United States Department of the Interior

FISH AND WILDLIFE SERVICE

Caribbean Ecological Services
Field Office
P.O. Box 491
Boqueron, PR 00622

JUN 23 2016

In Reply Refer to:
FWS/R4/CESFO/72123-035

Mr. Dave Swearingen
Chief, Gas Branch 4
Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

Re: Biological Opinion for the Aguirre Offshore GasPort Project, OEP/DG2E/Gas Branch 4 Aguirre Offshore GasPort, LLC, Jobos Bay, Salinas, Puerto Rico, FERC Docket No. CP13-193-000, FERC/EIS-0253, SAJ-2012-00353 (SP-CGR)

Dear Mr. Swearingen:

The Aguirre Offshore GasPort, LLC (AOGP), a subsidiary of Excelerate Energy, LP, is seeking authorization from the Federal Energy Regulatory Commission (FERC) to develop, construct, and operate a liquefied natural gas (LNG) import terminal off the southern coast of Puerto Rico within Jobos Bay in the municipality of Salinas. This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) based on our review of the proposed AOGP and its effects on the Antillean manatee (*Trichechus manatus manatus*), in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.) and the Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. 1361 et seq.).

Your February 26, 2016, request for formal consultation was received on March 1, 2016. On March 30, 2016, the Service acknowledged FERC's determination that the project may affect the Antillean manatee. The FERC also requested formal consultation for nesting sea turtles, although no sea turtle nesting habitat is present or may be adversely affected by the proposed action. The Service advised FERC to conclude consultation for the hawksbill sea turtle (*Eretmochelys imbricata*) and green sea turtle (*Chelonia mydas*) nesting using the optional informal consultation process at 50 CFR 402.13, and confirm to us within 30 days whether they wish to revise their consultation request accordingly or receive a biological opinion that unnecessarily addresses the action's discountable or non-existent effects to these two species' nesting. Since the FERC did not respond to the Service's request for reconsidering their effect determination for nesting sea turtles, this BO also addresses these two sea turtle species.

As the Antillean manatee is under the statutory authority of both the ESA and the MMPA, we cannot authorize incidental take of manatees as part of a BO unless it has also been authorized under Section 101 (a)(5) of the MMPA. To request an Incidental Harassment Authorization (IHA), we refer you to regulations at 50 CFR 216.101 – General Regulations Governing Small Takes of Marine Mammals Incidental to Specified Activities. Once IHA under MMPA has been authorized, you need to request our office to reinitiate formal section 7 consultation. With the authorization under MMPA, an incidental take permit under ESA could be issued. Be aware that until an incidental take permit is processed and the BO amended, prohibitions of section 9 of the ESA are not exempted.

This BO is based on information provided in the February, 2015, Final Environmental Impact Statement (EIS), the February, 2016, Biological Assessment (BA), and other sources of information from our files. A complete administrative record of this consultation is on file at the Caribbean Ecological Services Field Office in Boquerón, Puerto Rico.

CONSULTATION HISTORY

- On November 2, 2011, the Service attended the Corps of Engineers Interagency meeting where Excelerate Energy presented the proposed AOGP.

- On February 28, 2012, the FERC published the notice of intent to prepare an EIS for the proposed AOGP. The Service provided a response letter on March 23, 2012.

- On March 5, 2012, the Service received the Baseline Benthic Characterization Plan prepared by Tetra Tech, Inc. The Service provided a response letter on March 23, 2012.

- On March 20, 2012, the Service attended the FERC's Interagency Coordination Meeting.

- On August 31, 2012, the Service received from Tetra Tech, Inc., the Report of Baseline Benthic Characterization Study. The Service provided a response letter on October 3, 2012.

- On April 17, 2013, the AOGP submitted an application with FERC.

- On April 30, 2013, FERC published the notice of application from the AOGP. The Service provided a response letter on May 24, 2013.

- On August 23, 2013, the Service received from Tetra Tech, Inc. the AOGP draft BA. The Service provided a response letter on September 19, 2013.

- On October 1, 2013, the Corps of Engineers requested comments on the AOGP permit application. The Service provided a response letter on October 23, 2013.

- On June 24, 2014, the Service participated on a technical meeting to review and discuss the Draft Mitigation Plan presented by Tetra Tech, Inc.

- On August 14, 2014, FERC sent the notice of availability of the draft EIS and BA for the proposed project. The Service provided a response letter on October 14, 2014.

- On February 20, 2015, FERC issued the final EIS for the proposed project.

- On February 26, 2016, FERC sent the final BA for the proposed project and requested concurrence with their effects determination for federally listed species.

- On March 30, 2016, the Service provided a response letter to FERC to initiate formal consultation with that agency for the Antillean manatee.

- On June 1, 2016, the Service sent FERC an email with comments on their Draft Manatee Protection Plan and further ESA and MMPA information regarding the manatee take regulations.

- On June 9, 2016, the Service received from Excelerate Energy a revised Manatee Protection Plan and clarification of necessary nighttime work for the AOGP project.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The following information was obtained from the EIS (FERC 2015) and the BA (FERC 2016). The purpose of the AOGP facilities is to receive, store, and regasify LNG and deliver the gas to the Puerto Rico Electric Power Authority's (PREPA) existing onshore Aguirre Power Plant Complex (Aguirre PP) in Salinas, Puerto Rico. The project consists of the construction and operation of an offshore marine LNG receiving facility and a 4-mile-long (6.4 km) subsea pipeline connecting the offshore facility to the Aguirre PP. A Floating Storage and Regasification Unit (FSRU) would be moored semi-permanently at the offshore berthing platform were ships would dock and deliver LNG to the FSRU. The AOGP would also use a construction office, contractor staging area, and an existing dock within the Aguirre PP. The majority of the project would be located offshore. The LNG terminal would be located approximately 3 miles (4.89 km) off the southern coast of Puerto Rico. The proposed terminal will be located about 1 mile (1.6 km) outside of Jobos Bay (Appendix I).

The offshore berthing platform would be a fixed platform carrying topside facilities and two berths, one on each side of the fixed platform. The offshore berthing platform would be approximately 1,515 feet long by 330 feet wide. The FSRU would dock on one side of the platform (north or landward) and the LNG Carrier would temporarily dock on the other side (south or seaward). The subsea interconnecting pipeline would extend from the offshore terminal, northward under the *Boca del Infierno* pass, and across the basin of Jobos Bay to the

Aguirre PP (Appendix I). All of the subsea pipeline would be concreate coated with the exception of the length of the pipeline to be installed using horizontal directional drilling (HDD) and the pipeline located at the pipe bend locations. In the pipe bend locations and HDD entry/exit points, concrete mats would be placed above the buried pipeline. Excavated sediment would be deposited over the installed pipeline.

The AOGP anticipates that construction of the project facilities would take approximately 12 months (some activities would be conducted concurrently):

- Offshore GasPort Terminal (Marine Infrastructure) – 9 months.
- Offshore GasPort Terminal (Topside Facilities) – 8 months
- Subsea Pipeline – 3 months (includes 15-20 days for each pipeline segment, and 60 days for the HDD segment)

According to the BA, the construction of the AOGP facilities would affect approximately 126.9 acres of water surface, 97.8 acres of seafloor, and 1.3 acres of upland. These estimates include direct impacts on the seafloor from pipeline installation, anchor placement, temporary and entry/exit excavations for HDD operations, and shading impacts from the HDD entry barge. These estimates do not include the area affected by HDD drilling fluid release. Permanent impacts include approximately 21.5 acres and 2.6 acres of the seafloor by the operation of the AOGP and the subsea pipeline respectively, including areas covered by the concrete mats as well as areas where the pipeline would be buried with redeposited dredged material. Construction of the project would temporarily impact 13.1 acres and permanently impact 2.7 acres of seagrass habitat. Direct impacts on corals would cover 3.9 acres of patch reef and permanent impacts of coral reef habitat would cover 0.1 acres.

Action Area

Service regulations define the "action area" as "all areas affected directly or indirectly by the federal action and not merely the immediate area involved in the action," (50 CFR § 402.02). For purposes of this BO, the Service has defined the action area as the areas within the permanent and temporary footprint illustrated in Appendix I, plus a 0.62-mile (1 km) buffer around this footprint. The buffer is our estimate of additional area that vessel traffic during construction and operation of the project would affect.

Conservation Measures

The AOGP has developed a Draft Manatee Protection Plan (Appendix B in FERC 2016) with proposed conservation measures to minimize and compensate the potential adverse effects of construction and operation of the project on the Antillean manatee and its habitat (i.e., seagrass). Some of these measures follow recommendations from the manatee conservation measures for

in-water projects provided by the Service (USFWS 2012) and others recommend in this document (Appendix II).

All specific conservation measures can be found in the most recent Manatee Protection Plan revised on June 2016. Some of the measures proposed in that plan include:

- Educational training courses will be provided for all construction personnel including vessel operators, deck hands, construction staff, divers, and others.

- A final Manatee Protection Plan shall be submitted 30 days before construction and approved by the Service prior to implementation. The plan shall include a list of all observers associated with the project, their qualification serving as marine mammal observers, a description of where the observer will be located during work and how they will cover the areas required, the equipment used to aid in observation, the length of work shifts for the observers and the equipment used to communicate with the equipment operators.

- Each vessel and lay barge will have one certified Marine Mammal Observer (MMO) on board during all phases of the construction, with the exclusive responsibility of watching for marine mammals and sea turtles, and to alert the construction crew supervisor if a marine mammal or sea turtle is visually detected within the zone, generally within 500 meters of the vessel. A lead MMO will be in communication with all vessel MMOs to insure adequate coordination on site. Night-time observations will be conducted with the aid of a night-vision scope where practical.

- The amount and position of the observer(s) shall ensure observational coverage on each side of the in-water construction equipment. For operations with limited visibility or barge safety zones that may limit the observers visibility, the permitee shall include either a designated monitoring barge for marine monitors to view construction operations or if accessible, a land based position to view both sides of the operation.

- Establish protocols during construction and operation to avoid collisions and reduce the risk of vessel strikes with manatees. The general response to a manatee sighting is to maintain a distance of at least 300 feet (91 m) from the animal. If a manatee is sighted in close proximity to a moving vessel (and safety permits), the vessel operator would reduce speed and shift engine into neutral until the manatee is clear of the area. Precautions include making sure moving equipment does not come any closer than 50 to 100 feet (15 to 30 m) of a manatee. If a manatee is within 50 feet of in-water work (75 feet for nighttime work), all in-water activities must shut down until the manatee moves away on its own at least 100 feet away from the work area. Exceptions will be made during HDD operations and other activities where safety and environmental concerns preclude suspension of work.

- To reduce the risk of crushing a manatee by two vessels moored together, construction vessels shall install and maintain fenders or buoys providing a minimum standoff space of at least 3 feet between the two vessels that are moored together, such as, but not limited to dredge barges.

- Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

- All in-water construction activities within 200 feet of the shoreline and/or in waters 10 feet or less within the Action Area shall be limited to daytime only operations. The HDD under the *Boca del Infierno* is the only activity occurring within Jobos Bay that will require 24-hour operations. Pile-driving activities outside of the *Boca del Infierno* will also require 24-hour operations. The MMOs will be present throughout all HDD and pile-driving activities.

- At 200 feet away from the shoreline and/or waters deeper than 10 feet, the distance at which in-water nighttime activities shall cease when a manatee is present shall be expanded to 75 feet of observational coverage, 360 degrees around the in-water construction equipment. Lighting of this expanded area shall be 75 feet from the in-water equipment entry and exit from the water.

- When lowering construction equipment into the water, the operator shall gravity-release the equipment only at the water's surface, and only after confirmation that there are no manatees within the 50-foot safety distance during the day or the 75-foot distance during nighttime operations. The observers shall notify the dredge operator if manatees enter within the designated safety distances. Prior to lowering the equipment to the water's surface, the water immediately below and adjacent to the buck shall be scanned for the presence of manatees, and all in-water construction operations shall cease if a manatee is observed. Activities shall not resume until the manatee has moved beyond the designated safety distance of the project operation, or, if the manatee submerges, until 30 minutes elapses and the manatee has not reappeared within the immediate area of the operation

- During pile driving, a "ramp up" technique will be used which entails the gradual increase in intensity of the sound source. This would avoid or reduce the potential for instantaneous hearing damage to a manatee that might be in close proximity. It is designed to warn animals of pending operations and allow sufficient time to those animals to leave the immediate area. Confined bubble curtains will also be used during vibratory and impact hammer pile driving activities to reduce the potential for noise-related impacts on manatees.

- A detailed communication protocol and reporting log will be kept by the contractor. Any collision and/or injury to a manatee would be reported immediately to the Puerto Rico Department of Natural and Environmental Resources (PRDNER) Rangers and the

USFWS Caribbean Ecological Services Field Office. A report would be submitted upon completion of the proposed AOGP summarizing all marine mammal and sea turtle sightings and incidents.

- The project would include public education and outreach efforts. For example, AOGP project will fund the production and installation of up to three manatee educational signs within the project area in coordination with the PRDNER.

- During operation of the AOGP, vessel support traffic within the area will be managed in order to minimize effects, including slow speeds to avoid collisions and manatee observers as necessary to ensure that vessel operators are aware of the presence of manatees.

- A specific seagrass restoration and mitigation plan was developed as part of the BA in the Benthic Resources Mitigation Plan document (Appendix A in FERC 2016). Planned seagrass restoration and mitigation activities will offset the potential short-term and permanent impacts to manatee foraging habitat in Jobos Bay. The AOGP project will also seek to identify other mitigation sites. Seagrass mitigation areas will be monitored for at least 3 years.

STATUS OF THE SPECIES / CRITICAL HABITAT

Species / Habitat description

The **Antillean manatee**, *Trichechus manatus manatus*, is one of the two recognized subspecies of the West Indian manatee, *Trichechus manatus* (the other being the Florida manatee subspecies). Each subspecies has distinctive morphological features and occurs in discrete areas with rare overlap between ranges (Hatt 1934, Domning and Hayek 1986, Alvarez-Alemán *et al.* 2010). They are also genetically distinct (Hunter *et al.* 2010, Hunter *et al.* 2012). The Florida manatee is somewhat larger than the Antillean manatee, but adults can reach lengths of about 13 ft (3.9 m) and can weigh approximately 3,500 pounds (ca. 1588 kg), although most adults do not exceed 10 ft and 2,200 pounds (3 m and 1,000 kg) (USFWS 2014). Females and males are similar in size and appearance, although males tend to be more robust (Quintana-Rizzo & Reynolds 2008). Newborn calves generally range from 2.6 ft to 5.2 ft (80 to 160 cm) long and weigh approximately 70 pounds (30kg) (USFWS 2014).

The West Indian manatee has a dorso-ventrally compressed, fusiform body and well developed paddle-like pectoral flippers with nails with no pelvic appendages and a horizontally flattened tail (Quintana-Rizzo & Reynolds 2008). This species is also characterized by having small eyes and no external ear, obvious neck crease, or dorsal fin (Quintana-Rizzo & Reynolds 2008). Manatees have little hair except for the snout area which displays bristles on the upper and lower lip pads (Quintana-Rizzo & Reynolds 2008). Nostrils are located on the tip of the snout, which open upon surfacing and close when diving (Quintana-Rizzo & Reynolds 2008). The skin of manatees tends to be rough and is generally gray to brown in color although the appearance of

manatees can vary by age and due to the growth of barnacles or algae on the skin (Quintana-Rizzo & Reynolds 2008).

The **green sea turtle** was federally listed on July 28, 1978 (43 FR 32800). Breeding populations of the green sea turtle in the Caribbean are listed as threatened. The green sea turtle has a worldwide distribution in tropical and subtropical waters. The green sea turtle grows to a maximum size of about 4 feet and a weight of 440 pounds. It has a heart-shaped shell, small head, and single-clawed flippers. The carapace is smooth and colored gray, green, brown, and black. Hatchlings are black on top and white on the bottom (NMFS 2009). Hatchling green sea turtles eat a variety of plants and animals, but adults feed almost exclusively on seagrasses and marine algae.

The **hawksbill sea turtle** was federally listed as an endangered species on June 2, 1970 (35 FR 8491). In the wider Caribbean, adult hawksbills have been reported as typically weighing around 176 pounds or less; hatchlings average about 1.6 inches straight length and range in weight from 0.5 to 0.7 ounces. The carapace is heart shaped in young turtles, and becomes more elongated or egg-shaped with maturity. The top scutes are often richly patterned with irregularly radiating streaks of brown or black on an amber background. The head is elongated and tapers sharply to a point.

Life History

The lifespan of the **manatee** is not known with certainty. There is a record in Florida of a captive 67-year old manatee (South Florida Museum 2015) and there are documented longevity records of over 55 years in the wild. The average age of Florida manatees dying in Florida is 7.7 years (Pitchford 2009). Manatee mortality records from Puerto Rico found adults aged from 22 to 28 years old (Mignucci-Giannoni *et al.* 2000, p. 194).

Manatees generally become sexually mature between three to five years of age (Boyd *et al.* 1999, Glaser and Reynolds 2003, in UNEP 2010, p. 4) and female manatees continue reproducing in the wild into their thirties (Marmontel 1995, in UNEP 2010, p. 4). Females usually give birth every 2 to 5 years to one calf (although twins have been documented) after a gestation period between 11 and 14 months (Bonde et al. 2004). Newborn calves are dependent on their mothers for nutrition for 1-2 years and will follow closely while traveling (Quintana-Rizzo & Reynolds 2008). Beyond this initial mother and calf relationship, manatees tend to be solitary animals, although they can occur in small group aggregations where individuals engage in similar behaviors (feeding, resting, traveling, and mating) (Quintana-Rizzo & Reynolds 2008).

Green sea turtles deposit from one to nine clutches within a nesting season, but the overall average is about 3.3 nests. The interval between nesting events within a season varies around a mean of about 13 days (Hirth 1997). Mean clutch size varies widely among populations. Average clutch size reported for Florida was 136 eggs in 130 clutches (Witherington and Ehrhart 1989). Only occasionally do females produce clutches in successive years. Usually two or more years intervene between breeding seasons (NMFS and USFWS 1991). Age at sexual maturity is

believed to be 20 to 50 years (Hirth 1997). Peak nesting season is from August through October. However, nesting can occur from June through November and some turtles may even nest year round. Nesting is primarily nocturnal but some daytime nesting has been observed.

Hawksbills nest on average about 4.5 times per season at intervals of approximately 14 days (Corliss et al. 1989). In the U.S. Caribbean, clutch size is approximately 140 eggs, although several records exist of over 200 eggs per nest (NMFS and USFWS 1993). Peak nesting season is from August to October although the majority of the nesting can occur from June through November and some turtles may nest year round. In the U.S. Caribbean, nesting migration intervals of 2 to 3 years appear to predominate (Garduño-Andrade 1999, Richardson et al. 1999, Beggs et al. 2007). Based on data from growth rate studies (Diez and van Dam 2002; Leon and Diez 1999; Krueger et al. 2011), age at sexual maturity has been estimated as 20 or more years in the Caribbean.

Status and Distribution

The **Antillean manatee** is currently listed as an endangered species, although a recent petition to downlist the species to threatened is still under review (USFWS 2106). The Antillean manatee is also protected under the U.S. Marine Mammal Protection Act (16 USC § 1361 et seq. 1976 & supp. V 1981) and listed as endangered by the International Union for Conservation of Natural Resources (Self-Sullivan and Mignucci 2008). The species is also listed as endangered by the PRDNER (2004).

While the Antillean manatee has been reported to occur in Puerto Rico since Spanish exploration (Powel et al. 1981), except for anecdotal descriptions, the historical population size is unknown. Aerial surveys to estimate the population size have been completed and current preliminary results estimate a mean population size of 532 individuals with a 95% confidence interval of 342 to 802 (Pollock et al. 2013). The Antillean manatee population in Puerto Rico is considered stable (USFWS 2016).

The Antillean manatee occurs along the coastal shelf and estuarine waters of Puerto Rico and does not inhabit the marine environments around Mona, Monito, or Desecheo islands, and is rarely seen around Culebra and Caja de Muertos (USFWS 2007). Aerial surveys indicate manatees occur more frequently along the southern and eastern coasts of Puerto Rico than on the northern coast (Powell et al. 1981, Mignucci-Gianonni et al. 2004, Mignucci-Gianonni et al. 2006, USFWS 2007). Relatively higher concentrations of manatees are found in four areas: Ceiba on the east coast; Jobos Bay area between Guayama and Salinas on the southeast coast; Guayanilla and Guánica Bay area on the southwest coast; and between Cabo Rojo and Mayagüez (Guanajibo River mouth) in the west coast (Powell *et al.* 1981, Rathbun *et al.* 1985, Freeman and Quintero 1990, Mignucci-Gianonni et al. 2004, Mignucci-Gianonni et al. 2006, USFWS 2007, Drew et al. 2012).

Manatees are obligate herbivores (Bonde et al. 2004, Quintana-Rizzo & Reynolds 2008) and are efficient in the gathering and consumption of submerged aquatic vegetation (Marshall et al.

2000). Antillean manatees in Puerto Rico primarily feed on seagrass and require freshwater sources, neither of which is considered a limited resource in Puerto Rico (Drew et al. 2012). The Antillean manatee performs most activities (i.e., feeding, drinking, resting, calving) within shallow coves and bays characterized by low-energy waves (Lefebvre et al. 2000), but also travel through open, deep marine waters. Local movement patterns show alternating use between seagrass beds for feeding and freshwater sources for drinking (Slone et al. 2006). During a manatee expert elicitation process (Drew *et al.* 2012), manatees were described to regularly traverse deep water when moving between local sites or resources, do not feed or rest in waters deeper than 13 m (42.7 ft), and spend the majority of their time in waters less than 5 m (16.4 ft) deep (Drew et al. 2012).

Major **green sea turtle** nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Surinam. Within the U.S., green sea turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico. Green sea turtles are generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. The green sea turtle is attracted to lagoons and shoals with an abundance of marine grass and algae. Open beaches with a sloping platform and minimal disturbance are required for nesting.

There are an estimated 150,000 green sea turtle females that nest each year in 46 sites throughout the world (NMFS and USFWS 2007). In the U.S. Atlantic, there are about 100 to 1,000 females estimated to nest on beaches in Florida annually (FWC 2007). Green sea turtle nesting data for Puerto Rico estimates 149 nests for 2015, the majority on Vieques Island (ATMAR 2013). For the USVI there are an estimated 700-850 nests between Sandy Point NWR and Buck Island National Monument (personal communication, Claudia Lombard, Sandy Point NWR and Zandy Hillis NPS St. Croix).

The **hawksbill** is found in tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean. In the U.S. Caribbean, hawksbill nesting occurs on beaches throughout Puerto Rico and the U.S. Virgin Islands (NMFS and USFWS 1993). Puerto Rico provides plenty of suitable nesting beaches for the hawksbill. In Puerto Rico, the most important nesting beaches for green sea turtles occur in the east of Vieques Island.

About 21,212 to 28,138 hawksbill sea turtles are estimated to nest each year at 83 nesting concentrations among 10 ocean regions around the world (NMFS and USFWS 2013). In the U.S. Caribbean, recent trends show that the Mona Island hawksbill nesting population is increasing, as well as in Puerto Rico and in the Buck Island Reef USVI. The status of the remaining nesting population in the USVI is currently unknown (NMFS and Service 2013). Hawksbill sea turtle nesting activity for 2015 reported approximately 2,204nests in Puerto Rico, mostly on Mona Island (ATMAR 2015).

Analysis of the species/critical habitat likely to be affected

Critical habitat for the Antillean manatee has not been designated. Refer to next section for effects on the species habitat.

Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys. Critical habitat for the hawksbill sea turtle has been designated for selected beaches and/or waters of Mona, Monito, Culebrita, and Culebra Islands, Puerto Rico.

ENVIRONMENTAL BASELINE

Status of the species within the action area

Based on manatee aerial surveys and habitat characteristics, the Jobos Bay is one of the most important **manatee** areas in Puerto Rico. Past and present manatee aerial surveys have consistently resulted in a high number of manatee counts within the Jobos Bay. For example, as many as 40 manatees were counted in the Jobos Bay and Mar Negro mangrove areas during a helicopter survey in 2005 (A. Mignucci, unpublished data). Aerial surveys have also documented manatees within the *Boca del Infierno* area and south of the cays in Jobos Bay. In addition, field survey reports referenced in the EIS and BA specify that manatees were observed over seagrass near and offshore to the *Boca del Infierno* passage. Manatees are also described as commonly observed in the seagrass beds of Jobos Bay (PRDNER 2010).

An analysis conducted by Drew *et al.* (2012), described the Jobos Bay as having all of the three primary key ecological attributes necessary for manatee long-term survival: freshwater, seagrass, and shelter. Drew *et al.* (2012) identified the Jobos Bay as a potential Manatee Protection Area (MPA) region for Puerto Rico. In their analysis, the Jobos Bay MPA overlapped with areas identified as "hotspots" for manatees (80^{th} percentile for number of manatees observed during aerial surveys) in Puerto Rico.

Within the action area, no **sea turtle** nesting beaches have been identified. Sea turtles in the water are under the jurisdiction of NOAA-NMFS.

Factors affecting the species' environment within the action area

As previously explained, the Jobos Bay provides one of the most important areas for **manatee** feeding, resting, drinking, calving, and mating in Puerto Rico. The potential MPA regions identified by Drew *et al.* (2012) represent sites where manatee key ecological attributes and threats overlap. This report ranked watercraft collisions as the greatest threat, followed by entanglement from abandoned fishing gear and manatee harassment. Factors that received a low threat ranking included: bycatch, degraded/decreased seagrass habitat, exposure to contaminants, debris ingestion, lack/degradation of fresh water, oil spills, and poaching.

To varying degrees, all of these factors may be present within the action area, except for poaching, which is no longer considered a threat in Puerto Rico. The next sections identify and discuss manatee threats in relation to the proposed AOGP.

Since no nesting **sea turtle** beaches have been identified within the action area, factors affecting sea turtle nesting habitat are not relevant.

EFFECTS OF THE ACTION

Factors to be considered

Proximity of the action: The action area lies within suitable and occupied Antillean manatee habitat. No critical habitat has been designated for the Antillean manatee species.

Distribution: Project impacts would include seagrass beds, macroalgae, reef, and sand/mud areas within the action area. Temporary and permanent workspace and impacts would occur in waters less than 10 feet deep to more than 50 feet deep (Appendix I), which overlaps with preferred manatee depths. A section of the subsea pipeline would transect a portion of the conservation sector of the Jobos Bay National Estuarine Research Reserve (FERC 2015).

Timing and Duration: The AOGP anticipates that construction of the project facilities would take approximately 12 months, with some of the construction activities occurring simultaneously and during nighttime hours. The majority of that time is for the offshore terminal, with 9 months for the marine infrastructure and 8 months for the topside facilities. Construction of the subsea pipeline is expected to last approximately 3 months, including 60 days for the HDD segment. The HDD under the *Boca del Infierno* pass and pile driving at the offshore GasPort are the only activities that will require 24-hour operations. Manatees use the Jobos Bay year-round and could experience direct effects throughout construction and operation. Habitat alteration effects may be long-term depending on the success of the seagrass restoration and mitigation plan.

Nature of the effect: The proposed activity may affect manatees (i.e. harass, injure or kill) and will impact the species' seagrass habitat. The proposed action may prevent or discourage manatees from accessing or using preferred shelter, feeding, and drinking areas within the Jobos Bay. For example, some manatees may leave the area in search of other less disturbed suitable areas, or into areas with less suitable habitat. Such alteration of normal use patterns could expose manatees to boat traffic. The Applicant has developed a number of conservation measures to avoid and minimize potential detrimental effects on the species.

Disturbance frequency: There are no specific details of the mean number of disturbance events per unit of time (frequency). Proposed project duration is 1 year, with some of the work requiring 24-hour operations. Project operation involves vessel traffic to and from the new terminal for the foreseeable future. Thus, disturbance frequency is considered high and long-term.

Disturbance intensity and severity: The number of manatees that would use the Jobos Bay during the construction and operation of the proposed project is uncertain. However, this bay is one of the most heavily used manatee areas in Puerto Rico. Since the construction activities are expected to degrade the seagrass habitat and affect the behavior of the manatees in this area, at least temporarily, we consider the disturbance to be of high intensity. Nonetheless, the proposed project is not expected to reduce the Antillean manatee population in Puerto Rico unless take in the form of mortality occurs as a result of the proposed action. The Applicant has developed a number of conservation measures to avoid and minimize the take of the species.

Since no nesting sea turtle beaches have been identified within the action area, possible adverse effects to nesting sea turtles are not anticipated.

Analyses for effects of the action

Beneficial effects: The AOGP would reduce fuel oil barge traffic in Jobos Bay, thereby reducing the potential for fuel spills, and harm or harass to manatees and their habitat. According to the EIS (FERC 2015), the Aguirre PP currently receives fuel oil barges at a rate of three to four barge deliveries per week (approximately 208 deliveries per year). The proposed AOGP would reduce oil barge traffic to as much as 90% (15 to 20 deliveries per year). As proposed, LNG carriers would deliver LNG to the Offshore GasPort every 8 days (or 48 deliveries per year).

Direct Effects: Construction activities would result in several direct effects to the manatee and its habitat. The greatest threats to the species are vessel and construction equipment strikes, seagrass habitat impacts, manatee harassment by construction activities, and the possibility of a spill.

Vessel and construction equipment strikes

According to the EIS (FERC 2015), marine mammals and sea turtles in the water would be exposed to an elevated risk of vessel strikes during the construction period because the number of vessels present in the area would increase from the current traffic levels. The construction of the proposed project would require the use of a variety of marine vessels: crane barges with tugs, shallow-water lay barge, derrick barge, dive support vessel, crew/supply boats, and pipe transport barges shuttled by tugs. The operation of the AOGP would also require the use of LNG carriers and associated tug boats and other support vessels.

The inappropriate (e.g., high speed, chasing, grounding, etc.) use of vessels within high manatee use areas like the Jobos Bay, may harass, injure, or even kill manatees, and may also cause manatee mother/calf pairs to separate, making calves even more susceptible to threats and stranding. Manatees may also be crushed in between two vessels if not enough space is maintained between vessels. Manatees may also be injured or crushed with the use of in-water construction equipment such as that for dredging and pipe placement.

The use of on-board MMOs (observers) is the most important measure proposed to avoid and minimize the vessel and construction equipment strike threats. The nighttime work periods are considered the most difficult for manatee detection. According to the information provided, the only activity within Jobos Bay that requires 24-hour operations is the HDD under the *Boca del Infierno* pass (Appendix I green line). This HDD entry point is well within manatee preferred shallow depths and potential seagrass feeding habitat. The other activity that requires 24-hour operations would be the pile-driving activities outside of the Jobos Bay at the offshore GasPort location. Specific nighttime conservation measures outlined in this document and the Manatee Protection Plan should provide appropriate measures to avoid and minimize potential vessel and construction equipment strikes during nighttime activities (see Conservation Measures section of this document). Several MMOs will be present throughout all of the construction activities including 24-hour operations with the use of artificial lighting. The use of lighting for nighttime construction activities needs to be coordinated with National Marine Fisheries Service to determine potential impacts to other marine species that might be attracted to lights.

Manatee habitat impacts

The construction of the proposed AOGP would degrade manatee seagrass feeding habitat. Construction of the project would temporarily impact 13.1 acres and permanently impact 2.7 acres of seagrass habitat. Potential seagrass habitat impacts that were not included as temporary or permanent impacts in the EIS and BA include impacts from the inadvertent release of HDD fluid, brine water discharge and thermal plume. The majority of the seagrass impacts would occur in shallow sheltered seagrass areas, which are the areas preferred by manatees. Manatee experts believe that manatees do not feed or rest in waters deeper than 13 m (42.7 ft) and spend most of their time in waters less than 5 m (16.4 ft) deep (Drew et al. 2012). Fewer seagrass beds would be affected in the deeper and less sheltered offshore berthing platform area, which are seagrass beds less frequented by manatees.

The AOGP has preliminarily estimated that 3 million gallons of drilling fluid (i.e. fluidized bentonite clay) would be released into a dredge pit at the HDD exit or on the seafloor during the 50 to 60 day duration of the HDD operations (FERC 2016). According to the information provided, an inadvertent release of drilling fluid occurs when the drilling fluid migrates unpredictably to the surface of the seafloor through fractures, fissures, or other conduits in the underlying rock and sediments (FERC 2106). This would cause substantial turbidity and sedimentation in the area, potentially covering and degrading additional manatee feeding seagrass habitat that was not accounted for in the temporary or permanent AOGP impacts.

In addition, during HDD activities, a supply of freshwater would be necessary to fluidize the bentonite clay for drilling fluid application. This process would produce a brine water discharge of approximately 0.2 million gallons per day (757 m^3/day) during the duration of the HDD operations (FERC 2016). Operation of the offshore terminal would also result in approximately 0.27 million gallons per day (1,022 m^3/day) of brine water discharge from its desalination unit (FERC 2016). According to FERC (2016), the brine water plume should dissipate quickly due to the local currents and vertical mixing near the HDD operations areas and offshore terminal.

Seagrasses within the high salinity plume at the HDD entry and exit points may experience temporary reduced growth and/or density (FERC 2016). These additional impacts were also not accounted for in the temporary or permanent AOGP impacts.

The thermal plume would occur in the offshore terminal during operation of the FSRU at the AOGP and from the LNG Carriers. The thermal plume is expected to meet Puerto Rico's maximum temperature criterion of 90°F (FERC 2016). An additional thermal discharge may result in cumulative thermal effects on possible feeding resources for the manatee in the area. Since the thermal plume from the AOGP will occur at the offshore berthing platform were manatees are less frequent and there are less seagrass foraging areas, the Service agrees that thermal discharges effects on seagrass habitat would be low.

Construction impacts would degrade seagrass habitat within one of the most important manatee habitats in Puerto Rico. There is little information available to determine what specific effects seagrass impacts may have on the manatee population. Manatees will either adapt to the seagrass impact or be displaced from foraging areas within the action area. If displaced, manatees may be forced to use other less suitable areas or be exposed to greater threats such as higher boat traffic. Manatee experts indicate that the amount of seagrass in Puerto Rico is not a limiting resource for the manatee population (Drew et al. 2012). Although it is uncertain if manatees prefer a specific assemblage of seagrasses, it is known that there are some specific areas in Puerto Rico, like the Jobos Bay, which are more frequently used by manatees. Still manatees are able to regularly travel between local sites or resources (Slone et al. 2006, Drew et al. 2012).

The proposed Benthic Resources Mitigation Plan document (Appendix A in FERC 2016) is the most important measure that would be implemented to minimize the seagrass impacts. That plan includes a specific seagrass restoration and mitigation plan to offset impacts associated with the construction of the project. The seagrass mitigation plan includes pre-construction surveys, topographic restoration, seagrass transplanting, monitoring, and reporting. Overall post-mitigation monitoring efforts are proposed for 5 years or until success criteria have been reached (Appendix A in FERC 2016). Any additional loss of seagrass from that anticipated by the AOGP, should be accounted for as part of the Benthic Resources Mitigation Plan (Appendix A in FERC 2016).

Manatee harassment

Activities associated to the AOGP such as the increase in the number of vessels discussed above, and noise levels during construction and operation of the project, may cause manatee harassment. The thermal plume during operation of the AOGP and the HDD fluid and brine water discharge during construction of the pipeline were also considered to have potential effects on manatees (FERC 2016).

Noise sources and their distances to MMPA harassment thresholds based on hydroacoustic modeling are detailed in the BA (Table 3.1-1 in FERC 2016). Sources include vibratory and

impact hammer pile driving, HDD operations, construction and support vessels, dynamic positioning thrusters and transiting LNG carriers. Manatees within Jobos Bay may experience short-term moderate impacts because they may not be able escape the elevated noise levels within the bay (FERC 2016).

According to the BA (FERC 2016), manatee studies that address impacts of underwater noise on the species are limited to noises associated with watercrafts. Manatees have been shown to detect boat noise from up to 0.62 miles (1 km) away, and exhibit swimming behavioral changes at approximately 82 to 164 ft (25 to 50 m) from an approaching watercraft. It has been suggested that when ambient noise is high, manatees in foraging habitat increased the proportion of time spent feeding; manatees in non-foraging habitat increased the proportion of time spent traveling; and decrease the proportion of time spent in other activities such as resting (Miksis-Olds 2006 in FERC 2016). Additional results suggest that manatees modify their vocalizations as a function of noise (Miksis-Olds 2006 in FERC 2016). The BA (Reynolds 1999 in FERC 2016) also indicates that noise disturbance has the potential to reduce foraging areas, limit food intake, increase activity levels and energy costs, and deter manatees from optimal habitats.

The highest levels of noise would be during pile driving at the HDD entry/exit points within the Jobos Bay and *Boca del Infierno* pass, and in the offshore terminal. Hydroacoustic modeling (Table 3.1-1 in FERC 2016) showed that underwater sound levels associated with impact hammering of the piles exceed both harassment levels under the MMPA; that is harassment that has the potential to injure (Level A) or to disturb (Level B) a marine mammal, respectively. Additional noise associated to HDD operations would be continuous and of limited duration, and is expected to produce relatively low noise levels during drilling (FERC 2016).

Modeling also indicates that noise associated with construction and support vessels would exceed the Level B harassment threshold both offshore and within Jobos Bay (FERC 2016). Other noise from the incoming vessels, including the use of dynamic positioning thrusters (DPT), during the operation of the AOGP, would be generated within the immediate vicinity of the shipping route and offshore platform location (FERC 2016), where manatees are less frequent. The modeled sound levels from the LNG carriers and their use of DPT may exceed the Level A or B harassment noise levels. However, the use of DPT would be from a negligible distance from the source and of short (i.e., less than 30 minutes) duration (FERC 2016).

The AOGP also developed specific conservation measures to reduce the noise-related impacts on the manatee. Such measures are detailed in Appendix B of the BA (FERC 2016) and summarized in the Conservation Measures section of this document. As for the vessel strike threat, the use of MMOs is also the most important measure that would be implemented to avoid and minimize the harassment threat from the construction and operation noise levels. For example, if an MMO spots an animal within 0.3 miles (0.5 km) of pile driving activities, all construction activities would cease until the animal voluntarily leaves the area (Appendix B in FERC 2016). In addition, a confined bubble curtain would be deployed during vibratory and impact hammer pile driving activities to reduce sound propagation in the water. The "ramp up"

technique that will be used will also help avoid or reduce the potential for instantaneous hearing damage to a manatee that might be in close proximity of the pile driving activities (FERC 2016).

Based on the information available for the possible effects of sound levels on manatees, and measures that have been taken for similar projects, the Service believes the proposed manatee exclusion zone and associated measures during construction and operation are appropriate to minimize manatee harassment from noise levels.

As for the potential effects from the thermal plume and the HDD fluid and brine water discharge, no significant effects on the manatee are expected. Thermal plume from the AOGP will occur at the offshore berthing platform where manatees are less common; therefore, the Service agrees that thermal-discharge effects on the manatee would be low. Similarly, no significant effects to manatees are expected from the resulting high turbidity of the HDD fluid and a limited and temporary increase in the salinity of water from the HDD brine water discharge. The brine water plume is expected to dissipate quickly due to the local currents and vertical mixing with the action area (FERC 2016). There is no information available to indicate that a temporary increase turbidity or salinity would significantly affect manatees.

Spills

The information provided specifies that minor releases of hydrocarbons during construction could result in short-term, minor to moderate adverse impacts on the manatee and seagrass resources (FERC 2016). Spills can originate from multiple sources and the potential impacts would depend in part on the magnitude and components of the spill. The AOGP is required to comply with all laws and regulations related to avoiding and handling of fuels and lubricants. To ensure impacts from accidental spills are minimized, AOGP would prepare a site-specific spill prevention and control plan for construction and operation of the AOGP (FERC 2106). This plan would include protocols for the containment, remediation, and reporting of accidental spills and would identify measures that AOGP would implement if wildlife are adversely affected. The FERC is recommending that AOGP submit this plan for review and approval prior to construction.

Interrelated and interdependent actions: There are no interrelated and interdependent actions from the proposed AOGP that would affect the Antillean manatee or the sea turtles. All actions are considered as direct effects to the Antillean manatee.

Indirect Effects: No indirect effects are expected from the construction and operation of the AOGP.

Species response to the proposed action

Manatees may be harassed, injured or killed, and may also be susceptible to mother and calf separation, making calves even more vulnerable to threats and stranding, as a result of the proposed action. Manatees may also be prevented or discouraged from accessing or using

preferred shelter, feeding and drinking areas within the Jobos Bay. Some manatees may leave the area in search of other less disturbed sites or areas with less suitable habitat, or be exposed to higher boat traffic. However, because of differences in manatee behavior and information gathered from other projects with similar disturbances, we do not expect that all manatees that use the Jobos Bay will leave the area. Although manatees have been documented moving greater distances, aerials surveys and telemetry studies suggest that a 3.1-mile (5 km) radius is the scale that captures the local movements of most manatees (Powell 1981, Slone et al. 2006, Drew et al. 2012). Displaced manatees may have to travel farther than 5 km to obtain suitable resources, thus spending more energy searching and being exposed to threats such as higher boat traffic. However, manatees that modify their behavior because of the disturbances are expected to return to the Jobos Bay area during or after the disturbances are removed or minimized (potentially 1 year). Furthermore, manatees that are displaced because of the disturbances are expected to find other suitable habitat outside of the action area. There is suitable manatee habitat outside and adjacent to the action area (Drew et al. 2012).

There is no expected sea turtle nesting response to the proposed action since there no sea turtle nesting beaches that have been identified within the action area. Possible adverse effects to nesting sea turtles are not anticipated. Sea turtle response would be limited to sea turtles in the water. Sea turtles in the water are under the jurisdiction of NOAA-NMFS.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service is not aware of any cumulative effects in the project area.

CONCLUSION

After reviewing the current status of the Antillean manatee, the hawksbill and green sea turtles, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of these species. No critical habitat has been designated for these species within the Action Area; therefore, none will be affected.

The proposed AOGP project would have both beneficial and direct effects on the Antillean manatee and its habitat. Beneficial effects are considered because the project would reduce fuel oil barge traffic in Jobos Bay, thereby reducing the potential for fuel spills, and harm or harass to manatees and their habitat. Direct effects are considered because the construction activities of the project may affect the Antillean manatee and its habitat from vessel and construction equipment strikes, seagrass habitat impacts, manatee harassment by construction activities, and the possibility of a spill.

A number of conservation measures would be implemented to minimize direct effects on the Antillean manatee (see Conservation Measures section and Appendix II). The Service believes that the proposed project and its appropriate implementation of these conservation measures, is not expected to reduce the Antillean manatee population in Puerto Rico or cause mortality of manatees. Manatees may modify their behavior upon encountering construction activity; however, provisions of the proposed protection plan will avoid the likelihood of injury via significantly disrupting normal behavior patterns.

There is no expected sea turtle nesting response to the proposed action since there are no sea turtle nesting beaches that have been identified within the action area. Possible adverse effects to nesting sea turtles are not anticipated. Sea turtle response, if any, would be limited to sea turtles in the water. Sea turtles in the water are under the jurisdiction of NOAA-NMFS. Therefore, NOAA-NMFS opinion (or concurrence with "not likely to adversely affect" determinations) regarding sea turtle effects is necessary to conclude consultation for these species.

INCIDENTAL TAKE STATEMENT

In the Section 7(a)(2) consultation process, the Service typically addresses the incidental take of listed species with reasonable and prudent measures designed to minimize the amount or extent of anticipated taking, and with terms and conditions that describe how these measures area to be accomplished. Incidental taking that is associated with an action that is not likely to jeopardize listed species or destroy designated critical habitat and is in compliance with such terms and conditions is exempt from the prohibitions against taking under the ESA.

Section 17 of the ESA states, in part, that "... no provision if this Act shall take precedence over any more restrictive provision of the MMPA of 1972". At this time, no take of manatees, even sub-lethal take, has been authorized under section 101(a)(5) of the MMPA and/or its 1994 Amendments. Therefore, the Service cannot issue an opinion with an exemption for incidental take of manatees. Unless take regulations are requested and promulgated under the MMPA for this type of activity and a letter of authorization is obtained by the applicant, this requirement of section 7(b)(4), which specifies the conditions under which the Service may exempt incidental taking, cannot be met.

Because it is not possible to exempt any incidental take of manatees resulting from this project, the project must implement measures that avoid incidental take to avoid violating the take prohibitions under both the ESA and MMPA. The Service believes that properly implementing the Take Avoidance and Minimization Measures described in Appendix II will avoid taking manatees in the form of death. These measures were incorporated into the AOGP Manatee Protection Plan. Applicants may redesign their projects or propose alternative measures. Furthermore, the Applicant may request an IHA under Section 101 (a)(5) of the MMPA.

No incidental take of nesting sea turtles is anticipated, because no sea turtle nesting beaches are known to occur within the action area, and no adverse effects to nesting habitats have been identified.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

- Manatee observations can be complemented with the use of telemetry devices and/or the use of unmanned aerial vehicles (UAVs). Both of these alternatives require additional coordination and permitting. The Service shall be notified if any of these strategies will be pursued as part of the Manatee Protection Plan. Both of these alternatives will help obtain more detailed information on how manatees may respond to the AOGP short and long-term effects. The use of UAVs will also improve manatee detection and thus serve as an additional avoidance and minimization measure for the project.

- FERC should consult with NOAA-NMFS for possible effects to sea turtles in the water.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion or if the project has not been completed within five years of the issuance of this BO; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In addition, should incidental take authorization under the MMPA be requested and granted in the future, a request for re-initiation of consultation by FERC may be appropriate at that time.

In instances where incidental take occurs, any operations causing such take must cease pending re-initiation.

The above findings and recommendations constitute the report of the Service in accordance to ESA. Additional comments regarding the project and impacts to aquatic resources will be handled separately throughout the permit process with the Corps of Engineers.

If you have any questions or require additional information, please contact Marelisa Rivera at 787-851-7297 extension 206 or Jan P. Zegarra at extension 220. You may also visit our website http://www.fws.gov/caribbean/ES for additional information on threatened and endangered species under jurisdiction and the Section 7 consultation process.

Sincerely yours,

Edwin E. Muñiz
Field Supervisor

jpz

cc:
USFWS, RO, Jerry Ziewitz
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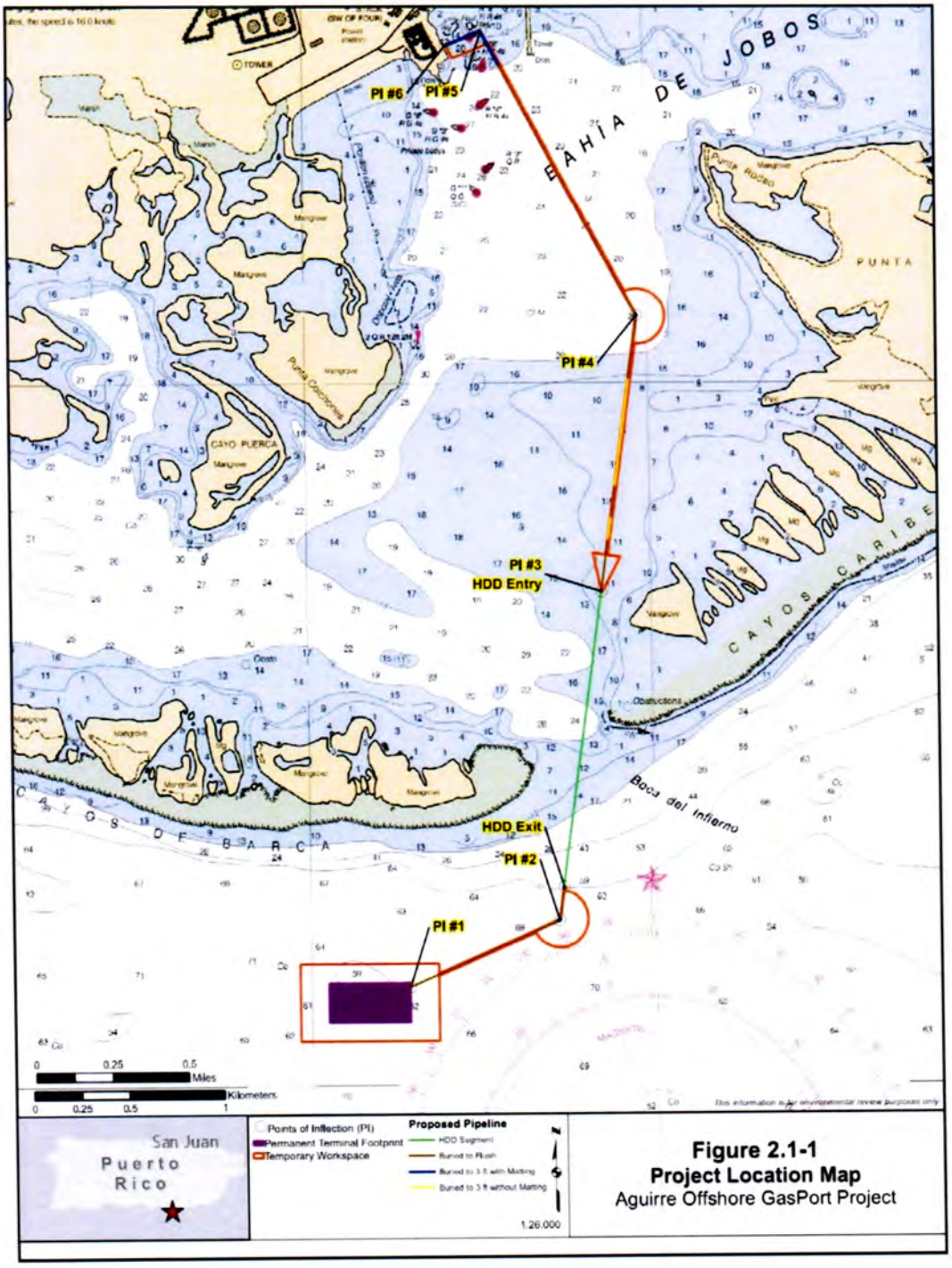
Appendix I. AOGP project location map (FERC 2016).



Appendix II. Take Avoidance and Minimization Measures.

The permittee shall comply with the following measures intended to protect manatees from direct project effects:

A. Standard measures

1. All personnel associated with the project shall be instructed about the presence of manatees and manatee speed zones, and the need to avoid collisions with and injury to manatees. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act and the Endangered Species Act.

2. All vessels associated with the construction project shall operate at "Idle Speed/No Wake" at all times while in the action area and while in water where the draft of the vessel provides less than a five-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

3. Siltation or turbidity barriers shall be made of material in which manatees cannot become entangled, shall be properly secured, and shall be regularly monitored to avoid manatee entanglement or entrapment. Barriers must not impede manatee movement.

4. All on-site project personnel are responsible for observing water-related activities for the presence of manatee(s). All in-water operations, including vessels, must be shutdown if a manatee(s) comes within 50 feet of the operation. Activities will not resume until the manatee(s) has moved beyond the 50-foot radius of the project operation, or until 30 minutes elapses if the manatee(s) has not reappeared within 50 feet of the operation. Animals must not be herded away or harassed into leaving.

5. Any collision with or injury to a manatee shall be reported immediately to the Puerto Rico Department of Natural and Environmental Resources 24-hour phone line at 787-724-5700. Collisions and/or injuries should also be reported to the U.S. Fish and Wildlife Service in Boquerón (787-851-7297, Monday to Friday from 8AM to 5PM).

6. Temporary signs concerning manatees shall be posted prior to and during all in-water project activities. All signs are to be removed by the permittee upon completion of the project. Temporary signs that have already been recommended by the Service can be should be used. The *Caution: Manatee Habitat* sign measuring at least 8½ " by 11" explaining the requirements for "Idle Speed/No Wake" and the shut down of in-water operations must be posted in a location prominently visible to all personnel engaged in water-related activities. The bilingual ready to print manatee signs can be downloaded here:
http://www.fws.gov/caribbean/es/documents/ManateeSigns_Letreros.pdf

B. Specific measures

1. To reduce the risk of a vessel crushing a manatee, construction vessels shall install and maintain fenders or buoys providing a minimum standoff space of at least 3 feet between two vessels that are moored together such as, but not limited to dredge barges.

2. A final Manatee Protection Plan shall be submitted 30 days before construction and approved by the Service prior to implementation. The plan shall include a list of all observers associated with the project, their qualification serving as manatee observers, a description of where the observer will be located during work and how they will cover the areas required, the equipment used to aid in observation, the length of work shifts for the observers and the equipment used to communicate with the equipment operators.

3. Observers shall have significant on-the job experience observing manatees during similar construction operations. Appropriate experience shall be demonstrated with observers that have monitored marine animals and their behaviors in association with in-water construction projects.

4. The dedicated marine observer must be on site and in position to observe project activities during all in-water construction activities and shall advise personnel to cease operation upon sighting a manatee within 50 feet of any in-water construction activity (75 feet for nighttime work).

5. Within 200 ft. of the shoreline and in waters 10 feet or less) within the Action Area, all in-water construction activities shall be limited to daytime only operations.

6. When in-water nighttime construction activities or equipment is being used in the water within 200 feet of the shoreline and/or in waters 10 ft. or less, at least three experienced manatee observers shall be used. To ensure observational coverage, two of these observers shall be positioned on each side of the in-water construction equipment and the other shall be positioned on the opposite side. For operations with limited visibility or barge safety zones that may limit the observers visibility, the permitee shall include either a designated monitoring barge for marine monitors to view construction operations or if accessible, a land based position to view both sides of the operation.

7. The distance at which in-water nighttime activities shall cease when a manatee is present shall be expanded to 75 feet of observational coverage, 360 degrees around the in-water construction equipment. Lighting of this expanded area shall be 75 feet from the in-water equipment entry and exit from the water.

8. All manatee observers working between the hours of one-half hour before sunset to one-half-hour after sunrise take a synchronized, 30-minute break immediately following four consecutive and continuous (C&C) hours of manatee observation. Such C&C includes one bathroom break. All in-water construction activities shall cease while manatee observers are on break.

9. When lowering construction equipment into the water, the operator shall gravity-release the equipment only at the water's surface, and only after confirmation that there are no manatees within the 50-foot safety distance during the day or the 75-foot distance during nighttime operations. The observers shall notify the dredge operator if manatees enter within the designated safety distances. Prior to lowering the equipment to the water's surface, the water immediately below and adjacent to the buck shall be scanned for the presence of manatees, and all in-water construction operations shall cease if a manatee is observed. Activities shall not resume until the manatee has moved beyond the designated safety distance of the project operation, or, if the manatee submerges, until 30 minutes elapses and the manatee has not reappeared within the immediate area of the operation.

10. All observers shall maintain a daily log that details sightings, collisions, or injuries to manatees, as well as project specific information such as work itinerary, weather, work shutdowns, observer shift changes, etc. In regard to manatee behavior, the observers shall also log time of observation, estimated distance of manatees from the dredge, type of behavior (such as passing through, pausing in the vicinity of the project, interacting with the construction equipment or attracted to running or dripping water), detection method (i.e., unaided visual, infrared, light intensification equipment, etc) and whether the dredge is operating at the time of observation). The permitee shall ensure that copies of the daily logs are submitted on a monthly basis to the USFWS at the address on the letterhead. A final report for each construction event, summarizing all activities noted in the daily observer logs, the location and name of project, and the dates and times of work shall be submitted within 30 days following project completion. The final report shall be submitted to the USFWS address on the letterhead.

11. If the dedicated marine observer determines that the detection of a manatee during certain weather conditions (i.e., waves, rain, wind, etc.) is not possible, then in-water construction operations shall cease until weather conditions improve and detection is again possible. The observers shall report any issues of non-compliance with the special operating measures to the permittee and record these instances on their logs.