

EXECUTIVE SUMMARY

ES1. INTRODUCTION

SPOT Terminal Services LLC (hereinafter referred to as the Applicant), a wholly owned subsidiary of Enterprise Products Operating LLC (EPO), a Texas limited liability company, is proposing the Sea Port Oil Terminal (SPOT) Project (hereafter referred to as the SPOT Project, SPOT deepwater port [SPOT DWP], or the Project). On January 31, 2019, the Applicant submitted an application to the United States Coast Guard (USCG) and Maritime Administration (MARAD) seeking a Federal license under the Deepwater Port Act of 1974 (DWPA), as amended, to own, construct, operate, and eventually decommission a deepwater port (DWP) for the transportation of crude oil for export to the global market in United States (U.S.) Federal waters between 27.2 and 30.8 nautical miles off the coast of Brazoria County, Texas. The SPOT DWP would allow for up to two very large crude carriers (VLCC) or other crude oil carriers to moor at single point mooring (SPM) buoys. EPO proposes to use its affiliates' existing assets and access to varying grades of crude oil supplies from multiple sources along the northern Texas Gulf Coast. Oil would be delivered to the SPOT DWP via two new collocated, offshore oil pipelines sourced from two new collocated onshore pipelines. Upon filing the Notice of Application (NOA) in the Federal Register (Fed. Reg.) on March 4, 2019, MARAD assigned the proposed SPOT Project Docket No. MARAD-2019-0011.

Together, the USCG and MARAD are the lead Federal agencies responsible for processing the application for the proposed SPOT Project. In accordance with Section 5(f) of the DWPA (33 United States Code [U.S.C.] § 1504(f)), this Environmental Impact Statement (EIS) has been prepared in cooperation with additional Federal agencies and departments to comply with the requirements of the National Environmental Policy Act (NEPA) of 1969. Such compliance fulfills the NEPA responsibilities of these agencies and departments related to the licensing and review of the proposed Project and the requirements of NEPA; the DWPA; USCG Commandant 5090.1; Department of Homeland Security Management Directive 23-01, Environmental Planning Program; the U.S. Department of Transportation (DOT) Order 5610.1C, "Procedures for Considering Environmental Impacts;" and Maritime Administrative Order 600-1, "Procedures for Considering Environmental Impacts." The U.S. Environmental Protection Agency (USEPA) and U.S. Army Corps of Engineers (USACE) have formally agreed to be cooperating agencies for the purpose of this EIS and they may incorporate the EIS in their permitting processes. Additionally, the following agencies are cooperating agencies for the purpose of this EIS: the U.S. Department of Energy, the U.S. Department of the Interior, the Bureau of Ocean Energy Management, the Bureau of Safety and Environmental Enforcement, the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries; also known as the National Marine Fisheries Service), and the DOT Pipeline and Hazardous Materials Safety Administration (PHMSA). These agencies have provided review and comment on the Project as part of the NEPA process.

The DWPA of 1974, as amended, defines a licensing system for ownership, construction, operation, and eventual decommissioning of DWPs in waters beyond state jurisdiction, but within the territorial limits of

the United States (i.e., 12 nautical miles offshore). Originally, the DWPA promoted the construction and operation of DWPs 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. The DWPA currently defines a DWP as “any fixed or floating manmade structure other than a vessel, or any group of such structures, that are located beyond State seaward boundaries and that are used or intended for use as a port or terminal for the transportation, storage, or further handling of oil or natural gas for transportation to or from any State, except as otherwise provided in Section 1522 of this title, and for other uses not inconsistent with the purposes of this chapter, including transportation of oil or natural gas from the United States outer continental shelf.” State seaward boundaries refer to the areas of the Gulf of Mexico (GoM) over which coastal states have jurisdiction. The state of Texas boundary is approximately 9 nautical miles offshore. As such, under the DWPA, the Federal government regulates the location, ownership, construction, and operation of DWPs outside of 9 nautical miles from the Texas coast. To adjust to changing markets and regulate the export of product, the U.S. Coast Guard and Maritime Transportation Act of 2012, amended Section 3(9)(A) of the DWPA to insert the words “or from” before the words “any State” in the definition of a DWP (33 U.S.C. § 1502(9)(A)). This change granted MARAD the authority to license the construction of DWPs for the export of oil and natural gas from domestic sources within the United States to foreign global markets.

Under the DWPA, all DWPs must be licensed by the Secretary of Transportation (Secretary). The Secretary has delegated authority to the USCG and MARAD to process applications submitted by private parties to construct, own, and operate DWPs (62 Fed. Reg. 48 [March 12, 1997], 11382). The USCG retains this responsibility under the Department of Homeland Security. On June 18, 2003, the Secretary delegated authority to MARAD to issue, transfer, amend, or reinstate a license for the construction and operation of a DWP. The responsibility for preparing the SPOT Project Record of Decision and for issuing or denying the DWP license has also been delegated to MARAD. Hereafter, “Secretary” refers to the Maritime Administrator as the delegated representative of the Secretary. On April 30, 2013, MARAD issued a *Notice of Policy Clarification Concerning the Designation of Adjacent Coastal States for Deepwater Port License Applications*, advising the public that nautical miles shall be used when determining adjacent coastal state status. Pursuant to the criteria provided in the DWPA, Texas is the only adjacent coastal state for the proposed SPOT Project, as it would be directly connected by pipeline to the SPOT DWP. No other state would be directly connected to the SPOT DWP or within 15 nautical miles of the proposed Project. Other states may apply for adjacent coastal state status in accordance with 33 U.S.C. § 1508(a)(1).

On March 4, 2019, MARAD issued a NOA for the Project in the Fed. Reg., summarizing the Applicant’s DWP application (84 Fed Reg. 42, (March 4, 2019), 7413-15). Under procedures set forth in the DWPA, the USCG and MARAD have 240 days from the date of the NOA to hold one or more public license hearings in the adjacent coastal state(s) for a project.

On March 7, 2019, MARAD issued a Notice of Intent (NOI), which also included a notice of public meeting and request for comments on the Project (84 Fed. Reg. 45 (March 7, 2019), 8401-04). In this notice, the USCG and MARAD stated their intent to prepare an EIS as part of the environmental review for the SPOT Project and hold one public scoping meeting on March 20, 2019, in the adjacent coastal state of Texas, and requested to receive comments by Monday, April 8, 2019.

The Applicant filed a permit application required under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act with the USACE on March 15, 2019. The Applicant also filed a draft National Pollutant Discharge Elimination System permit with the USEPA on January 31, 2019, but has not yet filed the final application. The Applicant also submitted draft permit applications required under the Clean Air Act to the USEPA on January 31, 2019.

ES2. DESCRIPTION OF THE PROPOSED ACTION

The proposed Project would have both onshore and offshore components. The proposed SPOT DWP would be located in Federal waters of the GoM, in Galveston Area OCS lease blocks 463 and A-59, approximately 27.2 to 30.8 nautical miles off the coast of Brazoria County, Texas, in water depths of approximately 115 feet. The onshore components would include the existing terminal, new terminal, and onshore pipelines from the existing terminal to the mean high-water line at the shore crossing. The offshore components would include the SPOT DWP and connected facilities, including the subsea pipelines, to the mean high-water line on shore. The Applicant would construct and operate two new collocated, offshore oil pipelines to transmit oil sourced from two new collocated onshore oil pipelines to the offshore SPOT DWP.

The onshore components of the Project would consist of:

- Modifications to the existing Enterprise Crude Houston (ECHO) Terminal, located on the southeast side of Houston, Texas, just east of Pearland, Texas, including four electric motor-driven mainline crude oil pumps, four electric motor-driven booster crude oil pumps, and one measurement skid to support delivery of crude oil to the proposed Oyster Creek Terminal;
- One 50.1-mile, 36-inch-diameter pipeline from the existing ECHO Terminal to the proposed Oyster Creek Terminal (hereafter referred to as the ECHO to Oyster Creek Pipeline);
- One pipeline interconnection from the existing Rancho II 36-inch-diameter pipeline to the ECHO to Oyster Creek Pipeline, at the existing Rancho II Junction facility;
- A new Oyster Creek Terminal, including six electric motor-driven mainline crude oil pumps with the capacity to push crude oil to the offshore pipelines at a rate of up to 85,000 barrels per hour (2 million barrels per day), four electric motor-driven booster crude oil pumps, seven aboveground storage tanks (each with a capacity of 685,000 barrels (bbl) [600,000 bbl of working storage]) for a total onshore storage capacity of approximately 4.8 million bbl (4.2 million bbl working storage) of crude oil, metering equipment, two permanent and one portable vapor combustion units, and a firewater system;
- Two collocated 12.2-mile, 36-inch-diameter crude oil pipelines from the Oyster Creek Terminal to the shore crossing where the onshore pipelines meet the offshore pipelines supplying the SPOT DWP (hereafter referred to as Oyster Creek to Shore Pipelines); and
- Ancillary facilities for the onshore pipelines, including ten mainline valves (MLVs), of which six would be along the ECHO to Oyster Creek Pipeline and four along the Oyster Creek to Shore Pipelines, pig launchers for the ECHO to Oyster Creek Pipeline, and pig launchers and receivers for the Oyster Creek to Shore Pipelines.

The offshore components of the Project would consist of:

- Two collocated, bi-directional, 46.9-mile, 36-inch-diameter crude oil offshore pipelines for crude oil delivery from the Oyster Creek Terminal to the platform;
- One fixed offshore platform with eight piles, four decks, and three vapor combustion units;
- Two SPM buoys to concurrently moor two VLCCs or other crude oil carriers with capacities between 120,000 and 320,000 deadweight tonnage for loading up to 365 days per year, including floating crude oil and vapor recovery hoses;
- Four pipeline end manifolds (PLEM)—two per SPM buoy—to provide the interconnection with the pipelines;
- Four 0.66-nautical mile, 30-inch-diameter pipelines (two per PLEM) to deliver crude oil from the platform to the PLEMs;
- Four 0.66-nautical mile, 16-inch-diameter vapor recovery pipelines (two per PLEM) to connect the VLCC or other crude oil carrier to the three vapor combustion units on the platform;
- Three service vessel moorings, located in the southwest corner of Galveston Area lease block 463; and
- An anchorage area in Galveston Area lease block A-59, which would not contain any infrastructure.

Detailed descriptions of the Proposed Action are provided in Section 2.2, Detailed Description of the Proposed Action.

ES3. PUBLIC INVOLVEMENT

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

The USCG and MARAD initiated the public scoping process on March 7, 2019, with the publication of a NOI to prepare an EIS in the Fed. Reg. The NOI included information on the public meeting and informational open house; requested public comments on the scope of the EIS; and provided information on how the public could submit comments by mail, hand delivery, facsimile, or electronic means. The USCG and MARAD set April 8, 2019, as the closing date for receipt of materials in response to the request for comments on the proposed Project. The NOI also announced the establishment of a public docket, accessible through the Federal Docket Management System website: <http://www.regulations.gov> under docket number MARAD-2019-0011.

The USCG and MARAD delivered an Interested Party Letter, a copy of the NOI published in the Fed. Reg., and a description of the proposed Project to potentially interested parties on March 7, 2019. They also delivered letters to Federal, state, and local agency representatives, and other potentially interested parties on March 4, 2019. Public comments and agency correspondence submitted as part of the scoping process were considered during the development of the EIS. Seven comments were received via

the public docket during the scoping period, and comments were also received from a number of Federal, state, and local agencies and tribes, including the Bureau of Safety and Environmental Enforcement, U.S. Department of Agriculture Natural Resources Conservation Service, USEPA, U.S. Fish and Wildlife Service, Railroad Commission of Texas, Texas Commission on Environmental Quality, Texas Department of Transportation, Texas Historical Commission, Texas General Land Office, Texas Parks and Wildlife Department (TPWD), Port Freeport, American Indians of Texas of Spanish Colonial Missions, Choctaw Nation of Oklahoma, Coshatta Tribe of Louisiana, and Quapaw Nation. The comments are addressed in this EIS.

ES4. ALTERNATIVES CONSIDERED

NEPA requires any Federal agency proposing a major action to consider alternatives to the Proposed Action. To warrant detailed evaluation by the USCG and MARAD, an alternative must be reasonable and meet the purpose and need of the Proposed Action. The Council on Environmental Quality defines reasonable as, “practical or feasible from the technical and economic standpoint and using common sense.” Specific criteria are used to determine the reasonability/feasibility of alternatives and are described in Sections 2.3, No Action Alternative, through 2.10, Decommissioning Alternatives. Evaluation of the alternatives assists in broadening the scope of options that might be available to reduce or avoid impacts associated with the action as proposed by the Applicant. The NEPA analysis is one of the nine factors the Secretary must consider in making a final determination (33 U.S.C. § 1503c). The USCG and MARAD evaluated a number of alternatives related to various components of the SPOT Project. Those that would not meet the purpose and need of the Proposed Action are discussed in Chapter 2, Description of the Proposed Action and Alternatives, but are not evaluated further in this EIS. Alternatives that could meet the purpose and need of the Proposed Action are presented in Chapter 2, Description of the Proposed Action and Alternatives, and are evaluated further in Chapter 3, Environmental Analysis of the Proposed Action.

The No Action Alternative refers to the continuation of existing conditions without implementation of the Proposed Action. Under the No Action Alternative, the infrastructure proposed by the Applicant would not be built or brought online, and the potential beneficial or adverse environmental impacts identified in this EIS would not occur. Furthermore, the purpose of the Proposed Action to transport and export excess and available domestic crude oil supplies to the global market with reduced use of ship-to-ship transfers would not be satisfied under the No Action Alternative. Similarly, if the Secretary were to deny the Applicant’s DWPA license application, oil would either continue to be partially loaded shoreside and then fully loaded using offshore ship-to-ship transfers, or other DWPs could be, and have been, proposed for the export of crude oil. Other license applications concerning proposals to export crude oil might be submitted to the Secretary, or other means might be used to export oil, such as expansion or establishment of onshore oil terminals that would require construction of onshore export facilities, including storage tanks, and pumping facilities. Chapter 1, Introduction, of this EIS includes a description of the Project’s purpose and need, which provides additional information regarding the Applicant’s proposal to fully load VLCCs offshore.

The Proposed Action is an export project and, as such, any alternatives considered must have the ability to export crude oil. Furthermore, surplus crude oil sources from excess production capability, at the time of this EIS, are primarily located in the Permian Basin in west Texas and the Eagle Ford Basin in south Texas. Thus, the system alternatives evaluated focus on new, existing, and proposed infrastructure capable of delivering and storing crude oil from these basins, ideally located along the Gulf Coast. This EIS evaluated the expansion of proposed or existing offshore crude oil loading terminals in the GoM, as well as the construction of new or expansion of existing onshore crude oil terminals on the Gulf Coast. Offshore, one existing and four proposed projects in the GoM were identified for evaluation as expansion system alternatives, including the Louisiana Offshore Oil Port, Texas Gulf Terminals, Inc., Jupiter MLP LLC, Bluewater Texas Terminal, LLC, and Texas GulfLink Holdings. The Proposed Action's export volume would require a substantial expansion of any of these projects to meet the capabilities of the Proposed Action discussed in Section 2.2, Detailed Description of the Proposed Action. As such, these projects would need to meet regulatory and development requirements for the area in which they are operating or proposed and would, therefore, include evaluation for environmental impacts, associated permitting timelines, and mitigation costs. These projects would result in environmental impacts similar to or greater than the Proposed Action and are therefore not considered further in this EIS. Two proposed onshore terminals along the GoM were identified for evaluation that would be capable of fully loading VLCCs, including the Lone Star Harbor Island Terminal and the Axis Harbor Island Marine Terminal. Lone Star Harbor Island would not be capable of exporting the capacity proposed for the SPOT Project. Axis Island Marine Terminal would not be able to meet the capacity and also would not be capable of fully loading VLCCs. In addition, existing terminals along the Gulf Coast are not capable of fully loading VLCCs and would require a substantial amount of dredging. Therefore, construction of new or expansion of existing onshore crude terminals as a system alternative would not meet the purpose and need of the Proposed Action and is not considered further in this EIS.

Onshore, five alternative pipeline routes were identified from the existing ECHO Terminal in Harris County to the shoreline of the GoM in Brazoria County (ECHO to Oyster Creek Pipeline), including the Proposed Action: two from the ECHO Terminal to the area near Sandy Point south of Highway 6, and three from that point to the shoreline. The alternatives take into account existing linear rights-of-way with which the Proposed Action could be collocated to minimize effects and are all considered in Chapter 3, Environmental Analysis of the Proposed Action.

The SPOT Project would require approximately 100 acres for storage and pumping facilities to receive, transport, store, and deliver the crude oil volumes. Because of the industrial nature of the area surrounding the ECHO Terminal in Harris County, available land greater than or equal to 100 acres was not available. Thus, expansion of the ECHO Terminal is not viable and a new onshore storage and pumping facility would be necessary to support the SPOT Project. Sites were identified that would provide at least 100 acres of land for development, minimize pipeline lengths and workspaces, and include location of a mainline pumping unit within 16 miles of the shoreline, which is the maximum distance required to transfer oil to the SPOT DWP without adding additional pumping unit(s) along the collocated Oyster Creek to Shore Pipelines. Four alternative onshore terminal sites for the Oyster Creek Terminal were identified that meet the criteria, and all are evaluated further in Chapter 3, Environmental Analysis of the Proposed Action.

Offshore, the USCG and MARAD identified six lease blocks and three offshore pipeline routes that meet the applicable USCG siting guidelines (33 Code of Federal Regulations § 148.720) for a DWP. The USCG and MARAD also considered other Project needs and evident obstacles (e.g., shipwrecks) and carried forward all of these alternatives for further evaluation in Chapter 3, Environmental Analysis of the Proposed Action.

Three offshore DWP design alternatives are also considered in this EIS in regard to the SPOT DWP itself and VLCC mooring: a fixed platform with berth, a fixed platform with SPM buoy, and an SPM buoy without fixed platform. The fixed platform with berth would require a greater amount of infrastructure and would, therefore, result in greater impacts than a fixed platform with SPM buoy, which is the Proposed Action. Based on the design limitations, the SPM buoy without fixed platform is not considered further in this EIS, as it would not be capable of meeting the purpose and need of the Proposed Action. The other two alternatives are further evaluated in Chapter 3, Environmental Analysis of the Proposed Action.

Three alternatives for the volatile organic compound recovery and removal system are considered in this EIS: vapor combustor alternative (Proposed Action), adsorption and absorption alternative, and adsorption with vapor combustion alternative. The vapor combustor alternative would provide the highest rate of volatile organic compound destruction/recovery, allow for the greatest flexibility, and require the smallest footprint of the alternatives considered. The vapor combustor can also be enclosed, minimizing visual and noise impacts from an open flare. The adsorption with absorption alternative would require more space than the other alternative methods and substantial power generation. The adsorption with vapor combustion alternative would also require a large footprint and substantial power generation. All three are evaluated further in Chapter 3, Environmental Analysis of the Proposed Action.

The USCG and MARAD also identified alternative construction methods for the SPOT Project to determine whether offshore environmental impacts could be reduced or mitigated by the use of alternative methods. This included a review of pipeline construction at the shoreline and platform foundation/pile driving alternatives. Two shoreline construction alternatives were identified for crossing the shoreline and beach at Surfside in Brazoria County: the open-cut alternative and the horizontal directional drill (HDD) alternative, which is the Proposed Action. The HDD method would avoid impacts on beach access, onshore and nearshore habitats, and nearshore water quality; it would also install the pipeline at a greater depth than the open-cut alternative and would thus provide greater pipeline protection. Therefore, only the HDD method is further considered in Chapter 3, Environmental Analysis of the Proposed Action. The pile driving methods evaluated include suction piles, drilled piles, jetted piles, mat foundations, and conventional impact or vibratory hammer. Based on site conditions, suction piles, drilled piles, jetted piles, and mat foundations would not be viable for the Project. Therefore, only conventional impact or vibratory hammer methods are further evaluated in Chapter 3, Environmental Analysis of the Proposed Action.

Four alternatives for the removal of the SPOT DWP facilities and offshore pipelines were evaluated, based on a request from the Bureau of Ocean Energy Management, including the partial removal and full removal of the subsea pipelines. The alternatives considered include removal of all Project components except the subsea pipelines, which would be abandoned in place; removal of all Project components except the portion of the subsea pipelines that would be located in state waters; removal of all Project

components except the portion of the subsea pipelines that would be located in Federal waters; and removal of all Project components except for the subsea pipelines, which would be abandoned in place from the shore crossing to the platform. All four alternatives are evaluated further in Chapter 3, Environmental Analysis of the Proposed Action.

ES5. EXISTING CONDITIONS

This section defines the key resources and receptors evaluated in this EIS and summarizes existing conditions for those resources and their components.

ES5.1. WATER RESOURCES

Water resources include the physical and chemical characteristics of any waterbodies or wetlands within, or in the vicinity of, the SPOT Project. Onshore water resources include groundwater, surface water, and wetlands. Offshore water resources include the coastal and marine waters from Mean Lower Low Water (i.e., the lowest of the two low tides per day) to the Exclusive Economic Zone within the GoM. GoM offshore environments, which include coastal and marine waters, are primarily influenced by temperature, salinity, dissolved oxygen, turbidity, nutrients, pH, and toxic contaminants. Coastal waters are nearshore waters and are dominated by tides, nearshore circulation, freshwater discharge from rivers, and local precipitation. This area of mixing between freshwater and marine waters forms estuarine habitats such as marshes, mangroves, and coastal wetlands along the Gulf Coast. Marine waters are waters that generally lie seaward of coastal waters, are influenced largely by tides and currents, have salinity levels similar to the open ocean, and include the deepwater environment of the GoM.

ES5.1.1. GROUNDWATER

The onshore proposed Project would be within the area of the Gulf Coast aquifer, which provides groundwater support for approximately one-third of the Texas population. The aquifer is used primarily for municipal, industrial, and irrigation purposes. Water quality is variable relative to depth and location throughout the Gulf Coast aquifer. The primary source of recharge for the Gulf Coast aquifer system is precipitation, and the largest recharge areas occur in southwestern Mississippi and parts of Louisiana. In coastal areas, the mixing of seawater within recharge zones results in increased salinity and higher total dissolved solid concentrations. No known wellhead protection areas would be crossed by the Project.

ES5.1.2. SURFACE WATER

The onshore Project components would cross 129 waterbodies (128 crossings associated with pipeline facilities and workspace and 1 crossing associated with an access road), including 48 perennial waterbodies, 21 intermittent waterbodies, 50 ephemeral waterbodies, and 10 ponds. The onshore Project components would cross 13 Section 10 waters in the USACE Galveston District. The Oyster Creek Terminal would be located within the 500-year flood zone, portions of the onshore pipelines would cross both 100-year flood zones and 500-year flood zones, and the shoreline MLV would be located in the 100-year flood zone. The remaining sections of onshore pipelines and the ECHO Terminal would not be located in a flood hazard zone.

ES5.1.3. WETLANDS

A total of 100.5 acres of wetlands would be affected by the Project, including about 39.9 acres of palustrine emergent wetlands, 2.8 acres of palustrine scrub-shrub wetlands, 6.7 acres of palustrine forested wetlands, 45.1 acres of estuarine emergent wetlands, and 6.0 acres of estuarine scrub-shrub wetlands.

ES5.1.4. PHYSICAL OCEANOGRAPHY

The proposed Project would be located on the continental shelf of the GoM. Bathymetry surveys conducted for the Project identified slopes of approximately 12 feet per mile from the HDD exit point (approximately 5,000 feet from shore) to the first curve of the offshore pipeline route. Further from shore, the seafloor slopes at a rate of approximately 2 feet per mile, becoming more gradual until the pipeline reaches the SPOT DWP site. Water depths within the proposed SPOT DWP survey area range from 110 to 117 feet, with the proposed terminal site being located in water 115 feet deep. The seafloor at the proposed SPOT DWP site is largely featureless with some pockmarks and trawl scars.

ES5.1.5. COASTAL AND MARINE ENVIRONMENTS

The offshore pipelines and SPOT DWP would be located within coastal waters in the GoM. The Brazos River and Oyster Creek are larger waterbodies that supply freshwater inputs into the GoM near the Project area. Runoff from several rivers into the GoM has caused an excess of nutrients, primarily nitrogen and phosphorus, resulting in hypoxia. Once outside the influence of coastal anthropogenic processes and surface water runoff, water quality in the marine environment of the OCS typically improves. In the central GoM, hydrocarbon seeps are widespread and contribute hydrocarbons to the surface sediments and water column. Analysis of water quality samples found that metal and nutrient concentrations were predominately below the reporting limits, with only one total phosphorus concentration detected above the reporting limit.

ES5.2. HABITATS

Habitats are composed of the natural environment in which organisms live. Both upland and aquatic areas contain habitats and, for the purposes of this EIS, the USCG and MARAD have defined the various habitats as vegetation, oyster reefs, and marine protected areas (MPAs). The upland and aquatic habitats in the vicinity of the proposed Project provide food, shelter, and reproductive areas for wildlife and aquatic species.

ES5.2.1. VEGETATION

The proposed Project is located within the Western Gulf Coast Plain ecoregion. The dominant vegetation community type identified within the Project footprint is Coastal Prairie, which accounts for more than half of the onshore pipeline route. About 84 percent of the Oyster Creek Terminal site is composed of Columbia Bottomlands: Grasslands and Gulf Coast: Coastal Prairie. Project workspace would intersect several TPWD coastal communities as well as established Priority Protection Habitats. One Federally and state-listed endangered plant, the Texas prairie dawn flower (*Hymenoxys texana*), was identified as having the potential to occur in the vicinity of the onshore pipelines and Oyster Creek Terminal. Six species of noxious and invasive weeds have been observed within the survey corridor for the onshore

pipeline. Five species of seagrass are found along the Texas coast. The closest seagrass beds are located in Christmas Bay, more than 35 nautical miles from the SPOT DWP location and approximately 4.3 nautical miles from the offshore HDD exit pit.

ES5.2.2. OYSTER REEFS

Oyster reefs occur in subtidal and intertidal zones of coastal waters in the GoM. Oyster reefs are considered Essential Fish Habitat and are afforded additional protection compared to other wetlands. Oyster reefs are also designated as coastal natural resource areas by the Texas General Land Office. The Applicant conducted field surveys to identify oyster reefs along the onshore pipeline route. Approximately 0.5 acre of oyster reefs would occur within the construction workspace of the SPOT Project.

ES5.2.3. MARINE PROTECTED AREAS

Portions of the offshore pipelines and the SPOT DWP would be located within three MPAs: Reef Fish Stressed Area, Reef Fish Longline and Buoy Gear Restricted Area, and Texas Shrimp Closure. The closest MPA sanctuary to the proposed Project is the Flower Garden Banks National Marine Sanctuary, which is approximately 40 nautical miles to the southeast of the SPOT DWP.

ES5.3. WILDLIFE AND AQUATIC RESOURCES

Wildlife and aquatic resources potentially affected by the Project include onshore wildlife and migratory birds, freshwater fisheries, marine mammals, benthic resources, and plankton. Inland wildlife, birds, and freshwater fish rely on upland, wetland, and stream habitats for food, shelter, and reproduction. Migratory birds may also rely on coastal habitats and estuarine wetlands, while marine species rely on coastal, nearshore, and offshore habitats of the GoM.

ES5.3.1. WILDLIFE

The Project facilities would cross habitats that support a variety of wildlife species and would affect about 1,134 acres of land. The greatest wildlife diversity and density are found in natural habitats such as grasslands, scrub-shrub habitats, and extensive contiguous forests. The Project would avoid crossing state or Federally managed lands or other sensitive areas. However, at its closest points, workspace for the Oyster Creek to Shore Pipelines would be about 515 feet from the west side and 420 feet from the south side of the Brazoria National Wildlife Refuge. The closest important bird area is the Columbia Bottomlands Important Bird Area, which is located about 2 miles southwest of the Oyster Creek to Shore Pipelines workspace. All native migratory game and non-game birds are protected under the Migratory Bird Treaty Act. Both the onshore and offshore Project components are located within the Central Flyway, one of four major migratory routes for birds in North America.

ES5.3.2. FRESHWATER FISHERIES

The proposed Project is located in the Western Gulf Coast Plain Ecoregion and the Texas Gulf Coast Prairies and Marshes region. Forty-nine families and 268 species of fishes are known to inhabit the freshwaters of Texas. Construction of the proposed onshore pipelines would include 129 waterbody

crossings. Some of the freshwater wetlands proposed to be crossed are intermittently dry and not likely to support permanent freshwater fish populations.

ES5.3.3. BENTHIC RESOURCES

Benthic resources in the northern GoM include level-bottom soft sediment (i.e., mud, sand), hard bottom (e.g., gravel, rock), and artificial reefs. The Project would predominantly cross mud and sand on the continental shelf. In the northern GOM a diverse assemblage of macrofaunas is present, with polychaete annelid worms being most common, and amphipod crustaceans and bivalve mollusks also present in large numbers. Macrofauna are found in highest densities in the nearshore/inshore environment while the outer-shelf margin has the lowest densities.

ES5.3.4. PLANKTON

The majority of fishes in the GoM have pelagic larval stages. The length of time spent in the egg and larval stages varies from 10 to 100 days, depending on the species. Ichthyoplankton is abundant in the northern GoM and peak seasons for ichthyoplankton concentrations on the shelf are spring and summer. Larval densities are lowest during the winter. The Applicant indicated that net data collected between 1982 and 2016 for 82 Southeast Area Monitoring and Assessment Program stations within the established block showed an overall fish larvae density of 0.22 per cubic meter, whereas the density of fish eggs averaged 2.97 per cubic meter. A total of 156 taxonomic groups were represented in the larvae samples collected from the 82 stations. Gobiidae (gobies) were the most abundant larval taxa.

ES5.3.5. MARINE MAMMALS (NON-ENDANGERED)

Eight species of non-endangered marine mammals or cetaceans (two species of whale and six species of dolphin) have the potential to occur in the area of the GoM where the SPOT Project has been proposed. The marine habitat and several of these species may have been affected by the Deepwater Horizon oil spill due to the duration and volume of oil released into the GoM. The most affected areas during that incident were shoreline habitats and estuaries within the bays of the GoM. These ecosystems provide shelter and food sources, especially for nearshore species such as the bottlenose dolphin.

ES5.4. ESTUARINE AND MARINE FISHERIES

The GoM has a relatively high biodiversity, partly due to the diversity of habitats ranging from coastal marshes to the deep-sea. The northern GoM has one of the most productive fisheries in the world, with approximately 25 percent of the U.S commercial fish landings and 40 percent of the recreational harvest. This highly productive fishery area has 1,443 finfish species representing 223 families. The Gulf of Mexico Fishery Management Council and NOAA Fisheries manage fishery resources in Federal waters of the GoM (from 9 to 200 miles off the coast of Texas). The proposed Project area is located in commercially fished areas of the GoM.

ES5.5. THREATENED AND ENDANGERED SPECIES

The USCG and MARAD have developed a Biological Assessment for the Project to be used for interagency coordination required under NEPA and consultation required under the Endangered Species Act (see Appendix E, Biological Assessment and Essential Fish Habitat Assessment). Based on a review

of publicly available information, agency correspondence, and field surveys, 27 Federally listed threatened or endangered species, 2 species that are a candidate for listing under the ESA, and 1 area of designated critical habitat may occur within the Project area and/or on the VLCC transit routes. USCG and MARAD have concluded that the Project would have no effect on eight of the Federally listed threatened or endangered species or critical habitat. The Project would be not likely to adversely affect the remaining 20 Federally listed species, and would be not likely to jeopardize the continued existence of the 2 candidate species. Based on information obtained from the TPWD's Rare, Threatened, and Endangered Species of Texas database, 31 state-listed threatened or endangered species in Brazoria and Harris counties have the potential to occur within the Project area and are managed by the TPWD. Of these, 11 state-listed species are also Federally listed as threatened or endangered and are discussed in detail in the Biological Assessment (Appendix E). An additional 10 state-listed species use habitats that would not be affected by the proposed Project.

ES5.6. GEOLOGIC AND SOIL RESOURCES

The analysis of soil and geologic resources includes the characteristics of the soil, sediment, and bedrock; geologic hazards such as seismic events and hurricanes; mineral resources; and paleontological materials such as the fossils of plants, animals, and other organisms.

ES5.6.1. REGIONAL AND LOCAL GEOLOGY

The onshore Project area would be located within the West Gulf Coastal Plain region, with gently rolling topography that includes features such as circular knolls, shallow depressions, and surface expressions of faulting and past stream activity. The onshore Project area would be located within an area of documented salt deposits. The offshore Project area would be located within the GoM basin, which slopes gently to the south or southeast, and has sandy silty clay, silty clay, silty sand, and sand sediments.

ES5.6.2. SOIL AND SEDIMENT CHARACTER

The onshore Project components would cross 23 major soil types (see Appendix T, Soil Maps). This includes 10 soil types that meet the definitions of prime farmland and farmland of statewide importance, or would meet these definitions if drained, accounting for more than 77 percent of the disturbed area. The Project would also cross 13 soil types that qualify as hydric (poorly drained, often water-saturated), including 2 types that could be prime farmland if properly drained. Based on geotechnical investigation, shallow sediments crossed by the offshore Project components consist of sandy sediments near the coastline that grade into silty clays and clays further offshore.

ES5.6.3. GEOLOGIC HAZARDS

Geologic hazards are naturally occurring or induced conditions that can result in damage to land and structures, or cause injury to people. Potential geologic hazards in the onshore Project area include seismic activity related to earthquakes, movement along existing faults, ground settlement due to subsidence, flooding and storm surges, and shoreline erosion. The potential offshore geologic hazards include seismicity related to earthquakes and seafloor subsidence.

ES5.6.4. MINERAL AND PALEONTOLOGICAL RESOURCES

Mineral resources include ores and active mines, industrial materials (e.g., sand and gravel), and fossil fuels such as coal, oil, and gas. One sand pit, one salt dome mine, and 25 active oil and gas wells are located within 0.25 mile of the onshore Project area. Paleontological resources include the preserved fossilized remnants and indirect traces or imprints of plants and animals. In the Project area, deposits from four geologic eras dating as far back as 65 million years ago could contain a wide variety of paleontological resources. No potentially significant vertebrate fossils are present within the proposed Project area.

ES5.6.5. OFFSHORE GEOPHYSICAL INVESTIGATION

The Applicant conducted an offshore geophysical investigation along the proposed subsea pipeline route, at the proposed platform and SPM buoy sites, and at the proposed anchorage area. The geophysical survey noted the presence of pockmarks in addition to trawl scars and depressions along the proposed offshore pipeline route and at the SPOT DWP site, and cut-and-fill channel complexes in the anchorage area.

ES5.7. CULTURAL RESOURCES

The affected environment for cultural resources is the area of potential effect (APE), as defined by the National Historic Preservation Act, and includes the seabed that would be affected by any bottom-disturbing activities during construction, operation, or decommissioning (offshore direct APE); terrestrial areas that would be affected by any ground-disturbing activities during construction, operation, or decommissioning (onshore direct APE); and the viewshed from which onshore, aboveground Project components would be visible (onshore indirect APE).

ES5.8. LAND USE, RECREATION, VISUAL RESOURCES, AND OCEAN USE

This EIS evaluated land use, recreation resources (including onshore recreation resources, recreational fishing and boating, artificial reefs and scuba diving, and cruise ships), onshore and offshore visual resources, and ocean uses (including offshore oil and gas activity, non-energy mineral resources, and military uses) affected by the Project.

ES5.8.1. LAND USE

Land uses within the onshore Project footprint predominantly include agricultural areas (hay/pasture and cultivated crops) and developed areas associated with residential, commercial, and industrial uses, as well as some more rural, undeveloped areas.

ES5.8.2. RECREATION

Recreation resources in the area include onshore parks and recreation areas, and offshore recreation activities such as recreational boating and fishing, scuba diving, and marine cruising. The existing ECHO Terminal is adjacent to the Pasadena Municipal Golf Course, while the proposed onshore pipelines would be located directly adjacent to three established parks. Recreational fishing occurs in both inland waterways and in the GoM near the Project area, and is an important economic activity in Texas. Offshore recreational boating and fishing activities occur in the vicinity of the proposed offshore pipelines

and SPOT DWP. Scuba diving is a popular activity at artificial reefs offshore Texas. The closest artificial reefs to the Project would be a converted platform reef 10.6 miles east-northeast of the SPOT DWP.

ES5.8.3. VISUAL RESOURCES

Onshore, the baseline visual character includes some high-intensity suburban and industrial development near the ECHO Terminal and the northern portions of the Oyster Creek to Shore Pipelines; however, most of the onshore pipeline routes pass through lower-intensity suburban, agricultural, and rural residential areas on flat coastal plains, interspersed with more heavily vegetated waterbodies and occasional oil and gas infrastructure such as MLV sites. The visual character at the landing site for the offshore pipeline is a developed beachfront environment, with residences and rental properties, within sight of the GoM. Industrial development is common in this region of Texas, and oil and gas infrastructure and other energy infrastructure are visible or close by in much of the existing viewshed for all proposed Project components. Offshore, the baseline visual character of the Project area is beach shoreline and open ocean. Infrastructure including oil and gas platforms, drilling rigs, and aids to navigation (such as navigation buoys) are widely scattered offshore, and offshore oil and gas infrastructure is a common sight in the regional landscape.

ES5.8.4. OCEAN USE

Ocean uses include offshore oil and gas activity, non-energy marine minerals activity, marine shipping and commercial ports, and military use. Approximately 17 percent of total U.S. crude oil production comes from the GoM, with the largest share of that production occurring in the central and western portions of the GoM. Offshore oil and gas activity is thus common in the GoM region, although no active lease blocks with ongoing production are located in the immediate vicinity of the SPOT DWP. No substantial sediment resources were identified in the Project area, and the nearest active marine minerals lease areas are located offshore Louisiana. Military uses within the GoM include military vessel and aircraft transit between onshore bases and offshore areas, aircraft carrier operations, rocket and missile research and testing, air-to-air gunnery, sonar buoy operations, and pilot training.

ES5.9. TRANSPORTATION

Onshore transportation resources evaluated in the EIS include the well-developed road network that links the Freeport area and other smaller towns to the greater Houston region. Offshore transportation resources include commercial shipping, fishing, passenger and recreational vessels, and offshore oil and gas activity. The EIS also briefly evaluates air traffic.

ES5.9.1. ROAD NETWORK AND TRAFFIC

The south-central portion of Brazoria County is characterized by a mix of traffic associated with residential, industrial, construction, shipping, and recreational/tourism activities. Some local petrochemical and industrial complexes experience large daily inflows and outflows of vehicles during work-shift turnarounds and construction projects. Port Freeport experiences large increases in road traffic when vessels are being loaded and unloaded and commodities transported out of the area. Recreational and tourist traffic patterns vary seasonally, with most activity taking place on weekends and during special events, especially in summer months. The southern portion of the Houston metropolitan area

experiences heavy morning and evening peak-hour traffic, with the heaviest morning flows directed northward (inbound toward central Houston) and the heaviest evening flows directed southward (outbound).

ES5.9.2. MARINE NAVIGATION AND VESSEL TRAFFIC

Cargo vessels, container ships, barges, and tankers carrying crude oil or other liquid commodities form much of the vessel traffic in the heavily travelled GoM. Commercial fishing, as well as recreational and passenger vessels, also contribute substantial volumes of marine traffic. The most concentrated vessel activity occurs in Federally designated shipping safety fairways. The Project's lease blocks have no existing safety or security zones, and are not within designated lightering areas, navigation safety fairways, or anchorages.

ES5.9.3. AIR TRAFFIC

In evaluating air traffic, the EIS primarily focuses on helicopter traffic. The Project would not involve fixed-wing aircraft travel. In the Project area, Helicopters provide transportation between the GoM coast and offshore oil platforms for crews, supplies, and emergencies. Numerous heliports exist in Brazoria County and nearby in Galveston County, including those at airports, hospitals, and private businesses.

ES5.10. AIR QUALITY

Air quality is defined as a measurement of pollutants in ambient air. Air pollution comes from many different sources, including stationary sources, mobile sources, and naturally occurring sources. The USEPA classifies and regulates six criteria air pollutants, including ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter, and lead. Greenhouse gases such as carbon dioxide, methane, and nitrous oxide are also regulated air pollutants. In addition, state agencies have state-specific standards that regulate a variety of air pollutants that can harm public health and the environment.

ES5.10.1. REGIONAL CLIMATE

The onshore Project area has a warm, humid climate with hot summers. The entire GoM and its coastal areas are subject to tropical storms and hurricanes, which are most likely to occur between late May and early November. Along the coast, heavy rains and wind-driven storm surges may cause local or widespread flooding.

ES5.10.2. ONSHORE AIR QUALITY

The Houston-Galveston-Brazoria (HGB) area, within which the Project's onshore components would be located, is designated as moderate nonattainment for the 2008 Eight-Hour Ozone National Ambient Air Quality Standards (NAAQS) and marginal (i.e., serious) nonattainment for the 2015 Eight-Hour Ozone NAAQS. Marginal is the lowest level of ozone nonattainment severity, and moderate is the next to lowest level. The HGB area is designated as attainment or unclassifiable for the NAAQS for other criteria pollutants. Both the 2008 NAAQS and the 2015 NAAQS are currently in effect for the HGB area, as the 2008 NAAQS have not yet been revoked by the USEPA.

ES5.10.3. OFFSHORE AIR QUALITY

The USEPA and the Texas Commission on Environmental Quality have not assigned an air quality attainment status (i.e., attainment or nonattainment) for locations beyond the seaward state territorial boundary, which extends 9 nautical miles from the shoreline. Therefore, the NAAQS attainment status of the nearest adjacent onshore location should be considered for the offshore locations. Brazoria County, which is the nearest onshore location to the proposed SPOT DWP, is designated as moderate nonattainment for the 2008 Eight-Hour Ozone NAAQS and marginal (i.e., serious) nonattainment for the 2015 Eight-Hour Ozone NAAQS. Marginal is the lowest level of ozone nonattainment severity, and moderate is the next to lowest level. Brazoria County is designated as attainment or unclassifiable for the other NAAQS.

ES5.11. NOISE

The terms “noise” and “sound” are often used interchangeably. Sound is energy created by vibrations, resulting in sound waves, and is a normal and desirable part of life. Noise is a class of sounds that are considered unwanted, and in some situations, noise can adversely affect the health and well-being of individuals, both human and animal. Consequently, noise is defined as audible acoustic energy that adversely affects, or can affect, the physiological and psychological well-being of people.

The standard unit of sound measurement is the decibel (dB). The dB scale is a measure used to quantify sound power or sound pressure. A sound power level describes the acoustical energy of a sound and is independent of the medium in which the sound is traveling. Because sound consists of variations in pressure, the unit for measuring sound is referenced to a unit of pressure, the Pascal (Pa). A dB is defined as the ratio between the measured sound pressure level in microPascals (μPa) and a reference pressure. In air, the sound reference level is dB re 20 μPa , which relates to the amplitude of a sound wave’s loudness with a pressure of 20 μPa . In water, the reference level is dB re 1 μPa .

For onshore activities, the EIS evaluates existing and Project-related airborne noise. For offshore activities, the EIS evaluates airborne and underwater noise.

ES5.12. SOCIOECONOMICS

Socioeconomic resources include population and demographics, housing, employment and income, public services, land- and marine-based tourism and recreation, commercial fisheries, marine commerce and shipping, and offshore mineral resources. The socioeconomic study area consists of Brazoria and Harris counties, Texas, which houses the Project’s proposed onshore pipelines, proposed new terminal, and existing terminal, and which would experience the Project’s direct and indirect economic impacts. The EIS evaluates cities and towns that would contain or be adjacent to Project facilities, as well the cities of Freeport and Lake Jackson, which are adjacent to Port Freeport, the Applicant’s proposed shore base for Project activities.

ES5.12.1. POPULATION AND DEMOGRAPHICS

Harris County has the largest population among Texas counties and contains Houston, the most populous city in Texas. The largest municipalities in Brazoria County are Pearland, adjacent to Houston’s southern boundary, and Lake Jackson near the Gulf Coast. The municipalities within Harris and Brazoria counties

grew at varying rates from 2010 to 2017. Regional projections anticipate that Harris and Brazoria counties will grow through 2040, with Harris County adding more than 72,000 new residents per year and Brazoria County adding nearly 9,000 new residents per year.

ES5.12.2. HOUSING

The EIS evaluates housing resources within an approximately 35-mile radius of the proposed Project facilities. Vacancy rates in Harris and Brazoria counties are similar to the statewide rates. In 2017, there were more than 13,000 vacant housing units in Brazoria County and more than 47,000 vacant housing units in Harris County (excluding the City of Houston). In 2016, there were 49 hotels or motels in Brazoria County, as well approximately 745 in Harris County, the large majority of which are in the City of Houston itself.

ES5.12.3. EMPLOYMENT AND INCOME

Employment data evaluated in the EIS includes the number of jobs by industry, unemployment, and tax revenues. Manufacturing and construction sectors are prominent employers in the Project area, together providing 29 percent of the jobs in Harris and Brazoria County. The oil and gas industry cluster (petroleum products manufacturing, chemical manufacturing, pipeline transportation, oil/gas extraction, support activities for mining, and heavy/civil engineering construction) provided 13 percent of jobs and at least half the region's total gross economic output of both southern and northern Brazoria County. Other major sectors of Brazoria County's economy include government, healthcare and social assistance, and retail trade. Unemployment in Harris County was higher than the state as a whole. Brazoria County had lower unemployment and a higher median income than Harris County or the state. Major revenue sources for Texas include the general sales tax; taxes on certain products and services such as motor fuels, motor vehicles, utilities, hotel, insurance, and franchises; licenses and fees; and Federal contributions. The largest revenue sources for Texas counties and municipalities are property and sales taxes.

ES5.12.4. PUBLIC SERVICES

Public services evaluated in the EIS include hospitals; police, fire, and emergency medical service (EMS) providers; and schools. Brazoria County has four general hospitals with 291 total beds. Harris County has 50 general hospitals with 12,288 total beds, 82 percent of which are in Houston. Brazoria County has 37 fire departments and Harris County has 64 fire departments, most consisting of more than one fire station. Twelve licensed EMS providers serve municipalities and communities in Brazoria County, in addition to seven private ambulance companies that are also state-licensed EMS providers. Police protection in the socioeconomic study area includes municipal police departments and county sheriff's departments. The Sheriff's Offices patrol unincorporated areas, as well as provide backup support throughout the counties. Most communities in the EIS study area have police staffing levels close to or exceeding the nationwide per capita average. The Project would pass through four of Brazoria County's eight independent school districts, all of which have available capacity for additional students.

ES5.12.5. RECREATION AND TOURISM

Recreation and tourism are minor economic drivers in Brazoria County and southern Harris County, generating jobs and encompassing a variety of onshore and offshore activities. Popular onshore recreation

and tourism activities in Brazoria County include hunting, fishing, boating, wildlife viewing, and birdwatching. Offshore recreation activities in the vicinity of the proposed offshore pipelines and SPOT DWP include boating and fishing, scuba diving at artificial reefs, and cruise ship operations. Although offshore recreation is not a major economic activity in Brazoria and southern Harris County, recreational fishing is an important economic activity in Texas, generating 1.2 million recreational fishing trips in the GoM in 2016, along with expenditures that supported an estimated 16,000 jobs and generated \$2 billion in sales.

ES5.12.6. COMMERCIAL FISHERIES

In 2016, the GoM accounted for 18 percent of the weight and 16 percent of the value of the U.S. commercial fishery landings. On average, Texas contributes approximately 6 percent of the landings and 26 percent of the revenue in the GoM. Ports within the Galveston Bay Complex ranked third among Texas ports in landings and second in value. Fishing vessels comprised 70 percent of the marine traffic within the lease block where the proposed SPOT DWP would be located.

ES5.12.7. MARINE COMMERCE AND SHIPPING

Texas Gulf Coast ports handled more than 496 million tons of foreign and domestic cargo in 2016, more than 20 percent of all U.S. port tonnage. The Port of Houston ranked 2nd among U.S. ports in terms of annual tonnage, while Port Freeport ranked 34th. Within the study area, Port Freeport and the Port of Houston are focal points for the transportation and warehousing sectors of the county economy. Port Freeport is the only DWP on the U.S. Gulf Coast currently able to receive large “post-Panamax” container ships now beginning to visit GoM ports due to the 2016 expansion of the Panama Canal. The Houston Ship Channel is the busiest waterway in the United States, and is also the home of the largest petrochemical complex in the nation.

ES5.12.8. OFFSHORE MINERAL RESOURCES

Mineral extraction, including offshore sand and gravel mining and the oil and gas industries, is an important component of the study area’s economy. Several large oil and gas and petrochemical companies (including Dow Chemical, Phillips 66, and Freeport LNG, among others) are present in southern Brazoria County. These companies rely on their coastal location and harbor access for transportation of products or supplies, but are not necessarily focused on offshore exploration or extraction in the region. Oil and gas are key industries in the regional economy as a whole. The oil and gas industry along the Gulf Coast originated due to the availability of oil in the GoM. Energy industry jobs account for approximately 20 percent of the region’s wages and 30 percent of the regional GDP, along with 57 percent of the total freight handled by the ports in the region.

ES5.13. ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that “each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” Minority and Hispanic populations comprise a majority of the populations

in Texas (57.1 percent), as well as in Brazoria and Harris counties (50.9 and 69.4 percent, respectively). Low-income populations comprise 16 percent of the state's population. Of the 80 U.S. Census block groups within 1 mile of proposed Project facilities, 61 had potential environmental justice communities, based on minority and/or low-income population characteristics.

ES6. PROPOSED PROJECT IMPACTS

ES6.1. ACTIVITIES GENERATING IMPACTS

Project construction and operation would involve numerous activities that would potentially generate impacts on one or more of the resources described in Section ES.5, Existing Conditions. The EIS identifies the potential impact-causing activities for each resource. Examples of these activities include (but are not limited to):

- Ground and ocean floor disturbance;
- Surface or groundwater use;
- Soil compaction and erosion;
- Onshore land clearing, earth-moving, trenching, and pipeline installation and burial;
- Offshore pipeline installation via jet sled;
- Movement and anchoring of construction vessels, VLCCs, and other crude oil carriers;
- Offshore pile driving and Project component installation;
- Sedimentation and turbidity in waterbodies;
- Installation of impervious surfaces;
- Light and noise associated with Project operations; and
- Accidental spills of hazardous materials.

ES6.2. SUMMARY OF CONSTRUCTION AND OPERATION IMPACTS

Potential impacts on environmental resources may be long-term or short-term; negligible, minor, moderate, or major; adverse or beneficial; and direct or indirect. Section 3.2.1, Descriptions of Impact, defines these terms.

In evaluating the potential social and environmental impacts from the construction, operation, and decommissioning of the proposed Project, the USCG and MARAD have considered mitigation measures recommended by cooperating agencies or subject matter experts and best management practices (BMPs) proposed by the Applicant to comply with Federal, state, and local requirements for permits and authorizations, and to reduce potentially adverse effects if a license is issued for the proposed Project. In addition, recommendations from various agencies, including the USCG and MARAD, have factored in the impact analyses for each resource. A complete list of mitigation measures, BMPs, and agency recommendations is included in Appendix N, List of Applicant's Best Management Practices and Agency Recommended Mitigation Measures.

Table ES-1 summarizes impacts of Project construction and operation, with implementation of mitigation measures and BMPs. Decommissioning impacts are discussed following Table ES-1.

Table ES-1: Summary of Existing Conditions, Impacts, and Mitigations

Resource	Project Area	Phase ^a	Direct or Indirect ^b	Adverse or Beneficial ^c	Duration ^d	Magnitude ^e	Notes
Water Resources							
Groundwater	Onshore	C, O	D, I	A	S, L	Neg to Min ^f	
Surface Water	Onshore	C	D	A	S	Neg	Moderate impact for open-cut waterbody crossings
		O	D	A	S, L	Mod to Maj	Reflects accidental spills of hazardous materials
Wetlands	Onshore	C	D	A	S	Min	
		O	D	A	L	Min ^f	
Physical Oceanography	Offshore	C	D	A	S	Neg	
		O	D	A, B	L	Min	Highly localized; adverse/beneficial cannot be determined
Coastal and Marine Environments	Offshore	C	D	A	S	Min ^f	
		O	D	A	S	Min ^f	
Habitats							
Vegetation	Onshore	C	D	A	S	Min	Herbaceous, scrub-shrub
		C	D	A	S	Mod	Forested
		O	D	A	S	Min	Herbaceous, scrub-shrub
		O	D	A	L	Mod ^f	Oyster Creek Terminal and forested areas of pipelines
	Offshore	C, O	None	None	None	None ^f	Seagrasses
Oyster Reefs	Offshore	C, O	None	None	None	None ^f	
Marine Protected Areas	Offshore	C, O	None	None	None	None	
Wildlife and Aquatic Resources							
Wildlife	Onshore	C	D, I	A	S, L	Min	
		O	D	A	L	Min to Mod	Depending on vegetation management frequency during migratory bird nesting; also reflects Oyster Creek Terminal lighting
	Offshore	C, O	D	A	L	Mod	
Freshwater Fisheries	Onshore	C	D	A	S	Min to Mod	Reflects open-cut waterbody crossings. Negligible impacts from general construction.
		O	None	None	None	None ^f	
Benthic Resources	Offshore	C	D, I	A	S	Min ^f	
		O	D	A	Variable	Variable ^f	Reflects accidental spills of hazardous materials
Plankton	Offshore	C	D	A	S	Min	
		O	D	A	L	Mod ^f	

Resource	Project Area	Phase ^a	Direct or Indirect ^b	Adverse or Beneficial ^c	Duration ^d	Magnitude ^e	Notes
Marine Mammals (non-Endangered)	Offshore	C	I	A	S	Neg	General construction
		C, O	D, I	A	S, L	Min ^f	Noise and lighting. Vessel strikes could be lethal for individual animals.
Estuarine and Marine Fisheries	Offshore	C	D	A	S	Min-Mod	Hydrostatic testing, noise, lighting. Vessel strikes could be lethal for individual animals.
		O	D	A, B	L	Neg	Habitat conversion
		O	I	A	S, L	Min-Mod ^f	Noise, lighting, ballast water exchange
Threatened and Endangered Species	Onshore	C	D	A	S	Min	
		O	D	A	L	Mod ^f	Oyster Creek Terminal
Geologic and Soil Resources							
Regional and Local Geology	Onshore	C	D	A	S	Min	
		O	D	A	S	Neg	
	Offshore	C	D	A	S	Min to Mod	
		O	D	A	L	Neg	
Soil and Sediment Character	Onshore (Soil)	C	D	A	L	Min to Mod	
		O	D	A	L	Min to Mod	
	Offshore (Sediment)	C	D	A	S	Mod	
		O	D	A	L	Neg	
Geologic Hazards	None						The Project would not impact geologic hazards; however, seismicity, subsidence, shoreline erosion, flooding, and storm surge could affect onshore and offshore Project components.
Mineral and Paleontological Resources	All	All	D	A	L	Neg	
Offshore Geophysical Investigation		O	D	A	S	Neg	Impacts only likely as a result of unplanned maintenance activities
Cultural Resources							
Onshore Direct and Indirect APE	Onshore	C, O	I	A	L	Neg to Min	
Offshore Direct APE	Offshore	C, O			None		Due to lack of cultural resources in the offshore APE
Land Use, Recreation, Visual Resources, and Ocean Use							
Land Use	Onshore	C	D	A	S	Min	
		O	D, I	A	L	Min	Indirect for onshore pipelines; direct for all others

Resource	Project Area	Phase ^a	Direct or Indirect ^b	Adverse or Beneficial ^c	Duration ^d	Magnitude ^e	Notes
Recreation	Onshore	C	D, I	A	S	Min	Indirect impacts on Surfside Beach; direct for all others
		O	I	A	L	Neg	
	Offshore	C	D	A	S	Neg	Direct: displacement of vessels; Indirect: displacement of recreational fish species
		O	D, I	A	L	Neg	
Visual Resources	Onshore	C	D	A	S	Mod	
		O	D	A	L	Neg	
	Offshore	C	D	A	S	Neg	
		O	D	A	L	Neg	
Ocean Use	Offshore	C	D, I	A	S	Neg	Direct: temporary safety zone around pipeline corridor; Indirect: SPOT DWP construction
		O	D	A	L	Min	
Transportation							
Road Network and Traffic	Onshore	C	D	A	S	Neg	Minor to moderate impacts for ECHO Terminal expansion, Oyster Creek Terminal construction; pending revised Applicant Traffic Impact Assessment
		O	D	A	L	Neg	
Marine Navigation and Vessel Traffic	Offshore	C	D	A	S	Mod	VLCC/other tanker and supply vessel traffic Elimination of lightering tanker traffic
		O	D	A	L	Neg-Min	
		O	D	B	L	Mod	
Air Traffic	All	C	None	None	None	None	
		O	A	D	L	Neg	
Air Quality							
Onshore Air Quality	Onshore	C	D, I	A	S	Min	Negligible for greenhouse gases, minor for other pollutants
		O	D, I	A	L	Neg-Min	
Offshore Air Quality	Offshore	C	D, I	A	S	Min	
		O	D, I	A	L	Min	
Noise							
Onshore Noise	Onshore	C	D	A	S	Min	
		O	D	A	L	Min	
Offshore Noise	Offshore	C	D	A	S	Neg	Airborne noise
		C	D	A	S, L	Min-Maj	Underwater noise
		O	D	A	L	Min	Airborne noise
		O	D	A	S	Min	Underwater noise

Resource	Project Area	Phase ^a	Direct or Indirect ^b	Adverse or Beneficial ^c	Duration ^d	Magnitude ^e	Notes
Socioeconomics							
Population and Demographics	All	C	D	Neither	S	Neg	
		O	D	Neither	L	Neg	
Housing	All	C	D	B	S	Min	Reflects increased lodging occupancy
		O	D	B	S	Neg	Reflects decreased residential vacancy rates
Employment and Income	All	C	D, I	B	S	Min	
		O	D, I	B	L	Min	
Public Services	All	C	I	A	S	Min	
		O	D, I	A	L	Neg	
Recreation and Tourism	Onshore	C	D	A	S	Neg	
		O	D	A	L	Neg	
	Offshore	C	D, I	A	S	Min	
		O	I	A	L	Neg	
Commercial Fisheries	All	C	D, I	A	S	Min to Mod	
		O	D, I	A	L	Min	
Marine Commerce and Shipping	All	C	D	B	S	Min	Economic activity at Port Freeport
		C	D	A	S	Min	Vessel avoidance of construction across fairways
		O	D	B	L	Min	Contracts for support vessels
		O	I	B	L	Mod-Maj	Productive re-use of lightering terminals
Offshore Mineral Resources	All	C	I	A	S	Neg	
		O	I	B	L	Min	
Environmental Justice	All	C			See Note		No disproportionate, adverse impacts on environmental justice communities
		O			See Note		

^a C = Construction; O = Operation

^b D = Direct; I = Indirect

^c A = Adverse; B = Beneficial

^d S = Short-term; L = Long-term

^e Neg = Negligible; Min = Minor; Mod = Moderate; Maj = Major

^f Accidental spills of hazardous materials could have minor to major impacts for these resources, depending on location, size, and duration of the spill.

ES6.3. SUMMARY OF DECOMMISSIONING IMPACTS

The Applicant would comply with the environmental regulations applicable at the time of decommissioning to minimize impacts on the natural and social environment, and would implement its spill response plans in the event of an accidental spill during decommissioning. The type and severity of impacts that would affect the natural or social environment would need to be reevaluated at the time of decommissioning to account for changes between the time the EIS is published and the time the Project is decommissioned.

Compared to operational impacts summarized in Table ES-1 (and throughout Chapter 3, Environmental Analysis of the Proposed Action), Project decommissioning would generally have beneficial impacts, due to the removal of Project components and restoration of affected areas, in accordance with regulatory requirements and Project plans and commitments. See Section 3.16, Decommissioning, of the EIS for a detailed discussion of the impacts of decommissioning on specific resources.

ES7. SAFETY

The proposed Project would increase vessel traffic in the Freeport Harbor safety fairway and the Galveston Entrance safety fairway, and near the Freeport Harbor Anchorage Area, as defined in 33 Code of Federal Regulations § 166.200(d); however, the location of the proposed SPOT DWP, approximately 27.2 to 30.8 nautical miles off the coast of Brazoria County, Texas, would move vessel traffic away from more congested safety fairways and navigation areas near and approaching Galveston and Houston. At the same time, the proposed Project would reduce the need for tanker trips to and from Galveston and Houston for ship-to-ship transfers. As a result, the offshore location of the proposed SPOT DWP would provide a safety benefit of reducing the likelihood and consequences of collisions or allisions associated with VLCCs and other tankers.

While safety concerns might have minor, long-term, adverse, or beneficial impacts on the decision-making processes of potential future proposals within the hazard area, there is no short-term or long-term, adverse, direct impact on activities outside the safety zone, area to be avoided (ATBA; see Section 2.2.8.5, Anchorage Areas, Safety Zones, and Limited Access Areas for the SPOT Deepwater Port), and vessels associated with the proposed Project. The safety zone would exclude non-Project vessels and the general public from the highest hazard zones surrounding the proposed SPOT DWP. To further enhance navigation safety, the Applicant would request an ATBA (a request that the USCG would pass along to the International Maritime Organization, as appropriate, on behalf of the U.S. Department of State). The sizes, locations, and designation of proposed safety zones and ATBAs have not been fully evaluated by the USCG. Further discussion and determinations of the Project's proposed navigational safety measures would be conducted prior to licensing, and would require a regulatory amendment in addition to the official notification to the International Maritime Organization.

This EIS does not serve as the USCG's final safety screening for the proposed Project or its alternatives. Should a license be issued, the Applicant would be required to submit a Final Port Operations Manual for review and approval by the USCG. This manual would contain detailed plans and procedures to address routine operations and emergencies at the proposed Project location. The USCG's review would ensure

that appropriate safety and security plans are included in the operations manual to minimize risk to proposed Project personnel, and the general public.

The DOT is mandated to prescribe minimum safety standards to protect against risks posed by pipeline facilities under 49 U.S.C. § 601. PHMSA administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA's safety mission is to ensure that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the Federal, state, and local level.

ES8. CUMULATIVE IMPACTS

Cumulative impacts are the collective result of the incremental impacts of an action that, when added to the impacts of other past, present, and reasonably foreseeable future actions, would affect the same resources, regardless of what agency or person undertakes those actions. Cumulative impacts can result from individually minor but collectively substantial actions taking place over a period of time. The EIS identifies 37 such cumulative projects, including:

- 10 onshore major industrial projects;
- 3 major onshore infrastructure projects;
- 1 onshore warehousing and distribution project;
- 1 utility project;
- 5 Federal, state, and municipal activities;
- 2 transportation projects;
- 4 commercial and residential developments;
- 3 pipeline projects;
- 2 major offshore industrial projects; and
- 5 waterway transportation projects.

The potential impact of the proposed Project, when combined with the impacts from the other projects considered, would not result in a major cumulative contribution to impacts on resources within the cumulative impact areas (see Chapter 5, Cumulative Impacts). Therefore, with the implementation of the mitigation measures, BMPs, and agency recommendations described throughout the EIS (and included in Appendix N, List of Applicant's Best Management Practices and Agency Recommended Mitigation Measures), the impacts of the proposed Project when combined with those of other projects would not result in major cumulative impacts.

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