DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 217

[Docket No. 110801452–2387–03]

RIN 0648–BB00

Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Construction and Operation of a Liquefied Natural Gas Deepwater Port in the Gulf of Mexico

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Proposed rule; request for comments.

SUMMARY: NMFS has received a request from Port Dolphin Energy LLC (Port Dolphin) for authorization to take marine mammals incidental to port construction and operations at its Port Dolphin Deepwater Port in the Gulf of Mexico, over the course of five years; approximately June 2013 through May 2018. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is proposing regulations to govern that take and requests information, suggestions, and comments on these proposed regulations.

DATES: Comments and information must be received no later than October 25, 2012.

ADDRESSES: You may submit comments on this document, identified by FDMS Docket Number 110801452–2387–03, by any of the following methods:

• *Electronic Submission:* Submit all electronic public comments via the Federal e-Rulemaking Portal *www.regulations.gov.* To submit comments via the e-Rulemaking Portal, first click the Submit a Comment icon, and then enter 110801452–2387–03 in the keyword search. Locate the document you wish to comment on from the resulting list and click on the Submit a Comment icon on the right of that line.

• Hand delivery or mailing of comments via paper or disc should be addressed to Michael Payne, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910.

Comments regarding any aspect of the collection of information requirement contained in this proposed rule should be sent to NMFS via one of the means provided here and to the Office of Information and Regulatory Affairs, NEOB–10202, Office of Management and Budget, Attn: Desk Office, Washington, DC 20503, *OIRA@omb.eop.gov.*

Instructions: Comments must be submitted by one of the above methods to ensure that the comments are received, documented, and considered by NMFS. Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered. All comments received are a part of the public record and will generally be posted for public viewing on *www.regulations.gov* without change. All personal identifying information (e.g., name, address) submitted voluntarily by the sender will be publicly accessible. Do not submit confidential business information, or otherwise sensitive or protected information. NMFS will accept anonymous comments (enter N/A in the required fields if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word, Excel, or Adobe PDF file formats only.

FOR FURTHER INFORMATION CONTACT: Ben Laws, Office of Protected Resources, NMFS, (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Availability

A copy of Port Dolphin's application may be obtained by writing to the address specified above (see **ADDRESSES**), calling the contact listed above (see **FOR FURTHER INFORMATION CONTACT**), or visiting the Internet at: *http://www.nmfs.noaa.gov/pr/permits/incidental.htm.* To help NMFS process and review comments more efficiently, please use only one method to submit comments.

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. NMFS has defined ''negligible impact'' in 50 CFR 216.103 as ''* * * an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.''

Except with respect to certain activities not pertinent here, the MMPA defines ''harassment'' as: ''any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild ['Level A harassment']; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering ['Level B harassment'].''

Summary of Request

On February 1, 2011, NMFS received a complete application from Port Dolphin for the taking of marine mammals incidental to port construction and operations at its Port Dolphin Deepwater Port (DWP) facility in the Gulf of Mexico (GOM). During the period of these proposed regulations (June 2013–May 2018), Port Dolphin proposes to construct the DWP and related infrastructure—expected to occur over an approximately 11-month period, beginning in June 2013—and to subsequently begin operations. The proposed DWP, which is designed to have an operational life expectancy of 25 years, would be an offshore liquefied natural gas (LNG) facility, located in the GOM approximately 45 km (28 mi) off the western coast of Florida, and approximately 68 km (42 mi) from Port Manatee, located in Manatee County, Florida, within Tampa Bay (see Figure S–1 in Port Dolphin's application). The DWP would be in waters of the U.S. Exclusive Economic Zone (EEZ) approximately 31 m (100 ft) in depth. The proposed DWP would consist principally of a permanently moored buoy system, designed for offloading of natural gas, leading to a single proposed new natural gas transmission pipeline that would come ashore at Port Manatee and connect to existing infrastructure.

Take of marine mammals would occur as a result of the introduction of sound into the marine environment during construction of the DWP and pipeline and during DWP operations, which would involve shuttle regasification vessel (SRV) maneuvering, docking, and debarkation, as well as regasification activity. Because the specified activities have the potential to take marine mammals present within the action area, Port Dolphin requests authorization to incidentally take, by Level B harassment only, small numbers of bottlenose dolphin (*Tursiops truncatus*) and Atlantic spotted dolphin (*Stenella frontalis*).

Description of the Specified Activity

Port Dolphin proposes to own, construct, and operate a DWP in the U.S. EEZ of the GOM Outer Continental Shelf (OCS) approximately 45 km (28 mi) off the western coast of Florida to the southwest of Tampa Bay, in a water depth of approximately 31 m (100 ft). On March 29, 2007, Port Dolphin submitted an application to the U.S. Coast Guard (USCG) and the U.S. Maritime Administration (MarAd) for all federal authorizations required for a DWP license under the Deepwater Port Act of 1974 (DWPA). Port Dolphin received that license in October 2009. The Port would consist of a permanently moored unloading buoy system with two submersible buoys separated by a distance of approximately 5 km (3 mi). The buoys would be designed to moor a specialized type of LNG carrier vessel (i.e., SRVs) and would remain submerged when vessels are not present. Regasified natural gas would be sent out through the unloading buoy to a 36-in (0.9 m) pipeline that would connect onshore at Port Manatee with the existing Gulfstream Natural Gas System and Tampa Electric Company (TECO) Bayside pipeline. The DWP would only serve SRVs. Construction of the DWP would be expected to take 11 months. Port Dolphin DWP would be designed, constructed, and operated in accordance with applicable codes and standards and would have an expected operating life of approximately 25 years. The locations of the DWP and associated pipeline are shown in Figure S–1 in Port Dolphin's application; Figure 1–1 of the same document depicts a conceptual site plan for the DWP.

The installation of the DWP facilities would include the construction and installation of offshore buoys, mooring lines, and anchors. The two unloading buoys, also known as submerged turret loading (STL) buoys, would each have eight mooring lines connected to anchor points, likely consisting of piles driven into the seabed. When not connected to a SRV, STL buoys would be submerged 60 to 70 ft (18 to 21 m) below the sea surface. The installation of the pipeline from the DWP to shore would include burial of the pipeline, selective placement of protective cover (either rock armoring or concrete mattresses) over the pipeline at several locations along the pipeline route where full burial is not possible, and the horizontal directional drilling (HDD) of three segments of the pipeline.

SRVs are specialized LNG carriers designed to regasify the LNG prior to off-loading for transport to shore. Each STL buoy would moor one SRV on location throughout the unloading cycle. An SRV would typically moor at the deepwater port for between 4 and 8 days, depending on vessel size and send-out rate. Unloading of natural gas (i.e., vaporization or regasification) would occur through a flexible riser connected to the STL buoy and into the pipeline end manifold (PLEM) for transportation to shore via the subsea pipeline. With two separate STL buoys, Port Dolphin may schedule an overlap between arriving and departing SRVs, thus allowing natural gas to be delivered in a continuous flow.

Port Dolphin is planning for an initial natural gas throughput of 400 million standard cubic feet per day (MMscfd). Although the Port would be capable of an average of 800 MMscfd with a peak capacity of 1,200 MMscfd, this level of throughput would not be achieved during the span of this proposed rule. Based on a regasification cycle of approximately 8 days and initial throughput of 400 MMscfd, maximum vessel traffic during operations over the lifetime of the proposed 5-year regulations is projected to consist of 46 SRV unloadings per year.

In the open ocean, SRVs typically travel at speeds of up to 19.5 kn (36.1 km/hr). When approaching the vicinity of the DWP (i.e., during approach to the DWP), the SRVs would typically slow to about half speed. In close proximity to the STL buoys, the SRVs would slow to dead slow and utilize thrusters to attain proper vessel orientation relative to the DWP, taking into consideration ambient ocean currents, wind conditions, and buoy position. The following subsections describe the Region of Activity and the preceding facets of construction and operation in greater detail.

Region of Activity

The GOM is a marine water body bounded by Cuba on the southeast; Mexico on the south and southwest; and the U.S. Gulf Coast on the west, north, and east. The GOM has a total area of 564,000 km^2 (217,762 mi^2). Shallow and intertidal areas (water depths of less than 20 m) compose 38 percent of the total area, with continental shelf (22 percent), continental slope (20 percent), and abyssal plain (20 percent) composing the remainder of the basin. The project site is located on the west Florida Shelf, a portion of the Inner Continental Shelf, in an area of relatively low wave energy and tidal variation (Gore, 1992).

The GOM is separated from the Caribbean Sea and Atlantic Ocean by Cuba and other islands, and has relatively narrow connections to the Caribbean and Atlantic through the Florida and Yucatan Straits. The GOM is composed of three distinct water masses, including the North and South Atlantic Surface Water (less than 100 m deep), Atlantic and Caribbean Subtropical Water (up to 500 m deep), and Subantarctic Intermediate Water.

Circulation within the GOM, and within the project area, is dominated by the Loop Current, which enters the GOM flowing north through the Yucatan Strait, flows south along the Florida coast in the vicinity of the project area, and exits the GOM through the Florida Straits. The velocity of the current in the project area ranges between 1.56 and 15.16 cm/s in summer, and 1.79 to 25.36 cm/s in winter (APL, 2006). The direction of flow in the project area is generally south to southeast.

In shallow areas along the west Florida Shelf, additional influences on water flow and circulation include wind stress, freshwater inflow, and variations in buoyancy (Gore, 1992). Wind speeds at the project site range from 2.26 to 7.61 m/s in summer, and 2.85 to 11.04 m/s in winter (APL, 2006). Tidal variation along Florida's west-central continental shelf is moderate, with an average range of approximately 2 ft (0.6 m) (Gore, 1992).

At the eastern edge of the Loop Current along the west Florida Shelf, circulation patterns result in an upwelling of deep nutrient-rich water. This upwelling supports a high level of biological activity, producing large concentrations of plankton. Nutrient levels (primarily nitrogen and phosphorus) are also affected by runoff from agricultural and urbanized areas and from submarine groundwater discharge, leading to red tide conditions. In the project area, red tide occurs on an almost annual basis (Hu *et al.,* 2006). Red tides are caused by rapid growth of the species *Karenia brevis,* a toxic species which produces brevetoxins (a type of neurotoxin) that can accumulate in bivalves and cause mortality in marine organisms (Hu *et al.,* 2006). The rapid growth of these organisms can also create a hypoxic zone (area with dissolved oxygen concentrations below 2 mg/L), which can cause mortality among benthic communities, fish, turtles, birds, and marine mammals (Hu *et al.,* 2006).

Extreme variations in water circulation patterns, tides, and wave heights can occur along the west Florida coast during periodic tropical storms and hurricanes. Warm water within the Loop Current can act as an energy source in summer and fall months, fueling the development of these storms. Features of these storms that can affect natural circulation and topography include high winds, flooding, storm surges, and beach erosion.

Tampa Bay is an estuary formed by the rise of sea level into a former river valley. Tampa Bay consists of four subregions, including lower Tampa Bay, middle Tampa Bay, Old Tampa Bay, and Hillsborough Bay. The project area would only extend to Port Manatee, within Lower Tampa Bay, near the outlet of the bay into the GOM. The bay covers an area of 1,030 km^2 within Hillsborough, Manatee, and Pinellas counties. Freshwater inflow to the bay occurs through four major river systems (Alafia, Hillsborough, Little Manatee, and Manatee), as well as more than a hundred minor creeks and rivers.

Water circulation within the bay is driven by freshwater inflow, tides, and winds. The bay has an average depth of 3.5 to 4 m. There is well-developed horizontal stratification in the bay, with fresh water flowing along the surface out to sea, and denser saline water flowing into the bay along the bottom.

The Tampa Bay area has a population of more than two million people, and tributaries, habitat, runoff patterns, and water quality are all affected by urbanization. Specific actions that have affected the bay include removal of mangroves, dumping of sewage, artificial filling, and modification of runoff from paved surfaces (Peene *et al.,* 1992).

Dates of Activity

Port Dolphin has requested regulations governing the incidental take of marine mammals for the five-year period from June 2013 through May 2018. Construction and installation of the port and pipeline would last approximately 11 months, with subsequent operations (i.e., SRV docking and regasification) occurring for the remainder of the specified time period.

LNG and SRVs

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

LNG is natural gas that has been cooled to about −260 °F (−162 °C) for efficient shipment and storage as a liquid. LNG is more compact than the gaseous equivalent, with a volumetric differential of about 610 to 1. LNG can thus be transported long distances across oceans using specially designed ships (e.g., SRVs), allowing efficient access to stranded reserves of natural gas that cannot be transported by conventional pipelines.

This proposed STL buoy system differs from other common LNG offload technologies insofar as it does not involve any permanent storage or regasification facility at the DWP, thus minimizing required infrastructure at the DWP itself. Rather, STL buoys receive SRVs that contain onboard LNG vaporization equipment. After mooring, LNG is vaporized onboard the vessel and discharged via the unloading buoy and a flexible riser into the subsea pipeline. Because the LNG is vaporized with the SRV's onboard equipment, no permanent fixed or floating storage or vaporization facilities are required. However, this means that the offload process can take 5 to 8 days, as compared with a standard offload of 18 hours or less. As a result of this trade-off, continuous off-loading operations are essential to minimize fluctuations in the throughput of natural gas. The SRVs proposed for use would be equipped to transport, store, vaporize, and meter natural gas. A closed-loop, glycol/water-brine heat transfer system would be used to vaporize the LNG. Closed-loop systems burn vaporized LNG in order to heat an intermediate fluid (e.g., glycol/water-brine), which warms the LNG. The closed-loop system results in reduced environmental impacts on water quality and marine resources; although these systems do require seawater for use in cooling electrical generating equipment (resulting in subsequent entrainment of fish eggs and plankton, as well as discharge of water at elevated temperatures), such usage is significantly reduced from that required in an open-loop system.

SRVs with approximate cargo capacities of either 145,000 m^3 or 217,000 m^3 (189,653–283,825 yd^3) based on standard designs for oceangoing LNG carriers would be used to supply LNG to the Port. Approximate dimensions of each SRV would range from 280 m (919 ft) in length and 43 m (141 ft) in breadth, with a design draft of 11.4 m (37.4 ft) for the smaller vessels to 315.5 m (1,035 ft) in length and 50 m (164 ft) in breadth, with a design draft of 12 m (39 ft) for the larger vessels. The maximum height above the waterline would be 41.1 m (135 ft). The 145,000 m^3 SRV would displace 80,000 t (88,185 ton) and the 217,000 m^3 SRV would displace 108,000 t (119,050 ton). The vessels would be equipped with a trunk and mating cone to receive the unloading buoy, lifting and connection devices, an LNG vaporization system, and gas metering systems. All critical functions would be manned 24 hours per day; other functions would be accomplished on a regular, scheduled basis.

The SRVs would have two thrusters forward and could have one or two thrusters aft. Thrusters allow precise control of positioning while mooring with the STL buoy. The dynamic positioning system would be used while retrieving the submerged unloading buoy handling line and moving onto the buoy. The system normally would not be used while the SRV is moored to the unloading buoy. SRVs would be equipped with an acoustic position reporting system that would monitor the buoy's draft and position before and during connection/disconnection; this would be enabled by six transponders located on the buoy itself.

Seawater would be used to ballast the SRV, cool the dual-fuel diesel engines supplying power for the regasification process, and condense the steam produced by the boilers supplying heat to the vaporization process. Ballasting the SRV is required to maintain proper buoyancy as the LNG is vaporized and offloaded through the pipeline. Water intake for ballasting the SRV would require an average intake of 360 m^3 per hour (2.3 MGD) over the vaporization cycle. The cooling water system would require an additional intake of approximately 1,520 m^3 per hour (9.5 MGD) and would take in seawater through one of two sea chests, each measuring 1.5 x 2.0 m (4.9 x 6.6 ft). Water velocity through the lattice screens at the hull side shell would not exceed 0.15 m/s (0.49 ft/s) at the maximum flow rate of 1,520 m^3 per hour.

Cooling water discharges would be made at points removed from the intake sea chests to avoid recirculating warmed water through the cooling system. All of the cooling water would be discharged at a temperature of approximately 10 °C (18 °F) above the ambient water temperature. Although the seawater system would be equipped with a chlorination system to prevent biofouling of heat transfer surfaces and system components, the chlorination system would not be used while the SRVs are approaching the Port or moored at the buoys.

Port Construction

In-water construction of Port Dolphin is expected to begin in June 2013 and last a total of approximately 11 months. Construction would include siting the STL buoys and associated equipment and laying the marine pipeline. Construction is assumed to be continuous from mobilization to demobilization with no work stoppages due to weather or other issues. Please see Table 2–1 of Port Dolphin's application for a graphical depiction of the complete timeline of proposed construction activities. Port Dolphin anticipates that construction/installation would be accomplished in the following sequence:

- Install the Port Manatee HDD section, with installation proceeding from onshore to the offshore location.
- Install the anchor piles and the mooring lines using the main installation vessel at the DWP.
- Construction and installation of the HDD pipe sections for the segments under the existing Gulfstream pipeline.
- Install seabed pipe segments between the Port Manatee HDD segment and the Gulfstream HDD segments.
- Install the Skyway Bridge section of the pipe (requiring dredging through the causeway).
- Install the STL Buoys.
- Install the two risers from the PLEMs.
- Install the north and south PLEMs.
- Perform pipelay and diving operations towards the Y-connector.
- Install the flowlines on the seafloor.
- Complete tie-ins and bury or armor the pipeline, as necessary.
- Conduct testing of the pipeline upon completion of burial operations.

These components of in-water construction are discussed in greater detail in the following subsections.

DWP Construction/Installation—As described previously, the Port would include two STL unloading buoy systems, separated by a distance of approximately 5 km (3.1 mi) in a water depth of approximately 31 m (100 ft). Each unloading buoy would have eight mooring lines, consisting of wire rope and chain, connecting to eight driven-pile anchor points on the sea floor, one 16-in (0.4-m) inside diameter flexible pipe riser, and one electrohydraulic control umbilical from the unloading buoy to the riser manifold. When not connected to a SRV, STL buoys would be submerged 60 to 70 ft (18 to 21 m) below the sea surface. A concrete or steel landing pad would be fixed to the sea floor by means of a skirted mud mat to allow lowering of the STL buoy to the ocean floor when it is not in use.

The mooring lines would be designed so that the SRV could remain moored in non-hurricane 100-year storm conditions, and would vary in length, from 1,800 to 4,000 ft (549 to 1,219 m) for the northern unloading buoy and from 2,500 to 3,600 ft (762 to 1,097 m) for the southern buoy. The mooring lines would consist of 132-mm (5.2-in) chain and 120-mm (4.7-in) spiral-strand wire rope. The riser system for each unloading buoy would consist of one 16-in interior diameter flexible riser in a steep-wave configuration. Total length of the riser would be approximately 82 m (269 ft). The riser would be directed between two of the mooring lines, and would lie on the seafloor when not in use.

The two PLEMs near the unloading buoys would connect the flexible risers to the flowlines and a Y-connection that would connect the two flowlines to the new gas transmission pipeline. Each of the two PLEMs would be approximately 75 m (246 ft) offset from the proposed unloading buoy locations. The purpose of a PLEM is to provide an interface between the pipeline system and the flexible riser, isolate the riser between gas unloading operations, and attach a subsea pig launcher or receiver as necessary. ''Pigs,'' or ''pipeline inspection gauges,'' travel remotely through a pipeline to conduct inspections of or clean the pipeline and collect data about conditions in the pipeline. Each PLEM would include a flange connection for attaching the flexible riser or the subsea pig launcher/receiver and a full-bore subsea hydraulic control valve and electrohydraulic umbilical termination assembly. Each PLEM would have a mud mat foundation to provide a stable base for bearing PLEM and riser weight and to resist sliding and overturning forces. Please see Figure 1–1 in Port Dolphin's application for a conceptual diagram of the DWP.

Offshore installation activities at the DWP would begin with installation of the PLEMs at both STL buoy locations (north and south), followed by placement of the buoy anchors, mooring lines, buoys, and risers. Installation activities at both STL buoy locations would require a cargo barge, supported by anchor-handling support vessels, a supply boat, a crew transfer boat, and a tug. Buoy anchors would likely be installed via impact pile driving.

Pipeline Installation—The pipeline would be laid on the seafloor by a pipelaying barge and then buried, typically using a plowing technique. Other techniques, such as dredging and HDD, are planned to be used in certain areas depending on the final geotechnical survey, engineering considerations, and equipment selection. At the western (seaward) end, the pipeline would consist of two 36-in (0.9-m) flowlines connected to the north and south PLEMs, which would connect at a Y-connection approximately 3.2 km (2 mi) away (see Figure 1–1 in Port Dolphin's application). From the Y-connection a 36-in (0.9-m) gas transmission line would travel approximately 74 km (46 mi) to interconnections with the Gulfstream and TECO pipeline systems. The pipelines would have a nominal outer diameter of 36 in, with a coating of fusion-bonded epoxy and a concrete weight coating thickness of 11.4 cm (4.5 in).

Pipeline trenching and burial requirements are governed by Department of the Interior regulations at 30 CFR 250 Subpart J, which requires pipelines and all related appurtenances to be protected by 3 ft (0.9 m) of cover for all portions in water depths less than 200 ft (61 m). Portions of the pipeline that travel through hard-bottom areas may not be able to be buried to the full 3 ft depth. In these areas, flexible concrete mattresses or other cover would be used to cover the pipeline. In places where the pipeline crosses shipping lanes, it would be buried 10 ft (3 m) deep if the sea floor permits plowing. Burying the pipeline and flowlines would protect them from potential damage from anchors and trawls and avoid potential fouling, loss, or damage of fishermen's trawls. The pipeline construction corridor would be 3,000 ft (914 m) wide in offshore areas. The permanent in-water right-of-way for the pipeline would be 200 ft (61 m) wide.

Under the plowing method, the pipeline is lowered below seabed level by shearing a V-shaped ditch underneath it. The plow is towed along and underneath the pipeline by the burial barge. As the ditch is cut, sediment is removed and passively pushed to the side by specially shaped moldboards that are fitted to the main plowshare. The trench is then backfilled with a subsequent pass of the plow. The estimated width of the trench (including sediments initially pushed to each side) is 67 ft (20.4 m) (see Figure 1–2 in Port

Dolphin's application for a conceptual diagram of this process).

In areas that cannot be plowed (e.g., due to hard/live bottom) or complete burial cannot be achieved, the pipeline would be covered with an external cover (e.g., concrete mattresses or rock armoring). Although plowing is the preferred methodology for pipeline burial, other techniques such as dredging and HDD would be used where required. Figure 1–3 of Port Dolphin's application uses color coding of the proposed pipeline route to show where these various methodologies would be used, based on bottom structure and other barriers. The total length of the pipeline route is 74 km. Burial techniques to be used along the pipeline route and their relative lengths are characterized as follows:

- Plowing/trenching soft sediments: 39.6 km (24.6 mi; 53.2 percent of total pipeline length);
- Plowing/external cover: 23.3 km (14.5 mi; 31.4 percent);
- External cover (concrete mattress/rock armoring): 8.5 km (5.3 mi; 11.7 percent);
- Clamshell dredging/dragline burial: 0.3 km (0.2 mi; 0.5 percent); and
- HDD: 2.4 km (1.5 mi; 3.2 percent).

HDD would be employed for installation of the pipeline at three locations along the inshore portion of the route. The proposed HDD locations include drilling from land to water at the Port Manatee shore approach and from water-to-water at two crossings of the existing Gulfstream pipeline. The eastern HDD crossing would be 898 m (2,947 ft) in length, and the western HDD crossing would be 407 m (1,335 ft) in length. Both crossings would be in a water depth of 6.4 m (21 ft). The Port Dolphin pipeline would be drilled to a depth of approximately 6 m (20 ft) below the existing Gulfstream Pipeline (Port Dolphin, 2007b).

HDD is a steerable method of installing pipelines underground along a prescribed bore path, with minimal impact on the surrounding area. The process starts with location of entry and exit points. The first stage drills a pilot hole on the designed path, and the second stage enlarges the hole by passing a larger cutting tool known as a reamer. This would involve using progressively larger drill strings to eventually produce a drill bore 48 in (1.22 m) in diameter. The third stage places the product or casing pipe in the enlarged hole by way of the drill steel and is pulled behind the reamer to allow centering of the pipe in the newly reamed path. Simultaneously, bucket dredging would be employed to produce an exit hole at the end of the bore. In-water HDD may involve significant distance between the seabed and the drilling rig, and so a casing pipe may be required during the initial pilot hole drilling to provide some rigidity to the drill pipe as it is pushed ahead by the rig. Structures known as "goal posts" provide support for the casing pipe and are typically comprised of two driven piles with cross members set at predetermined elevations.

Port Dolphin has identified the need to install goal posts as part of the HDD drilling effort at the two water-to-water HDD locations. One potential option is that the goal posts are designed to self-install; however, another option is that drilling may be required. Further, at the shore-to-water transition HDD, Port Dolphin would need to install sheet piling to form a coffer dam, designed to contain the HDD exit pit so as to not impact nearby aquatic vegetation. Sheet pile segments would be installed by vibratory means.

Clam shell dredging would be required for passage under the Skyway Bridge and would be performed from a fixed working platform. Although dredging, followed by conventional lay and bury, is the most likely scenario, HDD remains a possibility for this segment. In the area near Manbirtee Key, a flotation ditch—dredging operations may require such a ditch when the minimum water depth necessary to safely float equipment is not present—would be dredged using conventional dredging equipment (i.e., the same barge that would be used to pull-in the shore approach HDD). The anticipated locations where the various methods of pipeline installation would be used are shown in Figure 1–3 of Port Dolphin's application.

There are eleven locations where tie-in operations would be required to piece the pipeline sections together. This mechanical operation is accomplished with specially designed connectors and a manned diving rig. This common operation does not require welding. Tie-ins would be required at each end of all HDD crossings, the Y-connection, and the PLEMs.

Construction Vessels—A shallow-water lay barge, spud barge and clamshell dredge, and a jack-up barge would be mobilized for offshore pipe-laying activities. Jack-up barges are mobile work platforms that are fitted with long support legs that can be raised or lowered; upon arrival at the work location the legs would be lowered and the barge itself raised above the water such that wave, tidal and current loading acts only on the relatively slender legs and not on the barge hull. A spud barge is a type of jack-up barge that typically offers increased stability but does not raise the hull above the water. This equipment would be used where conventional installation methods are anticipated. An HDD spread, including four jack-up barges, three hopper barges (designed to carry materials), and two tugs for barge towing, would be used for the three planned HDD segments. Four diving support vessels would also support tie-in and mattressing operations. Construction equipment would make one round-trip to the project location, staying on location for the duration of construction activity. Work crew vessels and supply vessels would make on average two trips a day for the duration of offshore construction. Work crew and supply vessels are expected to make between 420 and 450 round-trips to the offshore construction location from shore-based facilities for the duration of the project.

Table 1 details the vessels that would be used during the DWP and pipeline construction and installation activities. The projected duration and duty load of each vessel are also provided. Duty load is a primary consideration when characterizing project-related sound sources.

TABLE 1—VESSELS TO BE EMPLOYED DURING PORT DOLPHIN CONSTRUCTION AND/OR FACILITY INSTALLATION OPERATIONS

Operation	Auxiliary equipment/notes	Engine specifications [1]	Operational usage [2]
Construction/Installation at DWP			
Barge		N/A	3.5 months at 100%.
Anchor-handling support vessels	ROV winches, hydraulic pumps, thrusters, sonar, survey equipment.	2 × 3,750-hp.	
Supply boat	Bow thruster	671-hp.	

TABLE 1—VESSELS TO BE EMPLOYED DURING PORT DOLPHIN CONSTRUCTION AND/OR FACILITY INSTALLATION OPERATIONS—Continued

Operation	Auxiliary equipment/notes	Engine specifications [1]	Operational usage [2]
Crew transfer boat		671-hp.	
Tug		800-hp.	
Impact hammer		N/A	As required.
Pipeline installation			
Jack-up: Port Manatee HDD	Jack-up	3,000-hp	27 days at 50%.
Spud lay barge: Shallow lay operation; no propulsion; uses two tugs.	Tug	1,200-hp	59.4 days at 75%.
	Tug	1,200-hp.	
East jack-ups	Jack-up	3,000-hp	27 days at 75%.
	Jack-up	3,000-hp.	
West jack-ups	Jack-up	3,000-hp	27 days at 75%.
	Jack-up	3,000-hp.	
Pipelay barge: Large lay barge operation; no propulsion; uses two tugs.	Tug	2,000-hp	37 days at 85%.
	Tug	2,000-hp.	
Dragline barge		600-hp	6 days at 100%.
Plow lay barge: Plow burial operation; no propulsion; uses two tugs.	Tug	2,000-hp	113 days at 85%.
	Tug	2,000-hp.	
DSVs for mattress armoring	Vessel	1,000-hp	108 days at 100%.
	Vessel	1,000-hp.	
DSVs for mattress armoring	Vessel	1,000-hp	12 days at 15%.
		1,000-hp.	
	Vessel	1,000-hp.	
		1,000-hp.	
Pipeline gauge, fill, test, dewater, and drying	Vessel	300-hp	13 days at 35%.
		300-hp.	
	Vessel	300-hp.	
		300-hp.	
Survey vessel	Vessel	1,000-hp	54 days at 50%.
	Vessel	1,000-hp.	
Spud lay barge: Shallow lay barge operation; no propulsion; uses two tugs.	Tug	1,200-hp	6.6 days at 15%.
	Tug	1,200-hp.	
East jack-ups	Jack-up	2,000-hp	3 days at 15%.
	Jack-up	2,000-hp.	
West jack-ups	Jack-up	2,000-hp	3 days at 15%.
	Jack-up	2,000-hp.	
Pipelay barge: Large lay barge operation; no propulsion; uses two tugs.	Tug	2,000-hp	4 days at 15%.
	Tug	2,000-hp.	
Dragline barge	Barge	600-hp	1 day at 15%.
Plow lay barge: Plow burial operation; no propulsion; uses two tugs.	Tug	2,000-hp	13 days at 15%.
	Tug	2,000-hp.	
DSVs for mattress armoring	Vessel	1,000-hp	12 days at 15%.
		1,000-hp.	
	Vessel	1,000-hp.	
		1,000-hp.	
Pipeline gauge, fill, test, dewater, and drying	Vessel	300-hp	1 day at 15%.
		300-hp.	
	Vessel	300-hp.	
		300-hp.	
Survey vessel	Vessel	1,000-hp	6 days at 15%.
HDD operations			
Jack-up: Port Manatee HDD	Jack-up	3,000-hp	3 days at 15%.
Spud barge	Crane-mounted drill and vibratory drill; ancillary equipment includes welding equipment, air compressor, and generator.	N/A	Maximum 4 days for vibratory drilling at each HDD location.
Tug		800-hp	Maximum 4 days for vibratory drilling at each HDD location.

DSV = Diving spread vessels

[1] All specifications are for diesel engines.

[2] All figures assume 24 hrs/day; percentages refer to percent maximum duty load.

Port Operations

The proposed DWP operations would include SRV maneuvering/docking, regasification of LNG cargo, and debarkation. The SRVs are expected to approach the DWP from the south. In the open ocean, the SRVs typically travel at speeds of up to 19.5 kn (36.1 km/hr), reducing to less than 14 kn (25.9 km/hr) while maintaining full maneuvering speed. However, once approaching the vicinity of the DWP—within approximately 16 to 25 km (10–16 mi) of the DWP—the SRVs would begin approach by slowing to about half speed, and then to slow ahead. Inside of 5 km (3.1 km) from the DWP, the SRVs' main engines would be placed in dead slow ahead and decreased upon approach to dead slow, with final positioning and docking to occur using thrusters. Expected SRV transit, approach, and maneuvering/docking characteristics are outlined in Table 2. Only the maneuvering/docking activities and their associated sound sources (i.e., thrusters) are considered in this document; transit and approach maneuvers are considered part of routine vessel transit and are not considered further.

TABLE 2—SRV SPEEDS AND THRUSTER USE DURING TRANSIT, APPROACH, AND MANEUVERING/DOCKING OPERATIONS AT THE DWP

Zone	Speed limit	Thrusters in use?
>33 km from DWP	Full service speed (19.5 kn)	No
25–33 km from DWP	Full maneuvering speed (<14 kn)	No
16–25 km from DWP	Half ahead (<10 kn)	No
5–16 km from DWP	Slow ahead (<6 kn)	No
Inside 5 km from DWP	Dead slow ahead (<4.5 kn, decreasing to <3 kn)	Bow and stern thrusters
Docking	Dead slow	Two bow thrusters; possibly one or two stern thrusters

Based on a regasification cycle of approximately 8 days and projected DWP throughput during the first several years of 400 MMscfd, vessel traffic during operations is projected to consist of a maximum of 46 SRV trips per year. During DWP operations, sound would be generated by the maneuvering of SRVs upon approach to the Port, regasification of LNG aboard the SRVs, and subsequent debarkation from the Port.

Once an SRV is connected to a buoy, the vaporization of LNG and send-out of natural gas can begin. Each SRV would be equipped with up to five vaporization units, each with the capacity to vaporize 250 MMscfd. Under normal operation, two or more units would be in service simultaneously, with at least one unit on standby mode.

Method of Incidental Taking

Incidental take is anticipated to result from elevated levels of sound introduced into the marine environment by the construction and operation of the DWP, as described in preceding sections. Specifically, sound from pile driving, drilling, dredging, and vessel operations during the construction and installation phase, and sound from SRV maneuvering, docking, and regasification during operations would likely result in the behavioral harassment of marine mammals present in the vicinity. Table 3 shows these proposed activities by the time of year they are anticipated to occur.

TABLE 3—PROJECTED CONSTRUCTION, INSTALLATION, AND OPERATIONS ACTIVITIES, BY SEASON

Activity	Season
Construction and installation	
Buoy installation	Summer 2013
Offshore impact hammering.	Summer 2013
Pipelaying offshore	Late Summer 2013 through early Winter 2013–14
Pipelaying inshore	Late Summer 2013 through early Winter 2013–14
Offshore pipeline burial.	Fall 2013 through Winter 2013–14
Inshore pipeline burial	Fall 2013 through Winter 2013–14
HDD	Summer 2013
HDD vibratory driving	Summer 2013
Operations	
SRV maneuvering/docking.	Year-round; maximum 46 visits per year
Regasification	Year-round; 8 days estimated per visit

During construction, underwater sound would be produced by construction vessels (e.g., barges, tugboats, and supply/service vessels) and machinery (e.g., pile driving and pipe laying equipment, trenching equipment, and goal post installation equipment at the HDD locations) operating either intermittently or continuously throughout the area during the construction period. Vessel traffic associated with construction would be a relatively continuous sound source during the construction phase. Vessel sound would be created by propulsion machinery, thrusters, generators, and hull vibrations and would vary with vessel and engine size. Machinery sound from underwater construction would be transmitted through water and would vary in duration and intensity. Port construction (i.e., field construction and installation operations) would require approximately 11 months.

While the main sound source during SRV transit and approach to the DWP would originate from the SRV main engines (i.e., predominantly in low frequencies), the primary sound source during maneuvering and docking would be the SRV thrusters. An additional underwater sound source would be the sound produced by the flow of gas through the proposed pipeline, although very little sound would be expected to result (JASCO, 2008); therefore, this source is not considered further.

Description of Sound Sources

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks of a sound wave; lower frequency sounds have longer wavelengths than higher frequency sounds, which is why the lower frequency sound associated with the proposed activities would attenuate more rapidly in shallower water. Amplitude is the height of the sound pressure wave or the ''loudness'' of a sound and is typically measured using the decibel (dB) scale. A dB is the ratio between a measured pressure (with sound) and a reference pressure (sound at a constant pressure, established by scientific standards), and is a logarithmic unit that accounts for large variations in amplitude; therefore, relatively small changes in dB ratings correspond to large changes in sound pressure. When referring to sound pressure levels (SPLs; the sound force per unit area), sound is referenced in the context of underwater sound pressure to 1 microPascal (μPa). One pascal is the pressure resulting from a force of one newton exerted over an area of one square meter. The source level (SL) represents the sound level at a distance of 1 m from the source (referenced to 1 μPa). The received level is the sound level at the listener's position.

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Rms is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1975). Rms accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in all directions away from the source (similar to ripples on the surface of a pond), except in cases where the source is directional. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

The underwater acoustic environment consists of ambient sound, defined as environmental background sound levels lacking a single source or point (Richardson *et al.,* 1995). The ambient underwater sound level of a region is defined by the total acoustical energy being generated by known and unknown sources, including sounds from both natural and anthropogenic sources. These sources may include physical (e.g., waves, earthquakes, ice, atmospheric sound), biological (e.g., sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (e.g., vessels, dredging, aircraft, construction). Even in the absence of anthropogenic sound, the sea is typically a loud environment. A number of sources of sound are likely to occur within Tampa Bay and the adjoining shelf, including the following (Richardson *et al.,* 1995):

- *Wind and waves:* The complex interactions between wind and water surface, including processes such as breaking waves and wave-induced bubble oscillations and cavitation, are a main source of naturally occurring ambient sound for frequencies between 200 Hz and 50 kHz (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Surf sound becomes important near shore, with measurements collected at a distance of 8.5 km (5.3 mi) from shore showing an increase of 10 dB in the 100 to 700 Hz band during heavy surf conditions.
- *Precipitation sound:* Sound from rain and hail impacting the water surface can become an important component of total sound at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times.
- *Biological sound:* Marine mammals can contribute significantly to ambient sound levels, as can some fish and shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz.
- *Anthropogenic sound:* Sources of ambient sound related to human activity include transportation (surface vessels and aircraft), dredging and construction, oil and gas drilling and production, seismic surveys, sonar, explosions, and ocean acoustic studies (Richardson *et al.,* 1995). Shipping sound typically dominates the total ambient sound for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they would attenuate (decrease) rapidly (Richardson *et al.,* 1995). Typical SPLs for various types of ships are presented in Table 4.

TABLE 4—UNDERWATER SPLS FOR REPRESENTATIVE VESSELS

Vessel description	Frequency (Hz)	Source level (dB)
Outboard drive; 23 ft; 2 engines @ 80 hp	630	156
Twin diesel; 112 ft	630	159
Small supply ships; 180–279 ft	1,000	125–135 (at 50 m)
Freighter; 443 ft	41	172

Source: Richardson *et al.,* 1995.

The sum of the various natural and anthropogenic sound sources at any given location and time—which comprise ''ambient'' or ''background'' sound—depends not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, the ambient sound levels at a given frequency and location can vary by 10–20 dB from day to day (Richardson *et al.,* 1995).

Very few measurements of ambient sound from Tampa Bay and the adjoining shelf are available. There are no specific data on ambient underwater sound levels for the area of the proposed Port and pipeline route. Shooter *et al.* (1982) analyzed approximately 12 hours of data collected in deep (3,280 m) waters in the western GOM and reported median ambient sound levels of 77–80 dB re: 1 $\mu Pa^2/Hz$. These levels are likely to be somewhat lower than those occurring in the vicinity of Tampa Bay, due in large part to the reduced contribution from surf in deep water.

Known sound levels and frequency ranges associated with anthropogenic sources similar to those that would be used for this project are summarized in Table 5. Details of each of the sources are described in the following text.

TABLE 5—ANTICIPATED SOURCE LEVELS FOR CONSTRUCTION/INSTALLATION AND OPERATIONS AT THE PORT DOLPHIN DWP

Source	Activity	Location	Maximum broadband source level (re: 1 μPa)
Barge	Anchor installation operations	STL buoys (DWP)	177 dB
Tug	Anchor installation operations	STL buoys (DWP)	205 dB
Impact hammer [1]	Pile driving	STL buoys (DWP)	217 dB
Barge	Pipe laying	Pipeline corridor, DWP to shore	174 dB
Tug	Transit	Offshore/Inshore	191 dB
Dredge	Dredging	Likely inshore, offshore if necessary	188 dB
HDD	Drilling	Two locations in Tampa Bay	157 dB
Vibratory driving	Sheet pile installation	Two locations in Tampa Bay	186 dB
SRV	Maneuvering/docking, with thrusters	DWP	183 dB
SRV	Regasification	DWP	165 dB

Source: JASCO, 2008, 2010.
[1] Source level for impact hammer estimated assuming pulse length of 100 ms.

The sounds produced by these activities fall into one of two sound types: Pulsed and non-pulsed (defined in next paragraph). The distinction between these two general sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (e.g., Ward, 1997 in Southall *et al.,* 2007). Please see Southall *et al.* (2007) for an in-depth discussion of these concepts.

Pulsed sounds (e.g., explosions, gunshots, sonic booms, impact pile driving) are brief, broadband, atonal transients (ANSI, 1986; Harris, 1998) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a decay period that may include a period of diminishing, oscillating maximal and minimal pressures. Pulsed sounds generally have an increased capacity to induce physical injury as compared with sounds that lack these features.

Non-pulse (intermittent or continuous) sounds can be tonal, broadband, or both. Some of these non-pulse sounds can be transient signals of short duration but without the essential properties of pulses (e.g., rapid rise time). Examples of non-pulse sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment. Many of the sounds produced by the project would be transient in nature (i.e., the source moves), such as during vessel docking. Regasification sounds are continuous (while the SRV is docked) and stationary. The positioning (maneuvering and docking) of SRVs using thrusters is intermittent (i.e., every 8 days) and of short duration (i.e., 10 to 30 minutes).

For this project, the only pulsive sounds are associated with pile driving activities at the offshore Port location (i.e., associated with anchor installation activities). Impact hammers (proposed for use in driving buoy anchors) operate by repeatedly dropping a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is characterized by rapid rise times and high peak levels, a potentially injurious combination (Hastings and Popper, 2005). Vibratory hammers, which would be used to install sheet pile and possibly pilings for goal posts inshore, install piles by vibrating them and allowing the weight of the hammer to push them into the sediment. Vibratory hammers produce significantly less sound than impact hammers. Peak SPLs may be 180 dB or greater but are generally 10 to 20 dB lower than SPLs generated during impact pile driving of the same-sized pile (Caltrans, 2009). Rise time is slower, reducing the probability and severity of injury (USFWS, 2009), and sound energy is distributed over a greater amount of time (Nedwell and Edwards, 2002; Carlson *et al.,* 2001).

Sound Attenuation Devices

Sound levels can be greatly reduced during impact pile driving using sound attenuation devices. There are several types of sound attenuation devices including bubble curtains, cofferdams, and isolation casings (also called temporary sound attenuation piles [TNAP]), and cushion blocks. Port Dolphin considers the installation of cofferdams to be infeasible for this project. The information available suggests that bubble curtains, cushion blocks and caps, and TNAP design offer comparable levels of sound attenuation for pile driving. Port Dolphin proposes to implement one or more of these techniques during the pile driving activities needed to install components of the STL buoys and will make a final decision with regard to the technology to be used prior to beginning work.

Bubble curtains create a column of air bubbles rising around a pile from the substrate to the water surface. The air bubbles absorb and scatter sound waves emanating from the pile, thereby reducing the sound energy. Bubble curtains may be confined or unconfined. An unconfined bubble curtain may consist of a ring seated on the substrate and emitting air bubbles from the bottom. A confined bubble curtain contains the air bubbles within a flexible or rigid sleeve made from plastic, cloth, or pipe. Confined bubble curtains generally offer higher attenuation levels than unconfined curtains because they may physically block sound waves and they prevent air bubbles from migrating away from the pile. For this reason, the confined bubble curtain is commonly used in areas with high current velocity (Caltrans, 2009).

An isolation casing is a hollow pipe that surrounds the pile, isolating it from the in-water work area. The casing is dewatered before pile driving. This device provides levels of sound attenuation similar to that of bubble curtains (Caltrans, 2009). Sound levels can be reduced by 8 to 14 dB. Cushion blocks consist of materials (e.g., wood, nylon) placed atop piles during impact pile driving activities to reduce source levels. Typically sound reduction can range from 4 to a maximum of 26 dB.

Both environmental conditions and the characteristics of the sound attenuation device may influence the effectiveness of the device. According to Caltrans (2009):

• In general, confined bubble curtains attain better sound attenuation levels in areas of high current than unconfined bubble curtains. If an unconfined device is used, high current velocity may sweep bubbles away from the pile, resulting in reduced levels of sound attenuation.

• Softer substrates may allow for a better seal for the device, preventing leakage of air bubbles and escape of sound waves. This increases the effectiveness of the device. Softer substrates also provide additional attenuation of sound traveling through the substrate.

• Flat bottom topography provides a better seal, enhancing effectiveness of the sound attenuation device, whereas sloped or undulating terrain reduces or eliminates its effectiveness.

• Air bubbles must be close to the pile; otherwise, sound may propagate into the water, reducing the effectiveness of the device.

• Harder substrates may transmit ground-borne sound and propagate it into the water column.

The literature presents a wide array of observed attenuation results for bubble curtains (see, e.g., WSF, 2009; WSDOT, 2008; USFWS, 2009; Caltrans, 2009). The variability in attenuation levels is due to variation in design, as well as differences in site conditions and difficulty in properly installing and operating in-water attenuation devices. As a general rule, reductions of greater than 10 dB cannot be reliably predicted (Caltrans, 2009).

Sound Thresholds

Since 1997, NMFS has used generic sound exposure thresholds to determine when an activity in the ocean that produces sound might result in impacts to a marine mammal such that a take by harassment or injury might occur (NMFS, 2005b). To date, no studies have been conducted that examine impacts to marine mammals from which empirical sound thresholds have been established. Current NMFS practice regarding exposure of marine mammals to high level sounds is that cetaceans exposed to impulsive sounds of 180 dB rms or above are considered to have been taken by Level A (i.e., injurious) harassment. Behavioral harassment (Level B) is considered to have occurred when marine mammals are exposed to sounds at or above 160 dB rms for impulse sounds (e.g., impact pile driving) and 120 dB rms for continuous sound (e.g., vessel sound, vibratory pile driving) but below injurious thresholds.

Distance to Sound Thresholds

This section details sound source modeling produced under contract by the applicant (JASCO, 2008, 2010) and describes the predicted distances to relevant regulatory sound thresholds for the specified activities. NMFS has determined that this information represents the best information available for project sound sources and has used the information to develop mitigation measures and to estimate potential incidental take in this document. The modeling scenarios considered all sound sources associated with the project and were developed to thoroughly characterize the various construction/installation and operation activities expected. The relevant information is summarized in Table 6. The equipment list associated with each activity is based on current construction plans for the Port (Ocean Specialists, 2007). For each piece of equipment specified, proxy vessels were selected from JASCO Research's database of underwater sound measurements. The sound propagation model used several parameters, including expected water column sound speeds, bathymetry (water depth and shape of the ocean bottom), and bottom geoacoustic properties (which indicate how much sound is reflected off of the ocean bottom), to estimate the radii of sound impacts (JASCO, 2008). Modeling scenario locations are depicted in Figure 1–4 of Port Dolphin's application. Please see Appendices C and D in Port Dolphin's application for a detailed description of this sound source modeling.

TABLE 6—REPRESENTATIVE SCENARIOS MODELED DURING THE PORT DOLPHIN SOUND SOURCE ANALYSIS AND RADIAL DISTANCE TO THRESHOLDS

Activity	Source	Modeled location	Distance to threshold [1,2]	Approximate area encompassed by threshold [2]
Buoy installation	Crane vessel, cargo barge, support vessel.	North STL buoy; offshore DWP site	180 dB: <0.2 km 120 dB: 3.9 km	180 dB: <0.13 km^2 120 dB: 48 km^2
Impact hammering	Impact hammer	Y-connector; offshore DWP site	180 dB: 0.18 km 160 dB: 4.5 km	180 dB: 0.10 km^2 160 dB: 64 km^2
Pipelaying, offshore	Barge, two anchor handling tugs, support tug.	15-m isobath	180 dB: <0.2 km 120 dB: 7.5 km	180 dB: <0.13 km^2 120 dB: 177 km^2
Pipelaying, inshore	Barge, two anchor handling tugs, support tug.	Tampa Bay	180 dB: <0.2 km 120 dB: 6.0 km	180 dB: <0.13 km^2 120 dB: 113 km^2
Pipeline burial, offshore.	Plow system, two anchor handling tugs.	15-m isobath	180 dB: <0.2 km 120 dB: 8.4 km	180 dB: <0.13 km^2 120 dB: 222 km^2
Pipeline burial, inshore.	Plow system, two anchor handling tugs.	Tampa Bay	180 dB: <0.2 km 120 dB: 6.7 km	180 dB: <0.13 km^2 120 dB: 141 km^2
HDD	Floating spud barge, crane mounted drill, welding equipment, air compressor, generator.	Tampa Bay	180 dB: <0.01 km 120 dB: 0.24 km	180 dB: <0.00 km^2 120 dB: 0.2 km^2
HDD vibratory driving.	Floating spud barge, vibrator, welding equipment, air compressor, generator.	Tampa Bay	180 dB: <0.01 km 120 dB: 12.6 km	180 dB: <0.00 km^2 120 dB: 499 km^2
Docking at buoy, dead slow, two bow thrusters and one stern thruster.	SRV	STL buoy; offshore DWP site	180 dB: <0.01 km 120 dB: 3.6 km	180 dB: <0.00 km^2 120 dB: 41 km^2
Regasification	SRV	STL buoy; offshore DWP site	180 dB: 0.00 km 120 dB: 0.17 km	180 dB: <0.00 km^2 120 dB: 0.09 km^2

Source: JASCO, 2008, 2010.

[1] All distances are unweighted, 95th percentile radial distances.

[2] For distances not given precisely (e.g., <0.2 km) area of ensonification was modeled using a radial distance of 200 m. Although the distance to threshold would be less than 200 m, it is not possible to specifically calculate the distance because the scenarios involve multiple vessel components.

Note that in many cases the scenarios involve multiple pieces of equipment. Although equipment spacing would vary during the course of operations, a single layout must be assumed for modeling purposes. As such, where multiple vessels were involved in the scenarios listed in Table 6 the following layout was assumed:

- The barge used for the main operation in each scenario (e.g., crane vessel, pipe laying barge, pipe burial barge) was set in the middle of the group of vessels.
- For four or fewer tugs (anchor handling and/or support), tugs were spaced at a range of 100 m (328 ft) from the center of the barge. Note that the pipe laying/burial barge itself is 122 m long x 30 m wide (400 x 100 ft).

The radii to sound thresholds vary for the same activity depending on water depth, because the transmission of lower-frequency sound waves can be significantly reduced in shallower water. As a result, the radii to the Level A and Level B harassment isopleths in Tampa Bay (i.e., shallower water) are shorter than those that would occur offshore. In addition, much of the energy from the vessels associated with pipelaying occurs at low frequencies and would propagate poorly in shallower water.

Although sounds created by construction equipment and vessels would be continuous during pipeline installation, activities would progress slowly along the pipeline route as the pipeline is laid and buried and the trench backfilled. Any one area would be subject to the maximum sound levels for only 1 to 2 days at a time as the construction activities pass that area. Sound modeling indicates that, overall, operational sound associated with the proposed project is consistent with other man-made underwater sound sources in the area (e.g., commercial shipping and dredging). Appendix E of Port Dolphin's application presents Level B harassment sound field graphics for construction activities.

Specific Activity Descriptions—As described previously, the applicant provided detailed sound source modeling for all sound-producing activities associated with the project. In the following sections, each specific type of activity is described in terms of the modeling scenario; the type, duration, and timing of sound produced by the activity; and the radial distances to relevant sound thresholds. All radial distances to thresholds presented in the following sections are modeled, and may be different from the actual distances as determined through site-specific acoustic monitoring conducted during the specified activities.

Buoy Installation—Proxies were selected for the crane and support vessels based on vessel specifications. While a cargo barge may be present on-site for a portion of the operations, Port Dolphin assumed that this barge would typically not be under power. Installation of the buoys at the Port would produce continuous sound for a relatively short period of time during summer, with the 120-dB isopleth located 3.9 km (2.4 mi) from each STL buoy location.

Impact Pile Driving—During the construction period, impact hammering would produce the loudest sound levels but would likely occur only for short periods of time. The source depth for pile driving was set to approximately half the local water depth. In actuality, sound would radiate from all portions of the pilings; this midwater column value is a precautionary estimate of the depth for an equivalent point source, as losses due to bottom and surface interactions would be less for a source at mid-depth than for one near the sea floor or surface. Impact hammering operations would involve a pipe lay barge and tugs, similar to pipe laying operations. However, because the potential impact to marine mammals is different for impulsive and continuous sources, impact hammering sound (an impulsive source) is considered separately from vessel sound (non-pulsed sources). Note that the source levels from impact hammering are much higher than those from the vessels that are likely to be on-site. Impact hammering offshore would encompass an area with a radius of approximately 180 m (591 ft) to the Level A threshold; radii to the 160-dB isopleths for this impulsive source would be at 4.5 km (2.8 mi).

Pipe Laying—Pipe laying activities would generate continuous, transient, and variable sound levels during construction predominantly during fall, with some activity during late summer and early winter. Two sites were selected for pipe laying: one approximately midway along the offshore portion of the pipeline and another along the inshore portion. Equipment lists for the offshore and inshore sites are identical: a pipe laying barge, two tugs involved in re-setting of anchors, and a third tug in transit. Sound impacts from pipelaying would produce a 6.0 or 7.5 km (3.7–4.7 mi) radius to the 120-dB isopleth inshore and offshore, respectively.

Pipe Burial—Pipeline burial using the plow system would generate continuous, transient, and variable sound levels during construction, primarily during fall and winter. Pipeline burial would be used infrequently during the construction period. Similarly to pipe laying, pipe burial using a trenching plow system would consist of an anchored barge accompanied by two anchor handling tugs. In addition, sound would be generated by the plow used to bury the pipeline. Detailed source level data were not available for plow operations. However, Aspen Environmental Group (2005) reported a broadband source level of 185 dB. Based on this information, similar source levels from dredge operations (Greene, 1987) were used for the applicant's modeling purposes. Note that the dredge source levels include the sound from the barge upon which the dredge is operated; consequently, a separate barge is not specified for plowing operations in Table 6. The modeling scenario used the depth of the barge hull under the water as the sound source depth, rather than the depth of the actual dredge work. This is because observations from clamshell dredging show that the highest levels of underwater sound are emitted from equipment on the barge (propagating through the hull) rather than from the scraping sounds of the dredge itself (Richardson *et al.,* 1995). Pipeline burial using the plow system produces sound attenuating to the 120-dB isopleth at 6.7 km (4.2 mi) inshore and 8.4 km (5.2 mi) offshore.

HDD—HDD within Tampa Bay would produce continuous sound levels and is expected to occur during summer. Installation of the goal posts (described previously under "Pipeline Installation") at each HDD location would produce a continuous sound for a relatively short period of time and would only occur during summer. HDD would be employed for installation of the pipeline at a number of locations along the inshore portion of the route, including the Port Manatee shore approach and two crossings of the existing Gulfstream pipeline. Drilling and vibratory driving (for goal posts/sheet pile) would be conducted from a floating spud barge approximately 41 m in length. Drilling would involve a crane-mounted drill, suspended from a crawler crane on the barge. The barge would also be equipped with welding equipment, an air compressor, and a generator.

Source levels for drilling of the pilot holes are based on measurements made by Greene (1987) during drilling operations in the Beaufort Sea. As with drilling from a barge, these measurements include contributions from both the drill assembly itself and from equipment on the drill platform (e.g., generators). Because the dominant sound source is equipment located on the drilling vessel (Richardson *et al.,* 1995) rather than the drilling or scraping itself, a source level height of 2.2 m was used, as it was for other barge-mounted activities modeled by JASCO.

Source levels for the vibratory driver were derived from measurements made by JASCO. The vibratory driver was mounted on a moored barge during the measurements, and so sound contributions from equipment on the barge are included in the source level estimates. The measured driver is larger than the vibratory driver planned for use at Port Dolphin. However, very few measurements of underwater sound exist for pile drivers of this size, and in most cases the available reports do not describe the vibratory driver used. Additionally, scaling by vibratory driver specifications (e.g., the eccentric moment) is made difficult by the fact that pile driving source levels depend not only on the equipment but also on the piling, substrate and environment. As such, JASCO's un-scaled measurements of underwater sound are used here as a conservative estimate of the sound likely to be generated during installation of the goal posts/sheet pile. As for the impact pile driving described previously, the source depth for pile driving was conservatively set to half the local water depth, i.e., 3.5 m.

Modeling results (JASCO, 2010) indicate that the 120-dB isopleth would extend 240 m (787 ft) from the drilling operation, while the 120-dB isopleth for HDD vibratory driving would extend 12.6 km (7.8 mi) from the source.

SRV Docking—Once the SRV completes its approach to Port Dolphin and is within approximately 5.6 km (3.5 mi) of the Port, bow and stern thrusters would be utilized. Thruster use would vary, operating for 10 to 30 minutes to allow for the proper positioning of the vessel and for connection to the STL buoy. Docking or berthing would occur at alternate STL buoys approximately every 8 days. Sound modeling, assessing the periodic use of the thrusters (i.e., every 8 days) producing an intermittent and moving sound, indicated that the 120-dB isopleth would occur at 3.6 km (2.2 mi) from the SRV.

Operational procedures for the SRVs specify probable use of thrusters during approach and docking. Speed is gradually reduced as the SRV approaches the unloading buoys, until main propulsion is at dead slow. Bow and stern thrusters are used during docking. Once moored, ship's propulsion is not required for positioning. Based on these operational procedures, the sample situation described in Table 6 was selected for modeling; i.e., docking at the northern buoy, using both bow thrusters and one stern thruster.

Very little information is available on the underwater sound levels produced by LNG carriers. However, some data and empirical formulas have been developed for large tankers in general. At typical cruising speeds, source levels from such vessels are dominated by propeller cavitation (Sponagle, 1988; Seol *et al.,* 2002). As described by LGL and JASCO (2005), an empirical expression for the source spectrum level (1 Hz bandwidth) in the frequency range between 100 Hz and 10 kHz is

$$SL = 163 + 10 \log BD^4N^3 f^{-2}$$

where B is the number of blades, D is the propeller diameter in meters, N is the number of propeller revolutions per second, and f is the frequency in Hz. For frequencies less than 100 Hz, the source level is assumed to be constant at the 100 Hz level. In the case of ducted propellers (e.g., bow and stern thrusters), the constant is approximately 7 dB larger. Specifications for the main propulsion system are based on a typical carrier, and are similar to those described by LGL and JASCO (2005). Bow and stern thrusters are expected to be single-speed, controllable-pitch devices, with power ratings of 2,000 kW each for the bow thrusters and 1,200 kW each for the stern thrusters. Based on these values, diameters and rates of revolution for the thrusters were based on specifications for the most common models currently available. The above model is not able to take into account the reduction in source levels that would result from a change in pitch at lower power outputs; hence, the modeled source levels are conservative (i.e., represent maximum expected levels of underwater sound).

Regasification—The SRV would regasify its LNG cargo while moored at the STL buoy. Sound levels for regasification are low, and the modeling predicts that the 120-dB isopleths would be only 170 m (558 ft) from the source.

The following additional sources of underwater sound are expected to be present during construction of the DWP, but were not modeled:

- *Dredging:* Dredging would be involved in a few stages of construction, including HDD (discussed later) and pipelaying at the Sunshine Bridge crossing (Ocean Specialists, 2007). This would involve a clamshell or bucket-style dredge, operated from a barge while one or more additional barges carry out other tasks nearby. Measurements taken by JASCO during operation of a clamshell dredge indicated source levels of approximately 150–155 dB, i.e., roughly 20 dB lower than the source levels associated with the barge used during pipe laying operations. As such, dredging may be considered an insignificant source of sound compared with operation of the barges that would also be present.

- *Transponders:* Once the port is operational, an additional source of underwater sound in the vicinity of the unloading buoys would be the acoustic transponders installed on the buoys. Information was not available on the specific transponders intended for use at the DWP; however, specifications from commercially available buoy positioning transponders indicate operating frequencies of a few tens of kHz, and source levels of approximately 190 dB. Given this estimated broadband source level, we may estimate ranges to various threshold values assuming simple spherical spreading, i.e., $RL = SL - 20\log_{10}(r)$. Solving for r shows that received levels would drop to 180 dB at a range of approximately 3 m, and to 160 dB at a range of approximately 32 m; further, this sound source would be highly intermittent, as the transponders would only transmit, briefly, when interrogated by the SRV-based command unit. As such, only marine mammals passing very near the unloading buoys during the brief period of transmittance would potentially be affected, and effects from these sources may be considered discountable.

Comments and Responses

On March 1, 2011, NMFS published a notice of receipt of an application for a Letter of Authorization (LOA) in the **Federal Register** (76 FR 11205) and requested comments and information from the public for 30 days. NMFS did not receive any substantive comments. Description of Marine Mammals in the Area of the Specified Activity

Twenty-nine marine mammals (28 cetaceans and the Florida manatee [*Trichechus manatus*]) have documented occurrences in the GOM (Wursig *et al.,* 2000). The manatee is under the jurisdiction of the U.S. Fish and Wildlife Service, and will not be discussed further in this document. Of the cetaceans, seven are mysticetes (baleen whales) and 21 are odontocetes (toothed whales, including dolphins). Table 7 contains a summary of relevant information for each of these 28 species.

TABLE 7—MARINE MAMMALS IN THE GULF OF MEXICO

Species	Status [a]	Occurrence [b]	Typical habitat		
			Coastal	Shelf	Slope/Deep
Order Cetacea					
Suborder Mysticeti					
Family Balaenidae:					
North Atlantic right whale (*Eubalaena glacialis*)	E	1	....	X	X
Family Balaenopteridae.					
Blue whale (*Balaenoptera musculus*)	E	1	....	X	X
Bryde's whale (*Balaenoptera edeni*)	....	3	....	X	X
Fin whale (*Balaenoptera physalus*)	E	2	....	X	X
Humpback whale (*Megaptera novaeangliae*)	E	2	....	X	X
Minke whale (*Balaenoptera acutorostrata*)	....	2	....	X	X
Sei whale (*Balaenoptera borealis*)	E	2	....	X	X
Suborder Odontoceti					
Family Physeteridae:					
Dwarf sperm whale (*Kogia sima*)	....	3	....	X	X
Pygmy sperm whale (*Kogia breviceps*)	....	3	....	X	X
Sperm whale (*Physeter macrocephalus*)	E	4	....	X	X
Family Ziphiidae:					
Blainville's beaked whale (*Mesoplodon densirostris*)	....	2 [c]	....	X	X
Cuvier's beaked whale (*Ziphius cavirostris*)	....	2 [c]	....	X	X
Gervais' beaked whale (*Mesoplodon europaeus*)	....	3 [c]	....	X	X
Sowerby's beaked whale (*Mesoplodon bidens*)	....	1 [c]	....	X	X
Family Delphinidae:					
Atlantic spotted dolphin (*Stenella frontalis*)	....	4	X	X	X
Bottlenose dolphin (*Tursiops truncatus*)	....	4	X	X	X
Clymene dolphin (*Stenella clymene*)	....	4	....	X	X
False killer whale (*Pseudorca crassidens*)	....	3	....	X	X
Fraser's dolphin (*Lagenodelphis hosei*)	....	4	....	X	X
Killer whale (*Orcinus orca*)	....	3	....	....	X
Melon-headed whale (*Peponocephala electra*)	....	4	....	....	X
Pantropical spotted dolphin (*Stenella attenuata*)	....	4	....	X	X
Pygmy killer whale (*Feresa attenuata*)	....	3	....	X	X
Short-finned pilot whale (*Globicephala macrorhynchus*)	....	4	....	X	X
Risso's dolphin (*Grampus griseus*)	....	4	....	X	X
Rough-toothed dolphin (*Steno bredanensis*)	....	4	....	X	X
Spinner dolphin (*Stenella longirostris*)	....	4	....	X	X
Striped dolphin (*Stenella coeruleoalba*)	....	4	....	X	X

Source: Würsig *et al.,* 2000
[a] Status: E = Listed as endangered under the Endangered Species Act.
[b] Occurrence: 1 = extralimital; 2 = rare; 3 = uncommon; 4 = common.
[c] Beaked whales in the GOM may be somewhat more common than survey data indicate, as beaked whales are difficult to sight and identify to species. Most surveys have been conducted in sea states that are not optimal for sighting beaked whales.

Of these 28 cetacean species, based on available survey data, only the bottlenose dolphin and Atlantic spotted dolphin are likely to occur regularly in the vicinity of the project area (i.e., coastal and shelf waters of the eastern GOM) (Fulling *et al.,* 2003). Because a small portion of the sound produced by the activity is predicted to extend into the mid-shelf depth stratum, three other species of cetacean—pygmy and dwarf sperm whales and the rough-toothed dolphin—could be affected. Other species of dolphins and an occasional whale are sometimes observed in nearshore GOM waters and might infrequently strand, but these are not considered normal occurrences for those deepwater species that occur more regularly in waters around and seaward of the continental shelf break (Mullin and Fulling, 2003a; Mullin *et al.,* 2004). As a result, the potential effects of the specified activity are analyzed only for these five species. As the species to be most affected by the specified activity, bottlenose and spotted dolphin occurrences relative to the project area are discussed in more detail in the following paragraphs.

The cetacean fauna of the northern and eastern GOM continental shelf, including the project area, typically consists of the bottlenose dolphin and the Atlantic spotted dolphin (Davis and Fargion, 1996; Jefferson and Schiro, 1997; Davis *et al.,* 1998; Davis *et al.,* 2000; Würsig *et al.,* 2000). At the shelf edge and within the deeper waters of the continental slope, the cetacean community typically includes nineteen species, including the Bryde's whale, sperm whale, pygmy and dwarf sperm whales, three species of beaked whales, and twelve species of oceanic dolphins. Oceanographic and bathymetric features (e.g., eddies, water temperature, salinity) are important factors in determining the distribution of marine mammals, in large part because the presence of prey is frequently influenced by such features (Katona and Whitehead, 1988; Biggs *et al.,* 2000; Wormuth *et al.,* 2000; Davis *et al.,* 2002). The presence of specific hydrographic and/or bathymetric features and discontinuities (e.g., abrupt temperature differentials, current edges, upwelling areas, sea mounts, banks, shoals, the continental shelf edge) may also affect marine mammal distribution (USDON, 2003).

The following discussions of the population status of GOM marine mammals use categories adapted from Würsig *et al.* (2000):

- *Common:* A species that is abundant and widespread throughout the region in which it occurs;
- *Uncommon:* A species that does not occur in large numbers and may or may not be widely distributed throughout the region in which it occurs;
- *Rare:* A species present in such small numbers throughout the region that it is seldom seen; and
- *Extralimital:* A species known on the basis of few records that are probably the result of unusual movements of few individuals into the region.

Data historically acquired during aerial and shipboard surveys conducted within the eastern GOM were analyzed by marine mammal researchers and summarized in USDON (2003). To increase the utility of the species sightings data, marine mammal occurrence and distribution data were partitioned into both seasonal and water depth categories. This partitioning is supported by distribution patterns (e.g., sightings over the continental shelf, sightings beyond the continental shelf) observed during large-scale surveys (e.g., Cetacean and Turtle Assessment Program [CETAP] surveys; CETAP, 1982; Hain *et al.,* 1985; Winn *et al.,* 1987). Seasonal categories included in USDON (2003) and employed in this analysis were:

- *Winter:* December 21 through March 20;
- *Spring:* March 21 through June 20;
- *Summer:* June 21 through September 20; and
- *Fall:* September 21 through December 20.

Water depth categories, or depth strata, included in USDON (2003) and employed in this analysis were as follows:

- *Nearshore:* 0 to 120 ft (0 to 36.6 m);
- *Mid-shelf:* 120 to 300 ft (36.6 to 91.4 m);
- *Shelf-edge:* 300 to 6,600 ft (91.4 to 2,000 m); and
- *Slope:* > 6,600 ft (> 2,000 m).

The U.S. Department of the Navy (USDON, 2003) reviewed available marine mammal survey data for the eastern GOM and summarized species presence and distribution on a seasonal basis. Relevant findings pertinent to marine mammals include the following:

- Spring is the season with the highest number of cetacean occurrence records, although high numbers of cetacean occurrence records were also noted for summer;
- Fall and winter are the two seasons with the lowest number of occurrence records and total number of cetaceans;
- Higher numbers in spring and summer are possibly due to the higher survey effort usually expended during those months (when sighting conditions are optimal); and
- There are fewer sighting records in fall than in the other seasons, likely attributable to suboptimal survey conditions (i.e., reduction in sightability).

Mysticetes

The Bryde's whale is the most frequently sighted mysticete in the Gulf, though considered uncommon. Strandings and sightings data suggest that this species may be present throughout the year, generally in the northeastern Gulf near the 100-m (328-ft) isobath between the Mississippi River delta and southern Florida (Davis *et al.,* 2000; Würsig *et al.,* 2000). The remaining six mysticete whales (blue, fin, humpback, minke, sei, and North Atlantic right whales) are considered rare or extralimital in the GOM (Jefferson, 1996; Jefferson and Schiro, 1997). Mysticete whales, including the Bryde's whale, could occur within the project area although such occurrence would be extremely unlikely.

Odontocetes

Bottlenose dolphins and spotted dolphins are known to occur regularly in the project area and are the species to be most affected by the project. In addition, there is some possibility that pygmy and dwarf sperm whales and rough-toothed dolphins could occur in deeper waters ensonified by some offshore project activities. Most of the odontocetes known to occur within the Gulf (Table 7) are considered common. Exceptions include the beaked whales, with most being rare or extralimital, and the dwarf and pygmy sperm whales, which are considered uncommon. The frequency of occurrence of beaked whales and dwarf and pygmy sperm whales are most likely underestimated because these cryptic species are submerged much of the time and avoid aircraft and ships (Würsig *et al.,* 1998). Consequently, these species may be somewhat more common than is indicated by survey data but are still likely to be relatively uncommon. The sperm whale is considered common in the Gulf (Jefferson, 1996; Jefferson and Schiro, 1997; Davis *et al.,* 2000; Waring *et al.,* 2006). Sightings data suggest a Gulf-wide distribution on the continental slope. Congregations of sperm whales are common along the continental shelf edge in the vicinity of the Mississippi River delta in water depths of 500 to 2,000 m (1,640–6,562 ft). As a result of these consistent sightings, it is believed that there is a resident population of sperm whales in the Gulf consisting of adult females, calves, and immature individuals (Brandon and Fargion, 1993; Mullin *et al.,* 1994; Sparks *et al.,* 1993; Jefferson and Schiro, 1997). Though most odontocetes (including delphinids) are considered common in the GOM, they prefer waters of the continental shelf edge (approximately 200 m [656 ft]) or deeper waters of the continental slope. Therefore, it is unlikely that these species would occur within the project area (i.e., Tampa Bay and nearshore waters). Due to the rarity of the majority of odontocete species, as well as the mysticetes discussed previously, in the proposed project area and the remote chance they would be affected by Port Dolphin's proposed port operations, these species are not considered further in this analysis.

The most commonly sighted cetaceans on the GOM continental shelf (in terms of numbers of individual sightings) during systematic surveys conducted in the mid to late 1990s (i.e., GulfCet II) were bottlenose dolphins and Atlantic spotted dolphins. Brief discussions of these commonly sighted marine mammal species are provided in the following subsections.

Bottlenose dolphins—The bottlenose dolphin is a common inhabitant of both the continental shelf and slope in the GOM, generally in waters less than 20 m (66 ft) (Griffin and Griffin, 2003). The species is also distributed throughout the bays, sounds, and estuaries of the GOM (Mullin *et al.,* 1990). Bottlenose dolphins are opportunistic feeders, taking a wide variety of fish, cephalopods, and shrimp (Wells and Scott, 1999) and using a wide variety of feeding strategies (Shane, 1990). In the GOM, bottlenose dolphins often feed in association with shrimp trawlers (Fertl and Leatherwood, 1997). In addition to the use of active echolocation to find food, bottlenose dolphins likely detect and orient to fish prey by listening for the sounds prey produce—so-called 'passive listening' (Barros and Myrberg, 1987; Gannon *et al.,* 2005). Nearshore bottlenose dolphins prey predominately on coastal fish and cephalopods, while offshore individuals prey on pelagic cephalopods and a large variety of epi- and mesopelagic fish species (Van Waerebeek *et al.,* 1990; Mead and Potter, 1995).

NMFS recognizes several stocks of bottlenose dolphins in the GOM, including a northern oceanic stock; a continental shelf and slope stock; western, northern, and eastern coastal stocks; and a group of 32 bay, sound, and estuarine stocks (Blaylock *et al.,* 1995; Waring *et al.,* 2006). Bottlenose dolphins likely occur within both offshore and nearshore waters of the project area. Bottlenose dolphins present in the project area would likely be represented by individuals from the eastern coastal stock and the relevant bay, sound, and estuarine stocks.

Bottlenose dolphins along the U.S. coastline are believed to be organized into local populations, or stocks, each occupying a small region of coast with some migration to and from inshore and offshore waters (Schmidly, 1981). The seaward boundary for coastal stocks, the 20-m (66-ft) isobath, generally corresponds to survey strata (Scott, 1990; Blaylock and Hoggard, 1994; Fulling *et al.,* 2003) and represents a management boundary rather than an ecological boundary. Both ''coastal/nearshore'' and ''offshore'' ecotypes of bottlenose dolphins (Hersh and Duffield, 1990) occur in the GOM (LeDuc and Curry, 1998), and both could potentially occur in coastal waters. The best abundance estimate available for the northern GOM eastern coastal stock of bottlenose dolphins is 7,702, with a minimum population estimate of 6,551. The status of the eastern coastal stock relative to optimum sustainable population (OSP) level is not known and population trends cannot be determined due to insufficient data. The eastern coastal stock is not considered a strategic stock under the MMPA because the stock's average annual human-related mortality and serious injury does not exceed potential biological removal (PBR) (Waring *et al.,* 2010).

Bottlenose dolphins are distributed throughout the bays, sounds and estuaries of the GOM (Mullin, 1988). The identification of biologically-meaningful ''stocks'' of bottlenose dolphins in these waters is complicated by the high degree of behavioral variability exhibited by this species (Shane *et al.,* 1986; Wells and Scott, 1999; Wells, 2003), and by the lack of requisite information for much of the region. However, distinct stocks are provisionally identified in each of 32 areas of contiguous, enclosed or semi-enclosed bodies of water adjacent to the northern GOM. Bay, sound, and estuarine dolphins found in the project area would likely be from Tampa Bay or Sarasota Bay.

These ''communities'' include resident dolphins that regularly share large portions of their ranges, exhibit similar distinct genetic profiles, and interact with each other to a much greater extent than with dolphins in adjacent waters. While these communities do not constitute closed demographic populations, the geographic nature of these areas and long-term, multi-generational stability of residency patterns suggest that they may exist as discrete, functioning units of their ecosystems. Members of these stocks emphasize use of the bay, sound, or estuary waters, with limited movements through passes to the GOM (Shane, 1977, 1990; Gruber, 1981; Irvine *et al.,* 1981; Maze and Würsig, 1999; Lynn and Würsig, 2002; Fazioli *et al.,* 2006). These habitat use patterns are reflected in the ecology of the dolphins in some areas; for example, residents of Sarasota Bay, Florida, lack squid in their diet, unlike non-resident dolphins found stranded on nearby Gulf beaches (Barros and Wells, 1998).

Genetic exchange occurs between resident communities; hence the application of the demographically and behaviorally-based term ''community'' rather than ''population'' (Wells, 1986a; Sellas *et al.,* 2005). A variety of potential exchange mechanisms occur in the Gulf. Small numbers of inshore dolphins traveling between regions have been reported, with patterns ranging from traveling through adjacent communities (Wells, 1986b; Wells *et al.,* 1996a,b) to movements over distances of several hundred kilometers in Texas waters (Gruber, 1981; Lynn and Würsig, 2002). In many areas, year-round residents co-occur with non-resident dolphins, providing potential opportunities for genetic exchange. Non-residents exhibit a variety of patterns, ranging from apparent nomadism recorded as transience to apparent seasonal or non-seasonal migrations. Passes, especially the mouths of the larger estuaries, serve as mixing areas. For example, several communities mix at the mouth of Tampa Bay (Wells, 1986a). Seasonal movements of dolphins into and out of some of the bays, sounds and estuaries provide additional opportunities for genetic exchange with residents, and complicate the identification of stocks in coastal and inshore waters.

In larger bay systems (e.g., Tampa Bay), seasonal changes in abundance suggest possible migrations, and fall/winter increases in abundance have been noted for Tampa Bay (Scott *et al.,* 1989). A number of geographically and socially distinct subgroupings of dolphins in some regions, including Tampa Bay, have been identified, but the importance of these distinctions to stock designations remains undetermined. For Tampa Bay, Urian *et al.* (2009) recently described fine-scale population structuring into five discrete communities (including the adjacent Sarasota Bay community) that differed in their social interactions and ranging patterns. Structure was found despite a lack of physiographic barriers to movement within this large, open embayment.

In the vicinity of the action area, there are distinct geographic subdivisions with year-round resident animals from Tampa Bay, Sarasota Bay, and Charlotte Harbor as well as a seasonal coastal stock (discussed previously; 1 to 12 km [0.6–7.5 mi] offshore) with mixing on a limited basis (Wells *et al.,* 1996; Wells and Scott, 2002; Sellas *et al.,* 2005). The Sarasota community's range extends from southern Tampa Bay southward through Sarasota Bay, and into the GOM about 1 km offshore. Waring *et al.* (2010) identified the animals in Tampa Bay as having a best estimate of abundance of 559 individuals (based on 1994 data) and those in Sarasota Bay as having a best abundance estimate of 160 individuals (based on 2007 data). The status of the stock relative to OSP is unknown. Because most of the stock sizes are currently unknown, but likely small, and relatively few mortalities or serious injuries would exceed PBR, NMFS considers that each of these stocks is a strategic stock under the MMPA (Waring *et al.,* 2010).

Atlantic spotted dolphins—Atlantic spotted dolphins are widely distributed in warm temperate and tropical waters of the Atlantic Ocean, including the GOM (Waring *et al.,* 2006). In the northern Gulf, these animals occur mainly on the continental shelf (Jefferson and Schiro, 1997). During GulfCet II aerial and shipboard surveys in the northern GOM, Atlantic spotted dolphins were seen at water depths ranging from 22 to 222 m (72–728 ft) (Mullin and Hoggard, 2000). On the shelf, they were second in abundance to bottlenose dolphins. Atlantic spotted dolphins can be expected to occur on the continental shelf during all seasons. However, they may be more common during spring (Jefferson and Schiro, 1997; Mullin and Hoggard, 2000). It is expected that Atlantic spotted dolphins could occur within offshore waters of the project area.

Atlantic spotted dolphins in the northern GOM are abundant in continental shelf waters from between 10 and 200 m (33 to 656 ft) to slope waters < 500 m (1,640 ft) (Fulling *et al.* 2003; Mullin and Fulling, 2003a). Griffin and Griffin (2003) reported that on the west Florida Shelf they are more common in waters from 20 to 180 m (66 to 591 ft), while Mullin *et al.* (2004) found that Atlantic spotted dolphins were sighted in waters with a bottom depth typically < 300 m (984 ft). Griffin and Griffin (2004) reported higher abundances of spotted dolphins on the west Florida Shelf between the months of November and May than during the rest of the year.

Atlantic spotted dolphins in the GOM have been seen feeding cooperatively on clupeid fishes (e.g., herring, sardine) and are known to feed in association with shrimp trawlers (Fertl and Würsig, 1995; Fertl and Leatherwood, 1997, respectively). In the Bahamas, this species has been observed to chase and catch flying fish (MacLeod *et al.,* 2004). The only information on dive depth for this species is based on a satellite-tagged individual from the GOM (Davis *et al.,* 1996). This individual made short, shallow dives (more than 76 percent of the time to depths < 10 m) over the continental shelf, although some dives were as deep as 40 to 60 m (Davis *et al.,* 1996).

The GOM population is considered a separate stock for management purposes. The most recent abundance estimate for Atlantic spotted dolphin in the GOM, based on pooled survey data from 2000 and 2001, was 37,611 (Waring *et al.,* 2009). These animals were found entirely in OCS waters; the abundance estimate for oceanic waters, from surveys conducted in 2003–04, was zero. There is insufficient information for this stock to determine PBR or its status relative to OSP. Despite an undetermined PBR and unknown population size, the GOM stock is not considered a strategic stock under the MMPA because previous estimates of population size have been large compared to the number of cases of documented human-related mortality and serious injury.

In addition to bottlenose and spotted dolphins, three other species that frequent the mid-shelf stratum could be exposed to sound from certain project activities and the potential for incidental harassment of these species has been evaluated (see ESTIMATED INCIDENTAL HARASSMENT). Dwarf and pygmy sperm whales and rough-toothed dolphins may be expected to occur in the mid-shelf stratum on a seasonal basis. The area of actual construction and operations for Port Dolphin is entirely contained within the nearshore depth stratum (0 to 37 m; depth strata were listed earlier). Maximum depth at the DWP is approximately 31 m, while the pipeline route transits increasingly shallower waters until entering Tampa Bay and subsequently making landfall. However, while the actual construction activities will be entirely contained within the nearshore stratum, the sound field produced by certain construction activity, and thus the area of effect, extends into the mid-shelf depth stratum (37 to 91 m). Most sound would be contained within the nearshore stratum. The one exception is for the offshore pipelaying activity, which would occur only from late summer 2013 through early winter 2013–14. The Level B sound field for this activity would be 99.9 percent contained within the nearshore stratum, with 0.1 percent potentially entering the mid-shelf stratum.

Background on Marine Mammal Hearing

Different kinds of marine life are sensitive to different frequencies of sound. Based on available behavioral data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data, Southall *et al.* (2007) designated functional hearing groups for marine mammals and estimated the lower and upper frequencies of functional hearing of the groups. The functional groups and the associated frequencies are indicated below (though animals are less sensitive to sounds at the outer edge of their functional range and most sensitive to sounds of frequencies within a smaller range somewhere in the middle of their functional hearing range):

- Low-frequency cetaceans (mysticetes): Functional hearing is estimated to occur between approximately 7 Hz and 22 kHz;
- Mid-frequency cetaceans (dolphins, larger toothed whales, beaked and bottlenose whales): Functional hearing is estimated to occur between approximately 150 Hz and 160 kHz;
- High-frequency cetaceans (true porpoises, river dolphins, *Kogia* sp.): Functional hearing is estimated to occur between approximately 200 Hz and 180 kHz; and
- Pinnipeds in water: Functional hearing is estimated to occur between approximately 75 Hz and 75 kHz, with the greatest sensitivity between approximately 700 Hz and 20 kHz.

As mentioned previously in this document, two species of cetacean, bottlenose and Atlantic spotted dolphins, are likely to occur in the project area. These two species are both classified as mid-frequency cetaceans (Southall *et al.,* 2007).

Potential Effects of the Specified Activity on Marine Mammals

Potential effects of Port Dolphin's proposed port construction and subsequent operations are likely to be acoustic in nature. In-water construction activities (e.g., pile driving, pipeline installation) and LNG port operations introduce sound into the marine environment and have the potential to have adverse impacts on marine mammals. The potential effects of sound from the proposed activities associated with the Port might include one or more of the following: Tolerance, masking of natural sounds, behavioral disturbance, non-auditory physical effects, and temporary or permanent hearing impairment (Richardson *et al.,* 1995). However, for reasons discussed later in this document, Port Dolphin's activities would not likely cause any cases of non-auditory physical effects or temporary or permanent hearing impairment. As outlined in previous NMFS documents, the effects of sound on marine mammals are highly variable and can be categorized as follows (based on Richardson *et al.,* 1995):

- The sound may be too weak to be heard at the location of the animal (i.e., lower than the prevailing ambient sound level, the hearing threshold of the animal at relevant frequencies, or both);
- The sound may be audible but not strong enough to elicit any overt behavioral response;
- The sound may elicit reactions of varying degrees and variable relevance to the well-being of the marine mammal. Reactions can range from temporary alert responses to active avoidance reactions such as vacating an area until the stimulus ceases, but potentially for longer periods of time;
- Upon repeated exposure, a marine mammal may exhibit diminishing responsiveness (habituation), or disturbance effects may persist; the latter is most likely with sounds that are highly variable in characteristics and unpredictable in occurrence, and associated with situations that a marine mammal perceives as a threat;
- Any anthropogenic sound that is strong enough to be heard has the potential to result in masking, or reduce the ability of a marine mammal to hear biological sounds at similar frequencies, including calls from conspecifics and underwater environmental sounds such as surf sound;
- If mammals remain in an area for feeding, breeding, or some other biologically important purpose even though there is chronic exposure to sound, the possibility exists for sound-induced physiological stress; this might

in turn have negative effects on the well-being or reproduction of the animals involved; and

• Very strong sounds have the potential to cause a temporary or permanent reduction in hearing sensitivity, also referred to as threshold shift. In terrestrial mammals, and presumably marine mammals, received sound levels must far exceed the animal's hearing threshold for there to be any temporary threshold shift (TTS). For transient sounds, the sound level necessary to cause TTS is inversely related to the duration of the sound. Received sound levels must be even higher for there to be risk of permanent hearing impairment (PTS). In addition, intense acoustic or explosive events may cause trauma to tissues associated with organs vital for hearing, sound production, respiration, and other functions. This trauma may include minor to severe hemorrhage.

Tolerance

Numerous studies have shown that underwater sounds from industrial activities are often readily detectable by marine mammals in the water at distances of many kilometers. However, other studies have shown that marine mammals at distances more than a few kilometers away often show no apparent response to industrial activities of various types (Miller *et al.* 2005). This is often true even in cases when the sounds must be readily audible to the animals based on measured received levels and the hearing sensitivity of that mammal group. Although various baleen whales, toothed whales, and (less frequently) pinnipeds have been shown to react behaviorally to underwater sound from sources such as airgun pulses or vessels under some conditions, at other times, mammals of all three types have shown no overt reactions (e.g., Malme *et al.,* 1986; Richardson *et al.,* 1995; Madsen and Mohl, 2000; Croll *et al.,* 2001; Jacobs and Terhune, 2002; Madsen *et al.,* 2002; Miller *et al.,* 2005). In general, small odontocetes seem to be more tolerant of exposure to some types of underwater sound than are baleen whales.

Masking

Masking is the obscuring of sounds of interest to an animal by other sounds, typically at similar frequencies. Marine mammals are highly dependent on sound, and their ability to recognize sound signals amid other sound is important in communication and detection of both predators and prey. Background ambient sound may interfere with or mask the ability of an animal to detect a sound signal even when that signal is above its absolute hearing threshold. Even in the absence of anthropogenic sound, the marine environment is often loud. Natural ambient sound includes contributions from wind, waves, precipitation, other animals, and thermal sound, at frequencies above 30 kHz, resulting from molecular agitation (Richardson *et al.,* 1995).

In general, masking effects are expected to be less severe when sounds are transient than when they are continuous. The majority of sound produced during the construction of Port Dolphin would be transient. Masking is typically of greater concern for those marine mammals that utilize low-frequency communications, such as baleen whales and, as such, is not likely to occur for the mid-frequency cetaceans in the project area.

Disturbance

Behavioral disturbance is one of the primary potential impacts of anthropogenic sound on marine mammals. Disturbance can result in a variety of effects, such as subtle or dramatic changes in behavior or displacement but may be highly dependent upon the context in which the potentially disturbing stimulus occurs. For example, an animal that is feeding may be less prone to disturbance from a given stimulus than one that is not. For many species and situations, there is no detailed information about reactions to sound. While there are no specific studies of the reactions of marine mammals to sounds produced by the construction or operation of a LNG facility, information from studies of marine mammal reactions to other types of continuous and transient anthropogenic sound (e.g., drillships) are described here as a proxy.

Behavioral reactions of marine mammals to sound are difficult to predict because they are dependent on numerous factors, including species, maturity, experience, activity, reproductive state, time of day, and weather. If a marine mammal does react to an underwater sound by changing its behavior or moving a small distance, the impacts of that change may not be important to the individual, the stock, or the species as a whole. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on the animals could be important.

Based on the literature reviewed in Richardson *et al.* (1995), most small and medium-sized toothed whales exposed to prolonged or repeated underwater sounds are unlikely to be displaced unless the overall received level is at least 140 dB, although the limited available data indicate that the sperm whale is sometimes, though not always, more responsive to underwater sounds than other toothed whales. Baleen whales, with better hearing sensitivities at lower sound frequencies, have been shown in several studies to react to continuous sounds at received sound levels of approximately 120 dB. Toothed whales appear to exhibit a greater variety of reactions to anthropogenic underwater sound than do baleen whales. Toothed whale reactions can vary from attraction (e.g., bow riding) to strong avoidance, while baleen whale reactions range from neutral (little or no change in behavior) to strong avoidance. Potential disturbance reactions of odontocetes are discussed in somewhat more detail.

In their comprehensive literature review, Southall *et al.* (2007) reported that combined field and laboratory data for mid-frequency cetaceans exposed to non-pulse sounds did not lead to clear conclusions about behavioral responses that may be expected from given received levels of sound. In some settings, individuals in the field showed significant behavioral responses to exposures from 90 to 120 dB, while others failed to exhibit such responses for exposure to received levels from 120 to 150 dB. Species differences, as well as uncontrolled contextual variables other than exposure, are the likely reasons for this variability. Captive subjects were often directly reinforced with food for tolerating exposure to high levels of sound, which likely explains the disparity seen in results from field and laboratory settings—where exposures typically exceeded 170 dB before inducing behavioral responses.

Dolphins and other toothed whales may show considerable tolerance of floating and bottom-founded drill rigs and their support vessels, though reactions are variable. Kapel (1979) reported that pilot whales congregated within visual range of drillships and their support vessels off of Greenland. Beluga whales (*Delphinapterus leucas*) have been observed swimming within 100–150 m (328–492 ft) of an artificial island while drilling was underway and within 1 mi (1.6 km) of a drillship engaged in active drilling (Fraker and Fraker, 1979, 1981). However, other belugas, when exposed to playbacks of drilling sounds, showed avoidance reactions, including altering course, increased swimming speed, and reversed direction of travel (Stewart *et al.,* 1982; Richardson *et al.,* 1995). Reactions of beluga whales to semi-submersible drillship sound were less pronounced than were their reactions to motorboats with outboard engines (Thomas *et al.,* 1990). There may be a significant contextual element to these reactions.

Morton and Symonds (2002) used census data on killer whales in British Columbia to evaluate avoidance of non-pulse acoustic harassment devices (AHDs). Avoidance ranges around the AHDs were about 2.5 mi (4 km). Also, there was a dramatic reduction in the number of days resident killer whales were sighted during AHD-active periods compared to pre- and post-exposure periods and a nearby control site.

Some species of small toothed whales avoid vessels when they are approached to within 0.5–1.5 km (0.31–0.93 mi), with occasional reports of avoidance at greater distances (Richardson *et al.,* 1995). Some toothed whale species, especially beaked whales and belugas, appear to be more responsive than others. However, dolphins may tolerate vessels of all sizes, often approaching and riding the bow and stern waves (Shane *et al.,* 1986). At other times, dolphin species that are known to be attracted to vessels will avoid them. Such avoidance is often linked to previous vessel-based harassment of the animals (Richardson *et al.,* 1995). Coastal bottlenose dolphins that are the object of dolphin-watching activities have been observed to swim erratically (Acevedo, 1991), remain submerged for longer periods of time (Janik and Thompson, 1996; Nowacek *et al.,* 2001), display less cohesiveness among group members (Cope *et al.,* 1999), whistle more frequently (Scarpaci *et al.,* 2000), and rest less often (Constantine *et al.,* 2004) when vessels were nearby. Pantropical spotted dolphins and spinner dolphins in the Eastern Tropical Pacific, where they have been targeted by commercial fishing vessels because of their association with tuna, display avoidance of survey vessels of up to 11.1 km (6.9 mi; Au and Perryman, 1982; Hewitt, 1985), whereas spinner dolphins in the GOM were observed bow riding the survey vessel in all fourteen sightings during one survey (Würsig *et al.,* 1998). As evidenced by these observations, the level of response of odontocetes to vessels is thought to be partly a learned behavior, e.g., a function of habituation or a response to some previous negative interaction.

Hearing Impairment and Other Physiological Effects

Temporary or permanent hearing impairment is a possibility when marine mammals are exposed to very strong sounds. Non-auditory physiological effects might also occur in marine mammals exposed to strong underwater sound. Possible types of non-auditory physiological effects or injuries that may occur in mammals close to a strong sound source include stress, neurological effects, bubble formation, and other types of organ or tissue damage. Some marine mammal species (e.g., beaked whales) may be especially susceptible to injury and/or stranding when exposed to strong pulsed sounds, particularly at higher frequencies. Non-auditory physiological effects are not anticipated to occur as a result of the proposed activities, which largely do not include strong pulsed sounds. The following subsections discuss in more detail the possibilities of TTS and PTS.

TTS—TTS, reversible hearing loss caused by fatigue of hair cells and supporting structures in the inner ear, is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises, and a sound must be stronger in order to be heard. TTS can last from minutes or hours to (in cases of strong TTS) days. For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the sound ends.

NMFS considers TTS to be a form of Level B harassment rather than injury, as it consists of fatigue to auditory structures rather than damage to them. The NMFS-established 180-dB injury criterion is considered to be the received level above which, in the view of a panel of bioacoustics specialists convened by NMFS before TTS measurements for marine mammals became available, one could not be certain that there would be no injurious effects, auditory or otherwise, to cetaceans. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals, and none of the published data concern TTS elicited by exposure to multiple pulses of sound.

Human non-impulsive sound exposure guidelines are based on exposures of equal energy (the same sound exposure level [SEL]; SEL is reported here in dB re: 1 μPa^2-s for in-water sound) producing equal amounts of hearing impairment regardless of how the sound energy is distributed in time (NIOSH, 1998). Until recently, previous marine mammal TTS studies have also generally supported this equal energy relationship (Southall *et al.,* 2007). Three newer studies, two by Mooney *et al.* (2009a,b) on a single bottlenose dolphin either exposed to playbacks of U.S. Navy mid-frequency active sonar or octave-band sound (4–8 kHz) and one by Kastak *et al.* (2007) on a single California sea lion exposed to airborne octave-band sound (centered at 2.5 kHz), concluded that for all sound exposure situations, the equal energy relationship may not be the best indicator to predict TTS onset levels. Generally, with sound exposures of equal energy, quieter sound exposures (lower SPL) with longer duration were found to induce TTS onset more than those of louder (higher SPL) and shorter duration. Given the available data, the received level of a single seismic pulse (with no frequency weighting) might need to be approximately 186 dB SEL in order to produce brief, mild TTS.

Data on TTS from continuous sound (such as that produced by Port Dolphin's proposed activities) are limited, so the available data from seismic activities are used as a proxy. Exposure to several strong seismic pulses that each have received levels near 175–180 dB SEL might result in slight TTS in a small odontocete, assuming the TTS threshold is (to a first approximation) a function of the total received pulse energy. Given that the SPL is approximately 10–15 dB higher than the SEL value for the same pulse, an odontocete would need to be exposed to a SPL of 190 dB in order to incur TTS.

TTS was measured in a single, captive bottlenose dolphin after exposure to a continuous tone with maximum SPLs at frequencies ranging from 4 to 11 kHz that were gradually increased in intensity to 179 dB and in duration to 55 minutes (Nachtigall *et al.,* 2003). No threshold shifts were measured at SPLs of 165 or 171 dB. However, at 179 dB, TTSs greater than 10 dB were measured during different trials with exposures ranging from 47 to 54 minutes. Hearing sensitivity apparently recovered within 45 minutes after sound exposure.

Although underwater sound levels produced by the Port Dolphin project may exceed levels produced in studies that have induced TTS in odontocetes, there is a general lack of controlled, quantifiable field studies related to this phenomenon, and existing studies have had varied results (Southall *et al.,* 2007). Therefore, it is difficult to extrapolate from these data to site-specific conditions for the Port Dolphin project. For example, because most of the studies have been conducted in laboratories, rather than in field settings, the data are not conclusive as to whether elevated levels of sound will cause odontocetes to avoid the project area, thereby reducing the likelihood of TTS, or whether sound will attract them, increasing the likelihood of TTS. In any case, there are no universally accepted standards for the amount of exposure time likely to induce TTS. While it may be inferred that TTS could theoretically result from the proposed activities, it is impossible to exactly quantify the magnitude of exposure, the duration of the effect, or the number of individuals likely to be affected. Exposure is likely to be brief because the majority of proposed activities would be transient. It is expected that elevated sound would have only a negligible probability of causing TTS in individual odontocetes because (1) of the relatively low SPLs produced by most project activities; (2) the transient nature of most sounds produced by the activities; (3) the short duration of certain activities that are expected to produce higher SPLs (i.e., offshore pile driving); and (4) the location of the project in, primarily, offshore open waters where marine mammals may easily avoid areas of ensonification.

PTS—When PTS occurs, there is physical damage to the sound receptors in the ear. In some cases, there can be total or partial deafness, whereas in other cases the animal has an impaired ability to hear sounds in specific frequency ranges.

There is no specific evidence that exposure to underwater industrial sounds can cause PTS in any marine mammal (see Southall *et al.,* 2007). However, given the possibility that marine mammals might incur TTS, there has been further speculation about the possibility that some individuals occurring very close to industrial activities might incur PTS. Richardson *et al.* (1995) hypothesized that PTS caused by prolonged exposure to continuous anthropogenic sound is unlikely to occur in marine mammals, at least for sounds with source levels up to approximately 200 dB. Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage in terrestrial mammals. Relationships between TTS and PTS thresholds have not been studied in marine mammals but are assumed to be similar to those in humans and other terrestrial mammals. PTS might occur at a received sound level at least several decibels above that inducing mild TTS.

Southall *et al.* (2007) propose that sound levels inducing 40 dB of TTS may result in onset of PTS in marine mammals. The authors present this threshold with precaution, as there are no specific studies to support it. Because direct studies on marine mammals are lacking, the authors base these recommendations on studies performed on other mammals. Additionally, the authors assume that multiple pulses of underwater sound result in the onset of PTS in mid-frequency cetaceans when levels reach 230 dB peak or 198 dB SEL; non-pulsed (continuous) sound would require levels of 230 dB peak or 215 dB SEL (Southall *et al.,* 2007). Sound levels this high are not expected to occur as a result of the proposed activities.

The potential effects to marine mammals described in this section of the document do not take into consideration the proposed monitoring and mitigation measures described later in this document (see the PROPOSED MITIGATION and PROPOSED MONITORING AND REPORTING sections). Because of the characteristics of sound produced by most construction activities (i.e., they are typically low intensity, non-pulsed, and transient), it is highly unlikely that marine mammals would receive sounds strong enough (and over a sufficient duration) to cause PTS (or even TTS). When taking the mitigation measures proposed for inclusion in the regulations into consideration (e.g., shutdown zones to prevent Level A harassment), it is highly unlikely that any type of hearing impairment would occur as a result of the proposed activities.

Anticipated Effects on Habitat

The proposed activities could have some impacts on marine mammal habitat, primarily by producing temporary disturbances through elevated levels of underwater sound, and to a lesser extent, temporarily reduced water quality and temporary and permanent physical habitat alteration. These impacts would not be expected to have tangible direct effects to marine mammals, but could result in minor effects to fish or other elements of the marine mammal prey base. Elevated levels of sound may be considered to affect the habitat of marine mammals through impacts to acoustic space (described in previous sections) or via impacts to prey species. The direct loss of habitat available during construction due to sound impacts is expected to be minimal.

Seafloor Disturbance

Installation of port components and pipelines would cause short- and long-term disruption of benthic habitat in the immediate vicinity of the construction areas; permanent alteration of benthic habitat would result from buoy anchor sweep during port operations. Destruction of bottom habitat, along with resident benthic organisms within the area, is an unavoidable component of pipeline installation. This affects not only the benthic communities, but also the fish assemblages that rely on those communities for food and/or shelter; these fish may in turn be preyed upon by marine mammals. Immediately upon cessation of disturbance, the substrate would be available for recruitment of benthic organisms and reestablishment of the community.

The areas affected by seafloor disturbance are essentially negligible in comparison with the habitat available to marine mammals in the surrounding area. The pipeline route was selected to avoid marine protected areas and areas of submerged aquatic vegetation to the extent possible. During and shortly after installation of the buoy array components and the pipeline, marine mammal prey species are expected to avoid feeding in the immediate vicinity of the project area, thus reducing the utility of habitat in the area. Displaced organisms would likely return to the area shortly after construction activities cease.

Turbidity

Turbidity refers to any insoluble particulate matter suspended in the water column that impedes light passage by scattering and absorbing light energy. Decreased light penetration reduces the depth of the photic zone, in turn reducing the depth at which primary productivity could occur. Impacts to marine mammals would be indirect, resulting from impacts to prey species. Water turbidity appears to have little or no direct impact on bottlenose dolphins, which are regularly seen in turbid waters. Turbidity may adversely affect prey species by direct mortality or reduction of growth rates, modifying migration patterns, reducing available food abundance or habitat (in part by reducing primary production), or burial of benthic shellfish.

However, these potential impacts would be spatially limited and short-term in nature, as the suspended sediment would redeposit soon after the buoy system array and pipeline components were installed.

Seawater Intake and Discharge

During the construction phase, seawater would be used for hydrostatic testing of the offshore pipeline and flowlines. Hydrostatic testing is a one-time temporary event that would require filling the pipeline twice; a total of approximately 24 million gallons would be used. Hydrostatic integrity testing could nevertheless indirectly impact marine mammals, because plankton and fish larvae and eggs could be entrained and subsequently killed by the seawater intake system. This could have either primary or secondary indirect impacts on marine mammals through impacts to prey species.

During regasification, seawater would be taken into an SRV through one of two sea chests covered with a lattice screen. Similar to uptake described for hydrostatic testing, marine mammals may be indirectly impacted through the entrainment of plankton and fish eggs and larvae. Cooling water would be discharged at 10 °C (18 °F) above ambient seawater temperature, and would affect a relatively small area. The discharge would produce detectable temperature increases over a maximum radius of 106 m (348 ft). The cooling water discharge is not expected to reach the seafloor, and would thus not impact benthic communities. The cooling water plume would affect a relatively small area. Considering the short-term nature of impacts and the overall amount of plankton and fish eggs and larvae in the area, these impacts may be considered negligible.

Sound Disturbance

Elevated levels of sound produced by port construction and operation could potentially directly impact marine mammals by reducing the attractiveness of a given area for foraging, i.e., marine mammals may be less likely to forage in a given area in the presence of elevated levels of sound. In addition, sound may indirectly impact marine mammals through effects to fish or other prey species. However, sound produced by project activities is unlikely to be of sufficient intensity or duration to result in significant pathological, physiological, or behavioral effects to fish.

All of the potential adverse impacts to marine mammal habitat would likely be indirect, and would result from impacts on the food web (i.e., adverse impacts directly to marine mammal prey species or to species lower in the food chain) from the proposed activities. The impact to marine mammals of temporary and permanent habitat changes from the proposed activities is expected to be minimal. Any potential impacts would likely be negligible relative to the amount of habitat available on the west Florida Shelf or in adjacent nearshore waters. These effects are summarized here:

- Seafloor disturbance and turbidity: Marine mammals could be indirectly impacted if benthic prey species were displaced or destroyed. Affected species would be expected to recover after construction ceased, and would represent only a small portion of food available to marine mammals in the area. Indirect adverse impacts of limited spatial extent could occur as a result of short- and long-term turbidity increases caused by construction and operations.
- Seawater intake and discharge: This activity, primarily occurring during regasification, would result in the entrainment and destruction of plankton and larvae and discharge of heated seawater. The resulting adverse impact to the prey base would be negligible.
- Sound disturbance: Elevated levels of sound during construction would cause temporary modification of habitat and could harm prey species, potentially reducing utility of habitat for marine mammal foraging. Elevated levels of sound during operation of the DWP would result in essentially permanent habitat modification to a limited area in the immediate vicinity of each STL buoy.

In conclusion, NMFS has preliminarily determined that Port Dolphin's proposed activities are not expected to have any habitat-related effects that could cause significant or long-term consequences for individual marine mammals or on the food sources that they utilize.

Proposed Mitigation

In order to issue an incidental take authorization under section 101(a)(5)(A) of the MMPA, NMFS must, where applicable, set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable adverse impact on such species or stock and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (where relevant). NMFS and Port Dolphin worked to devise a number of mitigation measures designed to minimize impacts to marine mammals to the level of least practicable adverse impact, described in the following and in Port Dolphin's Marine Protected Species Management Plan; please see Appendix B of Port Dolphin's application to review that plan in detail.

In addition to the measures described later, Port Dolphin would employ the following standard mitigation measures:

- All work would be performed according to the requirements and conditions of the regulatory permits issued by federal, state, and local governments.
- Briefings would be conducted between the Port Dolphin project construction supervisors and the crew, protected species observer(s) (PSO), and acoustical monitoring team (when present) prior to the start of all discrete construction activities, and when new personnel join the work, to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.
- Port Dolphin would comply with all applicable equipment sound standards and ensure that all construction equipment has sound control devices no less effective than those provided on the original equipment. In addition, vessel crew and contractors would be required to minimize sound to the extent possible. Equipment and/or procedures used may include the use of enclosures and mufflers on equipment, minimizing the use of thrusters, and turning off engines and equipment when not in use.

Additional mitigation measures, which are discussed in greater detail below, include the following:

- Visual monitoring program (marine mammal watch);
- Vessel strike avoidance measures;
- Line and cable entanglement avoidance measures; and
- Marine debris and waste management protocols.

Monitoring and Shutdown

The modeling results for acoustic zones of influence (ZOIs; described in following sections) were used to develop mitigation measures for the proposed activities. Those zones would initially be set at the distances derived through modeling (or be larger than those distances), but may be adjusted as necessary on the basis of acoustic monitoring conducted by Port Dolphin in order to verify source levels and local acoustic propagation characteristics (see Proposed Monitoring and Reporting, later in this document). The ZOIs effectively represent the mitigation zone that would be established around each activity to prevent Level A harassment and to monitor authorized Level B harassment of marine mammals.

For each of the described proposed activities, a shutdown zone (to include areas where SPLs equal or exceed 180 dB rms) and a disturbance zone (defined as where SPLs equal or exceed 120 dB or 160 dB rms for non-pulsed or pulsed sound sources, respectively) would be established. Shutdown zones include all areas where the underwater SPLs are anticipated to equal or exceed the Level A (injury) harassment criteria for marine mammals and are used in concert with mitigation monitoring in order to prevent the occurrence of Level A harassment. Disturbance zones typically include all areas where the underwater SPLs are anticipated to equal or exceed the Level B (behavioral) harassment criteria. These are intended as zones in which occurrence of marine mammals would be noted and recorded as incidental take while also alerting PSOs to potential close approach to the shutdown zone. In actual practice, the disturbance zones are often so large as to make comprehensive monitoring and fine-scale behavioral observation impracticable. The initial shutdown and disturbance zones would be established based on the worst-case underwater sound modeled as described, although shutdown zones may be larger than the actual modeled distances. Please see the discussion of ''Distance to Sound Thresholds'' under ''Description of Sound Sources,'' previously in this document.

Conservative shutdown zones would be employed in most instances. Impact pile driving (described later) and non-stationary activities would employ zones larger than what is predicted for the Level A harassment threshold. Radial distances to shutdown zones for HDD activities were predicted to be less than 10 m. For all activities, and regardless of modeled shutdown zone (applicable to HDD activities), all equipment would be shut down if any marine mammal enters a precautionary 100 yd (91 m) zone in order to avoid potential risk of vessel strike or direct interaction with equipment. However, these shutdown requirements would not be required for cases in which delphinids voluntarily make such close approaches to vessels (e.g., for bow riding). In addition, for scenarios in which the modeled sound source is a spread of vessels employed for a given construction task, the shutdown/disturbance zone would be measured from the central vessel in the spread, or the vessel that is the primary sound producer if it is not the central vessel. In most cases, the disturbance zone is of sufficient size to make comprehensive monitoring impracticable, although PSOs would be aware of the size and location of the modeled zone and would record any observations made within the zone as takes. Radial distances to Level B thresholds range up to 12.6 km; please refer to Table 6 for those distances.

Monitoring Protocols

The established zones would be monitored by qualified PSOs for mitigation purposes, as described here. Port Dolphin's marine mammal monitoring plan (see Appendix B of Port Dolphin's application) would be implemented, requiring collection of sighting data for each marine mammal observed during the proposed construction activities described in this document.

At least two PSOs would conduct monitoring of shutdown and disturbance zones (as described previously) for all concurrent specified construction activities during daylight hours (civil dawn to civil dusk). PSOs would have no other duties for the duration of the watch. Shutdown and disturbance zones would be monitored from an appropriate vantage point that affords the PSOs an optimal view of the sea surface while not interfering with operation of the vessel or in-water activities. Full observation of the shutdown zone would occur for the duration of the activity.

Monitoring would occur before, during, and after specified construction activity, beginning 30 minutes prior to initiation and concluding 30 minutes after the activity ends. If marine mammals are present within the shutdown zone prior to initiation, the start would be delayed until the animals leave the shutdown zone of their own volition, or until 30 minutes elapse without resighting the animal(s). PSOs will be on watch at all times during daylight hours when in-water operations are being conducted, unless conditions (e.g., fog, rain, darkness) make observations impossible. If conditions deteriorate during daylight hours such that the sea surface observations are halted, visual observations must resume as soon as conditions permit. While activities will be permitted during low-visibility conditions, they (1) must have been initiated following proper clearance of the ZOI under acceptable observation conditions; and (2) must be restarted, if halted for any reason, using the appropriate ZOI clearance procedures.

If a marine mammal is observed approaching or entering the shutdown zone, the PSO will call for the immediate shutdown of in-water operations. The equipment operator must comply with the shutdown order unless human safety is at risk. Any disagreement must be resolved after the shutdown takes place. Construction operations would be discontinued until the animal has moved outside of the shutdown zone. The animal would be determined to have moved outside the shutdown zone through visual confirmation by a qualified PSO or after 15 minutes have elapsed since the last sighting of the animal within the shutdown zone. The following additional measures would apply to visual monitoring:

- Monitoring would be conducted using binoculars and the unaided eye. The limits of the designated ZOI will be determined using binocular reticle or other equipment (e.g., electronic rangefinder, range stick). A GPS unit or range finder would be used for determining the observation location and distance to marine mammals and sound sources.
- Each PSO would have a dedicated two-way radio for contact with the other PSO or field operations manager.

Whenever a marine mammal species is observed, the PSO will note and monitor the position (including relative bearing and estimated distance to the animal) until the animal dives or moves out of visual range of the PSO. The PSO will continue to observe for additional animals that may surface in the area. Often, there are numerous animals that may surface at varying time intervals. Records will be maintained of all marine mammal species sightings in the area, including date and time, weather conditions, species identification, approximate distance from the activity, direction and heading in relation to the activity, and behavioral correlation to the activity. For animals observed in the shutdown zone, additional information regarding actions taken, such as duration of the shutdown, behavior of the animal, and time spent in the shutdown zone will be recorded. During pile driving activities, data regarding the type of pile driven (e.g., material construction and pile dimensions), type and power of the hammer used, number of cold starts, strikes per minute, and duration of the pile driving activities will be recorded.

Monitoring would be conducted by qualified PSOs. In order to be considered qualified, PSOs must meet the following criteria:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance; use of binoculars may be necessary to correctly identify the target.
- Advanced education in biological science, wildlife management, mammalogy, or related fields (bachelor's degree or higher is required).
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
- Experience or training in the field identification of marine mammals, including the identification of behaviors.
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.
- Writing skills sufficient to prepare a report of observations, including, but not limited to, the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and

times when in-water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone; and marine mammal behavior.

• Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

Pile Driving

Mitigation measures specific to pile driving would include use of (1) a sound attenuation device and (2) ramp-up procedures. In addition, the power of impact hammers will be reduced to minimum energy levels required to drive a pile, thus reducing the amount of sound produced in the marine environment. As for other construction activities, vibratory pile driving may continue into nighttime hours/low-visibility conditions only if ramp-up protocols have been conducted under acceptable observation conditions. Impact pile driving may occur only during daylight hours of good visibility. In the event of a shutdown during low-visibility conditions, the pile driving cannot resume until visual monitoring activities are resumed under acceptable observation conditions. The minimum shutdown zone for impact pile driving would be established conservatively at 250 m.

One or more sound attenuation device will be utilized during all impact pile driving activities needed to install components of the STL buoys at the deepwater port. The sound attenuation device(s) will be selected and designed by the marine construction and design contractor(s), but would likely be either a bubble curtain or a temporary sound attenuation pile (TNAP), potentially used in conjunction with cushion block. Please see the discussion of ''Sound Attenuation Devices'' under ''Description of Sound Sources,'' previously in this document.

The objective of a ramp-up is to alert any animals close to the activity and allow them time to move away, which would expose fewer animals to loud sounds. This procedure also ensures that any marine mammals missed during shutdown zone monitoring would move away from the activity and not be injured. The following ramp-up procedures would be used for in-water pile installation:

• To allow any marine mammals that may be in the immediate area to leave before pile driving reaches full energy, a ramp-up technique would be used at the beginning of each day's in-water pile driving activities or if pile driving has ceased for more than 1 hour.

• If a vibratory driver is used, contractors would be required to initiate sound from vibratory hammers for 15 seconds at reduced energy followed by a 1-minute waiting period. The procedure would be repeated two additional times before full energy may be achieved.

• If a non-diesel impact hammer is used, contractors would be required to provide an initial set of strikes from the impact hammer at reduced energy, followed by a 1-minute waiting period, then two subsequent sets.

• If a diesel impact hammer is used, contractors would be required to turn on the sound attenuation device (e.g., bubble curtain or other approved sound attenuation device) for 15 seconds prior to initiating pile driving to flush marine mammals from the area.

Vessel Strike Avoidance

Several construction and support vessels will be used during offshore construction activities. Certain vessel activities, including transits, may not be subject to the visual monitoring and shutdown protocols described previously in this section. Consequently, there is the possibility for vessel strike of protected species to occur within the project area. Port Dolphin would inform all personnel associated with the project of the potential presence of protected species. All vessel crew members and contractors would participate in training for protected species presence and emergency procedures in the unlikely event a protected species is struck by a vessel. Construction and support vessels will follow the NMFS Vessel Strike Avoidance Measures and Reporting for Mariners. Standard measures would be implemented to reduce the risk associated with vessel strikes.

The following vessel strike mitigation measures for cetaceans for active construction/installation vessel operations would be implemented during project activities:

• Vessel operators and crews must maintain a vigilant watch for marine mammals and slow down or stop their vessels, to the extent possible as dictated by safety concerns, to avoid striking sighted protected species.

• Construction or support vessels, while underway, would remain 100 yd (91 m) from all marine mammals to the extent possible.

• If a marine mammal is within 15 m of a construction or support vessel underway, all operations will cease until it is > 100 yd from the vessel. If the marine mammal is observed within 100 yd of an active construction or support vessel underway, the vessel would cease power to the propellers as long as sea conditions permit for safety. After the marine mammal leaves the area the vessel would proceed with caution, following the guidelines below:

▪ Resume vessel at slow speeds while avoiding abrupt changes in direction,

▪ Stay on parallel course with the marine mammal, following behind or next to at an equal or lesser speed,

▪ Do not cross the path of the animal,

▪ Do not attempt to steer or direct the marine mammal away,

▪ If a marine mammal exhibits evasive or defensive behavior, stop the vessel until the marine mammal has left the immediate area, and

▪ Do not allow the vessel to come between a mother and her calf.

• Cetaceans can surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel, the Master would reduce speed and shift the engine to neutral and would not engage the engines until the animals are clear of the area.

• If a sighted marine mammal is believed to be a North Atlantic right whale, federal regulation requires a minimum distance of 500 yd (457 m) from the animal be maintained (50 CFR 224.103 (c)).

• Practical speeds would be maintained to the extent possible. Guidelines for speeds include the following:

▪ Reduce vessel speed to 10 kn or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near an underway vessel, when safety permits. A single cetacean at the surface can indicate the presence of submerged animals in the vicinity of the vessel; therefore, prudent precautionary measures should always be exercised.

▪ No wake/idle speeds where the draft of the vessel provides less than a 4-ft (1.2-m) clearance from the bottom. All vessels would follow deep-water routes whenever possible.

▪ All construction vessels transiting to and from the port from shore would not exceed 14 kn during regular operations.

▪ Avoid sudden changes in speed and direction.

▪ Speeds approaching and departing the buoys would be reduced to 10 kn maximum.

▪ Speeds during installation would be well under 14 kn; vessels may be stationary during certain phases of installation.

• If a collision seems likely, emergency collision procedures would be followed.

• Members of the vessel crew would be encouraged to undergo NMFS training prior to activity, including instruction in reporting procedures, collision emergency procedures, and marine mammal presence detection (surfacing near wake).

• During construction of the facility, an Environmental Coordinator would be on site and responsible for communicating with NMFS and other relevant agencies, as appropriate.

• During construction/installation, transiting vessels would have lookouts required to scan for surfacing marine mammals and report sightings to the Master, who would notify the Environmental Coordinator.

• Offshore vessel activities not required to implement visual monitoring protocols described previously in this document would be temporarily terminated if marine mammals were observed in the area and there is the potential for harm of an individual. The Environmental Coordinator would be called in to determine the appropriate course of action.

Best Management Practices

Port Dolphin, in conjunction with NMFS and other regulatory agencies, has proposed a number of BMPs that will reduce project environmental impacts. Although these measures are not designed specifically to reduce project impacts on marine mammals to the level of least practicable adverse impact, they do have the effect of either directly or indirectly reducing the potential for adverse effects to marine mammals. These BMPs are briefly described here. See Port Dolphin's application or Environmental Impact Statement for more details about these measures.

Lighting—BMPs would be implemented to minimize the attraction of marine mammals to the project area and prevent potential impacts to protected species from nighttime lighting. Lighting would be down-shielded to prevent unnecessary upward illumination while illuminating the vessel decks only. To the extent possible, they would not illuminate surrounding waters. Lighting used during all activities would be regulated according to USCG requirements, without using excessive wattage or quality of lights. Once an activity is completed, all lights used only for that activity would be extinguished.

Entanglement—BMPs would be implemented to prevent entanglement in any lines or cables or siltation barriers used in any construction area. For example, lines, cables, and in-water barriers would not be made of any materials in which a protected species can become entangled (e.g., monofilament), would be properly secured, and would be regularly monitored to avoid protected species entrapment.

Marine Debris—BMPs would be implemented to prevent potential impacts to protected species from debris discarded within any construction area, including mandatory marine debris training consistent with Bureau of Ocean Energy Management, Regulation, and Enforcement (BOEMRE) NTL 2007–G03 Marine Trash and Debris Awareness and Elimination (*http://www.gomr.boemre.gov/homepg/regulate/regs/ntls/2007NTLs/07-g03.pdf*).

Turbidity—Measures related to turbidity are designed to reduce project impacts to water quality in the marine environment. These include requirements to reduce sediment resuspension from pipeline trenching and burial through the use of certain technology.

Benthic Habitat

• Anchor locations would be optimized to minimize impacts on benthic habitat; avoidance zones would be identified of critical habitat areas for placement of installation barge anchors. An anchoring plan would be developed that would provide procedures for anchor deployment to minimize impacts on hard- and live-bottom habitat.

• Required vessels would be selected to minimize the number and type of anchors, where possible, while still providing vessels adequate to perform the work.

• Midline buoys would be utilized to the extent practicable on anchor chains to reduce the amount of anchor chain sweep.

• A Mitigation Plan to compensate for unavoidable impacts on hard bottom would be developed.

Pelagic Habitat—As described previously in this document, SRV seawater intake/discharge and other vessel discharge protocols would be designed to minimize impacts to water column habitat by reducing seawater intake requirements, creating limits for seawater intake velocity and discharge temperature, and reducing other vessel discharges.

Conclusions

NMFS has carefully evaluated the applicant's proposed mitigation measures and considered a range of other measures in the context of ensuring that NMFS prescribes the means of effecting the least practicable adverse impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another:

• The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals;

• The proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and

• The practicability of the measure for applicant implementation.

Based on our evaluation of the applicant's proposed measures and the measures added by NMFS, NMFS has preliminarily determined that the mitigation measures proposed by both NMFS and Port Dolphin provide the means of effecting the least practicable adverse impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

The proposed rule comment period will afford the public an opportunity to submit recommendations, views, and/or concerns regarding this action and the proposed mitigation measures. While NMFS has determined preliminarily that the proposed mitigation measures presented in this document would effect the least practicable adverse impact on the affected species or stocks and their habitat, NMFS will consider all public comments to help inform the final decision. Consequently, the proposed mitigation measures may be refined, modified, removed, or added to prior to the issuance of the final rule based on public comments received, and where appropriate, further analysis of any additional mitigation measures.

Proposed Monitoring and Reporting

In order to issue an incidental take authorization (ITA) for an activity, section 101(a)(5)(A) of the MMPA states that NMFS must, where applicable, set forth ''requirements pertaining to the monitoring and reporting of such taking.'' The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for ITAs must include the suggested means of accomplishing the necessary monitoring and reporting that would result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area.

Port Dolphin proposed a protected species monitoring plan in their application (see Appendix B of Port

Dolphin's application). The plan may be modified or supplemented based on comments or new information received from the public during the public comment period. All monitoring methods identified herein have been developed through coordination between NMFS and Port Dolphin. The methods are based on the parties' professional judgment supported by their collective knowledge of marine mammal behavior, site conditions, and proposed project activities. Any modifications to this protocol would be coordinated with NMFS. A summary of the plan, as well as the proposed reporting requirements, is contained here.

The intent of the monitoring plan is to:

• Comply with the requirements of the MMPA Letter of Authorization as well as the ESA section 7 consultation;

• Avoid injury to marine mammals through visual monitoring of identified shutdown zones; and

• To the extent possible, record the number, species, and behavior of marine mammals in disturbance zones for the proposed activities.

As described previously, monitoring for marine mammals would be conducted in specific zones established to avoid or minimize effects of elevated levels of sound created by the specified activities. Initial shutdown and disturbance zones would be based on the applicant's modeled values. Shutdown zones for non-stationary activities would conform to NMFS Vessel Strike Avoidance Measures and Reporting for Mariners (i.e., 100 yd)—a distance much larger than actual areas ensonified to 180 dB rms or greater. However, shutdown requirements would not be triggered upon voluntary approach by small marine mammals (i.e., delphinids). The actual zone monitored for disturbance would be based upon logistical considerations, as described previously in this document, as the full disturbance zones would be so large as to make monitoring impracticable. Zones may be modified on the basis of actual recorded SPLs from acoustic monitoring.

Port Dolphin proposed a visual monitoring program in its application. In cooperation with NMFS, Port Dolphin has supplemented that plan with an acoustic monitoring program that would be conducted primarily to verify the sound source levels and local acoustic propagation characteristics that were assumed in the acoustic modeling.

Acoustic Monitoring

Port Dolphin would implement an acoustic monitoring program during construction and operation of the deepwater port and appurtenant marine facilities. Please see Port Dolphin's Sound Level Verification Plan (see Supplemental Information) for more detail. The objectives of this program are to: (1) Empirically measure the sound source levels associated with project activities and verify estimated source levels used in modelling, and (2) empirically determine ranges to relevant threshold levels, verifying the accuracy of the acoustic propagation model that was used to predict the size of sound fields generated by construction and operation of the port. Ambient sound levels would also be measured when no project activities are occurring.

Source level measurements would be made using a combination of bottom deployed autonomous multi-channel acoustic recorders (AMARs) and cabled acoustic data acquisition and monitoring systems (ADAMs), and would require that accurate measurements of distance from source to the monitoring hydrophones be made. Range measurements are required for scaling the measured levels to a standard reference range (typically one meter from the source). Range measurements would be performed using a combination of GPS, radar and laser range finders. Both systems would obtain measurements at 1.5 m (5 ft) above the sea floor, with the depth of the hydrophones determined using collocated pressure-sensitive depth gauges. The hydrophone depth measurement is accurate to within 1 m. Received sound levels would be measured at pre-determined distances (as specified here) and would be used to determine site-specific propagation characteristics and verify ranges to the relevant sound exposure thresholds.

The recording system would have a frequency response of ±3 dB from 10 Hz to 64,000 Hz over the anticipated measurement range of 100 dB to 220 dB (linear peak re: 1 μPa). Hydrophones with differing sensitivities may be required at different locations depending upon the acoustic environment and source to be measured. Analysis of the recorded data would determine the amplitude, time history, and frequency of sounds associated with construction activity. Acoustic data to be reported include:

• Mean squared pressure (integral of the squared pressure for duration of impulse, divided by the impulse duration; dB re: 1 $\mu Pa^2/s$, rms) for pulsed sounds;

• SPL (dB re: 1 μPa, rms) for non-pulsed sounds;

• The maximum averaging time and representative range of SPLs;

• Representative range of frequency spectra; 1/3rd octave band center frequency SPLs dB re:1 μPa measured over the frequency range of 10 Hz to 64,000 Hz; and

• Peak SPL (dB re: 1 μPa; the largest absolute value of the instantaneous sound pressure over the minimum frequency range of 10 Hz to 64,000 Hz). The maximum and representative range of peak SPLs would be recorded for each activity.

The activities to be monitored are:

• Pipelaying activities;
• Pipeline burial using the plow system and dredging;
• Pile driving at the buoy locations;
• Installation of the STL buoys;
• HDD within Tampa Bay;
• Vibratory driving (if conducted); and
• SRV maneuvering and docking.

Verification of sound source levels emitted by each of the various activities is required. Although most types of construction activity would be conducted at more than one location and on more than one occasion during the construction period, it is only necessary to determine their sound source level once because local acoustic propagation characteristics should have little effect on the source level calculation. Some construction activities are of long duration and may vary in source level during the operation. For these longer-duration activities (i.e., pipelaying and burial, HDD), a sound level monitoring program of 7 days of continuous recording at a sample rate of 128 kHz would be implemented to capture and consider potential variability when determining the source level associated with these activities. During the 7-day program, logs of the various activities would be collected, permitting a correlation between the activities occurring and the sound levels recorded. For all construction activities, sound level monitoring stations would consist of bottom deployed autonomous recorders at ranges of 500, 1,000 and 1,500 m, perpendicular to the construction spread's direction of travel when applicable. In addition a cabled recording system would be deployed from the appropriate vessel in order to capture close range data suitable for determining a source level estimate. The distances and directions of any of these sound monitoring locations from the activity may be changed if, in the opinion of either Port Dolphin or the marine construction contractors, activities at the planned monitoring locations could pose health and safety risks or impede vessels or construction. If the locations must be changed, the monitoring would occur at the safest location that is closest to the proposed location that would not interfere with vessels or construction. Specific details of monitoring locations for each activity type are discussed in the next paragraph.

For dredging, Port Dolphin is planning to monitor the operation at either the exit or entry pit dredges of the western Gulfstream HDD. The proposed HDD locations are drilling from land to water at the Port Manatee shore approach and from water-to-water at two crossings of the Gulfstream pipeline. Port Dolphin is planning to monitor the HDD operations at the entry pit of the western Gulfstream HDD. For the pipeline laying, plowing and backfilling the pipeline trench, Port Dolphin plans to conduct the sound level verification in the Sarasota Bay Estuarine System. During these activities, the construction spread would be moving relative to the acoustic monitoring stations. This would provide a more detailed record of data on received sounds levels as a function of range and direction from the construction spread.

The commissioning of a new SRV type (i.e., different cargo containment capacity) at the port may involve the unloading of more than one shipment of LNG through the port. The sound level verification program is planned to be implemented only once for each new SRV type during the approach, unloading, and departure during the first commissioning shipment. Once the SRV completes its approach to Port Dolphin and is within approximately 5.6 km of the Port, bow and stern thrusters would be utilized. Thruster use would vary, operating for 10 to 30 minutes to allow for the proper positioning of the vessel and allow for connection to the STL buoy. Docking or berthing is expected to occur at alternate STL buoys approximately every 8 days. The monitoring program would consist of a similar combination of autonomous and cabled acoustic recorders as outlined here.

For SRV maneuvering (i.e., approach, docking, unloading, undocking and departure) operations, Port Dolphin would establish four sound level measuring stations. As part of the DWPL issued by the MarAd, a safety zone, an area to be avoided (ATBA), and a no-anchoring zone have been established around the deepwater port. The boundary of the safety zone has been set at a distance of 850 m (2,790 ft) from both the northern and southern STL buoys. The boundaries of both the ATBA and no-anchoring zone have been set at 1,500 m (4,925 ft) from both the northern and southern STL buoy.

For the SRV maneuvering to docking/undocking at and departure from the two STL buoys, the sound level verification measurements would be taken at the boundary of the ATBA. Three bottom-deployed autonomous recording stations would therefore be set at a distance of 1,500 m from the STL buoys. This would ensure that sufficient data is collected regardless of the SRV's specific approach to the STL buoy. In addition, a fourth autonomous system would be deployed on a platform directly below the STL buoy. The recording system used here would have a frequency response of ±1 dB from 10 Hz to 20,000 Hz over the anticipated measurement range of 100 dB to 220 dB (linear peak re: 1 μPa) due to the lower frequencies expected.

Visual Monitoring

Visual monitoring of relevant zones would be conducted as described previously (see 'Proposed Mitigation'). Shutdown or delay of activities would occur as appropriate. The monitoring biologists would document all marine mammals observed in the monitoring area. Data collection would include a count of all marine mammals observed by species, sex, age class, their location within the zone, and their reaction (if any) to construction activities, including direction of movement, and type of construction that is occurring, time that activity begins and ends, any acoustic or visual disturbance, and time of the observation. Environmental conditions such as wind speed, wind direction, visibility, and temperature would also be recorded. No monitoring would be conducted during inclement weather that creates potentially hazardous conditions, as determined by the PSO(s). No monitoring would be conducted when visibility is significantly limited, such as during heavy rain or fog. During these times of inclement weather, in-water work that may produce sound levels in excess of 180 dB rms may continue, but may not be started. Impact pile driving shall not occur when visibility is significantly limited.

All monitoring personnel must have appropriate qualifications as identified previously. These qualifications include education and experience identifying marine mammals and the ability to understand and document marine mammal behavior. All monitoring personnel would meet at least once for a training session provided by Port Dolphin, and Port Dolphin would be responsible for verifying to NMFS that PSOs meet the minimal qualifications described previously. Topics would include, at minimum, implementation of the monitoring protocol, identification of marine mammals, and reporting requirements. All monitoring personnel would be provided a copy of the LOA. Monitoring personnel must read and understand the contents of the LOA as they relate to coordination, communication, and identifying and reporting incidental harassment of marine mammals. All sightings must be recorded on approved marine mammal field sighting logs.

Proposed Reporting

Reports of data collected during monitoring would be submitted to NMFS weekly. In addition, a final report summarizing all marine mammal monitoring and construction activities would be submitted to NMFS annually. The report would include:

- All data described previously under monitoring, including observation dates, times, and conditions; and
- Correlations of observed behavior with activity type and received levels of sound, to the extent possible.

Port Dolphin would also submit a report(s), as necessary, concerning the results of all acoustic monitoring. The final report for acoustic monitoring of construction activities would be provided at the completion of all marine construction activities. Reporting for acoustic monitoring of operational activities would be provided at the completion of the commissioning period for each new SRV servicing the port. Port Dolphin would to submit these reports to NMFS within 60 working days of the completion of each monitoring event.

Acoustic monitoring reports would include:

- A detailed description of the monitoring protocol;
- A description of the sound monitoring equipment;
- Documentation of calibration activities;
- The depth of water at the hydrophone locations and the depth of the hydrophones;
- The background SPL reported as the 50 percent cumulative density function;
- A summary of the data recorded during monitoring; and
- Analysis of the recorded data and conclusions.

Analysis of the data should include the frequency spectrum, ranges and means including the standard deviation/error for the peak and rms SPLs, and an estimation of the distance at which rms values reach the relevant marine mammal thresholds and background sound levels. Vibratory driving results would include the maximum and overall average rms calculated from 30-s rms values during driving of the pile. In addition, for pile driving, the report would include:

- Size and type of any piles driven, correlated with SPLs;
- A detailed description of any sound attenuation device used, including design specifications;
- The impact hammer energy rating used to drive the piles, make and model of the hammer(s), and description of the vibratory hammer;
- The physical characteristics of the bottom substrate into which the piles were driven; and
- The total number of strikes to drive each pile.

During all phases of construction activities and operation, sightings of any injured or dead marine mammals will be reported immediately (except as described later in this section) to the NMFS Southeast Region Marine Mammal Stranding Network, regardless of whether the injury or death is caused by project activities. In addition, if a marine mammal is struck by a project vessel (e.g., SRV, support vessel), or in the unanticipated event that project activity clearly resulted in the injury, serious injury, or death (e.g., gear interaction, and/or entanglement) of a marine mammal, USCG and NMFS must be notified immediately, and a full report must be provided to NMFS, Southeast Regional Office, and NMFS, Office of Protected Resources. The report must include the following information: (1) The time, date, and location (latitude/longitude) of the incident; (2) the name and type of vessel involved, if applicable; (3) the vessel's speed during and leading up to the incident, if applicable; (4) a description of the incident; (5) water depth; (6) environmental conditions (e.g., wind speed and direction, sea state, cloud cover, visibility); (7) the species identification or description of the animal(s) involved; (8) the fate of the animal(s); and (9) photographs or video footage of the animal (if equipment is available). Following such an incident, activities must cease until NMFS is able to review the circumstances of the incident. NMFS would work with Port Dolphin to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Port Dolphin may not resume activity until notified to do so by NMFS. If a prohibited take should occur, the NMFS Office of Law Enforcement and the Florida Fish and Wildlife Conservation Commission law enforcement would be notified.

In the event that an injured or dead marine mammal is discovered, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (i.e., in less than a moderate state of decomposition as described in the next paragraph), Port Dolphin will immediately report the incident to NMFS, Office of Protected Resources. The report must include the same information identified in the preceding paragraph. However, activity may continue while NMFS reviews the circumstances of the incident, and NMFS will work with Port Dolphin to determine whether modifications to the activities are appropriate. If the lead PSO determines that the discovered animal is not associated with or related to project activities (e.g., previously wounded animal, carcass with moderate to advanced decomposition, scavenger damage), Port Dolphin would report the incident to NMFS, Office of Protected Resources, within 24 hours of the discovery. Port Dolphin should provide photographs or video footage (if available) or other documentation of the sighting. Activities may continue while NMFS reviews the circumstances of the incident.

An annual report on marine mammal monitoring and mitigation would be submitted to NMFS, Office of Protected Resources, and NMFS, Southeast Regional Office, each year. The weekly and annual reports would include data collected for each distinct marine mammal species observed in the project area. Description of marine mammal behavior, overall numbers of individuals observed, frequency of observation, and any behavioral changes and the context of the changes relative to activities would also be included in the annual reports. Additional information that would be recorded during activities and contained in the reports include: date and time of marine mammal detections, weather conditions, species identification, approximate distance from the source, and activity at the construction site when a marine mammal is sighted.

In addition to annual reports, Port Dolphin would submit a draft comprehensive final report to NMFS, Office of Protected Resources, and NMFS, Southeast Regional Office, 180 days prior to the expiration of the regulations. This comprehensive technical report would provide full documentation of methods, results, and interpretation of all monitoring during the first 4.5 years of the regulations. A revised final comprehensive technical report, including all monitoring results during the entire period of the regulations would be due 90 days after the end of the period of effectiveness of the regulations.

Adaptive Management

The final regulations governing the take of marine mammals incidental to the specified activities at Port Dolphin would contain an adaptive management component. In accordance with 50 CFR 216.105(c), regulations for the proposed activity must be based on the best available information. As new information is developed, through monitoring, reporting, or research, the regulations may be modified, in whole or in part, after notice and opportunity for public review. The use of adaptive management would allow NMFS to consider new information from different sources to determine if mitigation or monitoring measures should be modified (including additions or deletions) if new data suggest that such modifications are appropriate for subsequent LOAs.

The following are some of the possible sources of applicable data:

- Results from Port Dolphin's monitoring from the previous year;
- Results from general marine mammal and acoustics research; or
- Any information which reveals that marine mammals may have been taken in a manner, extent or number not authorized by these regulations or subsequent LOAs.

If, during the effective dates of the regulations, new information is presented from monitoring, reporting, or research, these regulations may be modified, in whole, or in part after notice and opportunity of public review, as allowed for in 50 CFR 216.105(c). In addition, LOAs would be withdrawn or suspended if, after notice and opportunity for public comment, the Assistant Administrator finds, among other things, that the regulations are not being substantially complied with or that the taking allowed is having more than a negligible impact on the species or stock, as allowed for in 50 CFR 216.106(e). That is, should substantial changes in marine mammal populations in the project area occur or monitoring and reporting show that Port Dolphin actions are having more than a negligible impact on marine mammals, then NMFS reserves the right to modify the regulations and/or withdraw or suspend LOAs after public review.

Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, the MMPA defines ''harassment'' as: ''any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment].'' Take by Level B harassment only is anticipated as a result of Port Dolphin's proposed activities. Take of marine mammals is anticipated to occur as a result of elevated levels of sound from the previously described activities associated with construction and installation of the port and from port operations. No take by injury, serious injury, or death is anticipated.

As described previously in the ''Distance to Sound Thresholds'' section of this document, JASCO Research modeled a series of scenarios that thoroughly characterize the various construction/installation and operation activities expected. JASCO used proxy sound sources selected from a database of underwater sound measurements. The selected proxy sound sources were input to a sound propagation model with multiple parameters, including expected water column sound speeds, bathymetry, and bottom geoacoustic properties, to estimate the radii of sound impacts (JASCO, 2008, 2010). Note that for some scenarios, 180-dB threshold values only occur in the immediate vicinity of individual pieces of equipment that combine to form a construction ''spread,'' or modeled scenario, with little or no overlap of the sound fields from neighboring vessels. These scenarios are for transient activities—for example, pipelaying and burial activities require a spread of vessels and equipment (e.g., barges, tugs) rather than a single point source of sound. These modeled scenarios combine the sound output from multiple vessels/pieces of equipment. The overall radius depends primarily on the spacing between the vessels, and a single scenario-specific radius for the 180-dB threshold cannot sensibly be defined. All activity types considered here would produce sound source levels attenuating to less than 180 dB within 200 m; thus, 200 m is used as a conservative estimator for 180-dB area calculations in most cases.

JASCO's modeling reports the radial distance from each modeled source to received levels in 10 dB increments (i.e., from 120 dB through 180 dB), and this information is used here to report the intensity of sound source levels relative to this 200 m radius in subsequent sections. Please see Appendices C and D in Port Dolphin's application for a detailed description of this sound source modeling and Appendix E for a graphical depiction of the sound fields from various activities. Results of the modeled underwater analysis for Port Dolphin construction and operation are summarized as follows:

- *Buoy installation:* Installation of the buoys at the Port would produce continuous, transient (non-pulsed) sound for a relatively short period of time during summer, with 120-dB isopleths located 3.9 km from each STL buoy location and corresponding ensonification of approximately 48 km^2. At 200 m distance, sound produced by buoy installation would attenuate to less than 150 dB.
- *Pipelaying:* Pipelaying activities would generate continuous (non-pulsed) sound, and would be transient as the pipelaying operation moved along the pipeline route. Construction is expected to occur during summer and fall. Depending on location, the 120-dB isopleth for pipelaying activities would extend either 6.0 (offshore) or 7.5 km (inshore) from the source, encompassing approximately 113 or 178 km^2, respectively. At 200 m distance, sound produced by pipelaying would attenuate to less than 160 dB.
- *Pipeline burial:* Pipeline burial using the plow system would generate continuous, transient sound during construction similar to pipelaying and is expected to occur during fall and winter. Pipeline burial would only be used in those locations with suitable substrate conditions. Distances to the 120-dB isopleth would be 6.7 (offshore) or 8.4 km (inshore) from the source and would encompass approximately 141 or 222 km^2. At 200 m distance, sound produced by pipeline burial would attenuate to less than 160 dB.
- *Pile driving:* Offshore installation of anchors via impact pile driving is slated to occur during summer. This impulsive sound source would produce a 160-dB isopleth at 4.5 km from each STL buoy location, encompassing approximately 64 km^2. The 180-dB isopleths would extend to 180 m from the source, encompassing approximately 0.1 km^2.
- *HDD:* Horizontal directional drilling within Tampa Bay would produce continuous, non-pulsed sound and is expected to occur during summer. The 120-dB isopleth would extend 240 m from the drilling operation, encompassing approximately 0.2 km^2. Calculations based on the area of ensonification for HDD indicate that no marine mammals would be harassed as a result of this activity. Source levels for this activity are expected to be below the 180-dB threshold; therefore, consideration of Level A harassment is not relevant.
- *HDD vibratory driving:* Installation of the goal posts at each HDD location would produce continuous, non-pulsed sound for a relatively short period of time, exclusively during summer. The 120-dB isopleth for HDD vibratory driving would extend 12.6 km from the source, encompassing approximately 499 km^2. The 180-dB isopleths would be less than 10 m from the source.
- *SRV maneuvering:* Once an SRV completes its approach to Port Dolphin and is within approximately 5.6 km of the port, bow and stern thrusters would be utilized. Thruster use would vary, operating for 10 to 30 minutes to allow for the proper positioning of the vessel and connection to the STL buoy. Docking or berthing would occur at alternate STL buoys approximately every 8 days. The periodic use of the thrusters would produce continuous, non-pulsed sound that would be transient as the vessel moves, with the 120-dB isopleth occurring at 3.6 km from the SRV, encompassing approximately 41 km^2. The 180-dB isopleths would be less than 10 m from the source.
- *Regasification:* SRVs would regasify LNG cargo while docked at a STL buoy, producing continuous, non-pulsed sound. Sound levels for regasification are low, with the 120-dB isopleth at 170 m from the source, encompassing approximately 0.09 km^2. Calculations based on this area of ensonification indicate that no marine mammals would be harassed as a result of this activity. Source levels for this activity are below the 180-dB threshold.

Density of marine mammals in the project area was derived from a U.S. Navy review of available marine mammal survey data for the eastern Gulf of Mexico which summarized species presence and distribution on a seasonal basis (USDON, 2003). As described previously, marine mammal densities are determined on the basis of both seasonality and depth stratum. While the area of actual construction and operations for Port Dolphin is entirely contained within the nearshore depth stratum (0 to 37 m), the sound field from certain construction activity, and thus the area of effect, extends into the mid-shelf depth stratum (37 to 91 m). This has implications for the species of marine mammals that may potentially be affected by the activity. Almost all sound produced by construction activities would occur within the nearshore stratum. The only activity with a sound field extending to the mid-shelf depth stratum is offshore pipelaying, which would occur only during construction, from approximately late summer 2013 through early winter 2013–14. The Level B sound field for this activity would be 99.9 percent contained within the nearshore stratum, with 0.1 percent projected to enter the mid-shelf stratum. Densities for marine mammals that may be affected by the proposed activities are presented in Table 8.

TABLE 8—DENSITY ESTIMATES FOR MARINE MAMMALS IN THE NEARSHORE AND MID-SHELF DEPTH STRATA, EASTERN GOM

Species	Density (Individuals/100 km² (39 mi²))			
	Winter	Spring	Summer	Fall
Nearshore depth stratum:				
Atlantic spotted dolphin	2.243	10.752	2.524	10.752
Bottlenose dolphin	10.913	21.986	8.241	26.744
Mid-shelf depth stratum:				
Atlantic spotted dolphin	11.630	21.699	17.354	22.916
Bottlenose dolphin	7.410	2.588	11.707	10.856
Dwarf/pygmy sperm whale	0.000	0.011	0.011	0.000
Rough-toothed dolphin	0.000	0.000	0.000	0.400

Source: USDON, 2003.

Incidental take estimates are calculated based on: (1) The number of marine mammals that occur within each respective depth stratum, using species- and season-specific density estimates; (2) the percentage of sound field within each depth stratum, by source (this is relevant for offshore pipelaying only); (3) the areal extent of Level A and Level B sound fields, by sound source; and (4) the time or distance component of the activity. Areas of ensonification, by appropriate threshold, are presented in Table 6. With regard to the fourth component (time/distance), there are two types of construction activities: stationary and transient. Stationary activities would occur near specific sites (e.g., locations for buoy installation), while transient activities would occur while traveling along a pre-determined trackline (i.e., the pipeline route). Incidental take associated with stationary activities is determined by considering the estimated number of days of effect. Buoy installation, impact pile driving, and vibratory pile driving activities are expected to take 6, 32, and 8 days, respectively. The pre-determined pipeline route along which the pipelaying and burial activities would occur is approximately 72 km long (37 km offshore, 35 km inshore). For these transient activities, the overall area of effect (i.e., distance × width of ensonified area) is used in calculating estimated incidental take.

For stationary activities, season-specific estimated take was determined by first multiplying the modeled ZOI (i.e., the area ensonified using the appropriate thresholds) and the appropriate species-specific seasonal densities within each depth stratum (USDON, 2003). These results were then rounded to the nearest whole number and multiplied by the estimated number of days of effect to provide an estimate of take.

For transient activities, season-specific estimated take was determined by multiplying the overall area of effect for offshore and inshore portions, respectively, by the appropriate density and, because some of these activities are expected to occur during multiple seasons, by the proportion of trackline expected to be completed during a given season. For offshore pipelaying, approximately 43 percent of effort is expected to occur during summer and 57 percent occur during fall. The inshore portion would occur entirely during fall. For offshore pipe burial, approximately 12 percent of effort is expected to occur during fall and 88 percent occurring during winter. The inshore portion would occur entirely during winter.

For offshore pipelaying, the estimated take within each depth stratum was then integrated into the seasonal, species-specific calculations. Calculations indicate that, on the basis of the densities shown in Table 8 and the 0.1 percent of the sound field for pipelaying that would occur in the mid-shelf depth stratum, no incidental take of dwarf/pygmy sperm whales (i.e., *Kogia* spp.) or rough-toothed dolphins would occur. Similarly, take of spotted and bottlenose dolphins would occur only in the nearshore depth stratum (i.e., the 0.1 percent of effect occurring in the mid-shelf depth stratum would not add to the total take). Dwarf/pygmy sperm whales and rough-toothed dolphins are not covered by this proposed rule because incidental take is not anticipated, and no incidental take is proposed to be authorized. The results of take estimation calculations for bottlenose dolphins and spotted dolphins for construction activities are shown in Table 9.

TABLE 9—ESTIMATED INCIDENTAL TAKE, CONSTRUCTION ACTIVITIES

Activity	Season	Species	
		Atlantic spotted dolphin	Bottlenose dolphin
Buoy installation	Summer	6	24
Impact pile driving	Summer	64	160
Pipelaying—Offshore	Summer	6	20
	Fall	34	85
Pipelaying—Inshore	Fall	45	112
Pipeline burial—Offshore	Fall	8	20
	Winter	12	60
Pipeline burial—Inshore	Winter	11	51

TABLE 9—ESTIMATED INCIDENTAL TAKE, CONSTRUCTION ACTIVITIES—Continued

Activity	Season	Species	
		Atlantic spotted dolphin	Bottlenose dolphin
Vibratory pile driving	Summer	104	328
Total, by species		290	860

When the Port reaches operational status, an estimated 46 SRV visits would occur per year. Visits would be equally distributed across seasons, with 12 visits expected during winter and summer seasons and 11 visits per season during spring and fall. Each visit includes arrival and departure of the SRV, so 46 visits would result in 92 episodes that may result in incidental take. The results of take estimation calculations for operational activities, for a given year, are shown in Table 10.

TABLE 10—ESTIMATED YEARLY INCIDENTAL TAKE, PORT OPERATIONS

Activity	Season	Trips	Atlantic spotted dolphin		Bottlenose dolphin	
			Single visit [1]	Seasonal	Single visit [1]	Seasonal
SRV maneuvering	Summer	12	2	24	7	84
	Fall	11	9	99	22	242
	Winter	12	2	24	9	108
	Spring	11	9	99	18	198
Totals [2]		46		246		632

[1] Single-visit take calculated by multiplying appropriate density and appropriate area, then doubling the result to account for arrival and departure of the SRV in a single trip.
[2] Total represents the single visit take multiplied by the total number of trips.

Assuming that this proposed rulemaking would be in effect during 1 year of construction and 4 years of operations, the total estimated taking, by Level B harassment only, would be 1,274 Atlantic spotted dolphins and 3,388 bottlenose dolphins.

Negligible Impact and Small Numbers Analysis and Preliminary Determination

NMFS has defined ''negligible impact'' in 50 CFR 216 as ''* * * an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.'' In making a negligible impact determination, NMFS considers a variety of factors, including but not limited to: (1) The number of anticipated mortalities; (2) the number and nature of anticipated injuries; (3) the number, nature, intensity, and duration of Level B harassment; and (4) the context in which the takes occur.

Incidental take, in the form of Level B harassment only, is likely to occur primarily as a result of marine mammal exposure to elevated levels of sound resulting from the specified activities. No take by injury, serious injury, or death is anticipated or proposed for authorization. The expected impacts from this activity would be Level B harassment in the form of behavioral disturbance resulting in, for example, changed direction or speed, or temporary avoidance of an area. Anticipated behavioral disturbance is likely to be of low intensity due to the sound source characteristics—the majority of activities considered here would produce low source levels of non-pulsed sound that would be either intermittent or transient—and relatively short in duration associated with the specified activities. For the same reasons, no individual marine mammals are expected to incur any hearing impairment, whether temporary or permanent in nature. That is, non-pulsed sound does not produce the rapid rise times that are more likely to produce hearing impairment in marine mammals, and the low intensity of the sources would result in Level A isopleths within a short distance. Several activities would produce source levels below those considered capable of causing hearing impairment, even in close proximity to marine mammals. The shutdown zone monitoring proposed as mitigation, and the small size of the zones in which injury may occur, further reduces the potential for any injury of marine mammals, making the possibility of hearing impairment extremely unlikely and therefore discountable.

For the greater portion of the life of this proposed rule (i.e., 4 years remaining after the first year of construction), only port operations would occur. Each episode of SRV arrival/departure (requiring thruster use for a period of several hours) would be separated by approximately 8 days of regasification, an activity not expected to result in incidental take. The likely effects of behavioral disturbance from port operations are minor, as many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel (24-hour) cycle. Behavioral reactions to sound exposure (such as disruption of critical life functions, displacement, or avoidance of important habitat) are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al.,* 2007). Operational activities would occur on a single day (i.e., arrival or departure of a SRV), would not recur for a period of 8 days, and, as for the majority of construction activities, would produce only low levels of non-pulsed sound. NMFS' current criterion for Level B harassment from non-pulsed, underwater sound levels (the vast majority of sound produced by the proposed activities) is 120 dB rms. However, not all marine mammals react to sounds at this low level, and many will not show strong reactions (and in some cases any reaction) until sounds are much stronger.

Neither the bottlenose dolphin nor spotted dolphin is listed under the ESA. However, NMFS considers the bay, sound, and estuarine stock of bottlenose dolphins (of which the Tampa Bay/Sarasota Bay populations are a component) to be strategic under the MMPA. NMFS is in the process of writing individual stock assessment reports for each of the 32 bay, sound and estuary stocks of bottlenose dolphins, but none has been completed for the Tampa Bay/Sarasota Bay populations. There is insufficient data to determine population trends or status of the relevant stocks relative to optimum sustainable population. Population estimates for these species were provided earlier in this document (see the ''Description of Marine Mammals in the Area of the Specified Activity'' section).

The maximum estimated take per year of Atlantic spotted dolphins (290) would be small relative to the stock size (37,611; 0.1 percent); this would decline for subsequent years of operations. As a result, only small numbers of Atlantic spotted dolphins would be taken. For bottlenose dolphins, the maximum estimated total take per year for all bottlenose dolphins (860) is small relative to the coastal stock size (7,702; 11 percent); this would decline for subsequent years of operations. As a result, only small numbers of bottlenose dolphins from the coastal stock could be taken. However, it is difficult to partition potential takings between the coastal stock (7,702) and the smaller bay, sound, and estuarine stock (719) because the possibility for mixing of the stocks precludes any quantitative understanding of how the total estimated taking might be apportioned between stocks.

Although it is not possible to predict that portion of overall incidental take that might accrue to bay dolphin populations, NMFS believes that the potential effects of the proposed activities represent a negligible impact for bay dolphins. Only a subset of the specified activities has the potential to affect bay dolphins. Buoy installation and impact pile driving, as well as the entire offshore portion of pipelaying and burial, would occur offshore and would not have the potential to affect the bay dolphin populations. Vibratory pile driving would occur entirely within Tampa Bay, as would a portion of inshore pipelaying and burial, and could impact the bay populations. Vibratory pile driving would occur for only 8 days (at two piles per day), meaning that any harassment experienced by bay dolphins from this activity would be of very short duration. In addition, Tampa Bay is significantly industrialized and urbanized and is heavily used by recreational boaters. Bottlenose dolphins occurring in Tampa Bay are somewhat acclimated to disturbance and would not be expected to experience significant disruption to behavioral patterns on the basis of short-term and low intensity disturbance, such as is proposed for this project. The proposed activities would not take place in areas known to be of special significance for feeding or breeding.

In summary, NMFS believes that potential impacts to bay dolphins represent a negligible impact for the following reasons: (1) Only a subset of project activities have the potential to affect bay dolphins; (2) any takes would be of low intensity (resulting from exposure to low levels of non-pulsed sound over a limited duration) and likely would not result in significant alteration of dolphin behavior in the heavily urbanized/industrialized area where the activity would occur; (3) any takes are likely to represent repeated takes of individuals using the area where the activity is occurring, rather than each take being of a new individual; and (4) an unknown, but possibly large, number of coastal stock dolphins may be mixing in inshore waters at any given time, and it is not possible to accurately determine how many of the takes may occur to individuals of the coastal stock versus individuals of the bay stock. Finally, following the initial year of construction, all operations would occur offshore, and there would be no potential for incidental take of bay dolphins.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the mitigation and monitoring measures, NMFS preliminarily finds that construction and operation of Port Dolphin would result in the incidental take of small numbers of marine mammals, by Level B harassment only, and that the total taking from Port Dolphin's proposed activities would have a negligible impact on the affected species or stocks.

Impact on Availability of Affected Species or Stock for Taking for Subsistence Uses

There are no relevant subsistence uses of marine mammals implicated by this action.

Endangered Species Act (ESA)

On August 4, 2009, NMFS concluded consultation with MarAd and USCG under section 7 of the ESA on the proposed construction and operation of the Port Dolphin LNG facility. The result of that consultation was NMFS' concurrence with Port Dolphin's determination that the proposed activities may affect, but are not likely to adversely affect, listed species under NMFS' jurisdiction. NMFS does not propose to authorize incidental take of any ESA-listed marine mammal species. No listed species will be impacted by the specified activities.

National Environmental Policy Act (NEPA)

The USCG and the MarAd initiated the public scoping process in July 2007, with the publication of a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) in the **Federal Register**. The NOI included information on public meetings and informational open houses; requested public comments on the scope of the EIS; and provided information on how the public could submit comments. A Notice of Availability for the Draft EIS was published in the **Federal Register** in April 2008. Subsequently, a final EIS was published in July 2009. MarAd issued a Record of Decision (ROD) approving, with conditions, the Port Dolphin Energy Deepwater Port License application on October 26, 2009.

Because NMFS was a cooperating agency in the development of the Port Dolphin EIS, NMFS will adopt the EIS and, if appropriate, issue its own ROD for issuance of authorizations pursuant to section 101(a)(5)(A) of the MMPA for the activities proposed by Port Dolphin.

Information Solicited

NMFS requests interested persons to submit comments, information, and suggestions concerning the request and the content of the proposed regulations to authorize the taking (see **ADDRESSES**).

Classification

The Office of Management and Budget (OMB) has determined that this proposed rule is not significant for purposes of Executive Order 12866.

Pursuant to section 605(b) of the Regulatory Flexibility Act (RFA), the Chief Counsel for Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy of the Small Business Administration that this proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities. Port Dolphin Energy LLC is the only entity that would be subject to the requirements in these proposed regulations. Port Dolphin is ultimately owned by the Norway-based shipping company Höegh LNG AS, which is itself held by Leif Höegh & Co, a global shipping company. Therefore, it is not a small governmental jurisdiction, small organization, or small business, as defined by the RFA. Because of this certification, a regulatory flexibility analysis is not required, and none has been prepared.

Notwithstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act (PRA) unless that collection of information displays a currently valid OMB control number. This proposed rule contains collection-of-information requirements subject to the provisions of the PRA. These requirements have been approved by OMB under control number 0648–0151 and include applications for regulations, subsequent LOAs, and reports. Send comments regarding any aspect of this data collection, including suggestions for reducing the burden, to NMFS and the OMB Desk Officer (see **ADDRESSES**).

List of Subjects in 50 CFR Part 217

Exports, Fish, Imports, Indians, Labeling, Marine mammals, Penalties, Reporting and recordkeeping requirements, Seafood, Transportation.

Dated: September 4, 2012.

Alan D. Risenhoover,

Director, Office of Sustainable Fisheries, performing the functions and duties of the Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

For reasons set forth in the preamble, 50 CFR part 217 is proposed to be amended as follows:

PART 217—REGULATIONS GOVERNING THE TAKE OF MARINE MAMMALS INCIDENTAL TO SPECIFIED ACTIVITIES

1. The authority citation for part 217 continues to read as follows:

Authority: 16 U.S.C. 1361 *et seq.*

2. Subpart P is added to part 217 to read as follows:

Subpart P—Taking Marine Mammals Incidental to Construction and Operation of a Liquefied Natural Gas Deepwater Port in the Gulf of Mexico

Sec.

Subpart P—Taking Marine Mammals Incidental to Construction and Operation of a Liquefied Natural Gas Deepwater Port in the Gulf of Mexico

§ 217.151 Specified activity and specified geographical region.

(a) Regulations in this subpart apply only to Port Dolphin Energy LLC (Port Dolphin) and those persons it authorizes to conduct activities on its behalf for the taking of marine mammals that occurs in the area outlined in paragraph (b) of this section and that occur incidental to construction and operation of the Port Dolphin Deepwater Port (Port).

(b) The taking of marine mammals by Port Dolphin may be authorized in a Letter of Authorization (LOA) only if it occurs in the vicinity of the Port Dolphin Deepwater Port in the eastern Gulf of Mexico or along the associated pipeline route.

§ 217.152 Effective dates.

[Reserved]

§ 217.153 Permissible methods of taking.

(a) Under LOAs issued pursuant to § 216.106 and § 217.157 of this chapter, the Holder of the LOA (hereinafter ''Port Dolphin'') may incidentally, but not intentionally, take marine mammals within the area described in § 217.151(b) of this chapter, provided the activity is in compliance with all terms, conditions, and requirements of the regulations in this subpart and the appropriate LOA.

(b) The incidental take of marine mammals under the activities identified in § 217.151(a) of this chapter is limited to the following species and is limited to Level B Harassment:

(1) Bottlenose dolphin (*Tursiops truncatus*)—3,388 (860 the first year and an average of 632 annually thereafter)

(2) Atlantic spotted dolphin (*Stenella frontalis*)—1,274 (290 the first year and an average of 246 annually thereafter)

§ 217.154 Prohibitions.

Notwithstanding takings contemplated in § 217.151 of this chapter and authorized by a LOA issued under § 216.106 and § 217.157 of this chapter, no person in connection with the activities described in § 217.151 of this chapter may:

(a) Take any marine mammal not specified in § 217.153(b) of this chapter;

(b) Take any marine mammal specified in § 217.153(b) of this chapter other than by incidental, unintentional Level B Harassment;

(c) Take a marine mammal specified in § 217.153(b) of this chapter if such taking results in more than a negligible impact on the species or stocks of such marine mammal; or

(d) Violate, or fail to comply with, the terms, conditions, and requirements of this subpart or a LOA issued under § 216.106 and § 217.157 of this chapter.

§ 217.155 Mitigation.

(a) When conducting the activities identified in § 217.151(a) of this chapter, the mitigation measures contained in any LOA issued under § 216.106 and § 217.157 of this chapter must be implemented. These mitigation measures include but are not limited to:

(1) General Conditions:

(i) Briefings shall be conducted between the Port Dolphin project construction supervisors and the crew, protected species observer(s) (PSO), and acoustic monitoring team prior to the start of all construction activity, and when new personnel join the work, to explain responsibilities, communication procedures, protected species monitoring protocol, and operational procedures.

(ii) Port Dolphin shall comply with all applicable equipment sound standards and ensure that all construction equipment has sound control devices no less effective than those provided on the original equipment. Vessel crew and contractors shall minimize the production of underwater sound to the extent possible. Equipment and/or procedures used may include the use of enclosures and mufflers on equipment, minimizing the use of thrusters, and turning off engines and equipment when not in use.

(iii) All vessels associated with Port Dolphin construction and operations shall comply with NMFS Vessel Strike Avoidance Measures and Reporting for Mariners and applicable regulations. All vessels associated with Port Dolphin construction and operations shall remain 500 yd (457 m) away from North Atlantic right whales (*Eubalaena glacialis*) and 100 yd (91 m) away from all other marine mammals, except in cases where small marine mammals (i.e., delphinids) voluntarily approach within 100 yd or unless constrained by human safety concerns or navigational constraints.

(2) Shutdown and Monitoring:

(i) *Shutdown zone:* For all activities, shutdown zones shall be established. These zones shall include all areas where underwater sound pressure levels

(SPLs) are anticipated to equal or exceed 180 dB re: 1 μPa rms, as determined by modeled scenarios approved by NMFS for each specific activity. The actual size of these zones shall be empirically determined and reported by Port Dolphin. For all non-stationary activities (e.g., pipeline burial, shuttle regasification vessel (SRV) maneuvering), Port Dolphin shall maintain a minimum 100 yd (91 m) distance from marine mammals, with the exception that voluntary approach (e.g., bow riding) within the 100 yd zone by delphinids shall not trigger shutdown requirements.

(ii) *Disturbance zone:* For all activities, disturbance zones shall be established. For impact pile driving, these zones shall include all areas where underwater SPLs are anticipated to equal or exceed 160 dB re: 1 μPa rms. For all other activities these zones shall include all areas where underwater SPLs are anticipated to equal or exceed 120 dB re: 1 μPa rms. These zones shall be established on the basis of modeled scenarios approved by NMFS for each specific activity. The actual size of disturbance zones shall be empirically determined and reported by Port Dolphin, and on-site PSOs shall be aware of the size of these zones. However, because of the large size of these zones, monitoring of the zone is required only to maximum line-of-sight distance from established monitoring locations.

(iii) Monitoring of shutdown and disturbance zones shall occur for all activities. The following measures shall apply:

(A) Shutdown and disturbance zones shall be monitored from the appropriate vessel or work platform, or other suitable vantage point. Port Dolphin shall at all times employ, at minimum, two PSOs in association with each concurrent specified construction activity.

(B) The shutdown zone shall be monitored for the presence of marine mammals before, during, and after construction activity. For all activities, the shutdown zone shall be monitored for 30 minutes prior to initiating the start of activity and for 30 minutes following the completion of activity. If marine mammals are present within the shutdown zone prior to initiating activity, the start shall be delayed until the animals leave the shutdown zone of their own volition or until 15 minutes has elapsed without observing the animal. If a marine mammal is observed within or approaching the shutdown zone, activity shall be halted as soon as it is safe to do so, until the animal is observed exiting the shutdown zone or 15 minutes has elapsed. If a marine mammal is observed within the disturbance zone, a take shall be recorded and behaviors documented.

(C) PSOs shall be on watch at all times during daylight hours when in-water operations are being conducted, unless conditions (e.g., fog, rain, darkness) make observations impossible. If conditions deteriorate during daylight hours such that the sea surface observations are halted, visual observations must resume as soon as conditions permit. While activities will be permitted to continue during low-visibility conditions, they (1) must have been initiated following proper clearance of the shutdown zone under acceptable observation conditions; and (2) must be restarted, if halted for any reason, using the appropriate shutdown zone clearance procedures as described in § 217.155(a)(2)(iii)(B) of this chapter.

(3) Pile driving:

(i) A minimum shutdown zone of 250 m radius shall be established around all impact pile driving activity.

(ii) Contractors shall reduce the power of impact hammers to minimum energy levels required to drive a pile.

(iii) Port Dolphin shall use a sound attenuation measure for impact driving of pilings. Prior to beginning construction, Port Dolphin must provide information to NMFS about the device to be used, including technical specifications. NMFS must approve use of the device before construction may begin. If a bubble curtain or similar measure is used, it shall distribute small air bubbles around 100 percent of the piling perimeter for the full depth of the water column. Any other attenuation measure (e.g., temporary sound attenuation pile) must provide 100 percent coverage in the water column for the full depth of the pile. Prior to any impact pile driving, a performance test of the sound attenuation device must be conducted in accordance with a NMFS-approved acoustic monitoring plan. If a bubble curtain or similar measure is utilized, the performance test shall confirm the calculated pressures and flow rates at each manifold ring.

(iv) Ramp-up:

(A) A ramp-up technique shall be used at the beginning of each day's in-water pile driving activities and if pile driving resumes after it has ceased for more than 1 hour.

(B) If a vibratory driver is used, contractors shall be required to initiate sound from vibratory hammers for 15 seconds at reduced energy followed by a 1-minute waiting period. The procedure shall be repeated two additional times before full energy may be achieved.

(C) If a non-diesel impact hammer is used, contractors shall be required to provide an initial set of strikes from the impact hammer at reduced energy, followed by a 1-minute waiting period, then two subsequent sets.

(D) If a diesel impact hammer is used, contractors shall be required to turn on the sound attenuation device for 15 seconds prior to initiating pile driving.

(v) No impact pile driving shall occur when visibility in the shutdown zone is significantly limited, such as during heavy rain or fog.

(4) Additional mitigation measures:

(i) Use of lights during construction activities shall be limited to areas where work is actually occurring, and all other lights must be extinguished. Lights must be shielded such that they illuminate the deck and do not intentionally illuminate surrounding waters, to the extent possible.

(ii) Additional mitigation measures as contained in a LOA issued under § 216.106 and § 217.157 of this chapter.

(b) [Reserved]

§ 217.156 Requirements for monitoring and reporting.

(a) Visual monitoring program:

(1) Port Dolphin shall employ, at minimum, two qualified PSOs during specified construction-related activities at each site where such activities are occurring. All PSOs must be selected in conformance with NMFS' minimum qualifications, as described in the preamble to this rule, and must receive training sponsored by Port Dolphin, with topics to include, at minimum, implementation of the monitoring protocol, identification of marine mammals, and reporting requirements. The PSOs shall be responsible for visually locating marine mammals in the shutdown and disturbance zones and, to the extent possible, identifying the species. PSOs shall record, at minimum, the following information:

(i) A count of all marine mammals observed by species, sex, and age class, when possible.

(ii) Their location within the shutdown or disturbance zone, and their reaction (if any) to construction activities, including direction of movement.

(iii) Activity that is occurring at the time of observation, including time that activity begins and ends, any acoustic or visual disturbance, and time of the observation.

(iv) Environmental conditions, including wind speed, wind direction, visibility, and temperature.

(2) Port Dolphin shall sponsor a training course to designated crew members assigned to vessels associated

with construction activities or support of operations who will have responsibilities for watching for marine mammals. This course shall cover topics including, but not limited to, descriptions of the marine mammals found in the area, mitigation and monitoring requirements contained in a LOA, sighting log requirements, provisions of NMFS Vessel Strike Avoidance Measures and Reporting for Mariners, and procedures for reporting injured or dead marine mammals.

(3) Monitoring shall be conducted using appropriate binoculars, such as 8x50 marine binoculars. When possible, digital video or still cameras shall also be used to document the behavior and response of marine mammals to construction activities or other disturbances.

(4) Each PSO shall have two-way communication capability for contact with other PSOs or work crews. PSOs shall implement shut-down or delay procedures when applicable by calling for the shut-down to the equipment/vessel operator.

(5) A GPS unit and/or appropriate range finding device shall be used for determining the observation location and distance to marine mammals, vessels, and construction equipment.

(6) During arrival and departure of SRVs and regasification, qualified PSOs may not be required. During SRV arrival and departure, while thrusters are engaged for maneuvering, an additional lookout shall be designated to exclusively and continuously monitor for marine mammals. All sightings of marine mammals by the designated lookout, individuals posted to navigational lookout duties, or any other crew member while the SRV is maneuvering or in transit to or from the Port shall be immediately reported to the watch officer who shall then alert the Master. The SRV must report to Port Dolphin any observations of marine mammals while maneuvering with thrusters.

(b) Acoustic monitoring program:

(1) Port Dolphin must provide NMFS with an acoustic monitoring plan describing the planned measurement of underwater sound pressure levels from designated construction and operation activities as well as the characterization of site-specific sound propagation. NMFS must approve this plan before activities may begin, and acoustic monitoring must be conducted in accordance with the plan.

(2) Port Dolphin shall provide NMFS with empirically measured source level data for designated sources of sound associated with Port construction and operation activities and shall verify distances to relevant sound thresholds. Measurements shall be carefully coordinated with sound-producing activities.

(3) [Reserved]

(c) Reporting—Port Dolphin must implement the following reporting requirements:

(1) A report of data collected during monitoring shall be submitted to NMFS following conclusion of construction activities. Subsequent reports concerning Port operations shall be submitted annually. The reports shall include:

(i) All data required to be collected during monitoring, as described under 217.156(a) of this chapter, including observation dates, times, and conditions;

(ii) Correlations of observed behavior with activity type and received levels of sound, to the extent possible; and

(iii) Estimations of total incidental take of marine mammals, extrapolated from observed incidental take.

(2) Port Dolphin shall also submit a report(s) concerning the results of all acoustic monitoring. Acoustic monitoring reports shall include information as described in a NMFS-approved acoustic monitoring plan.

(3) Reporting injured or dead marine mammals:

(i) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by a LOA (if issued), such as an injury (Level A harassment), serious injury, or mortality, Port Dolphin shall immediately cease the specified activities and report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Southeast Regional Stranding Coordinator, NMFS. The report must include the following information:

(A) Time and date of the incident;

(B) Description of the incident;

(C) Environmental conditions (e.g., wind speed and direction, Beaufort sea state, cloud cover, and visibility);

(D) Description of all marine mammal observations in the 24 hours preceding the incident;

(E) Species identification or description of the animal(s) involved;

(F) Fate of the animal(s); and

(G) Photographs or video footage of the animal(s).

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with Port Dolphin to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Port Dolphin may not resume their activities until notified by NMFS.

(ii) In the event that Port Dolphin discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (e.g., in less than a moderate state of decomposition), Port Dolphin shall immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Southeast Regional Stranding Coordinator, NMFS. The report must include the same information identified in 217.156(b)(3)(i) of this chapter. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with Port Dolphin to determine whether additional mitigation measures or modifications to the activities are appropriate.

(iii) In the event that Port Dolphin discovers an injured or dead marine mammal, and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in the LOA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Port Dolphin shall report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Southeast Regional Stranding Coordinator, NMFS, within 24 hours of the discovery. Port Dolphin shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS.

(4) Annual Reports.

(i) A report summarizing all marine mammal monitoring and construction activities shall be submitted to NMFS, Office of Protected Resources, and NMFS, Southeast Regional Office (specific contact information to be provided in LOA) following the conclusion of construction activities. Thereafter, Port Dolphin shall submit annual reports summarizing marine mammal monitoring and operations activities.

(ii) The annual reports shall include data collected for each distinct marine mammal species observed in the project area. Description of marine mammal behavior, overall numbers of individuals observed, frequency of observation, and any behavioral changes and the context of the changes relative to activities shall also be included in the reports. Additional information that shall be recorded during activities and contained in the reports include: Date and time of marine mammal detections, weather conditions, species identification, approximate distance from the source, and activity at the construction site when a marine mammal is sighted.

(5) Five-year Comprehensive Report.

(i) Port Dolphin shall submit a draft comprehensive final report to NMFS, Office of Protected Resources, and NMFS, Southeast Regional Office (specific contact information to be provided in LOA) 180 days prior to the expiration of the regulations. This comprehensive technical report shall provide full documentation of methods, results, and interpretation of all monitoring during the first 4.5 years of the activities conducted under the regulations in this Subpart.

(ii) Port Dolphin shall submit a revised final comprehensive technical report, including all monitoring results during the entire period of the LOAs, 90 days after the end of the period of effectiveness of the regulations to NMFS, Office of Protected Resources, and NMFS, Southeast Regional Office (specific contact information to be provided in LOA).

§ 217.157 Letters of Authorization.

(a) To incidentally take marine mammals pursuant to these regulations, Port Dolphin must apply for and obtain a LOA.

(b) A LOA, unless suspended or revoked, may be effective for a period of time not to exceed the expiration date of these regulations.

(c) If an LOA expires prior to the expiration date of these regulations, Port Dolphin must apply for and obtain a renewal of the LOA.

(d) In the event of projected changes to the activity or to mitigation and monitoring measures required by an LOA, Port Dolphin must apply for and obtain a modification of the LOA as described in § 217.158 of this chapter.

(e) The LOA shall set forth:

(1) Permissible methods of incidental taking;

(2) Means of effecting the least practicable adverse impact (i.e., mitigation) on the species, its habitat, and on the availability of the species for subsistence uses; and

(3) Requirements for monitoring and reporting.

(f) Issuance of the LOA shall be based on a determination that the level of taking will be consistent with the findings made for the total taking allowable under these regulations.

(g) Notice of issuance or denial of a LOA shall be published in the **Federal Register** within 30 days of a determination.

§ 217.158 Renewals and modifications of Letters of Authorization.

(a) A LOA issued under § 216.106 and § 217.157 of this chapter for the activity identified in § 217.151(a) of this chapter shall be renewed or modified upon request by the applicant, provided that: (1) The proposed specified activity and mitigation, monitoring, and reporting measures, as well as the anticipated impacts, are the same as those described and analyzed for these regulations (excluding changes made pursuant to the adaptive management provision in § 217.158(c)(1) of this chapter), and (2) NMFS determines that the mitigation, monitoring, and reporting measures required by the previous LOA under these regulations were implemented.

(b) For LOA modification or renewal requests by the applicant that include changes to the activity or the mitigation, monitoring, or reporting (excluding changes made pursuant to the adaptive management provision in § 217.158(c)(1) of this chapter) that do not change the findings made for the regulations or result in no more than a minor change in the total estimated number of takes (or distribution by species or years), NMFS may publish a notice of proposed LOA in the **Federal Register**, including the associated analysis of the change, and solicit public comment before issuing the LOA.

(c) A LOA issued under § 216.106 and § 217.157 of this chapter for the activity identified in § 217.151(a) of this chapter may be modified by NMFS under the following circumstances:

(1) Adaptive Management—NMFS may modify (including augment) the existing mitigation, monitoring, or reporting measures (after consulting with Port Dolphin regarding the practicability of the modifications) if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring set forth in the preamble for these regulations.

(i) Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA:

(A) Results from Port Dolphin's monitoring from the previous year(s).

(B) Results from other marine mammal and/or sound research or studies.

(C) Any information that reveals marine mammals may have been taken in a manner, extent or number not authorized by these regulations or subsequent LOAs.

(ii) If, through adaptive management, the modifications to the mitigation, monitoring, or reporting measures are substantial, NMFS will publish a notice of proposed LOA in the **Federal Register** and solicit public comment.

(2) Emergencies—If NMFS determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in § 217.153(b) of this chapter, an LOA may be modified without prior notice or opportunity for public comment. Notice would be published in the **Federal Register** within 30 days of the action.

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