. Since the separator/collection unit is designed to be moored to the partially-submerged jacket, the potential for a release of the oil captured by the unit into the water column is highly unlikely. Even if a release from the separator/collection unit were to occur, the minimal volume of collected oil (~50 bbl) would be so low that it is not projected to reach coastal wetlands.

An inland, fuel-oil spill may occur at a shore base or as a result of a vessel collision. There is minimal to no probability of an inland, fuel-oil spill occurring in association with the proposed action due to minimal onshore support requirements. No maintenance of existing navigation channels is necessary since existing navigation routes will be used.

Conclusion

There is a negligible chance of a spill from the proposed action contacting wetland environments because minimal vessel support required and the extremely small amount of collected oil stored in the

PCS. Damage to the separator/ collection unit, though highly unlikely based on its configuration and mooring design, could result in a slightly larger instantaneous spill; however, it would be limited to 50 bbl, the unit's maximum possible volume. Furthermore, there would be not be an increased risk to wetlands from an instantaneous spill of even the maximum volume offshore, when compared to the known continuous spillage (of various sizes) from MC20 since September 2004 (**Appendix A**). Since the collection system is designed to capture and store ongoing crude oil releases, the proposed action is expected to stop the unmitigated pollution event and prevent impacts to wetlands. Therefore, no special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.2.2. Sensitive Offshore Resources

3.2.2.1. Marine Mammals

3.2.2.1.1. Description

Twenty-eight cetaceans (whales and dolphins) and one sirenian (manatee) species have confirmed occurrences in the northern Gulf of Mexico (Davis and Fargion, 1996). Cetaceans are divided into two major suborders: Mysticeti (baleen whales) and Odontoceti (toothed whales and dolphins). Of the six baleen whale species occurring in the Gulf, four are listed as endangered or threatened. Of the 21 toothed whale species occurring in the Gulf, only the sperm whale is listed as endangered. The only member of the Order Sirenia found in the Gulf is the endangered West Indian manatee. The manatee has been reported in Louisiana coastal waters, but the coastal waters of Peninsular Florida and the Florida Panhandle are the manatee's normal habitat.

Information on each marine mammal species can be found in Chapter 3.2.3 of the Multisale EIS (MMS, 2007) and is hereby incorporated by reference into this SEA. The MMS has been conducting scientific research of marine mammals in the Gulf of Mexico since 1991, including GulfCet I and II and the Sperm Whale Acoustic Monitoring Program (SWAMP). The most recent study, Sperm Whale Seismic Study (SWSS), completed four years of field work in 2005. This multi-faceted program involved numerous partners and researchers. Yearly reports were published and the synthesis report of the SWSS study will be published in 2008 (Jochens et al., in press). These studies have shown that the Gulf of Mexico has a diverse and abundant marine mammal community including a genetically-distinct resident population of the endangered sperm whale.

The distribution and abundance of cetaceans within the northern Gulf of Mexico is strongly influenced by various mesoscale oceanographic circulation patterns. These patterns are primarily driven by river discharge (primarily the Mississippi and Atchafalaya Rivers), wind stress, and the Loop Current and its derived circulation phenomena. Circulation on the continental shelf is largely wind-driven, with localized effects from freshwater (i.e., river) discharge. Beyond the shelf, mesoscale circulation is largely driven by the Loop Current in the eastern Gulf. Approximately once or twice a year, the Loop Current sheds anticyclonic eddies (also called warm-core rings). In the north-central Gulf of Mexico, the relatively narrow continental shelf south of the Mississippi River Delta may be an additional factor affecting cetacean distribution (Davis et al., 2000). Outflow from the mouth of the Mississippi River transports large volumes of low-salinity, nutrient-rich water southward across the continental shelf and over the slope. River outflow also may be entrained within the confluence of a cyclone-anticyclone eddy pair and transported beyond the continental slope. In either case, this input of nutrient-rich water leads to a localized deepwater environment with enhanced productivity and may explain the persistent presence of aggregations of sperm whales within 50 km (31 mi) of the Mississippi River Delta in the vicinity of Mississippi Canyon.

3.2.2.2.2. Impact Analysis

The impact-producing factors associated with the proposed action that could affect marine mammals include (1) noise from vessel traffic, (2) degradation of water quality from oil spills; (3) collision potential with service vessels; and (4) trash and debris from service vessels. These impact-producing factors are the same for nonthreatened and nonendangered marine mammal species as well as those listed under the ESA. Chapters 4.2.1.1.5 and 4.2.2.1.5 of the Multisale EIS (MMS, 2007) contain a discussion of impacts from OCS activity and are hereby incorporated by reference into this SEA.

Operations

The effect of underwater noise on cetaceans is a controversial subject and numerous studies are investigating the impacts. No sounds are expected from the PCS since it is designed with no moving parts and the required pumping operations will take place upon the offloading vessel. Noise from service-vessel traffic may elicit a startle and/or avoidance reaction from whales and dolphins or mask their sound reception. There is the possibility of short-term disruption of movement patterns and behavior, but such disruptions are unlikely to affect survival or productivity. Long-term displacement of animals from an area is a possibility, though not confirmed in any Gulf of Mexico studies. It is not known whether toothed whales exposed to recurring vessel disturbance will be stressed or otherwise affected in a negative but inconspicuous way. Smaller dolphins may approach vessels that are in transit in order to bow-ride. The behavioral disruptions apparently caused by noise and the presence of service-vessel traffic are unlikely to affect long-term survival or productivity of whale populations in the northern Gulf of Mexico.

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 stressed or otherwise affected in a negative but inconspicuous way. The behavioral or physiological responses to noise associated with the proposed action, however, are unlikely to affect long-term survival or productivity of whale or dolphin populations in the northern Gulf of Mexico.

Many types of plastic materials end up as solid waste during vessel operations and some of this material is accidentally lost overboard where whales and dolphins can consume or become ensnared in it. The result of plastic ingestion is certainly deleterious and could be lethal. The probability of a marine mammal encountering trash that appears edible is probably very low. The MMS issued NTL 2003-G11, "Marine Trash and Debris Awareness and Elimination," to help mitigate the potential threat trash and debris pose to marine mammals, fish, sea turtles, and other marine animals.

Service vessels present a collision hazard to marine mammals. The proposed action is expected to require one roundtrip offloading vessel trip per week, as well as a temporary use of a dive-support vessel onsite during installation of the PCS. Dolphins may bow-ride vessels that are in transit from a shore base to an offshore location. The MMS issued NTL 2003-G10, "Vessel Strike Avoidance and Injured/Dead Protected Species Reporting," to help avoid collisions between vessels and marine mammals. The consequence of a vessel collision with a marine mammal is likely to be lethal, but the probability of a collision taking place is low with the current mitigations in place.

Accidental Events

Oil spills have the potential to adversely affect whales and dolphins 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 or migration routes. Some short-term (months) effects of oil may be as follows: (1) changes in cetacean distribution associated with the avoidance of aromatic hydrocarbons and surface oil; (2) changes in prey distribution and human disturbance; (3) increased mortality rates from ingestion or inhalation of oil; (4) increased petroleum compounds in tissues; and (5) impaired health (e.g., immunosuppression) (Harvey and Dahlheim, 1994). Potential mechanisms for long-term injury include (1) initial sublethal exposure to oil causing pathological damage; (2) continued exposure to hydrocarbons persisting in the environment, either directly or through ingestion of contaminated prey; and (3) altered availability of prey as a result of the spill (Ballachey et al., 1994). Chronic effects may include (1) change in distribution and abundance because of reduced prey resources or increased mortality rates, (2) change in age structure in the breeding stock because certain year-classes were impacted more by an oil spill, (3) decreased reproductive success, and (4) increased rate of disease or neurological problems from exposure to oil (Harvey and Dahlheim, 1994).

Clearly, the vitality or productivity of some marine mammals can suffer long-term impacts from oil spills, but the evidence for cetaceans being among this affected population has not been convincingly established. There is, however, substantial circumstantial evidence based on effects documented in other marine mammals that harmful effects from contact between spilled oil and individual whales or dolphins can be reasonably expected. Contact between marine mammals and spilled oil is unlikely, and the duration of this contact with mobile animals in the open ocean is expected to be very brief. Effects on marine mammal populations are expected to be negligible.

Conclusion

The proposed pollution containment system is expected to have little impact on the vitality of any marine mammal species or productivity of any population endemic to the northern Gulf of Mexico. Collisions between service vessels and marine mammals would be extremely rare, but they could be lethal or crippling if realized. The MMS's regulations and NTL's are designed to reduce the possibility of collisions. There is no conclusive evidence as to whether or not anthropogenic noise in the water has caused displacements of marine mammal populations or is injurious to the vitality of individuals. Marine mammals could be injured or killed by eating indigestible debris or plastic items originating from the service vessels, but the likelihood of such an encounter is very small considering MMS' regulations and associated NTL. There is a negligible chance of a spill from the small amount of collected oil stored in the PCS. Damage to the separator/ collection unit could result in a slightly larger instantaneous spill, but it would be limited to 50 bbl and it would be not be an increased risk to marine mammals when compared to the known continuous spillage (of various sizes) from MC20 since September 2004 (**Appendix A**). Since the collection system is designed to capture and store ongoing crude oil releases, the proposed action is expected to stop the unmitigated pollution event and prevent impacts to marine mammals. Therefore, no special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.2.2.3. Sea Turtles

3.2.2.3.1. Description

Five species of sea turtle are found in the waters of the Gulf of Mexico: green, leatherback, hawksbill, Kemp's ridley, and loggerhead. All are protected under the ESA, and all except the loggerhead turtle (threatened) are listed as endangered. Sea turtles are long-lived, slow-reproducing animals that spend nearly all of their lives in the water. Females must emerge periodically from the ocean to nest on beaches. It is generally believed that all sea turtle species spend their first few years in pelagic waters, occurring in driftlines and convergence zones (in *Sargassum* rafts) where they find refuge and food in items that accumulate in surface circulation features (Carr and Caldwell, 1956; Carr, 1987). Genetic analysis of sea turtles has revealed in recent years that discrete, non-interbreeding stocks of sea turtles make up "worldwide extensive ranges" of the various species. Information on each turtle species can be found in Chapter 3.2.4 of the Multisale EIS (MMS, 2007) and is hereby incorporated by reference into this SEA.

3.2.2.3.2. Impact Analysis

The impact-producing factors associated with the PCS installation and operation that could affect loggerhead, Kemp's ridley, hawksbill, green, and leatherback turtles, (all listed as endangered or threatened species) include (1) noise from vessel traffic; (2) possible collisions with service vessels; (3) vessel-related trash and debris; and (4) oil spills. Chapters 4.2.1.1.6 and 4.2.2.1.6 of the Multisale EIS

(MMS, 2007) contain a discussion of impacts from OCS activity and are hereby incorporated by reference into this EA.

Operations

Transportation corridors for service vessels will be through areas where sea turtles have been sighted. Noise from service-vessel traffic may elicit a startle and/or avoidance reaction from sea turtles or mask their sound reception. Potential effects on turtles include disturbance (subtle changes in behavior, interruption of behavior), masking of natural sounds (e.g., surf and predators), and stress (physiological). There is the possibility of short-term disruption of movement patterns and behavior, but such disruptions are unlikely to affect survival or productivity. Sea turtles exposed to recurring vessel disturbance could be stressed or otherwise affected in a negative but inconspicuous way. Whether or not persistent noise causes sea turtles to avoid the area is unknown. Noise from the PCS installation could be intermittent, sudden, and depending upon proximity to the jetting operations, could be high intensity as the domes are secured to the seabed. The noises from dome installation and vessel traffic would have minor sublethal effects on sea turtles.

Service vessels present a collision hazard to sea turtles. The proposed action is expected to require one roundtrip offloading-vessel trip per week, as well as a temporary use of a dive-support vessel onsite during installation of the PCS. If offloading operation require, increased ship traffic levels could increase the probability of collisions between ships and sea turtles, resulting in injury or death to some animals. The MMS issued NTL 2003-G10, “Vessel Strike Avoidance and Injured/Dead Protected Species Reporting,” to help avoid collisions between vessel and sea turtles. The consequence of a vessel collision and a sea turtle is likely to be lethal, but the probability of a collision taking place is low with the current mitigations in place.

Many types of materials, including plastic wrapping materials, end up as solid waste during vessel operations. Some of this material could be accidentally lost overboard where sea turtles can consume it. The result of ingesting materials lost overboard could be lethal. Leatherback turtles are known to mistake plastics for jellyfish and may be more vulnerable to gastrointestinal blockage than other sea turtle species. The probability of a sea turtle encountering trash that appears edible is probably very low considering the low number of vessel trips proposed. The MMS issued NTL 2003-G11, “Marine Trash and Debris Awareness and Elimination,” to help mitigate the potential threat trash and debris pose to marine mammals, fish, sea turtles, and other marine animals.

Accidental Events

When an oil spill occurs, the severity of effects and the extent of damage to sea turtles are affected by (1) geographic location, (2) hydrocarbon type, (3) duration of contact, (4) weathering state of a slick, (5) impact area, (6) oceanographic and meteorological conditions, (7) season, and (8) growth stage of the animal (NRC, 1985). All sea turtle species and life stages are vulnerable to the harmful effects of oil through direct contact or by fouling of their habitats and food.

Contact with spilled oil and consumption of oil (tarballs) and oil-contaminated prey may be lethal or have serious long-term impacts on sea turtles. There is direct evidence that sea turtles, especially hatchlings and juveniles, have been seriously harmed by oil spills. Sea turtles directly exposed to oil or tarballs may suffer inflammatory dermatitis, ventilatory disturbance, salt gland dysfunction or failure, red blood cell disturbances, impaired immune system responses, and digestive disorders or blockages (Vargo et al., 1986; Lutz and Lutcavage, 1989; Lutcavage et al., 1995). Although disturbances may be temporary, long-term effects remain unknown, and chronically ingested oil may accumulate in organs.

No deaths would be expected from direct exposure to spilled oil or to chronic long-term effects. Several potential mechanisms for long-term impacts may be (1) sublethal initial exposure to oil causing pathological damage and weakening of body systems or inhibiting reproductive success, (2) chronic exposure to residual hydrocarbons persisting in the environment or through ingestion of contaminated prey, and (3) altered prey availability as a result of the spill. Turtles may be temporarily displaced from areas impacted by spills. Because sea turtle habitat in the Gulf includes coastal and oceanic waters, as well as numerous beaches in the region, sea turtles could be impacted by accidental spills from vessels supporting the proposed action that are in transit near these environments. Although there is documentation of the harmful effects of acute exposure to spilled oil, the effects of chronic exposure are less certain and are largely inferred. An interaction between sea turtles at sea and spilled oil are unlikely to be realized. Contact between sea turtles and spilled oil is very unlikely, and the duration of this contact with mobile animals in the open ocean would be very brief. Adverse effects on sea turtle populations are expected to be insignificant.

Conclusion

The proposed pollution containment system is expected to have little impact on the vitality of any sea turtle species or productivity of any population endemic to the northern Gulf of Mexico. Collisions between service vessels and sea turtles would be extremely rare, but they could be lethal or crippling if realized. The MMS's regulations and NTL's are designed to reduce the possibility of collisions. There is no conclusive evidence as to whether or not anthropogenic noise in the water has caused displacements of sea turtle populations or is injurious to the vitality of individuals. Sea turtles could be injured or killed by eating indigestible debris or plastic items originating from the service vessels, but the likelihood of such an encounter is very small considering MMS' regulations and associated NTL. There is a negligible chance of a spill from the small amount of collected oil stored in the PCS. Damage to the separator/ collection unit could result in a slightly larger instantaneous spill, but it would be limited to 50 bbl and it would be not be an increased risk to sea turtles when compared to the known continuous spillage from MC20 since September 2004 (**Appendix A**). Since the collection system is designed to capture and store ongoing crude oil releases, the proposed action is expected to stop the unmitigated pollution event and prevent impacts to sea turtles. Therefore, no special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.2.2.4. Essential Fish Habitat and Fish Resources

3.2.2.4.1. Description

Healthy fish resources and fishery stocks depend on essential fish habitat (EFH)—waters and substrate necessary to fish for spawning, breeding, feeding, and growth to maturity. Due to the wide variation of habitat requirements for all life history stages for managed species, EFH was previously identified throughout the Gulf of Mexico, including all coastal and marine waters and substrates from the shoreline to the seaward limit of the Exclusive Economic Zone (EEZ) (200 mi or 322 km from shore). Through extensive analysis in an EIS (GMFMC, 2004), a new approach was adopted with Generic Amendment #3 to all Gulf of Mexico Fishery Management Plans (FMP's). The Generic amendment to all fishery management plans (GMFMC, 2005) reduced the extent of EFH relative to the 1998 Generic Amendment by removing EFH description and identification from waters between 100 fathoms (183 m or 600 ft) and the seaward limit of the EEZ (as deep as 3,200 m or 10,499 ft). However, the habitats most important to managed species (i.e., those shallower than 100 fathoms) will still be designated as EFH, and so the great majority of benefits to the biological environment will remain.

The Magnuson Fishery Conservation and Management Act (MMS, 2007; page 1-7) established the provisions for Fishery Management Councils (FMC) and FMP's. There are FMP's in the Gulf of Mexico region for (1) shrimp, (2) red drum, (3) reef fishes, (4) coastal migratory pelagics, (5) stone crabs, (6) spiny lobsters, (7) coral and coral reefs, (8) billfish, and (9) highly migratory species. The Gulf of Mexico FMC's *Generic Amendment for Addressing Essential Fish Habitat Requirements* amends the first seven FMP's listed above, identifying estuarine/inshore and marine/offshore EFH for over 450 managed species (about 400 in the coral FMP). The Gulf of Mexico FMC's *Generic Amendment* also identifies threats to EFH and makes a number of general and specific habitat preservation recommendations for oil and gas exploration, production, and pipeline activities within State waters and OCS areas. These recommendations can be found in Chapter 3.2.8 of the Multisale EIS (MMS, 2007). In consideration of existing mitigation measures, lease stipulations, and a submitted EFH Assessment document, MMS entered into a Programmatic Consultation agreement with the National Marine Fisheries Service (NMFS) on July 1, 1999, for petroleum development activities in the CPA and Western Planning Area. Most of this area is now designated part of the CPA including the MC20 location. On December 21, 2006, NMFS concluded EFH consultation on the Multisale EIS and all activities described with no additional conservation recommendations beyond those followed routinely by MMS. This consultation also includes the proposed action.

It is understood that all previously accepted EFH Conservation Recommendations provided by NMFS in the past will be continued. There have been six additional EFH conservation recommendations provided by NMFS in addition to standard MMS policies (MMS, 2007). The MMS has accepted and adopted these six additional EFH conservation recommendations.

3.2.2.4.2. Impact Analysis

The primary impact-producing factor associated with proposed installation/operation of the pollution containment system that could affect EFH and fish resources is an oil spill. Chapters 4.2.1.1.8, 4.2.2.1.10, and 4.4.10 of the Multisale EIS (MMS, 2007) contain a discussion of impacts from all OCS activities and are hereby incorporated by reference into this SEA.

Oil spills have the potential to affect fish resources and EFH, but there is no evidence that fish or EFH in the Gulf have been adversely affected on a regional population level by spills or chronic contamination. In order for an oil spill to affect fish resources at the population level, it would have to be very large and correspond to an area of highly concentrated eggs and larvae. The oil would also have to disperse from the spill site into the water column at levels high enough to cause toxic effects. Fish resources can be affected by oil-spill components that become dissolved, dissipated, and dispersed in the water, and by oil that adheres to particulate matter and sinks into sediment. These effects degrade water and substrate quality, but the impacts are temporary and recoverable. Adult fish will, for the most part, avoid the oil (Malins et al., 1982; NRC, 1985, 2003; Baker et al., 1991). Impacts of oil spills on adult fish have generally been thought to be minimal. Additional discussion of the impacts of oil on fish and fish eggs and larvae can be found in Chapter 4.2.2.1.10 of the Multisale EIS (MMS, 2007).

Conclusion

There is a negligible chance of a spill from the small amount of collected oil stored in the PCS. Damage to the separator/ collection unit could result in a slightly larger instantaneous spill, but it would be limited to 50 bbl and it would be not be an increased risk to coastal or marine fish, EFH, or commercial fisheries when compared to the known continuous spillage from MC20 since September 2004 (**Appendix A**). Since the collection system is designed to capture and store ongoing crude oil releases, the proposed action is expected to stop the unmitigated pollution event and prevent ongoing impacts to essential fish habitat and fish resources. Therefore, no special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.2.2.5. Gulf Sturgeon

3.2.2.5.1. Description

The description of the biology, life history, distribution, and causes for population decline of Gulf sturgeon can be found in Chapter 3.2.7.1 of the Multisale EIS (MMS, 2007). Designated Gulf sturgeon critical habitat occurs in estuarine and riverine locations along the Gulf Coast east of the Mississippi River in Louisiana, Mississippi, Alabama, and Florida (Chapter 3.2.7.1 of the Multisale EIS; MMS, 2007). Critical habitat is defined as special geographic areas that are essential for the conservation of a threatened or endangered species and that may require special management and protection. Designated

Gulf sturgeon critical habitat is confined to State waters. Most activities related to the proposed action will occur in Federal waters at MC20; however, critical habitat may be impacted directly or indirectly.

3.2.2.5.2. Impact Analysis

The most likely impact to Gulf sturgeon from the proposed action would be from exposure to an accidental oil spill resulting from potential damage to the separator/collection unit of the PCS. Oil can affect Gulf sturgeon through direct ingestion or ingestion of oiled prey or by the absorption of dissolved petroleum products through the gills. Contact with or ingestion/absorption of spilled oil can result in death or nonfatal physiological irritation, especially of gill epithelium and liver function in adult Gulf sturgeon. Upon any exposure to spilled oil, liver enzymes of adult fish can oxidize soluble hydrocarbons into compounds that are easily excreted in the urine (Spies et al., 1982), without lethal effects. Behavior studies of other fish species suggest that adult sturgeon are likely to actively avoid an oil spill, thereby limiting the effects and lessening the extent of damage (Baker et al., 1991; Farr et al., 1995; Malins et al., 1982; Nevissi and Nakatani, 1990). Based on the limited amount of collected oil in the PCS and the unlikely chance of impact to the separator/collection unit, no impacts are expected on the size or productivity of any distinct interbreeding Gulf sturgeon population stock in the Gulf of Mexico.

Conclusion

There is a negligible chance of a spill from the small amount of collected oil stored in the PCS. Damage to the separator/ collection unit could result in a slightly larger instantaneous spill, but it would be limited to 50 bbl and it would be not be an increased risk to Gulf sturgeon when compared to the known continuous spillage from MC20 since September 2004 (**Appendix A**). Since the collection system is designed to capture and store ongoing crude oil releases, the proposed action is expected to stop the unmitigated pollution event and prevent ongoing impacts to Gulf sturgeon and their critical habitat. Therefore, no special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.2.2.6. Coastal and Marine Birds

3.2.2.6.1. Description

The offshore waters, coastal beaches, and contiguous wetlands of the northeastern Gulf of Mexico are populated by both resident and migratory species of coastal and marine birds. Six major bird groups occur in the northern Gulf of Mexico: (1) seabirds, (2) shorebirds, (3) marsh and wading birds, (4) waterfowl, (5) diving birds, and (6) raptors. Many species are mostly pelagic, and therefore are rarely sighted nearshore. The piping plover and brown pelican are coastal and marine bird species that inhabit or frequent the northern Gulf of Mexico. The piping plover is listed as endangered for its Great Lakes breeding population and is listed as threatened everywhere else. The brown pelican is listed as endangered in Louisiana, Mississippi, and Texas and is unlisted in Florida and Alabama.

3.2.2.6.2. Impact Analysis

The major impact-producing factors from the proposed action that could affect coastal and marine birds are (1) air emissions, (2) water-quality degradation from vessel discharges, (3) trash and debris, and (4) oil spills. There are two endangered or threatened bird species in the Northern Gulf of Mexico; the brown pelican and the piping plover. The brown pelican is a species of special concern in Louisiana and Mississippi, and it is no longer listed as endangered or threatened in Florida or Alabama. The piping plover is threatened over most of its range, including the northern Gulf Coast where shoreline conversion and modification of overwintering habitats is a principal threat. A discussion of impacts on coastal and marine birds is provided in Chapter 4.3.2.11 of the Multisale EIS (MMS, 2007), and is hereby incorporated by reference into this SEA.

Impacts on nonlisted birds are the same as those on endangered or threatened species. Air emissions are not expected to be serious enough to contaminate the air birds breathe. Birds may be affected by vessel discharges if individuals come into contact with outflows. Small numbers of birds could be impaired by consumption of indigestible trash, particularly plastic items lost from service vessels. Birds occupy the water surface and can be adversely affected or killed when coming into contact with an oil slick; however, the likely hood of impact from a spill is negated since the purpose of the proposed action is to capture the current, continuous spill event.

Conclusion

The proposed action is not expected to cause any effects or fatalities to endangered or threatened bird species or to bird species of special concern. There is a negligible chance of a spill from the small amount of collected oil stored in the PCS. Damage to the separator/ collection unit could result in a slightly larger instantaneous spill, but it would be limited to 50 bbl and it would be not be an increased risk to coastal and marine birds when compared to the known continuous spillage from MC20 since September 2004 (**Appendix A**). Since the collection system is designed to capture and store ongoing crude oil releases, the proposed action is expected to stop the unmitigated pollution event and prevent ongoing impacts to the bird population. Therefore, no special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.3. SOCIOECONOMIC RESOURCES

The descriptions of the socioeconomic resources in the Gulf of Mexico region are characterized in the Multisale EIS (MMS, 2007) and are hereby incorporated by reference into this SEA.

3.3.1. Socioeconomic Resources

3.3.1.1. Socioeconomic Impact Area

The MMS defines the Gulf of Mexico impact area for population, labor, and employment as that portion of the Gulf of Mexico coastal zone whose social and economic well-being (population, labor, and employment) is directly or indirectly affected by the OCS oil and gas industry. For this analysis, the coastal impact area consists of 132 counties and parishes along the U.S. portion of the Gulf of Mexico. This area includes 42 counties in Texas, 32 parishes in Louisiana, 7 counties in Mississippi, 8 counties in Alabama, and 43 counties in Florida, which are listed in Table 3-17 and illustrated in Figure 3-12 of the Multisale EIS (MMS, 2007). Thirteen economic impact areas (EIA's) divide the impact area for analysis purposes and are considered in Chapters 3.3.1 and 3.3.2 of the Multisale EIS (MMS, 2007) as the economic impact area for the proposed action.

The criteria for including counties and parishes in this impact area are explained in the Multisale EIS (MMS, 2007). This impact area is based on sets of counties (and parishes in Louisiana) that have been grouped on the basis of intercounty commuting patterns. The labor market area's (LMA) identified by this grouping are commuting zones, as identified by Tolbert and Sizer (1996). In their research, Tolbert and Sizer (1996) used journey-to-work data from the 1990 census to construct matrices of commuting flows from county to county. A statistical procedure known as hierarchical cluster analysis was employed to identify counties that were strongly linked by commuting flows. The researchers identified 741 of these commuting zones for the U.S. Twenty-three of these LMA areas span the Gulf Coast, from the southern tip of Texas to Miami and the Florida Keys, and comprise the 13 MMS-defined EIA's for the Gulf.

The socioeconomic resources evaluated in this SEA are limited to that portion of the Gulf of Mexico's coastal zone directly or indirectly affected by the emergency spill remediation work in MC20.

3.3.1.2. Commercial Fisheries

3.3.1.2.1. Description

The most recent, complete information on landings and value of fisheries for the U.S. was compiled by NMFS for 2006. During 2006, commercial landings of all fisheries in the Gulf of Mexico totaled nearly 1.3 billion pounds, valued at over $662 million (USDOC, NMFS, 2007). The Gulf of Mexico provides over 31 percent of the commercial fish landings in the continental U.S. (excluding Alaska) on an annual basis. Menhaden, with landings of about 900 million pounds and valued at $41.2 million, was the most important Gulf of Mexico species in terms of quantity landed during 2006. Shrimp, with landings of nearly 246 million pounds and valued at about $354 million, was the most important Gulf of Mexico species in terms of value landed during 2006.

3.3.1.2.2. Impact Analysis

The impact-producing factors associated with proposed action that could affect commercial fishing include (1) underwater OCS obstructions, (2) space-use conflicts, (3) contamination of nearshore and open marine environments, and (4) oil spills. Chapters 4.2.1.1.9, 4.2.2.1.11, and 4.4.10 of the Multisale EIS (MMS, 2007) contain a discussion of impacts from OCS activity and are hereby incorporated by reference into this SEA.

There will be no loss of area available to commercial trawlers by the temporary installation of the collection domes since the plume locations are located within the debris field in MC20. Additionally, the unstable, mudlobe bottoms do not provide adequate habitat for shrimp or other trawled species. The seafloor instability concerns also limit other users of the OCS, negating space use conflicts around the downed facility

Chronic, low-level contamination of nearshore and open marine environments is a persistent and recurring event resulting in frequent but nonlethal physiological irritation to those resources that lie within the range of impact. Because many commercial species are estuary dependent, coastal environmental degradation has the potential to adversely affect commercial fisheries. Spills that contact coastal bays and estuaries of the OCS when pelagic eggs and fish larvae are present have the greatest potential to affect commercial fishery resources by killing large numbers of fish eggs and larvae. If a spill contacts nearshore waters, commercially important migratory species, such as mackerel, cobia, and crevalle, could be impacted, as would more localized populations, such as menhaden, shrimp, blue crabs, or oysters. Although the quantity of commercial landings of migratory species in the Gulf of Mexico is comparatively small, these species can be of high value.

Should another mudslide event occur in MC20 after installation of the PCS, the primary damage to the system would be limited to the collection domes and associated hoses. The design of the containment system is such that no oil is stored in either the domes or their hoses; therefore, no collected discharges would be released. Since the separator/collection unit is designed to be moored to the partially-submerged jacket, the potential for a release of the oil captured by the unit into the water column is highly unlikely. Even if a release from the separator/collection unit were to occur, the minimal volume of collected oil (~50 bbl) would be so low that it is not projected to reach coastal wetlands.

An inland, fuel-oil spill may occur at a shore base or as a result of a vessel collision. There is minimal to no probability of an inland, fuel-oil spill occurring in association with the proposed action due to minimal onshore support requirements. No maintenance of existing navigation channels is necessary since existing navigation routes will be used.

Conclusion

The proposed action is expected to have no impact on the productivity of any commercial fisheries endemic to the northern Gulf of Mexico. No commercial fisheries are restricted exclusively to the area of the proposed action, nor is the PCS uniquely located to impact a commercial fishery that includes MC20 or adjacent areas. Bottom obstructions are not expected to be an issue because of seafloor instability concerns and lack of commercial fishing interest in the mudlobe areas.

There is a negligible chance of a spill from the small amount of collected oil stored in the PCS. Damage to the separator/ collection unit could result in a slightly larger instantaneous spill, but it would be limited to 50 bbl and it would be not be an increased risk to recreational resources when compared to the known continuous spillage from MC20 since September 2004 (**Appendix A**). The small volume of the instantaneous spill would not be projected to reach nearshore environments. Additionally, since the collection system is designed to capture and store ongoing crude oil releases, the proposed action is expected to stop the unmitigated pollution event and prevent impacts to commercial fishing. Therefore, no special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.3.1.3. Recreational Resources

3.3.1.3.1. Description

The northern Gulf of Mexico coastal zone is one of the major recreational regions of the U.S., particularly in connection with marine fishing and beach-related activities. The shorefronts along the Gulf Coasts of Florida, Alabama, Mississippi, and Louisiana offer a diversity of natural and developed landscapes and seascapes. The coastal beaches, barrier islands, estuarine bays and sounds, river deltas, and tidal marshes are extensively and intensively used for recreational activity by residents of the Gulf South and tourists from throughout the Nation, as well as from foreign countries. Chapter 3.3.3 of the Multisale EIS (MMS, 2007) contains a more detailed description of recreational resources and is hereby incorporated by reference into this SEA.

3.3.1.3.2. Impact Analysis

The impact-producing factors associated with the proposed action that could affect recreational resources include trash and debris and spilled oil. Chapters 4.2.1.1.10 through 4.2.1.1.13 of the Multisale EIS (MMS, 2007) contain a discussion on impacts from OCS activity on recreational fishing and recreational resources and are hereby incorporated by reference into this SEA.

Millions of annual visitors attracted to the coast are responsible for thousands of local jobs and billions of dollars in regional economic activity. Most recreational activity occurs along shorelines and includes such activities as beach use, boating and marinas, camping, water sports, recreational fishing, and bird watching. The location of the MC20 site of the mouth of the Mississippi River precludes any visual impacts on people engaged in activity along the shoreline or in coastal waters. Additionally, no impacts would be expected on recreational fishing due to the seabed conditions at the platform location.

The oil and gas industry is not the main source for trash and debris that litter shorelines along the Gulf. People engaged in recreational activities along the coast are mainly responsible for this litter, as well as trash and debris originating onshore but ending up in the sea through deliberate or careless acts. Other sources of trash and debris include (1) accidental loss from staffed structures in State and Federal waters where hydrocarbons are produced, (2) commercial shrimping and fishing, (3) runoff from storm drains, (4) antiquated storm and sewage systems in older cities, and (5) commercial and recreational fishermen who discard plastics.

Should a mudslide event occur in MC20 after installation of the PCS, the primary damage to the system would be limited to the collection domes and associated hoses. The design of the containment system is such that no oil is stored in either the domes or their hoses; therefore, no collected discharges would be released. Since the separator/collection unit is designed to be moored to the partially-submerged jacket, the potential for a release of the oil captured by the unit into the water column is highly unlikely. Even if a release from the separator/collection unit were to occur, the minimal volume of collected oil (~50 bbl) would be so low that it is not projected to reach recreational beaches or impact recreational fishing activities.

Conclusion

The proposed action is expected to have no impact on recreational resources. While some accidental loss of solid wastes may occur from the vessels used to support the proposed action, existing mitigations and regulations that control the handling of offshore trash and debris would be expected to restrict these inputs. There is a negligible chance of a spill from the small amount of collected oil stored in the PCS. Damage to the separator/ collection unit could result in a slightly larger instantaneous spill, but it would be limited to 50 bbl and it would be not be an increased risk to recreational resources when compared to the known continuous spillage and sheening from MC20 since September 2004 (**Appendix A**). The small volume of the instantaneous spill would not be projected to reach shore. Since the collection system is designed to capture and store ongoing crude oil releases, the proposed action is expected to stop the unmitigated pollution event and prevent the surface sheening that could impact recreational fishing and beaches. Therefore, no special mitigation, monitoring, or reporting requirements apply to this proposed action.

3.3.1.4. Archaeological Resources

Archaeological resources are any material remains of human life or activity that are at least 50 years old and that are of archaeological interest. The archaeological resources regulation (30 CFR 250.194) provides specific authority to each MMS Regional Director to require archaeological resource surveys, analyses, and reports. Surveys are required prior to any exploration or development activities proposed on leases within the high-probability areas (NTL 2005-G07 and NTL 2006-G07). A complete description of the prehistoric and historic archaeological resources can be found in Chapter 3.3.4 of the Multisale EIS (MMS, 2007).

3.3.1.4.1. Description

Available geologic evidence indicates that sea level in the northern Gulf of Mexico was at least 90 m (295 ft), and possibly as much as 130 m (427 ft), lower than present sea level, and that the low sea-stand occurred during the period 20,000-17,000 years before present (B.P.) (Nelson and Bray, 1970). Sea level in the northern Gulf reached its present stand around 3,500 years B.P. (CEI, 1986).

During periods that the continental shelf was above sea level and exposed, the area was open to habitation by prehistoric peoples. The advent of early man into the Gulf of Mexico region is currently accepted to be around 12,000 years B.P. (Aten, 1983). According to the sea-level curve for the northern Gulf of Mexico proposed by Coastal Environments, Inc. (CEI), sea level at 12,000 B.P. would have been approximately 45 m (148 ft) below the present level (CEI, 1977 and 1982). On this basis, the continental shelf shoreward of the 45- to 60-m (148- to 197-ft) bathymetric contours has a potential for prehistoric sites dating after 12,000 B.P. Because of inherent uncertainties in both the extent of emergent continental shelf depth and the entry date of prehistoric man into North America, MMS adopted the 12,000 years B.P. and the 60-m (197-ft) water depth as the seaward extent of the prehistoric archaeological high-probability area.

There are areas of the northern Gulf of Mexico that are considered by MMS to have a high probability for historic period shipwrecks (Garrison et al., 1989; Pearson et al., 2003). Statistical analysis of the shipwreck location data identified two specific types of high-probability areas: (1) within 10 km (6 mi) of the shoreline and (2) proximal to historic ports, barrier islands, and other loss traps. Additionally, MMS has created high-probability search polygons associated with individual shipwrecks to afford protection to wrecks located outside the two high-probability areas.

According to Garrison et al. (1989) and Pearson et al. (2003), the shipwreck database lists no known shipwrecks that lie, or are presumed to lie, in Lloyd Ridge Block 319. However, recent research on historic shipping routes suggests that Lloyd Ridge Block 319 were located along the historic Spanish trade route, which therefore increases the probability that a historic shipwreck could be located in this area (Lugo-Fernández et al., 2007). The specific locations of archaeological sites cannot be known without first conducting a remote-sensing survey of the seabed and near-surface sediments. Regular reporting of shipwrecks did not occur until late in the 19th century, and losses of several classes of vessel, such as small fishing boats, were largely unreported in official records. Aside from acts of war, hurricanes cause the greatest number of wrecks in the Gulf. Wrecks occurring in deeper water on the Federal OCS would have a moderate to high preservation potential because they lie beyond the influence of storm currents and waves. Additionally, temperature at the seafloor in deep water is extremely cold, which slows the oxidation of ferrous metals and helps to preserve wood structures and features. The cold water would also eliminate the wood-boring shipworm *Terredo navalis* (Anuskiewicz, 1989). Shipwrecks occurring in shallow water nearer to shore are more likely to have been reworked and disturbed by storms. Historic research indicates that shipwrecks occur less frequently in Federal waters, where they are likely to be better preserved, less disturbed, and, therefore, more likely to be eligible for nomination to the National Register of Historic Places than are wrecks in shallower State waters.

The MMS approved the latest revision of NTL 2005-G07, "Archaeological Resource Surveys and Reports," on July 1, 2005. This revised NTL (1) continues to require a 50-m (164-ft) line-spacing density for historic shipwreck remote-sensing surveys in water depths <200 m (656 ft) and a 300-m (984-ft) line-spacing density for historic shipwreck remote-sensing surveys in water depths >200 m (656 ft), (2) increases the number of historic shipwreck blocks along the deepwater approach to the Mississippi River, (3) issues a reminder to operators of their requirement to notify MMS within 48 hours of the discovery of any potential archaeological site, and (4) updates some of the reporting requirements for archaeological assessments.

3.3.1.4.2. Impact Analysis

The impact-producing factor associated with the proposed action that could affect prehistoric and historical archaeological resources is limited to direct contact or disturbance during dome installation. Chapters 4.2.1.1.12 and 4.2.2.1.14 of the Multisale EIS (MMS, 2007) contain a discussion of impacts from OCS activity on prehistoric resources. A detailed impact analysis of the routine, accidental, and cumulative impacts of the proposed exploration activities on historic archaeological resources can be found in Chapters 4.2.1.1.12.1, 4.2.2.1.14.1, 4.4.13.1, and 4.5.14.1 of the Multisale EIS (MMS, 2007). The following information is a summary of the impact analyses from the Multisale EIS, and they are hereby incorporated by reference into this SEA.

The MMS's operational regulation at 30 CFR 250.194 requires that an archaeological survey be conducted prior to development of leases within the high-probability zones for historic and prehistoric archaeological resources. However, since the activities outlined under the proposed action deal with emergency operations required to secure continual crude oil discharges and the seabed around the three plume sites consist of overturned sediments, a survey was not conducted for this review. Direct physical contact with a shipwreck site could destroy fragile remains, such as the hull and wooden or ceramic artifacts, and could disturb the site context. The result would be the loss of archaeological data on ship construction, cargo, and the social organization of the vessel's crew, as well as the loss of information on maritime culture for the time period from which the ship dates. Since the only seabed disturbing operations involve the deployment of the collection domes over the thee plume sites, there is a very-low chance of impact to archaeological resources.

Conclusion

The proposed action is expected to have no direct or indirect impact on prehistoric or historic archaeological resources in MC20. Since ROVs are proposed to install and secure the three collection domes to the seabed, their use of onboard cameras and high-resolution sonar will assist in detecting/mitigating any unknown archaeological resources near the plume sites.

4. CONSULTATION AND COORDINATION

The MMS is coordinating with the USCG on all operational and environmental oversight issues under the authority of a Unified Command overseeing the remediation of the continuous spill events in MC20, decommissioning of Platform A, and the P&A of the related wells. Letters and Administrative Orders sent from the USCG to Taylor we prepared after consultation with MMS' operational and environmental groups.

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7. APPENDICES

Appendix A—Oil-Spill Analysis

Appendix A

Oil Spill Analysis

Analysis of the Potential for an Accidental Oil spill and the Potential for Impacts from Emergency Spill Prevention and Response Operations Conducted Prior to Finalization of Decommissioning Activities at the Taylor Energy Company L.L.C's Mississippi Canyon Area, Block 20 Platform A and Associated Wells

Proposed Action Discussion

This analysis will address the installation and operation of an emergency spill pollution containment system for three seep sites in Mississippi Canyon Block 20. Since a mudslide incident that occurred as a result of Hurricane Ivan, there have been numerous spill reports made to the USCG for slick sightings in the vicinity of the Mississippi Canyon Block 20 Platform A. This pattern has continued to date and almost daily oil slicks are still spotted in the area. For a full discussion regarding these spills refer to the next section. Although MMS does not typically prepare an EA for emergency operations, this analysis is being conducted because Taylor has indicated they are concerned that an even greater pollution event could occur should another hurricane trigger seafloor instability which could damage the underwater pollution collection domes that are part of the emergency spill pollution containment system.

The MMS previously analyzed several alternatives to the present regulations during the decommissioning of Taylor Energy's 25 wells (wells not previously plugged) and an 8-pile fixed platform (Platform A) at Mississippi Canyon Block 20. Platform A was destroyed as a result of a mud flow incident during Hurricane Ivan in September 2004. After Hurricane Ivan, the platform was found lying on its side, partially buried in sediment, approximately 800 ft from its original position. The associated 6-in pipeline segment #7296 was also partially buried by the same mud flow. The wellheads and casings for the wells drilled from the Mississippi Canyon Block 20 platform were bent over and buried during the same mudslide event that toppled the platform. Mississippi Canyon Block 20 is located approximately 19 mi from shore in a water depth of approximately 445 ft.

According to Taylor, underwater ROV surveys have pinpointed the origin of recent spills to three separate seafloor locations. Although it unknown exactly what the source of these continuous seafloor leaks are, it is now thought that the releases could either be from well heads and/or buried tank storage that was on the platform. The prior EA assumed, based upon information from the operator, that the periodic sheening associated with this downed facility was related to periodic releases from oiled sediments.

Taylor estimated that approximately 624.1 bbl of crude oil, refined petroleum products, and chemicals were on the rig at the time of the incident. The highest estimated oil production at the time of the hurricane from Mississippi Canyon Block 20, Platform A was 199 bbl of oil/day. Most of the wells did not produce oil at rates nearly as high as this volume. Some of the wells were essentially dry gas and some had previously been plugged leaving a total of 25 wells capable of releasing oil at the time the incident occurred. Due to the location of the pipeline compared to the three ROV detected spill locations, it is not believed that the pipeline is a source of any of the leakage.

The emergency spill pollution containment system in Mississippi Canyon Block 20 will consist of three pollution domes located at each of the spill origin sites identified during the ROV survey. These domes will be installed by jetting the legs approximately 6-7 feet below the mud line. This will not disturb the downed production infrastructure as it has been documented as being approximately 165 ft beneath the mud line. The domes will be designed to accommodate maximum capacity fill without the possibility of the dome being displaced and with internal grating to prevent blockage of the hose offloading system by debris. There will be no hydrocarbon storage in the dome.

Oil and gas collected by the three collection domes will be transferred on a continuous basis by anti-collapse hoses connected with zero discharge fittings to a buoyant separator/collection unit that would be moored 200 feet below the sea surface to the downed platform jacket. This unit is designed for handling 17 bbl of oil during normal capacity, but a maximum capacity of 50 bbl of oil storage for burps or other unknowns. This unit will be connected to a surface offloading buoy by hose. Further description of these hoses is provided in **Table A-1**.

The surface offloading buoy is moored to the downed platform separately from the separator collection unit. No oil will be stored on the buoy. The buoy will serve only as an offloading location where a vessel can offload the recovered oil from the separator collection unit by retractable offloading hose on the surface offloading buoy. Further description of this hose is provided in **Table A-1**. The recovered oil will be pumped via the retractable hose to the vessel slop tank on a vessel. It is expected that this process will normally take less than 10 minutes to accomplish.

Table A-1

Description and Capacity of Anti-Collapsible Hoses

Hose Location	Hose Diameter (ID) (inches)	Length (ft)	Total Volume (bbl)
Plume A Collection Dome to the Collector	4.00	560	8.71
Plume B Collection Dome to the Collector	4.00	420	6.52
Plume C Collection Dome to the Collector	4.00	80	1.24
Collector Unit to the Surface Buoy	2.00	350	1.36
		Total	17.83

The total volume of oil possible in all three lines is 17.83 bbl. However, for oil to collect in the 3 plume lines, the separator would have to be at capacity (~50bbls). There is also a conical check valve at the 2 in hose connection at the collector/separator that automatically closes off after pumping operations (with clear seawater) finish at the surface buoy. During standard operations, no oil should be collecting in any of the hoses.

Taylor is currently finalizing their lease on a MODU that will conduct the intervention well work for Boots 'n Coots. They plan to begin the drilling work by the end of this year, targeting the 3 primary wells that both MMS and Taylor feel are leading to the seeps/spills. They are slated to be completed with these three wells by the summer of 2009. Because of the placement of active lines in the area and their need to intercept the wells from an angle northward from the original location, they will not be placing anchors into the area between the original platform site and the current jacket location – where the three collection domes will be anchored. Taylor has indicated that once the three primary wells are plugged and abandoned, the seepage/plume locations will 'dry up' and not require the containment system. Therefore, based upon Taylor's own assessment, there should be no need to have the proposed containment system in place during the 2009 hurricane season.

Past Spills from the Downed Mississippi Block 20 Platform

Two oil spill reports occurred soon after the hurricane. These 2004 reports described slicks that were barely discernible or having a silvery sheen of unknown amount. These spill reports and subsequent spill reports dating between the initial report, September 17, 2004, and April 14, 2008 recorded by the USCG National Response Center (NRC) that are linked to the Mississippi Canyon 20 location are summarized in **Table A-2**. Although it appears that the spillage during this time period may have been sporadic, it should be noted that the USCG in an email dated April 29, 2008 states that the number of reported spills included within this table may be low since some spills that should have been linked to the Mississippi Canyon Block 20 facility may have been recorded as a mystery spill (USCG, 2008).

Table A-2

Spill Reports Received by the U.S. Coast Guard National Response Center
from September 17, 2004 to April 14, 2008

Date Reported	Sheen Size	Estimated volume of Slick
9/17/04	4 mi X 50 ft	.27 gallons
10/5/04	Unmeasured sheen	unknown
6/26/06	3.5 mi X 1 mi	unknown
8/16/06	200 ft X 200 ft	unknown
5/12/07	2 mi X .25 mi	unknown
5/13/07	8 mi X .5 mi	unknown
5/14/07	6 mi X 10 mi	unknown
5/14/07	1 mi X 20 yd	unknown
10/1/07	11 mi X 100 ft	unknown
10/13/07	20 mi X .5 mi	unknown
11/30/07	7.5 mi X .5 mi	unknown
12/13/07	450 ft X 45 ft	4.3 gallons
4/14/08	5 mi X .25 mi	unknown
4/14/08	5 mi X .25 mi	unknown

MMS began daily over flights of the Mississippi Block 20 area in the Spring of 2008, and has kept a daily log of all slicks sighted in this area since this time. Slick sightings observed as a result of this effort are indicated by date of observation and volume (gallons) in Figure 1. The first spill report indicates a slick sighting on May 21, 2008. This over flight effort is ongoing and will continue until the site is no longer producing slicks. On July 9, 2008, MMS began, weather permitting, conducting over flights twice daily – once in the morning and once in the afternoon. **Figure 1** indicates only the largest daily slick size observed in order to minimize the possibility that the oil would be counted more than once.

Daily reports of slick sightings as a result of continuous seepage could report spilled oil more than once. An examination of the morning and afternoon spill data collected does not indicate a particular pattern regarding when the seepage is occurring or regarding when the larger volumes occur. Weather conditions are not noted on the spill reports so it is unknown whether weather incidents are a factor in either increasing or minimizing the seepage amounts or observation capability. As evident in Figure 1, no slick sightings larger than 2 bbl have occurred since mid-July 2008. Based upon all of the reported slick sightings, it is estimated that an average of 22 gallons or approximately ½ bbl of oil has been released daily. None of the chronic spillage has been reported to date to have reached shore.

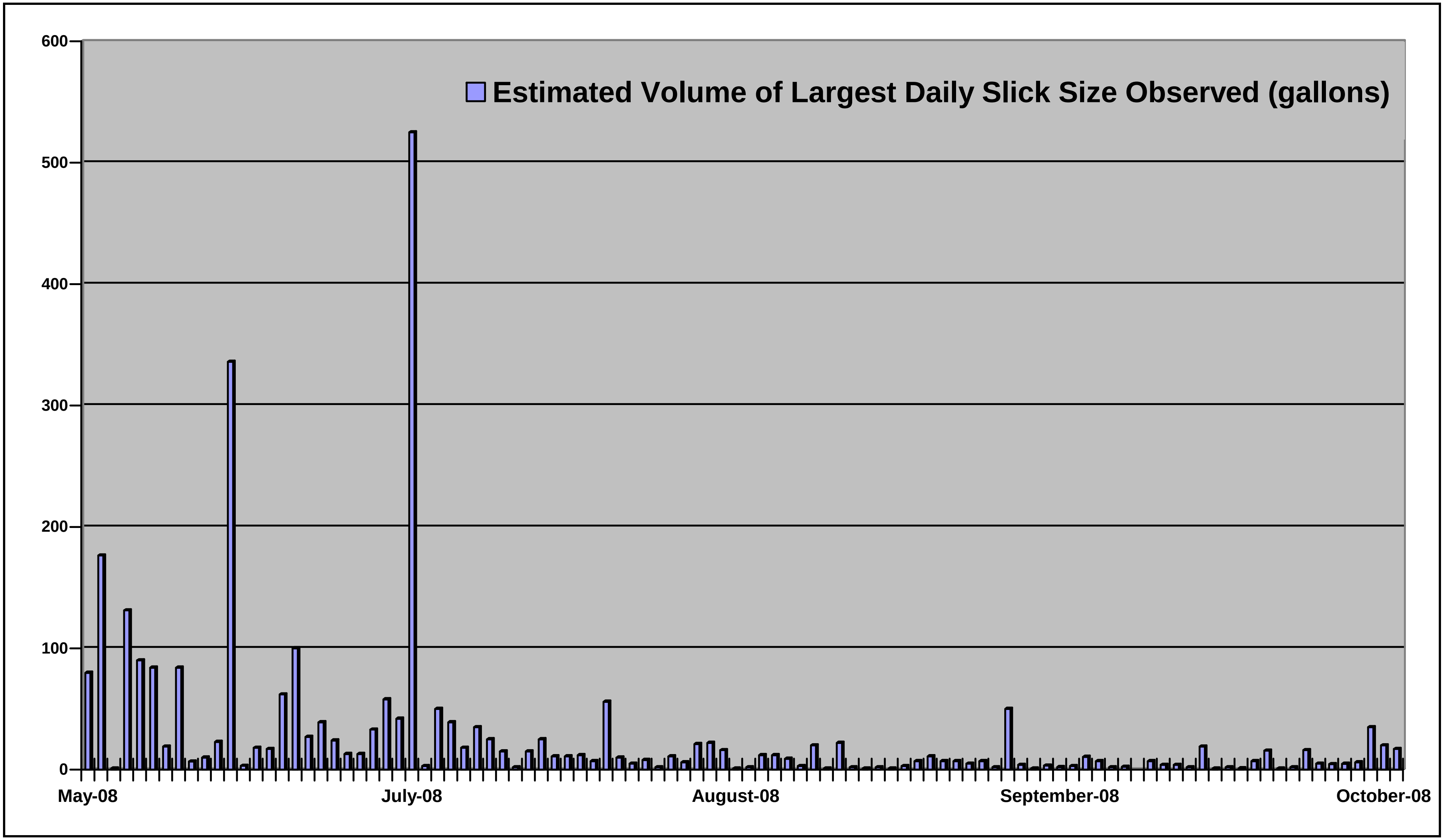

Figure A.1. Estimated Volume of Largest Observed Daily Slick Size.

Total Volume Spilled

The spill size estimates identified in **Figure A-1** were determined by field observers through observations made of the appearance of the oil and the estimated size of the area that the oil covered on the ocean surface. However, there are problems associated with trying to estimate the volume of oil in a slick observed on an over flight based on oil color and the surface area of the floating oil which make this technique unreliable.

The appearance and color of the oil sheen varies with the amount of available sunlight, sea surface state, and viewing angle. Because lighting conditions are highly variable during an actual spill, oil thickness observations based on the color of the slick are generally not reliable. Glare due to very low sun angles and sunlight directly overhead can make observations particularly difficult due to poor contrast between the oil sheen and water. Additionally, observations of the oil slick can be hampered by viewing in an up-sun direction; wearing sun glasses or face shields, or looking through Plexiglas windows.

Other factors that make this technique unreliable are the on-scene weather and difficulties inherent in estimating area of coverage. Waves will increase natural dispersion during the early parts of the spill, break the surface tension that causes the oil to look "slick," and mix some of the oil into the surface layer temporarily. Under calm sea conditions, an observer will probably view most of the floating oil. A few hours later, if the wind has increased and breaking waves have developed, it is not unusual for an observer to report significantly less oil due to over-washing of the oil by waves even though the amount of floating oil probably has not changed. As the wind speed increases, the observers' ability to detect the oil decreases. After oil spends even a short time floating on the ocean surface, it starts to change its physical characteristics due to various physical, biological, and chemical processes which can also affect the ability to accurately detect and estimate the size of an oil slick. (NOAA, 2008)

Attempting to determine the amount of oil spilled from the size and appearance of a slick also assumes that all of the spilled oil is observed in the surface slick. This may not be the case in this instance because of the fact that the Mississippi Canyon Block 20 wells are estimated by survey to be located approximately 165 ft below the present mud line. Oil seeping from these wells will have to percolate upwards through 165 ft of sediment before it even reaches the water column. Due to this subsurface release point, it is expected that much of the lost oil is entrained within the sediments surrounding the well sites. In fact, Taylor has previously reported that a large volume of oiled sediment surrounds the downed Mississippi Canyon Block 20 Platform A. In view of the problems associated with attempting to determine the volume of a spill based upon visual observation of a slick's appearance and slick size as well as reasons why some portion of this type of subsurface spill may go undetected, a total leak volume can not reliably be determined from the visual sightings attributed to the downed platform. Estimates of the observed slick volumes can; however, be used effectively to make initial response decisions.

Estimating Future Potential Spills from the Spill Containment System

The MMS typically estimates the risk of future potential spills by multiplying variables to result in a numerical expression of risk. These variables include (1) the potential of a spill occurring based on historical spill rates and (2) a variable for the potential for a spill > 1,000 bbl to be transported to environmental resources based on trajectory modeling. Since the MMS does not estimate spill rates for the emergency recovery of oil and a slick larger than 1,000 bbl resulting from the unlikely damage of the separator/collector unit could not occur, no numerical expression of risk can be generated for this activity.

If a spill occurred after the installation of the spill pollution containment system resulting from damage to any part of the of the spill pollution containment system or even during offloading there would be no increase in the volume of oil spilled as a result of having this system installed. The oil is seeping regardless of whether the spill pollution collection system is in place. As previously stated, the system is designed to allow the containment domes to funnel the spilled oil into the flow lines and into the separator collection unit. Oil is not stored within the collection domes or their associated hoses. No more oil will be contained with this part of the system than will flow naturally from the seepage.

While oil will be temporarily stored within the separator collection unit, the only oil stored will be the amount that was previously leaking unchecked continuously into the environment. As previously indicated, the separator/collection unit will be moored securely to the downed platform, which Taylor has assured the MMS will not move despite possible future mudslides in the area during inclement weather. Likewise, the a model of the separator/collector unit has withstood testing conducted by Oceaneering in their Large Dive Operations Tank in Morgan City from 8/12/08 to 8/14/08 During this testing, Oceaneering filled the separator/collector and then released "air slugs" from high-pressure compressor tanks to simulate a large gas "burp" from the collection dome. The testing proved that the separator easily 'baffled'/separated the gas (with its release into the water column) and that fluids will remain within the inner cylinder.

Even if compromised, the separator/collection unit only contains only captured oil that would have been lost to the environment without the use of the PCS. Damage to the separator/collection unit, could result in a slightly larger instantaneous spill; however, the unit is limited to 50 bbl, the unit's maximum possible volume. In addition, it would be unlikely that damage would occur to the interior closed cylinder that actually contains the oil in this buoyant system. Further, there would be not be an increased risk to the environment from an instantaneous spill offshore even of the maximum volume possible when compared to the known continuous spillage (of various size) from this source that the environment has been exposed to on a daily basis without the use of a spill pollution containment system.

Spill Response for this Project

No spill containment system mechanical or otherwise is guaranteed to remove 100% of an oil spill from the water surface in an offshore environment Only 10-30% of an oil spill in an offshore environment is typically removed via the traditional mechanical recovery methods. It would be an easier and more efficient spill-response cleanup to respond to a one-time event than attempting to respond to the chronic small spills that have been reported. Sheening caused by chronic small spills is typically such a thin layer on the water surface that it is not easily cleaned up. Containing oil released subsea prior to it reaching the sea surface and quickly spreading would be a preferable spill response option. Consequently, the use of spill containment domes has been increasing in popularity in recent years. The use of these domes on small spills within the GOM has been successful in the past few years. In addition, a similar spill pollution containment system to the one proposed for Mississippi Canyon Block 20, was successfully used recently in West Delta Block 47.

The regulations at 30 CFR 250.300 (a) indicates that the operator shall take measures to prevent the unauthorized discharge of pollutants into offshore waters. The lessee shall not create conditions that will pose unreasonable risk to public health, life, property, aquatic life, wildlife, recreation, navigation, commercial fishing, or other uses of the area. Further, the regulations at 30 CFR 250.300(a) (1) state that immediate corrective action shall be taken (at the expense of the lessee) in all cases where pollution has occurred The installation of a spill pollution containment system and the subsurface spill collection domes ensure compliance with the operator's OPA 90 requirements and the MMS requirements at 30 CFR 250.300.

Mitigation

Pre-Storm Offloading/Post-Storm Reporting Mitigation

Taylor will be required to conduct offloading/pumping operations on their pollution containment system at least 48-72 hours prior to a major storm entering the GOM to ensure that the system has been flushed of all hydrocarbons. Following the storm event, Taylor will schedule offloading operations at the earliest possible time to inspect the surface buoy and continue pumping activities. If pumping operations cannot resume for any reason (i.e., vessel contract, continued weather issues, service base impacts, containment system damage, etc.), MMS shall be notified within 24-hours and presented with a remedial program and/or inspection guidelines.

Summary

Taylor indicated that they were concerned that an even greater pollution event could occur should another hurricane trigger seafloor instability which could damage the underwater pollution collection domes that are part of the emergency spill pollution containment system. However, Taylor has indicated that once the three primary wells are plugged and abandoned, the seepage/plume locations will ‘dry up’ and not require the containment system. Therefore, based upon Taylor’s own assessment, there should be no need to have the proposed containment system in place during the 2009 hurricane season. In addition, if a spill occurred after the installation of the spill pollution containment system resulting from damage to any part of the of the spill pollution containment system or even during offloading there would be no increase in the volume of oil spilled as a result of having this system installed. The oil is seeping regardless of whether the spill pollution collection system is in place. Containing oil released subsea prior to it reaching the sea surface and quickly spreading would be a preferable spill response option. Further, the regulations at 30 CFR 250.300(a) (1) state that immediate corrective action shall be taken (at the expense of the lessee) in all cases where pollution has occurred The installation of a spill pollution containment system and the subsurface spill collection domes ensure compliance with the operator’s OPA 90 requirements and the MMS requirements in 30 CFR 250.300.

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