

**DEPARTMENT OF ENERGY**

**Record of Decision and Floodplain Statement of Findings for the Delfin LNG LLC Application to Export Liquefied Natural Gas to Non-Free Trade Agreement Countries**

**AGENCY:** Office of Fossil Energy, Department of Energy.

**ACTION:** Record of decision.

**SUMMARY:** The U.S. Department of Energy (DOE), Office of Fossil Energy (FE) announces its decision in Delfin LNG LLC (Delfin), FE Docket No. 13-147-LNG, to issue DOE/FE Order No. 4028 (Order No. 4028), granting long-term, multi-contract authorization for Delfin to export domestically produced liquefied natural gas (LNG). Delfin seeks authorization to export the LNG in a volume equivalent to approximately 657.5 billion cubic feet per year (Bcf/yr) of natural gas (1.8 billion cubic feet per day (Bcf/d)) by vessel from its proposed floating liquefaction facility to be located in West Cameron Block 167 in the Gulf of Mexico, offshore of Cameron Parish, Louisiana (Liquefaction Facility).<sup>1</sup> Delfin seeks to export this LNG for a 20-year term to any country with which the United States does not have a free trade agreement (FTA) requiring national treatment for trade in natural gas, and with which trade is not prohibited by U.S. law or policy (non-FTA countries). Order No. 4028 is issued under section 3(a) of the Natural Gas Act (NGA) and DOE's regulations. Because the floating Liquefaction Facility will be a "deepwater port" within the meaning of the Deepwater Port Act of 1974, as amended,<sup>2</sup> the Liquefaction Facility requires a deepwater port

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<sup>1</sup> Delfin states that the Liquefaction Facility (or "deepwater port") will be located offshore in West Cameron Block 167. Delfin's floating liquefied natural gas vessels (discussed herein) will be moored in additional offshore blocks, including West Cameron Blocks 319, 327, 328, 334, and 335.

<sup>2</sup> See 33 USC § 1501 *et seq.*; 33 CFR Part 148.

license from the U.S. Department of Transportation's Maritime Administration (MARAD). DOE participated as a cooperating agency with MARAD, in conjunction with the U.S. Coast Guard (USCG), in preparing an Environmental Impact Statement (EIS) analyzing the potential environmental impacts that would result from the proposed Liquefaction Facility and related onshore facilities (Delfin Onshore Facility)<sup>3</sup> (collectively, the Delfin Liquefaction Project).

**ADDRESSES:**

The EIS and this Record of Decision (ROD) are available on DOE's National Environmental Policy Act (NEPA) website at: <https://www.energy.gov/nepa/eis-0531-port-delfin-lng-project-deepwater-port-application-louisiana>. Order No. 4028 is available on DOE/FE's website at: [https://fossil.energy.gov/ng\\_regulation/applications-2013-delfinlngllc13-147-lng](https://fossil.energy.gov/ng_regulation/applications-2013-delfinlngllc13-147-lng). For additional information about the docket in these proceedings, contact Larine Moore, U.S. Department of Energy, Office of Regulation and International Engagement, Office of Oil and Natural Gas, Office of Fossil Energy, Room 3E-042, 1000 Independence Avenue, SW, Washington, DC 20585.

**FOR FURTHER INFORMATION CONTACT:**

To obtain additional information about the EIS or the ROD, contact Kyle W. Moorman, U.S. Department of Energy, Office of Regulation and International Engagement, Office of Oil and Natural Gas, Office of Fossil Energy, Room 3E-042, 1000 Independence Avenue SW, Washington, DC 20585, (202) 586-5600, or Edward Le Duc,

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<sup>3</sup> Although the Delfin EIS covers the entire Delfin Liquefaction Project, the Delfin Onshore Facility falls under the jurisdiction of the Federal Energy Regulatory Commission (FERC), and is subject to separate regulatory approval by FERC pursuant to sections 7(b) and 7(c) of the NGA in FERC Docket No. CP15-490.

U.S. Department of Energy, Office of the Assistant General Counsel for Environment,  
1000 Independence Avenue SW, Washington, DC 20585, 202-586-4007.

**SUPPLEMENTARY INFORMATION:**

DOE prepared this ROD and Floodplain Statement of Findings pursuant to the National Environmental Policy Act of 1969 (42 United States Code [USC] 4321, et seq.), and in compliance with the Council on Environmental Quality (CEQ) implementing regulations for NEPA (40 Code of Federal Regulations [CFR] parts 1500 through 1508), DOE's implementing procedures for NEPA (10 CFR part 1021), and DOE's "Compliance with Floodplain and Wetland Environmental Review Requirements" (10 CFR part 1022).

**Background**

Delfin, a Louisiana limited liability company with its principal place of business in Dallas, Texas, proposes to construct, own, and operate a deepwater port with floating liquefaction and export facilities, and related onshore facilities, in West Cameron Block 167 in the Gulf of Mexico, approximately 30 miles offshore of Cameron Parish, Louisiana. The proposed Liquefaction Project will connect to the U.S. natural gas pipeline and transmission system through the reuse and repurpose of two existing offshore pipelines and proposed offshore pipeline laterals connecting to the Delfin Onshore Facility.

On November 12, 2013, Delfin filed an application (Application) with DOE/FE seeking authorization to export domestically produced LNG in a volume equivalent to 657.5 Bcf/yr of natural gas to non-FTA countries. In Order No. 4028, DOE/FE is

authorizing Delfin to export LNG from the proposed Delfin Liquefaction Facility in the full volume requested.

In 2014, DOE/FE granted Delfin’s separate authorization to export LNG from the proposed Liquefaction Facility to FTA countries in a volume equivalent to 657.5 Bcf/yr of natural gas (1.8 Bcf/d) for a 20-year term.<sup>4</sup> The authorized FTA export volume is not additive to the export volume authorized in this proceeding.

Additionally, on May 8, 2015, Delfin filed its application with MARAD under the Deepwater Port Act of 1974 to site, construct, and operate the Delfin Liquefaction Project. On March 13, 2017, MARAD found that the Delfin Liquefaction Project will be “in the national interest” under section 4(c)(3) of the Deepwater Port Act<sup>5</sup> and issued a record of decision (MARAD ROD) authorizing the issuance of a deepwater port license.<sup>6</sup> Delfin’s deepwater port license is subject to various conditions discussed in the MARAD ROD, which will be set forth in the deepwater port license upon its issuance.<sup>7</sup>

On May 8, 2015, Delfin submitted its application for the Delfin Onshore Facility to FERC. To date, Delfin is still awaiting its NGA section 7 authorizations from FERC. The Delfin Liquefaction Project will be subject to any conditions outlined within FERC’s order.

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<sup>4</sup> *Delfin LNG LLC*, DOE/FE Order No. 3393, FE Docket No 13-129-LNG, Order Granting Long-Term, Multi-Contract Authorization to Export Liquefied Natural Gas by Vessel from a Proposed Floating Liquefaction Project and Deepwater Port 30 Miles Offshore of Louisiana to Free Trade Agreement Nations (Feb. 20, 2014).

<sup>5</sup> 33 U.S.C. § 1503(c)(3) (allowing the Secretary of MARAD to issue a license for a deepwater port if, in relevant part, “he determines that the construction and operation of the deepwater port will be in the national interest and consistent with national security and other national policy goals and objectives, including energy sufficiency and environmental quality”).

<sup>6</sup> U.S. Dep’t of Transportation Maritime Administration, Secretary’s Record of Decision on the Deepwater Port License Application of Delfin LNG, LLC, at 65 (Para. 3), 68 (Mar. 13, 2017).

<sup>7</sup> *See, e.g.*, MARAD ROD at 16.

## **Project Description**

Delfin's proposed Liquefaction Facility will be located off the coast of Cameron Parish, Louisiana, in Federal waters within the Outer Continental Shelf West Cameron Area. Water depths of the actual site ranges from 64 to 72 feet. The Liquefaction Facility primarily will consist of four semi-permanent floating liquefied natural gas vessels (FLNGVs) with a total liquefaction capability of 13.3 million metric tons per annum (mtpa) of LNG, or approximately 657.5 Bcf/yr of natural gas. Each FLNGV will have LNG storage capacity of 211,460 cubic meters; four disconnectable tower yoke mooring systems (TYMS); four pipeline riser components, four service vessel mooring points; and four 30-inch diameter pipeline laterals, each approximately 6,400 inches in length. The Liquefaction Facility will reuse and repurpose two existing offshore pipeline systems (formerly the U-T Offshore Systems, LLC (UTOS) and High Island Offshore Systems, LLC (HIOS) pipeline systems); and include one 700-foot, 42-inch diameter pipeline bypass around an existing offshore platform manifold infrastructure at West Cameron Block 167 to connect to the former UTOS and HIOS pipeline systems.

The Delfin Onshore Facility will require new pipeline and associated pipeline facilities in Calcasieu Parish, Louisiana, to supply natural gas to the liquefaction facility from existing onshore natural gas transmission pipelines. Components of the Delfin Onshore Facility will primarily consist of the reactivation of 1.1 miles of existing 42-inch pipeline (former UTOS pipeline) which runs to an existing compressor station; installation of a new compressor; construction of 0.25 miles of 42-inch pipeline to connect the former UTOS line to a new meter station; and construction of 0.6 miles of

twin 30-inch pipelines between an existing compressor station and the new compressor station.

### **EIS Process**

MARAD and the USCG were the co-lead federal agencies for the environmental review of the Delfin Liquefaction Project and initiated the NEPA process by publishing a Notice of Intent (NOI) to prepare an EIS for the Delfin Liquefaction Project on July 29, 2015. MARAD and USCG conducted a single environmental review process that assessed both the onshore and offshore components of the Delfin Liquefaction Project.<sup>8</sup>

DOE participated as a cooperating agency in the preparation of the EIS. MARAD and USCG issued the draft EIS and published in the Federal Register a notice of availability (NOA) for the draft EIS on July 15, 2016 (81 FR 46157). MARAD and USCG issued the final EIS<sup>9</sup> and published a NOA for the final EIS on November 28, 2016 (81 FR 85678). The final EIS addresses comments received on the draft EIS. The final EIS also addresses water resources; biological resources; essential fish habitat; geological resources; cultural resources; ocean use, land use, recreation, and visual resources; transportation; air quality; noise; socioeconomics; safety; cumulative impacts; and alternatives.

Based on the final EIS, MARAD and USCG concluded that the issuance of deepwater port license will subject the Delfin Liquefaction Project to the implementation of Best Management Practices and mitigation measures recommended by federal and state agencies to reduce the environmental impacts that would otherwise result from the

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<sup>8</sup> See MARAD ROD at 23-24, 45.

<sup>9</sup> Final Environmental Impact Statement for the Port Delfin LNG Project Deepwater Port Application, Docket No. USCG-2015-0472 (Nov. 2016) (EIS).

Project's construction and operation.<sup>10</sup> Subsequently, the MARAD ROD determined that Delfin's requested deepwater port license met the nine criteria required for approval under section 4(c) of the Deepwater Port Act, 33 U.S.C. § 1503(c), subject to certain conditions. MARAD describes many of these conditions in the ROD, but indicated that the precise conditions will be set forth in the License upon its issuance at a later date.<sup>11</sup>

In accordance with 40 CFR 1506.3, after an independent review of MARAD and USCG's final EIS, DOE/FE adopted MARAD and USCG's final EIS (DOE/EIS-0531) on April 18, 2017. The U.S. Environmental Protection Agency published a notice of the adoption on April 28, 2017 (82 FR 19715).

#### **Addendum to Environmental Review Documents Concerning Exports of Natural Gas from the United States (Addendum)**

On June 4, 2014, DOE/FE published the *Draft Addendum to Environmental Review Documents Concerning Exports of Natural Gas from the United States* (Draft Addendum) for public comment (79 FR 32,258). The purpose of this review was to provide additional information to the public concerning the potential environmental impacts of unconventional natural gas exploration and production activities, including hydraulic fracturing. Although not required by NEPA, DOE/FE prepared the Draft Addendum in an effort to be responsive to the public and to provide the best information available on a subject that had been raised by commenters in this and other LNG export proceedings.

The 45-day comment period on the Draft Addendum closed on July 21, 2014. DOE/FE received 40,745 comments in 18 separate submissions, and considered those

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<sup>10</sup> See *id.* at 4-14 to 4-23.

<sup>11</sup> See MARAD ROD at 16.

comments in issuing the final Addendum on August 15, 2014. DOE provided a summary of the comments received and responses to substantive comments in Appendix B of the Addendum.<sup>12</sup>

## **Alternatives**

The EIS analyzed alternatives that could achieve the Delfin Liquefaction Project's objectives. The range of alternatives analyzed included alternative deepwater port designs, alternative LNG liquefaction technologies, alternative cooling media, alternative pipeline routes, alternative port locations, alternative use of existing West Cameron 167 offshore manifold platform, alternative mooring systems, alternative anchoring methods, alternative Delfin Onshore Facility locations, a no action alternative, and energy alternatives. Alternatives were evaluated and compared to the Delfin Liquefaction Project to determine if the alternatives were reasonable and environmentally preferable.

In analyzing alternative deepwater port designs, the EIS reviewed and evaluated four different designs: (1) Gravity-based structure; (2) Fixed platform-based unit; (3) Floating HiLoad port; and (4) FLNGV. The EIS then evaluated those four different designs based on four environmental and technical considerations: (1) air emissions; (2) general environmental effects; (3) visual impacts; and (4) water depth and seafloor topography. Both the Gravity-based structure and Floating HiLoad port were eliminated due to the large seafloor impacts and lack of design purpose for producing LNG for export. The fixed platform-based unit would also likely result in additional seafloor impacts due to foundational requirements.

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<sup>12</sup> We take administrative notice of the Addendum in this proceeding. *See also* EIS at ES-14, 1-10, 4-169, 6-2, and 6.3 for MARAD's and USCG's discussion of the Addendum.



In analyzing alternative LNG liquefaction technologies for use on the FLNGV, the EIS reviewed three different technologies: (1) expander-based process; (2) dual mixed refrigerant process; and (3) single mixed refrigerant (SMR) process. When evaluating the three technologies, the EIS relied on efficiency and simplicity of each technology when used aboard a FLNGV. The SMR technology offered a balance of medium to high efficiency along with simplicity of operation when aboard a FLNGV in comparison to the other two alternatives.

For analyzing alternative cooling media, the EIS evaluated two types for use aboard the FLNGV: (1) open-loop, water-cooled heat exchangers or (2) air-cooled heat exchangers. Although the open-loop, water-cooled heat exchanger is more efficient, smaller in size, and less expensive, its high use of seawater and discharge method could have additional impacts on marine life in comparison to the air-cooled heater exchanger. As a result, the EIS concluded the use of the air-cooled heat exchanger was the preferred alternative.

In analyzing alternative pipeline routes, the EIS utilized several different criteria to identify existing pipeline systems. Those criteria include, but are not limited to, the following: (1) a location within 150 miles of Henry Hub (2) pipelines with a 36-inch or larger diameter; (3) a water-depth location suitable for construction and operation of a deepwater port; (4) proximity of 2 to 8 miles of a designated shipping safety fairway; and (5) pipeline capacity for the requested volume. From this criteria, the EIS then identified the following six existing pipeline systems: (1) HIOS/UTOS; (2) Natural Gas Pipeline Company, LLC/Stingray Pipeline Company, LLC; (3) Columbia Gulf Transmission Company; (4) Kinetica Partners, LLC (western section); (5) Sea Robin Pipeline

Company, LLC; and (6) Kinetica Partners, LLC (central section). Of the six pipeline systems, only two met the siting requirements for the proposed Project: HIOS/UTOS and Natural Gas Pipeline Company, LLC/Stingray Pipeline Company, LLC. Upon evaluating the two remaining pipeline systems, the EIS concluded that due to a larger available volume capacity, ultimately the HIOS and UTOS systems were the preferred systems.

For analyzing alternative port locations, the EIS initially relied upon the USCG guidelines on siting for LNG deepwater port terminals in 33 CFR 148.720. Based on those guidelines, the EIS then selected three locations: (1) along the HIOS/UTOS pipeline systems within West Cameron Block area; (2) along the HIOS/UTOS pipeline systems within deeper water of the West Cameron Block area, approximately 10 nautical miles south-southwest of alternative 1; and (3) along the Natural Gas Pipeline Company, LLC/Stingray Pipeline Company, systems, approximately 27 nautical miles from alternative 2.<sup>13</sup> From these three locations, the EIS then compared the following factors: (1) avoidance of cultural resources; (2) engineering; (3) avoidance of geological hazards; (4) air emissions and noise; (5) water and sediment quality; (6) commercial and recreational fishing; (7) wildlife and protected species; (8) socioeconomics; and (9) marine uses and aesthetics. The EIS concluded that due to the distance from shore, alternatives 2 and 3 would require additional service trips as well as additional compression requirements. Furthermore, these alternatives would require longer piles for structure purposes that would result in greater noise impacts on marine species. Overall,

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<sup>13</sup> See EIS pages 2-38 through 2-41 for further details and maps of exact site locations.

these factors would result in greater noise and air emissions compared to the proposed site (alternative 1) and thus were not selected.

In analyzing alternative use of existing West Cameron 167 offshore manifold platform, the EIS did not provide any alternatives to the proposed bypass pipeline. Although Delfin proposes to construct 700 feet of bypass pipeline on the seafloor, the reuse of the existing offshore platform would result in greater potential impacts on the area. Reuse of the existing offshore manifold platform would require removal of the infrastructure and interactions with six other pipeline systems utilizing the platform. The EIS made no further analysis of this Project area.

For analyzing alternative mooring systems, the EIS evaluated two different mooring systems: (1) permanent mooring system and (2) disconnectable mooring system. The main design criteria for the mooring system is to provide a stable environment for the FLNGV operations. For the permanent mooring system, the FLNGV would stay moored to the location regardless of weather and ocean conditions, thus eliminating the flexibility and project design for the self-propelled FLNGV. Conversely, the disconnectable mooring system allows the needed flexibility for the FLNGV to depart for maintenance purposes as well as allow for a much smaller anchoring system. As a result, the EIS selected the proposed disconnectable mooring system.

In analyzing alternative anchoring methods for installing the TYMS mooring structure, the EIS considered five different anchor designs. The design alternatives included: (1) suction anchors; (2) driven piles; (3) fluke anchors; (4) gravity-based anchors; and (5) grouted pile anchors. For evaluating the anchor design alternatives, the

EIS considered the following six issues: (1) air emissions; (2) water use and discharge; (3) turbidity, sedimentation, and seafloor impacts; (4) fisheries impacts; (5) noise impacts; and (6) decommissioning impacts. Based on these six issues, the EIS concluded that the driven piles had a smaller footprint, fewer installation impacts, and structural design advantages pursuant to the geotechnical evaluation of the affected area.

For evaluating alternative Delfin Onshore Facility locations, the EIS analyzed and determined the feasibility of the locations based on proximity to a gas supply pipeline for the Port, to various gas supply header pipelines, and to existing natural gas pipeline infrastructure. From these factors, the EIS evaluated the following four locations: (1) PSI Cameron Meadows Gas Plant; (2) Transco Station 44; (3) a greenfield location adjacent to the PSI Cameron Meadows Gas Plant; and (4) a greenfield location adjacent to Tennessee Gas Pipeline Company facilities on the north side of Highway 82 approximately 1.3 miles east of the three other alternative locations.<sup>14</sup> The EIS then evaluated the four locations based on the following criteria: (1) proximity to the feasible pipeline systems; (2) availability of land for siting a compressor station; (3) current land use; (4) proximity to sensitive resources (i.e. streams, wetlands, and wildlife; (5) proximity to noise sensitive areas; and (6) feasibility of air permitting. Due to the potential impacts to the greenfield sites, alternatives 3 and 4 were eliminated as those impacts would be greater than the impacts resulting from the use of existing infrastructure. Finally, the EIS concluded that due to existing pipeline infrastructure, alternative 1 would be the preferred location for the compressor station while alternative

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<sup>14</sup> See Figures 2.3-4 and 2.3-6 within the EIS for more details.

2 would be the preferred locations for the meter station and interconnection with gas supply header pipelines.

In analyzing the no action alternative, the EIS reviewed the effects of not constructing the Delfin Liquefaction Project.

### **Environmentally Preferred Alternative**

When compared against the other action alternatives assessed in the EIS, as discussed above, the proposed Delfin Liquefaction Project is the environmentally preferable alternative. Although the no action alternative would avoid the environmental impacts identified in the EIS, adoption of this alternative would not meet the Delfin Liquefaction Project objectives.

### **Decision**

DOE has decided to issue Order No. 4028 authorizing Delfin to export domestically produced LNG by vessel from the proposed Delfin Liquefaction Facility located off the coast of Cameron Parish, Louisiana, to non-FTA countries, in a volume equivalent to approximately 657.5 Bcf/yr of natural gas for a term of 20 years to commence on the earlier of the date of first commercial export or seven years from the date that the Order is issued.

Concurrently with this Record of Decision, DOE/FE is issuing Order No. 4028, in which it finds that the requested authorization has not been shown to be inconsistent with the public interest, and that the Application should be granted subject to compliance with the terms and conditions set forth in the Order, including all terms and conditions described by MARAD in its ROD and/or imposed in MARAD's forthcoming deepwater

port license for Delfin. Additionally, DOE/FE's authorization is conditioned on Delfin's receipt of all connected local, state, and federal permits (including FERC's authorization under Section 7 of the Natural Gas Act for the Delfin Onshore Facility), and on Delfin's on-going compliance with any other preventative and mitigative measures imposed by other federal or state agencies.

### **Basis of Decision**

DOE's decision is based upon the analysis of potential environmental impacts presented in the EIS, and DOE's determination in Order No. 4028 that it has not been shown that Delfin's proposed exports will be inconsistent with the public interest, as is required to deny Delfin's Application under NGA section 3(a). Although not required by NEPA, DOE/FE also considered the Addendum, which summarizes available information on potential upstream impacts associated with unconventional natural gas activities, such as hydraulic fracturing.


### **Mitigation**

As a condition of its decision to issue Order No. 4028, DOE is imposing requirements that will avoid or minimize the environmental impacts of the proposed Liquefaction Facility. These conditions include the Best Management Practices, mitigation measures, and conditions in the MARAD ROD and forthcoming deepwater port license. Mitigation measures beyond those included in Order No. 4028 that are enforceable by other Federal and state agencies are additional conditions of Order No. 4028. With these conditions, DOE/FE has determined that all practicable means to avoid or minimize environmental harm from the Delfin Liquefaction Project have been adopted.

## **Floodplain Statement of Findings**

DOE prepared this Floodplain Statement of Findings in accordance with DOE's regulations, entitled "Compliance with Floodplain and Wetland Environmental Review Requirements" (10 CFR part 1022). The required floodplain assessment was conducted during development and preparation of the EIS (see Sections 4.11.1 of the EIS). The EIS determined that the proposed Delfin Onshore Facility site is classified as having a 1-percent-annual-chance of flooding. While the placement of these facilities within floodplains would be unavoidable, DOE has determined that the current design for the Delfin Liquefaction Project minimizes potential harm to or in the floodplain to the extent practicable.

Issued in Washington, D.C. on June 1, 2017.



**Douglas W. Hollett**  
*Acting Assistant Secretary*  
*Office of Fossil Energy*