UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

MAKAH BAY OFFSHORE WAVE ENERGY PILOT PROJECT	)	PROJECT NO. 12751-000

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE SANCTUARY PROGRAM
NATIONAL MARINE FISHERIES SERVICE
NOTICE OF INTERVENTION,
COMMENTS AND PRELIMINARY TERMS AND CONDITIONS

I INTRODUCTION

The U.S. Department of the Commerce, National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS) and National Marine Sanctuary Program (NMSP) hereby jointly submit their Notice of Intervention, Comments and Preliminary Terms and Conditions for the Makah Bay Offshore Wave Energy Pilot Project (hereinafter the Project), in response to the Federal Energy Regulatory Commission's (FERC or the Commission) December 18, 2006 *Notice of Application and Applicant-prepared EA Accepted for Filing, Soliciting Motions to Intervene, and Protests, Ready for Environmental Analysis and Soliciting Comments and Terms and Conditions, Recommendations, and Prescriptions.* The Project would be located within the Olympic Coast National Marine Sanctuary, Makah Bay, near the City of Neah Bay, Clallam County, Washington.

II Notice of Intervention

The National Marine Sanctuary Program (NMSP) and the National Marine Fisheries Service (NMFS), both of which are offices and programs within the National Oceanic and

Atmospheric Administration (NOAA), U.S. Department of Commerce, hereby provide notice pursuant to 18 C.F.R. 385.214(a)(2), as amended at 68 Fed. Reg., 51, 070 (August 25, 2003) (Rule 214), that they are intervening in this proceeding. The NMSP has the Federal statutory responsibility for management and conservation of national marine sanctuaries and their resources and in particular, responsibility for the Olympic Coast National Marine Sanctuary (OCNMS or the Sanctuary) which will be directly affected by the results of this proceeding. The NMFS has a Federal statutory responsibility for the protection, mitigation, and enhancement of marine and anadromous fish resources and marine mammals that may be directly affected by the results of this proceeding. The NMSP and NMFS therefore intervene for the purposes of becoming a party, and to ensure that their interests and those of the Department of Commerce and the public are represented in this proceeding.

A. Contact Information

The names and addresses of legal counsel for the NMSP and the NMFS, respectively, are below and service of process and other communications concerning this motion should be made to:

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On November 8, 2006, the AquaEnergy Group, Ltd. (AquaEnergy) filed a hydroelectric application with the Commission for a wave energy project in Makah Bay, Clallam County, Washington within the boundaries of the OCNMS. As described in more detail in Section II below, AquaEnergy proposes to install four 250 kilowatt wave energy conversion buoys and associated mooring/anchoring and electrical connection systems inside the boundaries of the OCNMS, as well as a 3.7 mile long submarine cable anchored to the ocean floor connected to a metal shore station just inland of Hobuck Beach on the Makah Indian Reservation. The total installed capacity of the project would be 1 megawatt and the project would generate about 1,500,000 kilowatt-hours annually. AquaEnergy proposes to sell the power generated to the Clallam County PUD for use in its service area.

B. Interests of the NMSP and NMFS

Because this licensing proceeding is the first to involve consideration of this innovative technology, NMFS and NMSP have a particular duty and interest to ensure that no unintended risks to the resources under their jurisdiction are overlooked or not considered.

The NMSP is an office within the National Ocean Service, National Oceanic Atmospheric Administration, U.S. Department of Commerce. The NMSP is the Federal agency with jurisdiction over the National Marine Sanctuary System and all of the sanctuary resources within designated marine sanctuaries, and the Northwestern Hawaiian Islands Marine National Monument. See Reorganization Plan No. 4 of 1970, 84 Stat. 2090, as amended; National Marine Sanctuaries Act (NMSA), 16 U.S.C. §§ 1431 et seq. The NMSP manages a system of areas designated within the marine environment which have special conservation, recreational ecological, historical, cultural, archeological scientific, educational, or esthetic qualities. 16

U.S.C. §1431(a)(4). The NMSP facilitates all public and private uses of the marine sanctuaries to the extent they are compatible with the primary objective of resource protection. 16 U.S.C. § 1431(b)(6).

The Olympic Coast National Marine Sanctuary was designated by the Secretary of Commerce on May 11, 1994, for the purposes of protecting and managing the conservation, ecological, recreational, research, educational, historical and aesthetic resources and qualities of the ocean and coastal waters and submerged lands thereunder, off the central and northern coast of the State of Washington. 59 Fed. Reg. at 24586 -24615 (May 11, 1994). Among the activities prohibited within the OCNMS without approval from NMSP are: drilling into, dredging, or otherwise altering the seabed of the OCNMS; constructing, placing, or abandoning any structure, material or other matter on the seabed of the OCNMS; taking, removing, collecting, harvesting, injuring destroying or causing the loss of a marine mammal, sea turtle seabird, historical resource or other sanctuary resource. See generally, 15 C.F.R. § 922 Subpart O (2006) and more detailed discussion in Section III below. The exercise of treaty rights by Indian tribes with reservations adjacent to the OCNMS takes precedence over these prohibitions in accordance with applicable federal law.[1]

NMFS is the Federal agency with jurisdiction over marine, estuarine, and anadromous fish resources and marine mammals. See Reorganization Plan No. 4 of 1970, 84 Stat. 2090, as amended; the Fish and Wildlife Coordination Act (FWCA) 16 U.S.C. §§ 661 and 662; the Sustainable Fisheries Act, 16 U.S.C. §§1801 et seq.; the Pacific Northwest Electric Power

[1] The regulations governing the OCNMS acknowledge the special relationship between the sanctuary and adjacent Indian Tribes. See, 15 C.F.R. § 925.9(d), (j), and (k); 15 C.F.R. § 925.5(g)(2); 15 C.F.R. § 925.13. See generally, 59 Fed. Reg. 24594-95 (May 11, 1994). See also, Memorandum of Agreement between the Hoh Indian Tribe, Makah Indian Tribe, Quileute Indian Tribe and Quinault Indian Nation, January 30, 2007.

Planning and Conservation Act, 16 U.S.C§§ 839 et seq.; the Pacific Salmon Treaty Act, 16 U.S.C. §§ 3631 et seq.; the Endangered Species Act (ESA), 16 U.S.C §§ 1531 et. seq. and the Marine Mammal Protection Act (MMPA), 16 U.S.C. §§ 1361, as amended, et seq.

Pursuant to the above-cited authorities NMFS has a statutory responsibility for protection and enhancement of marine mammals and anadromous fish resources that may be affected by the outcome of this proceeding. The effects of the project on habitat, water quality, and other effects on living marine resources relate directly to NMFS' responsibilities under the statutory authorities cited above. The Federal Power Act (FPA) and FWCA specifically authorize NMFS to participate in this proceeding. By carrying out its statutory responsibilities under the FPA, FWCA, ESA and other authorities cited above, NMFS acts in the public interest.

In addition, all executive agencies of the Federal Government have a fiduciary duty on behalf of the United States toward American Indian tribes, to be carried out in accordance with applicable treaties, statutes, judicial decisions, and executive and secretarial orders. NMFS and NMSP strive to meet their Tribal trust responsibilities in their implementation of statutory responsibilities. Tribal trust resources are those natural resources, either on or off Indian lands, retained by, or reserved by or for Indian tribes through treaties, statutes, judicial decisions, and executive orders.

II. BACKGROUND AND PROJECT DESCRIPTION

A. Project Design

The proposed Project is the first of its kind to undergo licensing under the Federal Power Act. The Makah Bay offshore pilot plant may be a precursor to a potential full build-out project in either Makah Bay or another location. The following project design and construction descriptions

are taken from the preliminary draft environmental assessment document included in the project application to FERC (MBOWEPP 2006).

The proposed Makah Bay offshore pilot plant consists of patented wave energy converters, AquaBuOYs, based on heaving buoy point absorber and hose-pump technologies. The mechanical portion of the Makah Bay Project will consist of four low-profile moored AquaBuOYs placed 3.7 statute miles (3.2 nautical miles) offshore in water depths of approximately 150 feet. The AquaBuOYs function as a closed loop high-pressure freshwater system and floating wave energy converter, transforming wave energy into usable electrical energy. The hydraulic-to-electrical conversion takes place inside each AquaBuOY.

Dimensions of the AquaBuOY are tailored to the installation location with an average device having a 19.5-foot-diameter float with a 98-foot-long, 15-foot-diameter acceleration tube. Four devices installed in a cluster form the offshore power plant. All components of the power plant (including buoy hulls, anchors and mooring auxiliaries, energy converters, and turbine-generator housing) will be fabricated in off-site shipyards and machine shops. While in machine shops, buoys are fitted with internal systems, such as hose pumps, and hydraulic and electronic controls. The buoys will be spaced about 60 feet apart in a line approximately parallel to the wave front. The ocean surface occupied by the four AquaBuOYs and 10 surface floats is approximately 60 feet by 240 feet on the ocean surface. Generated electrical power is delivered to shore via a submarine cable installed on the ocean floor. Each AquaBuOY and collection buoy contains the following:

- Two single-acting hose pumps 35 feet in length with an inner diameter 16 to 18 inches, mounted vertically in the acceleration tube. The pumps will be working in a closed-loop hydraulic system filled with fresh water. The total volume of the fresh water

hydraulic system is about 1,850 gallons. The maximum output from both hose pumps is 34 gallons/second (125 liters) at 215 PSI (1.5 Mpa).

- One 200- to 400-liter water accumulator connected to the hydraulic system on the pressure side, the role of which is to even out the pressure and flow rate of the water feeding into the Pelton turbine.
- One Pelton turbine with a maximum water capacity of 34 gallons/sec at 215 PSI. The turbine rotation speed (revolutions per minute [rpm]) will vary based on incoming water pressure. Pressure nozzles regulating the turbine will be automatic or remotely controlled via an electro hydraulic system.
- One 480V AC variable speed synchronic generator, with a maximum output of 250 kilowatt (kW). Estimated average output is 46 kW (with an average wave resource of 8.5 kW/ft [28 kW/m] wave front). Controls, sensors, RF data link, radar reflector, and sealed/foamed chambers to insure positive buoyancy. Sensing instruments will monitor: wave height and period; buoy heave; piston position in the acceleration tube; piston force; mooring forces; water flow (nozzle); water pressure in different parts of the hydraulic loop; turbine rpm; generator output, v and amp; accumulator pressure; and inside buoy temperature. All sensing equipment will be RF capable to allow for wireless internet connection. All instruments will be equipped with a battery backup system in the event of primary power failure.
- Navigational instruments: navigational light with battery backup and radar reflector; global positioning system (GPS) transmitter in case of break away.
- In addition to the equipment previously described for each AquaBuOY, the Collection Buoy will hold: (1) a 1 MW 480 V/12 kV transformer; and (2) a 1 MW, 12 kV rectifier.

Each AquaBuOY hull will be tethered by a tension cable to four surface floats, each approximately 4 feet in diameter.

The surface floats will be connected to subsurface mooring buoys, located just above the seafloor, by a cable fastened to a chain. The mooring system for each buoy terminates with a chain running from the sub-surface buoy to a connection to the sea-bed placed approximately in a square pattern on the ocean floor with the AquaBuOY approximately centered on the surface above. The Applicant believes that heave forces acting on the surface floats and mooring buoys are dampened by lifting the chain slack between the two. According to the Applicant, the sub-surface floats serve to prevent chain scouring of the seafloor. AquaEnergy intends to use vertical load anchors (VLAs) with a near vertical leg connection to the sub-surface mooring buoy that in turn is connected to the buoy array. VLAs are designed to be retrieved by use of an unlocking device, a chain shank, and a streamlined fluke. The present design of the mooring system is projected to cover a rectangular area of approximately 625 by 450 feet on the ocean floor.

AquaEnergy believes the footprint on the ocean floor area can be reduced with the use of VLAs. Details of the mooring design will be finalized and provided prior to the pilot plant installation. The buoy closest to shore, referred to as the collector buoy, serves as a collector of electrical power, or the hub, receiving generated electricity from the other three buoys. From the hub, a tethered riser umbilical power cable—dimensioned to handle the maximum combined electric output of 1 MW at 12 kV—will deliver the energy to a seafloor DC transmission cable. The transmission cable, which is approximately 3.7 miles long, will lead from the tethered riser into the shore connection.

The land-based facilities will be located on Hobuck Beach, and will consist of a small distribution station, or shore station. This station will be located on tribal lands owned by the

Makah Tribe. The building will measure 15 feet by 15 feet and will house the electrical conditioning equipment necessary to connect to the utility grid. This equipment includes a 1 MW, 0.4 kV rectifier, 1 MW, 0.4 kV inverter, 0.4 kV/12 kV transformer, a 12 kV 50 amp switchgear with a connection to the transmission cable, and a 12 kV 50 amp switchgear with a connection to the primary distribution line. From this station, the power will be directly connected to the nearby existing Clallam County PUD 12 kV distribution line. The electrical interconnection will be located in close proximity to Makah Passage Road.

B. Project Construction

The AquaEnergy ocean wave offshore power plants use fabricated modular components. Any construction activities involving hazardous processes or materials (e.g., metal cutting, oil, or paint) are accomplished in existing shore-based shops and shipyards. Most of the system interconnections are preassembled. Once buoys, anchors, hoses, and transmission cables are assembled, boats or barges will be used to ferry the buoys and other hardware to the site approximately 3.7 miles offshore where water depth is about 150 feet. The buoy launch is accomplished either by towing the buoys or transporting them to the site aboard crane-equipped buoy tender vessels.

Installing sea-to-shore transmission cable is a specialty job that will be subcontracted to a marine construction firm. The cable will be anchored securely to the ocean floor to prevent movement along the sea floor. The actual anchoring method will be determined with the cable installation company and agreed to prior to the installation with OCNMS and Washington Department of Natural Resources (WDNR). From 10 to 30 feet in depth below mean low tide to shore the transmission cable will be bored horizontally under the beach using HDD methodology. The transmission cable will continue through the surf zone, underground to the grid

interconnection behind Hobuck Beach. It is anticipated that the HDD contractor will use specialized equipment to drill in a substantial pipe conduit along the route of the transmission cable which is to be passed below the seabed. Boring is done with a track-based horizontal boring rig that incrementally adds sections of pipe as the shaft or "drill string" progresses into the ground. When the shaft comes out at its destination, the bit is removed from the end and the transmission cable is attached at that end. The shaft is then pulled back the way it came towards the drilling rig, pulling the cable or conduit back with it. In many cases, water, mud, or gel is pumped into the drilling to speed the drilling process. With some rigs water is immediately recovered, filtered, and put back into a reservoir tank. The precise process that will be used for this project will be determined once a contractor specializing in HDD is selected.

Most of the shore station equipment is housed in a fabricated metal building (approximately 10 feet high with a floor plan measuring 15 feet by 15 feet) that can be erected with small equipment. The construction of the shore station will occur at the same time as the placement of the in-water components. Construction of the shore facilities requires some earthwork (foundation preparation); however, this work will not occur within 200 feet of a water line and no fill will be required. The shore station will be landscaped to blend with the local flora. The only impervious surface is about 200 square feet for the shore station.

The applicant indicates that the ocean wave power plant would be deployed in phases. First, a single buoy would be launched and tested for survivability. Subsequently, three additional power buoys and the transmission cable would be deployed over a period of approximately two months. Once all subsystems are in place and interconnected, system integration and testing will commence and continue until the power plant is declared operational. (MBOWEPP 2006).

III. LICENSE CONDITIONS NECESSARY FOR THE PROTECTION AND UTILIZATION OF THE OLYMPIC COAST NATIONAL MARINE SANCTUARY IN CONNECTION WITH P-12751 MAKAH BAY OFFSHORE WAVE ENERGY PILOT PROJECT

A. The Federal Power Act

Regarding reservations affected by projects licensed under the Federal Power Act, Section 4(e) of the Act, 16 U.S.C. § 1803(e), requires that licenses include "such conditions as the Secretary of the department under whose supervision such reservation falls shall deem necessary for the adequate protection and utilization of such reservation." Congress defined such "reservations" as "lands and interests in lands acquired and held for any public purpose." Congress' creation of the Olympic Coast National Marine Sanctuary constitutes a reservation, as the Commission itself has stated (see *Aqua Energy*, 102 FERC ¶ 61,242, at p. 4). Therefore, pursuant to the authority of section 4(e) of the Federal Power Act, 16 U.S.C. § 797(e), the NMSP submits the following preliminary terms and conditions which it has deemed necessary for the adequate protection and utilization of the OCNMS.

B. The National Marine Sanctuaries Act

The NMSA establishes the basic purposes behind marine sanctuary reservations, such as the OCNMS, which under the NMSA is called a "designation." The primary purpose of the NMSA is the protection of sanctuary resources. 16 U.S.C. § 1431(b)(6). In establishing the National Marine Sanctuary System, Congress found that "this Nation has recognized the importance of protecting special areas of its public domain, but these efforts have been directed almost exclusively to land areas above the high-water mark." 16 U.S.C. § 1431(a)(1). It further found that "certain areas of the marine environment possess conservation, recreational, ecological, historical, scientific, educational cultural, archeological or esthetic qualities which give them

special national and in some case international significance." 16 U.S.C § 1431(a)(2). One of the purposes and policies of the NMSA is "to provide authority for comprehensive and coordinated conservation and management of these marine areas, and activities affecting them, in a manner which complements existing regulatory authorities." 16 U.S.C. § 1432(b)(2). It is also the policy of the NMSA "to facilitate *to the extent compatible with the primary objective of resource protection*, all public and private uses of the resources of these marine areas not prohibited by other authorities." (Emphasis added). 16 U.S.C. § 1431(b)(6). To fulfill these Congressional purposes, the Secretary of Commerce is authorized to designate any discrete area of the marine environment that is of special national significance due to its conservation, recreational, ecological, historical, scientific, cultural archeological, educational or esthetic qualities; the communities of living marine resources it harbors or its resource or human-use values. 16 U.S.C. § 1433. The NMSA also provides a specific process for the designation of each national marine sanctuary and no designation may take effect until Congress has been notified and a review period of forty-five days of continuous session of Congress has elapsed. 16 U.S.C. § 1434(a)(6). Likewise, when a national marine sanctuary includes the seaward boundary of any State, the affected Governor has an opportunity to object to any of the terms of the designation that are unacceptable to the state. 16 U.S.C. § 1434(b)(1).

C. The Olympic Coast National Marine Sanctuary

The Olympic Coast National Marine Sanctuary was designated pursuant to the process described above. Its notice of designation was published on May 11, 1994. 59 Fed. Reg. at 24586 (May 11, 1994). The OCNMS was designated:

> *For the purposes of protecting and managing the conservation, ecological, recreational, research, educational, historical and aesthetic resources and qualities of the area.*

59 Fed. Reg 24603 (May 11, 1994).

The characteristics of the OCNMS that make it of national significance and give it particular value are described in detail in the OCNMS Designation Document. 59 Fed. Reg. 24604 (May 11, 1994). Among those unique characteristics making the OCNMS a marine area of national significance are: Its function as essential habitat for a wide variety of marine mammals and birds that reside in or migrate through the sanctuary; the migration route of the California gray whale, northern sea lion, and resident sea otters; sea bird colonies, albatross, peregrine falcon, brown pelican and marbled murrelet. Id. The OCNMS designation document states that this sanctuary is "one of the more dramatic natural wonders of the United States, paralleling the majestic splendor of such terrestrial counterparts as Yosemite National Park and the Grand Tetons." Id.

The regulations governing the OCNMS prohibit a number of activities within the boundaries of the sanctuary including exploring for or developing oil, gas, or minerals; discharging or depositing any material from within the boundary of the sanctuary; drilling into, dredging, or otherwise altering the seabed of the sanctuary; constructing, placing or abandoning any structure, material or other matter on the seabed of the sanctuary; or taking, removing, harvesting, injuring or causing the loss of any marine mammal, sea turtle, seabird, historical resource or other sanctuary resource. See generally 15 C.F.R. § 922.152 (2006).

A person may obtain a permit to conduct an activity otherwise prohibited in the OCNMS but for very limited purposes. Among the purposes for which a permit may be obtained are:

research related to sanctuary resources and qualities; to further the educational, natural or historical resource value of sanctuary resources; salvage and recovery; assist in the management of the sanctuary; or to promote the welfare of an Indian Tribe adjacent to the OCNMS. See generally 15 C.F.R. § 922.153. AquaEnergy will be required to obtain an OCNMS permit in order to conduct the project within the Sanctuary. In this case, AquaEnergy seeks to demonstrate that its wave energy pilot project is appropriate to permit in the OCNMS because it promotes the welfare of the Makah Indian Tribe.

D. Section 304(d) of the NMSA

In addition to FPA § 4(e) conditioning authority and the permitting processes applicable in a national marine sanctuary, the NMSA provides that federal agency actions, including issuance of licenses or permits to private entities issued by federal agencies that are likely to injure, cause the loss of, or destroy any sanctuary resource are subject to consultation with the Secretary of Commerce. 16 U.S.C. § 1434(d)(1)(A). The NMSP implements section 304(d) in such a manner as to take advantage of efficiencies in the development of information and recommendations in the context of the procedures of other Federal agencies. The NMSP will work with FERC to ensure each agency's statutory obligations are met in the most efficient and least burdensome manner possible.

E. Purpose and Utilization of the OCNMS

Further, it is important for FERC to appreciate that it is the exceptional hydropower project that is consistent with the purpose for which the sanctuary was created or designated. 16 U.S.C. § 797(e). The NMSP, as an agency charged with conservation of marine resources, supports the federal goals of energy independence, and development of energy from renewable and "green" sources. However, it is also the position of the NMSP, that Congress has determined that there are

special areas of the marine environment that should be set aside as national marine sanctuaries for the primary purpose of long term conservation and protection. Thus, as a general matter, proposals for industrial activities, including large scale energy projects, are given heightened scrutiny and may not be appropriate within a particular national marine sanctuary. Such determination depends on the nature, scope, duration, potential impacts and other factors of a project, and the size, purposes, resources and scope of a particular sanctuary. Clearly there are some sanctuaries where certain projects could not be allowed. In other cases, the applicant has the opportunity to show why such activity is appropriate to be conducted within a national marine sanctuary. In all cases, the burden of demonstrating that the activity is compatible with sanctuary purposes and uses is on the applicant. In this case, the applicant must demonstrate that the OCNMS offers unique location or characteristics necessary to conduct this pilot project. To date, it remains unclear to the NMSP that the applicant can make this demonstration because, if in fact the OCNMS did have such unique characteristics necessary to the demonstration of the applicant's technology, it would prevent the technology from being employed elsewhere and would be of little value in the broader scheme of renewable energy development.

In consultation with the many state and Federal agencies whose authorities are implicated by this application for a license, the applicant has included several environmental measures in the project design to protect marine resources. These include: use of horizontal directional drilling through the intertidal area, a closed-loop hydraulic system for the turbines, use of anti-fouling materials, design features to minimize seabed impacts, design features to prevent marine mammal and seabird use of buoys, GPS transponders, implementation of cultural resources management and interpretive/education plans, a schedule of regular maintenance, and design features to minimize aesthetic impacts of the project. The NMSP believes FERC should incorporate these

voluntary suggestions into its license as mandatory measures in addition to the NMSP's preliminary terms and conditions.

The NMSP has a federal trust relationship with the Makah Indian Tribe whose reservation is adjacent to the OCNMS and whose usual and accustomed fishing grounds encompass a portion of the sanctuary. This fiduciary relationship is acknowledged in the regulations governing the OCNMS and in its policy documents. [3] If the Applicant can demonstrate the technical and economic feasibility of its technology to benefit the Makah Indian Tribe, FERC should consider such facts in its determination as to whether the license will interfere or be inconsistent with the utilization of the OCNMS and the purposes for which it was designated. Similarly, FERC should consider the fact that the Project is of small scale and temporary duration in the sanctuary. At this time, there is some uncertainty as to whether the project will benefit to the Makah Indian Tribe, although it is the understanding of NMSP that the Makah Tribe does have a lease arrangement with the applicant.

Based on information available at this time, the limited geographic and temporal scope of this pilot project, and in full consideration of its trust relationship with the Makah Indian Tribe, the NMSP preliminarily finds the Makah Bay Wave Energy Pilot Project not inconsistent with the purposes and utilization of the OCNMS, provided: (1) the License, should one be issued, include, and the Project complies fully and at all times with, the preliminary terms and conditions submitted by the NMSP pursuant to section 4(e) of the FPA, including the NMSP's reservation of the opportunity to amend, modify or add to those terms and conditions, and (2) the environmental

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[3] The regulations governing the OCNMS acknowledge the special relationship between the sanctuary and adjacent Indian Tribes. See 15 C.F.R. § 925.9(d), (j), and (k); 15 C.F.R. § 925.5(g)(2); 15 C.F.R. § 925.13. See generally 59 Fed. Reg. 24594-95 (May 11, 1994). See also Memorandum of Agreement between the Hoh Indian Tribe, Makah Indian Tribe, Quileute Indian Tribe and Quinault Indian Nation, January 30, 2007.

measures incorporated by the applicant in its project design are also made mandatory by FERC in its License, should one be issued. As noted in Condition 10 below, the opportunity to amend, modify or add to these terms and conditions is reserved, and may be exercised if resource conditions change, project plans are altered, or new information is received or developed.

F. Effects of the Project on Sanctuary Resources

Development of licensing terms and conditions for the Project requires a cautionary approach to ensure against unmitigated or unintended consequences of this novel technological application in a sensitive marine environment. Heave buoys for power generation are a new technology that has received very limited field testing. To date, field testing appears to have been limited to monitoring of wave climate and energy production capacity assessment, with no documented concurrent monitoring of environmental impacts or operational characteristics that might negatively impact biota in the vicinity of the buoys.

The Licensee is seeking to install an interconnected system of 4 buoys of unique design never before constructed or tested in the marine environment. The engineered design of the proposed buoys for Makah Bay is different from an AquaBuOY previously deployed in the Baltic Sea. Thus, some operational characteristics of this buoy design have never been assessed or studied and are completely unknown. Also, some aspects of the proposed project, such as design of the anchoring system, including cabling between buoys, installation and anchoring requirements for the transmission cable to shore, and the portion of this route to be installed with horizontal directional drilling, were not engineered when the preliminary draft environmental assessment was submitted to FERC with the license application.

As a result, there are two groups of environmental impacts that must be addressed in the course of licensing. The first group is made up of those that can be reasonably anticipated based

on documented assessments, and the second consists of those for which there is an appreciable potential for negative impacts to occur, though less certain. It is important to underscore that these risks will be posed to the marine resources even if the proposed environmental measures are implemented, so that careful monitoring and management of project impacts during implementation will be critical. The following is a non-exclusive list of potential or likely impacts that must be addressed:

1. Water quality may be degraded by the presence of antifouling compounds applied to the underwater portions of the buoys to prevent biofouling.
2. The noise produced by the buoys may disturb or harm marine life in the vicinity of the project, resulting in avoidance behavior or impacts to feeding and/or reproductive behaviors.
3. Seabed impacts will occur during installation and servicing of anchors, as well as installation, placement, and anchoring of the transmission cable to shore. Seabed impacts will occur if chain or cable from the anchoring system makes contact with the seabed. Seabed impacts will further occur at the time the pilot project is terminated (five years) and the anchoring systems, AquaBuOYs and related equipment are removed. These seabed disturbances will inevitably injure or, cause the loss of or destroy benthic infauna which is an important component of the marine ecosystem.
4. Electromagnetic radiation or fields may be generated by the electrical transmission through cables, and may impact navigational or foraging capabilities of marine mammals, fish, and elasmobranches (sharks and rays).
5. The applicant's proposed fishery closures near the project may lead to alteration of local fish abundance, fishers and fishing effort.

6. If one or more buoys break free from their anchors, natural and cultural resources on the shore may be impacted. In addition, navigational safety will be impacted and anchoring material may be abandoned in the sanctuary.
7. Placement of an array of cables creates a risk that abandoned fishing gear and other marine debris could become entangled with the cable and create a trap that could harm or kill marine life.
8. The movement and behavior of marine mammals, both resident and migratory, throughout the project area could be affected by both the cabling system and alteration of the acoustic environment as a result of the project.

G. Federal Power Act § 4(e) Conditions for the Adequate Protection and Utilization of the Olympic Coast National Marine Sanctuary

Pursuant to Section 4(e) of the Federal Power Act, the NMSP has determined that the following conditions are necessary for the adequate protection and utilization of the Olympic Coast National Marine Sanctuary. These preliminary conditions are based on the best available biological and engineering information available, address uncertainties regarding the project, and are supported by substantial evidence.

The NMSP expects to submit modified conditions within 60 days of the close of the comment period on the draft Environmental Impact Statement to be issued for the Project, reflecting the traditional FERC calendar and practice. However, the preliminary conditions submitted here shall be considered the final conditions, to be included in the license, unless and until the NMSP submits modified conditions or an amended schedule for submitting such modified conditions.

The NMSP respectfully requests that the Commission include the following conditions in any license issued for the above-captioned Project, in their entirety and without material modification:

Condition 1. Anchoring, Mooring and Transmission Systems Design

A. Prior to finalization of the engineering, design and cable route selection for the transmission cable, and in consultation with and subject to the approval of the NMSP, the Licensee shall develop a study plan and conduct a baseline study of the existing epibenthic (surface dwelling) community on hard substrate along the proposed transmission cable route. The Licensee will file the study with the Commission and send a copy to the NMSP. If NMSP determines that this baseline study reveals the presence of important marine life or habitat, the Licensee will, in consultation with and subject to approval of the NMSP, develop and implement a plan to monitor the post-installation impacts of transmission cable where it traverses the hard substrate.

B. Prior to finalization of the engineering, design and cable route selection for the transmission cable, the Licensee, in consultation with and subject to the approval of the NMSP, will conduct a macroalgae/eelgrass survey of nearshore section of the transmission cable. The Licensee will conduct the survey following standard methods defined by Washington Department of Fish and Wildlife (WDFW). The Licensee shall file a report of the survey with the Commission and a copy to the NMSP. The information in the survey report will be used by the Licensee, in consultation with the NMSP, to determine the most environmentally appropriate route for the transmission cable.

C. No less than sixty days prior to the date the Licensee expects to submit final engineered design specifications for the mooring system to the Commission, the Licensee shall provide these final specifications for the mooring system to the NMSP. These specifications must

include a general description, materials description, and full dimensions of system components; anticipated depth of seabed penetration of anchors; safety, navigational, and aesthetic design characteristics of components on the sea surface; and the anticipated height above the seabed and below the sea surface of subsurface floats. Upon approval of the NMSP and incorporating any comments submitted by the NMSP, the Licensee shall file the final mooring system design with the Commission before any project components are deployed in the OCNMS.

D. No less than thirty days prior to the date the Licensee expects to submit final engineering design specifications and installation methods for the power transmission cable to shore, the Licensee shall provide these final specifications to the NMSP for review and approval. These specifications must include a description of the cable and its component parts, as well as methods of installation, including techniques for anchoring the cable to locations where this will be necessary. Upon approval of the NMSP and incorporating any comments submitted by the NMSP, the Licensee shall file the final power transmission cable design with the Commission.

E. The Licensee shall conduct an initial mooring, anchoring and cable system visual inspection at the time of project installation and at each phase of installation of AquaBuOY installation to ensure that anchors are properly set into the seabed and that chain or cable does not hang down to contact the seabed at maximum slack periods.

RATIONALE:

OCNMS regulations prohibit disturbance to the seabed. Some degree of seabed disturbance will occur during installation and servicing of anchors, as well as installation, placement, and anchoring of the transmission cable to shore. Ongoing seabed impacts may occur if chain or cable from the anchoring system contacts the seabed. Surveys of the proposed transmission cable route to shore focused on geological and physical characterization of the route

(TGPI 2002). No accurate assessment of the biological communities along the proposed cable route has been conducted. While sandy portions of the cable route likely host disturbance-tolerant species, hard marine substrate commonly hosts an epibenthic (surface dwelling) community that is intolerant of physical disturbance. Moreover, epibenthic organisms on hard substrate typically add structure to the habitat and are critical habitat for numerous species of marine organisms, habitat that is susceptible to physical damage from anthropogenic activity (Thrush and Dayton 2002). Because hard substrate covers a significant portion of the transmission cable route (MBOWEPP 2006), it is important to conduct a baseline study to characterize the epibenthic community on this hard substrate and to evaluate its regional significance as fisheries habitat so that impacts of the transmission cable installation and placement can be assessed.

In the preliminary draft environmental assessment submitted by the Applicant with its FERC license application, the Applicant proposes to conduct a macroalgae/eelgrass survey in accordance with WDFW standard methods to assess potential impacts to these resources in the nearshore area and assist with cable routing. The NMSP seeks to ensure this survey is completed to ensure that impacts to these critical coastal habitats are minimized or avoided in the sanctuary.

The engineering for the anchoring system and transmission cable installation to shore is not fully and consistently characterized in AquaEnergy's license application, as evidenced by differences between relevant text and figures. It is not yet defined by the Applicant whether a length of chain or cable will attach to the vertical load anchors, if one or more subsurface floats will be incorporated into the mooring design, or how much slack will be required in the cabling system to accommodate water depth changes due to daily tidal exchanges as well as surface wave activity. Comments to the Applicant from Washington Department of Fish and Wildlife in a letter dated 3 January 2006 requested a mooring system design that includes subsurface floats to keep

the catenary, or slack, of the mooring chains or cables from touching the seabed. Subsurface floats, however, may or may not be necessary with the use of vertical load anchors. It is difficult, therefore, to assess either the scale of initial impacts from installation or the potential for ongoing seabed disturbance of these installations within the sanctuary.

OCNMS anticipates that pre-deployment evaluation of potential impacts will occur after detailed engineering for the anchoring system and transmission cable installation techniques are provided, which will be required for consideration of a sanctuary permit. To evaluate if the initial anchoring system design is functioning properly, NMSP will require an initial visual inspection of the system immediately following each buoy deployment (if there are multiple staging events).

Condition 2. Site Inspections

A. The Licensee shall develop an installation inspection plan in consultation with and subject to approval by NMSP. The installation inspection plan will define the scheduling, tasks, observations and reporting by the Licensee. The installation inspection plan will also define plans and methods for removal of marine debris, including derelict fishing gear, that becomes entangled with project components. Upon NMSP approval, the Licensee shall file the final Plan with the Commission.

B. The Licensee shall conduct periodic site inspections at a minimum of biannually, but more frequently as additional data becomes available and if NMSP determines necessary, to ascertain the physical condition of the installation (including all buoys, anchors, and mooring cables), to ensure the integrity and performance of the installation, to determine the risks to marine mammals and other sanctuary resources, and to search and address marine debris caught on project features. The Licensee shall also conduct visual inspections of the transmission cable in areas of

hard substrate annually and provide an annual report of these inspections to the NMSP by December 31 of each year.

C. The Licensee shall provide for access and participation of NMSP personnel in each inspection and shall follow appropriate safety procedures when engaged in such inspections. The Licensee may combine other monitoring tasks required by the Project license with the site inspections, and integrate such tasks into the inspection plan per approval of NMSP.

RATIONALE:

The inspection plan and NMSP participation therein are necessary to ensure the project installation is performing as anticipated and in a manner that does not adversely affect sanctuary resources. Whereas initial impacts of installation might be assessed immediately following project installation (see Condition 1), ongoing impacts of the installations may not be fully predicted or stable over time. In particular, ongoing seabed disturbance from anchoring chain or cable, commonly referenced as "chain sweep", is of concern to OCNMS. Periodic maintenance inspections of the mooring system also are required to ensure system integrity for the duration of the project, to minimize the accumulation of marine debris on project structures, to minimize the risk of offsite impacts of loose buoys, and to serve for periodic assessment of ongoing impacts to the seabed.

With a minimal project life of 3 to 5 years and a FERC license for 30 or more years, the integrity and function of the mooring system is of concern to regulatory agencies, as well as the Applicant. Each AquaBuOY will connect with 4 anchors, and one or more anchors could be freed from the sediment due to mobile seafloor materials or strong tension from buoyant project features. Thus, anchoring system integrity could be compromised without perceptible evidence from buoy position or other characteristics visible at the water surface. Any loose mooring

components moving across the seabed will cause an avoidable impact on the seabed. In addition, a loose buoy is a navigational hazard. Moreover, the potential for physical damage to cultural resources on the adjacent shore was demonstrated when a buoy broke free from its mooring and washed against centuries-old petroglyphs carved by Native American inhabitants on intertidal rocks at Cape Alava, about 8 miles from the project site.

These inspections are also opportunities to identify and remove significant marine debris that may accumulate on project features. In-water structures serve as a collection site for marine debris, particularly discarded fishing gear that can entrap and kill marine life. This is of particular concern because the system of buoys and cables may have a "reef effect" whereby the physical structure attracts fish, birds, and marine mammals, as is evidenced with oil drilling platforms. In turn, this may attract predator species, as well as fishermen. If free floating marine debris or fishing gear snags on the buoys and cables, these materials can function as an unintended hazard that entraps and kills marine life. Periodic inspection and removal of marine debris is essential to avoid this project impact.

Condition 3. Antifouling Compound Study and Plan

The Licensee shall develop, in consultation with and subject to the approval of the NMSP, an antifouling study plan before installation of any in-water components of the project. The plan must include a description of proposed antifouling compounds and/or methods, analysis of their compliance with any recognized national and Washington State standards, a maintenance schedule, an experimental design for monitoring of effectiveness over time, and a reporting schedule for this study. The study plan shall describe a methodology for monitoring and reporting to NMSP any

effects on sanctuary resources that may result from the use of anti-fouling compounds. Upon NMSP approval, the Licensee shall file the final Plan with the Commission.

RATIONALE:

With the submerged portion of each AquaBuOY measuring 15' by 98', each buoy will have about 4,600 square feet of surface area, for a total of about 18,400 square feet of surface area treated with antifouling compounds. A variety of antifouling compounds are available for use in marine waters to restrict the growth on in-water structures. Antifouling compounds typically have toxic properties that inhibit colonization of hard surfaces. Some compounds are more persistent in the environment and have greater potential to affect water quality, accumulate in sediment deposits, or transfer through trophic levels of the food chain (Girivan and Pangam 2006; Konstantinou and Albanis 2004).

Concern for antifouling paint use and maintenance of in-water structures exists at state and federal levels. Washington State Departments of Ecology and Natural Resources issued a joint environmental advisory on April 28, 1999 stating that cleaning and manual scraping of vessels painted with sloughing and ablative (or soft) antifouling paints and those vessels painted with tin-based compounds while the vessel is afloat violates water quality standards and is prohibited by state law. In 2005, the Organotin Antifouling Paint Control Act (OAPCA) banned the application of antifouling paint containing organotin to vessels less than 25 meters in length (33 U.S.C. § 2403(a)). This prohibition does not prevent the application of organotin antifouling paints to the aluminum hull, outboard motor, or lower drive unit of a vessel less than 25 meters in length.

A pre-implementation evaluation of different antifouling options followed by a relatively simple effectiveness study will assist the Applicant to develop a construction and maintenance plan that minimizes potential environmental impacts of this and future AquaBuOY installations. The Applicant proposed a study of different antifouling compounds on their pilot project to study environmental effects. The NMSP finds that the description of the effects of anti-fouling compounds should occur prior to installation of the pilot project rather than once the project is installed in sanctuary waters.

Condition 4. Noise Assessment

A. Phase 1.

Before project deployment, the Licensee shall, in consultation with and subject to the approval of NMSP, design and implement a plan for measuring and monitoring project noise. The Licensee shall, in consultation with and subject to approval of NMSP, conduct monitoring to characterize the sound generated buoy the array and determine whether there is potential for detectable response by marine mammals and fish. The plan for measurement and monitoring of noise shall be of sufficient scientific rigor to support analysis of likely long-term effects on marine mammals including deviation of migratory route, short term behavioral modification (feeding and migrating) habitat use or abandonment, changes to marine mammal foraging patterns or vulnerability to predation. The Licensee shall, in consultation with and subject to the approval of the NMSP, file with the Commission a data reporting schedule. The monitoring program must measure the sound frequency and amplitude and attenuation over distance from the project site, and compare these results with Malme et al. (1984 and 1988) and Moore and Clarke (2002) on acoustic disturbance to whales and other marine mammals and sanctuary resources. Field

measurements of sound must be conducted at a minimum to a distance where values are below identified disturbance thresholds. Upon NMSP approval, the Licensee shall file the final Plan with the Commission.

B. Phase 2

If monitoring measures noise levels exceeding the disturbance threshold of 120dB, identified by Malme et al. (1984 and 1988) and Moore and Clarke (2002) and NMFS, 70 Fed. Reg. 18751-18757 (January 11, 2005), the Licensee must, in consultation with and subject to the approval of NMSP, develop and implement, within one year, a more extensive monitoring program to evaluate and document any occurrence of behavioral change, disturbance or injury to marine life, particularly marine mammals and fish. All monitoring, mitigation and implementation plans will include quarterly reporting requirements by the Licensee to the Commission with a copy to the NMSP.

RATIONALE:

The design of the AquaBuOYs to be deployed in Makah Bay differs from an earlier design that was field tested in the Baltic Sea. The hydraulic system that moves water through generation turbines has been confined to a closed loop to eliminate discharge to sanctuary waters, whereas the original design was flow through. Because these buoys have not been built or field tested and field testing of similar buoys did not monitor generated noise, the acoustic signature and footprint have not been characterized to assess the potential for impacts to marine life. Loud noise could be generated from four buoys operating in close proximity, and this noise has the potential to result in disturbance, avoidance behavior, or impacts to feeding behavior to a variety of marine species in the vicinity of the project. The NMSP's statutory responsibilities to manage and preserve marine resources require an initial assessment of the noise produced by the buoys and an evaluation of

the potential for this noise to disturb marine life. In addition, the NMSP, as well as NMFS, have a trust responsibility toward the exercise of treaty rights pursuant to one or more treaties with adjacent Indian tribes, in particular the Makah Indian Tribe.

The Olympic Coast National Marine Sanctuary hosts 29 species of marine mammals that reside or migrate through the waters off the western coast of Washington State. Designation of the sanctuary gained wide public and political support, in recognition of the remote and relatively undisturbed nature of this biologically rich and productive ecosystem. Consequently, increased contributions to anthropogenic noise in the sanctuary and the cumulative effects on this noise on marine life are a management concern for the sanctuary.

Reviews of anthropogenic noise in the marine environment have emphasized the growing concern for detrimental impacts on noise on marine life (Gisinser 1998; US Commission on Ocean Policy 2004; NRC 2005). Recent incidents of marine mammal strandings have been linked to acute and short term sound produced by naval activities. Other impacts on marine life are attributed to cumulative effects of noise from a variety of sources. Potential responses of marine mammals to noise range from temporary behavioral reaction, interference with other sound-dependent activity, temporary injury or impact, and permanent injury or impact.

The proposed project is along the migratory pathway of the gray whale, a route that follows the coast between Baja, Mexico and the Bering Sea. Field experiments have indicated that gray whales are sensitive to anthropogenic sounds, and that noise can drive gray whales from an area (Barlow and Gentry 2004).

Behavioral responses to anthropogenic noise, such as changes in swimming speed and direction away from a sound source, were demonstrated with migrating gray whales in Malme et al. (1984). Such responses were termed avoidance. Continuous noise levels exceeding about

120dB or intermittent noise levels exceeding about 170dB will likely result in avoidance behavior in gray whales (Malme et al. 1988). The lower of these levels approximates noise from a helicopter or oil production platform (Malme et al. 1984). Avoidance behavior is demonstrated in 80% of migrating gray whales exposed to 136dB. NMFS has proposed 120 dB as a threshold from a continuous noise source for disturbance to marine mammals. 70 Fed. Reg. 1871-1875 (January 11, 2005).

Phase 2 of this condition would be triggered if the monitoring conducted pursuant to Phase 1 demonstrated that the threshold noise levels were being exceeded. In such case, Phase 2 would require both more extensive monitoring to detect problems and evaluate their impacts, and response to them. Mitigation of impacts would be done in accordance with the principles of adaptive management. Because the project is employing technologies which have never been tested, and in an environment where the impacts potentially range from benign to extreme, NMSP cannot at this time specifically identify what measures might be required.

Condition 5. Electromagnetic Fields

A. The Licensee shall conduct, in consultation with and subject to the approval of the NMSP, an engineering analysis of electromagnetic radiation field (EMF) strength associated with the electrical transmission cable or bench testing of these properties of the cable. The Licensee shall determine in consultation with and subject to the approval of the NMSP, whether this analysis can be conducted prior to project deployment. If the testing of EMF properties can be done prior to deployment, the Licensee shall do so and file a report to the Commission with a copy to the NMSP. If an engineering analysis or testing cannot be conducted prior to project

deployment, the Licensee shall conduct post-deployment measurement of the transmission cable's EMF strength in consultation with the approval of the NMSP.

B. The Licensee shall compare predicted or measured EMF levels with published literature (1000μV/m for avoidance response, see Gill and Taylor 2002) to assess the potential for impacts to marine life. The Licensee shall summarize these data in a report filed with the Commission and a copy provided to NMSP no later than 3 months after the project has begun producing power.

C. If analyses under paragraph B, above, indicate the potential for adverse impacts to sanctuary resources near the transmission cable(s), the Licensee shall, in consultation with and subject to approval by the NMSP, develop a monitoring plan to assess the impacts of EMF resulting from the project on fish, elasmobranches, marine mammals, and shellfish, which shall, at a minimum, include in-field monitoring studies and quarterly reports to the NMSP. In addition, if, in consultation with the NMSP, sanctuary resource impacts near the transmission cable are demonstrated, the Licensee shall develop and implement, in consultation with and subject to the approval of the NMSP, a plan for mitigating all measurable effects. Upon NMSP approval, the Licensee shall file the final Plan with the Commission.

RATIONALE:

Electromagnetic radiation or fields (EMFs) can be generated by the movement of electrical charge through cables. Electrical fields (E fields) are proportional to the voltage (V) in a cable, and magnetic fields (B fields) are proportional to the current (A). Industry-standard cables are constructed with shielding designed to retain E fields within the cabling, yet E fields outside the cable can be produced if the cable is not perfectly shielded. B fields exist beyond even industry-

standard cables and are able to induce electrical fields in the surrounding environment. The motion of an organism, or even seawater, through an existing B field causes the generation of an electrical field known as an induced electrical field (iE field) (Talisman Energy 2005). iE fields do not propagate as well as E fields through sediment as through seawater. Therefore, burial within sediments and shielding built into transmission cables can significantly reduce the strength of EMFs (Gill et al. 2005).

For the Makah Bay pilot project, the transmission cable is proposed to be surface laid on the seabed, and cable design characteristics were not defined in the license application. With this uncertainty, it is difficult to predict the potential for EMF generation near the electrical transmission cable and to assess the potential impacts of EMFs to natural resources.

Previous studies have shown that marine species make use of geomagnetic fields for navigation (i.e., salmon, see Dittman & Quinn 1996; baleen whales, see Walker et al., 1992; Kenney et al., 2001). Walker et al. (1992) were able to correlate the location of whales in different seasons with areas of low geomagnetic intensity, and they concluded that this supported the existing hypothesis that fin whales possess a magnetic sense. A study of the orientation of plaice (Pleuronectes platessa) in the southern North Sea by Metcalfe et al. (1993) showed that plaice were able to orient themselves in the absence of visual and tactile clues, and it was suggested that the orientation mechanism may involve the earth's geomagnetic field. However, little work has been done on determining the effect of B fields on species that are known to use geomagnetic fields.

Benthic species such as skates and dogfish use electroreception as their principal sense for locating food. Migratory teleosts (bony fish), such as salmon, navigate by naturally occurring geomagnetic fields. If the species perceive a different magnetic field to the earth's there is

potential for them to react to local differences in the B field. Depending on the magnitude and persistence of the confounding magnetic field the impact could be a trivial temporary change in swimming direction, as seen with eels encountering a HVDC cable (Westerberg 2000), or a more serious delay to the migration. More open water (pelagic) species rely less routinely on electroreception and may encounter E fields only during specific periods such as the reproductive season, early life stages in shallow water nurseries, or migration. Thus, the potential for an impact is considered highest for species that depend on electric cues to detect benthic prey and mates, early life stages that use electroreception to detect predators or migratory routes which take them into shallow coastal waters (Gill et al. 2005).

Elasmobranches (sharks and rays) are among the most sensitive organisms. For the lesser spotted dogfish (Scyliorhinus canicula), an E field of 10μV/m elicits an attraction response whereas an E field of 1000μV/m elicits a (variable) avoidance response (Gill and Taylor 2002). For elasmobranches, the threshold between attraction and repulsion has been estimated at 100V/m (Gill et al. 2005).

Studies of B fields impacts on invertebrates have produced differing results. Responses to B fields have been demonstrated in shrimp, isopods, amphipods, and nudibranchs (Gill et al. 2005). However, one study found no significant effect of B fields on a variety of crustaceans (shrimp, crab, isopod), a bivalve (mussel), and teleost fish (flounder) (Bochert and Zettler 2004).

Condition 6. Marine Mammal Entanglement and Collision

A. In consultation with and subject to the approval of NMSP, the Licensee shall develop and implement a mitigation and monitoring plan to prevent marine mammal entanglement. Upon approval by NMSP, the Licensee shall file the plan with the Commission.

B. If the Licensee discovers such a marine mammal entanglement while on site for an inspection or otherwise, the Licensee or its contractors and their vessel(s) must remain available for 24 hours after telephone contact is made to assist NOAA with retrieval of the entangled animal(s). If, at any time, including during maintenance inspection, the Licensee finds or is notified that a marine mammal is entangled on project equipment or dead within the project area, the Licensee shall notify via phone OCNMS (360-457-6622) and NOAA's Marine Mammal Stranding Network (206-526-6733) within 24 hours. If a sea otter is entangled, the contact telephone number is the U.S. Fish and Wildlife Service at 877-326-8837.

C. After any marine mammal entanglement incident, the Licensee shall meet with NMSP and other appropriate NOAA personnel as available, not later than two weeks after the incident, to review circumstances of the entanglement and to define additional mitigation measures to reduce the risk of future entanglements.

RATIONALE:

The movement of large marine mammals through the project area could be impacted by the cabling system, which is proposed to have 10 cables between surface floats and the seabed and a network of near-surface cables between the surface floats and buoys covering an area approximately 450 feet by 625 feet for the pilot project.

As identified in the Applicant's licensing application materials, the gray whale (Eschrichtius robustus) migrates seasonally between Baha, Mexico, and the Bering Sea, a migration route that follows the coast closely along the West Coast of North America, particularly during the northward migration in the late winter/spring. Although the average distance offshore is greater for Washington State than for Oregon and California, shore based observations and published literature confirm that gray whales routinely travel within a few kilometers of Cape

Flattery and the project area (Green et al. 1995) and can also be found near the project in winter months (Shelden et al. 2000). Moreover, a summer feeding aggregation of a few hundred gray whales spends summer months between northern California and southeastern Alaska, with the northern Washington coast near the project area being one site where these whales are routinely found (Calambokidis et al. 2002).

In addition, the Olympic Coast National Marine Sanctuary hosts one of the most diverse marine mammal assemblages in North America, with 29 marine mammal species that inhabit or traverse the sanctuary. This includes 7 species of whales and 1 species of sea lion that are listed as endangered or threatened under the Endangered Species Act.

Marine mammal entanglement with fixed fishing gear, typically pots and nets, occurs regularly and can cause mortality, even with large whales (Hartley et al. 2003). Whereas one might assume a low risk of marine mammal entanglement with this project's components, multi-buoy projects with complex cabling systems have not commonly been deployed in the marine environment. This absence of precedent makes impacts assessment speculative and necessitates monitoring for such impacts. Periodic anchor system inspections, identified above, can serve to determine if marine mammals have become entangled in project components. If marine mammal entanglement does occur, this will constitute an incidental "take" under the Marine Mammal Protection Act, and the Applicant must work with regulatory agencies to assess the incident(s), augment monitoring for this impact, and develop an appropriate mitigation plan.

Many toothed whales use high-pitched, or ultra-sonic, sound for echolocation, by which sounds emitted by the whales are reflected and received by the whales to "see" or perceive their environment. Echolocation is used for navigation and hunting. There is no evidence that baleen whales, such as humpback and gray whales that frequent the sanctuary, use echolocation to

perceive their environment in the same way as toothed whales. Therefore, there is also potential for injury to whales, particularly baleen whales such as grays and humpbacks, through collisions with the large underwater structure of the AquaBuOYs.

Condition 7. Alterations to the Project

The Licensee shall obtain written approval from NMSP prior to changing any element of the project installation including the location of any project equipment within the sanctuary. The Licensee also shall obtain written approval from NMSP for any action that is inconsistent with the authorizations and project description provided in the FERC license application, and/or inspection plan submitted under Condition 2.

RATIONALE:

Unforeseen events may arise during the pilot project that may require changes to the installations within the sanctuary. For example, the anchoring of the transmission cable to shore may require modification to stabilize the cable and prevent physical damage to the cable. Because it is impossible to predict what these changes might be, NMSP requires that consultation and approval occur to allow for evaluation of potential impacts of proposed changes.

Condition 8. Bond and Decommissioning Plan

A. The Licensee shall, prior to the conduct of any activities under this License, purchase and maintain a bond, or equivalent financial assurance, to cover the entirety of costs in the event any portion of the project is no longer in compliance with this License (e.g. an AquaBuOY breaks free of its mooring and anchoring system or a cable becomes detached or cannot be secured in such a manner as to avoid injury to sanctuary resources.), costs associated with any emergency response

and restoration of any injured sanctuary resources, and the costs of the removal of all project components from the OCNMS at the end of the service life for the project.

B. The Licensee shall submit a project decommissioning plan, in consultation with and subject to the approval of the NMSP, at least 12 months prior to commencing any removal activities associated with project decommissioning. The Licensee's decommissioning plan must, at a minimum, include the following elements:

1. A detailed description of the methods to be employed to remove the equipment;

2. An environmental analysis of the potential environmental impacts associated with decommissioning the project.

3. A schedule for completion of the removal of the project from OCNMS.

Upon NMSP approval, the Licensee shall file the final Plan with the Commission.

RATIONALE:

OCNMS regulations prohibit constructing, placing, or abandoning any structure, material or other matter on the seabed of the sanctuary. 15 CFR §922.152(a)(4) In order to avoid violation of this regulation, the applicant must remove all equipment and components associated with the project from OCNMS upon conclusion of the pilot project. Given that this is a privately operated commercial project in a Federally-managed protected area, any costs associated with removing the equipment to comply with OCNMS regulations should be borne entirely by the applicant.

The Commission does not generically impose decommissioning funding requirements on licensees. However, in certain situations, where supported by the record, the Commission may impose license conditions to assure that funds are available to do the job when the time for

decommissioning arrives. 60 Fed. Reg. 340 (1995) (referenced in 18 C.F.R. § 2.24). In this instance, NMSP has a compelling interest in ensuring that the applicant will: (1) have sufficient funds available at the end of the project to ensure that abandonment of equipment in OCNMS will not occur in violation of 15 CFR § 922.152(a)(4) and (2) that all terms and conditions imposed as part of this license in order to protect sanctuary resources and qualities will be performed. The requirement for the applicant to post a bond or equivalent financial assurance (that might include a decommissioning trust fund) gives satisfaction to NMSP that such funding will be available and that the applicant can perform all the requirements of the license so far the sanctuary interests are concerned. NMSP will work cooperatively with any other agencies (such as the Washington Department of Natural Resources) to ensure that duplicative bonding requirements are not imposed on the Licensee.

The completion of a decommissioning plan is necessary in order for NMSP to ensure that activities related to the plan have been fully evaluated for their effect on sanctuary resources and qualities. Depending on the activities proposed to affect removal, supplemental analysis may also be required to comply with the National Environmental Policy Act.

Condition 9. Emergency Response

If an emergency response or repair is required, the Licensee shall notify OCNMS by telephone (360-457-6622 ext. 13) within 24 hours of the time it becomes aware of the need for this response/repair. The Licensee shall describe the need for the emergency action and proposed methods of response. The Licensee shall provide OCNMS with updates on the progress of the response every 24 hours or at a mutually agreed time interval. A written report summarizing the emergency response, including the need, response actions, and any activity that may have

impacted sanctuary resources shall be filed with the Commission, with a copy provided to OCNMS within 30 days of the conclusion of the response.

RATIONALE:

Unforeseen events may require unscheduled visits to the project site or emergency response to avoid loss or damage to project components or to prevent injury to sanctuary resources. For example, a buoy might break loose from moorings and be drifting toward the shore. NMSP requires prompt notification of such events so that it can assess potential impacts to sanctuary resources, coordinate with other interested agencies/parties, and assist in the response, if appropriate.

Condition 10. Reservation of 4e Authorities

Authority is reserved to the NMSP to require the Licensee to implement such modifications or additional conditions for the adequate protection and utilization of the OCNMS as may be provided by the Secretary of Commerce, pursuant to Section 4(e) of the Federal Power Act, 16 U.S.C. § 797(e).

RATIONALE:

As noted throughout these conditions, the Applicant's PDEA and is acknowledged generally in the industry, wave energy electrical generation is a new technology and information on its long-term individual and cumulative impacts on the marine environment and marine life is very limited. In addition, many aspects of the Makah Bay Wave Energy Pilot Project are yet to be designed, engineered and tested. There has been no previous deployment of the type proposed for the Makah Bay installation. Given this high degree of

uncertainty, the NMSP requests the reservation of its 4(e) authority to amend, modify and supplement the above terms and conditions for any license the Commission may issue.

IV. COMMENTS ON THE PRELIMINARY DRAFT ENVIRONMENTAL ASSESSMENT PROVIDED IN THE FERC LICENSE APPLICATION FOR P-12751, MAKAH BAY OFFSHORE WAVE ENERGY PILOT PROJECT

The Olympic Coast National Marine Sanctuary (OCNMS) submits the following comments on the preliminary draft environmental assessment (PDEA) dated 6 October 2006 and submitted to the Federal Energy Regulatory Commission with AquaEnergy's license application for the Makah Bay Offshore Wave Energy Pilot Project (P-12751).

P. 1-3: The OCNMS boundary is not accurate. Figure 1-1 should show the boundary further east at Koitlah Point. See http://www.olympiccoast.noaa.gov/protection/boundary/boundarymap.html. This or some other figure in the document should show the location of pilot project. The east-west line from Cape Flattery is ambiguous but appears to incorrectly mark the state boundary. This line should be removed or explained.

P. 3-10: OCNMS regulations prohibit drilling into or otherwise altering the seabed of the Sanctuary. The PDEA on p. 3-12 states that methods for installation and anchoring to hard substrate of the transmission cable between the buoys and shore will be determined in consultation with a qualified contractor. OCNMS would like to reiterate a comment from the 19 January 2007 meeting of Alternative Licensing Process (ALP) Participants that we can not fully evaluate the potential impacts of the project and its compatibility with sanctuary purposes and regulations

without detailed engineering specifications for the transmission cable and installation techniques that will be employed.

P. 3-12: One stated objective of this pilot project is to validate negligible environmental impacts. Because many features of the project are novel and unique, including the technology, the buoy design, and the anchoring system, monitoring must be conducted to assess environmental impacts. NOAA has provided a suite of license conditions to FERC that address monitoring that is necessary to evaluate environmental impacts of the project.

P. 3-13: Another project installation procedure that is not fully characterized in the PDEA is horizontal directional drilling. Of particular concern to OCNMS is the use and management of drilling water, mud, gel, or other fluids, which will be determined once a contractor is selected. Water quality impacts of the project can not be fully evaluated until these processes are fully characterized.

P. 3-13: OCNMS would like to compliment the Applicant on the proposed environmental measures outlined in the PDEA. To the extent these measures are compatible with comments and recommendations from other ALP Participants, FERC should require that these environmental measures are incorporated into the pilot project.

P. 3-14 onward: The Alternatives Analysis has inconsistencies and information deficiencies that should be addressed.

- A site selection criterion for water depth of 50m within 2.5 miles from shore is not met by the proposed Makah Bay site.
- The analysis rejects the Oregon coast based solely on significant seasonal extremes of wave energy. However, the PDEA does not provide definitive data to document this determination. This dismissal of the Oregon coast solely because of the extreme seasonal

wave height is inconsistent with ongoing efforts to develop wave energy off Oregon. In fact, AquaEnergy has submitted a preliminary permit request for Coos County, Oregon, that outlines site criteria similar to those used in the PDEA.

- For a more comprehensive comparison between Makah Bay and the Oregon coast, additional data for wave energy resource evaluation may be available from buoys off the Columbia River (Station 46029 - COL RIVER BAR), Newport, OR (Station 46050 - STONEWALL BANKS), and Port Orford, OR (Station 46015 - Port Orford).
- The rationale used to reject the Grays Harbor site are not fully defensible. For example, it seems unlikely that the cable would be routed through the large estuaries in the area where the oyster industry might be impacted. Also, the Quinault Nation's lack of interest for purchase of power is irrelevant because the local public utility district would purchase the power, not the Indian Nation.
- Given these considerations, it appears that the sole unique justification for siting the project in Makah Bay is the interest and cooperation of the Makah Tribe, and the PDEA should reflect this.

P. 3-16: The statement attributed to Carol Bernthal provides a brief summary of a long discussion. To accurately reflect sanctuary regulations, it must be modified to state that the demonstration plant "might be permitted to be located in the OCNMS if it is determined that it promotes the welfare of the Makah Indian Nation". Similar statements on pp.4-9 and 5-75 must be edited to accurately reflect sanctuary regulations "OCNMS regulations provide for permitting of projects that promote the welfare of any Indian tribe adjacent to the sanctuary."

P. 4-5: It states that the Applicant will "evaluate different antifouling paints to identify those that worked best." To the extent this evaluation is compatible with comments and

recommendations from other ALP Participants, FERC should require this evaluation be conducted on the pilot project. NOAA has incorporated this into its Terms and Conditions submitted to FERC.

P.5-1 and footnote p.5-5: Text could state more specifically that the sanctuary lies between the western Strait of Juan de Fuca and the Copalis River. The text as written implies that the sanctuary includes a significant portion of the Strait.

P.5-2 and 3: These figures could be improved because the bathymetry is not clearly labeled and the legends are illegible.

P.5-12 forward: To evaluate the stability of vertical load anchors at the project site, the document should clearly state the thickness of sand deposits where anchors will be deployed. Also, the document should acknowledge that it is difficult to evaluate benthic impacts of the vertical load anchors on biota during anchor installation and retrieval because the size of the anchors and cables or chains, and the depth of burial for the anchors is not described. This assessment can occur after the final engineering specifications for the mooring system are provided by the Applicant.

P.5-18: The dots indicating locations of all four monitoring buoys are incorrectly placed, except perhaps La Perouse Bank.

P.5-25: Information on deployed current meters is redundant with pp.5-19 and 20, but there are inconsistencies in depths and dates that should be corrected.

P.5-27: "Our Analysis" covers only buoy detachment and water quality impacts and provides little to no relevance for the information presented on waves, currents and wind.

P.5-29: Information should reflect the web postings for that were posted in October 2006 for humpbacks, Dall's porpoise, orcas, and Pacific white-sided dolphins, all considered "regular"

in occurrence. See

http://www.olympiccoast.noaa.gov/living/marine_wildlife/marine_mammals/mammallist.html

P.5-35: EFH designations were updated in early 2006 with specific areas closed to fishing, and none overlap with the project site. This section should be revised and probably can be shortened as a result of recent designations. The analysis on p.5-48 should also be updated.

P.5-42: The final environmental measures, here and on p.3-13, could be edited to reflect that maintenance minimizes disturbance to marine natural resources. There is not a need to minimize disturbance to "marine growth" which is a phrase commonly used in reference to biofouling on in-water structures.

P.5-77: As mentioned in our January 2006 comments, commercial fishing is not prohibited in the project area, only bottom trawling by non-tribal vessels. NOAA understands that Washington Department of Fish and Wildlife has provided clarification on fishing regulations in the area.

P.6-3: The statement "there is no impact on migratory marine life and fish" is unproved and speculative. To be accurate, this should be qualified with a "we believe that" or "an initial assessment that does not include field studies of deployed devices determined that".

P.10-1: Given the uncertainty that remains with this project based on 1) aspects of the installations that have not been fully engineered (i.e., the mooring system, transmission cable installation) and thoroughly assessed in the PDEA, 2) AquaBuOYs of the proposed design have not been constructed, field tested, or monitored for environmental impacts, and 3) this is a new technology and unique mooring system for which there is little basis for assessment of some potential impacts, NOAA contends that it is premature to include a Finding of No Significant Impact (FONSI) in this document as drafted. When engineered designs are provided for the

mooring system and transmission cable and installation techniques, and additional studies on living habitat on the transmission cable route to shore are completed it might be appropriate for FERC to make a FONSI determination for the pilot project.

V. COMMENTS OF THE NATIONAL MARINE FISHERIES SERVICE

The National Marine fisheries Service (NMFS) has statutory responsibility for the protection and enhancement of the Nation's living marine resources, including anadromous salmon and steelhead and marine mammals and their supporting habitats, under Reorganization Plan No. 4 of 1970, 84 Stat. 2090; Federal Power Act (FPA), 16 USC 791a et seq.; Fish and Wildlife Coordination Act (FWCA), 16 USC 661 et seq.; Magnuson-Stevens Fishery Conservation and Management Act, 16 USC 1801 et seq.; Pacific Northwest Electric Power Planning and Conservation Act, 16 USC 839 et seq.; the Pacific Salmon Treaty Act of 1985, 16 USC 3631-3644; the National Environmental Policy Act (NEPA), 42 USC 4321 et seq.; the Endangered Species Act, 16 USC 1531 et seq., and the Marine Mammal Protection Act 16 USC et seq.

The marine mammal and reptile species that may occur in the project area are listed in Table X-X. FERC must determine potential Project affects on these species and consult with NMFS either under the Endangered Species Act (ESA) or Marine Mammal Protection Act (MMPA) accordingly.

Table X-X. Marine mammals and reptiles that may occur in the Project area.

COMMON NAME	SCIENTIFIC NAME	STOCK	FEDERAL STATUS
Marine Mammals (whales, dolphins & porpoises)			
Killer Whale	*Orcinus orca*	Eastern North Pacific Southern Resident	Endangered
Humpback Whale	*Megaptera novaeangliae*	Eastern North Pacific	Endangered
Blue Whale	*Balaenoptera musculus*	Eastern North Pacific	Endangered
Fin Whale	*Balaenoptera physalus*	California/Oregon/Washington	Endangered
Sei Whale	*Balaenoptera borealis*	Eastern North Pacific	Endangered

Sperm Whale	*Physeter macrocephalus*	California/Oregon/Washington	Endangered
Gray Whale	*Eschrichtius robustus*	Eastern North Pacific	Not Listed
Killer Whale	*Orcinus orca*	Eastern North Pacific Transient	Not Listed
Killer Whale	*Orcinus orca*	Eastern North Pacific Offshore	Not Listed
Harbor Porpoise	*Phocoena phocoena*	Oregon/Washington Coast	Not Listed
Dall's Porpoise	*Phocoenoides dalli*	California/Oregon/Washington	Not Listed
Pacific White-Sided Dolphin	*Lagenorhynchus obliquidens*	Northern	Not Listed
Risso's Dolphin	*Grampus griseus*	California/Oregon/Washington	Not Listed
Marine Mammals (seals & sea lions)			
Steller Sea Lion	*Eumetopias jubatus*	Eastern U.S.	Threatened
California Sea Lion	*Zalophus californianus*	U.S.	Not Listed
Harbor Seal	*Phoca vitulina richardsi*	Oregon/Washington Coastal Waters	Not Listed
Northern Fur Seal	*Callorhinus ursinus*	Eastern Pacific	Not Listed
Marine Reptiles			
Leatherback Sea Turtle	*Dermochelys coriacea*	n/a	Endangered
Green Sea Turtle	*Chelonia mydas*	n/a	Endangered
Loggerhead Sea Turtle	*Caretta caretta*	n/a	Threatened
Olive Ridley Sea Turtle	*Lepidochelys olivacea*	n/a	Threatened

Authorization for any take under the MMPA incidental to the proposed activity must be obtained in advance to avoid potential liability under the MMPA. Such authorizations may include 1) a scientific research permit for monitoring activities; 2) incidental harassment authorization for short term disturbance associated with the deployment of the project; 3) small take authorization to cover incidental take for including harassment and mortality associated with noise or entanglement.

The proposed location of buoys and anchor lines would be in the migratory path of gray whales, creating the potential for entanglement in the anchor lines. Large baleen whales do not use high frequency echolocation and may be vulnerable to collision and entanglement. Noise generated by the Project may either attract or repel marine mammals.

The Project also would be located in the marine migration routes for many salmon and steelhead species originating from northern California, Oregon and Washington. A list of these species and their status under the ESA can be found at www.nwr.noaa.gov. It is difficult to asses

potential effects on these from the information provided in the PDEA. It is not known whether predatory species will congregate in the Project area and prey on salmon and steelhead. FERC must consult with NMFS on potential effects on salmon and steelhead under the ESA and EFH, as appropriate.

Finally, FERC must determine possible affects the Project would have on groundfish and coastal pelagic EFH and consult with NMFS accordingly. FERC should contact NMFS' Northwest Regional Office for a list of species under EFH.

VI. LITERATURE CITED

Barlow, J. and R. Gentry. 2004. Report of the NOAA workshop on anthropogenic sound and marine mammals, 19-20 February 2004. Report No. NOAA-TM-NMFS-SWFSC-361. June 2004.

Bochert, R. & Zettler, M.L. (2004) Long-term exposure of several marine benthic animals to static magnetic fields, Bioelectromagnetics, 25: 498-502.

Calambokidis, J., Darling, J.D., Volker, D., Gearin, P., Gosho, M., Megill, W., Tombach, C.M., Goley, D., Toropova, C., and Gisborne, B. 2002. Abundance, range and movements of a feeding aggregation of gray whales (Eschrichtius robustus) from California to southeastern Alaska in 1998. J. Cetacean Res. Manage. 4(3): 267-276.

CMACS (2003). A baseline assessment of electromagnetic fields generated by offshore wind farm cables. A report prepared by the Centre for Marine and Coastal Studies for COWRIE, Report EMF-01-2002 66.

Dittman, A.H. and Quinn, T.P. 1996. Homing in Pacific salmon: mechanisms and ecological basis. Journal of Experimental Biology, 199: 83-91

Gill, A.B. and Taylor, H. 2002. The potential effects of electromagnetic fields generated by cabling between offshore wind turbines upon elasmobranch fishes. Report to the Countryside Council for Wales. Report No. 488.

Gill, A.B., Gloyne-Phillips, I., Neal, K.J. and Kimber, J.A. 2005. The potential effects of electromagnetic fields generated by sub-sea power cables associated with offshore wind farm developments on electrically and magnetically sensitive marine organisms – a review. Report No. COWRIE-EM FIELD 2-06-2004. Centre for Marine and Coastal Studies and Institute of Water and Environment Joint Report.

Girivan, A. and Pangam, P. 2006. A review of antifouling strategies: alternatives to TBT. *In*: Multiple dimensions of global environmental change. TERI Press, New Delhi. pp. 502-518.

Gisinser, R.C. 1998. Workshop on the Effects of Anthropogenic Noise in the Marine Environment. Marine Mammal Science Program (Office of Naval Research), 10-12 February 1998.

Green, G.A., Brueggeman, J.J., Grotefendt, R.A., and Bowlby, C.E. 1995. Offshore distances of gray whales migrating along the Oregon and Washington coasts, 1990. Northwest Science 69(3): 223-227.

Hartley, D., Whittingham, A., Kenney, J., Cole, T., and Pomfret, E. 2003. Large whale entanglement report 2001, updated February 2003. National Marine Fisheries Service, Protected Resources Division, Gloucester, MA.

Kenney, R.D., Mayo, C.A., and Winn, H.E. 2001. Migration and foraging strategies at varying spatial scales in western North Atlantic right whales: a review of hypotheses. J. Cetacean Res. Manage. (special issue) 2:251-260.

Konstantinou, I.K. and Albanis, T.A. 2004. Worldwide occurrence and effects of antifouling paint booster biocides in the aquatic environment: a review. Environment International 30(2):235-24

MBOWEPP (Makah Bay Offshore Wave Energy Pilot Project). 2006. Preliminary Draft Environmental Assessment. Submitted to Federal Energy Regulatory Commission. FERC Docket No. DI02-3-002. October 2006.

Malme, C.I., Miles, P.I., Clark, C.W, Tyack, P. and Bird, J.E. 1984. Investigations of the potential effects of underwater noise from petroleum industry activities on migrating gray whale behavior – Phase 2: January 1984 migration. Final Report No. 5586 report prepared by Bolt, Beranek, and Newman Inc., Cambridge, MA for the US Minerals Management Service, Anchorage, AK. BBN, Inc. 297 pp.

Malme, C.I., Wursig, B., Bird, J.E., and Tyack. P. 1988. Observations of feeding gray whale responses to controlled industrial noise exposure. p. 55-73. *In*: W.M. Sackinger, M.O. Jeffries, J.L. Imm and S.D. Treacy (eds.) Vol. 2. *Port and Ocean Engineering under Arctic Conditions*. University of Alaska, Fairbanks, AK. 111pp.

Metcalfe, J.D.; Holford, B.H.; Arnold, G.P. 1993. Orientation of plaice (*Pleuronectes platessa*) in the open sea: Evidence for the use of external directional clues. Marine Biology 117(4):559-566.

Moore, S.E. and J.T. Clarke. 2002. Potential impact of offshore human activities on gray whales (Eschrichtius robustus). J. Cetacean Res. Manage. 4(1):19-25.

NRC (National Research Council). 2005. Marine Mammal Populations and Ocean Noise: determining when noise causes biologically significant effects. National Academies Press, Washington, D.C.

Shelden, K.E.W., Rugh, D.J., Laake, J.L., Waite, J.M., Gearin, P.J., Wahl, T.R. 2000. Winter observations of cetaceans off the northern Washington coast. Northwestern Naturalist 81: 54-59.

Talisman Energy (UK) Ltd. 2005. Beatrice Wind Farm Demonstrator Project. Environmental Statement. http://www.beatricewind.co.uk/environmental_statement.pdf

TGPI (Thales GeoSolutions (Pacific), Inc). 2002. Environmental Assessment Seabed Survey, Makah Bay, Washington. Prepared for AquaEnergy Group, Ltd. Report TGP-2577-RPT-01-00. October 18, 2002.

Thrush, S.F. and Dayton, P.K. 2002. Disturbance to marine benthic habitats by trawling and dredging: implications for marine biodiversity. Annual Rev. Ecol. Systematics 33:449-479.

US Commission on Ocean Policy. 2004. An Ocean Blueprint for the 21st Century. Final Report. Washington, DC.

Walker, M.M., Kirschvink, J.L., Ahmed, G. and Dizon, A.E. 1992. Evidence that fin whales respond to the geomagnetic field during migration. J. Exp. Biol. 171:67-78

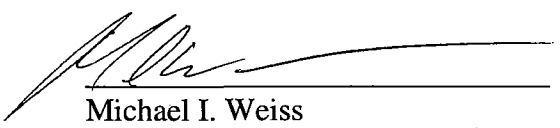
68 Fed. Reg. 64595-64609 (November 14, 2003).

70 Fed. Reg. 1871-1875 (January 11, 2005).

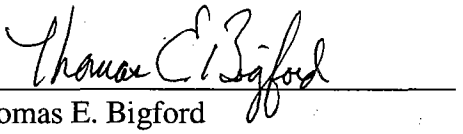
70 Fed. Reg. 333-338 (January 4, 2005).

DATED this 16th day of February, 2007, on behalf of the National Marine Sanctuaries Program and the National Marine Fisheries Service.

Respectfully submitted,



Michael I. Weiss
Deputy Director
National Marine Sanctuary Program



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National Marine Fisheries Service

CERTIFICATE OF SERVICE

I hereby certify that I have this day, served the foregoing U.S. DEPARTMENT OF COMMERCE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NATIONAL MARINE SANCTUARY PROGRAM, NATIONAL MARINE FISHERIES SERVICE, NOTICE OF INTERVENTION, COMMENTS AND PRELIMINARY TERMS AND CONDITIONS, upon each person designated on the official service list compiled by the Secretary of the Federal Energy Regulatory Commission in the above captioned proceeding.

DATED at Silver Spring, MD, on this day FEBRUARY 16, 2007,

Mary G. Holt
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