Environmental Assessment
Main Pass Energy Hub™
Deepwater Port License Application Amendment

September 2006

USCG ENVIRONMENTAL ASSESSMENT
FOR
MAIN PASS ENERGY HUB
DEEPWATER PORT LICENSE APPLICATION AMENDMENT
DOT DOCKET NUMBER: USCG-2004-17696

PREPARED BY: engineering-environmental Management, Inc. (e2M) for
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U.S. Coast Guard Headquarters2100 2nd Street, SW
Washington, D.C. 20593-0001

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This Environmental Assessment (EA) was prepared in accordance with Commandant's Manual Instruction M16475.1D and is in compliance with the National Environmental Policy Act of 1969 (P.L. 91-190) and the Council of Environmental Quality Regulations dated 28 November 1978 (40 CFR Parts 1500-1508). The EA serves as a concise public document to briefly provide sufficient information and analysis for determining the need to prepare a supplemental environmental impact statement or a finding of no significant impact (FONSI).

This environmental assessment supplements and incorporates by reference the relevant findings and analyses contained in the Final Environmental Impact Statement (FEIS) for the Main Pass Energy Hub Deepwater Port License Application. The application is for a Liquefied Natural Gas (LNG) deepwater port to be located in the Gulf of Mexico approximately 16 miles southeast of the coast of Louisiana that requires a license from the Maritime Administration under the Deepwater Port Act. The EA analyzes an amendment to the original DWPA application changing the regasification technology from an "open-loop" open rack vaporization (ORV) system to a "closed-loop" system using submerged combustion vaporization with selective catalytic reduction (SCV/SCR). The SCV/SCR option now being proposed was thoroughly analyzed as an alternative in the FEIS for the project as Option 1d. The FEIS was referred to and incorporated by reference in the EA. The EA includes additional information and analysis of the SCV/SCR system actual design and identifies the agencies and persons consulted during the preparation. All other relevant information and analyses in the FEIS remains valid and unchanged.

DATE COMMENTS MUST BE RECEIVED: November 6, 2006

Sept. 19, 2006	Patience Patton	Deepwater Ports NEPA Specialist
Date	Preparer/Environmental Project Manager	Title/Position
Sept 19, 2006	Mark G. Prescott	Chief, Deepwater Ports Standards
Date	Environmental Reviewer	Title/Position
Sept 19, 2006	Mark G. Prescott for	Chief, Office of Operating and Environmental Standards
Date	Responsible Official	Title/Position

DEPARTMENT OF TRANSPORTATION
MARITIME ADMINISTRATION (MARAD)

DRAFT

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
FOR
MAIN PASS ENERGY HUB™
DEEPWATER PORT LICENSE APPLICATION AMENDMENT

This project application amendment has been thoroughly reviewed by MARAD and the U.S. Coast Guard and I have determined that this project amendment will have no significant impact on the human environment. This finding of no significant impact is based on the attached Environmental Assessment (EA) which incorporates by reference and tiers from the Final EIS that was prepared for the Main Pass Energy Hub™ Deepwater Port project. The EA has been determined to fully and accurately discuss the environmental issues and impacts of the proposed application amendment that changes the project regasification technology to "closed-loop" submerged combustion vaporization with selective catalytic reduction (SCV-SCR). The EA provides sufficient information and analysis to determine that the impacts of this change in technology are minor and that a supplemental environmental impact statement (EIS) is not required under the Deepwater Port Act or the National Environmental Policy Act. The EA shows that the SCV-SCR system now being proposed will reduce environmental impacts to several resource areas, especially with regard to impacts on fish and wildlife resources.

The Main Pass Energy Hub™ Deepwater Port License Application originally proposed the use of "open-loop" open rack vaporization (ORV). In the application amendment, the applicant is now proposing a "closed-loop" SCV-SCR system. The SCV-SCR system now being proposed is very similar to the more generic SCV-SCR system that was analyzed as a reasonable alternative in the Final EIS as Option 1d. The application amendment and the EA evaluating the amendment provide expanded and refined actual design information for the SCV-SCR system now being proposed. The EA was prepared to provide analysis of the actual SCV-SCR design proposed and to determine if there were any significant impacts beyond those previously assessed in the Final EIS. All other relevant information and analyses provided in the Final EIS remain valid and applicable to the proposed project. The purpose of this EA along with the Final EIS is to provide an environmental analysis sufficient to support the licensing decision. Following final public hearings on the Application, as amended, (planned for October 2006), Governors of adjacent coastal states may approve, approve with conditions, or disapprove within 45 days and the MARAD will issue a record of decision within 90 days after the last public hearing.

I have considered the information contained in the EA, which is the basis for this FONSI. Based on the information in the EA, I have determined that the proposed action as described above and in the EA, will have no significant impact on the environment and than an environmental impact statement is not required.

Date	Responsible Official	Title/Position

ENVIRONMENTAL ASSESSMENT
FOR THE
MAIN PASS ENERGY HUB™
DEEPWATER PORT LICENSE APPLICATION AMENDMENT

Location: Gulf of Mexico (GOM), approximately 25.7 kilometers (16 miles) southeast of the coast of Louisiana in Main Pass Lease Block (MP) 299 and 64.4 kilometers (40 miles) from the Mississippi coast in MP 164.

Docket Number: USCG-2004-17696

Prepared By: The lead agencies, U.S. Coast Guard (USCG) and the Maritime Administration (MARAD) and their contractor, engineering-environmental Management, Inc. (e^2M).

Cooperating Agencies: U.S. Environmental Protection Agency; U.S. Department of the Interior, Minerals Management Service and U.S. Fish and Wildlife Service; U.S. Department of Commerce, National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS); U.S. Army Corps of Engineers, Mobile District and New Orleans District; and the Federal Energy Regulatory Commission.

Contact Information: Mark Prescott (G-PSO-5), 2100 Second Street, SW, Washington, DC 20593-0001, (202) 372-1440, *mark.a.prescott@uscg.mil*.

Abstract: Freeport-McMoRan Energy LLC proposes to construct a deepwater port in the GOM, approximately 25.7 kilometers (16 miles) southeast of the coast of Louisiana in MP 299, in water depth of approximately 64 meters (210 feet). A gas pipeline junction platform, also part of the proposed Port, would be approximately 64.4 kilometers (40 miles) from the Mississippi coast in MP 164. The proposed Port, capable of unloading liquefied natural gas (LNG) carriers of up to 160,000 cubic meters (m^3) capacity, would process 7.0 million metric tons per year of LNG (the equivalent of 350 billion cubic feet per year of gas). The vaporization facilities would be designed for a peak capacity of 1.6 billion cubic feet per day (bcfd) to provide additional supply during periods of peak demand. Storage facilities for LNG would include six tanks with a combined capacity of 145,000 m^3. There would also be three salt caverns for temporary storage of 27.9 billion standard cubic feet of natural gas. The proposed Port would also include six pipelines totaling approximately 309 kilometers (192 miles) for natural gas and natural gas liquids (NGL). Five natural gas takeaway pipelines would connect the proposed Port with existing gas transmission pipelines. Four natural gas pipelines would terminate offshore, and one pipeline would terminate onshore near Coden, Alabama. The NGL pipeline would connect the proposed Port to a fractionating facility near Venice, Louisiana, where the gas liquids would be separated for sale.

Draft and Final Environmental Impact Statement (EIS) on the MPEH™ Deepwater Port License Application were prepared and public hearings were held in Grand Bay, Alabama; Pascagoula, Mississippi; and New Orleans, Louisiana. On May 5, 2006, Louisiana Governor Kathleen Blanco—citing her concern over the environmental impacts of Open Rack Vaporizers (ORVs)—exercised her authority under the Deepwater Port Act (Title 33 United States Code [U.S.C.] Sections 1503(c)8 and 1508(b)(1)) and disapproved Freeport-McMoRan Energy LLC's Application for the MPEH™. On May 31, 2006, Freeport-McMoRan Energy LLC submitted an amendment to its Application pursuant to the USCG's Temporary Interim Rule (69 Federal Register 724, January 6, 2004) to own, construct and operate the MPEH™. The amendment changed the Applicant's preferred vaporization technology from ORV to a closed-loop submerged combustion vaporization (SCV) with selective catalytic reduction (SCR) to control air emissions (hereinafter referred to as SCV-SCR), and associated changes to Terminal infrastructure to support SCV-SCR operations.

Date of Publication: September 2006

ENVIRONMENTAL ASSESSMENT
FOR THE
MAIN PASS ENERGY HUB™
DEEPWATER PORT LICENSE APPLICATION AMENDMENT

Commandant
United States Coast Guard
Deepwater Ports Standards Division (G-PSO-5)
2100 Second Street, SW
Washington, DC 20593-0001

Docket No. USCG-2004-17696

The Department of Transportation Docket Management System
is available at <*http://dms.dot.gov*>.

SEPTEMBER 2006

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Executive Summary

Introduction

The Deepwater Port Act of 1974 (DWPA)[1], as amended, establishes a licensing system for ownership, construction, and operation of manmade structures beyond state seaward boundaries. The Act promotes the construction and operation of deepwater ports as a safe and effective means of importing oil into the United States and transporting oil from the Outer Continental Shelf (OCS), while minimizing tanker traffic and associated risks. In 2002, the Maritime Transportation Security Act[2] amended the definition of "deepwater port" to include natural gas.

All deepwater ports must be licensed in accordance with the nine factors mandated by the DWPA (33 United States Code [U.S.C.] §1503(c)). The DWPA requires a license applicant to submit detailed plans for its facility to the Secretary of Transportation (Secretary). The Secretary has delegated the processing of deepwater port applications to the U.S. Coast Guard (USCG) and the Maritime Administration (MARAD). The USCG retained this responsibility after its transfer to the Department of Homeland Security. On June 18, 2003, the Secretary also delegated to the Maritime Administrator the authority to issue, transfer, amend, or reinstate a license for the construction and operation of a deepwater port. Hereafter, "the Secretary" represents the Maritime Administrator's actions and responsibilities as the delegated representative of the Secretary. The DWPA also provides that for all applications, the Secretary, in cooperation with other involved Federal departments and agencies, will comply with the National Environmental Policy Act (NEPA) of 1969. This Environmental Assessment (EA) together with the Main Pass Energy Hub™ (MPEH™)[3] Final Environmental Impact Statement (Final EIS) completed in March 2006 for those aspects of the proposed project not impacted by the decision to change vaporization technology has been prepared to meet the agencies' requirements under NEPA and the DWPA.

On February 27, 2004, Freeport-McMoRan Energy LLC (also referred to as the Applicant) submitted to the USCG and MARAD an Application under the DWPA for all Federal authorizations required for a license to own, construct, and operate a deepwater port, referred to as the MPEH™, off the coast of Louisiana. On June 9, 2004, the USCG and MARAD issued a Notice of Application in the *Federal Register* summarizing the Application.[4] A Draft Environmental Impact Statement (Draft EIS) on the MPEH™ Deepwater Port License Application was prepared and a Notice of Availability was published in the *Federal Register* on June 17, 2005.[5] Public hearings on the Draft EIS were held on July 18, 19, and 20, 2005, at Grand Bay, Alabama; Pascagoula, Mississippi; and New Orleans, Louisiana; respectively. Comments on the Draft EIS were addressed and the Final EIS was published on March 10, 2006.[6] Hearings on the License Application were held on March 21, 22, and 23, 2006, at Grand Bay, Alabama; Pascagoula, Mississippi; and New Orleans, Louisiana; respectively.

Concurrent with their application for the deepwater port, Freeport-McMoRan Energy submitted an application to the Federal Energy Regulatory Commission (FERC) for a Certificate of Public Convenience and Necessity under Section 7 of the Natural Gas Act, as amended, to construct and operate a new natural gas pipeline and ancillary facilities in Alabama. FERC is the cooperating Federal agency

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[1] Public Law (P.L.) 93-627, Sec. 3, January 3, 1975, 88 Stat. 2127, as amended, codified to 33 U.S. Code (U.S.C.) 1501–1524.
[2] P.L. 107-295.
[3] "Main Pass Energy Hub" and "MPEH" are trademarks of Freeport-McMoRan Energy LLC.
[4] Vol. 69, *Federal Register*, No. 111, Wednesday, June 9, 2004, pp 32363–64.
[5] Vol. 71, *Federal Register*, No. 49, Tuesday, March 14, 2006, pp. 13213-15.
[6] The *Final EIS for the MPEH™ Deepwater Port License Application*, March 2006, is available on the USDOT Docket at: <*http://dms.dot.gov*>. The Docket Number is 17696, and the Final EIS is document numbers 232 through 247.

responsible for the review of the natural gas pipeline and associated aboveground components. FERC issued a Notice of Application in the *Federal Register* for the Proposed Coden Onshore Pipeline on March 11, 2004. Construction and operation of the natural gas liquids (NGL) pipeline is regulated by U.S. Department of Transportation (USDOT) regulations on transportation of hazardous liquids by pipeline (49 Code of Federal Regulations [CFR] 195). Freeport-McMoRan Energy also filed applications with the U.S. Army Corps of Engineers (USACE) for Department of the Army permits pursuant to Section 10 of the River and Harbor Act of 1899 (33 U.S.C. 403), and Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344). The USACE has jurisdiction over the wetlands associated with the proposed onshore pipelines in Alabama and Louisiana. On July 22, 2005, the USACE issued a public notice on the proposed permits. Freeport-McMoRan Energy also filed its permits required under the Clean Air Act (CAA) and CWA with the U.S. Environmental Protection Agency (USEPA). Alabama, Louisiana, and Mississippi were designated as the adjacent coastal states. Approval or denial of the license application by the adjacent coastal state must occur not more than 45 days after the last public hearing. If a license is issued, the Applicant would apply to the Department of the Interior Minerals Management Service (MMS) for pipeline rights-of-way. MMS would also be involved in the offshore construction, operation, and decommissioning activities of the Terminal and pipelines.

On May 5, 2006, Louisiana Governor Kathleen Blanco—citing her concerns about the potential environmental impacts from the use of Open Rack Vaporizers (ORVs)—exercised her authority under the DWPA (Title 33 U.S.C. Sections 1503(c)8 and 1508(b)(1)) and disapproved Freeport-McMoRan Energy LLC's Application for the MPEH™. On May 31, 2006, Freeport-McMoRan Energy LLC submitted an amendment to its Application pursuant to the USCG's Temporary Interim Rule (69 *Federal Register* 724, January 6, 2004)[7] to own, construct and operate the MPEH™. The amendment changed the Applicant's preferred vaporization technology from ORV to "closed-loop" submerged combustion vaporization (SCV) with selective catalytic reduction (SCR) to control air emissions (hereinafter referred to as SCV-SCR), and associated changes to Terminal infrastructure to support SCV-SCR operations.

On June 21, 2006 the Administrator of MARAD issued a Record of Decision (ROD) that a license will not be issued on the proposed project, no further action would be taken on the application as originally submitted, and MARAD will process the amended Application. Following consultation with the Council on Environmental Quality and other cooperating agencies, the USCG and MARAD determined that an EA would provide the appropriate level of NEPA review and analysis on the actual design proposed and to determine if there were any significant impacts beyond those previously assessed in the MPEH™ Final EIS. The EA incorporates by reference and supplements the MPEH™ Final EIS.

Purpose and Need

The purpose of licensing deepwater ports for importing liquefied natural gas (LNG) in the OCS is to provide natural gas markets with offshore access to LNG processing facilities. This requires construction of appropriate facilities for receiving the LNG, revaporizing the liquid to gaseous state, and interconnecting the facility to the transmission pipelines that can reach appropriate markets within the United States. The DWPA was passed to promote and regulate the construction and operation of deepwater ports as a safe and effective means of importing oil or natural gas into the United States. The DWPA requires the Secretary to approve or deny a deepwater port license application. In reaching this decision, it is the purpose and need of the Secretary to carry out the Congressional intent expressed in the DWPA, which is to

[7] Vol. 69, *Federal Register*, No. 3, Tuesday, January 6, 2004, pp 723–87. The temporary interim rule amends 33 CFR Part 148, Deepwater Ports: General; 33 CFR Part 149, Deepwater Ports: Design, Construction, and Equipment; and 33 CFR Part 150, Deepwater Ports: Operations.

- "authorize and regulate the location, ownership, construction, and operation of deepwater ports in waters beyond state seaward boundaries of the United States.
- "provide for the protection of the marine and coastal environment to prevent or minimize any adverse impact which might occur as a consequence of the development of such ports.
- "protect the interests of the United States and those of adjacent coastal States in the location, construction, and operation of deepwater ports.
- "protect the rights and responsibilities of States and communities to regulate growth, determine land use, and otherwise protect the environment in accordance with law.
- "promote the construction and operation of deepwater ports as a safe and effective means of importing oil and natural gas into the United States and transporting oil and natural gas from the outer continental shelf while minimizing tanker traffic and the risks attendant thereto.
- "promote oil and natural gas production on the outer continental shelf by affording an economic and safe means of transportation of outer continental shelf oil and natural gas to the United States mainland." [8]

This Congressional intent is codified in nine requirements set forth in 33 U.S.C. §1503(c).

The DWPA Application currently under consideration is one proposed by Freeport-McMoRan Energy. In its Application, Freeport-McMoRan Energy proposes to construct, own, and operate the MPEH™ to receive and vaporize LNG and condition, store and transport natural gas and constituent NGL at a geographical location that allows it to connect into the Nation's natural gas pipeline infrastructure and reuse existing infrastructure that Freeport-McMoRan Energy affiliates constructed for other purposes. Freeport-McMoRan Energy's proposed Port would provide a new facility for receiving LNG Carriers (LNGCs) from foreign markets and for transferring natural gas into the U.S. markets via the existing natural gas transmission infrastructure.

Part of the intent of establishing the DWPA was to provide mechanisms to meet the Nation's existing and estimated demand for natural gas supplies by increasing access to worldwide sources. The recent DWPA amendment regarding offshore LNG facilities indicated that the Federal government recognizes the potential for LNG imports to become a key supply source in the United States over the next 10 years. Energy demand in Louisiana and the United States has been growing and continues to increase steadily. The U.S. Department of Energy, Energy Information Administration's *Annual Energy Outlook 2006 Overview* estimates that total energy consumption in the United States will increase from 99.7 quadrillion British thermal units (Btu) per year in 2004 to 127.0 quadrillion Btu per year in 2025 (EIA 2006). This represents an annualized (i.e., year-to-year) increase of 1.2 percent. As natural gas prices have risen and the production and transportation of LNG has become more efficient, LNG imports have become more economically attractive and can contribute to the overall supply of natural gas. This growth is driven by large increases in industrial demand and electrical power generation. According to the *Annual Energy Outlook 2006 Overview*, LNG imports are expected to increase from 0.6 trillion cubic feet (tcf) in 2004 to 4.1 tcf annually in 2025. The proposed Port would help meet the Nation's gas supply need by enabling regasified LNG to be delivered into the existing pipeline infrastructure and providing supply diversification.

[8] 33 U.S.C. 1501(a)

Scope of the EA

In processing license applications under the DWPA, the Secretary (through MARAD and the USCG) is responsible for complying with a variety of Federal regulations, including NEPA. As such, the purpose of this EA, together with the MPEH™ Final EIS completed in March 2006 for those aspects of the proposed project not impacted by the decision to change vaporization technology, is to provide an environmental analysis sufficient to support the Secretary's licensing decision; to facilitate a determination of whether Freeport-McMoRan Energy has demonstrated that the MPEH™ would be located, constructed, operated, and decommissioned using the best available technology necessary to prevent or minimize adverse impacts on the environment; and to encourage and facilitate involvement by the public and interested agencies in the environmental review process.

The MPEH™ Deepwater Port License Application originally proposed the use of "open-loop" ORVs. In the Application Amendment, the applicant is now proposing a "closed-loop" SCV-SCR system. Though similar, a somewhat generic SCV-SCR system was analyzed in sufficient detail in the MPEH™ Final EIS as an alternative for public review and comment (Option 1d). This Application Amendment has now provided expanded and refined actual design information. This EA was prepared to provide analysis of the actual SCV-SCR design proposed and to determine if there were any significant impacts beyond those previously assessed in the MPEH™ Final EIS. All other aspects of the MPEH™ Final EIS still apply.

This EA assesses the potential environmental impacts associated with the proposed use of SCV-SCR for revaporizing LNG, as defined in Freeport-McMoRan Energy's amended DWPA License Application. In switching from an open-loop to a closed-loop system, the Applicant eliminated seawater usage; replaced water-cooled generators with low emission, air cooled gas turbine generators; proposed use of sodium hydroxide to neutralize the SCV process water; would move Platform No. 3 from its current position to the Terminal to support vaporization equipment; and made other minor changes to Terminal operations and infrastructure to support SCV-SCR operations. Proposed non-Terminal construction and operations were not changed by the amended Application; since non-Terminal impacts were fully evaluated in the MPEH™ Final EIS they will not be repeated here and instead are incorporated by reference. This EA incorporates by reference and is a supplement to the MPEH™ Final EIS.

Public Review and Comment

In the August 10, 2006, *Federal Register*, MARAD published a Notice of Amended Application and Notice of Intent (NOI) to prepare an EA, and request for public comments. The notice informed agencies and the public that comments on the scope of the EA could be submitted by mail, hand delivery, facsimile, or electronic means. The notice requested comments be submitted by September 11, 2006. The USCG also mailed a letter, the NOI, and attachments describing the changes to the Application to approximately 350 state, Federal, and other interested parties. Public comments were considered during the preparation of this EA.

Alternatives

NEPA requires that any Federal agency proposing a major action (as defined in Title 40 CFR 1508.18) must consider reasonable alternatives to that action. Evaluation of alternatives assists in avoiding unnecessary impacts by analyzing reasonable options to achieve the stated purpose that the Applicant might or might not have considered. Identifying alternatives to the proposed action potentially creates options for ways to meet the project's purpose and need that voids environmental impacts associated with the action as proposed by the Applicant. That said, the only action before the Secretary once the NEPA process is complete is to approve, deny, or approve with conditions an application[9] for a license under the DWPA. In approving a license application, the Secretary may impose enforceable conditions as part of the license. Consistent with NEPA, in determining the provisions of the license, the Secretary may also consider alternative means to construct and operate a deepwater port. The NEPA environmental analysis is one of the nine factors the Secretary must consider in making a final determination (33 U.S.C. 1503(c)).

Since the amended Application does not affect the location or construction of the MPEH™, as originally proposed, the alternatives analysis for those components of the deepwater port remains the same as provided for in the MPEH™ Final EIS and is incorporated herein by reference. With regard to means to vaporize LNG, the Secretary recognizes that selection of an LNG regasification technology depends on case-by-case evaluation, including consideration of how a given system's design and operating conditions would fit within the overall scheme of a project. The Secretary does not give preference to the use of any particular regasification technology, and therefore requires that available technologies are considered. The Secretary considers the alternatives considered in the MPEH™ Final EIS and this EA to be sufficient. Whereas a somewhat generic SCV-SCR alternative was already analyzed in detail in the MPEH™ Final EIS (Option 1d), this EA provides the analysis on the now proposed actual design criteria.

Overview of the MPEH™

The proposed MPEH™ Terminal would be situated in the Gulf of Mexico (GOM) approximately 25.7 kilometers (km) (16 miles [mi]) southeast of the coast of Louisiana in Main Pass Lease Block (MP) 299, in a water depth of approximately 64 meters (m) (210 feet [ft]). The proposed Terminal would consist of four existing platforms and two new adjacent platforms all in close proximity to each other with connecting bridgework. As proposed, the Terminal would accommodate LNGC berthing, LNGC unloading, six LNG storage tanks with a total net capacity of approximately 145,000 cubic meters (m^3), LNG vaporization, natural gas processing or conditioning, NGL metering and takeaway pipeline connections, salt cavern natural gas storage, natural gas compression, natural gas dehydration, natural gas metering and pipeline export (including one new platform at MP 164 to be used as a pipeline junction), power generation, storage facilities for spares and consumables, living quarters for up to 94 personnel, and facilities for flight operations (helidecks).

MP 299 sits atop a salt dome approximately 3.2 km (2 mi) in diameter. Storage for 27.9 billion cubic feet of natural gas would be provided by creating three salt caverns in the salt dome below the proposed LNG Terminal. Storing natural gas in salt caverns would allow the MPEH™ to provide a consistent supply of natural gas into the pipeline system and the ability to deliver up to 3 billion cubic feet per day of peak natural gas supply when needed. The cavern-creation process would take approximately 32 months to complete. Prior to construction and operation of the gas storage caverns, the Applicant would be required to obtain a subsurface storage agreement with MMS. The Applicant would also be required to pay royalties to MMS on leached salt for the gas storage caverns. Brine created during the salt cavern formation would be discharged at a maximum rate of 10,500 gallons per minutes (gpm) (0.567 cubic meters per second [m^3/s]).

Two existing satellite platforms within MP 299 (Platforms No. 3 and No. 4) would be used as part of the proposed Terminal. Of these two existing platforms, Platform No. 3 would be relocated from its current position (approximately 1 mi north of the proposed Terminal) to a site adjacent to existing bridge No. 11 to accommodate three turbine generators and three LNG vaporization units. The removal and reinstallation of Platform No. 3 would also require MMS approval. Platform No. 4, which is approximately 1 mi southwest of the proposed Terminal, has two existing 12,000–long ton liquid storage tanks that would be used for storage of glycol for the cavern gas dehydration system and other operating

[9] For this application, the No Action Alternative and denial of the license are considered to be the same.

supplies and chemicals. For a more detailed discussion of the proposed MPEH™ Terminal, see Section 2.2.1.1 of the MPEH™ Final EIS.

Description of the Proposed Action/Deepwater Terminal

The Secretary proposes to act on Freeport-McMoRan Energy's amended Deepwater Port License Application to own, construct and operate the MPEH™ Deepwater Port. As proposed in the amended Application, the MPEH™ Terminal would receive, store, and revaporize up to 7.0 million metric tons per year of LNG (the equivalent of 350 billion cubic feet per year of gas) using SCV-SCR technology.

Freeport-McMoRan Energy's amended Application changed the proposed LNG vaporization technology from ORV to SCV-SCR. By making this change, seawater usage was eliminated, low-emission, air-cooled gas turbine generators replaced water-cooled generators; sodium hydroxide would be used to neutralize the SCV process water; and Platform No. 3 would be moved from its current position to the Terminal to support vaporization equipment; and other minor changes to Terminal operations and infrastructure to support SCV-SCR operations.

All other components of the proposed MPEH™ are unaffected by the amended Application and, since they were fully analyzed in the MPEH™ Final EIS, they are incorporated by reference in this EA. These other components include the construction and operation of salt caverns for the storage of natural gas; six pipelines totaling approximately 309 kilometers (192 miles) including one new platform at MP 164 to be used as a pipeline junction; LNG carrier routes and anchorages; use of fabrication yards for Terminal construction; and decommissioning.

Proposed Action Environmental Impacts

Implementation of the Proposed Action would result in a combination of adverse and beneficial impacts of varying degree and duration. Proposed non-Terminal construction and operations were not changed by the amended Application; since non-Terminal impacts were fully evaluated in the MPEH™ Final EIS they will not be repeated here and instead are incorporated by reference. The following summarizes the impacts identified in this EA.

Water Quality. A combination of long- and short-term minor adverse impacts on water quality would be expected. Short-term direct minor adverse impacts would include resuspension of sediments that would occur during installation of the proposed Terminal structures. The primary effluents of SCVs are carbon dioxide (CO_2) and slightly acidic freshwater, the later of which would be subject to a National Pollutant Discharge Elimination System (NPDES) permit to be issued by USEPA. The freshwater discharge would be neutralized with a 20 percent solution of sodium hydroxide (NaOH), which produces sodium carbonate (Na_2CO_3) and freshwater at a pH of between 6 and 9. Based on modeling of similar discharges, SCV discharges would experience a 24- to 60-fold dilution at 5 m from the discharge point (see **Section 4.2.1.1.2** of this EA). If hazardous substances such as hydrocarbons (petroleum, oils, and lubricants) were to be spilled and escape containment, the release would result in short-term, minor adverse impacts on water quality.

Biological Resources. Minor, short-term, direct, and long-term, adverse impacts on biological resources would occur as a result of turbidity and sediment disturbance, noise, and potential accidental release of marine debris associated with the Proposed Action. No impacts would result from SCV-SCR discharge. Minor direct short-term and long-term impacts on benthic communities would occur during the installation of the proposed Terminal. Terminal installation would result in the permanent loss of a small portion of benthic habitat. These sediments support a wide variety of infaunal and epifaunal species (e.g., worms, crustaceans, mollusks, echinoderms, hydroids, and sponges) that would be displaced or destroyed by construction activities. Larger, more motile invertebrate and fish species would potentially be displaced by seafloor structures; while smaller, more sessile organisms would probably be crushed. Displaced organisms would likely return to the area shortly after construction activities ceased. Moreover, due to the ubiquitous nature of the region's benthic communities, affected populations of benthic organisms would be expected to recover quickly by recolonization from surrounding communities of similar organisms. Most impacts would be temporary, and would be limited to resources occurring in the immediate vicinity of the proposed MPEH™ Terminal (see **Section 4.2.2** of this EA).

Geological Resources. Minor direct impacts on sediments from Terminal installation (platform emplacement and barge anchoring) would be expected. Impacts would be localized and short-term (see **Section 4.2.4.1.1** of this EA).

Land Use. Minor direct or indirect impacts on land use are expected from construction of the Terminal. The MPEH™ would operate in an area of the GOM currently leased for oil and gas development. No limitations would be placed in current designated areas of the Terminal pipelines for the operation of the project. Minor long-term impacts on commercial fishing, recreational fishing, and boating could occur within the Safety Zone that would be established around the Terminal. This would limit usage of a very small percentage of the GOM for the life of the MPEH™ (see **Section 4.2.5** of this EA).

Socioeconomics. Construction and operation of the MPEH™ would have minor, beneficial impacts on socioeconomic resources through increased employment and purchase of goods and services. Project impacts related to population, employment, housing, public services, vessel traffic, and shipping would be minor and easily absorbed within the existing Louisiana and GOM regional resources and socioeconomic infrastructure (see **Section 4.2.7** of this EA).

Recreation and Visual Resources. Short- and long-term minor adverse impacts on recreational fishing, boating, and other water-dependent uses would result from construction and operation of the proposed Port. Minor impacts on visual resources would occur from the construction and operation of the MPEH™ Terminal. The existing platforms would be refurbished, and the construction of the new platforms would be consistent with the current viewscape. The USCG has determined that the amended Application would not change the impacts as presented in the MPEH™ Final EIS.

Transportation. Minor short-term and long-term adverse impacts on transportation resources would be expected from construction of the proposed Terminal. Terminal operations would have a minor, adverse, long-term impact on transportation. The USCG has determined that the amended Application would not change the impacts as presented in the MPEH™ Final EIS.

Air Quality. Minor direct short-term adverse impacts on air quality would occur during construction of the proposed Terminal. Criteria pollutant impacts would not exceed USEPA-established annual ambient air quality criteria. Impacts around the Terminal and on the Breton National Wildlife Refuge (NWR) were modeled, and, with mitigation, impacts would be below proposed significance thresholds for Class I and Class II areas (see **Section 4.2.9.2** of this EA).

Noise. Direct impacts on the airborne or underwater noise environment would occur from Terminal operations, vessel traffic, helicopter traffic, roadway traffic, and construction activities. Activities that would produce the greatest amount of noise are short-term actions such as the platform installations and decommissioning. Noise generated at the proposed Terminal operations would not affect noise-sensitive receptors onshore due to the distance from the shore. The USCG has determined that the amended Application would not change the impacts as presented in the MPEH™ Final EIS.

Risk Management. While safety concerns might have minor long-term adverse or beneficial impacts on the decisionmaking processes of potential future proposals within the hazard area, there is no direct short-term or long-term adverse impact on activities outside the Safety Zone or Area to be Avoided (ATBA). Mitigation measures would be developed to effectively mitigate anticipated hazards to the general public, non-Terminal structures, and vessels associated with the proposed Terminal (see **Section 5** of this EA).

No Action Alternative

Under the No Action Alternative, the Secretary would deny the License application, preventing construction and operation of this deepwater Port. If the Secretary pursues the No Action Alternative, potential short- and long-term environmental impacts identified in this EA would not occur. There would be no contribution to the Nation's natural gas supply from this source. Because of the existing and predicted demand for natural gas, it would be necessary to find other means to facilitate the importation of natural gas from foreign markets that would equal the contribution from the proposed Port. Strategies to meet this need could include other deepwater port applications, expansion of existing or construction of new onshore LNG ports, or increased use of other energy sources such as coal, oil, nuclear, or various forms of alternative energy.

Because the Applicant has existing platforms in place, continuation of existing oil storage and transfer operations and brine production would be expected. Additional uses for the existing platforms would probably be sought. The Applicant might reapply for authorization to dispose of Resource Conservation and Recovery Act-exempt wastes in salt dome caverns at MP 299. These activities would have attendant impacts that were either evaluated in previous licensing actions (existing activities) or would be evaluated under applicable regulations (future activities.)

Mitigation

The DWPA requires that an applicant demonstrate that a proposed deepwater port would be constructed and operated using the best available technology, thereby preventing or minimizing the adverse impact on the marine environment. Avoidance and mitigation measures would be a condition of the Deepwater Port License, should one be granted. In addition, mitigation measures are expected to be developed during the analysis and approval process of the Port Operations Manual[10]. The license would require the Applicant to comply with all environmental mitigations, standards and limitations set forth in the environmental permits issued by the regulatory agencies.

Water Resources. MPEH™ submitted a NPDES permit application for all of the regulated discharges anticipated in association with operations of the proposed Port. This permit is required under conditions of the CWA and USCG regulations to prevent long-term impacts on water quality. If granted, the permit would describe the conditions and mitigation measures required for compliance. A Facility Response Plan, Port Operations Manual, and any other required spill prevention plans would be developed to meet or exceed the requirements of all applicable and appropriate regulations and guidelines.

Biological Resources. To minimize potential impacts on protected species such as marine mammals and sea turtles, the following are expected to be conditions of the License, if issued: MMS/National Marine

[10] In accordance with 33 CFR Part 150, the licensee must obtain USCG approval of its Port Operations Manual. The license would require that the Port Operations Manual address the requirements of the Deepwater Port Act and provide detailed specifications and procedures for all aspects of port operations and infrastructure including navigation, vessel movement, materials handling, safety, and protection of the environment. The Port Operations Manual would be required to address port requirements for calling vessels, approaches, Safety Zones, port infrastructure, and pipelines.

Fisheries Service's (NMFS) *Vessel Strike Avoidance and Injured/Dead Species Reporting* would be included in the Port Operations Manual; a waste management plan would be included in the Port Operations Manual; and training on the elimination of marine debris for all offshore personnel. To reduce impacts associated with pile-driving, the Applicant would be required to develop a plan in consultation with NMFS (and other cooperating agencies) to use ramp-up procedures prior to pile-driving, monitor for protected species prior to and during pile-driving (using qualified observers), and monitor noise levels during the pile-driving, as a condition of the license, if issued.

Socioeconomics. The MPEH™ Terminal would operate with a Safety Zone and an ATBA. The Safety Zone around the Terminal would exclude shrimp fishing in an area of approximately 361 acres. Exclusion of shrimp fishing from the Safety Zone would have a negligible impact on shrimp landings in the GOM. Therefore, socioeconomic mitigation for commercial and recreational fisheries losses in the Safety Zone is not anticipated.

Air Quality. Air modeling identified the sulphur content in LNGC fuel as the primary contributor to ambient air concentrations in excess of the proposed modeling significance level for sulfur dioxide (SO_2) at the Breton NWR. Mitigation measures include LNGCs operating on boil-off gas and tugboats operating on 0.05 percent low sulphur fuel oil. As a result, predicted impacts from air emissions would be below the modeling significance thresholds and would not cause an adverse impact on Breton NWR. The Applicant would also be required to obtain all applicable and appropriate air quality permits. The License would require all monitoring and compliance requirements associated with the proposed Port's air permits to be met during the operating life of the facility.

Cumulative Impacts

Several cumulative impacts would occur upon implementation of the Proposed Action. Most would arise in connection with other OCS oil and gas activities. Several reasonably foreseeable future actions were identified on the OCS, including the proposed TORP LNG deepwater port (**Figure 6-1**).

The USCG and MARAD would not expect operation of the proposed Terminal to result in cumulative impacts on several resources in the GOM. These include coastal barrier beaches and associated dunes, wetlands, seagrass communities, recreational beaches, and coastal infrastructure. Long-term impacts from Terminal operations on water quality, biological and geological resources, socioeconomics, recreation, transportation, and risk management (safety) would be localized. Due primarily to the distance between the MPEH™, TORP, and other OCS activities, these impacts would not be synergistic and do not overlap in any measurable way. Some long-term minor adverse cumulative impacts on air quality could be associated with operation of the proposed Terminal.

Water Quality. Marine water quality would be minimally affected by MPEH™ construction activities, and no incremental impacts on water quality would occur. Terminal operation discharges would only produce minor incremental cumulative impacts on marine water quality and, if discharged in compliance with an approved NPDES permit, would produce only minor, localized changes to ambient marine water quality.

Biological Resources. Current and proposed deepwater ports could interact with other OCS activities to produce minor, long-term adverse cumulative impacts on biological resources. Marine mammals and sea turtles are and have been impacted by an increase in vessel traffic, turbidity, an increase in marine debris, and a general increase in water quality degradation from waste discharges. Benthic communities currently are and have been impacted by construction and installation of OCS platforms and pipelines, fishing, vessel anchoring, and a general degradation of sediment quality. The adverse effects on these resources from construction and operation of the proposed Terminal are expected to be minor.

Geological Resources. Construction routes and associated activities in the GOM would be required to avoid any impacts on sensitive geological resources; no sensitive geological resources were identified. The USCG has determined that the amended Application would not change the impacts as presented in the MPEH™ Final EIS.

Land Use. The establishment of a fishing exclusion zone around the MPEH™ is localized and has little potential to interact with other fishing exclusion zones to produce a cumulative effect. Existing and proposed MPEH™ facilities are similar to MMS-defined OCS activities; however, MPEH™ activities would be relatively small compared to OCS activities, so the cumulative effect would be minor.

Recreation and Visual Resources. A minor short-term adverse impact on recreational fishing would result from temporary displacement associated with Terminal construction activities. The USCG has determined that the amended Application would not change the impacts as presented in the MPEH™ Final EIS.

Socioeconomics. Construction and operation of the MPEH™ has the potential to beneficially affect socioeconomic resources in Louisiana, Mississippi, and Alabama through job creation and expenditures on goods and services. Construction of MPEH™ structures has the potential to interact with construction of other proposed ports if the same fabrication facilities were selected. Unlike deepwater ports that would require construction of gravity-based structures (GBSs), the MPEH™ would reuse existing offshore structures. Therefore, impacts associated with onshore fabrication yards would be fewer. As a result, the potential to interact with construction of the other LNG ports or major construction activities to produce a cumulative effect is much lower. Construction and operational activities associated with the MPEH™ have the potential for minor adverse cumulative impacts from competition for skilled workers; increased demand for goods and services; and, indirectly, by increasing demand for housing and public services. Relative to the existing economic activities associated with oil and gas production in the GOM, the cumulative employment associated with the MPEH™ would have a negligible, short-term, beneficial impact on area economies.

Transportation. Construction and operation of the MPEH™ would increase the number of LNGCs and service vessels operating, but do not and would not affect access to transportation routes, or result in crowding of routes that might lead to substantially increased risks of collisions or other mishaps. Construction and operation of TORP would also increase the number of LNGCs and support vessels operating in the GOM. However, LNGCs transiting to and from the MPEH™ would primarily use the South Pass (Mississippi River) to Mississippi River Gulf Outlet Safety Fairway. Since TORP would be located in deep open water, it would not use any shipping fairways or anchorages and would approach the terminal from the open sea. Due to their locations, the proposed MPEH™ Terminal would receive onshore support services from Venice, Louisiana, while TORP would likely receive onshore support services from Alabama. Due to the geographic separation of the two ports, the potential for them to interact to produce a cumulative effect is small. The USCG has determined that the amended Application would not change the impacts as presented in the MPEH™ Final EIS.

Air Quality. The distance between the proposed MPEH™ and TORP to other proposed offshore LNG terminals, in addition to prevailing atmospheric conditions, is sufficient to make it unlikely that air impacts would interact to produce a cumulative effect. Emissions from the proposed MPEH™ combined with TORP are projected to be a small (less than 2 percent) percentage of other activities on the OCS. Modeling was conducted to determine the impact of the MPEH™ on Class II areas and on the Breton NWR, which is a Class I area. Results of the modeling for Class II areas are below the Class II modeling significance levels; therefore, emissions would not be significant as defined by USEPA's Prevention of Significant Deterioration (PSD) regulations for Class II areas. PSD regulations are not applicable to the Proposed Action, but are used solely as a frame of reference for the NEPA analysis. Cumulative air emissions from existing and proposed onshore and offshore facilities would have long-term adverse impacts on coastal areas and the Breton NWR, but the MPEH™'s contribution would be minor.

Noise. The MPEH™ and TORP operations would be distant from any onshore (human) noise-sensitive areas and would have no adverse short-term or long-term impacts on those areas. The USCG has determined that the amended Application would not change the impacts as presented in the MPEH™ Final EIS.

Safety and Security. There are small but potentially significant risks associated with the storage and handling of LNG. Worst-case modeling scenarios identify a potential maximum hazard radius of approximately 5 miles around the MPEH™ Terminal. With consideration for the distances, operation of the MPEH™ and TORP would increase the overall LNG accident probability but there would be no cumulative contribution to the modeled extent or magnitude of any LNG accident scenario. The USCG has determined that the amended Application would not change the impacts as presented in the MPEH™ Final EIS.

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ENVIRONMENTAL ASSESSMENT FOR THE MAIN PASS ENERGY HUB™ DEEPWATER PORT LICENSE APPLICATION AMENDMENT

TABLE OF CONTENTS

APPENDICES

TABLES

FIGURES

ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/L	micrograms per liter
µg/m^3	micrograms per cubic meter
ATBA	Area to be Avoided
BA	Biological Assessment
bbl	barrels
bcf	billion cubic feet
bcfd	billion cubic feet per day
BO	Biological Opinion
BOD	Biological Oxygen Demand
BOET	Bienville Offshore Energy Terminal
BOG	boil-off gas
BS	bridge support
Btu	British thermal units
Btu/cf	British thermal units per cubic foot
CAA	Clean Air Act
CDP	census designated place
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cm	centimeter
CO	carbon monoxide
CO_2	carbon dioxide
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
dB	decibel
dBA	A-weighted decibel
DHS	Department of Homeland Security
DNL	day-night average sound level
DWPA	Deepwater Port Act
e^{2}M	engineering-environmental Management, Inc.
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FERC	Federal Energy Regulatory Commission
FSP	Facility Security Plan
ft	feet
ft/s	feet per second
ft^2	square feet
GBS	gravity-based structure
GHV	gross heating value
GOM	Gulf of Mexico
gpd	gallons per day
gpm	gallons per minute
H_2CO_3	carbonic acid
HLV	heavy lift vehicle
HP	high-pressure
Hz	Hertz
IFV	intermediate fluid vaporizer
in	inch
ITS	incidental take statement
kHz	kilo-Hertz
km	kilometer
km^2	square kilometers
LNG	liquefied natural gas
LNGC	liquefied natural gas carrier
LOOP	Louisiana Offshore Oil Port
LP	low-pressure
m	meter
m^3	cubic meters
m^3/h	cubic meters per hour
m^3/s	cubic meters per second
MARAD	Maritime Administration
MCC	Motor Control Center

mg/L	milligram per liter
MGD	million gallons per day
mi	mile
MMS	Minerals Management Service
MP	Main Pass
MPEH™	Main Pass Energy Hub™
MSL	modeling significance level
MW	megawatt
Na_2CO_3	sodium carbonate
NAAQS	National Ambient Air Quality Standards
NaOH	sodium hydroxide
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NGL	natural gas liquids
NH_3	ammonia
NM	nautical mile
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOI	Notice of Intent
NO_x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NWR	National Wildlife Refuge
OCS	Outer Continental Shelf
ORV	open rack vaporizer
OWS	oily water separators
P.L.	Public Law
PLEM	Pipeline End Manifold
PM_{10}	Particulate matter less than or equal to 10 microns in diameter
ppm	parts per million
ppt	parts per thousand (‰)
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
psig	pounds per square inch gauge
psu	practical salinity units
RCRA	Resource Conservation and Recovery Act
RO	reverse osmosis
ROD	Record of Decision
ROI	Region of Influence
SCR	selective catalyst reduction
SCV	submerged combustion vaporizer
SEAMAP	South East Area Monitoring Assessment Program
SO_2	sulfur dioxide
TAP	Toxic Air Pollutant
tcf	trillion cubic feet
TEG	triethylene glycol
TORP	Terminal Offshore Regas Plant
tpy	tons per year
U.S.C.	United States Code
UPS	uninterruptible power supply
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WHR	waste heat recovery

COMMON CONVERSIONS

Temperature

°F =	°C x 1.8 + 32
°C =	(°F – 32) ÷ 1.8

Length/Distance

1 in =	2.540 cm
1 in =	25.40 mm
1 ft =	0.3048 m
1 m =	3.2808 ft
1 mi =	1.6093 km
1 km =	0.6214 mi
1 NM =	1.15 mi

Volume

1 ft^3 =	0.02832 m^3
1 gal =	0.003785 m^3
1 m^3 =	264.172 gal
1 gal =	0.0238 bbl
1 m^3 =	6.29 bbl
1 MG =	23,800 bbl

Mass

1 g =	0.0022 lb

Flow Rate (unit volume per time)

1 bbl/hr =	0.1192 m^3/h
1 ft^3/s =	0.028316 m^3/s
1 ft^3/s =	448.8 GPM
1 GPD =	0.003785 m^3/day
1 GPM =	0.00379 m^3/min
1 MGD =	0.0438 m^3/s

Velocity

1 ft/s =	0.3048 m/s
1 ft/s =	30.48 cm/s
1 m/s =	1.467 ft/s

Concentration

1 mg/L =	1 ppm (in water)
1 mg/L =	1 x 10^6 µg/m^3

Energy

1 Btu =	2.9308 x 10^{-4} kW-hr

Pressure

1 psi =	psig + atmospheric pressure
1 psi =	0.0689476 bar
1µPa =	145 psi

1. Introduction

1.1 Deepwater Port License Application

On February 27, 2004, Freeport-McMoRan Energy LLC (also referred to as the Applicant) submitted to the U.S. Coast Guard (USCG) and the Maritime Administration (MARAD) an Application under the Deepwater Port Act of 1974 (DWPA)[1] for all Federal authorizations required for a license to own, construct, and operate a deepwater port off the coast of Louisiana. The proposed project, referred to as the Main Pass Energy Hub™ (MPEH™),[2] was assigned Docket No. USCG-2004-17696.[3] On June 9, 2004, the USCG and MARAD issued a Notice of Application in the *Federal Register* summarizing the Application.[4] A Draft Environmental Impact Statement (Draft EIS) on the MPEH™ Deepwater Port License Application was prepared and a Notice of Availability was published in the *Federal Register* on June 17, 2005.[5] Public hearings on the Draft EIS were held on July 18, 19, and 20, 2005, at Grand Bay, Alabama; Pascagoula, Mississippi; and New Orleans, Louisiana; respectively. Comments on the Draft EIS were addressed and the Final EIS was published on March 10, 2006.[6] Hearings on the License Application were held on March 21, 22, and 23, 2006, at Grand Bay, Alabama; Pascagoula, Mississippi; and New Orleans, Louisiana; respectively.

On May 5, 2006, Louisiana Governor Kathleen Blanco—citing her concern over the environmental impacts of Open Rack Vaporizers (ORVs)—exercised her authority under the DWPA (Title 33 United States Code [U.S.C.] Sections 1503(c)8 and 1508(b)(1)) and disapproved Freeport-McMoRan Energy LLC's Application for the MPEH™. On May 31, 2006, Freeport-McMoRan Energy LLC submitted an amendment to its Application pursuant to the USCG's Temporary Interim Rule (69 *Federal Register* 724, January 6, 2004)[7] to own, construct and operate the MPEH™. The amendment changed the Applicant's preferred vaporization technology from ORV to a "closed-loop" submerged combustion vaporization (SCV) with selective catalytic reduction (SCR) to control air emissions (hereinafter referred to as SCV-SCR), and associated changes to Terminal infrastructure to support SCV-SCR operations. These changes are presented in **Section 1.3** and **Section 2**.

On June 21, 2006 the Administrator of MARAD issued a Record of Decision (ROD) that a license will not be issued on the proposed project, no further action would be taken on the application as originally submitted, and MARAD will process the amended Application. Following consultation with the Council on Environmental Quality (CEQ) and other cooperating agencies, the USCG and MARAD determined that an Environmental Assessment (EA) would provide the appropriate level of National Environmental Policy Act (NEPA) review and analysis on the actual design proposed and to determine if there were any significant impacts beyond those previously assessed in the MPEH™ Final EIS. The EA incorporates by reference and supplements the MPEH™ Final EIS.

The staffs of the USCG and MARAD have jointly prepared this EA on the revised License Application for the proposed MPEH™ Project. Together, the USCG and MARAD are the lead Federal agencies responsible for compliance with NEPA for the MPEH™ facilities. This EA together with the MPEH™

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1 Public Law (P.L.) 93-627, Sec. 3, January 3, 1975, 88 Stat. 2127, as amended, codified to 33 U.S. Code (U.S.C.) 1501–1524.

2 "Main Pass Energy Hub" and "MPEH" are trademarks of Freeport-McMoRan Energy LLC.

3 The U.S. Department of Transportation (USDOT) Docket can be accessed at <*http://dms.dot.gov*>.

4 Vol. 69, *Federal Register*, No. 111, Wednesday, June 9, 2004, pp 32363–64.

5 Vol. 71, Federal Register, No. 49, Tuesday, March 14, 2006, pp. 13213-15.

6 The *Final EIS for the MPEH™ Deepwater Port License Application*, March 2006, is available on the USDOT Docket at: <*http://dms.dot.gov*>. The Docket Number is 17696, and the Final EIS is document numbers 232 through 247.

7 Vol. 69, *Federal Register*, No. 3, Tuesday, January 6, 2004, pp 723–87. The temporary interim rule amends 33 Code of Federal Regulations (CFR) Part 148, Deepwater Ports: General; 33 CFR Part 149, Deepwater Ports: Design, Construction, and Equipment; and 33 CFR Part 150, Deepwater Ports: Operations.

Final EIS completed in March 2006 for those aspects of the proposed project not impacted by the decision to change vaporization technology satisfies the requirements of the NEPA, the DWPA, Department of Homeland Security (DHS) Management Directive 5100.1 (Environmental Planning Program), USCG Commandant Instruction M16475.ID, the Natural Gas Act, Section 10 of the Rivers and Harbors Act of 1899, and Sections 402 and 404 of the Clean Water Act (CWA).

The DWPA establishes a licensing system for ownership, construction, and operation of deepwater ports in waters beyond the territorial limits of the United States. Originally, the DWPA promoted the construction and operation of deepwater ports as a safe and effective means of importing oil into the United States and transporting oil from the Outer Continental Shelf (OCS), while minimizing tanker traffic and associated risks close to shore. In 2002, the Maritime Transportation Security Act[8] amended the definition of "deepwater port" to include facilities for the importation of natural gas.

Under the DWPA, all deepwater ports must be licensed by the Secretary of Transportation (Secretary). The DWPA requires a license applicant to submit detailed plans for its facility. The Secretary has delegated the responsibility for processing deepwater port applications to the USCG and MARAD. The USCG retained this responsibility with its transfer to DHS.[9] On June 18, 2003, the Secretary delegated authority to the Maritime Administrator at MARAD to issue, transfer, amend, or reinstate a license for the construction and operation of a deepwater port.[10] Hereafter, "the Secretary" refers to the Maritime Administrator's actions and responsibilities as the delegated representative of the Secretary.

The proposed MPEH™ Port facilities would include

- The reuse of four large existing platforms and three smaller bridge support platforms along with the interconnecting bridges formerly used for sulphur mining operations at Main Pass Lease Block (MP) 299, including the removal and reinstallation of Platform No. 3.
- Installing two new fixed platforms with six tanks capable of storing a combined total of 145,000 cubic meters (m^3) of liquefied natural gas (LNG).
- LNG vaporization equipment capable of vaporizing a maximum of 1.6 billion standard cubic feet per day (bcfd) of LNG using SCV-SCR technology.
- Constructing three new salt cavern-based natural gas storage caverns that would each have a working gas capacity of 9.3 bcf to act as temporary storage for vaporized natural gas.
- Four natural gas pipelines ranging from 41 centimeters (cm) (16 inches [in]) to 51 cm (20 in) in diameter from the Terminal to four offshore locations, and one new platform at MP 164 to be used as a junction for the distribution of natural gas. One 91-cm (36-in) natural gas pipeline to connect onshore in Alabama (Alabama pipeline). Depending on the route alternative chosen, the total length of natural gas pipeline would range from approximately 302 kilometers (km) to 319 km (188 miles [mi] to 199 mi).
- One 30.5-cm (12-in) natural gas liquids (NGL) takeaway pipeline approximately 73.1 km (45.7 mi) long that would connect the MPEH™ to a fractionating facility in Venice, Louisiana.
- Installing miscellaneous additional facilities and equipment to assist with power generation, LNG unloading, gas compression, material handling, accommodations and living quarters for up to 94 personnel, and other support facilities.

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[8] P.L. 107-295.

[9] Title XV (Transition) of the Homeland Security Act provides that "pending matters," including license applications currently being processed, will continue regardless of the transfer of USCG from the USDOT. Even though the function of processing applications has been transferred with USCG to the U.S. Department of Homeland Security, the Secretary of Transportation retains ultimate authority to issue, transfer, amend, or reinstate licenses under the Deepwater Port Act.

[10] Vol. 68, *Federal Register*, No. 117, Wednesday, June 18, 2003, pp 36496–97.

If a license is issued, the Applicant would apply to the Minerals Management Service (MMS) for offshore pipeline rights-of-way and the removal and reinstallation of Platform No. 3. MMS would also be involved in the approval process of the offshore construction, operation, and decommissioning activities of the Terminal, natural gas storage caverns, and pipelines. On May 18, 2006, the Federal Energy Regulatory Commission (FERC) issued a Certificate to Freeport-McMoRan Energy, authorizing the construction and operation of the Alabama natural gas pipeline and auxiliary facilities portion of the proposed project, subject to the Applicant receiving a Deepwater Port License to operate the MPEH™.

Construction of the Terminal and pipelines would require approximately 34 months to complete and the Port would become operational in the fourth quarter of 2009. Construction of the storage caverns would continue for another 2 years (FME 2006a).

1.2 Project Purpose and Need

The purpose of licensing deepwater ports for importing LNG in the OCS is to provide natural gas markets with offshore access to LNG processing facilities. This requires construction of appropriate facilities for receiving the LNG, revaporizing the LNG to a gaseous state, and interconnecting the Port to the transmission pipelines that can reach appropriate markets within the United States. The DWPA of 1974, as amended, was passed to promote and regulate the construction and operation of deepwater ports as a safe and effective means of importing oil or natural gas into the United States. The DWPA requires the Secretary to approve, deny, or approve with conditions a deepwater port license application. In reaching this decision, it is the purpose and need of the Secretary to carry out the Congressional intent expressed in the DWPA, which is to

- "authorize and regulate the location, ownership, construction, and operation of deepwater ports in waters beyond the territorial limits of the United States.
- "provide for the protection of the marine and coastal environment to prevent or minimize any adverse impact which might occur as a consequence of the development of such ports.
- "protect the interests of the United States and those of adjacent coastal States in the location, construction, and operation of deepwater ports.
- "protect the rights and responsibilities of States and communities to regulate growth, determine land use, and otherwise protect the environment in accordance with law.
- "promote the construction and operation of deepwater ports as a safe and effective means of importing oil and natural gas into the United States and transporting oil and natural gas from the outer continental shelf while minimizing tanker traffic and the risks attendant thereto.
- "promote oil and natural gas production on the outer continental shelf by affording an economic and safe means of transportation of outer continental shelf oil and natural gas to the United States mainland."[11]

The DWPA Application currently under consideration is one proposed by Freeport-McMoRan Energy. In its amended Application, Freeport-McMoRan Energy proposes to construct, own, and operate the MPEH™ to receive and vaporize LNG and condition, store, and transport natural gas and constituent NGLs at a geographical location that allows it to connect into the nation's natural gas pipeline infrastructure and reuse existing infrastructure that Freeport-McMoRan Energy affiliates constructed for other purposes. Freeport-McMoRan Energy's proposed Port would provide a new facility for receiving LNG carriers (LNGCs) from foreign markets and for transferring natural gas into the U.S. markets via the

[11] 33 U.S.C. 1501(a)

existing natural gas transmission infrastructure. Multiple natural gas pipeline routes were proposed to provide Freeport-McMoRan Energy the flexibility in accessing the interstate pipeline system at a major distribution center and, therefore, supplying customers throughout the eastern United States through several major interstate pipeline systems.

The proposed Port would help meet the nation's natural gas supply need by enabling natural gas to be delivered into the existing pipeline infrastructure in the Gulf of Mexico (GOM) and the onshore U.S. pipeline network. The proposed Port would provide significant volumes of natural gas to the nation's natural gas distribution markets in the eastern United States, increasing the use of the existing pipeline infrastructure and providing supply diversification. To ensure that the intended purpose of natural gas deepwater ports is encouraged, the DWPA allows the proposed Port to operate under a strategy of "exclusive use," dedicating the entire capacity of the facility for its own purposes without being subject to the requirements of open access or common carriage.

A number of factors are contributing to interest in increasing the level of U.S. imports of LNG, including higher domestic natural gas costs (Gaul and Young 2003). In the *Annual Energy Outlook 2006* Report (EIA 2006) the price of natural gas to residential consumers would be 9 percent higher in 2015, 12 percent higher in 2025, and 13 percent higher in 2003 as compared to 2004. Other factors contributing to interest in increasing the level of LNG imports are leveling off of domestic gas production and supplies; and technological advances in liquefying, shipping, storing, and regasifying LNG, which have reduced the cost of transporting and importing LNG (Gaul and Young 2003). Currently there are more than 30 new onshore and offshore LNG terminals under consideration, although not all of these projects are expected to be built. The Energy Information Administration projects that by 2025, annual LNG imports will be 4.1 tcf (116 billion m^3), 7 times what they were in 2004 (EIA 2006).

LNG is natural gas that has been cooled to about -162.2 degrees Celsius (°C) (-260 degrees Fahrenheit [°F]) for efficient shipment and storage as a liquid. LNG is more compact than the gaseous equivalent, with a volumetric difference of about 610 to 1. LNG can be transported long distances across oceans using specially designed ships, thus allowing access to stranded reserves of natural gas that cannot be transported by conventional pipelines. Onshore marine LNG import terminals currently exist in the United States at the following four locations: Everett, Massachusetts; Cove Point, Maryland; Elba Island, Georgia; and Lake Charles, Louisiana. These facilities were built between 1971 and 1982. The Gulf Gateway offshore LNG deepwater port is 187 km (116 mi) south of Cameron, Louisiana, and began operations in 2005. In 2004, LNG imports into the United States totaled about 652 bcf (18 billion m^3) (CEC 2005). The nation's need for additional sources of natural gas and the purpose of and need for the Proposed Action are discussed in further detail in the MPEH™ Final EIS.

1.3 Scope of the EA

In processing license applications under the DWPA, the Secretary (through MARAD and the USCG) is responsible for complying with a variety of Federal regulations, including NEPA. As such, the purpose of this EA together with the MPEH™ Final EIS completed in March 2006 for those aspects of the proposed project not impacted by the decision to change vaporization technology is to provide an environmental analysis sufficient to support the Secretary's licensing decision; to facilitate a determination of whether Freeport-McMoRan Energy has demonstrated that the MPEH™ would be located, constructed, operated, and decommissioned using the best available technology necessary to prevent or minimize adverse impacts on the environment; and to encourage and facilitate involvement by the public and interested agencies in the environmental review process.

The MPEH™ Deepwater Port License Application originally proposed the use of "open-loop" ORVs. In the Application Amendment, the applicant is now proposing a "closed-loop" SCV-SCR system. Though similar, a somewhat generic SCV-SCR system was analyzed in sufficient detail in the MPEH™ Final EIS as an alternative for public review and comment (Option 1d). This Application Amendment has now provided expanded and refined actual design information. This EA was prepared to provide analysis of the actual SCV-SCR design proposed and to determine if there were any significant impacts beyond those previously assessed in the MPEH™ Final EIS. All other aspects of the MPEH™ Final EIS still apply.

This EA assesses the potential environmental impacts associated with the proposed use of SCV-SCR for revaporizing LNG, as defined in Freeport-McMoRan Energy's amended DWPA License Application. In switching from an open-loop to a closed-loop system, the Applicant eliminated seawater usage; replaced water-cooled generators with low emission, air cooled gas turbine generators; proposed use of sodium hydroxide to neutralize the SCV process water; would move Platform No. 3 from its current position to the Terminal to support vaporization equipment; and made other minor changes to Terminal operations and infrastructure to support SCV-SCR operations. Proposed non-Terminal construction and operations were not changed by the amended Application; since non-Terminal impacts were fully evaluated in the MPEH™ Final EIS they will not be repeated here and instead are incorporated by reference. This EA is a supplement to the MPEH™ Final EIS. The elements of the Proposed Action not changed by the amended Application include construction and operation of the Natural Gas Storage Caverns (MPEH™ Final EIS Section 2.2.1.1.4); Mooring System (MPEH™ Final EIS Section 2.2.1.1.5); Port Decommissioning (MPEH™ Final EIS Section 2.2.1.1.8); Marine Ships, Vessel Routes, and Anchorages (MPEH™ Final EIS Section 2.2.1.1.9); Offshore Pipelines and new platform at MP 164 to be used as a junction for the distribution of natural gas (MPEH™ Final EIS Section 2.2.1.2); Offshore Installation (MPEH™ Final EIS Section 2.2.1.4); Onshore Pipelines (MPEH™ Final EIS Section 2.2.2); Wetlands Restoration and Mitigation (MPEH™ Final EIS Section 2.2.3); Fabrication Site (MPEH™ Final EIS Section 2.2.4); and Surface Requirements (MPEH™ Final EIS Section 2.3).

The affected environment (Section 3) encompassed by the MPEH™ Final EIS included water quality, biological resources, cultural resources, geological resources, socioeconomics, transportation, air quality, noise, land use, recreation and aesthetics, and risk management. Those sections are incorporated herein by reference.[12] This EA describes the Proposed Action and potential alternatives (**Section 2**), the probable environmental consequences that might result from construction and operation of the proposed Port using SCV-SCR technology (**Section 4**), risk management (**Section 5**), cumulative and other impacts (**Section 6**), preparers (**Section 7**), and references (**Section 8**).

1.3.1 Impact Characterizations

In developing this EA, the agencies adhered to the procedural requirements of NEPA, the CEQ regulations for implementing NEPA (40 Code of Federal Regulations [CFR] 1500–1508), DHS Management Directive 5100.1, *Environmental Planning Program*, USCG procedures for implementing NEPA (Commandant's Instruction M16475.1D, *National Environmental Policy Act Implementing Procedures and Policy for Considering Environmental Impacts*), and the USCG's temporary interim rule for deepwater ports for LNG. The following elaborates on the nature of the characteristics that might relate to various impacts:

- *Short-term or long-term*. These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity or for a finite period or only during the time required for construction or installation activities. Long-term impacts are those that are more likely to be persistent and chronic. For instance, air emissions associated with vessel traffic at the Port would

[12] The *Final EIS for the MPEH™ Deepwater Port License Application*, March 2006, is available on the USDOT Docket at <*http://dms.dot.gov*>. The Docket Number is 17696, and the Final EIS is document numbers 232 through 247.

occur for 30 years, the entire period of operation. Other types of long-term impacts, however, might persist even beyond the Port's authorized operational period.

- *Direct or indirect*. A direct impact is caused by a Proposed Action and occurs contemporaneously at or near the location of the action. An indirect impact is caused by a Proposed Action and might occur later in time or be farther removed in distance but still be a reasonably foreseeable outcome of the action. For example, a direct impact of erosion on a stream might include sediment-laden waters in the vicinity of the action, whereas an indirect impact of the same erosion might lead to lack of spawning and result in lowered reproduction rates of indigenous fish downstream.
- *Negligible, minor, moderate, or major*. These relative terms are used to characterize the magnitude or intensity of an impact. Negligible impacts are generally those that might be perceptible but are at the lower level of detection. A minor impact is slight, but detectable. A moderate impact is readily apparent. A major impact is one that is severely adverse or exceptionally beneficial.
- *Significance.* Significant impacts are those that, in their context and due to their intensity (severity), meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27). This EA is a supplement to the MPEH™ Final EIS and meets the agencies' requirements to prepare a detailed statement on major Federal actions significantly affecting the quality of the human environment (42 U.S.C. 102.2(c)).
- *Adverse or beneficial*. An adverse impact is one having adverse, unfavorable, or undesirable outcomes on the man-made or natural environment. A beneficial impact is one having positive outcomes on the man-made or natural environment. A single act might result in adverse impacts on one environmental resource and beneficial impacts on another resource.

1.4 Public Review and Comment

Agency and public participation in the NEPA process promotes open communication between the public and the government and enhances decisionmaking. All persons and organizations having a potential interest in the Secretary's decision whether to grant the license are encouraged to participate in the decisionmaking process.

The CEQ regulations implementing NEPA state that agencies "Shall prepare, circulate, and file a supplement to a statement in the same fashion (exclusive of scoping) as a draft and final statement unless alternative procedures are approved by the Council." The USCG and MARAD published a Notice of Intent (NOI) to prepare an EA in the *Federal Register*.[13] The NOI provided information on the amended Application and how the public could submit comments by mail, hand delivery, facsimile, or electronic means. An Interested Party Letter, the NOI published in the *Federal Register*, and a fact sheet describing the project were sent to approximately 350 state, Federal, and local agencies, and other potentially interested parties (see **Appendix A**). All responses were considered in the preparation of this EA. In accordance with NEPA and the DWPA, the USCG and MARAD will provide a 45-day period for the public and agencies to review and comment on this EA.

1.5 Permits, Approvals, and Regulatory Requirements

As the lead agencies for administration of the DWPA, the USCG and MARAD are responsible for license application processing and issuance, NEPA compliance, and compliance with the provisions of numerous

[13] Vol. 71, *Federal Register*, No. 154, August 10, 2006, pp 45899-45890.

state and Federal environmental laws that require consultation with other agencies concerning specific environmental resources. Examples of these include Section 7 of the Endangered Species Act (ESA), the Magnuson-Stevens Fishery Conservation and Management Act, and Section 307 of the Coastal Zone Management Act (CZMA). In addition, any enforceable conditions imposed as part of an approved license must be consistent with the appropriate and applicable regulatory requirements. A license, if issued, would require the Applicant to comply with all environmental mitigations, standards, and limitations set forth in the environmental permits issued by the regulatory agencies.

Compliance with several state and Federal environmental laws was completed during the preparation of the MPEH™ Final EIS. Development of this EA included consultation with state and Federal agencies as appropriate to the Proposed Action. For its part, the Applicant would be required to obtain and comply with all applicable and appropriate permits, guidelines, and approvals as provided for in the CZMA, the CWA, and the Clean Air Act (CAA) for any impacts on coastal resources, wastewater discharges, or regulated air emissions to the environment. It is the Applicant's responsibility to provide the licensing agency with the information necessary to evaluate potential compliance with the applicable regulations and guidelines.

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2. Proposed Action and Alternatives

The Secretary proposes to act on Freeport-McMoRan Energy's amended Deepwater Port License Application to own, construct, and operate the MPEH™ Deepwater Port. As proposed in the amended Application, the MPEH™ Terminal would receive, store, and revaporize LNG using SCV-SCR technology. The amended Application also proposes to relocate Platform No. 3 to the Terminal from its present location about 1-mile north of the Terminal.

2.1 Overview of the Proposed MPEH™ Deepwater Port

The proposed MPEH™ Terminal would be situated in the GOM approximately 25.7 km (16 mi) southeast of the coast of Louisiana in Main Pass Lease Block 299 (MP 299), in a water depth of approximately 64 meters (m) (210 feet [ft]). The location of the proposed Port is shown in **Figure 2-1**. General layouts of the proposed Terminal and the proposed Port infrastructure are shown in **Figure 2-2**.

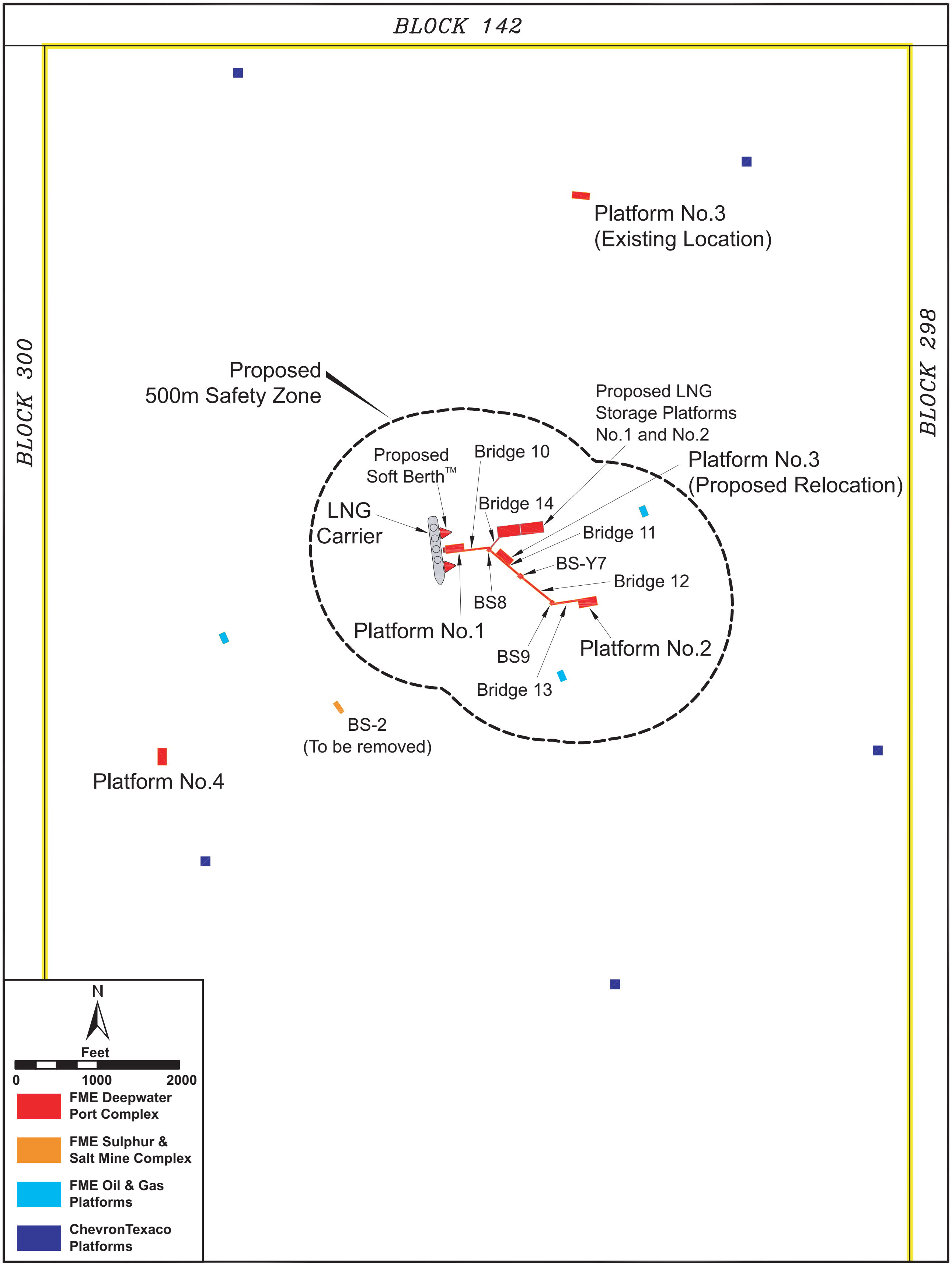
As shown in **Figure 2-2**, the proposed Terminal would consist of four existing platforms and two new adjacent platforms all in close proximity to each other with connecting bridgework. As proposed, the Terminal would accommodate LNGC berthing, LNGC unloading, six LNG storage tanks with a total net capacity of approximately 145,000 m^3, LNG vaporization, natural gas processing or conditioning, NGL metering and takeaway pipeline connections, salt cavern natural gas storage, natural gas compression, natural gas dehydration, natural gas metering and pipeline export (including one new platform at MP 164 to be used as a pipeline junction), power generation, storage facilities for spares and consumables, living quarters for up to 94 personnel, and facilities for flight operations (helidecks). The major components of the proposed Terminal are shown on **Figure 2-3** and are discussed in detail in **Section 2.2.1**.

MP 299 sits atop a salt dome approximately 3.2 km (2 mi) in diameter. Storage for 27.9 bcf of natural gas would be provided by creating three salt caverns in the salt dome below the proposed LNG Terminal. Storing natural gas in salt caverns would allow the MPEH™ to provide a consistent supply of natural gas into the pipeline system and the ability to deliver up to 3 bcfd of peak natural gas supply when needed. The cavern-creation process would take approximately 32 months to complete. Prior to construction and operation of the gas storage caverns, the Applicant would be required to obtain a subsurface storage agreement with MMS. The Applicant would also be required to pay royalties to MMS on leached salt for the gas storage caverns. Brine created during the salt cavern formation would be discharged at a maximum rate of 10,500 gallons per minute (gpm) (0.567 cubic meters per second [m^3/s]). Development of the storage caverns was discussed in detail in Sections 2.2.1.1.4 and 5.3 of the MPEH™ Final EIS.

As shown in **Figure 2-2**, and described in **Section 2.2.1.3**, two existing satellite platforms within MP 299 (Platforms No. 3 and No. 4) would be used as part of the proposed Terminal. Of these two existing platforms, Platform No. 3 would be relocated from its current position (approximately 1 mi north of the proposed Terminal) to a site adjacent to existing bridge No. 11 to accommodate three turbine generators and three LNG vaporization units. Platform No. 4, which is approximately 1 mi southwest of the proposed Terminal, has two existing 12,000-long ton liquid storage tanks that would be used for storage of glycol for the cavern gas dehydration system and other operating supplies and chemicals (**Figure 2-2**).

Freeport-McMoRan Energy's amended Application changed LNG vaporization technology to from ORV to SCV-SCR which eliminated seawater usage, changed gas turbine generators to fin-fan air-cooled heat exchangers which eliminated the water-cooled system, incorporated the use of sodium hydroxide to neutralize the SCV process water, and moved Platform No. 3 from its current position to the Terminal to support vaporization equipment.

Figure 2-1. Location of Proposed MPEH™



Source: Freeport-McMoRan Energy LLC

Figure 2-2. Location Plan for MPEH™ Terminal

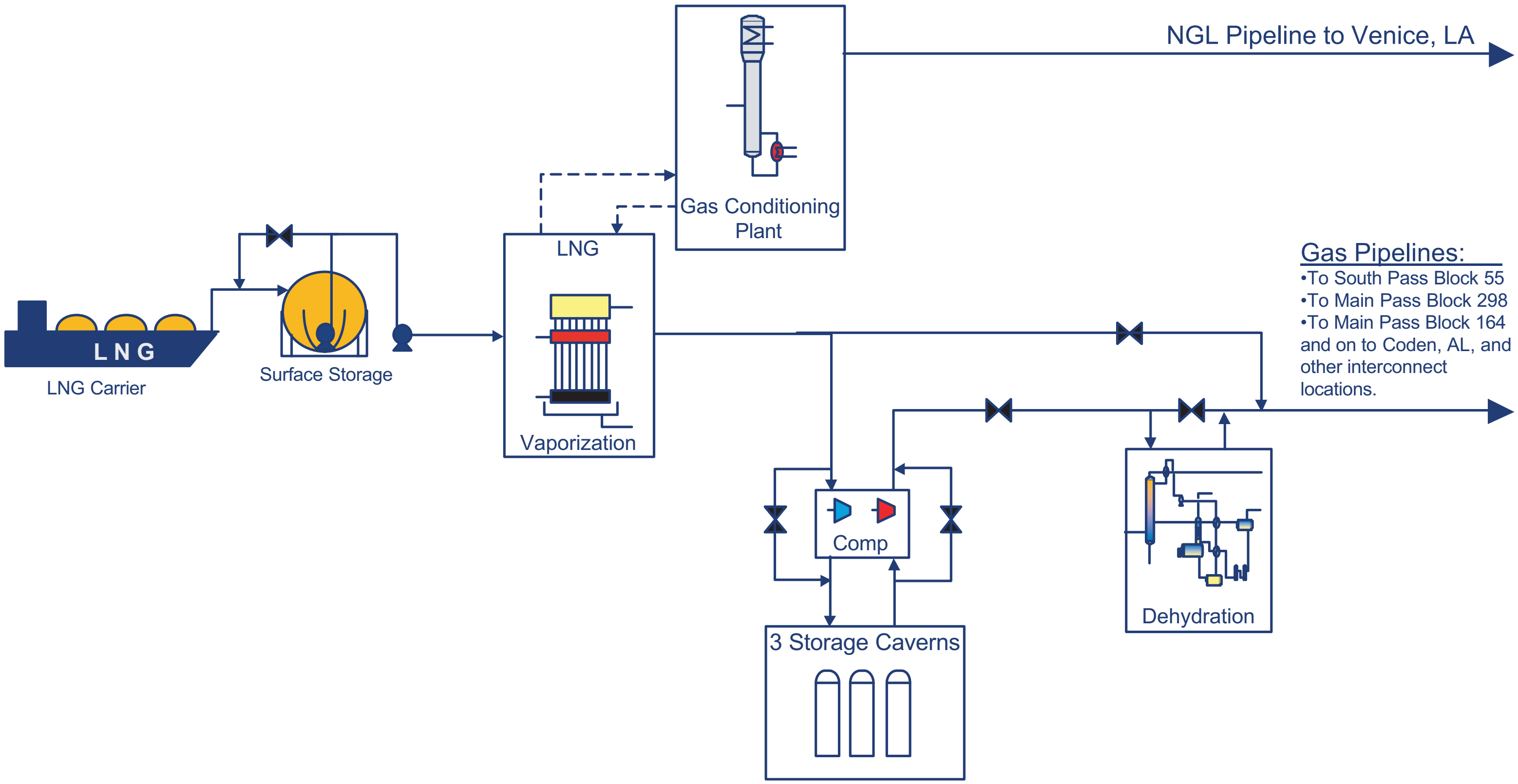


Figure 2-3. Overview of the MPEH™ Process

Subject to the Secretary's favorable action, consent by the governors of the adjacent coastal states, and no objection from the Administrator of the U.S. Environmental Protection Agency (USEPA), commissioning of the proposed Port would occur approximately 3 years after issuance of the license. Construction of the storage caverns would continue for another 2 years.

2.2 MPEH™ Components Unchanged from the Final EIS

The following elements of the Proposed Action were evaluated in the MPEH™ Final EIS, were unaffected by the amended Application, and therefore are incorporated in this EA by reference.

2.2.1 Natural Gas Storage Caverns

Storage for 27.9 bcf of natural gas would be provided by creating three salt caverns in the salt dome below the proposed MPEH™ Terminal. The salt cavern storage of natural gas would allow the proposed Port to provide a consistent volume of natural gas into the pipeline system and also meet peak demand needs. Three wells would be directionally drilled and the caverns would be solution-minded from these wells (see MPEH™ Final EIS Section 2.2.1.1.4).

2.2.2 Mooring System

Berthing of the LNGCs at the terminal would be accomplished using Soft Berth™. This system includes two dolphins, two auxiliary berthing buoys, and any associated equipment. The system would allow the berthing of LNGCs adjacent to Platform No. 1, the unloading of LNG, and the disconnection and egress of the LNGC after unloading is complete (see MPEH™ Final EIS Section 2.2.1.1.5).

2.2.3 Marine Ships, Vessel Routes, and Anchorages

The proposed MPEH™ would be designed to handle ships with a capacity of up to 160,000 m^3 of LNG. If the proposed Port were constructed, there would be approximately 2 LNGC trips per week (106 per year). This represents a reduction from 121 LNGC trips per year as analyzed in the MPEH™ Final EIS, and is based on LNGCs of up to 160,000 m^3 capacity currently in use. Vessels into and out of the MPEH™ Port would use GOM fairways to the south and southwest of the proposed Terminal, principally the South Pass (Mississippi River) to Mississippi River Gulf Outlet Safety Fairway (see MPEH™ Final EIS Section 2.2.1.1.9). The USCG has determined that the amended Application would not change the construction and operational impacts from vessel transportation as presented in the MPEH™ Final EIS.

2.2.4 Offshore Pipelines

Six proposed pipelines totaling approximately 309 kilometers (192 miles) would transport natural gas and NGLs from the MPEH™ Terminal. Five takeaway pipelines, subsea tie-ins, and one new junction platform at MP 164 would distribute natural gas into the interstate pipeline system. Four of the pipelines would be entirely offshore; one natural gas pipeline would have onshore components. The junction platform at MP 164 would be approximately 64.4 kilometers (40 miles) from the Mississippi coast. One pipeline would carry NGLs to a facility near Venice, Louisiana, and would have onshore components. Offshore pipeline construction and operation would be overseen by MMS. The Applicant would follow MMS guidelines for pipeline installation, operation, and mitigation. Decommissioning of the pipes would involve filling them with appropriate water, cutting them off at the mudline, and burying the ends (see MPEH™ Final EIS Section junction 2.2.1.2).

2.2.5 Onshore Pipelines

One onshore pipeline would be constructed to bring natural gas to the interstate natural gas pipeline system. This preferred pipeline route, called the Bayou La Batre Route, was approved by FERC based on the MPEH™ Final EIS. The Bayou La Batre pipeline would extend into the Mississippi Sound along the eastern edge of the Bayou La Batre navigation channel, turn east just north of Coffee Island, and make landfall through a horizontal directional drill under the coastline. The onshore portion of the pipeline would be collocated for most of the route with the Gulfstream pipeline. It would then progress onshore for approximately 8.2 km (5.1 mi) to an ultimate interconnection with Gulf South/Florida Gas, Transco/Florida Gas, and Gulfstream natural gas systems in Coden, Alabama (see MPEH™ Final EIS Section 2.2.2).

The NGL pipeline would run west from MP 299 into Louisiana waters and connect to a fractionating facility in Venice, Louisiana. The northern route is the Baptiste Collette Bayou Route Alternative, and the southern route is the Pass A Loutre Route Alternative. The Baptiste Collette Bayou Route is the Applicant's preferred alternative (see MPEH™ Final EIS Section 2.2.2).

2.2.6 Wetlands Restoration and Mitigation

Wetlands mitigation and restoration plans were developed by the Applicant in December 2005 to mitigate unavoidable impacts on wetlands and water bodies from pipeline construction. Plans were prepared in compliance with U.S. Army Corps of Engineers (USACE) guidelines. The Applicant proposed to allow wetlands vegetation temporary impacted by construction to recolonize naturally. If natural revegetation does not produce satisfactory results, the USACE, FERC (for the onshore natural gas pipeline), and other Federal and state agencies overseeing pipeline construction would require additional restoration activities until revegetation was successful. The Applicant proposed off-site mitigation for wetlands permanently impacted by construction of the NGL pipeline. For the natural gas pipeline in Alabama, forested wetlands temporally impacted would be mitigated on a 1:1 ratio and all other wetland types would be mitigated on a 2:1 ratio (see MPEH™ Final EIS Section 2.2.3).

2.2.7 Fabrication Site

The J. Ray McDermott, Gulf Island Fabrication and Kiewitt Offshore Services were identified as being capable of providing the fabrication services necessary for the MPEH™ Port. Existing facilities are adequate for the fabrication of all structures and equipment. Specialized components would be fabricated by specific manufacturers and assembled at the fabrication site. Terminal construction activities would employ approximately 350 workers for 21 months, with a peak of 450 workers. Fabrication activities would last 24 months (see MPEH™ Final EIS Section 2.2.4).

2.2.8 Decommissioning

The terminal would be designed for a 30-year service life. Decommissioning at the end of this service life would make use of conventional offshore platform salvage techniques. LNG facilities would be decommissioned in place, and pilings would be cut below the mud line. Bridge structures would be scrapped or disposed of at a permitted reefing site. The dolphins could either be reused at another site or scrapped (see MPEH™ Final EIS Section 2.2.1.1.8). The well drilled into the cap rock and salt dome for solution-mining and natural gas storage and retrieval would be sealed to prevent seawater from entering the cavern. An abandonment plan would require MMS approval.

2.3 Description of the Proposed Action/Deepwater Terminal

The proposed MPEH™ Terminal would be installed on a combination of new and modified existing platforms. Existing Platforms No. 1 and No. 2 and interconnecting bridge structures originally constructed for sulphur mining operations would be converted for use in the proposed Terminal. Existing platforms would support the living quarters and process facilities. Platform No. 3 would be removed from its current position approximately 1 mi north of existing Platforms No. 1 and No. 2 and moved to be adjacent to Bridge No. 11 (**Figure 2-2**). Two new platforms would be constructed for six LNG storage tanks.

The proposed Terminal would provide complete facilities to receive, regasify, store, and deliver natural gas to the pipeline system. The facility would be supplied with all utilities and infrastructure required for independent operation. The following discussion of Terminal facilities and operation activities is divided into five major components: (1) process facilities, (2) utility systems, (3) structures and buildings, (4) general port operations protocols, and (5) decommissioning. Each component is discussed in detail below.

2.3.1 Process Facilities

Process facilities are composed of services directly in contact with LNG supplied from LNGCs. The proposed Terminal process facilities would be designed to accept, regasify, and distribute LNG to the pipelines meeting all pipeline specifications. The LNG would be transferred from LNGCs into storage tanks at the Terminal at a rate of 10,000 to 14,000 cubic meters per hour (m^3/h). LNG from the storage tanks would be pumped for regasification and gas conditioning. The gas would be further routed to either the gas storage caverns or to a pipeline. Prior to send-out into takeaway pipelines, natural gas from the salt cavern storage would be processed through a gas dehydration system, making the natural gas ready for market. These processes are discussed in more detail below.

2.3.1.1 LNG offloading

The LNG offloading facilities would be designed to accommodate LNGCs ranging in capacity from 60,000 to 160,000 m^3. LNG would be offloaded from an LNGC to the storage tanks through an LNG unloading arms package. The offloading rate would be 10,000 to 14,000 m^3/h. The complete LNGC unloading cycle of berthing, hookup, offloading, disconnecting, and unberthing would be 18 to 24 hours.[14]

2.3.1.2 LNG storage

The proposed Terminal would contain six LNG storage tanks, each with an approximate gross capacity of 24,250 m^3 per tank, for a total gross capacity of approximately 145,000 m^3. Three tanks each would be on two new platforms connected by a bridge to the production platforms. The tanks would be designed to limit LNG boil-off to less than 0.1 percent during steady-state conditions. Each tank would have two submerged retractable LNG in-tank pumps. The capacity of each pump would be 12.5 percent of the peak LNG flow required. The in-tank pump would transfer LNG from storage tanks to low-pressure (LP) LNG supply pumps mounted on Platform No. 1. Each in-tank pump would be designed for a flow rate of 1,750 gpm with a differential head of 70 pounds per square inch (psi).

[14] The proposed Terminal would be able to accommodate LNGCs with 160,000 m^3 capacity through a combination of 145,000 m^3 of LNG storage capacity and LNG vaporization capacity. During a routine 12-hour offloading effort, operating at the maximum vaporization rate of 1.6 bcfd, the facility could vaporize 37,000 m^3 of LNG. Combining LNG vaporization capacity with surface storage would result, theoretically, in a capacity of 182,000 m^3 for offloading. Additional offloading time would be required to accommodate LNGCs with capacity greater than 182,000 m^3.

2.3.1.3 Boil-off gas compression and condensation

Some LNG would be vaporized in the tank by heat picked up from various sources, such as tank and pipeline surroundings, changes in fluid composition when LNG is offloaded to the tank from the LNGC, and input due to electrical inefficiencies of the in-tank pump and the ship offloading pumps. The vapor produced from these sources is referred to as boil-off gas (BOG). The BOG compressor(s) would compress this gas to approximately 100 pounds per square inch gauge (psig) and route it to the BOG condenser where it would be condensed by being mixed with a portion of the subcooled LNG pumped out of LNG storage tanks. LNG leaving the bottom of the condenser would be combined with the main flow from the in-tank LNG pumps and taken by the suction of the LP LNG supply pumps.

2.3.1.4 Low-pressure LNG supply

LNG from the BOG condenser would be pumped to an intermediate pressure of 590 psig by an LP LNG supply pump. Only part of this LNG would be routed via a gas conditioning plant to remove some of the heavier components to meet the final gas pipeline gross heating value (GHV) specifications. Six LP LNG supply pumps would be provided, five as working pumps and one as an installed spare.

2.3.1.5 Gas conditioning

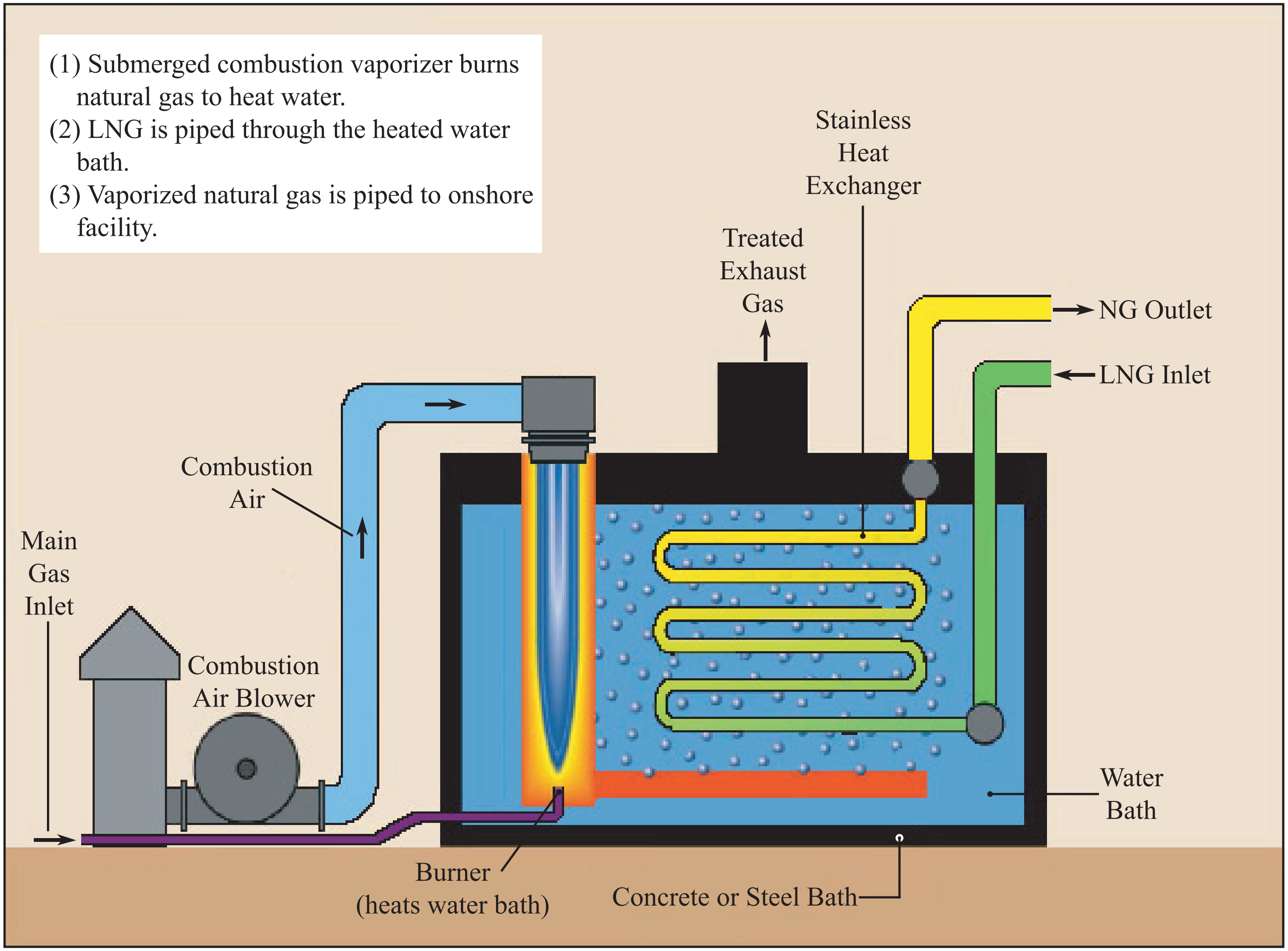
The pipeline specification requires the send-out natural gas to have a maximum GHV of 1,075 British thermal units per cubic foot (Btu/cf). Gas conditioning would be required because incoming LNG GHV would be approximately 1,156 Btu/cf. The Applicant determined that only approximately 1 bcfd of idle natural gas processing capacity was available in the southeastern Louisiana area. The Pascagoula plant has a capacity of 0.75 bcfd, which would likely be taken by expansion of deepwater oil and gas projects. The Mobile Bay plants have a total capacity of approximately 1.2 bcfd, although only 0.75 bcfd is currently being processed. The region's plants could not reliably handle the large capacity necessitated by the proposed Port, and the entire available processing capacity of the region could not handle the proposed 3-bcfd send-out peak capacity of the proposed Port's vaporizers and storage capacity. In addition, wet gas processing plants cannot "ramp" up fast enough to accommodate the large-volume withdrawals that would routinely flow from the proposed Port's storage caverns. Accordingly, the Applicant proposes a gas conditioning plant as part of the proposed Port to extract parts of the ethane, propane, and heavier components in the LNG. Only part of the LNG stream would be processed in the gas conditioning plant, and the rest would be bypassed. The extracted stream consisting of ethane, propane, and other heavier components in the LNG would be exported via the NGL pipeline.

2.3.1.6 High-pressure LNG send-out

The pressure of the combined stream downstream of the gas conditioning plant would be boosted to the pipeline send-out pressure of 1,750 psig. To achieve a design flow rate of vaporized LNG of 1.6 bcfd, 11 high-pressure (HP) send-out pumps would be provided. Of these 11 pumps, 10 would be working and 1 would be an installed spare. Each pump would have a design capacity of 1,500 gpm and a differential head of 1,200 psi. The pressurized LNG would then be routed to the vaporizers for regasification.

2.3.1.7 LNG vaporization

The MPEH™ Terminal would have eight SCV-SCR units with a maximum capacity of revaporizing 1.6 bcfd of LNG. At peak vaporization rate, all eight vaporizers would be in operation. Each SCV is composed of a stainless steel tube bundle immersed in a warm water bath (see **Figure 2-4**). LNG flowing through the bundle is vaporized by the heat transferred from the water bath operating at a temperature range between 16 °C (60 °F) and 49 °C (120 °F). The lower operating temperature range is desired to achieve higher thermal efficiencies. Water bath temperature is maintained by hot flue gas from a fuel-air combustion chamber directly heating a bath of water by bubbling through the water to the exhaust stack



Modified after Sumitomo Precision Products

Figure 2-4. SCV Schematic

which is open to the atmosphere. The burner is mounted at one end of the water bath partially submerged, and combustion products discharge into the water bath via the sparger tubes. Combustion products form a frothing two-phase mixture that rises in the water bath because of its lower density. This rising flow is confined within the weir assembly that surrounds the tube bundle. The froth flows up through the tube bundle and over the weir, where disengagement of the combustion product gases occurs. The water falls back over the weir and then recirculates through the heat-exchanger tube bundle. Because of the direct heat transfer from the hot flue gases to the water and the high agitation caused by the frothing two-phase flow, heat transfer efficiency for the SCV is very high, typically in the 96 to 100 percent range. The high efficiency allows a compact design with a relatively small plot-area. Each SCV requires a high-pressure, electric-motor-driven air blower to support the combustion process and to force the combustion flue gas through the water bath. SCVs are a closed-loop system that requires no seawater to revaporize LNG.

Each SCV would be equipped with an SCR unit to reduce combustion nitrous oxides (NO_x) emissions by injecting aqueous ammonia (NH_3) into the flue gas in the presence of a catalyst to convert NO_x product to nitrogen and water (see **Figure 2-5**). The exhaust from SCV flows to a heat exchanger where it is preheated by the hot gas from the SCR catalyst bed. The warm gas exits the heat exchanger and is heated further by an integral burner to reach a temperature around 343 °C (650 °F) required for catalytic reduction reaction. Aqueous ammonia (19.5 percent solution by weight in water) is then injected into the gas stream before it reaches the SCR catalyst bed. The NO_x and NH_3 combine on the NO_x catalyst's surface, forming an ammonia salt intermediate that subsequently decomposes to produce elemental nitrogen and water. Clean gas from the catalyst bed exchanges heat with the cool incoming SCV exhaust and then exits the stack at around 88 °C (190 °F).

The system can be designed to remove 90 to 95 percent of the NO_x with 5 parts per million unreacted NH_3 emission (slip) in the exhaust gas. With the addition of an oxidizing carbon monoxide (CO) catalyst, about 90 percent of the CO can be removed in the high temperature zone. Approximately 240 gallons per day (gpd) of 19.5 percent (by weight) aqueous ammonia solution would be required for operation of the SCV-SCRs. Freeport-McMoRan Energy would install a tank of approximately 7,200-gallon capacity such that a 30-day supply of 19.5 percent aqueous ammonia solution could be stored at the Terminal. Offshore supply vessels would transport the 19.5 percent aqueous ammonia solution to the MPEH™ Terminal in U.S. Department of Transportation (USDOT) specification portable tanks of 500 to 750 gallons each, rated for this service. These portable tanks would be offloaded from the offshore supply vessels by the MPEH™ platform cranes and the contents would be transferred to the storage tank. Chemical pumps taking supply from the platform storage tank would provide measured flow to the SCV-SCRs to control the NO_x emissions.

A 20 percent (by weight) caustic solution is required to neutralize the SCV water bath due to acid formation as carbon dioxide (CO_2) and nitrogen dioxide (NO_2) from hot flue gas are absorbed by the water bath. A maximum of 345,000 gpd of neutralized water with potentially high salt concentration would be generated and discharged. SCV operational discharges are discussed further in **Section 2.3.4.2**.

To supplement the eight SCV-SCRs, a portion of the energy needed for vaporization would be provided by two indirect waste heat recovery (WHR) vaporizers. Each WHR vaporizer would economically recover heat from the gas turbine generator exhaust gases, thereby reducing the overall fuel consumption and air emissions. Indirect WHR employs a closed-loop propylene-glycol water system and Intermediate Fluid Vaporizers (IFV) to maximize recovery of waste heat from the power-generation gas-turbine exhaust, reducing the exhaust temperatures from approximately 510 °C (950 °F) to 104 °C (220 °F). The WHR system is estimated to reduce SCV fuel usage by approximately 20 to 25 percent. The WHR also provides heat for the gas conditioning plant reboilers and the NGL plant preheating requirements.

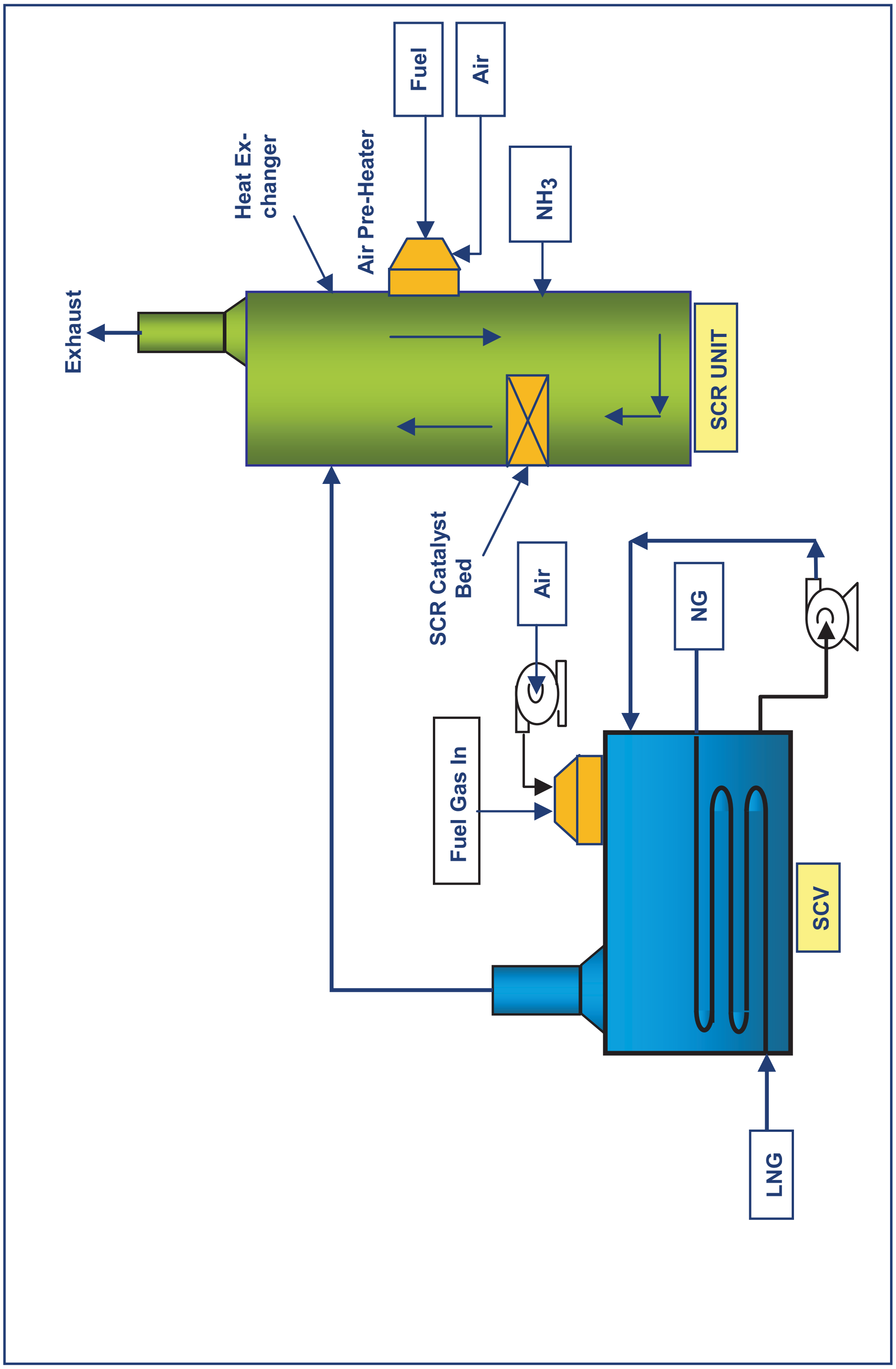


Figure 2-5. SCR Schematic

Table 2-1 presents an overview of SCV-SCR operating characteristics compared to the operating characteristics of the ORV-WHR and IFV technologies evaluated in the MPEH™ Final EIS. The MPEH™ Final EIS had evaluated a generic SCV-SCR option while this EA evaluates the proposed SCV-SCR system (with WHR units), including new equipment specifications and emission factors. The proposed SCV-SCR system also slightly reduced emissions of SO_2 and NO_x compared to the generic option.

Table 2-1. Comparison of ORV, SCV, and IFV Boiling/Condensing Systems

	Vaporizer Technology			
	SCV Low NO_x Option 1b	**SCV/SCR Option 1d**	**ORV-WHR Option 2b**	**IFV Boiling/ Condensing Option 3b**
Operating Parameters				
Proposed Peak Vaporization Capacity (bcfd)	1.6	1.6	1.6	1.6
Total Required Energy (heat duty) for Vaporization (MMBtu/h) [a]	110	110	110	110
Minimum Required Total Footprint (ft^2)	32,100	32,100	20,000	20,400
Costs				
Estimated Capital Expenditure ($ million) [b]	$225.9	$254	$218.7	$233.2
Estimated Vaporizer-Related Fuel and Chemical Cost ($ million/yr)	$31.68	$32.46	$3.53	$3.53
Estimated Vaporizer-Related Fuel and Chemical Cost Relative to Total Operation Cost	43%	43%	7%	7%
Total costs (initial installation, maintenance, and operation over a 30-year period)	$1,176.3 million	$1,228 million	$323.7 million	$338.2 million
Energy Requirements				
Regasification Electrical Load Total Power Requirement (MW)	4.54	4.24	6.29	6.29
Regasification Fuel Consumption Electrical Load (MMcfd)	1,376	1,376	2,040	2,040
Combustion for Regasification (MMcfd)	15,548	15,548	0	0

Table 2-1. Comparison of ORV, SCV, and IFV Boiling/Condensing Systems (continued)

		Vaporizer Technology			
		SCV Low NO_x Option 1b	SCV/SCR Option 1d	ORV-WHR Option 2b	IFV Boiling/ Condensing Option 3b
Emissions					
Water	Total Seawater Used for Vaporization (gpm)	None	None	92,800	92,800
Water	Seawater Discharge Treatment	pH Adjustment	pH Adjustment	Sodium Hypochlorite [c]	Sodium Hypochlorite [c]
Water	Seawater Delta T (Celsius)	NA	NA	10.7	10.7
Air [d]	PM_{10} (tpy)	92.84	54.84	70.38	70.38
Air [d]	SO_x (tpy) [e]	2.39	2.39	2.39	2.39
Air [d]	NO_x (tpy)	291.42	233.79	223.48	223.48
Air [d]	VOC (tpy)	145.38	130.92	127.01	127.01
Air [d]	CO (tpy)	272.42	237.76	159.79	159.79

Source: AK 2004, MPEH™ Final EIS Appendix F, FME 2004, FME 2006a, FME 2006b, and FME 2006c

Notes: MMBtu/h = million British thermal units per hour, ft^2 = square feet, MW = megawatt, MMcfd = million cubic feet per day, tpy = tons per year, PM_{10} = particulate matter less than or equal to 10 microns, SO_x = sulfur oxides, VOC = volatile organic compound

[a] With Gas Conditioning plant not running, total vaporization energy (heat duty) requirement is 831 MMBtu/h for high- pressure (2,000 psig) and 997 MMBtu/h for low-pressure (1,000 psig). With the Gas Conditioning plant running, total vaporization duties are 561 MMBtu/h for high-pressure and 696 MMBtu/h for low-pressure. Vaporization duty and duty required for the Gas Conditioning plant are met by vaporizers (ORV or SCV) and shell-and-tube vaporizers using waste heat from gas turbine generators.

[b] Estimated capital expenditure costs are only for vaporizer-related costs of the facility, not the capital expenditure costs for the entire facility.

[c] Seawater supplied to ORVs would be treated on the inlet side of the vaporizers. Therefore, treating the seawater discharge is not planned. SCVs would produce 160 gpm of freshwater effluent. The SCV freshwater effluent would be a product of combustion caused by burning natural gas to heat the LNG. The freshwater effluent would be acidic due to dissolved nitrates and CO_2 and would be treated with caustic pH adjustment before discharge to the sea.

[d] Total terminal emissions excluding mobile sources.

[e] Only natural gas from LNG (with no sulphur compounds) would be used to fire fixed Terminal sources such as gas turbines or glycol regenerators.

2.3.1.8 Gas compression

The gas compression system would perform dual functions and would operate under the following events. First, if the LNG regasification rate is higher than the pipeline demand and the cavern pressure is higher than the pipeline send-out pressure, the compression system would boost the excess natural gas pressure to inject into the cavern. Second, in the event the LNG regasification rate is lower than the pipeline demand and the cavern pressure is lower than the pipeline send-out pressure, the compression system would boost the pressure of cavern gas to make up the shortfall in gas demand.

2.3.1.9 Gas dehydration

Natural gas from the caverns would be water-saturated and require dehydration to meet the pipeline specification of 7 pounds of water per million cf of gas. The natural gas coming directly from the vaporization plant would be "dry" gas and would not need dehydrating. Triethylene glycol (TEG) is proposed as the dehydrating solvent. The dehydration unit would accept wet gas either directly from the caverns or from the gas compression system. The wet gas would be directed into the gas absorber where the gas and TEG solvent would make contact over structured packing. When the solvent makes contact with the wet gas, water would be absorbed from the gas into the solvent, resulting in "dry" gas exiting the processing vessel. Water-saturated, rich TEG from the bottom of the contactor would flow from each gas contactor through a set of exchangers designed to pre-heat the rich TEG before regeneration. This would minimize regeneration duty, and a slip stream of rich TEG would provide reflux to the glycol regenerator still column and reduce emissions in the vent from the glycol regenerator still column. The heated TEG would be flashed in a lowpressure glycol flash drum to allow any hydrocarbon gas absorbed by the TEG to exit the system. The flash gas containing hydrocarbons and a small amount of TEG, in equilibrium with the gas, would be used as supplemental fuel gas to the glycol regenerator to minimize fuel gas and volatile organic carbon emissions. The maximum TEG losses from the dehydration system are estimated at approximately 40 gpd.

2.3.1.10 Gas metering

Natural gas would pass through a check meter system before entering the pipeline. The LNG pumps or the gas compressors would produce a gas pressure slightly greater than the expected gas pipeline operating pressure of 1,100 to 1,750 psi at the check meters delivering gas from the proposed Terminal to the pipelines.

2.3.2 Utility Systems

All services not in direct contact with the LNG regasification process are considered part of the utility system. These services would be designed so that the offshore Terminal could be fully operational during times when there is no LNGC unloading. The utility services are summarized below.

2.3.2.1 Power generation

All electrical systems would be designed to be suitable for offshore use. Normal electrical power for the proposed Terminal would be generated by three 50-percent-load natural gas-fired low-emission, fin-fan air-cooled turbine generators manufactured by SOLAR, General Electric, or other companies. Of the three units, two would be working and one would be an installed spare. However, normal operations would be based on running all three natural gas-powered turbine generators concurrently to preclude operational interruption when a generator shuts down. Each power generation turbine would have capacity to generate approximately 19.5 megawatts (MW) of power (site rated). Gas to run the low-emission turbines would be supplied by the fuel gas system from product gas. An uninterruptible power supply (UPS) system would provide power to safety and navigational systems, process control instrumentation, programmable logic controllers, computers, and communications equipment for up to 3.5 hours if generating power is not available.

2.3.2.2 Instrument and utility air

Two 100-percent screw-type air compressors operating on lead-lag demand would provide compressed air for instrument and utility air. The common discharge of the compressors would supply a wet utility air to a dual set of air dryers. Compressed dry air would be stored in an instrument air receiver. The capacity of the instrument air receiver would be such that instrument air could be provided to users for 10 minutes after loss of the compressor. Instrument air would be distributed to users as required from the instrument air receiver.

2.3.2.3 Fuel gas

A fuel gas system would provide fuel gas to power SCV units, generation turbines, and gas compressors. Fuel gas would be sourced from downstream of the vaporization units. The natural gas would be heated by hot oil in a shell-and-tube exchanger to meet the turbine dew point requirement. For the purposes of black start (i.e., a rapid start up of an off-line generation source), an electric heater would be provided.

2.3.2.4 Nitrogen generation and storage

Nitrogen gas would be used for inertion purposes. At the proposed Terminal, a nitrogen blanket would surround the LNG tanks and be tested for the presence of leaking methane. Nitrogen would be made using a proven membrane-based nitrogen generator that would remove oxygen from air. The skid-mounted nitrogen generator would consist of two 100-percent air compressors and one 100-percent nitrogen generation membrane unit. The generator design capacity would be 15,000 cf/h at 98 percent nitrogen purity. Nitrogen would be stored in a 5,000-gallon pressurized storage tank from where it could be sent to users on demand.

2.3.2.5 Emergency flare system

To meet applicable safety standards, an emergency gas flare system would be installed on a boom support structure at both ends of the facility. The flare system would have no interconnecting piping between Platform No. 1 and Platform No. 2; therefore, two independent, HP flare boom structures would be installed. Platform No. 1 would include an LP flare as well as an HP flare. The LP flare system would collect and safely dispose of LP emergency relief from the LNG storage tanks. The flare system would operate only in emergencies and would be oriented so that the prevailing winds would direct its plume predominantly away from the facility. Crew quarters would be situated on Bridge Support- (BS) Y7, midway between the two processing platforms and a safe distance from the flare structures. A flare header system would collect hydrocarbon flows from relief valves, tank blankets (air spaces around the tank with nitrogen and natural gas sensors), and miscellaneous sources and send them to a flare drum and then to the flare. The flare would be equipped with multiple pilots and electronic igniters. The flare system would be continuously purged with sweep gas to prevent air infiltration through the flare tip. Liquid discharge from an emergency shutdown event would be returned to the storage tanks and not flared.

2.3.2.6 Diesel fuel

Diesel fuel is stored at the Terminal to supply emergency firewater pumps. The Terminal would receive bulk diesel from supply vessels. Since there would be no interconnecting piping from Platform No. 1 to Platform No. 2, two separate fill locations on either side of the complex would be needed. Diesel would be transferred to day tanks provided to users through the motor-driven diesel transfer pumps adjacent to the pedestal storage.[15] Diesel pump discharge would include high-quality filtering (for removal of water) and a totalizing meter. The storage, transport and use of diesel fuel would be governed by the Facility Response Plan. Design configuration of the proposed Port would not include ship-refueling capability or supplies for provisioning vessels.

2.3.2.7 Open drains and oily water treatment

An open-drain system would collect spills and rainwater from all equipment skids and other appropriate areas. The drain fluids would flow to a corrugated plate interceptor-type oil-water separator unit for separation; clean water would flow overboard. Oil would be removed and stored in a waste oil holding tank for transport to an onshore reclaiming facility. Clean water from the separator discharged overboard

[15] The Terminal would have a combination of 15 diesel storage and day tanks with a total capacity of 53,130 gallons (1,265 barrels [bbls]).

would meet National Pollutant Discharge Elimination System (NPDES) permit requirements. Engine wastes, such as lube oil, hydraulic fluid, and engine coolant, would be collected and transferred to one of two portable waste tanks. An approximate 3,785-liter (1,000-gallon) tank would be used to collect oil wastes, and an approximate 757-liter (200-gallon) tank would be used to collect aqueous engine coolant. When filled, the tanks would be loaded on a supply or work boat and transported to shore for reclaiming or disposal. Other associated solid wastes would be collected and transported to shore for proper disposal.

2.3.2.8 LNG spill control

LNG piping and LNG equipment would be placed on Platforms No. 1 and No. 3. Piping or equipment flanges would include shields on the flanges to prevent any leak from spraying. The area below the flanges would be designed to capture the spill and divert it through open troughs to the LNG spill downcomers. The LNG tanks would be enclosed in a nitrogen-purged cover. The floor and base walls of this enclosure would be designed to capture reasonable-sized spills and divert them through LNG spill drain downcomers to the sea. The downcomers would prevent the spilled LNG from contacting the jacket structure. The spilled LNG would quickly vaporize in the seawater. Piping and LNG in-tank pumps would be on top of the tanks. Potential LNG spill areas would include both thermal- and gas-type detection devices to alert personnel of the spill condition and to shut down associated systems. Spill control flooring, troughs, and downcomers would be sized to handle a credible-size spill. Main structural members such as columns and support beams would be shielded or insulated from contact with LNG. Solid flooring designed for cryogenic temperatures would prevent a spill from contacting the structure.

2.3.2.9 Potable water

The potable water system would meet all potable and utility water requirements. The system would consist of a proven reverse osmosis (RO) purifying method. The system would consist of two 50-percent-capacity trains, each delivering 4,000 gpd of potable water for Terminal use. Seawater would be supplied from the firewater loop supply header. The potable water from the RO unit would be chlorinated, collected in one of two 200-barrel (bbl) storage tanks, and distributed on demand from a potable water pressure set. The potable water produced would meet minimum World Health Organization potable water quality standards.

2.3.2.10 Waste and wastewater treatment

A sewage treatment system would be provided. A sanitary waste system consisting of a collection system and redundant, purpose-designed, fabricated, and packaged sewage treatment units would be provided. Domestic waste from the living quarters building and various Terminal control rooms would be treated by the sewage treatment unit prior to discharge overboard in accordance with NPDES permit requirements. Sewage would be treated chemically or biologically. Solid wastes from the kitchen, shops, and other operations would be collected and transported to shore for proper disposal.

2.3.2.11 Firewater system

The firewater demand for the Terminal is set at 9,800 gpm at 150 psi. This is based on cooling three zones on the LNG storage tanks while supplying two firewater monitors. There would be two 10,000-gpm, diesel-driven, submersible firewater pumps. One pump would be staged at BS-8 and one pump staged at BS-9. Isolation valves would be placed at the ends of each bridge to minimize the potential of losing all firewater. Each pump would have a caisson around a fiberglass riser and seawater strainer. Each pump would meet or exceed National Fire Protection Association (NFPA) Standard 20. Each platform (including crew quarters) would contain a ring main. A single pipe would be provided along the bridges between platforms. Many areas throughout the proposed Port would require extensive deluge for cooling and gas dissipation. NFPA Standard 59A, *Standard for the Production, Storage, and Handling of*

Liquefied Natural Gas, would be used to zone properly, to minimize water consumption, and to keep firewater pump sizing down.

2.3.3 Structures and Buildings

Existing fixed platforms on MP 299 would be modified for the proposed MPEH™ Terminal. These platforms include two large structures (Platform Nos. 1 and 2) with interconnecting bridges and associated support structures that would be used for the vaporization facility and gas cavern storage. Platform No. 3 would be moved from its current position approximately one mile north of existing Platforms No. 1 and No. 2 to be adjacent to Bridge No. 11. Platform No. 4 would be used for storage of materials. MMS would permit or approve the construction and operation of any new offshore structures and buildings in the GOM. The footprint of the proposed MPEH™ Terminal is provided in **Table 2-2**.

Table 2-2. Footprint of Proposed MPEH™ Terminal

Structure	Proposed Construction Footprint (acres) [a]	Operation Footprint (acres)
Platform No. 1 (8 legs): Vaporization, offloading arms, gas conditioning, flare boom, newer crane	225.03	0.79
Platform No. 2 (8 legs): Gas storage systems, compression		0.82
Platform No. 3 (8 legs): Vaporization, Motor Control Center (MCC)/Switchgear building, turbine generators		1.02
Platform No. 4: Materials		
LNG Storage Platform 1 (9 legs,12 skirt piles)		0.51
LNG Storage Platform 2 (9 legs, 12 skirt piles)		0.51
BS-Y7 crew accommodations (4 legs)		0.21
BS-8 (4 legs)		0.21
BS-9 (4 legs)		0.21
Soft Berth™ mooring system (2 moors, 20 pile connections)		0.21
Total	**225.03 acres**	**5.07 acres**

Note:

[a] The construction footprint was calculated using MMS guidelines of a 5:1 ratio for anchorage expansion in waters less than 1,000 ft (Appendix G1 of the MPEH™ Final EIS). The footprint encompasses the farthest reaching surface disturbance including anchorage impacts.

2.3.3.1 Platform No. 1

This platform includes an eight-legged jacket, piles, and a two-level deck. This platform is approximately 40 m (130 ft) by 77 m (253 ft). The eight-legged jacket is fixed to the sea floor by eight main piles installed through the jacket legs. During the construction of the proposed Port, Platform No. 1 would undergo extensive modifications in place and onshore. The anticipated modifications to the deck would consist of abandoning the mothballed drilling rig presently on deck, removing the deck from the jacket, and transporting the deck to shore. Existing wells would be plugged and abandoned in accordance with MMS Operating Regulations. Following the removal of the Platform No. 1 deck, the jacket main piles would be augmented by installing insert piles and seawater lift pump casings, and the jacket would be made ready for reinstallation of the modified deck. Once transported to shore, all existing sulphur operations equipment would be removed from the deck. A third deck level would be added, along with the installation of the new topsides.

New topsides on Platform No. 1 would primarily consist of five SCV-SCR vaporizers, the LNG offloading arms, the gas conditioning plant, a flare boom, and a newer crane. A 7,200 gallon tank for the storage of a 19.5% aqueous ammonia solution and a 50,000 gallon tank for storage of a 20% solution of sodium hydroxide would also be located on Platform No. 1. The tanks would be in close proximity to the SCR units (in the case of the 19.5% aqueous ammonia solution) and the SCV units (in the case of the 20% sodium hydroxide solution for the neutralization of the SCV process water). Detailed engineering might reduce the size of these tanks and locate a portion of the ammonia and sodium hydroxide solutions on Platform No. 3, where three of the 8 SCVs would be located. The total volume of chemicals stored would not change. The modified deck, complete with new topsides equipment, would be transported offshore and reinstalled on the jacket. Following the installation of the modified deck, modularized topsides consisting of the LNG offloading arms, gas conditioning plant with two additional turbine generators, and a flare boom would be installed.

2.3.3.2 Platform No. 2

This platform is composed of an eight-legged jacket, piles, and a two-level deck. This platform is approximately 30 m (100 ft) by 70 m (228 ft). The eight-legged jacket is fixed to the sea floor by eight main piles installed through the jacket legs. During the construction of the proposed Port, Platform No. 2 would undergo extensive modifications in place. The modifications to the deck would consist of abandoning the mothballed drilling rig presently on the deck, removing most of the existing sulphur operations equipment, and installing the new cavern leaching equipment, gas filter/separators, gas compression, gas dehydration, gas check meters, and a flare boom.

2.3.3.3 Platform No. 3

This platform is composed of an eight-legged jacket, piles, and a two-level deck. This platform is approximately 26 m (85 ft) by 65 m (215 ft). The eight-legged jacket is fixed to the sea floor by eight main piles installed through the jacket legs. During the construction of the proposed Port, Platform No. 3 would be moved to a location between Bridge Support Platforms BS-8 and BS-Y7 and would undergo extensive modifications in place and onshore. The anticipated modifications to the deck would include removing the deck from the jacket and transporting it to shore. Following the removal of the Platform No. 3 deck, the existing well conductors and jacket main piles would be removed, and the jacket would be relocated and installed at its new site and made ready for reinstallation of the modified deck. Existing wells would be plugged and abandoned in accordance with MMS Operating Regulations. Once transported to shore, all existing operations equipment would be removed from the deck, the deck strengthened as required, and the equipment installed. New topsides on Platform No. 3 would primarily consist of the three SCV-SCR LNG vaporizers, the Motor Control Center (MCC)/Switchgear building, and three turbine generators. Although preliminary engineering places a 7,200 gallon tank for the storage of a 19.5% aqueous ammonia solution and a 50,000 gallon tank for storage of a 20 percent sodium hydroxide solution on Platform No. 1, detailed engineering might locate a portion of the ammonia and sodium hydroxide solutions on Platform No. 3. The total volume of chemicals stored would not change. The modified deck, complete with new topsides equipment, would be transported offshore and reinstalled on the jacket. Following the installation of the modified deck, Bridges No. 11a and No. 11b would be installed.

2.3.3.4 Platform No. 4

This platform is composed of an eight-legged jacket, piles, and a two-level deck. The eight-legged jacket is fixed to the sea floor by eight main piles (installed through the jacket legs) and eight skirt piles grouted into sleeves at the bottom of the jacket. Platform No. 4 houses two 12,000-long ton liquid storage tanks that were previously used for the sulphur mining operation. These existing tanks would be used for storage of glycol for the cavern gas dehydration system, and other operating chemicals, allowing the facility to minimize operating costs by purchasing these chemicals at considerable bulk discounts. The upper deck of the platform also would have considerable area available for materials storage. The lower deck is a small deck that would be available for storage of lighter materials and provide access to below-deck piping. Although some of the residual sulphur might be removed from the tanks, the platform would require no modifications for its intended use as a supply/storage facility.

2.3.3.5 BS-Y7

This platform is composed of a four-legged jacket, piles, and a two-level deck. The four-legged jacket is fixed to the sea floor by four main piles (installed through the jacket legs). During the construction of the proposed Port, BS-Y7 would undergo modifications in place. The modifications to the deck would consist of removing all existing sulphur operations equipment and installing new living quarters with an integrated warehouse and shop and a MCC/Switchgear building.

Living quarters would be on the existing BS-Y7 and would accommodate 50 personnel, but could accommodate up to 94 personnel for brief periods. It would include offices, recreation, communications, and a galley. A jib crane would be provided for loading and offloading stores. In addition to the living areas, the building would include the proposed Port's control room; offices; and shop, warehouse, and laboratory spaces. Items originating from the bridge decks would be received into this building and maintained, repaired, or transferred onto a workboat for transport to shore. A safe burn/welding area would be designated within the shop. The control room, with windows affording views in all directions, would contain all plant monitoring, safety, and control equipment consoles.

The MCC/Switchgear building would be on BS-Y7 and would consist of a single-story building, 24.4 m by 6.1 m (80 ft by 20 ft). It would house switchgears, MCCs, panel boards, UPS, batteries and battery chargers, lighting transformers, Programmable Logic Controller panels for switchgears, generator control panels, and other equipment for all process and utility users. Power distribution transformers would be adjacent to the building.

2.3.3.6 BS-8 and BS-9

These platforms each comprise a four-legged jacket, piles, and a two-level deck. The deck areas of BS-8 and BS-9 are 60 ft by 40 ft (2,400 square feet [ft^2]). The platform sizes would be 40 ft by 40 ft, the same as what is currently in place. BS-8 would receive a firewater system, a new electrical system, and a pump and tank. During the construction of the proposed Port, the deck for BS-8 would be removed and transported to an onshore fabrication yard where it would undergo modifications (see Section 2.2.4 of the MPEH™ Final EIS for information on the fabrication sites). The modifications to this platform deck would primarily consist of installing new bridge support framing, piping, E&I, a new firewater pump, and an electrical building. The modified deck, complete with new topsides equipment, piping, and E&I, would be transported offshore and reinstalled on the jacket. Following the installation of the modified deck, Bridges No. 10 and No. 11a would be installed.

BS-9 would receive a firewater system, generators, and waste and separator systems. BS-9 has a two-pad helideck. The four-legged jacket is fixed to the sea floor by four main piles (installed through the jacket legs). During the construction of the proposed Port, BS-9 would undergo modifications in place. The existing helideck is on BS-9 and can accommodate one helicopter. This deck meets the latest USCG and Federal Aviation Administration (FAA) classification rules for lighting and firefighting requirements.

2.3.3.7 Bridge No. 10

This structure is a two-level, trussed bridge. Bridge No. 10 would be removed and brought to shore prior to the removal of the Platform No. 1 deck. The unused sulphur operations piping and cable tray would be removed and new piping, cable tray, supports, and cable would be installed onshore. Bridge No. 10 would be reinstalled following the installation of the modified Platform No. 1 deck.

2.3.3.8 Bridge Nos. 11, 12, and 13

Bridge No. 11 would be removed and brought to shore prior to the removal of the BS-8 deck. The unused sulphur operations piping and cable tray would be removed, and new piping, cable tray, supports, and cable would be installed onshore. Bridge No. 11 would be sectioned and become Bridges No. 11a and No. 11b. Bridges 11a and No. 11b would be installed following the installation of the modified BS-8 and PP3 decks. Bridge Nos. 12 and 13, which are two-level trussed bridges, would be modified in place. The modifications would consist of removing unnecessary piping and cable tray remaining from the sulphur operations and installing new piping, cable tray, supports, and cable.

2.3.3.9 Storage Platform Nos. 1 and 2 (new structures)

These would be duplicate platforms, each comprising an eight-legged jacket and a two-level deck. Each platform would be approximately 42 m (137 ft) by 84 m (276 ft). The eight-legged jacket would be fixed to the sea floor by eight main piles (installed through the jacket legs) and 12 corner skirt piles. Both storage platforms would be fabricated onshore, transported offshore, and installed. Following platform installation, three LNG storage tanks (with in-tank pumps) would be installed on each platform and interconnecting piping, cable, and bridges would be installed.

2.3.3.10 Bridge No. 14 (new structure)

This bridge would comprise a two-level, trussed bridge similar to the other bridges. Bridge No. 14 would be fabricated, transported offshore, and installed offshore after installing Storage Platform Nos. 1 and 2. This bridge would contain piping, cable tray, supports, and cable.

2.3.4 General Port Operations Protocols

2.3.4.1 Marine operations plan

The Applicant submitted with its original license application a *Draft Marine Operations Manual* for the conduct of daily activities of the proposed Port. The draft manual is subject to approval as part of the license application process. If the amended Application is approved, commencement of operations would be contingent upon an approved final operations manual.

A logbook would be placed on board the proposed Terminal to record and document all activities and operations involving the Terminal, such as weather conditions (2-hour intervals), LNGCs alongside (including arrival and departure times), cargo received and offloaded, helicopter activities, personnel onboard, other vessels alongside the proposed Terminal (including the reason for their presence), personnel injuries and sicknesses, and equipment/mechanical downtime. The date and time of all drills (e.g., lifeboat, fire, and safety) would also be recorded. Any pollution and overboard discharges would be recorded in the logbook. All transfer operations involving oil, waste, sewage, or other controlled materials would be recorded in the oil record book. This log would be permanently kept in the proposed Terminal's control center.

2.3.4.2 Operational discharges from SCVs

The primary by-products from burning natural gas in the SCV are CO_2 and fresh water. The water produced by the natural gas combustion process continuously replenishes the SCV water bath and also produces excess water that would be discharged pursuant to an NPDES permit issued by USEPA.[16] A portion of the CO_2 bubbling through the SCV water bath would combine with water molecules to form carbonic acid (H_2CO_3), a weak acid. Based on vaporizing 1.6 bcfd of LNG, a maximum of 345,000 gpd of slightly acidic fresh water would be produced by the eight SCV-SCR units running simultaneously. Prior to being discharged, this water would be neutralized to a pH range between 6 and 9 by injecting a 20 percent (by weight) sodium hydroxide (NaOH) solution. The neutralization reaction produces sodium carbonate (Na_2CO_3) and water.

Freeport-McMoRan Energy would install a tank of approximately 50,000-gallon capacity such that a 30-day supply of 20 percent NaOH solution could be stored at the Terminal. Offshore supply vessels would transport the 20 percent NaOH solution to the MPEH™ Terminal in USDOT-specification portable tanks of 500 to 750 gallons each, rated for this service. These portable tanks would be offloaded from the offshore supply vessels by the MPEH™ platform cranes, and the contents would be transferred to the storage tank. Chemical pumps taking supply from the platform storage tank would provide measured flow to treat the SCV effluent. The SCV effluent would be continuously monitored to ensure that the pH remained within the prescribed range of 6 to 9.

2.3.4.3 Support operations

The following describes the various vessels and helicopters that would support the proposed Terminal operations. The majority of support operations would be expected to originate from existing facilities in Venice, Louisiana; other locations might from time to time be called upon to provide necessary resources.

- *Tugboats.* Three tugboats, stationed at the proposed Terminal, would be used to escort LNGCs in the vicinity. Each week, one of the tugboats would travel to Venice, Louisiana (round trip).
- *Line-handling vessel.* One line-handling vessel, stationed at the proposed Terminal, would be used to assist in docking of LNGCs.
- *Offshore supply vessel.* An offshore supply vessel, originating in Venice, Louisiana, would travel to the proposed Terminal each week to provide logistics support for Terminal operations. Such offshore supply vessels are typically less than 61 m (200 ft) in length.
- *Crewboat.* Crewboats, originating in Venice, Louisiana, would operate daily. In addition, there would be an estimated two unscheduled trips per week, bringing the total number of such operations to 469 annually. Such crewboats are typically 40 m (130 ft) in length.
- *Helicopters.* A Bell 407 helicopter (or equivalent) would be used for offshore support. An estimated 23 flights per week of approximately 129 km (80 mi) round trip would originate from either Venice or Boothville, Louisiana. Each flight at a cruising speed of 130 knots and lasting approximately 50 minutes would result in an estimated 1,000 hours of helicopter operations per year.

2.3.4.4 Employment

The proposed Port would employ the equivalent of 151 full-time workers directly or through support contractors. The equivalent of 94 full-time workers would be needed to operate and support the Port.

[16] On May 19, 2006, Freeport-McMoRan Energy filed an amendment to its NPDES permit application for the MPEH™ project reflecting water discharges from SCV technology.

The four carrier-berthing support vessels are expected to employ 42 people, including vessel staff, supervision personnel, and a port captain. Additional onshore support requirements would employ the equivalent of 15 full-time workers.

2.3.5 Decommissioning

The proposed Terminal would be designed for a 30-year service life. At the end of the facility's service life, decommissioning operations would involve conventional offshore platform salvage techniques. The caverns would be decommissioned through MMS regulatory procedures and would include filling the caverns with brine, pressure monitoring, and plugging and abandonment of the wells.

Following termination of service, the LNG facilities would be decommissioned in place. All platform equipment would be drained and cleaned. Some of the large equipment might be removed from the platform prior to facility salvage operations.

A heavy lift derrick barge would first remove the platform deck. The piling (and skirt piles, if applicable) would be cut below the mud line by abrasive cutting or explosives. Should explosives be used during the decommissioning of the proposed Terminal, the explosives would be of a type normally used for decommissioning of OCS facilities in the GOM. It is anticipated that removal activities would involve only the use of explosive charges of less than 50 pounds. The piles could then be removed from the jacket. The platforms would then be taken ashore for salvage or converted to reefing components at a permitted site of suitable depth.

The bridge structures could be placed on a material barge and brought to shore for scrap or sunk at a permitted reefing site. The mooring dolphins could be salvaged for reuse at another location or sold for scrap. Another option would be to tow the dolphins and sink them at a permitted reefing site. The quarters building would be placed on a barge and brought to shore for reuse or for sale.

2.4 Alternatives

NEPA requires that any agency proposing a major action (as defined in the NEPA requirements) must consider reasonable alternatives to a proposed action. Evaluation of alternatives assists in avoiding unnecessary impacts by analyzing reasonable options to achieve the stated purpose that the Applicant might or might not have considered. This analysis of alternatives broadens the scope of options that might be available to reduce and or avoid impacts associated with the action as proposed by the Applicant. The Secretary may approve or deny an application[17] for a license under the DWPA. In approving a license application, the Secretary may impose enforceable conditions as part of the license. Consistent with NEPA, in determining the provisions of the license, the Secretary may also consider alternative means to construct and operate a deepwater port. The NEPA environmental analysis is one of the nine factors the Secretary must consider in making a final determination (33 U.S.C. 1503(c)).

Section 2.1 of the MPEH™ Final EIS evaluated a number of alternatives for the location, construction, and operation of a deepwater port. The alternatives considered include

Component	**MPEH™ Final EIS Section**
Deepwater Port Terminal Site	2.1.1
LNG Vaporization Technologies and Associated Equipment	2.1.2

[17] For this application, the No Action Alternative and denial of the license are considered to be the same.

Seawater Intake and Discharge Design Options	2.1.3
Marine Life Exclusion System Alternatives	2.1.4
Biocide Alternatives	2.1.5
Natural Gas Storage Caverns	2.1.6
Natural Gas Pipeline Alternatives	2.1.7
Natural Gas Liquids Pipeline Alternatives	2.1.8
Fabrication Site	2.1.9

LNG Vaporization Technologies and Associated Equipment (MPEH™ Final EIS Section 2.1.2) compared 13 variants of five basic vaporization technologies, and evaluated five options—representing three vaporizer technologies—for detailed evaluation: Option 1b, SCV low NO_x; Option 1d, SCV with SCR; Option 2a, ORV base case; Option 2b, ORV with indirect WHR; and Option 3b, IFV boiling/condensing.

The MPEH™ Final EIS evaluated a generic SCV-SCR option while this EA evaluates the proposed SCV-SCR system (with WHR units), including new equipment specifications and emission factors. The Secretary recognizes that selection of means to vaporize LNG depends on case-by-case evaluation, including consideration of how a given system's design and operating conditions would fit within the overall scheme of a project. The Secretary does not give preference to the use of any particular regasification technology, and therefore requires that available technologies are considered. The Secretary considers the alternatives in the MPEH™ Final EIS and this EA to be sufficient and no additional alternatives will be considered.

2.5 No Action Alternative

The No Action Alternative refers to the current, existing conditions without implementation of the Proposed Action. The No Action Alternative is prescribed by CEQ regulations and serves as a benchmark against which impacts of Federal actions can be evaluated. Freeport-McMoRan Energy's existing facilities are being used for salt brine production under MMS Sulphur and Salt Lease OCS-G-9372 and the temporary storage and offloading of oil under MMS Oil and Gas Lease OCS-G-12362. Oil production from the Oil and Gas Lease has been shut in since September 2004 due to hurricane damage to oil pipelines and facilities. Under the No Action Alternative, Freeport-McMoRan Energy would find other uses for its existing facilities. For example, in August 2001, Freeport-McMoRan Sulphur LLC submitted an application to MMS to inject OCS-generated Resource Conservation and Recovery Act-(RCRA) exempt exploration and production waste into salt caverns and caprock on Sulphur and Salt Lease OCS-G-9372. Freeport-McMoRan Energy put its proposal to MMS on hold pending a decision on its application to construct and operate the MPEH™. Should a license for the MPEH™ be denied, Freeport-McMoRan Energy might renew its proposal for the injection of RCRA-exempt waste, or undertake other activities.

Under the No Action Alternative, the Secretary would deny the license application and the project would not proceed. The additional infrastructure proposed by Freeport-McMoRan Energy would not be built and operated to satisfy natural gas demand. Other license applications concerning proposals to satisfy demand for natural gas might be submitted to the Secretary, or other means might be used to satisfy the nation's energy demands, such as expansion or establishment of onshore LNG ports. Because the demand for energy in the United States is predicted to increase, consumers could have fewer and potentially more expensive options for obtaining natural gas supplies in the near future. It is possible that existing natural gas infrastructure supplying the proposed market area could be developed in other ways unforeseen at this point, including the further development of natural gas sources in North America and construction of associated pipeline projects. In some cases, potential customers of natural gas could select available energy alternatives such as oil, coal, wind, solar, hydro, or biomass to compensate for the reduced availability of natural gas. However, it is purely speculative to predict the resulting action that would be taken by the end users of the natural gas supplied by the project and the associated direct and indirect environmental impacts.

2.6 Identification of the Agencies' Preferred Alternative

The CEQ regulations instruct EIS preparers to "[i]dentify the agency's preferred alternative or *alternatives*, if one or more exists, in the draft statement and identify such alternative in the final statement *unless another law prohibits the expression of such a preference*" (emphasis added) (40 CFR 1502.14(e)). Under the DWPA, MARAD has the decisionmaking authority to approve, approve with conditions, or deny a license application for a deepwater port. Because MARAD is the decisionmaking authority, identifying its Preferred Alternative could be interpreted as predecisional to issuing a license prior to the Secretary's assembling, reviewing, and analyzing all of the relevant information pertaining to a license application, as required under the DWPA. As such, the Secretary will defer identification of the agency's Preferred Alternative until a decision is made to approve or deny a deepwater port license. If the license is issued, the Secretary will indicate the agency's Preferred Alternative in its ROD issued under the DWPA.

3. Affected Environment

The MPEH™ Final EIS included a description of the environment that would be affected by the Proposed Action. The USCG has determined that the affected environment has not changed appreciably since the MPEH™ Final EIS was published on March 10, 2006. The MPEH™ Final EIS described the affected environment for the Deepwater Terminal and Offshore Pipelines, Onshore Natural Gas Pipelines, Onshore NGL Pipelines, and the Fabrication Sites. For the Deepwater Terminal and Offshore Pipelines—the environment potentially affected by this EA—the following 10 resource areas were described: (1) water quality, (2) biological resources, (3) cultural resources, (4) geological resources, (5) land and OCS use and Coastal Zone Management, (6) recreation and visual resources, (7) socioeconomic resources, (8) transportation, (9) air quality, and (10) noise. In accordance with the CEQ implementing procedures (40 CFR 1502.21, "Incorporation by reference"), Section 3.1 (Definitions of Resources Addressed by this EIS) and Section 3.2 (Deepwater Terminal and Offshore Pipelines) are incorporated by reference in this EA. These sections of the MPEH™ Final EIS are available for review on the USDOT docket at <*http://dms.dot.gov*>. The Docket Number is 17696 and Chapter 3 is contained in document number 232.

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4. Environmental Consequences

4.1 Evaluation Criteria for Resources Addressed

This chapter presents an analysis of the potential direct and indirect impacts each alternative would have on the affected environment as characterized in **Section 3.0**. Each alternative was evaluated for its potential to harm or destroy plant and animal species, as well as the habitats they utilize. Direct impacts are caused by the action and occur at the same time and place. Indirect impacts are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Impact classifications (i.e., negligible, minor, moderate, or major) are defined in **Section 1.3**.

Impact characteristics previously defined in **Section 1.3** outlined several impact attributes, including (1) duration (i.e., short-term, long-term), (2) mechanism (i.e., direct, indirect), (3) magnitude (classifications ranging from negligible to major), and (4) whether an impact is adverse or beneficial. Impact analyses and the criteria upon which impact determinations are made—as presented in the following section—also consider two critical NEPA-based factors:

- Context – where an impact can be localized or more widespread (e.g., regional). While the definition of the term "local" (or localized) can vary by resource, it can be broadly defined as one that occurs within an established regulatory limit (e.g., 100-m mixing boundary) or within approximately 10 km (6 mi) of the source. "Regional" impacts are broadly defined as those that occur on the order of 100 km (62 mi) or more from the source.
- Intensity – where an impact is determined through consideration of several factors, including whether the Proposed Action might have an adverse impact on the unique characteristics of an area (e.g., historical resources, ecologically critical areas), public health or safety, or endangered or threatened species or designated critical habitat. Impacts are also considered in terms of their potential for violation of Federal, state, or local environmental law; their controversial nature; the degree of uncertainty or unknown effects, or unique or unknown risks; if there are precedent-setting effects; and their cumulative impact (see **Section 6.0**).

The following guidance proves a framework for establishing whether an impact would be negligible, minor, moderate, or major (see **Section 1.3**). Some impacts would be major, while others would be minor to major depending on the intensity and context of the impact on the resource. These evaluation criteria were developed by environmental professionals in their respective fields in coordination and consultation with stakeholder agencies (see **Table 4-1**). Although some evaluation criteria have been designated based on legal or regulatory limits or requirements, others are based on best professional judgment and best management practices. The evaluation criteria include both quantitative and qualitative analyses, as appropriate to each resource.

4.2 Deepwater Terminal

Activities of both short-term and long-term nature would be expected to affect the environmental resources as described in the MPEH™ Final EIS. Short-term activities include all construction activities, the modification and installation of Terminal platforms and facilities, and intermittent or temporary activities associated with routine Terminal operations. Long-term activities are those associated with LNG vaporization and processing, LNGC and support vessel operations, noise, and routine terminal discharges and operations.

Table 4-1. Evaluation Criteria

Resource	Evaluation Criteria
Water Quality	• Violate a Federal, state, local, or federally recognized international water quality criterion or waste discharge requirement (major) • Cause irreparable harm to human health, aquatic life, or beneficial uses of aquatic ecosystems (major) • Degrade marine, coastal, or terrestrial (lakes, rivers, wetlands, tidal environments) water quality (minor to major depending on extent of degradation) • Alter surface runoff resulting in flooding, or place a structure within a 100-year floodplain (minor to major depending on extent of change)
Biological Resources	• Violate the legal protection of a species or its critical habitat (major) • Degrade the commercial, recreational, ecological, or scientific importance of a biological resource (minor to major depending on extent of degradation) • Measurably change the population size (density) or change the distribution of an important species in the region (minor to major depending on extent of change)
Cultural Resources	• Irretrievable or irreversible damage to a prehistoric or historic property that is listed or eligible for listing on the NRHP (major) • Adverse impact on a prehistoric or historic property that is listed or eligible for listing on the NRHP (minor to moderate depending on extent of adverse impact)
Geological Resources	• Destruction of unique geological features (major) • Increased erosion potential (minor to moderate depending on extent of increase) • Siting facilities to prevent recovery of mineral resources (minor to moderate) • Increased potential for geologic hazards, such as seismicity (minor to major depending on extent of increase) • Alteration of the lithology, stratigraphy, and geological structures that control the groundwater quality, distribution of aquifers and confining beds, and groundwater availability (minor to major depending on extent of alteration) • Alteration of the soil composition, structure, or function within the environment (minor to moderate depending on extent of alteration)
Land and OCS Use and Coastal Zone Management	• Create a measurable threat to human health (major) or persistent degradation of another environmental resource (minor to major) • Conflict with applicable planning and zoning (minor to moderate depending on extent of conflict) • Consistency with the state's Coastal Zone Management Program (minor to moderate depending on extent of inconsistency) • Alter the practical uses and functions of land, the OCS, or an adjacent area (minor to moderate depending on extent of alteration)

Table 4-1. Evaluation Criteria (continued)

Resource	Evaluation Criteria
Recreation and Visual Resources	• Alter or impair a viewshed, scenic quality, or aesthetic values not consistent with applicable laws or regulations • Interference with access to coastal recreational shorelines or waterways • Substantial loss or displacement of an important recreational resource, such as impairment of recreational fishing activities and other water-dependent uses • Substantial degradation of recreational value
Transportation	• Violate FAA regulations for the safety of commercial or private aircraft (major) • Long-term interference with access to transportation routes (minor to major) • Permanent decrease in Level of Service of key transportation arteries (minor to major) • Substantial increased risks of collisions or other mishaps (e.g., grounding) (minor to major depending on risk)
Air Quality	• Cause or contribute to a violation of any National Ambient Air Quality Standard (NAAQS) (major) • Cause or contribute to a violation of a Class I or Class II increment (minor to major) • Cause an adverse impact on Air Quality Related Values in a Class I area (minor to major) • Expose sensitive receptors to substantially increased pollutant concentrations (minor to major) • Increase emissions of criteria pollutants beyond limits allowed by CAA regulations (minor to major) • Substantially increase the emissions of greenhouse gases (minor)
Socioeconomics	• Substantial change to the local or regional economy, population, housing, infrastructure (schools, police, and fire services), social conditions, or employment (major) • Disproportionate environmental health or safety risk to children (minor to major depending on risk and scope of impact) • Disproportionate environmental, economic, social, or health impacts on minority or low-income populations (minor to major depending on risk and scope of impact)
Noise	• Substantial change in existing ambient noise levels on land (which could impact humans) or underwater (which could impact biological resources) (minor to moderate depending on change) • Violation of state or local noise ordinances, limits, or standards, or applicable land use compatibility guidelines (minor to moderate depending on violation)

4.2.1 Water Quality

Impact Summary: Construction activities (e.g., platform and bridge installation) would have minor, direct, short-term impacts on marine and coastal water quality from sediment disturbance and increased turbidity. These impacts would be localized and temporary. Direct, long-term impacts on marine water quality would occur during operation of the MPEH™. Operations discharges from SCV-SCR technology would be localized and would dilute rapidly. No indirect impacts on marine water quality would be expected. Minor, direct, short-term impacts on marine water quality would occur as a result of sediment disturbance and increased turbidity caused by decommissioning activities (e.g., platform removal and blasting removal). These impacts would be localized and temporary. A detailed discussion of impacts follows.

4.2.1.1 Marine Waters

This section details the potential impacts on marine water quality associated with the proposed Terminal. Impacts are evaluated in the context of Terminal construction, operations, and decommissioning. Marine waters, as defined in this document, include waters extending from 4.8 km (3 statute miles) offshore seaward to the Exclusive Economic Zone (EEZ) boundary in the vicinity of the proposed Terminal site (MP 299). For operations conducted in Federal OCS waters (e.g., Terminal installation, Terminal operations, LNG processing, decommissioning), discharges would have to comply with all applicable Federal Ocean Discharge Criteria as established under an NPDES permit.

4.2.1.1.1 Construction Impacts

Terminal Installation

Terminal installation would encompass the retrofitting of several existing offshore structures at MP 299 and the addition of new platforms and associated facilities. Installation of the proposed new platforms (LNG Storage Platform Nos. 1 and 2 at MP 299) and the relocation of Platform No. 3 would cause sediment disturbance as the platform jackets are lowered to the sea floor. The piles anchoring the new platforms to the seabed would be installed through the open ends of the jacket columns, which would minimize the potential for sediment suspension and localized turbidity increases. As indicated in **Table 2-2**, all temporary construction impacts would be contained in a footprint of 225.3 acres, but the actual area of disturbed sediment is expected to be less (as described below). The operational footprint for all existing, relocated, and new MPEH™ platforms and the associated mooring system is 5.1 acres (**Table 2-2**).

A specialized heavy lift vessel (HLV) construction barge would be employed to install the new platforms. Freeport-McMoRan Energy anticipates using a dynamically positioned HLV which does not require anchors to maintain station. However, if a dynamically positioned HLV were not available, six or more anchors might be necessary to anchor the construction barge depending upon sea conditions. Barge anchors and anchor chains hitting the sea floor would cause minor, short-term sediment disturbance and turbidity increases. Since anchoring methods are designed to minimize movement and sweeping of anchor chains, direct impacts from anchor cables on benthic organisms and turbidity would be minimal. It is expected that direct benthic impacts from anchor placement would be temporary. Turbidity from suspension of sediments would return to background levels within hours and displaced benthic organisms would likely recolonize the disturbed area within days. The extent of sea floor disturbance from anchoring would be influenced by water depth, wind, currents, and chain length, as well as the size of the anchor and chain (MMS 2002a). The temporarily disturbed area would be larger if the anchors are dragged due to barge movement. Anchor depressions can be as deep as 2.1 to 2.4 m (7 to 8 ft) (FERC and MMS 2001). A dragged anchor could create a trench from 3.0 to 9.1 m (10 to 30 ft) wide at the surface of the sea floor. Based on a conservative estimate of temporary anchor impacts (6 anchors multiplied by trenches that are 9 m (30 ft) wide by 9 m (30 ft) long), less than 2 acres would be impacted by installation operations.

Additional sediment disturbance would be caused by the installation of the Soft-Berth™ mooring system piles. This system requires that the piles are driven into the sea floor using pile emplacement techniques appropriate for the water depth at the Terminal.

A variety of other vessels (outlined in MPEH™ Final EIS Appendix G1) would also be required for Terminal installation. The duration of each individual vessel usage would vary, but they would all be used during the approximate 4-year construction period (**Table 6-1**). Discharges associated with these vessels and their activities would include treated sanitary wastes, bilge water, once-through cooling water, and (on occasion) ballast water. Additional details regarding vessel discharges are provided in **Section 4.2.1.1.2**.

Installation of the MPEH™ platforms and associated proposed Terminal structures would produce temporary, localized increases in turbidity at the sea floor as sediments are disturbed and resuspended. A total of 225.3 acres of sea floor would be temporarily affected by these installation operations. This estimate of sea floor disturbed is considered highly conservative given (1) the use of dynamically positioned HLVs which do not require anchors to maintain station; (2) MMS guidelines of a 5:1 ratio for installation-related anchoring activities in waters less than 305 m (1,000 ft), with the footprint encompassing the farthest reaching surface disturbance (see Appendix G1 from MPEH™ Final EIS); and (3) not all of the area within this potential footprint would be disturbed during installation activities. Nevertheless, resuspended sediments would be expected to settle rapidly to the bottom, with coarse particles settling faster than fine ones. Mobilization of pollutants into the water column would not be expected because offshore sediments at the proposed Terminal site have low contaminant concentrations.

Pipeline Installation

MPEH™ Final EIS Section 4.2.1.1.1 evaluated impacts on water quality from pipeline installation, and are incorporated herein by reference. The USCG has determined that the amended Application would not change the construction and operational impacts of the pipeline installation on water quality as presented in the MPEH™ Final EIS.

Hydrostatic Testing of the Takeaway Pipelines and Terminal Piping

MPEH™ Final EIS Section 4.2.1.1.1 evaluated impacts on water quality from pipeline installation, and are incorporated herein by reference. The USCG has determined that the amended Application would not change the construction and operational impacts of the pipeline testing on water quality as presented in the MPEH™ Final EIS.

Salt Cavern Formation

MPEH™ Final EIS Section 4.2.1.1.1 evaluated impacts on water quality, and are incorporated herein by reference. The USCG has determined that the amended Application would not change the construction and operational impacts of the salt cavern formation on water quality as presented in the MPEH™ Final EIS.

4.2.1.1.2 Operations Impacts

LNG Processing

This section evaluates the potential impacts on marine water quality that would be associated with the proposed LNG vaporization. The SCV-SCR vaporization technology is discussed in detail in **Section 2.3.1.7** and **2.3.4.2**. **Table 2-1** summarizes the potential water quality impacts associated with SCV technology. The MPEH™ Final EIS evaluated a generic SCV-SCR option, while this EA evaluates the proposed SCV-SCR system (with WHR units), including new equipment specifications and emission factors. **Table 2-1** of the EA incorporates data relative to the SCV-SCR option as detailed in Freeport-McMoRan Energy's Application Amendment.

Seawater Intake. Under the SCV-SCR alternative, there would be no use of seawater for LNG vaporization.

Discharges. No discharge of seawater would be required for LNG vaporization. However, a freshwater discharge would be generated under this vaporization technology. Primary by products resulting from the use of SCV technology include CO_2 and fresh water, the latter of which will be discharged pursuant to an NPDES permit to be issued by USEPA. On May 19, 2006, Freeport-McMoRan Energy filed an amendment to its NPDES permit application for the MPEH™ project reflecting the water discharge changes resulting from the switch to SCV technology for LNG vaporization. The revised NPDES permit application is included in **Appendix B**.

During combustion, a portion of the CO_2 bubbling through the SCV water bath combines with water molecules to form a weak H_2CO_3. Freeport-McMoRan Energy estimates that vaporization of 1.6 bcfd of LNG through eight SCVs would produce an average of 287,000 gpd of slightly acidic freshwater. The maximum rate of freshwater production from the eight SCVs would be 345,000 gpd. The neutralization product contained in the SCV system effluent at discharge would be sodium carbonate.

Prior to discharge, this slightly acidic freshwater effluent would be neutralized via injection of a 20 percent NaOH solution. Approximately 1,650 gpd of 20 percent (by weight) NaOH solution will be required to treat the SCV effluent from the MPEH™ facility. Target pH for the SCV treated effluent would range between 6 and 9. The SCV effluent would be monitored continuously to ensure that the pH remains within the prescribed range. Discharge of the SCV effluent would occur at Outfall 002, located on Platform No. 1 and No. 3.

The SCV treated effluent, composed of fresh water, will be more buoyant than seawater. Buoyancy of the effluent would cause the discharge to rise towards the ocean surface, rapidly mixing with and being diluted by surrounding seawater. Dilution of the effluent plume would occur in two primary phases: an initial dilution, or near-field or jet phase, that describes plume dilution in the first few minutes after discharge; and a far field dilution phase that describes plume dilution over several hours after discharge (e.g., see Baumgartner et al. 1992, 1994; Brandsma et al. 1992; Frick et al. 2000). In the initial dilution phase, the discharge plume (1) rapidly entrains ambient seawater as it ascends, and (2) bends in the direction of the ambient current. This phase ends when the plume either encounters a boundary (e.g., the sea surface) or entrains enough ambient seawater to reach neutral buoyancy.

Based on the estimated discharge volume, rate, and water depth, dilution factors in the 10^2 to 10^3 range would occur within minutes and within a few meters of the discharge source. Modeling of discharges of comparable volumes of wastewater from a stationary source (i.e., 265 to 618 gpm) indicated a 24- to 60-fold dilution at 5 m from the discharge point.

After reaching neutral buoyancy, the plume would quickly lose all momentum and further dilution would only result from ambient forces. This is the passive diffusion or far field dilution phase. Far field dilution occurs much more slowly with estimated dilution factors reaching 10^4 to 10^5 over a period of hours and over distances of a few kilometers from the discharge point.

SCV treated effluent would exhibit a pH ranging from slightly acidic to mildly basic (i.e., pH ranging from 6 to 9). Ambient seawater exhibits an excellent buffering capacity. Given the dilution factors noted previously, the pH of the SCV effluent is expected to reach ambient levels within tens of meters from the discharge point.

Other Impacts

In the MPEH™ Final EIS, the ORV base case was used to predict the worst-case critical dilution concentration for cold-water plumes based on the water intake requirements. Under this option, discharge modeling was conducted using a three outfall (downpipe)/two port diffuser (per downpipe) configuration. ORV with Indirect WHR (Option 2b) and IFV boiling/condensing would have fewer impacts due to the reduced amount of water used. Under the SCV-SCR vaporization approach, no seawater discharges are expected. Freshwater discharges at Outfall 002 are positively buoyant and there is no potential for impingement of the freshwater plume on the sea floor. At the 10-m boundary, it is expected that the salinity level within the discharge would be near ambient. While these discharges would be continuous during the life of the Terminal, only minor, long-term impacts on marine water quality would be expected.

Vessel Operations

MPEH™ Final EIS Section 4.2.1.1.2 evaluated impacts from vessel operations on water quality, and are incorporated herein by reference. A typical LNGC is estimated to use about 32,500 gpm of seawater for engine cooling (USCG and MARAD 2003b). The USCG has determined that the amended Application would not change vessel operations impacts on water quality as presented in the MPEH™ Final EIS.

Routine Discharges

Routine Terminal operations would include a variety of discharges including sanitary and domestic wastes; oily rinse water from the open-deck drain system, engine, and other equipment; intermittent storm water runoff; and brine from the reverse osmosis desalination unit. Routine discharges are outlined in **Table 4-2**. These discharges would be expected to have minor long-term, localized impacts on water quality.

The Terminal would be equipped with a marine sanitation device that produces an effluent with a maximum residual chlorine concentration of 1.0 milligrams per liter (mg/L) and no visible floating solids or oil and grease. Domestic waste (gray water from showers and sinks) does not require treatment before discharge. Sanitary and domestic wastes from the Terminal would temporarily degrade water quality, but would be diluted to undetectable levels within a short distance of the source (USEPA 1993, 1996). Water quality impacts from sanitary and domestic waste discharges would include minor, localized changes in Biological Oxygen Demand (BOD) and minor increases in turbidity downcurrent from the discharge point.

The Terminal would also be equipped with an open-deck drain system designed to collect rain water, minor spills, or water from washdown operations. The deck drain system water would be routed to a sump vessel for subsequent processing by a corrugated plate interceptor-type oily water separator (OWS) unit. After separation, processed water would be discharged overboard in accordance with NPDES permit requirements. Oily wastes removed from the deck drain system water by the OWS would be stored in a waste oil holding tank for transport to an onshore reclaiming facility. Engine wastes (e.g., lube oil, hydraulic fluid, and engine coolant) would be collected and transferred to one of two portable waste tanks. Oil wastes would be placed in a 3,785-liter (1,000-gallon) storage tank. Aqueous engine coolant would be placed in a 757-liter (200-gallon) storage tank. When filled, the tanks would be loaded on a supply or work boat and transported to shore for reclaiming or disposal. Other associated solid wastes would be collected and transported to shore for proper disposal. Discharges of processed deck drainage water would comply with permit limitations (e.g., 40 mg/L oil content) and would produce no visible sheen. Minor impacts on water quality are anticipated.

Table 4-2. Discharges Associated With the Operations of MPEH™ Terminal

Discharge and Source	Treatment	Number of Discharge Points	Discharge Volume and Comments
Slightly acidic to mildly basic fresh water from SCVs	Sodium hydroxide	2, fixed	Outfall 002 would discharge at an average rate of 287,000 gallons per day (gpd) and a maximum rate of 0.345,000 gpd. Discharge would be continuous during LNG vaporization operations. Treated fresh water would be released at ambient water temperature. Fresh water would be treated with sodium hydroxide to maintain proper pH.
Black and gray water	Chlorination	3, fixed	Outfall 003 would discharge at an average rate of 34,560 gpd and a maximum rate of 127,200 gpd from Platform No. 1, Platform No. 2, and BS Y-7. The maximum and average discharge rates are based on 60 gpd per person for 70 personnel. Discharge would be intermittent, as needed. All three outfalls would handle treated wastewater discharges from the sewage treatment units. Sewage treatment units would be activated sludge units that would treat black and gray wastewater prior to discharge overboard. Solids would be macerated by the sewage treatment units and discharged with the treated wastewater flows. Treated water from the sewage treatment units would be chlorinated to a minimum of 1 mg/L before being discharged.
Reject water (from potable water RO units)	None	1, fixed	Outfall 004 (on BS-Y7) would discharge reject water from the reverse osmosis water purifiers at a maximum rate of 32,000 gpd. Discharge would be intermittent to continuous, depending upon demand. Screened seawater would be pumped into the facility for the production of potable water for facility personnel. The salinity of the discharge water produced by the water purifiers would be approximately 4 percent.
Firewater	Sodium hypochlorite (intermittent treatment)	Multiple, fixed	Firewater is discharged at a rate of ~150,000 gpd (10,000 gpm for 15 minutes) under a readiness testing program. Discharges would be intermittent. Firewater discharges would be released overboard at multiple outfalls throughout the facility via the fire protection system and the system bypass. Outfall 009 would discharge water associated with the facility fire protection system. Seawater would be pumped from the GOM, then treated with sodium hypochlorite at an average concentration of 0.2 mg/L (maximum concentration of 1.0 mg/L).

Table 4-2. Discharges Associated with the operations of MPEH™ Terminal (continued)

Discharge and Source	Treatment	Number of Discharge Points	Discharge Volume and Comments
Hydrotest and line maintenance water	Sodium hypochlorite	2, fixed	The maximum discharge rate of hydrotest and line maintenance water would be approximately 5,700 gpm, and the average discharge rate would be 2,850 gpm for each of two outfalls. Discharges would be intermittent. Outfall 009 would discharge water associated with hydrostatic testing and line maintenance conducted at the MPEH™ Terminal at MP 299 for Terminal piping and the departing pipelines to be constructed. Outfall 011 at the MP 164 pipeline station would discharge the same type of hydrostatic testing and line maintenance water. Hydrostatic test and line maintenance water for both locations would be drawn directly from and returned to the GOM.
Oil-water separator	Separation of oil and water (hydrocyclone)	8, fixed	Outfall 001 would discharge at 8 locations an average rate of 520,000 gpd and a maximum rate of 1.95 million gpd, with discharges intermittent, as needed. No free oil would be discharged.

Brine would also be generated from an on-site desalination plant during production of fresh, potable water aboard the Terminal. Using RO, the desalination plant would provide 8,000 gpd of fresh water for the proposed Terminal facilities. The RO unit would draw 40,000 gallons of seawater per day (from the firewater loop). Brine solution produced during desalination would be discharged through a dedicated discharge point (Point 004) at BS-Y7. The daily volume of brine solution discharged after production of potable water would be 32,000 gpd (121 m^3/day), representing approximately 80 percent of the seawater volume taken into the proposed Terminal for this purpose. The brine solution would have a salinity of ~44 practical salinity units and a discharge temperature ranging from 10–32 °C (50–90 °F). Seawater taken into the RO units would be treated periodically to control scale. Brine discharges from the RO unit would cause a minor localized increase in the salinity of the receiving waters limited to the immediate vicinity of the discharge point. This is because brine discharges would be rapidly diluted following discharge. No noticeable impacts are anticipated from the discharge of desalination brine or the chemical additives used to control RO scale formation due to rapid mixing with ambient seawater.

Hydrocarbon Spill

It is highly unlikely that a catastrophic release of diesel fuel oil could occur. However, in the event of a vessel collision, it is possible that the double hull of a LNGC could be breeched, releasing the contents of a large fuel oil tank (e.g., 5,000–6,000 m^3). Spills of diesel fuel on water spread almost immediately to form a slick. Diesel fuel, once released on the sea surface, is subject to a series of natural processes—evaporation, dissolution, dispersion, microbial degradation, photo-oxidation, and (to a lesser extent due to its refined nature) weathering. Oil slicks and sheens move continuously in the general direction of prevailing wind and surface water currents. Thus, surface oil does not persist for more than a few days at any location at sea. Dispersed oil droplets usually are not mixed very deeply into the water column. Dispersed oil droplets tend to coalesce and return to the sea surface to form nonpersistent sheens. Thus, slicks and sheens adversely affect water quality of a particular water mass primarily in the upper reaches of the water column and only for a short period of time. Therefore, a fuel oil spill from MPEH™ Terminal operation would not persist long enough to adversely affect surface water quality in coastal waters.

In addition, the following protective measures would be used to minimize adverse impacts associated with hydrocarbon spills:

- Written oil transfer procedures would be required in order to receive diesel oil shipments from supply vessels.
- All equipment and process designs would be previously proven and consistent with industry norms.
- Spill-containment and recovery equipment would be strategically placed on the deck of Platform 1.
- The design, construction, and operation of the facility would minimize the use of materials determined to be toxic or hazardous to the environment.
- The preparation of a Facility Response Plan would include training for spill response and spill response exercises.
- The cranes on the intake recovery towers would be electric.

4.2.1.1.3 Decommissioning

MPEH™ Final EIS Section 4.2.1.1.3 evaluated impacts on water quality from decommissioning, and are incorporated herein by reference. The USCG has determined that the amended Application would not change the decommissioning impacts of the proposed Terminal on water quality as presented in the MPEH™ Final EIS.

4.2.1.1.4 Mitigation

Impacts on marine water quality associated with the Proposed Action would be minimized by adherence to NPDES permit-based discharge limits. Adherence to routine maintenance schedules and implementation of an appropriate emergency response plan (in event of equipment failure) would ensure that untreated discharges would not occur.

4.2.1.2 Coastal Waters

MPEH™ Final EIS Section 4.2.1.2 evaluated impacts on coastal water quality, and are incorporated herein by reference. The USCG has determined that the amended Application would not change the construction and operational impacts on coastal water quality as presented in the MPEH™ Final EIS.

4.2.2 Biological Resources

Impact Summary: Minor, short-term, direct, and long-term, adverse impacts on biological resources would occur as a result of turbidity and sediment disturbance, noise, and the potential accidental release of marine debris associated with the Proposed Action. No impacts would result from SCV-SCR discharge. Increased LNGC, tug, and support vessel traffic would have a direct, adverse impact on turtles and marine mammals from ship strikes. Most impacts would be temporary, and would be limited to resources occurring in the immediate vicinity of the proposed MPEH™ Terminal.

4.2.2.1 General Impact Discussions

As discussed in **Section 1.5**, and in accordance with Section 7(c)(1) of the ESA and Section 102 of NEPA, this EA combined with the MPEH™ Final EIS will serve as the Biological Assessment (BA) for the Proposed Action. Section 7 of the ESA requires all federal agencies to consult with the National Marine Fisheries Service (NMFS) for marine and anadromus species, or the U.S. Fish and Wildlife Service (USFWS) for fresh-water and wildlife, if they are proposing an action that may affect listed species or their designated habitat. A BA is document prepared for the Section 7 process to determine whether a proposed major construction activity under the authority of a Federal action agency is likely to adversely affect listed species, proposed species, or designated critical habitat (see also **Section 4.2.2.8**).

4.2.2.1.1 Seafloor Disturbance

Impact Summary: Minor, short-term and long-term, direct, adverse impacts on biological resources would occur during construction and installation of the proposed MPEH™ Terminal at MP 299. Construction activities associated with the Proposed Action would disturb the sea floor and disrupt benthic communities. Approximately 230.1 acres of seafloor would be disturbed, including a maximum of 225.03 acres of benthic habitat that would be temporarily disturbed due to Terminal installation operations (including vessel anchoring), and a maximum of 5 acres from removal of Platform 3. This disturbance is negligible considering the overall amount of similar habitat available in the GOM. A detailed discussion of impacts follows.

The proposed MPEH™ Terminal would be installed in an area of the GOM that is largely devoid of vegetation and consists of sand, silt, clay, or a mixture of the three. These sediments support a wide variety of infaunal and epifaunal species (e.g., worms, crustaceans, mollusks, echinoderms, hydroids, and sponges) that would be displaced or destroyed by construction activities. Larger, more motile invertebrate and fish species would potentially be displaced by seafloor structures; while smaller, more sessile organisms would probably be crushed. Displaced organisms would most likely return to the area shortly after construction activities ceased. Moreover, due to the ubiquitous nature of the region's benthic communities, affected populations of benthic organisms would be expected to recover quickly by recolonization from surrounding communities of similar organisms of all size classes.

A specialized HLV construction barge would be employed to install the new platforms. Freeport-McMoRan Energy anticipates using a dynamically positioned HLV which does not require anchors to maintain station. However, if a dynamically positioned HLV were not available, six or more anchors might be necessary to anchor the construction barge depending upon sea conditions. The extent of this seafloor disturbance would depend on water depth, wind, currents, and chain length, as well as by the size of the anchor and chain (MMS 2002b). The disturbed area would be larger if the anchors were dragged due to barge movement. Anchor depressions could be as deep as 2.1 to 2.4 m (7 to 8 ft) (FERC and MMS 2001), and the area affected by the anchor sweep could be expected to be relatively extensive. Note that a dragged anchor could create a trench from 3.0 to 9.1 m (10 to 30 ft) wide at the surface of the sea floor. Using a conservative estimate of temporary anchor impacts (6 anchors multiplied by trenches that are 9 m [30 ft] wide and 9 m [30 ft] long), less than 2 acres of sea floor would be impacted by Terminal installation vessels.

As indicated in **Table 2-2**, all temporary construction impacts would be contained in a footprint of about 225 acres. The GOM has an area about 1.6 million square kilometers (km^2). Soft-bottom sediments are ubiquitous throughout the entire GOM—from the continental shelf to the deepest abyss at about 3,850 m (12,630 ft) (MMS 2002d). Therefore, the temporary impact to 225 acres is negligible when compared to the amount of similar habitat available in the GOM and in the project area.

4.2.2.1.2 Turbidity

Minor, short-term, direct, adverse impacts on biological resources would be expected to occur as a result of turbidity increases associated with the construction and installation of the proposed MPEH™ Terminal.

Turbidity refers to any insoluble particulate matter suspended in the water column. This matter impedes light passage through the water by scattering and absorbing light energy. Decreased light penetration reduces the depth of the photic zone, in turn reducing the depth at which primary productivity could occur. Turbid sediments could also smother benthic flora and fauna when they resettle. Turbidity adversely affects biological resources in at least four ways by (1) killing organisms or reducing their growth rate; (2) preventing successful egg and larvae development; (3) modifying migration patterns; and (4) reducing available food abundance, in part by reducing primary production (USEPA 1976).

The proposed construction footprint of the Terminal would encompass about 225 acres (**Table 2-2**). The extent of the turbidity plume generated during offshore Terminal construction and pipeline installation would depend on the type of construction barge used, the removal method used for Platform 3, the amount of sediment disturbed, the grain size of the disturbed sediment, the jetting or trenching techniques employed, and the ambient current dynamics. Natural turbidity levels, such as those created by the Mississippi River plume, would be highly variable.

Turbidity increases created by offshore Terminal construction and installation would cause many benthic organisms to disperse from or avoid the construction areas. It is likely that some of these organisms would return once construction ceased. Increased turbidity could also clog or obstruct the gills and filter-feeding mechanisms of benthic organisms, and resettling sediments could smother demersal eggs and larvae. Increased turbidity would be expected to predominantly affect soft-bottom species such as red drum, sand sea trout, and spotted sea trout. Each of these species is sought by recreational fishers in the GOM. Turbidity-related impacts on biological resources would likely be temporary in duration, moderate in intensity, and localized in scope. Although Terminal construction could result in mortality of benthic eggs and larvae, the overall impacts on fish populations would be negligible since the spawning occurs over much broader areas (FERC and MMS 2001).

4.2.2.1.3 Vessel Traffic

The impacts of vessel traffic were fully evaluated in Section 4.2.2.1.4 of the MPEH™ Final EIS. Vessel traffic was unaffected by the amended Application, and therefore is incorporated herein by reference.

4.2.2.1.4 Noise

Minor, direct, adverse impacts on biological resources would be expected to result from noise associated with the construction and installation of the proposed MPEH™ Terminal. Noise associated with the operation of the deepwater port (machinery, support vessel, and LNGC noise) was unaffected by the amended Application and is therefore, incorporated herein by reference. The Proposed Action includes noise associated with construction vessels, pile-driving (if used), and the use of abrasive cutting or explosives to remove Platform No. 3.

Intense underwater noise has been shown to affect marine life, with adverse effects ranging from mortality and serious injury to behavioral changes, disorientation, and hearing loss. Animals can only respond to sounds if they can hear them. Noise impacts on sea life depend on loudness, the specific acoustic frequency pattern at a given location, the distance of an organism from a sound source, and an organism's particular hearing sensitivity (MMS 2000). Animals' hearing sensitivity depends on the frequency and sound pressure level (decibel [dB] referenced 1 microPascal [dB re 1 μPa]) of the sound, when it reaches the animal. The range of sounds produced by a species is generally associated with ranges of good hearing sensitivity, but many species exhibit good hearing sensitivity well outside the frequency range of sounds they produce (USN 2002). Scientific research indicates that best hearing thresholds for marine vertebrates range from about 60 dB re 1 μPa at 0.1 kilohertz (kHz) to about 40 dB re 1 μPa at 10 kHz.

Noise generated by construction vessels would be highly variable in duration and intensity. Vessel noise, which is transmitted through both air and water, is created by propulsion machinery, generators, and hull vibrations, and would vary with ship and engine size (Richardson et al. 1995). Ships create broadband noise over a wide range of frequencies, 20 to 100,000 Hertz (Hz), with dominant tones around 50 Hz (Richardson et al. 1995).

Abrasive cutting is the preferred method for the removal of Platform 3 and explosives would only be used in the unlikely event that the abrasive cutting was not successful. Man-made underwater explosions are possibly one of the strongest point sources of sound in the sea (with the possible exception of volcanic eruptions) (Richardson et al. 1995). The noise created by an underwater explosion is characterized by an initial shock and followed by a series of oscillating bubble pulses, if the explosion does vent through the surface (Richardson et al. 1995). Based on an experiment conducted on sea turtles, the sound pressure level of an explosion could be 213 dB re 1 μPa at 1,200 to 1,800 feet (CETS 1996).

Available information indicates that no impacts on biological resources would be expected from the use of nonexplosive cutting methods (TSB and CES LSU 2004). It is unlikely that the Applicant would use explosives to remove Platform 3. However, if it is necessary that the Applicant uses explosives to remove Platform 3, the harm avoidance measures listed in **Section 4.2.2.7** (in accordance with NMFS ESA Consultation) would be included as conditions of the License. These measures would avoid harm to listed species and avoid or minimize other potential environmental impacts associated with using explosives to remove Platform 3.

Pile-driving is expected to be performed by surface pile-driving equipment. The highest sound pressures are expected to result from pile-driving 48-inch steel piles using an impact hammer. Pressures of up to 209 dB_{peak}, when measured 10 m from the pile, are expected (NMFS 2004). However, the intensity of the noise associated with hammer pile driving would be dependent on the energy used to drive the bottom (CalTran 2001). The propagation or attenuation of this noise through water would also be dependent upon site-specific characteristics such as depth, gradient, and substrate type (Richardson et al. 1995). For example, soft sediment such as in the proposed project area is expected to be more absorptive than rock which would be reflective.

To reduce impacts associated with pile-driving (if used), the Applicant would be required to develop a plan in consultation with NMFS (and other cooperating agencies) to use ramp-up procedures prior to pile-driving, monitor for protected species prior to and during pile-driving (using qualified observers), and monitor noise levels during the pile-driving, as a condition of the license.

4.2.2.1.5 Routine Discharges

The impacts of routine discharges were fully evaluated in Section 4.2.2.1.6 of the MPEH™ Final EIS. Routine discharges were unaffected by the amended Application, and therefore are incorporated herein by reference.

4.2.2.1.6 Marine Debris

The impacts of marine debris were fully evaluated in Section 4.2.2.1.7 of the MPEH™ Final EIS. Marine debris was unaffected by the amended Application, and therefore is incorporated herein by reference.

4.2.2.1.7 Hydrocarbon Spills

The impacts of potential hydrocarbon spills were fully evaluated in Section 4.2.2.1.8 of the MPEH^{TM} Final EIS. The potential for hydrocarbon spills was unaffected by the amended Application, and therefore is incorporated herein by reference.

4.2.2.1.8 LNG Processing

Negligible, long-term, adverse impacts on biological resources would be expected to occur as a result of discharges associated with LNG processing operations. SCVs are a closed-loop system and therefore require no seawater intake for LNG revaporization. Water in the bath is always absorbing heat and would be maintained close to the ambient conditions, thereby eliminating any thermal effects. Based on vaporizing 1.6 bcfd of LNG, the SCV-SCR would produce slightly acidic water that would need to be discharged. Prior to discharge, the water would be neutralized. The end result would be a maximum discharge of 345,000 gpd of water and sodium carbonate. Details on the operational discharge associated with SCV-SCR are discussed in detail in **Sections 2.3.4.2** and **4.2.1.1.2**. The SCV effluent would be continuously monitored to ensure that the pH remained between 6 and 9.

The impact of sodium carbonate on marine organisms depends on the ambient pH at the discharge location. The discharge plume is expected to return to ambient salinity within about 5 meters from the discharge point and ambient pH within tens of meters from the discharge point. Because of the localized nature of the discharge, negligible, long-term, adverse effects on biological resources are expected as a result of the discharge of water and sodium carbonate.

4.2.2.1.9 Removal of Platform 3

The preferred method for removal of Platform 3 is abrasive cutting. No adverse impacts on biological resources would be expected from the use of non-explosive cutting methods (TSB and CES LSU 2004).

In the unlikely event that explosives are used to remove Platform 3, minor, short-term, direct adverse impacts on biological resources would occur. Impacts from an underwater explosion include both direct physical damage to organisms and noise-related effects (noise-related effects are addressed in **Section 4.2.2.4**). An EIS prepared by MMS on oil and gas leasing found that explosive platform removals disturb the seafloor and result in increased turbidity (MMS 2002c). These impacts are discussed in **Sections 4.2.2.1.1** and **4.2.2.1.2**, respectively. The magnitude of these effects depends largely on the weight of the explosives used.

In 1988, after a request by the MMS for initiation of formal consultation concerning potential impacts on federally listed species associated with explosive-severance activities conducted during structure-removal operations, NMFS issued a Biological Opinion (BO) and incidental take statement (ITS) limiting "takes" to five sea turtle species found along the shallows (depths less than 200 m). The BO and ITS also included a maximum charge weight of 50 pounds, established minimum reporting guidelines, and outlined specific measures to be implemented prior to severance detonations.

The removal of Platform 3 would be governed by the provisions of the MMS Programmatic EA, *Structure-Removal Operations on the Gulf of Mexico Outer Continental Shelf*, February 2005. That Programmatic EA considered current regulatory requirements and evaluated the environmental impacts of modern removal techniques (MMS 2005).

If it is necessary for the Applicant to use explosives to remove Platform 3, the harm avoidance measures listed in **Section 4.2.2.7** (in accordance with NMFS ESA Consultation) would be included as conditions of the License. An EIS prepared by MMS on oil and gas leasing found that such harm avoidance measures would minimize impacts on listed species to only short-term, minor behavioral disturbances (MMS 2002c).

4.2.2.1.10 Decommissioning

The impacts of decommissioning were fully evaluated in Section 4.2.2.1.12 of the MPEH™ Final EIS. Decommissioning was unaffected by the amended Application, and therefore is incorporated herein by reference.

4.2.2.2 Protected and Sensitive Habitats

Construction and operation of the MPEH™ Terminal would not occur in any coastal or marine protected areas such as critical habitat, National Wildlife Refuges (NWRs), or Wildlife Management Areas. The Region of Influence (ROI) for the Proposed Action does not contain known sensitive habitats such as seagrass communities, coral reefs, oyster beds, or hard- or live-bottom areas. Note that impacts of the construction and operation of the proposed pipeline on Gulf sturgeon critical habitat Unit 8 are fully addressed in Section 4.2.2.2 of the MPEH™ Final EIS.

The MMS restricts OCS operation in the vicinity of biologically sensitive areas (e.g., coral reefs, Pinnacle Trend features, and other hard-bottom communities that support diverse benthic assemblages) less then 400 m (1,212 ft) deep. None of the new or existing platforms would fall within OCS blocks designated by MMS as biologically sensitive areas (MMS 2004). Based on the Mississippi-Alabama Shelf Pinnacle Trend Habitat Mapping Study report, the closest hard-bottom area, called the 36 Fathom Ridge, lies approximately 40 km (24.8 mi) from the proposed MPEH™ Terminal and would not be directly or indirectly affected by the Proposed Action.

4.2.2.3 Marine Mammals

Twenty-nine species of marine mammals inhabit the GOM. Twenty-eight species are of the Order Cetacea (whales and dolphins), and one species, the West Indian Manatee (*Trichechus manatus*), is of the Order Sirenia. The cetaceans are further divided into the Suborder Mysticeti (7 species of baleen whales) and the Suborder Odontoceti (21 species of toothed whales, including dolphins). Six of the cetaceans that occur in the action area, and the West Indian manatee, are federally listed as endangered. The endangered whale species are the sperm whale (*Physeter macrocephalus*), sei whale (*Balaenoptera borealis*), blue whale (*B. musculus*), finback whale (*B. physalus*), northern right whale (*Eubalaena glacialis*), and humpback whale (*Megaptera novaeangliae*) (see MPEH™ Final EIS Section 3.2.2).

4.2.2.3.1 Construction Impacts

Turbidity

Minor, short-term, direct, adverse impacts on marine mammals would be expected to occur as a result of turbidity increases associated with the construction and installation of the proposed MPEH™ Terminal.

Removal of Platform 3 and construction of the proposed platforms would create short-term increases in turbidity that could cause marine mammals to temporarily disperse from or avoid construction areas. In addition, increased turbidity could decrease photosynthesis of plankton at depths down to 100 m, affecting primary productivity (MMS 2002c). This could indirectly affect marine mammals by temporarily reducing a portion of the available prey base. The construction area would be small compared to the amount of similar habitat that is available in the northern GOM. Displaced marine mammals would be expected to return shortly after construction ceased; therefore, no long-term, major, adverse impacts would be expected.

Noise

Minor, short-term, direct, adverse effects on marine mammals could result from noise generated during construction and installation of the proposed MPEH™ Terminal. Sources of noise would be installation vessels, pile-driving (if used), and the use of explosives to remove Platform 3 (if used). Based on an experiment conducted on sea turtles, the sound pressure level of an explosion could be 213 dB re 1 μPa at 1,200 to 1,800 feet (CETS 1996). Pile-driving 48-inch steel piles could result in a sound pressure level of 209 dB_{peak} re 1 μPa at 10 m from the pile (NMFS 2004). These pressures exceed the threshold value of 160 dB for physical injury and behavioral disruption in marine mammals.

To reduce impacts associated with explosives, as a condition of the license should one be granted, the Applicant would be required to implement the mitigation measures presented in **Section 4.2.2.7** to avoid and minimize harm to marine species. To reduce the impacts associated with pile-driving, the Applicant would be required to develop a plan in consultation with NMFS (and other cooperating agencies) to use ramp-up procedures prior to pile-driving, monitor for protected species prior to and during pile-driving (using qualified observers), and monitor noise levels during the pile-driving, as a condition of the license, if issued.

Removal of Platform 3

The preferred method for removal of Platform 3 is abrasive cutting. No adverse impacts on marine mammals would be expected from the use of non-explosive cutting methods (TSB and CES LSU 2004).

Minor, short-term, direct adverse impacts on marine mammals would result from the use explosives to remove Platform 3. Impacts of an underwater explosion include both direct physical damage to marine mammals and noise-related effects (noise-related effects are addressed in **Section 4.2.2.4**). Measures that would be used to avoid and minimize harm to marine species are presented in **Section 4.2.2.7**. Based on these measures, impacts on marine mammals, other than short-term, minor behavioral disturbances would be minimized (MMS 2002c).

Information regarding the effects of underwater explosions on marine mammals is limited. Shock waves produced by explosions can potentially cause blast injury and acoustic trauma to nearby animals (MMS 2003). Shallow-water platforms are usually older and more likely to require use of explosives for removal. The species most likely to be near these shallow-water platforms are bottlenose dolphins and Atlantic spotted dolphins. However, there is currently no evidence linking dolphin injuries or deaths in the Gulf to explosive removal of offshore platforms. Potential impacts from acoustic disturbance include behavioral effects, such as physical discomfort leading to avoidance or displacement, and physiological effects, such as concussive damage leading to death (MMS 2000). Based on the platform removal criteria established by NMFS, it is expected that marine mammals farther than 910 m (3,000 ft) from detonation would avoid death or serious injury attributed to explosions.

4.2.2.3.2 Operations Impacts

LNG Processing

As described in **Section 4.2.2.1.8**, negligible, long-term, adverse impacts on marine mammals would occur as a result of LNG processing or the SCV-SCR discharge. The discharge of water and sodium carbonate is expected to be localized, returning to ambient conditions in tens of meters from the discharge point (see **Section 4.2.1.1.2**).

Vessel Traffic

The impact of vessel traffic associated with the operation of the proposed deepwater port on marine mammals was fully evaluated in Section 4.2.2.3.2 of the MPEH™ Final EIS. Operational noise, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and is therefore, incorporated herein by reference.

Noise

The impact of noise associated with the operation of the proposed deepwater port on marine mammals was fully evaluated in Section 4.2.2.3.2 of the MPEH™ Final EIS. Vessel traffic, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and is therefore, incorporated herein by reference.

Routine Discharges

The impact of routine discharges associated with the operation of the proposed deepwater port on marine mammals was fully evaluated in Section 4.2.2.3.2 of the MPEH™ Final EIS. Routine discharges, as discussed in the MPEH™ Final EIS, were unaffected by the amended Application and therefore, incorporated herein by reference.

Marine Debris

The impact of marine debris associated with the operation of the proposed deepwater port on marine mammals was fully evaluated in Section 4.2.2.3.2 of the MPEH™ Final EIS. Marine debris, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

Hydrocarbon Spills

The impact of potential hydrocarbon spills associated with the operation of the proposed deepwater port on marine mammals was fully evaluated in Section 4.2.2.3.2 of the MPEH™ Final EIS. The potential for hydrocarbon spills, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

LNG Spills

The impact of potential LNG spills associated with the operation of the proposed deepwater port on marine mammals was fully evaluated in Section 4.2.2.3.2 of the MPEH™ Final EIS. The potential for LNG spills, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

4.2.2.3.3 Decommissioning

The impacts of decommissioning the proposed deepwater port were fully evaluated in Section 4.2.2.1.12 of the MPEH™ Final EIS. Port decommissioning, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

4.2.2.4 Sea Turtles

Five species of sea turtles that inhabit the GOM are threatened or endangered and could occur in the ROI. These species are the loggerhead sea turtle (*Caretta caretta*), Kemp's ridley sea turtle (*Lepidochelys kempi*), leatherback sea turtle (*Dermochelys coriacea*), hawksbill sea turtle (*Eretmochelys imbricata*), and the green sea turtle (*Chelonia mydas*). The loggerhead sea turtle is the most common sea turtle in the GOM, while the hawksbill sea turtle is the least common (see MPEH™ Final EIS Section 3.2.2.3).

4.2.2.4.1 Construction Impacts

Seafloor Disturbance

Minor, short-term, indirect, adverse and minor long-term beneficial impacts on sea turtles could result from disturbance of the sea floor during construction and installation of the proposed MPEH™ Terminal. Offshore structures provide hard-bottom habitat for a variety of marine organisms including sea turtles. Offshore platforms are particularly important for sea turtles in the soft substrate habitats of the northern GOM.

Benthic organisms would be crushed or displaced during construction activities, thereby reducing the prey base of sea turtles. This would result in minor, indirect adverse impacts on benthic-feeding sea turtles, including loggerhead and Kemp's ridley sea turtles. Displaced organisms would most likely return to the area shortly after construction activities ceased. Therefore impacts on sea turtles are expected to be short-term.

Sea turtles have often been observed near offshore platforms and most likely use the structures as places to feed and rest. Offshore platforms provide refuge from predators and stability in currents, and sea turtles have been observed sleeping under platforms (CETS 1996). Therefore the installation of two new platforms would result in minor, long-term, beneficial impacts on sea turtles.

Turbidity

Minor, short-term, direct and indirect, adverse impacts on sea turtles would be expected to occur as a result of turbidity increases associated with the construction and installation of the proposed MPEH™ Terminal.

Construction of the proposed platforms would create short-term increases in turbidity that could cause sea turtles to temporarily disperse from or avoid construction areas. Such impacts could temporarily displace sea turtles from commonly used feeding or resting habitats. Turbidity from installation/removal of the platforms could affect sessile benthic organisms, which could result in minor indirect impacts on sea turtles that rely on that food source. These impacts would be temporary and displaced sea turtles would be expected to return shortly after construction ceased; therefore, no long-term, major, adverse impacts would be expected.

Noise

Minor, direct, adverse effects on sea turtles could result from noise generated during construction and installation of the proposed MPEH™ Terminal. Sources of noise would be installation vessels, pile-driving (if used), and the use of explosives to remove Platform 3 (if used). Based on an experiment conducted on sea turtles, the sound pressure level of an explosion could be 213 dB re 1 µPa at 1,200 to 1,800 feet (CETS 1996). Pile-driving 48-inch steel piles could result in a sound pressure level of 209 dB_{peak} re 1 µPa at 10 m from the pile (NMFS 2004). These pressures would exceed the threshold value of 160 dB for physical injury and behavioral disruption in sea turtles.

To reduce impacts associated with explosives, the Applicant would be required to implement measures to avoid and minimize harm to marine species, presented in **Section 4.2.2.7**. To reduce impacts associated with pile-driving, the Applicant would be required to develop a plan in consultation with NMFS (and other cooperating agencies) to use ramp-up procedures prior to pile-driving, monitor for protected species prior to and during pile-driving (using qualified observers), and monitor noise levels during the pile-driving, as a condition of the License, if issued.

Removal of Platform 3

The preferred method for removal of Platform 3 is abrasive cutting. No adverse impacts on sea turtles would be expected from the use of non-explosive cutting methods (TSB and CES LSU 2004).

Minor, short-term, direct, adverse impacts on sea turtles would result from the use of explosives to remove Platform 3. Impacts of an underwater explosion include both direct physical damage to sea turtles and noise-related effects (noise-related effects are addressed in **Section 4.2.2.4** and above). Measures that would be used to avoid and minimize harm to marine species are presented in **Section 4.2.2.7** and above. Based on these measures, impacts on sea turtles, other than short-term, minor behavioral disturbances would be minimized (MMS 2002c).

The effects of an underwater explosion on marine turtles are dependent upon several factors: the size, type, and depth of the explosive charge; the size and depth of the turtle; overall water column depth; and the distance from the explosive charge to the turtle (MMS 2003). Potential impacts on marine turtles include lethal injuries and nonlethal effects, such as physical distress and damage to internal organs. A study was conducted by NMFS to determine the effects of underwater explosives on sea turtles, however, that study did not accurately estimate the magnitude and duration of the shockwave received by the turtles (MMS 2003). Immediately after the explosion, turtles at distances within 366 m (1,200 ft) and the loggerhead within 914 m (3,000 ft) were rendered unconscious, possibly posing a predation risk. Although normal behavior was resumed shortly after detonation, some of these turtles suffered everted cloaca and vasodilation for up to 3 weeks after the explosion (MMS 2000). Nonlethal injuries attributed to explosions, including damage to the auditory system and internal organs have not been determined. Only three injured turtles have been observed since 1987, when monitoring became mandatory (CETS 1996). Monitoring the waters for sea turtles is not 100 percent effective. Turtle behavior often makes observations difficult and there is currently no practical and efficient means of removing them from the area once observed. The turtle "safety range" of 914 m (3,000 ft) was established based on field observations and on the NMFS platform removal criteria. Data suggest the NMFS "generic consultation" has been effective in preventing most deaths or serious injuries of sea turtles (MMS 2003).

4.2.2.4.2 Operations Impacts

LNG Processing

As described in **Section 4.2.2.1.8**, negligible, long-term, adverse impacts on sea turtles would occur as a result of LNG processing or the SCV-SCR discharge. The discharge of water and sodium carbonate is expected to be localized, returning to ambient conditions in tens of meters from the discharge point (see **Section 4.2.1.1.2**).

Vessel Traffic

The impact of vessel traffic associated with the operation of the proposed deepwater port on sea turtles was fully evaluated in Section 4.2.2.4.2 of the MPEH™ Final EIS. Vessel traffic, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and is therefore, incorporated herein by reference.

Noise

The impact of noise associated with the operation of the proposed deepwater port on sea turtles was fully evaluated in Section 4.2.2.4.2 of the MPEH™ Final EIS. Vessel traffic, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and is therefore, incorporated herein by reference.

Routine Discharges

The impact of routine discharges associated with the operation of the proposed deepwater port on sea turtles was fully evaluated in Section 4.2.2.4.2 of the MPEH™ Final EIS. Routine discharges, as discussed in the MPEH™ Final EIS, were unaffected by the amended Application and therefore, incorporated herein by reference.

Marine Debris

The impact of marine debris associated with the operation of the proposed deepwater port on sea turtles was fully evaluated in Section 4.2.2.4.2 of the MPEH™ Final EIS. Marine debris, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

Hydrocarbon Spills

The impact of potential hydrocarbon spills associated with the operation of the proposed deepwater port on sea turtles was fully evaluated in Section 4.2.2.4.2 of the MPEH™ Final EIS. The potential for hydrocarbon spills, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

LNG Spills

The impact of potential LNG spills associated with the operation of the proposed deepwater port on sea turtles was fully evaluated in Section 4.2.2.4.2 of the MPEH™ Final EIS. The potential for LNG spills, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

4.2.2.4.3 Decommissioning

The impacts of decommissioning the proposed deepwater port were fully evaluated in Section 4.2.2.1.12 of the MPEH™ Final EIS. Port decommissioning, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

4.2.2.5 Coastal and Marine Birds

The most likely seabirds to be found near the Terminal are terns, storm petrels, jaegers, and laughing gulls. No threatened or endangered bird species are expected to occur near the Terminal (see MPEH™ Final EIS Section 3.2.2.4).

4.2.2.5.1 Construction Impacts

Seafloor Disturbance

No direct, adverse impacts on coastal and marine birds, including threatened and endangered species, would occur as a result of seafloor disturbance. However, minor, indirect, long-term, beneficial impacts on coastal and marine birds would occur as a result of installing two new platforms associated with the proposed MPEH™ Terminal. Offshore platforms provide suitable habitat for several species of migrant birds in the GOM. Trans-Gulf migratory birds use the platforms as stopover sites for resting and refueling (Russell 2005) and shelter from inclement weather during migration. The availability of suitable habitats in the vicinity of natural barriers such as the GOM, allows migrant birds to replenish energy reserves, resulting in increased migratory success and survivability. Therefore the installation of two new platforms would result in minor, long-term, beneficial impacts on marine birds.

Turbidity

No impacts on coastal and marine birds, including threatened and endangered species would occur as a result of turbidity.

Noise

Minor, short-term, adverse impacts on coastal and marine birds would occur as a result of the construction and installation of the proposed MPEH™ Terminal. Sources of noise would be installation vessels, pile-driving (if used), and the use of explosives to remove Platform 3 (if used). Impacts could include temporarily displacing coastal birds from commonly used feeding or resting habitats. These impacts would be temporary and displaced birds would be expected to return shortly after construction ceased.

To reduce impacts associated with pile-driving (if used), the Applicant would be required to develop a plan in consultation with NMFS (and other cooperating agencies) to use ramp-up procedures prior to pile-driving, monitor for protected species prior to and during pile-driving (using qualified observers), and monitor noise levels during the pile-driving, as a condition of the License, if issued.

Removal of Platform 3

The preferred method for removal of Platform 3 is abrasive cutting. No adverse impacts on coastal and marine birds would be expected from the use of non-explosive cutting methods (TSB and CES LSU 2004). No adverse impacts on coastal and marine birds, including threatened and endangered species, are expected to result from the removal of Platform 3. The explosion would occur at the sea floor and is not expected to reach the sea surface.

4.2.2.5.2 Operations Impacts

LNG Processing

No impacts on coastal and marine birds would occur as a result of LNG processing or the associated SCV-SCR discharge.

Vessel Traffic

The impact of vessel traffic associated with the operation of the proposed deepwater port on coastal and marine birds was fully evaluated in Section 4.2.2.5.2 of the MPEH™ Final EIS. Vessel traffic, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and is therefore, incorporated herein by reference.

Noise

The impact of noise associated with the operation of the proposed deepwater port on coastal and marine birds was fully evaluated in Section 4.2.2.5.2 of the MPEH™ Final EIS. Noise, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and is therefore, incorporated herein by reference.

Routine Discharges

The impact of noise associated with the operation of the proposed deepwater port on coastal and marine birds was fully evaluated in Section 4.2.2.5.2 of the MPEH™ Final EIS. Routine discharges, as discussed in the MPEH™ Final EIS, were unaffected by the amended Application and therefore, are incorporated herein by reference.

Marine Debris

The impact of marine debris associated with the operation of the proposed deepwater port on sea turtles was fully evaluated in Section 4.2.2.4.2 of the MPEH™ Final EIS. Marine debris, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

Hydrocarbon Spills

The impact of potential hydrocarbon spills associated with the operation of the proposed deepwater port on coastal and marine birds was fully evaluated in Section 4.2.2.5.2 of the MPEH™ Final EIS. The potential for hydrocarbon spills, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

LNG Spills

The impact of potential LNG spills associated with the operation of the proposed deepwater port on coastal and marine birds was fully evaluated in Section 4.2.2.4.2 of the MPEH™ Final EIS. The potential for LNG spills, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

Terminal Lighting

The impact of terminal lighting associated with the operation of the proposed deepwater port on coastal and marine birds was fully evaluated in Section 4.2.2.4.2 of the MPEH™ Final EIS. Terminal lighting, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

4.2.2.5.3 Decommissioning

The impact of decommissioning the proposed deepwater port was fully evaluated in Section 4.2.2.1.12 of the MPEH™ Final EIS. Port decommissioning, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

4.2.2.6 Fisheries Resources and Essential Fish Habitat

The northern GOM has traditionally been one of the most productive fishery areas in North America. The GOM's marine habitats, ranging from coastal marshes to the deep-sea abyssal plain, support a varied and abundant fish fauna. Coastal pelagic and demersal fish assemblages are recognized within broad habitat classes for the continental shelf and oceanic waters of the GOM. Many species within these two groups are also estuarine dependent, meaning they spend at least some part of their life cycle in estuaries (see MPEH™ Final EIS Section 3.2.2.5).

4.2.2.6.1 Construction Impacts

Seafloor Disturbance

Minor, short-term, indirect, adverse effects on demersal and pelagic fish, as well as essential fish habitat (EFH), would occur during construction and installation of the proposed MPEH™ Terminal.

Seafloor disturbance during construction activities would affect fisheries and EFH by replacing soft sediments with hard structure, and by crushing or displacing benthic organisms (i.e., benthos). This would indirectly affect bottom-feeding fish by reducing the available prey base and feeding behavior of demersal species. The reduction in prey base would be minor when compared to the area of soft sediment with identical benthos available in the GOM. Indirect, beneficial effects could also occur because disruption of sediment could expose benthos and make them readily available prey for opportunistic demersal fish. Seafloor disturbance could also result from temporary anchoring of installation vessels. As previously discussed, the extent of this disturbance would depend on a variety of factors (e.g., wind, waves, anchor chain length) and could be extensive.

As indicated in **Table 2-2**, the maximum area of seafloor disturbance due to the construction and installation of proposed Port infrastructure would be approximately 225 acres. The GOM has an area about 1.6 million km^2. Because there are no hard-bottom/live-bottom areas, pinnacles, or topographic features in close proximity of the Terminal, the benthic community in MP 299 is comprised of what lives in and on soft-bottom sediments. These types of communities include the full spectrum of living benthic organisms. Major groups include bacteria and other microbenthos, meiofauna (0.063–0.3 mm), macrofauna (larger than 0.3 mm), and megafauna (larger organisms such as crabs, sea pens, crinoids, demersal fish). All of these groups are represented in bottom sediments throughout the entire Gulf—from the continental shelf to the deepest abyss (MMS 2002d). Therefore, the temporary impact to 225 acres is negligible when compared to the amount of similar habitat available in the GOM and in the project area.

Minor, direct, adverse effects on EFH could also occur if seafloor disturbance degraded spawning or nursery areas. Soft sediments (e.g., silt, sand) are designated as EFH for various life stages of brown shrimp, white shrimp, lane snapper, and red snapper.

Turbidity

Minor, short-term, direct and indirect, beneficial and adverse effects on demersal and pelagic fish, as well as EFH, could result from sediment displacement and turbidity associated with construction and installation of the proposed MPEH™ Terminal. Effects on demersal and pelagic fish and EFH would be short-term, as suspended sediment would redeposit soon after the platforms and mooring piles have been installed.

Turbidity increases and the subsequent resettling of sediments could directly affect demersal and pelagic fish by (1) causing most species to avoid construction areas, (2) clogging gills, (3) reducing growth rates, and (4) smothering eggs and larvae, thereby increasing mortality and preventing successful development (USEPA 1976). Although proposed construction activities could result in egg and larval mortality, adverse effects on fish populations would likely be minor since spawning occurs over broad areas (FERC and MMS 2001). Turbidity increases could also indirectly affect fisheries and EFH by (1) altering migratory fish patterns, and (2) reducing abundance of available food (in part by reducing primary production) (USEPA 1976). However, preconstruction productivity levels would resume and displaced fish would be expected to recruit back to the area shortly after sediments resettled.

Short-term, indirect, beneficial effects could occur if sediment suspension exposed benthic fauna as additional prey items. Opportunistic fish often congregate in the immediate area where sediment is suspended and benthic prey items are exposed to feed. This effect would cease almost immediately after the sediments resettled.

Turbidity-related effects on benthic and demersal fish would most likely be temporary in duration, moderate in intensity, and localized in scope. Although Terminal construction could result in mortality to eggs and larvae, the overall effects on fish populations would be expected to be negligible since spawning occurs over broad areas (FERC and MMS 2001).

Noise

Minor, direct, adverse effects on demersal and pelagic fish could result from noise generated during construction and installation of the proposed MPEH™ Terminal. Sources of noise would be installation vessels, pile-driving (if used) and the use of explosives to remove Platform 3 (if used). Based on an experiment conducted on sea turtles, the sound pressure level of an explosion could be 213 dB re 1 µPa at 1,200 to 1,800 feet (CETS 1996). Pile-driving 48-inch steel piles could result in a sound pressure level of 209 dB_{peak} re 1 µPa at 10 m from the pile (NMFS 2004). These pressures exceed the threshold values for physical injury (180 dB re 1 µPa) and behavioral disruption (approximately 150 dB re 1 µPa) for fish.

Removal of Platform 3

The preferred method for removal of Platform 3 is abrasive cutting. No adverse impacts on fisheries resources would be expected from the use of non-explosive cutting methods (TSB and CES LSU 2004).

In the unlikely event that it is necessary that the Applicant uses explosives to remove Platform 3, minor, short-term, direct, adverse impacts on fisheries resources would occur. Once in place, platforms serve as artificial reefs or fish attraction devices and explosive removals of platforms can kill or stun these fish. During platform removal, explosives can also injure biota and destroy communities that are prey for managed fish species.

Studies conducted at platform removal sites in the central and western GOM by NMFS estimated that between 2,000 and 6,000 fish were killed during explosive removals in water depths ranging from 14 to 32 m. Fish killed due to explosive removal primarily included sheepshead, spadefish, red snapper, and blue runner (accounting for 89 percent of all fish killed). Projections of population-level effects for red snapper (the only species of that group managed by NMFS) indicated that the overall mortality of red snapper contributed by explosive platform removal, even if doubled, would be minor when compared to the mortality estimates already determined for the fished population (MMS 2002c).

4.2.2.6.2 Operations Impacts

LNG Processing

As described in **Section 4.2.2.1.8**, negligible, long-term, adverse impacts on fisheries resources and EFH would occur as a result of LNG processing or the SCV-SCR discharge. The discharge of water and sodium carbonate is expected to be localized, returning to ambient conditions in tens of meters from the discharge point (see **Section 4.2.1.1.2**).

4.2.2.6.3 Decommissioning

The impacts of decommissioning the proposed deepwater port were fully evaluated in Section 4.2.2.1.12 of the MPEH™ Final EIS. Port decommissioning, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, is incorporated herein by reference.

4.2.2.7 Mitigation

Pile-Driving

To reduce impacts associated with pile-driving (if used), as a condition of the license (if issued), the Applicant would be required to develop a plan in consultation with NMFS (and other cooperating agencies) to use ramp-up procedures prior to pile-driving, monitor for protected species prior to and during pile-driving (using qualified observers), and monitor noise levels during the pile-driving.

Removal of Platform 3

In the unlikely event that it is necessary that the Applicant uses explosives to remove Platform 3, the harm avoidance measures developed in accordance with NMFS ESA Consultation for the MPEH™ Final EIS would be included as conditions of the License. These measures, listed below, would avoid or minimize harm to listed species, as well as avoid or minimize other potential environmental impacts associated with the use of explosives. If incorporated into the License issued by MARAD, the following measures would be required

1. A blast plan would be submitted to NMFS for approval, which would include details on the decommissioning activity and a protected species mitigation plan. At the time of removal, the plan would be updated in accordance with existing terms and conditions for listed species and take authorization for marine mammals for the explosive removal of offshore structures on Federal lease blocks at the time of abandonment.
2. High-velocity explosives (those with detonation rates greater than 7,600 meters per second) would be used.
3. The maximum amount of explosives per detonation would be limited to 50 lbs.
4. A maximum of eight individual blasts per group of detonations would be used.
5. An interval of 0.9 seconds between individual blasts would be provided. The interval between individual blasts would be sufficient to effectively subdivide large explosive charges into a series of smaller ones (a detonation sequence) to reduce the additive effects of pressure on listed species, and would not be less than 0.9 seconds.
6. The charges would be set at a minimum depth of 4.6 m (15 ft) below the sediment surface.
7. Based on the blast plan and the protected species found in the project area, a monitoring zone would be established by qualified, NMFS-approved observers to monitor the site visually before, during, and after the detonation of charges and to conduct diver surveys if observed sea turtles are thought to be resident at the site.
8. Surface observations would be made 48 hours prior to the scheduled removal.
9. 30-minute aerial surveys would be made before and after each blast episode (an episode consists of a single blast or a series of blasts that are detonated with a delay to lower the overpressure).
10. Detonations would be delayed until observed sea turtles and marine mammals are more than 910 m (1,000 yds) from the site.
11. Blasts would be limited to daylight hours (between 1 hour after sunrise and 1 hour before sunset).
12. During the course of removal operations, divers would be instructed to scan subsurface areas around the removal site for the presence/absence of sea turtles.
13. The use of scare charges would be prohibited.
14. A post-removal report (prepared by NMFS observers) would be submitted.
15. Surveys would be conducted for animals in the impact zone.

Following the explosive removal of the LNG Terminal, clearance of obstructions and debris would be required at the site. Site-clearance verification procedures generally call for commercial trawling vessels to be used to clear all sites following abandonment, but allow for waivers to use other methods. NMFS has reported that site clearance using trawl nets has the potential to incidentally capture sea turtles. To avoid harming turtles during the clearance procedure, it is recommended that as a condition of the License, if issued, MPEH™ would be required to seek a waiver from the trawling requirement and instead use side-scan sonar to detect debris on the sea floor. If debris is detected, divers should be dispatched to locate and remove the debris. Debris would be transported to shore and disposed of properly.

4.2.2.8 Threatened and Endangered Species Consultation

The USCG initiated Section 7 consultation on June 17, 2005, for the MPEH™ Final EIS. All correspondence relating to the threatened and endangered species consultation is presented in Appendix C of the MPEH™ Final EIS. Impacts of construction and installation on the proposed pipelines on threatened and endangered Gulf sturgeon critical habitat unit 8 were addressed during consultation and included in Section 4.2.2.2.1 of the MPEH™ Final EIS. To minimize impacts on protected species, the Applicant would be required to follow the conditions listed in Section 4.2.2.6.4 of the MPEH™ Final EIS.

As a result of the threatened and endangered species consultation for the MPEH™ Final EIS, a condition of the license, if issued, is that the Applicant would be required to develop a plan (in consultation with NMFS and other cooperating agencies) to (1) perform a drop-core geotechnical survey (including sediment sampling and chemical composition analysis), (2) avoid areas of contaminated sediment (contaminants and levels of contaminants to be avoided to be predetermined as part of the plan), and (3) choose best methods to reduce turbidity based on the results of the survey. These measures are meant to reduce potential impacts of contamination and turbidity on Gulf sturgeon critical habitat Unit 8, as a result of pipeline installation.

Six of the cetaceans that occur in the GOM, and the West Indian manatee, are federally listed as endangered. The endangered whale species are the sperm whale (*Physeter macrocephalus*), sei whale (*Balaenoptera borealis*), blue whale (*B. musculus*), finback whale (*B. physalus*), northern right whale (*Eubalaena glacialis*), and humpback whale (*Megaptera novaeangliae*). These species are not likely to occur within the project area. The only designated critical habitat for marine mammals in the GOM is for West Indian manatees off portions of the Florida coast, several hundred miles from the ROI.

All five species of sea turtles that inhabit the GOM are threatened or endangered and could occur in the ROI (MMS 2001). These species are the loggerhead sea turtle (*Caretta caretta*), Kemp's ridley sea turtle (*Lepidochelys kempi*), leatherback sea turtle (*Dermochelys coriacea*), hawksbill sea turtle (*Eretmochelys imbricata*), and the green sea turtle (*Chelonia mydas*). The loggerhead sea turtle is the most common sea turtle in the GOM, while the hawksbill sea turtle is the least common.

The threatened and endangered birds that occur in the central GOM and inhabit coastal areas and waters of the inner continental shelf include the southern bald eagle (*Haliaeetus leucocephalus*), eastern brown pelican (*Pelicanus occidentalis*), and piping plover (*Charadrius melodus*). Piping plover critical habitat can be found in Alabama and Louisiana on Breton NWR and other nearshore habitats (see MPEH™ Final EIS Figure 3.2-1). Because of their normal coastal or inner continental shelf ranges, these species and their critical habitat are not expected to occur near the proposed Terminal.

Explosive removal of Platform 3 could have an adverse effect on marine mammals and sea turtles. These are described in **Sections 4.2.2.1.9**, **4.2.2.3.1**, and **4.2.2.4.1**. As stated above, threatened and endangered marine mammals are not expected in the project area. To reduce impacts on threatened and endangered sea turtles associated with explosives, the Applicant would be required to implement measures to avoid and minimize harm to marine species, presented in **Section 4.2.2.7**. To reduce impacts associated with pile-driving, the Applicant would be required to develop a plan in consultation with NMFS (and other cooperating agencies) to use ramp-up procedures prior to pile-driving, monitor for protected species prior to and during pile-driving (using qualified observers), and monitor noise levels during the pile-driving, as a condition of the License, if issued. Based on these measures, the Proposed Action is not likely to adversely affect threatened and endangered species.

The removal of Platform 3 would be governed by the provisions of the MMS Programmatic EA, *Structure-Removal Operations on the Gulf of Mexico Outer Continental Shelf*, February 2005. That

Programmatic EA considered current regulatory requirements and evaluated the environmental impacts of modern removal techniques (MMS 2005).

The impacts of vessel traffic were fully evaluated in Section 4.2.2.1.4 of the MPEH™ Final EIS. Vessel traffic, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application, and is therefore incorporated herein by reference. As a result of the threatened and endangered species consultation for the MPEH™ Final EIS, a condition of the License, if issued, would require the Applicant to include the provisions set forth in NMFS's *Vessel Strike Avoidance and Injured/Dead Protected Species Reporting*, as part of the Port Operations Manual.[18] Therefore, the Proposed Action is not likely to have any short- or long-term impacts on marine mammals or sea turtles.

Minor, short-term impacts associated with seafloor disturbance, turbidity, construction noise, trench excavation, and offshore MPEH™ Terminal installation may affect, but are not likely to adversely affect the southern bald eagle (threatened), the brown pelican (endangered in Mississippi, Louisiana, and Texas; threatened in Alabama), and the piping plover (threatened) by temporarily displacing them from commonly used feeding, nesting, or resting habitats. The Proposed Action does not entail installation of pipeline through any piping plover critical habitat areas. The threatened bald eagle (*Haliaeetus leucocephalus*), the endangered brown pelican (*Pelecanus occidentalis*), and the threatened piping plover (*Charadrius melodus*) are not expected to occur near the proposed LNG Terminal because of their coastal and inner continental shelf ranges; therefore, no short-term or long-term impacts on those species would occur as a result of construction activities associated with the proposed MPEH™ Terminal.

4.2.3 Cultural Resources

MPEH™ Final EIS Sections 4.2.3 (Deepwater Port and Offshore Pipelines), 4.3.3 (Onshore Natural Gas Pipelines), 4.4.3 (Onshore NGL Pipeline) evaluated impacts on cultural resources, and are incorporated herein by reference. The USCG has determined that the amended Application would not change the construction and operational impacts of the proposed Terminal on cultural resources as presented in the MPEH™ Final EIS.

4.2.4 Geological Resources

Impact Summary: Minor, direct impacts on sediments from platform removal and Terminal installation (platform emplacement and barge anchoring) would be expected. Impacts would be localized and short-term. Minor, direct impacts (from LNGCs in transit and anchored at the Terminal) would occur on geologic resources. There would be no impacts on unique geological features. No indirect impacts on geologic resources are expected. Impacts would be localized and short-term at the Terminal site while LNGCs are anchored. A detailed discussion of impacts follows.

4.2.4.1 Construction Impacts

4.2.4.1.1 Terminal Installation

Terminal installation would include retrofitting several existing offshore structures at MP 299 and the addition of several new platforms and associated facilities, including

[18] In accordance with 33 CFR Part 150, the licensee must obtain USCG approval of its Port Operations Manual. The license would require that the Port Operations Manual address the requirements of the Deepwater Port Act and provide detailed specifications and procedures for all aspects of port operations and infrastructure including navigation, vessel movement, materials handling, safety, and protection of the environment. The Port Operations Manual would be required to address port requirements for calling vessels, approaches, Safety Zones, port infrastructure, and pipelines.

- Removal of Platform No. 3 from existing site approximately 1 mile north of the Terminal and relocated at the Terminal near existing Bridge No. 11, between minor platforms BS No. 8 and BS-Y7.
- LNG Storage Platform Nos. 1, 2, and 3 would require installation of a jacket for each platform; jacket dimensions would be 36 by 58 m (117 by 190 ft); each jacket would occupy 0.52 acres; and the total area occupied by the three LNG storage platforms would be 1.56 acres.
- Installation of 24 new piles for the Soft Berth™ mooring system, resulting in the disturbance of an additional 0.21 acres of sea floor.

Minor direct impacts from Terminal installation (platform emplacement, removal and relocation of Platform No. 3, and barge anchoring) would be expected. Impacts would be localized and short-term. Removal of Platform No. 3 for relocation would require a heavy lift derrick barge to remove the platform deck of Platform No. 3. The piling (and skirt piles, if applicable) would be cut 5 m (16 ft) below the mud line by abrasive cutting or if necessary, by explosives. The piles could then be removed from the jacket. The platforms would then be taken ashore for the installation of three of the eight SCV-SCR LNG vaporization units and additional equipment before being relocated to the Terminal.

Abrasive cutting is the preferred method for platform removal. However, should explosives be used during the decommissioning of the proposed Terminal or removal of Platform No. 3 the explosives would be of a type normally used for decommissioning of OCS facilities in the GOM. It is anticipated that removal activities would involve only the use of explosive charges of less than 50 pounds. If explosives are used, consultation with NMFS and the MMS would be necessary. Therefore, decommissioning and removal of Platform No. 3 would result in local, short-term, negligible, adverse impacts on geological resources.

Installation of the proposed new platforms, (LNG Storage Platforms Nos. 1, 2, and 3) and Soft Berth™ would involve disturbance of seafloor sediments when platform jackets are lowered to the sea floor. The piles that anchor the new platforms to the sea bed would be installed through the open ends of the jacket columns (i.e., within a larger pipe), which would minimize the potential to disturb sediments outside of the actual jacket placement.

Several vessels would be employed to install the new platforms. Anchors and anchor chains hitting the sea floor would cause localized, short-term disturbance of sediments. Piles for the Soft Berth™ mooring system would be driven into the sediments.

A specialized HLV construction barge would be employed to install the new platforms. Freeport-McMoRan Energy anticipates using a dynamically positioned HLV which does not require anchors to maintain station. However, if a dynamically positioned HLV were not available, six or more anchors might be necessary to anchor the construction barge depending upon sea conditions. Installation of MPEH™ platforms and associated Terminal structures, including the use of barge anchors, would produce temporary, localized disturbances of sediment on the sea floor. Approximately 225 acres (**Table 2-2**) of sea floor would be affected during these installation operations. Once construction is complete, currents would move sediment from high areas back into the low areas.

4.2.4.1.2 Pipeline Installation

The impacts of pipeline installation on geologic resources were fully evaluated in Section 4.2.4.1.2 of the MPEH™ Final EIS. Pipeline installation, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

4.2.4.1.3 Salt Cavern Formation

The impacts of salt cavern formation on geologic resources were fully evaluated in Section 4.2.4.1.3 of the MPEH™ Final EIS. Salt cavern formation, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and is therefore incorporated herein by reference.

4.2.4.2 Operations Impacts

4.2.4.2.1 LNG Processing

No impacts on geologic resources would occur from LNG processing. The freshwater discharge from the outfalls for the SCV-SCR would be positively buoyant, therefore no impacts on seafloor sediments would occur.

4.2.4.2.2 Vessel Anchoring

The impacts of vessel anchoring on geologic resources were fully evaluated in Section 4.2.4.2.2 of the MPEH™ Final EIS. Vessel anchoring, as discussed in the MPEH™ Final EIS, was unaffected by the amended Application and therefore, incorporated herein by reference.

4.2.4.3 Decommissioning

Negligible, direct, short-term impacts on geologic resources would be experienced during decommissioning of the MPEH™ Terminal. Topography of the sea floor would only be temporarily impacted during decommissioning of the platforms and removal of Platform No. 3 for relocation. After decommissioning and removal of Platform No. 3 is complete, topography would return to pre-installation condition by the use of bottom currents and storm activities. Short-term, minor, adverse impacts on sediments would be expected in localized areas, especially if the platforms are decommissioned using explosives. Shallow gas pockets could be impacted if the decommissioning of the platforms is performed with explosives. Vibrations from explosives could cause the release of shallow gas pockets. Other decommissioning activities would not have an adverse impact on shallow gas pockets because they would be avoided during the construction phase.

4.2.4.4 Mitigation

There is no mitigation to attenuate disturbance to sediment from Terminal construction and upgrade activities. These impacts are temporary and would not cause the degradation of the geological resources in the area.

Caution would be exercised in anchor placement. Locations of cables, wells, and other objects would be relayed and, where necessary, marked with buoys to ensure they are avoided. Areas that would be avoided include authigenic carbonate deposits, pockmarks, depressions, and active gas-venting features.

A complete decommissioning plan should be in place and approved by the applicable agencies prior to decommissioning activities. Impacts on geologic resources could be avoided with an approved decommissioning plan.

4.2.5 OCS Use and Coastal Zone Management

This section evaluates the impacts of the MPEH™ Terminal on OCS and coastal land use. The Coastal Zone Management Program (CZMP) is authorized by the CZMA of 1972 and administered at the Federal level by the Coastal Programs Division within the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management. The CZMP's make day-to-day management decisions at the state level in the 34 states and territories with federally approved coastal management programs. Alabama, Mississippi, and Louisiana have federally approved coastal management programs. In June and July 2006, Freeport-McMoRan Energy submitted certifications to the Alabama, Louisiana, and Mississippi CZMPs that construction and operation of the MPEH™ would be consistent with the enforceable provisions of each state's program.

Impact Summary: No direct or indirect impacts on OCS use would be expected from the Terminal. The proposed Terminal would be located in an area of the GOM currently leased for oil and gas development, and no changes to the practical or functional uses of OCS land would be anticipated. Minor, long-term impacts on recreational and commercial fishing could occur within the Safety Zone and Area to be Avoided (ATBA) surrounding the Terminal. A detailed discussion of impacts follows.

4.2.5.1 Construction Impacts

No direct impacts on the current use of GOM lease block MP 299 would occur as a result of Terminal construction and operation. The proposed Terminal would be installed on a combination of new and modified existing platforms. Existing Platforms No. 1 and No. 2 would be converted for use in the proposed Terminal. Platform No. 1 would undergo extensive modification both in place and onshore, while Platform No. 2 would undergo extensive modification in place. Platform No. 3 would be removed from its current position (approximately 1 mile north of existing Platforms No. 1 and No. 2) and reinstalled adjacent to Bridge No. 11 (within the existing Terminal footprint).

The proposed Terminal would operate with a 500-m (1,640-ft) Safety Zone, and a 3.2-km (2-mi) ATBA that would include portions of Main Pass Lease Blocks 300, 299, 298, and 142. Currently 11 oil and gas development lease blocks are within the 3.2-km (2-mi) ATBA.

4.2.5.2 Operations Impacts

Minor, long-term impacts on recreational and commercial fishing could occur within the Safety Zone and ATBA surrounding the Terminal. Offshore platforms have become important to both recreational and commercial fishing in the northern GOM. The structures provide hard-bottom habitat in an area where most of the substrate is clay, silt, and sand. It has been estimated that 70 percent of all saltwater fishing trips in the EEZ off Louisiana were destined for offshore oil and gas structures (CETS 1996). Data from the Marine Recreational Fisheries Statistical Survey estimated that 30 percent of the 15 million fish caught off the coast of Louisiana and Texas by recreational fishers were caught in the vicinity of platforms. The Safety Zone and ATBA, however, represent only a small fraction of the total area used for commercial fishing. The MMS data indicate that the total area lost to commercial fishing because of the presence of production platforms has historically been less than 1 percent of the total area available to commercial fishing (MMS 2000). The proposed MPEH™ Terminal would limit a very small percentage of the GOM for the life of the proposed Port (see also **Section 4.2.7.1.3**, Socioeconomic Resources).

Operation of the Terminal would be consistent with current MMS leasing and operation activities in the GOM. No direct or indirect impacts would occur.

4.2.5.3 Decommissioning

Offshore pipelines would be filled with seawater and left in place. Platform decks would be removed and transported to shore for sale and reuse. Platform base components would be removed below the mudline. Pipelines would be marked as required by MMS.

4.2.6 Recreation and Visual Resources

MPEH™ Final EIS Sections 4.2.6 (Deepwater Port and Offshore Pipelines), 4.3.6 (Onshore Natural Gas Pipelines), 4.4.6 (Onshore NGL Pipeline) evaluated impacts on recreation and visual resources, and are incorporated herein by reference. The USCG has determined that the amended Application would not change the construction and operational impacts of the proposed Terminal on recreation and visual resources as presented in the MPEH™ Final EIS.

4.2.7 Socioeconomic Resources

Impact Summary: Construction and operation of the MPEH™ Terminal would have minor, beneficial direct impacts on socioeconomic resources through increased employment and purchase of goods and services. The proposed MPEH™ Terminal would also have negligible adverse impacts on commercial and recreational fishing, public services, vessel traffic, and shipping. A detailed discussion of impacts follows.

4.2.7.1 Construction Impacts

Socioeconomic resources are resources associated with the human environment, particularly characteristics of population and demographics; economic activity such as employment, personal income, and industrial or commercial growth; and how people interact with those resources.

4.2.7.1.1 Oil and Gas Leasing, Exploration, and Production Activities

If approved, the Deepwater Port License would grant the Applicant surface rights for the proposed Terminal site and Safety Zone; the Anchorage Area is at an existing location. The current lease and mineral rights associated with the lease block are presently held by the Applicant. By restricting all vessel traffic not related to Terminal operations, the Safety Zone would effectively restrict the installation of above water structures supporting exploration within 500 m (1,640 ft) of the Terminal until decommissioning.

No direct impacts on oil and gas leasing, exploration, and production activities would occur from installation of the proposed Terminal. Freeport-McMoRan Energy suspended its sulphur operations in 2000 as a result of declining value. However, because the infrastructure to mine sulphur would be removed, this mineral resource would be unavailable until after Terminal decommissioning. Impacts from installation of takeaway pipelines, including trenching, anchor placement, and laying of the pipeline were discussed in Section 4.2.7.1 of the MPEH™ Final EIS.

4.2.7.1.2 Marine Shipping

The proposed Terminal would be constructed outside shipping fairways and navigation channels, and would have no direct impacts on shipping or navigation activities. There would be minor, adverse indirect impacts on shipping lanes or channels from increased traffic and potential collisions with support vessels during construction.

4.2.7.1.3 Commercial Fisheries

The GOM has one of the most productive fisheries, providing almost 21 percent of the commercial fish landings in the continental United States, and produces a wide variety of species of fish (MMS 2002b). Gulf menhaden composed the bulk of the commercial landings in the GOM from 1997 to 2001. Average annual landings of Gulf menhaden for this time period were 1.29 billion lbs (74 percent of the landings). Other species that dominated commercial landings from 1997 to 2001 were brown shrimp (8 percent), white shrimp (4 percent), blue crab (4 percent), and eastern oyster (4 percent).

The proposed Terminal would cause permanent loss of approximately 5 acres of benthic substrata. The benthic substrata impacted by the proposed Terminal are typical for this region of the GOM and are not protected or unique. Adverse direct and indirect impacts on the local fisheries resources from proposed

Terminal construction would be negligible. The area occupied by the Safety Zone would be unavailable to commercial fishing and could result in minor space-use conflicts.

The Terminal would be located in NMFS Statistical Zone 11. The total shrimp harvest in Statistical Zone 11 is approximately 5 percent of the harvest for the entire GOM and approximately 6 percent of the value (based on the 5-year average from 2000–2004). The Safety Zone around the proposed Port would exclude shrimp fishing in an area of approximately 361 acres. This is approximately 0.01 percent of the total area of Statistical Zone 11. Exclusion of shrimp fishing from the Safety Zone would have negligible impacts on shrimp landings for the GOM.

There would be temporary, indirect noise and activity disturbance in the work area during the relocation of Platform No. 3, construction of new storage Platform Nos. 1 and 2, and the removal and installation of modified Terminal bridges and decks. Most species of demersal and pelagic fish would avoid construction areas. Potential impacts on commercial fishing would be temporary and minor, resulting in fish displacement followed by rapid recolonization. Fish and crustaceans might relocate to avoid construction disturbances, but the impact is reversible. Increase in sediment loads during construction would be short-term as the suspended sediments redeposit upon completion. Temporary loss of food supply for fish and crustaceans could occur during construction; however, new structures might actually attract fish to recently disturbed areas. Impacts on shellfish, including oyster beds, would be minor because the proposed facilities do not traverse any known commercial shellfish beds.

4.2.7.1.4 Recreational Fisheries

Sport fishing is a very important activity in the OCS waters. In the GOM, 7 percent of recreational fishing is conducted from charter boats and about 50 percent from private or rented boats. Recreational fishing is a prominent tourist activity in Alabama, Mississippi, and Louisiana.

Direct and indirect adverse impacts on recreational fisheries from the proposed Port installation would be similar to impacts on commercial fisheries, and would include temporary exclusion during Terminal construction, displacement of fish due to noise disturbance in the work area, and an increase in sediment loads during installation. The impacts would be temporary and minor. Negligible indirect, beneficial impacts would occur from induced conservation associated with the 500-m (1,640-ft) Safety Zone.

4.2.7.1.5 Support for Terminal Construction

Terminal construction would have both direct and indirect economic benefits. Although construction costs are confidential, installation of the proposed Terminal would have direct and indirect, short-term beneficial impacts on the economy of Plaquemines Parish, Louisiana, due to increased employment and the purchase of goods and services. The Applicant estimated that construction activities would employ 350 workers for approximately 21 months, which would have a direct, beneficial impact on the local economy. Based on the history of offshore oil and gas industry information, it is estimated that approximately 20 percent of the total workers would be nonlocal residents and 80 percent would be local residents. The western and central GOM, off the shore of Texas and Louisiana, are two of the most active offshore oil and gas areas in the world (MMS 2001, USCG and MARAD 2003a). Support for the proposed Terminal construction is expected to come primarily from Plaquemines Parish, Louisiana. Generally, workers spend approximately 25 to 30 percent of their wages locally for food, shelter, and entertainment, which would have an indirect, beneficial impact on the local economy. Other indirect impacts would be realized through taxes generated by purchases, as well as payroll deductions.

Census data for 2000 showed 715 and 145,850 employees working in the construction industry within Plaquemines Parish and Louisiana, respectively (U.S. Census Bureau 2000). The number of construction workers required for the proposed construction projects (350) is relatively large compared to the available work force within Plaquemines Parish, but very small compared to Louisiana. Each job created by the proposed Port would generate additional jobs within the region, due to the many companies that supply goods and services to support construction activities. Indirect impacts from the proposed construction projects are expected to be short-term and beneficial on local employment and the local economy; no permanent or long-term impacts on employment, population, personal income, or poverty levels, or other demographic or employment indicators would be expected from construction.

There is the potential for both adverse and beneficial indirect impacts from the demand for housing for construction workers. Construction projects could reduce availability of housing, especially during the peak season for tourism. In areas of seasonal tourism, construction workers might displace tourists, which could be a concern for motel and campground operators who depend on recurring business and might be reluctant to provide housing for construction workers. Ultimately, there might be a potential shortage in housing. Demand would differ depending on different housing unit categories. However, ample housing would be available in nearby areas so the overall impact is considered minor.

Changes in economic factors could also impact the social fabric of a community. For example, increases in employment could stimulate need for new housing units and, as a result, increase demand for community and social services such as primary and secondary education, fire and police protection, and health care. There would also be short-term, minor, adverse and beneficial impacts on public services from an increase in construction workers. A major temporary benefit would be increased employment in the local area. This would be a beneficial impact on the local tax base. However, an influx of construction workers and their families would increase demand on existing public services, which might result in an overall adverse impact on public services. Due to the temporary nature of Terminal construction, no impacts on social conditions would be anticipated.

4.2.7.1.6 Environmental Justice

Section 3.2.6.2 of the MPEH™ Final EIS presented demographic data for Plaquemines Parish. The MPEH™ Final EIS found that the proportion of minority and low-income residents in Plaquemines Parish is similar to Louisiana statewide figures. Therefore, no disproportionate impacts on minority or low-income populations would be expected from Terminal construction.

4.2.7.2 Operations Impacts

4.2.7.2.1 Oil and Gas Leasing, Exploration, and Production Activities

No direct or indirect impacts on oil and gas leasing, exploration, and production activities would occur from Terminal operations beyond the impacts from Terminal construction, discussed above. The proposed Terminal would have an impact on potential location and operation plans within the block (MP 299), but would not preclude exploration or extraction of mineral resources from the block. There could be reluctance by some developers to locate production facilities in the vicinity of a deepwater port because of safety concerns. However, most OCS operators are familiar with natural gas operations and might not be affected by the presence of proposed Terminal.

4.2.7.2.2 Commercial Fisheries

Terminal operations—to include SCV-SCR discharges—would have negligible direct impacts on fisheries resources as discussed in **Section 4.2.2.6**. Those negligible direct impacts would also have a negligible indirect impact on socioeconomic resources.

The Terminal would permanently occupy about 5 acres of sea floor. In addition to this footprint, commercial fishing vessels would not be permitted to anchor or traverse the area occupied by the 361-acre Safety Zone around the LNG Terminal. This portion of the sea floor is typical for this region of the GOM and is not protected, biologically significant, or topographically unique. The size of the Safety Zone relative to the open offshore waters of the area would require those vessels to make only minor alterations to their route to avoid the Safety Zone because the water depths and bottom conditions in adjacent areas are similar to those within the Safety Zone. The Terminal would be located in NMFS Statistical Zone 11. The total shrimp harvest in Statistical Zone 11 is approximately 5 percent of the GOM harvest and approximately 6 percent of the value (based on the 5-year average from 2000–2004). The Safety Zone around the proposed Port represents approximately 0.01 percent of Statistical Zone 11. No impact on the operations, characteristics, or activities of commercial fishing vessels that might currently operate within the proposed Safety Zone would be expected. Although fishing within the Safety Zone would be prohibited, it is not anticipated that these localized impacts would have a measurable economic impact on the regional fisheries industry.

4.2.7.2.3 Recreational Fisheries

Impacts on recreational fisheries would be similar to commercial fisheries as described above, including impacts on fishing populations and the prohibition of fishing in the Safety Zone and ATBA. It is not anticipated that localized impacts from the Safety Zone would have a measurable economic impact on the recreational fisheries industry.

Similar to the commercial fisheries, the most influential factor determining the recreational catch is state agency regulation. The Louisiana Department of Wildlife and Fisheries has established recreational limits to anglers by volume, size, and time-of-year restrictions. The limits for the red drum are five fish per licensed angler, per day, with a size limit of 16 inches in length (only one fish can exceed 27 inches in length) (LDWF 2005). Limits on the red snapper are more stringent: four fish per licensed angler, per day, a minimum length of 16 inches, a recreational quota, and an open season restricted to April 21 through October 31 (LDWF 2005). With these recreational regulations in place, it is unlikely that numbers of fish caught by recreational anglers would be impacted by Terminal operations because anglers would still take the limit of each species and practice catch and release once these limits are reached. Instead, impacts can be realized in the time and effort to catch each fish. In other words, more time might elapse before the limit is reached. This impact might or might not create economic losses to the red drum or red snapper recreational fisheries.

4.2.7.2.4 Support for Terminal Operations

Direct and indirect, short-term, moderate beneficial impacts would occur from operation of the proposed Terminal throughout its projected lifespan of 30 years due to increased employment and the purchase of goods and services. The Applicant projects that these personnel would be based in the town of Venice, Plaquemines Parish, Louisiana. The Applicant estimated that the MPEH™ Deepwater Port would employ approximately 151 workers, which would represent about 1.4 percent of the civilian labor force in Plaquemines Parish and 17.7 percent of the Boothville-Venice census designated place (CDP). This number includes on-site workers, catering support, berthing support vessels, onshore operations, helicopter pilots, crew boat staff, and offshore supply vessel staff (MPEH 2004).

There would also be short-term, minor, adverse and beneficial indirect impacts from the demand for housing for proposed Terminal workers. If all 151 workers move into the area and require new housing, 151 new residences would represent 1.3 percent of existing residences in Plaquemines Parish, and 14.1 percent in the Boothville-Venice CDP. Demand for housing might have a short-term, adverse impact on housing availability. There would also be short-term, negligible-to-minor, adverse and beneficial impacts on public services from new workers and their families. Increased employment would have a beneficial impact on the local tax base. However, workers might also bring family members that would increase demand on existing public services, which might result in an overall adverse impact on public services if demand was greater than the increase in taxes.

4.2.7.3 Decommissioning

Similar to Terminal construction, decommissioning activities would have a short-term, minor, beneficial direct impacts on socioeconomic resources through increased employment and purchase of goods and services. Potential impacts on fisheries resources associated with proposed Terminal operations would end and return to ambient conditions upon decommissioning of the facilities. Complete removal of all aboveground Terminal infrastructure would result in the loss of hard substrata habitat that might have developed over the life of Terminal operations. Any impacts on fisheries resulting from fishing exclusions within the Safety Zone would be removed. The removal of the Safety Zone would reopen that area to commercial fishing. However, the Safety Zone would continue to be enforced during decommissioning activities.

To minimize potential fisheries impacts associated with the decommissioning of the proposed Terminal facilities, it would be possible to leave some of the facility's underwater structure in place to function as an artificial reef. All decommissioning activities would be conducted in accordance with approved plans required by the licensing authority, and in compliance with all applicable and appropriate laws, regulations, and guidelines in place at the time of decommissioning.

4.2.8 Transportation

MPEH™ Final EIS Sections 4.2.8 (Deepwater Port and Offshore Pipelines), 4.3.8 (Onshore Natural Gas Pipelines), 4.4.8 (Onshore NGL Pipeline) evaluated impacts on transportation, and are incorporated herein by reference. The USCG has determined that the amended Application would not change the construction and operational impacts of the proposed Terminal on transportation as presented in the MPEH™ Final EIS.

4.2.9 Air Quality

Impact Summary: Minor, direct, short-term adverse impacts on air quality would occur during construction of the proposed Port (e.g., Terminal installation, pipeline installation, mobile sources, pipeline testing, and salt cavern formation). Emissions from Terminal operations and LNGCs would have a minor, direct, adverse impact on air quality during the life of the project. LNGCs are the primary source of air emissions affecting sensitive resources, but emissions would be mitigated to limit the long-term, adverse impacts. Long-term adverse impacts from Terminal operations using SCV-SCRs would be minor. The Final EIS evaluated a generic SCV-SCR option while this EA evaluates the proposed SCV-SCR system (with WHR units), including new equipment specifications and emission factors. **Table 2-1** of this EA presents data relative to the revised SCV-SCR option as described in Freeport-McMoRan Energy's amended Application and shows that air emissions are comparable to other vaporization technologies. A detailed discussion of impacts follows (see also MPEH™ Final EIS Section 4.2.9.1).

4.2.9.1 Construction Impacts

Regulated criteria pollutants and hazardous air pollutants would be emitted during construction of the proposed Terminal, offshore pipelines, and salt caverns. Construction activities would cause a temporary reduction of local ambient air quality due to emissions generated by auxiliary mobile equipment working offshore and onshore from onshore pipeline construction. These emissions would come from fuel combustion and would consist primarily of NO_x and CO, in addition to small amounts of volatile organic compounds (VOCs), particulate matter less than or equal to 10 microns in diameter (PM_{10}), and sulfur dioxide (SO_2). **Table 4-3** summarizes regulated pollutant emissions estimates from the construction phase of the proposed Terminal (SCV-SCR with WHR units) compared to estimates for the ORV technology discussed in the MPEH™ Final EIS Section 4.2.9.1. **Appendix C** of this EA contains the construction emission calculations.

Table 4-3. Emissions from Construction of the Proposed Terminal and Pipelines

Year	Emitted Pollutant (tpy)									
	PM_{10}		SO_x		NO_x		VOC		CO	
	ORV[a]	SCV[b]	ORV[a]	SCV[b]	ORV[a]	SCV[b]	ORV[a]	SCV[b]	ORV[a]	SCV[b]
Year 1 (Construction)	14.48	15.16	8.08	8.47	486.21	509.46	14.99	15.68	106.06	111.14
Year 2 (Construction)	9.75	12.14	5.49	6.82	561.07	641.03	11.87	14.34	219.63	237.07
Year 3 (Construction)	141.34	154.72	76.44	83.66	4,860.86	5,297.52	148.67	162.58	1,162.52	1,257.76
Year 4 (Construction)	0.86	0.86	0.49	0.49	194.47	194.47	2.16	2.16	111.91	111.91

Notes:
[a] As reported in the MPEH™ Final EIS.
[b] Revised construction emission estimates per 5/31/06 Application Amendment.

Construction emissions changes result from the additional work on Bridge 11, Bridge Support Platform 8, and Platform 3 to house the SCV units and their supporting auxiliaries. Construction emissions for pipeline construction are not expected to change from estimates in the MPEH™ Final EIS.

Emissions from construction activities in Year 3, including installation of the pipelines, were modeled, and the results reported in the MPEH™ Final EIS. The construction emissions impacts on Breton NWR were dominated by construction emissions for the NGL pipeline to Venice, LA. Construction emissions for this pipeline are not affected by the amended Application, so construction emissions impacts on Breton NWR are not expected to change, and are therefore incorporated herein by reference.

Construction emissions in Year 3 would also include emissions from installation of facility platforms and bridges and facility commissioning. Although these emissions would be concentrated at one point and would be large, they would be short-term. The emissions associated with Construction Year 3 were modeled to determine shoreline impacts. The modeling significance limits (MSL) for NO_2 is 1 microgram per cubic meter ($\mu g/m^3$) (annual averaging period), and for SO_2 is 1, 5 and 25 $\mu g/m^3$ (annual, 24-hour and 3-hour averaging period, respectively). The modeled impacts for all modeled pollutants were well below Class II MSLs and no NAAQS were approached or exceeded. Since the increases in construction emissions for Year 3 represent increases of less than 10 percent of the previously modeled emissions, the increased emissions are not expected to exceed MSLs or approach or exceed any NAAQS.

4.2.9.2 Operations Impacts

4.2.9.2.1 Emissions Common to All Vaporizer Technologies

As discussed in the MPEH™ Final EIS Section 4.2.9.2, direct, long-term, adverse impacts on air quality would be expected to occur as a result of routine operation of equipment at the proposed Terminal and the associated mobile equipment, such as LNGCs and tugs. Routine Terminal operations with the potential to affect air quality parameters would include engines, generators, flare systems, trucks, and cranes, as well as mobile equipment such as LNGCs and support vessels. The amended Application changed the emissions estimates related to SCV-SCR technology and LNGCs. The short-term emissions from an individual LNGC would not change, but the number of LNGCs required to supply the Port has been reduced because of the larger size of newer LNGCs that would serve the port. Therefore, total annual emissions from the LNGCs emissions while maneuvering to and departing the Port would be reduced.

The proposed MPEH™ would be designed to handle ships with a capacity of up to 160,000 m^3 of LNG. If the proposed Port were constructed, there would be approximately 2 LNGC trips per week (106 per year). This represents a reduction from 121 LNGC trips per week as analyzed in the MPEH™ Final EIS, and is based on LNGCs of up to 160,000 m^3 capacity currently in use. Vessels into and out of the MPEH™ Port would use GOM fairways to the south and southwest of the proposed Terminal, principally the South Pass (Mississippi River) to Mississippi River Gulf Outlet Safety Fairway (see MPEH™ Final EIS Section 2.2.1.1.9). The amended Application also changed the emissions estimates for the emergency flares. As described in the MPEH™ Final EIS, the emergency flares only operate if all power is lost to the terminal and boil off gas must be vented to maintain storage tank pressure. Therefore, the emissions are not included in estimates for the Air Operating Permit and have been excluded from the calculations in the amended Application for all vaporizer technologies. The emissions estimates in **Table 4-4** reflect this change.

4.2.9.2.2 Emissions Related to Vaporizer Technologies

Freeport-McMoRan Energy's amended Application included a revised Clean Air Act permit application, new equipment specifications, and revised emission calculations related to operations using SCV vaporization technology. **Appendix C** includes detailed calculations of projected air emissions. The revised emissions estimates for the SCV-SCR alternative are included in **Table 4-4**. **Table 4-4** includes estimated emissions of regulated pollutants from the stationary equipment associated with the proposed Terminal for the ORV with WHR and SCV with Low NO_x burner alternatives, which were the two options for which dispersion modeling was conducted for and described in the MPEH™ Final EIS. **Table 4-4** also includes the emissions estimated for the SCV-SCR proposed in the amended Application. Since the emissions from mobile sources have been reduced due to a reduction in the number of LNGC trips necessary to supply the MPEH™, only the stationary source emissions are listed. In the MPEH™ Final EIS the emissions estimates for the SCV alternatives assumed that the combustors would be fed with a combination of pipeline gas and revaporized LNG. In the amended Application, the system would use 100% revaporized LNG. Therefore, the SO_2 emissions associated with the SCV alternatives were reduced from the estimates presented in the MPEH™ Final EIS. The emissions estimates in **Table 4-4** for SCV Low NOx and SCV-SCR reflect this change.

Table 4-4. Emissions from Operation of the Proposed Terminal

Vaporization Type	Emitted Pollutant (tpy)				
	PM_{10}	SO_x [c]	NO_x	VOC	CO
ORV with WHR [a]	70.38	2.39	223.48	127.01	159.79
SCV Low NO_x [a]	92.84	2.39	291.42	145.38	272.42
SCV-SCR [b]	54.84	2.39	233.79	130.92	237.76

Sources: [a] FME 2006c, [b] FME 2006a.

Note: [c] Only natural gas from LNG (with no sulphur compounds) would be used to fire fixed Terminal sources such as gas turbines or glycol regenerators.

4.2.9.2.3 Dispersion Modeling and Results

The Applicant provided the results of dispersion modeling conducted to evaluate the impacts of the revised operational emissions described in the amended Application. The CALPUFF Model that was also used to determine impacts reported in the MPEH™ Final EIS was again used to calculate impacts on the revised emissions estimates. An Air Modeling Analysis Report for the amended Application is provided in **Appendix C** of this EA. The report describes the results of dispersion modeling equivalent to the modeling presented in Appendix F of the MPEH™ Final EIS.

For the amended Application, dispersion modeling was conducted using the CALPUFF model to determine impacts on the Breton NWR (the Class I area) at receptors along the coastline at the exclusion area boundary. The modeling included a grid of 13,000 receptors extending from the exclusion area boundary around the Terminal out in all directions for approximately 5 km (the Class II area receptors). Modeling was based on operation of the proposed Port using the revised SCV with SCR vaporizer design, and included emissions from mobile equipment associated with operation of the proposed Port. PM_{10}, NO_x, SO_x, and CO emissions were modeled. Emissions were modeled to determine impacts on both the Class I and Class II increments. Additional receptors were modeled to ensure complete coverage of areas in the immediate vicinity of the Terminal that would be expected to have the highest modeled concentrations. With the LNGCs operating on LNG BOG, and the tugboats using 0.05 percent low sulphur diesel, the modeling resulted in concentrations below the Class I significance thresholds, as shown in **Table 4-5**. Results of the Class II modeling demonstrate that the modeling also resulted in concentrations below the Class II significance thresholds, as shown in **Table 4-6**.

Table 4-5. Summary of Modeled Maximum Class I Concentrations

Pollutant	Averaging Period	ORV with WHR and IFV Boiling/ Condensing (μg/m³) [a]	SCV low NOx, (μg/m³) [a]	SCV-SCR, (μg/m³) [b]	Proposed Class I Modeling Significance Levels (μg/m³)
PM_{10}	24-hour	0.099	0.178	0.082	0.32
	Annual	0.004	0.017	0.005	0.16
SO_2	3-hour	0.719	0.484	0.886	1.0
	24-hour	0.080	0.050	0.061	0.2
	Annual	0.002	0.002	0.001	0.1
NO_2	Annual	0.023	0.057	0.027	0.1

Sources: [a] As reported in the MPEH™ Final EIS; [b] FME 2006a

Table 4-6. Summary of Modeled Maximum Class II Concentrations

Pollutant	Averaging Period	ORV with WHR (μg/m³) [a]	SCV (μg/m³) [b]	Class II MSLs (μg/m³)	PSD[a] Class II Increment (μg/m³)
SO_2	3-hour	13.99	13.03	25	512
	24-hour	1.88	1.30	5	91
	Annual	0.058	0.055	1	20
NO_2	Annual	0.98	0.99	1	25

Sources: [a] As reported in the MPEH™ Final EIS, [b] FME 2006a
Note: PSD = Prevention of Significant Deterioration

4.2.9.2.4 Toxic Air Pollutants

The MPEH™ would be subject to Louisiana Department of Environmental Quality Comprehensive Toxic Air Pollution Emission Control Program. Under the provisions of the TAP, a source is considered minor if total emissions of defined toxic pollutants is less that 25 tons per year (tpy) and no single TAP exceeds 10 tpy. Ammonia is one of the chemicals included in the TAP. Since the SCR systems will emit small amounts of unreacted ammonia, the emissions were evaluated to determine if they would exceed any of the TAP limits. Total emissions will be approximately 6 tons per year. Therefore, the MPEH™ would not be subject to additional modeling requirements as a major source of TAPs.

4.2.9.2.5 Air Quality Related Values

The Applicant conducted a visibility impairment analysis using VISCREEN, and the results indicate that screening values were not exceeded. Therefore, long-term adverse impairment to visibility would be expected to be minor (Trinity 2006).

The Applicant also conducted modeling to determine the deposition of acid compounds using the CALPUFF model. Deposition rates for both nitrogen and sulfur compounds were significantly below the Federal Land Manager's deposition assessment thresholds at Breton NWR.

4.2.9.3 Decommissioning

The impacts of decommissioning the proposed deepwater Terminal were fully evaluated in Section 4.2.9.3 of the MPEH™ Final EIS. Decommissioning was unaffected by the amended Application and therefore, incorporated herein by reference.

4.2.9.4 Mitigation

If approved, conditions of the License would require the Applicant to obtain all applicable and appropriate air quality permits prior to initiating Port operations. The License would require all monitoring and compliance requirements associated with the proposed Port's air permits to be met during the operating life of the facility.

4.2.10 Noise

Impact Summary: Minor, direct adverse impacts on the airborne or underwater noise environment would occur from Terminal operations, vessel traffic, helicopter traffic, roadway traffic, and construction activities. Activities that would produce the greatest amount of noise are short-term actions such as the platform and pipeline installations and decommissioning. Terminal operations might produce a slight increase in underwater noise. **Section 4.2.2** discusses potential impacts of underwater noise on biological resources. A detailed discussion of impacts follows.

4.2.10.1 Construction Impacts

Construction activities related to the MPEH™ would be typical of other OCS structure and pipeline projects in terms of schedule, equipment used, and types of activities. Offshore oil and gas production are usually the noisiest during site exploration and establishment. During this phase there is typically an increase in support operations, such as aircraft or helicopters, vessels, dredges, and sometimes explosive operations. Production activities are generally quieter and require fewer support operations.

Noise levels from construction equipment that are likely to be used are shown in **Table 4-7**. As shown, noise levels vary from the low 70s A-weighted decibel[19] (dBA) to the high 80s dBA at 50 feet from the construction site. Since the MPEH™ would be constructed about 25.7 km (16 mi) away from the shoreline, temporary increases in noise levels would not impact residents on the shoreline.

[19] When measuring sound to determine its effects on the human population, A-weighted sound levels (dBA) are typically used to account for the response of the human ear. A-weighted sound levels represent adjusted sound levels. The adjustments are made according to the frequency content of the sound. Another sound scale is the C-weighted scale (dBC). In contrast to the A-weighted scale, the C-weighted scale provides no adjustment to the noise signal over most of the audible frequency range. The C-weighted scale is generally used to measure impulsive noise such as airblasts from explosions, sonic booms, and gunfire.

Table 4-7. Predicted Noise Levels for Construction Equipment

Construction Equipment	Predicted Noise Level at 50 feet (dBA)
Loaders, excavators	80–85
Pumps	76
Graders, scrapers	85–89
Generators	81
Drill rigs	70–85

Source: MARS 2005

Pile-driving would occur during the construction phase at the offshore Terminal. The construction of LNG Storage Platform Nos. 1 and 2 would require 40 piles and 170 hours of driving over a 35-day period. The MP 164 Platform would require 4 piles and 12 hours of driving over a 4-day period. Existing Platform No. 1 would require 8 piles and 36 hours of driving over a 15-day period. The piles would be driven into the sediments using a pile-driving hammer suspended above water from one of the vessel's cranes. During this procedure, hearing protection is mandatory for construction workers when they are within 150 feet of the pile-driving hammer. Hearing protection is required by Occupational Safety and Health Administration standard 29 CFR 1910.95. The Soft Berth™ mooring system would be installed with suction piles.

All pile-driving is expected to be performed by surface pile-driving equipment, with the exception of the suction piles that might be used for the 24 piles that constitute the Soft Berth™ mooring system. The highest underwater sound pressures are expected to result from pile-driving 48-inch steel piles using an impact hammer. Pressures of up to 209 dB_{peak}, when measured 10 m from the pile, are expected (NMFS 2004).

Given the measures that would be used to alleviate noise from pile-driving operations and the distance to the nearest populated shoreline is 25.7 km (16 mi), it is not anticipated that the onshore population would experience noise impacts from pile-driving operations. Workers and personnel at the construction site would have adequate hearing protection from significant noise impacts. Impacts on biological resources are discussed in **Section 4.2.2**.

Platform No. 3 would be moved to a new location approximately 1 mile north of the main MPEH™ platform complex. During this process, the deck would be removed and transported onshore for maintenance. Onshore maintenance would occur at a facility that normally provides those services. The deck would then be transported to the new location. The remaining sections of Platform No. 3 would be transported directly to the new location. Noise impacts from the disbanding and assembly of Platform No. 3 are anticipated to be similar to noise from construction activities. Platform No. 3 would be approximately 24 km (15 mi) from the shoreline, therefore it is not anticipated that noise from the disbanding and assembly of Platform No. 3 would impact populations on the shoreline.

4.2.10.2 Operation Impacts

Noise from the Port operations could result from operation of equipment at the proposed Terminal, pipelines, vessel traffic, and helicopters. Since noise impacts occur only on a localized geographic scale, it is not possible to provide noise level estimates that would represent noise impacts at a system wide or regional scale. Therefore each category was analyzed separately.

4.2.10.2.1 Terminal

The proposed Terminal would be approximately 8 km (5 mi) from an existing shipping fairway, the Mississippi River Gulf Outlet Safety Fairway. The shipping fairway is between the proposed Terminal and the shoreline.

The equipment at the Terminal would operate at decibel levels estimated to range from about 85 to 120 dBA (Verrengia 2001). It is estimated that the SCVs would emit noise levels of 118 dBA (C.J. Engineering Consultants 2004). However, at 50 feet this would drop to approximately 94 dBA. Since the shoreline is approximately 25.7 km (16 mi) away from the Terminal and the closest town (Venice, Louisiana) is approximately 61.2 km (38 mi) away, it is not anticipated that the noise from the proposed equipment would impact onshore populations.

The moored LNGCs would emit similar noise levels during offloading operations. Given the distance between the proposed Terminal and the nearest town, and the existence of the shipping fairway between the Terminal and the shoreline, it is not anticipated that noise levels generated at the proposed Terminal would impact any noise-sensitive populations residing onshore. Sound traveling through the air is heard at these levels, but the same sound through water has a greater impact at close range. **Section 4.2.2** discusses noise impacts on biological resources.

4.2.10.2.2 Helicopters

Helicopters would travel from Venice or Boothville, Louisiana, to the offshore Terminal to transfer support staff. It is anticipated that helicopters would make about 23 round trips per week; each trip is approximately 64 km (40 mi) one way.

The addition of 23 helicopter trips per week would increase surrounding noise levels; therefore, a noise analysis was completed to analyze the degree of the increase. This analysis was completed using the NOISEMAP software program (BaseOps Version 7.295). NOISEMAP is used to analyze and develop noise contours for civilian and military aircraft and rotocraft operations. The noise contours determine to what extent the surrounding population is impacted by immediate aircraft or rotocraft operations.

Four flight tracks were developed: one arrival and one departure from Venice heading east/southeast for 38 nautical miles (NM) and one arrival and one departure track from Boothville heading east/southeast for 43 NM. The Bell 407 helicopter would be used for offshore support. However, NOISEMAP does not have the Bell 407 in the program; the Sikorsky 76 was modeled as a substitute.

The results of the NOISEMAP modeling program were analyzed according to FAA regulations (14 CFR Part 150). These regulations prescribe the procedures, standards, and methodology for determining the noise exposure of individuals from the operations of an airport or heliport. To determine if an airport or heliport exposes individuals to significant noise, contours are developed for noise levels of 65, 70, and 75 yearly day-night average (DNL) sound level. In those areas where the noise contour is 65 DNL or higher, land use compatibility shall be determined.

This analysis did not include helicopter operations from the heliports in Boothville or Venice; contours were developed exclusively for helicopter operations that would occur under the Proposed Action. These operations did not produce noise contours in the 65, 70, or 75 yearly DNL range. The largest contour, or the contour which represents the loudest noise, was the 45 DNL. This is 20 DNL lower than the 65 DNL threshold of significance.

In addition to running a noise analysis for helicopter operations, the land use where helicopters would be operating was considered. The area between Venice and Boothville consists mainly of industrial land use. As discussed in **Section 3.4.7.1**, there are 2,220 people in the Venice-Boothville area, and there are 16 heliports in Venice and 1 in Boothville.

The noise analysis did not produce significantly high contours; therefore, because of the high percentage of industrial land use in the area, and the volume of helicopter traffic that currently exists in the area, it is anticipated that the Proposed Action would cause only minor noise impacts in the area.

4.2.10.2.3 Vessel Traffic

If the proposed Port were constructed, there would be approximately 2 LNGC trips per week (106 per year). This represents a reduction from 121 LNGC trips per week as analyzed in the MPEH™ Final EIS, and is based on LNGCs of up to 160,000 m^3 capacity currently in use. The vessels would normally travel to and from the existing fairway, about 5 miles away from the site of the proposed Terminal and approximately 18 km (11 mi) away from the shoreline.

The northern section of the GOM is one of the most productive energy zones and consequently one of the world's busiest shipping channels. There are more than 3,700 offshore oil and gas platforms between Mexico and Mobile, Alabama (Verrengia 2001). Since the proposed Terminal would be constructed in a busy shipping area 26 km (16 mi) away from the onshore population, and the majority of the vessels would use the existing fairway, it is not anticipated that the additional vessels would cause a long-term, major, adverse increase in noise levels to the onshore population.

4.2.10.3 Decommissioning

Noise generated from decommissioning the proposed Port would occur out of auditory range of onshore receptors. The proposed pipelines would be filled with seawater and abandoned in-place and minor noise would be generated from abandonment activities.

5. Risk Management

5.1 Evaluation Criteria

The transportation, handling, storage, and processing of LNG and transportation of associated natural gas and NGL requires strict controls to minimize potential risks and interruptions of gas supplies. Section 5 of the MPEH™ Final EIS provided an overview of operation of the proposed MPEH™ Terminal that might affect public safety. This section focuses on operation of SCV-SCRs that might affect public safety, since Freeport-McMoRan Energy's amended Application modified Terminal operations to include use of SCV-SCR technology. Other components of the proposed MPEH™ were not affected by the amended Application and are therefore incorporated by reference in this EA. These sections of the MPEH™ Final EIS are MPEH™ Final EIS Section 5.3 (Subsurface Storage of Natural Gas in Salt Caverns on the OCS at MP 299); MPEH™ Final EIS Section 5.4 (LNG Hazards); MPEH™ Final EIS Section 5.5 (LNG Accident Modeling); MPEH™ Final EIS Section 5.6 (Risk Management Planning); MPEH™ Final EIS Section 5.7 (Operations); and MPEH™ Final EIS Section 5.8 (Port Security and Maritime Safety).

5.2 Proposed Action

The Applicant proposed the MPEH™ as an uninterrupted source of natural gas operating 24 hours a day, 365 days a year. If the License is approved, the USCG, in coordination with MMS, where applicable, would review and approve all design, engineering, operations, and security specifications prior to installation and at-sea construction of the proposed Terminal. The USCG's review would include a thorough evaluation of the Applicant's measures to manage safety risks. Relevant standards applicable to offshore and onshore LNG facilities would also be applied.

The primary safety concern of SCVs compared to ORVs is the burner as a potential ignition source for the natural gas or LNG. This concern is a misconception since the SCV design precludes contact between the burner flame and the SCV tubes carrying LNG, and the use of water as an intermediate fluid. In addition, the MPEH™ Terminal would be designed and constructed in accordance with NFPA Standard 59A, *Standard for the Production, Storage, and Handling of Liquefied Natural Gas*. Design criteria for SCVs call for an elaborate system of indicators which are required to monitor inlet and outlet temperature of LNG, vaporized gas, and heating medium fluids to ensure effectiveness of the heat transfer surface. Inlet and shutoff valves are required to be remotely closed if any of the following occur:

- Loss of line pressure (excess flow)
- Abnormal temperature is sensed in the immediate vicinity of the vaporizer (fire)
- Low temperature in the vaporizer discharge line

In the event of an emergency shutdown the system is designed to proceed to a failsafe condition that is maintained until the operators can take action either to reactivate or secure the system.

All piping and valves upstream of the SCV are designed to operate at LNG temperatures [-260˚F (-162˚C)]. Additionally, the SCV will be designed, fabricated, and inspected in accordance with all industry standards.

5.3 Overall Project Impacts on Public Safety

Risk management concerns associated with the proposed Terminal would be confined to authorized personnel employed to manage, operate, or support the proposed Terminal, and other OCS structures within the hazard area. While the September 11, 2001, terrorist attacks have fueled concerns about the handling and storage of LNG and other hazardous substances, the distance of the proposed Terminal from shore (approximately 25.7 km [16 mi]) from the coast of Louisiana, combined with the required Facility Security Plan (FSP) for the proposed Terminal and the existing coastal security measures covering the United States, create conditions that make a terrorist act associated with the proposed Terminal not likely to affect the public.

While safety concerns might have minor long-term adverse or beneficial impacts on the decisionmaking processes of potential future proposals within the hazard area, there is no direct short-term or long-term adverse impact on activities outside the Safety Zone.

All anticipated hazards to the general public, non-Terminal structures, or vessels associated with the proposed Terminal would be mitigated.

5.4 Mitigation

Mitigation that would contribute to minimizing potential risks include

- Terminal fabrication would take place within a facility closed to the public.
- The proposed Terminal would be approximately 61 km (38 mi) offshore.
- The proposed Safety Zone would preclude any unauthorized transit or activities within 500 m (1,641 ft) of the proposed Terminal anchorage. The proposed ATBA would encompass an area within 3.5 km (2.2 mi) of the proposed Terminal. If adopted, this area would be shown on nautical charts with an associated caution note.
- The nearest structure to the proposed Terminal is more than 4.8 km (3 mi) away.
- Pipeline construction would be conducted with strict adherence to potential license conditions, as well as all applicable construction and maritime safety regulations and guidelines.
- Installation, materials, and testing of the proposed Terminal infrastructure would meet or exceed the applicable engineering and regulatory standards and potential license conditions.
- If approved, the license would require an approved FSP be implemented as an integral part of the Port Operations Manual. The USCG would be responsible for patrol and enforcement within the Safety Zone as described in MPEH™ Final EIS Section 2.3.1.

6. Cumulative and Other Impacts

CEQ defines cumulative impacts as the "impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over time by various agencies (Federal, state, and local) or individuals. Informed decisionmaking is served by consideration of cumulative impacts resulting from projects proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

6.1 Reasonably Foreseeable Future Actions

This cumulative impacts analysis summarizes expected environmental effects from the combined impacts of past, current, and reasonably foreseeable future projects within the Proposed Action area. Other existing or reasonably foreseeable future actions are included in the cumulative impacts analysis if their impacts would fall within the same geographic area and timeframe as those of the Proposed Action. For purposes of this analysis, the timeframe of the Proposed Action is the expected service life of the MPEH™ proposed Port, an estimated 30 years. For most resources, the geographic scope of the cumulative effects analysis exceeds the proposed Port footprint and includes the Northeastern GOM OCS. For example, since the Terminal is approximately 16 km (10 mi) northeast of the Mississippi River discharge plume, the Mississippi River is a reasonable biological boundary between the northeast and northwest GOM for assessment of cumulative impacts on biological resources (MMS 2002b). Impacts on the GOM as a whole are also assessed where appropriate.

Projects that were considered for this analysis were identified through consultation with planning and engineering departments of local governments, state and Federal agencies, company news releases, and published media reports. Projects with similar impacts were identified. In addition, projects occurring beyond the vicinity of the Proposed Action or within a time frame such that their impacts would not contribute to a cumulative impact are not considered. Projects with similar impacts generally include nearshore and deepwater port construction, offshore mineral and oil leases in the OCS, and resource agency operations. As discussed in **Section 2.0**, Project Description, **Table 6-1** outlines the construction schedule for the Proposed Action. The proposed Port operation is assumed to be through 2038.

6.1.1 Offshore LNG Projects

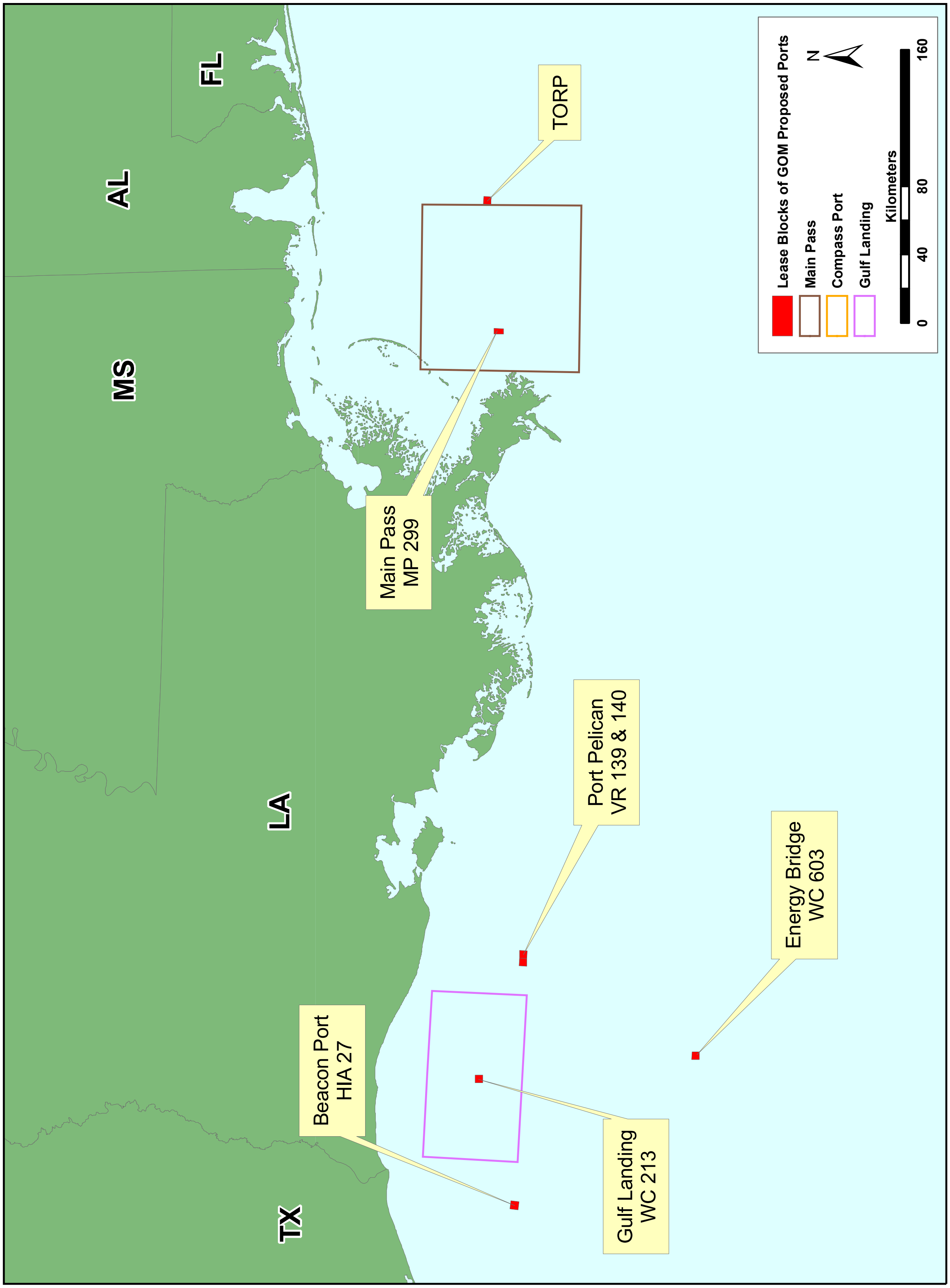
Since the amendment of the Deepwater Port Act in 2002 to encompass deepwater ports for natural gas, the USCG has received seven LNG Deepwater Port license applications for the GOM. In addition to the MPEH™ proposed Port, the USCG has received license applications from Port Pelican LLC (license issued; project on hold), Gulf Gateway Energy Bridge (formerly El Paso Energy Bridge Gulf of Mexico LLC) (license issued and in operation), Gulf Landing LLC (license issued; EIS on gravity-based structures (GBS) fabrication being prepared), Compass Port LLC (application withdrawn), ExxonMobil Pearl Crossing (application withdrawn), Beacon Port LLC (license application under review, Draft EIS published), and the Terminal Offshore Regas Plant (TORP) LNG (application received). These projects are listed in **Figure 6-1** and in **Table 6-2**. The USCG and MARAD have also received informal inquiries concerning application procedures for other deepwater ports for natural gas.[20]

[20] The USCG declines to speculate on where additional LNG deepwater ports might be located, what technologies they might employ, or whether inquiries that have been made to date will, in fact, result in license applications.

Table 6-1. Main Pass Energy Hub™ Construction Components and Schedule

Description	Year 1	Year 2	Year 3	Year 4	Year 5
Cavern Creation					
Drilling	X	X			
Leaching/Dewatering		X	X	X	X
Demolition					
Remove Existing Drill Rigs	X				
P&A Existing Wells on Platform No. 1 and No. 3		X			
Pipelines					
36-inch MP 299 to Coden, AL			X		
36-inch Coden to delivery points (onshore tie-in)			X		
20-inch MP 299 to SP 55			X		
16-inch MP 299 to MP 298	X				
12-inch MP 299 to Venice, LA			X		
Fixed Offshore Structures					
Platform No.1 deck and bridge removal		X			
Platform No.1 deck and bridge installation			X		
Platform No.3 deck and bridge removal		X			
Platform No.3 jacket relocation and installation			X		
Platform No.3 deck and bridge installation			X		
BS-8 deck removal		X			
BS-8 deck installation			X		
Living quarters installation			X		
MP 164 Junction Platform		X			
Storage Platform Nos. 1 and 2 installation			X		
Hook-up and Commissioning					
Platform No. 1 and No. 3 and BS-8 Hook-Up			X		
Platform No. 2 leaching equipment installation	X	X			
Platform No. 2 modifications			X		
Commissioning and Start-Up			X	X	
Soft Berth™ System pile installation			X		
Dolphins and Berthing Buoys Installation			X		

Source: FME 2006a



Adapted from: Freeport-McMoRan Energy LLC: Drawing # 02290012 [Layout 1]

Figure 6-1. Existing and Proposed Deepwater Ports in the GOM

Table 6-2. Offshore LNG Projects within the GOM

Project	Project Type	Project Location	Permitting Status
Port Pelican LLC	Deepwater Port 1.0 (2.0 after Phase II) bcfd LNG GBS platform facility	Vermilion Block 140 Approximately 443 km (275 mi) W of the MPEH™	License issued on January 20, 2004. As of June 2005, project on hold.
Gulf Gateway Energy Bridge GOM (formerly El Paso Energy Bridge GOM, LLC)	Deepwater Port 0.5 bcfd submerged turret loading system	West Cameron Block 603 Approximately 547 km (340 mi) W of the MPEH™	License issued on May 26, 2004. Offshore construction of Gulf Gateway Energy Bridge GOM commenced in August 2004 and was completed in February 2005. Gulf Gateway Energy Bridge GOM became operational on March 17, 2005.
Gulf Landing LLC	Deepwater Port 1.2 bcfd LNG GBS platform facility	West Cameron Block 213 Approximately 547 km (340 mi) W of the MPEH™	Final EIS issued and ROD signed on February 16, 2005. Draft Supplemental EIS for construction of GBS units under review.
Compass Port LLC	Deepwater Port 1.02 bcfd LNG GBS platform facility	Mobile Block 910 Approximately 113 km (70 mi) NNE of the MPEH™	Application withdrawn.
Beacon Port LLC	Deepwater Port 1.5 bcfd LNG GBS platform facility	West Cameron Block 167 and High Island A Block 27 More than 500 km (300 mi) W of the MPEH™	Application under review. Final EIS under review.
ExxonMobil Pearl Crossing	Deepwater Port 1.4 bcfd LNG GBS platform facility	West Cameron Block 220 Approximately 450 km (280 mi) W of the MPEH™	Application withdrawn.
TORP LNG	Deepwater Port 1.4 bcfd submerged turret loading system	MP 258 Approximately 77 km (48 mi) E of the MPEH™	Application under review. Draft EIS under review.
MPEH™	Deepwater Port Reuse of existing platform facility	Main Pass Block 299	Amended Application under review. EA under review.

This evaluation includes all deepwater port applications that the USCG is aware of. Using these criteria and the geographic location of ports east or west of the Mississippi River discharge plume, the assessment of cumulative impacts associated with the MPEH™ proposal will include the TORP project proposed for the northeastern GOM.

TORP Terminal LP, proposes to own, construct, and operate a deepwater port, named Bienville Offshore Energy Terminal (BOET), in the Federal waters of the OCS on MP 258, approximately 63 miles south of Mobile Point, Alabama, in a water depth of approximately 129.5 m (425 ft). The BOET would be approximately 77 km (48 miles) almost due east of the MPEH™ Terminal (see **Figure 6-1**). The BOET Deepwater Port would be capable of mooring two LNGCs of up to approximately 250,000 m^3 capacity by means of two Single Anchor Leg Moorings. The LNGCs would be offloaded one at a time to HiLoad floating regasification facilities, which use four submerged shell-and-tube heat exchangers to vaporize the LNG before sending it via 35.6-cm (14-inch) diameter flexible risers to a Pipeline End Manifold (PLEM) on the seafloor, then through 76.2-cm (30-inch) diameter pipeline to the support platform, where the gas would be metered and further sent out via interconnecting pipelines to four existing pipelines (Dauphin Island Gathering System Feedline, Transco Feedline, Destin Feedline, and Viosca Knoll Gathering System Feedline).

The major fixed components of the proposed deepwater port would be the Support Platform, two PLEMs with ancillary risers and terminal pipelines, HiLoad parking line pilings, and approximately 40.2 km (25 mi) of new pipeline. BOET would have an average throughput capacity of 1.2 bcfd. No onshore pipelines or LNG storage facilities are associated with the proposed deepwater port application. A shore-based facility would be used to facilitate movement of personnel, equipment, supplies, and disposable materials between the Terminal and shore. Construction of the deepwater port would be expected to take 30 months; with startup of commercial operations in the latter half of 2009, should a license be issued. The deepwater port would be designed, constructed and operated in accordance with applicable codes and standards and would have an expected operating life of approximately 25 years.

6.1.2 Offshore Oil and Gas Leasing/Mineral Leasing

Approximately 12 active platforms exist within an 8.1-km (5-mi) radius of the proposed MPEH™ Terminal, most of which supply offshore pipelines in the area. Platforms in the GOM are often refurbished, repaired, or otherwise maintained at construction yards on the GOM coast and elsewhere. New platforms are often added and old platforms are decommissioned or refurbished. There are four leases within the vicinity of the Proposed Action. In MP 299, there are two leases for production and development of oil and gas. Freeport-McMoRan Sulphur LLC holds a lease for sulphur and salt mining in MP 299. The fourth lease is held by Conoco, Inc., in SP 55 (see **Table 6-3**).

In November 2002, the MMS prepared an EIS entitled *Gulf of Mexico OCS Oil and Gas Lease Sales: 2003–2007* (OCS EIS/EA MMS 2002-052). The EIS evaluated five lease sales in the Central Planning Area that are expected to occur through 2007. Its discussions take into account a wide variety of activities that flow from OCS leases: exploration; pipeline and platform construction; emplacement and removal; oil and gas production operations, including use of the support vessels and helicopters; and ship transit and anchoring. The programmatic EIS also considers relationships of these actions on other activities not driven by the OCS Program that occur on the OCS and nearby shores, such as recreational pursuits and commercial fishing. In light of the similarity between the Proposed Action evaluated in the EIS and the MMS's OCS Proposed Action, this EIS has incorporated, as appropriate, information on projected OCS activities in the GOM. As such, those cumulative impacts are included as part of the cumulative assessment of the MPEH™ Deepwater Port application. In July 2006, MMS published a Draft EIS for the 2007-2012 Outer Continental Shelf oil and natural gas leasing program, including portions of the GOM in which LNG terminals are proposed or operating.

Table 6-3. Offshore Oil and Gas Leasing/Mineral Leasing Near MP 299

Project	Project Type	Project Location	Permitting Status	Schedule
Conoco, Inc.	Oil and Gas Production and Development	SP 55 – 1 well within 1,500 m (5,000 ft)	Lease No. G01607	Ongoing
Chevron USA, Inc.	Oil and Gas Production and Development	MP 299 - 11 wells within 1,500 m (5,000 ft)	Lease No. G01316	Ongoing
Freeport-McMoRan Sulphur LLC	Sulphur Production and Development	MP 299 - 22 wells within 1,500 m (5,000 ft)	Lease No. G09372	Lease current, but sulphur mining has been discontinued
Freeport-McMoRan Energy LLC	Oil and Gas Production and Development	MP 299 – Unknown number of wells	Lease No. G12362	Ongoing
Apache Corporation	Oil and Gas Production and Development	MP 148	Lease No. G02950	Temporarily abandoned
Walter Oil & Gas Corporation	Oil and Gas Production and Development	MP 149	Lease No. G12090	Discontinued
Chevron USA, Inc.	Oil and Gas Production and Development	MP 300	Lease No. G01317	Ongoing

The MMS EIS for oil and gas lease sales includes offshore scenario information related to OCS Program activities in the GOM for the years 2003–2042. Estimations for those future activities pertain to various water depths. **Table 6-4**, extracted from the MMS EIS, shows selected estimates for structures required for various activities on the OCS. Structures occurring in water less than 60 m (197 ft) deep are comparable to the Proposed Action. Structures sorted by activity for all water depths are GOM-wide estimates. The MMS estimates there are presently 4,000 offshore structures. Over the next 40 years, the MMS believes the net number of structures used for production will decrease in the GOM. In comparison to other structure-based activities in the OCS, and based on known applications for future deepwater ports, there would be a substantially smaller number of LNG terminals in the GOM. In addition, adding these deepwater ports to the inventory of offshore facilities, would not affect the MMS estimates of GOM-wide activities. The Louisiana Offshore Oil Port (LOOP) was the first deepwater port, permitted in 1977, and remains the only crude oil deepwater port. LOOP is approximately 18 miles south of Leeville and Grand Isle, Louisiana, in 110 feet of water. Ultra-large crude carriers and very large crude carriers transport crude oil from around the world to LOOP, where it is offloaded and piped to Fourchon, Louisiana, then to Clovelly Terminal. LOOP will operate until 2015.

Table 6-4. MMS Estimates Structures in the OCS, 2003–2042

Activity	Water 0 to 60 (meters)	All water depths (meters)
Exploration and delineation well drilled	3,409–3,977	8,996–11,333
Development well (oil and gas)	7,390–8,181	17,148–21,079
Production structures installed	2,239–2,969	2,897–3,999
Production structures removed	5,286–6,069	6,303–7,296
Length of installed pipelines (km) [a]	9,800–24,374	27,590–52,364
Service vessel trips (1,000 trips)	9,689–9,835	11,889–12,479
Helicopter trips (1,000 trips)	11,374–18,920	27,997–50,692

Source: MMS 2002b

Note: [a] Excludes pipelines in state waters

6.1.3 Other Projects

Section 6.1.2 of the MPEH™ Final EIS listed other reasonably foreseeable projects, including onshore pipelines. In June 2006, MoBay Storage Hub, Inc., a subsidiary of Falcon Gas Storage Company, Inc., applied to FERC for a Certificate of Public Convenience and Necessity seeking authorization to develop and operate the MoBay Storage Hub Project in southern Mobile County, Alabama (MoBay 2006). The project would include an onshore pipeline that would parallel the existing Gulfstream pipeline and the proposed MPEH™ Bayou La Batre natural gas pipeline route. FERC has not yet acted on MoBay Storage Hub's application, and a NEPA document has not yet been prepared. If the MoBay pipeline was approved, the cumulative impacts would be similar to those considered in the MPEH™ Final EIS, Section 6.4, for the MPEH™ and Compass Port pipelines.

6.2 Overview of Cumulative Impacts Analysis

Table 6-5 summarizes potential cumulative impacts on resources from the Proposed Action when combined with other past, present, and future activities. The cumulative impact analysis is discussed in more detail in the following sections.

6.3 Proposed Deepwater Terminal

6.3.1 Water Quality

Coastal waters of the GOM, including those of Louisiana and Alabama, encompass numerous bays and estuaries. Estuaries are classified based on their designated beneficial uses (e.g., aquatic life support, fish consumption, recreation). A recent assessment of estuarine health indicated that less than one-third of the GOM's estuaries have good water quality (i.e., sufficient to support their designated use), while the remainder are considered "impaired" due to nutrient enrichment, influx of pathogens, increases in oil and grease concentrations, alteration of habitat, salinity or chloride intrusion, siltation, or organic enrichment. In Louisiana, all seven of these factors have variably affected between 5 and 20 percent of estuaries. Pathogen indicators are also present in a limited number of estuaries in Alabama and Mississippi, while organic enrichment and nutrient enrichment have been documented in several estuaries beyond the bounds of the Proposed Action area.

Table 6-5. Cumulative Impacts on Resources

Resource	Past Actions	Current Background Activities	Proposed Action and Alternatives	Known Future Actions	Cumulative Impacts
Water Resources	Oil and gas production, vessel operations, onshore cooling water, and discharges have impacted GOM water quality.	Oil and gas production, vessel operations, onshore cooling water discharges impact GOM water quality.	Negligible impact from SCV alternative. Temporary impacts from construction activities.	Oil and gas production, vessels, onshore cooling water discharges. BOET in northern GOM. Potential for additional LNG Terminals.	Current and future activities would impact coastal and marine waters. LNG Terminals would have small incremental increase of impacts on water quality.
Biological Resources	Degraded historic habitat of sensitive and common wildlife species. Degraded water quality impacted sensitive species. Stresses to GOM fisheries including overfishing of certain species.	Oil and gas production, vessel operations, onshore cooling water discharges continue to impact biological resources and wildlife habitat.	Negligible impact from SCV alternative. Minor disturbance of vegetation and habitat by construction.	Continued oil and gas production, vessel operations, onshore cooling water discharges would impact EFH. Potential for additional LNG Terminals.	Oil and gas production, vessel operations, onshore cooling water discharges would impact biological resources.
Cultural Resources	Possible destruction of unknown artifacts.	Identification and recordation of historic and cultural resources.	None.	None.	None.
Geological Resources	Installation of pipelines and structures on the OCS.	Oil and gas production, installation of pipelines and structures on the OCS.	Installation of pipelines and structures. Solution-mining of salt cavern. Grading, excavating, and recontouring of soil.	Oil and gas production, installation of pipelines and structures on the OCS.	Minor additional impact from additional structures and pipelines.
OCS Use	Oil and gas production activities and shipping on the OCS.	Oil and gas production activities and shipping on the OCS.	Consistent use of the OCS.	None.	None.

Table 6-5. Cumulative Impacts on Resources (continued)

Resource	Past Actions	Current Background Activities	Proposed Action and Alternatives	Known Future Actions	Cumulative Impacts
Air Quality	Emissions from OCS activities, cargo and other vessels degraded offshore air quality. Power plants, factories, vehicles, and other major emissions sources degraded onshore regional air quality.	Existing emissions sources continue to adversely affect regional air quality.	LNGCs, support vessels, and Port equipment would have small contribution to emissions of adverse air quality.	Emissions from OCS activities are expected to maintain present levels or decrease. Distance to BOET reduces potential to interact to produce a cumulative effect.	Current activities would be the dominant source of emissions. Negligible cumulative impacts.
Noise	Ships and oil and gas production became dominant offshore noise sources.	Ships and oil and gas production are dominant offshore noise sources.	Short-term noise from construction activities; additional noise from increased offshore operations.	None.	Current activities would be the dominant noise source. Negligible cumulative impacts.
Socioeconomics and Environmental Justice	Oil and gas development along the Gulf Coast and the OCS. Development of local economic bases.	Oil and gas development, LNG import terminals, shipping ports, and fishing industries support of local economies.	Minor contribution to local oil and gas support industries.	Existing industries will support local economies.	Minor stimulation of local economies from construction activities.
Transportation	Cargo vessels, fishing ships, and oil and gas platforms and service vessels travel the GOM.	Cargo vessels, fishing ships, and oil and gas platforms and service vessels travel the GOM.	LNGCs and service vessels would add to ship traffic in the GOM.	TORP would also add LNGCs and service vessels to ship traffic in GOM.	Due to geographic distances and use of different shipping channels, potential for cumulative impacts are small.

The primary activities occurring along the Gulf Coast that have contributed, or are still contributing, to degradation of coastal water quality include effluents, run-off, or discharges from the petrochemical industry; agricultural sources; power plants; pulp and paper mills; fish processing; municipal wastewater treatment; maritime shipping; and dredging. The petrochemical industry along the Gulf Coast is the largest in the United States. This industry includes extensive onshore and offshore oil and gas development operations, tanker and barge transport of both imported and domestic petroleum into the GOM region, and petrochemical refining and manufacturing operations.

Within marine waters, the water quality over the continental shelf from the Mississippi River Delta to Tampa Bay is influenced by three primary factors—river discharge, run-off from the Gulf Coast, and eddies from the Loop Current. The Mississippi River is a major factor affecting quality of marine waters in the northern GOM and accounts for nearly three quarters of the total discharge on the continental shelf. This large amount of runoff, with its nonoceanic composition, mixes into the nearshore surface waters of the GOM, making the chemistry in parts of this system quite different from that of areas further offshore. Sea-surface salinities along the northern GOM vary seasonally. During months of low freshwater input, salinities near the coastline range between 29 and 32 parts per trillion (ppt). High freshwater input during the spring and summer months results in strong horizontal salinity gradients, with salinities of less than 20 ppt on the inner shelf. The outflow of the Mississippi River generally extends only 75 km (45 mi) to the east of the river mouth except under extreme flow conditions. The Loop Current also affects marine water quality as it intrudes in irregular intervals onto the shelf, forcing rapid changes in characteristics of the water column (e.g., from well-mixed to highly stratified). Discharges from the Mississippi River can be easily entrained in the Loop Current. While low oxygen levels (i.e., hypoxia) are rarely observed on the Mississippi-Alabama shelf, low oxygen values have been documented.

Activities related to the Proposed Action and other past, present, and reasonably foreseeable future actions that are of a short-term nature and have the potential to adversely affect coastal and marine water quality include

- Platform or facility installation
- Pipeline installation
- Storage cavern (salt cavern) formation
- Integrity testing
- Anchoring during installation and Terminal operation
- Anchoring during decommissioning
- LNG spills
- Miscellaneous spills (hydrocarbons and other hazardous substances)

Activities related to the proposed MPEH™ Terminal and similar activities that are of a long-term nature and have the potential to adversely affect coastal and marine water quality include

- Neutralized SCV freshwater discharges
- Domestic and sanitary waste water discharges
- Equipment open-drain and oily water treatment discharges
- Storm water drainage (intermittent)
- Onsite RO water treatment plant (brine) discharges
- Discharges from support vessels and onshore facilities

For all operations considered in this cumulative impact analysis that are currently or would be conducted in Federal OCS waters (e.g., platform installation, pipeline installation, storage cavern formation, LNG terminal installation and operation including regasification and decommissioning), discharges must comply with all applicable Federal water quality standards as established by an NPDES permit. For operations being conducted or to be conducted in state waters such as dredging or trenching, drilling under the coastal zone and beach, and pipelaying, the operator must comply with all applicable state water quality permit requirements. In Louisiana state waters, this would encompass compliance with requirements of a Louisiana Pollutant discharge Elimination System permit pursuant to Louisiana Administrative Code Title 33 Part IX (Water Quality, Subpart 2). In Alabama state waters, the Alabama

Department of Environmental Management regulates discharges to state waters under the Alabama Water Pollution Control Act, as amended (Code of Alabama 1975, §§22-22-1 to 22-22-14).

6.3.1.1 Terminal Installation

Terminal installation activities would combine with other past and ongoing discharges to GOM waters to produce a negligible, short-term, localized cumulative impact on water quality. During the installation of the proposed MPEH™ Terminal, support vessels (i.e., offshore service vessels, crew boats) would periodically traverse coastal and marine waters in support of platform emplacement and transportation of personnel and material to the Terminal site. During support vessel operations, processed bilge water and treated sanitary water discharges would occur on an intermittent basis, while engine cooling water discharges would occur continuously. All discharges would comply with applicable Federal and state water quality standards; no release of free oil would occur.

Venice, Louisiana, would serve as the primary service base for MPEH™ installation activities requiring support vessels. During MPEH™ Terminal installation, there would be one scheduled offshore service vessel trip from Venice each week and one scheduled crewboat trip from Venice each day, plus two unscheduled trips per week. Venice, Louisiana, is one of 50 OCS-related service bases in the GOM region currently supporting oil and gas exploration, development, and abandonment operations. Venice, along with service bases at Cameron, Fourchon, and Morgan City, Louisiana, services more than 81 percent of all GOM mobile drilling rigs and more than 91 percent of all GOM deepwater rigs. Venice, along with Fourchon and Morgan City, supports 84 percent of the deepwater platforms in the central GOM OCS planning area (MMS 2002b). Incremental cumulative impacts on marine and coastal water quality from MPEH™ Terminal installation support activities are expected to be negligible given (1) the overall level of support activity occurring at the Venice, Louisiana, support base, and (2) the level of support vessel activity occurring throughout the GOM in support of OCS oil and gas operations and other LNG terminal-related activities.

6.3.1.2 Terminal Discharges

6.3.1.2.1 Vaporizer Discharges

Routine MPEH™ Terminal discharges would produce minor, localized changes to ambient marine water quality. Neutralized SCV freshwater discharges would combine with other ongoing activities in the GOM to produce a negligible, cumulative impact on marine water quality. Discharges are unlikely to combine with other activities in the GOM to produce a cumulative impact on marine and coastal water quality. Other MPEH™ Terminal discharges would include domestic and sanitary wastewater discharges (treated), equipment open drain and oily water treatment discharges, storm water drainage (intermittent), and on-site RO water treatment plant (brine) discharges. The total volume of ambient seawater to be used by the offshore terminal facilities noted in **Table 6-6** is approximately 683 million gallons per day (MGD). These offshore terminals are sufficiently separated from one another that cumulative effects are unlikely to occur (USCG and MARAD 2004).

OCS exploration and production facility discharges must comply with an existing (General) NPDES permit. Similarly, existing and proposed LNG terminal projects would comply with discharge permit requirements. Routine MPEH™ Terminal discharges on MP 299 and limited discharges from MP 164 are not expected to produce any impacts on coastal water quality when discharged in compliance with an approved NPDES permit.

Table 6-6. Summary of Seawater Usage for LNG Revaporization in the GOM

LNG Facility/ Operator	Location	Expected Flow Rate (MGD)/ Regasification Technology	Water Depth	Area Filtered (km^2/yr)	Intake Screen	Intake Flow Rate
Port Pelican LLC/ Chevron/Texaco	37.9 km (36 mi) S/SW of Freshwater City, Louisiana	176.4/ORV	25 m (83 ft)	9.7	6.35 mm (0.25 in)	0.014 m^3/s (0.5 ft^3/s)
Gulf Gateway Energy Bridge	186.7 km (116 mi) S of Cameron, Louisiana	76/shell-and-tube vaporizer	87 m (285 ft)	2.1	21 mm (0.83 in)	0.03 m^3/s (1.0 ft^3/s)
Gulf Landing/ Shell	56.3 km (35 mi) S of Lake Charles, Louisiana	136/ORV	17 m (55 ft)	11.2	6.35 mm (0.25 in)	0.014 m^3/s (0.5 ft^3/s)
Beacon Port/ ConocoPhillips	90 km (56 mi) S of Louisiana	167.5/ORV	19.8 m (65 ft)	N/A	6.35 mm (0.25 in)	0.014 m^3/s (0.5 ft^3/s)
MPEH™/ Freeport-McMoRan Energy LLC	27 km (17 mi) E of Pass A Loutre, Louisiana	0/SCV	64 m (210 ft)	N/A	None	None
TORP LNG	77 km (48 mi) S of Alabama	126.7/ORV	129.5 m (425 ft)	TBD	2 mm (5/64 in)	0.014 m^3/s (0.5 ft/s)

Sources: Davy 2004, USCG and MARAD 2004, USCG and MARAD 2005b; TORP 2006a

6.3.1.3 LNGCs and Support Vessels in Transit

LNGCs and support vessels would combine with other ongoing activities in the GOM to produce a minor, cumulative impact on marine and coastal water quality. The LNGCs would not produce new or different impacts on water quality than other vessels in the GOM, and would have a minor, incremental increase in impacts. LNGCs would visit the MPEH™ Terminal for offloading approximately two times per week (i.e., 106 LNGC visits per year) and four berthing support vessels stationed at the Terminal would assist in the berthing and debarkation process. LNGCs and berthing support vessels servicing other existing and proposed LNG terminals, as well as the LNGCs and berthing support vessels at the MPEH™ Terminal, would produce only minor, localized impacts on marine water quality from discharges.

6.3.1.4 Decommissioning

Cumulative impacts on coastal water quality are expected to be minor. The proposed MPEH™ Terminal has been designed for a 30-year service life. Similar service lives are expected for the other LNG terminals. At the end of each facility's service life, decommissioning operations would involve conventional offshore platform salvage techniques mobilized from shore. Impacts on coastal water quality might occur as a result of support vessel and lift barge transit while traversing coastal waters. Bilge water and treated sanitary water discharges would occur on an intermittent basis from support vessels as they traverse coastal waters between the shorebase and the Terminal site; engine cooling water would be discharged on a continuous basis. Bilge water would be processed through an OWS before being discharged; no release of free oil would occur. Sanitary wastes would be treated to acceptable standards by an onboard marine sanitation device prior to discharge. Engine cooling water would pass through engine manifolds once and discharge at a slightly higher than ambient temperature.

6.3.2 Biological Resources

6.3.2.1 Marine Mammals

Construction (including moving Platform 3) and operation of the MPEH™ Terminal would combine with one proposed LNG deepwater port in the Northeastern GOM and other OCS activities to result in minor cumulative impacts on marine mammals. The Proposed Action would result in a temporary minor increase in vessel traffic, noise, and turbidity associated with construction and minor impacts on water quality associated with operation, resulting in negligible impacts on marine mammals. Note that the cumulative impacts of a long-term increase in vessel traffic associated with operation of the proposed deepwater port and marine debris are addressed in Section 6.3.2.1 of the MPEH™ Final EIS.

In general, cumulative impacts on marine mammals include a number of chronic and sporadic sublethal effects such as behavioral changes, including changes in movement (ranging from short-term changes in movement to complete abandonment of an important area such as a migration route), feeding, reproduction, or ingestion of OCS-related contaminants or discarded debris. These impacts might stress or weaken individuals of a local group or population and predispose them to infection from natural or anthropogenic sources.

Cumulative impacts on marine mammals resulting from an increase in noise, vessel traffic, and turbidity associated with the construction of two deepwater ports in the northeastern GOM would be limited because the impacts would be temporary; construction of the two proposed ports would not occur at same time; and the proposed ports are approximately 75 km [47 mi]) apart. As described in **Section 6.3.1** long-term cumulative impacts on water quality would be minor, resulting in minor cumulative impacts on marine mammals. Overall, the incremental contribution of the proposed MPEH™ Terminal and TORP to these cumulative impacts on marine mammals would be negligible when compared to other OCS activities.

6.3.2.2 Sea Turtles

Construction (including moving Platform 3) and operation of the offshore components of the proposed MPEH™ Terminal in combination with one other LNG deepwater port and OCS activities in the northeastern GOM could result in cumulative impacts on sea turtles. The Proposed Action would result in a temporary minor increase in vessel traffic, noise, and turbidity associated with construction and minor impacts on water quality associated with operation, resulting in negligible impacts on sea turtles. Note that the cumulative impacts of a long-term increase in vessel traffic associated with operation of the proposed deepwater port and marine debris are addressed in Section 6.3.2.2 of the MPEH™ Final EIS.

In general, cumulative impacts result in chronic sublethal effects (e.g., stress). These could result in persistent physiological or behavioral changes, or avoidance of impacted areas that could cause declines in survival or productivity and result in either acute or gradual population reduction. Contaminants in waste discharges and drilling mud might indirectly affect sea turtles through food-chain biomagnification; the possible effect is uncertain. The presence of, and noise produced by, construction vessels and the construction, operation, and removal of drill rigs might cause physiological stress and make animals more susceptible to disease or predation, as well as disrupt their normal activities.

Cumulative impacts on sea turtles resulting from an increase in noise, vessel traffic, and turbidity associated with the construction of two deepwater ports in the northeastern GOM would be limited because the impacts would be temporary, construction of the two proposed ports would not occur at same time, and the proposed ports are approximately 75 km [47 mi] apart. As described in **Section 6.3.1** long-term cumulative impacts on water quality would be minor, resulting in minor cumulative impacts on sea turtles. Overall, the incremental contribution of the proposed MPEH™ Terminal and TORP to these cumulative impacts on sea turtles would be negligible when compared to other OCS activities.

6.3.2.3 Coastal and Marine Birds

Impacts of the Proposed Action, including construction (including moving Platform 3) and operation of the MPEHTM Terminal in combination with the one other LNG deepwater port and other OCS activities are not expected to result in cumulative impacts on coastal and marine birds. Cumulative impacts of long-term increases in vessel traffic and terminal lighting associated with MPEH™ Deepwater Port, TORP, and other OCS activities are addressed in Section 6.3.2.3 of the MPEH™ Final EIS. No additional cumulative impacts would be expected as a result of the Proposed Action.

6.3.2.4 Benthic Resources

Construction (including moving Platform 3) and operation of the offshore components of the proposed MPEH™ Terminal in combination with one other deepwater port in the northeastern GOM and other OCS activities could result in cumulative effects on benthic resources. Construction, operation, and decommissioning of the proposed ports could have both short- and long-term cumulative impacts on benthic organisms and habitat. Short- and long-term minor benthic impacts would result from placement of structures and processes that disturb bottom habitat. Short-term impacts would be associated with construction and demolition of port infrastructure. Long-term impacts would be associated with the moving and placement of port infrastructure such as platforms. Both proposed deepwater ports would be designed, constructed, and operated in accordance with established, applicable, and appropriate regulations, permit conditions, and industry guidelines to minimize or avoid benthic impacts. Impact areas for MPEH™ and TORP and the cumulative areas are presented in **Table 6-7**. When compared to the vast uniform benthic habitat type available in the MPEH™ South East Area Monitoring Assessment Program (SEAMAP) Study Area (approximately 1.9 million acres) presented in **Figure 6-1**, the 1,014 acres of short-term and 14.2 acres of long-term disturbance associated with two deepwater ports are negligible.

Table 6-7. Benthic Impact Areas for Proposed and Existing Deepwater Ports in the Northeastern GOM

LNG Facility	Temporary Impacts – Terminal Installation (Acres)	Long-Term Impacts – Infrastructure (Acres)
MPEH™ [a]	225	5.1
TORP [b]	789	9.1
Total Northeastern GOM	1,014	14.2

Sources: [a] Based on Table 2.3-1 in the MPEH™ Final EIS. [b] TORP 2006b

6.3.2.5 Fisheries Resources and EFH

Construction (including moving Platform 3) and operation of the MPEH™ Terminal in combination with TORP and other OCS activities could result in negligible cumulative impacts on fisheries resources and EFH. The Proposed Action would result in a temporary minor increase in vessel traffic, noise, turbidity, and sediment displacement associated with construction, and long-term minor impacts on water quality associated with operation, resulting in negligible impacts on fisheries resources and EFH. Activities in the GOM that have a cumulative adverse impact on fisheries resources include structure installation, dredging, effluent discharge, loss of OCS-related trash and debris, vessel traffic, seismic surveys, explosive structure removals, oil spills, oil-spill response activities, shipping, commercial and recreational fishing, and cooling and warming discharges. In general, most anthropogenic impacts, with the exception of fishing, would not be easily distinguished from natural mortality.

Cumulative impacts on fisheries resources and EFH resulting from an increase in noise, vessel traffic, and turbidity associated with the construction of two deepwater ports in the northeastern GOM would be limited because the impacts would be temporary; construction of the two proposed ports would not occur at same time; and the proposed ports are approximately 75 km [47 mi] apart. As described above, long-term cumulative impacts on water quality and sediment disturbance would be minor, resulting in minor cumulative impacts on fisheries and EFH. Overall, the incremental contribution of the proposed MPEH™ Terminal and TORP to these cumulative impacts on fisheries and EFH would be negligible when compared to other OCS activities.

6.3.2.6 Threatened and Endangered Species

Impacts of the Proposed Action in combination with the one other LNG deepwater port and other OCS activities are not expected to result in cumulative impacts on Gulf sturgeon, Gulf sturgeon critical habitat, West Indian manatee, bald eagle, brown pelican, and piping plover and their critical habitat. Cumulative impacts of construction of the pipelines, long-term increases in vessel traffic, and terminal lighting associated with MPEH™ Deepwater Port, TORP, and other OCS activities on these species are addressed in Section 6.3.2.7 of the MPEH™ Final EIS. No additional cumulative impacts would be expected as a result of the Proposed Action.

6.3.3 Cultural Resources

MPEH™ Final EIS Sections 6.3.3, 6.4.3, 6.5.3, and 6.6.3 evaluated impacts on cultural resources, and are incorporated herein by reference. The USCG has determined that the amended Application would not change the construction and operational impacts of the proposed Terminal on cultural resources as presented in the MPEH™ Final EIS.

6.3.4 Geological Resources

Disturbance of the seabed in the GOM has the potential to encounter and cause long-term, adverse impacts on geological resources. The GOM seabed has been extensively disturbed by pipeline construction (MPEH™ Final EIS Table 3.2-13 and Appendix G1). The incremental impact from the MPEH™ pipelines would have a negligible cumulative impact on geological resources. Prior to any installation and at-sea construction, deepwater ports and other OCS activities are required to conduct detailed sonar surveys of proposed disturbance areas and all buffers established by applicable and appropriate guidelines. It is required that construction routes and associated activities in the GOM be designed and implemented to avoid any impacts on sensitive geological resources identified in the survey. There are no sensitive geological resources associated with the installation and at-sea construction or operating areas of the proposed deepwater ports.

6.3.5 Land Use

Commercial and recreational fishing and shipping are traditional uses of the OCS and GOM. Recent activities that have most affected land use on the OCS in and around MP 299 are oil and gas exploration and production activities, including drilling and pipeline construction. Offshore oil and gas operations similar to the proposed deepwater port are very common in the northern GOM along the Louisiana coastline.

Establishment of a fishing exclusion zone around the MPEH™ would be a localized adverse impact, but has little potential to interact with other fishing exclusion zones to produce a cumulative effect on fishing as a surface use of the OCS. No new shipping fairways or anchorage areas would be established. Existing and proposed MPEH™ facilities are similar to MMS-defined OCS activities, including placement of structures on the OCS, installation of pipelines on the OCS, and vessel and helicopter traffic to and from OCS activities. Construction of deepwater ports in the GOM is consistent with the MMS 5-year lease plan to remain a significant supplier of oil and natural gas to the United States. Ports capable of supporting deepwater OCS activities and MPEH™ construction and operation might interact to produce a cumulative effect. However, MPEH™ activities would be relatively small compared to OCS activities, so the cumulative effect from all alternatives would be negligible.

6.3.6 Recreation and Visual Resources

Construction and operational activities that would affect recreational areas include installation of pipelines and the proposed Terminal, and operation of the proposed Terminal. A minor, long-term, adverse impact on recreational fishing would result from temporary displacement associated with offshore pipeline construction activities, and establishment of the safety exclusion area around the Terminal. As noted earlier, the OCS has a large number of pipelines and this type of construction activity is very common in the GOM. Therefore it is assumed that recreational fishing is acclimated to this type of activity. Visual resources might be adversely affected by the temporary presence of pipe-laying vessels. Construction activities would be short-term, and no offshore activities were identified that might interact with MPEH™ construction activities to produce a visual resource cumulative effect.

Operation of the MPEH™, TORP, and onshore support services could have minor, short-term, adverse impacts on local recreational infrastructure. These impacts could result from introduction of new workers and their families into coastal communities. It is anticipated that affected resources would adapt to prevent any long-term, adverse impacts. The presence of additional LNGC and support vessels might be considered an adverse impact on visual resources as there would be increased activities in their ports. As noted above, offshore oil and gas operations similar to the MPEH™ Terminal are very common in coastal Alabama, Louisiana, and Mississippi. Therefore it is anticipated that operation of the MPEH™ would interact with current vessel activities to produce a negligible cumulative impact. Cumulative impacts on recreation and visual resources are expected to be similar for all alternatives.

6.3.7 Socioeconomics

Construction and operation of the MPEH™ has the potential to affect socioeconomic resources in Louisiana, Mississippi, and Alabama through job creation and expenditures on goods and services. MMS estimates that more than 55,000 persons are directly employed by the offshore oil and gas industry, about 30 percent of which are in the GOM. This does not include thousands of jobs created indirectly by the offshore oil and gas industry. The regional economy also relies heavily on the ports, as seven of the ten busiest ports in the United States are along the GOM. OCS-related employment for Louisiana's western coastal parishes would be expected to peak as high as 6.3 percent during 2004–2012 (MMS 2002b).

Construction of the proposed MPEH™ Terminal would employ 350 workers for approximately 21 months, with a peak employment of 450. Construction activities associated with the five proposed LNG deepwater ports would be primarily based along the Gulf Coasts of Texas, Louisiana, Mississippi, and Alabama. The ports would have an overlapping, but staggered, construction schedule. Fabrication activities associated with the MPEH™ have the potential for minor, short-term, and adverse cumulative impacts from competition for skilled workers; increased demand for goods and services; and, indirectly, by increasing demand for housing and public services. Relative to existing economic activities associated with oil and gas production in the GOM, the cumulative employment associated with the proposed MPEH™ Port would have a negligible, short-term, beneficial impact on area economies.

As discussed in **Section 2.3.4.4**, it is estimated that operation of the proposed MPEH™ Port would employ the equivalent of 151 full-time workers directly or through support contractors. Gulf Landing estimates that 100 permanent workers would be required. Port Pelican estimates that 123 permanent workers would be required, and Gulf Gateway estimates that 3 permanent workers would be required to operate the facilities. Assuming that Beacon Port and TORP would each employ about 60 workers, the six GOM LNG projects would employ about 500 workers. In the event that labor forces for the proposed MPEH™ and TORP deepwater terminals were based in the same coastal economic area, minor, short-term, adverse, as well as beneficial cumulative impacts might be expected from job growth and increased demand for goods and services. It is assumed that over time the economy would adjust and the additional employment, tax base, and expenditures for goods and services would result in minor, long-term, beneficial impacts on that regional economy.

As discussed in Section 6.2.2 of the MPEH™ Final EIS, GOM fisheries are threatened by overfishing, habitat degradation, habitat loss, introduced species, and a general degradation of water quality. Specific activities in the GOM that have a negative impact on fisheries resources include structure installation, dredging, effluent discharge, loss of OCS-related trash and debris, vessel traffic, seismic surveys, explosive structure removals, oil spills, oil-spill response activities, shipping, commercial and recreational fishing, and seawater intake for cooling and warming purposes. Operation of the MPEH™ using SCV technology has a very low potential to interact with other LNG Deepwater Ports to affect commercial and recreational fisheries in the GOM.

6.3.8 Transportation

Activities that can affect transportation include operation of oceangoing ships, vessels to service oil and gas platforms on the OCS, commercial and recreational fishing, and other vessels in the GOM. Construction and operation of the MPEH™ would increase the number of LNGCs and service vessels operating, but do not add to the need for and would not affect access to transportation routes, or result in crowding of routes that might lead to substantially increased risks of collisions or other mishaps.

Construction and operation of TORP would also increase the number of LNGCs and support vessels operating in the GOM. However, LNGCs transiting to and from the MPEH™ would primarily use the South Pass (Mississippi River) to Mississippi River Gulf Outlet Safety Fairway (USCG and MARAD 2005a). Since TORP would be located in deep open water, it would not use any shipping fairways or anchorages and would approach the terminal from the open sea. Due to their locations, the proposed MPEH™ Port would receive onshore support services from Venice, Louisiana, while TORP would likely receive onshore support services from Alabama. Due to the geographic separation of the two ports, the potential for them to interact to produce a cumulative effect is small.

Table 6-8 shows proposed offshore LNGC projects in the GOM and provides estimations for LNGC trips, service and tug trips, and helicopter operations. Numbers in this table are estimations from the latest data available at the time this document was written and could change as individual projects progress.

LNGCs, additional service vessels, and helicopter trips associated with the three ports would be a small fraction of the many vessels transiting the GOM. As shown on **Table 6-8**, the number of cumulative LNGC trips was estimated to be approximately 950 per year. The number of service vessel and tug

Table 6-8. Proposed Deepwater Port Cumulative Trips

Deepwater Port	LNGC trips (per year)	Service vessel and tug trips (round trips per year) [a]	Helicopter trips (round trips per year)
Northeastern GOM			
MPEH	106	521 vessel 363 tug	1,196
TORP [b]	159	382	52
Total Northeastern GOM	**265**	**903 vessel 363 tug**	**1,248**
Northwestern GOM			
Port Pelican LLC	244	estimated 104 vessel estimated 732 tug	negligible
Gulf Gateway Energy Bridge GOM	42	estimated 84 vessel estimated 126 tug	negligible
Gulf Landing LLC	135	1,080 tug round trips to port	52
Beacon Port LLC	122	52 vessel 366 tug	104–208
Total Northwestern GOM	543	240 vessel 2,304 tug	156–260
Total GOM	**808**	**1,143 vessel 2,667 tug**	**1,404–1,508**

Source: [b] TORP 2006a

Notes: Tug trips assist the LNGC into the terminal facility. Standard tug trips: 3 tug boats assist every LNGC.

[a] Vessel trips are round trips to and from a port.

operations is greater than the LNGC trips, however service vessels and tug boats travel relatively short distances. Service vessels travel to and from the offshore terminal to an onshore location. Tug boats generally escort the LNGC into the terminal facility. There are usually three tug boats that assist each LNGC.

The waterways and air traffic patterns in the coastal areas servicing the northwestern GOM are adapted to heavy use. The Port of New Orleans is one of the United States' busiest cargo ports. It is a diverse general cargo port with average volume of 11.2 million tons of cargo per year (1998–2002). More than 6,000 ocean vessels move through the port each year (PONO 2003). Nearly 1,000 vessels call on Alabama ports each year (ASPA 2003). Under these conditions vessel traffic associated with the deepwater ports would result in minor long-term adverse cumulative impacts.

Helicopter operations in the GOM that support OCS activities are currently estimated at 1.7 million trips annually. The cumulative increase in helicopter operations from the proposed offshore terminals would not be a significant increase.

In light of the extensive domestic and foreign maritime industry that exists in the northern GOM, the incremental increase in use of major trade shipping routes that might be brought about by additional deepwater ports represents a minor, long-term cumulative impact. Under these conditions, no cumulative impacts from support vessel and helicopter traffic are anticipated.

LNGCs, additional service vessels, and helicopter trips associated with the two ports would be a small fraction of the many vessels transiting the GOM. In light of the extensive domestic and foreign maritime industry that exists in the northern GOM, the incremental increase in use of major trade shipping routes that might be brought about by additional deepwater ports represents a minor, long-term cumulative impact. Under these conditions, no cumulative impacts from support vessel and helicopter traffic are anticipated. Cumulative impacts on transportation are expected to be similar for all alternatives.

6.3.9 Air Quality

Per consultation with USEPA and USFWS, a quantitative cumulative impact analysis was not required because the Proposed Action's Class I and Class II modeled impacts are below the Modeling Significance Levels. Air emissions from OCS activities are expected to maintain present levels or decrease because of a combination of projected declining OCS activity and advances in control technology (MMS 2002b). Emissions of pollutants into the atmosphere from OCS activities are generally not projected to have major impacts on onshore air quality because of prevailing atmospheric conditions, emissions rates, and heights, and the resulting pollutant concentrations. Distances between the proposed MPEH™ and TORP terminals to other proposed offshore LNG terminals, in addition to prevailing atmospheric conditions, are sufficient to make it unlikely that air impacts would interact to produce a cumulative effect. Emissions from the proposed MPEH™ combined with TORP are projected to be a small percentage (less than 3 percent) of other activities on the OCS. At this point, emissions from the Proposed Action are compared to emissions from OCS sources to provide a relative order of magnitude frame of reference. **Table 6-9** compares the projected MPEH™ and TORP emissions to MMS OCS Program activities.

Because emissions from the Proposed Action are projected to be below thresholds established by the USEPA's Prevention of Significant Deterioration (PSD) regulations, detailed air modeling is not required. However, to satisfy NEPA requirements, modeling has been conducted to determine the impact of the Proposed Action on Class II areas and on the Breton NWR, which is a Class I area. Results of the modeling for Class II areas are below Class II modeling significance thresholds. Therefore, emissions from the Proposed Action would not be significant as defined by USEPA's PSD regulations for Class II

Table 6-9. Projected Cumulative OCS Program Emissions in the Central Planning Area with Proposed LNG Terminal Contribution

	Pollutant (thousands of tons per year)				
	PM_{10}	SO_x	NO_x	VOC	CO
Outer Continental Shelf (OCS) [a]	10.0–14.3	25.8–59.8	212.6–225.0	54.9–204.2	33.2–81.4
MPEH™ SCV-SCR (Option 1d) [b]	0.05	0.002	0.23	0.13	0.24
TORP [c]	0.07	0.39	0.74	0.08	0.26
MPEH™ and TORP as percentage of OCS Program Emissions per year	0.8–1.2%	0.7–1.5%	0.4–0.5%	0.1–0.4%	0.6–1.5%

Sources: [a] MMS 2002b, [b] FME 2006a [c] TORP 2006a.

areas. The Applicant has committed to limit emissions from the mobile sources to ensure that modeled impacts are below the Class I modeling significance thresholds as defined by USEPA, subject to results of increment consumption modeling the Applicant is currently conducting. If the entire increment is not consumed, the Applicant may request less stringent mitigation requirements or reinstatement of its original operating plan. Therefore, emissions from the Proposed Action would not be significant as defined by USEPA's draft regulations that apply to Class I areas like the Breton NWR. In summary, cumulative air emissions from existing and proposed onshore and offshore facilities would have long-term adverse impacts on coastal areas and the Breton NWR, but the MPEH™'s contribution would be minor.

6.3.10 Noise

Activities that can produce noise impacts include construction, installation, operation, and decommissioning of proposed Terminal facilities and the takeaway pipelines. The MPEH™ and TORP operations would be distant from any onshore (human) noise-sensitive areas and would have no adverse short-term or long-term impacts on those areas. Increased service vessels and helicopter traffic associated with installation and at-sea construction of the ports would have minor, long-term, adverse impacts on onshore noise. Helicopters and support vessels would operate in areas with existing GOM support services. Long-term, adverse cumulative effects from these ports would be negligible relative to noise from existing onshore oil and gas support infrastructure. Support vessels and helicopters would follow existing channels and flight paths and would not create unusual noise levels in new areas.

Noise intensity and duration associated with the deepwater port proposals are similar to noise associated with existing OCS activities. A temporary increase in noise levels would result from onshore and offshore construction activities. Installation and at-sea construction noise would have minor short-term, adverse impacts on fish, sea turtles, marine mammals, and seabirds. No cumulative noise impacts related to offshore Port construction are anticipated.

Noise generated during operation of the MPEH™ Terminal, including noise generated from helicopter and vessel traffic, could impact biological resources. The cumulative area of airborne and underwater noise from the two ports would be greater than a single port. Because of the distance between the ports there would be no additive effects on noise intensity from operational noises.

6.3.11 Safety and Security

There are small but potentially significant risks associated with storage and handling of LNG. Worst-case modeling scenarios identify a potential maximum hazard radius of approximately 8 km (5 mi) around the MPEH™. TORP would have a similar hazard area, but would not overlap or interact with that of MPEH™. Port operations would increase overall LNG accident probability but there would be no cumulative contribution to the modeled extent or magnitude of any LNG accident scenario. By definition, increased risk probability would have a minor, long-term, adverse impact on safety in the vicinity of the ports. Because the ports would not share any resources that could be impacted by an unintentional LNG release, there would be no cumulative safety impact increase to any one resource.

Some operational risk management procedures can have a number of indirect impacts on other resources. An example is establishment of 500-m Safety Zones around the ports. Resulting impacts are discussed under the appropriate resource area. While safety concerns might have minor, long-term, adverse or beneficial impacts on the decisionmaking processes of potential future proposals within the hazard areas, there is no direct short-term or long-term adverse impact on activities outside the Safety Zone. Cumulative impacts on safety and security are expected to be similar for all alternatives.

6.4 Unavoidable Impacts

Unavoidable impacts are those impacts that would result from the Proposed Action or any alternatives that cannot be mitigated. These impacts might be beneficial or adverse in nature, and have short- and long-term impacts.

6.4.1 Water Quality

Routine offshore operations would have unavoidable effects to varying degrees on the quality of the surrounding water if the proposed projects are implemented. Port construction and pipe-laying activities would cause major, short-term localized impacts on turbidity of affected waters for the duration of activity periods. Discharge of treated sewage from the proposed Terminal, in accordance with appropriate laws, would increase levels of suspended solids, nutrients, chlorine, and BOD in a small area near the discharge point, for the life of the project. Accidental spills from the proposed terminals, other OCS activities, and vessels would result in increases of pollutant levels in the water column. These impacts would generally be short-term, but minor or major, depending on the size of the spill. Vessel traffic would contribute to cumulative degradation of GOM waters through inputs of chronic oil leakage, treated sanitary and domestic waste, bilge water, and contaminants known to exist in ship paints.

6.4.2 Biological Resources

Unavoidable effects on threatened and endangered marine mammals, listed sea turtles, fish, and migratory birds would result from construction (including moving Platform 3) and operation of the proposed Port. Marine animals would be affected by noise and disturbances associated with offshore construction and operation activities.

6.4.3 Cultural Resources

Unavoidable effects of the Proposed Action on cultural resources were addressed in Section 6.7.3 of the MPEH™ Final EIS, and are incorporated herein by reference.

6.4.4 Geological Resources

Unavoidable disturbance of surficial sediment or soils would occur during installation of the proposed Terminal structures, offshore burial of the takeaway pipelines, and onshore pipelines. These cumulative impacts would be considered long-term but minor.

6.4.5 Socioeconomics

Construction of proposed Port facilities would have unavoidable, short-term, beneficial impacts on jobs, and indirectly on the purchase of goods and services. Operation of the MPEH™ would have long-term, beneficial impacts on jobs, and indirectly on the purchase of goods and services for the 30-year life of the project.

6.4.6 Recreation

Creation of a Safety Zone in the vicinity of the proposed Terminal would result in limited displacement of commercial and recreational fishing during the period the proposed deepwater Port would be licensed for operations. The minor, but long-term, effects on fishing would be unavoidable because of the need to ensure safety at the facilities.

6.4.7 Transportation

Construction and operation of the proposed Port would have no unavoidable effects on offshore transportation. Construction of the onshore pipelines might have minor, short-term, localized impacts on transportation. Construction vehicles would cause congestion on roadways while transporting supplies and equipment. Transportation could also be temporarily detoured or stopped in areas where pipelines cross roads.

6.4.8 Air Quality

Adverse impacts on air quality from construction and operation of the proposed Port and takeaway pipelines would be cumulative and long-term. Mitigation of long-term impacts would be accomplished through existing regulations. Future development of new emissions control technology could also reduce long-term cumulative impacts. Short-term impacts from nonroutine catastrophic events (accidents) are unavoidable.

6.4.9 Noise

Effects on the marine noise environment, caused by service and cargo vessel Terminal operations, would be unavoidable. These noise sources would have minor, long-term cumulative impacts relative to existing and anticipated OCS activities. Construction of onshore pipelines would have short-term, minor impacts from noise produced by construction equipment.

6.4.10 Reliability and Safety

The proposed LNG Deepwater Port operations would have an unavoidable long-term adverse effect on risk probability within the 8-km (5-mi) hazard area. All related reliability and safety issues can be identified and avoided with development and implementation of appropriate risk management plans. There are potential unavoidable reliability and safety impacts inherent in any offshore activity.

6.5 Irreversible and Irretrievable Commitment of Resources

An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be reversed or recovered, even after an activity has ended and facilities have been decommissioned. A commitment of resources is related to use or destruction of nonrenewable resources, and effects that loss will have on future generations. For example, if a species becomes extinct as a result of a Proposed Action, the loss is permanent. If prime farmland is converted to a residential or commercial development, there is permanent loss of agricultural productivity. Chronic, low-level pollution can injure and kill organisms at virtually all trophic levels. Mortality of individual organisms can be expected to occur, and possibly a reduction or even elimination of a few small or isolated populations. Construction and operation of the MPEH™ involves the irreversible and irretrievable commitment of material resources and energy, land and wetland resources, and biological resources. The impacts on these resources would be permanent.

Material resources used for the proposed Port include building materials for new structures, platforms and other equipment. Steel might be recyclable after Port decommissioning. No supplies are considered scarce, and would not limit other unrelated construction activities in the region. Construction of the proposed Port would also require use of fossil fuels, a nonrenewable natural resource. Selection of an SCV alternative would also consume up to 1.5 percent of the LNG imported to MPEH™ Terminal.

Although abrasive cutting would be the preferred method, structure removal by explosives (less than 50-pound charges) might occur during the moving of Platform 3, causing a mortality to fish resources, including commercial and recreational species. Marine mammals, sea turtles, and listed species might also be affected. Small numbers of fish kills, including such valuable species as red snapper, are known to occur when explosives are used to remove structures in the GOM. Structure removal by explosives could adversely affect the commercial fishing industry close to the removal site.

Deepwater Port Act activities and OCS oil and gas exploration, development, production, and transportation are carried out under comprehensive, state-of-the-art, enforced regulatory procedures designed to ensure public safety and environmental protection. Nonetheless, some loss of human and animal life is inevitable from unpredictable and unexpected acts of man and nature (accidents, human error and noncompliance, and adverse weather conditions). Some normal and required operations, such as structure removal done in accordance with applicable laws and regulations, can result in the destruction of viable marine life. Although the possibility exists that individual marine mammals, marine turtles, birds, and fish can be injured or killed, there is unlikely to be a lasting effect on baseline populations.

6.6 Relationship Between Short-Term Uses and Long-Term Productivity

Short-term refers to the total duration of installation and at-sea construction of the proposed Terminal, and offshore and onshore pipelines. Long-term refers to an indefinite period following decommissioning of the proposed MPEH™ Terminal, pipelines, and other associated facilities. According to MMS, the short-term uses of the environment, and the cumulative development of OCS oil and gas resources in the GOM are compatible with the maintenance of long-term productivity of the OCS. Unavoidable adverse impacts are anticipated to be primarily short-term and localized in nature (MMS 2002b).

Short-term project operational activities might result in chronic impacts over a longer period. Installation and eventual removal of new structures would cause minor, localized impacts in the short-term; impacts of site clearance and decommissioning might last longer because of minor elements that would be left in place. Short-term use might have long-term impacts on biologically sensitive offshore areas or archaeological resources. Upon completion of Deepwater Port Act licensed activities, the marine environment would generally be expected to remain at or return to its normal long-term productivity levels.

OCS development off Alabama, Louisiana, and Mississippi has enhanced recreational and commercial fishing activities, which in turn have stimulated the manufacture and sale of larger private fishing vessels and special fish recreational equipment. Commercial enterprises such as charter boats have become heavily dependent on offshore structures for satisfying recreational customers. The development of the OCS through the Deepwater Port Act could increase these incidental benefits of offshore development. Offshore fishing and diving has gradually increased over the past 30 years; platforms have been the focus of much of that activity. As mineral resources throughout the GOM become depleted, platform removals would occur and might result in a decline in these activities. To maintain the long-term productivity of site-specific uses, artificial reefs attractive to fishermen and divers might eventually replace removed platforms.

No long-term productivity or environmental gains are expected as a result of the DWPA development of the OCS. Benefits of the Proposed Action are expected to be principally those associated with an increase in supplies of natural gas for domestic consumption. While no reliable data exist to indicate long-term productivity losses as a result of use of the OCS, such losses are possible.

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This EIS has been prepared under the direction of HQ USCG and MARAD. USEPA, MMS, USFWS, and FERC have joined USCG and MARAD as cooperating agencies in the preparation of the MPEH™ Final EIS and this EA. The individuals who assisted in resolving issues and providing agency guidance for this document are listed below.

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