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Via E-mail to Brian.Barton@dot.gov

Subject: Delfin LNG's Response to NOAA Fisheries Request for Additional Information Questions Received from MARAD January 16, 2024

Dear Mr. Barton:

On January 16, 2024 you provided via e-mail a list of six questions that NOAA Fisheries St. Petersburg, FL Southeast Regional Office has asked the U.S. Maritime Administration (MARAD) in response to MARAD's request to reinitiate informal marine protected species consultations for the Delfin LNG Deepwater Port project. Delfin LNG LLC (Delfin) believes we are in a unique position to provide our observations and comments on these questions for MARAD's review and possible use in responding to the NOAA Fisheries questions. Accordingly, Delfin offers the following comments and observations on the six NOAA Fisheries questions we were provided. These questions are presented and numbered in the order received from MARAD.

1. ***The consultation request includes conflicting information on the size of the piles that will be driven to anchor the mooring system. The text states that the piles will be 78 inches while the table (Table 1) shows 96-inch piles. Please clarify the actual proposed pile size.***

Delfin's observation. The proposed piles are 96" in diameter. The Delfin LNG Final Environmental Impact Statement considered a Tower Yoke Mooring System (TYMS) with four 78" diameter pilings for each of the four mooring locations (16 total pilings). Delfin's refined design presented to the U.S. Coast Guard and MARAD in a June 14, 2022 letter describes the Submerged Swivel and Yoke (SSY) mooring arrangement design and includes three 96" diameter pilings for each of the four SSY mooring systems (12 pilings total). The SSY mooring system with three 96" diameter pilings each (12 total) is also evaluated in Delfin's updated Environmental Assessment for the Port Delfin LNG Project (SWCA 2023). While it remains

possible that the final engineering design may specify the use of smaller diameter pilings (including 78" diameter), the current design concept is to use 96" diameter pilings.

2. ***The calculation of the number of days of pile driving also shows conflicting information. It shows that 12 piles will be driven at a rate of 2/3 of a pile per day (.6666…), but states that this pile driving will be completed in 8 days.***

Delfin's response. Delfin consulted with offshore construction contractors who estimated that each of the 96" diameter mooring pilings for the SSY assemblies could be driven to "refusal" (i.e. cannot be driven deeper with the construction equipment) within 2 to 16 hours. Using 16 hours as the conservative estimate for driving each 96" diameter SSY piling results in 48 hours (2 days) pile driving duration for each of the four SSY moorings. Thus, installing all four SSY mooring systems (12 pilings) will result in 192 hours of pile driving for the Delfin LNG Deepwater Port, or 8 days of total pile driving time. Currently, Delfin expects that a maximum of two SSY mooring systems will be installed in the first construction program (an estimated maximum of 96 hours of pile driving for 6 pilings) and the final two SSY mooring systems (an additional 96 hours of pile driving for the final 6 pilings) would be installed in a separate construction program a number of months later.

3. ***Remove reference to NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions. They have been replaced by SERO's Protected Species Construction Conditions, and the two include conflicting criteria/requirements.***

Delfin's observation. This appears to be a straightforward request by NOAA for MARAD to remove the NMFS Sea Turtle and Sawfish Construction Conditions reference from the informal consultation.

4. ***The analysis of the effects on the proposed critical habitat for Rice's whale is insufficient. This analysis should be treated similarly to what was done for the loggerhead sea turtle critical habitat (LOGG-S-2). The 3 Primary Constituent Elements (PCEs) of the essential feature of the proposed critical habitat should be listed out, and an analysis of how the proposed project may affect each individual PCE should be provided. Special attention to the potential effects of large LNGC's traversing through the critical habitat areas should be included, including noise effects from these large vessels on PCE #3 (Sufficiently quiet conditions for normal use and occupancy, including intraspecific communication, navigation, and detection of prey, predators, and other threats).***

Delfin's response: The distribution area for Rice's whales was originally identified as a Biologically Important Area (BIA) by LaBrecque et al. (2015). Following the listing of Rice's whale as endangered under the Endangered Species Act (ESA) in 2019, this BIA underwent expansion. The expanded area was delineated approximately between the 100 m and 400 m isobath extending from approximately Mobile Bay, Alabama to just south of Tampa, FL. In the 2020 Biological Opinion on the Federally Regulated Oil and Gas Program Activities in the Gulf of Mexico (NMFS 2020), this area was further expanded and described as the area in which Rice's whales are expected to be found. This expanded area is termed the

"2020 Biological Opinion distribution area" (distribution area). Since 2019, several sources of information have been used to help predict critical habitat features and distribution (e.g., Rosel et al. 2021; Soldevilla et al. 2022b; Kwon 2021). Central to defining critical habitat for any species is an understanding of the animal's spatial and temporal distribution.

In 2023, critical habitat for Rice's whale was proposed (88 FR 47453) for waters from the 100-m isobath to the 400 m isobath in the Gulf of Mexico (GOMx) from the Florida shelf to the Texas shelf. Data support the occurrence of Rice's whale throughout the northern GOMx between the 100 and 400 m isobaths and in some cases beyond those depths based on data from acoustic surveys, stock assessment surveys and mitigation surveys documented in the Western, Central, and Eastern Planning areas of the GOMx (Soldevilla et al. 2022a,b; Garrison et al. 2020; Barkaszi and Kelly 2019) (**Figure 1**). The proposed critical habitat rule identifies three key habitat attributes or Primary Constituent Elements (PCEs) that are contained within this habitat and are considered necessary to support Rice's whale (NOAA Fisheries 2023). These PCEs are:

- **PCE 1:** Sufficient density, quality, abundance, and accessibility of small demersal and vertically migrating prey species, including scombriformes, stomiiformes, myctophiformes, and myopsida;
- **PCE 2:** Marine water with elevated productivity, bottom temperatures of 10-19°C, and levels of pollutants that do not preclude or inhibit any demographic function; and
- **PCE 3:** Sufficiently quiet conditions for normal use and occupancy, including intraspecific communication, navigation, and detection of prey, predators, and other threats.

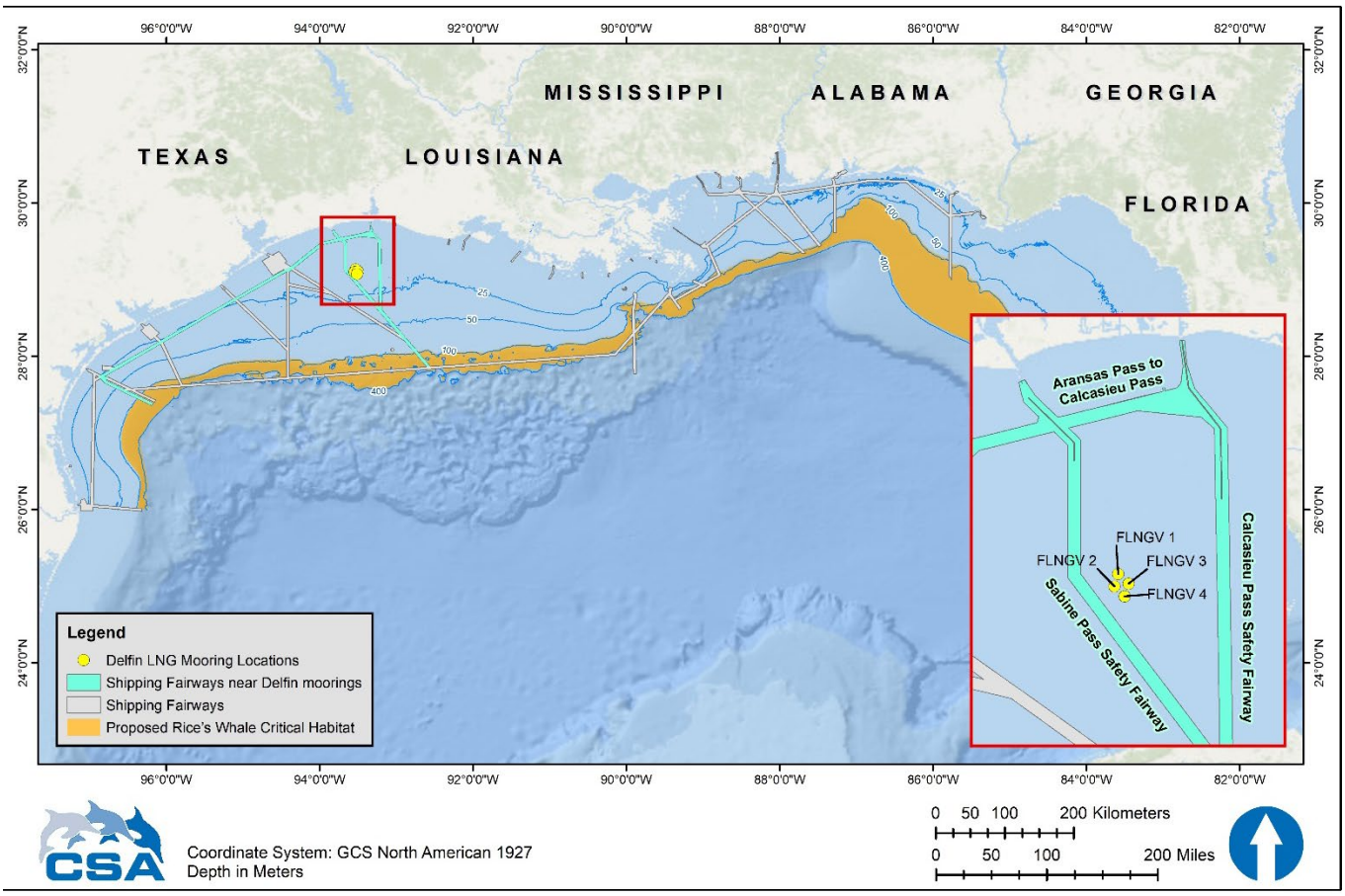

Figure 1. Location of the proposed Deepwater Port in relation to the proposed Rice's whale critical habitat and shipping fairways in the U.S. Gulf of Mexico.

Tagging (Kok et al. 2023) and stable isotope studies (Kiska et al. 2023) support that Rice's whale likely feed on small, schooling fishes, particularly *Ariomma spp*, identified under PCE 1. These fish groups (and squid) are widely represented throughout the GOMx. Stomiiformes (dragonfish), myctophiformes (lanternfish) are noted as some of the most abundant groups of fishes on earth within the meso- and bentho-pelagic zones of the ocean, and this is equally true in the GOMx (Marks et al. 2020; Dauden-Bengoa et al. 2020). These prey species are noted as widely spread throughout the GOMx based on review of the Smithsonian fish data base. *Ariomma bondi and Ariomma melanum,* showed concentrations in semicircle along the 200-m depth contours in the northern GOMx, with higher concentrations specifically within the area defined as the core Rice's whale habitat (Lamkin, 1997).

In regard to PCE 2, net primary productivity, based on surface chlorophyll-a levels, is consistent across the northern GOMx, with changes in productivity associated mainly with distance from shore and water depth rather than longitudinal differences (Allee et al. 2012; Love et al. 2013). In the GOMx open waters,

chlorophyll concentrations are generally low and exhibit an annual cycle with highest concentrations occurring between December and March and lowest values occurring between July and September (Damien et al. 2018). By comparison, coastal waters typically have higher surface chlorophyll concentrations driven by land and river discharges (Damien et al. 2018). Therefore, it is expected that surface chlorophyll-a levels for the 100 to 400-m isobath would be similar across the proposed critical habitat.

Primary productivity using particulate organic carbon (as opposed to surface chlorophyll) as noted by Kwon (2021) may be more important as Rice's whale habitat productivity descriptor. Jochens and DiMarco (2008) noted that historical time series records show current speeds near-bottom (driven by surface loop currents) can reach 50 to 100 cm s^{-1} throughout the GOMx with intensification along sloping bathymetry providing transport of large amounts of organic material. Jochens and DiMarco (2008) go on to note that there are persistent cyclones or anticyclones near the shelf edge. The persistence of these features can influence the productivity of the deep-water and bentho-pelagic communities throughout the shelf edge.

The importance of communication space for baleen whales is well documented and the driver for PCE 3. Areas of high anthropogenic activities such as high energy seismic surveys and commercial vessel traffic can reduce this communication space which may result in lowered health and altered behavior in marine mammals, particularly low frequency species such as Rice's whales. Rafter et al. (2022) provides a comprehensive summary of 10 years of acoustic data collection in the GOMx. Recorders in De Soto Canyon within Rice's whale core habitat had substantially lower noise levels, followed by the recorders in Mississippi Canyon, Dry Tortugas, and off the tip of the Yucatan Peninsula with industry-related noise (specifically shipping and seismic surveying) dominating the low frequency spectral components (Rafter et al. 2022). Similar results were found by Estabrook et al. (2016) for seven sites in the northern GOMx, and by HDR (2022). The soundscape information provided in these reports is also consistent with the information available regarding the locations where anthropogenic activities contributing to the local soundscapes are known to occur. Seismic survey activities typically occur in deeper waters beyond the shelf edge, which would contribute largely to the ambient noise levels in deeper waters (>500 m) (HDR 2022) which fall outside the proposed Rice's whale critical habitat.

The Delfin LNG Deepwater Port (DWP) infrastructure is located in shallow shelf waters, up to 22 m (72 ft) water depth and located more than 96 kilometers (60 miles) from the 100 m (328 ft) isobath (**Figure 1**). As described in the Port Delfin Final Environmental Impact Statement (USCG and MARAD 2016) and the updated Environmental Assessment (EA) for the Port Delfin LNG Project (SWCA 2023), the components of the proposed DWP that could affect the proposed Rice's whale critical habitat include noise, turbidity, and seafloor disturbances during construction and decommissioning of the mooring systems; and habitat creation, water intake by the moored Floating Liquefied Natural Gas Vessels (FLNGVs) and visiting LNG carriers, accidental releases, and vessel traffic during operations of the project (USCG and MARAD 2016; SWCA 2023).

Noise

Results of the acoustic modeling conducted by CSA (2016a) for the FEIS (USCG and MARAD 2016) indicate impact pile driving noise during construction would only be expected to exceed the threshold for physical injury in fish <2g (which is relevant for Rice's whale prey species in the critical habitat), based on the sound exposure level over 12 hours (SEL_{12h}) metric, up to 736 m (2,415 ft) from the moorings, and the threshold for behavioral disturbance in all fish could be exceeded up to 3,981 m (13,061 ft) from the moorings (CSA 2016a).

Rice's whales belong to the low-frequency cetacean (LFC) hearing group defined in NMFS (2018), and modeled range to the permanent threshold shift (PTS) threshold during impact pile driving were estimated to be 1,089 m (3,572 ft) based on the sound exposure level over 24 hours (SEL_{24h}) metric, and the estimated range to the SPL behavioral disturbance threshold of 160 dB re 1 µPa for marine mammals was 858 m (2,815 ft) (CSA 2016a; USCG and MARAD 2016). Given these modeled ranges (CSA 2016a) and source levels for a 96-in steel pile from ICP Jones & Stokes and Illingworth and Rodkin Inc. (2009) for fish and Rice's whales, construction noise would not be expected to affect Rice's whale prey species (PCE 1) or the soundscape conditions (PCE 3) in the critical habitat area as the nearest mooring that would be installed with impact pile driving is approximately 96 kilometers (60 miles) from the inner border of the proposed critical habitat (**Figure 1**).

During Project operations, non-impulsive, continuous noise would be produced by LNG carriers transiting to and from the DWP and station keeping at the moorings. Broadband SPL estimates for LNG carriers traveling at full speed (20 knots) and half speed (8 to 10 knots) would be 192 and 175 dB re 1 µPa in water, respectively (USCG and MARAD 2008). Broadband noise generated by offshore service vessels traveling at full speed (12 to 16 knots) and half speed (6 to 8 knots) is estimated at 186 and 183 dB re 1 µPa, respectively (USCG and MARAD 2008). Depending on the season and receiver depth, the range to the SPL 120 dB re 1 µPa behavioral disturbance threshold for all marine mammals in response to non-impulsive continuous noise could extend to approximately 22 kilometers (14 miles) from the vessels (CSA 2016b; USCG and MARAD 2016).

The noise produced by vessels operating in station keeping mode at the DWP would not reach the proposed Rice's whale critical habitat at levels above disturbance thresholds, but vessels transiting through the critical habitat would contribute noise to the existing soundscape. The Delfin LNG project expects up to 160 LNG carrier port calls at the Deepwater Port annually (40 for each of the four FLNGVs) for a total of 320 transits through the Rice's whale proposed critical habitat when accounting for roundtrip travel. However, the LNG carriers transiting to the DWP through one of the shipping fairways identified in **Figure 1** would only be expected to remain within the boundaries of the proposed Rice's whale critical habitat for a few hours when traveling at typical transit speeds of between 10 and 20 knots. Compared to the baseline vessel traffic in the area (discussed further under the ***Vessel Traffic*** header), the additional noise produced by the LNG carriers associated with this Project would not be expected to significantly affect the existing soundscape conditions (PCE 3) of the critical habitat such that Rice's whale communication and detection capabilities would be reduced.

Habitat Creation

The moorings installed for the DWP along the seafloor would alter the existing sandy and silty seafloor and create hardbottom seafloor and 3D structures that could create a "reef effect"; however, bentho-pelagic prey species that are concentrated in shelf habitats are not likely to utilize or benefit from this reefing effect. Further, none of these structures will be installed within or near the proposed Rice's whale critical habitat, which is 96 kilometers (60 miles) from the nearest project structure, so no habitat altered or created by the proposed DWP would affect any PCEs for the proposed critical habitat. Likewise, habitat alteration is not expected to affect primary productivity (PCE 2) within the area of proposed critical habitat.

Water intake

The updated EA for the Port Delfin LNG Project (SWCA 2023) describes project refinements to reduce seawater intake associated with the FLNGVs by using onboard air cooling for the essential generators used for supplemental power (and propulsion when underway). Limited seawater intake is also expected for electrical generator engine/boiler cooling, freshwater production, and other miscellaneous uses for the LNG carriers calling at each of the four FLNGVs. However, as discussed previously, the FLNGVs and LNG carriers will be moored at the DWP that is located 96 kilometers (60 miles) from the proposed Rice's whale critical habitat so this activity would not affect any of the three Rice's whale PCEs described above.

The only Delfin LNG project-related affects that would occur within the proposed Rice's whale critical habitat are the LNG carriers transiting through the critical habitat on their way to and from the DWP moorings. It should be noted that these vessels will not be owned or operated by Delfin LNG but will be contracted by Delfin's LNG offtake customers to receive and transport LNG from the Project. These LNG carriers will likely use water cooled main engines and/or boiler condensers that continuously intake and circulate seawater for engine cooling, boiler condensers and other miscellaneous shipboard needs while in transit. However, this water intake will be limited to the draft of the LNG carrier (generally the upper 12 m [40 ft] of the water column), and the shipboard seawater intake structures (sea chests) typically include a screen or grate system to prevent all but the smallest marine organisms from becoming entrained into the pumps and seawater circulation system. Further the vessels would only be present within the proposed critical habitat for a few hours while transiting as discussed previously under the ***Noise*** header. Given the limited portion of the water column that would be affected and the short duration of the LNG carriers transiting the proposed critical habitat, water intakes from these vessels would not be expected to affect the preferred bentho-pelagic prey species for Rice's whales (PCE 1) previously discussed and effects on water quality (PCE 2) within the proposed critical habitat, if any, would be insignificant.

Turbidity and Seafloor Disturbances

During project construction, turbidity and seafloor disturbances would be limited to the area immediately around the LNG moorings depicted in **Figure 1**, and would therefore not intersect with the Rice's whale proposed critical habitat (PCE 1 and PCE 2).

Accidental Releases

All FLNGVs and LNG carriers are designed with numerous features to prevent or mitigate the extent of LNG spills including double hulls and protected cargo tank locations to reduce the risk of an LNG release in the event of a collision, grounding or similar incident. These vessels include numerous additional safety features required by international LNG shipping codes and standards, classification societies and certifying nations. There are few examples in the literature of shipboard LNG spills and none that describe a significant LNG release into the water (USCG and MARAD, 2016 at Appendix R "Major LNG Incidents"). The Delfin LNG FEIS describes an LNG release from the FLNGV as "unlikely and discountable" when considered in the context of the best management practices agreed to by Delfin (USCG and MARAD, 2016 at Section 4.3.1.1 under LNG Spills). However, in considering the remote possibility of an LNG release, the Delfin LNG FEIS includes the following comments:

> *"However, if an LNG spill were to occur, potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death and asphyxiation by natural gas vapors above the surface of the water. These impacts would likely occur in the immediate vicinity of the spill location; the time frame of the impact is limited. Since LNG would boil off as natural gas at the surface, depth and pressure required for gas to dissolve in surface waters would not be sufficient and gas vapors would disperse. In addition, the time frame for these impacts would be limited, and adverse toxic impacts would be expected to be minor after the LNG boiled off and the vapors dispersed." (USCG and MARAD, 2016 at Section 4.3.1.1 under LNG Spills)*

The risk of an accidental LNG release would be slightly elevated in the area around the DWP location when LNG carriers are moored at an FLNGV and conducting cargo transfer operations. However, as noted previously, the Delfin LNG DWP is located approximately 96 kilometers (60 miles) from the proposed Rice's whale critical habitat so the likelihood of an LNG spill impacting a Rice's whale or the Rice's whale proposed critical habitat is discountable. A study conducted by the Department of Energy (2012) found that as much as 40% of the LNG spilled from an LNG carrier's cargo tank remained within the vessel structure reducing the amount of releases into the marine environment. Spills associated with LNG have also been found to have a smaller footprint and shorter duration than those associated with crude oil (Lehr and Simecek-Beatty 2017).

The Delfin LNG FLNGVs and visiting LNG carriers will be required to meet international pollution prevention standards including the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) that prescribes design and operational procedures to prevent or minimize marine pollution from oily waste, noxious liquid substances, garbage (including plastics), sewage and air pollution. Additionally, the Project will implement mitigation measures and best management practices outlined in the FEIS (USCG and MARAD 2016) such as compliance with Federal regulations to control the discharge of operational wastes such as bilge and ballast waters, trash and debris, and sanitary and domestic waste generated from vessels associated with the proposed Project. Best Management Practice (BMP) No. 13 contained in the Project's FEIS (USCG and MARAD, 2016) states:

> *BMP-13: LNGCs calling on the proposed DWP will be required to use approved equipment and follow and maintain records for ballast water and operational discharges (e.g., bilge, sanitary discharges) that are compliant with MARPOL and USCG standards. LNGCs operating fully within federal waters will be required to operate under a Vessel General Permit. Inspections will require review of onboard records for assessing compliance.*

Delfin LNG will prepare and implement a facility spill response and emergency plan required by 33 CFR 150.50(b) detailing emergency procedures for addressing accidental releases and spills during operations. These plans and procedures will be incorporated into the Delfin LNG Port Operations Manual that is reviewed and approved by the U.S. Coast Guard prior to commencing any operations at the DWP. In addition, all construction vessels and support vessels used as part of routine operations will be required to develop and comply with the applicable oil spill, firefighting, and emergency response plans required by U.S. regulations and international standards for the specific vessel type and size. Implementation of these measures will make accidental releases extremely unlikely, and the risk of effects on Rice's whale prey species (PCE 1) and existing water quality conditions (PCE 2) in the Rice's whale critical habitat are extremely low.

Vessel Traffic

Rice's whale are particularly susceptible to vessel strike risk due to their surface behaviors, particularly at night, when Rice's whales may spend up to 88 percent of their time within 15 m of the surface (Soldevilla et al. 2017). The only vessel traffic associated with the Project that would intersect the proposed Rice's whale proposed critical habitat are LNG carriers transiting to and from the DWP project. As the Project is located outside of the Rice's whale core distribution area, it is unlikely that the species will be impacted by the construction, operation, or decommissioning of the DWP facility. However, due to their distribution along the edge of the OCS, there exists the potential for an encounter during LNG carrier transit to and from the DWP. As the proposed transit routes are outside of the Rice's whale core distribution area, vessel encounters are anticipated to be infrequent.

As discussed previously, it is estimated that up to 160 LNG carrier port calls (equating to 320 transits through the critical habitat when accounting for roundtrip travel) to the DWP FLNGV moorings are anticipated per year under the proposed Project. These LNG carriers are expected to use shipping fairways as they approach the Delfin LNG deepwater port as these designated waterways are required to be kept clear of offshore platforms or other obstructions thus minimizing the risk of accidents and enhancing the safety of the vessel's transit. Shipping safety fairways essentially serve as the designated "highways" for large commercial vessels operating in offshore areas.

LNG carriers transiting to the DWP will likely arrive from the central Gulf of Mexico and use the Sabine Pass Safety Fairway or the Calcasieu Pass Safety Fairway depicted in **Figure 1**, as these are the closest designated fairways to the DWP. However, as shown in **Figure 1**, these fairways comprise a small fraction of the overall available and active shipping fairways in use for all commercial vessel traffic in the Gulf of Mexico. For example, the average estimated number of commercial vessel transits into the

Sabine-Neches Waterway, the location of three major ports inshore of the DWP, is **150 to 200 daily transits** (USCG 2021). In comparison, the **320 annual LNG carrier transits** associated with the Delfin LNG project would be less than 1 trip per day which would contribute a nominal amount of additional vessel traffic in the region.

The Delfin LNG Final Environmental Impact Statement (USCG and MARAD 2016) includes Best Management Practice (BMP) No. 17 that requires Delfin to institute Vessel Strike Avoidance Measures described in NOAA Fisheries Southeast Region (2008, 2011) guidelines. Delfin LNG FEIS BMP No. 17 specifically states:

> *BMP-17: Delfin LNG will institute the procedures described in the NOAA Fisheries Southeast Region (2008, revised 2011) guidelines for Vessel Strike Avoidance Measures and Reporting for Mariners, which call for vessels to maintain a vigilant watch for marine mammals and sea turtles to avoid striking protected species. Delfin LNG will adhere to the reporting procedures related to injured or dead protected species described in these guidelines.*

NOAA Fisheries Southeast Region updated their Vessel Strike Avoidance Measures in 2021. Under the new guidelines, all vessels associated with the Project would be required to comply with the Vessel Strike Avoidance Measures (NOAA Fisheries 2021) shown below:

> *1. Operate at the minimum safe speed when transiting and maintain a vigilant watch for protected species to avoid striking them. Even with a vigilant watch, most marine protected species are extremely difficult to see from a boat or ship, and you cannot rely on detecting them visually and then taking evasive action. The most effective way to avoid vessel strikes is to travel at a slow, safe speed. Whenever possible, assign a designated individual to observe for protected species and limit vessel operation to only daylight hours.*
>
> *2. Follow deep-water routes (e.g., marked channels) whenever possible.*
>
> *3. Operate at "Idle/No Wake" speeds in the following circumstances:*
>
> > *a. while in any Project construction areas;*
> >
> > *b. while in water depths where the draft of the vessel provides less than 4 feet of clearance from the bottom; or*
> >
> > *c. in all depths after a protected species has been observed in and has recently departed the area.*
>
> *4. When a protected species is sighted, attempt to maintain a distance of 150 feet or greater between the animal and the vessel. Reduce speed and avoid abrupt changes in direction until the animal(s) has left the area.*
>
> *5. When dolphins are bow- or wake-riding, maintain course and speed as long as it is safe to do so or until the animal(s) leave the vicinity of the vessel.*

> *6. If a whale is sighted in the vessel's path or within 300 feet from the vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animals are clear of the area.*
>
> *7. If a whale is sighted farther than 300 feet from the vessel, maintain a distance of 300 feet or greater between the whale and the vessel and reduce speed to 10 knots or less.*

All vessels owned or under the operational control of Delfin LNG will be required to implement NOAA's Vessel Strike Avoidance Measures. These procedures will be incorporated into Delfin LNG's Port Operations Manual as required by BMP-17 and will be provided to LNG carriers calling at Delfin's Deepwater Port. In addition, Delfin intends to actively monitor ongoing NOAA Fisheries rulemaking related to Rice's whale and their critical habitat, and will incorporate applicable requirements into the Project's Deepwater Port Operations Manual. Given the nominal contribution of Project vessels to the ongoing vessel traffic transits that are estimated to occur within the Rice's whale proposed critical habitat and the mitigation measures committed to by the Project, vessels strikes of Rice's whales within their proposed critical habitat are extremely unlikely to occur.

Summary

As discussed above, construction and operation of the Delfin LNG project is not expected to have significant impacts on the Rice's whale proposed critical habitat. The project facilities are located more than 96 kilometers (60 miles) from the inshore edge of the proposed critical habitat. LNG carriers transiting through the Rice's whale proposed critical habitat to access Project facilities are not expected to have significant impacts on the availability of prey (PCE 1), water characteristic or quality (PCE 2), or significantly affect the existing soundscape conditions of the critical habitat such that Rice's whale communication and detection capabilities would be reduced (PCE 3). Considering all possible stressors that could affect the three PCEs identified for the Rice's whale critical habitat, any effects that do occur would be considered insignificant as they are either undetectable or so minor they cannot be meaningfully evaluated. Therefore, the proposed Delfin LNG DWP project *may effect, but is not likely to adversely affect* the Rice's whale proposed critical habitat.

5. Please include an analysis of potential project effects on the recently proposed critical habitat for green sea turtles (88 FR 46572, 07/19/2023; https://www.federalregister.gov/d/2023-14109).

Delfin response: The project is located within range of the North Atlantic Distinct Population Segment (DPS) of the green sea turtle. The NMFS (2023) Draft Biological Report for the Designation of Marine Critical Habitat for Six Distinct Population Segments of the Green Turtle, *Chelonia mydas*, identified the specific areas within the range of the green sea turtle and their supporting essential features necessary for the conservation of the critical habitat for the species. Within the U.S. EEZ, the range of the North Atlantic DPS includes waters off the U.S. east coast, the Gulf of Mexico and Puerto Rico. Proposed critical habitat for the North Atlantic DPS include migratory and benthic foraging/resting habitat designated from the mean high water line to 20 m depth (depicted by the green polygons in **Figure 2**) and

surface-pelagic foraging/resting ("*Sargassum*") characterized as convergence zones, frontal zones, surface-water downwelling areas, the margins of major boundary currents, and other areas that result in concentrated components of the *Sargassum*-dominated drift community, as well as the currents which carry turtles to *Sargassum*-dominated drift communities (depicted by the pink dashed line in **Figure 2**).

Migratory habitat includes sufficiently unobstructed waters that allow for unrestricted transit of reproductive individuals between benthic foraging/resting and reproductive areas; benthic foraging/resting habitat includes underwater refugia and food resources (i.e., seagrasses, macroalgae, and/or invertebrates) of sufficient condition, distribution, diversity, abundance, and density necessary to support survival, development, growth, and/or reproduction; and *Sargassum* habitat includes sufficient food resources and refugia to support the survival, growth, and development of post-hatchlings and surface-pelagic juveniles, and which are located in sufficient water depth (at least 10 m) to ensure offshore transport via ocean currents to areas which meet forage and refugia requirements (NMFS 2023).

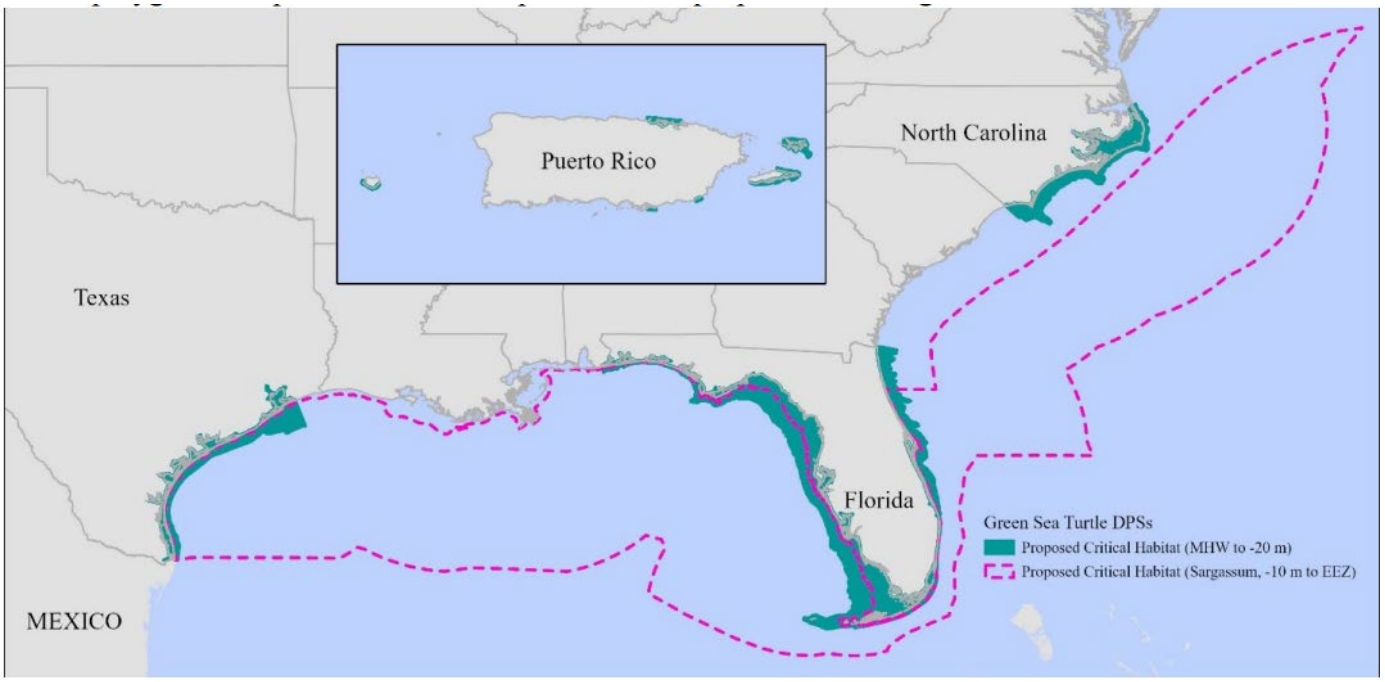

Figure 2. Proposed critical habitat for the North Atlantic DPS of green sea turtles (NMFS 2023).

Migratory habitat is essential to the conservation of the North Atlantic DPSs of the green sea turtle because it is required for connectivity between areas used by adults for foraging/resting and areas used for reproduction. Without successful migration, individuals could not survive and reproduce. The North Atlantic DPSs use relatively narrow paths in coastal waters to move between foraging/resting and

reproductive areas. In such instances, reproductive individuals that are otherwise spread out over many, often distant, foraging/resting sites become concentrated into a relatively small area (Foley et al. 2013), increasing the DPS's vulnerability to anthropogenic threats. Thwarted or delayed migration is likely to interfere with successful reproduction (88 FR 46572).

At all life stages, benthic and surface pelagic foraging/resting habitat is essential for the conservation of green turtle DPSs. Surface-pelagic foraging/resting habitats provide the energy required for post-hatchlings and juveniles to develop, grow, and transition into the next life stage. Benthic foraging/resting habitats provide the energy required for juveniles to mature and for adults to migrate and reproduce. Foraging includes locating and consuming food resources (e.g., seagrasses, macroalgae, invertebrates). Resting includes the use of underwater refugia for digestion, protection from predators, thermoregulation, and recuperation. Food resources and refugia are often located in adjacent areas, and turtles must move between these areas (88 FR 46572).

After the swim frenzy and early dispersal of post-hatchling stage green sea turtles, they swim and are carried by currents to pelagic habitats where surface waters converge to form local downwelling that result in linear accumulations of floating material, especially macroalgae (e.g., *Sargassum* spp.) (Carr 1987; Witherington et al. 2006, 2012; Mansfield et al. 2021). They remain at or near the sea surface, where thermal benefits promote the growth and survival of young turtles (Mansfield et al. 2021). These surface-pelagic habitats provide a place to rest and hide from predators as well as abundant food resources, including hydroids, bryozoans, polychaetes, gastropods, cnidarians, fish eggs, and organic debris associated with the *Sargassum* community (Witherington et al. 2006; Boyle and Limpus 2008; Jones and Seminoff 2013).

None of the proposed DWP Project infrastructure intersect the proposed migratory and benthic foraging/resting critical habitat shown in **Figures 1** and **2**. The Delfin Onshore Facility will be located immediately east of Sabine Pass which is approximately 63 kilometers (39 miles) from the nearest migratory and benthic foraging/resting critical habitat unit (**Figure 2**). All offshore components of the Project will extend south from this point and will not intersect this critical habitat unit (USCG and MARAD 2016; SWCA 2023).

The proposed DWP facility and associated vessel traffic does fall within the proposed *Sargassum* critical habitat for the North Atlantic DPS of green sea turtles (**Figures 1** and **2**). As described in the Port Delfin Final Environmental Impact Statement (USCG and MARAD 2016) and the updated Environmental Assessment for the Port Delfin LNG Project (SWCA 2023), the components of the proposed DWP that could affect the proposed green sea turtle critical habitat include noise during construction and decommissioning of the mooring systems; and habitat creation, water intake by the FLNGVs and LNG carriers, accidental releases, and vessel traffic during operations of the project (USCG and MARAD 2016; SWCA 2023). Seafloor disturbances and turbidity are not expected to affect green sea turtle habitat because the Project activities only overlap with the proposed *Sargassum* habitat which is a surface-based feature that would not be affected by seafloor alterations.

Noise

Noise from construction would be short term and not expected to affect the *Sargassum* habitat other than a temporary increase in local sound pressure levels. Acoustic modeling conducted for the Projects FEIS (USCG and MARAD 2016) indicated that the distances to sea turtle auditory injury would not be exceeded by pile driving noise during installation of the moorings, and noise above the behavioral disturbance threshold would only be exceeded out to 341 m (1,119 ft) (USCG and MARAD 2016). Given the short-term duration of the proposed pile driving activities, no long-term effects on the proposed *Sargassum* habitat that would affect green sea turtles access to these resources is expected.

During Project operations, non-impulsive, continuous noise would be produced by LNG carriers transiting to and from the DWP and station keeping at the moorings. It is currently estimated that up to 160 separate LNG carrier port calls will occur at the Delfin LNG Deepwater Port annually (40 LNG carrier port calls at each of the four FLNGV mooring locations for a total of 160 port visits). The vessel noise source is likely to be the most relevant to the proposed critical habitat as these low frequency sounds can propagate long distances. Broadband SPL estimates for LNGCs traveling at full speed (20 knots) and half speed (8 to 10 knots) are 192 and 175 dB re 1 µPa in water, respectively (USCG and MARAD 2008). Broadband noise generated by offshore service vessels traveling at full speed (12 to 16 knots) and half speed (6 to 8 knots) is estimated at 186 and 183 dB re 1 µPa, respectively (USCG and MARAD 2008). Vessel noise contribution to critical habitat from the DWP facility would be nominal when analyzed in the context of other commercial shipping traffic. Additionally, the modeled distance to the behavioral disturbance threshold for sea turtles was estimated to be 746 m (2,448 ft) so any impacts would be limited to the area around each LNG carrier.

Vessel Traffic

LNG carriers transiting through *Sargassum* critical habitat could disperse surface patches of *Sargassum* by breaking these aggregations into smaller areas due to the physical and hydraulic effects of the vessel's movement through the water. However, LNG carriers and support vessels associated with the Project are expected to voluntarily avoid *Sargassum* patches when practicable and safe to do so as it might have adverse impacts on vessel operation (e.g., slow or jam propellers or clog engine cooling water intakes). If vessels come in contact with *Sargassum*, the local biotic community might be affected however the effects would be localized and temporary.

Additionally, the Project will adhere to NOAA Fisheries Southeast Region Vessel Strike Avoidance Measures required by BMP No. 17 contained in the final EIS for the Delfin LNG Project (USCG and MARAD 2016) including NOAA's 2021 update to these guidelines. The increase in the number of vessel transits directly associated with the Delfin Project (320 per year), when viewed within the context of existing vessel traffic conditions, does not contribute a significant additional strike risk to sea turtles (including green sea turtles) within the proposed critical habitat. For example, the average estimated number of commercial vessel transits into the Sabine-Neches Waterway, the location of three major ports

directly inshore of the DWP, is 150 to 200 daily transits (USCG 2021). Therefore, the likelihood of Project vessel traffic significantly altering the proposed *Sargassum* critical habitat or resulting in strikes of green sea turtles within the critical habitat is extremely low.

Habitat Creation

The moorings installed for the DWP would create 3D structures in the water column that can affect local hydrodynamics and attract prey species to create a "reef effect". Man-made structures are known to attract sea turtles in the GOMx (Gitschlag 1990; Gitschlag and Herczeg 1994; NRC 1996). Therefore, it is possible that the post-hatchling turtles may be attracted to the DWP structures and provide sheltering or foraging benefits. However, changes in local hydrodynamics could also occur, but localized changes are expected to be nominal for the proposed *Sargassum* critical habitat.

In the GOMx, the interaction of wind stress, tide, and the Florida current system causes a circular current known as the Loop Current (USCG and MARAD 2016). Additionally, the surface currents in the proposed Port area are primarily wind- and tide-driven, causing the cyclonic circulation of the Louisiana-Texas Coastal current (USCG and MARAD 2016). The small size of the Delfin LNG Deepwater Port mooring structures are not expected to significantly impede the larger driving forces of the prevailing GOMx currents at depth and these currents are expected to return to ambient conditions immediately down current of the Port facilities (USCG and MARAD 2016). In addition, the Delfin LNG submerged swivel and yoke (SSY) mooring structures are located well under the surface of the water and will have limited interface with floating *Sargassum* assemblages. Therefore, no substantial effects in the assemblages of *Sargassum* would result from the presence of DWP structures such that green sea turtle access to these resources is altered.

Water intake

The visiting LNG carriers will likely use water cooled main engines and/or boiler condensers that continuously intake and circulate seawater for engine cooling, boiler condensers and other miscellaneous shipboard needs while in transit. However, this water intake will be limited to the draft of the LNG carrier (generally the upper 12 m (40 ft) of the water column) and the seawater intake structures (sea chests) typically include a screen or grate system to prevent marine organisms, including *Sargassum*, from becoming entrained into the pumps and seawater circulation system. In addition, *Sargassum* is typically concentrated in floating aggregations with the first several meters the water's surface while seawater intake from the LNG carriers will normally occur from sea chests located at greater depth reducing the potential for *Sargassum* to be entrained into the vessel's seawater circulation system.

The cooling system design for the Project FLNGVs evaluated in the Final EIS (USCG 2016) included air-cooled heat exchangers for the main power plant cooling processes (refrigerant compression drives and general power generation). This system eliminated the intake of seawater for this main cooling system and the impacts associated with the intake and discharge of the cooling water. In addition, the updated EA for the Port Delfin LNG Project (SWCA 2023) describes project refinements to further reduce seawater intake associated with the FLNGVs by using onboard air cooling for the essential generators

used for supplemental power (and propulsion when underway). As a result of these "air cooling" project design features, average daily water use for each FLNGV is estimated to be less than 3 million gallons (including for ballast needs). Similar to LNG carriers, the seawater intake structures (sea chests) on Project FLNGVs will be located lower on the vessel's hull, have protective screens or grates, and are not expected to routinely interface with floating assemblages of *Sargassum*. The reduction in needed seawater use and the location and screening features of the seawater intake structures, make it unlikely that the Project FLNGVs will cause significant impacts to *Sargassum* resources.

When viewed within the context of existing vessel traffic conditions (discussed previously for ***Vessel Traffic***), the number of LNG carrier visits associated with the Project does not contribute a significant additional risk posed by water intake within the proposed critical habitat. Therefore, this would represent a minimal contribution to existing vessel activities in the proposed green turtle critical habitat and would not be expected to significantly affect the existing water quality conditions or access to the *Sargassum* critical habitat features.

Accidental Releases

All FLNGVs and LNG carriers are designed with numerous features to prevent or mitigate the extent of LNG spills including double hulls and protected cargo tank locations to reduce the risk of an LNG release in the event of a collision, grounding, or similar incident. These vessels also include numerous additional safety features required by international LNG shipping codes and standards, classification societies and certifying nations. There are few examples in the literature of shipboard LNG spills and none that describe a significant LNG release into the water (USCG and MARAD, 2016 at Appendix R "Major LNG Incidents"). The Delfin LNG FEIS describes an LNG release from the FLNGV as "unlikely and discountable" when considered in the context of the best management practices agreed to by Delfin (USCG and MARAD, 2016 at Section 4.3.1.1 under LNG Spills). However, in considering the remote possibility of an LNG release the Delfin LNG FEIS includes the following comments:

> *"However, if an LNG spill were to occur, potential impacts would include exposure to low-temperature LNG at the water surface, possibly resulting in frostbite or death and asphyxiation by natural gas vapors above the surface of the water. These impacts would likely occur in the immediate vicinity of the spill location; the time frame of the impact is limited. Since LNG would boil off as natural gas at the surface, depth and pressure required for gas to dissolve in surface waters would not be sufficient and gas vapors would disperse. In addition, the time frame for these impacts would be limited, and adverse toxic impacts would be expected to be minor after the LNG boiled off and the vapors dispersed." (USCG and MARAD, 2016 at Section 4.3.1.1 under LNG Spills).*

During Project operations, the risk of accidental LNG releases would be slightly elevated in the area around the DWP location when LNG carriers are moored and conducting cargo transfer operations. A study conducted by the Department of Energy (2012) found that as much as 40% of the LNG spilled from an LNG carrier's cargo tank remained within the vessel structure reducing the amount of releases into the

marine environment. Spills associated with LNG have also been found to have a smaller footprint and shorter duration than those associated with crude oil (Lehr and Simecek-Beatty 2017).

The Delfin LNG FLNGVs and visiting LNG carriers will be required to meet international pollution prevention standards including the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) that prescribes design and operational procedures to prevent or minimize marine pollution from oily waste, noxious liquid substances, garbage (including plastics), sewage and air pollution. Additionally, the Project will implement mitigation measures and best management practices outlined in the FEIS (USCG and MARAD 2016) such as compliance with Federal regulations to control the discharge of operational wastes such as bilge and ballast waters, trash and debris, and sanitary and domestic waste generated from vessels associated with the proposed Project. Best Management Practice (BMP) No. 13 contained in the Project's FEIS (USCG and MARAD, 2016) states:

> *BMP-13: LNGCs calling on the proposed DWP will be required to use approved equipment and follow and maintain records for ballast water and operational discharges (e.g., bilge, sanitary discharges) that are compliant with MARPOL and USCG standards. LNGCs operating fully within federal waters will be required to operate under a Vessel General Permit. Inspections will require review of onboard records for assessing compliance.*

Delfin LNG will prepare and implement a facility spill response and emergency plan required by 33 CFR 150.50(b) for the Deepwater Port that includes emergency procedures for addressing accidental releases and spills during operations. These plans and procedures will be incorporated into the Delfin LNG Port Operations Manual that is reviewed and approved by the U.S. Coast Guard prior to commencement of operations at the port. In addition, all construction vessels, mooring tugs, and other support vessels used as part of routine operations will be required to develop and comply with the applicable oil spill, firefighting, and emergency response plans required by U.S. regulations and international standards for the specific vessel type and size.

Implementation of these measures will make accidental releases extremely unlikely and also protect existing water quality conditions. As a result, the risk of significant adverse effects from accidental releases into the proposed *Sargassum* critical habitat is extremely low.

Summary

The construction and decommissioning of the DWP facility would have a temporary impact on critical habitat through seafloor disturbance and covering of invertebrates, important for foraging of individuals. As described above, Project activities are not expected to result in significant impacts to proposed *Sargassum* critical habitat. As impacts to critical habitat essential features in Louisiana waters would be short-term and minor, and since Louisiana water's typically do not support large numbers of green sea turtles, any effects on sea turtle critical habitat would be insignificant as they are either undetectable or so minor they cannot be meaningfully evaluated. As a result, the proposed DWP project "*may effect, but is not likely to adversely affect*" the proposed green sea turtle critical habitat.

6. You can remove the South Atlantic [SA] DPS of green sea turtles from the list of species that may be affected, as the most recent scientific studies show that individuals from this DPS are not expected to occur within the Gulf of Mexico.

Delfin's observation. This appears to be a straightforward request by NOAA to remove the South Atlantic DPS of green sea turtles from the informal consultation request as they are not expected to occur in the Gulf of Mexico.

Delfin appreciates the opportunity to provide our observations on the NOAA Fisheries request for additional information on the Delfin LNG project. We are, of course, available to provide clarifications or augment the above discussions, if needed. Delfin believes that the NOAA Fisheries request for additional information can be answered quickly and we are hopeful that the information provided here is useful in developing MARAD's response. Delfin is prepared to participate in a meeting or teleconference with MARAD regarding the above comments including possible participation by NOAA Fisheries Southeast Regional Office staff.

Delfin respectfully requests an update on the current status of MARAD's consultation with NOAA Fisheries on the Delfin LNG project. Also, given the lengthy period of time since our last joint meeting or conference call, we also believe that a general Project update meeting or conference call is appropriate to discuss the status of MARAD's review of our submitted materials and issuance of the Project's Deepwater Port license.

Please call me at (850) 933-1720 to discuss any of the above.

Respectfully submitted,

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