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Re: **ESA § 7 Consultation with Nuclear Regulatory Commission on Entergy's Pilgrim Nuclear Power Station, Plymouth, Massachusetts**

Dear Mr. Morris,

We are writing on behalf of a network of groups to request that your office consider the following information in connection with its consultation under the Endangered Species Act (ESA), 16 U.S. C. §§ 1531-1544, with the Nuclear Regulatory Commission (NRC) regarding the NRC Staff 2006 Biological Assessment (2006 BA) and 2012 supplemental Biological Assessment (2012 BA) for the relicensing of Entergy Corporation's Pilgrim Nuclear Power Station (PNPS). As you know, Entergy is seeking to extend its operating license an additional 20 years, and to continue to use a once through cooling water intake system (CWIS) for its 715 MWe power station.

We request that NMFS consider the following comments and compilation of resources in making its determination under ESA § 7 as to whether PNPS operations are likely to adversely effect the endangered species documented as being present in Cape Cod Bay "in the vicinity" of PNPS and/or that "may be present" in identified action areas.

These comments relate to all of the species identified in the 2006 BA and the 2012 BA. They address significant data gaps, inconsistencies in the data, new and significant information that should be considered, and erroneous assumptions underlying both biological assessments and the NRC's July 2007 environmental impact statement for PNPS (PNPS EIS).[1] We address the PNPS EIS because NMFS has indicated it will rely

[1] "Generic Environmental Impact Statement for License Renewal of Nuclear Power Plants, Supplement 29, Regarding Pilgrim Nuclear Power Station, Final Report, July 2007," NUREG-1437, and its Appendices. (NUREG-1437). Available on line: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1437/supplement29/index.html; Vol. 1 ML 071990020; Vol. 2 Appendices ML 071990027.

on it in responding to the NRC's request for ESA § 7 consultation and concurrence on the biological assessments.[2]

General Issues Related to All ESA-Listed Species and Critical Habitat

There are several defects in the biological assessments and the PNPS EIS that cut across all issues relating to the species and habitat that are the subject of the ESA § 7 consultation for PNPS.

First, that the biological assessments fail to identify the "action area" for each ESA-listed species and critical habitat, as required by ESA regulation 50 CFR 402.02. Instead, the assessments and PNPS EIS make inconsistent and vague statements about the "action area." For example, the 2006 BA states, "The project area is defined as the PNPS site, adjacent areas of Cape Cod Bay, and approximately 7.2 miles (mi) of transmission ine right-of-way (ROW)." 2006 BA. In the 2012 BA, there is similarly no defined "action area." Instead the 2012 BA refers to Atlantic sturgeon "in the vicinity of" PNPS, "near Pilgrim" p. 3. We request that NMFS identify the "action area" for each of the 11 ESA-listed species and habitat identified in the BAs.

Second, it is our position that the framework used by the NRC to implement the National Environmental Policy Act, 42 USC 4321 et seq., is not adequate for ESA § 7 consultation purposes. The NRC implements NEPA pursuant to the agency's regulations under 10 CFR 51. In general, under these regulations, the NRC has declared certain issues "generic" to all nuclear power station relicensing proceedings, and classifies them as "Category 1" exempting them from site-specific assessment unless the NRC finds there is "new and significant information." See, e.g. 10 CFR 51.95(c)(2). Other issues are "Category 2" issues requiring a site-specific analysis and are addressed in supplements to the generic EIS. (This process is described in the PNPS EIS Executive Summary). It is our position that certain "Category 1" issues relate to whether ESA-listed species and habitat are likely to be adversely effected and cannot properly be exempt from assessment for ESA purposes. These include the discharge of biocides to Cape Cod Bay, and are discussed below. Therefore, NMFS should do its own individual site-specific assessment of "Category 1" environmental issues that may effect ESA-listed species and habitat. It is simply inadequate for ESA purposes to rely on conclusions in a "generic" EIS where there may be impacts to ESA resources.

Third, we urge NMFS to put the scope of Entergy's CWIS operations in perspective. The facility has operated for 40 years, and seeks to extend for another 20, meaning that if it is relicensed with the current CWIS as proposed, it will operate for 60 years. Statements in the PNPS EIS and by Entergy's own staff indicate that over a 60 year period, Entergy

[2] In the NMFS March 26, 2012 letter to the NRC, NMFS stated that "…we requested information on the effects of the listed species' prey resources and effects of the thermal plume. In response your staff provided references to appropriate sections of the Environmental Impact Statement."

will have used from at least 50% to 100% of the volume of Cape Cod Bay for once-through cooling, depending on whose estimates are used.[3]

Fourth, we urge NMFS to ensure that the NRC 2006 and 2012 biological assessments and the conclusions therein are measured against the broad definitions in the ESA regulations at 50 C.F.R. § 402.02. In order to ensure that the federal action is "not likely to jeopardize" the species or habitat, § 7(a)(2), the biological assessment, which is done to "facilitate compliance with § 7(a)(2)", must accurately portray the "action area", the "cumulative effects" and the "destruction or adverse modification" as those terms are defined in 50 C.F.R. 402.101. § 7(c)(1). The relevant regulatory definitions are:

> *Action area* means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.
>
> *Cumulative effects* are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation.
>
> *Destruction or adverse modification* means a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical.
>
> *Effects of the action* refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and

[3] These estimates are calculated as follows. In 2005, Entergy staff Jay Scheffer stated, "Recent studies have shown that Pilgrim Station's cooling water withdrawal rate is 0.05% of the exchange rate for Cape Cod Bay. If Cape Cod Bay were a closed system it would take 70 years to pass the entire volume of the bay through the station's cooling water system." Exhibit 1 hereto, Email Scheffer to Bunn, Amoret, L. Forty of those 70 years have already passed, since PNPS has been operating since 1972, so already over 50% of the water volume of Cape Cod Bay has passed through Entergy's cooling water system. At the end of the relicensing term, in 2032, 60 of those years will have passed. However, Scheffer's figures are contradicted by those in the PNPS EIS, which, if used, would mean ***the entire volume of Cape Cod Bay has been used by Entergy for cooling water in the last 35 years.*** The PNPS EIS states that "…PNPS withdraws a relatively small percentage of the net volumetric flow of water-generally less than 0.1 percent (ENSR and MRI 2005)… PNPS pp. 4-76-77, Section 4.8.1. Using Schaffer's time frame, and the PNPS EIS figure of closer to 0.1 percent (double Scheffer's amount of 0.05%) means that roughly, since it started operating in 1972, PNPS has used the entire volume of all the water in Cape Cod Bay.

> the impact of State or private actions which are contemporaneous with the consultation in process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration.

As the court stated in Gifford Pinochet Task Force v. U.S. Fish and Wildlife Service, 378 F.3d 1059, 1066 remanded on other grounds, 387 F. 3d 968 (9th Cir. 2004), the type of analysis needed to ensure that the agency action is "not likely to jeopardize" is more than just a "simplistic x number acres = y number of [species] type of equation." But this is exactly the type of oversimplified analysis upon which Entergy and the NRC Staff rely. For examples of the types of information courts have found necessary to meet ESA § 7 obligations, see: Hammond v. Norton, 370 F.Supp. 2d 226 (2006 D.C.); Citizens for Better Forestry v. Hanns, 481 F. Supp. 2d 1059 (N.D. Calif. 2007); National Wildlife Federation v. NMFS, 481 F.3d. 1224, (2007), Pacific Coast Federation of Fishermen's Association v. U.S Bureau of Reclamation, 606 F. Supp. 2d 1122 (N.D. Calif. 2001).

Fifth, we incorporate by reference herein comments raised by the documents cited at the end of this letter. We are also conferring with leading experts on the ESA-listed species and habitats that may be effected by PNPS, and plan to submit to NMFS more information from these experts promptly.

Radioactive Releases from Daily Operations

The NRC staff biological assessments and the PNPS EIS fail to adequately address the possible impacts on ESA-listed species and critical habitat from PNPS radiological effluent releases to Cape Cod Bay – both past and future.

Since 1972, PNPS has been releasing radioactive effluent to Cape Cod Bay under a fragmented and inadequate regulatory program overseen by the NRC.[4] Some years of data are available from various sources, but there does not seem to be any comprehensive assessment of how much radioactive material has been released into Cape Cod Bay waters and shoreline sediments. It appears that annual data for the past 40 years of operation is not readily available to the public.

In addition, uncontrolled leaks of liquid radioactive effluents, perhaps from leaking underground pipes, have resulted in contamination of groundwater.[5] According to the Entergy, the groundwater at the site flows toward Cape Cod Bay. PNPS EIS, p. 2-23,

[4] Radioactive Effluent Reports for PNPS for 2005 to 2010 are available at the NRC website. http://pbadupws.nrc.gov/docs/ML0622/ML062280602.pdf; PNPS Radiological Environmental Monitoring Program (REMP) reports for 2005 to 2010 are available at: http://pbadupws.nrc.gov/docs/ML0614/ML061440629.pdf; Electronic summaries of the data in the liquid radioactive effluent reports for 1998-2007 are available on the NRC website, www.neirs.com/effluent.

[5] See, Mass. Dept. of Public Health testing report, update, March 2011.

Section 2.2.3.2. Prior to 2006, PNPS did not have a groundwater monitoring program so it does not seem that there is data to show how much radioactive effluent leaked into Cape Cod Bay from contaminated groundwater on site.[6]

The haphazard nature of the monitoring of liquid radioactive effluent discharging from PNPS to Cape Cod Bay is typified by 1999 correspondence between Entergy and the U.S. EPA. In 1981, PNPS sought and obtained a waiver for its radwaste system, and the discharge point for the radwastes was not identified as an outfall from 1981 until 1999, nor was sampling required.[7] A "miscellaneous" storm drain similarly escaped the NPDES permit process at least until 1999. This 1999 letter states that the "miscellaneous" storm drain will be addressed in the NPDES permit renewal-which has yet to occur.

The monitoring data for radioactive discharges from PNPS to Cape Cod Bay is limited in part because the NRC's REMP program has allowed licensees like Entergy significant flexibility to make changes to their monitoring program without prior NRC approval. The historical trend has been to reduce the scope of monitoring based on any continued non-detection of radioactivity.[8]

The PNPS EIS essentially relies on only 5 years of data to make conclusions about the environmental impacts of radioactive release. The NRC looked at liquid effluent "Radioactive Effluent and Waste Disposal" (REWD) Reports to develop information for a representative year for capacity factors and operational events that impact the volume and activity of liquid, gaseous, and solid wastes – in other words, to determine what the average year looks like in terms for certain radioactive releases from PNPS. PNPS EIS p. 2-13, Section 2.1.4. *See also*, Section 2.2.7 of the PNPS EIS, 2-98, (NRC staff relied only on 5 years of data, from 2001 through 2005 to make its conclusion that the "radiation and radioactivity in the environmental media monitored around the plant are well within applicable regulatory limits and are not significantly higher than pre-operational levels.") Given the limited sampling frequency, parameters, and locations of this data, it does not meet the standards of the ESA in terms of assessing potential effects on ESA-listed species and/or critical habitat.

The PNPS EIS further relies on the NRC's generic EIS, Section 4.0 and Entergy's conclusion that there is no new and significant information to be considered. The NRC staff concluded that there are "no impacts related to these issues beyond those discussed in the GEIS" and that they are "SMALL" Category 1 impacts. The ESA § 7 does not authorize NMFS to rely on the NRC generic EIS for radiological effects on ESA-listed species and habitats.

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[6] See, July 31, 2006 letter from Entergy to the NRC. http://pbadupws.nrc.gov/docs/ML0622/ML062280602.pdf

[7] June 3, 1999 letter from Boston Edison to U.S. EPA. Exhibit 2 hereto.

[8] "Analysis of Cancer Risks in Populations near Nuclear Facilities, Phase 1 Report, 2012, prepublication copy (Cancer Risks Report). http://www.nap.edu/catalog.php?record_id=13388

The PNPS EIS assessment of cumulative impacts on ESA-listed species, Section 4.8.6, does not address impacts of releases of liquid radioactive effluent, but refers to the 2006 BA, which does not address it either.

Information is needed to assess the bioaccumulation of radioactive materials in Cape Cod Bay from PNPS, including food supplies for ESA-listed species, such as plankton, to determine whether radioactive material is entering the food chain for ESA-listed species and or critical habitats. For example, Cesium-137 was detected in plankton 600 kilometers from Fukushima just 3 months after the disaster, and scientists have stated it is necessary to look at bioaccumulation.[9]

NMFS should carefully examine Entergy's sediment samples from the shoreline, required under the RAMP, even though the sampling location, frequency, and parameters are limited and inadequate to assess harm to marine life, bioaccumulation, food chain impacts, and cumulative impacts of past and future PNPS operations. Table H.1, Cancer Risks. These existing reports may serve as a partial picture of the extent of past and potential future effects of radiological releases on ESA-listed species and habitat, but they are insufficient to form the basis of a biological assessment under the ESA § 7 or a NMFS concurrence on the BAs.

NMFS should also assess whether algae such as Irish Moss in the PNPS vicinity has accumulated the radioactive isotope iodine 131, which may well be found, given the high propensity of a similar species, underwater kelp, to accumulate iodine.[10] Adult green turns eat seaweed and algae, which could include Irish Moss. [11]

In sum, NMFS should assess whether 40 years of radioactive effluent releases from PNPS to the Bay via multiple routes (point source discharge, groundwater flow, and air deposition from daily radiation emissions) have bio-accumulated in the marine environment, and/or whether they may be adversely effecting the species and habitat themselves. NMFS itself should actually look at the PNPS monitoring reports to get available information on radionuclide releases including the release quantities of specific radionuclides, method of release (i.e. continuous or batch); time of release; and local

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[9] http://enenews.com/yomiuri-cesium-134-detected-plankton-600km-fukushima-3-months-after-meltdowns-scientists-necessary-look-bioaccumulation/comment-page-1; Marine Benchmark Study on the Possible Impact of the Fukushima Radioactive Releases in the Asia-Pacific Region. http://www.iaea.org/newscenter/news/2012/fukushima1yearon.html

[10] http://www.ecofriend.com/scientists-find-traces-radioactive-contaminants-fukushima-california-kelp-beds.html; Over 112 species of algae were identified at PNPS, with Irish Moss being the dominant subtidal macrophyte in Cape Cod Bay and the chief component of the subtidal flora near PNPS. The PNPS thermal discharge is located in the middle of what was once an Irish moss commercial bed. PNPS EIS, Section 2.2.5.3.5.

[11] http://www.whatdoturtleseatinfo.com/what-do-green-sea-turtles-eat/

meteorological conditions at the time of release. NMFS should assess the quality of data in these reports and identify the pre-operational levels of radiation in the action area. We do not believe it is adequate for ESA § 7 purposes for NMFS to rely on the NRC staff review of only 5 years worth of data, summary reports that are not readily available, and the NRC "generic" EIS on radioactive releases to the environment. There should be a site specific assessment of the effect of 40 years and the future discharges of liquid radioactive effluent releases into Cape Cod Bay from PNPS in order to determine whether these discharges are likely to adversely effect ESA-listed species and/or critical habitat.

Impacts on ESA-listed species from severe accidental radiological releases like at Fukushima

PNPS shares design features with the Fukushima reactors, and shares all the design defects of the GE Mark I.[12]

The Fukushima disaster shows that a severe reactor and/or spent fuel accident is significantly more likely than was estimated or assumed in the 2007 PNPS EIS. *Compare*, PNPS EIS, Section 5.0, Environmental Impacts of Postulated Accidents, to challenges filed by Massachusetts Attorney General to PNPS EIS SAMA analysis, available in the NRC Adams reading room. The Thompson Report describes the "occurrence of a large, offsite radiological impact from operation of PNPS that would involve a release to the environment of a substantial amount of radioactive material." Part of the release to the environment would be "an open pathway from the damaged fuel to the plant's environment (atmosphere, ocean, groundwater, etc.)" *Id.,* p. 14.

We request that NMFS consider all of the information in the Thompson Report and the contentions by the Massachusetts Attorney General's office as they relate to the effects on ESA-listed species and critical habitat from a severe accidental radiological release at PNPS.

Thermal Backwashes and Biocides

According to the PNPS EIS, biocide wastes are produced while controlling the pH in the coolant, controlling scale and corrosion, and in cleaning the main condenser. PNPS Section 2.1.5. The PNPS EIS did not assess the cumulative impacts to the environment of 40 years of use of this biocide, or the future cumulative impacts. Instead, it relied on the NRC's generic environmental impact statement on this issue, since discharge of biocides is a "Category I" issue under the NRC NEPA regulations. The NRC staff looked only at April 2005 to March 2006 discharge monitoring reports[13] and then

[12] Institute for Resource and Security Studies, "New and Significant Information from the Fukushima Daiichi Accident in the Context of Future Operation of the Pilgrim Nuclear Power Plant, by Gordon R. Thompson, June 1, 2011, a report for the Office of the Attorney General of the Commonwealth of Massachusetts (Thompson Report) p. 9-10. Available at: http://pbadupws.nrc.gov/docs/ML1115/ML111530339.pdf

[13] These reports are not electronically available to the public; rather to our knowledge they can only be obtained by physically going to EPA Region I headquarters and making photocopies.

concluded that there are no "significant impacts of discharge of chlorine or other biocides" during the relicensing period. *Id.* This assessment is entirely inadequate for purposes of determining whether relicensing is likely to adversely effect ESA-listed species and/or critical habitat. The PNPS EIS fails to identify the type of biocide being used, fails to look at the cumulative impacts of 60 years of discharging the biocide to Cape Cod Bay (i.e. 40 years past and 20 years future), fails to provide any information about the environmental toxicity of the biocide, and fails to address bioaccumulation. In addition, it is possible that ESA-species in the vicinity could come in contact with the biocide effluent and be harmed. NMFS should address fully the cumulative impact of biocide use, including toxicity and bioaccumulation.

According to the PNPS EIS, Entergy uses sodium thiosulfate for backwashes. It is "added to the wash water to remove chlorine and protect organism returned to the intake embayment." NMFS should examine the environmental toxicity of the discharges of sodium thiosulfate and the past and future cumulative impacts to determine whether its use can effect ESA-species and/or habitat. Some information on EPA's assessment of sodium thiosulfate is available at 66 Fed. Reg. 65850 (Dec. 21, 2001) however, this information is limited and further investigation is warranted.

Sea Turtles

The NRC staff statements and conclusions about effects on endangered sea turtles are contradictory, unsupported by scientific data, and unlawfully focused narrowly on simply whether or not Entergy has ever reported an impingement of a sea turtle at PNPS. We address several points here. First, Entergy's claims that sea turtles have never been impinged or seen in the vicinity of PNPS are unreliable, for reasons described below. Second, the ESA § 7 process does not allow NMFS to rely solely on Entergy and NRC claims of no impinged turtles to conclude that they are not likely to be adversely impacted. Instead, NMFS must assess all of the *cumulative effects*, the *destruction or adverse modification,* and the e*ffects of the action* as these are described by ESA regulations. This includes food, effects of climate change, and other factors as described here. Third, the analysis is not just a simplistic assessment of number of turtles that may or may not be impinged. *See, e.g.* Gifford Pinochet Task Force v. U.S. Fish and Wildlife Service, 378 F.3d 1059, 1066 remanded on other grounds, 387 F. 3d 968 (9th Cir. 2004).

Effects on turtles must be assessed in the context of the Cape Cod Bay ecosystem. According to NOAA, the general water flow of Cape Cod Bay "is counter-clockwise, running from the Gulf of Maine south *into the western half of CCB, over to eastern CCB"* (emphasis added) (NOAA 1994).[14] Turtle Journal, an organization devoted to the protection of sea turtles, refers to Cape Cod Bay as a "Marine Stranding Hotspot."[15] Mass

[14] http://www.mwra.state.ma.us/harbor/enquad/pdf/ms-085_04.pdf, Fig 4-1 (with reference) illustrates Cape Cod Bay circulation.

[15] In the Great White North of Cape Cod, the sea turtle stranding season arrives each year as frost begins to form on the pumpkins. Juvenile tropical and semi-tropical sea turtles hunker in Cape Cod Bay as the season turns colder, water temperatures drop and they're cued to head south to warmer climes. Unfortunately, these turtles become trapped in bay waters as the Atlantic Ocean temperature drops more

Audubon has participated in a ***turtle stranding program*** in Cape Cod Bay inconjunction with the New England Aquarium since 1979, and has kept records on the number of turtles stranded in Cape Cod Bay every winter. MassAudubon records show that loggerhead, green, and Kemp's Ridley turtles have been stranded, primarily in Dennis and Brewster at the southern edge of Cape Cod Bay. [16] Nearly two hundred Kemp's Ridleys have been stranded annually in the past two years. We are in the process of obtaining data that ***leatherback turtles*** have been found entangled in fishing gear in the Plymouth area, showing that they are also documented to be present near PNPS. We request the opportunity submit this information to NMFS within the next week.

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quickly to temperatures at which they cannot function. They are faced with a wall of cold ocean water and locked into Cape Cod Bay with no escape. Eventually bay water, too, reaches critical temperature and these turtles become cold-stunned and strand on bayside beaches usually beginning in early November with the lightest massed turtles (Kemp's Ridleys) and proceeding through the season to heavier massed turtles (loggerheads) in December. The hook of Cape Cod, an accident of the Laurentide glacial retreat, has become a huge geological trap and a global stranding hotspot for all marine animals from sea turtles to seals and marine mammals. See also, New England Aquarium website, "The majority of sea turtles that are treated at NEAQ come from annual cold stun stranding events on Cape Cod, Massachusetts, USA. Each fall and winter, juvenile and sub-adult sea turtles strand on Cape Cod beaches after experiencing cold-stunning. Cold stunning, or hypothermia, in sea turtles is thought to occur when the water temperature quickly drops below 50 degrees F (10 degrees C). Sudden cooling of ocean water temperatures leaves the turtles torpid and floating at the surface, unable to swim or dive, and allows them to be tossed by strong sustained storm winds onto the windward shore. Since the 1980s, NEAQ has worked with the Massachusetts Audubon Society's Wellfleet Bay Wildlife Sanctuary to save these threatened and endangered species."

[16] http://www.massaudubon.org/PDF/sanctuaries/wellfleet/seaturtles/seaturtlestrandings2010.pdf; See also http://www.neaq.org/conservation_and_research/projects/conservation_medicine/rescue_and_rehabilitation/learn_about_rescue_and_rehabilitation/animal_strandings/sea_turtle_stranding

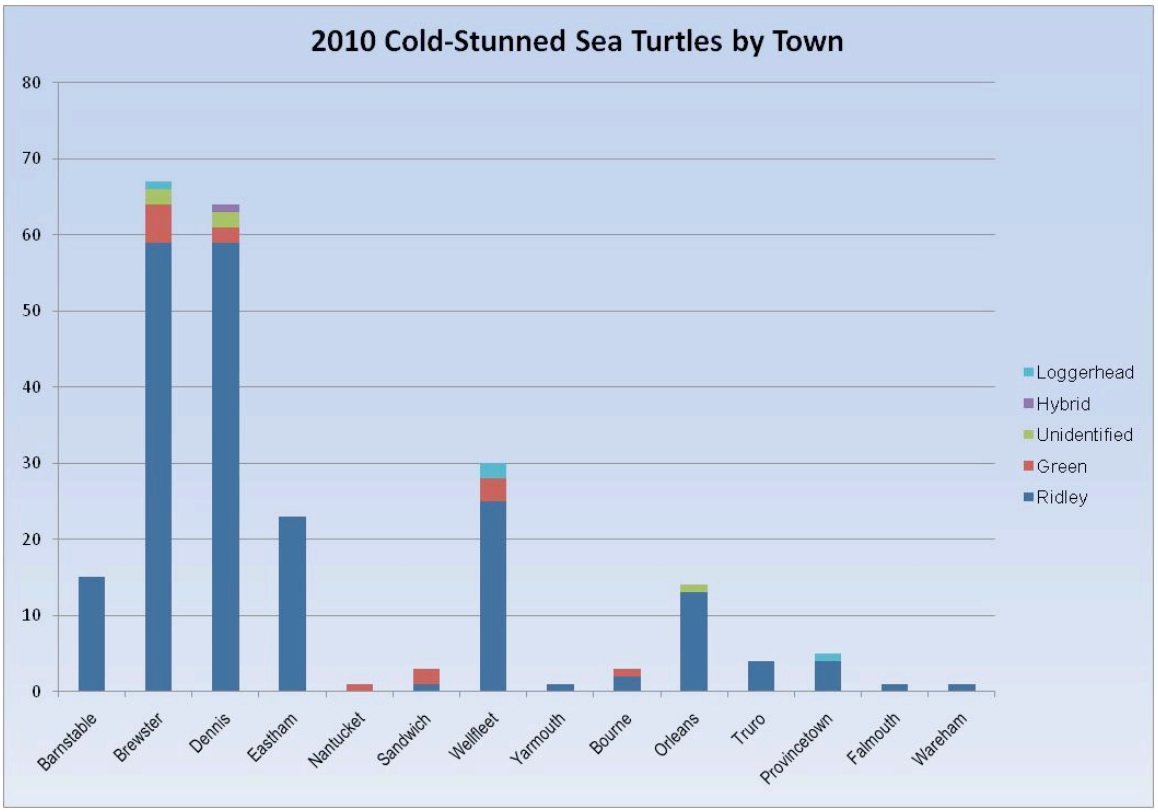

Chart from Mass Audubon

We request that NMFS address the possibility that sea turtles are drifting on currents into the western half of CCB, and encountering the ***thermal plume*** from PNPS, including the periodic thermal backwashes permitted under Entergy's NPDES permit.[17] NMFS should also address whether sea turtles which may encounter the thermal plumes later become cold stunned and strand on beaches to the south of PNPS when they drift out of the plume. The data about sea turtle strandings on Cape Cod should be acknowledged and considered, not merely referred to in passing as is done in the 2006 BA.

Extensive data documents sea turtle impingement and entrainment in CWIS at power stations like Entergy's. Indeed, NMFS' 2005 letter to Entergy states,

> It is the understanding of NMFS that there have been no interactions or impingements of sea turtles at PNPS during the past 30 years of monitoring at PNPS. <u>However, since the entrainment and impingement of sea turtles at several nuclear power plants on the East Coast has been documented, and as sea turtles may be seasonally present in the vicinity of the intakes associated with the PNPS, NMFS recommends that this impact</u>

[17] PNPS's NPDES permit allows a maximum daily discharge of 120 F degrees during thermal backwashes for bio-fouling control, three hours per day, two times a week.

be fully addressed in the application being prepared. (emphasis supplied)

See, PNPS EIS, p. E-6 of Appdx E: March 4, 2005 Letter from NMFS to Steven Bethay, Entergy.

The 1990 book, *Decline of the Sea Turtles: Causes and Prevention* by the National Academy of Sciences, Table 6-2 points out that ***from 5 to 50 Kemp's Ridley and 5 to 50 Loggerheads are fatally entrained in U.S. power plants each year.*** Few data are available for power plants in the Northeast, although sea turtles have been reported killed at the Oyster Creek, NJ and Seabrook, NH nuclear stations. We question whether, since endangered sea turtles are present in the Gulf of Maine north of PNPS at Seabrook, and south at Oyster Creek, there is a reasonable basis, without further investigation, to conclude that PNPS operations are not likely to adversely effect endangered turtles.

In January 2004, the report, *Threatened and Endangered Species Evaluation for Operating Commercial Nuclear Generating Plants,* was prepared for the US. Department of Energy by Pacific Northwest National Laboratory. It addresses the ESA and its significance to licensing by the NRC, and reevaluates 38 of 75 nuclear facilities originally assessed for their impact on endangered species in 1997. The tables in Appendix A to the Report evaluate the presence of endangered species in each of the 38 facilities. ***Endangered sea turtles were either found or indicated to be "probably" present near each of the coastal nuclear facilities reviewed.***

The "NOAA Fisheries Service: Protected Resources Division" website describes a "stranding network" and presents a "sea turtle recovery plan" for each endangered turtle species, jointly administered with USFWS.[18] Although this recovery plan focuses primarily on nesting sites, it acknowledges the Atlantic population of Kemp's Ridley, carried northward by the Gulf Stream, and the impact of power plant entrainment:

> *Industrial Plant Intake and Entrainment*
>
> Kemp's Ridleys have been documented to be taken during power plant operations generally as a result of entrainment in or impingement on the intake structures that transport water to cool plant condensers and auxiliary systems. Intake structures include bar racks, traveling screens, and seawater pump components. Water is drawn from the intake canal through the bar racks, through the traveling screens, and into the pumps. Intake bar racks prevent trash and large debris suspended in the seawater from entering the intake structure. Entrapment in the intake canal can result in direct negative impacts on turtles in a number of ways:

[18] See, e.g. the *Kemp's Ridley Bi-National Recovery Plan* at **http://www.nero.noaa.gov/prot_res/stranding/stssn.html**; See also, http://www.smithsonianmag.com/science-nature/Saving-the-Worlds-Most-Endangered-Sea-Turtle.html

> drowning in the intake pipes, injury sustained in the pipes and the canal, debilitation of condition due to long entrapment, exposure to predators in the intake canal, injury and stress sustained during capture, and impingement and drowning in barrier nets and on the intake racks.
>
> Under Section 7 of the ESA, NMFS has consulted with the Nuclear Regulatory Commission on the activities of five power plants in the Atlantic Ocean and the possible impacts on sea turtles. St. Lucie Power Plant on Hutchinson Island, Florida, has documented over 6,000 sea turtles entrapped at their intake canal between 1976 through 1999 (NMFS 2001b). Less than 40 of these were Kemp's Ridleys. The majority of turtles entering the canal are in good condition and few die (3.0%) as a result of extensive efforts to capture and safely release entrained turtles on a daily basis. Operations at the Brunswick, North Carolina, power plant resulted in 101 live and 22 lethal sea turtle takes from 1986 through 1996. Of these takes, 5 live and 1 lethal take were Kemp's Ridleys (NMFS 2000). In 1998, the Crystal River Energy Complex, located adjacent to the Cedar Keys, Florida, foraging grounds, documented a total of 40 sea turtles entrapped, of which 37 were Kemp's Ridleys (NMFS 2002b). In ***New Jersey, Oyster Creek Nuclear Generating Station has documented 28 (8 lethal) Kemp's Ridley takes since 2000*** (NMFS 2005b*). BiNational Plan at I-60*

By contrast to those situations where the presence of sea turtles at power stations has been acknowledged and a protection plan prepared, with limited incidental takes allowed, there has been no real assessment of the impacts of PNPS on sea turtles, because there has been ***no acknowledgement of the potential impacts of these endangered species by PNPS*** and no Biological Opinion has been prepared. *See and compare* the 76-page analysis and turtle rescue plan attached to the Biological Opinion prepared by NOAA dated November 21, 2006 for Oyster Creek, NJ nuclear generating station, which used a 50-mile radius from the nuclear power station to assess potential turtle impacts.

Another useful comparison between NMFS actions to date regarding PNPS and other nuclear stations is the Seabrook nuclear station.[19] A 2004 fact sheet on proposed regulations for CWIS prepared by the EPA also acknowledged the impact on sea turtles of once-through cooling systems at power facilities:

> The withdrawal of cooling water from waters of the U.S. harms billions of aquatic organisms each year, including fish, fish larvae and eggs, crustaceans, shellfish, sea turtles, and marine mammals.[20]

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[19] August 5, 2010 letter from NOAA to NRC, Bo Pham, Chief, NRC, Division of License Renewal, NRC, from NMFS, Patricia Kurkel, Regional Administrator.

[20] http://water.epa.gov/lawsregs/lawsguidance/cwa/316b/phase3/ph3-propose

EPA's Clean Water Act Section 316 guidance on Economic Assessments also acknowledges the potential impact on sea turtles and other species from power facilities.[21]

Pollution and climate change are identified as threats to endangered turtles by Oceana. [22] Among the findings in an Ocean report is that evidence is growing that changes in temperature due to climate change shift critical life events in many species, including their breeding, feeding, and migration cycles. [23]

Ocean acidification is predicted to harm the turtles' shells and the supply of crusteans and mollusks which play a large part in the ***loggerhead sea turtle diet***. The Oceana report states that ocean acidification could leave some vital elements in the sea turtle diet more vulnerable to predation by other species, lower rates of population survival, and diminish biodiversity of the ecoystem. Id., p. 7.

A report by Stratus Consulting, "Habitat-Based Replacement Costs: An Ecological Valuation of the Benefits of Minimizing Impingement and Entrainment of the Cooling Water Intake Structure of the Pilgrim Nuclear Power Generating Station in Plymouth, Massachusetts, February 5, 2002, states that ***PNPS destroys 160 billion blue mussels per year, and 460,000 fish comprising 13 species***. P. 4-85.

NMFS should assess the ***diet of sea turtles*** in Cape Cod Bay, and whether they may feed on blue mussels or other species which are destroyed by PNPS. If so, NMFS should

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[21] *See*, Section 316b EPA Chapter 11 for New Facilities CWIS I&E Impacts and Potential Benefits. "The potential for I&E in coastal areas can be quite high, not only because CWIS are located in the productive areas over the continental shelf where many species reproduce, but also because near shore areas within bays, estuaries, wetlands, or coastal rivers provide nursery habitat. In addition, the early life stages of many species are planktonic, and tides and currents can carry these organisms over large areas. The abundance of plankton in temperate regions is seasonal, with greater numbers in spring and summer and fewer numbers in winter.
An additional concern for CWIS in coastal areas pertains to the presence of marine mammals and reptiles, including threatened and endangered species of sea turtles. These species are known to enter submerged offshore CWIS and can drown once inside the intake tunnel…"

[22] http://oceana.org/en/our-work/protect-marine-wildlife/sea-turtles/overview.

[23] "…increasing ocean temperatures, together with the addition of significant amounts of fresh water from melting ice caps and glacier, may disrupt ocean current patterns and break down the marine food web. Sea turtles depend on ocean currents throughout their life. Juvenile sea turtles journey across ocean basins, sometimes swimming with currents, in search of productive feeding grounds. Young adults move through coastal areas, migrating thousands of miles to feed in open-ocean pelagic waters in search of ocean fronts, upwelling zones, and eddies where their food is concentrated….There is growing evidence that climate change will change ocean currents. With any changes in ocean circulation, either through oceans heat content or atmospheric cycles, sea turtles may also have to alter their movements and possibly even shift their range, along with the timing of their nesting." Oceana report, 2007, p. 6, *Climate Change and Commercial Fishing: A One-Two Punch for Sea Turtles*, available at http://oceana.org/sites/default/files/reports/Turtles_and_Climate_final1.pdf (last visited April 10, 2012).

evaluate whether PNPS' destruction of 160 billion blue mussels per year, combined with other factors including climate change, is likely to effect sea turtles and to what degree.

Kemp's ridleys turtles eat species of crabs, shrimp, clams, and sea urchins.[24] Juvenile loggerhead turtles eat mostly bottom dwelling invertebrates.[25] NMFS should assess whether Kemp's ridleys were attracted to the vicinity of PNPS for food, such as mussels, which are being destroyed on an annual basis by PNPS.

Green turtles may be attracted to the vicinity of PNPS to eat Irish Moss.

NMFS should also assess the role that sea turtles play in the ***ecosystem***. For example, sea turtles feed on jellyfish in the Chesapeake Bay; jellyfish in turn feed on fish larvae. Id. p. 7. Leatherback turtles main diet is jellyfish. [26] NMFS should assess whether there is a similar ecosystem role that the turtles play in Cape Cod Bay that would be affected by PNPS.

Entergy has stopped using ***barrier nets*** in the discharge channel. PNPS EIS, p. 4-8 states, "the fish barrier net has been removed from the discharge channel and is currently stored on site."[27] The absence of a barrier net over the discharge channel, where thermally heated effluent – sometimes up to 120F - is discharged, may well pose a risk to sea turtles. Moreover, if a turtle were in the discharge channel during a thermal backwash, any turtle in the discharge canal could be harmed by the superheated water and bio-fouling agents.

The PNPS CWA NPDES permit, nor any other regulatory permit at PNPS mandates ***notifications or reporting of impacts*** to either sea turtles or marine mammals. It is not evident that PNPS personnel have been instructed or trained to identify and report the presence of sea turtles in the intake channel and discharge locations at PNPS. Other power stations have been required to put up posters and conduct training on ESA-listed species as NMFS has required at other power stations. Therefore, Entergy's claims that there have been no "reports" of sea turtles "in the vicinity" of PNPS lack credibility.

The 2006 BA contains contradictory statements. For example, it states that "no Federally endangered or threatened species have ever been observed in Cape Cod Bay near PNPS, or in the intake and discharge areas, during the duration of these studies." The BA does not identify which studies it is relying upon. A small loggerhead turtle was stranded on Priscilla Beach about .63 miles south of PNPS in November 2003, according to the PNPS

[24] http://wwf.panda.org/what_we_do/endangered_species/marine_turtles/kemps_ridley_turtle/

[25] http://www.nmfs.noaa.gov/pr/pdfs/education/kids_times_turtle_loggerhead.pdf

[26] http://www.vanaqua.org/learn/aquafacts/reptiles/leatherback-turtles

[27] This is contrary to the PNPS NPDES permit, which originally required that the barrier net be maintained at all times. Te permit was later modified to require the barrier net from April to November during fish migration. We have found no authority for Entergy to unilaterally decline to comply with the permit condition requiring a barrier net over the discharge channel on a seasonal basis.

EIS. We request that NMFS investigate this stranding to determine whether this turtle could have been cold stunned after being in the thermal plume at PNPS, and whether a thermal backwash occurred and what the temperatures were. We also request that NMFS provide source data for this stranding report.

NMFS should assess how PNPS' operations may effect the ocean currents that sea turtles use in Cape Cod Bay for the functions of migration and feeding, and determine whether, combined with climate change, this would cause the turtles to shift their range and/or the timing of their nesting.

In sum, the high potential for nuclear generating facilities to harm endangered sea turtles has been well-documented by NOAA and acknowledged by EPA. We respectfully but strongly request that NMFS consider this and other scientific and commercially available data in its ESA § 7 consultation regarding PNPS.

Climate Change

We request that NMFS assess the impacts of climate change on Cape Cod Bay, including changes in salinity, acidification, and temperature as part of its ESA § 7 consultation. NMFS should take into account data predicting the future impacts on ESA-listed species over the 20 year relicense period from climate change and resultant changes in ocean salinity, acidification, and temperature, and the impacts on the local food web, from these changes. A few of the host of current information and resources on this subject are provided:

Science Magazine, 2012 report that ocean acidification is the worst in 300 million years. Hoenisch, B. *et al*., "The Geological Record of Ocean Acidification," http://academiccommons.columbia.edu/item/ac:145564

Hansen, J. et. all, *Public Perception of Climate Change and the New Climate Dice*, http://arxiv.org/ftp/arxiv/papers/1204/1204.1286.pdf. According to Dr. Hansen, the report shows more frequent weather anomolies, and "Summer anomalies over land are the most important, as discussed in the paper. Averaged over a decade the frequency distribution of seasonal mean temperature anomalies is shifting rapidly toward more extreme hot anomalies, and the distribution is becoming broader (greater extremes). Because the planet is out of energy balance, we can conclude that next decade the distribution will be shifted even further to the right."

U.S. Global Change Research Program, U. *S. National Assessment, New England Regional Assessment, Chapter 6, Climate Impacts on Regional Water*. http://www.globalchange.gov/publications/reports/scientific-assessments/first-national-assessment/606

Fuentes, M. and Hawkes, L., *How Will Sea Turtles Cope with Climate Change*, http://seaturtlestatus.org/sites/swot/files/report/033111_SWOT6_p12-13_Climate%20Change.pdf

Fish as Food Supply for Whales

The food supply for whales that eat schooling fish such as smelt, river herring, and menhaden should be assessed in far greater detail than the ***superficial survey in the PNPS EIS which merely catalogues the numbers of fish that Entergy reported it killed up to 2005***. It does not assess greater food web or ecosystem impacts.

As an example, Entergy's own data reported in its monitoring reports shows the following entrainment impacts from 2000 to 2009:

In 2000, there were 1,700,000 winter flounder eggs and 5,600,000 larvae entrained. During 2001 4,200,000 Atlantic cod larvae were entrained. Winter flounder impingement and entrainment accounted for 27,500 fatalities in 2001, 19,100 deaths in 2002, 3,300 fatalities in 2003, 48,000 mortalities in 2004 and 43,000 deaths in 2005. In 2003 2,000,000 winter flounder eggs and 4,200,000 larvae were entrained. Entrainment in 2007 destroyed 97,000,000 Atlantic mackerel eggs and 6,500,000 larvae, 8,300,000 Atlantic menhaden eggs and 17,500,000 larvae, 6,300,000 Atlantic cod eggs and 1,400,000 larvae, 126,000 winter flounder eggs and 8,600,000 larvae and 341,000 Atlantic herring larvae. In 2008, 1,200,000 winter flounder eggs and 12,000,000 larvae were mortalized. During 2009, 636,000 winter flounder eggs and 11,800,000 larvae were lost.

These are only a few of the 13 species that the Stratus report identifies as being destroyed by PNPS CWIS operations.

We request that you consider the following sources a s well as other broadly available other scientific and commercial data:

JRWA February 6, 2012 letter to NMFS re: facts about PNPS fish kills, including about 300,000 menhaden in 2005, and the listing of river herring as a candidate species under the ESA.

Little Fish Big Impacts, Managing a crucial link in ocean food webs, A report from the Lenfest Forage Fish Task Force, April 2012. http://www.oceanconservationscience.org/foragefish/files/Little%20Fish,%20Big%20Impact.pdf

Rainbow Smelt (Osemerus mordax) are a NOAA Species of Concern, See Fact Sheet, 3/16/2007 (stating that in the last 15 to 20 years there has been a region wide trend in declining smelt populations in Massachusetts Bay.)

Mass Div. of Marine Fisheries, Technical Report TR-30, Rainbow smelt spawning habitat in the Gulf of Main coast of Massachusetts, Chase, B.C., Mass DMF, Dec. 2006.

Plankton

The PNPS EIS states, "However, based upon the review conducted by the NRC staff, there is no evidence that the operation of the PNPS cooling system has had an impact on phytoplankton or zooplankton communities, or any resultant effects on the aquatic food

web, in Cape Cod Bay." The PNPS EIS relies on the NRC's generic EIS for assessing impacts on plankton, and there is no site-specific plankton data referenced in the PNPS EIS, beyond the pre-operational plankton study referred to. PNPS EIS, Section 4.1, p. 4-6. ***The only plankton data we have seen cited this over 40 years old*, *and this data is not publicly available.***

Plankton are important for many reasons, including because it is the base of food chain and direct food source for baleen whale such as the right whale.[28] NMFS should identify any plankton studies or data that are the basis for the conclusions for its decisions on the 2006 and 2012 BAs. If NMFS is going to rely upon the decades old plankton studies by PNPS, we request that they be made publicly available.

We further note that Entergy itself acknowledges that impacting plankton could effect endangered whales. Entergy official Jacob "Jay" Scheffer opines in his 2005 email, ***"The only way that Pilgrim could possibly impact these [endangered whale species] would be through impacting their food source (plankton) by entrainment***….The impact of the station's cooling system on the Cape Cod Bay ecosystem is insignificant." (emphasis supplied) Exhibit 1 hereto. Thus, even Entergy acknowledges that its operations could impact ESA-listed whales. Since there is no recent plankton data cited in the PNPS EIS or BAs, it is obvious that Scheffer's conclusion is unreliable.

References relied upon for the BA and PNPS EIS are being withheld from the public as CBI

While not necessarily NMFS responsibility, a major flaw with the 2006 and 2012 BAs is that ***references relied upon by the NRC Staff for its findings in the PNPS EIS and consequently the BAs are not publicly available.*** This includes the 2000 ENSR 316 demonstration report cited throughout the PNPS EIS. On March 27, 2012, we requested 4 documents from the NRC Staff that are cited as references in the PNPS EIS. As of the date of this letter, we have not received the documents. These documents are:

1. ENSR Corp. 2000, redacted version, 316 Demonstration Report-PNPS, prepared by Entergy, March 2000.

2. Entergy 2006d "Environmental Reviews and Evaluations" EN-EV-115, May 2, 2006

3. Stone and Webster Engineering Corp., 1975 316 Demonstration, Pilgrim Nuclear Power Station-Units 1 and 2. Prepared for Boston Edison Co., Boston MA

4. Stone and Webster Engineering Corp., 1977 Supplemental Assessment in Support of the 316 Demonstration, Pilgrim Nuclear Power Station-Units 1 and 2, prepared for

[28] See also, July, 2010: Nature News: "Ocean greenery under warming stress,", citing, Boyce, D., Lewis, M. & Worm, B. "Nature" 466, 591-596 (2010) and Behrenfeld, M. et al., Nature 444, 752-755 (2006). http://www.nature.com/news/2010/100728/full/news.2010.379.html

Boston Edison Company, Boston MA

If NMFS intends to rely upon these 4 documents for its ESA § 7 determination, we request that these documents be made publicly available and that they be addressed specifically.

Marine Mammal Protection Act

Although not related to the ESA, we request that NMFS assess the potential impact to marine mammals from PNPS. Species protected by the Marine Mammal Protection Act, 16 U.S.C. §§ 1371-1421h, are present in the vicinity of the PNPS. These include a number of dolphin species, pinnipeds, harbor porpoises and large whales. All of these may be impacted by the thermal discharges as well as by the discharges of biocides, chlorine and radioactive elements. There is a large body of scientific and commercially available data documenting the presence of these species near PNPS.

River Herring

Based on your March 26, 2012 letter, it appears that NMFS plans to ignore its own policy which directs the agency to consider candidate species when making natural resource decisions and in informal consultations and conferences.[29] We urge NMFS to confer with NRC on the river herring, as well as on the proposed expansion of critical habitat for North Atlantic Right Whale in the Gulf of Maine.

Thank you for considering this information. Please contact Meg Sheehan, 508 259 9154, or meg@ecolaw.biz if you have any questions.

Very truly yours,

Signed electronically

Margaret Sheehan, Esq.

Anne Bingham, Esq.

[29] *See* "Endangered Species Consultation Handbook, *Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act,* U.S. Fish & Wildlife Service, National Marine Fisheries Service (March 1998) available at httt://www.nmfs.nooa.gov/pr/pdfs/laws/esa_section7_handbook.pdf. NMFS Consultation Handbookpp. 31, 3-1, and 6-1.

Enclosures:
Exhibit 1 - Email from Schaffer, 2005
Exhibit 2 – June 3, 1999 Letter from Boston Edison to EPA
Affidavits of: Pine duBois, 3/6/2012, Alex Mansfield (2), dated 3/6/2012 and 3/26/12
Affidavit of Anne Bingham, Esq.
Letter to MassCZM, April 4, 2012 (incorporated by reference herein)
MassDPH Testing Summary, March 2012 (incorporated by reference herein)
Risk and Risk-Reducing Options Associated with Pool Storage of Spent Nuclear Fuel at the Pilgrim and Vermont Yankee Nuclear Power Plants, by Gordon R. Thompson, May 25, 2006 (incorporated by reference herein)
Report to the Massachusetts Attorney General on the Potential Consequences of A Spent-Fuel Fire At The Pilgrim or Vermont Yankee Nuclear Plant, Jan Beyea, PhD, May 25, 2006. (incorporated by reference herein)

cc:
Massachusetts Office of Coastal Zone Management
Whale and Dolphin Conservation Society
Provincetown Center for Coastal Studies
Mass DEP
U.S. EPA, Region 1
Conservation Law Office
Rep. Edward Markey
New England Aquarium